SIEMENS

APOGEE BACnet ALN Field Panel
User's Manual

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How to Use This Manual

This manual is for users of APOGEE building control systems that use the Human-Machine Interface (HMI) to command, configure, and monitor field panels.

How this Manual Is Organized

This manual contains the following sections in the following order:

How to Use this Manual provides an overview of the manual and explains field panel software conventions and the documentation conventions used throughout the manual.

Chapter 1—**The Operator Interface** explains how to use the common functions of the Human Machine Interface (HMI).

Chapter 2—**System Setup** describes the viewing and setup of system-related parameters.

Chapter 3—**User Accounts** describes the attributes and functions of user accounts.

Chapter 4—**Point Database** describes points, their characteristics, and the procedures that are used to add, view, modify, and delete them.

Chapter 5—**P1 FLN Devices** describes the uses of P1 Field Level Network (FLN) applications and devices.

Chapter 6—**MS/TP FLN and BACnet/IP Devices** describes the interaction and functionality between BACnet capable Compact controllers and MS/TP (FLN) devices.

Chapter 7—**Alarm Management** describes alarming functions.

Chapter 8—**License Management** describes the concept of field panel licenses, and how they are added.

Chapter 9—**Trending** describes the setup and function of trending points.

Chapter 10—**PPCL Editor** describes editing of the Powers Process Control Language (PPCL).

Chapter 11—**Peak Demand Limiting** describes the use and function of Peak Demand Limiting (PDL).

Appendix A—**Point Types** contains samples of entering each point type into the system.

Appendix B—**Default State Text Table** Listing contains a list of the default state text tables.

Appendix C—**Error Message Types** contains a list of all the error messages in the system.

Appendix D—**BACnet/IP Pre-defined Engineering Units** contains a list of pre-defined engineering units accepted by BACnet/IP.

Appendix E—**Transition to APOGEE BACnet®** describes the BACnet functionality designed into the APOGEE Automation system.

Prerequisites

In addition to this user's manual, you should also be familiar with the following documentation:

- APOGEE Powers Process Control Language (PPCL) User's Manual (125-1896), describes the Powers Process Control Language (PPCL) used to write the control programs.
- APOGEE Wiring Guidelines for Field Panels and Equipment Controllers (125-3002), describes general wiring requirements for installation and communications wiring guidelines for various network systems and equipment.

- PXC Modular Series Owner's Manual (125-3582), describes the operation of PXC Modular Controllers.
- PXC Compact Series Owner's Manual (553-104), describes the operation of PXC Compact Controllers.

Symbols Used in this Manual

The following table lists the safety symbols used in this manual to draw attention to important information.

Symbol	Meaning	Description
NOTICE	CAUTION	Equipment damage may occur if a procedure or instruction is not followed as specified. (For online documentation, the NOTICE displays in white with a blue background.)
	CAUTION	Minor or moderate injury may occur if a procedure or instruction is not followed as specified.
	WARNING	Personal injury or property damage may occur if a procedure or instruction is not followed as specified.
	DANGER	Electric shock, death, or severe property damage may occur if a procedure or instruction is not followed as specified.

Document Conventions

The following table lists conventions to help you use this manual in a quick and efficient manner.

Convention	Examples
Numbered Lists (1, 2, 3…) indicate a procedure with sequential steps.	1. Turn OFF power to the field panel. 2. Turn ON power to the field panel. 3. Contact the local Siemens Industry representative.
Conditions that must be completed or met before beginning a task are designated with a ▹. Intermediate results (what will happen following the execution of a step), are designated with a ⇨. Results, which inform the user that a task was completed successfully, are designated with a ⇨.	▹Composer software is properly installed. ▹A Valid license is available. 1. Select **Start** > **Programs** > **Siemens** > **GMS** > **Composer**. ⇨The Project Management window displays. 2. Open an existing project or create a new one. ⇨The project window displays.
Actions that should be performed are specified in boldface font.	Type **F** for Field panels. Click **OK** to save changes and close the dialog box.
Error and system messages are displayed in Courier New font.	The message `Report Definition successfully renamed` displays in the status bar.

New terms appearing for the first time are italicized.	The field panel continuously executes a user-defined set of instructions called the *control program*.
	This symbol signifies Notes. Notes provide additional information or helpful hints.
Cross references to other information are indicated with an arrow and the page number, enclosed in brackets: [→92]	For more information on creating flowcharts, see Flowcharts [→92].
Placeholders indicate text that can vary based on your selection. Placeholders are specified in bold print, and enclosed with brackets [ ].	Type **A C D H [username] [field panel #].**

Convention	Example
Sample screens and reports are displayed in Courier New font.	Report names and any information presented in screen shots.
New terms appearing for the first time in the manual are italicized.	A background graphic is the basic drawing of the building control system.
Short cut keys are specified as <key> + <key>	Move to previous prompt by pressing **CTRL+L.**
Angle brackets <placeholder> indicate text that can vary based on your selection.	If you select Hours, Days, Weeks or Months from the Time Period list, specify a parameter in the # of <units> box.

Procedures

Field panel procedures are performed by the user to complete specific tasks when working with field panel(s). In this manual, all procedures begin with a brief description and end with a screen shot showing the HMI commands used to execute the procedure.

Most procedures include a special table designed to aid the user in completing the steps. Procedures with fewer steps may be shown in a simplified format.

Example - Simple Procedure

This example shows the simplified procedure format. The procedure does not require additional instructions.

Displaying a Trend Log Report

This procedure allows the selection of points for inclusion in a trend log. If no points are being trended, the report is blank.

To access the report, follow the prompts.

HMI	**P, T, L** (Point, Trend, Log)

Example

```
>Point name : --------------------------------------------

09/15/1997 MON TREND LOG REPORT 08:56pm
--------------------------------------------------------------------------
Search for <*:*>

Point name
:Suffix (Description) Trend every Samples
-------------------------------------------------------------------------
BLD990.AHU01.MAT (MIXED AIR TEMP) Point COV 100
BLD990.AHU01.SAT (SUPPLY AIR TEMP) 2.0 DEG F COV 100
BLD990.AHU01.SFN (SUPPLY FAN) 10 Minutes 10

End of report

>Log, Display, Edit, Quit? –
```

Example - Long Procedure

This procedure contains many steps and requires numerous entries. You may benefit from additional information provided in the table that contains the steps.

Trending a Point by Change of Value (COV)

This procedure adds a point to trending and records data by change of value (COV). Before you start this procedure, determine the points to trend, as well as the maximum number of samples.

To trend a point by COV, complete the following steps:

HMI	**P, T, E, A** (Point, Trend, Edit, Add)

Prompt/Field	Option/Entry	Description
Point name	Type the point name.	
	Type **?**, and then type the point name with wildcard(s).	To query available points. **NOTE:** For ALN points only, type **?**. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list.
	Specify a point range using wildcards.	To *select multiple points for the same trend* **CAUTION:** When wildcards are used for multi point trend addition, the trend add operation occurs globally across the network on every point matching the description. **NOTE:** If you select a multi-point trend, you must verify that you want to perform a multi-point trend by typing **Y** (Yes) at **the Multi point trend. Are you sure (Y/N)** prompt.
COV, Time	C	For COV.

Maximum number of samples	Specify the maximum number of samples you want collected.	**NOTE:** The maximum number of samples limit is 2,500 if trending one point, and 100 if trending two or more points. If you exceed the maximum number of samples, the prompt displays again.
Trend log instance number	Type a BACnet object instance number between 0 through 4194303.	Press **ENTER** to automatically assign the next available instance number to this trend log object.
Trend log name	Type a name for the trend log.	Press **ENTER** to automatically assign a name in the following format: APO_<*DeviceInstance*>_TL_<*ObjectInstance*>
Trend log description	Type a description for the trend log.	
Enable start date/time (Y/N)	Y	To set a starting date and time for this trend and then continue with next step.
	N	To start the trend immediately and then proceed to the **Enable stop date/time (Y/N)** prompt.
Start date (MM/DD/YYYY)	Enter a starting date for this trend in the MM/DD/YYYY format	
Start time (HH:MM:SS)	Enter a starting time for this trend in the HH:MM:SS format	
Enable stop date/time (Y/N)	Y	To set an ending date and time for this trend and then continue with next step.
	N	To let the trend run continuously after the starting date/time and then proceed to **Notification threshold count** prompt.
Stop date (MM/DD/YYYY)	Enter an ending date for this trend in the MM/DD/YYYY format.	
Stop time (HH:MM:SS)	Enter an ending time for this trend in the HH:MM:SS format.	
Trend log enabled (Y/N)	Y	Enable trend log.
	N	Disable trend log.
Stop when full (Y/N)	Y	To stop trending once the maximum number of samples is reached.
	N	To continue trending after the log is full by writing over existing trend samples.
Notification threshold count	Type a value between 1 and the maximum number of samples for this trend.	Press **ENTER** to accept the default (80 percent of the maximum number of samples).
Notification class number	Type a value between 0 through 4194302 or press **ENTER** to accept the default (0).	Specify the field panel that will receive the notification threshold alarm. **NOTE:** The Notification Class number must be assigned to a field panel.
Field panel	Press **ENTER**.	Accept the field panel name supplied by the system.
	Type a different field panel name.	Specify the name of the field panel that will store the trend log object **NOTE:** The default field panel location is the field panel that owns the point (or FLN of the device subpoint) to which you are adding the trend.

The message `<Point Name> is now trending by Change-Of-Value successfully in field panel <field panel name>` is displayed.

Example

```
>Point name : ? btec1:*---------------------------------
> 1) BTEC1:CTLR ADDRESS
> 2) BTEC1:APPLICATION
> 3) BTEC1:RMTMP OFFSET
> 4) BTEC1:ROOM TEMP
> 5) BTEC1:HEAT.COOL
> 6) BTEC1:DAY CLG STPT
> 7) BTEC1:DAY HTG STPT
> 8) BTEC1:NGT CLG STPT
> 9) BTEC1:NGT HTG STPT
> 10) BTEC1:RM STPT MIN
> 11) BTEC1:RM STPT MAX
> 12) BTEC1:RM STPT DIAL
> 13) BTEC1:STPT DIAL
> 14) BTEC1:AUX TEMP AI3
> 15) BTEC1:FLOW START
> 16) BTEC1:FLOW END
> 17) BTEC1:WALL SWITCH
> 18) BTEC1:DI OVRD SW
> 19) BTEC1:OVRD TIME
> 20) BTEC1:NGT OVRD
Enter option # or <C> for Cancel> 4-
>Cov, Time : c
>Maximum number of samples : ----
>Trend log instance number : 123----
>Trend log name : abc---------------------------
>Trend log description : def-------------
>Enable start date/time (Y/N) : N
>Enable stop date/time (Y/N) : N
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 4------
>Notification class number : 0------
>Field panel : 7020---
BTEC1:ROOM TEMP is now trending by Change-Of-Value successfully in Field panel
<7020>
>Add, Modify, Copy, Delete, Look, Quit? –
```

Example - Multi-Point Trend Add

```
>Point name : btec*:room temp----------------------------
>Multi point trend. Are you sure (Y/N): y
>Cov, Time : c
>Maximum number of samples : ---
>Enable start date/time (Y/N) : N
>Enable stop date/time (Y/N) : N
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 4------
>Notification class number : 0------
BTEC1:ROOM TEMP is now trending by Change-Of-Value successfully in Field panel
<7020>
BTEC2:ROOM TEMP is now trending by Change-Of-Value successfully in Field panel
<7020>
End of commanding
>Add, Modify, Copy, Delete, Look, Quit? -
```

Field Panel Identifier

The *field panel identifier* is a number or alphanumeric string that uniquely identifies a field panel on the network(s). The format varies according to network type.

When specifying a field panel during a procedure, the correct identifier format must be used.

BACnet field panels use a *device instance number* (0 to 4,194,302)

Reports

Many types of reports can be generated by the system. All share a basic format.

Following is an example of a Trend Log report. The header contains the date stamp, the title of the report, and the timestamp:

```
09/15/1997 MON TREND LOG REPORT 04:42pm
------------------------------------------------------------------------
```

After the header, the criteria used to control the report output displays. In this example, a wildcard was used to search for points.

```
Search for <*:>
```

Following the criteria is the report data header, which identifies the type of data shown. The field panel identifies the subpoints in applications as *suffixes.*

```
Point name
:Suffix (Description) Trend every Samples
-------------------------------------------------------------------------
```

The complete report looks like this:

```
12/01/2003 MON TREND LOG REPORT 04:42pm
-------------------------------------------------------------------------------
Search for <*:*>

Point name
:Suffix (Description) Trend every Samples
-------------------------------------------------------------------------
BLD990.FLR01.RM101.TEC
:ROOM TEMP (RM101 TEC RM TMP) 2.0 DEG F COV 100
5 Minutes 100

End of report
```

To Pause a Report Display

Some reports contain more information than can fit on the screen.

- To pause a report as it scrolls down the screen, press **CTRL+S**.
- Press any key to resume scrolling.

Applications

An application is a control sequence that performs one or more specific control operations. Field panel applications include:

- PPCL programs
- FLN devices
- Equipment scheduling zones

PPCL programs can be applied to functions such as running an air handler, tuning a loop, and controlling duty cycling equipment. These control sequences can reside as individual PPCL programs and be viewed as independent applications, or they can be grouped as parts of one PPCL program and viewed as a single application.

FLN devices provide control according to the program (application) loaded into a particular device. Equipment scheduling provides time-based mode control for specified areas (zones) in a facility.

Applications are different from other system functions, such as trending or point monitoring, because they have specific attributes. Applications:

- Control points and subpoints.
- Maintain a unique set of points/subpoints related to the type of control performed.
- Use specific reports and editors in the field panel interface.

Default Value (DAY.NGT Point)

Many TEC applications have the subpoint DAY.NGT which corresponds to the operating status of the application (whether it is in day mode or night mode). If you query the system for a TEC point log report—without specifying any subpoint(s)—the system returns the value of DAY.NGT. In this way, the status of DAY.NGT represents the default value of the application.

Chapter 1—The Operator Interface

For information about the BACnet Field Panel Web Server and Siemens Launch Pad, see the *BACnet Field Panel Web Server User Guide* (125-3584) and Launch Pad (145-1005).

Chapter 1 explains how to use the common functions of the Human-Machine Interface (HMI) and discusses the following topics:

- Initial System Tasks
  – Displaying the System Time
  – Sending a Message to Another Network Node
  – Logging On to the Network
  – Logging Off the Network
- Accelerator Keys
- Queries
  – Query for Specific Point Type
- Wildcards
  – Examples
  – Commanding Points with Wildcards
  – Using Wildcard Characters in a Query
- BACnet Object Identification

Initial System Tasks

You communicate with a field panel by connecting a terminal or a computer with terminal emulation software to the human-machine interface (HMI) port.

When you first communicate with the field panel, the following menu is displayed:

```
>Time, Message, Cancel, Hello? –
```

The functions available from this menu allow you to display the current system time, send a message to another node on the network, cancel a report, and log on to the field panel.

Displaying the System Time

Use this procedure to verify the current system time and date. Type the letters **T, D** (Time, Display). The field panel number, system time, and system date are displayed.

Example

```
>Time, Message, Cancel, Hello? T
>Display? D
Field panel 22055 15:53:26 12-04-03 WED
```

Sending a Message to Another Network Node

To send a message, type **M**, then the field panel identifier of the device to which you want to send a message, and the message. (68 characters maximum, excluding [ ]*?:")

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? M
```

```
>Send to : 5--------------
>Message : Hi there! This is a message for field panel 5--
Command successful
>Point, Application, Time, Message, Cancel, System, Bye? –

>Time, Message, Cancel, Hello? M
>Send to : 13934-------------------------
>Message : This is a message for field panel 13934-
Command successful
>Time, Message, Cancel, Hello? –
```

Logging on to the Network

To log on, type **H**, the user initials for the account, and password (password keystrokes are not echoed onscreen).

A time-stamped message indicates a successful login. Available functions are based on the user's level of access. User initials, user accounts, and access are described in User Accounts.

Example

```
>Time, Message, Cancel, Hello? H
>Enter user initials : TAS-
>Enter user password : ???------------

14:20:04 07/09/2008 WED Logged on successfully Field panel
<13933>
User: <TAS> <System administrator user account>
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? -
```

Logging Off the Network

To log off, type **B, Y**.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? B
>Are you sure (Y/N) : Y
14:20:04 07/09/2008 WED Logged on successfully Field panel
<13933>
User: <TAS> <System administrator user account>

>Time, Message, Cancel, Hello? –
```

Accelerator Keys

The term *Accelerator Key* is synonymous with keyboard shortcut.

To display a list of shortcuts, type **?** at the HMI main menu:

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye?
```

Accelerator Key Quick Reference		
Task	**Keys**	**Definition**
Next line	**ENTER**	Accept default or selected entry
Previous line	**CTRL+L**	Move to previous prompt
Cancel	**# (SHIFT+3)**	Cancel current operation
Help	**?**	Access user help
Singlewild	**?**	Single character wildcard
Multiwild	*** (SHIFT+8)**	Multiple character wildcard
Home	**CTRL+D**	Move cursor to start of current field
End	**CTRL+F**	Move cursor to end of current field
Cursor left	**CTRL+Q**	Move cursor one character left in current field
Cursor right	**CTRL+W**	Move cursor one character right in current field
Delete left	**CTRL+H**	Delete character to the left of the cursor
Delete right	**CTRL+J**	Delete character to the right of the cursor
Delete to EOL	**CTRL+K**	Delete from current position to end of line
Delete field	**CTRL+U**	Delete current field’s input
Redisplay	**CTRL+R**	Redisplay current line
Toggle overstrike	**CTRL+T**	Toggles the overstrike/insert
Define string	**CTRL+P**	Define string in paste buffer
Insert string	**CTRL+I**	Insert paste buffer at current position
Pause	**CTRL+S**	Pause screen
Resume	**any key**	Resume screen scrolling
Hold alarms	**CTRL+A**	Stop alarms for 30 seconds
Autodial bye	**CTRL+B**	Disconnect from Autodial
Autodial extend	**CTRL+X**	Extend Autodial time out to 20 minutes

Queries

To query the system, type **?** and then press **ENTER**. The system returns the results in the form of a numbered list.

Example

In this example, a query is used at the **Point name** prompt. At the end of this example, the user would type **1** or **2** to select their choice from the list.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? P
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? D
>Value, Total, Priorityarray, Definition, Unresolvedname? T
>Point name : ?-----------------------------------------
1) BLD990.AHU01.RFN
2) BLD990.AHU01.SFN
Enter option # or <C> for Cancel> --
```

Queries can also be used in conjunction with a wildcard character (*).

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? P
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? L
>Point name : ? BLD990.FLR01.ZON*------------------------
1) BLD990.FLR01.ZON:MODE
2) BLD990.FLR01.ZON.OCS
3) BLD990.FLR01.ZON.OHS
4) BLD990.FLR01.ZON.TMP
5) BLD990.FLR01.ZON.VCS
6) BLD990.FLR01.ZON.VHS
Enter option # or <C> for Cancel> --
```

NOTE:
Queries can only display up to 20 items at a time on the screen. If the item you need is not in the list, you can press **ENTER** again to display the next 20 items.

Query for a Specific Point Type

NOTE:
Not all prompts provide a query option.

In some cases, the exact name of a point might be unknown, but another attribute, such as the state or priority, is known. The following example uses a query to display all points in the HAND state:

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? P
```

```
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? D
>Value, Total, Priorityarray, Definition, Unresolvedname? V
>Any, aLarm, Unacked, Hand, Failed, Disabled, Priority, tYpe,
tRouble? H
>Point name : ?-----------------------------------------
1) !MOD220-55:Address
2) BLD990.AHU01.OAD
3) BLD990.AHU01.RFN
4) BLD990.AHU01.SFN
Enter option # or <C> for Cancel> --
```

Wildcards

A wildcard is used to represent one or more characters. Use wildcards when you want to allow any character in their place (for example, during a filename search). Wildcards provide versatility when searching for, displaying, or commanding more than one point. The two wildcard characters available are:

- The asterisk (*), which can represent multiple characters.
- The question mark (?), which represents a single character.

NOTE:
In order for wildcarding to be effective, it is important for a point naming convention to be used consistently throughout the system. Point naming conventions are described in the *Point Database* section.

Wildcard Examples

If used appropriately, wildcards can improve the effectiveness of point displays and commands.

Using the Asterisk Wildcard

To specify all points, enter the following:

```
>Point name : *-----------------------------------------
```

To specify all points starting with `BLD990.AHU01`, enter the following:

```
>Point name : BLD990.AHU01.*----------------------------
```

To specify all points ending with `SENSOR`, enter the following:

```
>Point name : *sensor-----------------------------------
```

Using the Question Mark Wildcard

To specify all outside air damper points in any AHU (such as AHU01 through AHU09), you can type the following:

```
>Point name : AHU??-----------------------------------
```

To specify all day setpoints on seven different floors in building 12 (such as BLD12.FLR05.DAYSP), you can type something like the following:

```
>Point name : BLD12.FLR0?.DAYSP--------------------------
```

Commanding Points with Wildcards

CAUTION

Exercise caution when using wildcards.

An incorrectly specified wildcard operation can affect points globally across the network and may cause serious unintended consequences.

In some cases, a wildcard command can save time. For example, when the points in a field panel have been configured, all those points can be released to NONE priority using a wildcard.

Using Wildcard Characters in a Query

Queries and wildcards are mixed together to further define points to display or command. Enter the query character **?**, followed by a space, followed by the wildcard character(s).

Example

The following query will display all points ending with “TEMP”:

```
>Point name : ? *TEMP-----------------------------------
```

BACnet Object Identification

What is a BACnet Object?

A BACnet object is a set of properties, behaviors and requirements that represent a physical or virtual entity in the controlled system. In the APOGEE Automation System, a BACnet object may represent a point, a schedule, a field panel, or an Insight workstation, among others.

What is a BACnet Device?

A BACnet device is a special class of BACnet object that contains other BACnet objects and represents a physical device on the BACnet network. In the APOGEE Automation System, a BACnet device will not represent a point, but may represent a field panel, Insight workstation, or third-party device.

How are BACnet Objects Identified?

Each BACnet object is uniquely identified within the device that contains it.

A BACnet device is identified uniquely throughout the BACnet network.

Every BACnet object has:

- A unique object name within the device that contains it
- An object type
- A unique object instance number within the device that contains it

Object Name

Each object within a BACnet device must have a name that is unique within the device. Object names are case-sensitive.

Object Type

The object type identifies the set of properties, behaviors, and requirements for an object. Many object types correspond directly with points. See the *BACnet Implementation of Logical Point Types* [→ 152] section in Chapter 4 – *Point Database* for the available object types.

Object Instance Number

An identifying number that is unique:

- Throughout the BACnet network (for a device), or
- For one object type within the host device (for other objects).

Object Identifier

Each object within a BACnet device must have an identifier that is unique within the device, consisting of its *object type* and object *instance number*.

Example

An Analog Output object in a device might have the following identifiers:

- Object Type: AO (01)
- Object Instance Number: 0002

In this case, the encoded name is **BAC_*xx*_AO_2**, (where *xx* is the device ID).

BACnet Field Panel Web Server and Launch Pad

The BACnet Field Panel Web Server is enabled by using one of the following licenses:

- License to enable BACnet Web Server (PXC-36) or Web Services (PXC-16/24), LSM-FPWEB.
- License to enable any Siemens ALN controller to supply the host cmontroller with data for FIN Builder graphics, LSM-FPWEBPL.
- License to enable a PXC Modular or PXC-36 to host FIN Builder graphics, LSM-FPWEBPLHST.

See the *BACnet Field Panel Web Server User Guide* (125-3584) and the *Siemens Launch Pad* (145-1005) for more detailed information.

BACnet Field Panel Web Server Overview

BACnet Field Panel Web Server User Interface (*Web Server* or *FPWeb UI*) includes all the applications a facility operator needs to easily configure, monitor, and control the APOGEE® Automation System.

All of the files that make up the FPWeb UI are loaded onto a field panel (PXC Modular or PXC-36) and accessed through a browser running Adobe Flash. The files can also be loaded onto a computer and accessed through Launch Pad, which is an Adobe AIR-based application. Because the same files are accessed either through the Web browser (if deployed to a Siemens PXC Modular or PXC-36) or when installed on a computer with Launch Pad (the files are installed automatically with the installation of Launch Pad) the FPWeb UI accessed through Launch Pad is identical to the FPWeb UI accessed through a browser.

In order to access the BACnet Field Panel Web Server User Interface through a browser, the files must be deployed to a PXC Modular or PXC-36 controller. Due to space constraints, the Web Server User Interface cannot be deployed to a PXC-16 or PXC-24 Compact controller.

However any PXC controller can be accessed directly using the Launch Pad software, without the need to deploy the Web UI user interface to the controller. See the *Siemens Launch Pad User Guide* (145-1005) for information on installing or upgrading the BACnet Field Panel Web Server Embedded User Interface (UI) Client Application using the Launch Pad Web Server Deployment feature. Once deployed to a panel on the network, the user interface can be accessed from any compatible Web browser (see the Browser Requirements section).

Through the Launch Pad User Interface, you can access and interact with any BACnet IP-enabled controller in the network that is Web-enabled, including PXC-16 and PXC-24 controllers.

Siemens FINlite Graphics Tool

The Siemens FINlite Graphics Tool is a graphic utility program that can be used to create, modify, animate, and save graphics files for field panels, which are Web licensed (LSM-FPWEB, LSM-FPWEBPL, or LSM-FPWEBPLHST), and are used with the Web Server Graphics View.

For more information, see *Chapter 12 - FINlite Graphics Tool*.

Launch Pad Overview

Launch Pad provides easy access to the applications required for configuring, monitoring, and controlling the Building Automation System. It includes the BACnet Field Panel Web User Interface (FPWeb UI) as standard. During the installation of Launch Pad (an Adobe AIR application), the FPWeb UI files are automatically installed on the hard drive.

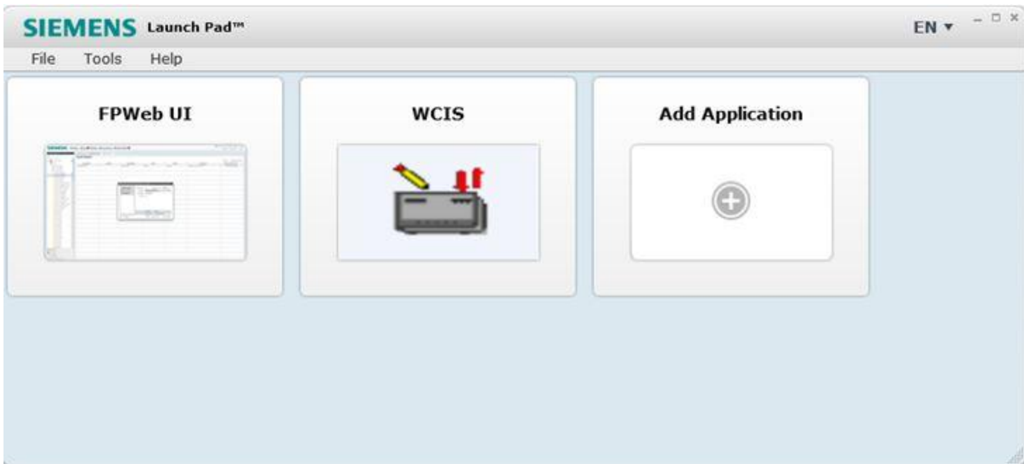
If the FPWeb UI files are deployed to a field panel (Siemens Modular or Compact 36), the same FPWeb UI files are loaded onto the field panel and can be accessed through a Web browser. Hence the FPWeb UI is identical when accessed through Launch Pad or through a browser. Accessing the FPWeb UI through Launch Pad does provide a cleaner look. For more information about the FPWeb UI functionality (managing trends, schedules, points, PPCL programs, and more), see the *BACnet Field Panel Web Server User Guide* (125-3584).

The Launch Pad also allows you to deploy the Application MC tool to a field panel, load licenses, add shortcuts to other applications, and access user documentation.

General Description

The Siemens Launch Pad is an Adobe AIR-based application that allows you to do the following:

- Launch Adobe AIR-based FPWeb UI which allows you to interact with Siemens Ethernet BACnet Field Panels with Web Services enabled, and provides a more intuitive user interface for database interaction in comparison to line-by-line command prompts.
- Deploy browser-based FPWeb UI to field panels.
- Deploy browser-based Application MC to field panels.
- Deploy licenses to field panels.
- Add shortcut buttons so that other commonly-used Building Automation System applications are easily accessible and can be launched from Launch Pad.
- A shortcut button is automatically added, if WCIS has been installed along with Launch Pad.
  - WCIS (Windows Controller Interface Software) is an application to start-up/commission Siemens Terminal Equipment Controllers (TECs).



Chapter 2—System Setup

Chapter 2 describes the functionality of:

- Daylight Saving Time (DST)
- Using the BACnet Address Table
- BACnet Command Priorities
- System Error Messages
- Field panels
- Ethernet/IP Procedures
- Disk Commands and Procedures
- State Text Commands and Procedures
- Notifications

NOTE:
System privilege levels determine the functionality available to each user. Many commands and menu branches documented as part of the HMI are only available to higher levels of user access or in specific firmware revisions.

Before You Begin

Before using the information in this section, you should have a working understanding of the following concepts:

- HVAC equipment of the facility.
- Point database.
- General knowledge of the APOGEE Automation System.
- Familiarity with the BACnet protocol.

Daylight Saving Time

The Daylight Saving Time (DST) functionality adjusts the system time to match the Daylight Saving Time changeover. If your area uses Daylight Saving Time, this feature offers a convenient method to automatically adjust the system clock. To set up the DST functionality, the changeover date and times must first be defined. The field panel can set up these dates automatically, or you can choose to define these entries separately.

HMI	**S, S** (System, dSt)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? s
>Display, Add, Remove, reMoveall, deFault, Quit? -
```

Displaying the DST Report

This procedure displays the Daylight Saving Time (DST) change-over time/date pairs.

HMI	**S, S, D** (System, dSt, Display)

Example

```
12/03/2003 WED              DAYLIGHT SAVING TIME
REPORT                 07:06pm
----------------------------------------------------------------
---------------

 Start Date                         End Date
----------------------------------------------------------------
--------------
 02:00am 04/06/1997                   02:00am 10/26/1997
 02:00am 04/05/1998                   02:00am 10/25/1998
 02:00am 04/04/1999                   02:00am 10/31/1999
 02:00am 04/02/2000                   02:00am 10/29/2000
 02:00am 04/01/2001                   02:00am 10/28/2001
 02:00am 04/07/2002                   02:00am 10/27/2002
 02:00am 04/06/2003                   02:00am 10/26/2003
 02:00am 04/04/2004                   02:00am 10/31/2004
 02:00am 04/03/2005                   02:00am 10/30/2005
 02:00am 04/02/2006                   02:00am 10/29/2006

End of report

>Display, Add, Remove, reMoveall, deFault, Quit? –
```

Adding a Date and Time Pair to DST

This procedure adds a Daylight Saving Time (DST) change-over date and time pair to the system calendar.

HMI	**S, S, A** (System, dSt, Add)

The system prompts for date and time information to define the DST parameters. All prompts use the date and time formats as defined in the user account.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware,
Text, Quit? A
>Calendar, Dst, Quit? D
>Display, Add, Remove, reMoveall, deFault, Quit? A
>Start Date (MM/DD/YYYY)       :  4/7/2003---
```

```
>Start Time (HH:MMAP)         :  2:00AM----
>End Date (MM/DD/YYYY)        :  10/26/2003-
>End Time (HH:MMAP)           :  2:00AM----

Command successful

>Display, Add, Remove, reMoveall, deFault, Quit? –
```

Removing a Date and Time Pair from DST

This procedure removes a specific Daylight Saving Time (DST) change-over date and time pair from the system calendar.

HMI	**S, S, R** (System, dSt, Remove)

The following example shows how to remove the DST date/time pair for the year 2003:

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware,
Text, Quit? A
>Calendar, Dst, Quit? D
>Display, Add, Remove, reMoveall, deFault, Quit? R
>Year (1959 - 2048)           :  2003

Command successful
```

Removing All Date and Time Pairs from DST

This procedure removes all specific Daylight Saving Time (DST) change-over time/date pairs from the system calendar. By using this procedure, Daylight Saving Time is removed from the system.

HMI	**S, S, M** (System, dSt, reMoveall))

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware,
Text, Quit? A
>Calendar, Dst, Quit? D
>Display, Add, Remove, reMoveall, deFault, Quit? M
>Are you sure (Y/N)           :  Y

Command successful

>Display, Add, Remove, reMoveall, deFault, Quit? –
```

Adding a Default Set of DST Date and Time Pairs

This procedure adds a set of Daylight Saving Time (DST) change-over date/time pairs. The effective dates are calculated for the ten years following the current system date.

HMI	**S, S, F** (System, dSt, deFault))

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware,
Text, Quit? A
>Calendar, Dst, Quit? D
>Display, Add, Remove, reMoveall, deFault, Quit? F
>Are you sure (Y/N)            :  Y

Command successful

>Display, Add, Remove, reMoveall, deFault, Quit? -
```

BACnet Command Priorities

Modifying the BACnet Command Priorities

Use this procedure to modify a command priority setting (Operator, Smoke, Emergency, Schedule, PDL, or PPCL). For more information on BACnet command priorities, see the *Point Database* [➙ 134] chapter of this manual.

HMI	**S, B, P, M** (System, Bacnet, Priorities, Modify)

From the **Oper, Smoke, Emer, PDL** prompt, select a command priority to modify (by typing the desired letter), then enter the new value (or press **ENTER** to retain the current value).

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? b
>Priorities, Addresses, objectId, Rpm, Quit? p
>Modify, Display, Quit? M
>Oper, Smoke, Emer, PdL       : s
>SMOKE priority slot (OPER-EMER): 11
>Are you sure (Y/N)           : y
Command successful

>Modify, Display, Quit? -
```

Displaying the Priority Map Report

This procedure generates a Priority Map report, which shows the BACnet priority slot settings and APOGEE P2 counterparts of the current device.

HMI	**S, B, P, D** (System, Bacnet, Priorities, Display)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? b
>Priorities, Addresses, objectId, Rpm, Quit? p
>Modify, Display, Quit? d
07/17/2008 THU                  PRIORITY MAP
REPORT                       17:51
----------------------------------------------------------------
---------------
OPER  priority slot (1-SMOKE)   :  8

SMOKE priority slot (OPER-EMER) : 10

EMER  priority slot (SMOKE-PDL) : 12

SCHED priority slot             : 15

PDL   priority slot (EMER-16)   : 14

PPCL  priority slot             : 16

End of report

>Modify, Display, Quit? -
```

Using the BACnet Address Table

The BACnet Address Table helps to identify third-party BACnet devices that don't properly respond to Who-Is or Who-Has queries on the BACnet network. These devices must be manually added to the local field panel Address Table. See *Adding an Object to the BACnet Address Table* in this section.

NOTE:
There are two possible BACnet/IP addressing systems: Fixed IP addressing (manually assigned IP addresses) and Dynamic IP addressing (IP addresses automatically assigned by a host database).

Displaying the BACnet Address Table Report

This procedure displays the local Address Table report, which contains the BACnet address settings of all objects in the global Address Table.

HMI	**S, B, A, D** (System, Bacnet, Addresses, Display)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? b
>Priorities, Addresses, objectId, Rpm, Quit? a
>Display, Add, dElete, Quit? d

01/16/2006 MON                   ADDRESS TABLE
REPORT                   06:25pm
----------------------------------------------------------------
---------------
>Device Instance Number : 7200
>Device Name            : BLDG1:West:BBLN2
>Object Instance Number : 3
>Object Type            : AI
>Object Name            : BBLN2:LAI3
>MAC Address            : 199.249.3.12
>Network number         :
>Advanced settings      :

End of report

>Display, Add, dElete, Quit? –
```

Configuring a Node on a Remote Network

Use this procedure to add a remote BACnet device to the node table.

To configure a node on a remote network, add the device to the node table. If the local field panel cannot receive an I-Am from the node, add the corresponding address to the address table and be sure to specify:

- The same device instance number you used in the previous step.
- The remote network number where the device resides.

Deleting BACnet Objects from the Address Table

Use this procedure to delete a BACnet object from the Address Table.

HMI	**S, B, A, E** (System, Bacnet, Addresses, dElete)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? b
>Priorities, Addresses, objectId, Quit? a
>Display, Add, dElete, Quit? e
>Device Instance Number : 7200
>Object Instance Number : 7049
>Object Type            : AO
Command successful

>Display, Add, dElete, Quit? -
```

Configuring the BACnet Address Table

The BACnet Address Table integrates with third-party BACnet devices that are not BTL compliant in one or more of the following ways. The third-party device does not:

- Support Who-Is/I-Am (or does this incorrectly)
- Respond with the APDU timeout specified in its device object (or does not respond when reading the APDU timeout)
- Support Who-Has/I-Have (or does this incorrectly)

This procedure adds one object reference to the BACnet address table, which allows devices to share object information with non-standard third-party BACnet devices. The APDU timeout value is also configurable.

Adding an Object to the Address Table

Use this procedure to add an object to the device Address Table.

HMI	**S, B, A, A** (System, Bacnet, Addresses, Add)

Example

An AI object is added to the Address Table of device 7200 in this example.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? b
>Priorities, Addresses, objectId, Rpm, Quit? a
>Display, Add, dElete, Quit? a
>Device Instance Number : 7200
>Device Name            : BLDG1:West:BBLN2
>Object Instance Number : 3
```

```
>Object Type           : AI
>Object Name           : BBLN2:LAI3
>MAC Address           : <press enter>
>Network number        : <press enter>
>Advanced settings     : <press enter>
Command successful

>Display, Add, dElete, Quit? –
```

Adding an Entry for Who-Is/I-Am

HMI	**S, B, A, A** (System, Bacnet, Addresses, Add)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? b
>Priorities, Addresses, objectId, Rpm, Quit? a
>Display, Add, dElete, Quit? a
>Device Instance Number : 7010---
>Device Name : -------
>Object Instance Number : -------(leave blank*)
>MAC Address : -------(a unique address; numbers separated by
periods)
>Network Number : -------(enter network number)
>Advanced Settings : -------(**)
Command successful
```

*Object Instance Number is not required for who-is.

The **Advanced Settings prompt allows you to change the APDU time-out to the node. You may either press **ENTER** to skip this step or you may enter the APDU time-out value as **ATO=***xxx* where *xxx* = milliseconds for the APDU time-out.

To Add an Entry for Who-Has/I-Have:

Same as above except skip Device Name by pressing **ENTER**, then provide the point Object Instance number, the two-character point Object Type abbreviation, and the point Object Name.

Example

```
>Add, Delete, dElete_all, Look, Quit? -
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? b
>Priorities, Addresses, objectId, Rpm, Quit? a
>Display, Add, dElete, Quit? a
```

```
>Device Instance Number : 1------
>Device Name : --(leave blank)
>Object Instance Number : 82-----
>Object Type : AI (two character point type abbreviation)
>Object Name : AUX TEMP AI5-----------------------
>MAC Address : --(leave blank)
>Network Number : --(leave blank)
>Advanced Settings : --(leave blank)
Command successful

>Display, Add, dElete, Quit? ->
```

Point Type abbreviations can be found in the following table:

Type Number	Abbreviation	Object Type	APOGEE **Equivalent**
00	AI	Analog Input Object	LAI
01	AO	Analog Output Object	LAO, LPACI
02	AV	Analog Value Object	Virtual LAI, LAO or LPACI
03	BI	Binary Input Object	LDI
04	BO	Binary Output Object	LDO, L2SL, L2SP
05	BV	Binary Value Object	Virtual LDI, LDO, L2SL, L2SP
06	CA	Calendar Object	Replaces Global Data: Calendar
07	CO	Command Object	Replaces Eqsched Command Table
10	FI	File Object	Used for upload/download
13	MI	Multistate Input Object	Reports on third-party MIs of this type.
14	MO	Multistate Output Object	LFSSL, LFSSP, LOOAL, LOOAP
19	MV	Multistate Value Object	LENUM
15	NC	Notification Class Object	Replaces Global Data: Destinations
17	SC	Schedule Object	Replaces Eqsched Mode Schedules
20	TL	Trend Log Object	Replaces APOGEE Trend definition and data

BACnet Read Property Multiple (RPM)

The Read Property Multiple (RPM) feature may be disabled from the Human Machine Interface (HMI) port. When the BACnet network performance is especially slow, disabling RPM at each field panel may improve system performance. .

- Always disable RPM when a field panel has 90 or more TECs connected. Otherwise, an error may occur.
- Always disable RPM when a third-party workstation is used on the BACnet network.

The following example shows the menu prompts for disabling RPM:

	CAUTION
	This procedure causes the field panel to coldstart. It is a good practice to back up the field panel database before using this procedure.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? B
>Priorities, Addresses, objectId, Rpm, Quit? R
>Enable, Disable, Look, Quit? D

>Ok to coldstart (Y/N) : Y
```

System Error Messages

A system error message is a notification from the system that an event has occurred in one of the field panels. System error messages identify events such as a device on a network failing or a user signing on or off the network.

Settings for Error Messages

Each error message has two settings. The first setting identifies the destination where the error message displays. As a default, error messages display at field panels defined in destination 0. The second setting concerns the dial-out status of the error message, relevant only when the field panels in the destination have a modem. To enable/disable dialing of system error messages, type **S**, **E**, and then **E** (Enable) or **I** (dIsable) from the HMI main menu.

Displaying Error Message Text

This procedure displays the list of system error messages. This report also displays the associated destination and dialing status for each system error message.

HMI	**S, E, D** (System, Error_msgs, Display)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Display, Replace, Quit? d
>Here, Printer                 :  H

07/17/2008 THU                   ERROR MESSAGE
REPORT                         19:05
```

```
-----------------------------------------------------------------
---------------
      Notification ID      Message
    1        0 (YES)       Field panel FAILURE
    2        0 (YES)       Field panel RETURN from failure
    3        0 (YES)       DEVICE FAILURE in field panel
    4        0 (YES)       DEVICE RETURN from failure in field
panel
    5        0 (NO)        PPCL statement FAILURE
    6        0 (NO)        PPCL statement RETURN from failure
    7        0 (NO)        User login at field panel
    8        0 (NO)        User logout at field panel
    9        0 (NO)        Unsuccessful login attempt at field
panel
   10        0 (NO)        Predicted demand above 90% for meter
area
   11        0 (NO)        Predicted demand below 90% for meter
area
   12        0 (NO)        Predicted demand above 100% for meter
area
   13        0 (NO)        Predicted demand below 100% for meter
area
   14        0 (NO)        Loop Tuning finished
   15        0 (NO)        Tuning failed; could not reach steady
state
   16        0 (NO)        Auto tuning failed, check results
   17        0 (NO)        Tuning failed; check available
memory, try again
   18        0 (NO)        Tuning failed; constant process
variable
   19        0 (NO)        Tuning failed; retry disturbance
   20        0 (NO)        Tuning failed; constant control
variable
   21        0 (NO)        Loop Tuning started
End of report

>Display, Replace, Quit? -
```

Field Panels

This section discusses the major topics of the field panel and their interaction with the ALN.

Adding a Field Panel to the ALN

In order for a field panel to operate as part of a networked system, it must not only be physically connected to the network, but it must also be defined as part of that network. A field panel is defined as part of a network through the procedure *Adding a Field Panel to the ALN* [→ 68]. This procedure is normally done only once per field panel and is not usually required on an installed system.

Before Connecting to the Network

When adding a field panel to the ALN, you must specify two sets of configuration information:

- ALN information and FLN information.

ALN Information

1. From the HMI at the field panel you are adding, specify the baud rate and field panel address or device instance number on the ALN for that field panel.
2. From the HMI at a different field panel, add the new field panel to the network. For specific information, see the procedure *Adding a Field Panel to the ALN* [→ 68] in this chapter.
3. When the field panel is added to the network (from another field panel), you must specify:
   – The field panel address number or device instance number.
   – Whether a remote or hardwire connection is used.
   – Whether a normal or extended timeout is needed.

FLN Information

You can select between P1 and MS/TP FLNs on Siemens BACnet field panels with FLN support and firmware revision 3.1 or later. For specific information, see the procedure *Changing the FLN Type* in this chapter.

- For a P1 FLN, you do not need to make additional configuration changes.

Hardware Configuration, Baud Rates

While connected to the newly added field panel, using the operator interface, the remaining configuration information is entered. This information can be grouped into three categories.

For the ALN network:

- The ALN speed
- Network status (should it be modified)
- device instance number

For the field panel:

- HMI port configuration (includes the baud rate, alarm, report, and dialing capabilities)
- Check the status of the battery
- Module bus (M-Bus) enabled/disabled

For the P1 FLN network (optional):
- The FLN speed

Open IP Ports in Firmware Revision 3.4.	
Port	**Usage**
21	FTP
23	Telnet
50	Second Telnet (for Integration Drivers only)
69	Diagnostic*
80	HTTP
100	Diagnostic*
* Diagnostic ports are disabled by default and should only be enabled with instructions from Technical Support.	

Configuring the Wireless FLN

Wireless Field Level Network (WFLN) can be turned on in any field panel that supports P1 FLNs and is at Firmware Revision 2.8 or later.

Before implementing a Wireless FLN, you should familiarize yourself with the following Siemens Industry documentation:
- *WFLN Application Guide* (563-033)
- *Wireless Field Level Network Start-up Procedures* (140-0649)

Deleting a Field Panel from the ALN

Deleting a field panel clears the point database and any existing control information stored within that field panel.

A field panel can be completely deleted from communication and other network operations. This procedure is normally used in troubleshooting situations. Deleting a field panel causes the network to ignore it. Control programs in other field panels that reference points in the removed field panel become unresolved (undefined in the database). In addition, as soon as the field panel accepts the command to delete itself, it automatically coldstarts (that is, the contents of its memory are erased).

This process should not be confused with *ostracizing* a field panel, where the field panel does not coldstart.

Configuring the BACnet MS/TP Routing

This section explains how to enable routing for BACnet MS/TP ALN and/or FLN.

BACnet field panels with firmware revision 3.1 or later can route BACnet messages between devices on a:
- BACnet/IP ALN and a BACnet MS/TP FLN, or
- BACnet MS/TP ALN and a BACnet MS/TP FLN

Modifying the BACnet MS/TP ALN

HMI	**S, H, F, C, A, M, M** (System, Hardware, Fieldpanels, Congig, Aln, Mstp, Modify)

NOTE:
When the FLN is configured as MS/TP, and the MS/TP ALN is enabled, then the MS/TP ALN may also be used as a secondary MS/TP FLN port (Modular and Compact 36 panels only).

NOTE:
If the current panel does not support MS/TP ALN, the system will prompt for a remote field panel address.

Prompt/Field	Option/Entry	Description
Enable MSTP ALN (Y/N)	Y	Enables the RS-485 MS/TP port.
	N	Disables the RS-485 MS/TP port. If you did not change the Enable/Disable status of the MS/TP ALN, Command successful displays. MS/TP ALN configuration is complete.
MSTP ALN Baud Rate	Enter the Baud rate for this port, or press **ENTER** to accept the default value (9600).	
MSTP ALN Network Number	Enter the network number for this port, or press **ENTER** to accept the default value.	
MSTP ALN Node Address	Enter the node address for this port, or press **ENTER** to accept the default value.	

- If the Enable/Disable status of the MS/TP ALN did not change, `Command successful` displays.
- If the Enable/Disable status did change, type **Y** to accept the changes and coldstart the panel.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord, Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter, Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? c
>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? a
>Alnsettings, Ip, Mstp, nodeType, Quit? m
>Display, Modify, Quit? m
>Enable MSTP ALN (Y/N)         :  y
```

```
>MSTP ALN Baud Rate          :  76800---
>MSTP ALN Network Number     :  65535
>MSTP ALN Network Number     :  65532
>MSTP ALN Node Address       :  127
>Ok to coldstart (Y/N)       :  y

>Time, Message, Cancel, Hello? -
```

Modifying MS/TP ALN Settings

NOTE:
The field panel coldstarts during this procedure.

For more information on ALN port configuration, see PXC *Modular Port Configuration and* PXC *Compact Port Configuration*.

Modifying MS/TP ALN Settings

HMI	**S, H, F, C, A, M, M** (System, Hardware, Field Panel, Config, Aln, Mstp, Modify)

NOTE:
If the MS/TP ALN is already enabled, and the BACnet/IP ALN port is either disabled or not present on this device, the following prompt is not displayed. Under these conditions, continue this procedure with the following step (MS/TP ALN Baud Rate prompt).

Prompt/Field	Option/Entry	Description
Enable MSTP ALN (Y/N)	Y	Enables the MS/TP ALN port.
	N	Disables the MS/TP ALN port.
MSTP ALN Baud Rate	Enter the Baud rate for this port.	
MSTP ALN Network Number	Enter the network number for this port, or press **ENTER** to accept the current value, if other than 65535.	The network number must be changed from the system default of 65535.
MSTP ALN Node Address	Enter the node address for this port.	
If you made any changes from existing values during this procedure, `OK to coldstart (Y/N)` displays.	Y	Coldstarts the device and saves your configuration changes.
	N	Cancels the configuration.

Example

```
>MSTP ALN Network Number : 55---
>MSTP ALN Node Address : 127
>MSTP ALN Baud Rate : 9600----
>OK to coldstart (Y/N) : y
```

Configuring the MS/TP FLN

NOTE:
When the FLN is configured as MS/TP, and the MS/TP ALN is enabled, then the MS/TP ALN may also be used as a secondary MS/TP FLN port (Modular and Compact 36 panels only).

Before implementing an MS/TP FLN network, you should familiarize yourself with the BACnet protocol.

BACnet field panels can support up to 96 devices on FLN 1 (assuming 1/8 load devices; 1/4 load devices need trunk extenders every 31 devices).

Device Reserved Instance Base

The Device Reserved Instance Base is a value that determines the range of instance numbers reserved for use by the controller. Range is set between this configurable starting instance number and the fixed end value of 4,194,302. The default starting value for the Device Reserved Instance Base is 10,000.

Device Reserved Instance Base replaces Base Instance for FLN Devices, which was the term used in BACnet Revision 3.0.

Configuring the BACnet MS/TP FLN

Before configuring the FLN as a BACnet MS/TP network, run a Field Panel Configuration report to determine the present field panel FLN type. See *Displaying a Field Panel Configuration Report* [➙ 66].

HMI	**S, H, F, C, F, M** (System, Hardware, Fieldpanels, Config, Fln, Mstp)

Prompt/Field	**Option/Entry**	**Description**
Enable MSTP FLN (Y/N)	Y	
Enter baud rate	Enter the BACnet MS/TP baud rate (9600, 19200, 38400, or 76800), or press **ENTER** to accept the current value.	For optimal performance, Siemens recommends an MS/TP FLN baud rate of 38,400 bps.
Network number	Unique network number assigned for this FLN (1 to 65534), or press **ENTER** to accept the current value.	Reserve network number 1, as this may be used by the BACnet/IP network.
MSTP Device Mac Address	Enter the node address (0 to 127), or press **ENTER** to accept the current value.	
Keep Alive Poll Rate	Enter the desired time between live node scans (10 to 300 seconds), or press **ENTER** to accept the current value.	Default = 60.
Discovery Poll Rate	Enter the desired time between dead node scans (10 to 300 seconds), or press **ENTER** to accept the current value.	Default = 60.

- If the FLN type is MS/TP and either the network number or node address is changed, `OK to coldstart (Y/N)` displays.
  - Type **Y** to coldstart the device and save your configuration changes.
  - Type **N** to cancel the configuration.
- If only the baud rate is changed, `Command successful` displays. No coldstart is required.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Qui
t? f
>Log, Display, Add, dElete, Modify, Config, Quit? c
>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? f
>fln1, fln2, fln3, Wireless, Mstp, flnType, Quit? m
>Enable MSTP FLN (Y/N)          :  Y
>Enter baud rate                :  19200---
>Network Number                 :  22054
>MSTP Device Mac Address        :  48-
>Keep Alive Poll Rate           :  60---
>Discovery Poll Rate            :  60---
Command successful

>fln1, fln2, fln3, Wireless, Mstp, flnType, Quit? –
```

Field Panel Configuration Procedures

Procedures in this section are under the following HMI menu:

S, H, F, C (System, Hardware, Fieldpanels, Config)

Configuring a Field Panel HMI Port

This procedure changes the baud rate and message display of the HMI port. If you change the port baud rate, you should also know how to change the baud rate of the interface terminal.

Configuring a Field Panel HMI Port

HMI	**S, H, F, C, H** (System, Hardware, Fieldpanels, Config, Hmi)

After typing S, H, F, C, H, select **I** (for HMI).

NOTE:
The HMI/modem menu option only displays on field panels that support this port type.

Example

```
>Baud rate : 115200--
>Alarm printing enabled (Y/N) : Y
>Report printing enabled (Y/N) : Y
Port 1 Modified
>hmI, telNet, usbTool, Look, Statlog, Resetlog, Quit? -
```

Displaying or Resetting HMI Port Statistics

Use these procedures to display or reset communication statistics for the HMI ports. These procedures can be used for diagnostic purposes due to the type of information identified.

HMI	**S, H, F, C, H,** (System, Hardware, Fieldpanels, Config, Hmi)

Type **S** (to display the Statlog) or **R** to reset all communication counters to zero.

Example

```
07/12/2008 SAT                    HMI STATUS
REPORT                         11:52
-----------------------------------------------------------------
----------
Field panel name               : 22054
HMI1 port
Transmitted bytes              : 808
Received bytes                 : 0
Total calls                    : 1
Dial out connect time          : 0
Dial in connect time           : 0
HMI port
Transmitted bytes              : 213487
Received bytes                 : 158242
Telnet port
Transmitted bytes              : 808
Received bytes                 : 0
End of report

>Hmi/modem, hmI, telNet, Look, Statlog, Resetlog, Quit? -
```

Enabling or Disabling the M-BUS

NOTE:
This procedure applies only to an MBC field panel.

This procedure enables or disables the module bus (M-BUS) of an Open Processor. Once disabled, the field panel uses the last commanded values of the Point Termination Modules (PTMs) as the actual value. Analog output points will revert to their minimum value while digital output points revert to their de-energized state. PTMs that have a HAND switch can be manually controlled. Only one Open Processor in each field panel can have the M-BUS enabled at any time.

HMI	**S, H, F, C, B** (System, Hardware, Fieldpanels, Config, mBus)

Specify whether the PTMs on the M-BUS should be enabled or disabled by typing **E** for Enabled or **D** for Disabled.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware,
Text, Quit? H
>Fieldpanels, Disks, Partners, Quit? F
>Log, Display, Add, dElete, Modify, Config, Ostracize, Quit? C
>Mmi, bLn, Fln, mBus, mOdem, Address, Defaultlanguage, Quit? B
>Enable, Disable              :  E
Command successful

>Mmi, bLn, Fln, mBus, mOdem, Address, Quit? –
```

Displaying BACnet IP ALN Settings

HMI	**S, H, F, C, A, I, D** (System, Hardware, Fieldpanels, Config, Aln, Ip, Display)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? c
>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? a
>Alnsettings, Ip, Mstp, nodeType, Quit? i
>Display, Modify, Quit? d
```

```
07/17/2008 THU                BACnet IP ALN
Report                      18:04
----------------------------------------------------------------
---------------
BACnet IP ALN Settings: Enabled
  BACnet IP Network Number         : 1
  UDP Port                         : 47808
  Act as a Foreign device          : NO
End of report

>Display, Modify, Quit? -
```

Displaying BACnet Device Settings

HMI	**S, H, F, C, V, D** (System, Hardware, Fieldpanels, Config, deVice, Display)

The BACnet Device report displays.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? c
>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? v
>Display, Modify, Quit? d

07/21/2008 MON                BACnet Device
Report                      15:01
----------------------------------------------------------------
---------------
BACnet Device Settings
  Device Instance Number           : 22055
  Device Location                  : ARCHIVES BASEMENT
  Device Description               : BACnet PXC-Modular
  Device Reserved Instance Base    : 10000
  COV Resubscribe Period (min)     : 60
  COV Poll Rate (sec)              : 60
End of report

>Display, Modify, Quit? -
```

Modifying BACnet Device Settings

	CAUTION
	If the Device Instance Number or Device Reserved Instance Base are changed, the field panel coldstarts at the end of this procedure.

NOTE:
To accept the existing value and advance to the next entry field at any step of BACnet configuration, press **ENTER**.

Modifying BACnet Device Settings

HMI	**S, H, F, C, V, M** (System, Hardware, Fieldpanels, Config, deVice, Modify)

Prompt/Field	Option/Entry	Description
Device Instance Number	Enter the device instance number.	(0 through 4,194,302). Recommended values are 7000 through 7999; must be unique throughout the BACnet network.
Device Location	Enter the device location.	
Device Description	Enter the device description.	
Device Reserved Instance Base	Enter the starting reserved instance number.	For more information on this parameter, see *Device Reserved Instance Base* in this section.
COV Resubscribe Period (min)	Enter the COV resubscribe period in minutes.	
COV Poll Rate (sec)	enter the COV poll rate in seconds.	
OK to coldstart (Y/N)		This prompt only displays if you change the Instance Number or Device Reserved Instance Base.
	Y	Coldstart the device and save your configuration changes.
	N	Cancel the configuration.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? c
>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? v
```

```
>Display, Modify, Quit? m
>Device Instance Number        :  13933--
>Device Location              :  BIERMAN SUB BASEMENT---------
>Device Description           :  ABSORPTION CHILLER-----------
>Device Reserved Instance Base :  10000--
>COV Resubscribe Period (min)  :  30--
>COV Poll Rate (sec)          :  60--
Command successful

>Display, Modify, Quit? -
```

Displaying the Field Panel Names

HMI	**S, H, F, C, N, D** (System, Hardware, Fieldpanels, Config, Names, Display)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? c
>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? n
>Display, Modify, Quit? d

07/17/2008 THU                Field Panel Name
Report                     13:23
----------------------------------------------------------------
----------
     BLN name                        : BACBLN
     Site name                       : ZONE_2
     Node name                       : MOD22-055
End of report

>Display, Modify, Quit? -
```

Modifying Ethernet Capable Field Panel Names

This procedure modifies the Node name, Site name, or ALN name of an Ethernet capable field panel.

	CAUTION
	If you modify the node name or ALN name, the field panel will coldstart.

HMI	S, H, F, C, N, M (System, Hardware, Fieldpanels, Config, Names, Modify)

Example (Site name)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? c
>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? n
>Display, Modify, Quit? m
>Nodename, Sitename, Blnname, Quit? s
>Site name                    :  BLD3.MAINT--------------------
-
Command successful
>Nodename, Sitename, Blnname, Quit? –
```

Autorestore and Database Backup to Flash

- The field panel may be configured to automatically restore the database from flash memory after a coldstart.
  - When auto-restore is enabled, a coldstart does not result in the same downtime as with earlier revisions of APOGEE firmware. Because there is no waiting on a full download from the backup system, the database is restored from flash so quickly that there is little to no downtime. However, the accumulated trend data is deleted from memory.
  - Database restoration from flash is disabled by default.

If you choose to enable auto-restore, the method of restoring the database is determined by the status of the network (active or inactive) at the moment the database was saved.

If the database was saved when the network was active:

Typically, the Insight software will restore the database. The field panel will perform an auto-restore if Insight is failed or if Insight is available, but has not begun downloading the database within three minutes of a request. However, if the Insight Loader Service is not running, but the Mass Storage device is defined at the field panel, the panel will **not** restore the database.

NOTE:
By design, the field panel loses its Mass Storage device definition after a coldstart. The Insight workstation that is defined as the Mass Storage device is responsible for setting the field panel's Mass Storage definition device after a coldstart. If the Insight workstation sets the Mass Storage device Definition, but the Insight Loader Service is not running the field panel can get into a situation as described above.

If the database was saved when the network was not active:

The field panel will perform an immediate auto-restore of its saved database.

HMI	**S, H, F, C, L** (System, Hardware, Fieldpanels, Config, db_fiLe)

Next Sub-menu Option	Prompt/Field	Option/Entry	Description
Save, **C**lear **R**estore_db	Field panel	Enter field panel name.	
	Are you sure (Y/N)	Y	Save, Clear, or Restore the database.
		N	Do not Save, Clear, or Restore the database.
Autorestore • **E**nable • **D**isable	Field panel	Enter field panel name.	
	Are you sure (Y/N)	Y	Enable Autorestore.
		N	Disable Autorestore.
Display	Field panel	Enter field panel name.	Display the DB File settings.

In order to support autorestore and database backup to flash, the following new HMI prompts (bolded below) have been added.

NOTE:
When files are added to or deleted from the panel's Internal Flash Drive (IFD), the panel's performance is impacted. All other field panel processes are interrupted and the panel may temporarily drop off of the network and not provide COV updates.

```
>Point, Application, Time, Message, Cancel, System, passWord, Bye? s
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware, Text, Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Partners, Licensemanager, Vaem, Quit? f
>Log, Display, Add, dElete, Modify, Config, Ostracize, Quit? c
>Hmi, alnSettings, db_fiLe, Fln, mOdem, Names, Defaultlanguage, Quit? l
>Save, Clear, Restore_db, Autorestore, Display, Quit? s
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Database Backed Up to Flash


>Save, Clear, Restore_db, Autorestore, Display, Quit? c
```

```
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Flash Backup Erased


>Save, Clear, Restore_db, Autorestore, Display, Quit? r
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Command successful


>Save, Clear, Restore_db, Autorestore, Display, Quit? a
>Enable, Disable, Quit? e
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Autorestore enabled


>Save, Clear, Restore_db, Autorestore, Display, Quit? a
>Enable, Disable, Quit? d
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Autorestore disabled

>Save, Clear, Restore_db, Autorestore, Display, Quit? d
>Field panel : ---

01/01/2006 SUN DB File Report 00:16
----------------------------------------------------------------
---------------
Field panel : 6
Flash backup : Present
Database size : 2482 bytes
Last saved : 00:16:43 01/01/2006 SUN
Result of last backup : Success
Autorestore : Disabled
File manager status : Idle

End of report

>Save, Clear, Restore_db, Autorestore, Display, Quit? a
>Enable, Disable, Quit? e
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Autorestore enabled
```

```
>Enable, Disable, Quit? Q
```

Changing the System Default Language

This procedure changes the System Default Language (SDL) of the field panel. Prior to user log on, all firmware prompting and messaging appears in the SDL. Changes to the SDL are implemented at the next user log on.

HMI	**S, H, F, C, D** (System, Hardware, Fieldpanels, Config, Defaultlanguage)

Example

At the Language ID prompt, enter a valid language ID.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware,
Text, Quit? >Fieldpanels, Ethernet, nodeNametable, Disks,
Reportprinter, Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? c
>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? d
>Language ID                    :  0409
Command successful

>Hmi, Aln, deVice, db_fiLe, Fln, Names, Defaultlanguage, Quit? -
```

Verifying Connection, Communication and Default Switch Mapping

The field panel with Firmware Revision 3.2 and later recognizes the HOA within two seconds of connection; prior to that the HOA switches are not operational.

The HOA Switch to PXC Point Mapping report, provides the following information:

- HOA device type connected along with its firmware revision
- List of the HOA switches and its respective number
- List of all of the PXC Modular Controllers onboard points
- Snapshot of the current values associated with each point
- Corresponding point type that has been defined
- Corresponding point name that has been defined

Use the following keystrokes to display the HOA Switch to PXC Point Mapping AP2 report and to verify the HOA is properly communicating.

HMI	**S**, **H**, **F**, **C**, **M** (System, Hardware, Fieldpanels, Config, hoaMap)

Prompt/Field Entry	Option	Description
Field panel name		Alphanumeric value, 30 character limit.
Display, Modify, Remove, Setdefault, Quit	D	

The HOA Switch to Point Mapping report displays.

Example

Sample report of a 16 switch HOA module connected to PXC Modular displays. Verify HOA type displays **8 Keys** or **16 keys**.

Before Connection

```
01/01/2009 THU HOA Switch to Point Mapping 00:00
----------------------------------------------------------
Panel name <PXCC>
HOA Type: not detected or unknown

Switch Point     % Value   Point Type    Point Name
----------------------------------------------------------
1       DO14      0         Not defined   Not defined
2       DO15      0         Not defined   Not defined
3       DO16      0         Not defined   Not defined
4       AO9       0         Not defined   Not defined
5       AO10      0         Not defined   Not defined
6       AO11      0         Not defined   Not defined
7       UNUSED    0
8       UNUSED    0
9       UNUSED    0
10      UNUSED    0
11      UNUSED    0
12      UNUSED    0
13      UNUSED    0
14      UNUSED    0
15      UNUSED    0
16      UNUSED    0

End of report
```

After Connection

```
01/01/2009 THU HOA Switch to Point Mapping 00:03M:Addressc
-------------------------------------------------------------
Search for <*:
HOA Type: 16 Keys Roof Top Firmware revision: 1.0 0004E Apr 22
2009 14:10:17

Switch Point     % Value   Point Type    Point Name
-------------------------------------------------------------
1      DO14     0         Not defined    Not defined
2      DO15     0         Not defined    Not defined
3      DO16     0         Not defined    Not defined
4      AO9      0         Not defined    Not defined
5      AO10     0         Not defined    Not defined
6      AO11     0         Not defined    Not defined
```

```
7      UNUSED   0
8      UNUSED   0
9      UNUSED   0
10     UNUSED   0
11     UNUSED   0
12     UNUSED   0
13     UNUSED   0
14     UNUSED   0
15     UNUSED   0
16     UNUSED   0

End of report
```

HOA Module Default Switch Mapping

Displaying the HOA Switch to PXC Point Mapping AP2 report.

HMI	**S**, **H**, **F**, **C**, **M** (System, Hardware, Fieldpanels, Config, hoaMap)

Prompt/Field	Option/Entry	Description
Field panel name		Maximum of 30 alphanumeric characters.
Display, Modify, Remove, Setdefault, Quit	D	

The Point Mapping AP2 report displays.

Modifying the Default Switch Mapping

The HOA switch mapping can be modified from its default mapping using Insight software or the Commissioning Tool.

See the Insight or the Commissioning Tool online help for more information.

Modifying the Default Switch Mapping

HMI	**S**, **H**, **F**, **C**, **M** (System, Hardware, Fieldpanels, Config, hoaMap)

Prompt/Field	Option/Entry	Description
Field panel name		Maximum of 30 alphanumeric characters.
Display, Modify, Remove, Setdefault, Quit	M	
Switch number	1 through 8 or 16.	Physical switch on HOA.
Point number	1 through 36.	Field panel point mapped to HOA switch.

`Command successful` displays.

Example

Assigning switch 4 to logical point 14.

```
>Field panel : ------->
Display, Modify, Remove, setdEfault, Quit? M
>Switch number : 4-
>Point number : 14-
Command successful
```

Example

Sample report of a 16 switch HOA module connected to PXC Modular. Verify HOA type displays **8 Keys** or **16 keys**.

```
03/26/2009 THU         HOA Switch to Point Mapping    10:41
--------------------------------------------------------------
Panel name <EPXC30>
HOA Type: 16 Keys   Firmware revision: 1.0 0003b Jan 09 2009
14:37:31

  Switch  Point   % Value   Point Type   Point Name
--------------------------------------------------------------
  1       DO21    *100*     LDO          sw1_DO21
  2       UI12     100      LDI          sw2_DI12
  3       X13     *50*      LAO          sw3_AOVoltage13
  4       X14      49       LAI          sw4_AIVoltage14
  5       X15     *90*      LAO          sw5_AOCurrent15
  6       X16      87       LAI          sw6_AICurrent16
  7       U7       72       LAI          sw7_AITemperature7
  8       U8       0        LPACI        sw8_LPACI8
  9       DO20    *100*     Not defined  Not defined
  10      UNUSED   0
  11      UNUSED   0
  12      UNUSED   0
  13      UNUSED   0
  14      UNUSED   0
  15      UNUSED   0
  16      UNUSED   0

End of report
```

NOTE:
If the default mapping is sufficient print labels. For more information see *Using* Insight/Commissioning Tool *to Map HOA Switches*.

NOTE:
Perform a backup using MMI Database Transfer when all settings are complete.

If modifications are necessary continue to *Modifying the Default Switch Mapping* [→ 60].

Resetting the Default HOA Switch Mapping

Use HOA editor to restore default HOA switch mapping.

HMI	**S**, **H**, **F**, **C**, **M** (System, Hardware, Fieldpanels, Config, hoaMap)

Prompt/Field Entry	Option	Description
Field panel name		Maximum of 30 alphanumeric characters.
Display, Modify, Remove, Setdefault, Quit	S	
Are you sure? (Y/N)	Y	Resets the HOA switch mapping back to default.
	N	No changes are made to HOA switch mapping

`Command successful` displays.

Example

```
>Field panel : ------->
Display, Modify, Remove, Setdefault, Quit? S
>Are you sure?(Y/N) : y

Command successful
```

The host PXC Modular will retain the reconfigured HOA switch mapping. In the event the HOA module was removed and plugged back into the host panel, you are not required to reconfigure the HOA mapping.

Removing the HOA Switch Mapping

Use HOA editor to remove the HOA switch mapping.

HMI	**S**, **H**, **F**, **C**, **M** (System, Hardware, Fieldpanels, Config, hoaMap)

Prompt/Field	Option/Entry	Description
Field panel name		Maximum of 30 alphanumeric characters.
Display, Modify, Remove, Setdefault, Quit	R	
Remove All (Y/N)	Y	Removes all HOA switch mapping.
	Switch number.	1 to HOA maximum.
	N	

`Command successful` displays.

Example

```
>Field panel : ------->
Display, Modify, Remove, Setdefault, Quit? R
>Remove All (Y/N) : N
>Switch number : 7-
Command successful
```

FLNnode and ALNnode Mode Configuration

The PXC Unitary Equipment Controller (UEC) is an MS/TP device, that can be configured as a programmable, stand-alone device or as a networked device on the BACnet MS/TP ALN (Automation Level Network) or FLN (Field Level Network).

PXC UEC-16

The PXC UEC-16 provides control for 16 points, including 8 software-configurable universal points.

Point count includes: 3 Universal Input (UI), 5 Universal I/O (U), 2 Digital Input (DI), 3 Analog Output

(AOV), and 3 Digital Output (DO).

PXC UEC-24

The PXC UEC-24 provides control for 24 points, including 16 software-configurable universal points.

Point count includes: 3 Universal Input (UI), 9 Universal I/O (U), 4 Super Universal I/O (X), 3 Analog

Output (AOV), 5 Digital Output (DO).

FLNnode Mode

HMI	**S**, **H**, **F**, **C**, **P**, **M** (System, Hardware, Fieldpanels, Config, mstP, Modify)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Modify, Config, Filesys, Quit? c
>Hmi, mstP, deVice, Names, nEttype, Defaultlanguage, db_fiLe,
Quit? p
>Display, Modify, Quit? m
>Baud rate : 19200---
>Network Number : 60---
>MAC Address : 80-
Command successful
```

ALNnode Mode

HMI	S, H, F, C, A, M, M (System, Hardware, Fieldpanels, Config, Aln, Mstp, Modify)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? c
>Hmi, Aln, deVice, Names, nEttype, Defaultlanguage, db_fiLe,
Quit? a
>Alnsettings, Mstp, Quit? m
>Display, Modify, Quit? m
>MSTP ALN Baud Rate : 19200---
>MSTP ALN Network Number : 160--
>MSTP ALN Node Address : 80-
Command successful
```

Enabling Auto Save

Enabling the Auto Save Feature

NOTE:
You must perform a manual save before the enabled Auto Save feature will function.

HMI	S, H, F, C, L, U (System, Hardware, Fieldpanels, Config, db_fiLe, aUtosave)

Prompt/Field	Option/Entry	Description
Enable, Disable, Quit?	E, D, Q	
Field panel name		Maximum of 30 alphanumeric characters.
Are you sure (Y/N)	Y	

`Auto Save Enabled` or `Auto Save Disabled` displays.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? c
>Hmi, Aln, deVice, Names, Fln, nEttype, Defaultlanguage,
db_fiLe, Quit? l
>Save, Clear, Restore_db, Autorestore, aUtosave, Display, Quit?
u
>Enable, Disable, Quit? e
>Field panel                  :  -------
>Are you sure (Y/N)           :  y
Field panel 130: Auto Save Enabled
```

NOTE:
Any new Web Server panel must be made ready before Auto Save will work. Fifteen minutes after the panel is made ready, the database will be automatically saved.

NOTE:
Manually or automatically saving the database can cause the device to fail momentarily.

NOTE:
It is recommended that you leave the Auto Save feature enabled to ensure that the Field Panel database is backed up.

Field Panel Procedures

Displaying a Field Panel Log

This procedure displays a summary report of field panels on the ALN. This report contains the address, status, and auto-dial capabilities for specified field panels on the ALN.

Displaying a Summary Log of Field Panels

HMI	**S, H, F, L** (System, Hardware, Fieldpanels, Log)

Specify the name/device ID of the first and last field panels for the log.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? l
>First field panel             :  13933--
>Last field panel              :  13934--
07/09/2008 WED                FIELD PANEL LOG
REPORT                      15:37
----------------------------------------------------------------
-----------
 <"13933" to "13934">
 Field panel                              State
----------------------------------------------------------------
-----------
  <BLN>
    <ZONE_1>
>     13933                         OK     Online  Ready
      13934                         OK     Online  Ready
End of report

>Log, Display, Add, dElete, Modify, Config, Quit? -
```

NOTE:
In the example, the panel you are connected to is indicated by the ">" symbol.

Displaying a Field Panel Configuration Report

HMI	**S, H, F, D** (System, Hardware, Fieldpanels, Display)

Specify where you want the report sent and for which panel.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Quit? d
```

```
>Here, Printer              :  H
>Field panel                :  13778--

01/03/2009 SAT FIELD PANEL CONFIGURATION REPORT 00:55
----------------------------------------------------------------
--------
Field panel address : 13778
Firmware revision : B6E1265 EX36 V3.4 BACnet 4.3g
Firmware checksum : 0028

USB MODEM : Available Alarm
HMI : 115200 bps Alarm Report
Telnet : Available Alarm
USB Tool : Available Alarm
USB PRINTER : Available Alarm

Point modules : Disabled
Battery status : Dead
Language : English American

Network Type : BACnet Router between networks 13, 1302, 1301
(Alnnode)

Node name : WT2
Site name : DESK
BLN name : BBLN
DNS Suffix :
DHCP : Enabled
IP Address : 10. 0. 2. 2
Netmask : 255.255.255. 0
Gateway Address : 10. 0. 2.250
DHCP Server Address : 10. 0. 2.250
DNS 1 : 0. 0. 0. 0
DNS 2 : 0. 0. 0. 0
DNS 3 : 0. 0. 0. 0
DNS 4 : 0. 0. 0. 0
MAC Address : 00:C0:E4:03:30:BD
Configured Data Rate : Auto Negotiate
Configured Duplex : Auto
Actual Data Rate : 100BaseT
Actual Duplex : Full
Link Status : Up
Telnet Enabled : Enabled

BACnet Device Settings
```

```
Device Instance Number : 13778
Device Location : Default Location
Device Description : Default Description
Device Reserved Instance Base : 10000
COV Resubscribe Period (min) : 30
COV Poll Rate (sec) : 60

BACnet IP ALN Settings : Enabled
BACnet IP Network Number : 13
UDP Port : 47808
Act as a Foreign device : NO

BACnet MSTP ALN Settings : Enabled
MSTP ALN Baud Rate : 38400 bps
MSTP ALN Network Number : 1302
MSTP ALN Node Address : 0
(Note When FLN is MS/TP, and MS/TP ALN is enabled,
MS/TP ALN may also be used as second MS/TP FLN)

FLN Settings
Fln Type : MSTP
MSTP FLN Baud Rate : 19200 bps
MSTP FLN Network Number : 1301
MSTP FLN Node Address : 0
MSTP FLN Keep Alive Poll Rate : 60
MSTP FLN Discovery Poll Rate : 60

End of report
>Log, Display, Add, dElete, Modify, Config, Quit? -
```

NOTE:
Although this report shows values in the Point modules and FLN rows, this information would be meaningless in a report for a PXC Compact because these field panels have no point modules.

Adding a Field Panel to the ALN

Before you begin this procedure, you must identify the new address of the field panel, whether it is remotely connected, the type of time-out, and whether it should be placed online.

	CAUTION
	This procedure causes the field panel to coldstart. It is a good practice to back up the field panel database before using this procedure.

Adding a Field Panel

NOTE:
It is highly recommended that ports in the range of 0 through 1023 not be used.

HMI	**S, H, F, A** (System, Hardware, Fieldpanels, Add)

Prompt/Field	Option/Entry	Description
`Command Successful`		The system adds the field panel to the ALN.

Open TCP Ports.	
Port	**Usage**
21	FTP
23	Telnet
50	Second Telnet (for Integration Drivers only)
69	Diagnostic*
80	HTTP
100	Diagnostic*
* Diagnostic ports are disabled by default and should only be enabled with instructions from Technical Support.	

Deleting a Field Panel from the ALN

	CAUTION
	This procedure causes a coldstart in field panels with firmware revisions prior to 2.8.2 (build 1121f) or 3.0 (build 967q). It is a good practice to back up the field panel database before using this procedure.

From the HMI main menu, type the following letters in sequence and follow the prompts:

HMI	**S, H, F, E** (System, Hardware, Fieldpanels, dElete)

Example

```
>Field panel : 22054--
>Are you sure (Y/N) : y
Command successful

>Log, Display, Add, dElete, Modify, Config, Quit? -
```

Languages

APOGEE Firmware Revision 3.0 and later enables multiple language use. Current language options are French Canadian and English American. This function allows you to display the field panel HMI information in various languages. You can use the Factory Default Language (FDL) or load any of the optional languages.

Language Types

Language type	Explanation
Factory Default Language (FDL)	This is the fundamental language used. It is typically English and cannot be deleted. If the language settings listed in this table are not defined, the FDL is used as the default.
System Default Language (SDL)	This is the default language for prompting and messaging prior to user log-on.
User Defined Language (UDL)	This is the optional language loaded by the user that can be used instead of the factory defined FDL.
User Specific Language (USL)	This is defined in the user’s account. Can be the FDL or the optional UDL. By default, it is the SDL.

Settings will default to the FDL if a coldstart occurs.

Language Use

PPCL and OIP statements - PPCL and OIP statements use keystroke sequences based on the English prompting.

Point priority - Point priority status always displays in English. When logged onto the system using a language ID other than English, point priority appears in English.

Point status - Point status displays always appear in English. When logged onto the system using a language ID other than English, point status appears in English.

State text - The default state text tables always appear in English. When logged onto the system using a language ID other than English, default state text tables appear in English.

Default user accounts - Default user account names (LOW, MED, HIGH) and passwords always appear in English.

Keyboards - Some languages require an international keyboard/setting for entering certain letters or characters not found on a standard English keyboard.

Emulating an International Keyboard

When an international keyboard/setting is not available, enter characters using the following key sequence (activate the Num Lock key). While holding down the ALT key, type 0 (zero) and then:

Table 1: International Characters (ISO Latin-1 Character Set).

Character	Number (0 + number)	Description
À	192	Capital A with grave accent
Á	193	Capital A with acute accent
Ã	195	Capital A with tilde.
È	200	Capital E with grave accent
É	201	Capital E with acute accent
Ì	204	Capital I with grave accent
Í	205	Capital I with acute accent
Ò	210	Capital O with grave accent
Ó	211	Capital O with acute accent
Õ	213	Capital O with tilde
Ù	217	Capital U with grave accent
Ú	218	Capital U with acute accent

Field Panel File System Operations

Basic File System Operation Commands

Use these procedures to set drives, change directories, list drives, or list files in a directory using the HMI.

Do not use the \ (backslash) symbol before entering a file name.

Set Drive

Set Drive is used to set the drive for all file operations. The drive must be set before any other file operations can be performed.

HMI	**S, H, F, F, S,** (System, Hardware, Fieldpanels, Filesys, Set_drive)

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? s
>Drive name: a-------------------------------

A:\
```

Change Directories

The drive must be set before this file operation can be performed. See the *Set Drive* section.

HMI	**S, H, F, F, C,** (System, Hardware, Fieldpanels, Filesys, Change_dir)

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? c
>File Directory: wsroot--------------------------

Path: A:\WSROOT\
```

List Drives

HMI	**S, H, F, F, L,** (System, Hardware, Fieldpanels, Filesys, List_drives)

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? l

07/30/2010 FRI Drives List 10:15
--------------------------------------------------------------
Disk Size Free Space

IFD 10 MB 8652 KB
A:\ 8174 KB 6542 KB
B:\ 1907 MB 1659 MB

End of report
```

List Files in a Directory

The drive must be set before this file operation can be performed. See the *Set Drive* section.

HMI	**S, H, F, F, D,** (System, Hardware, Fieldpanels, Filesys, listDirectory)

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? d

07/30/2010 FRI File Directory 10:17
--------------------------------------------------------------

Path: A:\

07/28/2010 11:27:20 0 WSROOT <DIR>
07/28/2010 11:27:20 197 CROSSDOMAIN.XML
07/28/2010 11:27:22 327 LicenseVault.xml
07/28/2010 11:27:24 7342 FieldPanel.xml
07/30/2010 09:55:04 33924 40091.db

End of report
```

Rename a File

Use this procedure to rename a file within the current directory, using the HMI. The drive must be set before this file operation can be performed. See the *Set Drive* section.

HMI	**S, H, F, F, F, R,** (System, Hardware, Fieldpanels, Filesys, File_ops, Rename_file)

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? f
>Copy_file, Rename_file, Move_file, Delete_file, Quit? r
>File name: testone------------------------------------------------
------
>New File Name: testtwo--------------------------------------------
------

DONE
```

Delete a File

Use this procedure to delete a file from the current directory, using the HMI. The drive must be set before this file operation can be performed. See the *Set Drive* section.

HMI	**S, H, F, F, F, D,** (System, Hardware, Fieldpanels, Filesys, File_ops, Delete_file)

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? f
>Copy_file, Rename_file, Move_file, Delete_file, Quit? d
>File name: wsroot\fpweb.swf---------------------------------------
>Are you sure: y
Deleting wsroot\fpweb.swf...

wsroot\fpweb.swf deleted successfully.
```

When deleting a panel using *.* in the filename prompt, do not use the \ (backslash) symbol before entering *.*. The panel may coldstart.

Move a File

Use this procedure to move a file from the current directory to another directory or drive, using the HMI. This procedure deletes the file from the current directory. The drive must be set before this file operation can be performed. See the *Set Drive* section.

HMI	**S, H, F, F, F, M,** (System, Hardware, Fieldpanels, Filesys, File_ops, Move_file)

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? f
>Copy_file, Rename_file, Move_file, Delete_file, Quit? m
>Source File Name: testtwo------------------------------------------
-------
>Destination Path: -------------------------------------------------
--------------------------------------------------------------------
---------------
b:\testtwo.swf-----------------------------------

DONE
```

Copy a File

Use this procedure to copy a file from the current directory to another directory or drive (root or subfolder), using the HMI. This procedure does not delete the file from the current directory. The drive must be set before this file operation can be performed. See the *Set Drive* section.

HMI	**S, H, F, F, F, C,** (System, Hardware, Fieldpanels, Filesys, File_ops, Copy_file)

Examples

Copying the file to a subfolder within the destination drive:

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? f
>Copy_file, Rename_file, Move_file, Delete_file, Quit? c
>Source File Name: fpweb.swf---------------------------------------
----
>Destination Path: ------------------------------------------------
-------------------------------------------------------------------
---------------
ifd:\wsroot\-------------------------------------

DONE
```

Copying the file to the root of the destination drive:

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel <40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops, Quit?
f
>Copy_file, Rename_file, Move_file, Delete_file, Remove_dir, Quit?
c
>Source File Name: index.html--------------------------------------
-------
>Destination Path: -------------------------------------------------
-------------------------------------------------------------------
---------------
ifd:\--------------------------------------------

DONE
```

Remove a Directory

Use this procedure to remove a directory from Drive A or B (root or subfolder), using the HMI. The drive must be set before this file operation can be performed. See the *Set Drive* section. To remove files from the Internal Flash Drive (IFD), you must use the wildcard feature (*.*).

This procedure will not remove a directory that has subdirectories within it. Subdirectories must be removed first.

You must be one directory or drive above the desired directory. Use the Set_drive, Change_dir, and listDirectory procedures to navigate to the desired location.

HMI	**S, H, F, F, R** (System, Hardware, Fieldpanels, Filesys, Remove_dir)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? s
>Drive name : a------------------------------

A:\
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? c
>File Directory : wsroot--------------------------

Path: A:\WSROOT\
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? c
>File Directory : graphics------------------------

Path: A:\WSROOT\Graphics\
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? c
>File Directory : media---------------------------

Path: A:\WSROOT\Graphics\MEDIA\
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? d

05/11/2011 WED File Directory 12:12

Path: A:\WSROOT\Graphics\MEDIA\

05/11/2011 08:24:28 20140 FAN_CENTRIFUGAL_SF_1.PNG
05/11/2011 08:24:28 21785 CHWV_BELIMO_4.PNG
05/11/2011 08:24:28 0 VALANIMATION1 <DIR>

End of report

>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? r
>Directory Name : valanimation1----------------------------
>Are you sure : y

Deleting FAN-R1.JPG...
Deleting FAN-R2.JPG...
Deleting FAN-R3.JPG...
Deleting THERM50.JPG...

valanimation1 deleted successfully.
```

Wildcard Example

```
>Point, Application, Time, Message, Cancel, System, passWord, Bye?
s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text, Quit?
h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? f
>Log, Display, Add, dElete, Modify, Config, Filesys, Quit? f
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? s
>Drive name : ifd-----------------------------

IFD
>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? d

05/11/2011 WED File Directory 12:13

Path: IFD:\

04/24/2009 14:06:28 7580 FieldPanel.xml
03/01/2010 14:45:26 328 LicenseVault.xml
wsroot\Graphics\MEDIA\VALANIMATION1\THERM0.JPG
05/11/2011 11:18:53 5600
wsroot\Graphics\MEDIA\VALANIMATION1\THERM10.JPG
05/11/2011 11:18:54 5601
wsroot\Graphics\MEDIA\VALANIMATION1\THERM20.JPG
05/11/2011 11:18:56 5620

End of report

>List_drives, Set_drive, listDirectory, Change_dir, File_ops,
Remove_dir, Quit? f
>Copy_file, Rename_file, Move_file, Delete_file, Quit? d
>File name : wsroot\Graphics\MEDIA\VALANIMATION1\*.*--
>Are you sure : Y

Deleting wsroot\Graphics\MEDIA\VALANIMATION1\THERM0.JPG...
Deleting wsroot\Graphics\MEDIA\VALANIMATION1\THERM10.JPG...
Deleting wsroot\Graphics\MEDIA\VALANIMATION1\THERM20.JPG...
deleted successfully.
```

Ethernet/IP Procedures

Procedures in this section are under the following HMI menu:
S, H, E (System, Hardware, Ethernet)

Displaying the Field Panel IP Settings

HMI	**S, H, E, S, D** (System, Hardware, Ethernet, ipSettings, Display)

Example

Ethernet Setup report for a BACnet/IP field panel

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, Telnet, Quit? s
>Display, Modify, dhcpRelease, reNew, Quit? d
07/17/2008 THU                 Ethernet Setup
Report                      12:53
----------------------------------------------------------------
-----------
Apogee Names
  Node name                        : MOD220-55
  Site name                        : ZONE_2
  BLN name                         : BACBLN
IP Settings
  DNS Suffix                       :
  DHCP                             : Disabled
  IP Address                       : 172. 16. 19. 49
  Netmask                          : 255.255.254.  0
  Gateway Address                  : 172. 16. 19.254
  DNS 1                            :   0.  0.  0.  0
  DNS 2                            :   0.  0.  0.  0
  DNS 3                            :   0.  0.  0.  0
  DNS 4                            :   0.  0.  0.  0
  Telnet Enabled                   : Enabled
BACnet Device Settings
  Device Instance Number           : 22055
  Device Location                  : ARCHIVES BASEMENT
  Device Description               : BACnet PXC-Modular
  Device Reserved Instance Base    : 10000
  COV Resubscribe Period (min)     : 60
  COV Poll Rate (sec)              : 60
BACnet IP ALN Settings             : Enabled
```

```
  BACnet IP Network Number         : 1
  UDP Port                         : 47808
  Act as a Foreign device          : NO
BACnet MSTP ALN Settings           : Disabled
(Note When FLN is MS/TP, and MS/TP ALN is enabled,
MS/TP ALN may also be used as second MS/TP FLN)
FLN Settings
  Fln Type                         : MS/TP
  FLN1 Baud rate                   : 4800 bps
  Wireless Enabled                 : N
End of report

>Display, Modify, dhcpRelease, reNew, Quit? -
```

Enabling or Disabling Telnet in the Field Panel

HMI	**S, H, E, T** (System, Hardware, Ethernet, Telnet) then **E** or **D** to enable/disable

Example (enable)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, Telnet, Quit? t
>Enable, Disable? e
Command successful
>ipSettings, Bbmd, Telnet, Quit? -
```

Setting or Modifying the Field Panel IP Configuration

NOTE:
The field panel coldstarts during this procedure.

HMI	**S, H, E, S, M** (System, Hardware, Ethernet, ipSettings, Modify)

Prompt/Field	Option/Entry	Description
Node name		Alphanumeric field Object name of the panel - must be unique on the entire system.
Site name		Alpha-numeric field BACnet panels and Insight software on same IP subnet should have the same site name. The site name affects which discovery and replication times are used.
BLN name		Alpha-numeric field This must be identical to the System Name of the BACnet ALN in System Profile.
DNS suffix		Press **ENTER** to continue without entering data BACnet field panels do not use naming resolution.
DHCP	Y	DHCP is enabled DHCP server is to assign the field panels IP addresses.
	N	DHCP is disabled If using fixed IP addresses.
	IP address	Numeric field If DHCP = N, you are prompted for an IP setting. Enter the IP setting. If DHCP = Y, you are not prompted for the IP setting.
	Netmask	Numeric field
	Gateway address	IP address for the assigned gateway If there is no IP gateway, enter **0.0.0.0**.
	DNS 1	Enter the address of the DNS server. This can be obtained from the site's IT department. If you do not need to specify DNS addresses, enter **0.0.0.0** for each of these.
	DNS 2	
	DNS 3	
	DNS 4	
Telnet Enabled	Y	Telnet is enabled to allow remote HMI sessions using Telnet and to enable FTP.
	N	Telnet is disabled Remote HMI and FTP are blocked.
Configure BACnet	Y	BACnet configuration options are displayed.
	N	Exit configuration and save or discard changes.
Configure BACnet device	Y	Configure BACnet Device.

	Device Instance Number	Numeric field. Valid values are 0 through 4,194, 302. Must be unique on the entire BACnet site. Recommended values for Siemens panels: 7000 though 7999 for Siemens panels.
	Device Location	Alpha-numeric field Specify a descriptive location so the customer or other Siemens employee can locate the device.
	Device Description	Press **ENTER** to accept existing value Enter a device description.
	Device Reserved Instance Base	Press **ENTER** to accept the default of 10,000 Enter the instance number where the field panel starts creating BACnet points for FLN devices; this must be at least 10000.
	COV Resubscribe Period (min)	Press **ENTER** to accept default of 30 Enter a number that identifies how often the field panel and the system will re-register for COVs.
	COV Poll Rate (sec)	Press **ENTER** to accept default of 60 Enter a number, in seconds (10 to 3600) that identifies how often the field panel and the system will poll devices that do not support the Subscribe COV BACnet service.
	N	Press **ENTER** to default value of 10000.
Enable BACnet IP ALN	Y	Configure the IP ALN
	BACnet IP Network Number	Specify a network; valid values are 1 through 65534. This network must be unique for the entire BACnet site. No other BACnet MS/TP ALN or BACnet MS/TP FLN or third-party network number may be the same.
	UDP Port	Accept the default BACnet UDP port, 47808. Other port may be used if required.
	N	No IP ALN.
Act as a Foreign Device	Y	A foreign device is a BACnet device (workstation or field panel) that has an IP connection but does not have a BBMD or multicast router on its subnet to allow it access to BACnet broadcast messages. A foreign device enables itself to send and receive both directed and broadcast messages. Foreign devices are only used when a BACnet device is joining a network that spans multiple IP subnets and it is only going to be on that network for a short time.

	N	If the BACnet network does not span multiple Networks, enter **N**.
Enable MSTP ALN	Y	If MS/TP ALN is used, enter **Y** and configure the next three parameters.
	MSTP ALN Baud Rate	Enter the desired baud rate. 38400 is recommended.
	MSTP ALN Network Number	Specify a network. Valid values are 1 through 65534. This network must be unique for the entire BACnet site. No other BACnet/IP ALN, BACnet MS/TP ALN or BACnet MS/TP FLN or third-party network number may be the same.
	MSTP ALN Node Address	Enter a MAC address. Valid values are 0 through 127. Address 0 is recommended. This address is the MAC address of the BACnet/IP to BACnet MS/TP ALN router. No other device on the BACnet MS/TP ALN may have the same MAC address. Other MS/TP FLNs or MS/TP ALNs may use this address.
	N	Enter **N** unless MS/TP ALN is being used.
P1, Mstp	P	Select **P** for p1.
	FLN1 Baud Rate	A typical baud rate is 4800 for TECs and VFDs. If you are using P1 BIM, PXC on P1, PXMs, you can specify another baud rate. On a PXC Modular, you will be prompted for the baud rates of all three FLNs.
	FLN2 Baud Rate	
	FLN3 Baud Rate	
	Wireless Enabled (Y/N)	If the FLN will be Wireless, specify **Y**. Otherwise, specify **N**.
	M	Select **M** for MS/TP FLN.
	Enable MSTP FLN (Y/N)	Select **Y** to enable the MS/TP FLN.
	MSTP FLN Baud Rate	Enter the desired baud rate. 38.4k is recommended
	MSTP FLN Network Number	Specify a network. Valid values are 1 through 65534. This network must be unique for the entire BACnet site. No other BACnet/IP ALN, BACnet MS/TP ALN or BACnet MS/TP FLN or third party network number may be the same.

	MSTP FLN Node Address	Enter a BACnet Media Access Control (MAC) address. Valid values are 0 through 127. Address 0 is recommended. This address will be the MAC address of the BACnet/IP to BACnet MS/TP FLN router. No other device on the BACnet MS/TP FLN may have the same MAC address. Other MS/TP FLNs or MS/TP ALNs may use this address.
	MSTP Keep Alive Poll Rate	Enter desired time between live node scans (10 to 300 seconds) if different than the default setting. Press **ENTER** to accept the default of 60.
	MSTP FLN Discovery Poll Rate	Enter the desired time between dead node scans (10 to 300 seconds) if different than default setting. Press **ENTER** to accept the default of 60.
OK to coldstart (Y/N)	Y	Coldstart the field panel and save the configuration.
	N	Do not coldstart. Discard any changes.

Release and Renew DHCP Settings

Perform both parts of this procedure to cause the DHCP server to assign a new IP address to the field panel.

HMI	**S, H, E, S, R** (System, Hardware, Ethernet, ipSettings, dhcpRelease)

Example (Release)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, Telnet, Quit? s
>Display, Modify, dhcpRelease, reNew, Quit? r
Command successful

>Display, Modify, dhcpRelease, reNew, Quit? n
```

Example (reNew)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
```

```
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, Telnet, Quit? s
>Display, Modify, dhcpRelease, reNew, Quit? n
Command successful

>Display, Modify, dhcpRelease, reNew, Quit? n
```

Displaying the BACnet Broadcast Message Device (BBMD) Address Report

This procedure generates a BACnet Broadcast Message Device (BBMD) Address report for a specific BACnet device. The report contains the IP address settings of all BBMDs entered in the BBMD Address Table of that device.

NOTE:
To allow BACnet broadcast messages to reach every subnet on the network, each BBMD on the network must be entered in the BBMD Address Table for every other BBMD on the network.

HMI	**S, H, E, B** (System, Hardware, Ethernet, Bbmd)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Quit? e
>ipSettings, Bbmd, Telnet, Quit? b
>Field panel           : 1------
> Display, Edit, Quit? d

07/17/2008 THU              BACnet BBMD Address
Report                    14:06
----------------------------------------------------------------
---------------
<9005>
IP Address                Netmask                   UDP Port
----------------------------------------------------------------
-
192.168.0.101             255.255.255.255           47808
192.168.1.102             255.255.255.255           47808
192.168.2.13              255.255.255.0             47808

End of report
```

```
>Display, Edit, Quit? -
```

Adding a Device to the BBMD Address Table

Use this procedure to enter BACnet Broadcast Message Device (BBMD) information in the BACnet BBMD Address Table of the local field panel, or to configure the local device as a BBMD and add it to the local table.

NOTE:
This procedure must be performed once for each BBMD on the network at every BBMD on the network.

NOTE:
To configure the field panel you are connected to as the BBMD for the local BACnet/IP subnet, add that field panel to its own BBMD Address Table.

Adding a Device to the BBMD Address Table

HMI	**S, H, E, B** (System, Hardware, Ethernet, Bbmd)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Quit? e
>ipSettings, Bbmd, Telnet, Quit? b
>Field panel           : 771------
>Display, Edit, Quit? e
>Add, Delete, dElete_all, Look, Quit? a
>IP Address                    : 172.16.5.71
>Netmask                       : 255.255.255.255
>UDP Port                      : 47808
Command successful

>Add, Delete, dElete_all, Look, Quit? -
```

The UDP port default value is 47808 for the BBMD device.

The field panel is now added to the BACnet BBMD Address Table. If you added the local field panel to its own table, it is now configured as a BBMD.

NOTE:
Siemens Industry, Inc. recommends 2-hop configuration for all BBMDs. A 2-hop BBMD netmask is configured as follows: 255.255.255.255. Any other netmask will result in 1-hop configuration.

Deleting or Converting a Device from the BBMD Address Table

Use this procedure to delete a BBMD from the local BACnet BBMD Address Table, which contains the IP address settings of all BACnet Broadcast Message Devices (BBMDs) on the network. This converts the BBMD to a standard BACnet field panel.

NOTE:
All BBMD tables must be identical. You must delete this BBMD entry from the Address Table of every BBMD on the network.

HMI	**S, H, E, B** (System, Hardware, Ethernet, Bbmd)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Quit? e
>ipSettings, Bbmd, Telnet, Quit? b
>Field panel           : 771------
>Display, Edit, Quit? e
>Add, Delete, dElete_all, Look, Quit? d
>IP Address                     : 172.16.5.71
Command successful

>Add, Delete, dElete_all, Look, Quit? -
```

Deleting All Entries from a BBMD Address Table

Use this procedure to delete all entries from the local BACnet BBMD Address Table, which contains the IP address settings of all BACnet Broadcast Message Devices (BBMDs) on the site network.

HMI	**S, H, E, B** (System, Hardware, Ethernet, Bbmd)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Quit? e
>ipSettings, Bbmd, Telnet, Quit? b
>Field panel           : 771------
>Display, Edit, Quit? e
>Add, Delete, dElete_all, Look, Quit? e
>Are you sure                   : y
Command successful Field panel name 771

>Add, Delete, dElete_all, Look, Quit? -
```

Backing Up Graphics

Use these procedures to back up graphics files using the HMI.

HMI	**S, H, E, W, G** (System, Hardware, Ethernet, Webserver, Graphicsbackup

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel
<40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, Telnet, Webserver, Quit? w
>Display, Modify, Uiupgrade, Graphicsbackup, Quit? g
>Are you sure : y

DONE
```

Enabling or Disabling Web Server

Use these procedures to enable or disable the Web Server.

HMI	**S, H, E, W, M** (System, Hardware, Ethernet, Webserver, Modify

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel
<40091>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, Telnet, Webserver, Quit? w
>Display, Modify, Uiupgrade, Graphicsbackup, Quit? m
>Webserver Enabled (Y/N) : y
>Ok to coldstart (Y/N) : y
```

Use these procedures to check the enabled/disabled status of the Web Server.

HMI	**S, H, E, W, D** (System, Hardware, Ethernet, Webserver, Display

Example

```
10:13:04 07/30/2010 FRI Logged on successfully Field panel
<40091>
User: <high> <High default user account>
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, Telnet, Webserver, Quit? w
>Display, Modify, Uiupgrade, Graphicsbackup, Quit? d
Webserver Enabled : Enabled
```

Disks Procedures

The main disk defines the ALN address numbers of the *main* and *backup* Insight workstations. In the case of a field panel failure, the main Insight workstation will attempt to reload the field panels. The backup ALN address number identifies a secondary Insight workstation used if the main Insight workstation is unavailable.

NOTE:
When Desigo CC discovers an APOGEE Field Panel, Desigo CC will auto-add itself as the field panel's main disk or backup disk, if a slot is available (and the field panel is in ready state), in order to receive database change notifications. However, Desigo CC separates the concept of field panel main disk/backup disk from Desigo CC's feature of Backup/Restore. The Backup/Restore feature of Desigo CC, which uses native BACnet services, can be enabled or disabled independently. See the *Desigo CC* user documentation for more information.

Displaying Workstation Disks

This procedure displays the ALN address or name of the main and backup Insight disks.

HMI	**S, H, D, L** (System, Hardware, Disk, Log)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? d
>Log, Add, Delete, Quit? l

07/17/2008 THU              SYSTEM HARDWARE DISK
REPORT                   18:44
----------------------------------------------------------------
---------------
  Main disk            : 13933
  Backup disk          : <Not defined>
End of report
```

Adding a Workstation Disk

This procedure defines the ALN addresses or node names of the main or backup Insight disks.

HMI	**S, H, D, A** (System, Hardware, Disk, Add) then type **M** for main or **B** for backup

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware,
Text, Quit? H
>Fieldpanels, Disks, Partners, Quit? D
>Log, Add, Delete, Quit? A
>Main, Backup                  :  B
>Are you sure (Y/N)            :  Y
Backup disk added in field panel 98

>Log, Add, Delete, Quit? –
```

Deleting a Workstation Disk

This procedure deletes a main or backup Insight disk from the ALN.

HMI	**S, H, D, D** (System, Hardware, Disk, Delete) then type **M** for main or **B** for backup

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware,
Text, Quit? H
>Fieldpanels, Disks, Partners, Quit? D
>Log, Add, Delete, Quit? D
>Main, Backup                  :  B
>Are you sure (Y/N)            :  Y
Backup disk deleted in field panel 98

>Log, Add, Delete, Quit? –
```

State Text Commands and Procedures

State text is a function that defines how the field panel visually reports and commands the values of digital and LENUM point types.

- For digital points, the default state text includes words like ON, OFF, RUN, and STOP to describe the value of a point.
- For LENUM points, the system assigns a state text table with six states.
- PPCL and analog points never use state text.

NOTE:
State text always displays in English.

You can modify the state text when the default text does not match the purpose or function for which a point is defined. For example, for a digital input point, such as a sensor monitoring a security door, the default state text may not make sense. When viewed on a display, the security door would be either ON or OFF. To clarify the display, the words OPEN and CLOSED would better describe the security door:

```
07/17/2008 THUR                  POINT LOG
REPORT                      07:12pm
-----------------------------------------------------------------
---------------
Search for <*:>

Point name
   :Suffix
(Description)                       Value/State      Status  Prio
rity
-----------------------------------------------------------------
---------------
!Field panel 3
  :Address                                    3                 -
N-       NONE

BLD990.FLR01.SECURITY DOOR (Sensor point)     OPEN              -
N-       NONE
```

Default State Text Tables

The state text table is a collection of two or more values and descriptions, grouped according to type of equipment or method of control. For example, the state text table DAY_NIGHT looks like the following:

```
07/17/2008 THUR               STATE TEXT TABLE
REPORT                   07:23pm
-----------------------------------------------------------------
---------------
Search for <DAY_NIGHT>

Table name          Table ID            # of states
     State                   Value
-----------------------------------------------------------------
---------------
DAY_NIGHT           <default>           2
     DAY                     0
     NIGHT                   1

End of report

>Log, Display, Edit, Quit? -
```

There are more than 50 predefined state text tables available to every field panel on the ALN. Additional state text tables can be added and customized to fit any type of control or equipment.

The default state text tables are listed in *State Text File Listing* [→ 395].

Custom State Text Tables

Besides the pre-defined (default) state text tables in the field panel, additional tables can be entered to accommodate custom applications. Depending on how the system is set up, the custom state text tables can be defined after points are entered into the database. If a point definition references an undefined custom state text table, the system represents the status with a question mark (?) and the point value:

```
07/17/2008 THUR                  POINT LOG
REPORT                       07:23pm
----------------------------------------------------------------
---------------
Search for <*:>

Point name
   :Suffix
(Description)                      Value/State      Status  Prio
rity
----------------------------------------------------------------
---------------
!Field panel 3
  :Address                                    3                -
N-       NONE

BLD990.COOLING.FLOW (flow sensor)           ? 0                -
N-       NONE
```

State Text Table Attributes

All state text tables contain the following attributes:

Table name	Unique name for the system. The table name can contain up to 30 alphanumeric characters.
Table ID	Unique identifier used when creating new state text tables. The Table ID range is 1 through 32767.
Number of states	Number of states contained in the table. The range for number of states is 1 through 32767.
State description	Text associated to a point value. The description can contain up to 8 alphanumeric characters.
State value	Logical value of the point. Binary: The state value can be 0 or 1. Multistate or LENUM: The state value range is 1 through 32767. Must not include 0 as a value.

Displaying a State Text Table Log

This procedure displays a summary report of state text table(s) on an ALN.

HMI	**S, T, L** (System, Text, Log) ..and then specify the state text table(s)

Example

```
07/17/2008 THUR                STATE TEXT TABLE
LOG                      07:24pm
----------------------------------------------------------------
---------------
Search for <*>

Table name           Table ID             # of states
----------------------------------------------------------------
---------------
ACTIVE_NTRAL         <default>            2
ALARM_NORMAL         <default>            2
BLEED_HOLD           <default>            2
...

End of report

>Log, Display, Edit, Quit? –
```

Displaying a State Text Table Report

This procedure displays a detailed report of the state text table(s) on an ALN.

HMI	**S, T, D** (System, Text, Display) ..and then specify the state text table(s)

Example

```
07/17/2008 THUR               STATE TEXT TABLE
REPORT                    12:58pm
----------------------------------------------------------------
---------------
Search for <ALARM_NORMAL>

Table name           Table ID             # of states
     State                     Value
----------------------------------------------------------------
---------------
ALARM_NORMAL         <default>            2
     ALARM                     0
     NORMAL                    1
```

```
End of report

>Log, Display, Edit, Quit? –
```

Adding a State Text Table

This procedure adds a state text table to the ALN. Before you begin, it is helpful to identify the following items:

- Text table name
  1 to 16 alphanumeric characters. Valid characters include A to Z, a to z, 0 to 9, spaces ( ), periods (.), commas (,), dashes (-), underlines (_), and apostrophes (').
- Text table ID (Valid numbers range from 1 through 32767).
- Values and descriptions for each state.

HMI	**S, T, E, T, A** (System, Text, Edit, Table, Add)

Example

The following is one example of how to add a RUN_STOP state text table.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Log, Display, Edit, Quit? E
>Table, States, Quit? T
>Add, Delete, Look, Quit? A
>State text table name         :  RUN_STOP--------
>State text table ID           :  1----
>  1) Value                    :  0-----
>  1) State text               :  RUN-----
>  2) Value                    :  2-----
>  2) State text               :  STOP----
>  3) Value                    :  ------
Command successful

>Add, Delete, Look, Quit? –
```

Deleting a State Text Table

This procedure deletes a custom state text table from the ALN. Any references to the deleted state table are represented by a question mark. Default state text tables cannot be deleted.

HMI	S, T, E, T, D (System, Text, Edit, Table, Delete)

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Log, Display, Edit, Quit? E
>Table, States, Quit? T
>Add, Delete, Look, Quit? D
>State text table name         :  RUN_STOP--------
>Are you sure (Y/N)            :  Y
Command successful
```

Adding States to a State Text Table

This procedure adds additional states and associated text descriptions to an existing state text table.

HMI	S, T, E, S, A (System, Text, Edit, States, Add)

Example

The following example shows how to add an additional state to the RUN_STOP state text table:

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Log, Display, Edit, Quit? E
>Table, States, Quit? S
>Add, Modify, Delete, Look, Quit? A
>State text table name         :  RUN_STOP--------
>Value                         :  3-----
>State text                    :  PROOF---
Command successful

>Add, Modify, Delete, Look, Quit? –
```

Modifying a State Text Table

This procedure modifies the state values or descriptions for the entries in a state text table.

HMI	**S, T, E, S, M** (System, Text, Edit, States, Modify)

Example

In this example, the State text for Value 3 will be modified from PROOF to PROOFING.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Log, Display, Edit, Quit? E
>Table, States, Quit? S
>Add, Modify, Delete, Look, Quit? M
>State text table name         :  RUN_STOP--------
>Value                         :  3-----
>State text                    :  PROOFING
Command successful
```

Deleting States from a State Text Table

This procedure deletes a value state and the associated description from an existing state text table. Note that you cannot delete states from a default state text table.

HMI	**S, T, E, S, D** (System, Text, Edit, States, Delete)

Example

In this example, the value **3** is specified for deletion.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? S
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Log, Display, Edit, Quit? E
>Table, States, Quit? S
>Add, Modify, Delete, Look, Quit? D
>State text table name         :  RUN_STOP--------
>Value                         :  3-----
>Are you sure (Y/N)            :  Y
Command successful
```

Notifications

Event Type	Notification Parameters	Referenced Object's Properties	Description
CHANGE_OF_STATE	New_State Status_Flags	Present_Value Status_Flags	The new value of the referenced property. The Status_Flags of the referenced object.
COMMAND_FAILURE	Command_Value Status_Flags Feedback_Value	Present_Value Status_Flags Feedback_Value	The value of the property that was commanded. The Status_Flags of the referenced object. The value that differs from the Command_Value.
FLOATING_LIMIT	Referenced_Value Status_Flags Setpoint_Value Error_Limit	Controlled_Variable_Value Status_Flags Setpoint Error_Limit	The new value of the referenced property. The Status_Flags of the referenced object. The value of the setpoint reference. The difference limit that was exceeded.
OUT_OF_RANGE	Exceeding_Value Status_Flags Deadband Exceeded_Limit	Present_Value Status_Flags Deadband Low_Limit or High_Limit	The value that exceeded a limit. The Status_Flags of the referenced object. The deadband used for limit checking. The limit that was exceeded.

SNMP Procedures

Creating Notification Class

Using SNMP in a field panel requires you to create a Notification Class in the panel. After logging into the controller, do the following:

HMI	**A, B, N, E, A** (Application, BACnet, Notification, Edit, Add)

Prompt/Field	Option/Entry
Field panel	Press **ENTER**.
Notification Class Name	SNMP
Notification ID	0 through 255.
Description	Press **ENTER**.
OFFNormal Priority	0 (zero)
OFFNormal Ack Required	Y
Fault Priority	0 (zero)
Fault Ack Required	Y
Normal Priority	0 (zero)
Normal Ack Required	Y
Add Destination (Y/N)	Y
Valid Days (m, t, w, th, f, sa, su)	Press **ENTER**.
Start time (HH:MM:SS)	Press **ENTER**.
Stop time (HH:MM:SS)	Press **ENTER**.

Device, Address, Broadcast	Enter **D**.
Recipient Device Instance	Enter the Panel Instance Number.
Process ID	Press **ENTER**.
Confirmed Notifications (Y/N)	Y
OffNormal transitions (Y/N)	Y
FAULT transitions (Y/N)	Y
NORMAL transitions (Y/N)	Y
Add another destination	N

Example:

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? a
>Ppcl, flNdevice, Quit? b
>Calendar, Schedule, coMmander, Notification, Bbmd, coVtable,
Event, Quit? n
>Log, Display, Edit, deStinations, Quit? e
>Add, Delete, Look, Quit? a
>Field panel : -------
>Notification Class Name : SNMP--------------------------
>Notification ID : 255----
>Description : SNMP------------
>OFFNORMAL Priority (0-255) : ---
>OFFNORMAL Ack Required (Y/N) : y
>FAULT Priority (0-255) : ---
>FAULT Ack Required (Y/N) : y
>NORMAL Priority (0-255) : ---
>NORMAL Ack Required (Y/N) : y
>Add Destination (Y/N) : y
>Valid Days (m,t,w,th,f,sa,su) : --
>Start time (HH:MM:SS) : -----------
>Stop time (HH:MM:SS) : -----------
>Device, Address, Broadcast : d
>Recipient Device Instance : 5001
>Process ID : -------
>Confirmed Notifications (Y/N) : y
>OFFNORMAL transitions (Y/N) : y
>FAULT transitions (Y/N) : y
>NORMAL transitions (Y/N) : y
>Add another destination (Y/N) : n
```

Creating Alarm Messages at the HMI

You can create alarm messages at the HMI.

After logging into the panel, do the following:

HMI	**P, A, E, E, ENTER, A** (Point, Alarm, mEssage, Edit, ENTER, Add)

Prompt/Field	Option/Entry
Message Number	0 to 250
Line 1: ?	[BACnet Alarm Message Text]
Line 2: ?	Press ENTER

Example:

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
>mEssage, Acknowledge, eVent, Quit? e
>Display, Edit, eNable, dIsable, Quit? e
>Field panel : -------
>Add, Modify, Copy, Delete, Look, Help, Quit? a
>Message number : 250
>Line 1:? [BACnet Alarm Message Text]-------------------------
>Line 2:? --------------------------------------------------
Command successful
```

Selecting Points for the MIB for SNMP

After logging into the controller, do the following:

HMI	**S, H, E, N, M, A** (System, Hardware, Ethernet, sNmp, Mibpoints, Add)

Prompt/Field	Option/Entry
Point System Name	Enter a point name.
Enable Write (Y/N)	Y
Enable Alarm Reporting (Y/N)	Y

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
```

```
>ipSettings, Bbmd, sNmp, Telnet, Webserver, Quit? n
>Mibpoints, Snmpmanager, Quit? m
>Display, Add, Modify, Remove, Look, Genmib, Quit? a
>Point system name : LDO3-----------------------------------
>Enable Write<Y/N> : y
>Enable Alarm Reporting<Y/N> : y
Command successful
```

Generating the MIB File

After creating the points, adding the Notification Class, adding the Alarm Message, and selecting the points for the MIB, you will need to generate the MIB. Using HMI software (HyperTerminal, Tera Term, or something similar), you will need to create an output file for the SNMP MIB.

For example, in Tera Term, do the following:

1. From the **File** menu, select **Log**. A pop-up window with file storage options displays.
2. Type the desired log file name and then click **Open**. The pop-up window will close and the log file will be created. You are ready to start logging everything from the HMI screen.

After logging into the controller, do the following:

HMI	**S, H, E, N, M, G, ENTER** (System, Hardware, Ethernet, sNmp, Mibpoints, Genmib, ENTER)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, sNmp, Telnet, Webserver, Quit? n
>Mibpoints, Snmpmanager, Quit? m
>Display, Add, Modify, Remove, Look, Genmib, Quit? g

01/01/2009 THU GEN_MIB REPORT 20:21
----------------------------------------------------------------
---------------
sbt_fp_4194303 DEFINITIONS ::= BEGIN

IMPORTS
enterprises FROM RFC1155-SMI
OBJECT-TYPE FROM RFC-1212
DisplayString FROM RFC-1213
TRAP-TYPE FROM RFC-1215;

sbtOBJECT IDENTIFIER ::= {enterprises 6361}
fp_4194303OBJECT IDENTIFIER ::= {sbt 4194303}
```

```
fp_4194303_Notifications OBJECT IDENTIFIER ::= {fp_4194303 0}

General_Notifications NOTIFICATION-TYPE
OBJECTS
{}
STATUScurrent
DESCRIPTION
""
::={fp_4194303_Notifications 0}

LAO1 OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Add Missing Point Descriptor"
::={fp_4194303 1}

LAO1_LOW_ALARM NOTIFICATION-TYPE
OBJECTS
{LAO1}
STATUScurrent
DESCRIPTION
"Add Missing Trap Descriptor"
::={fp_4194303_Notifications 1}

END
End of report
```

To stop logging to the file, select **Close** in the Tera Term log window.

Modifying the Log File

You must now modify the logged text file into a MIB file.

- Open the logged file with Word. It may look similar to the following:

```
h
>Enter user initials : ----high
>Enter user password : ---------------????
09:06:32 09/14/2009 MON Logged on successfully Field panel
<4194303>
User: <high> <High default user account>

>Point, Application, Time, Message, Cancel, System, passWord,
Bye? -s
```

```
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? -h
>Fieldpanels, Ethernet, nodeNametable, Disks, Licensemanager,
Quit? -e
>ipSettings, Bbmd, sNmp, Telnet, mibpOints, Webserver, Quit? -n
>Mibpoints, Snmpmanager, Quit? -m
>Display, Add, Modify, Remove, Look, Genmib, Quit? -g

09/14/2009 MON GEN_MIB REPORT 09:06
--------------------------------------------------------------
----------
sbt_fp_4194303 DEFINITIONS ::= BEGIN

IMPORTS
enterprises FROM RFC1155-SMI
OBJECT-TYPE FROM RFC-1212
DisplayString FROM RFC-1213
TRAP-TYPE FROM RFC-1215;

sbtOBJECT IDENTIFIER ::= {enterprises 6361}
fp_4194303OBJECT IDENTIFIER ::= {sbt 4194303}
fp_4194303_Notifications OBJECT IDENTIFIER ::= {fp_4194303 0}

General_Notifications NOTIFICATION-TYPE
OBJECTS
{}
STATUScurrent
DESCRIPTION
""
::={fp_4194303_Notifications 0}

P1LDI01 OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Add Missing Point Descriptor"
::={fp_4194303 1}
```

- Delete all information and symbols before sbt_fp_xxxxxxx (**bolded** in the example above).

The end of the file should be similar to the following:

```
P5LAI02_FAULT NOTIFICATION-TYPE
OBJECTS
{P5LAI02}
STATUScurrent
```

```
DESCRIPTION
"Add Missing Trap Descriptor"
::={fp_4194303_Notifications 18}

END
```

```
End of report

>Display, Add, Modify, Remove, Look, Genmib, Quit? -
09:11:49 09-14-2009 MON Logged off successfully Field panel
<4194303>
User: <HIGH> <High default user account>

>Time, Message, Cancel, Hello? –
```

1. Delete all the information after END (**bolded** in the example above). Save the file.
2. Change the Point Descriptor or Trap Descriptor to a user-defined description, so the SNMP manager will see the Descriptor on the Manager Screen. See the example below.

```
P1LDI01 OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Add Missing Point Descriptor" change to “Point 1 Logical
Digital Input 01”
::={fp_4194303 1}

P1LDI01_Alarm NOTIFICATION-TYPE
OBJECTS
{P1LDI01}
STATUScurrent
DESCRIPTION
"Add Missing Trap Descriptor" change to “Switch 1 is in the
Manual position”
::={fp_4194303_Notifications 1}

P1LDI01_NORMAL NOTIFICATION-TYPE
OBJECTS
{P1LDI01}
STATUScurrent
DESCRIPTION
"Add Missing Trap Descriptor" change to “Switch 1 is in the Auto
position”
::={fp_4194303_Notifications 2}
```

```
P1LDI01_FAULT NOTIFICATION-TYPE
OBJECTS
{P1LDI01}
STATUScurrent
DESCRIPTION
"Add Missing Trap Descriptor" change to "Switch 1 is faulted"
::={fp_4194303_Notifications 3}
-----------------------------------------------------------------
---------
P4LAO01 OBJECT-TYPE
SYNTAX DisplayString (SIZE (0..255))
ACCESS read-write
STATUS mandatory
DESCRIPTION
"Add Missing Point Descriptor" change to "Room 6, 2nd Flr, Bldg
4 Temp"
::={fp_4194303 4}

P4LAO01_LOW_ALARM NOTIFICATION-TYPE
OBJECTS
{P4LAO01}
STATUScurrent
DESCRIPTION
"Add Missing Trap Descriptor" change to "Room 6 2nd Flr Bldg 4
Low Temp Alarm"
::={fp_4194303_Notifications 11}

P4LAO01_HIGH_ALARM NOTIFICATION-TYPE
OBJECTS
{P4LAO01}
STATUScurrent
DESCRIPTION
"Add Missing Trap Descriptor" change to "Room 6 2nd Flr Bldg 4
High Temp Alarm"
::={fp_4194303_Notifications 12}

P4LAO01_NORMAL NOTIFICATION-TYPE
OBJECTS
{P4LAO01}
STATUScurrent
DESCRIPTION
"Add Missing Trap Descriptor" change to "Room 6 2nd Flr Bldg 4
Normal Temp"
::={fp_4194303_Notifications 13}
```

```
P4LAO01_FAULT NOTIFICATION-TYPE
OBJECTS
{P4LAO01}
STATUScurrent
DESCRIPTION
"Add Missing Trap Descriptor" change to “Room 6 2nd Flr Bldg 4
Temp Sensor Fault”
::={fp_4194303_Notifications 14}
```

1. Save the file. Once the file is saved, change the file type from .XXX to .MIB. See the *MIB* section of this document for an example.
2. Test your MIB so that you can browse and see the points using some type of a MIB browser, such as iReasoning.
3. Pass this file to the SNMP manager user so it can be loaded into the manager and receive traps.
   NOTE: This is not a validated MIB and must be modified further. To validate your MIB, use a MIB validator site, such as Muonics.com.

Adding SNMP Manager Information for Traps

NOTE: A maximum of five SNMP Manager IP Addresses can be added.

HMI	**S, H, E, N, S, A** (System, Hardware, Ethernet, sNmp, Snmpmanager, Add)

Prompt/Field	Option/Entry
IP Address	Enter IP Address

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, sNmp, Telnet, Webserver, Quit? n
>Mibpoints, Snmpmanager, Quit? s
>Add, Remove, Display, Modify, Cnfgpswd, Quit? a
>IP Address : 130.132.40.6
Command successful

>Add, Remove, Display, Modify, Cnfgpswd, Quit?
```

Configuring Password for Traps and Receiving Commands

If you want to change the default User Name, Privacy Password and Authentication Password, do the following:

HMI	**S, H, E, N, S, C** (System, Hardware, Ethernet, sNmp, Snmpmanager, Cnfgpswd)

Prompt/Field	Option/Entry
Existing User Name	siemens (all lowercase)
Existing Privacy Password	high$123 (all lowercase)
Existing Authentic Password	high$123 (all lowercase)
New User Name	Enter new user name.
New Privacy Password	Enter new privacy password.
New Authentic Password	Enter new authentic password.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, sNmp, Telnet, Webserver, Quit? n
>Mibpoints, Snmpmanager, Quit? s
>Add, Remove, Display, Modify, Cnfgpswd, Quit? c
>Existing User Name : siemens
>Existing Privacy Password : ????????
>Existing Authentic Password : ????????
>New User Name : hsjobsite
>New Privacy Password : ????????
>New Authentic Password : ????????
Command successful
```

Back up, Restore, and Autorestore

The field panel must be configured to automatically restore the database from flash memory after a coldstart, and the Insight software should not be used:

- When autorestore is enabled, a coldstart does not result in the same downtime as with earlier revisions of firmware. Because there is no waiting on a full download from the backup system, the database is restored from flash so quickly that it seems as though the field panel never coldstarted.
- Database restoration from flash is disabled by default and should be enabled.

HMI	**S, H, F, C, L** (System, Hardware, Fieldpanels, Config, db_fiLe)

Next Sub-menu Option	Prompt/Field	Option/Entry	Description
Save, Clear Restore_db	Field panel	Enter field panel name	
	Are you sure (Y/N)	Y	Save, Clear, or Restore the database.
		N	Do not Save, Clear, or Restore the database.
Autorestore • Enable • Disable	Field panel	Enter field panel name	
	Are you sure (Y/N)	Y	Enable Autorestore.
		N	Disable Autorestore.
Display	Field panel	Enter field panel name	

In order to support autorestore and database backup to flash, the following new HMI prompts (bolded below) have been added.

```
>Point, Application, Time, Message, Cancel, System, passWord, Bye? s
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware, Text, Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Partners, Licensemanager, Vaem, Quit? f
>Log, Display, Add, dElete, Modify, Config, Ostracize, Quit? c
>Hmi, alnSettings, db_fiLe, Fln, mOdem, Names, Defaultlanguage, Quit? l
>Save, Clear, Restore_db, Autorestore, Display, Quit? s
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Database Backed Up to Flash


>Save, Clear, Restore_db, Autorestore, Display, Quit? c
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Flash Backup Erased


>Save, Clear, Restore_db, Autorestore, Display, Quit? r
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Command successful


>Save, Clear, Restore_db, Autorestore, Display, Quit? a
>Enable, Disable, Quit? e
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Autorestore enabled


>Save, Clear, Restore_db, Autorestore, Display, Quit? a
>Enable, Disable, Quit? d
>Field panel : ---
>Are you sure (Y/N) : y
Field panel 6: Autorestore disabled

>Save, Clear, Restore_db, Autorestore, Display, Quit? d
>Field panel : ---

01/01/2006 SUN DB File Report 00:16
-------------------------------------------------------------------------------
Field panel : 6
Flash backup : Present
Database size : 2482 bytes
Last saved : 00:16:43 01/01/2006 SUN
Result of last backup : Success
Autorestore : Disabled
File manager status : Idle
```

Chapter 3—User Accounts

Chapter 3 provides information for the high-level system administrator who is responsible for overall system operation and security. In order to use the functionality described in User Accounts, you must have Edit access (highest level) privileges to the system.

Major topics in this chapter include:

- What Are User Accounts?
- What Are Access Groups?
- What Are Access Levels?
- Password Security Options—Three Strikes Lockout and Password Expiration
- Guidelines for Managing User Accounts
- User Account Attributes
- User Account Procedures
  - Adding a User Account
  - Modifying a User Account
  - Copying a User Account
  - Deleting a User Account
  - Modifying an Access Group Name
- User Account Reports

Before You Begin

Before using the information in this section, you should have a working understanding of the following concepts:

- HVAC equipment of the facility
- Point database
- General knowledge of the APOGEE Automation System

What Are User Accounts?

User accounts are used to manage access and security for field panels on a specified Automation Level Network (ALN). By creating individual accounts, a system administrator can control each user’s access to objects and functions residing in field panels on a specified ALN.

Specifically, a system administrator can perform the following tasks:

- Define the users that can access a ALN
- Assign access to access groups
- Assign privileges to field panel functions residing on an ALN

Any user accounts that are created or modified through the field panel HMI are used by all of the field panels on the specified ALN. These accounts are also automatically uploaded to the primary mass storage device. ALN user accounts do not affect Insight software access.

NOTE:
With Firmware Revision 2.5.3 and later, there is no limit to the number of user accounts that can be created through the field panel HMI. However, Firmware Revision 2.5.2 and earlier, and Insight Revision 3.5.1 and earlier, support only 50 ALN user accounts. Do not create more than 50 user accounts through the field panel HMI.

Default User Accounts

There are three default user accounts: HIGH, MED, and LOW. They are permanent and cannot be deleted from the system; only their passwords can be changed. It is recommended that the default accounts be copied and used as templates for setting up other individual accounts.

In Firmware Revision 3.3. or later, the passwords for the default accounts (“high/high” and “med/med”) must be changed immediately upon login. When you log in using either of these accounts, you will immediately be prompted to change the password to something other than “high” or “med”. The “low” accounts need not change.

What Are Access Groups?

Access groups are used to manage related *objects* (points, applications, and devices) under one group name. When an object is created, it can be assigned to one or more access groups. A system administrator then defines a user’s privilege to work with each access group when setting up a user account. The privilege granted is based on the user’s need to work with the points in each access group.

For example, you could create an access group called LIGHTING and place all points that control or monitor lights in the LIGHTING group. Then you can manage which users are able to control or monitor lights based on user privileges granted to the LIGHTING group.

There are 30 standard access groups, numbered 1 through 30, in the system. Each group can be given a unique, descriptive name. Field panels can store only 30 access groups and those groups are shared between the Insight workstation and all field panels on an ALN. Any changes to access groups 1 to 30 at the Insight workstation or field panel are downloaded to the field panel or uploaded to the Insight workstation, as appropriate.

See *Modifying an Access Group Name* [→ 129] in this chapter for more information.

What Are Access Levels?

NOTE:
See *ABT Site* online help (Settings\User Profile\Access Levels) for information on DXR device object access levels.

Access levels define a user's privileges to work with a field panel function and determine the extent to which the function can be used. The following four access levels are available for field panel functions:

- No Access—Users cannot see the function, and the related prompts are not displayed in the menus when the user is logged on.
- Read Only—Users see prompts and information related to this feature, but the objects cannot be commanded and the parameters cannot be changed.
- Command—Users can view and command the value or status of objects.
- Edit—Users can view, command, add, delete, and modify objects.

Each access level can be assigned to field panel functions.

For example, if a user has Command access to Point Editing, then only the functionality needed to command a point is available. The user would not have the prompts available to add, modify, or delete a point definition.

Access groups and access levels work together to give a user only the access needed. For example, if a user has the Edit privilege to points but is assigned to only three of six access groups in a field panel, then the user can only edit points in those three access groups. The user will not even be able to see the points in the other three access groups.

Password Security Options—Three-Strikes Lockout and Password

The Password Security Options enhance system security and give the system administrator additional control over user access. These options closely mimic password security features found on most computer networks.

- Password Expiration enhances system security by forcing users to regularly change their password.
- Setting a password expiration limit activates the feature for Three-Strikes Lockout. With this option, user accounts are disabled (locked out) after three failed password logon attempts.

CAUTION

User account records in field panels containing Firmware Revision 2.5.2 or earlier do not include account expiration information.

This means that an account with Password Security Options will have the lockout cleared and an unlimited expiration date if a field panel containing Firmware Revision 2.5.2 or earlier is on the network.

NOTE:
For the Password Security Options to be functional, all field panels on the same ALN must contain Firmware Revision 3.0 or later.

Features of the Password Security Options

All user accounts contain an expiration limit, an expiration date, and a lockout counter.

Expiration Limit

The expiration limit is entered by the system administrator when creating or modifying a user account.

- The expiration limit value is the number of days until the password expires.
  - A value of zero (0) indicates no limit. (The password never expires.)
  - The maximum allowable entry is 365 days. (The password expires every 365 days.)
  - Default accounts are created with no expiration date.
- Only users with account modification privileges are able to set expiration limits.

Expiration Date

The firmware calculates an *expiration date* by adding the value of the expiration limit to the current system time.

- Passwords expire at midnight on the expiration date.
- Users must successfully log on to a field panel in order to change the password.
- Passwords can be changed by either the user or the system administrator.
- When the system administrator creates a new user account or changes a user's password, the expiration date is set to the current date. In this case, the password immediately expires the next time the user successfully logs on to a field panel.
- When a user's password expires, access is limited to password modification until a new password is entered. Full user privileges, as defined in the user setup, are restored once the password is successfully changed.

Lockout Counter

The *lockout counter* counts unsuccessful logon attempts for an individual user. Any successful logon resets the lockout counter.

If the password expiration limit is zero (no limit), there is no limit on unsuccessful logon attempts.

If a password expiration limit is entered, Three-Strikes Lockout prevents system access after three sequential failed logon attempts. After the third failed logon attempt, the account is locked and only a system administrator with account modification privileges can clear the account.

- If an account is locked out, the information is transmitted to all nodes as part of the user account.
- If only one administration account has account modification privileges and that account becomes locked out, the only available remedy is to unlock the administrator account through an Insight workstation.

For more information on clearing a locked out account, see *Modifying a User Account* [→ 123] in this chapter.

Password Alarm Messages

The following informational messages related to password activity are printed in the alarm window at the Insight workstation:

- Failed logon attempt
- Account lockout

User Instructions for Changing the Password

The only function available to users is changing the password.

The `passWord` prompt at the HMI Main Menu allows users to change their password at any time. The following information must be entered once the `passWord` prompt is selected:

- Current password
- New password
- Verification of the new password

If the current password is entered incorrectly, the error is not verified until all data has been entered. You must return to the main menu and start again.

```
E129(0x0081) - Invalid password
```

If the current password is entered correctly, but the new password and verification password do not match, the change is not accepted until the verification password matches the new password.

Change your password by completing the following steps. See *Account Attributes* [→ 118] if you need further explanation of the information required for a field.

HMI	**W** (passWord)

Prompt / Field	Option / Entry	Description
Enter user password		Current password
New password		New password
Verify password		Retype the password

A message confirms the password change and the new expiration date.

Example

```
>Enter user password          :  ????????-------
>New password                 :  ????-----------
>Verify new password          :  ????-----------
User account <HIGH> modified, Password Expire Date 05/23/2004
```

Guidelines for Managing User Accounts

The information in each user account is used to set up the working environment when that user is logged on. The account information includes user identification for logon and reports, access group assignment, the access level granted for each field panel function, and password expiration settings.

- The general account information (user initials and account name) does not require much management. Once this information is defined, it should stay the same for as long as the account is defined.
  - To change a user's initials or an account name, you must copy the account. For more information, see *Copying a User Account* [➙ 125] in this chapter.
  - To change a user's password or clear a locked out account, follow the instructions in this chapter under *Modifying a User Account* [➙ 123].
- Use access groups to limit which points, applications, or devices a user is able to use. Keep the following guidelines in mind when creating access groups:
  - Objects (points, applications, and devices) can be assigned to more than one access group.
  - An access group can include an unlimited number of objects.
  - Any number of access groups can be assigned to an individual user account.
- Assign access levels based on the user's responsibilities and the need to use the application or function. For example, if a user receives No Access privileges to an access group, then the related applications or functions are not displayed in the prompt string when the user logs on to the field panel.
- Keep in mind that you can change all aspects (except the user initials and account name) of a user's account at any time. This includes:
  - Adding and deleting users as necessary.
  - Creating and deleting access groups.
  - Changing access levels for field panel functions.

User Account Attributes

Each user account contains the following information regarding access levels and privileges:

Account Attributes.		
Attribute	**Input Option**	**Description**
User initials	1 to 4 characters	Identifies a user in logs and reports. Each user must have unique initials. To change the user initials once the account is set up, the existing account must be copied and renamed. Valid characters include A to Z and 0 to 9. Do not use #, ?, or *. This field is not case sensitive.
Account name	1 to 40 characters	Name used to log on to the field panel. The full name is displayed in reports. Each user must have a unique account name. To change the account name once the account is set up, the existing account must be copied and renamed. Valid characters include A to Z and 0 to 9. Do not use #, ?, or *. This field is not case sensitive.

Account Attributes.		
Attribute	**Input Option**	**Description**
Password and Verify password	3 to 15 characters	A password for the user to enter when logging on to the field panel. Valid characters include A to Z and 0 to 9. Do not use #, ?, or *. This field is not case sensitive.
System, User namespace	S (System), U (User)	Defines if the user sees the System or User name for points in the field panel. The PPCL editor always uses and displays the point system name.
Access group(s)	Numeric value between 1 and 30	Defines which access groups the user can see. The default is 1 through 30.
Point privilege	N, R, C, E*	Defines the user’s privileges for working with points.
Alarm privilege	N, R, C, E*	Defines the user’s privileges for working with alarms.
Trend privilege	N, R, C, E*	Defines the user’s privileges for working with point trending.
Application privilege	N, R, C, E*	Defines the user’s privileges for working with PPCL programs and FLN devices.
PPCL privilege	N, R, C, E*	Defines the user’s privileges for working with PPCL programs.
FLN devices privilege	N, R, C, E*	Defines the user’s privileges for working with FLN devices.
Equipment Scheduler privilege	N, R, C, E*	Defines the user’s privileges for working with zones, command tables, and scheduling equipment.
System privilege	N, R, C, E*	Defines the user’s privileges for working with system functions, such as user accounts and alarm destinations.
Diagnostics privilege	N, R, C, E*	Defines the user’s privileges for working with field panel diagnostics.
Users privilege	N, R, C, E*	Defines the user’s privileges for working with user accounts on the network.
Hardware privilege	N, R, C, E*	Defines the user’s privileges for adding, deleting, and modifying the field panel characteristics.
Language ID	0409 English American 0c0c French Canadian (Other languages may be defined.)	Specifies a user’s default logon language. Other available language options are determined at the Defaultlanguage prompt (System, Hardware, Fieldpanels, Config, Defaultlanguage).
Time format	6 format options are available. Type ? for a list of options.	Specifies the format for the time. The default is HH:MM:SS.

Account Attributes.		
Attribute	**Input Option**	**Description**
Date format	20 format options are available. Type ? for a list of options.	Specifies the format for the date. The default is MM/DD/YYYY.
Autologoff enabled (Y/N)	Y (Yes), N (No)	Defines whether a user is automatically logged off a field panel after a defined period of inactivity.
Autologoff delay	1 to 1440 minutes	When enabled, a user is automatically logged off a field panel after a defined period of inactivity.
Password Expire Limit	Numeric value between 0 and 365	Number of days until the password expires. Zero (0) indicates no limit. (The password never expires.) 365 is the maximum allowable entry. (The password expires every 365 days.)

* N (No_access)	Users cannot see the function, and the related prompts are not displayed in the menus when the user is logged on.
R (Read_only)	Users see prompts and information related to this feature, but the objects cannot be commanded and the parameters cannot be changed.
C (Command)	Users can view and command the value or status of objects.
E (Edit)	Users can view, command, add, delete, and modify objects.

User Account Procedures

Adding a User Account

A system administrator is responsible for creating new user accounts.

NOTE:
If multiple languages are installed on a field panel, you may want to view the available language options before adding a new account. To list the languages installed on a particular field panel, go to the **Defaultlanguage** prompt (**S**ystem, **H**ardware, **F**ieldpanels, **C**onfig, **D**efaultlanguage), type **?**, and press **ENTER**.

Creating a User Account

HMI	**S, U, A, E, A** (System, Users, Accounts, Edit, Add)

Prompt/Field	**Option/Entry**	**Description**
User initials		Type the new user's initials.
Account name		Type the account name.
Password		Type a password for the user.

Verify password		Retype the password.
System, User namespace	S	View System point names.
	U	View User point names. (default setting)
Access group(s)	All groups.	Default
	A single access group.	Valid value 1 through 30.
	Multiple access groups.	Valid values 1 through 30 separated by commas, or use two periods to indicate a range (for example, 1..4,7,9,12..20).
Privilege	Point	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Alarm	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Trend	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Application	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	PPCL	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	FLN devices	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Equipment Scheduler	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	System	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Diagnostics	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Users	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Hardware	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)

Language ID	Language.	Default
	Particular language.	Language ID, **?** displays all available languages.
Time format	(HH:MM:SS)	Default
	Particular format.	Time format; **?** displays all available formats.
Date format	(MM/DD/YYYY)	Default
	Particular format.	Date format; **?** displays all available formats.
AutoLogoff enabled (Y/N)	Y AutoLogoff delay.	Enable automatic logoff. 1 to 1440 minutes.
	N	Disable automatic logoff.
Password Expire Limit		0 to 365 days.
Use for PXM10Tiny AutoLogin (Y/N)	Y	Enable automatic login.
	N	Disable automatic login.

The message `User account <NUA> added` displays once the account has been successfully created.

Example

The following example shows how to create a user account:

```
>User initials                 :  NUA-
>Account name                  :  NEW USER ACCOUNT--------------
----------
>Password                      :  ???------------
>Verify password               :  ???------------
>System, User namespace        :  U
>Access group(s)               :  1..30-------------------------
----------
>Point privilege - No_access, Read_only, Command, Edit:  E
>Alarm privilege - No_access, Read_only, Command, Edit:  C
>Trend privilege - No_access, Read_only, Command, Edit:  E
>Application privilege - No_access, Read_only, Command, Edit:  E
>PPCL privilege - No_access, Read_only, Command, Edit:  C
>FLN devices privilege - No_access, Read_only, Command, Edit:  R
>Equipment Scheduler privilege - No_access, Read_only, Command,
Edit:  E
>System privilege - No_access, Read_only, Command, Edit:  C
>Diagnostics privilege - No_access, Read_only, Command, Edit:  R
>Users privilege - No_access, Read_only, Command, Edit:  E
>Hardware privilege - No_access, Read_only, Command, Edit:  C
>Language ID                   :  0409
>Time format                   :  HH:MM:SS---
>Date format                   :  MM/DD/YYYY-
>AutoLogoff enabled (Y/N)      :  Y
>AutoLogoff delay              :  5---
>Password Expire Limit         :  30-
>Use for PXM10Tiny AutoLogin (Y/N): Y
```

```
User account <NUA> added
```

Modifying a User Account

This procedure modifies a user account, resets or changes a user password, or clears a locked out account in a field panel.

Any account modification activity by the system administrator clears a locked out user account. No changes to the current settings are required; however, it is recommended that the user password always be changed when an account has been locked out.

If an existing user account is configured with AutoLogin for PXM10Tiny and you modify another user account to use this feature, the original user account's AutoLogin privileges for PXM10Tiny is no longer valid.

NOTE:
If multiple languages are installed on a field panel, you may want to view the available language options before adding a new account. To list the languages installed on a particular field panel, go to the **Defaultlanguage** prompt (**S**ystem, **H**ardware, **F**ieldpanels, **C**onfig, **D**efaultlanguage), type **?**, and press **ENTER**.

Modifying a User Account

HMI	**S, U, A, E, M** (System, Users, Accounts, Edit, Modify)

Prompt/Field	**Option/Entry**	**Description**
User initials		Type the initials of the user account you want to modify.
Modify password (Y/N)	N	Retain the current password.
	Y	Change the password.
	Password.	Type a new password for the user.
	Verify password.	Retype the password.
System, User namespace		System displays the current setting.
	S	View System point names.
	U	View User point names.
Access group(s)		Current setting is displayed.
	A single access group.	Valid values are 1 through 30.
	Multiple access groups.	Valid values are 1 through 30 separated by commas, or use two periods to indicate a range (for example, 1..4,7,9,12..20).
Privilege	Point	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	Alarm	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)

	Trend	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	Application	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	PPCL	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	FLN devices	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	Equipment Scheduler	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	System	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	Diagnostics	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	Users	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
	Hardware	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit)
Language ID	Language	Default
	Particular language.	Language ID, ? displays all available languages.
Time format		Default
	Particular format.	Time format; ? displays all available formats.
Date format		Default
	Particular format.	Date format; ? displays all available formats.
AutoLogoff enabled (Y/N)	Y	Enable or retain automatic logoff.
	AutoLogoff delay.	1 to 1440 minutes
	N	Disable automatic logoff.
Password Expire Limit		0 to 365 days.
Use for PXM10Tiny AutoLogin (Y/N)	Y	Enable automatic login.
	N	Disable automatic login.

The message `User account <NUA> modified` displays once the account has been successfully modified.

Example

The following example shows how to modify a user account:

```
>User initials                  :  NUA-
>Modify password (Y/N)          :  Y
>Password                       :  ???------------
>Verify password                :  ???------------
>System, User namespace         :  U
>Access group(s)                :  1..30-------------------------
----------
>Point privilege - No_access, Read_only, Command, Edit:  E
>Alarm privilege - No_access, Read_only, Command, Edit:  C
>Trend privilege - No_access, Read_only, Command, Edit:  C
>Application privilege - No_access, Read_only, Command, Edit:  E
>PPCL privilege - No_access, Read_only, Command, Edit:  R
>FLN devices privilege - No_access, Read_only, Command, Edit:  E
>Equipment Scheduler privilege - No_access, Read_only, Command,
Edit:  C
>System privilege - No_access, Read_only, Command, Edit:  R
>Diagnostics privilege - No_access, Read_only, Command, Edit:  C
>Users privilege - No_access, Read_only, Command, Edit:  N
>Hardware privilege - No_access, Read_only, Command, Edit:  C
>Language ID                    :  0409
>Time format                    :  HH:MM:SS---
>Date format                    :  MM/DD/YYYY-
>AutoLogoff enabled (Y/N)       :  Y
>AutoLogoff delay               :  5---
>Password Expire Limit          :  45-
>Use for PXM10Tiny AutoLogin (Y/N): Y
User account <NUA> modified
```

Copying a User Account

This procedure copies a user account in a field panel. All of the information associated with a user account is copied, with the exception of the password, user initials, account name, and PXM10Tiny autologin.

You can create a new user account by copying a default user account (HIGH, MED, or LOW), and then modifying the information specific for the new user, such as the password, initials, etc. Also use this procedure for changing a user’s initials or account name.

Copying a User Account

HMI	**S, U, A, E, C** (System, Users, Accounts, Edit, Copy)

Prompt/Field	Option/Entry	Description
User initials to copy		Type the initials of the user whose account you want to copy.
New user initials		Type the initials of the new user account.
New account name		Type the name of the new account.
New password		Type the password for the new account.
Verify new password		Retype the password.

The message `User account <NUA> copied to user account <AUA>` displays once the system copies the user account to the field panel.

Example

The following example shows how to copy a user account to a newly created account:

```
>User initials to copy         :  NUA-
>New user initials             :  AUA-
>New account name              :  ANOTHER USER ACCOUNT----------
----------
>New password                  :  ???------------
>Verify new password           :  ???------------
User account <NUA> copied to user account <AUA>
```

Deleting a User Account

This procedure deletes a user account in a field panel.

NOTE:
The default user accounts (HIGH, MED, and LOW) cannot be deleted from the system.

Deleting a User Account

HMI	**S, U, A, E, D** (System, Users, Accounts, Edit, Delete)

Prompt/Field	Option/Entry	Description
User initials		Type the initials of the user account to delete.
Delete global data	Y	Delete the user account.
	N	

If you verify the deletion, the system deletes the user account from the field panel and displays the message `User account <NUA> deleted`.

Example

The following example shows how to delete a user account:

```
>User initials                : NUA-
>Delete global data? Are you sure (Y/N):  Y
User account <NUA> deleted
```

Configuring AutoLogin for a User Account

HMI	**S, U, A, E, A** (System, Users, Accounts, Edit, Add)

Prompt/Field	Option/Entry	Description
User initials		Type the new user's initials.
Account name		Type the account name.
Password		Type a password for the user.
Verify password		Retype the password.
System, User namespace	S	View System point names.
	U	View User point names. (default setting)
Access group(s)	All groups.	(default setting).
	A single access group.	Valid value 1 through 30.
	Multiple access groups.	Valid values 1 through 30 separated by commas, or use two periods to indicate a range (for example, 1..4,7,9,12..20).
Privilege **NOTE:** Auto User accounts need access to Point and Alarm ONLY.	Point	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Alarm	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Trend	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Application	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	PPCL	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	FLN devices	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)

	Equipment Scheduler	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	System	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Diagnostics	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Users	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
	Hardware	**N** (No_access) **R** (Read_only) **C** (Command) **E** (Edit) (default setting)
Language ID	Language	Default
	Particular language.	Language ID, ? displays all available languages. **NOTE:** You can also enter nothing, to display all available languages.
Time format	(HH:MM:SS)	Default
	Particular format.	Time format; ? displays all available formats. **NOTE:** You can also enter nothing, to display all available Time formats.
Date format	(MM/DD/YYYY)	Default
	Particular format.	Date format; ? displays all available formats. **NOTE:** You can also enter nothing, to display all available Date formats.
AutoLogoff enabled (Y/N)	Y	Enable automatic logoff.
	AutoLogoff delay.	1 to 1440 minutes.
	N	Disable automatic logoff.
Password Expire Limit		0 to 365 days.
Use for PXM10Tiny AutoLogin (Y/N)	Y	Enable automatic login.
	N	Disable automatic login.

Example

```
>User initials                 :  tiny
>Account name                  :  PXM10TINY---------------------
---
>Password                      :  ?????----------
>Verify password               :  ?????----------
>System, User namespace        :  U
>Access group(s)               :  1..30-------------------------
----------
>Point privilege - No_access, Read_only, Command, Edit: E
```

```
>Alarm privilege - No_access, Read_only, Command, Edit: E
>Trend privilege - No_access, Read_only, Command, Edit: E
>Application privilege - No_access, Read_only, Command, Edit: E
>PPCL privilege - No_access, Read_only, Command, Edit: E
>FLN devices privilege - No_access, Read_only, Command, Edit: E
>Equipment Scheduler privilege - No_access, Read_only, Command,
Edit: E
>System privilege - No_access, Read_only, Command, Edit: E
>Diagnostics privilege - No_access, Read_only, Command, Edit: E
>Users privilege - No_access, Read_only, Command, Edit: E
>Hardware privilege - No_access, Read_only, Command, Edit: E
>Language ID                  :  0409
>Time format                  :  HH:MM:SS---
>Date format                  :  MM/DD/YYYY-
>AutoLogoff enabled (Y/N)     :  Y
>AutoLogoff delay             :  5---
>Password Expire Limit        :  30-
>Use for PXM10Tiny AutoLogin (Y/N): Y
User account <tiny> added
```

Modifying an Access Group Name

This procedure modifies the name of an access group in a field panel. There are 30 standard access groups in the system.

This procedure allows you to give descriptive names to access groups.

Modifying an Access Group

HMI	**S, U, G, M** (System, Users, accessGroups, Modify)

Prompt/Field	Option/Entry	Description
Access group number		Type the number of the access group name. Valid values are 1 through 30.
Access group name		Type the new name for the access group.

The system modifies the name of an access group in a field panel.

Example

The following example shows how to modify an access group:

```
>Access group number          :  1-
>Access group name            :  AIR HANDER UNITS--------------
Command successful

>Display, Modify, Quit? –
```

User Account Reports

Displaying a System Accounts Log

This report displays the list of user accounts defined on the ALN.

Displaying a User Account

HMI	**S, U, A, L** (System, Users, Accounts, Log)

Prompt/Field	Option/Entry	Description
User initials	Particular user.	Type the user initials.
	All user accounts.	

The field panel displays a **System Accounts Log** report.

Example

The following example shows all user accounts on the ALN:

```
12/04/2009 FRI             SYSTEM ACCOUNTS LOG
REPORT               21:22
-----------------------------------------------------------------
----------
Search for <*>

User    Name                      Namespace     AutoLogoff
 PXM10Tiny
                                                  mins
AutoLogin
-----------------------------------------------------------------
-----------
HIGH   High default user
account     System        5                N
LOW    Low default user
account      User          5                Y
MED    Med default user
account      System        5                N

End of report
```

Displaying a User Account

This report displays a user’s access group and privilege settings for field panel functions and the password expiration limit, expiration date, and whether or not the account is locked out.

Displaying a User Account

HMI	**S, U, A, D** (System, Users, Accounts, Display)

Prompt/Field	Option/Entry	Description
User initials	Particular user account.	Type the user initials.
	All user accounts.	
Display report	H	Here
	P	Printer

The field panel displays a **System Accounts Display** report.

Example

The following example shows the user account settings for user *NUA*. In this case, the account is locked out.

```
>User initials                  :  NUA-
>Here, Printer                  :  H

12/04/2009 FRI          SYSTEM ACCOUNTS DISPLAY
REPORT              21:52
----------------------------------------------------------------
---------------
Search for <high>

User    Name                      Namespace     AutoLogoff
 PXM10Tiny
                                                 mins
AutoLogin
----------------------------------------------------------------
---------------
HIGH    High default user
account      System         5              N

-- Regional Options :
     Time          Date          ID      Language
     HH:MM:SS      MM/DD/YYYY    0409    English American

-- Access Control :
     Access group(s) :      <all>
       Functional access privilege :

              Edit Point
              Edit Alarm
              Edit Trend
              Edit Application
```

```
                    Edit Application PPCL
                    Edit Application FLN Devices
                    Edit Application Equipment Scheduler
                    Edit System

                    Edit System Diagnostics
                    Edit System Users
                    Edit System Hardware

-- Password :
     Expired     Expire Limit(in Days)     Expire Date    Lockout
     N           0                         01/18/2038    0
```

Displaying Access Groups

This report displays the names of the access groups in a field panel.

Displaying Access Groups

HMI	**S, U, G, D** (System, Users, accessGroups, Display)

Prompt/Field	Option/Entry	Description
First access group number		Default
	Particular starting access group.	Type the access group number.
Last access group number		Default
	Particular ending access group.	Type the access group number.
Display report	H	Here
	P	Printer

The system displays the **System Access Groups Log** report.

Example

The following example shows access groups one through ten:

```
>First access group number     :  1-
>Last access group number      :  10
>Here, Printer                 :  H

12/30/2006 SAT            SYSTEM ACCESS GROUPS LOG
REPORT                 06:28
----------------------------------------------------------------
---------------
Search for < 1> to <10>

Number       Name
```

```
------------------------------------------------------------------
---------------
1            AIR HANDER UNITS
2            Access2
3            Access3
4            Access4

5            Access5
6            Access6
7            Access7
8            Access8

9            Access9
10           Access10

End of report

>Display, Modify, Quit? -
```

Chapter 4—Point Database

This chapter discusses the following topics:

- Point Database Basic Concepts
- Point Characteristics
- Point Type Attributes
- Commanding Points
- Monitoring Points
- Point Database Procedures

Point Database Basic Concepts

The point database is a file containing all information defined for every point in the APOGEE Automation System. The system controls points according to their definitions and the purposes they represent. Points are classified as follows:

Logical points	A group of one to four physical and/or virtual point addresses under two unique 30-character names. Either name is referenced by operators, control programs, and the other system features to command, examine, and store information for those points.
Physical points	Logical points with physical addresses that the system uses to reference the actual physical devices connected to a field input/output termination.
Virtual points	Logical points with virtual addresses residing in memory that do not represent a piece of equipment. Virtual points generally store values such as setpoints and results from calculations.
Subpoints	Points within an application, such as equipment scheduler or a TEC. May be referenced by operators, control programs, and the other system features to command, examine, and store information for those points.
Local point	Standard system points residing in a PPCL program that are specific to that program (such as ALMCNT).

Logical Points

All logical points are composed of one or more of the following four basic point types: Analog Input (AI), Analog Output (AO), Digital Input (DI), and Digital Output (DO).

Analog Input (AI)

Analog Input (AI) points provide variable-type information to the field panel. Examples of AI points include:

- Temperature sensors
- Relative humidity sensors

Analog Output (AO)

Analog Output (AO) points receive variable commands from the field panel. Examples of AO points include:

- Valve or damper actuators
- Variable speed drives

Digital Input (DI)

Digital Input (DI) points provide two-state information to the field panel. Examples of DI points include:

- Proof of operation switches
- Filter alarms
- Smoke alarms

Digital Output (DO)

Digital Output (DO) points receive two-state commands from the field panel. Examples of DO points include:

- Fans and pumps
- Electric/pneumatic switches

Logical Point Type Combinations

The basic point types are combined to form numerous logical point types. These point types are adapted to various pieces of equipment. The following table contains a list of all available logical point types used by the system.

Logical Point Types.

Point Type	Point Composition	Description
LAI	1 - AI (numeric value)	Logical Analog Input—Monitors one AI point (sensors for temperature, flow, pressure, humidity, and so on).
LAO	1 - AO (numeric value)	Logical Analog Output—Commands one AO point (positioners for dampers, valves, and motors, and so on).
LDI	1 - DI (ON/OFF)	Logical Digital Input—Monitors one latched DI point (door contacts, smoke detectors, low temperature detectors, damper end switches, and so on).
LDO	1 - DO (ON/OFF)	Logical Digital Output—Commands one latched DO point for a two state (ON/OFF) device. For example, switches for lighting and occupancy indication.
LENUM*	1 - Analog (multiple value point–numeric only)	Logical ENUMerated—Control points that have multiple numeric values. Each value is associated with a state text entry.
L2SL	1 - DO (ON/OFF) 1 - DI (PROOF status - mandatory)	Logical 2-State Latched—Commands one latched DO point (ON/OFF) and monitors one latched DI point (PROOF). For example, motor starters (ON/OFF) that provide proof indication, such as fan and pump motors.
L2LP	1 - DO (pulsed ON) 1 - DO (pulsed OFF) 1 - DI (PROOF status–optional)	Logical 2-State Pulsed—Commands two pulsed DO points (ON/OFF) and monitors one optional latched DI point (proof). For example, push button motor starters ON/OFF) that provide proof indication, such as fan or pump motors.
LFSSL*	1 - DO (OFF/FAST) 1 - DO (OFF/SLOW) 1 - DI (PROOF status)	Logical FAST/SLOW/STOP Latched—Commands two latched DO points (ON/OFF) and monitors one latched DI point (PROOF). For example, motor starters (ON/OFF) that provide proof indication, such as fan and pump motors.

LFSSP*	1 - DO (pulsed OFF) 1 - DO (pulsed FAST) 1 - DO (pulsed SLOW) 1 - DI (PROOF status)	Logical FAST/SLOW/STOP Pulsed—Commands three pulsed DO points (ON/OFF) and monitors one optional latched DI point (PROOF). For example, push button motor starters (ON/OFF) that provide proof indication, such as fan or pump motors.
LOOAL*	1 - DO (ON/OFF) 1 - DO (AUTO) 1 - DI (PROOF status)	Logical ON/OFF/AUTO Latched—Commands two latched DO points (ON/OFF and Auto/Commanded) and monitors one optional latched DI point (PROOF). For example, three state (ON/OFF/AUTO) motor starters that provide proof indication.
LOOAP*	1 - DO (pulsed ON) 1 - DO (pulsed OFF) 1 - DO (latched AUTO) 1 - DI (PROOF status)	Logical ON/OFF/AUTO Pulsed—Commands two pulsed DO points (ON/OFF) and one latched DO (AUTO) point, and monitors one optional latched DI point (PROOF). For example, three state (ON/OFF/AUTO) push button motor starters that provide proof.
LAPCI	1 - DI (counter)	Logical Pulsed Accumulator—Counts the number of pulses (momentary contacts) for one DI point. For example, an LPACI point can track electrical consumption by totaling the number of kilowatt hours from a power meter.

* In BACnet Fast/Slow/Stop, On/Off/Auto and LENUM points are mapped to multistate objects such that their default state text table starts at one instead of zero (1,2,3 rather than 0,1,2 as in the APOGEE Automation System).

Resetting a Logical Pulsed Accumulator (LPACI) Point Under BACnet

Input points cannot be commanded when they are in service. To reset an LPACI point:

1. Take the point out of service.
2. Command the present value to **NONE** (empty).
3. Put the point back in service.

Physical Points

Physical points reside on a field panel, expansion device or equipment controller. They are only usable when defined by a logical point to be one of the basic four point types. They have physical characteristics such as wire terminals, address and type as follows.

Analog Input (AI)

Integer values using Analog to Digital Conversion ADC. Sensor type may be current, voltage, pneumatic or resistive. Sensor type may be fixed or switched through hardware or point definition.

Analog Output (AO)

Integer values using Digital to Analog Conversion DAC. Actuator type may be current, voltage or binary. Actuator type may be fixed or switched through hardware or point definition. Actuator type may not be seen by older firmware or software.

Digital Input (DI)

Integer values 1/0 using contact sensing.

Pulse Accumulator Input has Integer counting values using contact sensing.

Digital Output (DO)

Integer values 1/0 using relay contacts or solid state to switch control.

Universal

Point may be changed to some or all of the basic four types through hardware switches or point definition.

Virtual Points

A virtual point is a logical point without a physical device. Virtual points are used for various applications and can display any of the following formats:

Float	Floating point values.
Integer	Integer values.
Time	A floating point value that represents the time of day (for example, 13.5 = 1:30 P.M.).
Date	A floating point value identifying the number of minutes that have elapsed since 01/01/1970.
Date/Time	A floating point value identifying the number of minutes that have elapsed since January 1 at 00:00 in the current year.

How Virtual Points Can Be Used

The following examples demonstrate how virtual points can be used:

For setpoints

Virtual points can store desired values such as temperature, relative humidity, and pressure. For the system to make adjustments to control equipment, the system must compare the actual value to the desired value. The field panel stores the desired value in memory as a virtual analog output point.

For operational values

Virtual points are often used to store operational data. For example, a virtual point can be used to store the high and low temperatures for outside air. Applications such as Start/Stop Time Optimization (SSTO) use virtual points for different types of values.

For a time/date

PPCL uses virtual time and date points to accomplish building control.

Subpoints

Subpoints are points that are unique to the application where they reside. Two applications may use the same subpoint name, but the actual subpoints are different because they reside in separate applications.

Example

Because of the unique TEC name, the value in the ROOM TEMP point of BLD990.FLR01.RM101.TEC:ROOM TEMP is different from BLD990.FLR02.RM102.TEC:ROOM TEMP.

When viewing, commanding, or editing an application's subpoints, the application name must be specified first, followed by a colon, and then followed by the subpoint name:

```
POINT NAME:SUBPOINT NAME
```

NOTE:
In reports, subpoints are called *suffixes*.

How Subpoints Can Be Used

When an FLN device is first added to the network, the field panel uploads a copy of the database for that device. This copy represents the subpoints for that particular application. Not all FLN devices have the same database, so the subpoint names and numbers for one application may not match those in a different FLN device. Reports in an FLN device can be referenced using the long name with delimiter format, if the name of the report is known.

For more information on FLN device subpoints, see Chapter 5 *P1 Field Level Network/Floor Level Network (FLN) Devices* [→ 195] or Chapter 6 *MS/TP Field Level Network (FLN) Devices* [→ 227].

PPCL Programs

A field panel creates a default set of subpoints when a program is initially entered. The default set of subpoints include SECNDS counters and $LOC points. The field panel also considers any local points defined by the user as a subpoint to a program. For more information on local points, see the section *Local Points* [→ 138] in this chapter.

Local Points

Local points are primarily used in PPCL programming. Every PPCL program has a set of fixed local points, such as SECNDS, SECND7, $LOC1, and $LOC15, which can be used to count seconds and hold temperature variables. Unlike virtual and logical points, local points don't require the full point definition.

Normally, local points are not shared between programs. For example, two programs, such as PANEL22.AHU1.SAFETYMODE and PANEL22.FAN2.SAFETYMODE, can each give $LOC1 a different definition without disrupting each other. However, they can be shared between programs by using the whole application name and the local name. For example:

PANEL22.AHU1.SAFETYMODE could use the $LOC1 in PANEL22.FAN2.SAFETYMODE by specifying the point as PANEL22.FAN2.SAFETYMODE:$LOC1.

When a program is defined, each local point is given a default value. The following example shows a sample list of all the available local points for a program and their corresponding default values. See PPCL Editor [→ 333] for more information on using local points.

```
12/01/2007 MON                     POINT LOG
REPORT                         11:24pm
-----------------------------------------------------------------
-----------
Search for <BLD990.AHU01.PGM:*>


Point name
   :Suffix
(Description)                      Value/State      Status  Prio
rity
-----------------------------------------------------------------
-----------
BLD990.AHU01.PGM
```

```
  :PPCL Address                                  1           -
N-       NONE
  :SECNDS                                        0           -
N-       NONE
  :SECND1                                        0           -
N-       NONE
  :SECND2                                        0           -
N-       NONE

  :SECND3                                        0           -
N-       NONE
  :SECND4                                        0           -
N-       NONE
  :SECND5                                        0           -
N-       NONE
  :SECND6                                        0           -
N-       NONE

  :SECND7                                        0           -
N-       NONE
  :LOC1                                          0.0         -
N-       NONE
  :LOC2                                          0.0         -
N-       NONE
  :LOC3                                          0.0         -
N-       NONE

  :LOC4                                          0.0         -
N-       NONE
  :LOC5                                          0.0         -
N-       NONE
  :LOC6                                          0.0         -
N-       NONE
  :LOC7                                          0.0         -
N-       NONE

  :LOC8                                          0.0         -
N-       NONE
  :LOC9                                          0.0         -
N-       NONE
  :LOC10                                         0.0         -
N-       NONE
  :LOC11                                         0.0         -
N-       NONE

  :LOC12                                         0.0         -
N-       NONE
  :LOC13                                         0.0         -
N-       NONE
```

```
  :LOC14                                         0.0             -
N-       NONE
  :LOC15                                         0.0             -
N-       NONE

  :PDL                                           0.0             -
N-       NONE

End of report
```

Point Characteristics

Each point (logical or virtual) is composed of the following attributes that define it in the database:

- Point name/point system name
- Point address
- Point status
- Point priority
- Point value/state

Point Name and Point System Name

The point name and point system name are the labels that identify a particular point in the database. The point system name and point name can be the same or different. Both names, whether they are set equal or defined differently, must be unique on the network.

Having two names provides the ability to customize the database without affecting the control of the system. PPCL programs (which exclusively use the point system name) remain unchanged if the point name is changed.

Each user account defines the type of name that is displayed in the interface. Those with User access see the point name. Those with System access see the point system name. When viewing PPCL programs, the system always displays the point system name regardless of the access settings.

The following example illustrates a point name and a point system name:

Point name:	BUILDING1.AHU1.SPACETEMP
Point system name:	B1A1ST

For points on an FLN device, or in applications, a suffix is used with the device or application name. For these types of points, the FLN device/application is referenced first, followed by a colon, followed by the suffix (the name of the subpoint).

The following example illustrates referencing a point on an FLN device called BUILDING 1-VAV12:

```
BUILDING 1-VAV12:DO2
```

The following example illustrates referencing a local setpoint in a PPCL program called WARMUPMODE:

```
WARMUPMODE:SETPOINT
```

Point Naming Conventions

Naming conventions provide a consistent and predictable organization for points. The following guidelines are recommended:

- When designing a point database, identify common segments or groupings for point names. Larger facilities may use six or more segments to name points. Smaller facilities may choose a simpler convention by using only three or four segments. The most common segments and order are as follows:
  - State
  - Campus
  - Building or Department
  - Floor, Room, or Area
  - Equipment (boiler, chiller, air handler, etc.)
  - Device
- Structure the names hierarchically, moving from global (far left characters), to specific (far right characters). For example:
  - LIB.CHILL02.CWT (room, equipment, device)
  - BLD990.FLR01.AHU01.SAT (building, floor, equipment, device)
- Use only alphanumeric characters and periods in point names.
  - Do not use underscores or spaces.
  - Use periods only as separators between sections. Do not use periods in abbreviations.
  - Do not begin a point name with a period.
- If one or more points on a job lack a section that you identified in your point naming conventions, insert a period for the missing section. For example:
  - BLD990.FLR01.AHU01.SAT
  - BLD990.FLR01..SAT
  - The equipment section is missing in the second point name, replaced by two periods.

Program names should be the same as the point names and equipment they control, but without the suffix. For example:

Equipment:	Building 990, Floor 1, Air Handling Unit 1
Program Name:	IL.BLD990.FLR01.AHU01
Points Controlled:	IL.BLD990.FLR01.AHU01.SAT IL.BLD990.FLR01.AHU01.HVL IL.BLD990.FLR01.AHU01.SFN

BACnet Point Naming Conventions

BACnet provides two additional methods of point naming; one supports third-party BACnet devices that do not adhere to APOGEE naming conventions, and one uniquely identifies correctly named points across the network. The two added methods of naming a point are the BACnet encoded name and the device specific name.

BACnet Encoded Name

The BACnet encoded name is a numeric representation of an object name that exceeds the APOGEE standard of 30 alphanumeric characters per name. It consists of two parts; the numeric representation of the device (field panel) name and the numeric representation of the point name.

Use the Encoded Name to identify a point that does not meet the APOGEE naming standards. When used as the point name to generate a Point Edit Look report, the Encoded Name will also display BACnet-only versions of each supported BACnet object type.

BACnet encoded names are created by the system and appear in parenthesis in the Instance Number row of the Point Look report (Point, Edit, Look).

Example:

```
BAC_15_AI_10
```

Device Name Component	Object Name Component*
BAC_15	_AI_10

* BACnet supports many object types. In this example, the object is a point.

In this example:

- BAC identifies this as a BACnet device.
- 15 is the device instance number, unique throughout the network.
- AI is the BACnet object type. It identifies the object as a physical Analog Input point.
- 10 is the object instance number for this Analog Input object. The number is unique for this object type within the BAC_15 device.

Device Specific Name

The BACnet device specific name is a textual representation of an object name that meets the APOGEE naming standards. It consists of two parts; the node name of the device and the point system name.

Use the Device Specific Name to identify a point within a specific device when that point meets the APOGEE naming standards.

Example: [AdminBld1] ReturnWaterTemp

Node Name	Point System Name
[AdminBldg1]	ReturnWaterTemp

Saving Time When Entering Point Names

If you are unsure of the exact point name, or if you prefer not to type the entire point name, you can use shortcuts, including:

- Wildcards provide for easier selection for names of points.
- Query for point names provides a numeric list of points to select from.
- Quick text key to define part of the point name.
- Command key (such as CTRL+P and CTRL+I from the paste buffer).

For examples of queries and wildcarding, see Chapter 1 *The Operator Interface*.

Point Addressing

NOTE:
Virtual points only require a field panel number, and cannot be defined on FLN devices. A virtual point number may be assigned.

Modular Series Point Addressing

Points residing on the TX-I/O BUS of the PXC Modular Series are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - For points on the TX-I/O BUS, the FLN number is always 0.
- Drop - The number of the address key on the TX-I/O Module (Keys 1 through 72).
- Point - The point number on the TX-I/O Module.

Points on an FLN Device

Points residing on an FLN device are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - The number of the FLN connection on the field panel. A point on an FLN device will always have an FLN number of 1, 2, or 3.
- Drop - The address number of the FLN device.
- Point - The number of the subpoint on the FLN device.

Compact Series Point Addressing

Points residing on the PXC Compact Series are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - Always use 0.
- Drop - Always use 0.
- Point - Use the following tables to determine the valid address number.

Points on an FLN Device

Points residing on an FLN device are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - The number of the FLN connection on the field panel. A point on an FLN device will always have an FLN number of 1, 2, or 3.
- Drop - The address number of the FLN device.
- Point - The number of the subpoint on the FLN device.

Point Address Table for the PXC-16.				
Point Type	**Point Type Number**	**Connection Terminal**		**PXC Point Address**
		+	**-**	
Universal Input (UI)	UI1	25	26	1
	UI2	27	26	2
	UI3	28	29	3

Universal Input/Output (U)	U4	30	29	4
	U5	31	32	5
	U6	33	32	6
	U7	34	35	7
	U8	36	35	8
Analog Output (AO)	AO1	53	54	9
	AO2	55	56	10
	AO3	57	56	11
Digital Input (DI)	DI1	58	59	12
	DI2	60	59	13
Digital Output (DO)		**NC**	**COM**	
	DO1	4	5	14
	DO2	7	8	15
	DO3	10	11	16

<table>
<tr><th colspan="6">Point Address Table for the PXC-24.</th></tr>
<tr><th>Point Type</th><th>Point Type Number</th><th colspan="3">Connection Terminal</th><th>PXC Point Address</th></tr>
<tr><td></td><td></td><td colspan="2">+</td><td>-</td><td></td></tr>
<tr><td rowspan="3">Universal Input (UI)</td><td>UI1</td><td colspan="2">25</td><td>26</td><td>1</td></tr>
<tr><td>UI2</td><td colspan="2">27</td><td>26</td><td>2</td></tr>
<tr><td>UI3</td><td colspan="2">28</td><td>29</td><td>3</td></tr>
<tr><td rowspan="13">Universal Input/Output (U)</td><td>U4</td><td colspan="2">30</td><td>29</td><td>4</td></tr>
<tr><td>U5</td><td colspan="2">31</td><td>32</td><td>5</td></tr>
<tr><td>U6</td><td colspan="2">33</td><td>32</td><td>6</td></tr>
<tr><td>U7</td><td colspan="2">34</td><td>35</td><td>7</td></tr>
<tr><td>U8</td><td colspan="2">36</td><td>35</td><td>8</td></tr>
<tr><td>U9</td><td colspan="2">41</td><td>42</td><td>9</td></tr>
<tr><td>U20</td><td colspan="2">43</td><td>42</td><td>10</td></tr>
<tr><td>U11</td><td colspan="2">44</td><td>45</td><td>11</td></tr>
<tr><td>U12</td><td colspan="2">46</td><td>45</td><td>12</td></tr>
<tr><td>U13</td><td colspan="2">47</td><td>48</td><td>13</td></tr>
<tr><td>U14</td><td colspan="2">49</td><td>48</td><td>14</td></tr>
<tr><td>U15</td><td colspan="2">50</td><td>51</td><td>15</td></tr>
<tr><td>U16</td><td colspan="2">52</td><td>51</td><td>16</td></tr>
<tr><td rowspan="3">Analog Output (AO)</td><td>AO1</td><td colspan="2">53</td><td>54</td><td>17</td></tr>
<tr><td>AO2</td><td colspan="2">55</td><td>56</td><td>18</td></tr>
<tr><td>AO3</td><td colspan="2">57</td><td>56</td><td>19</td></tr>
<tr><td>Digital Output (DO)</td><td></td><td>NC</td><td>COM</td><td>NO</td><td></td></tr>
</table>

	DO1	4	5	6	20
	DO2	7	8	9	21
	DO3	10	11	12	22
	DO4	13	14	15	23
	DO5	16	17	18	24

MBC/RBC Point Addressing

Points residing on the Module Bus (M-BUS) of the MBC or RBC are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - For points on the M-BUS, the FLN number is always 0.
- Drop - The number of the address key on the Point Termination Module (PTM, Keys 1 through 80).
- Point - The point number on the Point Termination Module (PTM).

Points on an FLN Device

Points residing on an FLN device are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - The number of the FLN connection on the field panel. A point on an FLN device will always have an FLN number of 1, 2, or 3.
- Drop - The address number of the FLN device.
- Point - The number of the subpoint on the FLN device.

MEC Point Addressing

Points residing on the MEC are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - Always use 0.
- Drop - Always use 0.
- Point - The type of point determines the valid address number.

Points on the MEC Expansion Bus

Points residing on the MEC Expansion Bus are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - Always use 0.
- Drop - Corresponds to the address of the expansion board (1 through 8).
- Point - The type of point determines the valid address number.

Points on a P1 FLN

Points residing on a P1 FLN device are addressed as follows:

- Field panel - The Field Panel Identifier (device instance number).
- FLN - The number of the FLN connection on the field panel. A point on an FLN device will always have an FLN number of 1, 2, or 3.
- Drop - The address number of the FLN device.
- Point - The number of the subpoint on the FLN device.

Point Status

The point status indicates the current condition of a logical point as defined in the APOGEE database. It can also reflect two or more statuses for a point. For example, a point may be in alarm (*A*) and failed (*F*) at the same time, in which case, the status would be *AF*.

NOTE:
Point status always displays in English. When logged onto the system using a language ID other than English, the point still displays in English.

The Table Point Status explains each status.

Table. Point Status

Status	Meaning	Explanation
-N-	NORMAL	The point is in regular operation. The value and alarm conditions of the point can be updated by control programs or operator commands.
A	ALARM	The condition of the point is outside its defined limits and an alarm priority has been assigned to the point. An alarm occurs when: • The value of an analog point is outside a defined high or low limit. • The value of a proof point does not correspond to the commanded value of the associated output point within the proof delay time. • An LDI or LDO point is ON and the point was defined to go into alarm when it turns ON. For example, a smoke detector point.
An	ALARM	The condition of the point is outside its defined limits and an enhanced alarm priority has been assigned to the point. The *n* represents the number of the alarm level.
AC	ALRM-BY-COMMAND	The value of a point is in its normal operating range; however, the point has been commanded into alarm by an operator or by the control program. The point remains in this state until it is commanded back to the Normal state by an operator or control program.
ACK	ACKNOWLEDGE	The point is in alarm and has been acknowledged by a user.
F	FAILED	The field panel is unable to command or read any of the physical points associated with the logical point. This may be the result of hardware failure or a sensor reading outside of its defined limits.
O	OUT OF SERVICE	This status displays in addition to other point status, for example, *A*-0-. The logical value of BACnet points are decoupled from their physical value. When a point is taken out of service: • Output points: The user can set the value of the point without changing its physical output. • Input points: COVs from the physical input are ignored. BACnet input points cannot be commanded by the user unless they are first taken out of service.
ODSB	OPERATOR DISABLED ALARM	An operator has manually disabled a point from alarm reporting.

P	PROOFING	The field panel is waiting to verify that the value of a proof point corresponds to the commanded value of an associated output point. The point is in this state for as long as the proof delay time that is defined for the point.
PDSB	PROGRAM DISABLED ALARM	An alarm has been disabled from reporting by PPCL.
HAND	HAND	A TX-I/O manual override switch has been used and the system no longer has control of the point. The system will not be able to control that point until the TX-I/O is switched back into AUTOMATIC mode.
T	TROUBLE	The point is in TROUBLE state. This status appears when a PPCL program or user commands the point to this state.

Unresolved Points

A point is considered unresolved if its point name is used in an application (most commonly PPCL) but not found on the network.

- A point will be unresolved if the name has been misspelled.
- A point can also be unresolved if the system has not yet discovered it across the network. Once the system discovers the point, it no longer displays as unresolved.

An unresolved point is displayed with a ‘U’ at the end of a system name value, as in the following example:

Point system name : BTEC22:ROOM TEMP (BAC_11_??_4194303) U

Point Priority/Command Priority

The point priority determines if an operator or a particular control program is responsible for controlling the point.

NOTE:
Point status always displays in English. When logged onto the system using a language ID other than English, the point still displays in English.

Table *APOGEE Point Priority* describes the five APOGEE priority levels.

BACnet uses a command priority to perform the same function as the APOGEE point priority. Table APOGEE to *BACnet Point Priority Reference* explains the 17 BACnet command priorities and shows how they relate to the APOGEE point priority levels.

APOGEE Point Priority	
Command Priority	**Description**
OPER (Operator)	The highest command priority. The control program is overridden and an operator has direct control for commanding the point. A point commanded by an operator must have its priority lowered in order for the control program to resume control of the point. This change in priority is known as releasing a point.
SMOKE	The point is commanded by a smoke control program. Smoke control is a special control program that monitors smoke alarms.
EMER (emegency)	The point is commanded by an emergency control program. Emergency control is a special control program that commands a point during emergency situations. For example, a smoke detector goes into ALARM and turns on the exhaust fan at EMER priority.
PDL (Peak Demand Limiting)	The point is commanded by a Peak Demand Limiting (PDL) control program. PDL control is a special energy management program that limits electrical demand by turning off electrical loads when demand approaches a setpoint (for example shutting down an air handling unit if demand approaches setpoint).
NONE	The lowest command priority level. The point can be commanded by the standard PPCL control program. The point is not controlled by the operator or special control programs. Most point commanding in a building system is done automatically by PPCL programs commanding points with the NONE priority.

In most cases, the priority of a point should be NONE. Depending on the type of application, the system can change point priority to prevent interaction by other applications (either by PPCL or an application). For example:

- A point at NONE priority can be commanded by any PPCL program or application. A point at PDL priority (slot 14 for BACnet/IP) is being used by the PDL application. The point can be commanded by other higher-level applications, such as SMOKE (slot 10 for BACnet/IP or OPER (slot 8 for BACnet/IP), but not by general PPCL programs or applications (slot 16 for BACnet/IP). Commands from lower-level applications are saved in the Priority Array under BACnet. If the priority of the commanded point drops to the level of the saved command, the command is executed.
- A point in OPER priority was commanded by a user. The system cannot command the point until it is released back to system control. At any time, you can override any application. The result of this action can change system performance.

Point priority can be changed by:

- User interaction—the priority is changed manually using the interface.
- A PPCL command—PPCL uses a command to directly change the point priority.
- Applications (for example, Equipment Scheduler).

Once the point priority changes to NONE, it is available for commanding by general PPCL and applications.

Table. APOGEE **to BACnet Point Priority Reference.**		
APOGEE **Point Priority**	**BACnet Priority Slot**	**BACnet Name**
	BN01	Manual Life Safety
	BN02	Automatic Life Safety
	BN03	Available
	BN04	Available
	BN05	Critical Equipment Control
	BN06	Minimum On/Off

	BN07	Available
OPER (Operator)	BN08	Manual Operator
	BN09	Available
SMOKE	BN10	Available
	Bn11	Available
EMER (Emergency)	BN12	Available
	BN13	Available
PDL (Peak Demand Limit)	BN14	Available
	BN15	Available
Sched., PPCL, TEC Tool*	BN16	Available
Initial value of the point; TEC Application	NONE	Relinquish Default

* The TEC Tool can command Priority slot 16 only if it is not being commanded by PPCL.

BACnet Priority Array

APOGEE firmware uses the Priority Array to determine the command order for a point. The array contains sixteen slots plus a Relinquish Default slot. BN01 is the highest position in the array, and Relinquish Default is the lowest.

Any level in the priority can be commanded at any time. If the Present Value of the point is at a higher priority slot, the command will not be executed. The Priority Array retains all commands made at lower priority slot levels. When the Present Value drops to that slot level, the stored point command is executed.

CAUTION

The Insight software does not save or restore the Priority Array. After a download, all points will be at their Relinquish Default value.

Present Value

The Present Value of a point is usually the value of the highest position in the array that contains a value. Physical HAND overrides the Present Value and does not affect the Priority Array. For example, the Priority Array for a point might contain the Present Value shown in Table Priority Array Example.

Table. Priority Array Example.

BACnet Priority Slot	BACnet Name/ (APOGEE Point Priority)	Value or State of Point	Present Value of Point
BN01	Manual Life Safety (N/A)	Empty	
BN02	Automatic Life Safety (N/A)		
BN03	Available (N/A)		
BN04	Available (N/A)		
BN05	Critical Equipment Control (N/A)		

BN06	Minimum On/Off (N/A)		
BN07	Available (N/A)		
BN08	Manual Operator (OPER)	OFF	OFF
BN09	Available (N/A)		
BN10	Available (SMOKE)		
BN11	Available (N/A)		
BN12	Available (EMER)		
BN13	Available (N/A)		
BN14	Available (PDL)		
BN15	Available (N/A)		
BN16	Available (Sched, PPCL, TEC Tool)	ON	
NONE	Relinquish Default (Initial value of the point or TEC Application)	OFF	

The Present Value of the point (OFF) matches the value of BACnet Priority slot 8, or Manual Operator, because no higher slot contains a value. As long as slot 8 is not empty and no higher slot contains a value, the point can only be commanded at the Manual Operator priority. If slot 8 is emptied, the Present Value of the point changes to match the next lower value in the Priority Array (in this case, ON at BN16).

Use the Release command to empty a priority slot. See *Releasing Points* [➙ 165] and *Changing the Priority of a Point* in this chapter.

Commands issued at lower BACnet Priority slot levels (slots 9 through 16 and Relinquish Default) are stored and immediately command the point when all slots above that value are empty. In this example, slot 16 contains a PPCL value that commands the point as soon as Manual Operator is emptied. Once slot 16 is emptied, the Relinquish Default value controls the point until a higher slot number receives a new value.

Relinquish Default

Relinquish Default allows you to configure an initial value for a point when the priority array is empty. FLN application subpoint COVs (for example, subpoint COVs within a TEC) are stored in Relinquish Default.

The Relinquish Default for Object Types BO and MSO, which correspond to point types LDO, L2SL, L2SP, LFSSL, LFSSP, LOOAL and LOOAP, contain a fixed value determined from the physical value of the point that results in the DO or DOs being OFF. See *Table Priority Array Example*.

NOTE:
The Relinquish Default for analog points in BACnet panels is not updated automatically by the Insight Commander application.

Point Values or State

Analog points have numeric values, which identify temperatures, positions, flow rate, etc. The point value is usually associated to an engineering unit that gives the value more meaning.

Point State	Default System Text
Energized state	ON (value 1)
De-energized state	OFF (value 0)

Digital points have states such as ON or OFF. A state is determined by the physical position of one or more electronic switches. If a switch is energized, then the point is at a certain state (for example, ON). For example:

Point State	Default System Text	New State Text
Energized state	ON (value 1)	DIRTY
De-energized state	OFF (value 0)	CLEAN

State text allows the text used by each digital point to be redefined with more meaningful text. The following example illustrates the difference between the default text and an alternate state text labels:

See System Setup for more information on using state text.

NOTE:
In BACnet, Fast/Slow/Stop, On/Off/Auto and LENUM points are mapped to multistate objects so that their default state text table starts at one instead of zero (1,2,3 rather than 0,1,2 as in the APOGEE Automation System.

Point Type Attributes

Each point definition is composed of attributes. These attributes describe the point to the system. Some attributes are used by all point types, and some are specific to a particular point type. See *Point Attribute Matrix* in this chapter for a comparison of which attributes apply to the particular point types.

Point Name

The following attributes are used for the point name:

```
>Point system name
>Point name
```

Both entries can contain from 1 to 30 alphanumeric characters. Valid characters include A to Z, a to z, 0 to 9, spaces ( ), periods (.), commas (,), dashes (-), underlines (_), and apostrophes (').

NOTE:
If spaces, periods, commas, dashes, or underlines are used in the point system name, it must have quotes around it when used in PPCL.

Point Type

The following attribute is used to identify the logical point type:

```
> Point type
```

Any of the point types can be entered. Typing **?** presents a numerical list to choose from. To select a point from a list, type the corresponding number and press **ENTER**.

1 LAO	5 LDI	9 LAOOP
2 LAO	6 L2SL	10 LFSSL
3 LPACI	7 L2SP	11 LFSSP
4 LDO	8 LOOAL	12 LENUM

BACnet Implementation of Logical Point Types

The APOGEE logical point types map to BACnet physical and virtual objects as shown in the following table.

Table. APOGEE **to BACnet Point Type Cross-reference.**

APOGEE **Point Type**	**BACnet Physical Object**	**BACnet Virtual Object**
Logical Analog Input (LAI) [1]	Analog Input Object (AI)	Analog Value Object (AV)
Logical Analog Output (LAO) [1]	Analog Output Object (AO)	Analog Value Object (AV)
Logical Digital Input (LDI) [1]	Binary Input Object (BI)	Binary Value Object (BV)
Logical Digital Output (LDO) [1]	Binary Output Object (BO)	Binary Value Object (BV)
Logical Pulse Accumulator Input (LPACI)	Analog Input Object (AI)	Analog Value Object (AV)
Logical Two State Latched (L2SL)	Binary Output Object (BO)	Binary Value Object (BV)
Logical Two State Pulsed (L2SP)	Binary Output Object (BO)	Binary Value Object (BV)
Logical Fast/Slow/Stop Latched (LFSSL) [2]	Multistate Output Object (MO)	Multistate Output Object (MO)
Logical Fast/Slow/Stop Pulsed (LFSSP) [2]	Multistate Output Object (MO)	Multistate Output Object (MO)
Logical On/Off/Auto Latched (LOOAL) [2]	Multistate Output Object (MO)	Multistate Output Object (MO)
Logical On/Off/Auto Pulsed (LOOAP) [2]	Multistate Output Object (MO)	Multistate Output Object (MO)
Logical Enumerated (LENUM)	Multistate Value Object (MV)	Multistate Value Object (MV)

1) Analog and Digital (Binary) points are mapped to BACnet Value objects if the primary (or only) physical point is virtual (if the second pulsed point or proof point is ignored in the determination).

2) APOGEE points with a proof are mapped to Multistate Output objects.

Point Descriptor

The following attribute is used for the point descriptor:

`>Descriptor`

This optional prompt identifies additional information for the point. The descriptor can contain from 0 to 16 alphanumeric characters. Valid characters include A to Z, a to z, 0 to 9, spaces ( ), periods (.), commas (,), dashes (-), underlines (_), and apostrophes ('). Pressing ENTER without entering text leaves the descriptor blank.

State Text

The following attribute is used to define state text for digital and LENUM points:

`>State text table`

Designates the state text table assigned to a particular point. To use the default entry for a point, press **ENTER** without typing a number. To assign an alternate state text table, type the table name, and then press **ENTER**. If the name of a particular table is unknown, type **?**, and then press **ENTER** to display a list of available state text tables.

Engineering Values

Analog points have numeric values, identifying temperatures, positions, flow rate, etc. The point value is usually associated to an engineering unit that gives the value more meaning.

The following attribute identifies the point value format type Analog points:

`>Float, Integer, Time, Date, dAte/Time`

There are five different types of point values for analog points:

- Float—Floating point values. If a floating point value type is defined, the system prompts for the number of decimal places for the point value as follows:

`>Number of decimal places:`

- Integer—Integer values
- Time—A floating point value representing time of day (for example, 13.5 = 1:30 P.M.).
- Date—A floating point value identifying the number of minutes that have passed since 01/01/1970.
- Date/Time—A floating point value identifying the number of minutes that have passed since January 1 at 00:00 in the current year.

Engineering Units

BACnet accepts pre-determined values for engineering units only. For this reason, APOGEE BACnet/IP devices do not accept user-created engineering units. You can type an exact value from the pre-determined list of APOGEE BACnet/IP engineering units, or use a query to select an engineering unit for the point. For example, ? C* will display all pre-determined APOGEE BACnet/IP engineering units that begin with the letter 'C'. If you type an exact value that is not in the pre-determined list, you will be re-prompted for the engineering unit.

The Engineering units prompt also accepts the BACnet engineering number in place of the APOGEE BACnet/IP name.

See *BACnet/IP Pre-defined Engineering Units* [→ 455] for a complete list of APOGEE BACnet/IP Engineering Units and their corresponding BACnet engineering unit numbers.

Access Groups

The following attribute is used to identify access groups for the point:

`>Access group(s)`

This prompt identifies to which access group(s) a point belongs. Valid entries range from 1 to 30. Pressing **ENTER** without entering a number(s), will default to all access groups. To define more than one access group, you can use either of the following conventions:

- Use commas to separate the access group numbers (1, 10, 22—for access groups 1, 10, and 22).
- Use double periods to define a range (1..8—for access groups 1 through 8).

If the defined access groups are unknown, type **?**, and then press **ENTER**. The system displays a list of all defined access groups.

Alarming

`>Alarmable (Y/N)`—Specifies if the point will use alarming. Answering N will forego the remaining alarm prompting.

`>OFFNORMAL event enabled`—Specifies if the system should print an alarm message when the point state changes to ALARM. Answer **Y** to print alarms; otherwise, answer **N** to suppress alarm printing for the point.

`>NORMAL event enabled (Y/N)`—Specifies if the system should print a Return to Normal message when the point state changes to NORMAL. Answer Y to print Return to Normal messages; otherwise; answer **N** to suppress Return to Normal printing for the point.

`>FAULT event enabled (Y/N)`—Specifies if the system should print a Point Failure message when the point state changes to FAULT. Answer **Y** to print Point Failure messages; otherwise, answer **N** to suppress Point Failure printing for the point.

`>Notification ID`—The instance number of the notification class that specifies the destinations where event messages will be sent.

`>Alarm Message number`—Identifies the number of the message text assigned to the point.

`>High limit`—For analog points that use standard alarming, the high limit represents the maximum value before the point condition changes to ALARM.

`>Low limit`—For analog points that use standard alarming, the low limit represents the minimum value before the point condition changes to ALARM.

`>Deadband`—An additional value, applied to the high and low alarm limits, that defines when a point is no longer in an ALARM state. The deadband is especially helpful in preventing nuisance status changes when a point fluctuates near an alarm level.

`>TimeDelay (sec)`—The amount of time (in seconds) that the system waits after an alarm level is crossed before evaluating an alarm condition. The time delay prevents alarms when a point value fluctuates near an alarm level.

```
>Field panel                   :   -------
```

Totalize

The totalization function accumulates the runtime value of a point. It can be used to:

- Accumulate run time for fans and pumps.
- Accumulate volume total from a flow rate sensor.
- Calculate degree days (used in PPCL).

The following attributes are used for totalization of a point:

`>Totalize (Y/N)`

If you answer **Y**, the system keeps track of the run time for the various states of the point and prompts for how the system displays the runtime value. The acceptable values are:

- Seconds

Guidelines for Setting COV Limits for Totalized Points

To determine an appropriate COV limit for an analog point being totalized, consider the level accuracy required for the totalized value. The following rules, that are used to determine the COV limit for point monitoring and control, also apply to situations where the point value is being totaled.

- For LAO and LAI points, the COV Limit cannot be less than the slope of the point. For example, you cannot set a COV limit of 1/100th of a degree for a sensor with a slope of 1/10th of a degree.
- For LPACI points, the COV limit cannot be lower than the value of one pulse count.
- A COV limit that is set too high, may result in programs and applications not receiving adequate updates of point values.
- A COV limit that is set too low, may slow system response by increasing the amount of information being transmitted over the communications trunk. A point with a COV limit that is too low may also toggle in and out of alarm state resulting in an increased number of alarms that occur.

Totalization of Analog Points

Totalized point values in APOGEE field panel Firmware Revision 2.0 and later are updated based on any of the following conditions:

- When the point is commanded or on a change in COV.
- If the point is not commanded or a change COV does not occur within 1 minute, the totalized value is updated.
- When the user displays the points' total in a report.
- Every time the TOTAL statement is called in PPCL for the point.

The field panel stores the totalized value in seconds. Points may display totalized values in Seconds, Minutes, or Hours. The conversion from second to minutes or hours is only for display purposes and not for data storage. The following table illustrates how the totalized value for an analog point is updated by seconds, by minutes, and by hours.

Event	Time	AO Value	Total Calculation	Total (Seconds)	Total (Minutes)	Total (Hours)
Command to 1	12:00:00	1	1 x 0 x 60 = 0.0000	0.00	0.00	0.00
Command to 2	12:08:00	2	1 x 8 x 60 = 480.0000	480.00	8.00	0.13
Command to 3	12:16:00	3	2 x 8 x 60 = 960.0000	1440.00	16.00	0.26

When total values are displayed in a point information block on an Insight graphic, Insight reads the total value of the point every five seconds to update the value displayed on the active graphic.

Totalized values are stored at the field panel. The totalized values will be reset to zero on the coldstart of a field panel. The reset time in the totalized display will show the time that the database is reloaded, and a reset value of zero. It is recommended that totalized values be reset (initialized) to zero at regular scheduled intervals (that is, the first day of the month at midnight or daily at midnight).

Totalization for Analog and Multistate Points

The Point Commander and Point Editor supports totalization for analog and multistate points.

The following point types can be totalized:

- LAO
- LAI
- LDO
- LDI
- L2SL
- L2SP
- LOOAL
- LOOAP
- LFSSL
- LFSSP

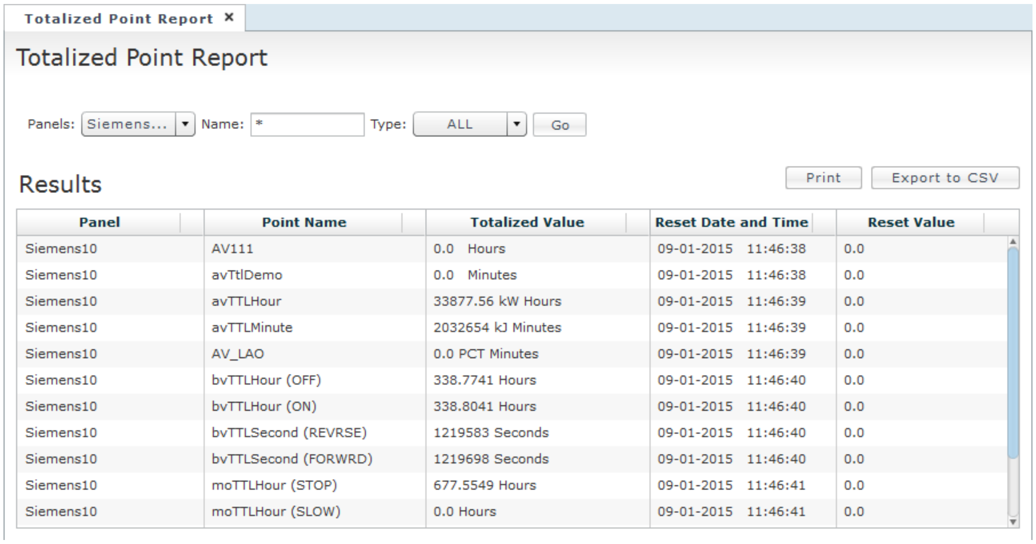
The totalization function accumulates the runtime value of a point. Examples for using this feature include:

- Accumulating runtime for fans and pumps.
- Accumulating total volume from a flow rate sensor.
- Calculating degree days.

NOTE:
Using the PPCL TOTAL function to access the totalized value of a BACnet Multistate Output point is currently not supported.

Totalized Point Report

The BACnet Field Panel Web Server (FPWeb) now offers a Totalized Point report, which displays the panel name, point name, totalized value, reset date and time, and reset value. To open the report, click the **Totalized Point Report** icon under the **Reporting** bar.



Panel	Point Name	Totalized Value	Reset Date and Time	Reset Value
Siemens10	AV111	0.0 Hours	09-01-2015 11:46:38	0.0
Siemens10	avTtlDemo	0.0 Minutes	09-01-2015 11:46:38	0.0
Siemens10	avTTLHour	33877.56 kW Hours	09-01-2015 11:46:39	0.0
Siemens10	avTTLMinute	2032654 kJ Minutes	09-01-2015 11:46:39	0.0
Siemens10	AV_LAO	0.0 PCT Minutes	09-01-2015 11:46:39	0.0
Siemens10	bvTTLHour (OFF)	338.7741 Hours	09-01-2015 11:46:40	0.0
Siemens10	bvTTLHour (ON)	338.8041 Hours	09-01-2015 11:46:40	0.0
Siemens10	bvTTLSecond (REVRSE)	1219583 Seconds	09-01-2015 11:46:40	0.0
Siemens10	bvTTLSecond (FORWRD)	1219698 Seconds	09-01-2015 11:46:40	0.0
Siemens10	moTTLHour (STOP)	677.5549 Hours	09-01-2015 11:46:41	0.0
Siemens10	moTTLHour (SLOW)	0.0 Hours	09-01-2015 11:46:41	0.0

Figure 1: Totalized Point Report Example.

Point Address

The following attributes are used to address the point in the field panel:

`>Field panel`

`>Field panel identifier`

Identifies the field panel where the point is defined.

`>Physical, Virtual Point address`

`>Physical, Virtual AUTO Point address`

`>Physical, Virtual FAST Point address`

`>Physical, Virtual OFF Point address`

`>Physical, Virtual ON OFF Point address`

`>Physical, Virtual ON Point address`

`>Physical, Virtual Proof Point address`

`>Physical, Virtual SLOW Point address`

`>Physical, Virtual STOP Point address`

Depending on the point being defined, the system displays any of the above prompts after the field panel has been identified. Each point type has different characteristics, so the system displays the appropriate prompt for the type being defined.

A physical point address means a point is associated with an actual termination in the field panel.

A virtual point address means the point resides in memory. If the point serves a specific purpose (such as a complex digital requiring multiple points to control specific states), then the system will identify which point (and state) is being defined. The system does not prompt for FLN and DROP numbers when defining virtual points.

`> FLN`

The number of the FLN (Field Level Network/Floor Level Network) where the point resides. If the point resides in the field panel, the FLN Number is 0.

If the point resides on a P1 FLN device, the FLN Number can be 1, 2, or 3. If the point resides on a LonWorks network FLN device, by default the FLN Number is set to 1, and should be left unchanged.

If the point resides on an MS/TP FLN device, the FLN Number will be 1.

`> Drop`

The drop number identifies devices on the FLN. How a device is addressed varies by the type of device. See the documentation appropriate for the device when you want to specify a drop number.

`> Point`

A number that identifies the physical or virtual point number within the field panel or the point on the FLN device. The valid values for point numbers are set by the actual layout of the hardware within the field panel or FLN device.

Other Digital Point Attributes

Digital Input Point Attributes

`>Normally closed (Y/N)`— Defines how a input point will react during a power loss. If a point is normally closed, the contacts for the DI point are wired to be closed when no energy is applied to the point. A point that is normally open will have open contacts when no energy is applied to the point.

`>Gain`— Number used to convert pulses from a pulse accumulator point into the engineering units that represent point values. Gain defines the number of engineering units (ranging from 0.001 to 5000.0) represented by each pulse count.

`>Count both edges (Y/N)`— Defines how the system interprets a pulse count. Gain is specified per pulse edge count. If both edges are counted, each on/off pulse (momentary contact) of the point produces two pulse counts. If only one edge is counted, each on/off pulse produces one pulse count. If both pulse edges are counted, gain is doubled.

Digital Output Point Attributes

`>Invert value (Y/N)`— Defines how a command should be applied to an output. If a point has an inverted value, an ON command de-energizes the point and an OFF command energizes the point. Conversely, a point with a value that is not inverted energizes when an ON command is received, and de-energizes when an OFF command is received.

`>Proof (Y/N)`— Defines if a point should be proofed. If the point does have a proof point, then the system also asks for a proof delay.

`>Proof delay (seconds)`— Defines (in seconds) how much time must pass after a point is commanded, before the system will check if an alarm condition exists for the point.

Other Analog Point Attributes

Analog Input Point Sensor Type

The following attributes are used when defining analog input points:

Sensor type – Indicates type of input that sensor point receives. The sensor types are:

```
I  Current (4 to 20 mA)
V  Voltage (0 to 10 Vdc)
P  Pneumatic (0 to 20 PSI)
```

Thermistors – (thermo-electric element with electrical resistance that falls with the rise of temperature). Thermistor types are:

```
T  Thermistor 100K
O  Thermistor 10K Type 2
S  Thermistor 10K Type 3
```

RTD – (thermo-electric element with electrical resistance that rises with the rise of temperature). See *RTD Wire Resistance and Intercept Adjustments*. RTD types are:

```
M  RTD 1K Platinum (tc375)
R  RTD 1K Platinum (tc385)
N  RTD 1K @ 32F Nickel (tc500-LG)
L  L-Type (AI sensor terminated on a FLN device)
C  Custom (Not implemented, defaults to type M)
J  RTD 1K @ 70F Nickel JCI *
D  RTD 1K Nickel DIN
```

* TXIOs (PXCM and P1 BIM) do not support JCI 1K Nickel sensors.

NOTE:
When defining the sensor type for analog input points, either enter the letter that corresponds to the sensor type as listed above, or type **?** and then press **ENTER** for a list of available sensor types. When entering the sensor type from the list of available types, enter the number that corresponds to the sensor type on the list.

```
>Sensor type                  :  ?
>  1) I  ( Current )
>  2) V  ( Voltage )
>  3) P  ( Pneumatic )
>  4) T  ( Thermistor 100K )
>  5) O  ( Thermistor 10K )
>  6) S  ( Thermistor 10K Type 3 )
>  7) M  ( RTD 1K Platinum 375 )
>  8) R  ( RTD 1K Platinum 385 )
>  9) N  ( RTD 1K Nickel )
> 10) J  ( RTD 1K Nickel JCI )
> 11) D  ( RTD 1K Nickel DIN )
> 12) L  ( L-Type )
> 13) C  ( Custom )
Enter option # or <C> for Cancel> 3-
>Slope                        :  ------------------
```

RTD Wire Resistance and Intercept Adjustments

Intercept adjustments are used to adjust a point intercept value to compensate for long runs of wire. Available when RTD sensor type is selected.

```
>Wire resistance adjustment:
```

The value is not visible in point look; it is only accessible in point add and modify prompts.

The value is combined with Intercept before upload. It is cleared when point is downloaded. Slope Intercept tool combines this value with the Intercept before download.

To calculate the intercept adjustment, measure the total resistance of the wire between the point termination and the sensor as follows:

- Short both wires at the sensor and measure the total resistance at the point termination with an Ohm meter.

This results in total resistance term for R x ft. or R x m.

If direct measurement is not available use the manufacturer's specification for dc resistance of the wire and calculate the total wire resistance.

/mΩ/ft or R = 2 x ΩR = 2 x

Multiply R by the wire distance from point termination to sensor

If manufacturer's specification is not available, use typical value from following table for the wire gauge selected.

Typical 2-conductor Wire Resistances.		
Wire Size (AWG)	**Resistance (R)**[1]	
	/ft.Ω	/mΩ
14	0.005	0.0164
16	0.008	0.0262
18	0.012	0.0394
20	0.020	0.0656
22	0.030	0.0984
24[2]	0.056	0.1837

1) Resistance /m).Ω/ft. or Ω(R) is for 2-conductor cable.

2) Installed as part of Structured Cabling system; average resistance shown will vary depending which pair used.

Then perform the Intercept adjustment calculation:

Divide the total resistance by the average sensor temperature constant for the sensor being used and subtract from the point intercept. See the following sensor table and slope intercept calculations for the field panel used later in this topic.

Enter results at the prompt.

Intercept Adjustments.		
RTD Type and temperature coefficient[1]	**Intercept Formula for Fahrenheit**[2 3]	**Intercept Formula for Celsius**[2 4]
1000-ohm Platinum tc375	I - (R × ft)/2.117	I - (R × m)/3.8102
1000-ohm Platinum tc385	I - (R × ft)/2.171	I - (R × m)/3.9080
1000-ohm Nickel tc500-LG	I - (R × ft)/2.459	I - (R × m)/4.427
1000-ohm Nickel JCI	I - (R × ft)/2.814	I - (R × m)/5.066
1000-ohm Nickel DIN	I - (R × ft)/3.047	I - (R × m)/5.485

1) Intercept Formula uses average temperature coefficient for the sensor connected.

2) Resistance (R) is from the wire specification or the typical wire resistance table.

3) I is for the intercept from the field panel Slope/Intercept table and ft is the wire length in feet.

4) I is for the intercept from the field panel Slope/Intercept table and m is the wire length in meters.

Analog Output Point Attributes

The following attributes are used when defining analog output points:

Actuator type – Indicates the type of output that the actuator point receives. The actuator types are:

```
1. I       Current (4 to 20 mA)
2. V       Voltage (0 to 10 Vdc)
3. L       L-Type (AO actuator terminated on a FLN device)
```

Initial value (Relinquish Default) – Used to set the point value when an analog point is first viewed by the field panel (either by being defined or on a return from power loss).

Analog Input and Output Point Attributes

Factors used to convert signals that the field panel uses for analog points into engineering units that represent point values. Slope and intercept constants are determined by the type of input or output device that is represented by the point, and whether the point is a physical point or a virtual point. See the *Slope and Intercept Calculations* section for the field panel where the point resides.

```
>Slope
>Intercept
```

Change of Value Attributes

The following attributes are used to define a COV limit for an analog or pulse accumulator point:

COV limit – Indicates the amount of change, in engineering units, that a point can experience before a field panel reports the change to other field panels on the ALN.

Slope and Intercept Calculations

This section contains tables of slope/intercept formulas for each field panel type.

PXC Compact and TX-I/O Slope/Intercept Calculations

The following table contains the slope/intercept formulas for the PXC Compact Series Controllers (PXC-16, PXC-24) and TX-I/O Modules (TXM1.8U, TXM1.8U -ML, TXM1.8X, and TXM1.8X-ML) used with PXC Modular, PXC-36, or P1 BIM:

Signal Range	Slope[a]	Intercept[1]	Sensor or Actuator Type	Modules
AI-V (0 to 10 Vdc)	$\frac{V_2 - V_1}{25,600}$	V1 – (Slope × 3584)	V (Voltage)	All
AI-I (4 to 20 mA)	$\frac{V_2 - V_1}{24,576}$	V1 – (Slope × 6144)	I (Current)	TXM1.8X TXM1.8X-ML PXC Compacts
AI-RTD 1000 Ω 375 Platinum RTD[b]	1.0°F 0.5556°C	0°F -17.7778°C	M (RTD 1K Platinum tc375)	All
AI-RTD 1000 Ω 385 Platinum RTD[b]	1.0°F 0.5556°C	0°F -17.7778°C	R (RTD 1K Platinum tc385)	All
AI-RTD 1000 Ω @ 32F 500-LG Nickel RTD[b]	1.0°F 0.5556°C	0°F -17.7778°C	N (RTD 1K @ 32F Nickel tc500-LG)	All
AI-RTD 1000 Ω @ 70F 500-JCI Nickel RTD[b]	1.0°F 0.5556°C	0°F -17.7778°C	J (RTD 1K @ 70F Nickel tc500-JCI)	All
AI-RTD 1000 Ω 500-DIN Nickel RTD[b]	1.0°F 0.5556°C	0°F -17.7778°C	D (RTD 1K Nickel tc500-DIN)	All
AI-NTC 10K Ω Thermistor Type 2	1.0°F 0.5556°C	0°F -17.7778°C	O (Thermistor 10K Type 2)	All
AI-NTC 10K Ω Thermistor Type 3	1.0°F 0.5556°C	0°F -17.7778°C	S (Thermistor 10K Type 3)	All
AI-NTC 100K Ω Thermistor	1.0°F 0.5556°C	0°F -17.7778°C	T (Thermistor 100K)	All
AO-V (0 to 10 Vdc)[c]	$\frac{V_2 - V_1}{30,720}$	V1	V (Voltage)	All
AO-I (4 to 20 mA)[c]	$\frac{V_2 - V_1}{24,576}$	V1 – (Slope × 6144)	I (Current)	TXM1.8X TXM1.8X-ML
Series 1000 sensor	1.0°F 0.5556°C	-0.6°F[d] -17.4445°C	M (RTD 1K Platinum tc375)	All
Series 1000 sensor setpoint dial	0.1981473	61.2	M (RTD 1K Platinum tc375)	All
Series 2200 sensor Type 2	1.0°F 0.5556°C	0°F -17.7778°C	O (Thermistor 10K Type 2 NTC)	All
Series 3200 sensor	1.0°F 0.5556°C	0°F -17.7778°C	O (Thermistor 10K NTC)	All

a) V1 is the low analog value of the signal range. V2 is the high analog value of the signal range.

b) The temperature range is fixed. If this type of device is used, adjust the intercept for wire length and wire gauge using the *RTD Intercept Adjustments* table.

c) At start-up, the output of the AOs is 0V or 4 mA until commanded to a different value by the firmware.

d) Compensation for sensor's self-heating effect.

General Guidelines To Calculate Slope/Intercept for Series 1000/2200/3200 Sensor Devices

Individual Series 1000/2200/3200 sensor devices typically contain multiple outputs that can be of different Sensor Types – RTD, Current, Voltage and so on. Given a particular output on a Series 2200/3200 model and for Series 1000 outputs not listed above, the corresponding Slope/Intercept may be calculated by looking up the actual Sensor Type (Voltage, Current, RTD, Thermistor and so on) used in the output.

Commonly Used PXC Compact or TX-I/O Slope/Intercepts

Point Type	Slope	Intercept
ao(v)	0.0003255208	0.0V
ao(i)	0.0006510417	0.0 mA
ai(v)	0.000390625	-1.4V
ao(i)	0.0006510417	0.0 mA
ai(1k nickel)	1.0	0.0 F
ai(1k platinum)	1.0°F	0.0 F
ai(1k platinum3)	1.0°F	0.0 F
ai(10k thermistor)	1.0°F	0.0 F
ai(100k thermistor)	1.0°F	0.0 F

Point Attribute Matrix

The following table illustrates which point attributes apply to the logical point types:

XX Indicates the system always prompts for this information.

X Indicates the system will prompt for this information if certain attributes are specified.

A blank cell indicates the system does not prompt for this information.

Table 2: Point Attributes for Logical Point Types.

Attribute	LAO	LAI	LPACI	LDO	LDI	L2SL	L2SP	LOOAL	LOOAP	LFSSL	LFSSP	LENUM
Point System name	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Point name	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Point type	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Descriptor	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Engineering units	XX	XX	XX									
Access group(s)	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Alarmable (Y/N)	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	
Enhanced alarms (Y/N)	X	X	X	X	X	X	X	X	X	X	X	
Print alarms (Y/N)	X	X	X	X	X	X	X	X	X	X	X	
Alarm count 2 (Y/N)	X	X	X	X	X	X	X	X	X	X	X	
Normal ack enabled (Y/N)	X	X	X	X	X	X	X	X	X	X	X	
High limit	X	X	X									

Attribute	LAO	LAI	LPACI	LDO	LDI	L2SL	L2SP	LOOAL	LOOAP	LFSSL	LFSSP	LENUM
Low limit	X	X	X									
Totalize (Y/N)	XX	XX		XX	XX	XX	XX	XX	XX	XX	XX	
Totalize in Hours, Minutes, Seconds	X	X		X	X	X	X	X	X	X	X	
Field panel	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
Physical, Virtual Point address	XX	XX	XX	XX	XX							XX
Physical, Virtual AUTO Point address								XX	XX			
Physical, Virtual FAST Point address										XX	XX	
Physical, Virtual OFF Point address							XX		XX			
Physical, Virtual ON OFF Point address						XX		XX				
Physical, Virtual ON Point address							XX		XX			
Physical, Virtual Proof Point address						XX	X	X	X	X	X	
Physical, Virtual SLOW Point address										XX	XX	
Physical, Virtual STOP Point address											XX	
FLN	X	X	X	X	X	X	X	X	X	X	X	X
Drop	X	X	X	X	X	X	X	X	X	X	X	X
Point	X	X	X	X	X	X	X	X	X	X	X	X
Dynamic COV limit (Y/N)	XX	XX										
COV limit	X	X										
Float, Integer, Time, Date, dAte/time	XX	XX										
Sensor type		XX										
Number of decimal places	X	X										
Slope	XX	XX										
Intercept	X	X										
Initial value	XX											
Wire resistance		X										
State text table				XX	XX	XX	XX	XX	XX	XX	XX	XX
Invert value (Y/N)					XX		X		X		X	
Normally closed (Y/N)				XX		XX		XX				

Attribute	LAO	LAI	LPACI	LDO	LDI	L2SL	L2SP	LOOAL	LOOAP	LFSSL	LFSSP	LENUM
Proof (Y/N)							XX	XX	XX	XX	XX	
Proof delay (seconds)							X	X	X	X	X	
Count both edges (Y/N)			XX									
Gain			XX									

Commanding Points

To change the value of a point, you must physically enter a new value. The process of changing a point value is called a command. Points are commanded to:

- Set the input to a control sequence (such as a setpoint).
- Override a control strategy.
- Provide a short-term solution to a control need.
- Troubleshoot a control strategy.

Releasing Points

BACnet/IP Command Priority levels must be emptied to allow lower priority levels to control the point. See Changing the Priority of a Point in this chapter for information about releasing BACnet points.

State Text

If state text is defined for a point, that text replaces the system default text. There are default state text tables for every type of point.

When commanding points that use state text, the system always prompts for the point name to be entered before displaying the available commands. Depending on how state text is used, there can be a number of different words that represent a system command, but only one set can apply to any particular point.

Monitoring Points

The point monitor provides a scrolling display of point values. It is a useful tool when troubleshooting and testing the control of the system. To use the point monitor, designate the points the system is to display. Once initiated, the point monitor begins scrolling the point values on the display terminal. After displaying point values, the system waits approximately four seconds, then redisplays the same points with updated values.

NOTE:
The UEC does not use system names, remote points have to be specified using BACnet the encoded name format (for example BAC_125_BV_0).

The following example displays a point monitor report:

```
12/01/2003 MON                  POINT MONITOR
REPORT                 12:22pm
-----------------------------------------------------------------
-----------
Point name
   :Suffix
(Description)                     Value          State   Prio
rity
-----------------------------------------------------------------
-----------
BLD990.FLR01.RM101.TEC
  :ROOM TEMP (RM101 TEC RM TMP)             (74.0 DEG
F)      *F*       NONE

BLD990.AHU01.RFN (RETURN FAN)                OFF               -
N-       NONE
BLD990.AHU01.SFN (SUPPLY FAN)                OFF               -
N-       NONE
BLD990.AHU01.SAT (SUPPLY AIR TEMP)           90.0 DEG
F       *A*       NONE
Delaying...

12:22pm 09/15/1997 MON

BLD990.FLR01.RM101.TEC
  :ROOM TEMP (RM101 TEC RM TMP)             (74.0 DEG F)      -
N-       NONE

BLD990.AHU01.RFN (RETURN FAN)                OFF               -
N-       NONE
BLD990.AHU01.SFN (SUPPLY FAN)                OFF               -
N-       NONE
BLD990.AHU01.SAT (SUPPLY AIR TEMP)           90.0 DEG
F       *A*       NONE
Delaying...

Report canceled
```

Multiple Points

The point monitor report can display multiple points on one report. Each point using the monitor is listed after the time/date stamp. The system is capable of displaying up to 20 points in the monitor. To keep the report readable, limit the number of points defined in the monitor.

Keystroke Control

The point monitor is started by performing the Starting the Point Monitor procedure. Once initiated, use the keys in the following table to control the report:

Action	Keystroke
Pause	CTRL+S
Resume	ENTER
Cancel	Shift+#

Point Database Procedures

This section contains step-by-step procedures for working with the point database.

Generating Point Logs and Reports

Displaying a Point Log

This procedure displays points in the database. This procedure can display all points on the network, or refine the report using wildcards to display only certain points.

Displaying a Point Log

HMI	**P, L** (Point, Log)

Prompt/Field	Option/Entry	Description
Point name	Press **ENTER**	All points
	Type that point name.	A particular point
	Type that point name, including wildcard characters.	A range of points
	Type **?**, and then type a number from the list.	A point using a query

The field panel displays a Point Log report.

Example

The following example displays a point log:

```
>Point name                    :  -------------------------------------------
12/01/2003 MON                  POINT LOG REPORT                       11:33pm
-------------------------------------------------------------------------------
Search for <*:>

Point name
   :Suffix (Description)                      Value/State      Status  Priority
-------------------------------------------------------------------------------
BLD990.AHU01.MAD (MIXED AIR DMPR)             11.0             -N-       NONE
BLD990.AHU01.MAT (MIXED AIR TEMP)             70.0 DEG F       -N-       NONE
BLD990.AHU01.OAD (OUTSIDE AIR DMPR)           11.0             -N-       NONE
...

End of report
```

Displaying a Point Log for Points on an FLN Device

This procedure is similar to Displaying a Point Log, but demonstrates the use of the suffix to display points residing on FLN devices.

Displaying Points on an FLN Device

HMI	**P, L** (Point, Log)

Prompt/Field	Option/Entry	Description
Point name	Type the FLN device name, followed by the delimiter, followed by an asterisk (*).	All points on the FLN device.
	Type the FLN device name, followed by the delimiter, followed by the exact point name of the FLN point.	A particular point.
	Type the FLN device name, followed by the delimiter, followed by an FLN point name/wildcard combination.	A range of points.
	Type **?**, and then the number from the list.	All the points in the device.

The field panel displays a Point Log report.

Example

The following example displays a point on an FLN device:

```
>Point name                    :  BLD990.FLR01.RM101.TEC.ROOM TEMP---------

12/01/2003 MON                  POINT LOG REPORT                       11:36pm
---------------------------------------------------------------------------
Search for <BLD990.FLR01.RM101.TEC:ROOM TEMP>

Point name
   :Suffix (Description)                     Value/State      Status  Priority
-------------------------------------------------------------------------------
BLD990.FLR01.RM101.TEC
  :ROOM TEMP (RM101 TEC RM TMP)             (74.0 DEG F)      *F*       NONE

End of report

>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend, Quit? -
```

Displaying Points by Point Status

This procedure is similar to Displaying a Point Log, but has more options (such as field panel number or operational state) to define the point display. Points can be displayed according to such criteria as type, status (ALARM, unacknowledged points), priority, or whether they have failed.

Displaying Points by Point Status

HMI	**P, D, V** (Point, Display, Value)

Prompt/Field	Option/Entry	Description
Any	A	For points in any state.
aLarm > Alarm priority	L	For points in Alarm.
	1 through 6 or press **ENTER**.	The severity level of alarms you want to display. Type the number of the alarm level to display points at a specific alarm level. Press **ENTER** to display all points in alarm.
Unacked	U	Points in alarm that have not been acknowledged.
Hand	H	For points in HAND.
Failed	F	For Failed points.
Disabled	D	For Disabled points.
Priority	P	For a particular Priority.
tYpe	Y	For a particular point Type.
tRouble	R	For Trouble.
Point name	Type the exact point name.	A specific point.
	Type the point name/wildcard combination.	A range of points.
	Press **ENTER**.	All points.

	Type **?**, and then type a number from the list.	A point using a query. The system lists points at the specified status.
Field panel or Field panel name	Press **ENTER**.	The field panel where you are connected.
	Type that field panel ALN address number, device instance number, or name.	A particular field panel.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

The field panel displays a Point Value report for the type of point requested. For an explanation of the report, see Displaying a Point Log [➙ 167].

Example

The following example displays points by point status. This example shows points in ALARM at any alarm priority:

```
>Any, aLarm, Unacked, Hand, Failed, Disabled, Priority, tYpe, tRouble? L
>Alarm priority (1-6)          :  --------
>Point name                    :  BLD990*------------------------------------
>Field panel                   :  1--
>Here, Printer                 :  H

12/01/2003 MON              ALARM POINT VALUE REPORT                  11:47am
-------------------------------------------------------------------------------
Search for <BLD990*:>
Field panel <1>

Point name
   :Suffix (Description)                     Value/State      Status  Priority
-------------------------------------------------------------------------------
BLD990.AHU01.RFN (RETURN FAN)                OFF              *A*       NONE
BLD990.AHU01.SFN (SUPPLY FAN)                OFF              *A*       NONE

End of report

>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend, Quit? -
```

Displaying Points by Point Priority

This procedure is similar to Displaying a Point Log, but allows for more options (such as field panel number and point priority) to refine the point display.

Displaying Points by Point Priority

HMI	**P, D, V, P** (Point, Display, Value, Priority)

Prompt/Field	Option/Entry	Description
None	N	For None.
Pdl	P	For PDL.
Emer	E	For Emergency.
Smoke		For Smoke.
Oper	O	For Operator.
Point name	Type the exact point name.	A specific point.
	Type the point name, including wildcard characters.	A range of points.
	Press **ENTER**.	All points.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
Field panel or Field panel name	Press **ENTER**.	The field panel where you are connected.
	Type that field panel ALN address number, device instance number, or name.	A particular field panel.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

The field panel displays the Priority Point Value report.

Example

The following example displays points by point priority at an RS-485 field panel (in this example, points at OPER priority):

```
>None, Pdl, Emer, Smoke, Oper  :  O
>Point name                    :  BLD990*------------------------------------
>Field panel                   :  1--
>Here, Printer                 :  H

12/01/2003 MON             PRIORITY POINT VALUE REPORT                10:38am
-------------------------------------------------------------------------------
Search for <BLD990*:>
Field panel <1>

Point name
   :Suffix (Description)                    Value/State      Status  Priority
-------------------------------------------------------------------------------
BLD990.AHU01.RFN (RETURN FAN)               OFF              -N-       OPER
BLD990.AHU01.SAT (SUPPLY AIR TEMP)          200.0 DEG F      -N-       OPER
BLD990.AHU01.SFN (SUPPLY FAN)               OFF              -N-       OPER

End of report
```

Displaying Points by BACnet Command Priority

The Point Priority Array Report displays the BACnet Priority Array of the specified point. The command priority determines if an operator or a particular control program is responsible for controlling the point.

Displaying a Point Priority Array Report

HMI	**P, D, P** (Point, Display, Pointarray)

Prompt/Field	Option/Entry	Description
Point name	Type that point name, encoded name, or device specify name.	A particular point.
	Type the point name, including wildcard characters.	A range of points.
	Type **?**, and then type a number from the list .	A query. The system lists points at the specified status.

The field panel displays the Point Priority Array report.

Example

The following example displays points by point priority at a BACnet/IP field panel. Note that the first line following the report header displays the current state of the point.

```
>Point name                   :  BACnet Trend AV 2----------------------------

02/19/2006 MON              POINT PRIORITY ARRAY REPORT                10:38am
-------------------------------------------------------------------------------
Search for <BACnet Trend AV 2:>

Point name
   :Suffix (Description)                     Value/State      Status  Priority
-------------------------------------------------------------------------------
<BACnet Trend AV 2:> (BACnet Trend Point)     OFF              -N-       NONE
   1.  BN01 Manual Life Safety             ---
   2.  BN02 Automatic Life Safety                 ---
   3.  BN03                                       ---
   4.  BN04                                       ---
   5.  BN05 Critical Equipment Control            ---
   6.  BN06 Minimum On/Off                        ---
   7.  BN07                                       ---
   8.  BN08 Manual Operator (oper)         ---
   9.  BN09                                       ---
  10.  BN10      (smok)                                ---
  11.  BN11                                       ---
  12.  BN12      (emer)                                ---
  13.  BN13                                       ---
  14.  BN14 (pdl)                                ---
  15.  BN15                                       ---
  16.  BN16 (ppcl, sche)                          ---
      Relinquish Default                         OFF

>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend, Quit? -
```

Displaying Points by Type

This procedure is similar to Displaying a Point Log, but allows for more options (such as field panel number and point type) to refine the point display.

Displaying Points by Point Type

HMI	**P, D, V, Y** (Point, Display, Value, tYpe)

Prompt/Field	Option/Entry	Description
Point type	Specify point type: LAO	Logical Analog Output.
	LAI	Logical Analog Input.
	LPACI	Logical Pulsed Accumulator.
	LDO	Logical Digital Output.
	LDI	Logical Digital Input.

	L2SL	Logical 2-State Latched.
	L2SP	Logical 2-State Pulsed.
	LOOAL	Logical ON/OFF/AUTO Latched.
	LOOAP	Logical ON/OFF/AUTO Pulsed.
	LFSSL	Logical FAST/SLOW/STOP Latched.
	LFSSP	Logical FAST/SLOW/STOP Pulsed.
	LENUM	Logical ENUMerated Value.
Point name	Press **ENTER**.	All points.
	Type that point name.	A particular point.
	Type the point name, including wildcard characters.	A range of points.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
Field panel or Field panel name	Press **ENTER**.	The field panel where you are connected.
	Type that field panel ALN address number, device instance number, or name.	A particular field panel.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

The field panel displays a Type Point Value report for the type of point requested. For an explanation of the report, see Displaying a Point Log [➙ 167].

Example

The following example displays points by point type (in this example, Logical Analog Input type):

```
>Point type                    :  LAI------------------------------------------
>Point name                    :  ------------------------------------------
>Field panel                   :  1--
>Here, Printer                 :  H

12/01/2003 MON              TYPE POINT VALUE REPORT                  10:39am
------------------------------------------------------------------------------
Search for <*:>
Field panel <1>

Point name
   :Suffix (Description)                     Value/State      Status  Priority
------------------------------------------------------------------------------
BLD990.AHU01.MAT (MIXED AIR TEMP)            70.0 DEG F       -N-       NONE

BLD990.AHU01.PGM
  :PPCL Address                              1                -N-       NONE

BLD990.AHU01.SAT (SUPPLY AIR TEMP)           200.0 DEG F      *A*       OPER

End of report
```

Displaying the Totalized Value of a Point

This procedure displays the totalized values for a point. Before using this procedure, one or more points must have their operational states totalized.

Displaying Totalized Values of Points

HMI	**P, D, T** (Point, Display, Total)

Prompt/Field	Option/Entry	Description
Point name	Press **ENTER**.	All points A specific point.
	Type that point name.	A particular point.
	Type the point name, including wildcard characters.	All range of points.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
Field panel or Field panel name	Press **ENTER**.	The field panel where you are connected.
	Type that field panel ALN address number, device instance number, or name.	A particular field panel.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

The field panel displays a Totalized Point Value report.

Example

The following example displays totalized values of a point:

```
>Point name                  :  BLD990*-----------------------------------
>Field panel                 :  1--
>Here, Printer               :  H

12/01/2003 MON             TOTALIZED POINT VALUE REPORT              10:41am
-------------------------------------------------------------------------------
Search for <BLD990*:>

Point name (Description)
   Totalized value              Reset time            (Reset value)
-------------------------------------------------------------------------------
BLD990.AHU01.RFN (RETURN FAN      )
       117:22:13      OFF                    09/15/1997 04:33pm 0
         0:00:00      ON                     09/15/1997 04:33pm 0
BLD990.AHU01.SFN (SUPPLY FAN      )
       117:21:31      OFF                    09/15/1997 04:33pm 0
         0:00:00      ON                     09/15/1997 04:33pm 0

End of report
```

Displaying a Point Definition by Point Name

This procedure displays the definition of a point by point name. The type of information contained in the report can be different due to the attributes of the different point types.

Displaying Point Definitions by Point Name

HMI	**P, D, D, N** (Point, Display, Definition, Name)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name.	A particular point.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
Field panel or Field panel name	Press **ENTER**.	The field panel where you are connected.
	Type that field panel ALN address number, device instance number, or name.	A particular field panel.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

The field panel displays a Point Display Definition report.

Example

The following example displays a point definition by point name:

```
>Point name                  :  BLD990.AHU01.RFN---------------------------
>Field panel                 :  1--
>Here, Printer               :  H

12/01/2003 MON            POINT DISPLAY DEFINITION REPORT              10:43am
-------------------------------------------------------------------------------
Search for <BLD990.AHU01.RFN:>
Field panel <1>

Field                                      Value
-------------------------------------------------------------------------------
Point system name             : BLD990.AHU01.RFN
Instance Number             : 0 <BAC_771_MV_0>
Point name                    : BLD990.AHU01.RFN
Point type                    : L2SL
Descriptor                    : RETURN FAN
Value                         : OFF
Condition                     : -N-
Priority                      : OPER
State text table              : Default L2SL
Access group(s)               : <all>
Point enabled for alarming
      Print alarms                         : YES
      Alarm count 2                        : NO
      Normal ack enabled                   : NO
Totalize                      : YES, in Minutes
Field panel                   : 3
Point address                 : 003 0 04 01
   Invert value               : NO

End of report
```

Displaying a Point Definition by Address

This procedure displays the definition of a point by address. The type of information contained in the report can be different due to the attributes of the different point types.

Displaying Point Definitions by Address

HMI	**P, D, D, A** (Point, Display, Definition, Address)

Prompt/Field	Option/Entry	Description
Field panel or Field panel name	Press **ENTER**.	The field panel where you are connected.
	Type that field panel ALN address number, device instance number, or name.	A particular field panel.
FLN number	Specify the FLN number.	
FLN drop address	Specify the FLN drop address.	

Enter point number	Press **ENTER**.	All points.
	Type that point number.	A particular point.
Show subpoints? (Y/N)	Y	Display subpoints.
	N	Suppress subpoint display.

The field panel displays the Point Display Definition report.

Example

The following example displays a point definition by address:

```
>Field panel                   :  1--
>FLN number                    :  0--
>FLN drop address              :  53-
>Enter point number            :  1----
>Show subpoints? (Y/N)         :  N

12/01/2003 MON      POINT DISPLAY DEFINITION BY ADDRESS REPORT          10:49am
--------------------------------------------------------------------------------
Search for:
    Address <1 0 53 1>
    Subpoints included <NO>

Field                                      Value
--------------------------------------------------------------------------------
Point system name             : SHIPPING DOOR SENSOR
Instance Number             : 0 <BAC_771_MV_0>
Point name                    : SHIPPING DOOR SENSOR
Point type                    : LDI
Descriptor                    : SENSOR
Value                         : ON
Condition                     : *A*
Priority                      : NONE
State text table              : Default LDI
Access group(s)               : <all>
Alarmable                   : NO
Device Instance Number      : 771
Totalize                      : NO
Field panel                   : 1
Point address                 : 001 0 53 01
   Normally closed            : YES

End of report

>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend, Quit? –
```

Displaying Unresolved Points

This procedure displays points that are unresolved. A point is considered unresolved if the name is used in an application (most commonly PPCL), but not found on the network.

Displaying Unresolved Points

HMI	**P, D, U** (Point, Display, UnresolvedName)

Prompt/Field	Option/Entry	Description
Point name	Press **ENTER**.	To specify all points.
	Type that point name.	To specify a particular point.
	Type the point name, including wildcard characters.	To specify a range of points.

The field panel displays an Unresolved Name report.

Example

The following example shows unresolved points:

```
07/17/2008 THU              Unresolved Name Report                   02:31pm
-------------------------------------------------------------------------------
Search for <*:*>

FAN                                                Field panel 1
TEST                                               Field panel 1

End of report
```

Commanding Point Values

Commanding the Value of Analog Points

This procedure commands the value of an analog point. Before commanding the point value, you should understand what effect a change to this point will have on the system.

Commanding Analog Point Values

HMI	**P, C, V** (Point, Command, Value)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name.	A particular point.
	Type **?**, and then type a number from the list.	A query. The system displays the current value for the point in the Current State field.

New	Specify a new analog value for the point.	
BACnet Command Priority	Enter the command priority for the point.	

The system commands the analog point to the specified new value.

Example

The following example displays commanding analog point value:

```
>Point name                    :  BLD990.AHU01.OAD--------------
-------------
>Current value = 11.0       New:  7-----------------
>BACnet Command Priority (8 – 16):  9
BLD990.AHU01.OAD commanded to 7.0

>Value, resetTotal, Quit? –
```

Resetting the Totalized Value of a Point

This procedure resets the totalized value of a point. The totalized value can be reset for either all states of the point, or one specific state. The totalized value can be reset to a number other than zero.

Resetting a Totalization Value

HMI	**P, C, T** (Point, Command, resetTotal)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name.	A particular point.
	Type **?**, and then type a number from the list.	A query. The system displays the current value for the point in the Current State field.
Reset total for all states (Y/N)	Y	To reset the totalization value for all states. Specify whether the reset the totalization value for all states of the point.
	N	To retain the current totalization value. The system displays the values available for the point.
Reset total for state	Type the number from the list that specifies the state that you want to reset.	Displays the state text for the point.
Reset total value	0	To reset the value to zero.
	Type the new value.	To set the value.

The system resets the totalized value of the specified point.

Example

The following example displays resetting a totalized point value:

```
>Point name                    :  BLD990.AHU01.RFN--------------
-------------
>Reset total for all states (Y/N):  N
>Reset total for state         :  ON------
>Reset total value             :  0-----------------
Command successful
```

Defining Points

This procedure adds a Logical point to the database. Before beginning this procedure, identify the information that will be needed to enter the point, such as whether the address is physical or virtual, access groups, whether the point is Alarmable, the COV limit, and so on. This information will vary greatly, depending on the type of point being added.

Adding a Physical Point

Adding a Logical Point with Physical Address

HMI	**P, E, A** (Point, Edit, Add)

NOTE:
After entering **P, E, A**, the field panel prompts for various point attributes, determined by the point type. For more information concerning specific point attributes, see *Point Type Attributes* [→ 151]. Once you reach the **Physical, Virtual Proof Point address** prompt follow the information in the table below.

Prompt/Field	Option/Entry	Description
Physical, Virtual Proof Point address	P	
FLN	0	If the point resides in the field panel.
	Type the appropriate FLN number.	
	Press **ENTER**.	
Drop	Enter the appropriate number.	**NOTE:** How a device is addressed varies by the type of device. See the documentation for the device when you want to specify a drop number.
Point	Type a number that identifies the physical point number within the field panel or on the FLN device.	**NOTE:** The valid values for point numbers are set by the actual layout of the hardware within the field panel or FLN device.

TX-I/O Logical Point Adds

If you are adding an LAO or LAI point for a TX-I/O module, do one of the following:

LAO Point Add – Following the Point field entry, an Actuator type entry appears. When defining the actuator type for analog output points, either enter the letter that corresponds to the actuator type or type ? or ENTER for a list of actuator types available. When entering the actuator type from the list of available types, enter the number that corresponds to the actuator type on the list.

```
> Point                         :  3----
>Actuator type                  :  -
>  1) I  ( Current )
>  2) V  ( Voltage )
>  3) L  ( L-Type )
Enter option # or <C> for Cancel> 1-
>Slope                          :  ------------------
```

LAI Point Add – Following the Point field entry, a Sensor type entry appears.

When defining the sensor type for analog points, either enter the letter that corresponds to the sensor type or type ? or ENTER for a list of sensor types available. When entering sensor type from the list of available types, enter the number that corresponds to the sensor type on the list.

```
>Sensor type                    :  ?
>  1) I  ( Current )
>  2) V  ( Voltage )
>  3) P  ( Pneumatic )
>  4) T  ( Thermistor 100K )
>  5) O  ( Thermistor 10K )
>  6) S  ( Thermistor 10K Type 3 )
>  7) M  ( RTD 1K Platinum 375 )
>  8) R  ( RTD 1K Platinum 385 )
>  9) N  ( RTD 1K Nickel )
> 10) J  ( RTD 1K Nickel JCI )
> 11) D  ( RTD 1K Nickel DIN )
> 12) L  ( L-Type )
> 13) C  ( Custom )
Enter option # or <C> for Cancel> 3-
>Slope                          :  ------------------
```

Prompt/Field	Option/Entry	Description
		Continue entering point attributes at the remaining prompts until the message Command successful displays.

Example

The following example displays adding a Logical Analog Output (LAO) point with physical address:

```
>Point system name             :  LAO EXAMPLE POINT-------------
>Instance Number             : 1 <BAC_771_MV_1>_
>Point name                    :  LAO EXAMPLE POINT-------------
>Point type                    :  LAO---
>Descriptor                    :  LAO EXAMPLE-----
>Float, Integer, Time, Date, dAte-time:  F
>Number of decimal places      :  2
>Engineering units             :  UNITS-
>Access group(s)               :  ------------------------------
----------
>Alarmable (Y/N)               :  Y
>OFFNORMAL event enabled (Y/N) :      Y
>NORMAL event enabled (Y/N)    :      Y
>FAULT event enabled (Y/N)     :      Y
>Notification ID             : 5
>Alarm Message Number        : 5
>High limit                    :  80----------------
>Low limit                     :  65----------------
>Deadband                    : 10
>Time Delay (sec)                    : 30
>Field panel                   :  1--
>Physical, Virtual Point address:  P
> FLN                          :  0--
> Drop                         :  12-
> Point                        :  1----
>Slope                         :  1-----------------
>Intercept                     :  0-----------------
>COV limit                     :  2-----------------
>Relinquish Default          :
>Initial value                 :  75----------------
Command successful
```

Adding a Virtual Point

Adding a Logical Point with Virtual Address

HMI	**P, E, A** (Point, Edit, Add)

NOTE:
After entering **P, E, A**, the field panel prompts for various point attributes, determined by the point type. For more information concerning specific point attributes, see *Point Type Attributes* [→ 151]. Once you reach the **Physical, Virtual Proof Point address** prompt follow the information in the table below.

Prompt/Field	Option/Entry	Description
Physical, Virtual Proof Point address	V	
Point	Press **ENTER**.	If the point will not be used by pre-APOGEE field panels. Accept default address assigned by the APOGEE Automation System.
	Type a virtual address that is unique for the field panel.	If the MLN contains pre-APOGEE field panels that use this point.
Relinquish Default	Press **ENTER**.	To accept the default value (OFF).
	ON	To allow the default value to relinquish.

The system adds the logical point with virtual address that is unique system wide. The message Command successful displays.

Example

```
>Add, Modify, Copy, Delete, Look, Quit? A
>Point system name             :  BLD990.FLR01.RM101.VIRT-------
>Instance Number             :
>Point name                    :  BLD990.FLR01.RM101.VIRT-------
>Point type                    :  LDI---
>Descriptor                    :  RM101 VIRT------
>State text table              :  ALARM_NORMAL------------------
>Access group(s)               :  ------------------------------
----------
>Alarmable (Y/N)               :  N
>Totalize (Y/N)                :  N
>Field panel                   :  ---
>Physical, Virtual Point address:  V
> Point                        :  200—
>Relinquish Default          : OFF
Command successful
```

Looking at a Point Definition

HMI	**P, E, L** (Point, Edit, Look)

Prompt/Field Entry	Option	Description
Point name		1 to 25

The `Point Look Report` displays.

Example

```
01/01/2009 TUE POINT LOOK REPORT 00:01
----------------------------------------------------------------
---
Search for <ldo25:>

Field Value
----------------------------------------------------------------
---
Point system name : ldo25
Instance Number : 0 (BAC_9032_BO_0)
Point name : ldo25
Point type : LDO
Descriptor :
Value : OFF
Condition : -N-
Priority : NONE
State text table : Default LDO
Access group(s) : <all>
Alarmable : NO
Totalize : NO
Device Instance Number : 9032
Point address : 9032 0 00 25
Invert value : NO
Relinquish Default : OFF

End of report
```

Modifying a Point Definition

This procedure changes the attributes of the point. Before beginning, have the changes ready to facilitate the procedure.

Modifying a Point Definition

HMI	**P, E, M** (Point, Edit, Modify)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name.	A particular point.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
		The field panel prompts for various point attributes, determined by the point type and also displays current values with each attribute. - Press **ENTER** to retain a value and displays next attribute. - Type a new value. To changes an attribute.

The system changes the attributes of the point.

Example

The following example displays the modification of an LAO point from a BACnet/IP field panel. For specific point attributes, see Point Type Attributes [➔ 151].

```
>Point name                    :  LAO EXAMPLE POINT-------------
-----------
>Descriptor                    :  LAO EXAMPLE-----
>Float, Integer, Time, Date, dAte-time:  F
>Number of decimal places      :  2
>Engineering units             :  UNITS-
>Access group(s)               :  1..30-------------------------
----------
>Alarmable (Y/N)               :  Y
>OFFNORMAL event enabled (Y/N) :      Y
>NORMAL event enabled (Y/N)    :      Y
>FAULT event enabled (Y/N)     :      Y
>Notification ID             : 5
>Alarm Message Number        : 5
>High limit                    :  80.0--------------
>Low limit                     :  65.0--------------
>Deadband                    : 10
>Time Delay (sec)                   : 30
>Slope                         :  1.0---------------
>Intercept                     :  0.0---------------
>COV limit                     :  2.0---------------
>Relinquish Default          : 2.0---------------
Command successful
```

Copying a Point Definition to a New Point

This procedure copies the attributes from one point to a new point name. Once copied, the new point is added to the database. Except for a few specific attributes, all remaining attributes are copied. Before beginning, have the necessary attributes, such as the new point name and address, ready to enter.

Copying a Point Definition

HMI	**P, E, C** (Point, Edit, Copy)

Prompt/Field	Option/Entry	Description
Copy from point name	Type the exact point name you want to copy.	
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
Copy to point system name	Type the point system name of the new point.	
Point name	Type the point name of the new point.	
Descriptor	Type the descriptor for the new point.	
Field panel or field panel name	Type the ALN address number, device instance number, or name of the point type and whether the point is virtual or physical.	

When the point addressing information is entered, this procedure is complete.

Example

The following example displays copying a point definition:

```
>Copy from point name          :  BLD990.AHU01.RFN--------------
-------------
>Copy to point system name     :  BLD1000.AHU01.RFN-------------
>Instance Number             : -------
>Point name                    :  BLD1000.AHU01.RFN-------------
>Descriptor                    :  BLD1000 AHU01RFN
>Field panel                   :  2--
>Physical, Virtual ON OFF Point address:  P
> FLN                          :  0--
> Drop                         :  12-
> Point                        :  1----
> Invert value (Y/N)           :  N
>Physical, Virtual Proof Point address:  P
> FLN                          :  0--
> Drop                         :  13-
> Point                        :  2----
> Normally closed (Y/N)        :  N
> Proof delay (seconds)        :  30---
Command successful
```

Deleting a Point from the Database

This procedure deletes a point from the database.

HMI	**P, E, D** (Point, Edit, Delete)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name you want to delete.	
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
Are you sure (Y/N)	Y, N	Verify that you want to delete the specified point.

The system deletes the specified point.

Example

```
>Point name                    :  LAO EXAMPLE POINT-------------
>Are you sure (Y/N)            :  Y
Command successful
```

Changing the Command Priority

BACnet/IP Command Priority levels must be emptied to allow lower priority levels to control the point. Use the following procedure to release a point to the next lowest priority level that contains a value.

NOTE:
Because changing point priority can disrupt the operation of the system, be careful when performing this procedure. Also, this procedure does not allow wildcard commanding of subpoints to NONE priority.

Changing the Point Priority

HMI	**P, O, R** (Point, Operation, Release)

Prompt/Field	Option/Entry	Description
Point name	Type that point name.	A particular point.
	Type **?**, and then type a number from the list.	A query. The system lists points matching the criteria.
BACnet Command Priority (8-16)	Enter the priority array number you want to clear.	

The system releases the specified point priority level.

Example

The following example displays changing point priority:

```
>Point name:  BLD990.AHU01.MAD----------------------------------
--
>Bacnet Command Priority (8 - 16): 12
Point BLD990.AHU01.MAD released

>Enable, Disable, Status, Release, Quit? -
```

Enabling or Disabling a Point

This procedure enables or disables a point. When a point is disabled, the value state cannot be changed by an interface terminal or PPCL statement until it is enabled. Disabled points have a status of *O* on point logs and displays.

Enabling or Disabling a Point

HMI	**P, O** (Point, Operation)

Prompt/Field	Option/Entry	Description
Priority, Enable, Disable, Status, Release, Quit?	D	For Disable
	E	For Enable
Point name	Press **ENTER**.	All points
	Type that point name.	A particular point.
	Type the point name, including wildcard characters.	A range of points.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
Are you sure (Y/N)	Y,N	If you selected all points or a range of points using wildcards, you will be prompted to verify whether you want to enable or disable the specified points.

The system enables or disables the specified point(s).

Example

The following example displays enabling a range of points:

```
>Priority, Enable, Disable, Status, Release, Quit? E
>Point name                    :  BLD990.*----------------------
----------
>Are you sure (Y/N)            :  Y
Point BLD990.AHU01.RFN Enabled
```

Monitoring Points

Displaying Points in the Point Monitor

This procedure displays the points in the point monitor.

Displaying Points in the Monitor

HMI	**P, M, L** (Point, Monitor, Listpoints)

The field panel displays a Point Monitor List report.

Example

The following example shows displaying points in the monitor:

```
12/01/2003 MON               POINT MONITOR LIST
REPORT                  12:28pm
----------------------------------------------------------------
---------------
Point name
   :Suffix
(Description)                      Value            State   Prio
rity
----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
  :ROOM TEMP (RM101 TEC RM TMP)             (74.0 DEG
F)      *F*       NONE

BLD990.AHU01.RFN (RETURN FAN)                OFF               -
N-       NONE
BLD990.AHU01.SFN (SUPPLY FAN)                OFF               -
N-       NONE
BLD990.AHU01.SAT (SUPPLY AIR TEMP)           90.0 DEG
F       *A*       NONE

End of report

>Listpoints, Start, Add, Delete, Quit? -
```

Starting the Point Monitor

This procedure starts the point monitor and displays the output on the terminal. Once started, the system displays the points (and their associated values) in the monitor group approximately every four seconds.

Starting the Point Monitor

HMI	**P, M, S** (Point, Monitor, Start)

The field panel displays a scrolling Point Monitor report. In this report, points and their associated values are displayed in the same format as shown in the Displaying Points in the Point Monitor procedure. These point values are updated and redisplayed about every four seconds.

Example

The following example displays the point monitor:

```
12/01/2003 MON                   POINT MONITOR
REPORT                       12:36pm
-----------------------------------------------------------------
-----------
Point name
   :Suffix
(Description)                      Value            State   Prio
rity
-----------------------------------------------------------------
-----------
BLD990.FLR01.RM101.TEC
  :ROOM TEMP (RM101 TEC RM TMP)               (74.0 DEG
F)      *F*       NONE

BLD990.AHU01.RFN (RETURN FAN)                  OFF              -
N-       NONE
BLD990.AHU01.SFN (SUPPLY FAN)                  OFF              -
N-       NONE
BLD990.AHU01.SAT (SUPPLY AIR TEMP)             200.0 DEG
F      *A*       NONE
Delaying...

Report cancelled
```

Adding a Point to the Point Monitor

This procedure adds a point to the point monitor.

Adding a Point to the Monitor

HMI	**P, M, A** (Point, Monitor, Add)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name you want to add to the monitor.	A particular point.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.

The system adds the point to the point monitor.

Example

The following example displays adding a point to the monitor:

```
>Point name                    :  BLD990.AHU01.MAT--------------
-------------
Command successful

>Listpoints, Start, Add, Delete, rEmoveall, Quit? –
```

Deleting a Point from the Point Monitor

This procedure deletes a point from the monitor.

Deleting Points from the Monitor

HMI	**P, M, D** (Point, Monitor, Delete)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name you want to delete to the monitor.	A particular point.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.

The system deletes the specified point from the monitor.

Example

The following example displays deleting a point from the monitor:

```
>Point name                    :  BLD990.AHU01.MAT--------------
-------------
Command successful
```

Removing All Points from the Point Monitor

This procedure removes all points from the monitor.

Removing All Points from the Monitor

HMI	**P, M, E** (Point, Monitor, rEmoveall)

The system removes all points from the monitor.

Example

The following example displays removing all points from the monitor:

```
>Point, Application, Time, Message, Cancel, System, passWord, Bye? P
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend, Quit? M
>Listpoints, Start, Add, Delete, rEmoveall, Quit? E
Command successful
```

Acknowledging Point Alarms

This procedure acknowledges an alarm. Points that require acknowledging are specified in the database definitions. Acknowledging a point is different than changing the operational state of the point. Points that require acknowledging cannot change operational state or priority once they enter the ALARM state.

Acknowledging Point Alarms

HMI	**P, A, A** (Point, Alarm, Acknowledge)

Prompt/Field	Option/Entry	Description
Offnormal, Normal, Fault	O, N, F	**NOTE:** To view these timestamp values, display a Point Display Definition report.
Point name	Press **ENTER**.	All points.
	Type that point name.	A particular point.
	Type the point name, including wildcard characters.	A range of points.
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.

The system acknowledges an alarm for the specified point(s).

Example

```
>Offnormal, Normal, Fault    :  O
>Point name                    :  BLD990*----------------------
----------
BLD990.AHU01.MAT : Acknowledged

BLD990.AHU01.RFN : Acknowledged
...


End of commanding
```

Chapter 5—P1 FLN Devices

This section discusses the interaction and functionality between a field panel and a P1 Field Level Network (FLN) device, including:

- Displaying FLN points and definitions, reports, and initialization values
- Commanding points on FLN devices
- Initializing and updating FLN device values
- Adding, modifying, and deleting FLN devices

You will also learn the procedures needed to perform these functions.

Before You Begin

Before using the information in this section, you should have a working understanding of the following concepts:

- HVAC equipment of the facility
- Point database
- General knowledge of the APOGEE Automation System

What Are FLN Devices?

Field Level Network (FLN) devices are high performance, cost effective solutions used to control or monitor specific types of HVAC equipment. FLN devices are either Equipment Controllers or Expansion Devices.

Equipment Controllers

Some of the characteristics of Equipment Controllers are:

- All Equipment Controllers can operate as stand-alone or networked to field panels
- All Equipment Controllers can maintain their own database
- There are many different types of Equipment Controllers to fit a wide variety of needs
- Some Equipment Controllers use customized PPCL programs

Types of Equipment Controllers

There are two basic classes of Equipment Controllers:

Terminal Equipment Controllers (TEC): Provide direct digital control at the room and zone level. Other devices such as the Fume Hood Controller, Constant Volume Monitor, and Differential Pressure Monitor are similar to TEC and are viewed with TEC prompting.

Unitary Controllers (UC): Provide direct digital control with flexible programming.

Unbundlable and Non-Unbundlable Points

TEC subpoints can be commanded by various ways and the behavior of when they are released.

Command and Release of Subpoints

Every TEC has two types of subpoints: Unbundlable and Non-unbundlable

Comparision of Unbundlable and Non-Unbundlable Points.					
TEC Point Type	How Subpoint No. Displays in Application Notes	Method Subpoints can be Commanded	Memory Type for Subpoints	Show OPER When Overriddenin 2.6, build 941 or later	Show OPER when Overridden in 2.5 to 2.6, build 9.35
Unbundled	Subpoint number enclosed in braces { }	HMI: PCV* or ANITCS* Insight: Global Commander or Point Commander PPCL: Set, Assignment Statements, or OIP with ANTICS*	EEPROM and RAM	Yes	Yes
Non-bundled	No braces { } around subpoint number	HMI: ANTICS* Insight: Global Commander PPCL: OIP with ANTICS*	EEPROM	No	Yes
*PCV stands for the keystrokes Point, Command, Value. ANTICS stands for Application, flN, Tec, Initial values, Command, Set.					

Although all subpoints are auto-unbundlable at the Insight workstation, only TEC subpoints that have EEPROM and RAM storage of point values are considered unbundlable.

For Firmware Revision 2.4 and earlier, see the *November/December 1998 Field Support News* article: *How to Read Subpoint Priorities from Field Panel Reports* for information on how priorities are displayed in subpoint reports.

Example of how unbundlable and non-unbundlable points appear in an Application Notes document.							
Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercepts (SI Units)	On Text	Off Text
{31}	UNOCC FLOW	220.000 (103.818)	CFM (LPS)	4.000 (1.888)	0.000	--	--
58	MTR SETUP	0.000	--	1.000	0.000	--	--

Non-unbundlable points are configuration points. They are intended to be set once and remain at a given value. MTR SETUP, DUCT AREA, DAY HTG STPT are examples of non-unbundlable points. These points can be commanded at least 100,000 times before damaging the TEC. When a non-unbundlable subpoint is released, it immediately reverts to its factory default value. Firmware revisions prior to 2.6 Build 941 display these subpoints in OPER priority when they are overridden. Unbundlable subpoints are expected to change value; they can represent sensors such a ROOM TEMP, or commadable points such as DMPR COMD, digital outputs, DIs, or calculations performed by the TEC such as Loop Outputs. When these points are released, they remain at the present value, until the TEC's internal program commands them.

Certain configuration subpoints in the TEC have been designed as unbundlable configuration subpoints, such a UNOCC/OCC FLOW (Applications 2031, 2033, subpoints 31 and 32). This is so that they may be commanded through PPCL or Point Commander. When these points are released, they remain at their present value, because the TEC's internal program does not command these subpoints. However, if the TEC is initialized or power cycled, unbundlable configuration subpoints such as UNOCC/OCC FLOW will revert to their factory default values and stay at that value. In addition, as with any unbundlable subpoint, they display OPER priority if they are overridden. Therefore, these subpoints should not be released if they are at OPER priority if you want them to retain their values after a power cycle or initialization.

Initial Values Updates

When a TEC is commissioned with WCIS, Voyager, or similar tools, the subpoints are overridden to configure the TEC. When a field panel is connected, an update command can be performed. The update command brings all the initial values from the TEC to the field panel and the Insight workstation if it is configured as a Mass Storage device. The purpose of this is to replace a TEC without having to recommend all the configuration points. The new TEC simply needs to have its Application and Address points set and once it is connected to the FLN, the panel sends down the initial values. The Insight workstation stores the initial values of the field panel in case the panel coldstarts. Both unbundlable and non-unbundlable subpoints may be overridden. The unbundlable subpoints will display in OPER.

Expansion Devices

Some of the characteristics of Expansion Devices are:

- Devices cannot operate stand-alone
- Database is maintained at the Field Panel or Insight workstation

Types of Expansion Devices

P1 Bus Interface Module: The P1 Bus Interface Module (P1 BIM) provides P1 FLN communication and power for TX-I/O modules.

P1 TECs, Unitary Controllers (UC) (in slave mode only) and P1 Point Pick-up Modules: Provide direct digital control with flexible programming.

NOTE:
TX-I/O modules appear in the same manner as points on an MEC or PXM. They do not appear as TEC devices.

Equipment Controlled by FLN Devices

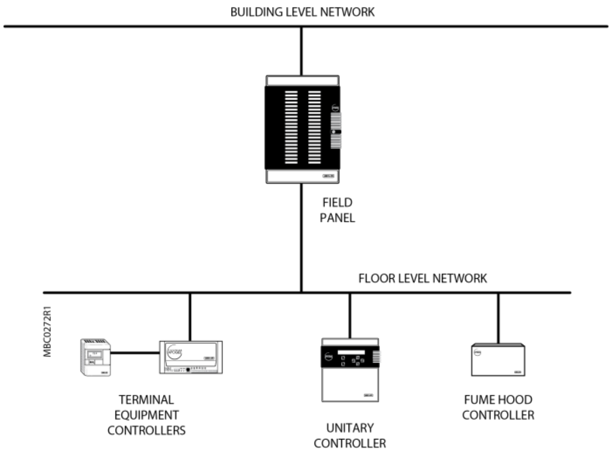
The following list identifies HVAC equipment commonly controlled by FLN devices:

- Air handlers
- Constant Volume boxes
- Fan coil units
- Heat pumps
- Rooftop units
- Unit vents
- Variable Air Volume boxes

Communication on the FLN

The field panel initiates communication with the devices residing on one of the three FLNs. After communication begins, the subpoints residing on the FLN device become available to the field panel. If the field panel is unavailable (for example, a power loss at the field panel), the FLN devices operate in stand-alone mode.

A field panel can support three FLNs, each containing up to 32 FLN devices. Each FLN can have any combination of FLN devices. See the following diagram (Note: This diagram contains old terminology. For Building Level, substitute Automation Level; for Floor Level, substitute Field Level.):



Using FLN Devices

The following section explains how FLN devices can be used with a number of the features in the APOGEE Automation System. These examples all use an FLN device (named BLD990.FLR01.RM101.TEC) which has been defined in field panel Number 1.

Interaction with FLN Devices

Subpoints on FLN devices are accessed in the same manner as other applications in the system. The two options are:

Interacting with subpoints on applications (FLN devices) using specific menus:

By using the APPLICATION menu, the field panel functionality for FLN devices is divided into two major sections, TEC and UC. Both sections contain prompting that is specific to that particular FLN device.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? a
```

```
>Ppcl, flNdevice, Schedule, Quit? n
```

```
>Tec, Uc, Quit? T
```

Interacting with subpoints on applications using the system delimiter:

Since FLN devices are field panel applications (using a standard point name), they can be viewed in the POINT menu. To interact with FLN devices, you must enter the name of the FLN device, followed by the system delimiter (:), followed by part or the entire subpoint name. See the following example:

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? d
>Value, Total, Definition? d
>Name, Address? n
>Point name                    :  BLD990.FLR01.RM101.TEC:ROOM
TEMP-----------
```

Using Wildcards on FLN Devices

Wildcard characters can be useful for such things as displaying multiple subpoints. For example, to display:

All subpoints on BLD990.FLR01.RM101.TEC:

```
>Point name                    :  BLD990.FLR01.RM101.TEC:*------
-------------
```

All subpoints on BLD990.FLR01.RM101.TEC starting with DO:

```
>Point name                    :  BLD990.FLR01.RM101.TEC:DO*----
-------------
```

Commanding Subpoints

Points residing on FLN devices can be directly commanded by using the FLN device name, system delimiter, subpoint name convention. Subpoints on TECs can also be commanded to NONE priority, also known as *releasing*.

NOTE:
Not all points on the FLN device can be commanded. See the individual user's manual for a description of the subpoints contained in the FLN device.

The following example demonstrates commanding HEAT.COOL, a subpoint on BLD990.FLR01.RM101.TEC:

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? P
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? C
>Value, resetTotal, Quit? V
>Point
name                   :  BLD990.FLR01.RM101.TEC:HEAT.COOL-----
------
>Current state = COOL      New state:  HEAT----
BLD990.FLR01.RM101.TEC:HEAT.COOL commanded to HEAT
```

Displaying Subpoint Definition Information

To display subpoint definition information in an application, use either the APPLICATION or the POINT prompts at the field panel main menu. For the point name, enter the application name, the system delimiter (:), and the subpoint name. The following example shows the ROOM TEMP subpoint definition on BLD990.FLR01.RM101.TEC:

HMI	**P, D, D, N** (Point, Display, Definition, Name)

Prompt / Field	Option / Entry	Description
Point name	Type the point name	
Field panel	1	
Here, Printer	H	

Example

```
05/08/2006 MON            POINT DISPLAY DEFINITION
REPORT                05:03pm
-----------------------------------------------------------------
---------------
Search for <BLD990.FLR01.RM101.TEC:ROOM TEMP>
Field panel <1>

Field                                       Value
-----------------------------------------------------------------
---------------
Point system name            : BLD990.FLR01.RM101.TEC:ROOM TEMP
Point name                   : BLD990.FLR01.RM101.TEC:ROOM TEMP
Point type                   : LAI
Descriptor                   : RM101 TEC RM TMP
Value                        : 74.0
Condition                    : *F*
Priority                     : NONE
Analog representation        : Float
Number of decimal places     : 2
Engineering units            : DEG F
Access group(s)              : <all>
Point enabled for alarming
      Print alarms                      : YES
      High alarm limit                  : 78.0
      Low alarm limit                   : 66.0
      Alarm count 2                     : NO
      Normal ack enabled                : YES
Totalize                     : NO
Field panel                  : 1
Point address                : 001 1 01 04
```

```
Sensor type                    : Voltage
Slope                          : 0.25
Intercept                      : 48.0
COV limit                      : 0.0

End of report
```

Modifying FLN Subpoints

To enhance the functions of subpoints, you can modify the attributes of the subpoint definition. By changing the definition, you can allow subpoints to use functions such as alarming and trending, as well as change the user access and descriptor. The following example shows subpoint BLD990.FLR01.RM101.TEC:ROOM TEMP before modification:

HMI	**P, D, D, N** (Point, Display, Definition, Name)

Prompt / Field	Option / Entry	Description
Point name	Type the point name	
Field panel	1	
Here, Printer	H	

Example

```
05/08/2006 MON            POINT DISPLAY DEFINITION
REPORT              05:08pm
----------------------------------------------------------------
---------------
Search for <BLD990.FLR01.RM101.TEC:ROOM TEMP>
Field panel <1>

Field                                     Value
----------------------------------------------------------------
---------------
Point system name              : BLD990.FLR01.RM101.TEC:ROOM TEMP
Point name                     : BLD990.FLR01.RM101.TEC:ROOM TEMP
Point type                     : LAI
Descriptor                     : RM101 TEC RM TMP
Value                          : 74.0
Condition                      : *F*
Priority                       : NONE
Analog representation          : Float
Number of decimal places       : 2
Engineering units              : DEG F
Access group(s)                : <all>
Point enabled for alarming
      Print alarms                        : YES
```

```
      High alarm limit                  : 78.0
      Low alarm limit                   : 66.0
      Alarm count 2                     : NO
      Normal ack enabled                : YES
Totalize                      : NO
Field panel                   : 1
Point address                 : 001 1 01 04
Sensor type                   : Voltage
Slope                         : 0.25
Intercept                     : 48.0
COV limit                     : 0.0

End of report
```

After modifications, the subpoint definition looks like the following:

```
05/08/2006 MON            POINT DISPLAY DEFINITION
REPORT               05:08pm
----------------------------------------------------------------
---------------
Search for <BLD990.FLR01.RM101.TEC:ROOM TEMP>
Field panel <1>

Field                                      Value
----------------------------------------------------------------
---------------
Point system name             : BLD990.FLR01.RM101.TEC:ROOM TEMP
Point name                    : BLD990.FLR01.RM101.TEC:ROOM TEMP
Point type                    : LAI
Descriptor                    : RM101 TEC RM TMP
Value                         : 74.0
Condition                     : *F*
Priority                      : NONE
Analog representation         : Float
Number of decimal places      : 2
Engineering units             : DEG F
Access group(s)               : <all>
Point enabled for alarming
      Print alarms                      : YES
      High alarm limit                  : 80.0
      Low alarm limit                   : 70.0
      Alarm count 2                     : NO
      Normal ack enabled                : NO
Totalize                      : NO
Field panel                   : 1
Point address                 : 001 1 01 04
Sensor type                   : Voltage
Slope                         : 0.25
```

```
Intercept                      : 48.0
COV limit                      : Dynamic

End of report
```

Point Monitoring FLN Subpoints

Points residing on FLN devices can be directly added to the point monitor by using the FLN device name, delimiter, subpoint name convention. The following example shows the ROOM TEMP subpoint being added to the point monitor:

Add

HMI	**P, M, A** (Point, Monitor, Add)

Prompt / Field	Option / Entry	Description
Point name	Type the point name	

List

HMI	**P, M, L** (Point, Monitor, Listpoints)

Example

```
05/08/2006 MON               POINT MONITOR LIST
REPORT                  07:36am
----------------------------------------------------------------
---------------
Point name
   :Suffix
(Description)                       Value            State   Prio
rity
----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
  :ROOM TEMP (RM101 TEC RM TMP)              (74.0 DEG F)       -
N-       NONE

End of report
```

Alarming FLN Subpoints

To add alarm functionality to individual subpoints on an FLN device, the point subpoint definition must be modified. These modifications are made through the POINT menu. The following example adds alarm functionality to the ROOM TEMP subpoint residing on BLD990.FLR01.RM101.TEC:

Modify

HMI	**P, E, M** (Point, Edit, Modify)

Prompt / Field	Option / Entry	Description
Point name	Type the point name	
Descriptor		Provide the description
Float, Integer, Time, Date, dAte-time	F	
Number of decimal places		
Engineering units	DEG F	
Access group(s)		Value between 1 and 30
Alarmable (Y/N)	Y	
Enhanced alarms (Y/N)	N	
Print alarms (Y/N)	Y	
Alarm count 2 (Y/N)	N	
Normal ack enabled (Y/N)	Y	
High limit		
Low limit		
Totalize (Y/N)	N	
Sensor type	V	
Slope		
Intercept		
Dynamic COV limit (Y/N)	N	
COV limit		

Log

HMI	**P, L** (Point, Log)

Prompt / Field	Option / Entry	Description
Point name	Type the point name	

Example

After the subpoint is modified, the subpoint uses the new assigned attributes. The following example demonstrates how the point would look in a point log, after being modified:

```
05/08/2006 MON                    POINT LOG
REPORT                        07:18am
-----------------------------------------------------------------
---------------
Search for <BLD990.FLR01.RM101.TEC:ROOM TEMP>
Point name
   :Suffix
(Description)                         Value/State      Status  Prio
rity
-----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
  :ROOM TEMP (RM101 TEC RM TMP)              (74.0 DEG F)      -
N-       NONE
End of report
```

Trending FLN Subpoints

Points residing on FLN devices can be directly added to trending by using the FLN device name, delimiter, subpoint name convention. The following example shows the ROOM TEMP subpoint being added to trending. Note that ROOM TEMP is being trended by both COV and time interval.

Added by Trend COV

HMI	**P, T, E, A** (Point, Trend, Edit, Add)

Prompt / Field	Option / Entry	Description
Point name	Type the point name	
COV, time	C	
Maximum number of samples		
Trend by point COV limit (Y/N)	N	
Trend COV limit		

`BLD990.FLR01.RM101.TEC:ROOM TEMP` is now trending by Change-Of-Value.

Added by Trend Time Interval

HMI	**P, T, E, A** (Point, Trend, Edit, Add)

Prompt / Field	Option / Entry	Description
Point name	Type the point name	
COV, time	T	
Maximum number of samples		
Trend in Hours, Minutes	M	
Minutes between samples		

`BLD990.FLR01.RM101.TEC:ROOM TEMP` is now trending every 5 Minutes.

Example

Trended by COV

```
>Point name                    :  BLD990.FLR01.RM101.TEC:ROOM
TEMP-----------
>Cov, Time                     :  C
>Maximum number of samples     :  100-
>Trend by point COV limit (Y/N):  N
>Trend COV limit               :  2-----------------
BLD990.FLR01.RM101.TEC:ROOM TEMP is now trending by Change-Of-
Value
```

Trended by Time Interval

```
>Point name                    :  BLD990.FLR01.RM101.TEC:ROOM
TEMP-----------
>Cov, Time                     :  T
>Maximum number of samples     :  100-
>Trend in Hours, Minutes       :  M
>Minutes between samples       :  5--
BLD990.FLR01.RM101.TEC:ROOM TEMP is now trending every   5
Minutes
```

FLN Device Definition Reports

The field panel views FLN devices like any other application (PPCL programs, equipment scheduling, etc.)

To display the definition report for the actual FLN device, use the report generated through the **Application** menu.

HMI	**A, N, T, D, D** (Application, flNdevice, Tec, Display, Definitions)

Prompt / Field	Option / Entry	Description
TEC name	Type the TEC name	
Here, Printer	H	

To display a point definition report for the default output subpoint or a specific subpoint, use the report generated through the **Point** menu.

The following example shows the Point Display Definition report for the `ROOM TEMP` subpoint residing on `BLD990.FLR01.RM101.TEC`. Note that for a specific subpoint, the name of the FLN device, followed by the system delimiter (:), followed by the subpoint name must be entered at the **Point name** prompt. (Bold added for emphasis.)

HMI	**P, D, D, N** (Point, Display, Definitions, Name)

Prompt / Field	Option / Entry	Description
Point name	Type the point name	
Field panel	1	
Here, Printer	H	

Example

```
05/08/2006 MON             TEC DEFINITION DISPLAY
REPORT                06:46am
----------------------------------------------------------------
---------------
Search for <BLD990.FLR01.RM101.TEC>

Field                                      Value
----------------------------------------------------------------
---------------
TEC system name                          :
BLD990.FLR01.RM101.TEC
TEC name                                 :
BLD990.FLR01.RM101.TEC
Application number                       : 2023
Descriptor                               : FLR 1 RM101 TEC
Access group(s)                          : <all>
English units                            : YES
Field panel                              : 1
FLN                                      : 1
Drop                                     : 1
Use duct area                            : NO
Night override (hours)                   : 2

End of report
```

Point Display Definition report for the `ROOM TEMP` subpoint residing on `BLD990.FLR01.RM101.TEC`.

```
05/08/2006 MON            POINT DISPLAY DEFINITION
REPORT               07:11am
----------------------------------------------------------------
---------------
Search for <BLD990.FLR01.RM101.TEC:ROOM TEMP>
Field panel <1>
```

```
Field                                        Value
-----------------------------------------------------------------
---------------
Point system name             : BLD990.FLR01.RM101.TEC:ROOM TEMP
Point name                    : BLD990.FLR01.RM101.TEC:ROOM TEMP
Point type                    : LAI
Descriptor                    :
Value                         : 74.0
Condition                     : *F*
Priority                      : NONE
Analog representation         : Float
Number of decimal places      : 2
Engineering units             : DEG F
Access group(s)               : <all>
Alarmable                     : NO
Totalize                      : NO
Field panel                   : 1
Point address                 : 001 1 01 04
Sensor type                   : Voltage
Slope                         : 0.25
Intercept                     : 48.0
COV limit                     : 0.0

End of report
```

FLN Device Applications

When used in the APOGEE Automation System, FLN devices are viewed as applications to the field panel. The subpoints residing on the FLN device can be displayed, monitored, commanded, and trended directly through the interface. If necessary, subpoints can be redefined at the field panel to allow for such functions as alarming and totalization.

NOTE:
The word *application* describes two types of functionality. A field panel application (including PPCL programs or equipment scheduling) is the actual FLN device as it relates to the field panel. Most FLN devices also have one or more embedded programs, or applications. When used in this chapter, the word application refers to the FLN device as it relates to the field panel. For more about applications residing on FLN devices, see the user manual that accompanies the specific device.

Understanding Application Status

When displaying FLN device information, you will see information that identifies the attributes of the application and physical device. See the following example:

```
05/08/2006 MON                    TEC LOG
REPORT                          03:02
-----------------------------------------------------------------
---------------
Search for <*>
""Field panel""
 TEC Name
(Description)                           Application     Device
                                                 Number
Status  Address Status
-----------------------------------------------------------------
---------------
""0""
 Loyola.CampusA.Bldg5.F2.Tec001 (Auditorum Fans)   2021  -N-
      1 002   -N-
 Loyola.CampusA.Bldg5.F2.Tec002 (Hallway Fans)     2021  -N-
      1 009   -N-
End of report
```

In the above example, the application number and status (Application 2021 and NORMAL status) correspond to the TEC definition held by the field panel. If an application number is entered that does not match the application number in the FLN device, the field panel shows the application as failed.

UCs are different in that the field panel does not require the definition of an application number. The device address and status (1 002 and NORMAL status) corresponds to the physical address and status of the FLN device.

Default Output—DAY.NGT

Like all applications, an FLN device application has a default output value, which in most cases is the DAY/NIGHT mode subpoint. When an application is viewed on a point report, the field panel displays the FLN device name followed by the default output subpoint. See the following example:

```
05/08/2006 MON POINT LOG REPORT 12:15am
-----------------------------------------------------------------
---------------
Search for <*tec:>

Point name
:Suffix (Description) Value/State Status Priority
-----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
:DAY.NGT (DAY) -N- NONE
End of report
```

For a DXR this point will be RM OP MODE.

NOTE:
Each FLN device application contains a number of other subpoints. To reference other subpoints, the system delimiter (:) is required with a subpoint name or device report name. See Chapter 1 – T*he Operator Interface* [→ 24] for information on referencing subpoints.

FLN Device Field Attributes

The sequence for setting up FLN devices includes the following fields:

FLN Device Field Attributes.

Attribute	Input Option	Description
TEC system name UC system name	1 to 30 characters	System names must be unique and cannot be changed once the FLN device is set up. Valid characters include **A** to **Z**, **a** to **z**, **0** to **9**, spaces ( ), periods (.), commas (,), dashes (-), underlines (_), and apostrophes (').
TEC name UC name	1 to 30 characters	TEC and UC names must be unique. This name can be changed once the FLN device is set up. Valid characters include **A** to **Z**, **a** to **z**, **0** to **9**, spaces ( ), periods (.), commas (,), dashes (-), underlines (_), and apostrophes (').
Application number	TEC: See the Owner's Manual for your TEC. PXC Compact on P1: 3000 to 3999 UC: 1000 to 1999	Defines the application that is pre-programmed in the FLN device. For PXC Compact on P1, application numbers 3900 to 3999 are reserved for Home Office use. Numbers 3916 and 3924 are reserved for the default slave mode applications
Descriptor	1 to 16 characters	Plain text description of the FLN device. Valid characters include **A** to **Z**, **a** to **z**, **0** to **9**, spaces ( ), periods (.), commas (,), dashes (-), underlines (_), and apostrophes (').
Access group(s)	Numeric value between **1** and **30**	Assigns the FLN device to an access group.
English Units	**Y** English (DEG F, CFM, etc.) **N** Metric (DEG C, LPS, etc.)	Specifies which unit of measure the FLN device displays.
Field panel	Numeric value	ALN address number of the field panel.
FLN	**1**, **2**, or **3**	Number of the FLN port where the device is connected.
Drop	Firmware Rev. 2.8.5 and later: Numeric value between **0** and **254.** Firmware Rev. 2.8.4 and earlier: Numeric value between **0** and **31** if networked or **0** and **99** if stand-alone.	The FLN device address. This must match the value defined in the FLN device.

Instance Number Block Start	Automatically assigned by the system.	The subpoint instance IDs are offset from this number. This is a numeric value between the TeamBase and 4,194,302.
Instance Number Block Size	Automatically assigned by the system.	The total number of subpoints for this device. This is a numeric value between 1 and 65,535.
Use duct area (Y/N)	**Y** Enable duct use **N** Disable duct use	Duct area represents the physical area controlled by the FLN device. This field enables and disables use of the ducts with the FLN device.
Rectangle, Circle, Oval	**R** Rectangle **C** Circle **O** Oval	Shape of the duct that is controlled by the FLN device.
Night override	Numeric value	Defines how many hours an FLN device stays in the night override control mode.

Procedures for Terminal Equipment Controllers (TECs)

Modifying the Attributes of a TEC

This procedure modifies an existing TEC on the FLN. Only the TEC name, descriptor, access groups, duct area, and night override attributes can be modified. See *FLN Device Field Attributes* [→ 210] if you need further explanation of the information required for a field.

Modifying the Attributes of a TEC

HMI	**A, N, T, E, M** (Application, flNdevice, Tec, Edit, Modify)

Prompt/Field	**Option/Entry**	**Description**
TEC name to modify	Type the TEC system name.	Specify the name of the TEC whose attributes you want to modify.
	Type ?, and then type a number from the list.	
TEC name	Type the new TEC name.	Specify a new TEC name
	Keep the existing TEC name.	
Descriptor	Type the TEC descriptor.	
	Keep existing descriptor.	
Access group(s)	A single access group.	Value between 1 through 30.
	Keep the existing access groups.	
	N	To use generic value defined by the TEC.
	Y	The system requests the geometry of the duct. To use the actual duct area, type one of the following: **R** (Rectangular duct) **C** (Circular duct) **O** (Oval duct)

Night override	Specify the night override time.	
	Keep the existing value.	

The system modifies the attributes of the TEC as specified.

Example

The following example shows how to modify the access privileges of BLD990.FLR01.RM101.TEC:

```
>TEC name to modify           :  BLD990.FLR01.RM101.TEC--------
>TEC name                     :  BLD990.FLR01.RM101.TEC--------
>Descriptor                   :  FLR 1 RM101 TEC-
>Access group(s)              :  1,14,15,22--------------------
----------
>Use duct area (Y/N)          :  N
>Night override (hours)       :  2-
TEC <BLD990.FLR01.RM101.TEC> modified

>Add, Modify, Copy, Delete, Look, Quit? -
```

Copying the Attributes of a TEC

This procedure copies the attributes from an existing TEC to a new TEC, effectively adding it to the FLN. See *FLN Device Field Attributes* [→ 210] if you need further explanation of the information required for a field. Before you begin, you must identify the following attributes for the new TEC:

- TEC name
- Descriptor
- FLN address (Drop number)

The remaining information is copied from the existing TEC definition.

Adding a New TEC by Copying the Attributes of an Existing TEC

HMI	**A, N, T, E, C** (Application, flNdevice, Tec, Edit, Copy)

Prompt/Field	Option/Entry	Description
Copy from TEC name	Type the TEC name.	Specify the name of the TEC that you want to copy.
	Type ?, and then type a number from the list.	
TEC system name	Type the new TEC system name.	
TEC name	Type the new TEC name.	Specify a new TEC name.
	Keep the new TEC name as the TEC system name.	
Descriptor	Type the new TEC descriptor.	
Field panel	Specify the ALN address where the new TEC resides to the field panel where you are connected.	
	Type the field panel ALN address.	A field panel other than the one you are connected to.
FLN	1, 2, 3	The number of the FLN port where the new TEC resides.
Drop	Type the FLN address (drop number).	
Instance Number Block Start	Accept default value.	If a BACnet/IP system.

The system copies the attributes from the existing TEC and creates a new TEC.

Example

The following example shows how to copy the attributes from BLD990.FLR01.RM101.TEC to BLD990.FLR02.RM102.TEC:

```
>Copy from TEC name          :  BLD990.FLR01.RM101.TEC--------
>TEC system name             :  BLD990.FLR02.RM102.TEC--------
>TEC name                    :  BLD990.FLR02.RM102.TEC--------
>Descriptor                  :  FLR02 RM102 TEC-
>Field panel                 :  1--
>FLN                         :  1
>Drop                        :  2—
>Instance Number Block Start :  -------

TEC <BLD990.FLR02.RM102.TEC> added
```

Deleting a TEC from the FLN

This procedure deletes a TEC from the field panel. Deleting a TEC also removes the subpoints defined in the field panel.

Deleting a TEC

HMI	**A, N, T, E, D** (Application, flNdevice, Tec, Edit, Delete)

Prompt/Field	Option/Entry	Description
TEC name	Type the exact TEC name.	Specify a TEC name you want to delete.
	Type ?, and then type a number from the list.	
Are you sure (Y/N)	Y	Confirm you want to delete specified TEC.
	N	Cancel deletion of specified TEC.

If you verified the deletion, the system deletes the specified TEC.

Example

The following example shows how to delete the BLD990.FLR01.RM102.TEC:

```
>TEC name                      :  BLD990.FLR02.RM102.TEC--------
>Are you sure (Y/N)            :  Y
TEC <BLD990.FLR02.RM102.TEC> deleted
```

Commanding TEC Subpoints

This procedure allows you to command subpoints by name or number. See *FLN Device Field Attributes* [➔ 210] if you need further explanation of the information required for a field.

Commanding TEC Subpoints

HMI	**A, N, T, I, C, S** (Application, flNdevice, Tec, Initvalues, Command, Set)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcards.	
	Type the exact TEC name.	For a particular TEC.
	Type TEC name, the system delimiter, and subpoint name or number.	Specify a particular TEC by subpoint name or number. Example: TEC1:PHTG START where the TEC name is TEC1 and the subpoint name is PHTG START.
Application number	ENTER	Select all applications.
	Type the exact application number.	Select a particular application.
Subpoint_name, subpoint_Number	S, type the exact subpoint name.	To command by subpoint name. System then requests the subpoint name.
	N, type the subpoint number.	To command by subpoint number. System then requests the subpoint number.
Initial Value	Type the new value for the subpoint.	
	Y	Confirm that you want to command the value of the subpoint.
	N	Cancel the command.

If you verified that you want to command the subpoint, the system changes the value of the subpoint.

Example

The following example shows how to command the subpoint called address 72 residing on BLD990.FLR01.RM101.TEC:

```
>TEC name                      :  BLD990.FLR01.RM101.TEC--------
-------------
>Application number            :  2023-
>Subpoint_name, subpoint_Number:  N
>Subpoint number               :  72
>Initial value                 :  72------------------
>Are you sure (Y/N)            :  Y
<BLD990.FLR01.RM101.TEC:[72]> Command successful


End of commanding
```

Releasing TEC Subpoints

This procedure allows you to release subpoints by the name or number attribute. See *FLN Device Field Attributes* [→ 210] if you need further explanation of the information required for a field.

Releasing TEC Subpoints

HMI	**A, N, T, I, C, R** (Application, flNdevice, Tec, Initvalues, Command, Release)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcards	
	Type the exact TEC name	For a particular TEC.
	Type TEC name, the system delimiter, and subpoint name or number	Specify a particular TEC by subpoint name or number Example: TEC1:PHTG START where the TEC name is TEC1 and the subpoint name is PHTG START.
Application number	ENTER	Select all applications.
	Type the exact application number	Select a particular application.
Subpoint_name, subpoint_Number	S, type the exact subpoint name	To command by subpoint name. System then requests the subpoint name.
	N, type the subpoint number	To command by subpoint number. System then requests the subpoint number.

The system releases the commanded subpoint.

Example

The following example shows how to release the subpoint called CTL STPT residing on all TECs:

```
>TEC name                      :  ------------------------------
-------------
>Application number            :  -----
>Subpoint_name, subpoint_Number:  S
>Subpoint name                 :  CTL STPT----
<BLD990.FLR01.RM101.TEC:CTL STPT> Command successful

>Set, Release, Tec_initialize, Panel_update, Quit? –
```

Initializing a TEC

This procedure resets the TEC, clears the field panel and/or TEC initial values, and resets the TEC.

NOTE:
When using this procedure, the TEC reset may cause a device failure message. The TEC should promptly return to the network after the initialization routine is complete.

This procedure allows you to clear initial values in the field panel and/or the TEC. If you want to clear initial value, it is recommended that you do it in either the field panel or the TEC, but not both. Responding yes to both prompts clears all initial values in the specified devices as well as in the online copies in the database.

The following table provides situations and solutions to consider before performing this procedure.

Solution/Solution:	You can do the following:
Situation: The TEC initial values are correct, but the field panel initial values are not correct. **Solution:** You can clear and then update the field panel initial values.	Perform the procedure to Initialize a TEC and respond to the steps to clear values as follows: 1. Respond Yes to the prompt to clear the field panel initial values. 2. Respond No to the prompt to clear the TEC initial values. 3. Then, update the values in the field panel with the initial values stored in the TEC. See the *Updating Field Panel Initial Values* procedure in this chapter for more information.
Situation: The field panel initial values are correct, but the TEC initial values are not correct. **Solution:** You can clear the TEC initial values, and then update the TEC with the field panel initial values.	Perform the procedure to *Initialize a TEC* and respond to the steps to clear values as follows: 1. Respond No to the prompt to clear the field panel initial values. 2. Respond Yes to the prompt to clear the TEC initial values. 3. The values in the TEC are cleared, then overwritten with the field panel initial values.
Situation: You want to reset the TEC. **Solution:** You can reset the TEC, but not clear initial values.	Perform the procedure to *Initialize a TEC* and respond to the steps to clear values as follows: 1. Respond No to the prompt to clear the field panel initial values. 2. Respond No to the prompt to clear the TEC initial values. 3. The TEC resets; the field panel initial values and TEC initial values remain unchanged.

To view the initial values stored before and after you use this procedure, create either one or both of the following reports:

- The TEC Initial Values report, which displays the initial values stored at a TEC. For more information, see *TEC Initial Values Display Report* [→ 225].
- The Panel Initial Values Display report, which displays the initial values stored in the field panel. For more information, see *Field Panel Initial Values Display Report* [→ 224].

Initializing a TEC

HMI	**A, N, T, I, C, T** (Application, flNdevice, Tec, Initvalues, Command, Tec_initialize)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcard characters.	For a range of TECs.
	Type the exact TEC name.	For a particular TEC.
Application number	ENTER	Every application present.
	Type the application number.	Specify a particular application.
Verify clear initial value at field panel	Y	Specify you want to clear initial values in field panels.
	N	Cancel the command to clear initial values at the field panel. **NOTE:** Depending upon your response to this prompt, the system will either clear or retain the panel initial values in the field panel. If you choose to clear the initial values, the panel initial values are not resent to the TEC. If you choose to retain the initial values, the panel initial values are resent to the TEC.
Verify clear initial value at TEC	Y	Specify you want to clear initial values in the TEC.
	N	Cancel the command to clear initial value at TEC
Verify initialize all	Y	Specify that you want to initialize all or a range of TECs, the system prompts you to verify that you want to initialize the TECs and revert to the factory defaults
	N	Cancel the command to initialize TECs

The system initializes the TEC, depending on your responses to the verification prompts.

Example

The following example shows how to initialize all TECs. The values in the TEC will be cleared, then overwritten with the panel initial values.

```
>TEC name                      :  ------------------------------
>Application number            :  ----
>Clear panel init. values (Y/N):  N
>Clear TEC initial values (Y/N):  Y
>Are you sure (Y/N)            :  Y
01:52pm 05/08/2006 MON DEVICE FAILURE in field panel 1 1 1

<BLD990.FLR01.RM101.TEC> Command successful

End of commanding
```

```
>Set, Release, Tec_initialize, Panel_update, Quit? -
01:52pm 05/08/2006 MON DEVICE RETURN from failure in field panel
1 1 1
```

Updating Field Panel Initial Values

This procedure sends a copy of the TEC initial values to the field panel. Any TEC initial values stored in the field panel are replaced by the update.

Updating the Field Panel with the TEC Initial Values

HMI	**A, N, T, I, C, P** (Application, flNdevice, Tec, Initvalues, Command, Panel_update)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcard characters.	For a range of TECs.
	Type the exact TEC name.	For a particular TEC. The system updates the field panel with the TEC initial values, which completes this procedure.
Application number	ENTER	Have field panel determine the application number.
	Type the application number.	Specify a particular application.

The system updates the TEC initial values at the field panel.

Example

The following example shows how to update the initial values matching the BLD990* criteria:

```
>TEC name                     :  BLD990.*----------------------
>Application number           :  -----
<BLD990.FLR01.RM101.TEC> Command successful

>Set, Release, Tec_initialize, Panel_update, Quit? –
```

Displaying TEC Reports

TEC Log Report

This procedure generates a TEC Log report, which displays the application number and status, and the TEC address and status for all TECs defined on the FLN.

Displaying a Summary Report of TECs

HMI	**A, N, T, L** (Application, flNdevice, Tec, Log)

Prompt/Field	**Option/Entry**	**Description**
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcard characters.	For a range of TECs.
	Type the exact TEC name.	For a particular TEC.

The field panel displays a TEC Log report.

Example

The following example shows all TECs on an FLN:

```
>TEC name                      :  ------------------------------
05/08/2006 MON                    TEC LOG
REPORT                          03:02
----------------------------------------------------------------
---------------
Search for <*>
"Field panel"
 TEC Name
(Description)                                Application     Device
                                                      Number
Status  Address Status
----------------------------------------------------------------
---------------
"0"
 Loyola.CampusA.Bldg5.F2.Tec001 (Auditorum Fans)    2021  -N-
      1 002   -N-
 Loyola.CampusA.Bldg5.F2.Tec002 (Hallway Fans)      2021  -N-
      1 009   -N-
End of report
```

TEC Definition Display Report

This procedure generates a TEC Definition Display report, which displays attributes of the TEC, such as the address, access groups, and override time.

Displaying TEC Definition Information

HMI	A, N, T, D, D (Application, flNdevice, Tec, Display, Definition)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcard characters.	For a range of TECs.
	Type the exact TEC name.	For a particular TEC.
Here, Print	H, P	Specify to display report.

The system displays a TEC Definition Display report.

Example

The following example shows the definition information for the BLD990.FLR01.RM101.TEC:

```
05/08/2006 MON             TEC DEFINITION DISPLAY
REPORT                 12:06pm
----------------------------------------------------------------
---------------
Search for <BLD990.FLR01.RM101.TEC>

Field                                       Value
----------------------------------------------------------------
---------------
TEC system name                           :
BLD990.FLR01.RM101.TEC
TEC name                                  :
BLD990.FLR01.RM101.TEC
Application number                        : 2023
Descriptor                                : FLR 1 RM101 TEC
Access group(s)                           : <all>
English units                             : YES
Field panel                               : 1
FLN                                       : 1
Drop                                      : 1
Instance Number Block Start               : 10500
Instance Number Block Size                : 100
Use duct area                             : NO
Night override (hours)                    : 2

End of report
```

TEC Subpoint Display Report

This procedure generates a TEC Subpoint Display report, which displays the current value of subpoints on TECs. This report is similar to a Point Log report for the field panel, but the range of points is limited to only TECs.

Displaying TEC Subpoint Information

HMI	**A, N, T, D, S** (Application, flNdevice, Tec, Display, Subpoint)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcards.	
	Type the exact TEC name.	For a particular TEC.
	Type TEC name, the system delimiter, and subpoint name or number.	Specify a particular TEC by subpoint name or number. Example: TEC1:PHTG START where the TEC name is TEC1 and the subpoint name is PHTG START.
Application number	ENTER	Select all applications.
	Type the exact application number.	Select a particular application.
Subpoint_name, subpoint_Number	S, type the exact subpoint name.	To command by subpoint name. System then requests the subpoint name.
	N, type the subpoint number.	To command by subpoint number. System then requests the subpoint number.
Here, Print	H, P	Specify to display report.

The field panel displays a TEC Subpoint Display report.

Example

The following example shows information for the ROOM TEMP subpoint residing in all TECs:

```
05/08/2006 MON              TEC SUBPOINT DISPLAY
REPORT                 12:09pm
----------------------------------------------------------------
---------------
Search for <*:ROOM TEMP>


TEC name
   :Suffix
(Description)                      Value            State   Prio
rity
----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
[04] :ROOM TEMP (RM101 TEC RM TMP)          (74.0 DEG F)      -
N-       NONE
```

```
End of report
```

TEC Report Display Report (Subpoints)

This procedure generates a TEC Report Display report, which displays subpoints defined in the reports of the TEC. All TECs contain a set of reports that group specific subpoints according to function or point type.

Displaying Subpoint Values on TEC Reports

HMI	**A, N, T, D, R** (Application, flNdevice, Tec, Display, Reports)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcards.	
	Type the exact TEC name.	For a particular TEC.
	Type TEC name, the system delimiter, and subpoint name or number.	Specify a particular TEC by subpoint name or number. Example: TEC1:PHTG START where the TEC name is TEC1 and the subpoint name is PHTG START.
Application number	ENTER	Select all applications.
	Type the exact application number.	Select a particular application.
Report_name, report_Number	R, type the exact report name.	To display all available report names, type **?** and then type a number from the list.
	N, type the report number.	To display all available report names, type **?** and then type a number from the list.
Here, Print	H, P	Specify to display report.

The field panel displays a TEC Report Display report.

Example

The following example shows the subpoints contained on the Startup report of the TEC:

```
05/08/2006 MON              TEC REPORT DISPLAY
REPORT                 12:13pm
----------------------------------------------------------------
---------------
Search for <*:STARTUP>


TEC name
   :Suffix
(Description)                      Value            State   Prio
rity
----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
```

```
[02] :APPLICATION                              (2023)          -
N-       NONE
[14] :STPT DIAL                                (NO)            -
N-       NONE
[18] :WALL SWITCH                              (NO)            -
N-       NONE
[51] :MTR1 TIMING                              (95 SEC)        -
N-       NONE
...

End of report
```

Field Panel Initial Values Display Report

This procedure generates a Panel Initial Values Display report, which summarizes the initial TEC values that are stored in the field panel.

Displaying a Field Panel Initial Values Report

HMI	**A, N, T, I, L, P** (Application, flNdevice, Tec, Initvalues, Log, Panel_initvals)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcards.	
	Type the exact TEC name.	For a particular TEC.
Application number	ENTER	Select all applications.
	Type the exact application number.	Select a particular application.
Here, Print	H, P	Specify to display report.

The field panel displays a Panel Initial Values Display report.

Example

The following example shows the initial values for the BLD990.FLR01.RM101.TEC:

```
05/08/2006 MON          PANEL INITIAL VALUES DISPLAY
REPORT            12:33pm
-----------------------------------------------------------------
---------------
Search for <*:*>


TEC name
   :Suffix
(Description)                     Value            State   Prio
rity
-----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
[20] :OVRD TIME                              (2 HRS)         -
N-       NONE
```

```
End of report
```

TEC Initial Values Display Report

This procedure generates a TEC Initial Values Display report, which summarizes the initial values stored at the TEC.

Displaying a TEC Initial Value Report

HMI	**A, N, T, I, L, T** (Application, flNdevice, Tec, Initvalues, Log, Tec_initvals)

Prompt/Field	Option/Entry	Description
TEC name	ENTER	Specify all TECs.
	Type the TEC name, including wildcards.	
	Type the exact TEC name.	For a particular TEC.
Application number	ENTER	Select all applications.
	Type the exact application number.	Select a particular application.
Here, Print	H, P	Specify to display report.

The field panel displays a TEC Initial Values Display report.

Example

The following example shows the initial values for the TECs matching the BLD* wildcard criteria:

```
05/08/2006 MON           TEC INITIAL VALUES DISPLAY
REPORT              12:37pm
----------------------------------------------------------------
---------------
Search for <BLD*:*>

TEC name
   :Suffix
(Description)                     Value            State   Prio
rity
----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
[02] :APPLICATION                              (2023)           -
N-       NONE
[20] :OVRD TIME                                (2 HRS)          -
N-       NONE
[58] :MTR SETUP                                (5)              -
N-       NONE

End of report
```

```
>Panel_initvals, Tec_initvals, Quit? -
```

Chapter 6—MS/TP FLN and BACnet/IP Devices

Chapter 6 discusses the interaction and functionality between a field panel and an MS/TP FLN and BACnet/IP devices, including:

- Displaying MS/TP devices and objects
- Adding, deleting, copying, and modifying MS/TP FLN devices
- Restoring the Relinquish Default values of an FLN device
- Displaying, releasing, and setting MS/TP device Initial Values
- Changing the FLN Type

You will also learn the procedures needed to perform these functions.

NOTE:
For the remainder of this manual, MS/TP FLN can refer to BACnet/IP FLN, where applicable. The Application, flN, MS/TP prompt is where you will be able to display, configure, and command BACnet/IP FLN devices.

Before You Begin

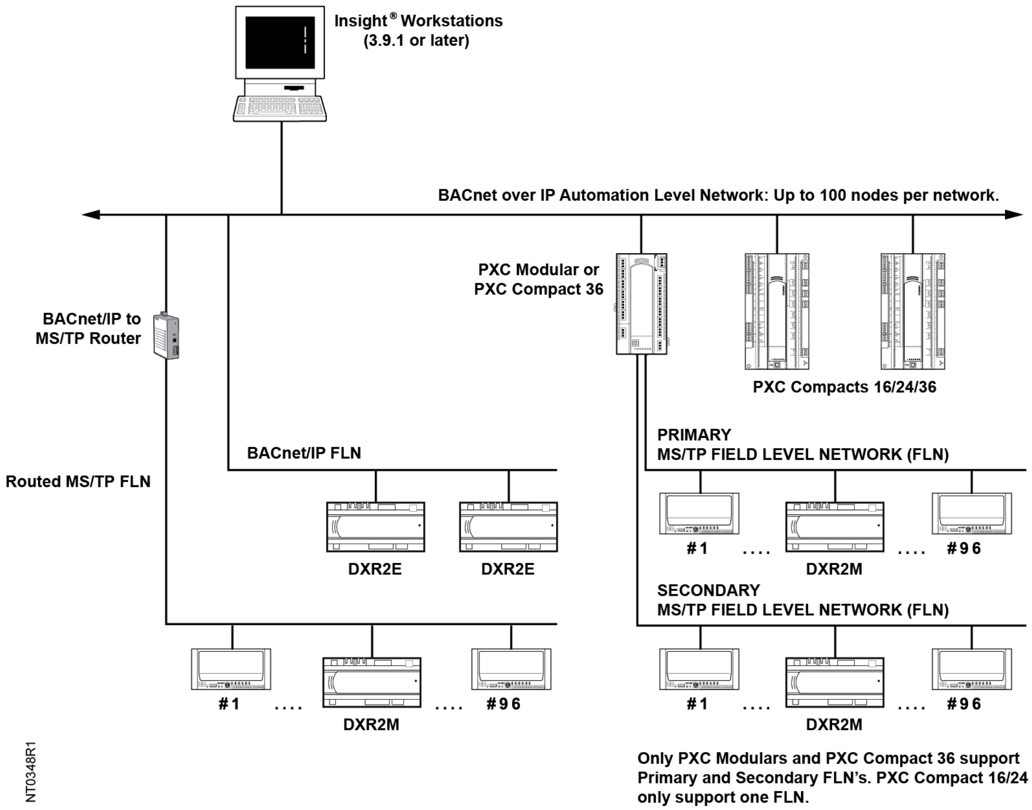
Before using the information in this section, you should have a working understanding of the following concepts:

- HVAC equipment of the facility
- Point database
- General knowledge of the APOGEE Automation System

Communication on the MS/TP FLN

The field panel initiates communication with the devices residing on the MS/TP FLN. If the field panel is unavailable (for example, a power loss at the field panel), the FLN devices (including the new DXRs) operate in stand-alone mode.

A field panel can support two MS/TP FLNs; PXC-16 and PXC-24 controllers can only support up to 32 devices, while PXC-36 and PXC Modular controllers can support up to 96 devices. However, as the number of devices increase, the performance of monitoring the devices will decrease. A general guideline for the maximum limit of devices, with reasonable performance, is 64 devices. **NOTICE! Excessive commanding and monitoring of points can lower this number.**



Two MS/TP FLN Connections Supported

For improved cost-effectiveness and flexibility of BACnet MS/TP FLN installations, two physical MS/TP FLN connections are supported on PXC Modular and PXC-36 field panels

- For PXC Modular, the PXX-485.3 FLN 1 port is the primary FLN port, and the RS-485 ALN is the secondary FLN port. **NOTICE! The RS-485 ALN port can also be configured as an MS/TP FLN without a PXX-485.3 being present.**
- For PXC-36, the **A** port is the primary FLN port, and the **B** port is the secondary FLN port.

To use the secondary FLN port, the primary FLN must be configured as MS/TP and the MS/TP ALN must be enabled.

NOTE:
You cannot have the first FLN port configured for P1 and the second FLN port for MS/TP.

Supported Network Types

The following network types are supported by Firmware Revision 3.4 or later:

- BACnet MS/TP local FLN on the Primary port.
- BACnet MS/TP local FLN on the Secondary port.
- BACnet MS/TP Routed FLN using a remote BACnet/IP to BACnet MS/TP router.
- BACnet/IP FLN. This option is primarily for DXR2.E controllers.

MS/TP Device Name and MS/TP Device System Name

The MS/TP device name and MS/TP device system name are the labels that identify a particular MS/TP device on the FLN (for example, a BACnet TEC). The MS/TP device system name and MS/TP device name can be identical. The two names taken together (if identical), or each name separately (if different), must be unique on the network.

NOTE:
The MS/TP device is identified on the BACnet network by the BACnet device name, which is established during the initial configuration of the device. Siemens recommends that you use the same name in all locations (BACnet device name, MS/TP device name, and MS/TP device system name) whenever possible.

Each user account defines the type of name that is displayed in the interface. Those with User access see the MS/TP device name. Those with System access see the MS/TP device system name.

When viewing PPCL programs, the system always displays the MS/TP device system name regardless of the access settings.

BACnet Master-Slave/Token-Passing (MS/TP)

The BACnet Master-Slave/Token-Passing (MS/TP) protocol uses a token-passing scheme to control access to a bus network. A Master device that holds the token can initiate the transmission of a data frame. All other master and slave devices on the bus can respond to requests from this master by transmitting data in frames. After the master device holding the token sends no more than XX data frames and waits for the replies, it passes the token to the next master device on the bus.

NOTE:
BACnet MS/TP addresses range from 0 to 255. MS/TP master devices must be addressed between 0 and 127.

MS/TP Device MAC Address

The MS/TP device MAC address, like the drop address number, identifies an individual device on the MS/TP FLN. The full range of BACnet MS/TP addresses is allowed (0 to 254). A BACnet/IP MAC Address will be the IP address of the device plus BAC0 (47808) as the last two octets.

MS/TP Device Network Number

The MS/TP device network number is the address of the local router's MS/TP network, the remote router's MS/TP network, or the BACnet/IP network number (this will usually be the same as the field panel's BACnet/IP network number).

MS/TP Device Scanner

Devices are scanned periodically to detect and return failure status.

The Who-is service is used to discover a device.

The Read Property Multiple service is used to learn the device services supported; device type and vendor ID.

The poll timer is reset to one of two poll rates whenever the MS/TP device communicates with the field panel.

- Keep Alive Poll Rate - MS/TP device is not failed (default setting 60 sec.).
- Discovery Poll Rate - MS/TP device is currently failed (default setting 60 sec.).

If the device does not respond to a poll, it is marked failed.

The scanner supports changes in the devices application number, causing a team description upload.

NOTE:
Device information is populated a piece at a time; device specific information first, followed by application data. Wait for the application status to return to normal in the MS/TP Log Report before displaying subpoint information for the device.

BACnet Router Overview

A *BACnet router* allows communication between networks that use different Data Link technologies (IP, MS/TP, Ethernet, ARCNET, LonTalk, and so on). A BACnet router also allows communication between networks that are physically dissimilar (Ethernet to RS-485, and so on) but connected via the router.

BACnet routers provide the relay function for sending data between two devices on different networks. They also support message broadcasting on the local network, a remote network, or all networks.

Firmware Revision 3.4 allows you to view and command points in DXR controllers. Supervision and support of DXR controllers is supported on both MS/TP and IP networks.

FLN Device Applications

When used in the APOGEE Automation System, Siemens BACnet FLN devices are viewed as applications to the field panel. The subpoints residing on the FLN device can be displayed, monitored, commanded, and trended directly through the interface.

NOTE:
The word *application* describes two types of functionality. A field panel application (including PPCL programs or equipment scheduling) is the actual FLN device as it relates to the field panel. Most FLN devices also have one or more embedded programs, or applications. When used in this chapter, the word application refers to the FLN device as it relates to the field panel. For more about applications residing on FLN devices, see the user manual that accompanies the specific device.

Default Output

Like all applications, an FLN device application has a default output value, which in most cases is the DAY/NIGHT mode subpoint. When an application is viewed on a point report, the field panel displays the FLN device name followed by the default output subpoint. See the following example:

Example

```
05/08/2006 MON POINT LOG REPORT 12:15am
-----------------------------------------------------------------
---------------
Search for <*tec:>

Point name
:Suffix (Description) Value/State Status Priority
-----------------------------------------------------------------
---------------
BLD990.FLR01.RM101.TEC
:DAY.NGT (DAY) -N- NONE
End of report
```

For a DXR this point will be RM OP MODE.

NOTE:
Each FLN device application contains a number of other subpoints. To reference other subpoints, the system delimiter (:) is required with a subpoint name or device report name. See Chapter 1 – *The Operator Interface* [➙ 24] for information on referencing subpoints.

Keep Alive Poll Rate

The Keep Alive Poll Rate is used when the MS/TP device is not failed.

This scan is performed to verify that all devices on the network are connected and communicating.

The poll rate time limit is adjustable, from 10 to 300 sec. The default is 60 sec.

Initial Values Overview

FLN devices have pre-set values for the points they contain. These values can be configured to match site requirements; for example, when balancing the system. These configuration changes can sometimes be lost through a power failure or device failure. Because different FLN devices handle the storage and restoration of these point configurations in different ways, the field panel can back up the configuration changes for devices residing on its FLN in an initial values table.

The TEC Initial Value feature requires the correct case-sensitive password for MS/TP device re-initialization. The password for MS/TP device re-initialization is configured when adding/modifying an MS/TP FLN device to the field panel.

Initial Values Example – BACnet TEC

A BACnet TEC application has a collection of pre-set values for the points it contains. These values allow the BACnet TEC to do a generic job of control for its intended application.

For example, the pre-set values for a VAV application might have the temperature setpoint at 72°F.

Configuration at the FLN Device

These pre-set values are not always correct for your intended use of the device and application. For example, you may want a different temperature setpoint in order to command the pre-set value (72°F) to better match your site (73°F).

Depending on the device and how you make the setpoint change (using Set or Command), the MS/TP device may not save these changes in non-volatile memory. In the case of a BACnet TEC:

- If this point value is written to non-volatile memory, this new value is retained during a power failure and return. Examples of BACnet TEC points written to non-volatile memory are SBT device name, Device ID, and Initial Value Priority.
- Other BACnet TEC points whose values change frequently are stored in RAM, and do not overwrite the application relinquish default value. These points are returned to the default application value after a power failure and return.

Storing the Initial Values at the Field Panel

Once you have the values working correctly in your environment, you save them to the field panel as the initial values for that BTEC. By default, these initial configuration values may be read from the Relinquish Default slot for every point, because these are the values the points should return to when all other command priorities are empty (the point is not being commanded from the field panel, PPCL, or Insight workstation).

You can also choose to save only the point information that has changed since the application was loaded.

NOTE:
If you do not store the relinquish default values at the field panel, you must store the configuration data in another manner if you want to restore the device after a failure.

Overriding Initial Values

You can command points to values other than their initial configuration values from the field panel. For example:

- you may want to command an output point to a specific value in order to heat a building during construction
- you could command an input point to a fixed value to continue heating an occupied space to 72°F when the room sensor fails

In the case of the output point, you are *overriding* the initial configuration value. In the case of the input point, you ignore its value (put the input out of service) and substitute a value in its place. These commanded values are not in the initial configuration values, so they must be saved in order to bring the BTEC back to its previous state after a power failure or device failure.

Restoring the Commanded Values of Points

When a BACnet TEC returns from a loss of power, the field panel sends the following values from the initial values table for the device:

- the present value of all 'out of service' input points
- the present value of all overridden output points

This collection of values is written to the MS/TP device, restoring its previous configuration exactly.

NOTE:
You can also manually send all of the initial values to a device, for example when replacing a failed device.

Initial Values Procedures

Displaying MS/TP Device Initial Values

Displaying MS/TP Device Initial Values Backed-Up at the Field Panel

HMI	**A, N, M, I, L** (Application, flNdevice, Mstp, Initvalues, Log)

Prompt/Field	**Option/Entry**	**Description**
MSTP Device name	Type the name of MS/TP device.	
	Press **ENTER**.	To select all MS/TP devices on the network and display initial values based on application number.
Application number	Type the application number.	
	Press **ENTER**.	To search for all MS/TP device applications on the network.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

The system displays the MS/TP Initial Values Display report.

Example

```
>MSTP Device name : ------------------------------
>Application number : -----
>Here, Printer : H

07/17/2008 THU MSTP INITIAL VALUES DISPLAY REPORT 11:42
-----------------------------------------------------------------
---------------
Search for <*:*>
MSTP Device name
:Suffix (Description) Value State Priority
-----------------------------------------------------------------
---------------
device1
:DO 5 OFF -N- BN15
End of report

>Log, Command, Quit? -
```

Releasing MS/TP Device Initial Values

Releasing an MSTP Device Subpoint to Normal Control after Setting its Initial Value

HMI	**A, N, M, E, M** (Application, flNdevice, Mstp, Edit, Modify)

Prompt/Field	Option/Entry	Description
MSTP Device system name	Type the MSTP Device.	
	Press **ENTER**.	To select all MS/TP devices on the network and release initial values based on application number. **NOTE:** If you select MS/TP devices by application number, you can accidentally release the initial values of multiple MS/TP devices on the network.
Application number	Type the application number.	
Subpoint name	Type the subpoint name.	

The system displays `<MSTP device:subpoint name>` and `Command successful.`

Example

```
>Set, Release, Mstp_initialize, Panel_update, Quit? r
>MSTP Device system name : device1------------------------------
---------
>Subpoint name : DO 5--------
<device1:Do 5> Command successful

>Set, Release, Mstp_initialize, Panel_update, Quit? -
```

Setting MS/TP Device Initial Values

Setting Initial Values for the MSTP Device

HMI	**A, N, M, I, C, S** (Application, flNdevice, Mstp, Initvalues, Command, Set)

Prompt/Field	Option/Entry	Description
MSTP Device name	Type the name of the MS/TP device.	
	Press **ENTER**.	To select all MS/TP devices on the network and set initial values based on application number. **CAUTION:** If you select MS/TP devices by application number, you will set the initial values for every MS/TP device that is running that application on the network.
Application number	Type the application number.	
Subpoint name	Type the subpoint name.	
Initial value	Enter an initial value for the subpoint.	

The system displays `<MSTP device:subpoint name>` and `Command successful.`

Example

```
>Set, Release, Mstp_initialize, Panel_update, Quit? s
>MSTP Device system name : device1------------------------------
---------
>Subpoint name : DO 5--------
>Initial value : 4-------------------
<device1:DO 5> Command successful

>Set, Release, Mstp_initialize, Panel_update, Quit? -
```

Updating MS/TP Device Initial Values

This procedure sends a copy of the MS/TP device initial values to the field panel. Any MS/TP device initial values stored in the field panel are replaced by the update.

NOTE:
DXRs are designed to not respond to initial value update requests. Do not use the initial value update command on a DXR because it will not upload the initial values. Instead, set the initial values using ABT Site, or by commanding the point's initial values from the field panel, APOGEE Insight, or Desigo CC workstation.

The following sequence occurs on MS/TP FLN devices during an update:

- **Out of Service Input points** - the present value of the point is saved as the field panel initial value for these points
- **Output Points** - the present value of the point priority array slot designated as override will be saved as the field panel initial value for this point, and will be marked as an override.

Updating Initial Values for the MS/TP Device

HMI	**A, N, M, I, C, P** (Application, flNdevice, Mstp, Initvalues, Command, Panel_update)

Prompt/Field	Option/Entry	Description
MSTP Device system	Type the name of the MS/TP device.	
	Press **ENTER**.	To select all MS/TP devices on the network and set initial values based on application number. **CAUTION:** If you select MS/TP devices by application number, you will set the initial values for every MS/TP device that is running that application on the network.
Application number	Type the application number.	
Subpoint name	Type the subpoint name.	
Initial value	Enter an initial value for the subpoint.	

The system displays `<MSTP device:subpoint name>` and `Command successful.`

Example

```
>Set, Release, Mstp_initialize, Panel_update, rEstore_rds, Quit?
s
>MSTP Device system name : device1------------------------------
---------
>Subpoint name : DO 5--------
>Initial value : 4-------------------
<device1:DO 5> Command successful

>Set, Release, Mstp_initialize, Panel_update, rEstore_rds, Quit?
-
```

Restoring the Relinquish Default Values of an FLN Device

Restoring the Relinquish Default Values of an FLN Device from the Field Panel Initial Values Table for that Device

HMI	**A, N, M, I, C, E** (Application, flNdevice, Mstp, Initvalues, Command, rEstore_rds)

Prompt/Field	Option/Entry	Description
MSTP Device name	Type the MS/TP device name.	To select a specific FLN device.
	Type a partial MS/TP device name with wildcards.	To select a range of FLN devices.
	Press **ENTER**.	To select FLN devices.
Application number	Type the application number.	To select all FLN devices with a single application.
	Press **ENTER**.	To select all FLN devices.
Are you sure (Y/N)	Y	

`Command successful` displays. The FLN device relinquish default values are restored.

Example

```
>Set, Release, Mstp_initialize, Panel_update, rEstore_rds, Quit?
e
>MSTP Device name : ------------------------------
>Application number : -----
>Are you sure (Y/N) : y
<BTEC4> Command successful
<VAV3040> Command successful
End of commanding

>Set, Release, Mstp_initialize, Panel_update, rEstore_rds, Quit?
-


>MSTP Device name : ------------------------------
>Application number : -----
>Are you sure (Y/N) : y
<BTEC4> Command successful
<VAV3040> Command successful
End of commanding

>Set, Release, Mstp_initialize, Panel_update, rEstore_rds, Quit?
-
```

Understanding BACnet TEC and PTEC Initial Values

Subpoint Types

There are two types of subpoints: Unbundlable and Non-unbundlable.

Although all subpoints are auto-unbundlable at the Insight workstation, only TEC subpoints that have EEPROM and RAM storage are considered unbundlable. These points are enclosed in braces { } in the Point Database section in the Application Notes for the TEC. EEPROM and RAM points are explained in more detail in *TEC Memory Types* section.

EEPROM only subpoints are configuration points and are designed to be commanded once and left at that value.

Example of an EEPROM Subpoint (6) and a RAM Subpoint (92).							
Point Number	Descriptor	Factory Default (SI Units)	Engr. Units (SI Units)	Slope (SI Units)	Intercept (SI Units)	On Text	Off Text
6	DAY CLG STPT	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)	--	--
{92}	CTL STPT	74.0 (23.44888)	DEG F (DEG C)	0.25 (0.14)	48.0 (8.88888)		

TEC Memory Types

There are three memory types for subpoints in BACnet TECs:

- EPROM – this is where the default values are stored for TEC subpoints. This memory is burned into the TEC from the factory and cannot be changed.
- EEPROM – EEPROM points can be overwritten and the value is not lost after a power loss. EEPROM is where operator commands are stored and those values are reloaded upon a return from power loss.
- RAM – located in the volatile memory of the TEC. The values stored here are lost when a TEC loses power. Current values, such as readings from sensors, control loops, and so on, are stored in the RAM. When the TEC is initially powered up, the factory default values from EPROM load into RAM.

Comparison Between EEPROM and RAM Subpoints.				
Memory Types for Subpoint	How Subpoint Numbers are Displayed in Application Notes	Methods for Commanding Subpoints in a BACnet TEC	Notes for BACnet TEC Commanding	Methods for Commanding Subpoints for a P1 TEC
EEPROM and RAM	Subpoint number enclosed in braces { }	HMI: P,C,V*	Does not write to Panel Initial Values or TEC Initial Values.	HMI: PCV*
		HMI: A,N,M,I,C,S**	Writes to Panel Initial Values, but not to TEC Initial Values.	HMI: ANTICS***
		Insight: Point Commander	Does not write to Panel Initial Values or TEC Initial Values.	Insight: Point Commander

Comparison Between EEPROM and RAM Subpoints.				
Memory Types for Subpoint	How Subpoint Numbers are Displayed in Application Notes	Methods for Commanding Subpoints in a BACnet TEC	Notes for BACnet TEC Commanding	Methods for Commanding Subpoints for a P1 TEC
		Insight: Global Commander	Writes to Panel Initial Values, but not to TEC Initial Values.	Insight: Global Commander
		PPCL: Set, Assignment Statements	Does not write to Panel Initial Values or TEC Initial Values.	PPCL: Set, Assignment Statements
		PPCL: OIP with ANMICS**	Writes to Panel Initial Values, but not to TEC Initial Values.	PPCL: OIP with ANTICS***
EEPROM Only	No braces { } around subpoint number	HMI: P,C,V*	Writes to TEC Initial Values, but not to Panel Initial Values.	--
		HMI: A,N,M,I,C,S**	Writes to Panel Initial Values and to TEC Initial Values.	HMI: ANTICS***
		Insight: Point Commander	Writes to TEC Initial Values, but not to Panel Initial Values.	--
		Insight: Global Commander	Writes to Panel Initial Values and to TEC Initial Values.	Insight: Global Commander
		PPCL: Set, Assignment Statements	Writes to TEC Initial Values, but not to Panel Initial Values.	--
		PPCL: OIP with ANMICS**	Writes to Panel Initial Values and to TEC Initial Values.	PPCL: OIP with ANTICS***
* PCV stands for the keystrokes Point, Command, Value.				
** ANMICS stands for Application, flN, Ms/tp, Initial values, Command, Set.				
*** ANTICS stands for Application, flN, TEC, Initial values, Command, Set.				

An important distinction between BACnet TECs and P1 TECs is that the BACnet TECs allow their EEPROM subpoints to be commanded without using an OIP statement; while this makes it easier to write PPCL, it can also result in excessive commanding and eventually damaging the BACnet TEC.

An Initial Value is intended to be used to set the point value when an analog point is first viewed by the TEC or field panel upon a return from power loss or failure. There are two types of Initial Values: TEC Initial Values and Panel Initial Values.

TEC Initial Values

Subpoint values set through operator commands are TEC Initial Values. For example, when an operator commands the address and application numbers using WCIS or BACnet Object Browser (BOB), those values are burned into the EEPROM as TEC Initial Values.

Viewing Through WCIS from the RTS port (this is the P1 interface to the BACnet TEC)

1. From the **View** menu, select **Column Headings**.
2. When the Custom Column dialog box displays, select the **Initial** option.

⇨ TEC Initial Values can be viewed this way for BACnet TECs as well as P1 TECs.

Commanding Through WCIS from the RTS port (this is the P1 interface to the BACnet TEC)

The TEC Initial Value can be set for a subpoint by double-clicking the subpoint and assigning a value in the **New Val** field.

Commanding the subpoint puts an asterisk (*) next to the Priority. Releasing the subpoint does not remove the asterisk. The asterisk indicates when the Initial Value that has been set differs from the Default Value.

The TEC Initial Values can also be accessed for a BACnet TEC by right-clicking on the subpoint in System Profile, selecting **BACnet**, and then **Object Browser**.

The Relinquish Default value is the TEC Initial Value.

Commanding Through the BACnet Object Browser (this is done from the BACnet side)

The TEC Initial Value can be set for a subpoint by double-clicking the **Present Value** property of the EEPROM point and assigning a value in the New Value field of the Write Property window. For PTECs with 66xx applications, the Relinquish Default property can also be commanded for RAM subpoints.

Commanding Through the HMI or Global Commander

The Present Value of EEPROM subpoints can be commanded through the HMI or Global Commander. Doing this also puts the Present Value in the TEC Initial Value.

Using the HMI (or telnet)

```
Point, Application, Time, Message, Cancel, System, passWord,
Bye? A

Ppcl, flNdevice, Quit? N

Mstp, Tec, Uc, Quit? M

Log, Display, Edit, Initvalues, Quit? I

Log, Command, Quit? C

Set, Release, Mstp_initialize, Panel_update, rEstore_rds, Quit?
S

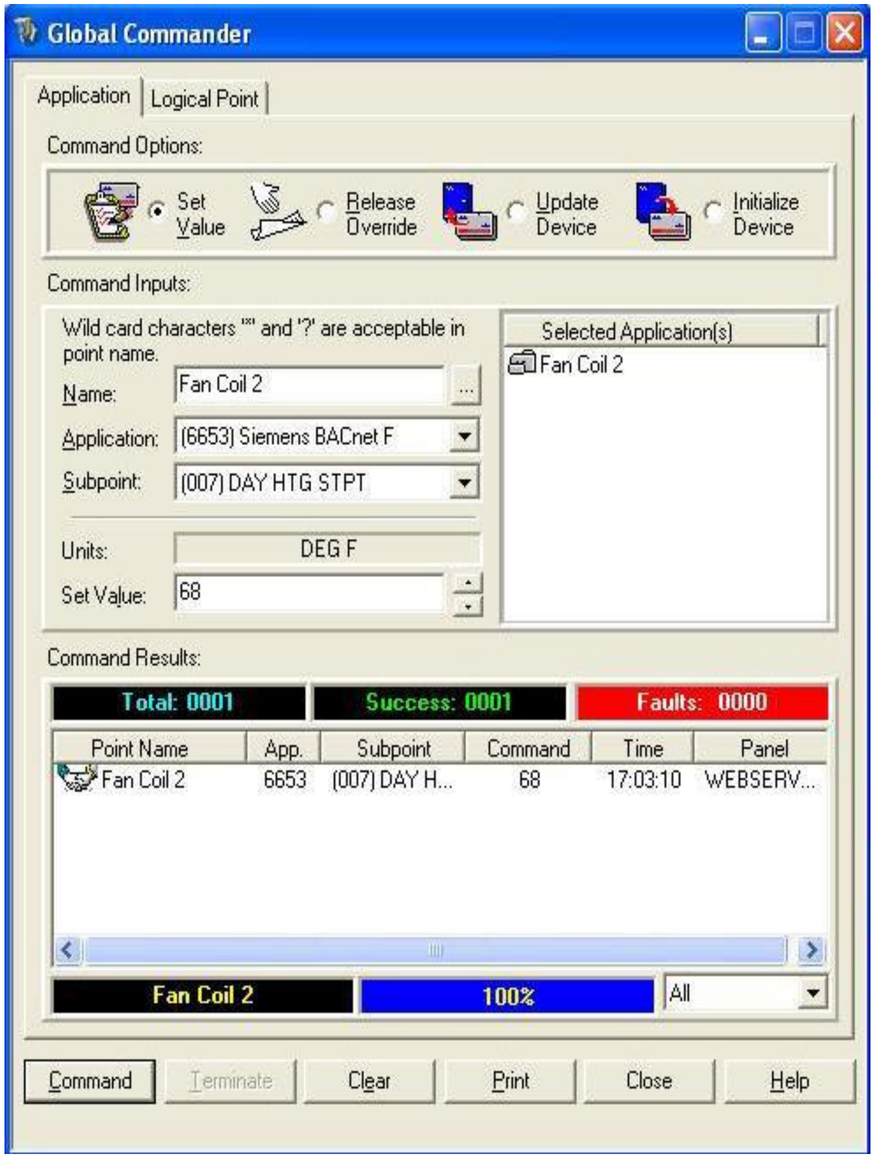
MSTP Device system name : FAN COIL 2-------------------------
-------

Subpoint name : DAY HTG STPT

Initial value : 68------------------

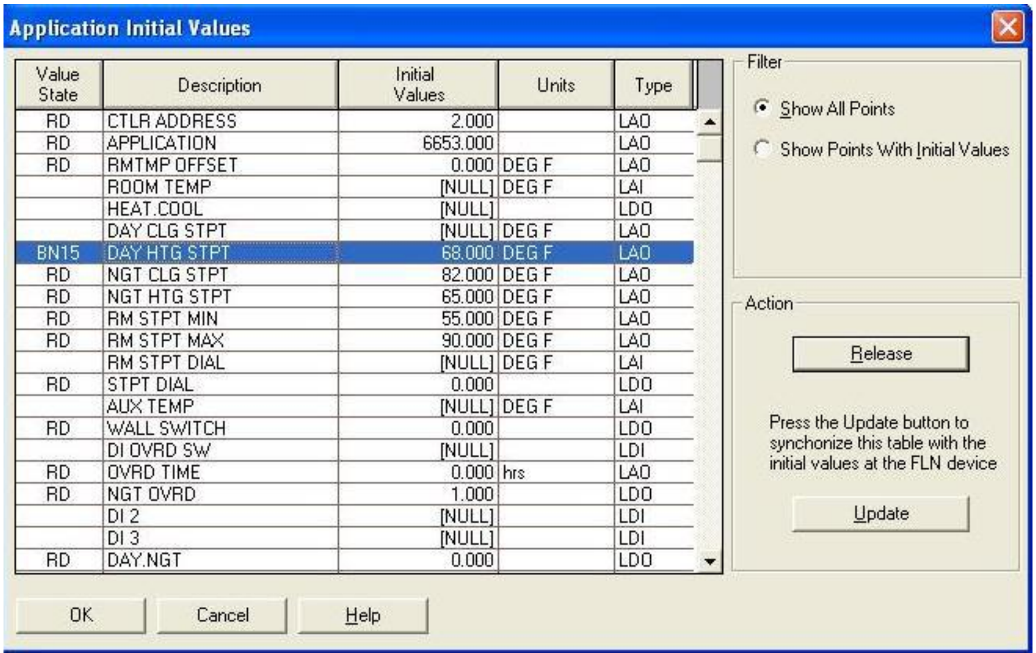
<Fan Coil 2:DAY HTG STPT> Command successful
```

Using Global Commander



Commanding Using System Profile

The TEC Initial Value of a subpoint can be set through System Profile in the Application Initial Values dialog box. This dialog box can be accessed by double-clicking on the **BACnet TEC**, and then clicking the **Initial Values** button. In the **Initial Values** column, type the desired TEC Initial Value and then click **OK**.

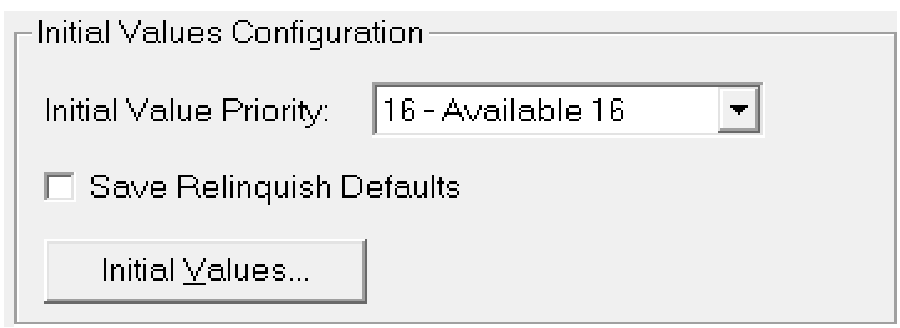


TEC Panel Initial Values

Panel Initial Values are loaded into the TEC to send the last known operator command after the field panel establishes that the TEC has returned from failure. Panel Initial Values are created when either a subpoint's initial value is commanded from the HMI or Global Commander, or a Panel Update is performed. Panel Update is explained in more detail in the *TEC Panel Update* section.

Output Points

If a value exists in the Initial Value Priority drop-down menu, then the value in the Panel Initial Values is updated at the Initial Value Priority. The Initial Value Priority defaults to BN16. The Initial Value Priority is defined in the BACnet TEC definition as illustrated below.



The value in the Initial Value Priority drop-down menu can be seen from the BACnet Object Browser. In the drawing below, the priority slot for BN16 is set to a value of 84.

If a value does not exist in the Initial Value Priority drop-down menu (it displays a null value) and the Save Relinquish Defaults property is set to Yes, then the Relinquish Default value is updated in the Panel Initial Values.

NOTE:
Relinquish Defaults only apply to points which have a Command Priority Array.

Input Points

If the Out of Service property is set to True, then the Present Value is updated in the Panel Initial Values as Out of Service.

Commanding the Panel Initial Value

Output Points

- Value is updated in the Panel Initial Values at the Initial Value Priority.
- The field panel sends commands to the BACnet TEC at Initial Value Priority.

NOTE:
Initial Value Priority cannot be the highest priority.

Input Points

- Field panel sets the Out of Service property to True and commands the BACnet TEC subpoint.
- Value is updated in the Panel Initial Values as Out of Service.

Using the HMI, Global Commander or System Profile

Commanding EEPROM subpoints through the HMI, Global Commander or System Profile as described in Section 3, also commands the Panel Initial Values, as well as TEC Initial Values.

TEC Panel Update

When a subpoint is commanded from WCIS, the TEC Initial Values do not automatically upload to the field panel.

When an update is performed:

- The field panel uses the Read Property Multiple services to read the BACnet TEC.
- Panel Initial Values are updated using the Initial Values Configuration as specified in the BACnet TEC definition. See *TEC Panel Initial Value* section for more details.
- Any TEC point, which has a value stored in the Initial Value Priority drop-down menu of the Command Priority Array, has that value saved in Panel Initial Values.

From the HMI prompt

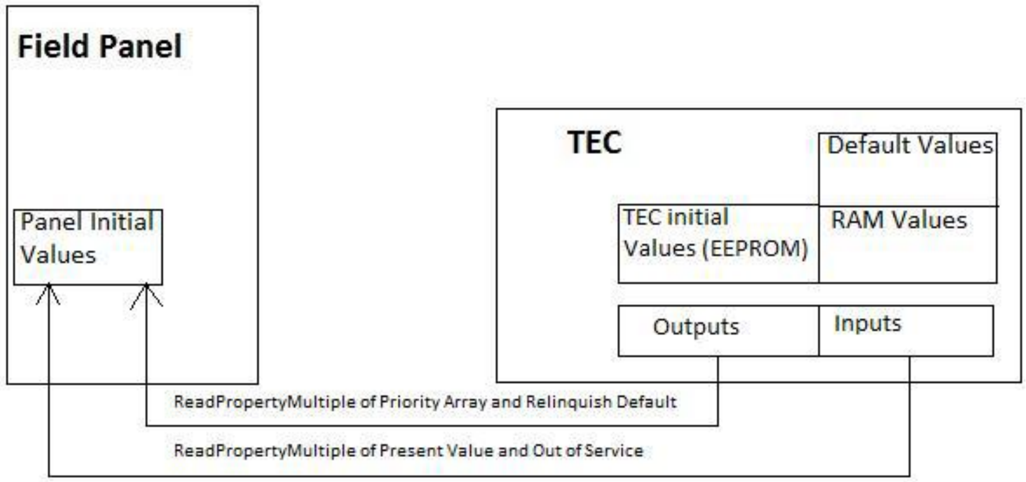
```
Point, Application, Time, Message, Cancel, System, passWord, Bye? a
Ppcl, flNdevice, Quit? n
Mstp, Tec, Uc, Quit? m
Log, Display, Edit, Initvalues, Quit? i
Log, Command, Quit? c
Set, Release, Mstp_initialize, Panel_update, rEstore_rds, Quit? p
MSTP Device name : FAN COIL 2--------------------
<FAN COIL 2> Command successful
```

From an Insight Workstation

This can be done by doing one of the following:

- In **System Profile**, right-click on the **BACnet TEC**, and then select **Update**.
- In **Global Commander**, click the **Update Device** button.

The drawing below summarizes what happens to Panel Initial Values when an update is performed.



BACnet TEC Initial Value for EEPROM and RAM Points

BACnet TEC Initial Value for EEPROM Points

- The command sent at the highest priority becomes the Present Value and Relinquish Default.
- Can be set by WCIS using the RTS port (P1 interface). The default priority is BN08.
- Can be set by BACnet services as follows:
  - Global Commander and System Profile (from the BACnet TEC definition): commands at the priority set in the Initial Value Priority field in the BACnet TEC definition.
  - Point Commander: commands at the default priority of BN08. The command priority can be changed from the drop-down menu.
  - BACnet Object Browser: commands at the default priority of BN08.
  - HMI or telnet: point command (Point, Command, Value) is set at a default priority of BN08. Initial value command (Application, flNdevice, Mstp, Initvalues, Command, Set) is set at default priority of BN16.

NOTE:
The Relinquish Default property is also writeable through BACnet services for PTEC applications 66xx.

BACnet TEC Initial Value for RAM Points

TEC Initial Values for applications 25xx and 65xx can only be set through the RTS port (P1 interface) of the BACnet TEC connected to WCIS. For PTEC applications 66xx this can also be done through the BACnet Object Broswer by writing to the Relinquish Default value.

Examples

Heat.Cool (subpoint 5) in PTEC Application 6653 is set to **HEAT** through WCIS. This updates the TEC Initial Value to HEAT and changes the Relinquish Default to HEAT (from the default value of COOL). The subpoint displays as follows:

#	Descriptor	Current	Status	Units	Priority	Ty...	Initial
5	HEAT.COOL	HEAT	-N-		OVRD *	LDO	HEAT

Cycle power to the PTEC or re-initialize the PTEC. This releases the override, but keeps the TEC Initial Value as HEAT. The subpoint displays as follows:

#	Descriptor	Current	Status	Units	Priority	Ty...	Initial
5	HEAT.COOL	COOL	-N-		NONE *	LDO	HEAT

Which Values Are Sent to the BACnet TEC Upon a Return from Failure?

TEC Initial Values are sent to the subpoint after the BACnet TEC returns from a power loss. If the field panel detects a BACnet TEC failure, it sends the Panel Initial Values to the BACnet TEC as follows:

- Output subpoints are set to the value stored in the Initial Value Priority drop-down menu.
- Panel Initial Values are sent to the input subpoints with the Out of Service property set to True.
- Relinquish Default values are not sent. They are only sent on Restore Relinquish Defaults.

NOTE:
Brief power losses may not be detected by the field panel.

Restore Relinquish Default

- Restore Relinquish Default commands the output subpoints to the value in the Initial Value Priority drop-down menu.
- Relinquish Default values for EEPROM subpoints are updated if the Initial Value Priority is the highest priority.
- Releases the Initial Value Priority.

Restore Relinquish Default is automatically performed by the field panel when a BACnet TEC is replaced.

It can also be manually performed through the HMI or telnet using the following keystrokes:

```
Point, Application, Time, Message, Cancel, System, passWord,
Bye? A
Ppcl, flNdevice, Quit? n
Mstp, Tec, Uc, Quit? M
Log, Display, Edit, Initvalues, Quit? i
Log, Command, Quit? c
Set, Release, Mstp_initialize, Panel_update, rEstore_rds, Quit?
e
MSTP Device name : FAN COIL 2--------------------
<FAN COIL 2> Command successful
```

MS/TP Device Procedures

Adding a Master MS/TP or BACnet/IP FLN Device to the MS/TP FLN

This procedure adds a Master MS/TP device to the MS/TP or BACnet/IP FLN. Once you add the device, the subpoints residing on it are automatically available to the field panel.

This can be done, in most cases, by entering the Device Instance Number of the device.

The following FLN types are supported:

- Primary Local MS/TP
- Secondary Local MS/TP
- Router MS/TP FLN
- BACnet/IP FLN

If there is a need to add by network number and MAC Address, specify the network number that the device is connected to:

- Primary Local MS/TP – field panel's primary MS/TP network number.
- Secondary Local MS/TP – field panel's secondary MS/TP network number.
- Router MS/TP FLN – BACnet MS/TP router's MS/TP network number.
- BACnet/IP FLN – It in not possible to specify the BACnet/IP network number and MAC Address. You must specify the device instance number.

NOTE:
All DXRE and DXRM devices must be added as a Master. Technically, a Master does not really apply to a DXRE, however, it produces the correct prompting to add the DXRE to the field panel's database.

NOTE:
On a PXC Modular:
- The Primary FLN port is **FLN 1** of the PXX485.3 module.
- The Secondary FLN port is the **RS-485 ALN** port. This port can be used as a FLN port.

To use only the secondary port on a PXC Modular, disable the primary MS/TP FLN.
On a PXC Compact-36:
- The Primary FLN port is the **A** port.
- The Secondary FLN port is the **B** port.

To use the secondary port, the MS/TP ALN must be enabled.
There is no secondary port on a PXC Compact 16/24.

Adding a Master MS/TP Device to the MS/TP FLN

HMI	**A, N, M, E, A** (Application, flNdevice, Mstp, Edit, Add)

Prompt/Field	Option/Entry	Description
MSTP Device System name	Type the new MS/TP device system name.	
MSTP Device name	Specify a new MS/TP device name.	
	Keep the MS/TP device name the same as the MS/TP device system name.	
Application number	If this is a Siemens device:	Have the field panel determine the application number.
		Specify a particular application, type the application number.
		Share team descriptions with other MS/TP devices on the same network, type the common application number.
	If this is a third-party device:	Specify a unique application number for this third-party device, type the application number.
		Share team descriptions with other third-party MS/TP devices on the same network, type a common third-party application number. **NOTE:** The application number range for third-party devices is 10,000 - 11,999. Numbers outside this range will show as failed.
Descriptor	Type the MS/TP device descriptor.	
Access group(s)	Specify the access group(s) to which the new MS/TP device belongs. To specify:	All access groups (1 through 30).
	Type the number of that access group.	A single access group.

	Type the number of each access group separated by commas, or use two periods to indicate a range (for example, 1..4,7,9,12..20).	Two or more access groups
Field panel	Specify the ALN device ID of the field panel. To specify:	The field panel where you are connected.
	Type the field panel ALN device ID.	A particular field panel.
Master, Slave	M	For Master All DXREs and DXRMs must be configured as Masters.
MSTP Device Instance Number	If you know the MS/TP device instance number, type it.	The system adds the MS/TP master device to the MS/TP FLN.
	Press **ENTER**.	If you do not know the MS/TP device instance number:
	• In **the MSTP Device Network Number** field, type the network number. • In the **MSTP Device Mac Address** field, type the MAC address for the device. This option is not available for a DXRE.	
Initial Value Priority		Type the Priority Array slot number you have specified to receive initial values (1 through 16), or press ENTER to accept the default value (15).
Save Relinquish Defaults (Y/N)	Y	Save the relinquish default values of every point log object in this MS/TP device to the matching field panel Initial Values table.
	N	Save only commanded point log object values to the matching field panel Initial Values table. **NOTE:** When setting up a UEC, always select **N** at this prompt.
Device Init Password	Enter the device initialization password for a password-protected MS/TP device that supports re-initialization, and then type the password .	This password will be used by the system to re-initialize the device.
	Press **ENTER**.	For MS/TP devices that are not password-protected.

The system adds the MS/TP master device to the MS/TP FLN.

Adding a Slave MS/TP Device to the MS/TP FLN

This procedure adds a Slave MS/TP device to the MS/TP FLN. Once you add the device, the subpoints residing in it are automatically available to the field panel.

Adding a Slave MS/TP Device to the MS/TP FLN

HMI	**A, N, M, E, A** (Application, flNdevice, Mstp, Edit, Add)

Prompt/Field	Option/Entry	Description
MSTP Device System name		Type the new MS/TP device system name.
MSTP Device name	Specify new MS/TP device name and type the name.	
	Keep the MS/TP device name the same as the MS/TP device system name.	
Application number	If this is a Siemens device:	Have the field panel determine the application number.
		Specify a particular application and type the application number.
		Share team descriptions with other MS/TP devices on the same network and type the common application number.
	If this is a third-party device:	Specify a unique application number for this third-party device and type the application number.
		Share team descriptions with other third-party MS/TP devices on the same network and type a common third-party application number. **NOTE:** The application number range for third-party devices is 10,000 - 11,999. Numbers outside this range will show as failed.
Descriptor		Type the MS/TP device descriptor
Access group(s)	Specify the access group(s) to which the new MS/TP device belongs. To specify:	All access groups (1 through 30).
		A single access group, type the number of that access group.
		Two or more access groups, type the number of each access group separated by commas, or use two periods to indicate a range (for example, 1..4,7,9,12..20).
Field panel	Specify the ALN device ID of the field panel. To specify:	The field panel where you are connected
		A particular field panel and type the field panel ALN device ID.
Master, Slave	S	

MSTP Device Instance Number		Type the MS/TP device instance number.
MSTP Device Network Number		Type the network number, and then press **ENTER**. A blank field defaults to the local MS/TP network.
MSTP Device Mac Address		Type the MAC address for the device.
Initial Value Priority		Type the Priority Array slot number you have specified to receive initial values (1 through 16), or press **ENTER** to accept the default value (15).
Save Relinquish Defaults (Y/N)	Y	Save the relinquish default values of every point log object in this MS/TP device to the matching field panel Initial Values table.
	N	Save only commanded point log object values to the matching field panel Initial Values table
Device Init Password	Enter the device initialization password for a password-protected MS/TP device that supports re-initialization, type the password and press **ENTER**.	This password will be used by the system to re-initialize the device.
	Press **ENTER** for MS/TP devices that are not password-protected.	

The system adds the MS/TP slave device to the MS/TP FLN.

Removing an MS/TP Device From the MS/TP FLN

When you remove an MS/TP device (for example, a BTEC) from the MS/TP FLN:

- Polling for COVs is stopped
- Proxying is stopped

Because removed master devices may still be communicating on the FLN:

- The token is still passed to removed master devices
- BACnet routing is still provided for removed MS/TP devices

Removing an MS/TP Device from the MS/TP FLN

HMI	**A, N, M, E, D** (Application, flNdevice, Mstp, Edit, Delete)

Prompt/Field	Option/Entry	Description
MSTP Device Name	Type the name of the MS/TP device that you are removing.	
Are you sure (Y/N)	Y	

The MS/TP device is removed.

Example

The following example shows removal of an MS/TP device.

```
BTEC <btec1> deleted
```

Copying an MS/TP Device

Copying a Device on the MS/TP FLN

HMI	**A, N, M, E, C** (Application, flNdevice, Mstp, Edit, Copy)

Prompt/Field	Option/Entry	Description
Copy from MSTP name	Type the name of the device you want to copy.	
MSTP Device system name	Type the new system name.	
MSTP Device name	Specify a new MS/TP device name and type the name.	
	Keep the MS/TP device name the same as the MS/TP device system name.	
Field panel	Specify the ALN device ID of the field panel. To specify:	The field panel where you are connected.
	Type the field panel ALN device ID.	A particular field panel.
MSTP Device Instance Number	Type the MS/TP device instance number or leave blank for system to provide.	

`MSTP <TECn> added` is displayed (where TEC*n* is the system name of the new device).

Example

```
>Copy from device system name : ------------------------------
>MSTP Device system name : mstp new-------------------------
>Device name : mstp new----------------------
>Field panel : -------
>MSTP Device Instance Number : -------
>MSTP Device Mac Address : ---
MSTP < mstp new > added
>Add, Modify, Copy, Delete, Look, Quit? –
```

Modifying an MS/TP Device On the MS/TP FLN

NOTE:
This procedure does not modify the end device. To change TEC settings, you must use the tool at that device.

Modifying a Device on the MS/TP FLN

HMI	**A, N, M, E, M** (Application, flNdevice, Mstp, Edit, Modify)

Prompt/Field	Option/Entry	Description
MSTP name to modify	Type the MSTP Device system name of the device you want to modify.	
MSTP Device name	Specify a new MS/TP device name and type the name.	
	Keep the MS/TP device name the same as the MS/TP device system name.	
Descriptor	Type the MS/TP device descriptor.	
Access group(s)	Specify the access group(s) to which the new MS/TP device belongs. To specify:	All access groups (1 through 30).
	Type the number of that access group.	A single access group.
	Type the number of each access group separated by commas, or use two periods to indicate a range (for example, 1..4,7,9,12..20).	Two or more access groups.
Master, Slave	M or S	
MSTP Device Instance Number	Type the MS/TP device instance number.	

`MSTP <TECn> modified` is displayed (where TEC*n* is the system name of the modified device).

Example

```
>Device system name : ------------------------------
>Device name : mstp-------------------------
>Descriptor : mstp------------
>Access group(s) : 1-10, 15----------------------
>Master, Slave : s
>MSTP Device Instance Number : 123----
MSTP < mstp > modified

>Add, Modify, Copy, Delete, Look, Quit? –
```

Discovering FLN Devices

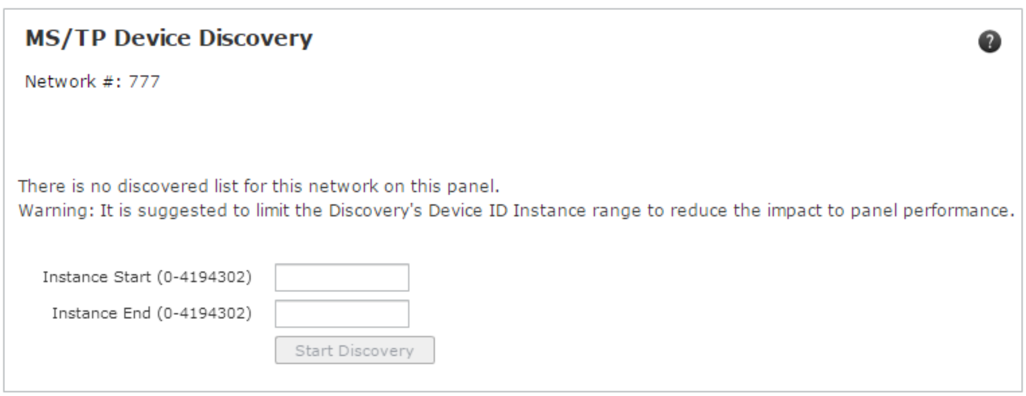
The Device Discovery feature, in the Field Panel Web Server User Interface, is available if the field panel has been enabled for MS/TP FLN and has Firmware Revision 3.3 or later. The field panel automatically triggers a discovery process on startup for the local MS/TP FLN(s).

NOTE:
When data is modified in the Device Discovery table, the device reference that is stored in the field panel database is modified when the device is added. Modifying data in the Device Discovery table does not modify the properties that are stored in the FLN device.

Use the following procedure to manually trigger a discovery process:

1. In the **FLN Editor**, select a field panel with Firmware Revision 3.3 or later.
2. Select the desired FLN.
3. Click the **Discover Devices** 

button at the bottom of the FLN Editor device tree pane.
4. Complete the following steps if they apply to your network:
   – If the field panel has Firmware Revision 3.4 or later, you can enter a range of instance numbers to filter the discovered list and reduce the impact to panel performance.
   – During the first device discovery on a routed MS/TP FLN or IP FLN, the following window displays. Enter the range of instance numbers to discover. This range will then be used for any subsequent discoveries of the same network.



   ⇨ The **Device Discovery** pane displays a list of all devices that are physically connected to the network but have not been added to the field panel database.
5. Do one of the following:
   – Select the **ALL** check box to select all devices in the table to be added to the database.
   – Select the check box for individual devices to be added to the database.
6. Enter or modify any device information. For more information, see the User Interface Description for FLN Device Discovery section.
   NOTE: A field with an invalid entry displays a red border. Move your cursor over the field to display the valid entry parameters.
7. Click the **Add Selected** button to add all selected devices to the panel database.

NOTE:
Before adding a UEC to the database, the UEC must be made ready.

If device discovery is in progress, the **Refresh List** button is available. To refresh the list of discovered devices, click the **Refresh List** button at the bottom of the pane.

CAUTION

Changes made to the Device Discovery table are overwritten when you click the **Refresh List** button. Before refreshing the list, click the **Add Selected** button to add all selected devices to the database.

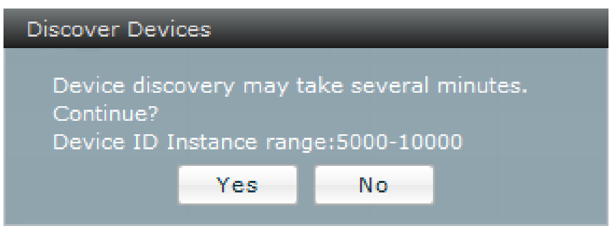
Restarting Device Discovery

Selecting the **Restart Discovery** button triggers a new discovery process and updates the list to include any changes to the physical network. The **Restart Discovery** button is available if discovery is complete.

To restart the device discovery process:

1. Click the **Restart Discovery** button in the bottom right corner of the **Device Discovery** pane.
   - If the field panel has Firmware Revision 3.4 or later, you can enter a range of instance numbers to filter the discovered list and reduce the impact to panel performance.

   ⇨ A **Discover Devices** dialog box displays.



2. Click **Yes** to continue.

   ⇨ A Discovering Devices progress bar displays:

If you click the **Cancel** button to close the progress window, a current (partial) list of discovered devices displays in the **Device Discovery** pane. While the discovery process continues, you can work with the current list of devices.

If Discovery is in progress, the **Refresh List** button is available. To refresh the list of discovered devices, click the **Refresh List** button at the bottom of the pane.

	CAUTION
	Changes made to the Device Discovery table are overwritten when you click the **Refresh List** button. Before refreshing the list, click the **Add Selected** button to add all selected devices to the database.

MS/TP Device Reports

Displaying an MS/TP Device Report

This report displays the properties of the specified MS/TP device objects, including:

- MSTP device name for each MS/TP device object
- Supported services and object types
- BACnet encoded name and object name for each object within an MS/TP device
- Number of objects within an MS/TP device

NOTE:
Failed MS/TP devices are not displayed.

Displaying an MS/TP Device Report

HMI	**A, N, M, D, V** (Application, flNdevice, Mstp, Display, deVice)

Prompt/Field	Option/Entry	Description
MSTP Device name	Specify all MS/TP devices across the network.	
	Specify a range of MS/TP devices using wild cards.	
	Type a specific MS/TP device name.	

The system displays the MS/TP Device report.

Example

NOTE:
Lines have been removed from the example for the sake of brevity.

```
>MSTP Device name : *-------------------------
03/17/2008 MON MSTP DEVICE REPORT 04:49
----------------------------------------------------------------
-----------
ALERTON
.Object name : "BTEC2"
.Object type : device
.System status : operational
```

```
.Vendor name : "Siemens Industry, BAU-NA"
.Vendor id : 7
.Model name : "VAV Actuator Series 2 Bacnet ASC Controller"
.Firmware revision : "BY20 Rev 1.0"
.APP Software Version : "Appl Rev 1.2"
.Location : "DEFAULT LOCATION"
.Description : "DEFAULT DESCRIPTION"
.Protocol version : 1
.Protocol revision : 3
.Services supported : Atomic Read File
: Atomic Write File
: Read Property
: Read Property Multiple
: Write Property
: Write Property Multiple
: Device Communication Control
: Reinitialize Device
: I Am
: I Have
: Time Synchronization
: Who Has
: Who Is
.Object types supported : Analog Input
: Analog Output
: Analog Value
: Binary Input
: Binary Output
: Binary Value
: Device
: File
: Program
.Max APDU length accepted : 480
.Segmentation supported : no-segmentation
.Max segments accepted : {}

End of report
>Definitions, Subpoints, deVice, Quit? -

>MSTP Device name : *-------------------------
03/17/2008 MON MSTP DEVICE REPORT 04:49
----------------------------------------------------------------
---------------
ALERTON
.Object name : "BTEC2"
.Object type : device
```

```
.System status : operational
.Vendor name : "Siemens Industry, BAU-NA"
.Vendor id : 7
.Model name : "VAV Actuator Series 2 Bacnet ASC Controller"
.Firmware revision : "BY20 Rev 1.0"
.APP Software Version : "Appl Rev 1.2"
.Location : "DEFAULT LOCATION"
.Description : "DEFAULT DESCRIPTION"
.Protocol version : 1
.Protocol revision : 3
.Services supported : Atomic Read File
: Atomic Write File
: Read Property
: Read Property Multiple
: Write Property
: Write Property Multiple
: Device Communication Control
: Reinitialize Device
: I Am
: I Have
: Time Synchronization
: Who Has
: Who Is
.Object types supported : Analog Input
: Analog Output
: Analog Value
: Binary Input
: Binary Output
: Binary Value
: Device
: File
: Program
.Max APDU length accepted : 480
.Segmentation supported : no-segmentation
.Max segments accepted : {}

End of report
>Definitions, Subpoints, deVice, Quit? -
```

Displaying an MS/TP Look Report

This procedure displays a Look for BACnet TECs and third-party devices. The MS/TP Look report contains location information for one or more BACnet TECs or third-party devices.

Displaying an MS/TP Look Report

HMI	**A, N, M, E, L** (Application, flNdevice, Mstp, Edit, Look)

Prompt/Field	Option/Entry	Description
MSTP Device name	Type the MS/TP device name.	

The system displays an MS/TP Look report, as shown in the following example:

Example

```
>MSTP Device name : btec4-------------------------

07/20/2008 SUN MSTP LOOK REPORT 11:35
-----------------------------------------------------------------
-----------
Search for <btec4>
Field Value
-----------------------------------------------------------------
-----------
MSTP Device system name : BTEC4
MSTP Device name : BTEC4
MSTP Device Instance Number : 4
Application number : 2587
Descriptor : BACnet TEC
Access group(s) : <all>
Field panel name : 22054
Master, Slave : Master
MSTP Device Network Number : 22054
MSTP Device Mac Address : 4
Initial Value Priority : 16
Save Relinquish Defaults : YES
Device Init Password :
End of report

>Add, Modify, Copy, Delete, Look, Quit? –
```

Example

The following example shows a DXRE Look report. The MS/TP Device MAC Address is the IP address of the DXRE:BAC0 (BACnet UDP point number).

```
>MSTP Device name : DXR--------------------------

04/11/2016 MON MSTP LOOK REPORT 13:39
-----------------------------------------------------------------
-----------
Search for <DXR>
```

```
Field Value
----------------------------------------------------------------
-----------
MSTP Device system name : DXR
MSTP Device name : DXR
MSTP Device Instance Number : 15052
Application number : 14052
Descriptor :
Access group(s) : <all>
Field panel name : 13041
Master, Slave : Master
MSTP Device Network Number : 42
MSTP Device Mac Address : 192.168.1.24:BAC0
Initial Value Priority : 16
Save Relinquish Defaults : YES
Device Init Password : <password>

End of report

>Add, Modify, Copy, Delete, Look, Quit? –
```

Displaying an MS/TP Device Definition Report

This report displays the:

- MSTP device name
- Device Instance Number
- Field Panel device is connected to
- Device Network Number
- Device MAC Address
- Example

The following example shows an MS/TP Device Definition report.

```
>MSTP Device name : DXR---------------------------
>Here, Printer : H

04/11/2016 MON MSTP DEFINITION DISPLAY REPORT 15:00
----------------------------------------------------------------
-----------
Search for <DXR>

Field Value
----------------------------------------------------------------
-----------
MSTP Device system name : DXR
MSTP Device name : DXR
MSTP Device Instance Number : 15052
Application number : 14052
```

```
Descriptor :
Access group(s) : <all>
Field panel name : 13041
Master, Slave : Master
MSTP Device Network Number : 42
MSTP Device Mac Address : 192.168.1.24:BAC0
Initial Value Priority : 16
Save Relinquish Defaults : YES
Device Init Password : <password>

End of report

>Definitions, Subpoints, deVice, Quit? -
```

HMI	**A, N, M, D, D** (Application, flNdevice, Mstp, Display, Definition)

Displaying an MS/TP Log Report

The MS/TP Log report displays address, name, and status information for the selected MS/TP device.

Displaying an MS/TP Log Report

HMI	**A, N, M, L** (Application, flNdevice, Mstp, Log)

Prompt/Field	Option/Entry	Description
MSTP Device name	Type the MS/TP device name.	

The system displays an MS/TP Log report.

Notice that in the DXRE, the MAC displays as IP to show that this device is on the BACnet/IP FLN. To determine more information, see the *Look Report* or the *Display Definition Report*.

Example

The following example shows an MS/TP Log report.

```
>MSTP Device name : ------------------------------

05/06/2008 TUE MSTP LOG REPORT 00:01
----------------------------------------------------------------
-----------
Search for <*>
"Field panel"
MSTP Device Name Application Device
Master Number Status Instance NetNum MAC Status
----------------------------------------------------------------
-----------
"7135"
```

```
ALBERTA YES 11223 -N- 3032 55 32 -N-
BTEC06 YES 2587 -N- 6 55 6 -N-
DXR YES 14052 -N- 15052 42 IP -N-

"4194303"
VAV CTLR YES 2587 *F* 2 65534 2 -N-
End of report
>Log, Display, Edit, Initvalues, Quit? -
```

Displaying an MS/TP Device Subpoint Log

HMI	**A, N, M, D, S** (Application, flNdevice, Mstp, Display, Subpoints)

Prompt/Field	Option/Entry	Description
MSTP Device name	Type the device name.	
Application number	Type the application number.	
Subpoint name	Type the subpoint name.	
Here, Printer	H	Field panel where you are connected.
	P	ALN report printer.

The system displays an MS/TP Device Subpoint Log report as shown in the following example.

Example

```
07/20/2008 SUN MSTP SUBPOINT DISPLAY REPORT 11:47
----------------------------------------------------------------
-----------
Search for <btec4:*>
MSTP Device name
:Suffix (Description) Value State Priority
----------------------------------------------------------------
-----------
BTEC4
:CTLR ADDRESS 4 -N- NONE
:APPLICATION 2587 -N- NONE
:RMTMP OFFSET 0 DEG F -N- NONE
:ROOM TEMP 74 DEG F *F* NONE

:DI 6 OFF -N- NONE
:RM STPT DIAL 74 DEG F *F* NONE
:AUX TEMP AI5 38 DEG F *F* NONE
:WALL SWITCH NO -N- NONE

End of report

>Definitions, Subpoints, deVice, Quit? -
```

Chapter 7— Alarm Management

This section describes the functions and process tasks of the point alarming application. The following topics are discussed:

- Alarm Basics
- Why Should I Define Points as Alarmable?
- Types of Alarming
- Alarm Counters
- Displaying Points in Alarm
- Acknowledging Alarms
- Using Standard Alarming
- Using Enhanced Alarming
- Enhanced Alarm Feature for LENUM Points
- Examples for Setting Up Alarming
- Uploading Alarm History to the Insight workstation

Before You Begin

Before using the information in this section, you should have a working understanding of the following concepts:

- HVAC equipment of the facility
- Point database
- General knowledge of the APOGEE Automation System

Alarm Basics

An *alarm* is a status that indicates whether a point value or state is above or below a defined value. Alarm management is the strategy used to define, route, acknowledge, and resolve those alarms.

Example of an Alarm

Point values can be monitored to ensure proper operation. If a point value falls outside its normal operating range or state, an alarm can alert you to this possible problem.

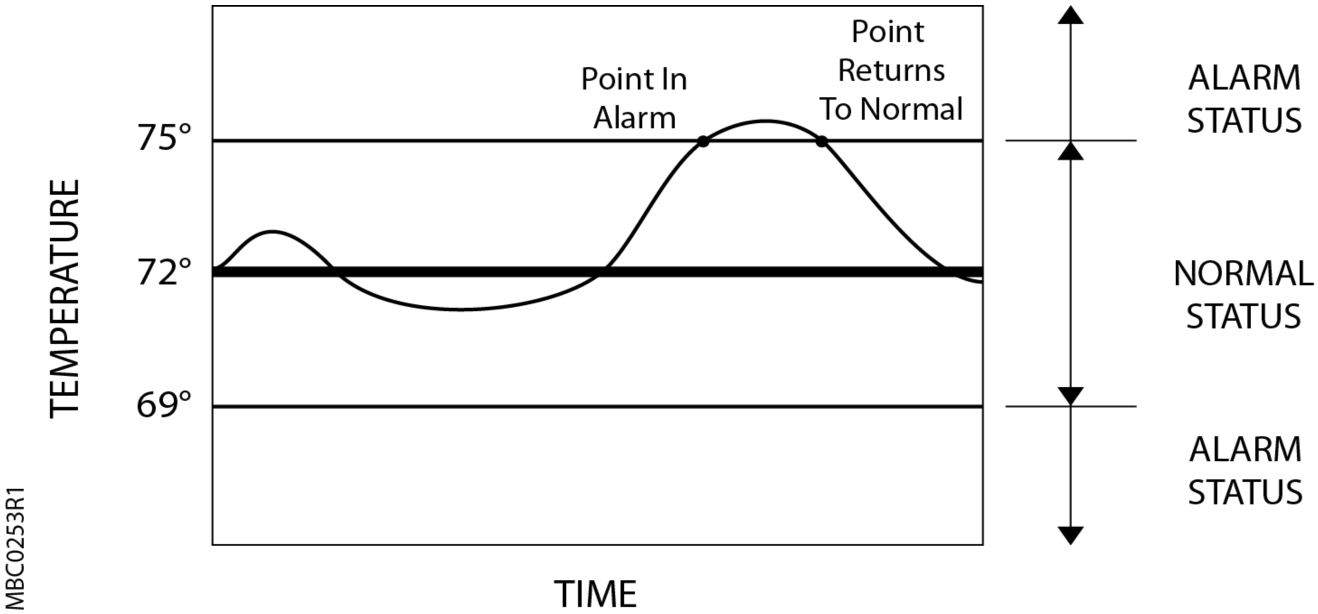


Figure 2: Figure. Example of Analog Value Tracking.

Figure. Example of Analog Value Tracking shows an example of an analog point value being tracked over a period of time. In this case, the desired value is 72°F within a ±3°F operating range. When the point value exceeds 75°F, the point status changes to ALARM. When the point value decreases and falls below 75°F, the point returns to NORMAL.

An example of a digital point used in alarming is an L2SL point with a proof switch. The status of both the DO and DI points is set to NORMAL. If the state of the points becomes unequal for a length of time greater than specified in the proof delay (in seconds), the point status changes to ALARM.

Reporting Alarms with Notification Classes

Alarms automatically routed to the field panels defined in the selected Notification class. To verify which field panels are defined in the associated notification classes, see the Insight *Online Documentation* window of Insight 3.x help, which you can access from the Insight Main Menu or the Insight program group.

The field panel sends alarm messages to the destinations in the associated notification class if the following conditions are met:

- the alarm is enabled for Offnormal events
- the destination is enabled for Offnormal events
- the destination is active based on day of week and time of day
- the panel status is Ready in the node table

The field panel sends normal messages to the destinations in the associated notification class if the following conditions are met:

- the alarm enabled for Normal events
- the destination is enabled for Normal events
- the destination is active based on day of week and time of day
- the panel status is Ready in the node table

The field panel sends fault messages to the destinations in the associated notification class if the following conditions are met:

- the alarm is enabled for Fault events
- the destination is enabled for Fault events
- the destination is ‘active’ based on day of week and time of day
- the panel status is Ready in the node table

Alarm Priority

Alarm priorities within a notification class object have a value of 0 through 255. See *Table APOGEE to BACnet Alarm Severity Cross-reference* for an APOGEE to BACnet alarm severity comparison.

Table. APOGEE to BACnet Alarm Severity Cross-reference.		
APOGEE **Priority Level**	APOGEE **Name**	**BACnet Alarm Priority Value**
1	Life Safety	0-31
2	Property Safety	32-63
3	Supervisory	64-95
4	Trouble	96-127
5	High Priority Alarms	128-191
6	Low Priority Alarms	192-255

BACnet alarm priority values are mapped to APOGEE Priority levels using these values.

Alarm Acknowledgement

Acknowledgment indicates to other users on the network that a particular alarm has been seen by a user. Once an alarm is acknowledged, any other user that views the alarm message might assume that someone has already taken action to investigate the ALARM condition. Acknowledgement is commonly used with critical alarms that require immediate response.

After an alarm is acknowledged, the system does the following:

- Adds an additional line of text to the standard alarm message, identifying the initials of the last user to acknowledge the alarm.
- Reissues the alarm message, displaying the new status and the user acknowledging the alarm.

The acknowledgment text remains with the alarm until a different user acknowledges a new alarm condition. The status of the alarm returns to NORMAL when the point value also returns to NORMAL. An alarm can also be defined to require an acknowledgment on a return to NORMAL.

BACnet supports individual alarm acknowledgement for all states of an alarmable object. The panel with the alarmable object saves the time stamp for the last notification time, so that the acknowledgement time can be verified before setting the acknowledgement flags for each event.

Alarm Messages

When an object is in alarm, the system issues an alarm message. The following example illustrates an intrinsic alarming message:

```
15:55 11-15-2003
BLD990.AHU01.MAT (MIXED AIR TEMP) 54.0 DEG F *A* NONE
***********************
* Mixed Air Alarm *
***********************
```

This message informs you that `BLD990.AHU01.MAT` went into ALARM at 3:55 P.M. and the space temperature is currently 54°F. When the point value returns to NORMAL, the system issues another message informing you of the change of status.

Tokens in Message Text

To enhance generic messages, tokens can be incorporated into the message. A token is inserted into the message text and when an alarm occurs, the system replaces the token with the information that the token represents. Tokens can help reduce the number of alarm messages that must be entered into a field panel.

Information to Insert	**Text String** (case sensitive)
System point name	%SYSTEMNAME%
Point name	%USERNAME%
Point value	%VALUE%
Descriptor	%DESCRIPTOR%
Engineering units	%ENGS%
Number of state changes	%CHANGES%
Time when point was acknowledged	%TIMEACK%
Time when point last went into alarm	%TIMEOCC%
Time when point first went into alarm	%TIMEFIRST%
Current time	%TIME%
Point status	%STATUS%
Point priority	%PRIORITY%
Alarm Priority	%ALARMPRI%

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
>mEssage, Acknowledge, eVent, Quit? e
>Display, Edit, eNable, dIsable, Quit? e
>Field panel : -------
>Add, Modify, Copy, Delete, Look, Help, Quit? d
```

```
>First message number ? 2--
>Last message number ? 2--
>Are you sure (Y/N) : y
Command successful

>Add, Modify, Copy, Delete, Look, Help, Quit? a
>Message number : 2--
>Line 1: ? *********************************----------------
>Line 2: ? * value, units, status, pri ****----------------
>Line 3: ? * %VALUE% %ENGS% %STATUS% %PRIORITY%---------------
>Line 4: ? *********************************----------------
Command successful

>Add, Modify, Copy, Delete, Look, Help, Quit? l
>First message number ? 2--
>Last message number ? 2--
Field panel name 31
Message number 2 Enabled
*********************************
* value, units, status, pri ****
* %VALUE% %ENGS% %STATUS% %PRIORITY%
```

Example

In this example, you can see what the alarm message, with tokens having been defined, could look like for a point.

```
>Add, Modify, Copy, Delete, Look, Help, Quit? -
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? c
>Value, resetTotal, Quit? v
>Point name : lao1-----------------------------
>Current value = 10.0 DEG F New: 90----------------
>BACnet Command Priority (8 - 16): ------------------
lao1 commanded to 90.0 DEG F

>Value, resetTotal, Quit? -
14:52 10-06-2009
lao1 90.0 DEG F *A3* BN08

*********************************
* value, units, status, pri ****
* 90.0 DEG F *A3* BN08
*********************************
```

Why Should I Define Points as Alarmable?

Points are defined as alarmable for the following reasons:

- **To prevent critical problems**. Points that affect human safety or can cause a severe problem in building operation should be defined as alarmable. For example, an alarm that notifies you that the temperature of a heating coil is too low and action must be taken before it freezes.

Objects are defined as alarmable for the following reasons:

- **To prevent critical problems**. Objects that affect human safety or can cause a severe problem in building operation should be defined as alarmable. For example, an alarm that notifies you that the temperature of a heating coil is too low and action must be taken before it freezes.
- **To notify you when equipment is not functioning properly**. Sometimes problems may occur and go unnoticed. Alarming is a useful tool to identify equipment that is not working properly and to prevent other devices from becoming damaged.
- **To announce scheduled maintenance**. For example, an alarm can notify you when it is time to change air filters.

The following are some examples of equipment that is monitored with alarms:

- Temperature sensors
- Heating and cooling coils
- CO_2 detectors
- Door sensors
- Proof switches

Types of Alarming

Two methods of BACnet alarming are available: Intrinsic, and Event Enrollment (algorithmic). Intrinsic alarming is relatively simple; the point is defined as alarmable and configured with a few basic user supplied alarm criteria.

Event Enrollment (EE) is an enhanced alarming feature more flexible and powerful than Intrinsic Alarming. It employs an Event Enrollment object (stored separately from the point object) which is combined with a Notification class object for multiple messaging to multiple locations.

Supported Events

Event	Object Type	Event State	Event Parameters	Description	Alarming Type
CHANGE_OF_STATE	Binary Input, Binary Value, Multi-state Value	NORMAL OFFNORMAL FAULT	Time_Delay List_Of_Values	Based on a change in present value.	Intrinsic Event Enrollment
COMMAND_FAILURE	Binary Output, Multi-state Output	NORMAL OFFNORMAL FAULT	Time_Delay Feedback_Property_Reference	Based on a difference between reference point and feedback point.	Intrinsic Event Enrollment
FLOATING_LIMIT	Analog Input, Analog Output, Analog Value	NORMAL HIGH_LIMIT LOW_LIMIT FAULT	Time_Delay Setpoint_Reference Low_Diff_Limit High_Diff_Limit Deadband	Based on a difference between setpoint and error limit.	Event Enrollment
OUT_OF_RANGE	Analog Input, Analog Output, Analog Value	NORMAL HIGH_LIMIT LOW_LIMIT FAULT	Time_Delay Low_Limit High_Limit Deadband	Based on a change in present value.	Intrinsic Event Enrollment

NOTE:
Change_of_ Bitstring, Change_of_Value, Buffer_Ready, and Change_of_Life_Safety events are not supported in our field panels, but are supported at Insight for event enrollment in third-party devices.
Siemens Industry, Inc. field panels only support the Present-Value property for all referenced objects.

CHANGE_OF_STATE

When the present value of a referenced property is equal to a value in the List_Of_Values for the amount of time set in Time_Delay, the object goes into alarm (OFFNORMAL). When the present value of the reference property is not equal to a value in the List_Of_Values for the amount of time set in Time _Delay, the alarm clears (returns to NORMAL). A FAULT occurs when the reference object fails.

This event can only be applied to the following objects: MSV/BI/BV.

Example

```
05/19/2009 TUE EVENT ENROLLMENT REPORT 08:45
----------------------------------------------------------------
---------
Device Instance Number : 111
Event Enrollment Name : testing2
Event Enrollment Instance : 2
Event Enrollment Description :
Notify Type : Alarm
Event state : Normal
OFFNORMAL transitions : Enabled
NORMAL transitions : Enabled
FAULT transitions : Enabled
Notification ID : 0
```

```
Alarm Message number : 0
Reference point name : BAC 111 BV 0
Event type : ChangeOfState
TimeDelay (sec) : 0
Alarm value : 1

End of report
```

COMMAND_FAILURE

When a disagreement occurs between the present value of a referenced property and the Feedback_Property_Reference for a time greater than Time_Delay, the object goes into alarm (OFFNORMAL). For example, it is used to verify a process change occurs after writing to a property. A FAULT occurs when either the reference or feedback object fails.

When the value of the referenced property and the Feedback_Property_Reference become equal for a time period greater than the Time_Delay, the alarm clears (returns to NORMAL).

This event can only be applied to properties with an enumerated value (MO) or Boolean (BO).

Example

```
05/19/2009 TUE EVENT ENROLLMENT REPORT 08:43
-----------------------------------------------------------------
---------
Device Instance Number : 111
Event Enrollment Name : testing1
Event Enrollment Instance : 1
Event Enrollment Description :
Notify Type : Alarm
Event state : Normal
OFFNORMAL transitions : Enabled
NORMAL transitions : Enabled
FAULT transitions : Enabled
Notification ID : 0
Alarm Message number : 0
Reference point name : BAC 111 BO 0
Event type : commandFAiLure
TimeDelay (sec) : 0
Feedback point name : BAC 111 BO 1
End of report
```

FLOATING_LIMIT

Floating limit event enrollment objects trigger when the value of the referenced property exceeds a defined offset from a setpoint that may vary over time (i.e. a setpoint object whose value changes based on a schedule. Out of range event enrollment objects trigger when the value of the referenced property exceeds a specific value.

When a referenced property leaves a range of values based on the current value of the Setpoint_Reference, High_Diff_Limit, Low_Diff_Limit and Deadband, the object goes into alarm (OFFNORMAL). A FAULT occurs when either the reference or feedback object fails.

When the present value of a reference property returns to the range of values defined by the High_Limit and Low_Limit for the amount of time set in Time_Delay, the alarm clears (returns to NORMAL).

HIGH_LIMIT – When the reference property is greater than Setpoint_Reference + High_Diff_Limit for the amount of time set in Time_Delay, the object goes into alarm (OFFNORMAL). When the reference property is less than Setpoint_Reference + High_Diff_Limit – Deadband for the amount of time set in Time_Delay, the alarm clears (returns to NORMAL).

LOW_LIMIT – When the reference property is less than Setpoint_Reference - Low_Diff_Limit for the amount of time set in Time_Delay, the object goes into alarm (OFFNORMAL). When the reference property is greater than Setpoint_Reference - Low_Diff_Limit + Deadband for the amount of time set in Time_Delay, the alarm clears (returns to NORMAL).

This event can only be applied to an AO, AI, or AV point.

NOTE:
Both differential limits should be entered as positive numbers.

Example

```
05/19/2009 TUE EVENT ENROLLMENT REPORT 08:41
----------------------------------------------------------------
----------
Device Instance Number : 111
Event Enrollment Name : testing
Event Enrollment Instance : 0
Event Enrollment Description :
Notify Type : Alarm
Event state : Normal
OFFNORMAL transitions : Enabled
NORMAL transitions : Enabled
FAULT transitions : Enabled
Notification ID : 0
Alarm Message number : 0
Reference point name : BAC 111 AV 0
Event type : floatingLIMit
Setpoint reference : BAC 111 AV 1
High diff limit : 2.000000
Low diff limit : 2.000000
Deadband : 0.000000
TimeDelay (sec) : 0
```

OUT_OF_RANGE

Out of range event enrollment objects trigger when the value of the referenced property exceeds a specific value.

When the present value of a reference property has left a range of values defined by the High_Limit and Low_Limit for the amount of time set in Time_Delay, the object goes into alarm (OFFNORMAL). A FAULT occurs when either the reference or feedback object fails.

When the present value of a reference property returns to the range of values defined by the High_Limit and Low_Limit for the amount of time set in Time_Delay, the alarm clears (returns to NORMAL).

HIGH_LIMIT – When the reference property is greater than High_Limit for the amount of time set in Time_Delay, the object goes into alarm (OFFNORMAL). When the reference property is less than High_Limit – Deadband for the amount of time set in Time_Delay, the alarm clears (returns to NORMAL).

LOW_LIMIT – When the reference property is less than Low_Limit for the amount of time set in Time_Delay, the object goes into alarm (OFFNORMAL). When the reference property is greater than Low_Diff_Limit + Deadband for the amount of time set in Time_Delay, the alarm clears (returns to NORMAL).

This event can only be applied to an AO, AI, or AV point.

Example

```
05/19/2009 TUE EVENT ENROLLMENT REPORT 08:46
-----------------------------------------------------------------
----------
Device Instance Number : 111
Event Enrollment Name : testing3
Event Enrollment Instance : 3
Event Enrollment Description :
Notify Type : Alarm
Event state : Normal
OFFNORMAL transitions : Enabled
NORMAL transitions : Enabled
FAULT transitions : Enabled
Notification ID : 0
Alarm Message number : 0
Reference point name : BAC 111 AV 2
Event type : OutOfRange
High limit : 8.000000
Low limit : 2.000000
Deadband : 0.000000
TimeDelay (sec) : 0
End of report
```

Intrinsic Alarming

APOGEE BACnet field panels support intrinsic alarming. Intrinsic alarming allows a BACnet device to provide one or more event sources, locally, that generate notifications that can be directed to a number of destinations. APOGEE BACnet standard objects support intrinsic reporting by supporting properties that define the type of event to be generated and options for handling and routing notifications. Internal status changes and alarms can also use intrinsic reporting to generate diagnostic notifications.

Intrinsic alarming features:

- Easy setup.
- Alarms can be separated into groups for customized reporting.
- Multiple reporting devices based on type of alarm.
- Customized alarm messages with user-defined text.
- Limit nuisance alarms using Deadband and Time Delay.
- Separate print enabling for Offnormal, Normal, and Fault.
- Separate time stamp for Offnormal, Normal, and Fault.
- Separate acknowledgement of Offnormal, Normal, and Fault.

Objects Using Intrinsic Alarming

An intrinsic alarming criterion is entered when an object is initially defined in the database. During point database entry, you have an option to make the object alarmable and can choose notification class, message number and whether or not notification is enabled for OFFNORMAL, NORMAL and FAULT conditions.

Proof Delay for Unbundled Points

The proof delay is the time (in seconds) that must elapse before the system checks the digital input point for ALARM status. It is used to verify that a digital point is truly in an alarm condition. When a digital input point changes to PROOF status, the system begins the proof delay counter. If the time defined as the proof delay expires, and the point value is in ALARM, then the system reports the alarm. If the point value is NORMAL when the proof delay expires, then the system does not report the alarm.

For example, an L2SL point named `BLD990.AHU01.SFN` has a proof point. When the fan starts up, the flow sensor monitors the downstream pressure. If there is not enough downstream pressure, the sensor will not provide a proof signal and the fan will shut down (causing an ALARM). When the fan first starts, there may not be enough pressure and the sensor will not provide a proof signal. The result is that the fan shuts off and the system issues an alarm. When a proof delay is incorporated, the system does not check for proof status until the delay time has expired. During this time, the fan can increase speed and provide enough pressure for the sensor to engage. When the delay time expires, the system checks the digital point and reacts accordingly.

Event Enrollment (Algorithmic Alarming)

APOGEE BACnet field panels supporting Firmware Revision 3.2 or later support Event Enrollment (algorithmic alarming). Event Enrollment (EE) is an extension of intrinsic alarming, and uses the event enrollment object in combination with the notification class object. The EE object is entered independently of when a point is defined. During EE definition, the point associated with the EE object is referenced.

BACnet devices supporting event enrollment objects are able to define any number of unique conditions that trigger alarm or event notifications. Event objects can identify their state from moment to moment as one of any number of unique event states. Notifications are triggered by the transition of conditions for an object, typically from one state to another. A transition to an event state can be used to identify specific or unique handling for the notification generated by the object. The main purpose for event enrollment objects is to define an event and provide a connection between the occurrence of the event and the transmission of a notification message to one or more recipients.

Algorithmic alarming features:

- Ability to monitor and alarm point objects on other devices (off-node) that do not support intrinsic/algorithmic alarming.**NOTICE! It is not recommended that you use Event Enrollment for Off-node alarming to another ALN level device.**
- Algorithmic functions: floating limit and out of range for analog points, change of state for binary or multi-state output points and command failure for binary or multi-state points.
- Provides more than two alarm limits.
- Provides multiple alarm levels instead of just using a simple deadband to determine the normal operational range.
- Automatically adjusts to setpoint changes at different times of the day.
- Can accommodate multiple environments where the temperature range is more critical in some than others.
- Can associate custom alarm messages with the severity of the alarm. For example, as the temperature in a data center moves further away from setpoint, the alarm messages become more urgent and the messages are sent to more locations (different notification classes are used).

Using Intrinsic Alarming

BACnet field panels support intrinsic alarming, which uses the BACnet notification class object to incorporate alarm destinations within a single alarm message.

Adding an Intrinsic Alarm

HMI	**P, E, A** (Point, Edit, Add)

Prompt/Field	**Option/Entry**	**Description**
Point system name		Enter name of point.
Instance number		
Point name		
Point type		
Descriptor		
	Float, Integer, Time, Date, dAte-time.	
Number of decimal places		
Number of decimal places		
Access group(s)		
Alarmable	Y	
OFFNORMAL event enabled	Y	
	N	

NORMAL event enabled	Y	
	N	
FAULT event enabled	Y	
	N	

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? e
>Add, Modify, Copy, Delete, Look, Quit? a
>Point system name : Cooling Fan Switch------------
>Instance Number : -------
>Point name : Cooling Fan Switch------------
>Point type : LAO---
>Descriptor : ----------------
>Float, Integer, Time, Date, dAte-time: F
>Number of decimal places : 5
>Engineering units : ------
>Access group(s) : ----------------------------------------
>Alarmable (Y/N) : Y
>OFFNORMAL event enabled (Y/N) : Y
>NORMAL event enabled (Y/N) : Y
>FAULT event enabled (Y/N) : Y
>Notification ID : 3------
>Alarm Message number : 18-
>High limit : 76----------------
>Low limit : 54----------------
>Deadband : ------------------
>TimeDelay (sec) : 3------
>Field panel : -------
>Physical, Virtual Point address: P
> FLN : 0--
> Drop : 0--
> Point : 3----
>Actuator type : V
>Slope : .003255-----------
>Intercept : 0-----------------
>COV limit : .1----------------
>Relinquish Default : 66----------------
Command successful
```

Acknowledging Alarms

This procedure acknowledges an alarm. Points that require acknowledging are specified in the database definition.

Acknowledging Alarms

HMI	**P, A, A** (Point, Alarm, Acknowledge)

Prompt/Field	Option/Entry	Description
Point name	Press **ENTER**.	For all points.
	Type that point name.	For a particular point.
	Type the point name including wildcards.	For a range of points.
	Type **?**, and then type a number from the list.	A point using a query. The system displays all points matching the criteria.

The system acknowledges an alarm for the specified points.

Example

```
16:48 07/17/2008
BLD990.AHU01.SAT (SUPPLY AIR TEMP)         80.0 DEG
F     *A1*      NONE

>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
>Setup, Mode, mEssage, Acknowledge, Quit? a
>Point name : LDO-POINT------------------------------
Acknowledged

16:48 07/17/2008
BLD990.AHU01.SAT (SUPPLY AIR TEMP)        80.0 DEG
F     *A1*    NONE
Last Acknowledged by TAS

>Setup, Mode, mEssage, Acknowledge, Quit? -
```

Status of a Point

When a point value is within the normal operating range, the status is NORMAL. When viewing a report that displays point status, NORMAL displays as -N-. For example:

```
07/17/2008 THU                  POINT LOG
REPORT                      03:55pm
----------------------------------------------------------------
---------------
Search for <BLD990.AHU01.MAT:>

Point name
   :Suffix
(Description)                     Value/State      Status  Prio
rity
----------------------------------------------------------------
---------------
BLD990.AHU01.MAT (MIXED AIR TEMP)            73.0 DEG F       -
N-       NONE

End of report
```

When a point value is outside of the normal operating range, the point status changes to ALARM.

The ALARM status displays as *A* . For example:

```
07/17/2008 THU                  POINT LOG
REPORT                      03:55pm
----------------------------------------------------------------
---------------
Search for <BLD990.AHU01.MAT:>

Point name
   :Suffix
(Description)                     Value/State      Status  Prio
rity
----------------------------------------------------------------
---------------
BLD990.AHU01.MAT (MIXED AIR TEMP)            54.0 DEG
F       *A*       NONE

End of report
```

Displaying an Intrinsic Alarm Report

HMI	**P, E, L** (Point, Edit, Look)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name you want to delete.	
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.

The `POINT LOOK REPORT` displays.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? e
>Add, Modify, Copy, Delete, Look, Quit? l
>Point name : Cooling Fan Switch-------------------------

09/29/2009 TUE POINT LOOK REPORT 15:26
----------------------------------------------------------------
---------
Search for <Cooling Fan Switch:>

Field                                       Value
----------------------------------------------------------------
---------
Point system name :                            Cooling Fan Switch
Instance Number :                            0 (BAC_130_AO_0)
Point name :                                 Cooling Fan Switch
Point type :                                 LAO
Descriptor :
Value :                                       66.0
Condition :                                 *F*
Priority :                                    NONE
Analog representation :                       Float
Number of decimal places :                    5
Engineering units :
Access group(s) :                            <all>
Point enabled for                            alarming
OFFNORMAL event :                            YES
NORMAL event :                               YES
FAULT event :                                YES
Notification ID :                            3
Alarm Message number :                       18
```

```
High alarm limit :                       76.0
Low alarm limit :                         54.0
Deadband :                                0.0
TimeDelay (sec) :                          3

Device Instance Number :                   130
Point address :                          130 0 00 03
HOA switch number :                     Not defined
Actuator type :                           Voltage
Slope :                                    0.003255
Intercept :                               0.0
COV limit :                                0.1
Relinquish Default :                      66.0


End of report
```

Removing an Intrinsic Alarm

HMI	**P, E, D** (Point, Edit, Delete)

Prompt/Field	Option/Entry	Description
Point name	Type the exact point name you want to delete.	
	Type **?**, and then type a number from the list.	A query. The system lists points at the specified status.
Are you sure (Y/N)	Y, N	Verify that you want to delete the specified point.

The system deletes the specified point.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? e
>Add, Modify, Copy, Delete, Look, Quit? d
>Point name : Cooling Fan Switch------------
>Are you sure (Y/N) : y
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Using Algorithmic Alarming

Adding Algorithmic Alarms

This procedure adds the information necessary for event enrollment alarming. Before beginning, you should gather the following information:

- Reference point name
- Event enrollment name
- Alarm Message number
- Event type

Adding an Algorithmic Alarm

HMI	**P, A, V, A** (Point, Alarm, eVent)
	Add, Remove, Look, Quit?

Prompt/Field	Option/Entry	Description
Field panel		Location of the EE object, blank means the current location.
Event Enrollment Name		30 characters.
Event Enrollment Instance		7 digit maximum (0 to 4,194,303) or leave blank.
Event Enrollment Description		16 characters maximum.
Report as Alarm	Y	Alarm
	N	Event for Notify type.
OFFNORMAL event enabled	Y	OFFNORMAL notification is enabled.
	N	OFFNORMAL notification is disabled.
NORMAL event enabled	Y	NORMAL notification is enabled.
	N	NORMAL notification is disabled.
FAULT event enabled	Y	FAULT notification is enabled.
	N	FAULT notification is disabled.
Notification ID		Specifies the instance of the notification class object.
Alarm Message number		Specifies the number of the message that needs to be displayed when the object is in alarm.
Reference point name		Reference point (Point whose property is monitored by this EE object).
Event Type		Query available (?),displays supported event types for the reference point type.
	Floating Limit	
	Setpoint reference	Setpoint name.
	High diff limit	Offset from setpoint value to determine the High Limit.

	Low diff limit	Offset from setpoint value to determine the low limit.
	Deadband	Range between high limit and low limit within which the reference point value should be present to go to NORMAL state.
	TimeDelay (sec)	Time in seconds (0 to 4,194,303).
	Out of Range	
	High limit	
	Low limit	
	Deadband	
	TimeDelay (sec)	
	Change of state	
	TimeDelay (sec)	
	Alarm value	value can be text also, values for which point should be in alarm.
	Add another alarm value (Y/N)	Y = Add another alarm value. N =
	Command Failure	
	TimeDelay (sec)	
	Feedback point name	30 characters, enumerated or Boolean (Point whose value is used as a feedback to reference point to determine whether EE object is in OFFNORMAL or NORMAL state).

`Command successful` displays.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
>mEssage, Acknowledge, eVent, Quit? v
>Add, Remove, Look, Quit? a
>Point system name : Cooling Fan Switch------------
>Instance Number : -------
>Point name : Cooling Fan Switch------------
>Point type : LAO---
>Descriptor : ----------------
>Float, Integer, Time, Date, dAte-time: F
>Number of decimal places : 5
>Engineering units : ------
>Access group(s) : ----------------------------------------
>Alarmable (Y/N) : Y
>OFFNORMAL event enabled (Y/N) : Y
```

```
>NORMAL event enabled (Y/N) : Y
>FAULT event enabled (Y/N) : Y
>Notification ID : 3------
>Alarm Message number : 18-
>High limit : 76----------------
>Low limit : 54----------------
>Deadband : ------------------
>TimeDelay (sec) : 3------
>Field panel : -------
>Physical, Virtual Point address: P
> FLN : 0--
> Drop : 0--
> Point : 3----
>Actuator type : V
>Slope : .003255-----------
>Intercept : 0-----------------
>COV limit : .1----------------
>Relinquish Default : 66----------------
Command successful
```

Acknowledging Algorithmic Alarms

Event state transitions that can be acknowledged are OFFNORMAL, NORMAL and FAULT. The Event Enrollment Object is specified by Device Id and instance number. You can acknowledge event notification from a local or remote field panel's HMI.

HMI	**P, A, V, A** (Point, Alarm, eVent, Acknowledge)
	Offnormal, Normal, Fault

Prompt/Field	Option/Entry	Description
Field panel		location of the EE object, blank means the current location.
Instance		7 digit maximum (0 to 4,194,303) or leave blank.

`Acknowledged` displays, if successful.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
>Log, Display, Acknowledge, Edit, Quit? a
>Offnormal, Normal, Fault : n
>Field panel : -------
>Instance : 45-----
Acknowledged
```

```
>Log, Display, Acknowledge, Edit, Quit? -
08:32 09-22-2009
BAC_660_EE_45 From: Normal To: Normal
Cooling Fan OFF -N- NONE

>Log, Display, Acknowledge, Edit, Quit? -
```

Displaying Algorithmic Alarms

Event enrollment objects can be displayed locally or remotely. Leaving the field panel prompt blank will display all event enrollment objects on the network (excluding third-party devices).

HMI	**P, A, V, D** (Point, Alarm, eVent)
	Log, Display, Acknowledge, Edit, Quit?

Prompt/Field	Option/Entry	Description
Field panel		Location of the EE object, blank means the entire network (excluding third-party devices).
First Id		Use First Id and Last Id to specify a range of instance numbers.
.Last Id		

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
> Log, Display, Acknowledge, Edit, Quit? d

06/24/2009 WED EVENT ENROLLMENT REPORT 09:47
---------------------------------------------------------------
--------
Device Instance Number : 111
Event Enrollment Name : hjsd
Event Enrollment Instance : 1
Event Enrollment Description :
Notify Type : Event
Event state : Normal
OFFNORMAL transitions : YES
NORMAL transitions : YES
FAULT transitions : YES
Notification ID : 0
Alarm Message number : 0
```

```
Reference point name : BAC_111_BV_0
Event type : ChangeOfState
TimeDelay (sec) : 60
Alarm value : 1


Device Instance Number : 111
Event Enrollment Name : hajg
Event Enrollment Instance : 2
Event Enrollment Description :
Notify Type : Event
Event state : Normal
OFFNORMAL transitions : YES
NORMAL transitions : YES
FAULT transitions : YES
Notification ID : 0
Alarm Message number : 0
Reference point name : BAC_111_BV_0
Event type : ChangeOfState
TimeDelay (sec) : 60
Alarm value : 1


Device Instance Number : 134
Event Enrollment Name : hagfg
Event Enrollment Instance : 0
Event Enrollment Description :
Notify Type : Alarm
Event state : Offnormal
OFFNORMAL transitions : YES : 08:55:27 06/22/2009 MON : ACKed
NORMAL transitions : YES
FAULT transitions : YES
Notification ID : 0
Alarm Message number : 0
Reference point name : BAC_134_BV_0
Event type : ChangeOfState
TimeDelay (sec) : 0
Alarm value : 1


End of report
```

Displaying an Event Enrollment Log

Event Enrollment objects can be displayed locally or remotely. Leaving the field panel prompt blank will display all event enrollment objects on the network (excluding third-party devices).

HMI	**P, A, V, L** (Point, Alarm, eVent, Log)
	Log, Display, Acknowledge, Edit, Quit?

Prompt/Field	Option/Entry	Description
Field panel		Location of the EE object, blank means the entire network (excluding third-party devices).
First Id		Use First Id and Last Id to specify a range of instance numbers.
Last Id		

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
>mEssage, Acknowledge, eVent, Quit? v
>Log, Display, Acknowledge, Edit, Quit? l
>Field panel : -------
>First Id : 45-----
>Last Id : 45-----

09/22/2009 TUE EVENT ENROLLMENT LOG 08:33
----------------------------------------------------------------
---------
<45 to 45>
Device Id
Instance Object Name Description Event state
----------------------------------------------------------------
---------

660
45 Cooling Fan Alarm (Change of State ) Normal
End of report

>Log, Display, Acknowledge, Edit, Quit? -
```

Displaying an Event Enrollment Report

HMI	**P, A, V, L** (Point, Alarm, eVent, Look)
	Add, Remove, Look, Quit?

Prompt/Field	Option/Entry	Description
Field panel		Location of the EE object , blank means the current location.
Instance		Only one instance number will be allowed at a time, cannot be blank.

The system displays an Event Enrollment report.

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
>mEssage, Acknowledge, eVent, Quit? v
>Log, Display, Acknowledge, Edit, Quit? e
>Add, Remove, Look, Quit? l
>Field panel : -------
>Instance : 45-----


09/22/2009 TUE EVENT ENROLLMENT REPORT 08:33
----------------------------------------------------------------
----
Device Instance Number : 660
Event Enrollment Name : Cooling Fan Alarm
Event Enrollment Instance : 45
Event Enrollment Description : Change of State
Notify Type : Alarm
Event state : Normal
OFFNORMAL transitions : YES
NORMAL transitions : YES
FAULT transitions : YES
Notification ID : 0
Alarm Message number : 0
Reference point name : BAC_660_BV_3
Event type : ChangeOfState
TimeDelay (sec) : 4
Alarm value : 1


End of report
```

Removing Algorithmic Alarms

HMI	**P, A, V, R** (Point, Alarm, eVent, Remove)
	Add, Remove, Look, Quit?

Prompt/Field	Option/Entry	Description
Field panel		Location of the EE object , blank means here.
First Id		First Id and Last Id will be used to specify the range of instance numbers to remove, cannot be blank.
Last Id		

Example

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? a
>Log, Display, Acknowledge, Edit, Quit? e
>Add, Remove, Look, Quit? r
>Field panel : -------
>First Id : 45-----
>Last Id : 45-----
660 45
Command successful

>Add, Remove, Look, Quit? -
```

Alarm Counters

The field panel has two resident points; *alarm count (ALMCNT)* and *alarm count 2 (ALMCT2)*. These points automatically maintain a running tally of points in any alarm status. When a point enters ALARM, the ALMCNT point is incremented by one. When the point returns to NORMAL, ALMCNT is reduced by one.

ALMCNT is automatically activated when a point is specified as alarmable. ALMCT2 works the same as ALMCNT, but its use is optionally selected when the point is entered into the database. ALMCT2 changes only when a point is specified to use it.

Acknowledging an alarm does not affect the value of the alarm counter resident points ALMCNT and ALMCT2. Both of these points maintain specific counts of points in the actual ALARM state.

NOTE:
ALMCNT and ALMCT2 are resident points that are automatically maintained by the field panel. Altering the point definitions of these resident points may interfere with field panel operations.

Uploading Alarm Buffer History to the Workstation

Uploading alarm history to the Insight workstation minimizes the loss of alarm messages in the event of a communications loss between the field panel and the Insight workstation.

Systems containing Firmware Revision 2.6 or later and Insight Revision 3.5.1 or later support the Buffer and Send all Alarms feature.

Earlier firmware revisions do not buffer any alarm history.

Setting up Alarm Buffering

The Buffer and Send all Alarms feature can only be enabled or disabled from the Insight workstation. For more information, see the *Setting up Soft Controller* book in the Insight online help, which is accessed from the Insight Online Documentation screen.

How Alarm Buffering Works at the Workstation

The workstation receives the current point status and alarm message first, followed by a sequence of alarm messages. The method for acknowledging alarm messages does not change.

Buffer and Send all Alarms to the Workstation

The Buffer and Send all Alarms feature captures up to ten messages per alarmable point to ensure that the earliest alarm history is sent to the Insight workstation. All buffered alarm messages include the point value and point status.

- When the workstation is online, messages are continuously buffered and uploaded.
- When the workstation is offline, it is estimated that this feature will accommodate typical system operations during several hours of network outage.

Due to memory requirements, the Buffer and Send all Alarms feature limits the number of points that can be configured on a field panel. The limits are determined by the individual network configuration.

CAUTION

Whenever Buffer and Send all Alarms is enabled or disabled,

The field panel coldstarts and reloads the database

- The system allocates a buffer for each alarmable point as soon as alarm buffering is enabled.
- The default buffer size is automatically set in the firmware during startup.

What Messages are Sent to the Workstation

The following messages are buffered for delivery only to the workstation main mass storage device (MSD):

- The initial alarm message
- Intermediate alarm messages
- Every alarm COV
- Every return to normal COV

How Alarm Buffering Works at the Field Panel

Each time a point goes into alarm, the history buffer records the point's current alarm status, point value, and time of occurrence.

When an alarm is communicated, the current point status and alarm message, plus up to ten buffered messages for each alarmable point, are sent to the workstation.

- Buffer size is limited to ten alarms per alarmable point.
- The buffer stops collecting data when it reaches its limit.

If the Alarm Buffer is Full

When the buffer is full, alarm buffering operates as follows:

- The oldest alarms are preserved in the alarm buffer.
- New alarm messages are discarded until the buffer for that point is uploaded to the workstation.
- New alarm messages are collected once the system clears the buffer.

If Network Status Prevents the Alarm Message from Being Sent

The following occurs if an alarm message cannot be immediately sent due to network traffic or a network disconnect:

1. The system immediately begins buffering messages for the points in alarm.
   – Up to ten alarm messages per point are stored in the buffer.
   – Buffered alarm messages are available only for the main MSD.
2. When the network is available, alarm messages are sent to the MSD in time sequence per point (first-in-first-out).

Chapter 8—License Management

Chapter 8 describes the functions and process tasks of the License Manager application. The following topics are discussed:

- License Manager
- Ordering and Installing License(s)
- Displaying the License Manager Report
- Installing a License
- Removing Licenses

Before You Begin

Before you begin this chapter, you should have a working knowledge of the APOGEE Automation System.

License Manager

License Manager adds applications or functionality to a field panel without the need to replace the hardware or perform a firmware flash. Field panels with Firmware Revision 3.0.1 or later support the License Management attribute.

Contact your Siemens Industry representative for more information on applications and functionality that can be activated through License Manager.

License Manager Definitions

- A *feature* is an application or additional functionality that can be added to a field panel without the need to replace the hardware. Some features require a firmware flash.
- A *license* is the code provided by Siemens Industry to unlock a feature.
- The *ID_STRING* is a unique identifier that distinguishes an individual piece of hardware. It is composed of the panel's part number, revision, year and week of manufacture, and serial number. Therefore, a license for one field panel will not work on another field panel.

How does License Manager Work?

Field panels can either be ordered with licensed features and functionality pre-loaded, for example, FLN or TX-I/O island bus support, or upgraded to add special features, for example, Integration Drivers, Field Panel GO, and Virtual AEM.

NOTE:
The installation of some features and licenses require that the field panel be coldstarted, while others do not. For example, Field Panel GO requires the creation of Web server folders and therefore requires that the field panel be coldstarted. However, TX-I/O module installation does not.

Any or all of the licensed features can be activated at any time using licenses acquired from Siemens.

When the field panel is powered, the firmware reviews the inventory of installed features, comparing that list to the License Vault, where all installed licenses are stored. Every feature with a corresponding license is initiated and run. Because licenses are loaded into non-volatile memory, powering down the field panel will not erase them.

Ordering and Installing Licenses

In order for the desired functionality features to operate, a license for each feature must be ordered and installed. Contact your branch representative to order the license(s). To install each license, you must have the feature name for each feature being added, and the device ID_STRING for each device to which the feature is being added, and the Purchase Order (PO) number.

After ordering a feature that will be enabled using License Manager, contact your Siemens Industry representative to have them verify the order and generate the license for the licensed feature. The resulting license will be emailed to you.

Displaying the License Manager Report

The field panel ID_String is required to generate a license. The field panel’s ID_String is a unique device-specific identifier that is "burned" into the field panel’s non-volatile memory.

Use this procedure to:

- Display the field panel ID_String
- Verify that features are installed
- Verify that licenses are installed

HMI	**S, H, L, D, S** (System, Hardware, Licensemanager, Display, Singlenode)

Prompt/Field	Option/Entry	Description
Here, Print	H, P	Specify to display report.

The system displays a License Manager report.

- If the feature is not listed (following the **Application Name** field), it is neither installed nor licensed.
- If **Tasks Attached** = 1or higher, the feature is installed.
- If **Tasks Attached** = 0, the feature is not installed.

Example

NOTE:
The following example report has been truncated.

```
>Point, Application, Time, Message, Cancel, System, passWord, Bye? S
>Diagnostics, Users, dAtes, deStinations, Error_msgs, Hardware, Text, Quit? H
>Fieldpanels, Ethernet, nodeNametable, Disks, Licensemanager, Quit? L
>Log, Display, Add, dElete, Removall, Quit? D
>Singlenode, Allnodes     : S
>Here, Printer          : H

05/14/2007 MON        LICENSE MANAGER REPORT          09:15
-------------------------------------------------------------------------------

Field panel: PXC                ID_STRING = 070419Z560PXC100-PE.A

Application Name = FPGo
License = Not Installed              License is not installed
Application Limit = None
Expired = NO
Tasks Attached = 1                   Feature is installed

Application Name = TXIO
License Line 1: =
 DEFAULT TXIO_120 siemenssbt 1.0 permanent uncounted 111111111 HOSTID=ID_STRING=
070419Z560PXC100-PE.A                                 License is installed
Application Limit = 120
Expired = NO
Tasks Attached = 1                   Feature is installed
...
```

Installing a License

Once you have the licenses, place each one separately into a file with a .lic extension (for Insight software), or type the licenses directly from the HMI using the following method.

NOTE:
The HyperTerminal or DOS window you use to connect to the field panel must be wide enough to accommodate the entire license entry line.

NOTE:
Licenses must be typed exactly as they appear. Make sure to type all spaces as they occur, and extend the entry to several lines to fit the entire license as described in the following procedure.

Installing a License for a Licensed Feature

HMI	**S, H, L, A** (System, Hardware, Licensemanager, Add)

Prompt/Field	Option/Entry	Description
License	Begin typing the license number.	Stop typing before the end of the line.
	Press **ENTER**.	License prompt displays.
	Continue typing the license.	
	Repeat until the entire license number is entered.	

	Press **ENTER**.	Blank line indicates the end of text entry. The following text is displayed for a successful license entry:
		`License 1 accepted`
		`Licenses received 1, Licenses accepted 1, Licenses rejected 0`
		`Log, Display, Add, dElete, Removall, Quit? -`

	A	To add more licenses.

Removing Licenses

Removing the license will disable the associated feature and, in certain cases cause a coldstart of the panel.

Removing the License Associated with a Licensed Feature

HMI	**S, H, L, E** (System, Hardware, Licensemanager, dElete)

Prompt/Field	Option/Entry	Description
License	Type the name of the license you wish to remove.	
Are you sure (Y/N)	Y	

`Command Successful` displays. The license is removed.

Example

```
>License                     :  TXIO------------------------
>Are you sure (Y/N)          :  y
>Log, Display, Add, dElete, Removall, Quit? -
Command successful
```

Chapter 9—Trending

Chapter 9 discusses Trending, including:

- Background Information
- Using BACnet Trend
- Trend Diagram
- Automatic Trend Upload to the Insight Workstation
- Options for Recording Trend Data
- Trending a Point by COV (change of value)
- Trending a Point by Time Interval
- Copying a Trend
- Modifying a Trend
- Deleting Trend Log Objects
- Disabling Trend Logging
- Enabling Trend Logging
- Resetting the Trend Buffer
- Generating Trend Logs and Reports
- Trend Data Upload to FTP Server

Before You Begin

Before using the information in this section, you should have a working understanding of the following concepts:

- HVAC devices and concepts
- The point database
- General knowledge of the APOGEE Automation System

Background Information

Trending is a function that records point data over time. Each field panel can trend points. The records created by each trend log object can be set to start and stop at specific times. The Insight workstation can also be notified to upload the log records when the internal trend log buffer reaches a specified percent of its capacity.

When a point is defined for trending, the trend definition and data are stored as a BACnet trend log object in the field panel that owns the point (local trending), or in a different field panel of the user's choosing (remote trending - the point and the trend log object are in separate devices).

See *Using BACnet Trend* in this chapter for information on using the BACnet Trend features.

Why Trend HVAC Devices?

HVAC devices are trended to:

- Keep a historical record of a point over time
- Track system operating conditions
- Track energy consumption
- Track device run-time schedules
- Assist in designing maintenance and service schedules

- Assist with loop tuning
- Assist with troubleshooting

What Devices Can be Trended?

Commonly trended devices include:

- Boiler and chiller temperature sensors
- Outside air temperature sensors
- Outside humidity sensors
- Discharge air temperature sensors
- Flow sensors
- Proof points

Using BACnet Trend

APOGEE BACnet Trend has been designed to match the existing Trend functions as closely as possible. The Trend feature changes between APOGEE and BACnet are explained in the following sections.

Firmware Revision 3.1 or later field panels can store BACnet Trend Log Objects for:

- their own logical points (local trending), and
- points owned by devices that do not support the BACnet Trend Log Object (remote trending).

Local Trending

Local trending stores the trend log object at the field panel that owns the logical point object (the point and the trend log object are in the same device).

BACnet 3.0 and all prior APOGEE firmware revisions support local trending only.

NOTE:
Although TEC subpoints are contained in a TEC, they (the subpoints) are "owned" by the field panel they are connected to and are therefore considered local to that panel. All trending of these points in the field panel that owns them is local trending.

Remote Trending

Remote trending can store the trend log object in any field panel on the network (the point being trended and the trend log object are in separate devices). This feature was designed so that the field panel can trend the points of BACnet devices connected through an MS/TP FLN—such as BACnet TECs or third-party devices—that cannot store their own trend log objects.

NOTE:
BACnet TEC subpoints are "owned" by the BACnet TECs that contain them. However, because BACnet TECs cannot store trend log objects, all trending of their points must be remote—the trend log object must be assigned to and stored in a specified field panel.

APOGEE BACnet revision 3.1 and later support both local and remote trending.

NOTE:
While Firmware Revision 3.1 will allow remote trending across an MS/TP ALN, this will increase MS/TP ALN network traffic and can affect network speed.

Trend Log Enable/Disable

Trend Log Enable/Disable is a BACnet feature that replaces APOGEE Conditional Trending. This feature allows trend sampling to start and stop based on user selected constraints. If trend start/stop times are not specified during trend set-up, the trend point behaves in the traditional manner—always trending. Trend Log Enable/Disable allows you to troubleshoot the system by filtering records to relevant data only.

Trend Data Upload

Trend Data Upload is a feature with Firmware Revision 3.5 or later that allows you to configure automatic export of Trend data to a user-defined network location using File Transfer Protocol (FTP).

A FTP Server is necessary to be configured for uploading trend data collected by the field panel. Individual Trend Objects may be enabled for FTP Upload. A FTP Server is not necessary if the FTP Upload feature is not used.

Configuring FTP Trend Upload

One .CSV file is uploaded per selected trend object. The number of trend objects that can be defined for upload is only limited by the field panel's memory.

See the APOGEE BACnet ALN Field Panel User's Manual (125-3020) *Trend Procedures, Configuring the FTP Server* section for the following procedures:

- Configuring the field panel with the address, user name and password for the remote FTP server.
- Designating trend log objects to upload to an FTP server.
- Creating a folder on the FTP Server to store the .CSV export files.

NOTE:
For more information on Trending, see the BACnet *Field Panel Web Server User Guide* (125-3584), *Chapter 10 – Create/Edit, Trend Application* section.

BACnet Trend Log Buffer

BACnet Trend Log objects have an internal, fixed size buffer, which fills as log records are added. When the buffer becomes full, one of two things happens. If you selected 'Stop when Full' when you created the object, trending stops until you reset the buffer to zero. Otherwise, the oldest record is overwritten when a new record is added.

Trend Log Buffer Reset

The trend log object buffer can be reset to zero using the Reset command.

	CAUTION
	Resetting a trend log object clears all records in the trend log buffer for that object. All trend data not backed up to the Insight workstation is lost.

Trend Log Buffer Notification Threshold

Trend log objects also contain a notification threshold, which is used to trigger trend data collection from Insight. The notification threshold is set when you create a trend log object. The default value is eighty percent of the maximum number of samples (also set when you create the trend log object). The maximum number of samples cannot exceed 100 for points with multiple trends.

Unresolved Points

A point is considered unresolved if the name is used in an application (most commonly PPCL), but not found on the network. A trend log will display points as unresolved until they are discovered. If points remain unresolved, the name was entered incorrectly, or there is a break in the MS/TP ALN network.

Resetting the Trend Log Buffer for A Trend Record

To disable logging of a trend record, complete the following steps:

HMI	**P, T, I** (Point, Trend, dIsable)

Prompt / Field	**Option / Entry**	**Description**
Point name	Type that point name or device instance number	A particular point
	Type **?**, and then type a number from the list	A point using a query. The system displays all points matching the criteria.
Enter option # or <C> for Cancel>	Type a number from the list	Trend records for the point are displayed.
Enter option # or <C> for Cancel>	Type the number of the trend record you want to disable	
Are you sure (Y/N)	Y	Disable the trend record.
	N	Do not disable the trend record.

`Trend log disabled` is displayed. The trend record is disabled.

Trending Best Practices

To reduce network traffic, improve accuracy, and avoid losing the data link, follow these guidelines:

- Whenever possible, FLN devices should be defined in the panel that is physically routing to that MS/TP segment.
- For FLN points, try to keep the trend log object in the panel that is physically routing to that MS/TP segment (accept the default trend storage location suggested by the system).

- For ALN points, try to keep the trend log object in the panel that owns the point being trended (accept the default trend storage location suggested by the system).
- Do not define a trend to a point that is in a panel on a different ALN.

BACnet Trending and Third-Party Device Limitations

With Firmware Revision 3.1, trend log objects in third-party devices are subject to the following limitations:

- Firmware Revision 3.1 does not allow you to create, modify, or delete trend log objects in third-party devices. This means you cannot use the **Add**, **Copy to**, **Modify**, or **Delete** trend operations when handling trend log objects in a third-party device. Other trend operations, including **Copy from**, are supported.
- To perform trend operations other than Add, Copy to, Modify, or Delete upon trend log objects in third-party devices (such as **Copy from**, **Enable/Disable**, **Reset**, **Display**, **Look**, and **Log**) you must use the BACnet encoded name of the trend log object (BAC_<*DeviceInstance*>_TL_<*ObjectInstance*>). The system will not recognize regular point names of trend log objects in third-party devices.

On-Node Trending

APOGEE BACnet Revision 3.0 and all prior APOGEE firmware revisions supported on-node point trending only. On-node trending stores the trend log at the field panel that owns the point.

Off-Node Trending

APOGEE BACnet Revision 3.1 and later supports both on-node and off-node object trending.

Off-node trending allows a field panel to keep the trend log for a point that is owned by another BACnet device. This feature was designed to allow a field panel to trend objects in devices connected to the field panel through an MS/TP FLN. It can also trend objects in devices across an MS/TP ALN.

NOTE:
Off-node trending across an MS/TP ALN to another ALN level device is **not** recommended and will increase network traffic.

In order to trend an off-node point, the local (operator) field panel needs:

- the point name
- the device ID of the trending field panel

See *Figure. Location of point and trend log for Off-node trend*.

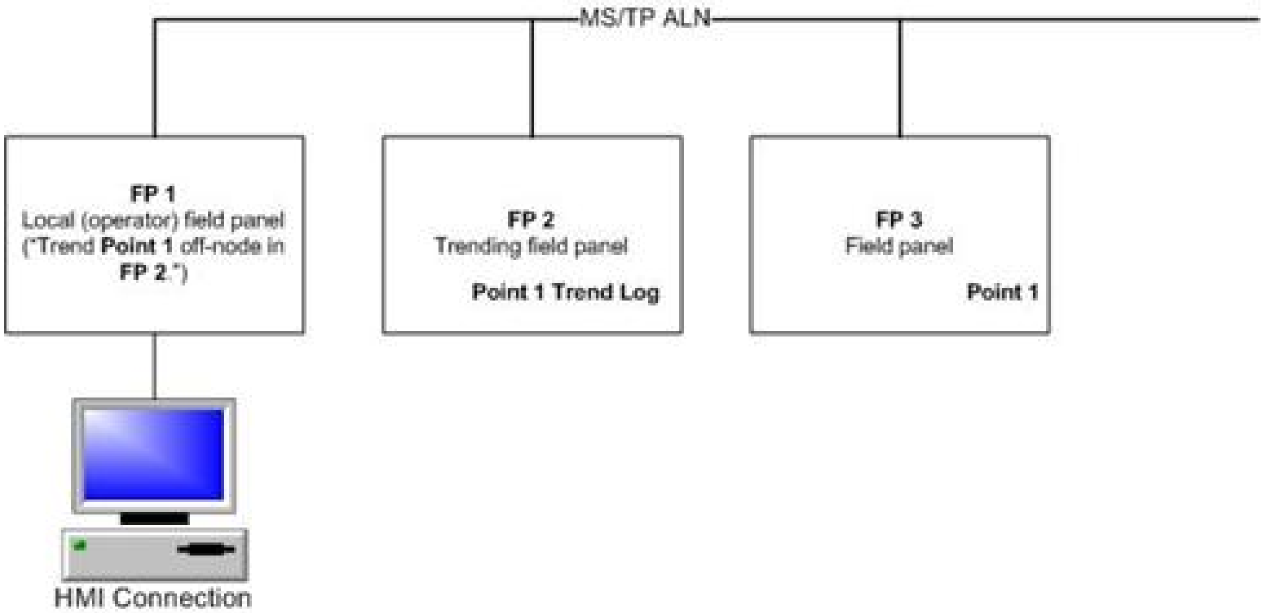


Figure 3: Figure. Location of point and trend log for Off-node trend.

Unresolved Points In Off-Node Trend Logs

A point is considered unresolved if the name is used in an application (most commonly PPCL), but not found on the network. An off-node trend log will display points as unresolved until they are discovered across the network. If points remain unresolved, the name was entered incorrectly, or there is a break in the MS/TP ALN network.

In the following example:

- `tec1:ROOM TEMP` shows as unresolved (by 'U' at the end of the Point system name value)
- the trending field panel is identified as the local (operator) field panel by a blank entry.

```
>Add, Modify, Copy, Delete, Look, Quit? l
>Offnode Trend (Y/N)          :  y
>Field panel                  :  -------
>Point name                   :  tec1:ROOM TEMP----------------
-------------
>  1) Point COV                   5 Samples
Enter option # or <C> for Cancel> 1-

01/03/2006 TUE                TREND EDIT LOOK
REPORT                      23:33
----------------------------------------------------------------
---------------
Search for <tec1:ROOM TEMP>

Field                                       Value
----------------------------------------------------------------
---------------
```

```
Point system name              : tec1:ROOM TEMP
(BAC_11_??_4194303) U
Maximum number of samples      : 5
Record every                   : Point COV
Instance Number                : 0 (BAC_11_TL_0)
Trend log name                 : APO_11_TL_0
Trend log description          :
Start time                     : (no start time specified)
Stop time                      : (no stop time specified)
Trend log enabled              : Y
Stop when full                 : N
Notification threshold count   : 4 (80%)
Notification class number      : 0
Event Enable, to-Normal        : Y
Event state                    : NORMAL
Total samples recorded         : 0
Current samples                : 0
Last notification time         : (no notifications issued)
Last record at notification    : 0
Records since notification     : 0

End of report

>Add, Modify, Copy, Delete, Look, Quit? -
```

Trend Log Enable/Disable

Trend Log Enable/Disable is a BACnet feature that replaces APOGEE Conditional Trending. This feature allows trend sampling to start and stop based on user selected constraints. If trend start/stop times are not specified during trend set-up, the trend point behaves in the traditional manner—always trending. Trend Log Enable/Disable allows you to troubleshoot the system by filtering records to relevant data only.

- When creating a trend record, enabling the trend log is optional.

Enabling a Trend Record for Trend Logging

To enable a trend record, complete the following steps:

HMI	**P, T, N** (Point, Trend, eNable)

Prompt/Field	Option/Entry	Description
Point name	Type that point name or device instance number.	A particular point.
	Type **?**, and then type a number from the list.	A point using a query. The system displays all points matching the criteria.
Enter option # or <C> for Cancel>	Type a number from the list.	
Enter option # or <C> for Cancel>	Type the number of the trend record you want to disable.	
Are you sure (Y/N)	Y	Enable the trend record.

`Trend log enabled` displays. The trend record is enabled.

Disabling Trend Logging for A Trend Record

To disable logging of a trend record, complete the following steps:

HMI	**P, T, I** (Point, Trend, dIsable)

Prompt/Field	Option/Entry	Description
Point name	Type that point name or device instance number.	A particular point.
	Type **?**, and then type a number from the list.	A point using a query. The system displays all points matching the criteria.
Enter option # or <C> for Cancel>	Type a number from the list.	
Enter option # or <C> for Cancel>	Type the number of the trend record you want to disable.	
Are you sure (Y/N)	Y	Disable the trend record.

`Trend log disabled` displays. The trend record is disabled.

Trending Diagram

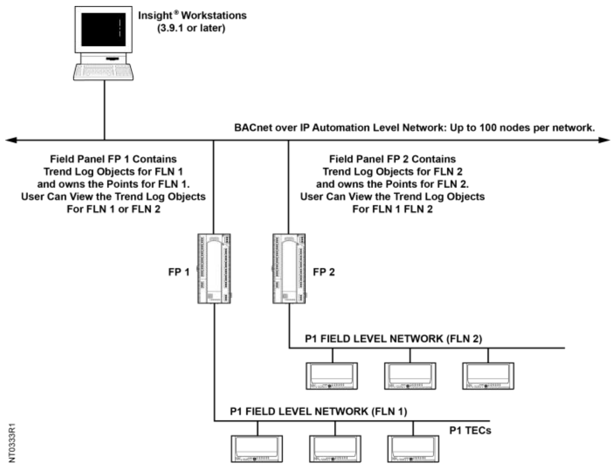


Figure 4: Point Ownership and Trend Log Object Support - BACnet 3.0 with P1 FLNs

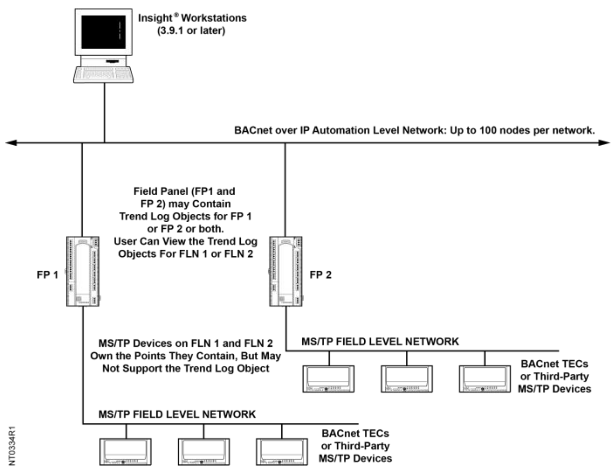


Figure 5: Point Ownership and Trend Log Object Support - BACnet 3.1 with MS/TP FLNs 12-6

Generating Trending Logs and Reports

Three reports or logs are possible: the Trend Log report (a report showing point(s) being trended with some general information about the trend(s); the Trend Data report which displays trend data values; and the Trend Edit Look report which shows the specific configured parameters of a trend definition.

Displaying a Trend Log Report

In order to display trend points, the field panel should have one or more points assigned to trending. If no trend points are assigned, then this report is blank.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

To display a Trend Log report, complete the following steps:

HMI	**P, T, L** (Point, Trend, Log)

Prompt/Field	Option/Entry	Description
Point name	Press **ENTER**.	To specify all trends across the network. The system displays the Trend Log report.
	Type the point name.	
	Type ?, a space, and then a point range using wildcards <? BTEC*:*>.	To search within a range. **CAUTION:** When wildcards are used to specify a point range for multi-point trend deletion, the deletion occurs globally across the network on every point matching the description.
	Specify a point range using wildcards.	For multi point trend deletion.
Specify Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel.
	N	To filter for locally trended points only, residing in any field panel on the network. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at the **Specify Field Panel (Y/N)** prompt.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	The system skips this step if the point name was entered manually at the Point name prompt. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**.

The system displays the Trend Log report.

Example

```
07/24/2008 THU TREND LOG REPORT 13:48
----------------------------------------------------------------
-----------
Search for <btec*:*>
Point Name:Suffix (Description)
Point Trend Log Record Max Pct Logging
Encoded Name Encoded Name Every Samples Full Enabled
----------------------------------------------------------------
-----------
BTEC1:CTL TEMP
BAC_21_AO_78 BAC_7020_TL_2 Point COV 100 79% Y
BAC_21_AO_78 BAC_7020_TL_6 1 Hours 100 4% Y
BTEC1:ROOM TEMP
BAC_21_AI_4 BAC_7020_TL_0 Point COV 5 100% Y
BTEC2:CTL TEMP
BAC_22_AO_78 BAC_7020_TL_3 Point COV 100 10% Y
BAC_22_AO_78 BAC_7020_TL_7 1 Hours 100 7% Y
BTEC2:ROOM TEMP
BAC_22_AI_4 BAC_7020_TL_1 Point COV 5 100% Y
End of report
>Log, Display, Edit, eNable, dIsable, Reset, Quit? –
```

Displaying a Trend Data Report

The Trend Data report can be performed for a single trended point or multiple (up to six) trended points.

To perform this procedure, the field panel should already have points being trended. The amount of data in the report depends on the time and change in value experienced by the point, and the number of samples collected.

In addition to point values, a single point trend data report includes the Normal/Fail status of the point. A multiple point trend data report does not include the Normal/Fail status of the points.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

To display a Trend Data report, complete the following steps:

HMI	**P, T, D** (Point, Trend, Display)

Prompt/Field	Option/Entry	Description
Specify Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel.
	N	To filter for locally trended points only, residing in any field panel on the network.
Point name	Type the point name.	
	Type ?, a space, and then a point range using wildcards <? BTEC*:*>.	To search within a range. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at the **Specify Field Panel (Y/N)** prompt.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	The system returns to the Specify Field Panel (Y/N) prompt and the pattern repeats. You can enter up to six points on a single report. The point name prompts are numbered to match the number of points selected for the report. When you are done entering points, ignore the Specify Field Panel (Y/N) prompt and press **ENTER**.
Start date (MM/DD/YYYY)	Enter the start date.	
Start time (HH:MM:SS)	Enter the start time.	
Display in Hours, Minutes	H or M	
Hours between displayed lines or Minutes between displayed lines	Enter the desired number of hours or minutes.	
Here, Print	H, P	Specify to display report.

The system displays a Trend Data report.

Example

Trend Single Data report

```
>Specify Field Panel (Y/N) : y
>Field panel : 7010---
>1) Point name : ?-------------------------------------------
> 1) TEC1:ROOM TEMP
> 2) TEC2:ROOM TEMP
> 3) TEC2:CTL TEMP
Enter option # or <C> for Cancel> 2-
> 1) Point COV 100 Samples
> 2) 1 Hours 100 Samples
Enter option # or <C> for Cancel> 2-
>Specify Field Panel (Y/N) : -
>Start date (MM/DD/YYYY) : -----------
>Start time (HH:MM:SS) : 12:00:00---
>Here, Printer : H
07/24/2008 THU TREND SINGLE DATA REPORT 15:03
----------------------------------------------------------------
---------------
Point name: <TEC2:ROOM TEMP> () (APO_7010_TL_4)
Start time <07/24/2008, 12:00:00>
1 Hours between displayed lines
Time Value State
----------------------------------------------------------------
---------------
Entries for: 07/24/2008
12:00:00 76.25 DEG F -N-
13:00:00 76.0 DEG F -N-
14:00:00 76.0 DEG F -N-
15:00:00 76.25 DEG F -N-
End of report
>Log, Display, Edit, eNable, dIsable, Reset, Quit? -
```

Trend Multi Data report

```
>Specify Field Panel (Y/N) : y
>Field panel : 7020---
>1) Point name : ?-------------------------------------------
> 1) BTEC1:CTL TEMP
> 2) BTEC1:ROOM TEMP
> 3) BTEC2:CTL TEMP
> 4) BTEC2:ROOM TEMP
Enter option # or <C> for Cancel> 2-
> 1) Point COV 5 Samples
Enter option # or <C> for Cancel> 1-
>Specify Field Panel (Y/N) : y
>Field panel : 7020---
```

```
>2) Next point name : ?----------------------------------------
-
> 1) BTEC1:CTL TEMP
> 2) BTEC1:ROOM TEMP
> 3) BTEC2:CTL TEMP
> 4) BTEC2:ROOM TEMP
Enter option # or <C> for Cancel> 4-
> 1) Point COV 5 Samples
Enter option # or <C> for Cancel> 1-
>Specify Field Panel (Y/N) : -
>Start date (MM/DD/YYYY) : -----------
>Start time (HH:MM:SS) : 12:00:00---
>Display in Hours, Minutes : h
>Hours between displayed lines : 1----
>Here, Printer : H
07/24/2008 THU TREND MULTI DATA REPORT 15:09
----------------------------------------------------------------
---------------
Start time <07/24/2008, 12:00:00>
< 1 Hours> between displayed lines
Column Name (Description)
Trigger Name (Description) Value
----------------------------------------------------------------
---------------
--P1-- BTEC1:ROOM TEMP () (APO_7020_TL_0)
--P2-- BTEC2:ROOM TEMP () (APO_7020_TL_1)
---P1--- ---P2--- ---P3--- ---P4--- ---P5--- ---P6---
Time DEG F DEG F
----------------------------------------------------------------
---------------
Entries for: 07/24/2008
12:00:00 81.25 74.25
13:00:00 81.0 74.5
14:00:00 81.0 74.25
15:00:00 81.25 74.5
End of report
>Log, Display, Edit, eNable, dIsable, Reset, Quit? -
```

Displaying a Trend Edit Look Report

The Trend Edit Look report shows the configured parameters of a trend definition.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

To display a Trend Edit Look report, complete the following steps:

HMI	**P, T, E, L** (Point, Trend, Edit, Look)

Prompt/Field	Option/Entry	Description
Specify Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel.
	N	To filter for locally trended points only, residing in any field panel on the network.
Point name	Type the point name.	
	Type ?, a space, and then a point range using wildcards <? BTEC*:*>.	To search within a range. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at the **Specify Field Panel (Y/N)** prompt.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	

The system displays the Trend Edit Look report.

Example

```
>Specify Field Panel (Y/N) : n
>Point name : ?----------------------------------------
> 1) TEC1:ROOM TEMP
> 2) TEC2:ROOM TEMP
> 3) TEC2:CTL TEMP
Enter option # or <C> for Cancel> 1-
> 1) Point COV 100 Samples
> 2) 1 Hours 100 Samples
Enter option # or <C> for Cancel> 2-
07/24/2008 THU TREND EDIT LOOK REPORT 13:19
----------------------------------------------------------------
---------------
Search for <TEC1:ROOM TEMP>
Field Value
----------------------------------------------------------------
---------------
```

```
Point system name : TEC1:ROOM TEMP (BAC_7010_AI_10104)
Maximum number of samples : 100
Record every : 1 Hours
Instance Number : 3 (BAC_7010_TL_3)
Trend log name : APO_7010_TL_3
Trend log description :
Start time : (no start time specified)
Stop time : (no stop time specified)
Trend log enabled : Y
Stop when full : N
Notification threshold count : 80 (80%)
Notification class number : 0
Event Enable, to-Normal : Y
Event state : NORMAL
Total samples recorded : 54
Current samples : 4
Last notification time : (no notifications issued)
Last record at notification : 0
Records since notification : 4
Enable FTP Upload : N
FTP Upload Status : Unknown
End of report
>Add, Modify, Copy, Delete, Look, Quit? –
```

The following example shows BACnet/IP trend points:

```
>Point name                    :  oat---------------------------
-------------
>  1)   1 Minutes                100 Samples
Enter option # or <C> for Cancel> 1-

04/17/2006 MON                TREND EDIT LOOK
REPORT                      01:56
----------------------------------------------------------------
---------------
Search for <OAT:>

Field                                     Value
----------------------------------------------------------------
---------------
Point system name             : oat
Maximum number of samples     : 100
Record every                  :   1 Minutes
Instance Number               : 3 (BAC_9005_TL_3)
Trend log name                : oat_tr1
Trend log description         :
Start time                    : (no start time specified)
```

```
Stop time                      : (no stop time specified)
Trend log enabled              : Y
Stop when full                 : N
Notification threshold count   : 80 (80%)
Notification class number      : 0
Event Enable, to-Normal        : Y
Event state                    : NORMAL
Total samples recorded         : 14
Current samples                : 14
Last notification time         : (no notifications issued)
Last record at notification    : 0
Records since notification     : 14
Enable FTP Upload : N
FTP Upload Status : Unknown

>Add, Modify, Copy, Delete, Look, Quit? -
```

The **FTP Upload Status** field provides information about the last attempt to upload trend data to a remote FTP Server. It is “Unknown” if no attempt has yet been made to upload the data. If the last upload has been successful, the date and time of the last upload is also provided.

Example

```
Success 10:01:00 10-20-2016 THU
```

If the last upload has not been successful, the date and time of when the initial failure occurred is also provided.

Example

```
Failed 10:06:26 10-20-2016 THU
```

Trending a Point by Change of Value (COV)

This procedure adds a point to trending and records data by change of value (COV). Before you start this procedure, determine the points to trend, as well as the maximum number of samples.

CAUTION

When wildcards are used, the trend operation executes globally across the network on every point matching the description.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

To trend a point by COV, complete the following steps:

HMI	**P, T, E, A** (Point, Trend, Edit, Add)

Prompt/Field	**Option/Entry**	**Description**
Point name	Type the point name.	
	Type **?**, and then type the point name with wildcard(s).	To query available points. **NOTE:** For ALN points only, type **?**. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list.
	Specify a point range using wildcards.	To *select multiple points for the same trend* **CAUTION:** When wildcards are used for multi point trend addition, the trend add operation occurs globally across the network on every point matching the description. **NOTE:** If you select a multi point trend, you must verify that you want to perform a multi-point trend by typing **Y** (Yes) at **the Multi point trend. Are you sure (Y/N)** prompt.
COV, Time	C	
Maximum number of samples	Specify the maximum number of samples you want collected.	**NOTE:** If trending a point by multiple intervals, the maximum number of samples per trend type is 100; if trending a point by one interval, the maximum number of samples is 2,500. If you exceed the maximum number of samples, the prompt is displayed again.
Trend log instance number	Type a BACnet object instance number from 0 through 4194303.	Press **ENTER** to automatically assign the next available instance number to this trend log object.
Trend log name	Type a name for the trend log .	Press **ENTER** to automatically assign a name in the following format: APO_<*DeviceInstance*>_TL_<*ObjectInstance*>.
Trend log description	Type a description for the trend log.	
Enable start date/time (Y/N)	Y	To set a starting date and time for this trend and then continue with next step.
	N	To start the trend immediately and then proceed to the **Enable stop date/time (Y/N)** prompt.
Start date (MM/DD/YYYY)	Enter a starting date for this trend in the MM/DD/YYYY format.	
Start time (HH:MM:SS)	Enter a starting time for this trend in the HH:MM:SS format.	
Enable stop date/time (Y/N)	Y	To set an ending date and time for this trend, continue with the **Stop date (MM/DD/YYYY)** prompt.
	N	To let the trend run continuously after the starting date/time and then proceed to **Notification threshold count** prompt.

Stop date (MM/DD/YYYY)	Enter an ending date for this trend in the MM/DD/YYYY format.	
Stop time (HH:MM:SS)	Enter an ending time for this trend in the HH:MM:SS format.	
Trend log enabled (Y/N)	Y	Enable trend log.
	N	Disable trend log.
Stop when full (Y/N)	Y	To stop trending once the maximum number of samples is reached.
	N	To continue trending after the log is full by writing over existing trend samples.
Notification threshold count	Type a value between 1 and the maximum number of samples for this trend.	Press **ENTER** to accept the default (80 percent of the maximum number of samples).
Notification class number	Type a value from 0 through 4194302 or press **ENTER** to accept the default (0).	Specify the field panel that will receive the notification threshold alarm **NOTE:** The Notification Class number must be assigned to a field panel.
Field panel	Press **ENTER**.	Accept the field panel name supplied by the system
	Type a different field panel name	Specify the name of the field panel that will store the trend log object **NOTE:** The default field panel location is the field panel that owns the point (or FLN of the device subpoint) to which you are adding the trend.
Enable FTP Upload (Y/N)	Y	Upload trended data to a remote FTP Server. Refer to the section on how to define the remote FTP Server.
	N	Do not use the FTP upload trend data feature for this trend.

The message `<Point Name> is now trending by Change-Of-Value successfully in field panel <field panel name>` displays.

Example

```
>Point name : ? btec1:*----------------------------------
> 1) BTEC1:CTLR ADDRESS
> 2) BTEC1:APPLICATION
> 3) BTEC1:RMTMP OFFSET
> 4) BTEC1:ROOM TEMP
> 5) BTEC1:HEAT.COOL
> 6) BTEC1:DAY CLG STPT
> 7) BTEC1:DAY HTG STPT
> 8) BTEC1:NGT CLG STPT
> 9) BTEC1:NGT HTG STPT
> 10) BTEC1:RM STPT MIN
> 11) BTEC1:RM STPT MAX
> 12) BTEC1:RM STPT DIAL
> 13) BTEC1:STPT DIAL
```

```
> 14) BTEC1:AUX TEMP AI3
> 15) BTEC1:FLOW START
> 16) BTEC1:FLOW END
> 17) BTEC1:WALL SWITCH
> 18) BTEC1:DI OVRD SW
> 19) BTEC1:OVRD TIME
> 20) BTEC1:NGT OVRD
Enter option # or <C> for Cancel> 4-
>Cov, Time : c
>Maximum number of samples : ----
>Trend log instance number : 123----
>Trend log name : abc---------------------------
>Trend log description : def-------------
>Enable start date/time (Y/N) : N
>Enable stop date/time (Y/N) : N
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 4------
>Notification class number : 0------
>Field panel : 7020---
>Enable FTP Upload (Y/N) : Y
BTEC1:ROOM TEMP is now trending by Change-Of-Value successfully
in Field panel <7020>
>Add, Modify, Copy, Delete, Look, Quit? -
```

Example - multi-point trend add

```
>Point name : btec*:room temp----------------------------
>Multi point trend. Are you sure (Y/N): y
>Cov, Time : c
>Maximum number of samples : ---
>Enable start date/time (Y/N) : N
>Enable stop date/time (Y/N) : N
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 4------
>Notification class number : 0------
>Enable FTP Upload (Y/N) : N
BTEC1:ROOM TEMP is now trending by Change-Of-Value successfully
in Field panel <7020>
BTEC2:ROOM TEMP is now trending by Change-Of-Value successfully
in Field panel <7020>
End of commanding
>Add, Modify, Copy, Delete, Look, Quit? -
```

Trend Procedures

Modifying a Trend

Trend definitions can be modified after having been created, if desired.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

Modifying a Trend Definition

HMI	**P, T, E, M** (Point, Trend, Edit, Modify)

Prompt/Field	Option/Entry	Description
Specify Source Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel. **NOTE:** Pressing **ENTER** without specifying a field panel defaults to the local panel.
	N	To filter for locally trended points only, residing in any field panel on the network.
Point name	Type the point name.	
	Type **?**, a space, and then a point range using wildcards <? BTEC*:*>	To search within a range. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at **the Specify Field Panel (Y/N)** prompt.
	Specify the maximum number of samples you want collected.	**NOTE:** If trending a point by multiple intervals, the maximum number of samples per trend type is 100; if trending a point by one interval, the maximum number of samples is 2,500. If you exceed the maximum number of samples, the prompt is displayed again.

Enter option # or <C> for Cancel>	Type a number from the list of point trends.	
	Modify (or accept as is) the trend definition parameters as desired, pressing **ENTER** after each one.	The system displays the first of several trend definition parameters. The system warns that all current data for selected trend(s) will be lost **NOTE:** This prompt no longer displays in Firmware 3.5 or later, as all current data collected is retained.
Are you sure (Y/N)	Y	To accept changes and modify the trend.

Example

```
>Specify Field Panel (Y/N) : y
>Field panel : 7020---
>Point name : ?------------------------------------------
> 1) BTEC1:CTL TEMP
> 2) BTEC1:ROOM TEMP
> 3) BTEC2:CTL TEMP
> 4) BTEC2:ROOM TEMP
Enter option # or <C> for Cancel> 1-
> 1) 1 Hours 5 Samples
Enter option # or <C> for Cancel> 1-
>Cov, Time : t
Maximum number of samples : 100-
>Trend in Hours, Minutes : m
>Minutes between samples : 10-
>Trend log description : ----------------
>Enable start date/time (Y/N) : N
>Enable stop date/time (Y/N) : N
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 80-----
>Notification class number : 0------
>All current data for selected trend(s) will be lost. Are you
sure (Y/N): Y
BTEC1:CTL TEMP is now trending every 10 Minutes successfully in
Field panel <7020>
>Add, Modify, Copy, Delete, Look, Quit? –
```

NOTE:
The **All current data for selected trend(s)** prompt no longer displays in Firmware 3.5 or later, as all current data collected is retained.

Deleting Trend Log Objects

Trend delete can be performed on single or wildcarded points.

	CAUTION
	When wildcards are used, the trend operation executes globally across the network on every point matching the description.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

Deleting Trend Log Object

HMI	**P, T, E, D** (Point, Trend, Edit, Delete)

Prompt/Field	**Option/Entry**	**Description**
Point name	Type the point name.	
	Type **?**, a space, and then a point range using wildcards <? BTEC*:*>.	To search within a range. **CAUTION:** When wildcards are used to specify a point range for multi-point trend deletion, the deletion occurs globally across the network on every point matching the description.
	Specify a point range using wildcards.	For multi point trend deletion.
Specify Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel.
	N	To filter for locally trended points only, residing in any field panel on the network. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at the **Specify Field Panel (Y/N)** prompt.

Enter option # or <C> for Cancel>	Type a number from the list of point trends.	The system skips this step if the point name was entered manually at the Point name prompt. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	
Are you sure (Y/N)	Y	To delete trending.

Trending deleted for <pointname> displays.

Example

```
>Point name : ? BTEC*:*---------------------------------
>Specify Field Panel (Y/N) : Y
>Field panel : 7020---
> 1) BTEC1:CTL TEMP
> 2) BTEC1:ROOM TEMP
> 3) BTEC2:CTL TEMP
Enter option # or <C> for Cancel> 2-
> 1) Point COV 100 Samples
Enter option # or <C> for Cancel> 1-
>Are you sure (Y/N) : Y
Trending deleted for BTEC1:ROOM TEMP (by Change-Of-Value)
>Add, Modify, Copy, Delete, Look, Quit? -
```

Disabling Trend Logging

When you disable a trend, the trend definition and trend data (if any) is retained, but you are not collecting new trend data from the point. Trend disable can be performed on single or wildcarded points.

CAUTION

When wildcards are used, the trend operation executes globally across the network on every point matching the description.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

Disabling Trend Logging

HMI	**P, T, I** (Point, Trend, dIsable)

Prompt/Field	**Option/Entry**	**Description**
Point name	Type the point name.	
	Type **?**, a space, and then a point range using wildcards **<**? BTEC*:*>.	To search within a range. **CAUTION:** When wildcards are used to specify a point range for multi-point trend deletion, the deletion occurs globally across the network on every point matching the description.
	Specify a point range using wildcards.	For multi point trend deletion.
Specify Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel.
	N	To filter for locally trended points only, residing in any field panel on the network. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at the **Specify Field Panel (Y/N)** prompt.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	The system skips this step if the point name was entered manually at the Point name prompt. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	
Are you sure (Y/N)	Y	To disable trending.

`Trend log disabled for <pointname>` displays.

Example

```
>Specify Field Panel (Y/N) : n
> 1) Point COV 100 Samples
> 2) 1 Hours 100 Samples
> 3) > > All trends < <
Enter option # or <C> for Cancel> 1-
>Are you sure (Y/N) : y
```

```
Trend log disabled for TEC1:ROOM TEMP (by Change-Of-Value)
>Log, Display, Edit, eNable, dIsable, Reset, Quit? -
```

Example - Multi-Trend Disable

```
>Point name : btec*:room temp----------------------------
>Are you sure (Y/N) : y
Trend log disabled for BTEC1:ROOM TEMP
Trend log disabled for BTEC2:ROOM TEMP
End of commanding
>Log, Display, Edit, eNable, dIsable, Reset, Quit? -
```

Enabling Trend Logging

Use trend enable to start collecting trend data for a previously disabled trend log object.

Trend enable can be performed on single or wildcarded points.

CAUTION

When wildcards are used, the trend operation executes globally across the network on every point matching the description.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

Enabling Trend Logging

HMI	**P, T, N** (Point, Trend, eNable)

Prompt/Field	**Option/Entry**	**Description**
Point name	Type the point name.	
	Type **?**, a space, and then a point range using wildcards <? BTEC*:*>.	To search within a range. **CAUTION:** When wildcards are used to specify a point range for multi-point trend deletion, the deletion occurs globally across the network on every point matching the description.
	Specify a point range using wildcards.	For multi point trend deletion.
Specify Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel.

	N	To filter for locally trended points only, residing in any field panel on the network. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at the **Specify Field Panel (Y/N)** prompt.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	The system skips this step if the point name was entered manually at the Point name prompt. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	
Are you sure (Y/N)	Y	To enable trending.

`Trend log enabled for <pointname>` displays.

Example

```
>Point name : btec2:ctl temp-----------------------------
>Specify Field Panel (Y/N) : y
>Field panel : -------
> 1) Point COV 100 Samples
> 2) 1 Hours 100 Samples
> 3) > > All trends < <
Enter option # or <C> for Cancel> 2-
>Are you sure (Y/N) : y
Trend log enabled for BTEC2:CTL TEMP (every 1 Hours)
>Log, Display, Edit, eNable, dIsable, Reset, Quit? -
```

Resetting the Trend Buffer

Resetting the trend buffer clears the stored trend data at the field panel. Trend reset can be performed on single or wildcarded points.

NOTE:
To save the trend buffer data before a reset, upload the trend data to the mass storage device.

	CAUTION
	When wildcards are used, the trend operation executes globally across the network on every point matching the description.

Resetting Trend Buffer

HMI	**P, T, R** (Point, Trend, Reset)

Prompt/Field	**Option/Entry**	**Description**
Point name	Type the point name.	
	Type **?**, a space, and then a point range using wildcards <? BTEC*:*.>	To search within a range.
	Specify a point range using wildcards.	For multi point trend deletion **CAUTION:** When wildcards are used to specify a point range for multi-point trend deletion, the deletion occurs globally across the network on every point matching the description.
Specify Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel.
	N	To filter for locally trended points only, residing in any field panel on the network. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at the **Specify Field Panel (Y/N)** prompt.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	The system skips this step if the point name was entered manually at the Point name prompt. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	
Are you sure (Y/N)	Y	To reset trend buffer.

`Trend buffer reset for <pointname>` displays.

Example

```
>Point name : btec1:ctl temp----------------------------
>Specify Field Panel (Y/N) : y
>Field panel : 7020---
> 1) 10 Minutes 100 Samples
Enter option # or <C> for Cancel> 1-
>Are you sure (Y/N) : y
Trend buffer reset for BTEC1:CTL TEMP (every 10 Minutes)
>Log, Display, Edit, eNable, dIsable, Reset, Quit? -
```

Copying a Trend

Copying a trend allows you to establish a trend definition that is similar to the copied trend.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

Applying an Existing Trend Definition to Another Point

HMI	**P, T, E, C** (Point, Trend, Edit, Copy)

Prompt/Field	**Option/Entry**	**Description**
Specify Source Field Panel (Y/N)	Y, and then type the field panel device instance number.	To filter for both locally and remotely trended points residing in a specific field panel. **NOTE:** Pressing **ENTER** without specifying a field panel defaults to the local panel.
	N	To filter for locally trended points only, residing in any field panel on the network.
Copy from point name	Type the point name.	
	Type **?** and then press **ENTER**.	To query the database for trended points. Displays the first 20 trended points.

	Type **?**, a space, and then a point range using wildcards <? BTEC*:*>.	To query the database for trended points within a point range. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list and press **ENTER**. **NOTE:** If you manually entered a point name at the Point name prompt, and the system reprompts it, then one of three conditions exists: there are no trends for the point in the specified field panel; the point name (and/or the field panel device instance number, if specified) does not exist or was entered incorrectly; the trend log object is trending remotely but N was typed at **the Specify Field Panel (Y/N)** prompt.
Enter option # or <C> for Cancel>	Type a number from the list of point trends.	
Copy to point name	Type the point name.	
	Type **?**, a space, and then the point range using wildcards.	To query for points within a point range.
	Type **?** and then press **ENTER**.	To query for ALN points only.
Trend log instance number	Specify the instance number.	
Trend log name	Specify a trend log name.	
Trend Log description	Specify a description.	
Field panel	Press **ENTER**.	Accept the field panel name supplied by the system.
	Type a different field panel name.	Specify the name of the field panel that will store the trend log object **NOTE:** The default field panel location is the field panel that owns the point (or FLN of the device subpoint) to which you are adding the trend.

The message `<pointname> is now trending by <trend type>` displays.

Example

The following example shows how to copy a BACnet/IP trend definition:

```
>Copy from point name          :  oat---------------------------
-------------
>  1)   1 Minutes                100 Samples
Enter option # or <C> for Cancel> 1-
>Copy to point name            :  matemp------------------------
-------------
>Trend log instance number     :  -------
>Trend log name                :  ------------------------------
>Trend log description         :  ----------------
matemp is now trending every   1 Minutes

>Add, Modify, Copy, Delete, Look, Quit? -
```

Configuring the FTP Server

The following procedures are to configure the field panel and trend log objects for the FTP Server.

The FTP Server must be configured as follows:

- A username and password for a dedicate FTP user that the field panel can use to access the FTP server.
- A folder in the root of the home directory of that user named, **TrendData**. **NOTICE! This is case sensitive.**

Creating a folder on the FTP Server to store the .CSV export files

On the remote FTP server (defined at the field panel by the IP Address), and at the home directory of the FTP user account (defined at the field panel by the User Name and Password), you must create a **TrendData** folder to contain files uploaded by the field panel. The field panel expects this folder to already exist when it attempts to upload trend data using the FTP user account on the remote server. If this folder does not exist, the upload will not be successful.

Naming Convention of Trend Data Files

For each trend log object which has FTP Upload enabled, and upon reaching the Notification Threshold, a corresponding .CSV file that contains trend data will be uploaded to the TrendData folder.

The following naming conventions are applied, by the field panel, for .CSV file(s):

- For COV Trends, <*point name*>.csv. For example, **TEMPERATURE.csv**.
- For Timed Trends, <*point name*>_<*log interval in seconds*>.csv. For example, **TEMPERATURE_3600.csv**.

The Windows file name does not allow a colon ":",in the case of a subpoint being trended, the ":" in the subpoint's name is replaced with an underscore "_". For example, **BTEC:MTR1POS** will be renamed **BTEC_MTR1 POS_60.csv**.

A .CSV file residing under the TrendData folder is appended with additional trend data when the field panel attempts to upload a .CSV file by the same name.

Configuring the field panel with the address, user name and password for the remote FTP Server

To display the current FTP settings, complete the following steps:

HMI	**S, H, E, L, D** (System, Hardware, Ethernet, ftpupLoad, Display)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s
>Diagnostics, Integration, Users, dSt, Bacnet, Error_msgs,
Hardware, Text, Quit? h
>Fieldpanels, Ethernet, nodeNametable, Disks, Reportprinter,
Licensemanager, Quit? e
>ipSettings, Bbmd, sNmp, Telnet, Webserver, ftpupLoad, Quit? l
>Display, Modify, Quit? d
06/21/2017 WED FTP TREND CONFIGURATION REPORT 14:37
--------------------------------------------------------------------------------
User Name : sbt
FTP Server IP : 192.168.1.101
```

To edit the FTP Settings:

```
>Display, Modify, Quit? m
>User Name : sbt------------------------------------
>Change Password? (Y/N) : y
>New Password : ???------------
>Re-enter Password : ???------------
>FTP Server IP : 192.168.1.101--
Command successful
```

Designating Trend Log Objects to Upload to a FTP Server

Trend log objects can be designated when trending a point or modifying a point trend definition.

To designate trend log objects for FTP Upload when creating a new trend, complete the following steps:

HMI	**P, T, E, A** (Point, Trend, Edit, Add)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? t
>Log, Display, Edit, eNable, dIsable, Reset, Quit? e
>Add, Modify, Copy, Delete, Look, Quit? a
```

Example

```
>Point name : flag---------------------------------------
>Cov, Time : c
>Maximum number of samples : 100-
>Trend log instance number : -------
>Trend log name : flag.trendLog-----------------
>Trend log description : ----------------
>Enable start date/time (Y/N) : y
>Start date (MM/DD/YYYY) : -----------
>Enable start date/time (Y/N) : n
>Enable stop date/time (Y/N) : n
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 80-----
>Notification class number : 0------
>Field panel : 7010---
>Enable FTP Upload (Y/N) : y
FLAG is now trending by Change-Of-Value successfully in Field
panel <7010>
```

To designate trend log objects for FTP Upload when modifying an existing trend, complete the following steps:

HMI	**P, T, E, M** (Point, Trend, Edit, Modify)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? p
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? t
>Add, Modify, Copy, Delete, Look, Quit? m
```

Example

```
>Point name : flag---------------------------------------
> 1) Point COV 100 Samples
Enter option # or <C> for Cancel> 1-
>Cov, Time : C
>Maximum number of samples : 100-
>Trend log description : ----------------
>Enable start date/time (Y/N) : N
>Enable stop date/time (Y/N) : N
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 80-----
>Notification class number : 0------
>Enable FTP Upload (Y/N) : y
FLAG is now trending by Change-Of-Value successfully in Field
panel <7010>
```

Troubleshooting FTP Upload

NOTE:
The FTP Upload feature will not upload a file to the FTP Server until the notification threshold is reached. By default, this occurs when the number of samples has reached 80% of the maximum sample storage.

If Trend samples are not getting uploaded, use the following procedure to troubleshoot.

▷ Use a computer with an FTP Client installed or use the Command Prompt to access the FTP Server.

1. From the **HMI**, verify that you can connect (ping) the FTP Server.
2. Logon using the same user name and password credentials that you defined for the field panel FTP Server.
3. From the **Command Prompt FTP** command, type **ls**, press **ENTER** to display a directory list and then verify that the TrendData directory (folder) exists

NOTE:
If using a GUI based FTP Client, ensure that the TrendData folder is present in the home directory, which is the folder that you are logged on to by default.

Trending a Point by Time Interval

This procedure adds a point to trending and records data by time interval. Before you start this procedure, determine the points to trend, as well as the number and frequency of the samples. See *Time Sampling Guidelines* in this section for more information.

CAUTION

When wildcards are used, the trend operation executes globally across the network on every point matching the description.

NOTE:
See *Using BACnet Trend* [→ 295] in this chapter for more information about trending, including remote trending and third-party device limitations.

Trending a Point by Time Interval

HMI	**P, T, E, A** (Point, Trend, Edit, Add)

Prompt/Field	Option/Entry	Description
Point name	Type the point name.	
	Type **?**, and then type the point name with wildcard(s).	To query available points. **NOTE:** For ALN points only, type ?. **NOTE:** Queries return up to 20 items in a list. If the item (point name/trend) you want is not in the list, press **ENTER** again to display the next 20 items. When you see your item, type the corresponding number from the list.
	Specify a point range using wildcards.	To *select multiple points for the same trend.* **CAUTION:** When wildcards are used for multi point trend addition, the trend add operation occurs globally across the network on every point matching the description. **NOTE:** If you select a multi point trend, you must verify that you want to perform a multi-point trend by typing **Y** (Yes) at the **Multi point trend. Are you sure (Y/N)** prompt.
COV, Time	T	
Maximum number of samples	Specify the maximum number of samples you want collected.	**NOTE:** If trending a point by multiple intervals, the maximum number of samples per trend type is 100; if trending a point by one interval, the maximum number of samples is 2,500. If you exceed the maximum number of samples, the prompt is displayed again.
Trend in hours, Minutes	H or M	
Hours between samples or Minutes between samples	Enter the number of hours or minutes between trend samples.	
Trend log instance number	Type a BACnet object instance number from 0 through 4194303.	Press **ENTER** to automatically assign the next available instance number to this trend log object.
Trend log name	Type a name for the trend log.	Press **ENTER** to automatically assign a name in the following format: APO_<*DeviceInstance*>_TL_<*ObjectInstance*>.
Trend log description	Type a description for the trend log.	
Enable start date/time (Y/N)	Y	To set a starting date and time for this trend and then continue with the next step.
	N	To start the trend immediately and then proceed to the **Enable stop date/time (Y/N)** prompt.

Start date (MM/DD/YYYY)	Enter a starting date for this trend in the MM/DD/YYYY format.	
Start time (HH:MM:SS)	Enter a starting time for this trend in the HH:MM:SS format.	
Enable stop date/time (Y/N)	Y	To set an ending date and time for this trend and then continue with next step.
	N	To let the trend run continuously after the starting date/time and then proceed to **Notification threshold count** prompt.
Stop date (MM/DD/YYYY)	Enter an ending date for this trend in the MM/DD/YYYY format.	
Stop time (HH:MM:SS)	Enter an ending time for this trend in the HH:MM:SS format.	
Trend log enabled (Y/N)	Y	Enable trend log.
	N	Disable trend log.
Stop when full (Y/N)	Y	To stop trending once the maximum number of samples is reached.
	N	To continue trending after the log is full by writing over existing trend samples.
Notification threshold count	Type a value between 1 and the maximum number of samples for this trend.	Press **ENTER** to accept the default (80 percent of the maximum number of samples).
Notification class number	Type a value from 0 through 4194302 or press **ENTER** to accept the default (0).	Specify the field panel that will receive the notification threshold alarm **NOTE:** The Notification Class number must be assigned to a field panel.
Field panel	Press **ENTER**.	Accept the field panel name supplied by the system.
	Type a different field panel name.	Specify the name of the field panel that will store the trend log object. **NOTE:** The default field panel location is the field panel that owns the point (or FLN of the device subpoint) to which you are adding the trend.
Enable FTP Upload (Y/N)	Y	Upload trended data to a remote FTP Server. Refer to the section on how to define the remote FTP Server.
	N	Do not use the FTP upload trend data feature for this trend.

The message `<Point Name> is now trending every x <unit of time> successfully in field panel <field panel name>` displays.

Example

```
>Point name : btec2:ctl temp-----------------------------
>Cov, Time : t
>Maximum number of samples : ----
>Trend in Hours, Minutes : h
>Hours between samples : 1--
>Trend log instance number : -------
>Trend log name : ------------------------------
>Trend log description : ----------------
>Enable start date/time (Y/N) : N
>Enable stop date/time (Y/N) : N
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 4------
>Notification class number : 0------
>Field panel : 7020---
BTEC2:CTL TEMP is now trending every 6 Hours successfully in
Field panel <7020>
>Add, Modify, Copy, Delete, Look, Quit? -
```

Example - multi-point trend add

```
>Point name : btec*:ctl temp-----------------------------
>Multi point trend. Are you sure (Y/N): y
>Cov, Time : t
>Maximum number of samples : ---
>Trend in Hours, Minutes : h
>Hours between samples : 1--
>Trend log description : ----------------
>Enable start date/time (Y/N) : N
>Enable stop date/time (Y/N) : N
>Trend log enabled (Y/N) : Y
>Stop when full (Y/N) : N
>Notification threshold count : 4------
>Notification class number : 0------
>Field panel : 7020 ---
>Enable FTP Upload (Y/N) : Y
BTEC1:CTL TEMP is now trending every 1 Hours successfully in
Field panel <7020>
BTEC2:CTL TEMP is now trending every 1 Hours successfully in
Field panel <7020>
End of commanding
```

BACnet COV Poll Period Overview

There are four configurable Change of Value (COV) poll period settings in BACnet 3.1 or later.*

These four settings affect devices on the ALN or the FLN, as follows:

On BACnet/IP ALN or MS/TP ALN networks:

- Use the Intranet COV Poll Period between ALN devices with the same Site Name (local ALN devices).
- Use the Internet COV Poll Period between ALN devices with different Site Names (remote ALN devices).

On MS/TP FLN networks:

- Use the MSTP FLN **local** COV Poll Rate between FLN devices physically on the local router MS/TP port network number (local FLN devices).
- Use the MSTP FLN **remote** COV Poll Rate between FLN devices which are not physically on the local router MS/TP network number (remote FLN devices).

Communication between local devices is generally faster than communication between remote devices, because there are no 'hops' between local devices. The Intranet COV Poll Period and MSTP FLN Local COV Poll Rate could be set lower (faster) than the Internet COV Poll Period and MSTP FLN Remote COV Poll Rate for these reasons. The default value for both the Intranet COV Poll Period and the MSTP FLN Local COV Poll Rate is 60 seconds.

Communication between remote devices is generally slower and generates more network traffic due to the number of 'hops' between devices. To reduce the effect that COV polling has on both the local and remote networks, the Internet COV Poll Period and MSTP FLN Remote COV Poll Rate should be set slower than the Intranet COV Poll Period and MSTP FLN Local COV Poll Rate. The default value for both the Internet COV Poll period and the MSTP FLN Remote COV Poll Rate is 60 seconds.

* BACnet 3.0.*x* supports Intranet COV Poll Period and Internet COV Poll Period only.

BACnet Trend Log Enable/Disable

BACnet replaces the APOGEE Conditional Trending event trigger point with Trend Log Enable/Disable feature. See *Trend Log Enable/Disable* in this chapter for information.

Example - Unresolved Point in Remote Trend Log

In the following example:

- `tec1:ROOM TEMP` shows as unresolved (by ‘U’ at the end of the Point system name value).
- the trending field panel is identified as the operator field panel by a blank entry.

```
>Add, Modify, Copy, Delete, Look, Quit? l
>Specify Field Panel (Y/N) : y
>Field panel : -------
>Point name : tec1:ROOM TEMP-----------------------------
> 1) Point COV 5 Samples
Enter option # or <C> for Cancel> 1-

01/03/2006 TUE TREND EDIT LOOK REPORT 23:33
```

```
-----------------------------------------------------------------
---------------
Search for <tec1:ROOM TEMP>

Field Value
-----------------------------------------------------------------
---------------
Point system name : tec1:ROOM TEMP (BAC_11_??_4194303) U
Maximum number of samples : 5
Record every : Point COV
Instance Number : 0 (BAC_11_TL_0)
Trend log name : APO_11_TL_0
Trend log description :
Start time : (no start time specified)
Stop time : (no stop time specified)
Trend log enabled : Y
Stop when full : N
Notification threshold count : 4 (80%)
Notification class number : 0
Event Enable, to-Normal : Y
Event state : NORMAL
Total samples recorded : 0
Current samples : 0
Last notification time : (no notifications issued)
Last record at notification : 0
Records since notification : 0

End of report

>Add, Modify, Copy, Delete, Look, Quit? -
```

Chapter 10—PPCL Editor

This section discusses the interaction and functionality of the Powers Process Control Language (PPCL) program editor, including:

- PPCL Editor Concepts
  - PPCL Program Attributes
  - Point Names in PPCL Programs
  - Comment Lines
  - PPCL Line Status Indicators
  - Accelerator Key Refresher
- Generating PPCL Program Logs and Reports
- The Effects of Program Changes
- Changing a PPCL Program—Procedures

Before You Begin

Before using the information in this section, you should have a working understanding of the following concepts:

- The building equipment of the facility
- The point database
- General knowledge of the APOGEE Automation System

This section does not illustrate the use and application of the PPCL programming language. For information about programming, see the *APOGEE Powers Process Control Language (PPCL) User's Manual* (125-1896).

PPCL Editor Concepts

PPCL is a language developed and optimized to control equipment, such as HVAC and other related building systems, and to perform energy management functions. This language provides complex functionality using English-based text commands. Information about the field panel editor for PPCL is contained in this section. To learn more about the PPCL language, see the *APOGEE Powers Process Control Language (PPCL) User's Manual* (125-1896).

PPCL Program Attributes

A field panel can contain multiple PPCL programs that execute simultaneously. Creating multiple programs provides for better organization of PPCL code. Standard functionality can also be copied and customized for each program with minimal modifications. Each program has its own set of line numbers from 1 to 32767.

Each program in a field panel must have a unique 30-character name. The following example names a program that will control the safety mode of Air Handler Unit 1 in Field Panel 22:

```
PANEL22.AHU1.SAFETYMODE
```

If you create a program without a program name, the system automatically saves the program using a default program name. The name format of the default program is the number of the field panel:

```
>Program name ? 01
```

There is only one default program per panel.

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```

If you create a program without a program name, the system automatically saves the program using a default program name. The name format of the default program is the number of the field panel:

```
>Program name ? 01
```

There is only one default program per panel.

BACnet/IP Priority For Writing

BACnet/IP uses Priority For Writing to specify the Priority Array slot that is used by point commands and releases. For more information on the Command Priority Array, see *Point Priority/Command Priority* in the *Point Database* chapter.

NOTE:
Existing PPCL that uses @Priority may have to be re-written to operate correctly under BACnet.

Point Names in PPCL Programs

The point database can be set up so that the points have different point system and point names. However, the PPCL editor only uses the *point system name* to identify points. Using only the point system name in programs eliminates the need to update programs should the point name be modified. Even if the user account is set to display point names, the system name appears when editing PPCL programs.

PPCL also uses an optional statement called DEFINE to improve operator efficiency when entering longer point names. The DEFINE statement assigns text abbreviations to all or part of point system names. When used in program code, the abbreviation assigned by the DEFINE statement is used.

Examples

System names:	BUILDING.2.FLOOR.3.RETURN_FAN BUILDING.2.FLOOR.3.SUPPLY_FAN BUILDING.2.FLOOR.3.SETPOINT
DEFINE statement:	DEFINE (B2F3,"BUILDING.2.FLOOR.3.")
Program code:	ON("%B2F3%RETURN_FAN%") ON("%B2F3%SUPPLY_FAN") SET(75.0,"%B2F3%SETPOINT")
Is the same as:	ON("BUILDING.2.FLOOR.3.RETURN_FAN") ON("BUILDING.2.FLOOR.3.SUPPLY_FAN") SET(75.0,"BUILDING.2.FLOOR.3.SETPOINT")

The DEFINE statement is program-specific and cannot be used to pass point values between field panels or programs within a field panel. Point names that use special characters (such as "_") must have double quotes around them when used in PPCL.

Point Names in PPCL Programs

The point database can be set up so that the points have different point system and point names. However, the PPCL editor only uses the *point system name* to identify points. Using only the point system name in programs eliminates the need to update programs should the point name be modified. Even if the user account is set to display point names, the system name appears when editing PPCL programs.

BACnet/IP allows the use of the point system name, the BACnet encoded name, and the BACnet device specific name in PPCL. All names are case sensitive in BACnet.

PPCL also uses an optional statement called DEFINE to improve operator efficiency when entering longer point names. The DEFINE statement assigns text abbreviations to all or part of point system names. When used in program code, the abbreviation assigned by the DEFINE statement is used.

Examples

System names:	BUILDING.2.FLOOR.3.RETURN_FAN BUILDING.2.FLOOR.3.SUPPLY_FAN BUILDING.2.FLOOR.3.SETPOINT
DEFINE statement:	DEFINE (B2F3,"BUILDING.2.FLOOR.3.")
Program code:	ON("%B2F3%RETURN_FAN%") ON("%B2F3%SUPPLY_FAN") SET(75.0,"%B2F3%SETPOINT")
Is the same as:	ON("BUILDING.2.FLOOR.3.RETURN_FAN") ON("BUILDING.2.FLOOR.3.SUPPLY_FAN") SET(75.0,"BUILDING.2.FLOOR.3.SETPOINT")

The DEFINE statement is program-specific and cannot be used to pass point values between field panels or programs within a field panel. Point names that use special characters (such as "_") must have double quotes around them when used in PPCL.

Comment Lines

A program may contain comment lines to identify information such as who wrote the program, what the program does, or the points the program uses. Comment lines are not compiled in the field panel. The following example shows comment lines mixed with program code:

```
07/17/2008 THU                  PPCL DISPLAY
REPORT                     08:09pm
----------------------------------------------------------------
---------------
Search for <*>
Line numbers <1 to 32767>

PPCL program <BLD990.AHU01.PGM>
Field panel  <1>
State  Line  Statement
```

```
----------------------------------------------------------------
---------------
ET     150 C
****************************************************************
*
ET     160 C          SET OA TEMP VIRTUAL TO ACTUAL OA TEMP
ET     170 C
ET     200 SAMPLE (60) MTEOAT = (MOAT + @3TOAT1) / 2
ET     300 C
****************************************************************
*
ET     310 C           GARAGE GATE CONTROL PROGRAM
ET     320 C
ET     400 IF (G3GAT .EQ. ON ) THEN ON (G3GATE) ELSE OFF
(G3GATE)
ET     410 C  IF (G7GATS .EQ. ON ) THEN ON (G7GATE) ELSE OFF
(G7GATE)

End of report
```

Creating a Notepad at the Field Panel with PPCL Comment Lines

With Firmware Revision 3.1 and later, a PPCL program containing only comment lines can be used as a notepad for the field panel. This allows you to record information regarding activities, modifications, a to-do list, special instructions to follow-up personnel, or general notes.

- The comment lines can be added and viewed from any HMI or front-end device.
- The program can be archived for historical purposes.

A PPCL program that contains only comment lines is not executed, and, therefore, does not affect system performance.

PPCL Line Status Indicators

When viewing a PPCL program report, the beginning of each line of code contains one or more status indicators. These indicators, maintained by the system, allow you to quickly evaluate if a program is running. The following example shows a sample program and the indicators. See *PPCL Status Indicator Descriptions* for a description of the PPCL status indicators:

```
07/17/2008 THU                  PPCL DISPLAY
REPORT                     08:09pm
----------------------------------------------------------------
---------------
Search for <*>
Line numbers <1 to 32767>

PPCL program <BLD990.AHU01.TEST>
Field panel  <1>
State  Line  Statement
```

```
----------------------------------------------------------------
---------------
ET     100   IF(SECND4 .LT. 7) THEN GOTO 300
D      200   SECND4 = 0
ET     300   IF(SECND4 .GT. 0 .AND. SECND4 .LT. 5) THEN
ON("greenlight") ELSE
             OFF("greenlight")
ET     400   IF(SECND4 .GE. 5) THEN ON("redlight") ELSE
OFF("redlight")
ET     500   GOTO 100

End of report
```

PPCL Status Indicator Descriptions.

Column Position	Possible Character	Description
1	E	Line of code is enabled.
	D	Line of code is disabled and will not execute.
3	T	System executed the line of code at least once after the last time the trace bit was cleared.
	<BLANK>	Program has not tried to execute the line of code since the last time the trace bit was cleared.
3	U	Point unresolved; at least one point used in the line of code cannot be found in the system point database, or the field panel has not been made ready.
	<BLANK>	All points in the line of code have been found in the system point database.
4	F	System tried to execute the line of code but failed.
	<BLANK>	Line of code is not failed.
5	L	Line of code is currently being tested or has been tested by the loop tuning application.
	<BLANK>	Line of code is not being tuned by the loop tuning application.

PPCL Assist

The PPCL Assist feature assists you in creating PPCL statements:

- The Assist Bubble offers a selection of commands.
- The Referenced Points list allows you to see current point values.
- The Device/Points bar in the navigation tree allows you to easily add points to your program using the Drag and Drop feature.
- The error table guides you in creating accurate PPCL statements.

See the BACnet Field Panel Web Server (FPWeb) (125-3584) for more information and a full description of the PPCL Assist feature.

Manual Programming

PPCL programs can be created and modified manually (without automatic PPCL Assist features) using the PPCL Editor. You may simply type or copy/paste PPCL lines, including statements, point information, and punctuation, into the program pane in the PPCL Editor. Be sure that the **Assist Pop-up Enable** check box in the Editor Settings window is deselected. See the *Creating a PPCL Program* section for more information.

Please note:

- The PPCL Assist category pop-up does not display when you stop typing.
- The ability to drag and drop commands from the **Commands** list is still available when using manual programming.
- The Assist Bubble is active and supplies one instance of assistance each time you click it.

Accelerator Key Refresher

Accelerator keys provide a quick means for navigating through the program lines. For a complete list of accelerator keys, type ? at the prompt.

NOTE:
A VT emulator is required for the accelerator keys to function properly.

Common PPCL Editor Accelerator Keys.		
Name	**Accelerator Key**	**Function**
Home	CTRL+D	Moves the cursor to the beginning of the program line.
End	CTRL+F	Moves the cursor to the end of the program line.
Cursor Left	CTRL+Q	Moves the cursor one character left in the current field.
Cursor Right	CTRL+W	Moves the cursor one character right in the current field.
Delete Left	CTRL+H	Deletes character left of cursor and moves the cursor one space to left.
Delete Right	CTRL+J	Deletes character right of the cursor leaving the cursor in its current position.
Delete to end of line	CTRL+K	Deletes the characters from the current cursor position to the end of the field.
Delete Field	CTRL+U	Deletes the current field’s input.
Redisplay	CTRL+R	Redisplays the current line keeping any field input.
Toggle Insert/ Overstrike	CTRL+T	Toggles the insert/overstrike mode.
Define String	CTRL+P	Defines string in the cut & paste buffer.
Insert String	CTRL+I	Adds string from paste buffer to current cursor position. Follows current insert/overstrike mode.

Generating PPCL Program Logs and Reports

Displaying a List of PPCL Programs

This procedure displays a log of all the available PPCL programs on the network.

Displaying Available PPCL Programs on the Network

HMI	**A, P, L** (Application, Ppcl, Log)

Prompt/Field	Option/Entry	Description
Program name	Press **ENTER**.	All programs.
	Type the exact program name.	A particular program name.
	Type the program name, including wildcard characters.	A range of programs.
	Type **?**, and then type a number from the list .	A program name using a query. The system displays programs matching the criteria.
Here, Print	H, P	Specify to display report.

The field panel displays a PPCL Log report.

Example

The following example shows a log of available PPCL programs on the network:

NOTE:
The **Priority For Writing** field applies to BACnet only.

```
07/17/2008 THU                      PPCL LOG
REPORT                        08:11pm
----------------------------------------------------------------
-----------
Search for <*>

Program name                             Field panel name
Priority For Writing
----------------------------------------------------------------
-----------
BLD990.AHU01.PGM                         1            16
BLD990.CHL01.PGM                         1            16
BLG990.BLR02.PGM                         1            16

End of report

>Log, Display, Edit, Find, eNable, dIsable, Trace, Pdl, Quit? l
```

Displaying a PPCL Program

This procedure displays the lines of code contained in a PPCL program.

Displaying the Code in PPCL Programs

HMI	**A, P, D** (Application, Ppcl, Display)

Prompt/Field	Option/Entry	Description
Program name	Press **ENTER**.	All programs.
	Type the exact program name.	A particular program name.
	Type the program name, including wildcard characters.	A range of programs.
	Type **?**, and then type a number from the list .	A program name using a query. The system displays programs matching the criteria.
First line number	Press **ENTER**.	The first available line number.
	Type the starting line number.	A particular line number.
Last line number	Press **ENTER**.	The last available line number.
	Type the ending line number.	A particular line number.
Here, Print	H, P	Specify to display report.

The system displays the PPCL Display report based on the specified information.

Example

The following example shows the code in PPCL programs:

```
07/17/2008 THU                  PPCL DISPLAY
REPORT                     08:13pm
----------------------------------------------------------------
---------------
Search for <BLD990.AHU01.PGM>
Line numbers <1 to 32767>

PPCL program <BLD990.AHU01.PGM>
Field panel  <1>
State  Line  Statement
----------------------------------------------------------------
---------------
E      100   IF(SECND4 .LT. 7) THEN GOTO 300
E      200   SECND4 = 0
E      300   IF(SECND4 .GT. 0 .AND. SECND4 .LT. 5) THEN
ON("greenlight") ELSE
             OFF("greenlight")
E      400   IF(SECND4 .GE. 5) THEN ON("redlight") ELSE
OFF("redlight")
E      500   GOTO 100
```

```
End of report
```

Displaying Unresolved Points in PPCL

This procedure displays points that are used in PPCL that are unresolved and not found on the network.

Displaying Unresolved Points in PPCL Programs

HMI	**A, P, R** (Application, Ppcl, unReslv

Prompt/Field	Option/Entry	Description
Program name	Specify the program name.	
	Press **ENTER**.	All programs.
	Type that program name.	A particular program.
	Type **?**, and then type a number from the list.	A program using a query. The system display all programs.
Field panel name	Specify the field panel ALN name.	If an Ethernet ALN panel.
First line number	Press **ENTER**.	The first available program line number.
	Type that program line number.	A particular program line number that begins the range.
Last line number	Press **ENTER**.	The last available program line number.
	Type that program line number.	A particular program line number that completes the range.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

Prompt/Field	Option/Entry	Description
Program name	Specify the program name.	
	Press **ENTER**.	All programs.
	Type that program name.	A particular program.
	Type **?**, and then type a number from the list.	A program using a query. The system display all programs.
Field panel	Specify the ALN address number of the field panel.	If an RS-485 panel.
	Press **ENTER**.	The field panel where you are connected.
	Type that field panel ALN address number or device instance number.	A particular field panel. **NOTE:** The ALN address number can be from 0 to 100, but must be unique for each field panel on the ALN. The node name must contain fewer than 30 characters, and cannot contain periods or special characters. The device instance number can be from 0 through 4,194,302, but must be unique for each device on the ALN.

First line number	Press **ENTER**.	The first available program line number.
	Type that program line number.	A particular program line number that begins the range.
Last line number	Press **ENTER**.	The last available program line number.
	Type that program line number.	A particular program line number that completes the range.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

Prompt/Field	Option/Entry	Description
Program name	Specify the program name.	
	Press **ENTER**.	All programs.
	Type that program name.	A particular program.
	Type ?, and then type a number from the list.	A program using a query. The system display all programs.
Field panel	Specify the ALN address number of the field panel.	
	Press **ENTER**.	The field panel where you are connected.
	Type that field panel ALN address number or device instance number.	A particular field panel. **NOTE:** The ALN address number can be from 0 to 100, but must be unique for each field panel on the ALN. The node name must contain fewer than 30 characters, and cannot contain periods or special characters. The device instance number can be from 0 through 4,194,302, but must be unique for each device on the ALN.
First line number	Press **ENTER**.	The first available program line number.
	Type that program line number.	A particular program line number that begins the range.
Last line number	Press **ENTER**.	The last available program line number.
	Type that program line number.	A particular program line number that completes the range.
Here, Print	H	Field panel where you are connected.
	P	ALN report printer.

The field panel displays a PPCL Display report.

Example

The following example shows unresolved points in all PPCL programs of field panel 1:

```
07/17/2008 THU                    PPCL DISPLAY
REPORT                      02:57pm
-----------------------------------------------------------------
---------------
Search for <*>
Line numbers <1 to 32767>

PPCL program <1>
Field panel  <1>
State  Line  Statement
-----------------------------------------------------------------
---------------
D U    10    ON(TEST)

PPCL program <BLD990.BLR01.PGM>
Field panel  <1>
State  Line  Statement
-----------------------------------------------------------------
---------------
D U    450   OFF(FAN)

End of report
```

The Effects of Program Changes

When you work on a program, be aware that any change can affect facility operations. A running program controls some aspect of the system. If the controls are changed or removed, how will the system react? To avoid problems when enabling, disabling, adding, modifying, or removing a program, review the following list:

- Identify any points associated with life safety, fire, or smoke control. Take any necessary precautions when working with these types of points.
- Identify any points that influence the operation of other points. Evaluate how a change will affect those points and take the necessary precautions.
- Understand and follow any system shutdown or maintenance procedures.

NOTE:
It is highly recommended that an entire program be disabled before making changes to that program.

Changing a PPCL Program—Procedures

Adding PPCL Program Lines

This function adds a line of PPCL code to a program in a field panel. Before using this function, identify the code to be added, and the field panel and program where it will be added. If a new program is being created, then a name is needed for the program.

NOTE:
Before running a program, the field panel must be made ready and the code must be enabled. To make ready a field panel, see the System Setup chapter.

Adding PPCL Program Lines

HMI	**A, P, E** (Application, Ppcl, Edit)

Prompt/Field	Option/Entry	Description
Program name	Type the exact program name.	A particular program name.
	Type the program name, including wildcard characters.	A range of programs.
	Type **?**, and then type a number from the list.	A program name using a query. The system displays programs matching the criteria. **NOTE:** If you are starting a new program, type the field panel number where the program will reside.
	A	For Add.
Line	Type the line of code, and then press **TAB** or **SPACE**.	To type one line of code and the line number.
	Type the line number, press **TAB** or **SPACE**, and then start typing the line of code.	To type code that extends beyond one line. Type **&** at the end of the first line. Complete the line of code.

The system adds a line of PPCL code to a program in a field panel.

Example

The following example shows how to add a PPCL program line:

```
>Program name                  :  BLD990.AHU01.PGM--------------
>Add, Modify, Copy, Delete, Look, Quit? A
>Line ?  450 IF(SECND4 .GE. 3) THEN ON("bluelight") ELSE
OFF("bluelight")---
PPCL Line Added Program name: BLD990.AHU01.PGM
```

Modifying PPCL Program Lines

This function modifies existing PPCL program lines. Before using this function, identify the program and changes you want to make.

NOTE:
Accelerator keys shorten the modifying process (for example, CTRL+Q, CTRL+W, and CTRL+T).

This procedure can change the control of the system.

Modifying Program Lines

HMI	**A, P, E** (Application, Ppcl, Edit)

Prompt/Field	Option/Entry	Description
Program name	Type the exact program name.	A particular program name.
	Type **?**, and then type a number from the list.	A program name using a query. The system displays programs matching the criteria.
	M	For Modify.
Line number	Type the line number you want to modify.	The system displays the text for the line number. **NOTE:** If the system re-displays the **>LINE NUMBER** prompt, no code is available for the line number.
Line	Type the changes you want to make.	

The system updates the line of PPCL code for the specified program.

Example

The following example shows how to modify a program line:

```
>Program name                 :  BLD990.AHU01.PGM--------------
>Add, Modify, Copy, Delete, Look, Quit? M
>Line number ?  450-----
>Line ?  450 IF(SECND4 .GE. 2) THEN ON("BLUE LIGHT") ELSE
OFF("BLUE LIGHT")-
PPCL Line Added Program name: BLD990.AHU01.PGM
```

Copying PPCL Programs

This function copies an existing PPCL program to another program name. It also allows PPCL code from one program to be merged with another. Before using this function, identify the name of the program to copy (known as the source) and the name and location of the program to copy to (known as the destination).

NOTE:
If the destination program contains line numbers that exist in the source program, the newer lines are not copied. Care should be taken when merging PPCL code from one program to another.

Copying a PPCL Program

HMI	**A, P, E** (Application, Ppcl, Edit)

Prompt/Field	Option/Entry	Description
Program name	Type the exact program name.	A particular program name.
	Type **?**, and then type a number from the list.	A program name using a query. The system displays programs matching the criteria.
	C	For Copy.
Copy to program name	Type the exact program name.	A particular existing program name.
	Type **?**, and then type a number from the list.	A program name using a query. The system displays program matching the criteria.
	Type the new program name.	A new program.
Field panel of Field panel name	Type the field panel identifier.	The system prompts you for the identifier of the field panel where the program will be stored, if the program does not already exist. See *Field Panel Identifier* in the *How to Use this Manual* section for information on field panel identifiers.

If you specified a new program name, the system copies an existing PPCL program to another program name. If you specified an existing program name, the system merges the old and new programs.

Example

The following example shows how to copy a PPCL program:

```
>Program name                  :  BLD990.AHU01.PGM--------------
>Add, Modify, Copy, Delete, Look, Quit? C
>Copy to program name ?  BLD990.BLR01.PGM--------------
>Field panel ?  1--

PPCL Line Added Program name: BLD990.BLR01.PGM
```

Deleting PPCL Program Lines

This function removes PPCL lines from a program. If all of the lines in a PPCL program are deleted, the system automatically deletes the program name.

NOTE:
This procedure can change the control of the system.

Deleting Program Lines

HMI	**A, P, E** (Application, Ppcl, Edit)

Prompt/Field	Option/Entry	Description
Program name	Type the exact program name.	A particular program name.
	Type **?**, and then type a number from the list.	A program name using a query. The system displays programs matching the criteria.
	D	For Delete.
First line number	Press **ENTER**.	The first available line number.
	Type the starting line number.	A particular line number.
Last line number	Press **ENTER**.	For the last available line number.
	Type the ending line number.	A particular line number.
Are you sure (Y/N)	Y	Verify you want to delete the specified lines of code.
	N	Cancel deletion of line of code.

If you verified the deletion, the system removes the specified PPCL lines from the program.

Example

The following example shows how to delete program lines:

```
>Program name                 :  BLD990.AHU01.PGM--------------
>Add, Modify, Copy, Delete, Look, Quit? D
>First line number            :  1000----
>Last line number             :  2000----
>Are you sure (Y/N)           :  Y
PPCL line removed from program BLD990.AHU01.PGM
```

Searching for Specific Program Code

This procedure searches programs for point system names or program statements.

Searching for Point System Names and Program Statements

HMI	**A, P, F** (Application, Ppcl, Find)

Prompt/Field	Option/Entry	Description
Program name	Press **ENTER**.	All programs.
	Type the exact program name.	A particular program name.
	Type **?**, and then type a number from the list.	A program name using a query. The system displays programs matching the criteria.
Field panel of Field panel name	Type the field panel where you are connected.	
	Type the field panel identifier.	The system prompts you for the identifier of the field panel where the program will be stored, if the program does not already exist. See *Field Panel Identifier* in the *How to Use this Manual* section for information on field panel identifiers.
Statement type	Press **ENTER**.	All PPCL statements.
	Type the exact statement.	A particular PPCL statement.
Point system name	Type that point name.	A particular point system name.
	Type **?**, and then type a number from the list.	A point system name using a query. The system displays point system names matching the criteria.
Here, Print	H, P	Specify to display report.

The system displays a PPCL Search report based on the specified information.

Example

The following example shows how to search programs for program statements:

```
07/17/2008 THU                  PPCL SEARCH
REPORT                      08:16pm
-----------------------------------------------------------------
---------------
Program name    : <BLD990.AHU01.PGM>
Statement type  : <ON>
Point system name : <>

PPCL program <BLD990.AHU01.PGM>
State  Line  Statement
-----------------------------------------------------------------
---------------
ET     700   IF(SECND1 .LT. 20) THEN GOTO 900
```

```
ET      900   IF(SECND1 .GT. 0 .AND. SECND1 .LT. 10) THEN AOE00 =
10
              .0 ELSE AOE00 = 0

End of report
```

Enabling or Disabling PPCL Program Lines

This procedure enables or disables PPCL programs. When enabled, the system executes those lines of code. Disabled lines of code are not executed. You can enable or disable all or part of the program.

NOTE:
This procedure can change the control of the system.

Enabling or Disabling Lines of Program Code

HMI	**A, P** (Application, Ppcl)

Prompt/Field	Option/Entry	Description
	E	Enable PPCL lines.
	I	Disable PPCL lines.
Program name	Type the exact program name.	A particular program name.
	Type **?**, and then type a number from the list.	A program name using a query. The system displays programs matching the criteria.
First line number	Press **ENTER**.	The first available line number.
	Type the starting line number.	A particular line number.
Last line number	Press **ENTER**.	The last available line number.
	Type the ending line number.	A particular line number.

The system enables or disables lines of code in the PPCL program.

Example

The following example shows how to enable program lines:

```
>Program name                 :  BLD990.AHU01.PGM--------------
>First line number            :  --------
>Last line number             :  --------
PPCL lines enabled for program BLD990.AHU01.PGM
```

Clearing Program Trace Bits

A trace bit indicates that a program line has been executed at least once since the trace bit was last cleared. Clearing trace bits restarts PPCL from the first line of the program. This allows the flow of a program to be examined.

Clearing Trace Bits

HMI	**A, P, T** (Application, Ppcl, Trace)

Prompt/Field	Option/Entry	Description
Program name	Type the exact program name.	A particular program name.
	Type **?**, and then type a number from the list.	A program name using a query. The system displays programs matching the criteria.

The system clears the program trace bits.

Example

The following example shows how to clear trace bits:

```
>Program name                  :  BLD990.AHU01.PGM--------------
PPCL lines trace bits cleared for program BLD990.AHU01.PGM
```

Appendix A—Point Types

This section includes examples of adding each point type into the field panel. For more information on point types and attributes, see the *Point Database* section.

	CAUTION
	When working on a network with multiple firmware revisions, always connect to the operator interface at the field panel with the newest firmware revision. Otherwise, you cannot view features in newer firmware revisions, or the field panel may coldstart.

Changes To HMI Prompting For BACnet/IP

BACnet/IP uses an Instance Number to identify points, and replaces standard and enhanced alarming. An example of BACnet prompting is shown in *Adding a Logical Analog Output Point* [→ 351] in this section.

Changes To HMI Prompting For Super Universal Points

Some points on TX-I/O Super Universal modules can be configured as either voltage (V) or current (I), Because of these changes, HMI prompting has been altered slightly from APOGEE P2 prompting. Examples of TX-I/O prompting are shown in *Adding a Logical Analog Output Point* [→ 351] and *Adding a Logical Analog Input Point* [→ 353].

Adding a Logical Analog Output Point

This procedure adds a Logical Analog Output (LAO) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- Relinquish default
- Point Alarm information
- Point value type
- Totalization information
- Slope/Intercept values
- Point type
- Engineering units
- Addressing information
- COV limit

The information varies, depending on the type of point you add.

Adding a Logical Point

HMI	**P, E, A** (Point , Edit, Add)

Prompt/Field	Option/Entry	Description
	Specify the initial value.	

The system begins prompting for the attributes of the LAO point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LAO point to a BACnet device:

```
>Point system name            :  damper------------------------
>Instance Number              :  -------
>Point name                   :  damper------------------------
>Point type                   :  lao---
>Descriptor                   :  damper----------
>Float, Integer, Time, Date, dAte-time:  f
>Number of decimal places     :  1
>Engineering units            :  pct-----
>Access group(s)              :  ------------------------------
----------
>Alarmable (Y/N)              :  y
>OFFNORMAL event enabled (Y/N) :  y
>NORMAL event enabled (Y/N)    :  y
>FAULT event enabled (Y/N)     :  y
>Notification ID              :  1------
>Alarm Message number         :  2--
```

```
>High limit                   :  80----------------
>Low limit                    :  20----------------
>Deadband                     :  1-----------------
>TimeDelay (sec)              :  2------
>Field panel                  :  -------
>Physical, Virtual Point address:  p
> FLN                         :  0--
> Drop                        :  0--
> Point                       :  9----
>Slope                        :  .0039-------------
>Intercept                    :  0-----------------
>COV limit                    :  1-----------------
>Relinquish Default           :  0-----------------

>Add, Modify, Copy, Delete, Look, Quit? –
```

The following example shows how to add an LAO current point to a TX-I/O module. The additional entry, **Signal type**, is in bold text.

```
>Point system name            :  damper------------------------
>Instance Number              :  -------
>Point name                   :  damper------------------------
>Point type                   :  lao---
>Descriptor                   :  damper----------
>Float, Integer, Time, Date, dAte-time:  f
>Number of decimal places     :  1
>Engineering units            :  pct-----
>Access group(s)              :  ------------------------------
----------
>Alarmable (Y/N)              :  y
>OFFNORMAL event enabled (Y/N) :  y
>NORMAL event enabled (Y/N)   :  y
>FAULT event enabled (Y/N)    :  y
>Notification ID              :  1------
>Alarm Message number         :  2--
>High limit                   :  80----------------
>Low limit                    :  20----------------
>Deadband                     :  1-----------------
>TimeDelay (sec)              :  2------
>Field panel                  :  -------
>Physical, Virtual Point address:  p
> FLN                         :  0--
> Drop                        :  0--
> Point                       :  9----
> Signal Type               :  I
>Slope                        :  .0039-------------
>Intercept                    :  0-----------------
```

```
>COV limit                    :  1-----------------
>Relinquish Default           :  0-----------------

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical Analog Input Point

This procedure adds a Logical Analog Input (LAI) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- Sensor type
- Point alarm information
- Point value type
- Totalization information
- Slope/Intercept values
- Point type
- Engineering units
- Addressing information
- COV limit

Adding an LAI Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LAI point type.

See the *Point Type Attributes* [➔ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LAI point to a BACnet/IP field panel:

```
>Point system name            :  temp--------------------------
>Instance Number              :  -------
>Point name                   :  temp--------------------------
>Point type                   :  lai---
>Descriptor                   :  roomtemp--------
>Float, Integer, Time, Date, dAte-time:  f
>Number of decimal places     :  1
>Engineering units            :  deg f---
>Access group(s)              :  ------------------------------
----------
>Alarmable (Y/N)              :  y
>OFFNORMAL event enabled (Y/N) :  y
>NORMAL event enabled (Y/N)    :  y
>FAULT event enabled (Y/N)     :  y
>Notification ID              :  1------
```

```
>Alarm Message number         :  2--
>High limit                   :  80----------------
>Low limit                    :  70----------------
>Deadband                     :  1-----------------
>TimeDelay (sec)              :  50-----
>Field panel                  :  -------
>Physical, Virtual Point address:  p
> FLN                         :  0--
> Drop                        :  0--
> Point                       :  17----
>Sensor type                  :  ?
>  1) I  ( Current )
>  2) V  ( Voltage )
>  3) P  ( Pneumatic )
>  4) T  ( Thermistor 100K )
>  5) O  ( Thermistor 10K )
>  6) S  ( Thermistor 10K Type 3 )
>  7) M  ( RTD 1K Platinum 375 )
>  8) R  ( RTD 1K Platinum 385 )
>  9) N  ( RTD 1K Nickel )
> 10) J  ( RTD 1K Nickel JCI )
> 11) D  ( RTD 1K Nickel DIN )
> 12) L  ( L-Type )
> 13) C  ( Custom )
Enter option # or <C> for Cancel> 1-
>Slope                        :  00065104----------
>Intercept                    :  0-----------------
>COV limit                    :  1-----------------
Command successful

>Add, Modify, Copy, Delete, Look, Quit? –
```

The following example shows how to add an LAI voltage point to a TX-I/O module. The additional entry, **Signal type**, is in bold text.

```
>Point system name            :  temp--------------------------
>Instance Number              :  -------
>Point name                   :  temp--------------------------
>Point type                   :  lai---
>Descriptor                   :  roomtemp--------
>Float, Integer, Time, Date, dAte-time:  f
>Number of decimal places     :  1
>Engineering units            :  deg f---
>Access group(s)              :  ------------------------------
----------
>Alarmable (Y/N)              :  y
```

```
>OFFNORMAL event enabled (Y/N) :  y
>NORMAL event enabled (Y/N)    :  y
>FAULT event enabled (Y/N)     :  y
>Notification ID               :  1------
>Alarm Message number          :  2--
>High limit                    :  80----------------
>Low limit                     :  70----------------
>Deadband                      :  1-----------------
>TimeDelay (sec)               :  50-----
>Field panel                   :  -------
>Physical, Virtual Point address:  p
> FLN                          :  0--
> Drop                         :  0--
> Point                        :  17----
>Signal type                   :  V
>Sensor type                   :  ?
>  1) I  ( Current )
>  2) V  ( Voltage )
>  3) P  ( Pneumatic )
>  4) T  ( Thermistor 100K )
>  5) O  ( Thermistor 10K )
>  6) S  ( Thermistor 10K Type 3 )
>  7) M  ( RTD 1K Platinum 375 )
>  8) R  ( RTD 1K Platinum 385 )
>  9) N  ( RTD 1K Nickel )
> 10) J  ( RTD 1K Nickel JCI )
> 11) D  ( RTD 1K Nickel DIN )
> 12) L  ( L-Type )
> 13) C  ( Custom )
Enter option # or <C> for Cancel> 1-
>Slope                         :  00065104----------
>Intercept                     :  0-----------------
>COV limit                     :  1-----------------
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding an LAI Point to a Compact Series Controller

Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- Sensor type
- Point alarm information
- Point value type
- Totalization information
- Slope/Intercept values
- Point type
- Engineering units
- Addressing information
- COV limit

To add an LAI point, complete the following steps:

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LAI point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LAI point to a PXC Compact Controller:

```
>Point system name              :  LAI EXAMPLE-------------------
>Point name                     :  LAI EXAMPLE-------------------
>Point type                     :  LAI---
>Descriptor                     :  EXAMPLE LAI PT--
>Float, Integer, Time, Date, dAte-time:  F
>Number of decimal places       :  2
>Engineering units              :  UNITS-
>Access group(s)                :  ------------------------------
----------
>Alarmable (Y/N)                :  Y
>Enhanced alarms (Y/N)          :  N
>Print alarms (Y/N)             :  Y
>Alarm count 2 (Y/N)            :  N
>Normal ack enabled (Y/N)       :  N
>High limit                     :  90----------------
>Low limit                      :  60----------------
>Totalize (Y/N)                 :  Y
>Totalize in Hours, Minutes, Seconds:  M
>Field panel                    :  1--
>Physical, Virtual Point address:  P
> FLN                           :  0--
> Drop                          :  23-
```

```
> Point                        :  1----
>Sensor type                   :  ?
>  1) I  ( Current )
>  2) V  ( Voltage )
>  3) P  ( Pneumatic )
>  4) T  ( Thermistor 100K )
>  5) O  ( Thermistor 10K )
>  6) S  ( Thermistor 10K Type 3 )
>  7) M  ( RTD 1K Platinum 375 )
>  8) R  ( RTD 1K Platinum 385 )
>  9) N  ( RTD 1K Nickel )
> 10) J  ( RTD 1K Nickel JCI )
> 11) D  ( RTD 1K Nickel DIN )
> 12) L  ( L-Type )
> 13) C  ( Custom )
Enter option # or <C> for Cancel> 4-
>Wire resistance adjustment    :  -4.3244423--------
>Slope                         :  1-----------------
>Intercept                     :  0-----------------
>Dynamic COV limit (Y/N)       :  N
>COV limit                     :  2-----------------
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical Pulsed Accumulator Point

This procedure adds a Logical Pulsed Accumulator (LPACI) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- Gain value
- Point alarm information
- Point value type
- COV limit
- Count both edges?
- Point type
- Engineering units
- Address information

Adding an LPACI Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LPACI point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

```
>Point system name              :  Pulse acc---------------------
>Instance Number                :  -------
>Point name                     :  Pulse acc---------------------
>Point type                     :  lpaci-
>Descriptor                     :  ----------------
>Engineering units              :  kW h-----
>Access group(s)                :  ------------------------------
----------
>Alarmable (Y/N)                :  y
>OFFNORMAL event enabled (Y/N)  :  y
>NORMAL event enabled (Y/N)     :  y
>FAULT event enabled (Y/N)      :  y
>Notification ID                :  1------
>Alarm Message number           :  2--
>High limit                     :  50000-------------
>Deadband                       :  0-----------------
>TimeDelay (sec)                :  0------
>Field panel                    :  -------
>Physical, Virtual Point address:  p
> FLN                           :  0--
> Drop                          :  0--
> Point                         :  8----
>Gain                           :  10----------------
>Count both edges (Y/N)         :  n
>COV limit                      :  10----------------
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical Digital Output Point

This procedure adds a Logical Digital Output (LDO) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- Inverted value information
- Point alarm information
- Point value type
- Totalization information
- Point type
- Engineering units
- State text

Adding an LDO Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LDO point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LDO point:

```
>Point system name            :  LDO EXAMPLE-------------------
>Instance Number              :  -------
>Point name                   :  LDO EXAMPLE-------------------
>Point type                   :  LDO---
>Descriptor                   :  EXAMPLE LDO PT--
>State text table             :  ------------------------------
>Access group(s)              :  ------------------------------
----------
>Alarmable (Y/N)              :  y
>OFFNORMAL event enabled (Y/N) :  y
>NORMAL event enabled (Y/N)   :  y
>FAULT event enabled (Y/N)    :  y
>Notification ID              :  2------
>Alarm Message number         :  4--
>Totalize (Y/N)               :  y
>Field panel                  :  -------
>Physical, Virtual Point address:  p
> FLN                         :  1--
> Drop                        :  2--
> Point                       :  3----
> Invert value (Y/N)          :  n
Command successful
```

```
>Add, Modify, Copy, Delete, Look, Quit?
```

Adding a Logical Digital Input Point

This procedure adds a Logical Digital Input (LDI) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- State text information
- Point alarm information
- Point value type
- Totalization information
- Addressing information
- Point type
- Inverted value
- Delay value
- Normally Open/Closed

Adding an LDI Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LDI point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LDI point:

```
>Point system name             :  LDI EXAMPLE-------------------
>Instance Number               :  -------
>Point name                    :  LDI EXAMPLE-------------------
>Point type                    :  LDI---
>Descriptor                    :  EXAMPLE LDI PT--
>State text table              :  ------------------------------
>Access group(s)               :  ------------------------------
----------
>Alarmable (Y/N)               :  Y
>OFFNORMAL event enabled (Y/N) :  Y
>NORMAL event enabled (Y/N)    :  Y
>FAULT event enabled (Y/N)     :  Y
>Notification ID               :  4------
>Alarm Message number          :  2--
>Totalize (Y/N)                :  Y
>Field panel                   :  -------
>Physical, Virtual Point address:  P
```

```
> FLN                          :  1--
> Drop                         :  2--
> Point                        :  5----
> Normally closed (Y/N)        :  Y
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical 2-State Latched Point

This procedure adds a Logical 2-State Latched (L2SL) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- State text
- Point alarm information
- Point value type
- Totalization information
- Delay value
- Point type
- Addressing information
- Inverted commanding
- Proof information

Adding a L2SL Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the L2SL point type.

See the *Point Type Attributes* [➔ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an L2SL point:

```
>Point system name             :  L2SL EXAMPLE------------------
>Instance Number               :  -------
>Point name                    :  L2SL EXAMPLE------------------
>Point type                    :  L2SL--
>Descriptor                    :  EXAMPLE L2SL PT-
>State text table              :  ------------------------------
>Access group(s)               :  ------------------------------
----------
>Alarmable (Y/N)               :  Y
>OFFNORMAL event enabled (Y/N) :  Y
>NORMAL event enabled (Y/N)    :  N
>FAULT event enabled (Y/N)     :  Y
```

```
>Notification ID              :  3------
>Alarm Message number         :  2--
>Totalize (Y/N)               :  Y
>Field panel                  :  -------
>Physical, Virtual ON OFF Point address:  P
> FLN                         :  1--
> Drop                        :  3--
> Point                       :  1----
> Invert value (Y/N)          :  N
>Physical, Virtual Proof Point address:  P
> FLN                         :  1--
> Drop                        :  2--
> Point                       :  2----
> Normally closed (Y/N)       :  N
> Proof delay (seconds)       :  20---
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical 2-State Pulsed Point

This procedure adds a Logical 2-State Pulsed point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- State text
- Point alarm information
- Point value type
- Totalization information
- Delay value
- Point type
- Addressing information

Adding an L2SP Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the L2SP point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an L2SP point:

```
>Point system name            :  L2SP EXAMPLE------------------
>Instance Number              :  -------
>Point name                   :  L2SP EXAMPLE------------------
>Point type                   :  L2SP--
>Descriptor                   :  EXAMPLE L2SP PT-
>State text table             :  ------------------------------
>Access group(s)              :  ------------------------------
----------
>Alarmable (Y/N)              :  Y
>OFFNORMAL event enabled (Y/N) :  N
>NORMAL event enabled (Y/N)    :  Y
>FAULT event enabled (Y/N)     :  Y
>Notification ID              :  1------
>Alarm Message number         :  2--
>Totalize (Y/N)               :  Y
>Field panel                  :  -------
>Physical, Virtual ON Point address:  P
> FLN                         :  0--
> Drop                        :  4--
> Point                       :  2----
>Physical, Virtual OFF Point address:  P
> FLN                         :  0--
> Drop                        :  5--
> Point                       :  2----
>Proof (Y/N)                  :  Y
>Physical, Virtual Proof Point address:  P
> FLN                         :  0--
> Drop                        :  6--
> Point                       :  2----
> Normally closed (Y/N)       :  Y
> Proof delay (seconds)       :  10---
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical ON-OFF-AUTO Latched Point

This procedure adds a Logical ON/OFF/AUTO Latched (LOOAL) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- State text
- Point alarm information
- Point value type
- Proof information
- Delay value
- Point type
- Addressing information
- Inverted commanding

Adding an LOOAL Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LOOAL point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LOOAL point:

```
>Point system name              :  LOOAL EXAMPLE-----------------
>Instance Number                :  -------
>Point name                     :  LOOAL EXAMPLE-----------------
>Point type                     :  LOOAL-
>Descriptor                     :  EXAMPLE LOOAL PT
>State text table               :  ------------------------------
>Access group(s)                :  ------------------------------
----------
>Alarmable (Y/N)                :  Y
>OFFNORMAL event enabled (Y/N)  :  Y
>NORMAL event enabled (Y/N)     :  Y
>FAULT event enabled (Y/N)      :  Y
>Notification ID                :  -------
>Alarm Message number           :  2--
>Field panel                    :  -------
>Physical, Virtual ON OFF Point address:  P
> FLN                           :  1--
> Drop                          :  1--
> Point                         :  1----
> Invert value (Y/N)            :  N
>Physical, Virtual AUTO Point address:  -
```

```
>Physical, Virtual AUTO Point address:  P
> FLN                          :  1--
> Drop                         :  1--
> Point                        :  2----
> Invert value (Y/N)           :  N
>Proof (Y/N)                   :  Y
>Physical, Virtual Proof Point address:  P
> FLN                          :  1--
> Drop                         :  2--
> Point                        :  1----
> Normally closed (Y/N)        :  N
> Proof delay (seconds)        :  30---
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical ON-OFF-AUTO Pulsed Point

This procedure adds a Logical ON/OFF/AUTO Pulsed point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- State text
- Point alarm information
- Point value type
- Proof information
- Delay value
- Point type
- Addressing information
- Inverted commanding

Adding an LOOAP Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LOOAP point type.

See the *Point Type Attributes* [➔ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LOOAP point:

```
>Point system name             :  LOOAP EXAMPLE-----------------
>Instance Number               :  -------
>Point name                    :  LOOAP EXAMPLE-----------------
>Point type                    :  LOOAP-
>Descriptor                    :  EXAMPLE LOOAP PT
>State text table              :  ------------------------------
>Access group(s)               :  ------------------------------
----------
>Alarmable (Y/N)               :  Y
>OFFNORMAL event enabled (Y/N) :  Y
>NORMAL event enabled (Y/N)    :  Y
>FAULT event enabled (Y/N)     :  Y
>Notification ID               :  4------
>Alarm Message number          :  2--
>Field panel                   :  -------
>Physical, Virtual ON Point address:  P
> FLN                          :  0--
> Drop                         :  32-
> Point                        :  1----
>Physical, Virtual OFF Point address:  P
> FLN                          :  1--
> Drop                         :  ---
> FLN                          :  0--
> Drop                         :  32-
> Point                        :  2----
>Physical, Virtual AUTO Point address:  -
> Point                        :  1----
>Physical, Virtual AUTO Point address:  P
> FLN                          :  0--
> Drop                         :  32-
> Point                        :  3----
> Invert value (Y/N)           :  Y
>Proof (Y/N)                   :  Y
>Physical, Virtual Proof Point address:  P
> FLN                          :  0--
> Drop                         :  32-
> Point                        :  4----
> Normally closed (Y/N)        :  N
> Proof delay (seconds)        :  30---
Command successful

>Add, Modify, Copy, Delete, Look, Quit? –
```

Adding a Logical FAST-SLOW-STOP Latched Point

This procedure adds a Logical FAST/SLOW/STOP Latched (LFSSL) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- State text
- Point alarm information
- Point value type
- Proof information
- Delay value
- Point type
- Addressing information
- Inverted commanding

Adding an LFSSL Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LFSSL point type.

See the *Point Type Attributes* [➞ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LFSSL point:

```
>Point system name             :  LFSSL EXAMPLE-----------------
>Instance Number               :  -------
>Point name                    :  LFSSL EXAMPLE-----------------
>Point type                    :  LFSSL-
>Descriptor                    :  EXAMPLE LFSSL PT
>State text table              :  ------------------------------
>Access group(s)               :  ------------------------------
----------
>Alarmable (Y/N)               :  Y
>OFFNORMAL event enabled (Y/N) :  Y
>NORMAL event enabled (Y/N)    :  Y
>FAULT event enabled (Y/N)     :  Y
>Notification ID               :  8------
>Alarm Message number          :  1--
>Field panel                   :  -------
>Physical, Virtual FAST Point address:  P
> FLN                          :  0--
> Drop                         :  35-
> Point                        :  1----
> Invert value (Y/N)           :  Y
>Physical, Virtual SLOW Point address:  P
```

```
> FLN                       :  0--
> Drop                      :  35-
> Point                     :  2----
> Invert value (Y/N)        :  Y
>Proof (Y/N)                :  Y
>Physical, Virtual Proof Point address:  P
> FLN                       :  0--
> Drop                      :  36-
> Point                     :  1----
> Normally closed (Y/N)     :  N
> Proof delay (seconds)     :  30---
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical FAST-SLOW-STOP Pulsed Point

This procedure adds a Logical FAST/SLOW/STOP Pulsed (LFSSP) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Access groups
- State text
- Point alarm information
- Point value type
- Proof information
- Delay value
- Point type
- Addressing information
- Inverted commanding

Adding an LFSSP Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LFSSP point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add an LFSSP point:

```
>Point system name              :  LFSSP EXAMPLE-----------------
>Instance Number                :  -------
>Point name                     :  LFSSP EXAMPLE-----------------
>Point type                     :  LFSSP-
>Descriptor                     :  EXAMPLE LFSSP PT
>State text table               :  ------------------------------
>Access group(s)                :  ------------------------------
----------
>Alarmable (Y/N)                :  Y
>OFFNORMAL event enabled (Y/N) :  Y
>NORMAL event enabled (Y/N)     :  Y
>FAULT event enabled (Y/N)      :  Y
>Notification ID                :  8------
>Alarm Message number           :  14-
>Field panel                    :  -------
>Physical, Virtual STOP Point address:  P
> FLN                           :  0--
> Drop                          :  37-
> Point                         :  1----
>Physical, Virtual FAST Point address:  P
> FLN                           :  0--
> Drop                          :  37-
> Point                         :  2----
>Physical, Virtual SLOW Point address:  P
> FLN                           :  0--
> Drop                          :  38-
> Point                         :  1----
>Proof (Y/N)                    :  Y
>Physical, Virtual Proof Point address:  P
> FLN                           :  0--
> Drop                          :  39-
> Point                         :  1----
> Normally closed (Y/N)         :  Y
> Proof delay (seconds)         :  30---
Command successful

>Add, Modify, Copy, Delete, Look, Quit? -
```

Adding a Logical Enumerated Point

This procedure adds a Logical enumerated (LENUM) point to the database. Before beginning this procedure, identify the following:

- Point name information
- Descriptor
- Addressing information
- Point alarm information
- Access groups
- Relinquish default information
- Point type
- State text

Adding a LENUM Point

HMI	**P, E, A** (Point, Edit, Add)

The system begins prompting for the attributes of the LENUM point type.

See the *Point Type Attributes* [→ 151] topic in the *Point Database* section concerning specific point attributes and values.

Example

The following example shows how to add a LENUM point:

```
>Point system name             :  LENUM EXAMPLE-----------------
>Instance Number               :  -------
>Point name                    :  LENUM EXAMPLE-----------------
>Point type                    :  LENUM-
>Descriptor                    :  ----------------
>State text table              :  ------------------------------
>Access group(s)               :  ------------------------------
----------
>Alarmable (Y/N)               :  Y
>OFFNORMAL event enabled (Y/N) :  Y
>NORMAL event enabled (Y/N)    :  Y
>FAULT event enabled (Y/N)     :  Y
>Notification ID               :  9------
>Alarm Message number          :  2--
>Alarm value                   :  1-------
>Add another level (Y/N)       :  N
>Field panel                   :  -------
>Physical, Virtual Point address:  P
> FLN                          :  0--
> Drop                         :  2--
> Point                        :  2----
>Relinquish Default            :  DAY-----
Command successful
```

Chapter 11—Peak Demand Limiting (PDL)

This section discusses the subject of Peak Demand Limiting (PDL) and the information necessary for the design and start-up of a distributed PDL control strategy.

WARNING

This chapter contains generic program code intended for the sole purpose of demonstrating how to set up a PDL application. Do not use the example code contained in this chapter as a programming template.

If you are new to the concepts of peak demand limiting, or to any concept discussed in this chapter, please contact your Siemens Industry representative before attempting to implement PDL in your facility.

Before You Begin

Before using the information in this section, you should have a working understanding of the following concepts:

- Electrical power versus electrical consumption
- Utility rate structure applied to your facility
- HVAC equipment used in the facility
- General knowledge of the APOGEE Automation System

This document is intended primarily for engineers and system specialists. It is also recommended that users of this application attend Siemens Industry PDL training classes.

What is PDL?

Electric utilities calculate demand by recording the kilowatts used during a short (typically 15 minutes) time period called a *demand interval*. The highest demand interval for a specified calendar period (usually one to eight months) in turn determines a facility's peak demand charge. In the past, the most common demand interval has been the fixed (set) demand interval, which records the kilowatts consumed in a specified time period. However, most utilities currently use a sliding window demand interval. It more accurately measures the actual peak demand by recording consumption every minute for the entire demand window period, then calculating the average demand for that period. This process continually moves along in one-minute increments. When the next minute's demand value is recorded, the oldest demand value is dropped and a new average demand for the demand window is calculated.

Peak Demand Limiting (PDL) is an application implemented through PPCL that limits consumption of electricity with the intent to prevent higher demand rate charges. In most cases, PDL will be useful on days of extreme temperature variances that place excessive demand on the equipment in the facility. For those days, PDL will prevent higher demand charges by shutting off or reducing the capacity of non-essential electrical loads. The loads will be reactivated once the overall demand decreases and the loads can be restored without adversely affecting the overall demand.

While the PDL application prevents excessive demand charges, it should not be used to duty cycle equipment. If the PDL application continually turns equipment on and off on a daily basis, then the application is not being applied correctly. Also, be aware that duty cycling equipment in some cases, void warranties, shortens the life of equipment, and does not allow PDL to accurately control equipment. For more information, see the *APOGEE Powers Process Control Language (PPCL) User's Manual* (125-1896).

Will PDL Help My Facility?

To effectively implement PDL, a facility must have enough loads that can be turned off, slowed, or moved to other time periods without adversely affecting building operations. As a general rule, PDL is effective when it controls at least 10% of a facility demand. If a power consumption audit of the facility reveals that the lighting (indoor and outdoor), ventilation, cooling, comfort heating, refrigeration, water heating, and motor loads are being used efficiently, then PDL should not be used. Also, electrical loads cannot be turned off during peak times of demand should not be used in PDL.

The best candidates for PDL involve loads that can be shed during building peak hours without having any adverse affects on building operations. The first loads to consider for PDL control are: lighting, heating, air conditioning, refrigeration, and ventilation equipment. Some common examples of loads include (listed in order of consideration):

- Florescent lighting (for facilities that have split-ballast wiring, one or two lamps per fixture can be shut off).
- Speed reductions on variable speed air handler fans and secondary chilled water pumps. When considering these types of loads, consult your Siemens Industry representative.
- Small, non-essential fans, such as rest room and cafeteria exhaust fans, which typically run during the occupied hours of a facility.
- Air handler unit fans (preferably those fans rated at 10HP and under, which allow for multiple start and stops per hour) and can be shut off without violating building codes or regulations.

These types of loads are considered first because they can be temporarily shut off or reduced in capacity to avoid the demand charge, and later restarted before residents in the facility experienced discomfort.

While reviewing the equipment, note the charges for demand and consumption on the electric bills. A high demand charge influences the number of loads that should be considered for PDL. Reviewing past electric bills can also provide a good history of demand levels. This knowledge can assist you in making decisions concerning what the demand setpoints should be.

CAUTION

Always consider building codes and regulations for control equipment before assigning loads to PDL.

If you have concerns or questions related to building codes and regulations, please contact your Siemens Industry, Inc. representative.

Basic PDL Functions

Each PDL program performs the following major functions to help the operator avoid unnecessary high peak electrical demand:

Monitor electrical consumption. PDL continuously tracks the amount of electricity being consumed, by monitoring one or more electrical kilowatt-hour/demand meters. These meters can measure the electrical consumption (kWh), electrical demand (kW), or both.

Forecast demand. PDL samples meter data to continuously forecast the demand likely to be used during successive time intervals.

Shed loads. If the PDL forecasted demand indicates that electricity usage is likely to exceed a preset maximum allowable level, then automatic action is taken to shed (or turn off) electrical loads. Turning off certain electrical loads before the preset maximum is reached helps you reduce the electrical costs of the facility.

Restore loads. Once the demand peak has passed, loads that have been shed must be restored (reactivated) and returned to normal control.

Principal of Operation

All meter monitoring and demand prediction for a meter area is done through a PPCL program residing in one specific field panel (known as the predictor field panel). Normally, all meter inputs from the field connect directly to the predictor field panel. Based on a comparison between the actual demand and predicted demand, the predictor field panel sends a target value to up to seven other field panels containing loads controlled by PDL. During the span of one day, up to seven demand targets can be issued by the predictor field panel, allowing for adjustments to the demand charge Schedule (making it necessary to know when these changes occur). The predictor field panel also decides how many kilowatts of load must be shed from the meter area and is responsible for keeping data for the reports.

The definition of the loads under control of a meter area, and the direct control of the shedding and restoring of those loads, are accomplished by PPCL in one or more field panels (known as *load handling* field panels). The order in which loads are shed and restored, and the assurance that loads are not kept off too long or short-cycled, is left to these field panels. Load handling field panels are also responsible for keeping track of the total loads available to be controlled and for feeding this available load information back to the predictor field panel.

In facilities without an ALN, one field panel handles both the predicting and load handing responsibilities. Facilities with networks may also design their PDL applications in this same manner.

PDL Specific Attributes

The PDL application contains some specific attributes concerning the meters, types of load points controlled, control variables and how the application reports information.

Meter Inputs

The PDL application uses any of the following inputs:

- Pulsed Digital Input representing consumption (kWh) from the utility meter
- 4 to 20 mA, or 0 to 10 Vdc Analog Input representing demand (kW)
- A mix of pulsed consumption (kWh) and analog demand (kW) inputs

If a meter signal is lost due to an ALN communications failure, PDL will control loads in order to maintain each field panels load target at the last assigned value. PPCL has the ability to define default values for the individual meters. You have the choice to use a historical value determined by the PDL application or an actual value defined in kilowatts.

Maximum Number of Meters

A single meter area can sum up to five physical meter inputs. If more than five meters exist per meter area, additional PPCL will have to be written that will sum the LPACI or LAI meter inputs into a virtual LAO point which will serve as the meter input point. Example 2 of the *Example of PDL Applications* section addresses this practice. Contact your Siemens Industry, Inc. representative for more information about extending the maximum number of meters.

Meter Areas

A *meter area* is defined as a collection of meters and loads for which a unique demand prediction is made, a unique group of loads can be shed and restored, and a unique set of PDL reports is generated.

It is common for a facility to sum the inputs from several meters to determine total electrical consumption and demand for a facility. Some larger facilities may be billed separately for different groups of meters, requiring each of the meter groups to have separate definitions, separate demand predictions and separate shed and restore groups of loads.

Type of Load Points Controlled

PDL can control the following types of points:

- Any single or bundled digital output (ON/OFF) point. This includes LDO, L2SL, L2SP, LOOAL, and LOOAP point types.
- Loads can be controlled over multiple ALNs. Up to four ALNs can be connected to a given Insight workstation. If the loads to be controlled are defined on more than four ALNs, an additional Insight workstation is required.

For control of analog points, contact your Siemens Industry representative.

Shedding and Restoring

Each of the individual PDL loads residing in a field panel is associated to one of four priority groups. The order of shedding can be selected as either fixed sequence or round robin within each priority group of the field panel. All load sheds by demand limiting are also subject to user-defined minimum on, minimum off, and maximum off times. Equipment with internal protection devices may also dictate minimum on and off times.

Demand limiting shedding is done at a higher priority than normal load control (PDL priority versus NONE). Loads restored by demand limiting after shedding are kept at PDL priority until their minimum on times have elapsed.

Setpoint (Demand Limit) Definition

The day may be divided into a maximum of seven separate demand limits (setpoints).

Setpoints may be entered as variables to be altered by operator command or seasonal programming without interruption of demand limiting operation.

Prediction Method

The PDL application uses a sliding window (drop oldest sample) average predictor with an adjustable weighting factor to more recent and less recent samples. The adjustable demand window can store up to 30 calculation intervals (samples). The calculation interval (sample time) can use a value as small as one minute.

Warning Messages

The PDL application can issue the following warning messages:

- The network alarm device can receive warning messages whenever the predicted demand crosses the 90% and 100% threshold levels of the setpoint.
- An LDO point can be toggled at the end of any setpoint interval during which the actual sliding window demand exceeded the setpoint.

Database Requirements (Per Meter Area)

The following items are required to define PDL:

- Three PPCL statements (PDLMTR, PDLSET, PDLDPG) to monitor meter input points, make demand predictions, define setpoints, update reports, and issue demand targets. PDLMRT and PDLSET statements are mandatory for monitoring input.
- One virtual LDO load point is required per meter area, which is toggled whenever actual demand exceeds setpoint. Each load handling field panel requires one PPCL statement (PDL) to receive demand targets and manage its loads. Each of these statements require two virtual LAO points (one to hold the demand target, the second to hold the total available kW value under the control of the field panel).
- One PPCL statement (PDLDAT) is required to define each load under demand limiting control. Each statement is entered in the field panel that handles the load even if the load itself is not entered in that field panel.

NOTE:
This is not recommended due to lack of load shed/restore control in the field panel in the event of a communication interrupt.

- Other virtual points may be required if demand limiting PPCL statement parameters (such as setpoints and kW values of loads) are needed for commanding.

If required, additional PPCL is necessary to support automatic report generation.

PPCL Statements Required for PDL

This section discusses the individual PPCL statements needed to accomplish PDL. If PDL is implemented across the ALN where two or more field panels are used, then the predictor and load handling field panels may be different. If PDL is implemented in a single field panel, then that panel serves as both the predictor and load-handling field panel.

The PPCL programming code needed to create the PDL application requires a specific sequence. The following sections generically discuss the necessary PPCL commands and their functionality. For an explanation of the PPCL code, see the *APOGEE Powers Process Control Language (PPCL) User's Manual* (125-1896).

Single Field Panel PDL

When PDL is implemented in a single field panel (the predictor and load-handling field panels are the same), that field panel performs all of the functions of PDL. The program code must be entered in the following sequence:

1. PDLMTR
2. PDLSET
3. PDLDPG
4. PDL
5. PDLDAT

Multiple Field Panel PDL

When PDL is implemented over an ALN, the program code is divided between a predictor and one or more load-handling field panels. The predictor field panel requires three statements (defined in the following order), PDLMTR, PDLSET, PDLDPG. These statements use meter inputs and total kilowatt information from load handling field panels. They monitor and predict demand and determine the correct value of the LAO target points for PDL statements in a meter area.

Each load-handling field panel requires two statements (defined in order), PDL and PDLDAT. A single PDL statement and a group of PDLDAT statements work as a team to define load parameters and maintain a kilowatt level, or a target for that group of loads.

PPCL Commands

The following commands are used to implement PDL in the field panels:

PDL

This statement is responsible for the direct control of a group of PDLDAT statements. The PDL command performs the following functions:

- Maintains a target kW value by shedding and restoring loads. This value is passed to the PDL statement by the PDLDPG statement, through a LAO point value.
- Keeps track of the total available kilowatts under its control. The PDL statement determines which of the loads defined in the PDLDAT statements associated with it are actually available for peak demand limiting control and places the total kilowatts available to it in a LAO point.
- Defines which of four priority groups each load under its control belongs. This is accomplished by checking the line numbers of PDLDAT statements.
- Defines and controls the sequence of shedding and restoring (fixed sequence or round robin) for each priority group.

The PDL command contains the following parameters:

Meter area number	The number assigned to a particular meter area.
Total available kilowatt value	Total amount of power consumed by all of the loads under control of PDL in the field panel. A power consuming load is any point defined with a PDLDAT command. The value of this LAO point is calculated by the PDL command and must correspond to the point defined in the available *kilowatt total* parameter of the PDLDPG point.
Target value	The power consumption limit that the PDL command should maintain. The value of this LAO point is calculated by the PDLDPG command and must correspond to the point defined in the *target value* parameter of the PDLDPG command. **NOTE:** To prevent any unnecessary shedding of loads on an initial field panel startup or a return from power failure, and to assure that PDL starts from a "steady-state" condition, do the f following: - Recommand the target point with an ONPWRT statement that jumps to a section of code resetting the target point to a value slightly above the sum of the KW value of all point under PDL control in that cabinet (see *Example of PDL Applications* in this chapter).
Priority group definition (one to four groups possible)	Up to four priority groups can be defined, each group containing three specific values: a beginning PPCL line number, an ending PPCL line number, and the type of shed action. The first priority group defined is shed, followed by the second group, and so on. The beginning and ending line numbers define a range of PPCL code containing PDLDAT commands. The shed type determines how the field panel sheds the loads contained within the range (either a fixed sequence shedding or round robin).

PDLDAT

A PDLDAT (*PDL data*) command is the description of the load controlled by PDL. The PDLDAT command contains the following parameters:

Point name of load	Point name of the load controlled by PDL.
Minimum on-time	Minimum time in minutes that PDL must keep the load ON after being restored.
Minimum off-time	Minimum time in minutes that a load must remain OFF before it can be restored by PDL.
Maximum off-time	Maximum time in minutes that PDL can keep a load switched off before it must be restored. Maximum off-time also has special importance for supply air fans providing a mixture of outdoor air and supply air to a space. Maximum off-time should be chosen so that the total amount of outside air does not fall below the specifications required by code.
Kilowatt rating	Kilowatt rating of the load.

The choice of minimum on, minimum off and maximum off times for a given load depend on the type of equipment and kW rating of the load. During periods of heavy PDL activity, a load may be shed and restored several times in a short period of time. Before assigning values to these parameters, you must consider the limitations of the equipment so that the equipment can operate in a safe manner.

The minimum on-time, minimum off-time, maximum off-time and kilowatt rating values can also be determined by consulting the technical specifications for a particular piece of equipment. If the specifications are unavailable, you can consult National Electric Manufacturers Association (NEMA) documentation for the latest general specifications.

The following table provides specifications, as determined by NEMA, for single speed and two speed motor sizes:

Single Speed Motor Size	Recommended Maximum Number of Starts per Hour	Minimum ON Time in Minutes	Minimum OFF Time in Minutes
1 HP (0.746 kW)	10	3	3
2 HP (1.49 kW)	8	4	3
5 HP (3.73 kW)	6	5	5
10 HP (7.46 kW)	4	8	7
25 HP (18.65 kW)	1	30	30
Greater than 25 HP	Consult motor manufacturer		
Two Speed Motor Size	**Recommended Maximum Number of Starts per Hour**	**Minimum ON Time in Minutes**	**Minimum OFF Time in Minutes**
1 HP (0.746 kW)	12	3	2
2 HP (1.49 kW)	10	3	3
5 HP (3.73 kW)	8	4	3
10 HP (7.46 kW)	6	5	5
25 HP (18.65 kW)	2	20	20
Greater than 25 HP	Consult motor manufacturer		

Controlling Loads over the ALN with PDLDAT

Although a PDLDAT statement in one field panel can control a load in another field panel (whether on that ALN or on another ALN), it is recommended that you avoid this design. If communication is lost between these two field panels and PDL determines that a load must be shed, the command to shed the load will fail. PDL does not incorporate a status feedback to confirm the shedding and restoring of loads.

PDLMTR

The PDLMTR (*PDL meter*) statement has the primary role in monitoring meters, making predictions, and keeping report data up to date. There is only one of these statements per meter area. This statement defines the following:

- Meters by logical point name.
- Calculation interval (how often are demand predictions made).
- Sliding prediction window width.
- Historical weighting factor for sliding window prediction, default values to be used if meters cannot be read.

- Whether or not warning messages will be issued as the predicted demand nears or exceeds setpoint.
- Full scale demand for time versus demand plot section of reports.

The PDLMTR statement is responsible for the following actions:

- Making sliding window demand predictions.
- Updating report information pertaining to demand and consumption.
- Deciding when warning messages should be issued.
- Initializing and restarting a meter area.

The PDLMTR contains the following parameters:

Meter area number	The number assigned to a particular meter area.
Historical forecast weighting factor	The historical weighting factor defined as a percentage. This factor multiplies the calculated average of the last (most recent) half window demand values recorded by PDL. The default value is 30% of the anticipated demand.
Calculation interval	Defines the calculation interval in minutes.
Demand window interval	Defines the sliding window interval in minutes.
Plot	Defines the maximum value for the time versus demand plot section of the PDL activity report.
Warning messages	Determines if PDL will issue warning messages.
Meter point names (up to five points possible)	The first value of a corresponding pair defining the point names of up to five demand or consumption meters. Each meter point requires an associated default value.
Default values (up to five points or values possible)	The second value of a corresponding pair defining the default values used as the meter reading when communication is lost on the ALN. You have the option to use a historical value or a value defined in kilowatts.

PDLSET

The PDLSET *setpoint* statement is responsible for defining the peak demand levels for a meter area, and the time of day during which those setpoints are in effect. The demand predictions made by the PDLMTR command are compared to the appropriate setpoints as determined by this statement to determine how many kilowatts, if any, are to be shed or restored for the meter area.

The PDLSET contains the following parameters:

Meter area number	The number assigned to a particular meter area.
Exceeded setpoint indicator	A DO point that is commanded OFF at the end of each interval. The point is commanded ON if the demand exceeds the setpoint during the interval.
Demand setpoint (total of seven possible)	First value of a corresponding pair defining a demand setpoint value that the meter area should not exceed. Each demand setpoint requires an ending time value.
Ending time (total of seven possible)	Second value of a corresponding pair defining the ending time for the associated setpoint. Each ending time requires a demand setpoint.

PDLDPG

The PDLDPG (*PDL Digital Point Group*) statement keeps track of how many kilowatts worth of load are available in each load handling field panel, and how many of those kilowatts should be shed or restored at any time in each of those panels. This statement is also responsible for setting the target value for each PDL command associated with a meter area.

The PDLDPG contains the following parameters:

Meter area number	The number assigned to a particular meter area.
Total available kilowatt (up to seven points possible)	First point of a corresponding pair defining the amount of power consumed by the loads under control of the PDL command. This point should be defined as a virtual LAO point and requires an associated target point. The value of this point is calculated by the PDL command and must correspond to the point name defined in the total kilowatt parameter of the PDL command.
Target value (up to seven points possible)	Second point of a corresponding pair defining the power consumption limit that the PDL command should maintain. The value of this point is calculated by the PDLDPG command and must correspond to the point name defined in the target value parameter of the PDL command. NOTE: To prevent any unnecessary shedding of loads on an initial field panel startup or a return from power failure, and to assure that PDL starts from a "steady-state" condition, do the following: - Recommand the target point with an ONPWRT statement that jumps to a section of code resetting the target point to a value slightly above the sum of the kW value of all points under PDL control in that cabinet (see Example of PDL Applications [➙ 384] in this chapter).

PDL Activity Report

The PDL application provides a single report for each meter area. The report can be displayed at any field panel on a network or sent to the system printer. The PDL Activity report consists of the following three sections:

- The *Billing Period Summary* section contains consumption and actual sliding window peak demand for an adjustable billing period (monthly, semi-monthly, and so on).
- The *24-hour Summary* section contains: setpoint interval begin and end times, setpoints, actual sliding window peak demand values during the setpoint interval, time of occurrence for those demand vales, and consumption for the previous twenty-four hours.
- The *Demand vs. Time Plot* section contains the plot of demand at fifteen minute intervals for the previous twenty-four hours.

This report may be triggered automatically through PPCL, and also resides as part of the field panel interface.

Generating a PDL Activity Report

The following example demonstrates how to generate the PDL Activity report:

HMI	**A, P, P, D, H** or **P** (Application, Ppcl, Pdl, Display, Here or Printer)

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? a
>Ppcl, flNdevice, Schedule, Quit? p
>Log, Display, Edit, Find, eNable, dIsable, Trace, Pdl, tUne,
Quit? p
>Display, Restart, Initsummary, Quit? d
>Here, Printer                 :  h
>Meter area
```

```
PDL Activity Report     Meter Area 1  15:00 29-Sep-96
-----------------------------------------------------------------
-----------

Billing Period Summary

                    Shed          Peak         Time and
Date    Consumption
Begin    End      Setpoint       Demand           of Peak
-----------------------------------------------------------------
-----------
23:59   00:00   100   KW    10.0      KW     23:59 28-
Sep    0.166666  KWH
00.00   04:00   200   KW    202.6666  KW     18:38 28-
Sep    90.83301  KWH
04:00   08:00   300   KW    10.0      KW     04:00 29-
Sep    40.0      KWH
08:00   12:00   400   KW    10.0      KW     08:00 29-
Sep    40.0      KWH
12:00   16:00   500   KW    10.0      KW     12:00 29-
Sep    29.0      KWH
16:00   20:00   600   KW    467.3333  KW     18:00 28-
Sep    78.83314  KWH

                                                 Total        349
.6659  KWH
24 Hour Summary

                    Shed          Peak         Time and
Date    Consumption
Begin    End      Setpoint       Demand           of Peak
-----------------------------------------------------------------
-----------
23:59   00:00   100   KW    10.0      KW     23:59 28-
Sep    0.166666  KWH
00.00   04:00   200   KW    202.6666  KW     18:38 28-
Sep    90.83301  KWH
04:00   08:00   300   KW    10.0      KW     04:00 29-
Sep    40.0      KWH
08:00   12:00   400   KW    10.0      KW     08:00 29-
Sep    40.0      KWH
12:00   16:00   500   KW    10.0      KW     12:00 29-
Sep    29.0      KWH
16:00   20:00   300   KW    467.3333  KW     18:00 28-
Sep    78.83314  KWH
20:00   23:59   100   KW    10.0      KW     20:00 28-
Sep    39.8334   KWH

Demand vs Time Plot
```

```
Begin  Day    Percentage of 500.0     KW
==================================================================
======
17:30     Y      0      KW     ? |     |
17:45     Y      0      KW     ? |     |
18:00     Y      0      KW     ? |     |
18:15     Y      1      KW     ? |X    |
18:30     Y      402    KW     D
|XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX      |
18:45     Y      75     KW     D |XXXXXXX     |
19:00     Y      10     KW     D |X    |
19:15     Y      10     KW     D |X    |
19:30     Y      10     KW     D |X    |
```

Billing Period Summary Section

This section of the report logs data on actual sliding window peak demand and consumption during daily setpoint intervals, as well as total consumption since the last initialization (reset to zero) of the data in this section. Zeroing the billing period summary data has no effect on data in the other two sections of the report.

The billing period summary section is intended to provide summary information for comparison with utility bills. Data is kept until reset by operator action. The billing period is typically one month. The data in this section of the report is always displayed in chronological order from midnight by setpoint interval end time.

24-Hour Summary Section

This section of the report provides a summary of peak demand and consumption for the previous twenty-four hours. It is updated each time a new setpoint interval is entered (This is much less frequently than the billing period section). The data in this section of the report is always displayed in chronological order from midnight by setpoint interval.

Demand vs. Time Plot

The demand versus time section provides a graphical profile of average demand (kW) for each quarter hour (15 minutes) during the past twenty-four hours. This data is updated on each fifteen minute clock boundary. Data is displayed as oldest at the top, and a "Y" or "T" (Yesterday or Today) besides the data serves as a reminder of this to the observer. This section also provides an indication that a meter default value used by PDL (shown by the letter "D" appearing next to the plot for the 15-minute interval). If a power failure occurs or the PDLMTR statement was disabled or failed, the report will indicate invalid data by displaying a question mark (?) next to the plot for the interval.

Start/Stop Time Optimization (SSTO)

See the *BACnet Field Panel Web Server (FPWeb)* (125-3584) for more information and a full description of the Start/Stop Time Optimization (SSTO) feature.

Insight software provides you the ability to configure and enable SSTO for BACnet schedules.

When the **Schedule Optimization Enabled** check box is selected:

- The 12 default SSTO Action Titles are added to the **Action** list (see table below).
- The + and - buttons of the **Action** list are grayed out.
- You can add commands to the action.
- You cannot change the name of the actions. The **Action Title** field in the **Actions** dialog box is grayed out.

Index	Action Title	Description of "State"
1	VAC	Actions for vacant (unoccupied) time periods
2	OCC1	Actions for 1st occupied time period
3	OCC2	Actions for 2nd occupied time period
4	OCC3	Actions for 3rd occupied time period
5	OCC4	Actions for 4th occupied time period
6	OCC5	Actions for 5th occupied time period
7	WARMUP	Early start time actions used to heat the zone to occupied setpoint
8	COOLDOWN	Early start time actions used to cool the zone to occupied setpoint
9	NGHT_HTG	Night time actions for controlling heating
10	NGHT_CLG	Night time actions for controlling cooling
11	STOP_HTG	Early stop time actions used when in heating
12	STOP_CLG	Early start time actions used when in cooling

When you save the Command object:

- The **Schedule Optimization Enabled** checkbox is grayed out.
- The Command Object is saved to the field panel.

Important Notes and Cautions on PDL Operation

The following items cover some important points about PDL operation over an ALN.

PDL is started by the PDLMTR statement the first time it is executed.

PDL may be restarted by an operator command sequence through the Operator Interface Program at the field panel. Following a PDL Restart command, all report data is zeroed out and one-half of a demand window interval must pass before any warnings or new triggers are set by the PDLMTR statement. It is suggested that PDL be restarted whenever you change any PDL statement other than the PDLDAT statement. Performing a Disable/Enable or Remove/Add of any PDL statements are handled gracefully, but data logging in reports may not be correct.

If you are unsure of the gain value of an LPACI meter input point, make sure that you disable the PDLMTR statement before removing and re-adding the point to change its gain. Remember that removing a point causes a statement, which references it into the unresolved state. In this state, the PDLMTR statement will not execute until the point is re-added, and demand predictions and table updates will become unsynchronized.

The PDL statement will run with whatever target value it sees, regardless of what other PDL statements are doing. For example, the PDL statement will maintain its target even if PDLMTR is removed or disabled. This is an important feature, since it allows you to set targets for PDL(…) statements to some safe value if communication is lost with the predictor field panel.

Following warmstarts, statement enables, and PDL restarts, PDLMTR(…) will not issue warning messages or set demand targets (shed loads) until one-half of a demand window interval has passed. If you are afraid of exceeding a setpoint after a return from a power failure, set a safe target value as part of your ONPWRT code.

There is a resident point in each field panel called $PDL. This point represents the value of the demand prediction made by the PDLMTR statement each calculation interval. This point may be equated to a virtual LAO point and displayed, trended, and so on to check that PDL is operating correctly.

The time arguments in the PDLSET statement **must be in ascending order**. If these times are entered as point names, they may be changed by commanding the points, but **ascending order must be preserved and you should not change the end time of the current interval to a time before the present**. Please note that any times on reports are current, and therefore peaks and consumptions may appear out-of-whack with times if you do this. The reports store data by setpoint interval, not the times used to define those intervals.

If setpoint arguments are entered as point names, they may be changed at any time; however, realize that the reports will reflect only what is current.

PDL sheds loads by issuing an OFF command at PDL priority. If the command is successful, PDL begins the minimum off and maximum off timers for that load. PDL will not command the load ON before it minimum off timer has expired. PDL will automatically turn a load ON once its maximum off timer has expired.

When PDL restores a load, it issues an ON command at PDL priority, waits until the load’s minimum on time has expired, and then changes the load’s priority to NONE.

Operator commands and PPCL emergency commands can override commands issued by PDL.

For proper operation, **do not** set points controlled by PDL to PDL priority by operator command.

It is a good idea to release any loads under PDL control to priority NONE on return from power failure. It is the best way to assure that PDL does not lose control of loads that were in the minimum-on time period when the power failure occurred.

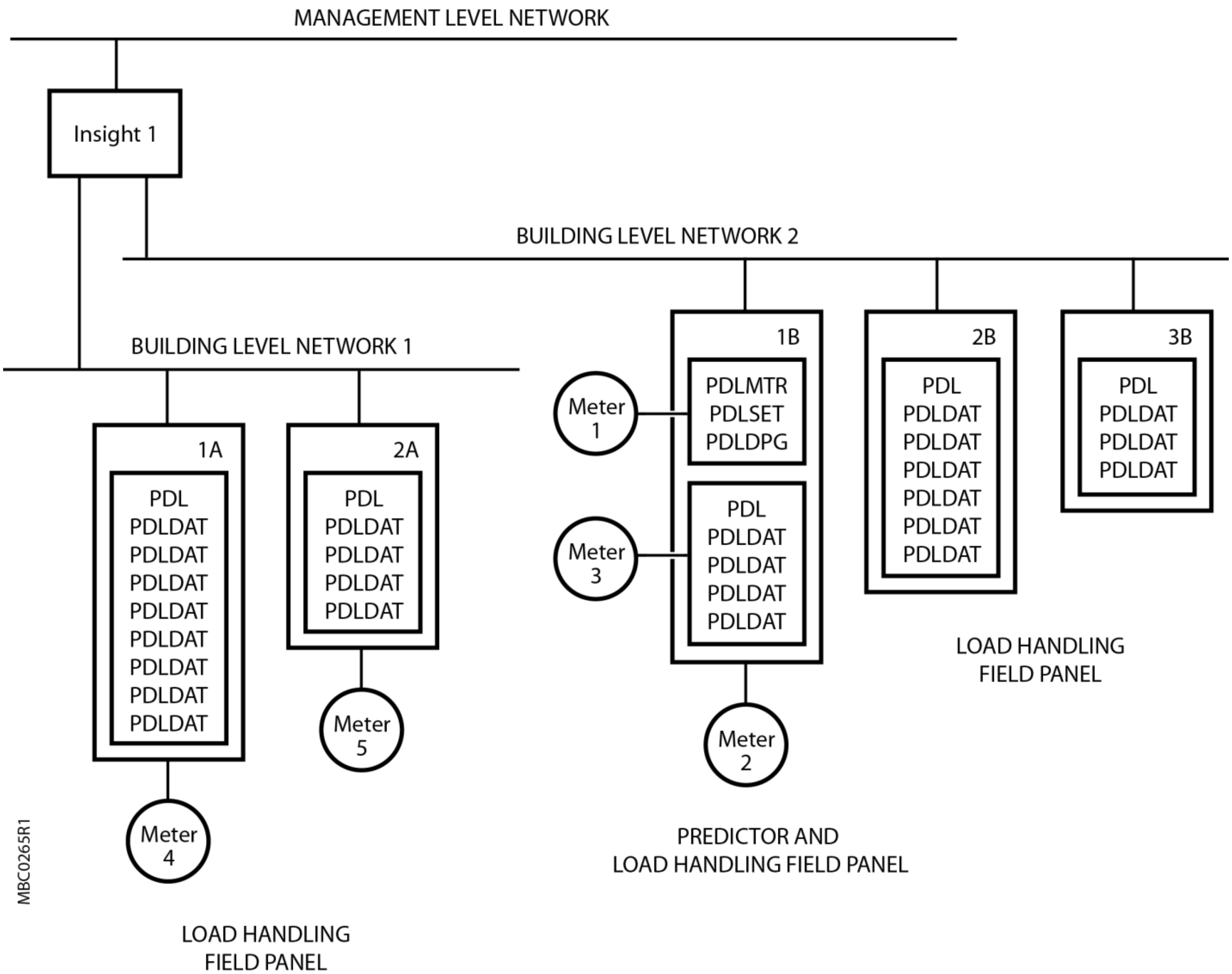
Examples of PDL Applications

The following applications are generic examples of implementing PDL. The examples should only be used for the purpose of learning how the PDL application is implemented through PPCL. Please contact your Siemens Industry representative concerning specific PDL application solutions for your facility.

Example 1

The system contains five field panels with APOGEE firmware installed, all of which are involved with demand limiting. Field panel 1B serves as both a predictor and load handling field panel; the remaining field panels are load-handling only. Three meter input points are physically wired to field panel 1B. One physical meter input is wired to field panel 1A and one physical meter input is wired to field panel 2A. Meter points 1, 2, and 3 are pulsed inputs (LPACI point type), while meter points 4 and 5 are analog inputs, reading instantaneous kW.

The following diagram illustrates Example 1:



Point List

The following table lists the loads that the field panels control:

Field Panel 1A	Field Panel 2A	Field Panel 1AB	Field Panel 2B	Field Panel 3B
FAN01	PUMP01	CHLR01	LITE01	ZONE01
FAN02	PUMP02	CHLR02	LITE02	ZONE02
FAN03	PUMP03	CHLR03	LITE03	ZONE03
FAN04	PUMP04	CHLR04	LITE04	
FAN05			LITE05	
FAN06			LITE06	
FAN07				
FAN08				

Example PPCL Code

WARNING

This generic program code is intended for the sole purpose of demonstrating how to set up a Peak Demand Limiting (PDL) application. Do not use the example code contained in this chapter as a programming template.

If you are new to PDL concepts or to any concept discussed in this chapter, please contact your Siemens Industry representative before attempting to implement PDL in your facility.

Example code for field panel 1A:

```
50 PDL(1,TKW1A,TGT1A,100,110,1,200,210,1,300,310,1,400,410,1)
100 PDLDAT(FAN01,10,10,60,7.46)
110 PDLDAT(FAN02,10,10,60,7.46)
200 PDLDAT(FAN03,10,10,60,7.46)
210 PDLDAT(FAN04,10,10,60,7.46)
300 PDLDAT(FAN05,10,10,60,7.46)
310 PDLDAT(FAN06,10,10,60,7.46)
400 PDLDAT(FAN07,10,10,60,7.46)
410 PDLDAT(FAN08,10,10,60,7.46)
```

Example code for field panel 2A:

```
10 PDL(1,TKW2A,TGT2A,100,120,0,200,200,0,0,0,0,0,0,0)
100 PDLDAT(PUMP01,10,20,60,14.92)
110 PDLDAT(PUMP01,10,20,60,14.92)
120 PDLDAT(PUMP01,10,20,60,14.92)
200 PDLDAT(PUMP01,10,20,60,14.92)
```

Example code for field panel 1B:

```
5   ONPWRT(10000)
10 VMETER=METER4+METER5
```

```
20
PDLMTR(1,30,1,15,2000,1,METER1,200,METER2,150,METER3,100,VMETER,
400)
30 PDLSET(1,EXCEED,KWSET1,06:00,KWSET2,20:00)
40
PDLDPG(1,TKW1A,TGT1A,TKW2A,TGT2A,TKW1B,TGT1B,TKW2B,TGT2B,TKW3B,T
GT3B)
50 PDL(1,TKW1B,TGT1B,100,199,0,0,0,0,0,0,0,400,499,0)
100 PDLDAT(CHLR01,20,30,480,25.0)
400 PDLDAT(CHLR02,20,30,480,25.0)
410 PDLDAT(CHLR03,20,30,480,25.0)
420 PDLDAT(CHLR04,20,30,480,25.0)
....................
(Rest of program)
.......................
9960  GOTO 12000
9970  C
9980  C    ONPWRT ROUTINE TO RESET DEMAND TARGETS
9990  C
10000 TGT1A=65.0
10010 TGT2A=65.0
10020 TGT1B=110.0
10030 TGT2B=30.0
10040 TGT3B=15.0
10050 C
10060 C
12000 GOTO 5
```

Example code for field panel 2B:

```
10 PDL(1,TKW2B,TGT2B,100,199,1,200,299,1,300,399,1,0,0,0)
100 PDLDAT(LITE01,10,10,60,4.0)
110 PDLDAT(LITE02,10,10,60,4.0)
200 PDLDAT(LITE03,10,10,60,4.0)
210 PDLDAT(LITE04,10,10,60,4.0)
300 PDLDAT(LITE05,10,10,60,4.0)
310 PDLDAT(LITE06,10,10,60,4.0)
```

Example code for field panel 3B:

```
10 PDL(1,TKW3B,TGT3B,100,199,0,200,299,0,0,0,0,0,0,0)
100 PDLDAT(ZONE01,10,10,60,4.0)
110 PDLDAT(ZONE02,10,10,60,4.0)
200 PDLDAT(ZONE03,10,10,60,4.0)
```

Application Notes

The following notes apply to the various field panels:

- Notes for Field Panel 1A
- Notes for Field Panel 2A
- Notes for Field Panel 1B
- Notes for Field Panel 2B
- Notes for Field Panel 3B

Notes for Field Panel 1A

The PDL statement defines the following:

- The meter area is 1.
- The point in which it keeps the total of all the kW values of loads defined under its control and available for PDL control is TKW1A.
- The point that tells this statement what kW target to maintain is TGT1A.
- The line ranges in which PDLDAT statements define loads in each of four priority groups are:
  - Group 1 between lines 100 and 110 inclusive
  - Group 2 between lines 200 and 210 inclusive
  - Group 3 between lines 300 and 310 inclusive
  - Group 4 between lines 400 and 410 inclusive

The PDLDAT statements define which loads are under the control of the PDL statement and the time constraints and kW values for each. The shedding mode, fixed sequence (0) or round robin (1), for each priority group is as follows:

- Group 1: Round Robin
- Group 2: Round Robin
- Group 3: Round Robin
- Group 4: Round Robin

Notes for Field Panel 2A

The PDL statement defines the following:

- The meter area is 1.
- The point in which it keeps the total of all the kW values of loads defined under its control and available for PDL control is TKW2A.
- The point that tells this statement what kW target to maintain is TGT2A.
- The line ranges in which PDLDAT statements define loads in each of four priority groups are:
  - Group 1 between lines 100 and 120 inclusive
  - Group 2 between lines 200 and 200 inclusive

The PDLDAT statements define which loads are under the control of the PDL statement and the time constraints and kW values for each. The shedding mode, fixed sequence (0) or round robin (1), for each priority group is:

- Group 1: Fixed Sequence
- Group 2: Fixed Sequence
- Group 3: Does not matter – fixed sequence entered here
- Group 4: Does not matter – fixed sequence entered here

Notes for Field Panel 1B

The point `VMETER` is a virtual LAO point and stores the sum of analog input meter points `METER4` and `METER5`. Note that this statement is valid only for meter points of the analog input point type. For summing LPACI meter input points, see *Example 2.*

The PDLMTR statement defines the following:

- The meter area number is 1.
- The historical weighting factor is 30%.
- The calculation interval is 1 minute.
- The prediction window is 15 minutes.
- The Time vs. Demand section of the PDL Activity report has a full scale of 2000 kW.
- Warning messages are enabled to be sent to alarm devices.
- This meter area has four meters (METER1, METER2, METER3, and VMETER). Their default values are 200, 150, 100, and 400 kW, respectively.

The PDLSET statement defines the following:

- The meter area is 1 to match the PDLMTR statement.
- The `EXCEED` virtual LDO point will toggle OFF/ON at the end of setpoint intervals during which the setpoint was exceeded.
- This meter area has two daily setpoints which have been entered as variables: KWSET1 and KWSET2. KWSET1 ends at 6:00 A.M. and KWSET2 ends at 8:00 P.M.

The PDLDPG statement:

- The meter area is 1 to match the PDLMTR statement.
- Keeps track of the total available kilowatts by adding the values of TKW1A, TKW2A, TKW1B, TKW2B, and TKW3B. These are the total kilowatt points from the PDL statements in field panels 1A, 2A, 1B, 2B, and 3B.
- Issues demand targets to those PDL statements by changing the values of TGT1A, TGT2A, TGT1B, TGT2B, and TGT3B.

The PDL statement defines the following:

- The meter area is 1.
- The point in which it keeps the total of all the kW values of loads defined under its control and available for PDL control is TKW1B.
- The point that tells this statement what kW target to maintain is TGT1B.
- The line ranges in which PDLDAT statements define loads in each of four priority groups are:
  - Group 1 between line 100 and 199 inclusive
  - Group 2 between line 0 and line 0 has no loads in this group
  - Group 3 between line 0 and line 0 has no loads in this group
  - Group 4 between lines 400 and 499 inclusive
- The shedding mode, fixed sequence (0) or round robin (1), for each priority group is:
  - Group 1: Fixed
  - Group 2: Does not matter – fixed sequence entered here
  - Group 3: Does not matter – fixed sequence entered here
  - Group 4: Fixed

The PDLDAT statements define which loads are under the control of the PDL statement and the time constraints and kW values for each.

NOTE:
The loads `CHLR01`, `CHLR02`, `CHLR03`, and `CHLR04` are meant to convey equal incremental load reductions for a given chiller – not the turning ON/OFF of individual chillers.

For example, line 400 specifies that the load name is `CHLR02` and includes the following information:

- Minimum ON time is 20 minutes
- Minimum OFF time is 30 minutes
- Maximum OFF time is 480 minutes
- Nominal kW value is 25.0 kW

Notes for Field Panel 2B

The PDL statement defines the following:

- The meter area is 1.
- The point in which it keeps the total of all the kW values of loads defined under its control and available for PDL control is TKW2B.
- The point that tells this statement what kW target to maintain is TGT2B.
- The line ranges in which PDLDAT statements define loads in each of four priority groups are:
  - Group 1 between lines 100 and 199 inclusive
  - Group 2 between lines 200 and 299 inclusive
  - Group 3 between lines 300 and 399 inclusive
  - Group 4 between lines 0 and 0 inclusive has no loads in this group

The PDLDAT statements define which loads are under the control of the PDL statement and the time constraints and kW values for each. The shedding mode, fixed sequence (0), or round robin (1), for each priority group is:

- Group 1: Round Robin
- Group 2: Round Robin
- Group 3: Round Robin
- Group 4: Does not matter—fixed sequence entered here

Notes for Field Panel 3B

The PDL statement defines the following:

- The meter area is 1.
- The point in which it keeps the total of all the kW values of loads defined under its control and available for PDL control is TKW3B.
- The point that tells this statement what kW target to maintain is TGT3B.
- The line ranges in which PDLDAT statements define loads in each of four priority groups are:
  - Group 1 between lines 100 and 199 inclusive
  - Group 1 between lines 200 and 299 inclusive
  - Group 1 between lines 0 and 0 inclusive has no loads in this group
  - Group 4 between lines 0 and 0 inclusive has no loads in this group

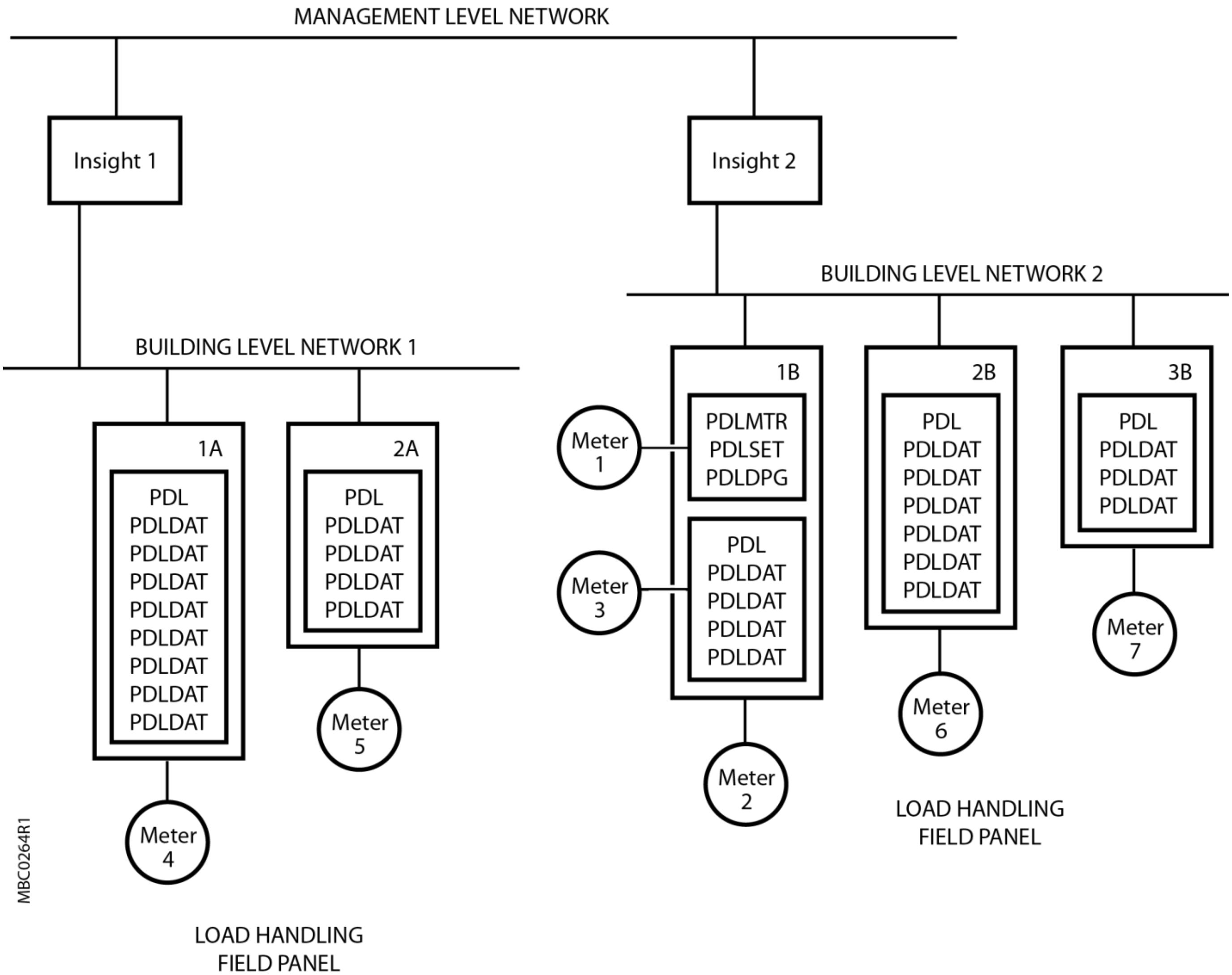
The PDLDAT statements define which loads are under the control of the PDL statement and the time constraints and kW values for each. The shedding mode, fixed sequence (0), or round robin (1), for each priority group is:

- Group 1: Fixed Sequence
- Group 2: Fixed Sequence
- Group 3: Does not matter—fixed sequence entered here
- Group 4: Does not matter—fixed sequence entered here

Example 2

Example 2 is identical to Example 1, except that another Insight workstation has been added that is connected to Insight 1 by an MLN, and two additional LPACI meter inputs (point names `METER6` and `METER7`) have been added.

The following diagram illustrates Example 2:



Point List

The following is a modified list of points for the example program code in field panel 1B:

Point Name	Description	Slope	Intercept	Point Type
LPAC1 LPAC2 LPAC3 LPAC6 LPAC7	Physical pulse accumulator points representing kWh consumption	N/A	N/A	LPACI
VLAO1 VLAO2 VLAO3 VLAO6 VLAO7	Virtual LAO points representing the previous kWh value of LPAC1, LPAC2, LPAC3, LPAC6, and LPAC7	1.0	0.0	Virtual LAO
VLAOKW	Calculated total kW serving as PDL meter input point	1.0	0.0	Virtual LAO

Additional/Modified for Example PPCL Code in Field Panel 1B

The PPCL required to code the PDL application in this example is identical to that for Example 1, except that additional PPCL is needed to sum the meter inputs for the LPACI meter points (`METER1`, `METER2`, `METER3`, `METER6`, and `METER7`), and the PDLMTR statement in field panel 1B must be modified as shown in the following example. This example also illustrates how this additional code would reside in Field Panel 1B.

```
10  C
20  ONPWRT(10000)
30  C
60 C      SAMPLE THE PHYSICAL METER VALUES EVERY MINUTE.  THE
SAMPLE
70 C      TIME (IN SECS) MUST MATCH THE CALCULATION INTERVAL
TIME (IN
80 C      MINUTES) IN THE PDLMTR STATEMENT.
90 C
100 SAMPLE (60) GOTO 115
110 GOTO 4000
115 VLAOKW=0.0
120 GOSUB 1040 LPAC1,VLAO1
130 GOSUB 1040 LPAC2,VLAO2
140 GOSUB 1040 LPAC3,VLAO3
150 GOSUB 1040 LPAC6,VLAO6
160 GOSUB 1040 LPAC7,VLAO7
170 VLAO1=LPAC1
180 VLAO2=LPAC2
190 VLAO3=LPAC3
```

```
200 VLAO6=LPAC6
210 VLAO7=LPAC7
210 C
220 GOTO 4000
230 C
1000      C -----------------------------------------------------
--------------------------
1010      C      SUBROUTINE TO SUM FIVE (5) LPACI METER INPUTS
INTO ONE VIRTUAL
1020      C      LAO METER INPUT POINT FOR PDL
1030      C -----------------------------------------------------
--------------------------
1040      $LOC1=$ARG1-$ARG2
1050      IF($ARG1.GE.32768.0) THEN $ARG1=$ARG1-32768.0
1060      $ARG2=$ARG1
1070      C
1080      C      IN THE FOLLOWING STATEMENT, "GAIN" REPRESENTS
THE KWH VALUE
1090      C      OF EACH PULSE FROM THE LPACI METER
POINT.  HERE, IT IS ASSUMED
1100      C      THAT EACH LPACI METER HAS THE SAME GAIN VALUE.
1110      C
1120      VLAOKW=VLAOKW+$LOC1*GAIN*60.0
1130      RETURN
1140      C
1150      C
1160      C      PEAK DEMAND LIMITING STATEMENTS
1170      C
4000 VMETER=METER4+METER5
4010 PDLMTR(1,30,1,15,2000,1,VMETER,400,VLAOKW,600)
4020 PDLSET(1,EXCEED,KWSET1,06:00,KWSET2,20:00)
4030
PDLDPG(TKW1A,TGT1A,TKW2A,TGT2A,TKW1B,TGT1B,TKW2B,TGT2B,TKW3B,TGT
3B)
4040 PDL(1,TKW1B,TGT1B,4100,4199,0,0,0,0,0,0,0,4400,4499,0)
4100 PDLDAT(CHLR01,20,30,480,25.0)
4400 PDLDAT(CHLR02,20,30,480,25.0)
4410 PDLDAT(CHLR03,20,30,480,25.0)
4420 PDLDAT(CHLR04,20,30,480,25.0)
4430 C
.........................................
(Rest of program)
.........................................
9960  GOTO 12000
9970  C
9980  C    ONPWRT ROUTINE TO RESET DEMAND TARGETS
9990  C
```

```
10000 TGT1A=65.0
10010 TGT2A=65.0
10020 TGT1B=110.0
10030 TGT2B=30.0
10040 TGT3B=15.0
10050 C
12000 GOTO 20
```

Appendix B—Default State Text Table

The following report lists the default state text tables that reside in a field panel:

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? s

>Diagnostics, Users, dSt, Bacnet, Error_msgs, Hardware, Text,
Quit? h

>Log, Display, Edit, Quit? d

>State text table name : ------------------------------

>Here, Printer : H


02/13/2006 MON                STATE TEXT TABLE
REPORT                     03:46
----------------------------------------------------------------
----------
Search for <*>


Table name                           Table ID             # of
states
     State                       Value
----------------------------------------------------------------
----------
ACTIVE_NTRAL                         <default>            2

     ACTIVE                      0
     NTRAL                       1

ALARM_NORMAL                         <default>            2

     ALARM                       0
     NORMAL                      1

AO_DO                                <default>            2

     AO                          0
     DO                          1

AUTO_LEAD                            <default>            2

     AUTO                        0
     LEAD                        1

AUTO_MANUAL                          <default>            2

     AUTO                        0
     MANUAL                      1
```

```
Table name                         Table ID            # of
states
     State                     Value
------------------------------------------------------------------
----------
AUTO_OFF                           <default>           2

     AUTO                      0
     OFF                       1

4AUTO_ON                            <default>           2

     AUTO                      0
     ON                        1

AUX_DP_LOC_T                       <default>           2

     HOT_DUCT                  0
     DSCH_DCT                  1

AVERGE_NEAREST                     <default>           2

     AVERGE                    0
     NEARST                    1

BACnet Fast Slow
Stop              <default>            3
     STOP                      1
     SLOW                      2
     FAST                      3

BACnet Multistate
Value            <default>            6
     NIGHT                     1
     DAY                       2
     SPECIAL2                  3
     SPECIAL3                  4
     SPECIAL4                  5
     SPECIAL5                  6

BACnet On Off
Auto                 <default>            3
     OFF                       1
     ON                        2
     AUTO                      3
```

Table name State	Table ID Value	# of states
BACnet_AUX_DP_LOC_T	<default>	2
HOT_DUCT	1	
DSCH_DCT	2	
BACnet_BOOLEAN	<default>	2
FALSE	1	
TRUE	2	
BACnet_CHILLER_T	<default>	5
OFF	1	
START	2	
RUN	3	
PRESHUTD	4	
SERVICE	5	
BACnet_DAYS_OF_WEEK_T	<default>	7
SUN	1	
MON	2	
TUE	3	
WED	4	
THU	5	
FRI	6	
SAT	7	
BACnet_DEFROST_MODE_T	<default>	3
AMBIENT	1	
FORCED	2	
SYNC	3	
BACnet_DEFROST_STATE_T	<default>	5
STANDBY	1	
PUMPDOWN	2	
DEFROST	3	
DRAINDWN	4	
INJ_DLY	5	

```
Table name                          Table ID             # of
states
     State                      Value
------------------------------------------------------------------
----------

BACnet_DEFROST_TERM_T               <default>            4

     TEMP                       1
     TIME                       2
     FIRST                      3
     LAST                       4

BACnet_DISABLE_TYPE_T               <default>            17

     NONE                       1
     BYPASS                     2
     DI1                        3
     DI2                        4
     DI3                        5
     DI4                        6
     DI5                        7
     DI6                        8
     DO1                        9
4
     DO2                        10
     DO3                        11
     DO4                        12
     DO5                        13
     DO6                        14
     DO7                        15
     DO8                        16
     NVI_DIS                    17

BACnet_DISCRETE_LEVELS_T            <default>            5

     OFF                        1
     LOW                        2
     MED                        3
     HIGH                       4
     ON                         5

BACnet_DP_RANGE_T                   <default>            3

     DP2_INWC                   1
     DP1_INWC                   2
```

```
     DP_HALF                   3
Table name                         Table ID             # of
states
     State                     Value
----------------------------------------------------------------
----------

BACnet_ECON_CONTROL_T              <default>            4

     NONE                      1
     MAT                       2
     DAT                       3
     INTLK                     4

BACnet_EMERG_T                     <default>            6

     NORMAL                    1
     PRESS                     2
     DEPRESS                   3
     PURGE                     4
     SHUTDOWN                  5
     FIRE                      6

BACnet_EVAP_T                      <default>            3

     NO_CLG                    1
     COOLING                   2
     EMER_CLG                  3

BACnet_EVENT_MODE_TYPE_T           <default>            3

     LIST_END                  1
     SCENE                     2
     MODE                      3

BACnet_FAN_COEF_SEL_T              <default>            4

     CUSTOM                    1
     TYPE_3                    2
     TYPE_5                    3
     TYPE_7                    4

BACnet_FIRE_INDICATOR_T            <default>            9

     UNDEF                     1
     STROBE_U                  2
     STROBE_S                  3
```

```
     HORN                      4
     CHIME                     5
Table name                         Table ID             # of
states
     State                     Value
-----------------------------------------------------------------
----------
     BELL                      6
     SOUNDER                   7
     SPEAKER                   8
     UNIVERSL                  9

BACnet_FIRE_TEST_T                 <default>            4

     NORMAL                    1
     RESET                     2
     TEST                      3
     NOTEST                    4

BACnet_FNC_SELECT_T                <default>            3

     MINIMUM                   1
     MAXIMUM                   2
     AVERAGE                   3

BACnet_HVAC_HVT_T                  <default>            10

     GENERIC                   1
     FAN_COIL                  2
     VAV                       3
     HEATPUMP                  4
     ROOFTOP                   5
     UNITVENT                  6
     CHILCEIL                  7
     RADIATOR                  8
     AHU                       9
     SELFCONT                  10

BACnet_HVAC_OVERID_T             <default>            49

     OFF                       1
     POSITION                  2
     FLOW_VAL                  3
     FLOW_PCT                  4
     OPEN                      5
     CLOSE                     6
```

```
     MINIMUM                    7
Table name                        Table ID             # of
states
     State                      Value
----------------------------------------------------------------
----------

MAXIMUM                    8
     UNUSED8                    9
     UNUSED9                    10
     UNUSED10                   11
     UNUSED11                   12
     UNUSED12                   13
     UNUSED13                   14
     UNUSED14                   15
     UNUSED15                   16
     UNUSED16                   17
     POS_1                      18
     FLOWVAL1                   19
     FLOWPCT1                   20
     OPEN1                      21
     CLOSE1                     22
     MINIMUM1                   23
     MAXIMUM1                   24
     UNUSED24                   25
     UNUSED25                   26
     UNUSED26                   27
     UNUSED27                   28
     UNUSED28                   29
     UNUSED29                   30
     UNUSED30                   31
     UNUSED31                   32
     UNUSED32                   33
     POS_2                      34
     FLOWVAL2                   35
     FLOWPCT2                   36
     OPEN2                      37
     CLOSE2                     38
     MINIMUM2                   39
     MAXIMUM2                   40
     UNUSED40                   41
     UNUSED41                   42
Table name                      Table ID             # of
states
     State                      Value
```

```
-----------------------------------------------------------------
----------
     UNUSED42                  43
     UNUSED43                  44
     UNUSED44                  45
     UNUSED45                  46
     UNUSED46                  47
     UNUSED47                  48
     UNUSED48                  49

BACnet_HVAC_T                  <default>           15

     AUTO                      1
     HEAT                      2
     WARMUP                    3
     COOL                      4
     NGT_PURG                  5
     PRE_COOL                  6
     OFF                       7
     TEST                      8
     EMERHEAT                  9
     FAN_ONLY                  10
     FREECOOL                  11
     ICE                       12
     MAX_HEAT                  13
     ECONOMY                   14
     DEHUMID                   15

BACnet_OBJECT_REQUEST_T         <default>           18

     NORMAL                    1
     DISABLED                  2
     UPDATE_S                  3
     SELFTEST                  4
     UPDATE_A                  5
     REPTMASK                  6
     OVERRIDE                  7
     ENABLE                    8
     REMVOVRD                  9
     CLRSTAT                   10
Table name                      Table ID            # of
states
     State                     Value
-----------------------------------------------------------------
----------
     CLRALARM                  11
```

```
     ALNVYENA                  12
     ALNVYDIS                  13
     MANUAL                    14
     REMOTE                    15
     PROGRAM                   16
     CLRRESET                  17
     RESET                     18

BACnet_OCCUP_T                     <default>            4

     OCC                       1
     UNOCC                     2
     BYPASS                    3
     STANDBY                   4

BACnet_OVERRIDE_T                  <default>            3

     RETAIN                    1
     SPECIFY                   2
     DEFAULT                   3

BACnet_PRIORITY_LEVEL_T            <default>            12

     LEVEL_0                   1
     LEVEL_1                   2
     LEVEL_2                   3
     LEVEL_3                   4
     PR_1                      5
     PR_2                      6
     PR_3                      7
     PR_4                      8
     PR_6                      9
     PR_8                      10
     PR_10                     11
     PR_16                     12

Table name                      Table ID             # of
states
     State                     Value
----------------------------------------------------------------
----------
BACnet_RESET_SRC_T                 <default>            5

     NONE                      1
     RETURN                    2
     SPACE                     3
```

```
     OA_TEMP                   4
     PERCENT                   5

BACnet_SCENE_T                     <default>            24

     RECALL                    1
     LEARN                     2
     DISPLAY                   3
     GRP_OFF                   4
     GP_ON                     5
     STAT_OFF                  6
     STAT_ON                   7
     STAT_MIX                  8
     GRP_STAT                  9
     FLICK                     10
     TIMEOUT                   11
     TMO_FLK                   12
     DELAYOFF                  13
     DLA_FLK                   14
     DELAYON                   15
     ENA_GRP                   16
     DIS_GRP                   17
     CLEANON                   18
     CLEANOFF                  19
     WINK                      20
     RESET                     21
     MODE1                     22
     MODE2                     23
     MODE3                     24

BACnet_SERIES_PARL_T               <default>            2

     SERIES                    1
     PARALLEL                  2
Table name                     Table ID             # of
states
     State                     Value
----------------------------------------------------------------
----------
BACnet_SETTING_T                   <default>            6

     OFF                       1
     ON                        2
     DOWN                      3
     UP                        4
     STOP                      5
```

```
     STATE                     6

BACnet_SOURCE_TYPE_T               <default>            12

     STAT_TMP                  1
     STAT_SPT                  2
     PVI_TEMP                  3
     PVI_PCT                   4
     NVI_TEMP                  5
     NVI_PCT                   6
     PID                       7
     MAP                       8
     COMPARE                   9
     NCI_TEMP                  10
     NCI_PCT                   11
     AIRFLOW                   12

BACnet_SRC_TMP_LOC_T               <default>            3

     NONE                      1
     COLD_DCT                  2
     HOT_DUCT                  3

BACnet_TEMP_SOURCE_T               <default>            3

     RETURN                    1
     SPACE                     2
     FIXED                     3

BACnet_THERM_MODE_T                <default>            3

     NO_CTL                    1
     IN_OUT                    2
     MODULATE                  3
Table name                      Table ID             # of
states
     State                     Value
----------------------------------------------------------------
-----------
 BACnet_T_CONTACT                   <default>            2

     NRM_OPEN                  1
     NRM_CLOS                  2

BACnet_T_DO_OFFSET                 <default>            2

     NRM_OFF                   1
```

```
     NRM_ON                   2

BACnet_T_UNVT_AIR_TERMINAL        <default>           3

     NO_FAN                   1
     SERIES                   2
     PARALLEL                 3

BACnet_T_UNVT_COIL_CONTROL        <default>           2

     VALVE                    1
     BYP_DMPR                 2

BACnet_T_UNVT_DEVICE_MODE         <default>           4

     MODULATE                 1
     CYCLE                    2
     OFF                      3
     ON                       4

BACnet_T_UNVT_ENERGY_TYPE         <default>           5

     ELECTRIC                 1
     HOTWATER                 2
     STEAM                    3
     CHILLWTR                 4
    OUT_AIR                  5

BACnet_T_UNVT_SWITCH_METHOD       <default>           2

     DEADBAND                 1
     PWM                      2

Table name                      Table ID            # of
states
     State                    Value
----------------------------------------------------------------
----------
BACnet_UNVT_UNIT_T             <default>           2

     TEMP                     1
     PERCENT                  2

BLEED_HOLD                        <default>           2

     BLEED                    0
     HOLD                     1
```

BOOLEAN		<default>	2
FALSE	0		
TRUE	1		
BRINE_COMFRT		<default>	2
BRINE	0		
COMFRT	1		
CAL_RECAL		<default>	2
CAL	0		
RECAL	1		
CAV_VAV		<default>	2
CAV	0		
VAV	1		
CHILLER_T		<default>	6
OFF	0		
START	1		
RUN	2		
PRESHUTD	3		
SERVICE	4		
NUL	255		
CLEAN_DIRTY		<default>	2
CLEAN	0		
DIRTY	1		

Table name Table ID # of states

State Value

CLEAR_LATCH		<default>	2
CLEAR	0		
LATCH	1		
CLEAR_RESET		<default>	2
CLEAR	0		

```
     RESET                    1

CLG_HTG                           <default>           2

     CLG                      0
     HTG                      1

CLOSED_ON                         <default>           2

     CLOSED                   0
     ON                       1

CLOSED_OPEN                       <default>           2

     CLOSED                   0
     OPEN                     1

CLRBIT_EXTFLT                     <default>           2

     CLRBIT                   0
     EXTFLT                   1

CLRBIT_RESET                      <default>           2

     CLRBIT                   0
     RESET                    1

CNSTNT_VARBLE                     <default>           2

     CNSTNT                   0
     VARBLE                   1

COLD_HOT                          <default>           2

     COLD                     0
     HOT                      1

Table name                    Table ID            # of
states
     State                    Value
----------------------------------------------------------------
----------
COOLNG_HEATNG                     <default>           2

     COOLNG                   0
     HEATNG                   1
```

```
COOL_HEAT                          <default>           2

     COOL                     0
     HEAT                     1

CR_ALARMSTATE1                     <default>           3

     0                        0
     1                        1
     7                        7

CR_CHILLERSTAT1                    <default>           10

     0                        0
     1                        1
     2                        2
     3                        3
     4                        4
     5                        5
     6                        6
     7                        7
     8                        8
     9                        9

CR_CONTROLMODE1                    <default>           4

     0                        0
     2                        2
     3                        3
     15                       15

CR_CONTROLMODE2                    <default>           3

     0                        0
     2                        2
     3                        3
 Table name                      Table ID             # of
states
     State                    Value
-----------------------------------------------------------------
----------

CR_CONTROLMODE3                    <default>           8

     1                        1
     2                        2
     3                        3
```

```
     4                          4
     5                          5
     6                          6
     7                          7
     8                          8

CR_CONTROLMODE4                     <default>           8

     1                          1
     2                          2
     3                          3
     4                          4
     5                          5
     6                          6
     7                          7
     8                          8

CR_CONTROLTYPE1                     <default>           3

     1                          1
     2                          2
     3                          3

CR_CURRENTALARM1                    <default>           70

     1                          1
     2                          2
     3                          3
     4                          4
     5                          5
     6                          6
     7                          7
     8                          8
     9                          9
 Table name                     Table ID            # of
states
     State                      Value
----------------------------------------------------------------
----------
     10                         10
     11                         11
     12                         12
     13                         13
     14                         14
     15                         15
     16                         16
```

```
     17                         17
     18                         18
     19                         19
     20                         20
     21                         21
     22                         22
     23                         23
     24                         24
     25                         25
     26                         26
     27                         27
     28                         28
     29                         29
     30                         30
     31                         31
     32                         32
     33                         33
     34                         34
     35                         35
     36                         36
     37                         37
     38                         38
     39                         39
     40                         40
     41                         41
     42                         42
     43                         43
     44                         44
     45                         45
 Table name                     Table ID             # of
states
     State                      Value
----------------------------------------------------------------
----------
46                         46
     47                         47
     48                         48
     49                         49
     50                         50
     51                         51
     52                         52
     53                         53
     54                         54
     55                         55
     56                         56
```

```
     57                       57
     58                       58
     59                       59
     60                       60
     61                       61
     62                       62
     63                       63
     64                       64
     65                       65
     66                       66
     67                       67
     68                       68
     69                       69
     70                       70

CR_CURRENTALARM2              <default>          77

     1                        1
     2                        2
     5                        5
     6                        6
     7                        7
     8                        8
     9                        9
     10                       10
 Table name                     Table ID            # of
states
     State                    Value
----------------------------------------------------------------
---------
     11                       11
     12                       12
     13                       13
     14                       14
     15                       15
     16                       16
     17                       17
     18                       18
     19                       19
     20                       20
     21                       21
     22                       22
     23                       23
     24                       24
     25                       25
     26                       26
```

```
     27                        27
     28                        28
     29                        29
     30                        30
     31                        31
     32                        32
     34                        34
     35                        35
     36                        36
     37                        37
     38                        38
     40                        40
     41                        41
     42                        42
     43                        43
     44                        44
   45                        45
     46                        46
     47                        47
Table name                     Table ID             # of
states
     State                     Value
----------------------------------------------------------------
----------
48                        48
     49                        49
     50                        50
     51                        51
     52                        52
     53                        53
     54                        54
     55                        55
     56                        56
     57                        57
     58                        58
     59                        59
     60                        60
     61                        61
     62                        62
     63                        63
     64                        64
     65                        65
     66                        66
     67                        67
     68                        68
```

70 70
71 71
72 72
73 73
74 74
75 75
76 76
77 77
78 78
79 79
80 80
81 81
82 82

Table name Table ID # of states
State Value

CR_CURRENTMODE1 <default> 18

0 0
1 1
2 2
3 3
4 4
5 5
6 6
7 7
8 8
9 9
10 10
11 11
12 12
13 13
14 14
15 15
16 16
17 17

CR_DMDLMTSTAT1 <default> 5

0 0
1 1
2 2
3 3

```
     4                         4

CR_ERRORCODES                  <default>            12

     1                         1
     2                         2
     3                         3
     6                         6
     7                         7
     8                         8
     9                         9
     10                        10
Table name                     Table ID             # of
states
     State                     Value
----------------------------------------------------------------
----------
     11                        11
     12                        12
     13                        13
     14                        14

CR_LOADSHEDSTAT1                <default>            3

     0                         0
     1                         1
     2                         2

CR_OVRDSTATUS1                  <default>            4

     0                         0
     1                         1
     2                         2
     3                         3

CR_RUNSTATUS1                   <default>            14

     0                         0
     1                         1
     2                         2
     3                         3
     4                         4
     5                         5
     6                         6
     7                         7
     8                         8
```

```
     9                         9
     10                        10
     11                        11
     12                        12
     13                        13

CR_RUNSTATUS2                   <default>            4

     0                         0
     1                         1
     2                         2
     3                         3
Table name                      Table ID             # of
states
     State                     Value
----------------------------------------------------------------
----------
CR_RUNSTATUS3                   <default>            3

     0                         0
     1                         1
     3                         3

CR_RUNSTATUS4                   <default>            12

     1                         1
     2                         2
     3                         3
     4                         4
     5                         5
     6                         6
     7                         7
     8                         8
     9                         9
     10                        10
     11                        11
     12                        12

CR_RUNSTATUS5                      <default>            8

     0                         0
     1                         1
     2                         2
     3                         3
     4                         4
     5                         5
```

```
     6                         6
     7                         7

CURENT_DELTPP                      <default>           2

     CURENT                    0
     DELTPP                    1

DAYS_OF_WEEK_T                     <default>           8

     SUN                       0
     MON                       1
Table name                      Table ID             # of
states
     State                     Value
----------------------------------------------------------------
-----------
     TUE                       2
     WED                       3
     THU                       4
     FRI                       5
     SAT                       6
     NUL                       255

DAY_NIGHT                          <default>           2

     DAY                       0
     NIGHT                     1

Default
L2SL                       <default>           2

     OFF                       0
     ON                        1

Default
L2SP                       <default>           2

     OFF                       0
     ON                        1

Default
LDI                        <default>           2

     OFF                       0
     ON                        1
```

```
Default
LDO                        <default>            2

     OFF                        0
     ON                         1

Default
LENUM                      <default>            6

     NIGHT                      0
     DAY                        1
     SPECIAL2                   2
     SPECIAL3                   3
     SPECIAL4                   4
     SPECIAL5                   5


Table name                         Table ID             # of
states
     State                      Value
-----------------------------------------------------------------
----------
Default
LFSSL                      <default>            3

     STOP                       0
     SLOW                       1
     FAST                       2

Default
LFSSP                      <default>            3

     STOP                       0
     SLOW                       1
     FAST                       2

Default
LOOAL                      <default>            3

     OFF                        0
     ON                         1
     AUTO                       2

Default
LOOAP                      <default>            3

     OFF                        0
     ON                         1
```

```
     AUTO                      2

DEFROST_MODE_T                     <default>             4

     AMBIENT                   0
     FORCED                    1
     SYNC                      2
     NUL                       255

DEFROST_STATE_T                    <default>             6

     STANDBY                   0
     PUMPDOWN                  1
     DEFROST                   2
     DRAINDWN                  3
     INJ_DLY                   4
     NUL                       255

Table name                         Table ID              # of
states
     State                     Value
-----------------------------------------------------------------
----------
DEFROST_TERM_T                     <default>             5

     TEMP                      0
     TIME                      1
     FIRST                     2
     LAST                      3
     NUL                       255

DIRECT_REVRSE                      <default>             2

     DIRECT                    0
     REVRSE                    1

DISABLED_ENABLED                   <default>             2

     DISABLED                  0
     ENABLED                   1

DISABLE_TYPE_T                     <default>             17

     NONE                      0
     BYPASS                    1
     DI1                       2
     DI2                       3
```

```
     DI3                      4
     DI4                      5
     DI5                      6
     DI6                      7
     DO1                      8
     DO2                      9
     DO3                      10
     DO4                      11
     DO5                      12
     DO6                      13
     DO7                      14
     DO8                      15
     NVI_DIS                  16


Table name                         Table ID             # of
states
     State                    Value
-----------------------------------------------------------------
----------
DISABL_ENABL                       <default>            2

     DISABL                   0
     ENABLE                   1

DISCRETE_LEVELS_T                  <default>            6

     OFF                      0
     LOW                      1
     MED                      2
     HIGH                     3
     ON                       4
     NUL                      255

DISPRS_AMBENT                      <default>            2

     DISPRS                   0
     AMBENT                   1

DONE_READY                         <default>            2

     DONE                     0
     READY                    1

DP_RANGE_T                         <default>            3

     DP2_INWC                 0
```

```
   DP1_INWC                 1
     DP_HALF                  2

ECON_CONTROL_T                    <default>            4

     NONE                     0
     MAT                      1
     DAT                      2
     INTLK                    3

ECON_VENT                         <default>            2

     ECON                     0
     VENT                     1


Table name                        Table ID             # of
states
     State                    Value
----------------------------------------------------------------
----------
EMERG_T                           <default>            7

     NORMAL                   0
     PRESS                    1
     DEPRESS                  2
     PURGE                    3
     SHUTDOWN                 4
     FIRE                     5
     NUL                      255

ENABLE_DISABL                     <default>            2

     ENABLE                   0
     DISABL                   1

ENGLSH_SI                         <default>            2

     ENGLSH                   0
     SI                       1

ENG_SI                            <default>            2

     ENG                      0
     SI                       1
```

```
EQS_OFF_ON                          <default>             2

     OFF                        0
     ON                         1

ETS_STE                             <default>             2

     ETS                        0
     STE                        1

EVAP_T                              <default>             4

     NO_CLG                     0
     COOLING                    1
     EMER_CLG                   2
     NUL                        255

Table name                          Table ID              # of
states
     State                      Value
-----------------------------------------------------------------
----------
EVENT_MODE_TYPE_T                   <default>             4

     LIST_END                   0
     SCENE                      1
     MODE                       2
     NUL                        255

EXTRNL_CHLR                         <default>             2

     EXTRNL                     0
     CHLR                       1

FALSE_TRUE                          <default>             2

     False                      0
     True                       1

FAN_COEF_SEL_T                      <default>             4

     CUSTOM                     0
     TYPE_3                     1
     TYPE_5                     2
     TYPE_7                     3
```

```
FAULT_OK                           <default>            2

     FAULT                     0
     OK                        1

FIRE_EST_STATUS                    <default>            8

     0                         0
     1                         1
     2                         2
     3                         3
     4                         4
     5                         5
     6                         6
     10                        10


Table name                         Table ID             # of
states
     State                     Value
----------------------------------------------------------------
----------
FIRE_INDICATOR_T                   <default>            10

     UNDEF                     0
     STROBE_U                  1
     STROBE_S                  2
     HORN                      3
     CHIME                     4
     BELL                      5
     SOUNDER                   6
     SPEAKER                   7
     UNIVERSL                  8
     NUL                       255

FIRE_MXL_STATUS                    <default>            5

     0                         0
     1                         1
     2                         2
     4                         4
     8                         8

FIRE_SIMPLEX4100                   <default>            5

     0                         0
     1                         1
```

```
     2                          2
     5                          5
     6                          6

FIRE_TEST_T                         <default>           5

     NORMAL                     0
     RESET                      1
     TEST                       2
     NOTEST                     3
     NUL                        255

FIXED_AUTO                          <default>           2

     FIXED                      0
     AUTO                       1
Table name                          Table ID            # of
states
     State                      Value
-----------------------------------------------------------------
---------
FIXED_VARBLE                        <default>           2

     FIXED                      0
     VARBLE                     1

FLOAT_SPRING                        <default>           2

     FLOAT                      0
     SPRING                     1

FNC_SELECT_T                        <default>           3

     MINIMUM                    0
     MAXIMUM                    1
     AVERAGE                    2

FORWRD_REVRSE                       <default>           2

     FORWRD                     0
     REVRSE                     1

FOUR_TWO                            <default>           2

     FOUR                       0
     TWO                        1
```

```
FULL_LIMTED                        <default>            2

     FULL                     0
     LIMTED                   1

FWD_REV                            <default>            2

     FWD                      0
     REV                      1

GAUGE_PSI                          <default>            2

     GAUGE                    0
     PSI                      1

GERMAN_ENGLSH                      <default>            2

     GERMAN                   0
     ENGLSH                   1
Table name                         Table ID             # of
states
     State                    Value
----------------------------------------------------------------
---------
HAND_AUTO                          <default>            2

     HAND                     0
     AUTO                     1

HIGH_LOW                           <default>            2

     HIGH                     0
     LOW                      1

HIGH_NORMAL                        <default>            2

     HIGH                     0
     NORMAL                   1

HOLD_FILL                          <default>            2

    HOLD                     0
     FILL                     1

HOT_COLD                           <default>            2

     HOT                      0
```

```
     COLD                      1

HVAC_HVT_T                         <default>            11

     GENERIC                   0
     FAN_COIL                  1
     VAV                       2
     HEATPUMP                  3
     ROOFTOP                   4
     UNITVENT                  5
     CHILCEIL                  6
     RADIATOR                  7
     AHU                       8
     SELFCONT                  9
     NUL                       255


Table name                         Table ID             # of
states
     State                     Value
-----------------------------------------------------------------
----------
HVAC_OVERID_T                      <default>            50

     OFF                       0
     POSITION                  1
     FLOW_VAL                  2
     FLOW_PCT                  3
     OPEN                      4
     CLOSE                     5
     MINIMUM                   6
     MAXIMUM                   7
     UNUSED8                   8
     UNUSED9                   9
     UNUSED10                  10
     UNUSED11                  11
     UNUSED12                  12
     UNUSED13                  13
     UNUSED14                  14
     UNUSED15                  15
     UNUSED16                  16
     POS_1                     17
     FLOWVAL1                  18
     FLOWPCT1                  19
     OPEN1                     20
     CLOSE1                    21
```

```
     MINIMUM1                  22
     MAXIMUM1                  23
     UNUSED24                  24
     UNUSED25                  25
     UNUSED26                  26
     UNUSED27                  27
     UNUSED28                  28
     UNUSED29                  29
     UNUSED30                  30
     UNUSED31                  31
     UNUSED32                  32
     POS_2                     33
 Table name                         Table ID             # of
states
     State                     Value
----------------------------------------------------------------
----------
    FLOWVAL2                  34
     FLOWPCT2                  35
     OPEN2                     36
     CLOSE2                    37
     MINIMUM2                  38
     MAXIMUM2                  39
     UNUSED40                  40
     UNUSED41                  41
     UNUSED42                  42
     UNUSED43                  43
     UNUSED44                  44
     UNUSED45                  45
     UNUSED46                  46
     UNUSED47                  47
     UNUSED48                  48
     NUL                       255

HVAC_T                             <default>            16

     AUTO                      0
     HEAT                      1
     WARMUP                    2
     COOL                      3
     NGT_PURG                  4
     PRE_COOL                  5
     OFF                       6
     TEST                      7
     EMERHEAT                  8
     FAN_ONLY                  9
```

```
     FREECOOL                  10
     ICE                       11
     MAX_HEAT                  12
     ECONOMY                   13
     DEHUMID                   14
     NUL                       255

Table name                         Table ID            # of
states
     State                     Value
----------------------------------------------------------------
----------
HW_ELEC                            <default>           2

    HW                        0
     ELEC                      1

INACTIVE_ACTIVE                    <default>           2

     INACTIVE                  0
     ACTIVE                    1

INACTV_ACTIVE                      <default>           2

     INACTV                    0
     ACTIVE                    1

LEAD_AUTO                          <default>           2

     LEAD                      0
     AUTO                      1

LOCAL_NET                          <default>           2

     LOCAL                     0
     NET                       1

LOCAL_REMOTE                       <default>           2

     LOCAL                     0
     REMOTE                    1

LOW_HIGH                           <default>           2

     LOW                       0
     HIGH                      1
```

```
LOW_NORMAL                           <default>            2

     LOW                         0
     NORMAL                      1

LOW_STNDRD                           <default>            2

     LOW                         0
     STNDRD                      1

Table name                           Table ID             # of
states
     State                       Value
-----------------------------------------------------------------
-----------
LO_HI                                <default>            2

     LO                          0
     HI                          1

LT_51S_TO255                         <default>            2

     LT_51S                      0
     TO255                       1

LVWTR_RETWTR                         <default>            2

     LVWTR                       0
     RETWTR                      1

MANUAL_AUTO                          <default>            2

     MANUAL                      0
     AUTO                        1

MASTER_SLAVE                         <default>            2

     MASTER                      0
     SLAVE                       1

MC_CHLR_LDLGSP                       <default>            3

     MSTLEAD                     0
    SLVLEAD                     1
     AUTO                        2
```

```
MC_CHLR_LDLGSSP                       <default>            7

     SUNDAY                  1
     MONDAY                  2
     TUESDAY                 3
     WEDNSDAY                4
     THURSDAY                5
     FRIDAY                  6
     SATURDAY                7


Table name                            Table ID             # of
states
     State                   Value
------------------------------------------------------------------
---------
MC_CHLR_LDLGST                        <default>            4

     BOTHOFF                 0
     LEADON                  1
     LAGON                   2
     BOTHON                  3

MC_CHLR_OPMODE                        <default>            4

     STOP                    0
     NETWORK                 1
     IDLE                    2
     RUN                     3

MC_HP_AUTMANMODE                      <default>            5

     MANUNOCC                0
     MANOCC                  1
     MANFAN                  5
     MANOFF                  9
     AUTO                    255

MC_HP_FAULTS                          <default>            8

     LOWDAT1                 187
     LOWRPRS1                188
     HIRPRS1                 189
     RATSENSR                204
     LOWDAT2                 205
     LOWRPRS2                206
     HIRPRS2                 207
```

```
     NONE                      255

MC_RCH_CHWRSTOPT                   <default>            6

     NO_RESET                  0
     RETURN                    1
     mA_4_20                   2
     NETWORK                   3
     ICE                       4
     OATEMP                    5

Table name                         Table ID             # of
states
     State                     Value
----------------------------------------------------------------
---------
MC_RMC_TPPRCALC                    <default>            3

     MINIMUM                   0
     MAXIMUM                   1
     AVERAGE                   2

MC_RTU_SYSMODE                     <default>            5

     RATEMP                    0
     SATEMP                    1
     NETWORK                   2
     OATEMP                    3
     NONE_MAT                  4

MC_SCA_CLGRESTYP                   <default>            6

     NONE                      0
     SATEMP                    1
     RATEMP                    2
     OATEMP                    3
     mA_4_20                   4
     AIR_MAT                   5

MC_SCA_HTGRESTYP                   <default>            5

     NONE                      0
     SATEMP                    1
     RATEMP                    2
     OATEMP                    3
     mA_4_20                   4
```

```
MC_SCH_OATMETHOD                  <default>           2

     LOCAL                    1
     NETWORK                  2

MC_SCU_HUMCTRLTP                  <default>           3

     NONE                     0
     HUMIDITY                 1
     DEWPOINT                 2

Table name                        Table ID            # of
states
     State                    Value
----------------------------------------------------------------
----------
MC_SCU_SFANSTATS                  <default>           3

     OFF                      0
     LO_SPEED                 1
     HI_SPEED                 2

MC_TIMESCHEDULE                   <default>           7

     SUNDAY                   1
     MONDAY                   2
     TUESDAY                  3
     WEDNSDAY                 4
     THURSDAY                 5
     FRIDAY                   6
     SATURDAY                 7

MC_UV_HCMODE                      <default>           3

     TEMPOK                   0
     COOLING                  1
     HEATING                  2

MC_UV_SYSMODE                     <default>           3

     UNOCC                    0
     OCC                      1
     OVRD                     2

MIN_MAX                           <default>           2

     MIN                      0
```

```
     MAX                      1

NCLOSE_NOPEN                       <default>             2

     NCLOSE                   0
     NOPEN                    1

NEG_POS                            <default>             2

     NEG                      0
     POS                      1
Table name                         Table ID              # of
states
     State                    Value
----------------------------------------------------------------
----------
NIGHT_DAY                          <default>             2

     NIGHT                    0
     DAY                      1

NOAUX_AUX                          <default>             2

     NOAUX                    0
     AUX                      1

NOELEC_ELEC                        <default>             2

     NOELEC                   0
     ELEC                     1

NOFLOW_FLOW                        <default>             2

     NOFLOW                   0
     FLOW                     1

NONLNR_LINEAR                      <default>             2

     NONLNR                   0
     LINEAR                   1

NOPEN_NCLOSE                       <default>             2

     NOPEN                    0
     NCLOSE                   1
```

```
NORMAL_ALARM                       <default>            2

     NORMAL                    0
     ALARM                     1

NORMAL_CLEAR                       <default>            2

     NORMAL                    0
     CLEAR                     1

NORMAL_FAIL                        <default>            2

     NORMAL                    0
     FAIL                      1

Table name                         Table ID             # of
states
     State                     Value
-----------------------------------------------------------------
---------
NORMAL_LIGHT                       <default>            2

     NORMAL                    0
     LIGHT                     1

NORMAL_RESET                       <default>            2

     NORMAL                    0
     RESET                     1

NORMAL_STNDBY                      <default>            2

     NORMAL                    0
     STNDBY                    1

NORMAL_UNFAIL                      <default>            2

     NORMAL                    0
     UNFAIL                    1

NOTOK_OK                           <default>            2

     NOTOK                     0
     OK                        1

NOTRDY_READY                       <default>            2
```

```
     NOTRDY                    0
     READY                     1

NO_AUTH                            <default>            2

     NO                        0
     AUTH                      1

NO_ERR_DATA_E                      <default>            2

    NO_ERR                    0
     DATA_E                    1

NO_FLT_FAULT                       <default>            2

     NO_FLT                    0
     FAULT                     1

Table name                         Table ID             # of
states
     State                     Value
-----------------------------------------------------------------
---------
NO_LIMIT                           <default>            2

     NO                        0
     LIMIT                     1

NO_READY                           <default>            2

     NO                        0
     READY                     1

NO_RESET                           <default>            2

     NO                        0
     RESET                     1

NO_YES                             <default>            2

     NO                        0
     YES                       1

NTO_ON                             <default>            2

     NTO                       0
     ON                        1
```

```
NTRAL_ACTIVE                       <default>            2

     NTRAL                    0
     ACTIVE                   1

OATEMP_ENTLPY                      <default>            2

     OATEMP                   0
     ENTLPY                   1

OBJECT_REQUEST_T                   <default>            19

    NORMAL                   0
     DISABLED                 1
     UPDATE_S                 2
     SELFTEST                 3
     UPDATE_A                 4
     REPTMASK                 5

Table name                         Table ID             # of
states
     State                    Value
-----------------------------------------------------------------
----------
     OVERRIDE                 6
     ENABLE                   7
     REMVOVRD                 8
     CLRSTAT                  9
     CLRALARM                 10
     ALNVYENA                 11
     ALNVYDIS                 12
     MANUAL                   13
     REMOTE                   14
     PROGRAM                  15
     CLRRESET                 16
     RESET                    17
     NUL                      255

OCCUP_T                            <default>            5

     OCC                      0
     UNOCC                    1
     BYPASS                   2
     STANDBY                  3
     NUL                      255
```

```
OCC_UNOCC                          <default>            2

     OCC                       0
     UNOCC                     1

OFF_AUTO                           <default>            2

     OFF                       0
     AUTO                      1

OFF_BRAKE                          <default>            2

     OFF                       0
     BRAKE                     1

OFF_BYPASS                         <default>            2

     OFF                       0
     BYPASS                    1
Table name                         Table ID             # of
states
     State                     Value
----------------------------------------------------------------
---------
OFF_CLOSED                         <default>            2

     OFF                       0
     CLOSED                    1

OFF_HEAT                           <default>            2

     OFF                       0
     HEAT                      1

OFF_MNWMUP                         <default>            2

     OFF                       0
     MNWMUP                    1

OFF_ON                             <default>            2

     OFF                       0
     ON                        1

OK_BAD                             <default>            2
```

```
     OK                     0
     BAD                    1

OK_FAULT                        <default>           2

     OK                     0
     FAULT                  1

OK_RESET                        <default>           2

     OK                     0
     RESET                  1

OK_TRIP                         <default>           2

     OK                     0
     TRIP                   1

OK_WARNNG                       <default>           2

     OK                     0
     WARNNG                 1


Table name                      Table ID            # of
states
     State                  Value
----------------------------------------------------------------
---------------
ONE_TWO                         <default>           2

     ONE                    0
     TWO                    1

ON_OFF                          <default>           2

     ON                     0
     OFF                    1

OPEN_CLOSE                      <default>           2

     OPEN                   0
     CLOSE                  1

OPEN_CLOSED                     <default>           2

     OPEN                   0
```

```
     CLOSED                    1

OPEN_LOCK                          <default>            2

     OPEN                      0
     LOCK                      1

OPERATION_PHASE                    <default>            10

     OFF                       0
     HTDURVAC                  1
     CLDURVAC                  2
     STRT_HTG                  3
     STRT_CLG                  4
     REGULATG                  5
     STOP_HTG                  6
     STOP_CLG                  7
     POST_HTG                  8
     POST_CLG                  9


Table name                         Table ID             # of
states
     State                     Value
----------------------------------------------------------------
--------
OVERRIDE_T                         <default>            4

     RETAIN                    0
     SPECIFY                   1
     DEFAULT                   2
     NUL                       255

PAR_SERIES                         <default>            2

     PAR                       0
     SERIES                    1

PRIORITY_LEVEL_T                   <default>            13

     LEVEL_0                   0
     LEVEL_1                   1
     LEVEL_2                   2
     LEVEL_3                   3
     PR_1                      4
     PR_2                      5
     PR_3                      6
```

```
     PR_4                      7
     PR_6                      8
     PR_8                      9
     PR_10                     10
     PR_16                     11
     NUL                       255

PURGE_RUN                          <default>           2

     PURGE                     0
     RUN                       1

RATEMP_OATEMP                      <default>           2

     RATEMP                    0
     OATEMP                    1

READY_DONE                         <default>           2

     READY                     0
     DONE                      1
Table name                         Table ID            # of
states
     State                     Value
-----------------------------------------------------------------
-------
READY_YES                          <default>           2

     READY                     0
     YES                       1

RECAL_CAL                          <default>           2

     RECAL                     0
     CAL                       1

REMOTE_LOCAL                       <default>           2

     REMOTE                    0
     LOCAL                     1

RESET_SRC_T                        <default>           5

     NONE                      0
     RETURN                    1
     SPACE                     2
     OA_TEMP                   3
```

```
     PERCENT                  4

RESTORED                          <default>          2

     NOT_REST                 0
     RESTORED                 1

RETURN_SPACE                      <default>          2

     RETURN                   0
     SPACE                    1

REVRSE_FORWRD                     <default>          2

     REVRSE                   0
     FORWRD                   1

REV_FWD                           <default>          2

     REV                      0
     FWD                      1

Table name                        Table ID           # of
states
     State                    Value
-----------------------------------------------------------------
---------
SCENE_T                           <default>          25

    RECALL                   0
     LEARN                    1
     DISPLAY                  2
     GRP_OFF                  3
     GP_ON                    4
     STAT_OFF                 5
     STAT_ON                  6
     STAT_MIX                 7
     GRP_STAT                 8
     FLICK                    9
     TIMEOUT                  10
     TMO_FLK                  11
     DELAYOFF                 12
     DLA_FLK                  13
     DELAYON                  14
     ENA_GRP                  15
     DIS_GRP                  16
     CLEANON                  17
```

```
     CLEANOFF                 18
     WINK                     19
     RESET                    20
     MODE1                    21
     MODE2                    22
     MODE3                    23
     NUL                      255

SECURITY_STATUS                   <default>            5

     0                        0
     1                        1
     4                        4
     5                        5
     20                       20


Table name                        Table ID             # of
states
     State                    Value
----------------------------------------------------------------
----------
SERIES_PAR                        <default>            2

     SERIES                   0
     PAR                      1

SERIES_PARL_T                     <default>            2

     SERIES                   0
     PARALLEL                 1

SETTING_T                         <default>            7

    OFF                      0
     ON                       1
     DOWN                     2
     UP                       3
     STOP                     4
     STATE                    5
     NUL                      255

SHARED_STNDRD                     <default>            2

     SHARED                   0
     STNDRD                   1
```

```
SI_ENG                             <default>           2

     SI                        0
     ENG                       1

SI_ENGLSH                          <default>           2

     SI                        0
     ENGLSH                    1

SLAVE_MASTER                       <default>           2

     SLAVE                     0
     MASTER                    1

SLC_LOCAL                          <default>           2

     SLC                       0
     LOCAL                     1

Table name                         Table ID            # of
states
     State                     Value
----------------------------------------------------------------
----------
SOFTWR_TSTAT                       <default>           2

     SOFTWR                    0
     TSTAT                     1

SOURCE_TYPE_T                      <default>           12

     STAT_TMP                  0
     STAT_SPT                  1
     PVI_TEMP                  2
     PVI_PCT                   3
     NVI_TEMP                  4
     NVI_PCT                   5
     PID                       6
     MAP                       7
     COMPARE                   8
     NCI_TEMP                  9
     NCI_PCT                   10
     AIRFLOW                   11

SRC_TMP_LOC_T                      <default>           3
```

```
     NONE                     0
     COLD_DCT                 1
     HOT_DUCT                 2

SSTO_OPERATION                    <default>         4

     NONE                     0
     HEATING                  1
     COOLING                  2
     BOTH                     3

START_MODE                        <default>         3

     STRT_HTG                 0
     STRT_CLG                 1
     NO_START                 2

STEAM_GAS                         <default>         2

     STEAM                    0
     GAS                      1

Table name                        Table ID          # of
states
     State                    Value
-----------------------------------------------------------------
---------
STNDBY_ACT                        <default>         2

     STNDBY                   0
     ACT                      1

STNDRD_LOWTMP                     <default>         2

     STNDRD                   0
     LOWTMP                   1

STOP_ENABLE                       <default>         2

     STOP                     0
    ENABLE                   1

STOP_MODE                         <default>         4

     STOP_HTG                 0
     STOP_CLG                 1
     STOP_HOC                 2
```

```
     NO_STOP                  3

STOP_RUN                          <default>          2

     STOP                     0
     RUN                      1

STOP_START                        <default>          2

     STOP                     0
     START                    1

STPT_FLOW                         <default>          2

     STPT                     0
     FLOW                     1

SURGE_OK                          <default>          2

     SURGE                    0
     OK                       1


Table name                        Table ID           # of
states
     State                    Value
-----------------------------------------------------------------
--------
TEMP_SOURCE_T                     <default>          3

     RETURN                   0
     SPACE                    1
     FIXED                    2

THERM_MODE_T                      <default>          4

     NO_CTL                   0
     IN_OUT                   1
     MODULATE                 2
     NUL                      255

TIME_NETWRK                       <default>          2

     TIME                     0
     NETWRK                   1
```

```
TREND_EVENT                         <default>           3

     OFF                        0
     ON                         1
     ALARM                      2

T_CONTACT                           <default>           2

     NRM_OPEN                   0
     NRM_CLOS                   1

T_DO_OFFSET                         <default>           2

     NRM_OFF                    0
     NRM_ON                     1

T_UNVT_AIR_TERMINAL                 <default>           3

     NO_FAN                     0
     SERIES                     1
     PARALLEL                   2


Table name                          Table ID            # of
states
     State                      Value
-----------------------------------------------------------------
--------
T_UNVT_COIL_CONTROL                 <default>           2

     VALVE                      0
     BYP_DMPR                   1

T_UNVT_DEVICE_MODE                  <default>           4

     MODULATE                   0
     CYCLE                      1
     OFF                        2
     ON                         3

T_UNVT_ENERGY_TYPE                  <default>           5

     ELECTRIC                   0
     HOTWATER                   1
     STEAM                      2
     CHILLWTR                   3
     OUT_AIR                    4
```

```
T_UNVT_SWITCH_METHOD                <default>          2

     DEADBAND                   0
     PWM                        1

UNLOCK_LOCK                         <default>          2

     UNLOCK                     0
     LOCK                       1

UNOCC_OCC                           <default>          2

     UNOCC                      0
     OCC                        1

UNUSED_USE                          <default>          2

     UNUSED                     0
     USE                        1

UNVT_UNIT_T                         <default>          2

     TEMP                       0
     PERCENT                    1

Table name                          Table ID           # of
states
     State                      Value
----------------------------------------------------------------
----------
VALVE_FBP                           <default>          2

     VALVE                      0
     FBP                        1

VH_VECT                             <default>          2

     VH                         0
     VECT                       1

WINTER_SUMMER                       <default>          2

     0                          0
     1                          1
```

```
YES_NO                                 <default>          2

     YES                    0
     NO                     1

ZONE_MODE                              <default>          12

     VAC                    0
     OCC1                   1
     OCC2                   2
     OCC3                   3
     OCC4                   4
     OCC5                   5
     WARMUP                 6
     COOLDOWN               7
     NGHT_HTG               8
     NGHT_CLG               9
     STOP_HTG               10
     STOP_CLG               11

End of report

>Log, Display, Edit, Quit? -
```

Appendix C—Error Message Types

The field panel contains two major sets of error messages. The first set is known as *E-code* errors. This type of message is prefixed with the letter "E" and relates to any of the operations in the field panel.

The second set is known as *R-code* errors. This type of error is related specifically to the PPCL editor and is prefixed with the letter "R".

Format of E-code and R-code Error Messages

E-code error messages report an error that has occurred in a non-specific area of the system. This type of message uses the following format:

- Code number, hex value, and a brief description

For example:

```
E1  0x0001 No memory available


E2  0x0002 Invalid command
```

R-code error messages report an error that has occurred in a specific area of the field panel. Only the error message description is displayed. For example:

```
PPCL line already exists
```

Field Panel (E-code) Error Codes

Code Number	Hex Value	Text Description	Explanation
E1	0x0001	No memory available	The field panel does not have enough memory to carry out our request.
E2	0x0002	Invalid command	Invalid operation. Your command cannot be executed. The most common cause of this error is a point command which is inappropriate for the point type being commanded. Examples include commanding an analog point to ON, or attempting to put a non-alarmable point into alarm-by-command.
E3	0x0003	Not found	This error displays for one of the following reasons: The point is not found. The point entered is not defined in any online, unfailed field panel. The program line is not found. The program line entered does not exist in any specified field panel. The device is not found. The field panel entered cannot be found as a member of that network.
E4	0x0004	Priority too low	The point cannot be commanded because the priority of the operator or the control statement issued is lower than that of the current priority.
E5	0x0005	No change	The condition of the point (NORMAL, ALARM, FAILED, ALARM-BY-COMMAND, OPERATOR, DISABLED, PROOFING) has not been changed by your program. This usually occurs during Point Operation sequences. For example, you have attempted to DISABLE a point that is already disabled.
E7	0x0007	FAILED	The point being commanded is failed. This usually indicates a hardware problem. Either the field panel in which the point is defined is failed (not communicating with other field panels on a network), the board on which the point is terminated is failed, or a problem exists with the point termination itself.

E8	0x0008	Out of service	The point is currently operator disabled (out-of-service) and cannot be altered until it is re-enabled.
E9	0x0009	Already exists	This error displays for one of the following reasons: The point already exists. An attempt has been made to add a point using a point name that already exists in some other field panel (or in the current field panel if there is no network). The field panel already has a database. This error indicates that a database is being loaded on top of existing data. Coldstart the field panel and attempt to reload the database. An attempt has been made to add a field panel that is already defined in the network.
E10	0x000A	Trend already exists	An attempt has been made to add a point to trending that is already being trended.
E11	0x000B	Value unchanged	The point is already at the value or state to which you are attempting to command it.
E12	0x000C	Value out of range	The digital value of an analog point is out of range. An analog point has been commanded to a value which, according to the slope and intercept defined for that point, causes the digital value to be outside the range of 0 to 32,767. Check for correct slope and intercept values for this point. This error commonly occurs when commanding a virtual LAO point defined with an intercept of zero to a negative case.
E13	0x000D	Not Hostcaller node	An attempt has been made to add a node telephone number to a field panel that does not contain the Telecommunications Interface Unit (the Hostcaller).
E22	0x0016	Line not traced	Line of program code was accessed but not traced. This line was not executed.
E23	0x0017	Line not enabled	A line of code is disabled. This line of code must be enabled for the system to access it.
E25	0x0019	Line already exists	An attempt has been made to add a program line that already exists in the field panel. The line should either be re-entered with a new line number, or the existing line must be removed and the new line added again.
E26	0x001A	Has unresolved points	A program line references point name(s) that cannot be found in any active, unfailed field panel on the network.
E27	0x001B	Not coded yet	The requested operation is not available in this version of the field panel.
E28	0x001C	Bad statement type	Used in loop tune option. You have tried to tune a non-loop statement.
E30	0x001E	Not coded yet	Feature not available.
E31	0x001F	Not setup for TOD	The point is not set up for Time-Of-Day (TOD) functions.
E34	0x0022	Cannot override	Time-Of-Day error resulting when you try to override an override statement.
E40	0x0028	Invalid DST pari	The dates entered for DST pair are invalid.
E50	0x0032	Too many commands outstanding	Too many operator requests are waiting to be handled. Wait 10 to 30 seconds and try again.
E51	0x0033	Report active	A request to print a report at the network printer has been made while another report is still printing. Either wait until the first report completes, or cancel the first report and try again.
E52	0x0034	Tape load error	An attempt has been made to load a database from a tape that contains data for a field panel with a different number (address switch) than the one being loaded. Make sure you have the correct cassette tape for the field panel receiving the data.

E53	0x0035	Tape header invalid	Indicates that the field panel cannot read the header block (or title) of the tape. This error commonly occurs because the bits per second is set higher than 1200 during a Save option. The Save appears to complete successfully, but fails to verify. Database Save operations (backups) must be performed with the rate set at or below 1200 bps. Check the volume setting on the cassette player and make sure that the cassette interface switch is in the LOAD (PLAY) position and try again. The error may disappear after repeated attempts to load the database. If the error persists, try your second backup tape if available. Corrupt or bad recording tape and excessive electrical noise may also cause this error.
E54	0x0036	Tape trailer invalide	Indicates that the field panel cannot detect the end of the data on a tape. This error usually occurs because the Save procedure on that tape had been aborted. Use a tape that was verified at the time of a Save option.
E55	0x0037	Cannot modify	An attempt has been made to directly modify an area of memory that cannot be modified. DO NOT attempt to modify memory without direct supervision from a Siemens Industry representative. The results of direct modification of memory on system operation are completely random.
E57	0x0039	Destinaion node failed	The field panel to which you sent a command has either failed, is not defined on the network, has never been made ready, or is a remote node (not connected).
E58	0x003A	No Give 1st active	Report error. The field panel providing data is no longer running the report.
E59	0x003B	SCB outstanding	Data is ready, but the report is no longer running.
E60	0x003C	No slave SCB available	You are requesting information from a field panel that is busy providing display information to other field panels and cannot start your display. Wait several seconds and try again. More than one attempt may be necessary to complete the request
E61	0x003D	Cannot remove self	An attempt has been made to remove the field panel through which you are communicating. This is not allowed.
E62	0x003E	No report active	An attempt has been made to cancel a display at the system printer, but no report is currently being printed there.
E63	0x003F	No report printer	No report printer has been defined for the network.
E64	0x0040	Invalid report ID	The particular report you requested is not available.
E65	0x0041	Report data lost	This error displays for one of the following reasons: Report data was lost across the network. Data was lost while transferring (saving) the database onto a cassette tape.
E66	0x0042	Host ID security failed	Host ID security check failed. The host ID defined in the network does not match the ID defined at the host. This error can only occur when an operator manually initiates the call.
E67	0x0043	Bad trunk/remote	Remote connection attempt failed because trunk and remote identification labels did not match.
E80	0x0050	Inavlid phone number	Invalid or unrecognizable telephone number was found or has been used.
E81	0x0051	TIU busy	This particular Telecommunications Interface Unit (TIU) is already busy with a call.
E82	0x0052	TIU no present	The specific TIU hardware is not present at the object field panel.

E83	0x0053	No more alarm devices	No alarm devices are available.
E84	0x0054	Command error:	The system does not recognize the modem type and cannot connect to the modem.
E85	0x0055	Alarm levels are full	An attempt has been made to add more than six alarm levels to a particular mode.
E100	0x0064	Runer needs more data	An attempt has been made to "advance" the tuning process before enough data has been collected.
E101	0x0065	Command not supported	The function you selected is not supported in this field panel.
E102	0x0066	Not set up for modes	Addition of a mode point that has not been setup for enhanced alarming.
E104	0x0068	Bad category number	The destination number entered was invalid.
E112	0x0070	Point is in HAND mode	An attempt was made to command a point in HAND mode.
E128	0x0080	Invalid user id	An attempt was made to log in with an invalid user ID, or the user ID was misspelled.
E129	0x0081	Invalid password	An attempt was made to log in with an invalid password, or the password was misspelled.
E130	0x0082	User accounts database is full	User accounts database is full. To correct this problem, remove inactive accounts.
E171	0x00AB		The field panel cannot accept a tape load without being coldstarted. This error usually occurs during a tape load. You must coldstart the field panel and try again.
E172	0x00AC	Invalid command	P2 or P3 command is not supported by the server field panel.
E182	0x00B6		Operation aborted due to a warmstart of the field panel.
E183	0x00B7		Too many communication framing errors over the network. Information sent was garbled. Try again.
E184	0x00B8	SCU fails to answer	This error displays for one of the following reasons: Previously unfailed field panel fails to answer. This error indicates that a field panel has failed in the middle of a network operation. A field panel failure message should follow at the alarm printer. A condition similar to error code E183 exists.
E249	0x00F9	Invalid point address	This error displays for one of the following reasons: A checksum error has occurred during a database save, load, or verify operation. If this error occurs, try the operation a few more times. If the error continues to appear, follow the directions for treating error code E253. Either the physical point address is not valid for the point type, or a point has been assigned an address that is outside the range of valid point numbers. Check the point definition.
E250	0x00FA	Failed I/O device	Failed input/output board. The point appears failed (*F*) because the standard termination board or AO-P board in the field panel or on the FLN trunk is failed or missing. When the board is repaired or installed, the point status corrects itself.
E251	0x00FB		No Change-Of-Value to report.
E252	0x00FC		This error condition may occur on the first attempt to characterize a point within a set. Either the physical point address is not valid for the point type, or a point has been assigned an address that is outside the range of valid point numbers. Check the point definition.

E253	0x00FD		Framing error occurred while reading a record from a tape during a database load or verify. More than one attempt may be necessary. Verify the switch on the cassette interface box is in the correct position and the communication speed for the operator terminal matches the rate used to record the tape. If you are verifying a tape, make certain that the tape was not recorded above 1200 bps (also see error code E53). Make another attempt. In some cases, fast forwarding the tape to the end, rewinding it, and then retyping the operation is effective.
E254	0x00FE		Input/Output timeout. This error generally occurs during a database load or verify operation when a valid character has not been read from the tape in a specified time. Follow the directions for clearing error E253.
E512	0x0200	Monitor list full	Point monitor list is full.
E514	0x0202	FLT transfer in progress	An attempt was made to start a second database transfer with FLT. Wait for the first FLT database transfer to finish.
E515	0x0203	FLT transfer killed	An error caused the FLT database transfer to abort.
E517	0x0205	TEC *<name>* not added	Failure during point addition because field panel does not support long point name functionality.
E518	0x0206	Connection lost	A field panel failed while a command was in progress.
E519	0x0207	Warm started	Warmstart occurred while a command was in progress.
E521	0x0209	Protocol error	Low level protocol error occurred during a command.
E528	0x0210	Time-out error	Time-out on a command occurred. The server field panel did not respond to a command during the allotted time.
E3600	0x0e10	Invalide FLN number	FLN number used was outside the range of 0 through 3.
E3601	0x0e11	Invalid drop number	Drop number of the FLN device is invalid (Note: 99 is an invalid value for drop number).
E3602	0x0e12	Device failed	FLN device is failed.
E3603	0x0e13	Invalid point number	Point address is outside the range of a specific physical device.
E3604	0x0e14	Physical point failed	Physical point failed.
E3605	0x0e15	Phyisical point not commandable	An attempt was made to change the value of a physical point that cannot process commands. This error most often occurs when you attempt to command certain point s on FLN devices.
E3606	0x0e16	Value out of range	An attempt was made to command a point to a value that is outside the physical range for that point.
E3607	0x0e17	Application invalid for device	An application defined for a particular FLN device is invalid. Verify the application that resides on the FLN device.

PPCL (R-code) Error Codes

Code Number	Explanation
R0	A program line was not accepted, but the field panel cannot determine the specific problem. Carefully examine the line, recompose if necessary, and re-enter the line.
R1	A program line was entered without a valid line number. Re-enter the line with a number from 1 to 32,767.
R2	Unrecognized statement. A statement in the program line entered is not recognized. A typographical mistake is the most common cause (for example, typing ONN instead of ON, or typing LOP instead of LOOP).
R3	Invalid RETURN statement. The RETURN statement has been used incorrectly in the program line.
R5	Invalid control statement. The most common cause of this error is an attempt to command an analog point with a digital control statement, or vice versa (for example, 100 OFF(DAMPER)).
R6	Invalid IF statement. The IF statement in the program line has been used incorrectly or has been improperly constructed.
R7	Invalid ASSIGNMENT statement. The program line is trying to assign an illegal value to a point (for example, assigning a decimal value to a digital point).
R8	Unbalanced parentheses. The number of left parentheses in the program line is not equal to the number of right parentheses.
R9	Line numbers are out of order. The program line numbers are not in ascending order.
R10	Too many arguments in the statement.
R11	Too many operands in the statement.
R13	Invalid binary operator. The binary operator in the program line is not recognized. The most common cause of this error is incorrectly typing the relational operators: EQ, GE, +, -, *, /, etc.

Appendix D—BACnet/IP Pre-defined Engineering Units

Appendix D contains the list of pre-defined engineering units accepted by APOGEE BACnet/IP, the corresponding BACnet engineering unit number, and the meaning or unit of measure for each unit. BACnet accepts pre-determined values for engineering units only. For this reason, APOGEE BACnet/IP devices do not accept user-defined engineering units. You can type an exact value from the pre-determined list of APOGEE BACnet/IP engineering units, or use a query to select an engineering unit for the point. For example, **? C*** will display all pre-determined APOGEE BACnet/IP engineering units that begin with the letter ‘C’. If you type an exact value that is not in the pre-determined list, you will be re-prompted for the engineering unit.

The `Engineering units` prompt also accepts the BACnet engineering number in place of the APOGEE BACnet/IP name.

Unit of Measure	APOGEE BACnet/IP Engineering Unit	BACnet Engineering Unit Number
Area		
square-meters	m2	0
square-centimeters	cm2	116
square-feet	ft2	1
square-inches	in2	115
Currency		
currency1	crrncy1	105
currency2	crrncy2	106
currency3	crrncy3	107
currency4	crrncy4	108
currency5	crrncy5	109
currency6	crrncy6	110
currency7	crrncy7	111
currency8	crrncy8	112
currency9	crrncy9	113
currency10	crrncy10	114
Electrical		
milliamperes	mA	2
amperes	A	3
amperes-per-meter	A/m	167
amperes-per-square-meter	A/m2	168
ampere-square-meter	A/m2	169
farads	farads	170
henrys	henrys	171
ohms	Ohms	4
ohm-meters	Ohm-m	172

milliohms	mOhms	145
kilohms	kOhms	122
megohms	MOhms	123
siemens	S	173
siemens-per-meter	S/m	174
teslas	telas	175
volts	V	5
millivolts	mV	124
kilovolts	kV	6
megavolts	MV	7
volt-amperes	VA	8
kilovolt-amperes	kVA	9
megavolt-amperes	MVA	10
volt-amperes-reactive	VAr	11
kilovolt-amperes-reactive	kVAr	12
megavolt-amperes-reactive	MVAr	13
volts-per-degree-Kelvin	V/Deg K	176
volts-per-meter	V/m	177
degrees-phase	Dg-phase	14
power-factor	pf	15
webers	webers	178
joules	J	16
kilojoules	kJ	17
kilojoules-per-kilogram	kJ/kg	125
megajoules	MJ	126
watt-hours	W h	18
kilowatt-hours	kW h	19
megawatt-hours	MW hour	146
btus	Btu	20
kilo-btus	k Btus	147
mega-btus	M Btus	148
therms	Therms	21
ton-hours	ton-h	22
Enthalpy		
joules-per-kilogram-dry-air	J/kg Air	23
kilojoules-per-kilogram-dry-air	kJ/kg A	149
megajoules-per-kilogram-dry-air	MJ/kg A	150
btus-per-pound-dry-air	Btu/lb A	24
btus-per-pound	Btu/lbs	117

Entropy		
joules-per-degree-Kelvin	J/DEG K	1127
kilojoules-per-degree-Kelvin	k J/DG K	151
megajoules-per-degree-Kelvin	M J/DG K	152
joules-per-kilogram-degree-Kelvin	J/kg K	128
Force		
Newton	N	153
Frequency		
cycles-per-hour	cycles/h	25
cycles-per-minute	cycles/m	26
hertz	Hz	27
kilohertz	kHz	129
megahertz	MHz	130
per hour	/h	131
Humidity		
grams-of-water-per-kilogram-dry-air	g/kg	28
percent-relative-humidity	r/h	29
Length		
milimeters	mm	30
centimters	cm	118
meters	m	31
inches	in	32
feet	ft	33
Light		
candelas	cd	179
candelas-per-square-meter	cd/m2	180
watts-per-square-foot	W/ft2	34
watts-per-square-meter	W/m2	35
lumens	Lm	36
luxes	Lx	37
foot-candles	ft cd	38
Mass		
kilograms	kg	39
pound-mass	lbs	40
tons	tons	41
Mass Flow		
grams-per-second	g/s	154
grams-per-minute	g/m	155
kilograms-per-second	kg/s	42

kilograms-per-minute	kg/m	43
kilograms-per-hour	kg/h	44
pounds-mass-per-second	lbs/s	119
pounds-mass-per-minute	lbs/m	45
pounds-mass-per-hour	lbs/h	46
tons-per-hour	ton/h	156
Power		
milliwatts	mW	132
watts	W	47
kilowatts	kW	48
megawatts	MW	49
btus-per-hour	Btu/h	50
kilo-btus-per-hour	k Btu/h	157
horsepower	hp	51
tons-refrigeration	T	52
Pressure		
pascals	Pa	53
hectopascals	hPa	133
kilopascals	kPa	54
milibars	mbar	134
bars	bar	55
pounds-force-per-square-inch	psi	56
centimeters-of-water	cm H2O	57
inches-of-water	in H2O	58
millimeters-of-mercury	mm Hg	59
centimeters-of-mercury	cm Hg	60
inches-of-mercury	in Hg	61
Temperature		
degrees-Celcius	DEG C	62
degrees-Kelvin	DEG K	63
degrees-Kelvin-per-hour	DEG K/h	181
degrees-Kelvin-per-minute	DEG K/m	182
degrees-Fahrenheit	DEG F	64
degree-days-Celcius	DEG-d-C	65
degree-days-Fahrenheit	DEG-d-F	66
delta-degrees-Fahrenheit	^ DEG F	120
delta-degrees-Kelvin	^ DEG K	121
Time		
years	yrs	67

months	mos	68
weeks	wks	69
days	days	70
hours	hrs	71
minutes	mins	72
seconds	secs	73
hundredths-seconds	1/100s	158
Torque		
milliseconds	ms	159
newton-meters	N-M	160
Velocity		
millimeters-per-second	mm/s	161
millimeters-per-minute	mm/m	162
meters-per-second	m/s	74
meters-per-minute	m/m	163
meters-per-hour	m/h	164
kilometers-per-hour	km/h	75
feet-per-second	ft/s	76
feet-per-minute	ft/m	77
miles-per-hour	mph	78
Volume		
cubic-feet	ft3	79
cubic-meters	m3	80
imperial-gallons	Imp gal	81
liters	l	82
us-gallons	gal	83
Volumetric Flow		
cubic-feet-per-second	ft3/s	142
cubic-feet-per-minute	ft3/m	84
cubic-meters-per-second	m3/s	85
cubic-meters-per-minute	m3/m	165
cubic-meters-per-hour	m3/h	135
imperial-gallons-per-minute	Imp gpm	86
liters-per-second	lps	87
liters-per-minute	lpm	88
liters-per-hour	lph	136
us-gallons-per-minute	gpm	89
Other		
degrees-angular	Deg-ang	90

degrees-Celcius-per-hour	DEG C/h	91
degrees-Celcius-per-minute	DEG C/m	92
degrees-Fahrenheit-per-hour	DEG F/h	93
degrees-Fahrenheit-per-minute	DEG F/m	94
joule-seconds	J s	183
kilograms-per-cubic-meter	kg/m3	186
kilowatt-hours-per-square-meter	kW h/m2	137
kilowatt-hours-per-square-foot	kW h/ft2	138
megajoules-per-square-meter	MJ/m2	139
megajoules-per-square-foot	MJ/ft2	140
no-units		95
newton-seconds	N s	187
newtons-per-meter	N/m	188
parts-per-million	ppm	96
parts-per-billion	ppb	97
percent	PCT	98
percent-obscuration-per-foot	PCT/ft	143
percent-obscuration-per-meter	PCT/m	144
percent-per-second	PCT/s	99
per-minute	/m	100
per-second	/s	101
psi-per-degree-Fahrenheit	psi/DG F	102
radians	rad	103
radians-per-second	rad/s	184
revolutions-per-minute	rpm	104
square-meters-per-Newton	m2/N	185
watts-per-meter-per-degree-Kelvin	W/m Dg K	189
watts-per-square-meter-degree-Kelvin	W/m2 K	141

Appendix E—Transition to APOGEE BACnet Overview

This appendix discusses the functionality BACnet functionality designed into the APOGEE Automation System. Some references to Insight software are also included to expand upon any relevant discussions.

APOGEE Field Panels and BACnet Interaction

Both the APOGEE Automation System and BACnet field panels can connect to the same network; however, the two devices use different protocols to communicate. APOGEE field panels use the Siemens Industry, Inc. proprietary protocol for communication, while BACnet field panels adhere to the BACnet standard protocol for interoperability. Every effort was made to integrate BACnet functionality and connectivity into the APOGEE interface, allowing users who have experience with the APOGEE Automation System to leverage that knowledge and apply it to the APOGEE BACnet system.

Though much of the BACnet functionality is available through the BACnet field panel user interface, it is highly recommended that you use an Insight workstation when working on an APOGEE BACnet system. See the section *Access to BACnet Functionality* section for the BACnet functions that are available at the field panel, but are accessed through the Insight BACnet workstation.

BACnet/IP Equipment Scheduling

BACnet/IP replaces the APOGEE Equipment Scheduler application with the following objects:

- The *Schedule* object replaces the APOGEE objects Zone, Mode Schedule, and Override Schedule.
- The *Command* object replaces the APOGEE command table within the Equipment Scheduler.
- The *Calendar* object replaces the APOGEE calendar that is shared as global data on the ALN.

The previous objects are configurable from an Insight workstation only. To view Insight 3.x Help, see the Insight Online Documentation window, which you can access from the Insight Main Menu or the Insight program group.

NOTE:
The SSTO PPCL statement replaces the APOGEE P2 Equipment Scheduler SSTO.

Functionality Matrix

The sections of this appendix present a high-level comparison between the APOGEE Automation System and field panels that have built in BACnet functionality. The functionality is broken into sections that parallel the order of information presented in this manual. Additional comments following the matrix for each section providing more information on relevant topics.

Introduction

This section discusses information contained in Chapter 1 – *The Operator Interface*.

Functionality	APOGEE Automation System	APOGEE with BACnet	Comments
Accelerator keys	YES	YES	See the *Accelerator Keys* section in Chapter 1 [→ 25] of this manual.
Applications (see also P1 FLN Devices [→ 195], MS/TP Devices [→ 227], and PPCL Editor [→ 333])	YES	YES	Design concept for system functionality. Allows for easier interaction with subpoints and application data.
Cut and paste	YES	YES	Use with point naming conventions.
Modify functionality	EXTENSIVE	YES	Any BACnet object property that is available for writing can be edited by the field panel interface.
Queries	YES	YES	Context-specific help.
Reports	YES	YES	Enhanced and standardized field panel reports.
System delimiter	YES	YES	Used to access subpoints in applications. There are several different methods for using the system delimiter. See Point Database [→ 134] for more information.
Wildcard characters	YES	YES	None.

Accelerator Keys

Accelerator keys are keyboard shortcuts that perform specific tasks. The back of this manual contains a complete list of accelerator keys. If you are working in the operator interface, the accelerator key list can also be generated by pressing ? at the HMI main menu.

Modify Functionality

APOGEE field panels and BACnet field panels can both modify certain point/object properties.

Queries

APOGEE field panels and BACnet field panels have the same query capability.

System Delimiter

The system delimiter (:) is used to reference subpoints in applications. Common tasks such as displaying and commanding can be performed from the HMI main menu by using the system delimiter. Both APOGEE field panels and BACnet field panels support the system delimiter.

System Setup

This section discusses information contained in Chapter 3 – *System Setup*.

Functionality	APOGEE Automation System	APOGEE with BACnet	Comments
Destinations			
Referred to as…	Destinations	Notifications	Destinations were implemented as BACnet notifications. Objects that require notification.
Default destination 0	YES	YES	The notification class ID is used as the default notification for BACnet field panel applications. This class is not created by default. Users should create this class and define Insight (if available).
Destination 1 to 250	YES	YES	Expanded to BACnet requirements. Notification identifiers can be from 0 through 4194302.
Disks			
Main, Backup disk support	YES	YES	Same as the APOGEE Automation System.
Field panels			
Maximum nodes	100	100	None.
Separate configurable ports	YES	YES	Baud rate, reporting and dialing capabilities.
Independent communication on HMI ports	YES	YES	APOGEE ports can communicate simultaneously.
Ports can filter alarms, reports and dialing communications	YES	YES	None.
ALN communication with a remote Insight workstation using APOGEE Ethernet Microserver	YES	NO	Not supported.
State text			
Fixed state text labels for digital points	YES	YES	Point status typically is ON, OFF, STOP, and so on.
Customized state text	YES	YES	Point types default to fixed state text, or can use customized state text. Default point states like ON and OFF can be assigned alternate labels such as RUN and STOP.
System error messages			
Standard set of system error messages	YES	YES	None.
Enable/disable dialing	YES	NO	Not supported under BACnet.
Customized routing to destinations	YES	YES	Individual error messages can be routed to different destinations.
System time and calendar—Daylight Saving Time (DST)			
Future 10-year DST time and date change-over pairs	YES	YES	None.

Destinations

APOGEE field panels use destinations to route alarms.

BACnet/IP field panels use Notification Classes to route alarms.

Field Panels

Field panels are uniquely identified according to the type of ALN network to which they are connected. See *Field Panel Identifier* in the *How to Use this Manual* section for information on field panel identifiers.

Network

BACnet/IP field panels use UDP/IP, while Ethernet ALN uses TCP/IP.

BACnet/IP field panels use Who-Is/I-Am, while Ethernet ALN uses DNS.

BACnet/IP uses BACnet Broadcast Management Devices (BBMDs) to communicate across subnets.

State Text

State text is a function that defines how a field panel visually reports and commands the values of LDIs, LDOs and LENUM point types. With the example of ON/OFF, different state text tables can display alternate labels such as HOT/COLD, WARM/COOL or OPEN/CLOSE respectively. State text tables can also be used with complex digital points and LENUM points, where there are more than two states. Additional state text tables can be defined for custom applications.

System Time and Calendar

APOGEE field panels can report the system time and date in a wide variety of formats. The designation of the time and date format used is contained in the individual user accounts.

Calendars in BACnet/IP are contained in every panel and must be separately updated.

APOGEE P2 field panels share a single global calendar and can be updated globally.

User Accounts

Functionality	APOGEE Automation System	APOGEE with BACnet	Comments
Default accounts	YES	YES	None.
User levels	YES	YES	APOGEE field panels have the following default user accounts: LOW, MED, HIGH.
User accounts	NO	YES	50 configurable user accounts with individual setting and passwords.
Functionality restricted	YES	YES	If access is granted, the level of interaction can also be defined: Look, Command or Edit privileges.
Point grouping for access	YES	YES	Points can be assigned to groups. User accounts then define if a particular user can access that group.

A user account defines the configuration information that applies to a specific user (such as the user name, description, password, language, auto-log off setting, and the time and date format). Each account also designates which of the configurable point groups a user can access. Users that do not have access to various point groups cannot display, command or edit those points.

The APOGEE field panel supports 30 point groups. By default, if a point is not specifically assigned to one or more groups, it is automatically associated to all groups. The designation of which groups a point belongs is contained in the database definition for that point.

Field panel functionality can also be administered in the user account. If access is granted to a certain type of functionality, the account defines the level of interaction that can occur (read only, command, or edit privileges). If certain functionality is restricted, then the related prompting will not appear in the interface.

Point (Object) Database

This section discusses information contained in Chapter 5 – *Point Database*.

Functionality	APOGEE Automation System	APOGEE with BACnet	Comments
Commanding points			
Enhanced point commanding	YES	YES	Enhanced to use the BACnet Priority Array.
Point attributes			
Two names for each point and application (each equipment scheduling application and FLN devices)	YES	YES	Two point names, point system name and point name. When defining points in the database, the second name can default to the point system name by simply pressing **ENTER**. Each user account defines which name is displayed in the interface. The only exception is PPCL, which always uses the point system name. Once entered in the field panel, the point system name cannot be changed. The second print name can be modified. BACnet objects also contain an instance number and object type, which is different from APOGEE field panels.
30-character (long) point name support	YES	YES	Both names can keep existing 6-character name formats. When using longer point names, use a naming convention. BACnet field panels can use BACnet encoded names or device-specific names.
6-character point name support (pre-APOGEE field panels)	YES	YES	If necessary, modify the point name at a later time.
Extended character set	YES	YES	APOGEE points can use the following characters: A to Z, a to z, 0 to 9, spaces ( ), periods (.), commas (,), dashes (-), underlines (_), and apostrophes (').
Point addressing	YES	YES	APOGEE field panels use a slightly different addressing scheme. Point address are prompted for in segments (with example included): Field panel :12 FLN :0 Drop :34 Point :1 This is different than pre-APOGEE field panels.
Point descriptor size (in characters)	16	16	Additional space to describe a point.
Support for Point Expansion Modules (PXMs) used as an FLN device	YES	YES	When transitioning to the APOGEE Automation System, use the slope/intercept calculations in the MEC and PXM tables in Chapter 5.
LAI point type support	YES	YES	See the following table to see how APOGEE

LA0 point type support	YES	YES	field panel points relate to BACnet objects.
LAPACI point type support	YES	YES	
LDI point type support	YES	YES	
LDO point type support	YES	YES	
L2SL point type support	YES	YES	
L2SP point type support	YES	YES	
LOOAL point type support	YES	YES	
LOOAP point type support	YES	YES	
LFSSL point type support	YES	YES	
LFSSP point type support	YES	YES	
LENUM point type support	YES	YES	
Analog points can store floating point and integer values	YES	YES	None.
Analog points can store time, date or date/time values	YES	YES	None.
Totalize			
Totalization values displayed by state	YES	PARTIAL	Not supported for complex digital point types (multistate).
Totalized values can be displayed in hours, minutes or seconds	YES	PARTIAL	BACnet supports Totalization in seconds.

APOGEE to BACnet Point Type Cross-reference

APOGEE Point Type	BACnet Physical Object	BACnet Virtual Object
Logical Analog Input (LAI) [1]	Analog Input Object (AI)	Analog Value Object (AV)
Logical Analog Output (LAO) [1]	Analog Output Object (AO)	Analog Value Object (AV)
Logical Digital Input (LDI) [1]	Binary Digital Input (BI)	Binary Value Object (BV)
Logical Digital Output (LDO) [1]	Binary Digital Output (BO)	Binary Value Object (BV)
Logical Pulse Accumulator Input (LPACI)	Analog Input Object (AI)	Analog Value Object (AV)
Logical Two State Latched (L2SL)	Binary Output Object (BO)	Binary Value Object (BV)
Logical Two State Pulse (L2SP)	Binary Output Object (BO)	Binary Value Object (BV)
Logical Fast/Slow/Stop Latched (LFSSL) [2]	Multistate Output Object (MO)	Multistate Output Object (MO)
Logical Fast/Slow/Stop Pulsed (LFSSP) [2]	Multistate Output Object (MO)	Multistate Output Object (MO)
Logical On/Off/Auto Latched (LOOAL) [2]	Multistate Output Object (MO)	Multistate Output Object (MO)
Logical On/Off/Auto Pulsed (LOOAP) [2]	Multistate Output Object (MO)	Multistate Output Object (MO)
Logical Enumerated (LENUM)	Multistate Value Object (MV)	Multistate Value Object (MV)

1) Analog and Digital (Binary) points are mapped to BACnet Value objects if the primary (or only) physical point is virtual (if the second pulsed point or proof point is ignored in the determination).

2) APOGEE points with a proof are mapped to Multistate Output objects.

Commanding Points

When commanding points, the APOGEE field panel includes the current value in the prompt line. If you are unsure of the values that a point can use (especially for complex digital points), you can query the point for valid values. When commanding points, the APOGEE field panel includes the current value in the prompt line. If you are unsure of the values that a point can use (especially for complex digital points), you can query the point for valid values.

```
>Point, Application, Time, Message, Cancel, System, passWord,
Bye? P
>Log, Display, Command, Edit, Operation, Monitor, Alarm, Trend,
Quit? C
>Value, resetTotal, Quit? V
>Point name                   :  BLD990.AHU01.RFN--------------
-------------
>Current state = STOP      New state:  ?-------
>  1) STOP
>  2) SLOW
>  3) FAST
Enter option # or <C> for Cancel> 3-
BLD990.AHU01.RFN commanded to FAST

>Value, resetTotal, Quit? -
```

Point Names

APOGEE P2 points use two names (each can contain up to 30 alphanumeric and punctuation characters). The first point name is used by the system, and once entered, cannot be modified. The second point name is used for descriptive purposes and can be modified. When upgrading to the APOGEE Automation System, the original point name (six-character name format) can be retained as the point system name, while a more descriptive second name can be added to enhance usability.

BACnet uses the point name and point system name conventions just as the APOGEE Automation System does. BACnet also provides two additional methods of point naming;

- The first method supports third-party BACnet devices that do not adhere to APOGEE naming conventions,
- The second method uniquely identifies correctly named points across the network.

The two added methods of naming a point are the *BACnet encoded name* and the *device specific name*. See *BACnet Point Naming Conventions* in the *Point Database* chapter for more information.

Instance Number

Within the host device, every point has a unique instance number within its point type. For example, instance number 0 can apply to both analog input and analog output in the same field panel. They are distinguished by type within the field panel.

Point Types

Table 3: BACnet Object Types and APOGEE P2 Equivalents.

Abbreviation	Object Type	APOGEE Type
AC	Accumulator Object	--
AI	Analog Input Object	LAI
AO	Analog Output Object	LAO, LPACI
AV	Analog Value Object	Virtual LAI, LAO, or LPACI
AG	Averaging Object	--
BI	Binary Input Object	LDI
BO	Binary Output Object	LDO, L2SL, L2SP
BV	Binary Value Object	Virtual LDI, LDO, L2SL, L2SP
CA	Calendar Object	Replaces Global Data: Calendar
CO	Command Object	Replaces the Command Table within the Equipment Scheduler application.
EE	Event Enrollment Object	--
FI	File Object	Used for upload/download
GR	Group Object	--
LP	Life Safety Point	--
LZ	Life Safety Zone	--
LO	Loop Object	--
MI	Multistate Input Object	--

Abbreviation	Object Type	APOGEE Type
MO	Multistate Output Object	LFSSL, LFSSP, LOOAL, LOOAP
MV	Multistate Value Object	LENUM
NC	Notification Class Object	Replaces Global Data: Destinations
PR	Program Objet	--
SC	Schedule Object	Replaces Eqsched Mode Schedules
TL	Trend Log Object	Replaces APOIGEE Trend definition and data

Point Priority

Table 4: APOGEE to BACnet Point Priority Reference

BACnet Priority Slot	BACnet Name	Default APOGEE Point Priority
1	Manual Life Safety	
2	Automatic Life Safety	
3	Available	
4	Available	
5	Critical Equipment Control	
6	Minimum On/Off	
7	Available	
8	Manual Operator	OPER (Operator)
9	Available	
10	Available	SMOKE
11	Available	
12	Available	EMER (Emergency)
13	Available	
14	Available	PDL
15	Available	
16*	Sched, PPCL, TEC tool	
NONE	Relinquish Default	NONE; TEC Application

* The TEC Tool can command Priority slot 16 only if it is not being commanded by PPCL.

Dynamic COV

Dynamic COV is not supported in APOGEE BACnet field panels.

Totalized Value

APOGEE field panels contain changes in totalization functionality. They allow point run-time values to display in hours, minutes, or seconds. The Totalized Value report also includes the reset time and date for a point being totalized.

BACnet field panels totalize the following points:

- LAO
- LAI
- LDO
- LDI
- L2SL
- L2SP
- LOOAL
- LOOAP
- LFSSL
- LFSSP

FLN Devices

This section discusses information contained in Chapter 6 – *P1 Floor Level Network (FLN) Devices*.

Functionality	APOGEE Automation System	APOGEE with BACnet	Comments
Three FLNs per ALN controller	YES	YES	None.
TEC support	YES	YES	None.
UC support	YES	YES	None.
Location of FLN device prompting	APPLICATION	APPLICATION	None.
Automatic unbundling of FLN device subponts	YES	YES	Allows direct access to subpoints for displaying and commanding. Access subpoints with the following convention: FLN device name, followed by the system delimiter (:), followed by the subpoint name.
Manual unbundling of FLN device subpoints	YES	YES	Subpoints can be added to the field panel, allowing additional functionality such as alarming and totalization.
Suboint reports	YES	YES	Can use either the specific prompting for FLN devices or use the prompting located under the `POINT` menu.

All FLN device functionality resides under the main level `APPLICATION` prompt. Direct displaying and commanding of FLN subpoints can also occur through the `POINT` menu by using the system delimiter (:) with the FLN application name.

LonWorks FLN Devices

APOGEE P2 field panels and APOGEE BACnet field panels have the same basic LonWorks FLN functionality. Differences in HMI prompting and menu structure are described in Chapter 3 – *System Setup*, and Chapter 7 - *LonWorks Network Floor Level Network Devices*.

Alarm Management

This section discusses information contained in Chapter 8 – *Alarm Management*.

Functionality	APOGEE	APOGEE with BACnet	Comments
Standard alarming support	YES	NO	Uses destination 0, so additional field panels can receive standard alarms.
Enhanced alarming support	YES	NO	Addition of alarm tokens to messages.
BACnet intrinsic alarms	NO	YES	Uses Notification Classes so additional field panels can receive standard alarms.
Alarm message tokens	NO	YES	Allows for additional point information.
Alarm acknowledgement	NO	YES	BACnet allows independent acknowledgement for OFFNORMAL, NORMAL, and FAULT.

Alarm Priority

The alarm priority of a logical point ranks the severity of the alarm from the lowest priority (6) to the highest priority (1). The priority of alarm levels is application specific. The MEC does not react to a specific alarm level.

BACnet field panels support intrinsic alarming. Alarm priorities have a value between (and including) 0 and 255. See the following table for an APOGEE to BACnet alarm severity comparison.

APOGEE to BACnet Alarm Severity Cross-reference.		
APOGEE Priority Level	**APOGEE Name**	**BACnet Notification Class Priority Value**
1	Life Safety	0 - 31
2	Property Safety	32 - 63
3	Supervisory	64 - 95
4	Trouble	96 - 127
5	High Priority Alarms	128 - 191
6	Low Priority Alarms	192 - 255

Equipment Scheduling

This section discusses information contained in Chapter 9 – *Equipment Scheduling*.

Functionality	APOGEE Automation System	APOGEE with BACnet	Comments
Method of scheduling equipment	Equipment Scheduler	BACnet Scheduling	BACnet uses the Insight software to configure the scheduling function.
Zones			
Zone support	YES	YES	BACnet uses a schedule object for the APOGEE zone functionality.

Override support	YES	YES	In BACnet, exception schedules provide override support.
Shift day support	YES	NO	
Temporary support	YES	NO	
Commanding points			
Commanding point with the command table	YES	YES	BACnet uses the command object for the APOGEE command table functionality.
Commanding point with the PPCL	YES	YES	
Calendar			
System calendar support for day shifts	YES	NO	BACnet calendars are not shared system-wide.
Modifications to schedules	YES	YES	
Special day support	NO	YES	In BACnet, exception schedules provide override support.
Holiday support	YES	YES	In BACnet, exception schedules provide override support.
SSTO			
SSTO functionality	Equipment Scheduling	PPCL	
Calculation of SSTO parameters	Automatically	PPCL	

Trending

This section discusses information contained in Chapter 10 - *Trending*.

Functionality	APOGEE Automation System	APOGEE with BACnet	Comments
Trending with multiple definitions	YES	YES	Both field panel types allow points to be trended with a total of five definitions, one COV and four time-samples.
Trending enabled Start/Stop time	NO	YES	
Trending ON/OFF	Trend trigger	Log enable	
Stop when Trend buffer is full	NO	YES	
Trend by point COV	YES	YES	None.
Trend by user-assigned trend COV	YES	YES	None.
Display trend value	Hour, minutes	Hours, minutes, seconds	None.
Display trend values for each state	YES	YES	None.

PPCL Editor

This section discusses information contained in Chapter 11 – *PPCL Editor*. See *Point Priority/Command Priority* in the *Point Database* chapter for information on the BACnet Command Priority array.

Use of the command priority array has the following effects on PPCL programs:

- Each PPCL program has a configurable priority used for point commands and releases issued from PPCL statements.
- Existing PPCL that uses @Priority and Release uses the global data for mapping APOGEE priorities to BACnet command priority slots.

BACnet Backup/Restore

BACnet uses two methods of backup/restore:

- Field panel upload/download to Insight (APOGEE P2 and BACnet/IP).
- Meets BTL requirements for upload/download using BACnet objects and services.

Access to BACnet Functionality

Type of Functionality	Insight BACnet workstation	APOGEE Field Panel HMI
Access to alarm functions	Yes	Yes
Yes Access to FLN/LON device functionality	Yes	Yes
Access to trending	Yes	Yes
Calendar Functions	Yes	No
Command Objects	Yes	No
Command points (BACnet objects)	Yes	Yes
Diagnostics	Yes	No
Display point definitions	Yes	Yes
Display reports	Yes	Yes
Edit point (BACnet objects)	Yes	Yes
Events configuration	Yes	Yes
Loop tuning	Yes	Yes
Notification Class configuration	Yes	No
PDL access	Yes	Yes
Point Monitor	Yes	Yes
PPCL access	Yes	Yes
Schedule Functions	Yes	No
System BBMD configuration	Yes	Yes
System Configuration	Yes	Yes
User accounts	Yes	Yes

* Use at workstation such as Insight 3.7 or later with BACnet option.

BACnet Object Property Mapping

Analog Input Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Acked_Transitions		No	Used for Alarming. Indicates which of the transitions have been acknowledged; TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
COV_Increment	COV Limit	Yes	No dynamic COV in BACnet.
Deadband	Deadband	Yes	Used for Alarming.
Description	Description	Yes	1 to 16 characters.
Device_Type	Sensor Type	No	Can be one of the following values: current voltage pneumatic 100k Thermistor 1K Platinum RTD LType custom
Event_Enable	Print Alarms	Yes	Used for Alarming. If alarming is enabled, then TO-OFFNORMAL, TO-FAULT, and TO-NORMAL are all set to TRUE.
Event_State	Status	No	If point is in *alarm*, then Event_State = OFFNORMAL, else if point is *failed*, then Event_State = FAULT, else Event_State = NORMAL.
Event_Time_Stamps		No	Used for Alarming. Timestamps of the following event transitions, TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
High_Limit	High Limit	Yes	Used for Alarming.
Limit_Enable		Yes	Used for Alarming. If alarming is enabled, then LOW_LIMIT and HIGH_LIMIT both enabled.
Low_Limit	Low Limit	Yes	Used for Alarming.
Notification Class	Destination	Yes	Used for Alarming.
Notify_Type		Yes	Used for Alarming. Always = “Alarm”
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	System Name	No	1 to 30 characters.
Object_Type	LAI point type	No	BACnet object AI.
Out_of_Service	Enabled or disabled point (*O*)	Yes	Must be set to override Present_Value.

Present_Value	Value	Yes	REAL. BACnet Out_Of_Service property must be set to true to make this value writeable.
Reliability	Status (*F*)	No	If point is *failed*, then Reliability = UNRELIABLE_OTHER, else Reliability = NO_FAULT_DETECTED.
Resolution	Slope	No	
Status_Flags	Status (*A* or –N-)	No	IN_ALARM = true if point is in *alarm*, else false. FAULT = true if point is *failed*, else false. OVERRIDDEN = true if point is in hand mode, else false. OUT_OF_SERVICE = reflects the value of the property by the same name.
Time_Delay		No	Used for Alarming.
Units	Engineering Units	Yes	

Analog Output Object Type

BACnet Property	**APOGEE Attribute**	**Writeable by a BACnet Browser or Workstation**	**Notes**
Acked_Transitions		No	Used for Alarming. Indicates which of the transitions have been acknowledged; TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
COV_Increment	COV Limit	Yes	No dynamic COV in BACnet.
Deadband	Deadband	Yes	Used for Alarming.
Description	Description	Yes	1 to 16 characters.
Device_Type	Point Type	No	LAO
Event_Enable		Yes	Used for Alarming. If alarming is enabled, then TO-OFFNORMAL, TO-FAULT, and TO-NORMAL all set to TRUE.
Event_State	Status	No	If point is in *alarm*, then Event_State = OFFNORMAL, else if point is *failed*, then Event_State = FAULT, else Event_State = NORMAL.
Event_Time_Stamps		No	Used for Alarming. Timestamps of the following event transitions, TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
High_Limit	High Limit	Yes	Used for Alarming.
Limit_Enable		Yes	Used for Alarming. If alarming is enabled, then LOW_LIMIT and HIGH_LIMIT are both enabled.
Low_Limit	Low Limit	Yes	Used for Alarming.
Notification Class	Destination	Yes	Used for Alarming.
Notify_Type		Yes	Used for Alarming.

Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	System Name	No	1 to 30 characters.
Object_Type	LAO point type	No	BACnet object AO.
Out_of_Service	Enabled or disabled point	Yes	Always FALSE.
Present_Value	Value	Yes	REAL.
Priority Array	Priority		For commanding the present value.
Reliability	Status	No	If point is *failed*, then Reliability = UNRELIABLE_OTHER, else Reliability = NO_FAULT_DETECTED.
Relinquish_default			For releasing the present value when the Priority Array is empty.
Resolution	Slope	No	
Status_Flags	Status	No	IN_ALARM = true if point is in *alarm*, else false. FAULT = true if point is *failed*, else false. OVERRIDDEN = true if point is in hand mode, else false. OUT_OF_SERVICE = reflects the value of the property by the same name.
Time_Delay		No	Used for Alarming.
Units	Engineering Units	Yes	

Analog Value Object Type

BACnet Property	**APOGEE Attribute**	**Writeable by a BACnet Browser or Workstation**	**Notes**
Acked_Transitions		No	Used for Alarming. Indicates which of the transitions have been acknowledged; TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
COV_Increment	COV Limit	Yes	No dynamic COV in BACnet.
Deadband	Differential	Yes	Used for Alarming.
Description	Description	Yes	1 to 16 characters.
Event_Enable		Yes	Used for Alarming. If alarming is enabled, then TO-OFFNORMAL, TO-FAULT, and TO-NORMAL all set to TRUE.
Event_State	Status	No	If point is in *alarm*, then Event_State = OFFNORMAL, else if point is *failed*, then Event_State = FAULT, else Event_State = NORMAL.
Event_Time_Stamps		No	Used for Alarming. Timestamps of the following event transitions, TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
High_Limit	High Limit	Yes	Used for Alarming.

Limit_Enable		Yes	Used for Alarming. If alarming is enabled, then LOW_LIMIT and HIGH_LIMIT are both enabled.
Low_Limit	Low Limit	Yes	Used for Alarming.
Notification Class	Destination	Yes	Used for Alarming.
Notify_Type		Yes	Used for Alarming.
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	System Name	No	1 to 30 characters.
Object_Type	LAO point type	No	BACnet object AV.
Out_of_Service	Enabled or disabled point	Yes	Always FALSE.
Present_Value	Value	Yes	REAL.
Priority Array	Priority		For commanding the present value.
Reliability	Status	No	If point is *failed*, then Reliability = UNRELIABLE_OTHER, else Reliability = NO_FAULT_DETECTED.
Relinquish_default		No	For releasing the present value when the Priority Array is empty.
Status_Flags	Status	No	IN_ALARM = true if point is in *alarm*, else false. FAULT = true if point is *failed*, else false. OVERRIDDEN = true if point is in hand mode, else false. OUT_OF_SERVICE = reflects the value of the property by the same name.
Time_Delay		No	Used for Alarming.
Units	Engineering Units	Yes	

Binary Input Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Acked_Transitions		No	Used for Alarming. Indicates which of the transitions have been acknowledged; TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Active_Text	State text	No	Corresponds with the second entry in the point's State Text Table.
Active_Value		No	Used for Alarming. Specifies what the present_value is when the point is in Alarm.
Description	Description	Yes	1 to 16 characters.
Device_Type	Point Type	No	LDI
Elapsed_Active_Time	Totalize	Yes	

Event_Enable		Yes	Used for Alarming. If alarming is enabled, then TO_OFFNORMAL, TO_FAULT, and TO_NORMAL all set to TRUE.
Event_State	Status	No	If point is in *alarm*, then Event_State = OFFNORMAL, else if point is *failed*, then Event_State = FAULT, else Event_State = NORMAL.
Event_Time_Stamps		No	Used for Alarming. Timestamps of the following event transitions, TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Inactive_Text	State text	No	Corresponds with the first entry in the point's State Text Table.
Notification Class	Destination	Yes	Used for Alarming.
Notify_Type		Yes	Used for Alarming.
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	System Name	No	1 to 30 characters.
Object_Type	LAO point type	No	BACnet object BI.
Out_of_Service	Enabled or disabled point	Yes	Must be set in order to override the Present_Value.
Polarity	Normally closed	No	
Present_Value	Value	Yes	Binary. BACnet Out_Of_Service property must be set to true to make this value writeable.
Reliability	Status	No	If point is *failed*, then Reliability = UNRELIABLE_OTHER, else Reliability = NO_FAULT_DETECTED.
Status_Flags	Status	No	IN_ALARM = true if point is in *alarm*, else false. FAULT = true if point is *failed*, else false. OVERRIDDEN = true if point is in hand mode, else false. OUT_OF_SERVICE = reflects the value of the property by the same name.
Time_Delay		No	Used for Alarming.
Time_Of_Active_Time_Reset		No	Reset Time for totalization.

Binary Output Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Acked_Transitions		No	Used for Alarming. Indicates which of the transitions have been acknowledged; TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Active_Text	State text	No	Corresponds with the second entry in the point's State Text Table.
Description	Description	Yes	1 to 16 characters.
Device_Type	Point Type	No	LDI
Elapsed_Active_Time	Totalize	Yes	
Event_Enable		Yes	Used for Alarming. If alarming is enabled, then TO_OFFNORMAL, TO_FAULT, and TO_NORMAL all set to TRUE.
Event_State	Status	No	If point is in *alarm*, then Event_State = OFFNORMAL, else if point is *failed*, then Event_State = FAULT, else Event_State = NORMAL.
Event_Time_Stamps		No	Used for Alarming. Timestamps of the following event transitions, TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Feedgack_value	Proof		Used for Alarming. Current value of the proof point for APOGEE proof points, set equal to the Present_Value for points without proofing.
Inactive_Text	State text	No	Corresponds with the first entry in the point's State Text Table.
Notification Class	Destination	Yes	Used for Alarming.
Notify_Type		Yes	Used for Alarming.
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	System Name	No	1 to 30 characters.
Object_Type	LDO point type	No	BACnet object BO.
Out_of_Service	Enabled or disabled point	Yes	Always FALSE.
Polarity	Inverted	No	
Present_Value	Value	Yes	Binary. BACnet Out_Of_Service property must be set to true to make this value writeable.
Priority_Array		No	For commanding the present value.
Reliability	Status	No	If point is *failed*, then Reliability = UNRELIABLE_OTHER, else Reliability = NO_FAULT_DETECTED.

Relinquish_default		No	For releasing the present value when the Priority Array is empty.
Status_Flags	Status	No	IN_ALARM = true if point is in *alarm*, else false. FAULT = true if point is *failed*, else false. OVERRIDDEN = true if point is in hand mode, else false. OUT_OF_SERVICE = reflects the value of the property by the same name.
Time_Delay	Proof Delay	No	Used for Alarming.
Time_Of_Active_Time_Reset	Reset Totalization Time	No	

Binary Value Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Acked_Transitions		No	Used for Alarming. Indicates which of the transitions have been acknowledged; TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Active_Text	State text	No	Corresponds with the second entry in the point's State Text Table.
Active_Value		No	Used for Alarming. Specifies what the present_value is when the point is in Alarm.
Description	Description	Yes	1 to 16 characters.
Elapsed_Active_Time	Totalize	Yes	Totalization
Event_Enable		Yes	Used for Alarming. If alarming enabled, then TO_OFFNORMAL, TO_FAULT, and TO_NORMAL all set to TRUE.
Event_State	Status	No	If point is in *alarm*, then Event_State = OFFNORMAL, else if point is *failed*, then Event_State = FAULT, else Event_State = NORMAL.
Event_Time_Stamps		No	Used for Alarming. Timestamps of the following event transitions, TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Inactive_Text	State text	No	Corresponds with the first entry in the point's State Text Table.
Notification Class	Destination	Yes	Used for Alarming.
Notify_Type		Yes	Used for Alarming.
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	System Name	No	1 to 30 characters.
Object_Type	Virtual digital point type	No	BACnet object BV.
Out_of_Service	Enabled or disabled point	Yes	Always FALSE.

Present_Value	Value	Yes	Binary.
Reliability	Status	No	If point is *failed*, then Reliability = UNRELIABLE_OTHER, else Reliability = NO_FAULT_DETECTED.
Relinquish_default		No	For releasing the present value when the Priority Array is empty.
Status_Flags	Status	No	IN_ALARM = true if point is in *alarm*, else false. FAULT = true if point is *failed*, else false. OVERRIDDEN = true if point is in hand mode, else false. OUT_OF_SERVICE = reflects the value of the property by the same name.
Time_Delay	Proof Delay	No	Used for Alarming.
Time_Of_Active_Time_Reset		No	Reset Time for totalizaion.

Calendar Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Date_List	Calendar	Yes	Single Dates, Date Ranges, and WeekNDays.
Description		Yes	1 to 16 characters.
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name		No	1 to 30 characters.
Object_Type		No	BACnet object CA. The **Calendar** object replaces the APOGEE **calendar** that is shared between field panels on the ALN.
Present_Value		Yes	Binary. True if today is in the calendar.

Command Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Action	Command Table	Yes	The array of Action Lists.
Action_Text		Yes	The array of Names for the Action Lists.
All_Writers_Successful		No	True if all commands in last action list run were executed without error.
Description		Yes	1 to 16 characters.
In_Process		No	True during the time the action list is being executed.

Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	Zone name	No	1 to 30 characters.
Object_Type		No	BACnet object CO. The **Command** object replaces the APOGEE **command table** within the Equipment Scheduler.
Present_Value	MODE point value	Yes	Unsigned value, similar to the "mode" point; triggers one of many action lists.

Device Object Type

BACnet Property	**APOGEE attribute**	**Writeable by a BACnet Browser or Workstation**	**Notes**
Active_COV_Subscriptions	COV XREF report	No	List of active subscriptions.
APDU_Segment_Timeout		No	3000
APGU_Timeout		No	3000
Application_Software_Version	Firmware rev string	No	
Backup_Failure_Timeout		Yes	Wait time before aborting a backup or restore operation.
Configuration_Files		No	List of files to be backed up. Valid only during the backup procedure.
Database_Revision		No	Logical revision number for the database, incremented when objects are created and/or deleted, an object's name is changed, or a database restore is performed.
Daylight_Savings_Status		No	
Description		No	1 to 40 characters; configured in IP Settings.
Device_Address_Binding		No	
Firmware_Revision	Firmware rev string	No	
Last_Restore_Time		No	Time of last file download. Applies only to BACnet file transfer services.
Local_Date	Field Panel Date	No	
Local_Time	Field Panel Time	No	
Location		No	1 to 40 characters; configured in IP Settings.
Max_APDU_Length_Accepted		No	1497
Max_Segments_Supported		No	32
Model_Name		No	Siemens BACnet EMEC.
Number_Of_APDU_Retires		No	3
Object_Identifier		No	Assigned in the IP Settings. Valid range is 0 to 4,194,302.

Object_Name	Field Panel Name	No	1 to 30 characters, configured in the IP Settings.
Object_Type	Point Log Report	No	List of object Ids in the field panel.
Protocol_Object_Types_ Supported		No	List of objects supported.
Protocol_Revision		No	4
Protocol_Services_Supported		No	List of services supported.
Protocol_Version		No	1
Segmentation_Supported		No	BACNET_SEGMENTATION_TYPE_BOTH.
System_Status	Similar to Ready status	No	
Vendor_Identifier		No	7
Vendor_Name		No	Siemens BAU

Multistate Output Object Type

BACnet Property	**APOGEE Attribute**	**Writeable by a BACnet Browser or Workstation**	**Notes**
Acked_Transitions		No	Used for Alarming. Indicates which of the transitions have been acknowledged; TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Description		Yes	1 to 16 characters.
Device_Type		No	One of the following APOGEE point types: LOOAL, LOOAP, L2SL, L2SP, LFSSL, or LFSSP.
Event_Enable		Yes	Used for Alarming. If alarming enabled, then TO_OFFNORMAL, TO_FAULT, and TO_NORMAL all set to TRUE.
Event_State		No	If point is in alarm, then Event_State = OFFNORMAL, else if point is failed, then Event_State = FAULT, else Event_State = NORMAL.
Event_Time_Stamps		No	Used for Alarming. Timestamps of the following event transitions, TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Feedback_Value	Proof point	No	Used for Alarming. Current value of the proof point for APOGEE proof points, set equal to the Present_Value for points without proofing.
Notification Class	Destination	Yes	Used for Alarming.
Notify_Type		No	Used for Alarming. Always = **Alarm**.
Number_Of_States	State Text Table related	No	
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.

Object_Name	System Name	No	1 to 30 characters.
Object_Type	LFSSL, LFSSP, LOOAL, LOOAP, point types	No	BACnet object MO.
Out_Of_Service		Yes	
Present_Value		Yes	Unsigned.
Priority_Array		No	For commanding the present value.
Reliability		No	If point is *failed*, then Reliability = UNRELIABLE_OTHER, else Reliability = NO_FAULT_DETECTED.
Relinquish_default		No	For releasing the present value when the Priority Array is empty.
State_Text	State Text Table related	No	
Status_Flags		No	IN_ALARM = true if point is in *alarm*, else false. FAULT = true if point is *failed*, else false. OVERRIDDEN = true if point is in hand mode, else false. OUT_OF_SERVICE = reflects the value of the property by the same name.
Time_Delay	Proof Delay	No	Used for Alarming.

Multistate Value Object Type

BACnet Property	**APOGEE Attribute**	**Writeable by a BACnet Browser or Workstation**	**Notes**
Acked_Transitions		No	Used for Alarming. Indicates which of the transitions have been acknowledged; TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Alarm_Values		No	Used for Alarming.
Description		Yes	1 to 16 characters.
Event_Enable		Yes	Used for Alarming.
Event_State		No	If point is in alarm, then Event_State = OFFNORMAL, else if point is failed, then Event_State = FAULT, else Event_State = NORMAL.
Event_Time_Stamps		No	Used for Alarming. Timestamps of the following event transitions, TO_OFFNORMAL, TO_FAULT, TO_NORMAL.
Fault_Values		No	Used for Alarming.
Notification Class	Destination	Yes	Used for Alarming.
Notify_Type		No	Used for Alarming. Always = **Alarm**.
Number_Of_States	State Text Table related	No	
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.

Object_Name	System Name	No	1 to 30 characters.
Object_Type	LENUM	No	BACnet object MV.
Out_Of_Service		Yes	
Present_Value		Yes	Unsigned.
Priority_Array		No	For commanding the present value.
Reliability		No	If point is *failed*, then Reliability = UNRELIABLE_OTHER, else Reliability = NO_FAULT_DETECTED.
Relinquish_default		No	For releasing the present value when the Priority Array is empty.
State_Text	State Text Table related	No	
Status_Flags		No	IN_ALARM = true if point is in *alarm*, else false. FAULT = true if point is *failed*, else false. OVERRIDDEN = true if point is in hand mode, else false. OUT_OF_SERVICE = reflects the value of the property by the same name.
Time_Delay		No	Used for Alarming.

Notification Class Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Acked_Required		Yes	
Description	Destination Description	Yes	1 to 16 characters.
Notification Class	Destination Number	No	Automatically assigned by default, starting at 0. Maximum number is 4,194,302.
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	Destination Name	No	1 to 30 characters.
Object_Type		No	BACnet object NC. The Notification class replaces the APOGEE destination.
Priority		Yes	
Recipient_List	List of panels	No	

Schedule Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Description	Zone Description	Yes	1 to 16 characters.
Effective_Period	Always	Yes	
Exception_Schedule	Override schedule	Yes	
List_Of_Object_ Property_References		Yes	
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name	Zone Name	No	**System Name** is limited to 30 characters.
Object_Type	Zone	No	BACnet object SC. The **Schedule** object replaces the APOGEE objects: **Zone**, **Mode Schedule**, **Override Schedule**.
Out_Of_Service	Enable/Disable zone	Yes	
Present_Value		Yes	Value can be: REAL, Unsigned, Enum or BOOL.
Priority_For_Writing		Yes	
Reliability		No	
Schedule_Default	Default zone	Yes	
Status_Flags		No	
Weekly_Schedule	Mode Schedule	Yes	

Trend Log Object Type

BACnet Property	APOGEE Attribute	Writeable by a BACnet Browser or Workstation	Notes
Acked_Transitions		No	Used for Alarming.
Buffer_Size	Number of samples	No	
Client_COV_Interval	Trend COV	No	
Description	Description	Yes	1 to 16 characters.
Event_Enable		No	Used for Alarming.
Event_State		No	
Event_Time_Stamps		No	Used for Alarming.
Last_Notify_Record		No	Used for Alarming to notify the Insight workstation that the buffer is full.
Log_Buffer	Number of samples	No	
Log_DeviceObjectProperty	Point being trended	No	Always the Present Value property of a point.
Log_Enable	Value of trend trigger point	Yes	BOOL

Log_Interval	Time interval	No	Nonzero value = trend by Time. Zero = trend by COV.
Notification_Class	Main disk (Insight workstation)	Yes	Used for Alarming.
Notification_Threshold	Insight buffer full notification	Yes	Used for Alarming. Notifies the Insight workstation that the buffer is full.
Notify_Type		Yes	Used for Alarming. Always set to **Event**.
Object_Identifier		No	Automatically assigned by default, starting at 0 for this object type. Maximum number is 4,194,302.
Object_Name		No	1 to 30 characters.
Object_Type	Trend definition	No	BACnet Trend Log object TL. This replaces APOGEE trending.
Record_Count		Yes	
Records_Since_Notification		No	Used for Alarming. Notifies the Insight workstation that the buffer is full.
Start_Time		Yes	
Stop_Time		Yes	
Stop_When_Full	Default zone	Yes	
Total_Record_Count		No	