Foxboro®

by Schneider Electric

Foxboro Evo™
Process Automation System

Transient Data Recorder and Analyzer (TDR/TDA) User's Guide

B0700AL

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Preface

This section provides you with general document information including revision information and a list of other useful documents.

Audience

This document assumes that you are a process engineer and have configured the control database and devices (workstations, historians, and printers) using a configurator such as Foxboro Evo™ Control Editors (hereinafter referred to as Control Editors), ICC or IACC, or that you are familiar with the configured control database.

Revision Information

For this release (B0700AL-J), the following change was made to this document:

Chapter 1 "Introduction"

- In "Control and I/O Configuration" on page 2, added FBM219.
- Added the last row to Table 1-1.

Reference Documents

You should be familiar with the following documents:

- *Control Processor 270 (CP270) and Field Control Processor 280 (CP280) Integrated Control Software Concepts* (B0700AG)
- *Integrated Control Block Descriptions* (B0193AX)
- *I/A Series Transient Data Recorder and Analyzer (TDR/TDA) V1.5.2 Release Notes (*B0700RL*)*.

Most of these documents are available on the Foxboro Evo Electronic Documentation media (K0174MA). The latest revisions of each document are also available through our Invensys Global Customer Support at *https://support.ips.invensys.com.*

For contact information, refer to the last page of this document.

1. Introduction

This chapter provides an overview of the Transient Data Recorder and Analyzer software package.

The Transient Data Recorder/Transient Data Analyzer (TDR/TDA) software package is used for acquisition, storage, display, and reporting of high resolution digital and analog data from a control system. It allows analysis of the data, and stores it in historical archive files. TDR/TDA, using the optional GPS based time synchronization capability, supports digital data acquisition across control processors at intervals of up to one millisecond. The TDR/TDA software package provides accurate and complete reporting of the data, which can be used to verify that a plant is managed correctly and to analyze plant behavior after a fault.

The TDR/TDA package runs on a:

- Control Core Services workstation with Windows 7 operating system
- Foxboro Evo server with Windows Server® 2008 R2 Standard operating system.
- I/A Series® workstation with Windows 7 or Windows XP® operating system
- I/A Series server with Windows Server® 2008 R2 Standard or Windows Server 2003 operating system.

TDR data is delivered to the workstation by the Field Control Processor 280 (FCP280) or Field Control Processor 270 (FCP270), or via a Fieldbus Communications Module (FCM100Et) when the Z-Module Control Processor 270 (ZCP270) is used.

— NOTE

For TDR data to be delivered, the FCM must be connected to an Ethernet switch on the Foxboro Evo Control Network, as described in *Z-Module Control Processor 270 (ZCP270) User's Guide* (B0700AN); not connected directly to the ZCP270.

Product Description

The Transient Data Recorder/Transient Data Analyzer (TDR/TDA) software uses server/client architecture for gathering, storing, displaying, and reporting data from a control system.

The Transient Data Recorder (TDR) continuously stores all the data it receives in a cyclically overwritten "Transient Data Circular Buffer". This configurable buffer resides in the memory of the workstation on which the TDR software is installed, and can store up to 20 minutes of data before and after an event. When a trigger signal is detected, the data of a defined timeslice before and after the signal is extracted from the buffer and stored in a separate "Transient Data Archive" file for later analysis. Data collection and analysis are based on specific events, or "trips" that occur. A trip occurs when a user-defined trigger expression becomes true. Transient Data Analyzer (TDA) is a collection of functions that analyze data from the Transient Data Circular Buffer or from the Transient Data Archive.

Control and I/O Configuration

To configure a real-time point (RTP) so that its value is available to TDR/TDA, you must first configure the relevant ECBs and control blocks. As such, you must first set up and configure your control database using a control configurator (such as Foxboro Evo Control Editors, ICC, or IACC).

Data from the following FBM I/O channels can be collected, recorded, and analyzed with the TDR/TDA software:

- FBM201/b/c/d Analog Input (0 to 20 mA, 0 to 100 mV, 0 to 5 V, 0 to 10 V dc) Modules
- FBM207/b/c Voltage Monitor/Contact Sense Input Modules
- FBM208/b, Channel Isolated, Redundant with Readback, 0 to 20 mA, I/O Module
- FBM217, Group Isolated Discrete Input Module
- FBM219, Group Isolated Discrete Input Module
- FBM247, Current/Voltage Analog/Digital/Pulse I/O Configurable Channel Module.

NOTE

1. TDR only recognizes data from the analog FBM201/b/c/d and FBM208/b configured with AIN or MAIN blocks, from the digital FBM207/b/c or FBM217, or FBM219 configured with ECB5 and with CIN and MCIN blocks, or from an FBM247 configured with RIN or BIN block. The PNT_NO parameter for RIN blocks must be CURRENT, 10V or 5V to configure the FBM for high speed TDR data collection. The PNT_NO parameter in BIN blocks must be SOE to configure the FBM for the high speed SOE data collection. Other values are permitted but cannot be used with SOE/TDR.
2. When using TDR to monitor points on a redundant FBM208/b you must configure an AIN/MAIN block for each FBM in the pair in addition to any existing AINR blocks. Corresponding points from each FBM must be monitored separately in TDR. AINR blocks are not supported.

The AIN and MAIN blocks use the Gain (KSCALE) and Bias (BSCALE) parameters. Scaling with KSCALE and BSCALE normally allows the conditioned value to be made dimensionally compatible with the desired output units, as for example in conversion from Celsius to Fahrenheit scales in the case of temperature measurements. KSCALE and BSCALE are applied by the AIN/MAIN blocks after any signal conditioning or characterization of the raw input in accordance with the formula:

Scaled Value = (Conditioned Value * KSCALE) + BSCALE.

This output is presented to the control strategy as Point (PNT). The original value as present in the ECB is preserved and made available as output Raw Count (RAWC).

However, when TDR converts the value sent from the FBM to engineering units, it does not factor in the BSCALE or KSCALE parameter settings.

Features

Although the evaluation of transient data is accomplished by the operator or plant engineer, the preparation and presentation of data is automated using TDR/TDA software. The TDR/TDA software provides:

- Highly accurate data collection and continuous storage of up to 500 data points, including digital signals at a resolution of 1 ms[1], analog signals at a resolution of 10 ms (with a maximum of 128 analog points from a single FCP/FCM), and snapshots of selected data at the time of a trigger
- High-resolution data acquisition across multiple control processors with the optional GPS time synchronization feature
- Storage capacity in the circular buffer for up to 20 minutes of data before and after a trip
- Ability to continuously monitor the data stream for process variables
- Processing and storage of active data until all actions related to the trigger are complete
- Ability of an operator to manually trigger an event
- Report generation and data analysis at any time using transient data stored in the circular buffer or an archive file
- Support for user-defined automatically generated actions, such as informing an operator that an archive is being generated
- Capability to display and print reports of transient data both within the Foxboro Evo system (on Control Core Services workstation nodes and associated printers in the control network) or on system units attached to the Ethernet network above the Foxboro Evo system (for example, personal computers and printers in the application network).

TDR/TDA Configuration and Operator Clients

TDR/TDA software provides two different types of interaction: configuration and operation.

The Configurator Client has a standard Microsoft® Windows operating system look-and-feel, and uses a tree control for navigation. With the TDR/TDA Configurator Client, you can:

- Configure general settings
- Define and configure the data sources and signal types you want to monitor and store (process variables)
- Configure groups, triggers, and displays
- Change or delete configuration data and archives

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1. WARNING: ac signals coming into digital points cannot be synchronized to 1 millisecond in the same manner as dc based points can. The ac digital points will have a delay of ~8-20 milliseconds due to the 50 or 60 Hz ac wave form. If 1 millisecond synchronization is critical when time synchronization is required, avoid the use of ac inputs.
   Also, digital data coming from FBMs with ac driven inputs could be delayed due to the dynamics of the ac waveform and filtering in the FBM and therefore may not be recorded until the following 10 millisecond sampling period.

- Perform some of the functions of an Operator Client.

Using the Operator Client, you can generate and view the configured displays, logs, reports, plots, and trends, create Transient Data Archive files, and manually trigger events. The Operator Client can be safely used with a touchscreen.

The Configurator Client and the Operator Client are implemented as two separate executables, and cannot be accessed simultaneously. For detailed descriptions of the Configurator and Operator Clients, refer to Chapter 3 “Using the TDR/TDA Configurator Client” and Chapter 4 “Using the TDR/TDA Operator Client”.

Process Variables

A process variable (PV) represents a digital or analog data point that is equivalent to the scaled raw count signal from the FBM. Signal conditioning and/or scaling of the raw count is based upon the configuration data within the controller. A process variable can be further defined as a snapshot PV or a history PV. Snapshot PVs are process variables that are stored only at the time of an event. The pre-trip and post-trip data for history PVs are stored during the pre-trip and post-trip time. You can add up to 500 digital and analog PVs per server from your system to the set of transient data points to be monitored by the TDR/TDA server, with a maximum of 128 analog points from a single FCP/FCM.

Triggers

Triggers are boolean mathematical expressions of process variables that initiate events. When the value of a trigger expression changes from false to true, a trip is generated, and TDR monitors and stores the transient data so it can be extracted and analyzed.

You can use the Configurator Client to define logical and arithmetical expressions of process variables to be used as trigger expressions. TDR/TDA software supports triggers derived directly from digital input state changes, analog input values reaching limits, as well as more complex trigger definitions that use logical and/or arithmetical calculations of both analog and digital points. You can cause an event to occur by manually initiating its trigger.

Groups

The Configurator Client allows you to create groups that represent specific physical, logical, or organizational units of the plant. You can configure these groups according to your process control needs by including unique combinations of specific PVs, triggers, actions, and displays within each group.

Principles of Operation

Figure 1-1 demonstrates a typical configuration of TDR/TDA software, showing some of the internal processes of the TDR/TDA server.

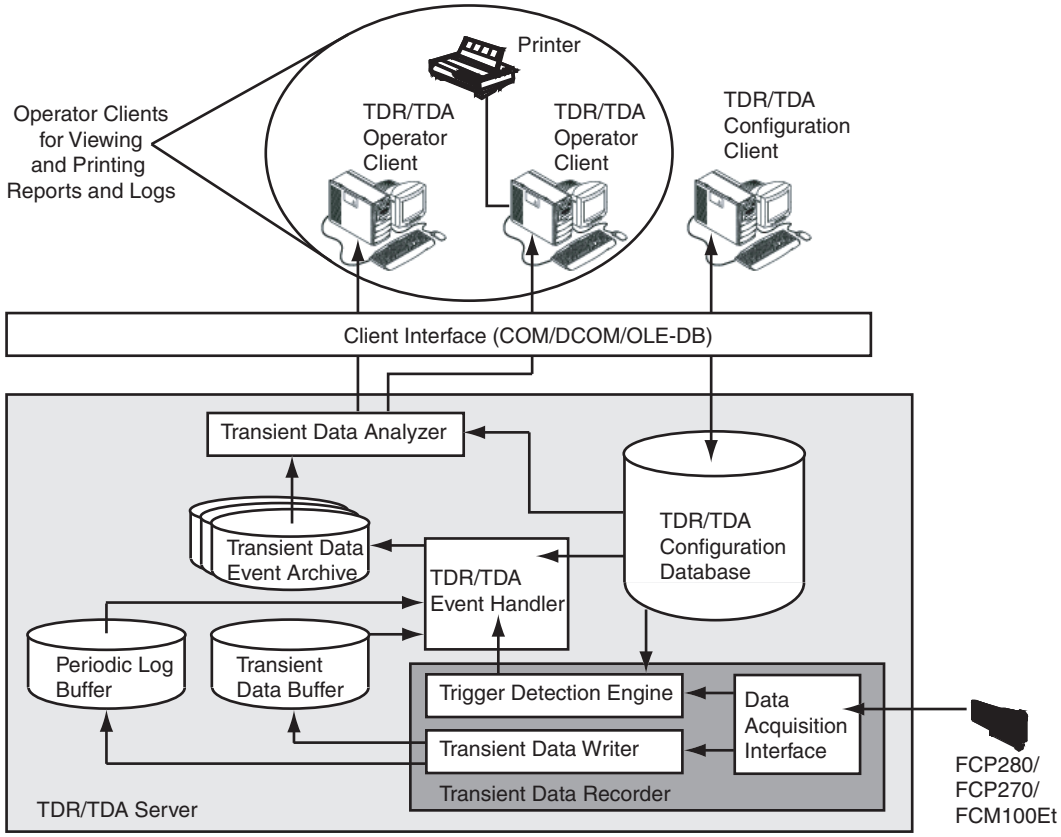


Figure 1-1. TDR/TDA Software Architecture

When your process is running, the TDR/TDA server software acquires raw data from FCP280s/FCP270s or via an FCM100Et (when ZCP270s are used) on the control domain using a high-speed data acquisition interface (HSDAI). All the raw data that the acquisition interface receives is sent to the Transient Data Writer and the Trigger Detection Engine.

NOTE

Configuring multiple clients to be served by the same FCM100Et or FCP280/FCP270 can result in the loss of data.
An FCM100Et or FCP280/FCP270 'client' is a single instance of HSDAI that connects to one or more FBMs through that device. Configuring such a connection causes a data stream to be created from that FBM to the particular client. With a single configuration to the FBM, data is re-sent whenever the client fails to acknowledge it.
Due to buffer limitations, multiple clients configuring to the same FBM share a single data stream. This prevents overburdening the FBM. However, clients who fail to monitor the shared data stream, for example while reconnecting network services, can miss part of that stream. Acknowledgements from other clients result in the data buffers being reused during the re-connection time.
To prevent such losses and to maintain the least amount of burden on a single FBM, it is best to have single client connections to each FBM. It is recommended, if both TDR and SOE are to collect data from the same FBM, that they should use the same HSDAI. That is, they must both be in the same station.

The Trigger Detection Engine monitors the stream of data to detect trigger signals, while the Transient Data Writer sends the data stream for temporary storage in the Transient Data Circular Buffer. If any PVs are configured for the periodic log (described in Chapter 6 "Reports and Logs"), the data is also sent to the Periodic Log Circular Buffer.

When a trigger signal is detected, TDR/TDA gathers data from the configured pre-trip time and stores it in an archive. Then the Trigger Detection Engine initiates the Event Handler, which continues to monitor data from the data stream, and stores it in the circular buffer until a configured amount of time passes, called the post-trip time. After the post-trip time elapses, the Event Handler appends post-trip data to pre-trip data and initiates the execution of any tasks scheduled for TDR/TDA Operator Clients, such as creating a Transient Data Archive of data from the event, generating a report, or exporting data. The information that the event handler has gathered about the trigger and the resulting event is stored in a temporary "event file".

Using data from the Transient Data Circular Buffer, the Periodic Log Buffer, the event files, or the Transient Data Archives, client machines can generate reports or export data.

Interruption of TDR/SOE Data Collection

Equipment Change actions of FBMs, FCMs, and FCPs can interrupt TDR data collection. The following table lists conditions under which TDR data collection may be interrupted. In the following table, OOS indicates that TDR data collection is out-of-service and NML indicates that TDR data collection is being carried out as it usually does.

Table 1-1. Conditions that Interrupt TDR/SOE Data Collection

Condition	TDR/SOE Data Collection State
Rebooting both fault-tolerant FCP280/FCP270 modules, or Rebooting/downloading both redundant FCM100Et modules	OOS
Rebooting a primary FCP280/FCP270 module when the shadow module is online, or Rebooting/downloading a master FCM100Et module when the tracker module is online	OOS[1]
Rebooting a primary FCP280/FCP270 module when no shadow module exists or the shadow module is offline, or Rebooting/downloading a master FCM100Et module when there is no tracker module or the tracker module is offline)	OOS
Rebooting a shadow FCP280/FCP270 module or Rebooting/downloading a tracker FCM100Et module	NML
Image updating a primary FCP280/FCP270 module when the shadow module is online[1], or EEPROM updating a master FCM100Et module when the tracker is online	OOS
Image updating a primary FCP280/FCP270 module when there is no shadow module or the shadow module is offline, or EEPROM updating a master FCM100Et module when there is no tracker module or the tracker module is offline	OOS
Image updating a shadow FCP280/FCP270 module, or EEPROM updating a tracker FCM100Et module	NML
Taking both FCP280/FCP270 modules offline, or Taking both FCM100Et modules offline	OOS
Taking a primary FCP280/FCP270 module offline when the shadow module is online, or Taking a master FCM100Et module offline when tracker module is online	OOS[1]
Taking a primary FCP280/FCP270 module offline when there is no shadow module or the shadow module is offline, or Taking a master FCM100Et module offline when there is no tracker module or the tracker module is offline	OOS
Taking a shadow FCP280/FCP270 module offline, or Taking a tracker FCM100Et module offline	NML
Powering off both FCP280/FCP270 modules, or Powering off both FCM100Et modules	OOS
Powering off the primary FCP280/FCP270 module when the shadow module is online, or Powering off the master FCM100Et module when the tracker module is online	OOS[1]
Powering off the primary FCP280/FCP270 module when there is no shadow module or the shadow module is offline, or Powering off the master FCM100Et module when there is no tracker module or the tracker module is offline	OOS

Table 1-1. Conditions that Interrupt TDR/SOE Data Collection (Continued)

Condition	TDR/SOE Data Collection State
Powering off the shadow FCP280/FCP270 module, or Powering off the tracker FCM100Et module	NML
Switching roles between FCP280/FCP270 modules, or Switching roles between FCM100Et modules	OOS[1]
Taking the FBM offline	OOS
EEPROM updating an FBM	OOS
Powering off an FBM	OOS
Performing an FBM Download	OOS
During MAC reset	OOS

1. in each of these cases, the FCM/FCP that was performing the TDR operation is taken out of service for a short time. The partner FCM/FCP will take over operations almost immediately. Data collection will resume automatically once TDR reconnects.

2. Installing the TDR/TDA Software

This chapter describes installation and startup procedures for the Transient Data Recorder and Analyzer software.

System Requirements

The workstation on which you install TDR/TDA software must be a Windows-based Control Core Services or I/A Series workstation that meets the requirements listed in "SOE and TDR/TDA Software Requirements" in *Transient Data Recorder and Analyzer (TDR/TDA) Release Notes* (B0700RL).

The minimum amount of system RAM is 512 MB of memory minimum, but 1 GB of memory is recommended.

The workstation where the TDR/TDA Server is installed must also have enough disk space to handle potentially large archive files. Use the following formula to approximate the size taken up by a single TDR archive:

(Pre-trip time + Post-trip time)*120000*(number of History PVs) is approximately equal to the size of archive in bytes

Snapshot and digital PVs will not normally affect archive size appreciably.

NOTE

When running remote SOE clients, both the server station and the client stations must all be secure or must all be non-secure versions of I/A Series software or Control Core Services software. Connection from secure clients to a non-secure TDR/SOE server and vice versa are not allowed.
Ensure that you either install the SOE Server and Client on stations which all have secure or all have non-secure versions of I/A Series software or Control Core Services software.

Required Procedures for TDR/TDA Usage

The general sequence of procedures to install and start TDR/TDA includes the following steps:

NOTE

Refer to *I/A Series Transient Data Recorder and Analyzer (TDR/TDA) Release Notes* (B0700RL) for specific information related to your TDR/TDA software version and the workstation on which it is being installed.

— NOTE

The TDR/TDA software can be installed on stations with I/A Series software or Control Core Services software either enabled or disabled. When installing SOE software with I/A Series software or Control Core Services disabled/off, the NuTCRACKER service must be started manually from the following: `Control Panel` -> `Services` -> `NuTCRACKER` -> `Properties`.

1. Install TDR/TDA software using the Install Wizard. See "Installing the TDR/TDA Server and Client" on page 10.
2. Use the Control Panel to turn on the TDR/TDA display server and archive server for real-time collection. See "Starting the Software" on page 30.
3. Using the TDR/TDA Configuration Client screen, configure general TDR/TDA server parameters and local TDR/TDA client parameters. If remote clients are installed, configure the required general and local parameters.
4. Configure data points to be collected, reports, and displays using the TDR/TDA Configuration Client.

Installing the TDR/TDA Server and Client

Transient Data Recorder and Analyzer (TDR/TDA) software provides two different types of interaction: configuration or operation.

TDR/TDA software is located on the Transient Data Recorder and Analyzer (TDR/TDA) Package CD-ROM (K0173WJ) and is installed using an InstallShield setup procedure.

The two TDR/TDA installation options are:

- TDR/TDA Complete installation. Selecting this option automatically installs all of the software components necessary to configure and run TDR/TDA, including the Data Collector and Display Servers, the Configurator Client, and the Operator Client.
- TDR/TDA Custom installation. Selecting this option gives the user the ability to manually select which software component(s) to install. You can install the Data Collector and Display Servers, which requires and automatically installs the Configurator Client. Alternatively, you can install just the Configurator Client or Operator Client to provide remote access. For instructions on installing TDR/TDA clients, refer to "Custom Installation" on page 19.

TDR/TDA Complete Installation

Use this option to install all the software components necessary to configure and run TDR/TDA software on a single workstation. This procedure will install the entire TDR/TDA package, including the Data Collector and Display Servers, the Configurator Client, and the Operator Client.

1. Insert the TDR/TDA CD in the CD-ROM drive.
2. When the initial install screen appears, click **Next** to continue.

   Alternately, click **Cancel** to stop the installation.

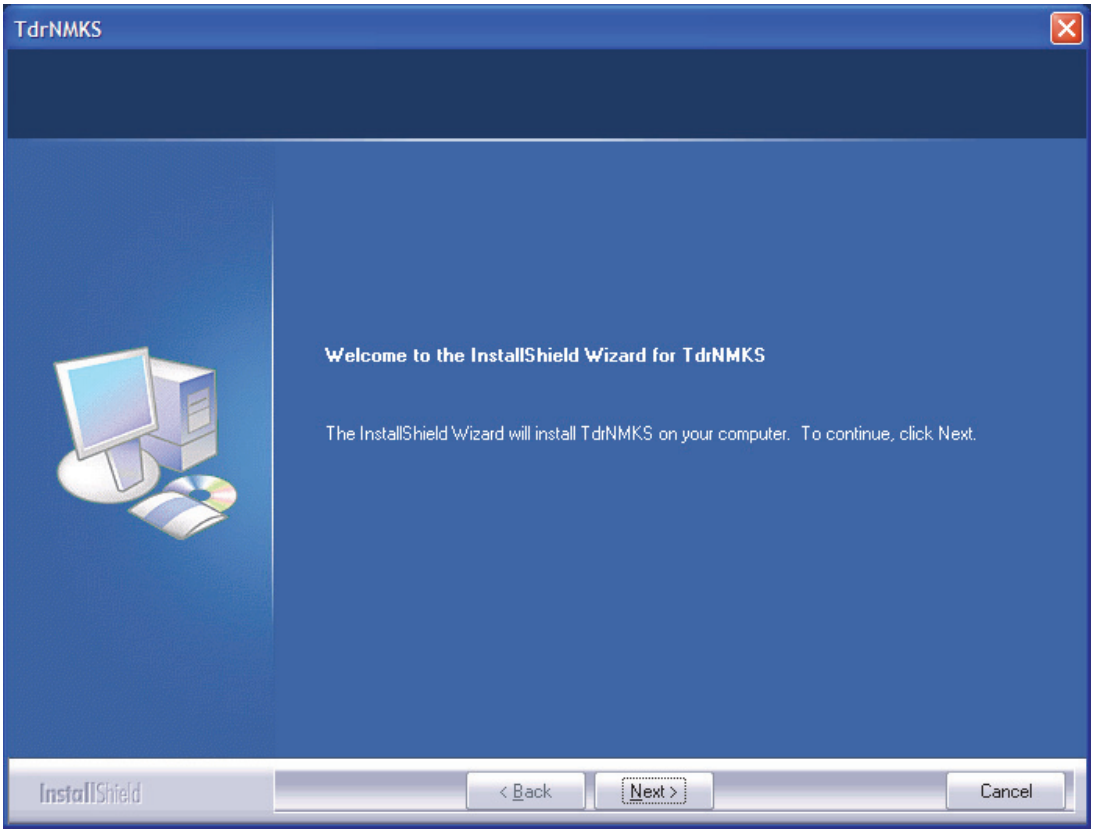


Figure 2-1. TDR/TDA Server Installation: Initial Install Screen

3. From the subsequent License Agreement screen, select **I accept the terms of the license agreement**. If you need a printout of the license agreement for your records, click **Print**. Click **Next** to continue.

   Alternately, click **Back** to return to the previous screen or **Cancel** to stop the installation.

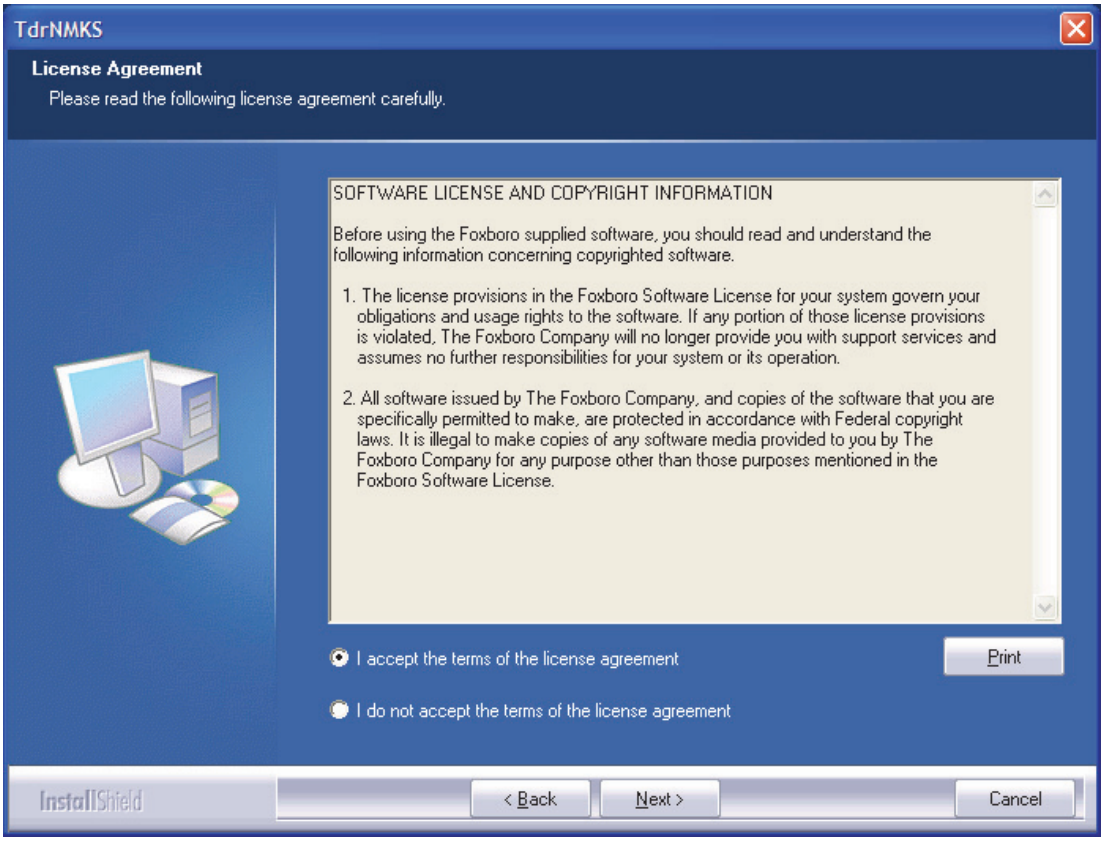


Figure 2-2. TDR/TDA Server Installation: License Agreement Screen

4. From the subsequent Customer Information screen, enter your User Name and Company Name as well as the security information. Click **Next** to continue.

   Alternately, click **Back** to return to the previous screen or **Cancel** to stop the installation.

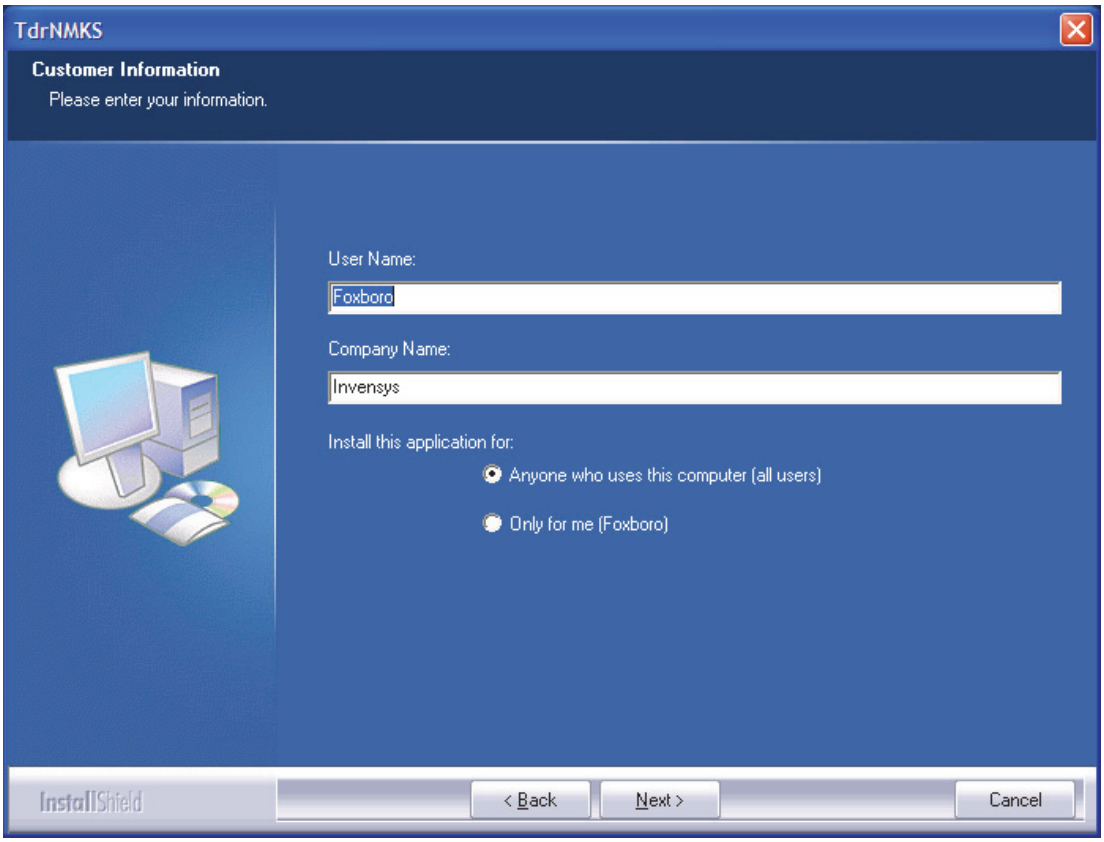


Figure 2-3. TDR/TDA Server Installation: Customer Information Screen

5. From the next Setup Type screen, select **Complete** to install the TDR/TDA Server, which includes the installation of the Data Collector and the TDR/TDA Client(s). Click **Next**.

   Alternately, click **Back** to return to the previous screen or **Cancel** to stop the installation.

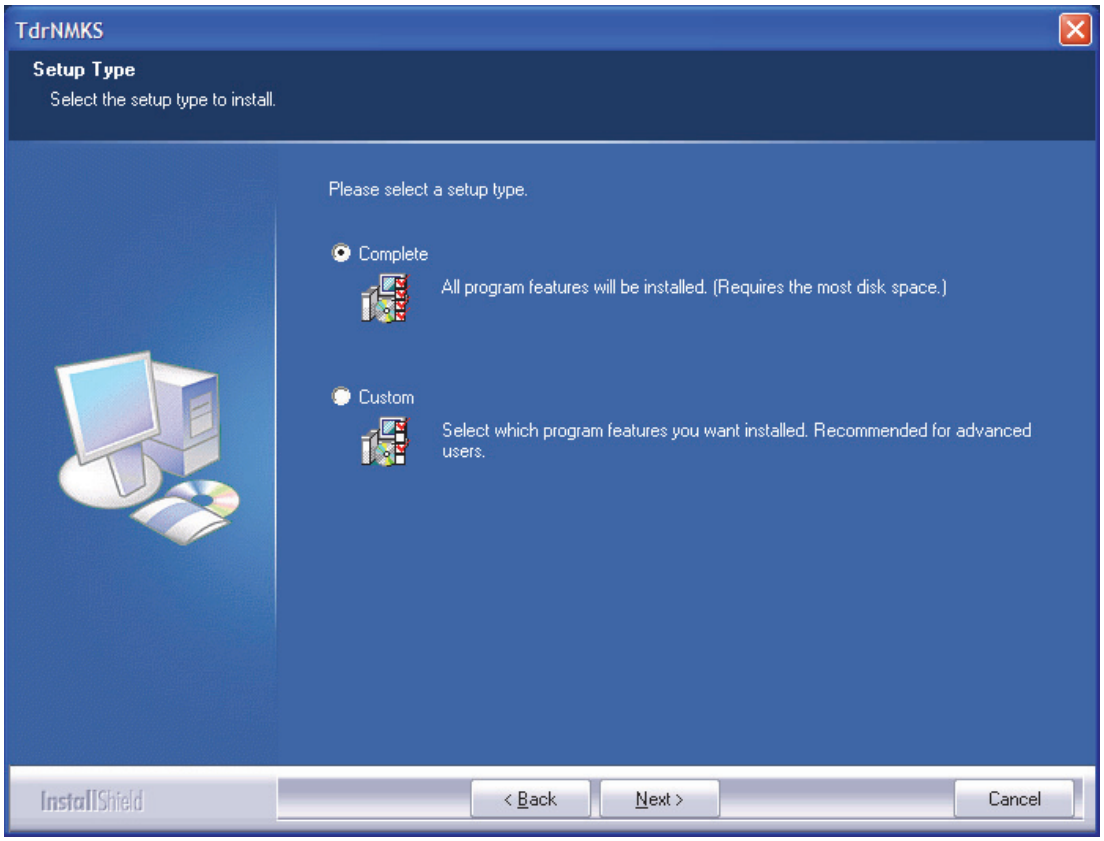


Figure 2-4. TDR/TDA Server Installation: Setup Type Screen

6. From the Start Copying Files screen, review the current setting and click **Next**.

   Alternately, click **Back** to return to the previous screen or **Cancel** to stop the installation.

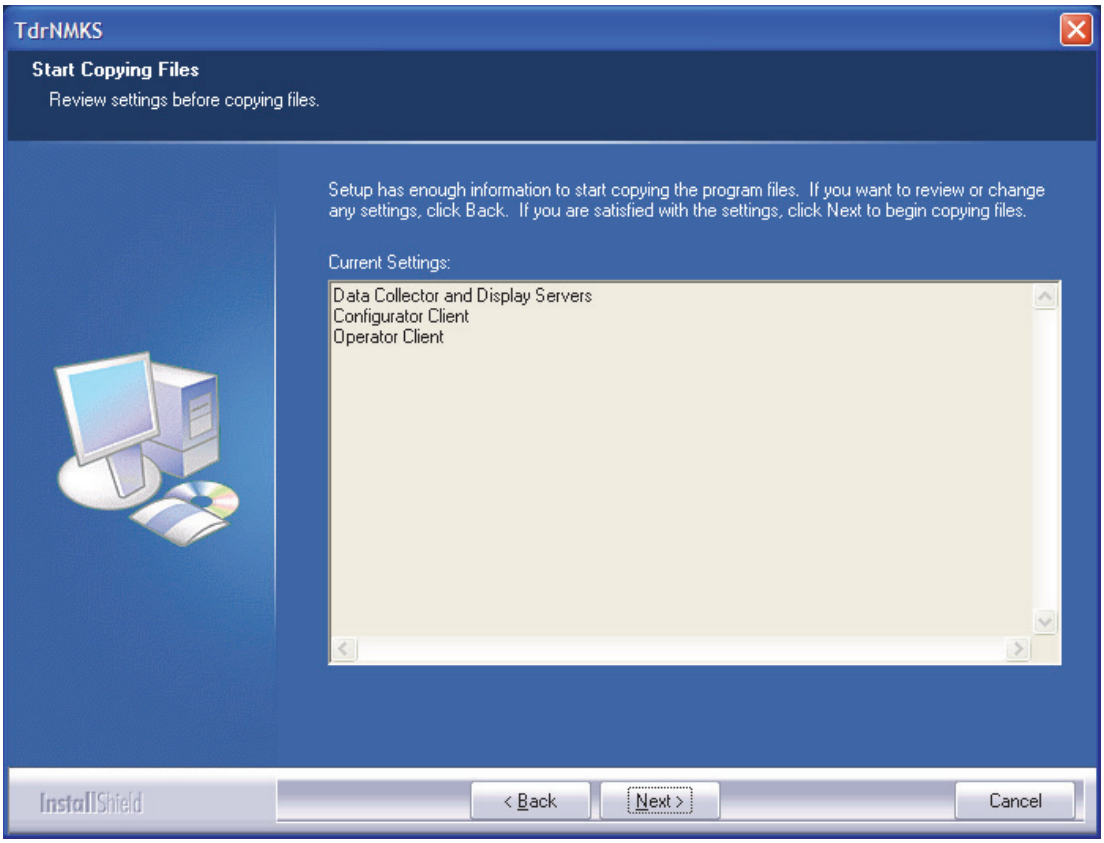


Figure 2-5. TDR/TDA Server Installation: Start Copying Files Screen

7. From the Setup Status screen, you can view the TDR/TDA installation status. If you wish to terminate the installation, click **Cancel**.

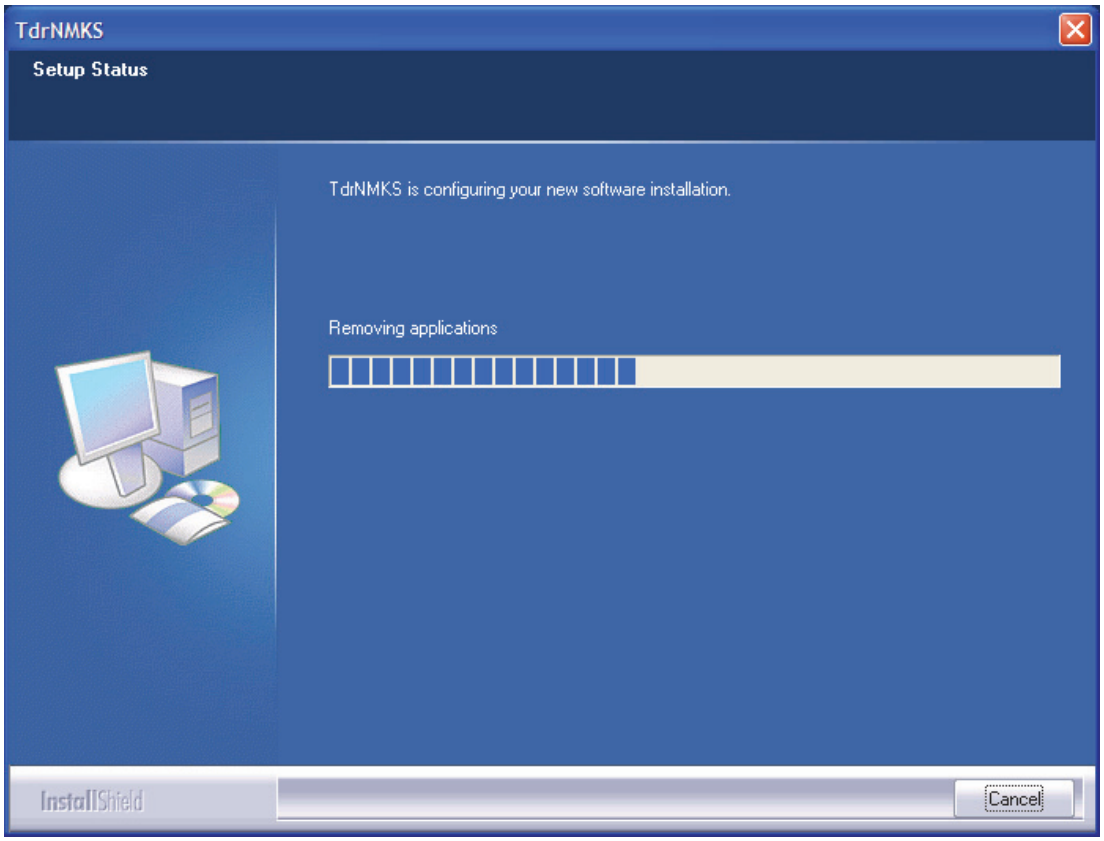


Figure 2-6. TDR/TDA Server Installation: Setup Status Screen

8. When the files are done being copied, you can select how you want to be able to invoke the Configurator Client. You can select to have an entry in the **Start** menu, to have an icon on the desktop, or both. The default selection is to have just an entry in the **Start** menu.

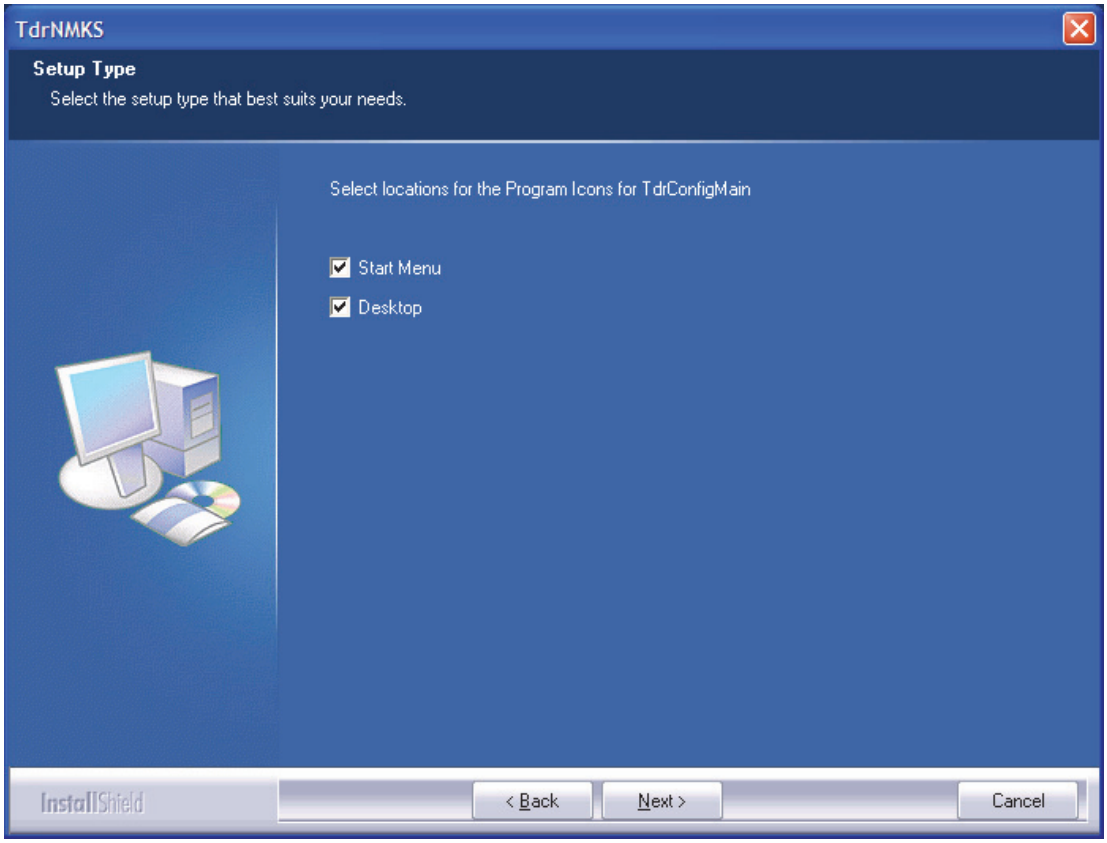


Figure 2-7. TDR/TDA Server Installation: Selecting Locations for Program Icons for Configurator Client

9. Then you can select how to invoke the Operator Client. Again you can select to have an entry in the **Start** menu, to have an icon on the desktop, or both. The default selection is to have just an entry in the **Start** menu.

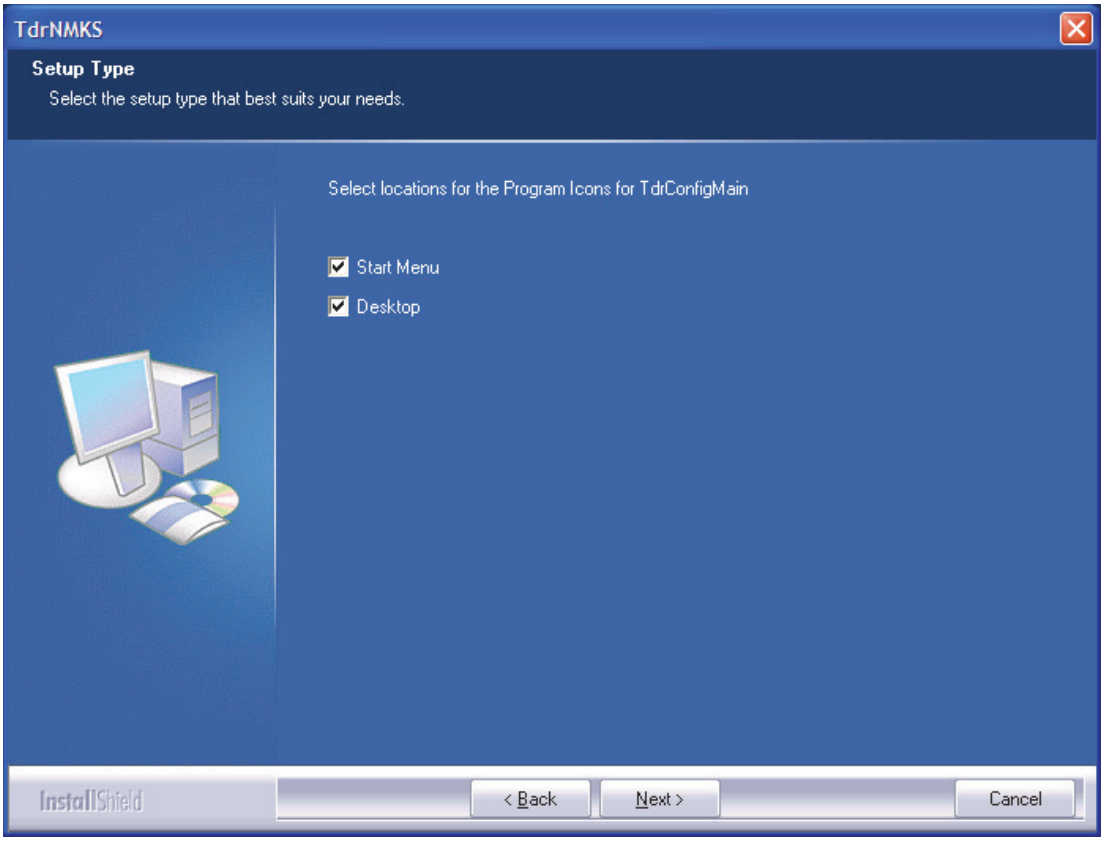


Figure 2-8. TDR/TDA Server Installation: Selecting Locations for Program Icons for Operator Client

10. When the installation is complete, the following screen appears. Click **Finish**.

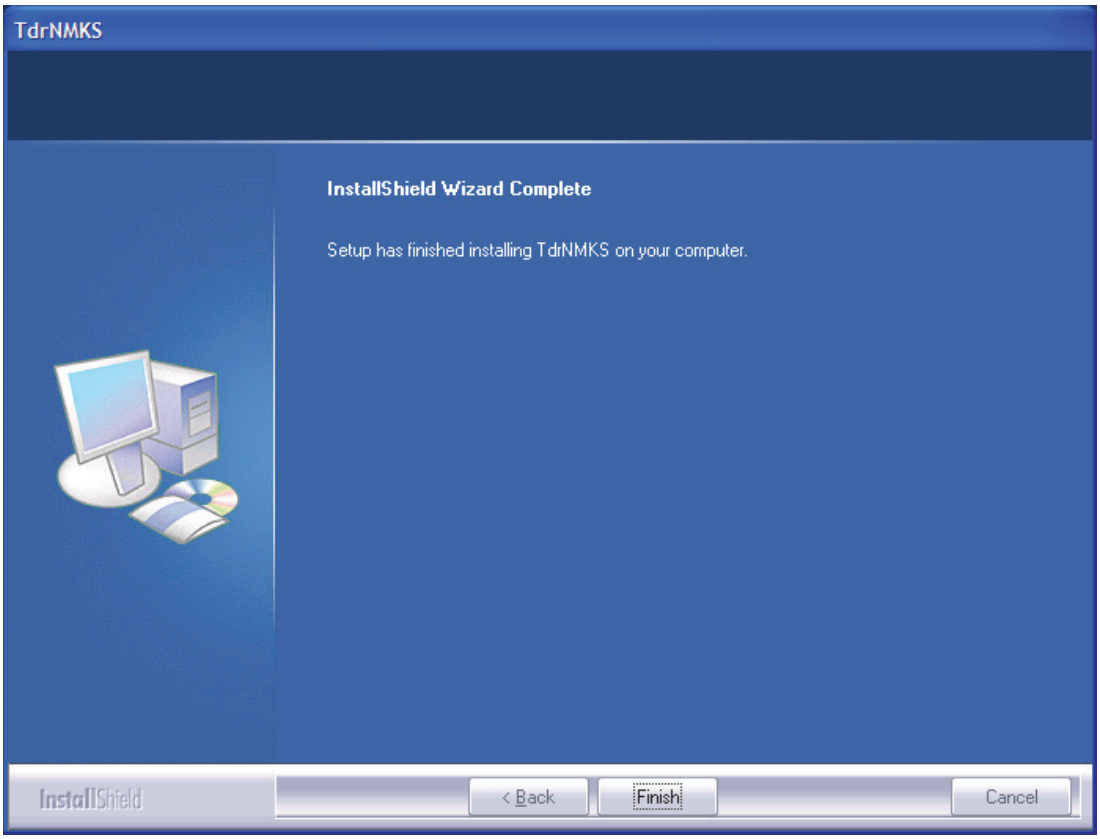


Figure 2-9. TDR/TDA Server Installation: Installation Complete

If you are configuring remote client(s), continue with "Custom Installation" below. Otherwise, skip to "Starting the Software" on page 30.

Custom Installation

Use this option to distribute the TDR/TDA software over one or more remote client(s). The available options are:

- The Data Collector and Display Servers - which requires and automatically installs the Configurator Client.
- The Configurator Client - which provides the ability to configure TDR/TDA from a remote workstation
- The Operator Client - which provides the ability to operate TDR/TDA from a remote workstation.

The example provided here will install a remote Operator Client. The same procedure can be followed to install either of the other clients.

1. Insert the TDR/TDA CD and follow the instructions on the screen.
2. The following initial install screen appears. Click **Next** to continue.

   Alternately, click **Back** to return to the previous screen or **Cancel** to stop the installation.

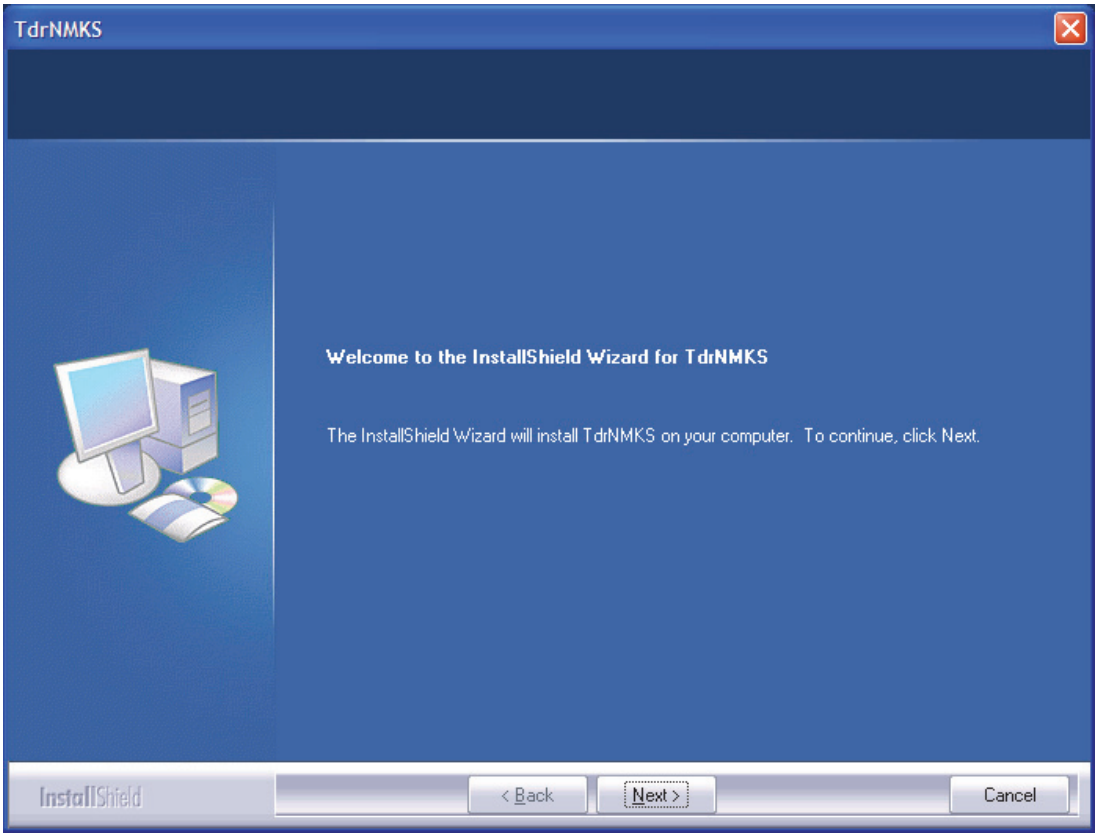


Figure 2-10. Remote Client Installation: Initial Install Screen

3. From the subsequent License Agreement screen, select **I accept the terms of the license agreement**. If you need a printout of the license agreement for your records, click **Print**. Click **Next** to continue.

   Alternately, click **Back** to return to the previous screen or **Cancel** to stop the installation.

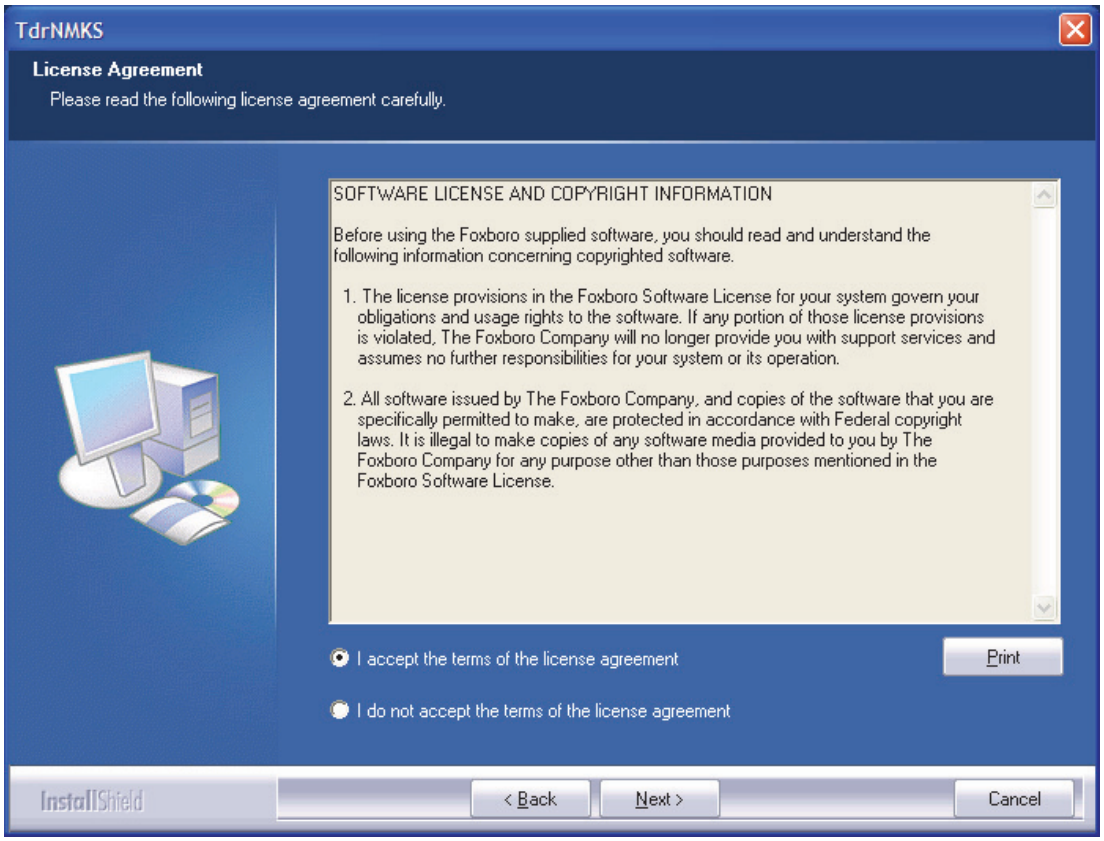


Figure 2-11. Remote Client Installation: License Agreement Screen

4. From the subsequent Customer Information screen, enter your User Name and Company Name as well as the security information. Click **Next** to continue.

   Alternately, click **Back** to return to the previous screen or **Cancel** to stop the installation.

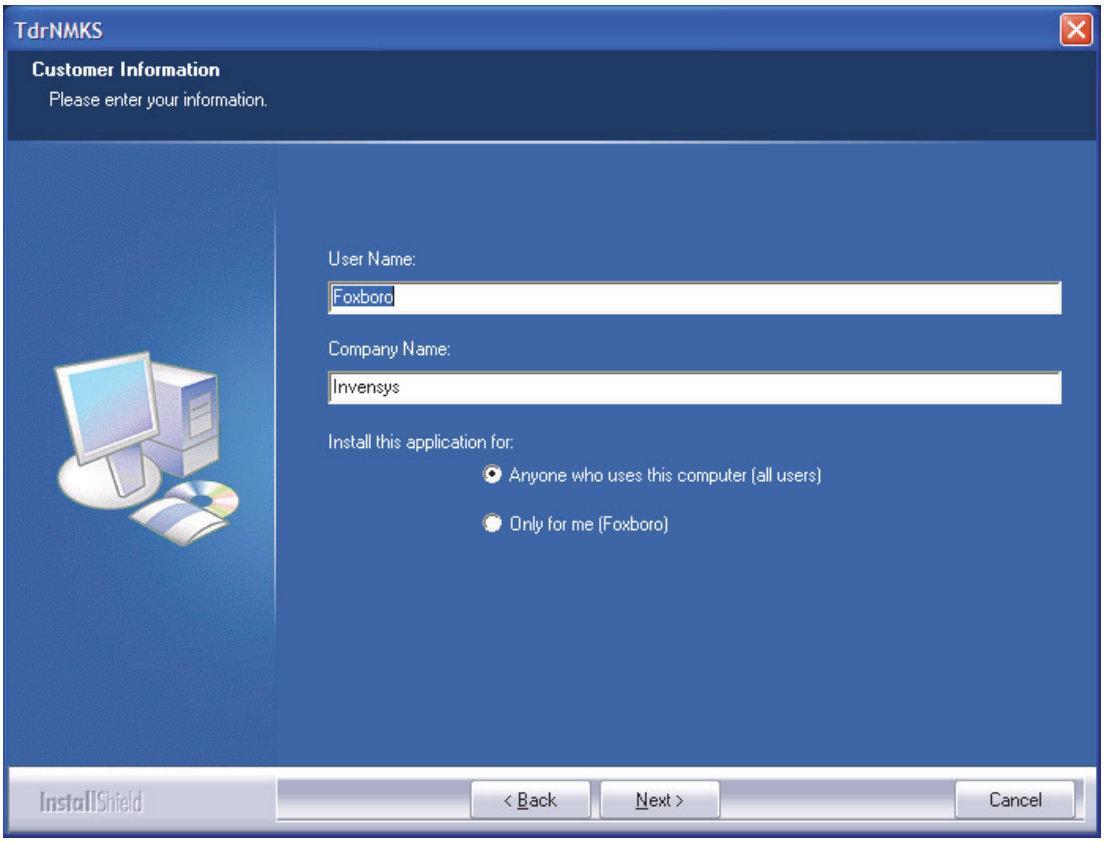


Figure 2-12. Remote Client Installation: Customer Information Screen

5. From the Setup Type screen, select **Custom** to install and optionally, configure information for the Remote Client(s). Click **Next**.

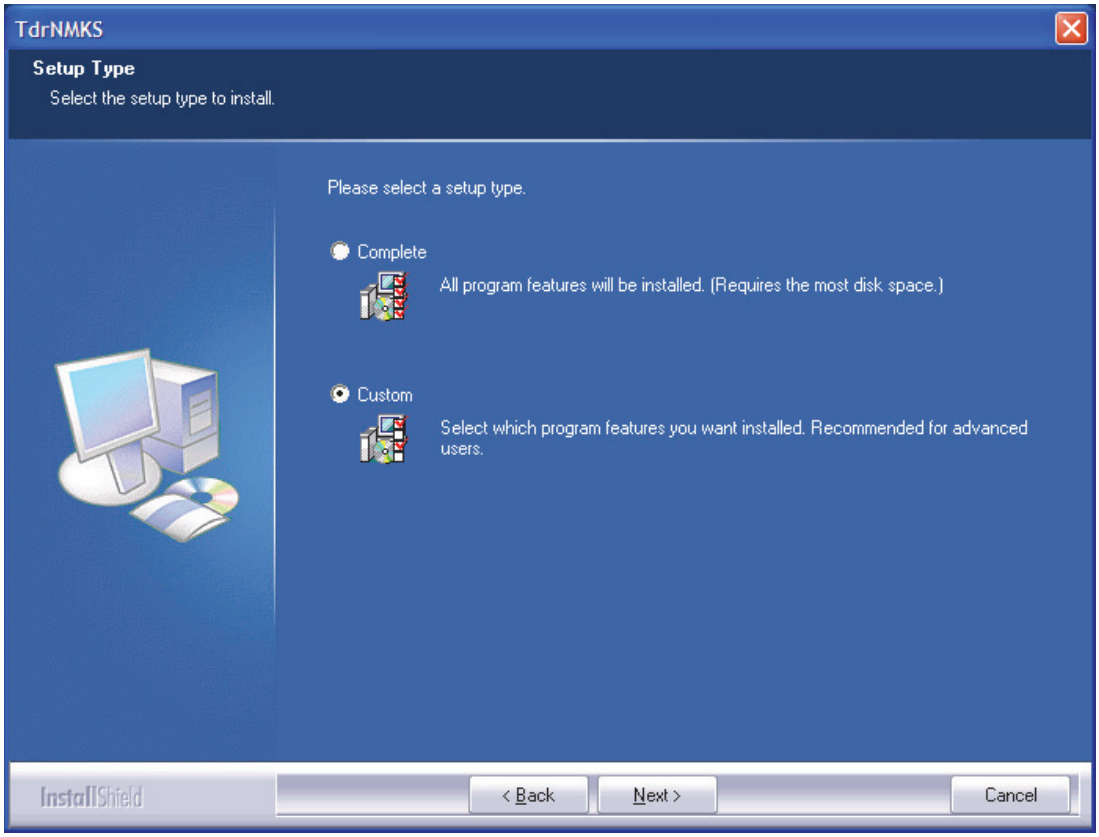


Figure 2-13. Remote Client Installation: Setup Type Screen

6. From the subsequent display, select the desired client(s) and deselect any others that are selected.

NOTE

Selecting "Data Collector and Display Server" requires a Configurator Client. If you select this option, the Configurator Client is automatically selected for you.

Click **`Next`** to continue.

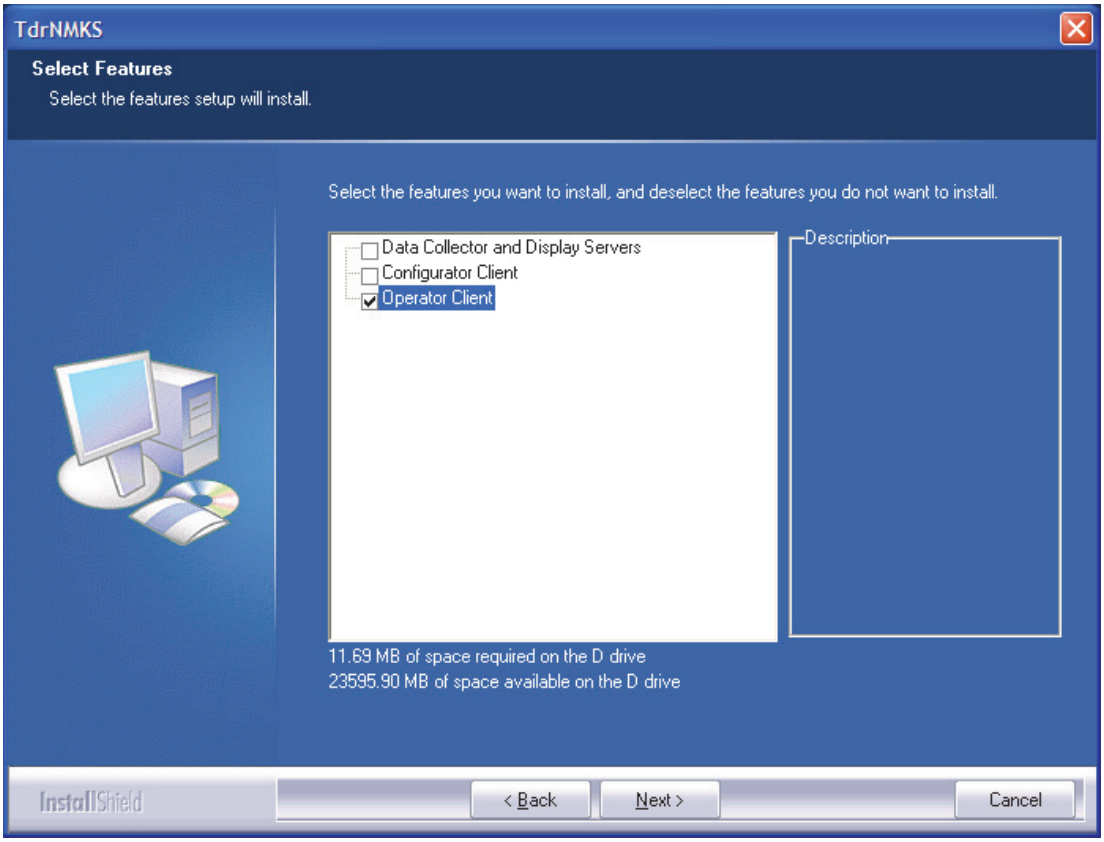


Figure 2-14. Remote Client Installation: Selecting the Desired Client(s)

7. From the subsequent display, enter the name of the workstation (in UPPERCASE) where the TDR/TDA Server software was previously installed and click **Next**.

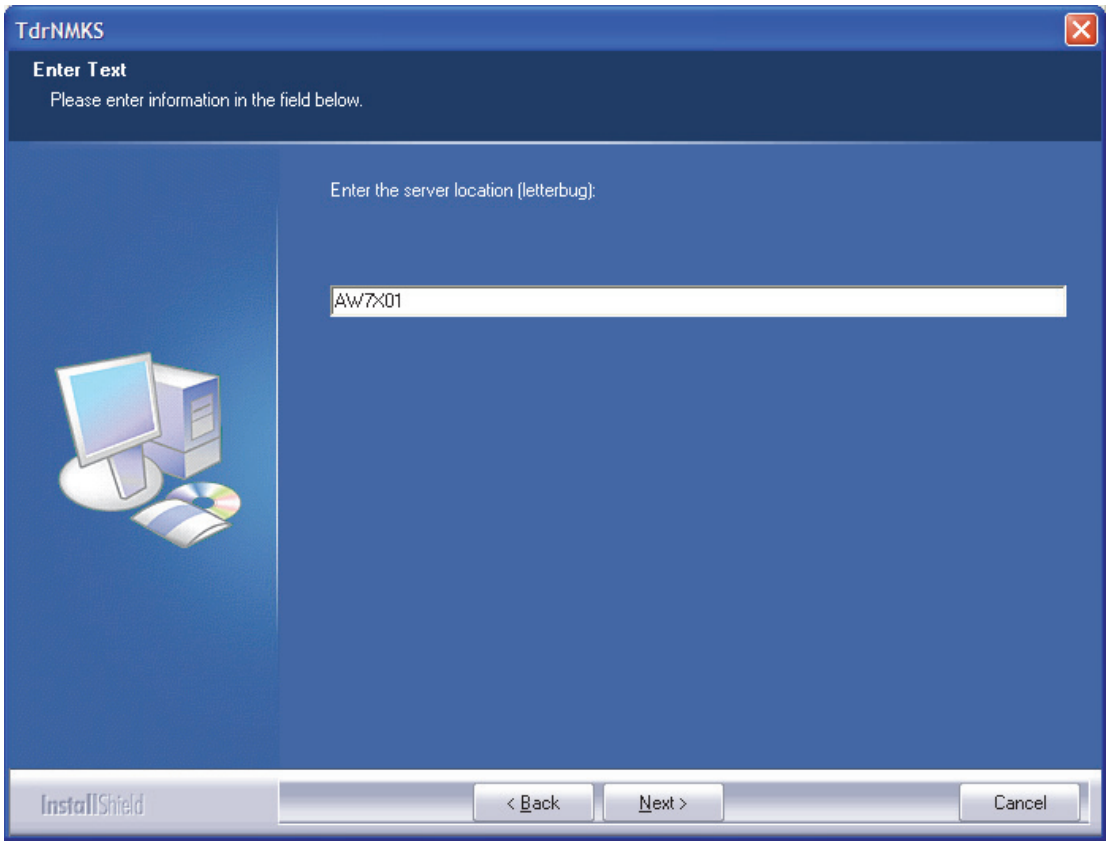


Figure 2-15. Remote Client Installation: Entering the TDR/TDA Server Name

8. From the Start Copying Files screen, review the current setting and click **Next**.

   Alternately, click **Back** to return to the previous screen or **Cancel** to stop the installation.

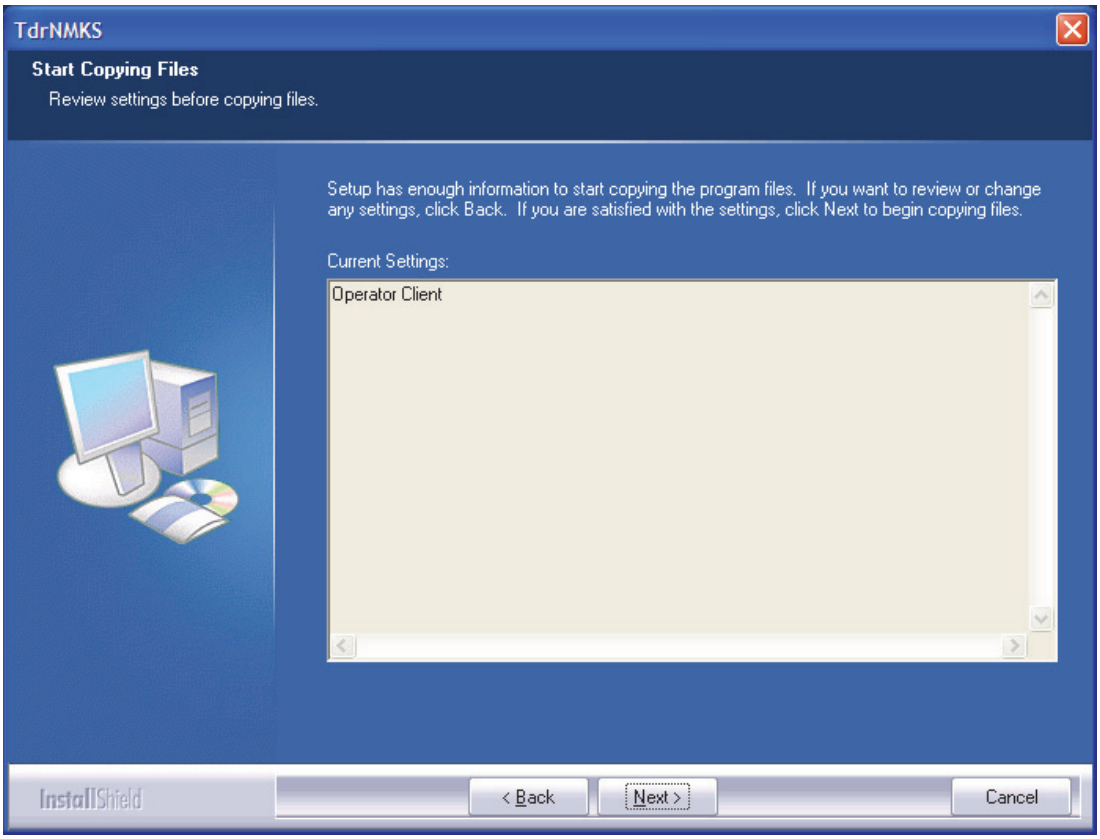


Figure 2-16. Remote Client Installation: Start Copying Files Screen

9. From the Setup Status screen, you can view the Remote Client installation status. If you wish to terminate the installation, click **Cancel**.

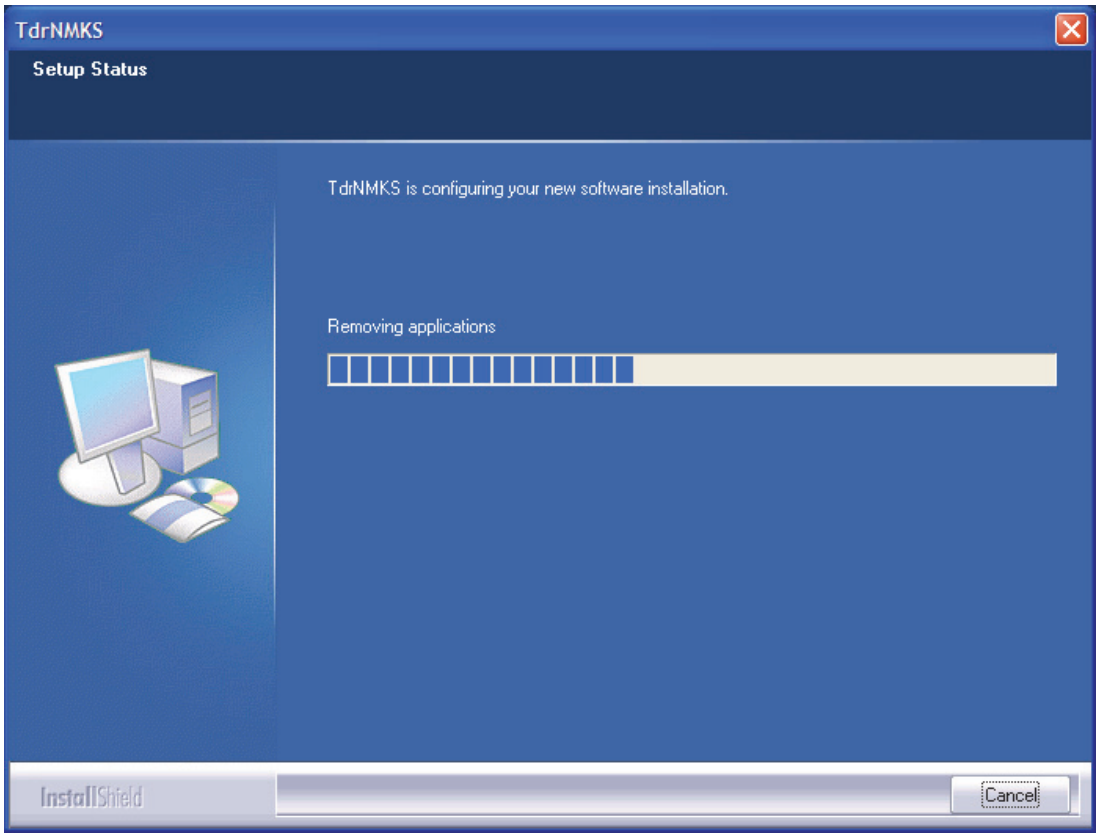


Figure 2-17. Remote Client Installation: Setup Status Screen

10. Then you can select how to invoke the Operator Client. You can select to have an entry in the **Start** menu, to have an icon on the desktop, or both. The default selection is to have just an entry in the **Start** menu.

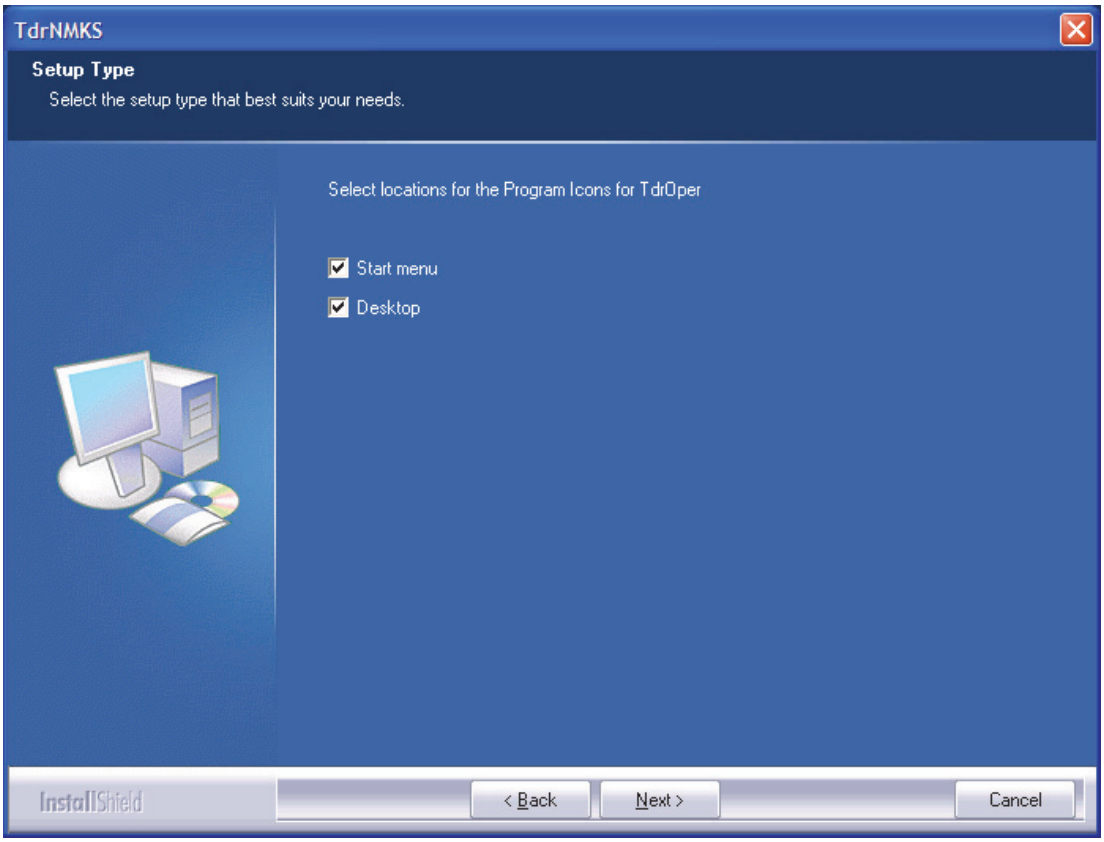


Figure 2-18. Remote Client Installation: Selecting Locations for Program Icons for Operator Client

11. When the installation is complete, the following screen appears. Click **Finish**.

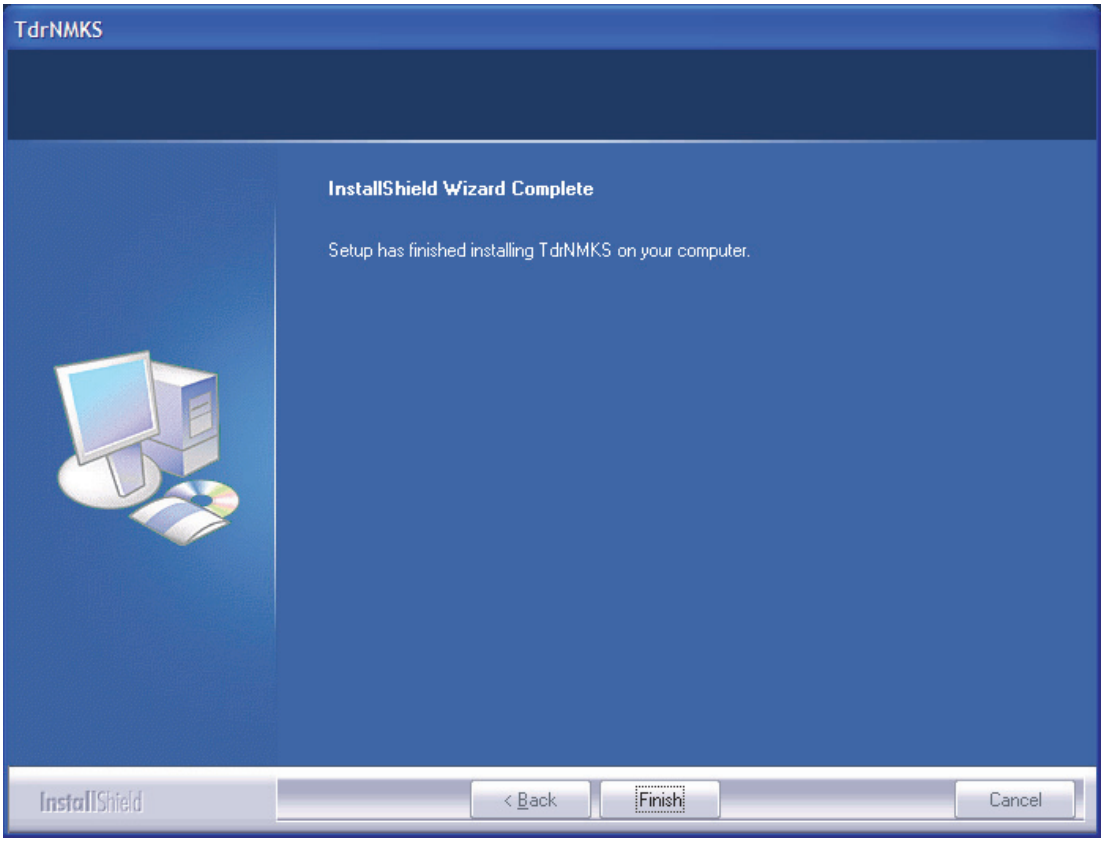


Figure 2-19. Remote Client Installation: Installation Complete

Repeat the procedure in this section until all remote client(s) have been successfully installed, and then continue with "Starting the Software" below.

Connecting Remote Clients to Servers with Windows Server 2008 R2 Standard and Windows Server 2003

NOTE

The Remote Client must be configured/authorized on the Server platform before use. For information on configuring and authorizing remote clients and consoles on the server platform, refer to "Adding Consoles (Clients)" on page 47.

After installing TDR on a server with Windows Server 2008 R2 Standard or Windows Server 2003, you must change the DCOM settings if remote clients will be connected to this server. To do this, perform the following steps:

1. Click **Start** -> **Programs** -> **Administrative Tools** -> **Component Services**.
2. From the left tree, expand **Component Services** > **Computers** > **My Computer**, and select **DCOM Config**.

3. Find the **RtCOMBaseRunningRootClass** icon, right-click **Properties**, and select the **Identify** tab.
4. Change the user account from **The launching user** to **The interactive user**.
5. Click **OK** to close the Properties dialog box, and then exit the Component Services window.

Uninstalling the TDR/TDA Server and Client

You can uninstall the TDR/TDA software using either of the following methods:

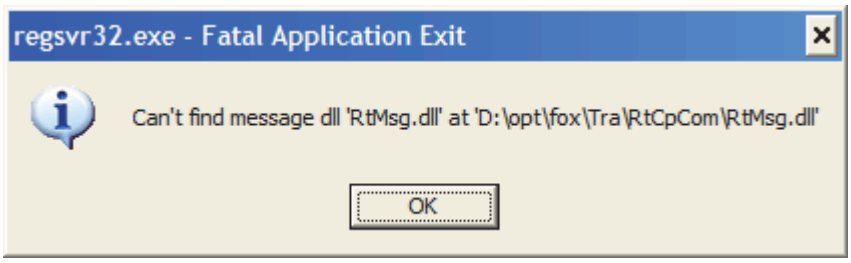
1. Insert the TDR/TDA software CD and select the **Remove** option. Reboot if prompted to do so.

   OR

2. Make sure I/A Series software or Control Core Services software is running and open the Control Panel. Select **Add Remove Programs**, then **TDR/TDA** installation. When prompted during uninstallation, select **Remove All**. Reboot if prompted to do so.

NOTE

A benign "regsvr32.exe" error message may appear indicating that the system cannot find the specified DLL file. If so, click **OK**.



Starting the Software

You can start the TDR/TDA Servers from the Foxboro® TDR applet in the Windows Control Panel on the workstation where the TDR/TDA servers have been installed. The applet is not available on client-only workstations.

NOTE

The time needed to start the TDR servers is dependent on the number of archives in the archive folder. Ideally, the number of stored archives should be kept to a minimum (that is, under 100) to achieve quick startup times. During this startup time, the server states will show as None or Unknown and the Configurator Client or Operator Client will fail to start up.

Perform the following steps to start the Configuration or Operator Clients from the Windows Start menu. Note that the following steps can only be performed on the server platform.

1. From the Windows **Start** menu select **Control Panel** > **Foxboro TDR**. The TDR Properties dialog box appears (Figure 2-20).

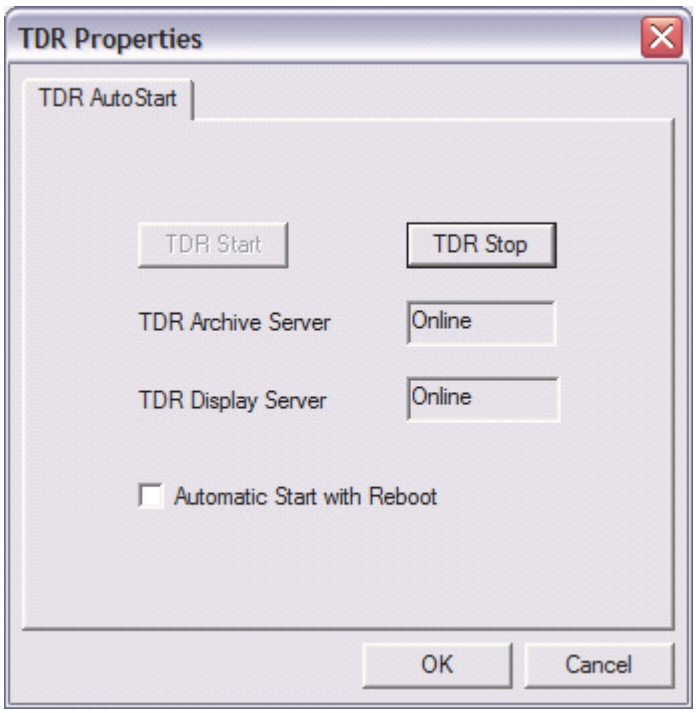


Figure 2-20. TDR Auto Start Tab in Properties Dialog Box

2. Click **TDR Start** to start both the archive and display servers. When the servers start, **Online** appears in the text fields next to each.
3. To start the Operator or Configurator Clients, proceed as follows:
   - Select **Start** > **Programs** > **TDR Software** > **TDRConfigMain** to start the TDR Configurator Client

     or

   - Select **Start** > **Programs** > **TDR Software** > **TDROper** to start the TDR Operator Client.

NOTE

1. You cannot access the Configurator Client and the Operator Client simultaneously. The Configurator Client and the Operator Client are implemented as two separate executables.
2. When both the Display servers and Archive servers are in Configuration mode and the servers are restarted, the display and archive servers will restart in Online mode. To switch modes, use the **File** > **Set Configuration Mode** menu selection.

Refer to Chapter 3 “Using the TDR/TDA Configurator Client” for additional information on configuring your TDR/TDA software, and Chapter 4 “Using the TDR/TDA Operator Client” for information on the operation of TDR/TDA software.

3. Using the TDR/TDA Configurator Client

This chapter provides a description of the options in the TDR/TDA Configurator Client, and describes the procedures to set up the TDR/TDA software to record and analyze data.

Overview

The Configurator Client provides a user interface with which you can:

- Define the data that you want to record
- Define the time interval at which you want data recorded
- Configure process variables and groups of process variables
- Define event triggers
- Configure displays and reports that you would like generated
- Change or delete configuration data and archives
- Configure general settings of the TDR/TDA software
- Save an existing TDR configuration for use on another workstation.

Additionally, the Configurator Client contains some of the functionality of the Operator Client.

Before recording any transient data, you must use the Configurator Client to define the behavior of the TDR/TDA software by setting general operating parameters, specifying the data sources and signal types to be monitored and stored, and developing the trigger expressions that will initiate events. In addition, you can use the Configurator Client to organize process variables into groups, and the groups can be configured to contain the specific triggers, displays, and so forth required by the process. After you perform these configuration steps, the configuration database holding the required information is located in the TDR/TDA server's RAM at run-time. The configuration data is also stored in a configuration database.

The configuration database is saved with every event in the archive so that data can be analyzed at a later time using values from the database configured at the time (the database could have been reconfigured at any time).

TDR/TDA Configurator Client Window

The TDR/TDA Configurator Client is a Windows based Graphical User Interface (GUI). This section provides a description of the menu bar, tool bar, status bar, and the navigation tree control options available in the Configurator Client window.

Toolbar

The toolbar provides quick access to the commands shown in Figure 3-1.

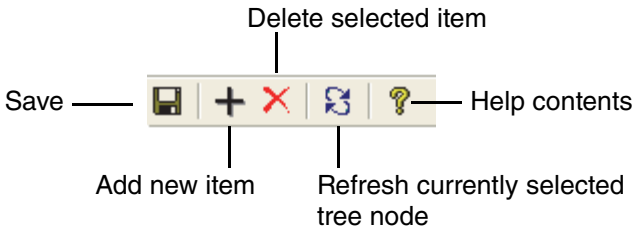


Figure 3-1. Toolbar Commands

Status Bar

The status bar, which appears at the bottom of the Configurator Client window, is shown in Figure 3-2.

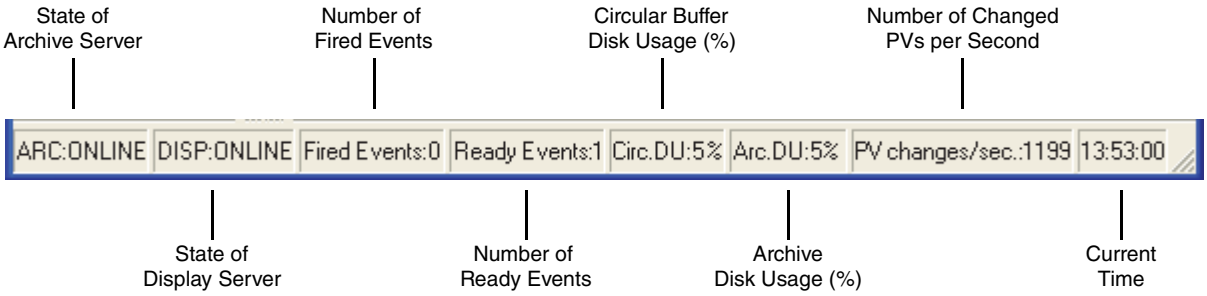


Figure 3-2. Status Bar

The status bar displays the following information:

- Server configuration modes – displays the state of the two Transient Data servers: the Archive server and the Display server. The Archive server is the software component responsible for reading and writing Transient Data Archive files and for trigger detection and processing. The Display server is the software component responsible for automatic event actions and display/report management. The possible states for the two servers are:
  - None – unknown server state
  - OFFLINE – server is running but not configured
  - CONFIGURATION – server is running and in configuration mode
  - ONLINE – server is running, configured, and on-line (that is, the server has established a connection to external devices). Figure 3-2 shows that both the archive server and the display server are both on-line.
- Number of fired events – the number of events corresponding to a trigger that has just become true and the post-trip time has not elapsed yet. (The event is waiting for TDR to collect appropriate data during the post-trip time.)
- Number of ready events – the number of configured events that are saved in the display server after the post-trip time has elapsed, but have not been saved to an archive.

- Buffer disk use in percent – the percentage of hard disk's resources that the buffer task is using
- Archive disk use in percent – the percentage of hard disk's resources that are used for archive storage
- Number of changed PVs per second – the average rate at which the software gathers and stores process variables
- Current time – current local time.

Menus

The Configurator Client is based on a tree view design that provides fast navigation in the hierarchy of configuration objects. You can activate the main components of TDR/TDA software by selecting any icon on the tree.

File Menu Commands

Table 3-1 provides a description of the File menu commands.

Table 3-1. File Menu Commands

Menu Command	Description
Reload	Reloads the last saved client configuration.
Save	Saves the current configuration.
Save As	Saves an existing TDR configuration for use on another workstation.
Set Configuration Mode	Configuration modes are: ♦ Display-Server – controls how reports, logs, and trends are displayed. This option must be checked to use the Configurator Client. ♦ Archive-Server – controls how transient data is stored and recalled. This option must be checked to use the Configurator Client. After you have completed using the client you should deselect both of these selections.
Options	Sets save to persistence. The options are: ♦ Always save all configuration data – saves all client configuration settings. ♦ Save only changes – Saves only those settings in the active client window.
Exit	Exits the application. When you select **`Exit`**, you are prompted to save any unsaved changes and to deselect the server mode selections.

Edit Menu Commands

The Edit menu may contain the commands shown in Table 3-2, depending on what branch is currently selected in the tree control. These commands let you perform operations on specific items in the navigation tree.

Table 3-2. Edit Menu Commands

Menu Command	Description
Delete	Deletes a selected item.
Add	Adds a new item to the selected tree branch.
Refresh	Displays the changes you made in the client when the changes may not be immediately visible.

Navigation Tree Control

You can use the tree control, shown in Figure 3-3, to select different client windows. The selected window is displayed to the right of the tree. Shortcut menus are used inside the tree control to create new objects or to delete objects. You can access the shortcut menus by clicking the right mouse button.

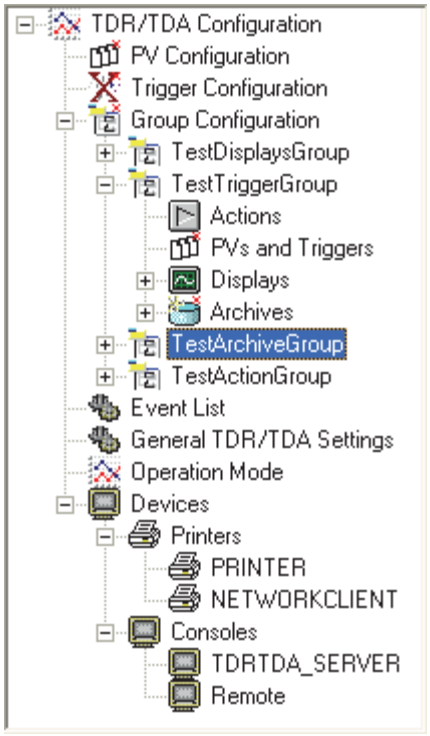


Figure 3-3. Navigation Tree

NOTE

Whenever you make modifications to a screen, you must either **Apply** the changes or **Recall** the original display before you can proceed with the other steps.

Using the TDR/TDA Configurator Client

Once you are familiar with the menus and the other interface elements, follow the steps below, to develop your configuration data. These steps define the procedure for setting up your TDR/TDA software to record and analyze data. Since data from one step is used in subsequent steps, it is strongly recommended that you follow these steps in consecutive order.

1. Review and set the Configurator Client's settings and operation modes (refer to "Step 1: Reviewing TDR/TDA Configuration" on page 37).
2. Import process variables (refer to "Step 2: Importing Process Variables" on page 39).
3. Define triggers (refer to "Step 3: Adding Triggers" on page 41).
4. Add output devices (refer to "Step 4: Adding Output Devices" on page 45).
5. Create groups of process variables corresponding to plant units, and configure them with specific PVs, triggers, displays, and automatic transient data tasks (refer to "Step 5: Adding and Configuring Groups" on page 49).
6. Configure general settings (refer to "Step 6: Configuring TDR/TDA General Settings" on page 57).
7. Test displays and triggers (refer to "Step 7: Testing Displays and Triggers" on page 60).

Step 1: Reviewing TDR/TDA Configuration

Prior to performing any TDR/TDA configuration, confirm that you are logged into the Configurator Client appropriately and that the display and archive servers are configured correctly.

To verify these settings:

1. Select **`TDR/TDA Configuration`** from the navigation tree.

   The TDR/TDA Configuration window opens, as shown in Figure 3-4.

Connected As:	
Computer Name	TAW701
User Name	Fox
Authorization:	
May configure Display-Server	Yes
May configure Archive-Server	Yes
Configuration Mode:	
Display-Server	Configuration Mode
Archive-Server	Configuration Mode
Persistence:	
Display-Server	Configuration Data not saved
Archive-Server	Configuration Data not saved
Server Mode:	
Display-Server	Online - Configured
Archive-Server	Online - Configured
Data:	
Circular Buffer Time Range	12:00:00 AM - 12:00:00 AM
Periodic Log Time Range	12:00:00 AM - 12:00:00 AM

Figure 3-4. TDR/TDA Configuration Window

2. Ensure that the configuration in Figure 3-4 reflects the settings listed in Table 3-3. Make modifications as required.

Table 3-3. TDR/TDA Configuration Settings

Configuration Field	Setting
Connected As	The name of the current computer and user.
Authorization	The display and archive servers must be set to **Yes**. This is required to use the Configurator Client.
Configuration Mode	Both the display and archive servers must be in **Configuration Mode** to use the client. If either field shows something different, see “File Menu Commands” on page 35 to change the setting.
Persistence	The current saved state of the client data. If data is not saved, select **File** > **Save**.
Server Mode	Both display and archive servers must be set to **Online - Configured**. If either field shows something different, see “File Menu Commands” on page 35 to change the setting.
Data	This field indicates the time range of data storage. It is updated only by exiting and restarting the TDR/TDA application.

Step 2: Importing Process Variables

After you have configured the client, you are now ready to define the data that you want to monitor by importing the digital and analog PVs from your system corresponding to control block parameters. You can add a maximum of 500 digital and analog PVs from your system, with a maximum of 128 analog points from a single FCP/FCM.

To add PVs, perform the following steps:

1. Select **`PV Configuration`** from the navigation tree.

   The PV Configuration window opens.

2. Click **`Add Binary PVs`** to open the Add Binary PVs dialog box (Figure 3-5).

NOTE

When the Add Analog or Add Binary PVs dialog boxes are opened for the first time, the software must query the system for available PVs. This information is stored in the files \opt\fox\Tra\analog.dat and \opt\fox\Tra\binary.dat. Querying the system for available PVs may take up to 20 minutes for large systems. The Refresh option allows you to update the system after a configuration change. Refreshing forces a new query of the system for PVs and can also take up to 20 minutes to complete. These queries are independent for binary and analog PVs.

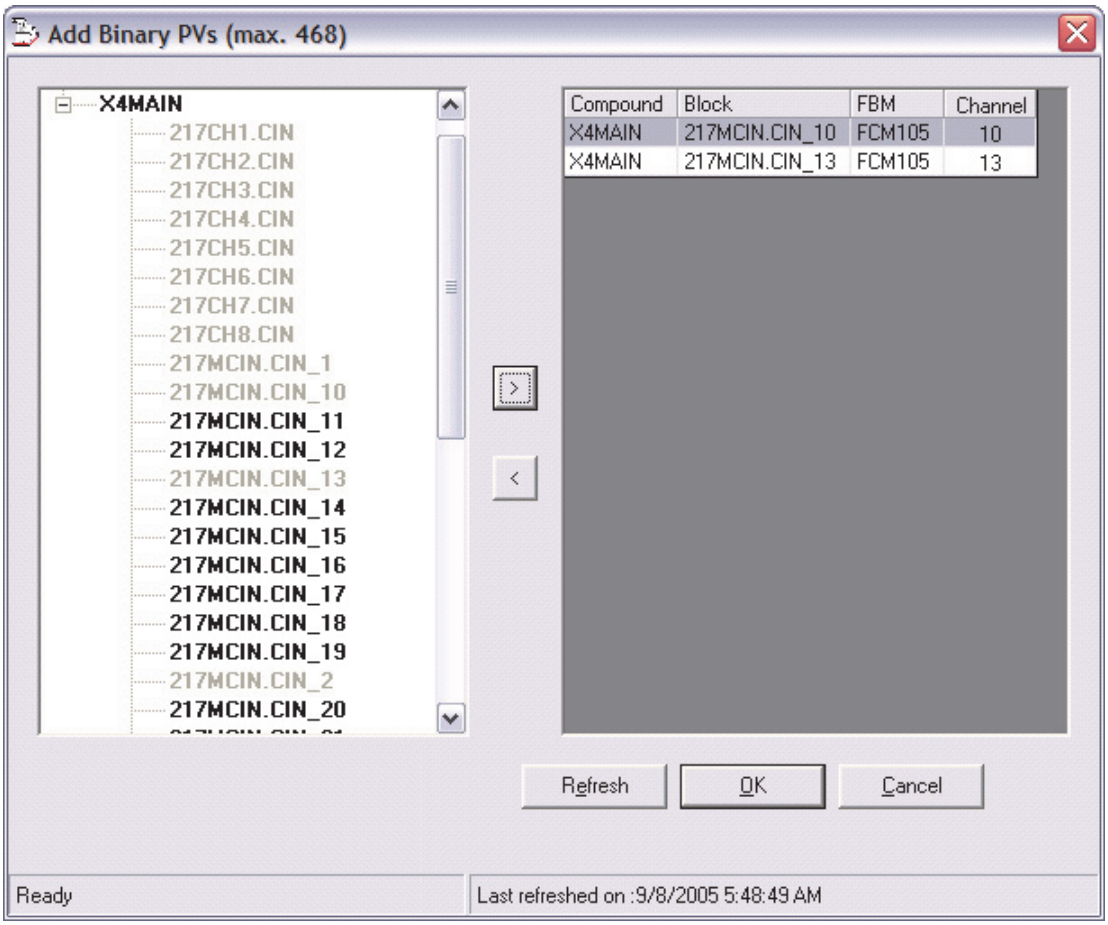


Figure 3-5. Add PVs Dialog Box

3. In the Add Binary PVs dialog box, select the Binary PVs that you want to add from the list, and click the right arrow button. Click **OK**. You can select multiple PVs by holding down the Shift or Ctrl keys.
4. Click **Add Analog PVs** to open the Add Analog PVs dialog box.
5. In the Add Analog PVs dialog box, expand the entries corresponding to the control station (first level) and the compound (second level) that contain the desired points. The points appear in block.parameter format.

   You can select multiple PVs by holding down the Shift or Ctrl keys.

   Select the desired points, click the right arrow button, and click **OK**.
6. The PV configuration appears as shown in Figure 3-6 with analog PVs at the top and binary PVs at the bottom of the window.

   The PVs shown in Figure 3-6 contain the parameters that were set up when you configured the blocks and compounds for your system.

   From the PV Configuration window, you can remove a selected process variable by right-clicking it and selecting **Remove PV** from the popup menu.

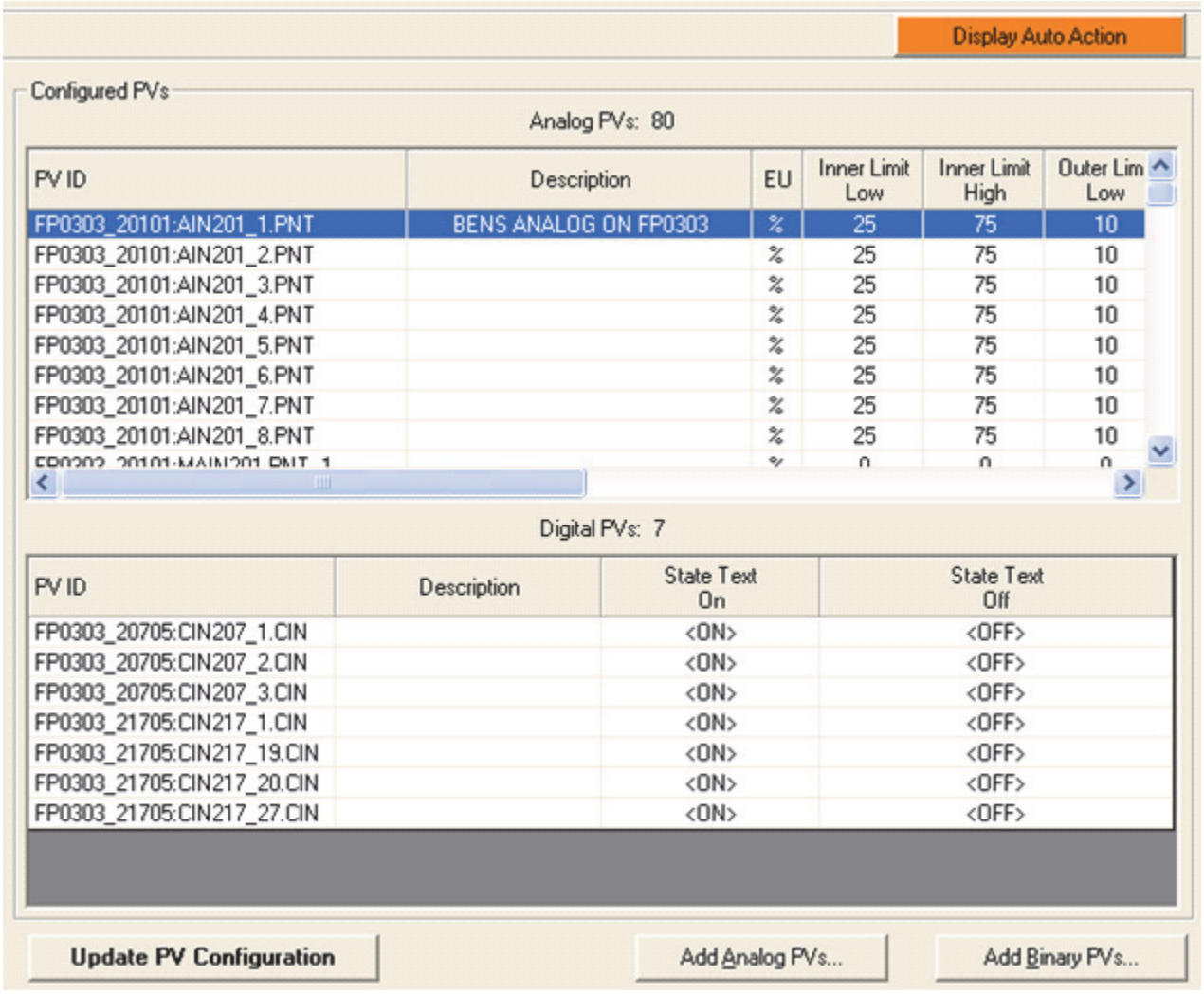


Figure 3-6. PV Configuration Window

7. To manually update the PV configuration, select the PV and then click **Update PV Configuration**.

— NOTE

Updating a control block configuration via Control Editors (previously FCS Configuration Tools), ICC, or IACC will not update the PV configuration within TDR/TDA. After making any control block configuration changes, you must manually select **Update PV Configuration** to ensure that the FBM raw counts are correctly scaled within the TDR application.

8. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Step 3: Adding Triggers

Once you have added the PVs to the client, you can define the signals or groups of signals you want to use as triggers. Triggers are logical and arithmetical expression of process variables. When the value of a trigger changes from FALSE to TRUE, a trigger event is generated.

A trigger expression is composed of operands and operators. The expression can consist of a simple operation, or can involve many levels of nesting with the use of parentheses.

The following operands are available from the Trigger Expression Editor window (see Figure 3-7):

- The numerical buttons in the upper left corner of the dialog box allow you to enter constants into your expression.
- The scrollable tree structure and the **Add Selected C:B.P** button in the right side of the dialog box allow you to add a block parameter (C:B.P) from the Foxboro Evo control database to your expression.
- The **DAY_OF_MONTH**, **DAY_OF_WEEK**, **HOUR**, and **MINUTE** buttons allow you to enter a specific date, day, or time into your expression. For example, the expression **DAY_OF_MONTH=10** triggers an event or archive on the 10th day of the month.
- The **TRUE** and **FALSE** buttons allow you to test the values of boolean PVs or C:B.Ps within the trigger expression. For example, the expression **HEAT_ON:C117CO.COUT=FALSE** triggers an event or archive when the COUT parameter of the C117CO block is false.
- The **Add Weekday** button allows you to use a day of the week in your trigger expression. For example, the expression **DAY_OF_WEEK=0** triggers events or archives on Sundays.
- The **Select PV** button allows you to browse for and select a process variable to use in your trigger expression.
- The **Select Trigger** button allows you to select a trigger from a pre-existing list to use in your trigger expression.
- The **Enter C:B.P** button allows you to type a block parameter (in C:B.P format) for use in your trigger expression.

Two groups of buttons in the Trigger Expression Editor allow you to add arithmetic and boolean operators into your trigger expression. Operators are applied from highest to lowest precedence; operators that have equal precedence are applied as written from left-to-right.

You can use the operators in Table 3-4, listed from highest to lowest precedence, in the Trigger Expression Editor.

Table 3-4. Trigger Expression Editor Operators

Precedence	Symbol	Operation
1 (highest)	(and)	Parentheses group parts of the expression.
2	**	Exponentiation
3	-	Negation
	NOT	Boolean complement (see below)
4	*	Multiplication
	/	Division
5	+	Addition
	-	Subtraction
6	<	Less than
	<=	Less than or equal to
	>	Greater than
	>=	Greater than or equal to
7	=	Equality
	< >	Inequality
8	AND	Logical AND (see below)
9	XOR	Logical exclusive OR (see below)
10 (lowest)	OR	Logical OR (see below)

- **NOT** – performs an inversion on two inputs; NOT takes one bit as input and produces the opposite as the output.

Input	Output
0	1
1	0

- **AND** – performs a logical "and" operation on two boolean inputs, A and B. Following is the logic table for a logical AND. When both A and B have the same value, the output is that value. If A and B do not have the same value, the output is 0.

A (Input 1)	B (Input 2)	Output
0	0	0
0	1	0
1	0	0
1	1	1

- **XOR** – performs an "exclusive or" operation on two boolean inputs, A and B. Following is the logic table for an exclusive OR. When either A or B is 0 (or 1), but **not both** (that is, A and B do not have the same value), the output is 1. When A and B have the same value, the output is 0.

A (Input 1)	B (Input 2)	Output
0	0	0
0	1	1
1	0	1
1	1	0

- **OR** – performs a logical "or" operation on two inputs, A and B. Following is the logic table for a logical OR. If either A or B has a value of 1, or both have a value of 1, the output is 1. Otherwise, A and B both have the value of 0 and the output is 0.

A (Input 1)	B (Input 2)	Output
0	0	0
0	1	1
1	0	1
1	1	1

To add a trigger:

1. Select **`Trigger Configuration`** from the navigation tree.

   The Trigger Configuration window opens.
2. Click **`Add Trigger`**.
3. The Trigger Configuration dialog box opens. Enter a **`Trigger ID`** and click **`OK`**.

   The Trigger Expression Editor opens, as shown in Figure 3-6.

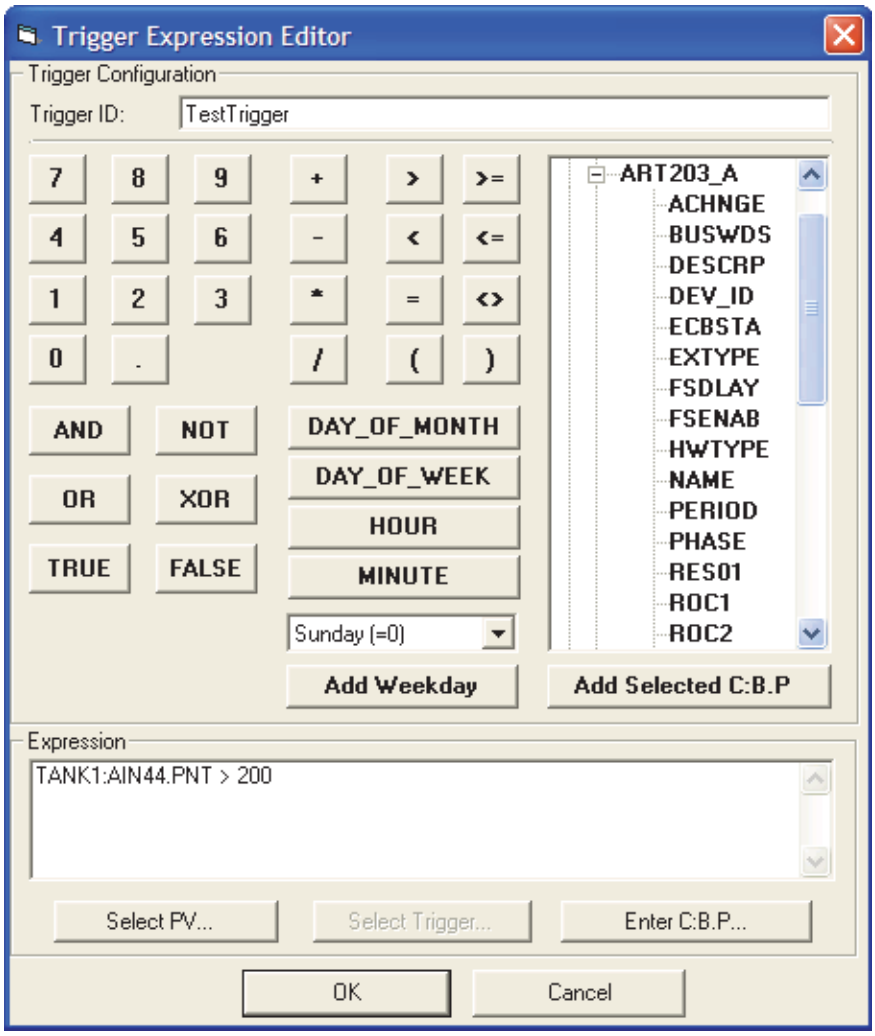


Figure 3-7. Trigger Expression Editor

4. Design the trigger.

   If you are editing an existing trigger, the current Trigger expression is displayed in the Expression edit box. If you are creating a new trigger, the Expression edit box is initially empty.

   - To add a currently existing process variable or another trigger in the Expression area, click Select PV or Select Trigger. To add a constant or an operator, click the appropriate calculator button that appears in the Trigger Configuration section of the window.
   - To add a Foxboro Evo control parameter, expand the desired compound and block entries in the list box on the right side of the Trigger Expression Editor. Select the parameter you want to include in your expression, and click **Add Selected C:B.P**.

   In the example above, the trigger named "TestTrigger" compares the value of TANK1:AIN44.PNT, an analog PV in your control system, to the constant 200. If the value of the PNT parameter becomes greater than 200, the trigger becomes true and a trip is initiated.

5. Click **OK**.

After you have added all the triggers, the Trigger Configuration window appears as shown in Figure 3-8. The Active check box is checked by default after creating a trigger.

- Uncheck the box to de-activate the trigger.
- Re-check the box to re-activate the trigger.

To modify an existing trigger expression listed in the Trigger Configuration **window** (Figure 3-8)**:**

1. **Double-click the trigger and modify the expression as desired using the** Trigger Expression Editor.
2. Click **OK**. The Trigger list is updated immediately.
3. If the Trigger Expression is invalid, an error message displays until you enter a valid expression or click **Cancel**.
4. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

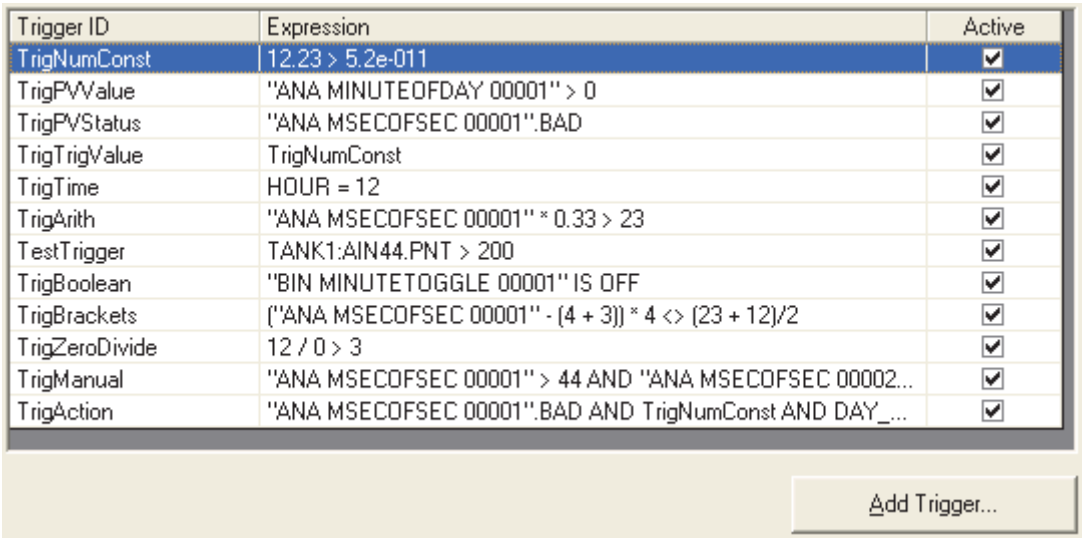


Figure 3-8. Trigger Configuration Window

Step 4: Adding Output Devices

After you have added the triggers, add the devices that let you view or print the data collected as a result of the triggered event, including printers and monitors.

Adding Printers

The printers you add in this step are used to print the reports and logs that you set up in the group displays.

To add a printer:

1. Select the **Devices** icon in the navigation tree (Figure 3-3) and expand it. Right-click the **Printers** icon and then select **Add Printer** from the popup menu.

   The Add New Printer dialog box appears (Figure 3-9).

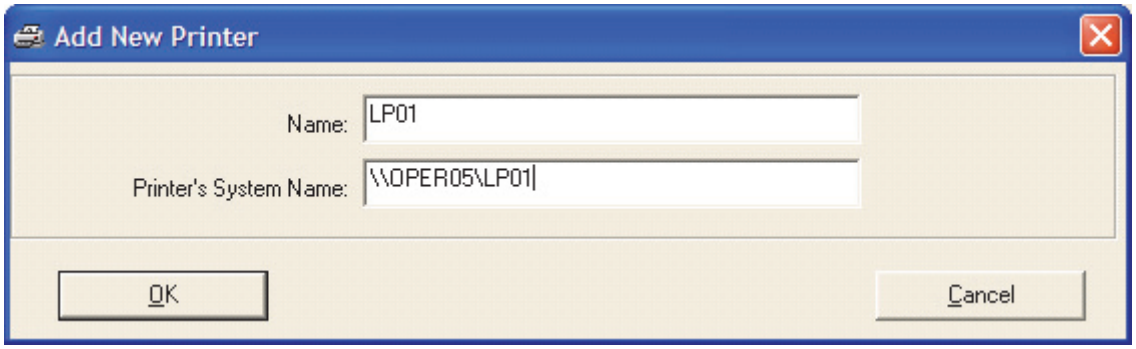


Figure 3-9. Add New Printer Dialog Box

NOTE

The printer's system name must be in the format **\\<Server>\<printer>** and the printer must be shared on the host machine unless it is local.

2. Type the printer **Name** and the **Printer's System Name**. The printer name can be any name you choose to clearly identify the printer. The system name is the name that is assigned to the printer. Click **OK**.

   The printer is added to the list of devices.

3. Select the printer you just added.

   In the printer configuration window that opens, the "Displays configured for this Device" and "Auto Actions using this Device" fields do not display any data. These fields are filled in when you set up displays in your configured groups (see "Adding and Configuring Displays" on page 52). After you add and configure the displays, the Printer window appears as shown in Figure 3-10.

4. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

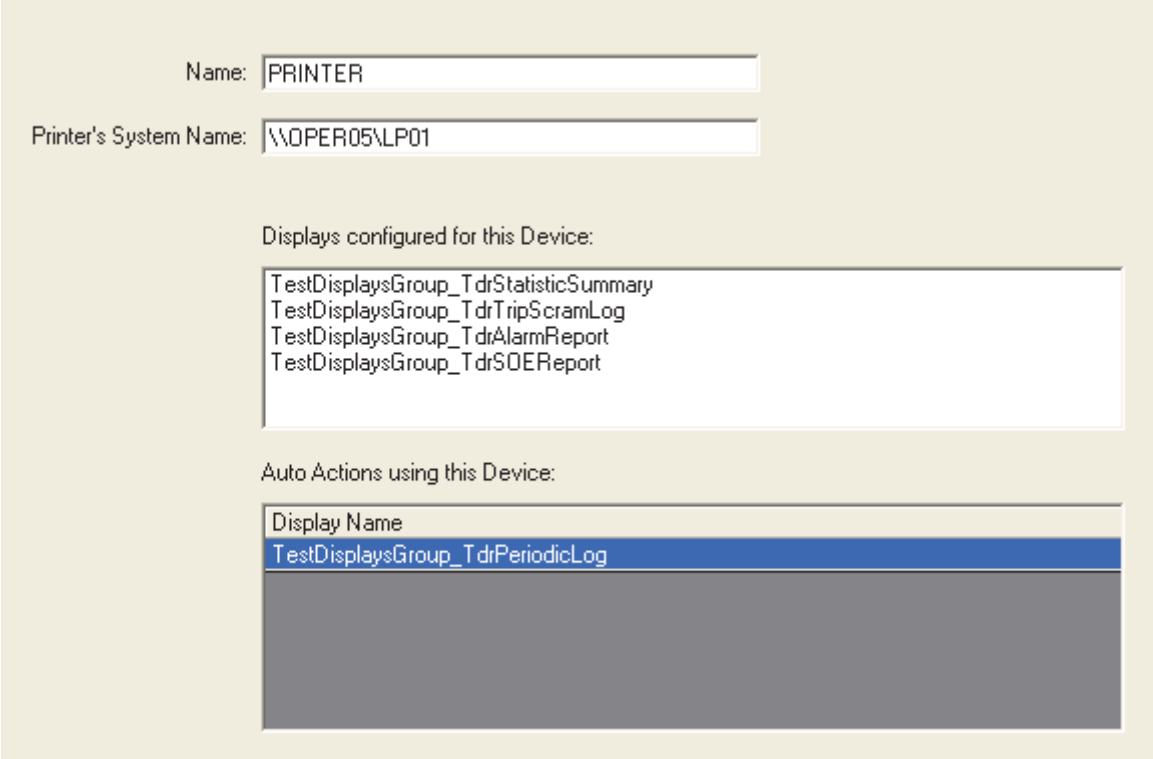


Figure 3-10. Printer Window

Adding Consoles (Clients)

A console is the monitor of a host station on which you want to display configured logs and reports.

To add a console:

1. Select the **Devices** icon in the navigation tree and expand it. Right-click the **Consoles** icon and select **Add Console**.

   The Add Console Device dialog box appears (Figure 3-11).

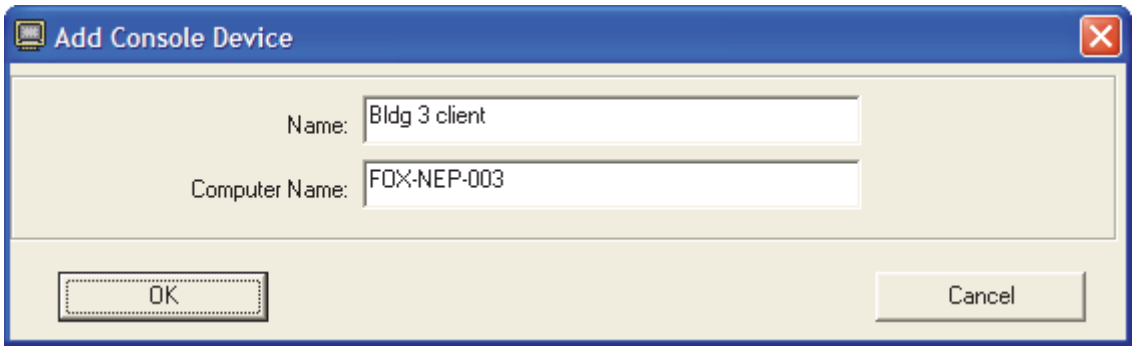


Figure 3-11. Add Console Device Dialog Box

2. Type in the console's **Name** and **Computer Name**. The console's name can be any name you choose to clearly identify the console. The Computer Name is the name that is assigned to the computer or workstation from which you wish to run the TDR/TDA software, and must be entered in all UPPERCASE characters. Click **OK**.

NOTE

Login error messages will appear if the console's name is not in uppercase characters.

The console is added to the list of devices.

3. Select the console you just added.

   In the console's configuration window that appears, the "Displays configured for this Device" and "Auto Actions using this Device" fields do not display any data. These fields are filled in when you set up displays in your configured groups (see "Adding and Configuring Displays" on page 52). After you add and configure the displays, the Client window appears as shown in Figure 3-12.

4. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

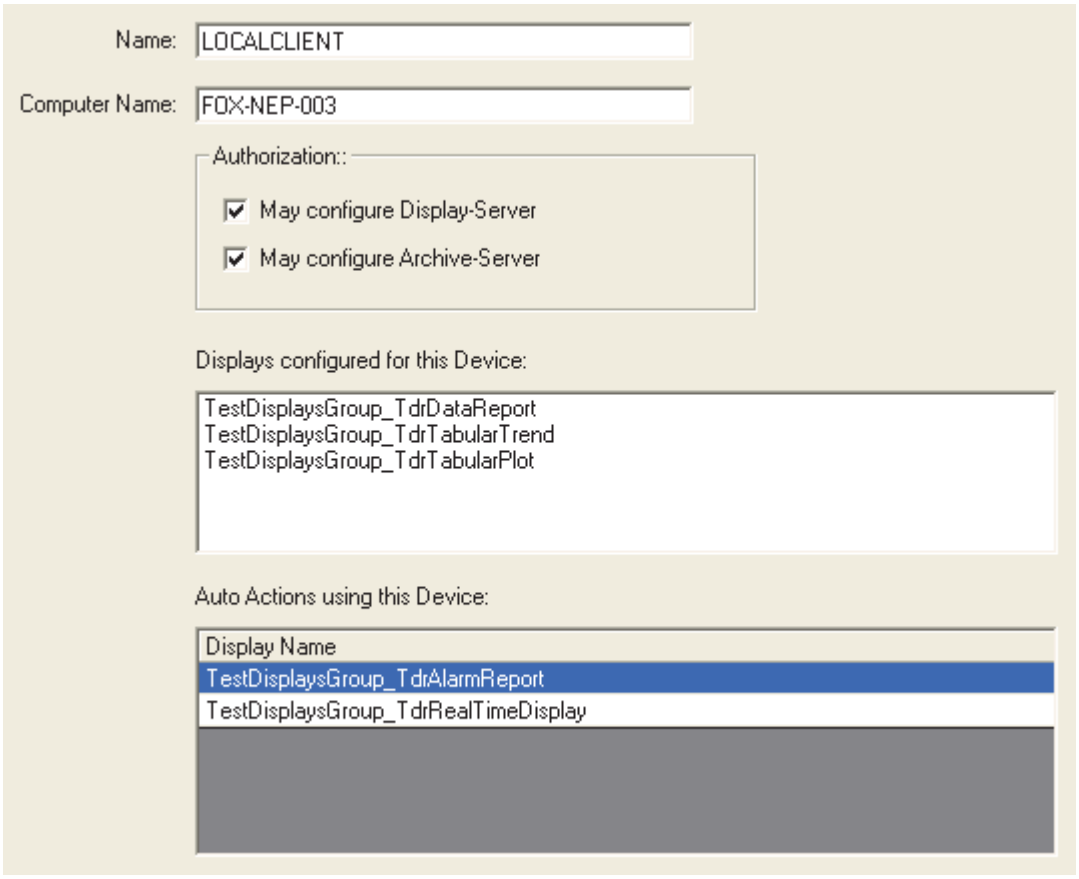


Figure 3-12. Client Window

Step 5: Adding and Configuring Groups

After you have set up your Configurator Client settings, imported PVs, configured triggers, and configured output devices, you are ready to add groups. A group is a collection of process variables that represent specific units of the plant, such as a physical unit (for example, vessel #1, vessel #2, drive A, or drive B), a logical unit (for example, a transport system), or an organizational unit (for example, preparation, manufacturing, quality assurance, or wrapping functions). Groups are further defined by the specific PVs, triggers, actions, and displays that you set up within that group.

Each group is identified by a unique name and number and can include:

- Specific digital or analog PVs to provide a snapshot of process data at the time of the event
- Specific digital or analog points for reporting historical values
- Automatically generated actions that execute in response to a trip, including:
  - Invoking a program
  - Calling up a display
  - Creating an archive.
- One or more displays with associated target output devices, for example, files, printers, or workstations
- One or more triggers.

Additionally, you can configure a time delay between the detection of a trigger and the initiation of actions that are automatically generated for the group; this delay time provides for reliable data retrieval, ensuring that data for the requested time period is available. You can also configure the amount of time during which data is recorded for a group, both before and after a trip.

Adding Groups

To add a new group:

1. In the navigation tree, select **`Group Configuration`**.
2. Right-click and select **`Add New Group`**.

   The Add New Group dialog box appears, as shown in Figure 3-13.

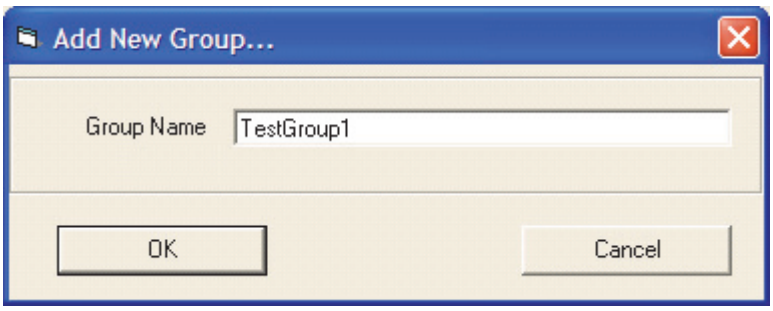


Figure 3-13. Add New Group Dialog Box

3. Enter a unique group name. Names may be any alphanumeric string and may include underscores, @ characters, asterisks, dollar signs, or percent symbols.

4. Click **OK**.

   The new group appears on the configuration tree. Notice that when you add a new group, Actions, PVs and Triggers, Displays, and Archives icons are added under the group name in the navigation tree.

5. Select the group on the tree and configure the following parameters that appear in the group's general configuration window, shown in Figure 3-14:

   a. **Pre Trip Time (in minutes)** – The maximum amount of time for which data is archived before the trigger event occurs.

   b. **Post Trip time (in minutes)** – The maximum amount of time for which data is archived after a trigger event occurs.

   c. **Notify C:B.P** – Allows TDR to notify the I/A Series software or Control Core Services software in the event of a trip. This option allows you to enter the name (C:B.P) of a binary, settable, unlinked control block parameter or shared variable. When you select this check box, TDR sets the specified binary parameter to True when the trip trigger fires.

   d. **Create Archive after Trip** – Directs the client to create an archive for every trigger event.

6. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

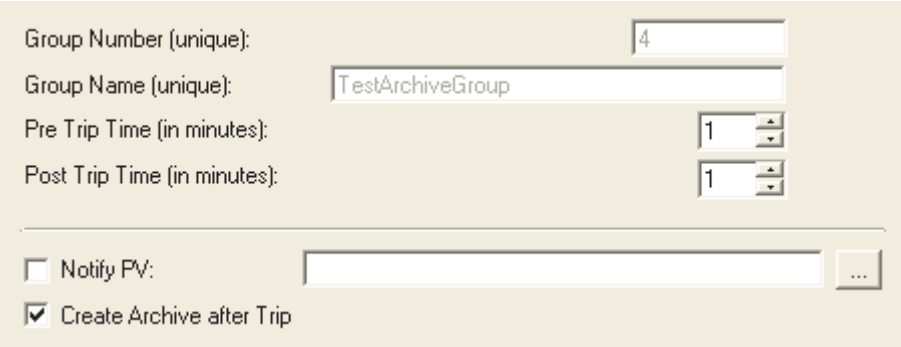


Figure 3-14. Configuring a Group's General Properties

To delete a group:

1. Select the group you want to delete on the tree, right-click it and select **Delete Group** from the shortcut menu.

   A message appears confirming the delete command.

2. Click **Yes**.

Adding Process Variables and Triggers to a Group

A process variable (PV) represents a digital or analog process data point in your control system that corresponds to a particular FBM channel via a block parameter. PVs are stored with the value of the data point and the point's configuration data. PVs are further defined as snapshot PVs or history PVs. Snapshot PVs are process variables that are stored only at the time of the event. History PVs are stored with all their associated changes during trip time.

To add PVs and triggers to a group:

1. Select a group and then select the **PVs and Triggers** icon.

   The PVs and Triggers window opens on the right side of the interface, as shown in Figure 3-15.

2. Click **Add Snapshot PVs**.

   The Add Snapshot PVs dialog box opens.

3. Select the PVs you want to add from the list and click **OK**. Select multiple PVs by holding down the Shift or Ctrl keys.

   The PVs you selected are added to the Snapshot PVs list.

4. Click **Add History PVs**.

   The Add History PVs dialog box opens.

5. Select the PVs you want to add from the list and click **OK**. Select multiple PVs by holding down the Shift or Ctrl keys.

   The PVs you selected are added to the History PVs list.

6. Click **Add Triggers**.

   The Add Triggers dialog box opens. It contains the list of active triggers you designed in “Step 3: Adding Triggers” on page 41.

7. Select the triggers you want to add and click **OK**. Select multiple triggers by holding down the Shift or Ctrl keys.

   The triggers you selected are added to the Triggers list.

8. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

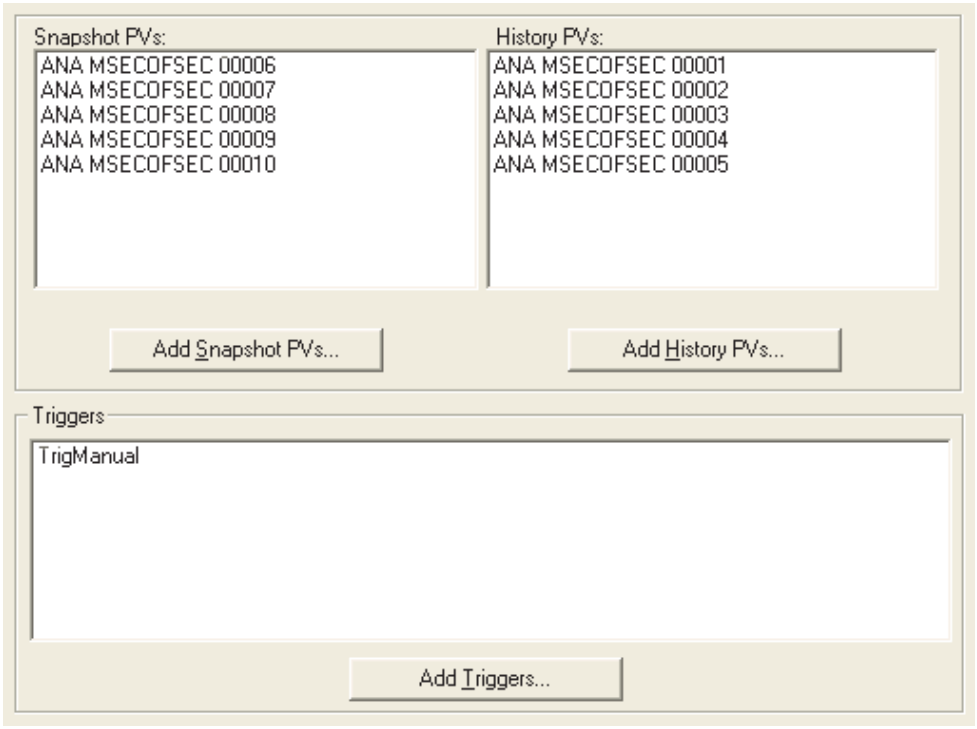


Figure 3-15. Group Process Variables and Triggers Window

Adding and Configuring Displays

Displays are the reports, logs, and trends that perform data analysis tasks by providing unique views of the transient data collected from your process. You can configure these displays to include specific PVs and configure the display's general parameters.

To create a new display:

1. From the navigation tree (Figure 3-3), select **`Group Configuration`** and expand it.

   Select a group and expand it. Right-click the **`Displays`** icon. In the menu that appears select a display from the list or select **`Add Display`**.

   The New Display dialog box opens, as shown in Figure 3-16.

2. Select one of the displays, type a display name, and click **`OK`**.

   The new display is added under the Displays icon in the navigation tree.

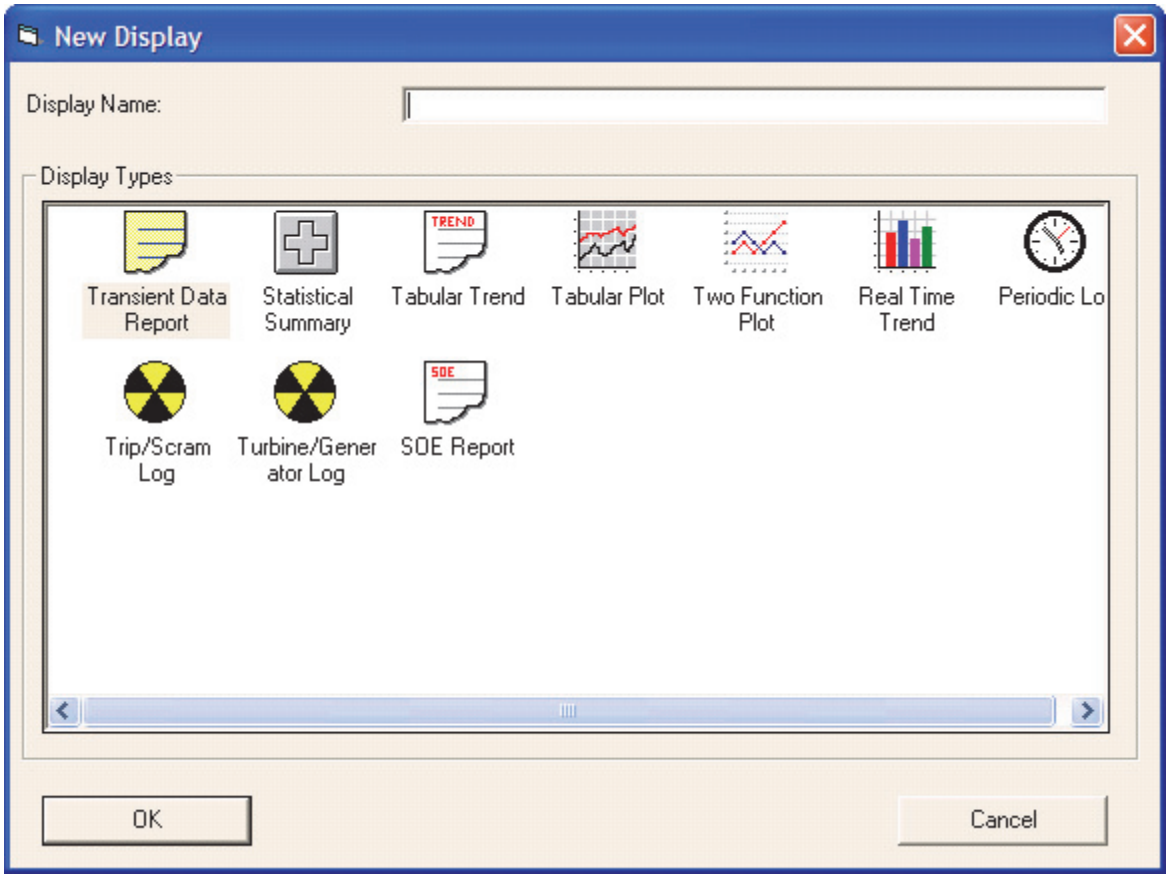


Figure 3-16. New Display Dialog Box

3. Select the new display.

   A display configuration window opens on the right side of the interface. Figure 3-17 shows an example of a tabular plot configuration screen.

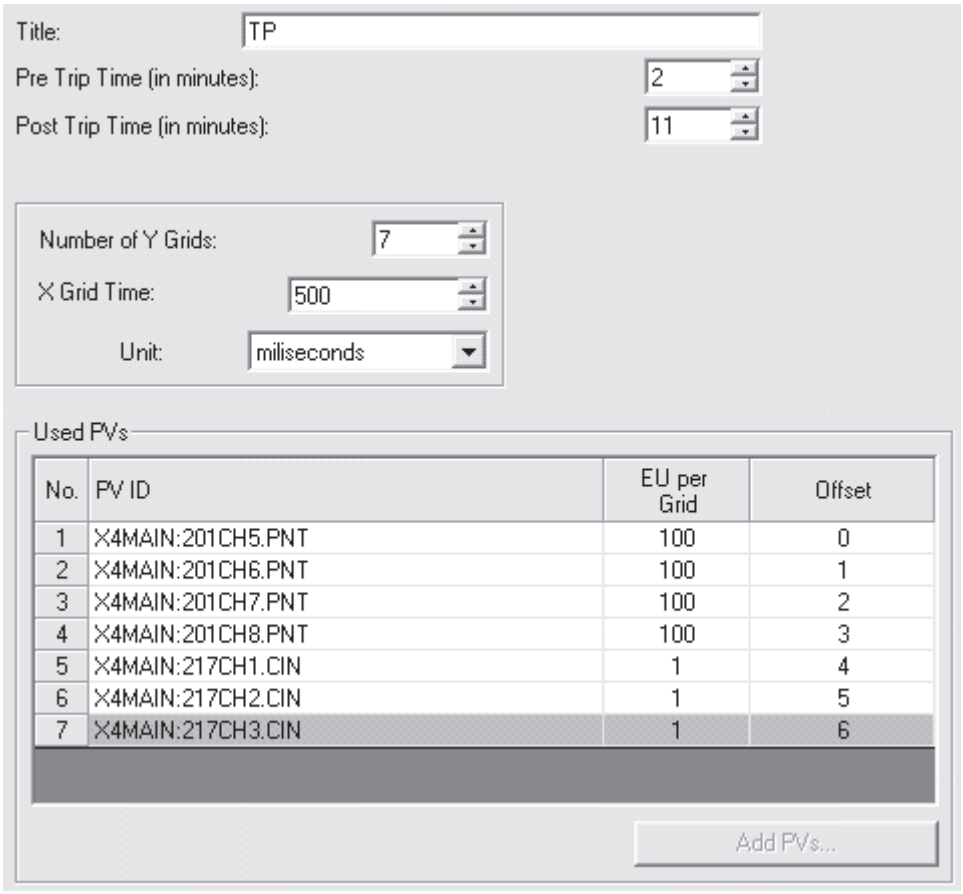


Figure 3-17. Display Configuration Window Example for a Tabular Plot

4. Configure the display parameters based on the field definitions listed in Table 3-5.
5. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

— NOTE

The display parameters differ by display type. For detailed parameter descriptions and configuration procedures for all the displays, see Chapter 6 “Reports and Logs”.

Table 3-5. Display Configuration Window Field Descriptions for Tabular Plot

Window Field or Button	Description
Title	The title that you assign to this display.
Pre and Post Trip Times	The maximum amount of time for which data is displayed prior to and after a trigger event occurs.
Interval	The frequency, in milliseconds, at which data is reported on the display. For example, a value 1000, instructs the software to sample the collected data stream once per second, and display the results.

Table 3-5. Display Configuration Window Field Descriptions for Tabular Plot (Continued)

Window Field or Button	Description
Number of Y Grids	The number of check marks on the vertical axis of the graph (if applicable).
X Grid Time and Unit	The time intervals at which data is displayed on the horizontal axis of the graph (if applicable). For example, selecting 1000 for X Grid Time and milliseconds for unit creates a graph in which data is displayed for a specific data point once per second.
Default Output Device	The device where you want the data displayed or printed. You may also choose to save the data to a text file or export the data to a CSV or XML file. Note: The default output device is used when a display is generated from the Operator Client, not when generated from the Configurator Client.
Used PVs	The list of PVs selected for this display.
No.	Numeric listing for the PVs
PV ID	Point Value ID
EU per Grid	The number of Engineering Units displayed per grid line. This setting is used in scaling the plot.
Offset	Point on the axis where data starts displaying.
Add PVs	This button is used to add additional PVs to this display.

Configuring Actions

For each group, you can specify actions that are automatically initiated in response to a trip. These automatic actions can include specifying that a TDR/TDA client launch a new program, generate a display, or export data. Commands are strings of up to 127 characters and can be any command line that you can enter into the MS-DOS Shell window in the Windows operating system. The command line consists of a program name and one or more arguments, which depend on the program that you use. Arguments can include filenames, E-mail addresses, or IP addresses, for example.

In Figure 3-18, the entries `mplayer2.exe`, `AppendLogEntry.exe`, and `SendInfoMail.exe` are examples of programs that can be started. `/Play Horn.wav`, `"Alarm Type 01 Occurred"`, and `recipientGrp1` are examples of possible arguments that the programs expect.

You can also schedule the execution of the task. For example, you can choose to execute the action (upon detection of a trigger signal) after the configured post-trip time has elapsed, or after an archive for the event has been saved.

To add a command:

1. From the navigation tree (Figure 3-3), select **Group Configuration** and expand it. Select a group and expand it and then click on the **Actions** icon.

   The Actions window opens, as shown in Figure 3-18.

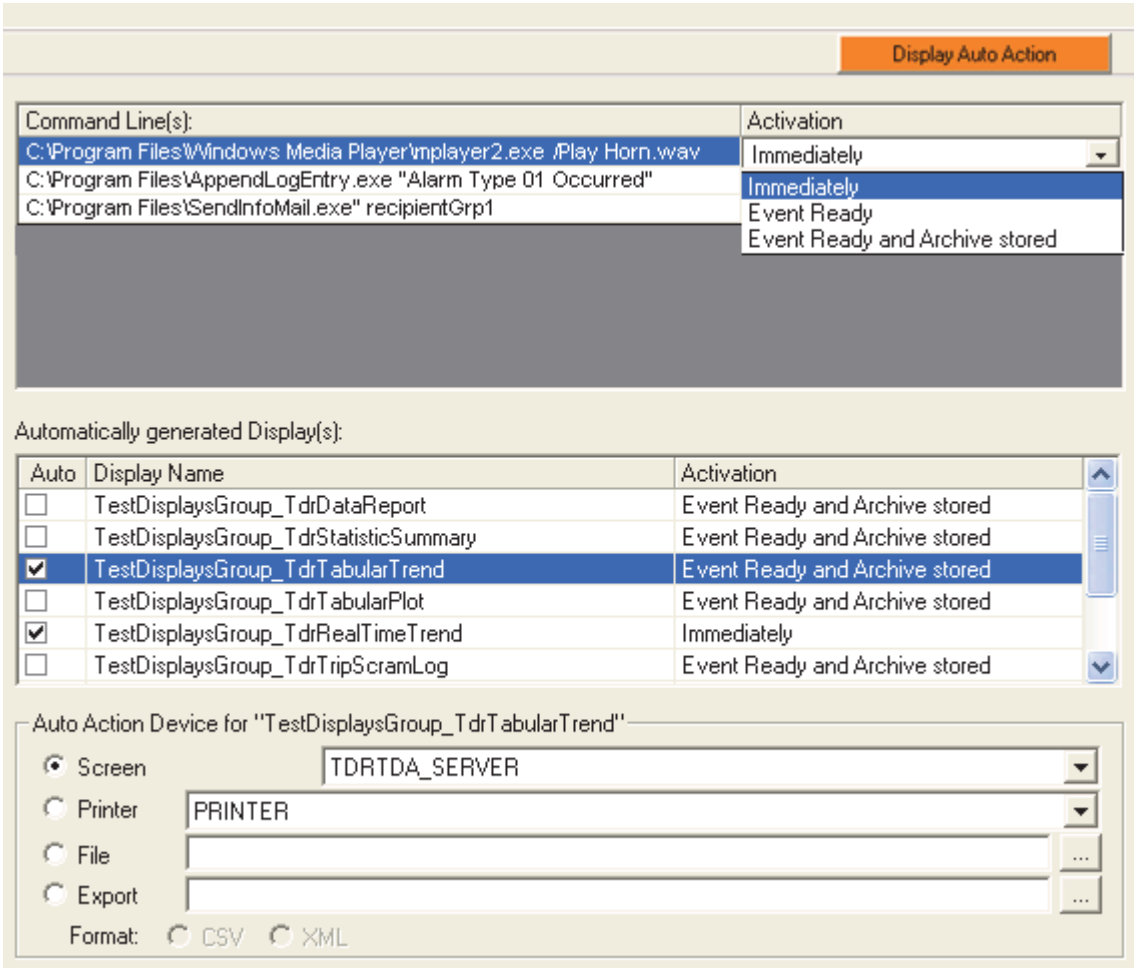


Figure 3-18. Actions Window

2. Right-click in the **Command Line(s)** field on the Actions window.
3. Select **Add Command** from the shortcut menu.

   A new line appears under the Command Line(s) field.
4. Select the line and type in the new command.
5. Select the **Activation** field and use the drop down box to select when you want the action to occur. Options include:
   - Immediately – there is no time delay between trigger identification and the execution of a command.
   - Event Ready – the command is executed after the trigger is identified and the configured post-trip time has elapsed.

- Event Ready and Archive Stored – the command is executed after the trigger is identified, the post-trip time has elapsed, and an archive for the event has been saved to an archive file.

6. The **Display Auto Action** button appears on the Actions window when there are auto actions configured for displays. Click **Display Auto Action** to display the specified automatic action that will occur in response to the trip.

— NOTE

If the TDR Display Server is stopped with outstanding display actions (that is, when the **Display Auto Action** button is displayed), they will be cleared.

7. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

To remove a command:

1. Select the command you wish to delete and right-click it.
2. Select **Remove Command** from the shortcut menu. The command is removed from the window.
3. Click **Apply**.

A list of all the displays that you previously configured in "Adding and Configuring Displays" on page 52 are listed in the **Automatically Generated Display(s)** listbox.

To configure a display to generate automatically:

1. Select the check box next to the display name that you want to generate automatically.
2. Select the **Activation** field and use the drop down box to select when you want the display generated. Options include:
   - Immediately – there is no time delay between trigger identification and the generation of the display.
   - Event Ready – the display is generated after the trigger is identified and the configured post-trip time has elapsed.
   - Event Ready and Archive Stored – the display is generated after the trigger is identified, the post-trip time has elapsed, and an archive for the event has been saved to an archive file.
3. Select an output device for the display using the Device Selection control.
4. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

If you do not want the display automatically generated, deselect the check box next to the display name.

Viewing Archive Attributes

Archives are generated when a trigger you defined becomes true, and TDR software has completed collecting data for the duration of the configured post-trip time.

To view archive attributes, expand the **Archives** tree. In the expanded list of archives, select the archive you want to view. The data appears in the window on the right side of the GUI. Figure 3-19 shows an example of the archive attributes and Table 3-6 describes them.

Name:	TestGroup1_20030815_153755
Description:	Manual created archive (at: TAW701 from Fox)
Event Name:	TestGroup1_20030815_153755
Triggered By:	TrigTime
Start Time:	8/15/2003 3:35:55 PM
End Time:	12:00:00 AM
File Path:	D:\opt\fox\TdrTda\TdrTda-DATA\Archives\TestGroup1_20030815_153755
Size in KB:	1720

Figure 3-19. Archive Attributes

Table 3-6. Archive Attributes

Field Name	Description
Name	The name of the archive data file.
Description	Details of archive creation. This field distinguishes between automatically generated and manually created archives, and provides the computer's system name and the user's name.
Event Name	The name of the event that caused the archive to be created. This is automatically stored as the group name and date and time the event was generated (<*group name*>_<*yyyymmdd*>_<*hhmmss*>).
Triggered By	The name of the trigger that caused the archive to be created.
Start Time	The time when the archive data collection started.
End Time	The time when the archive data collection ended.
File Path	The directory and name under which the archive is stored.
Size in KB	The archive's file size.

Step 6: Configuring TDR/TDA General Settings

Use the General Settings window to configure the global TDR/TDA settings.

To configure general settings:

1. Click on the **General TDR/TDA Settings** icon.

   The General TDR/TDA Settings window opens, as shown in Figure 3-20.

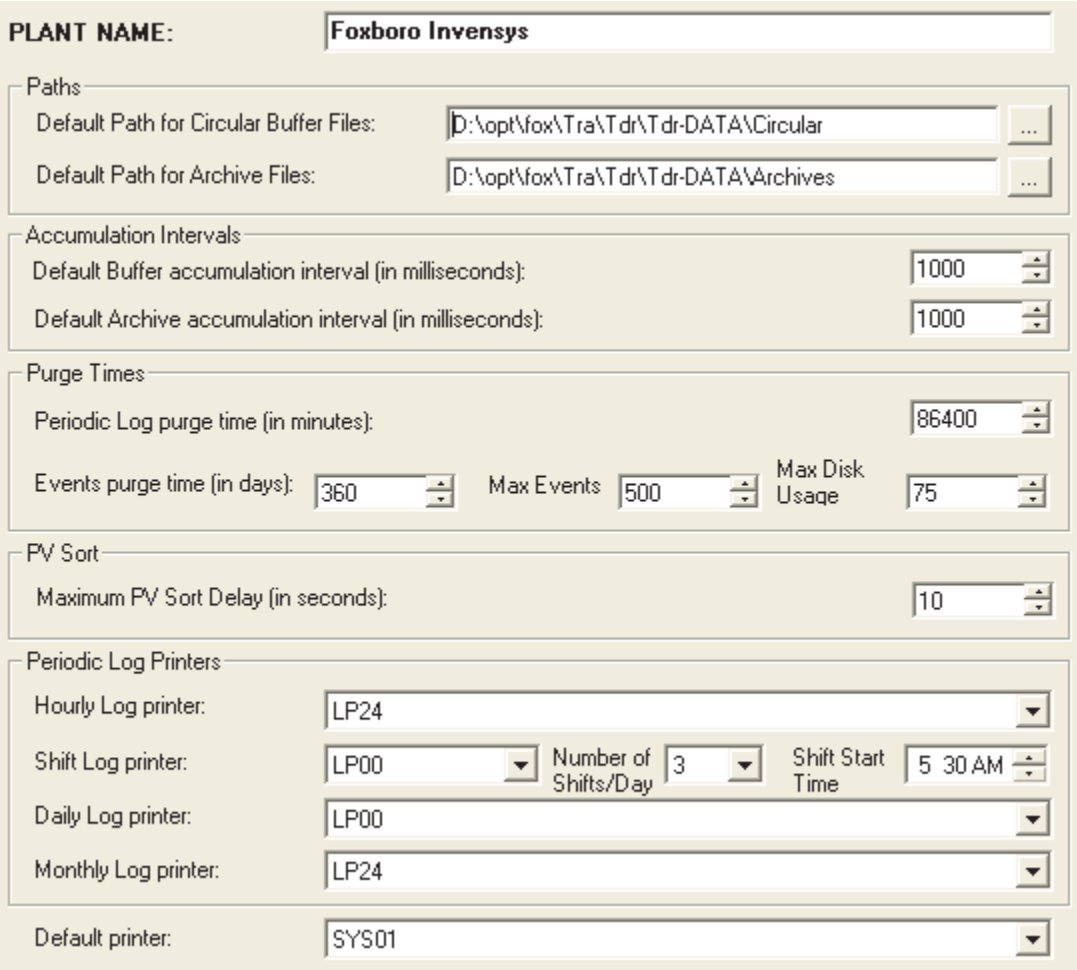


Figure 3-20. General TDR/TDA Settings

2. Configure the settings based on the field descriptions in Table 3-7.

Table 3-7. General TDR/TDA Settings

Field Name	Description
Plant Name	User-defined string to describe a plant.
Paths	
Default Path for Circular Buffer Files	Full path name of default location for storage of the circular buffer.
Default Path for Archive Files	Full path name of default location for storage of archive files.
Accumulation Intervals	
Default Buffer accumulation interval	The time period, in milliseconds, at which data is collected and stored to the circular buffer.
Default Archive accumulation interval	The time period, in milliseconds, at which data is collected and stored to the archive file.

Table 3-7. General TDR/TDA Settings (Continued)

Field Name	Description
Purge Times[1]	
Periodic Log purge time	The time period, in minutes, after which the Periodic Log Buffer starts overwriting itself.
Events purge time	The time period, in days, after which the stored list of events starts overwriting itself. This value can be set from 1 to 365 days.
Max Events	The maximum number of events that can be stored. After this limit is reached, the oldest event will be deleted. This value can be set from 5 to 5000. If the number of stored events is above Max Events **or** the percentage of disk usage is above the Maximum Disk Usage (see below), then the oldest events will be deleted until both conditions are within their specified limits.
Max Disk Usage	The maximum disk usage indicates the percentage of the hard disk that can be used before events are deleted. This value can be set from 50% to 95%. If the number of stored events is above Max Events **or** the percentage of disk usage is above the Maximum Disk Usage (see below), then the oldest events will be deleted until both conditions are within their specified limits.
PV Sort	
Maximum PV Sort Delay	Process data must be sorted by time stamp before a trigger can be calculated. This field contains the time delay, in seconds, between the time a process variable is collected and the calculation of a trigger. This time delay ensures that the most reliable data from different sources is used in trigger calculations.
Periodic Log Printers	
Hourly Log Printer	Printer used to print out the hourly periodic log.
Shift Log Printer	Printer used to print out the shift (8-hour) periodic log.
Number of Shifts/Day	Determines time period of each shift; for example, 3 shifts per day results in 8 hour shifts.
Shift Start Time	Determines when the first shift starts. All subsequent shifts will start one shift length away.
Daily Log Printer	Printer used to print out the daily periodic log.
Monthly Log Printer	Printer used to print out the monthly periodic log.
Default Printer	Default printer used to print out displays and reports.

1. These fields essentially determine buffer sizes. Use caution when specifying a longer amount of time; larger buffer sizes can reduce the available RAM and significantly decrease performance.

3. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

NOTE

After changing any of the general settings, you must restart the TDR servers. Refer to "Starting the Software" on page 30 for instructions on starting the TDR servers.

Step 7: Testing Displays and Triggers

Using the Operation Modes window in the Configurator Client, you can test the displays and triggers that you configured using the Configurator Client. You can confirm that the expected data is collected, the displays appear correctly, and automatic actions execute correctly.
By manually initiating trips and generating displays, you can ensure that you are getting the results you expect.

NOTE

Both servers must be in the Online mode to manually initiate trips and generate displays. To switch modes, use the **File** > **Set Configuration Mode** menu selection.

To generate a display manually:

1. Select the **Operation Mode** icon.

   The Operation Mode window opens, as shown in Figure 3-21.

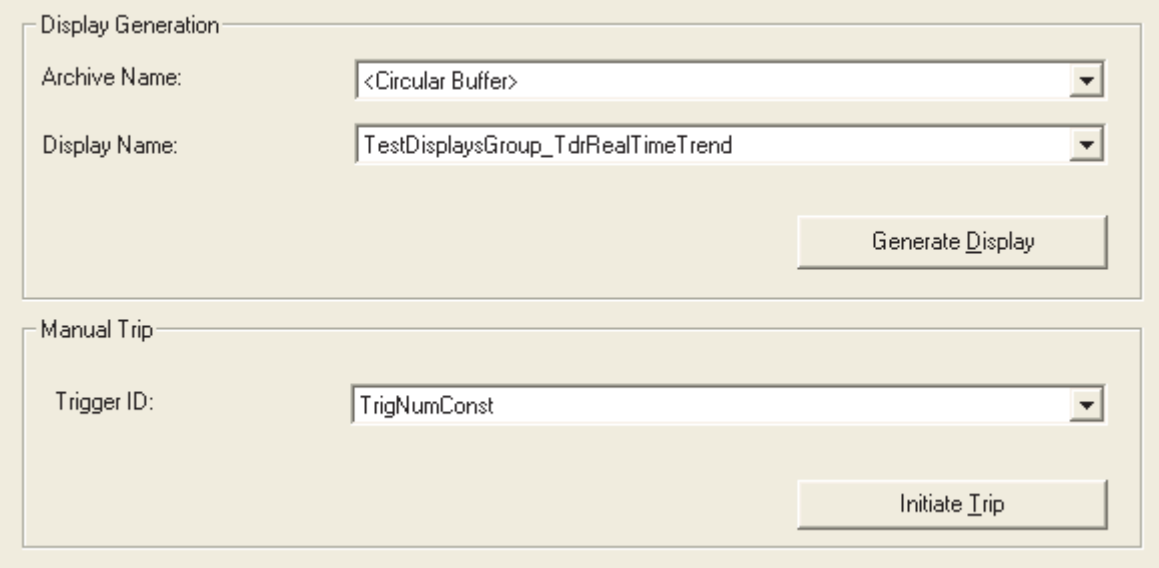


Figure 3-21. Operation Mode Window

2. Use the drop down list to select the archive that contains the display for **Archive Name**. Select a **Display Name**.
3. Click **Generate Display**.

   The Select Report Device dialog box opens, as shown in Figure 3-22.

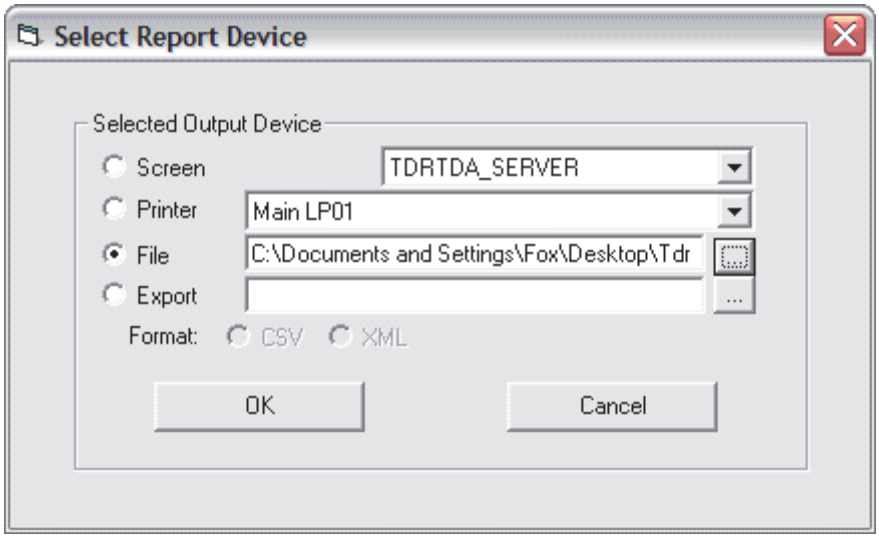


Figure 3-22. Select Report Device Dialog Box

4. Select the output device, and click **OK**. The display you selected is generated.

To test a trigger condition:

- In the Operation Mode window (Figure 3-21), select the trigger you wish to test from the **TriggerID** drop-down menu and then click **Initiate Trip**.

  This forces the trigger to become true, and the actions that you configured in "Configuring Actions" on page 54 occur; for example, a command line executes or a configured client console receives notification that a display has been generated.

NOTE

If this trigger becomes true during your testing because of changes in actual process variable value and/or status, the manual trigger is overridden.

5. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Viewing Events

The Events window provides a method of viewing the active events you have set up in the Configurator Client.

To view events, select the **Event List** icon in the navigation tree. The Events window opens, as shown in Figure 3-23, which displays a list of events and each event's state.

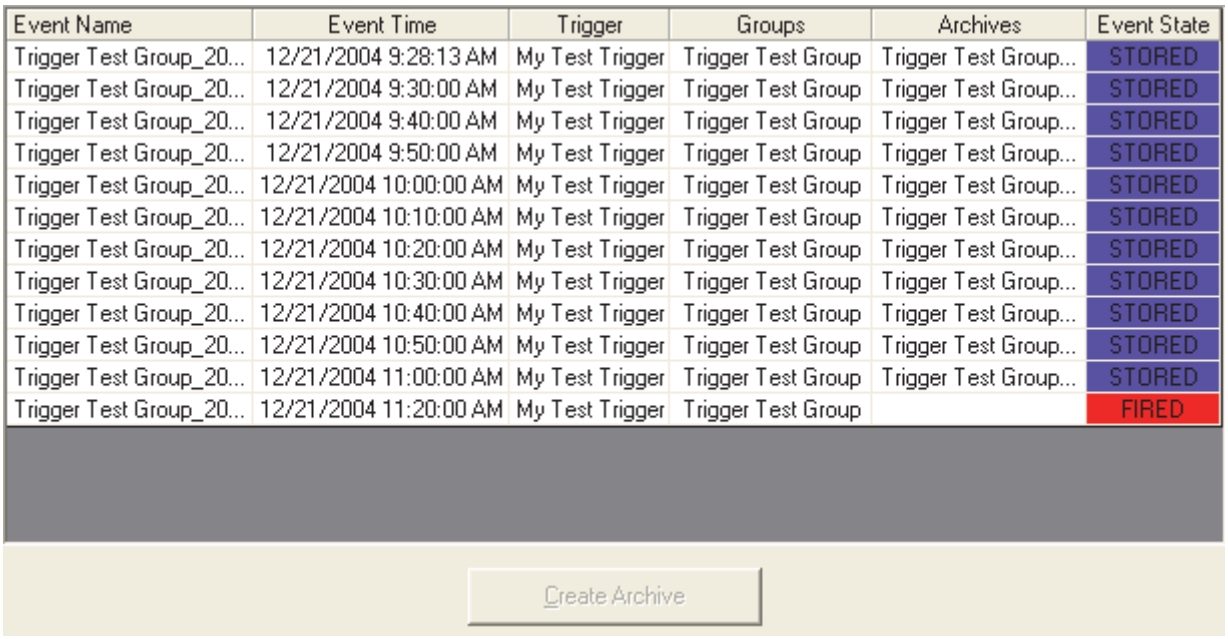


Figure 3-23. Events Window

Table 3-8 provides a description of the fields in the Events window.

Table 3-8. Events Window Descriptions

Window Field/Button	Description
Event Name	The event name. The name is a combination of the group name and the date and time (<*group name*>_<*yyyymmdd*>_<*hhmmss*>).
Event Time	The time the event occurred.
Trigger	The name of the trigger that initiated this event.
Groups	The name of the group from which the event occurred.
Archives	The name of the archive file that is created after the event occurs and the post-trip time has passed.
Event State	Events can exist in the following states: ♦ **Stored** – The data from a triggered event is stored in the archive shown in the archive column. ♦ **Ready** – The trigger configured for this event has become true, the post-trip time has elapsed, and the event is saved in the buffer. ♦ **Fired** – The trigger configured for this event has become true, and the configured post-trip time has not elapsed.
Create Archive	Creates an archive of the selected event.

Saving the Configuration

The TDR/TDA **File** > **Save As** menu item, located in the Configurator Client main menu bar, saves an existing TDR configuration for use on another workstation.

NOTE

Prior to saving the configuration, keep in mind that configuring multiple clients to be served by the same FCM100Et or FCP270 can result in the loss of data. To prevent loss of data and to maintain the least amount of burden on a single FBM, it is best to have single client connections to each FBM. If both TDR and SOE are to collect data from the same FBM, it is recommended that they use the same HSDAI. Refer to the note on page 6 for more information.

Perform the following steps to save a TDR/TDA configuration:

1. Select **File** > **Save As** from the Configurator Client main menu bar.

   A dialog box appears.

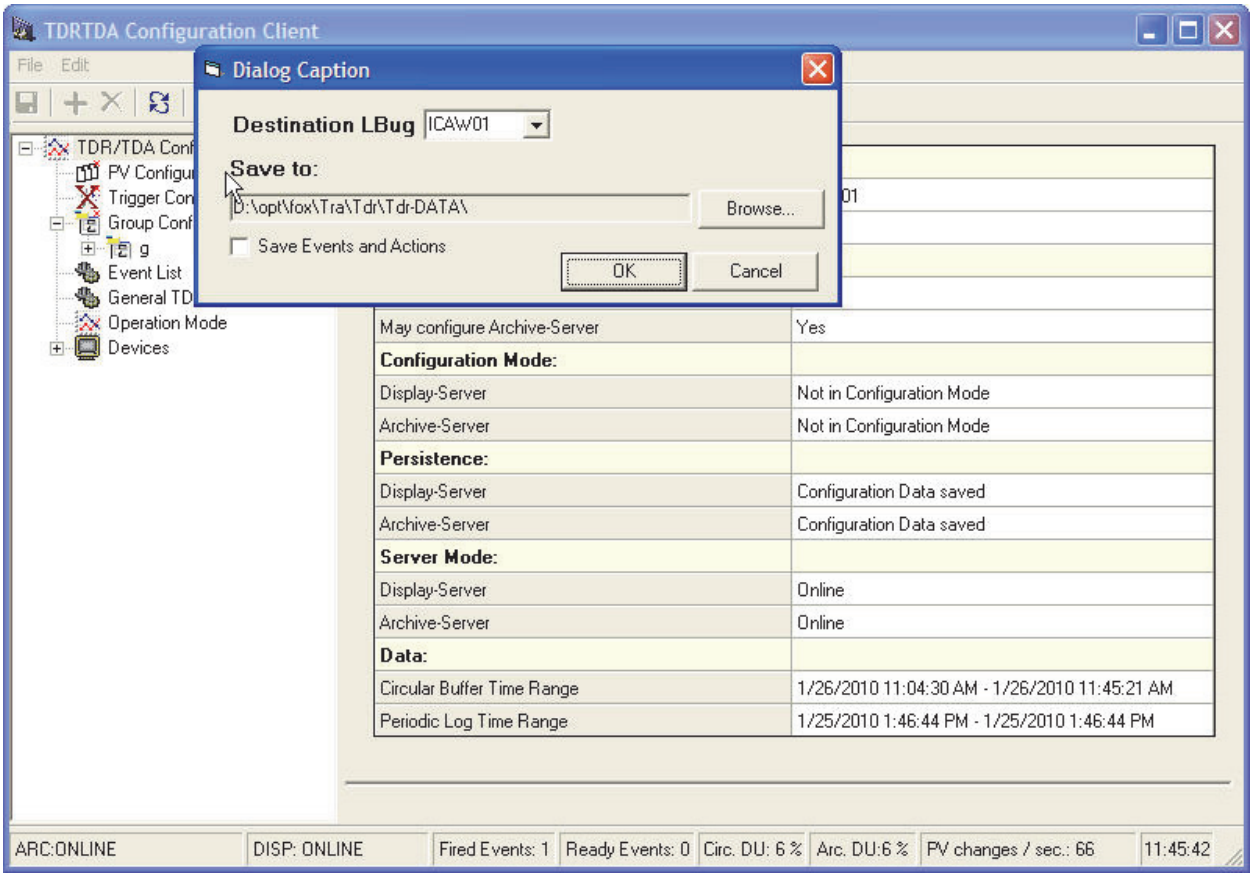


Figure 3-24. TDR/TDA Configuration Client Save As Feature

2. Enter the letterbug of the station to which you want to move the configuration.

   If the station is currently in the system, use the **Destination LBug** drop-down list to select the target station. If you are moving the configuration to a station that is not currently in the system, type a different letterbug name in the **Destination LBug** text box.

3. Configure the folder where you want the new files to be stored in the **Save to** field. Use the **Browse** button to select a folder.
4. If desired, check **Save Events and Actions**. When this selection is checked, all the events, actions, and archives will also be copied to the destination folder.

— NOTE

If there are a large number of archives or the archives are very large in size, the save operation will take a long time and consume a lot of disk space.

5. Click **OK**.

To use the new configuration on a new server:

1. Shut down the ArcServer and DispServer servers from the Control Panel applet on the computer that will become the new server station.
2. Move the existing **Config** and **Archives** folders located in **D:\opt\fox\Tra\Tdr\Tdr-Data** to a safe location, and then copy the new **Config** and **Archives** folders (if present) to the **D:\opt\fox\Tra\Tdr\Tdr-Data** directory on the new server.

4. Using the TDR/TDA Operator Client

This chapter provides a description of the options in the TDR/TDA Operator Client and describes the procedures to generate logs and reports, archive data, and manually trigger events.

Overview

After the process engineer has configured TDR/TDA using the Configurator Client, use the Operator Client to perform the following associated activities:

- View or print a configured display of transient data on a specific monitor or printer.
- Manually create Transient Data Archives.
- Manually initiate trigger events.

The Operator Client is designed for use with touch screen or a mouse pointing device. Descriptions of the elements in the user interface are available in "TDR/TDA Operator Client Window" on page 66.

Before performing any operator tasks, click the appropriate combination of "Show" buttons in the Operator window (Figure 4-1), to navigate to the information you want to analyze.

NOTE

Both servers must be in the ONLINE mode to manually initiate trips and generate displays. To switch modes, use the `File` > `Set Configuration Mode` menu selection.

TDR/TDA Operator Client Window

The Operator Client window appears as shown in Figure 4-1.

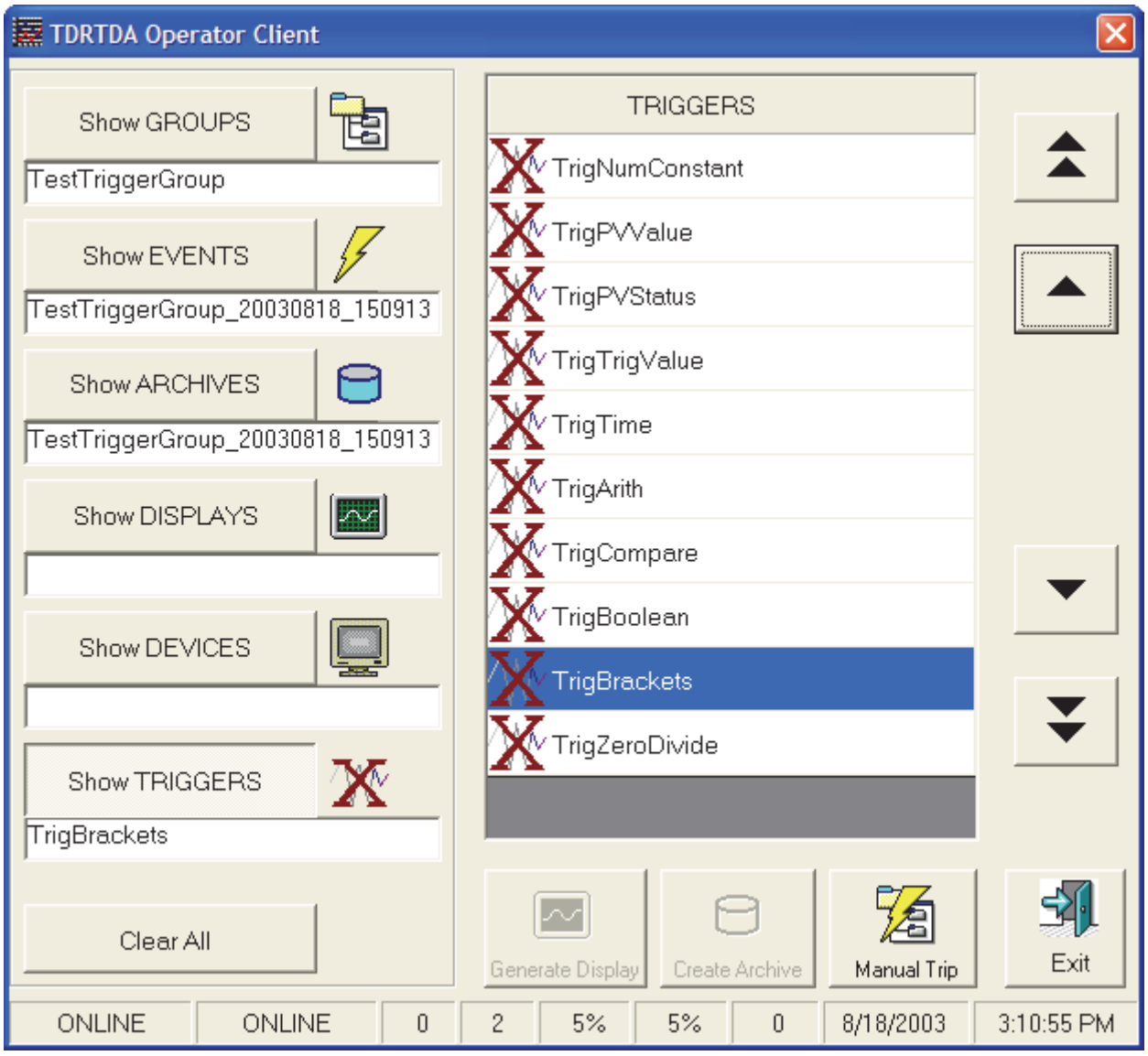


Figure 4-1. Operator Window

Refer to Table 4-1 for a description of the buttons that appear on the main Operator Client window.

NOTE

You must select a Group prior to selecting items within the group.

Table 4-1. Operator Buttons

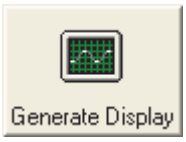
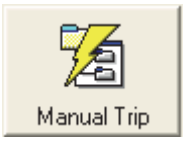
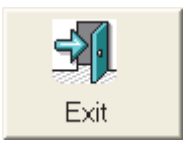
Button	Description
	Displays the groups that have been configured using the Configurator Client. You cannot generate a display for a group that does not have any displays configured within it.
	Displays events that have occurred within the selected group.
	Displays the archives that have been generated for the selected group.
	Displays the available displays configured with the Configurator Client for the selected group.
	Displays the available output devices configured with the Configurator Client for the selected group.
	Displays the available triggers configured with the Configurator Client for the selected group.
	Clears all fields in the client window, allowing you to make new selections.
	The Auto Action button is visible only if a display that has been configured to be automatically generated is waiting to be opened. When you click this button, the configured action occurs (that is, the display appears).
	Opens a display or generates a report depending on which display and device you select. The default output device is your monitor. All displays (except the real-time display) also require you to select an archive.
	Creates an archive for the currently selected group and event. The archive is given the same name as that of the selected event.
	Generates a manual trip (event) for the currently selected trigger.
	Exits the Operator Client.

Table 4-1. Operator Buttons (Continued)

Button	Description
	Navigates to the top of the list.
	Navigates to the previous item.
	Navigates to the next item.
	Navigates to the bottom of the list.

Status Bar

The status bar, which appears at the bottom of the Operator Client window, is shown in Figure 4-2.

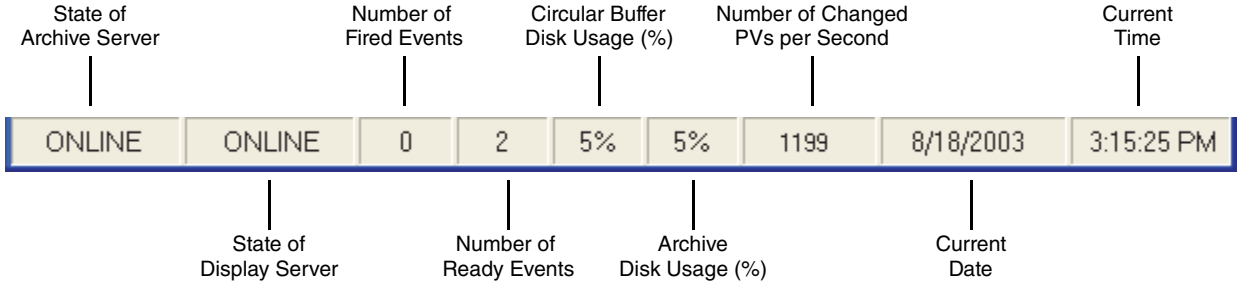


Figure 4-2. Status Bar Information

The status bar displays the following information:

- Server configuration modes – displays the state of the two Transient Data servers: the Archive server and the Display server. The Archive server is the software component responsible for reading and writing Transient Data Archive files and for trigger detection and processing. The Display server is the software component responsible for automatic event actions and display/report management. The possible states for the two servers are:
  - None – unknown server state
  - OFFLINE – server is running but not configured
  - CONFIGURATION – server is running and in configuration mode
  - ONLINE – server is running, configured, and on-line (that is, the server has established a connection to external devices).

  The example in Figure 4-2 shows that the archive server and the display server are both on-line.

- Number of fired events – the number of events corresponding to a trigger that has just become true and the post-trip time has not elapsed yet. (The event is waiting for TDR to collect appropriate data during the post-trip time.)
- Number of ready events – the number of configured events that are saved in the display server after the post-trip time has elapsed, but have not been saved to an archive.
- Buffer disk use in percent – the percentage of hard disk's resources that the buffer task is using
- Archive disk use in percent – the percentage of hard disk's resources that the archive task is using
- Number of changed PVs per second – the average rate at which the software gathers and stores process variables
- Current date – displays the date.
- Current time – displays the current local time.

Using the TDR/TDA Operator Client

This section describes the functions you can perform from the Operator Client environment.

Generating Displays, Logs, and Reports

You can generate displays, logs, and reports by selecting a combination of buttons in the Operator Client.

To generate a display, log, or report, perform the following steps:

1. Click **Show GROUPS**, and the list box on the right pane of the Operator Client window displays a list of all groups that have been configured using the Configurator Client.
2. Select a group from the list box. The group you select must have at least one display associated with it. The name of the group you select appears in the field below the Show Groups button.
3. Click **Show DISPLAYS**, and the list box on the right pane of the Operator Client window now shows all the displays configured for the selected group.
4. Select a display from the list box, and the name of the display appears in the field below the Show Displays button.
5. Click **Show ARCHIVES**, and the list box on the right pane of the window shows all the archives for the configured group.
6. Select an archive from the list box. The name of the archive appears in the field below the **Show ARCHIVES** button.
7. Click **Show DEVICES**, and the list box on the right pane of the window shows all the output devices configured for the selected group.

8. Select an output device from the list box. Its name appears below the **Show DEVICES** button.

— NOTE

Selecting an output device is optional. If no output device is selected, the output appears on the screen of the workstation running the TDR/TDA software.

9. Click **Generate Display**. Note that the output device you configured for this display appears under the Show Devices button. The display is sent to the selected device; either a printer or a console client.
10. If you want to clear all fields, click **Clear All**.

Creating Archives

To create an archive, perform the following steps:

1. Click **Show GROUPS**, and the list box on the right pane of the Operator Client window displays a list of all groups that have been configured using the Configurator Client.
2. Select a group from the list box. The group you select must have at least one event associated with it. The name of the group you select appears in the field below the Show Groups button.
3. Click **Show EVENTS**, and the list box on the right pane of the Operator Client window displays a list of all events that are currently stored in the circular buffer.
4. Select an event from the list box. The group you select must have at least one display associated with it.

   The name of the event you select appears in the field below the Show Events button, and the names of the group and trigger associated with the event appear under their respective buttons.

— NOTE

You can create an archive only if the event is in the ready state.

5. Click **Create Archive**. If an archive for the selected event has already been created, this button is not active.

   An archive based on the event and trigger is created and stored in the archive directory. The archive appears in the Operator Client's main window, and is given a name based on the group, date, and time associated with it.

— NOTE

If you shut down the TDR/TDA software, the Transient Data Circular Buffer and Periodic Log Buffers are cleared. This means that any active trips and/or events which have not been saved to a Transient Data Archive are lost.

6. If you want to clear all fields, click **Clear All**.

Manually Triggering an Event

You can manually trigger an event by selecting a group and the trigger.

To trigger an event manually by selecting a trigger, perform the following steps:

1. Click **Show Groups**, and the list box on the right pane of the Operator Client window displays a list of all groups that have been configured using the Configurator Client.
2. Select a group from the list box. The group you select must have at least one trigger associated with it.

   The name of the group you select appears in the field below the Show Groups button.
3. Click **Show Triggers**, and the list box on the right pane of the Operator Client window displays a list of all the triggers that have been configured using the Configurator Client.
4. Select a trigger from the list box.

   The name of the trigger you select appears in the field below the Show Triggers button.
5. Click **Manual Trip**. This forces the trigger logic to become true. When the software detects that the trigger has become true, TDR/TDA continues monitoring the configured data from the trigger's associated group and storing it in the circular buffer until the group's post-trip time elapses.
6. If you want to clear all fields, click **Clear All**.

— NOTE

Manually initiated triggers do not prevent the proper operation of automatic triggers; automatic trips always overrule manual trips. If this trigger becomes true because of process variable changes and so forth, the manual trigger is overridden.

For descriptions of the displays, reports, and logs that you can view using the Operator Client, refer to Chapter 6 "Reports and Logs".

5. Configuring DCOM for Foxboro SOE Server Hosted on Windows Secure Foxboro Evo Systems

This chapter describes the procedures to configure DCOM for Foxboro SOE server that is hosted on a Windows Secure Foxboro Evo System.

You must configure the DCOM Security on the SOE server machine for the SOE Client to operate correctly in the operator login. The SOE Client connects to a remote SOE server on a Windows workstation through the Ethernet interface using DCOM. The following sections describe the procedures that must be performed before connecting the SOE Client in operator login to the remote SOE server.

Required Procedures for Foxboro SOE Server Running on Windows Server 2003

You must add a distributed COM users group to the Foxboro SOE Server and then add an operator account to the group.

These procedures are also applicable to Foxboro SOE Server running on Windows Server 2008 R2, but may vary slightly.

Adding Distributed COM Users Group to Foxboro SOE Server

To add a distributed COM users group, you must use the Windows® dcomcnfg utility. Proceed as follows:

1. On the Start menu, select **Run**.

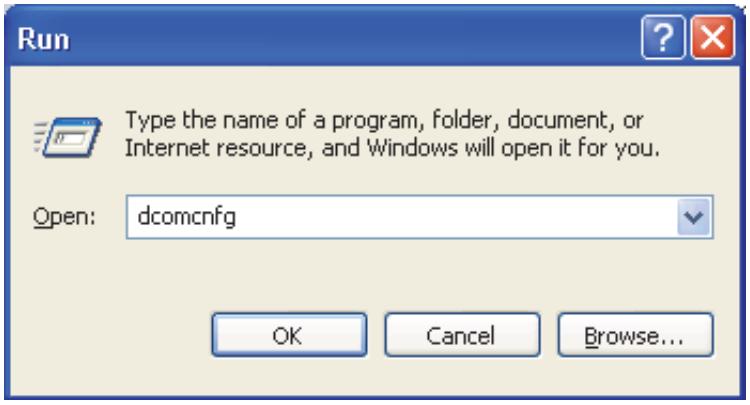


Figure 5-1. Run Dialog Box

2. In the **Open** box, enter `dcomcnfg` and then click **OK**. The **Component Services** dialog box is displayed.

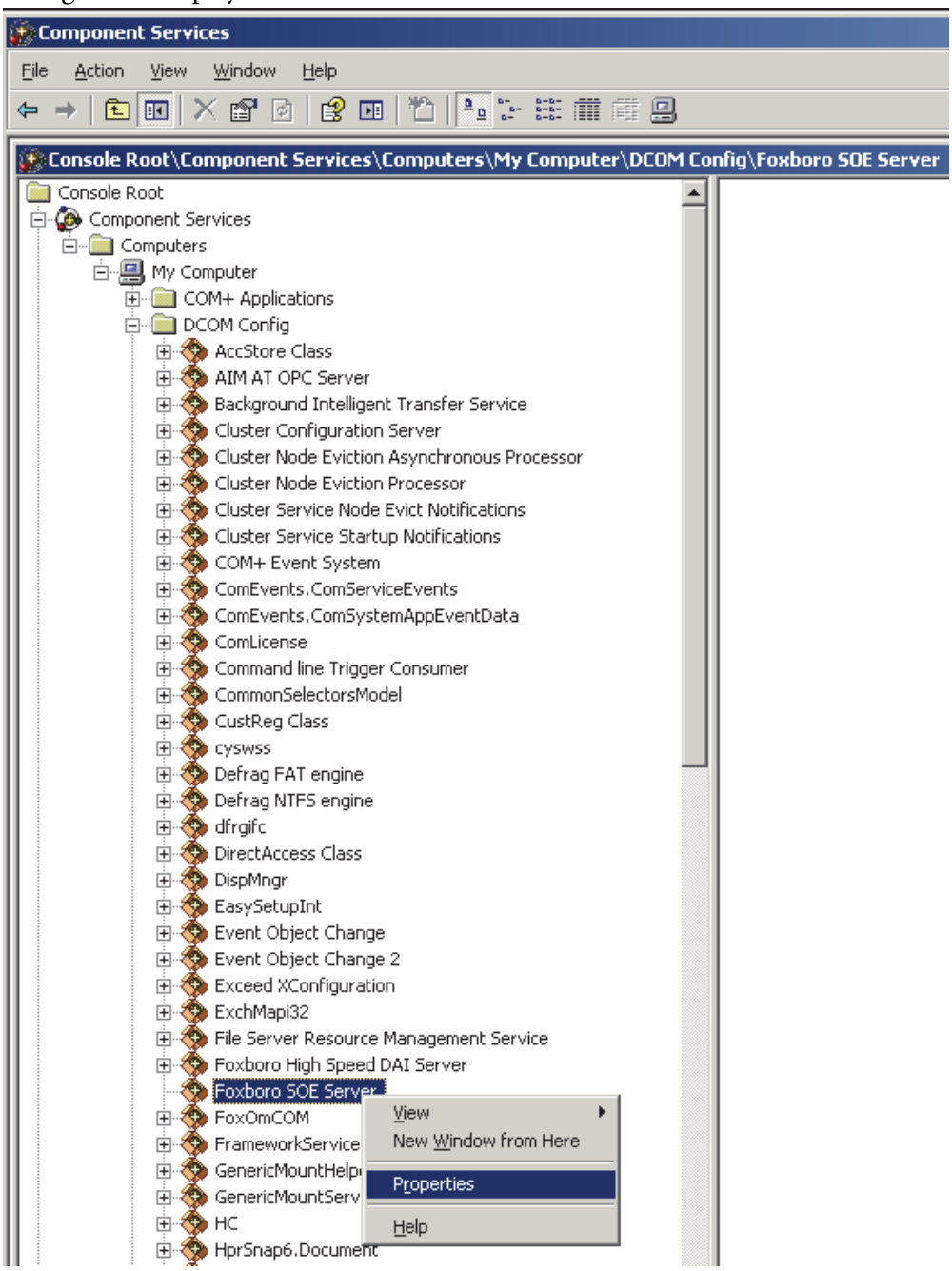


Figure 5-2. Component Services Dialog Box

3. Select **Console Root > Component Services > Computers > My Computer > DCOM Config > Foxboro SOE Server.**

4. Right-click **Foxboro SOE Server** and select **Properties** from the context item. The **Foxboro SOE Server Properties** dialog box is displayed.

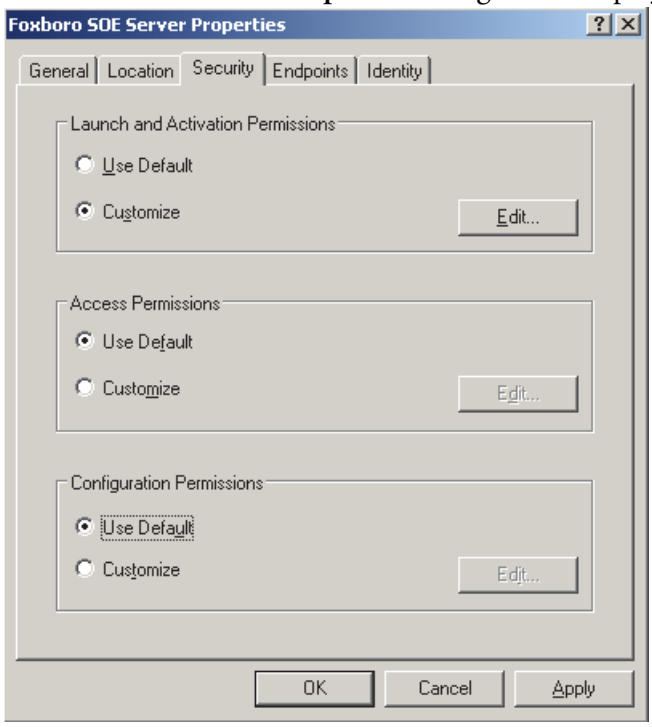


Figure 5-3. Foxboro SOE Server Properties Dialog Box

5. Click the **Security** tab.
6. Under **Launch and Activation Permissions**, select **Customize** and then click **Edit**. The **Launch Permission** dialog box is displayed.

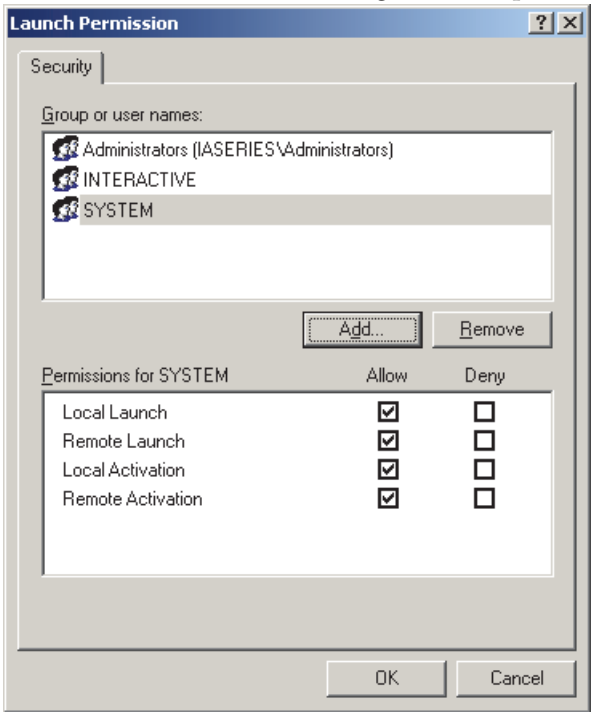


Figure 5-4. Launch Permission Dialog Box

7. Click **Add**. The **Select Users, Computers, or Groups** dialog box is displayed.

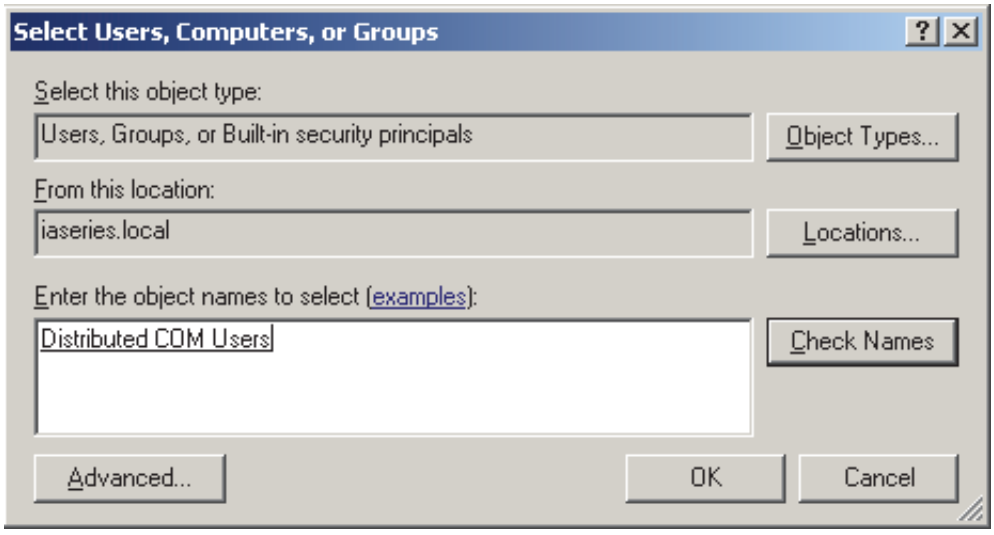


Figure 5-5. Select Users, Computers, or Groups Dialog Box

8. In the **Enter the object names to select** box, enter Distributed COM Users.
9. Click **Check Names** and the click **OK**. A new object is added.

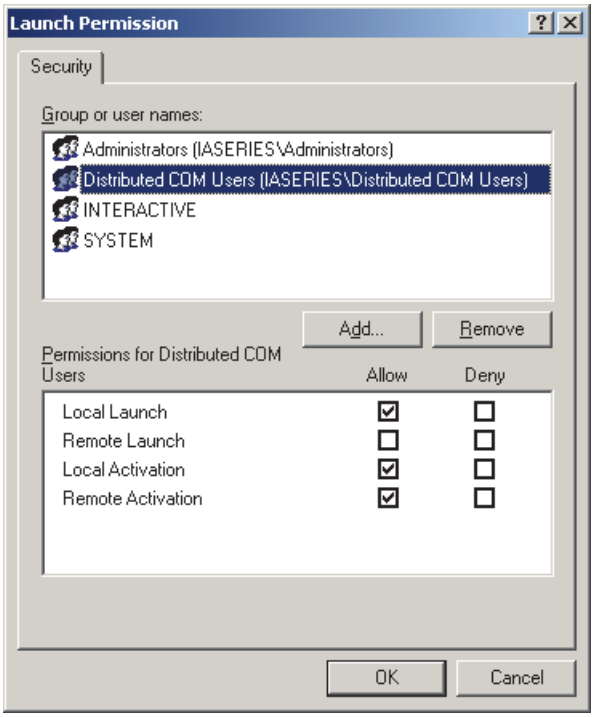


Figure 5-6. Adding Distributed COM Users

10. Under **Group or user names**, select **Distributed COM Users (IASERIES\Distributed COM Users)**.
11. Under **Permissions for Distributed COM Users**, click **Allow** for **Local Launch**, **Local Activation**, and **Remote Activation**.
12. Click **OK**. The **Foxboro SOE Server Properties** dialog box is displayed.
13. Click **Apply** and then click **OK**.

Adding Operator Account to Distributed COM Users Group

To add an Operator account into Distributed COM Users group, proceed as follows:

1. Select **Start** > **Programs** > **Administrative Tools** > **Active Directory Users and Computers**.

   You may need to scroll down to view the **Active Directory Users and Computers** menu command.

   The **Active Directory Users and Computers** dialog box is displayed.

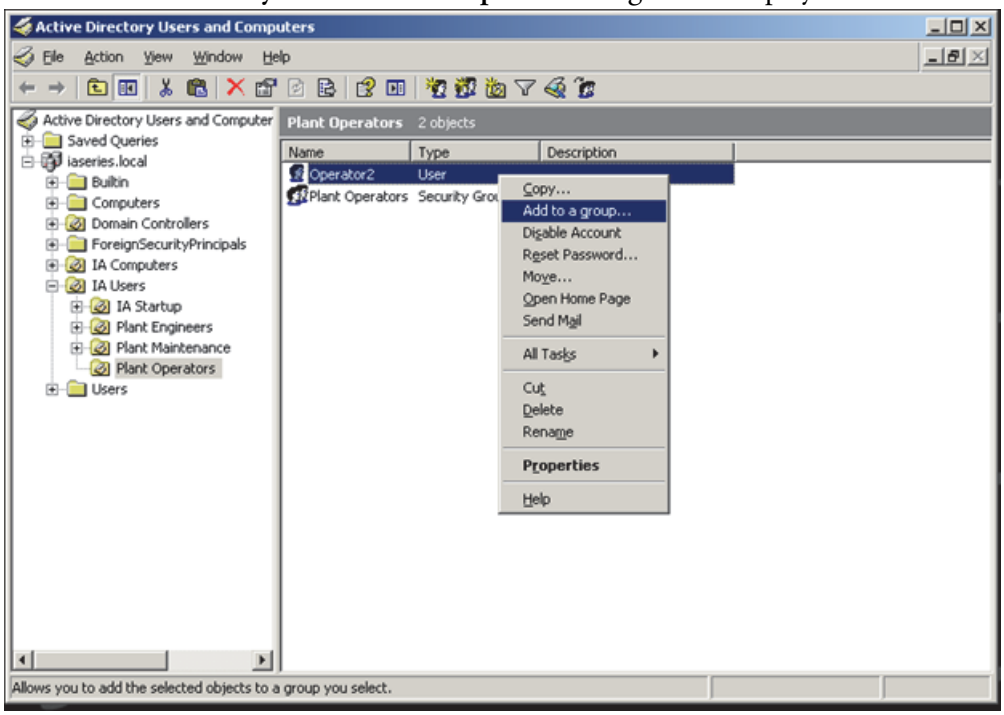


Figure 5-7. Active Directory Users and Computers Dialog Box

2. Select **iaseries.local** > **IA Users** > **Plant Operators**. The **Plant Operators** are displayed in the right pane.
3. Right-click **Operator** account and select **Add to a group...** from the context menu. The **Select Group** dialog box is displayed.

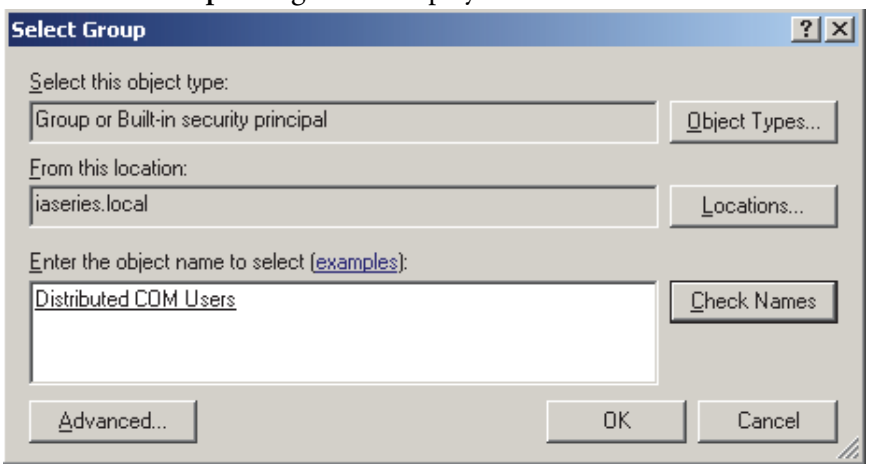


Figure 5-8. Select Group Dialog Box

4. In the **Enter the object names to select** box, enter Distributed COM Users.
5. Click **Check Names** and the click **OK**. A new operator account is added.

Required Procedure for Foxboro SOE Server Running on Windows XP

This section describes the procedure to add an operator account to Foxboro SOE Server running on Windows XP. The procedure is also applicable to Foxboro SOE Server running on Windows 7, but may vary slightly.

Adding Operator Account to Foxboro SOE Server

To add an operator account, you must use the Windows® dcomcnfg utility. Proceed as follows:

1. On the Start menu, select **Run**.

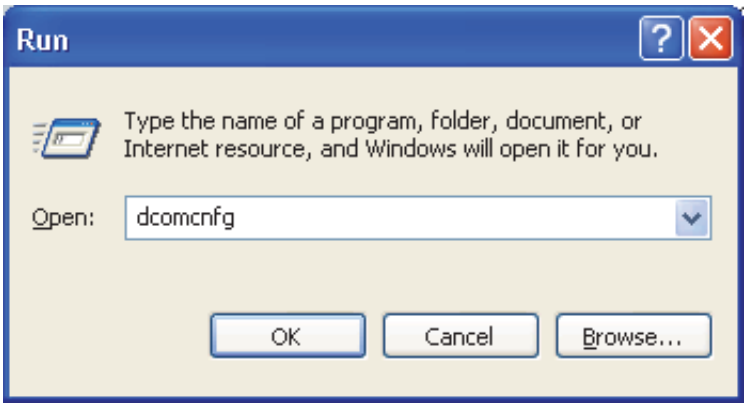


Figure 5-9. Run Dialog Box In Windows XP

2. In the **Open** box, enter `dcomcnfg` and then click **OK**. The **Component Services** dialog box is displayed.

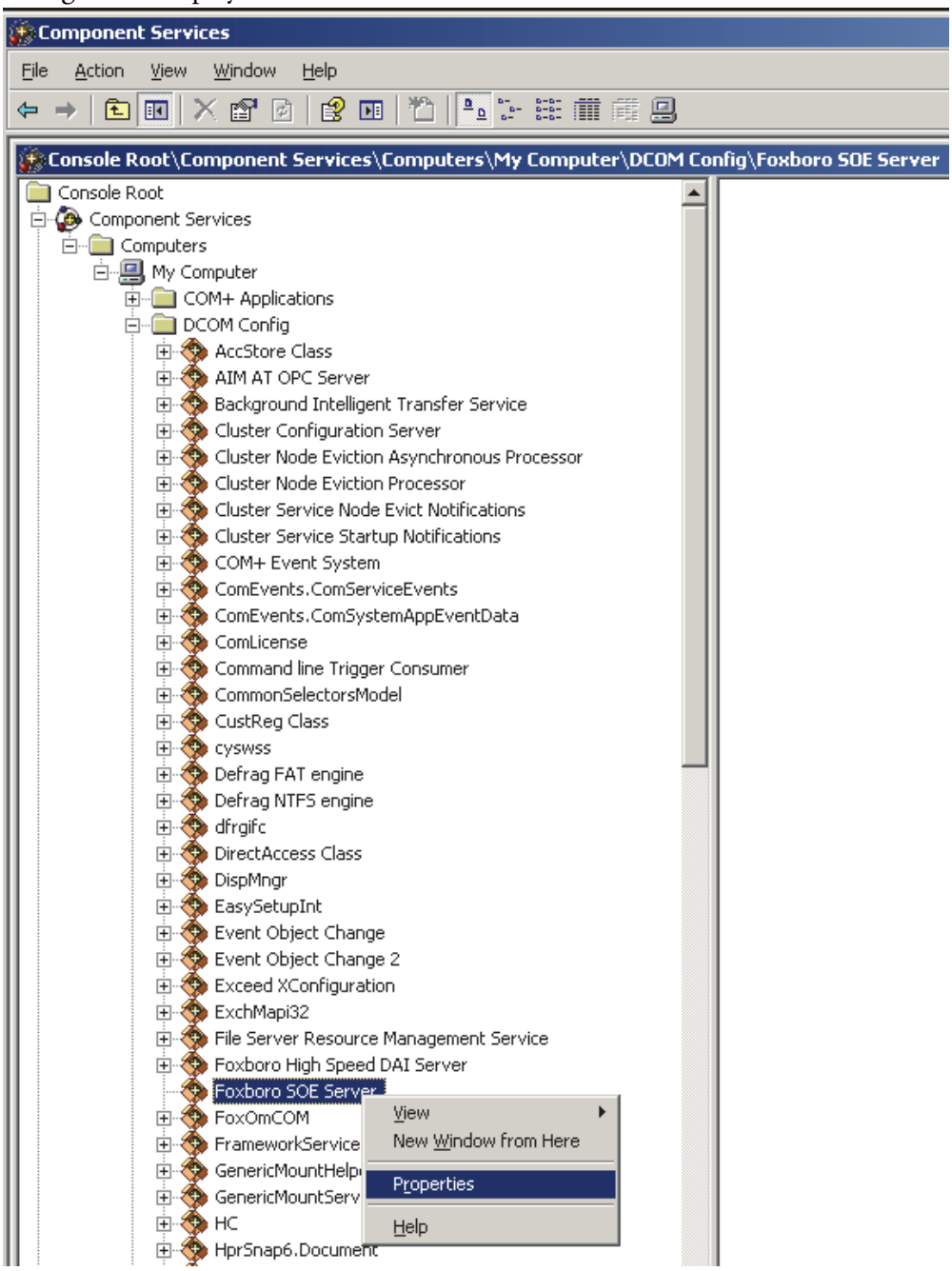


Figure 5-10. Component Services Dialog Box

3. Select **Console Root** > **Component Services** > **Computers** > **My Computer** > **DCOM Config** > **Foxboro SOE Server.**

4. Right-click **Foxboro SOE Server** and select **Properties** from the context item. The **Foxboro SOE Server Properties** dialog box is displayed.

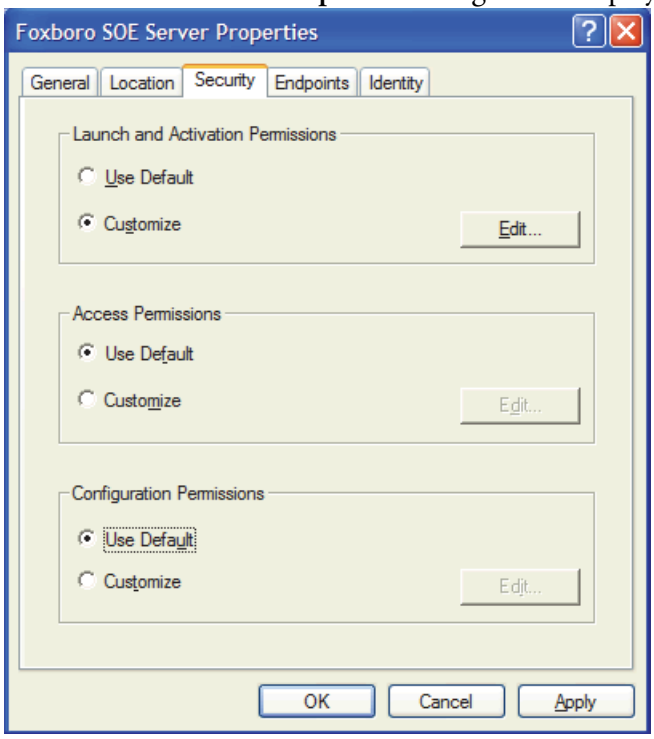


Figure 5-11. Foxboro SOE Server Properties Dialog Box In Windows XP

5. Click the **Security** tab.
6. Under **Launch and Activation Permissions**, select **Customize** and then click **Edit**. The **Launch Permission** dialog box is displayed.

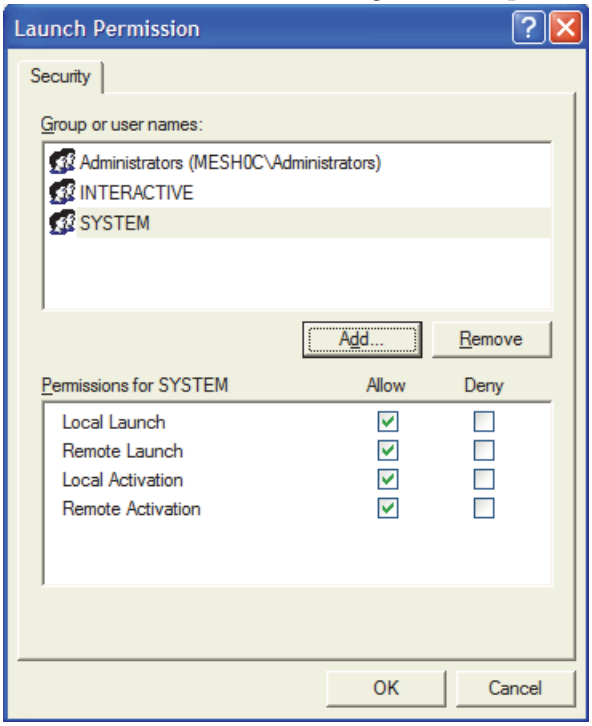


Figure 5-12. Launch Permission Dialog Box In Windows XP

7. Click **Add**. The **Select Users, Computers, or Groups** dialog box is displayed.

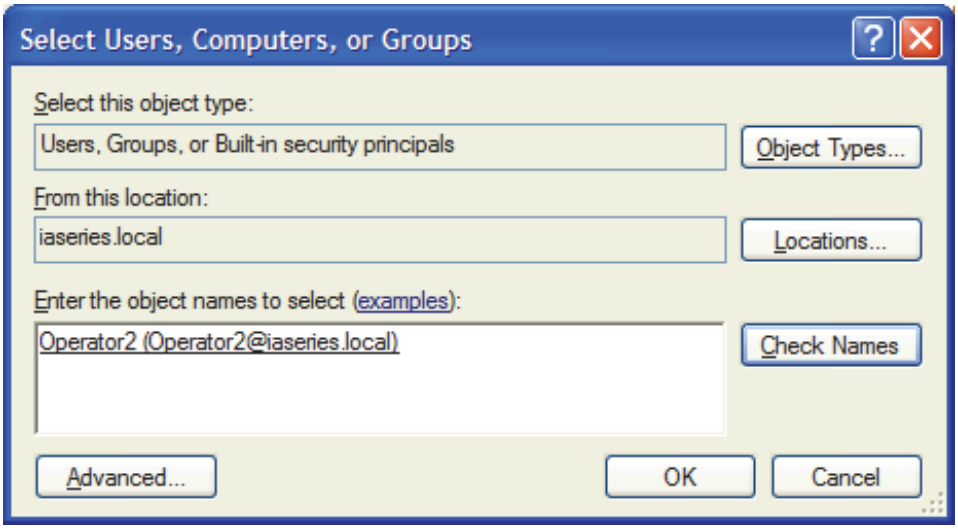


Figure 5-13. Select Users, Computers, or Groups Dialog Box In Windows XP

8. In the **Enter the object names to select** box, enter the operator account.
9. Click **Check Names** and the click **OK**. A new operator account is added.

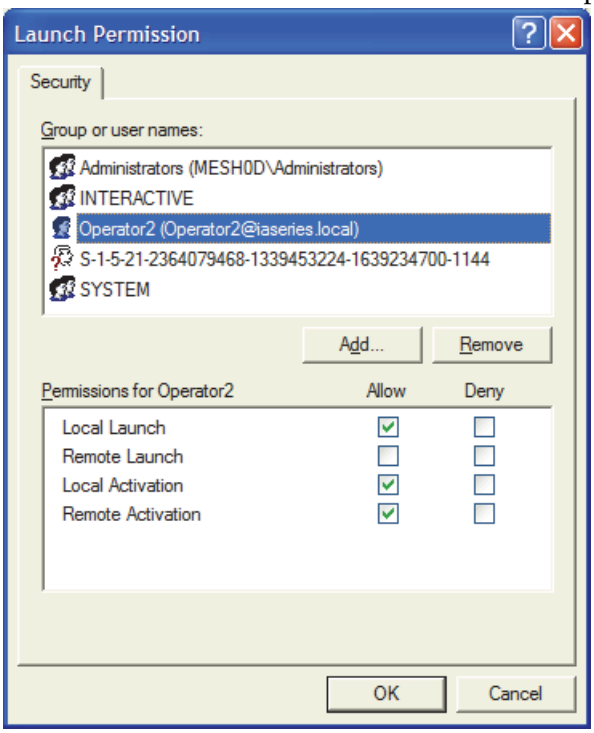


Figure 5-14. Adding Operator Account

10. Under **Group or user names**, select **Operator2 (Operator2@iaseries.local)**.
11. Under **Permissions for Operator2**, click **Allow** for **Local Launch**, **Local Activation**, and **Remote Activation**.
12. Click **OK**. The **Foxboro SOE Server Properties** dialog box is displayed.
13. Click **Apply** and then click **OK**.

6. Reports and Logs

This chapter describes the various logs and reports generated by the TDR/TDA application, and provides procedures to setup, modify, and export these reports and logs.

Overview

All logs, reports, trends, and plots that the TDR/TDA software can generate are called displays. Displays organize and present information so that you can analyze transient data easily; for example, you can determine the cause of a plant disturbance or monitor various plant subsystems during plant maneuvers and tests.

For most display types, you can view the output on a screen, send the display to a configured printer, save the display to a text file, or export the display to a CSV or XML file format. The only exception is the real-time trend display. There is no printed output available for a real-time display; it only displays on-screen.

You can view or print reports generated by the TDR/TDA software from any workstation with the transient data client software installed, whether the workstation is part of the control network or on the enterprise network.

Refer to the following sections for detailed descriptions of screen displays, reports, logs, trends, and plots, and the procedure to configure and generate each type:

- "Transient Data Report" on page 85
- "Statistical Summary Report" on page 89
- "Tabular Trending Report" on page 92
- "Tabular Plot" on page 94
- "Two Function Plot" on page 97
- "Trip/Scram Log" on page 99
- "Turbine/Generator Log" on page 102
- "Periodic Logs" on page 106
- "Real-Time Displays and Trends" on page 110 (no printed output available)
- "Sequence of Events Report" on page 113.

Adding and Configuring Displays

Following are some general procedures to add and configure displays. Depending on the display with which you are working, these procedures may vary.

— NOTE

You must be in the Configurator Client environment to add and configure displays. To switch modes, use the **`File`** > **`Set Configuration Mode`** menu selection.

Adding a New Display

To add a new display to a configured group, perform the following steps:

1. Select a group from the navigation tree and then select the **Displays** icon.
2. Right-click **Displays** and click **Add Display** from the popup menu.

   The New Display dialog box opens (Figure 6-1).
3. Select a display type, enter a display name, and click **OK**.

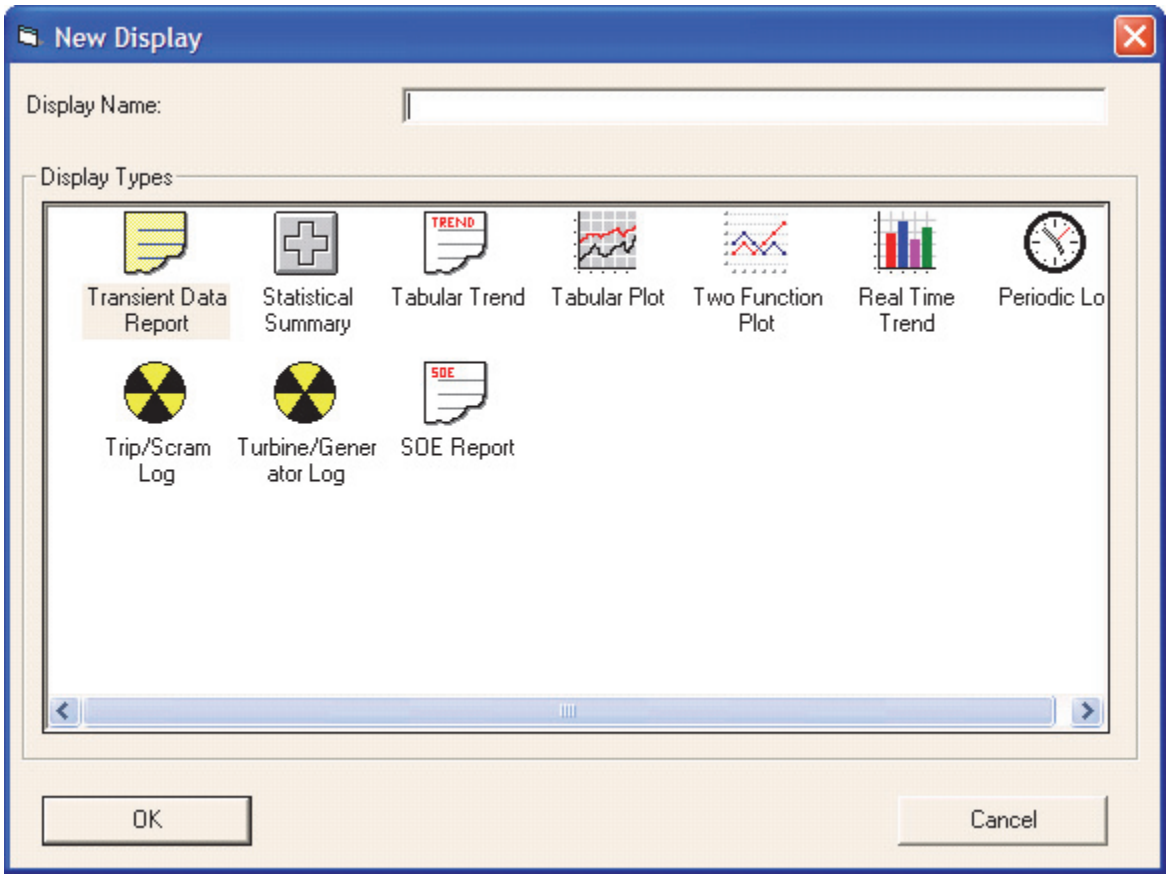


Figure 6-1. New Display Dialog Box

4. Select the new display, and configure it using the display configuration window that appears on the right pane of the TDR/TDA main window.
5. Configure the display parameters and click **Apply** to save the current configuration, including the display you just configured.

   If you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

NOTE

Report field lengths are variable; if the text in a field exceeds the column width, a carriage return is inserted automatically. To get a proper column-oriented page layout, do not allow the text in the report fields to exceed the column width when you are configuring the report.

General Configuration of Display Output

When you add a new display to a group and begin to configure it, you must select an output device. The following options may be available, depending on the display type:

- **`Screen`** – select this option to display the report or log on a console's monitor. Select the desired console from the drop-down list.
- **`Printer`** – select this option to print a hard copy of the report or log on a printer. Select the desired printer from the drop-down list.
- **`File`** – select this option to save the report or log to a text file on your computer, or on a network. Select the directory where you want to save the file by clicking the Browse button (**`...`**).
- **`Export`** – select this option to export the file to a specified data file format. See "Exporting Displays" on page 116.

Display Types

The TDR/TDA application supports the following display types:

- Transient Data Report
- Statistical Summary Report
- Tabular Trending Report
- Tabular Plot
- Two Function Plot
- Trip/Scram Log
- Turbine/Generator Log
- Periodic Logs
- Real Time Displays and Trends
- Sequence Of Events Report.

This section provides the procedure to configure these displays, and a sample display output.

Transient Data Report

Transient data reports show the conditions leading up to an event and the results after an event occurs. There is no limit to the number of PVs you can add. The transient data report, shown in Figure 6-3, displays the following information for the specified group:

- The date and other information related to the trigger and the event are located in the report's header.
- A snapshot of configured digital and analog transient data at the exact time the event occurred, including the name, description, engineering units (for analog PVs only), and the value (analog) or state (digital) of each PV configured as a snapshot PV.
- A historical view of sequence of events (SOE) data extracted from the circular buffer, from the beginning of the pre-trip time until the end of the configured post-trip time. This section contains an entry for every time a configured digital PV changes state, and each entry includes the time at which the digital PV changed its state, the PV's name, and the new state of the digital PV.

- A historical view of analog data. The first part of the historical analog section provides a table that associates each configured analog PV with a number, and displays the PV's name, description, and engineering units. The second part of this section contains a matrix of historical analog data extracted from the circular buffer, from the beginning of the configured pre-trip time until the end of the configured post-trip time. This section reports the values of all configured analog PVs at the specified frequency over the specified time period.

Because transient data reports list the analog and digital values from the beginning of the pre-trip time until the end of the post-trip time, a transient data report cannot be displayed or printed immediately on detection of a trigger signal. The display is sent to the configured output device after the post-trip time has elapsed. Valid output devices for transient data reports are operator screens, printers, or text, CSV, or XML files.

Transient Data Report Configuration

The transient data report format is fixed (Figure 6-3), but you can configure the report's contents, time span, and interval by performing the following steps:

1. Enter a unique title for the transient data report in the **`Title`** field.
2. Enter the desired **`Pre Trip Time (in minutes)`** and **`Post Trip Time (in minutes)`**, and the **`Interval (in milliseconds)`** at which you want historical data displayed.
3. Click **`Add Snapshot PVs`**, and enter the PVs that you want to include in the "Snapshot Data" section of the transient data report.
4. Click **`Add History PVs`**, and enter the PVs that you want to include in the "Historical Data" section of the transient data report.

— NOTE

The Snapshot PVs list can include PVs that you configured as snapshot PVs or history PVs, but the History PVs list can only include PVs that you configured as history PVs. Refer to "Adding Process Variables and Triggers to a Group" on page 50 for instructions on configuring snapshot and history PVs.

5. If you want to remove a snapshot or history PV, right-click the PV and click **`Remove PV`** from the popup menu.
6. Enter the default output device. For example, select a console on which you want to display the report, or a printer on which you want to print the report.
7. If you want to cancel your changes to the configuration and retrieve the last saved version, click **`Recall`**.
   Otherwise, click **`Apply`** to save the current configuration.

The transient data report configuration screen appears as shown in Figure 6-2.

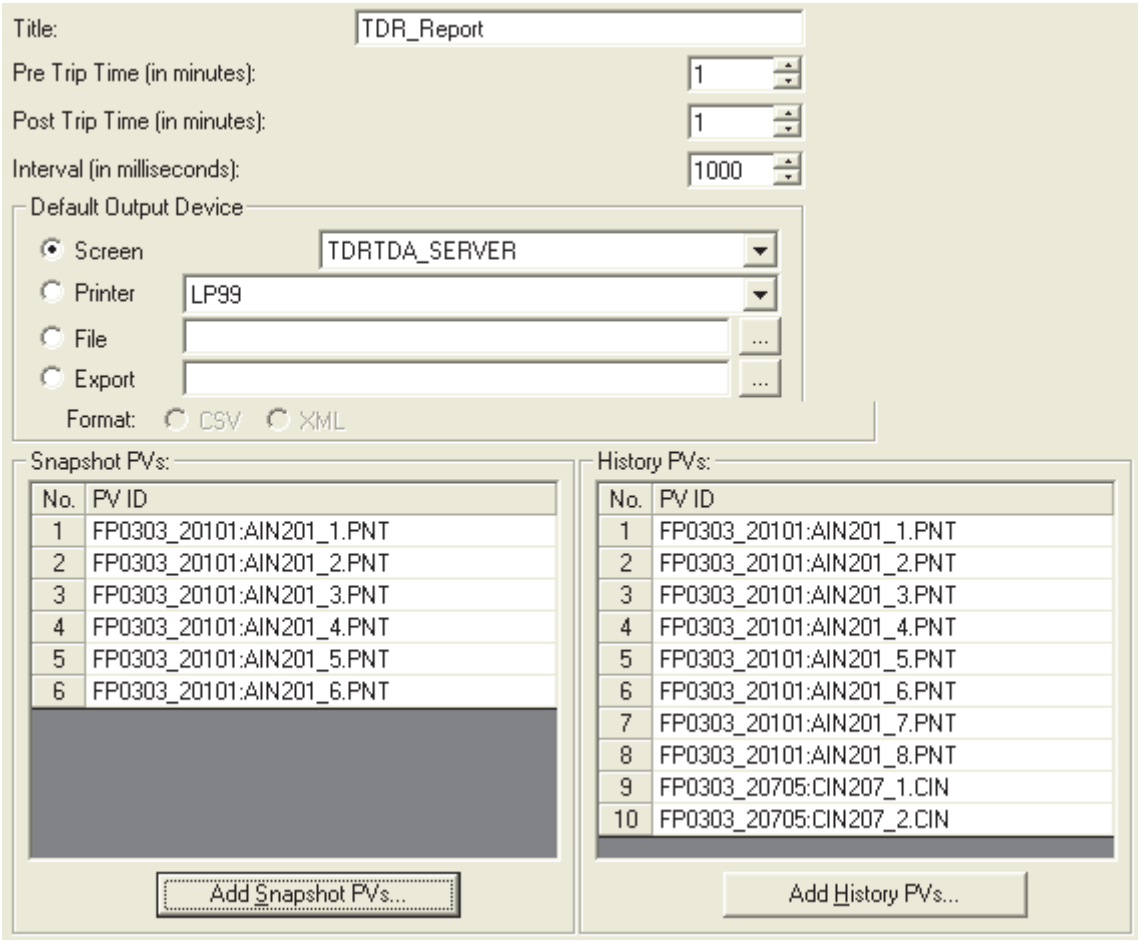


Figure 6-2. Transient Data Report Configuration

Transient Data Report Output

Figure 6-3 shows an example of a transient data report.

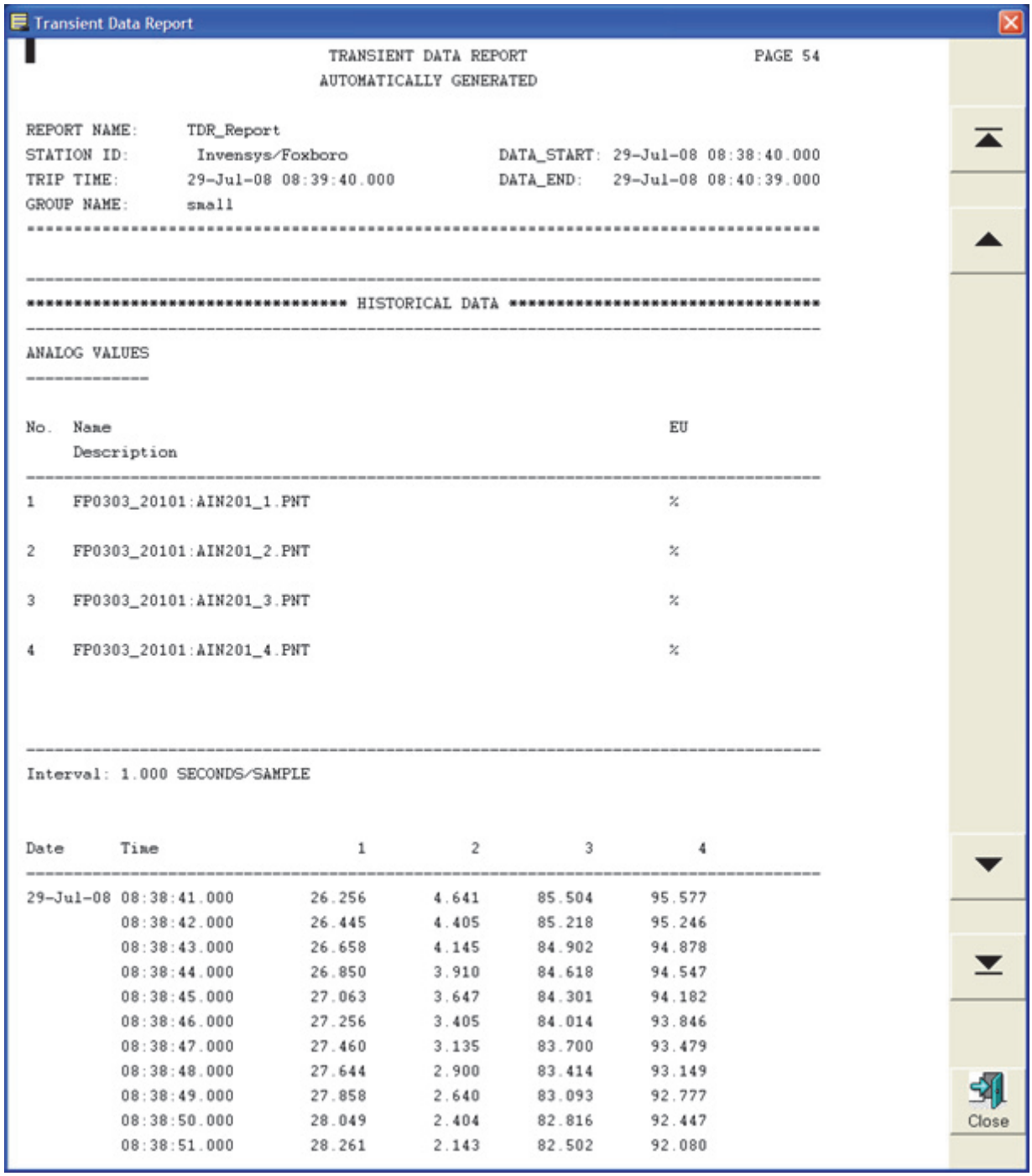


Figure 6-3. Transient Data Report Output

Statistical Summary Report

The statistical summary report, shown in Figure 6-5, is divided into sections, and each section pertains to a different historical PV. Each section contains the PV's ID, description, and engineering units, along with statistical evaluation of the variable's values over the configured time period. Statistical calculations include the minimum, maximum, mean, standard deviation, and variance.

Valid output devices for statistical summary reports are operator screens, printers, or text, CSV, or XML files.

Statistical Summary Report Configuration

The statistical summary report format is fixed, but you can configure the report's contents and time span by performing the following steps:

1. Enter a unique title for the statistical summary report in the **Title** field.
2. Enter the desired **Pre Trip Time (in minutes)** and **Post-Trip Time (in minutes)**.
3. Enter the default output device. For example, select a console on which you want to display the report, or a printer on which you want to print the report.
4. Click **Add PVs** to enter the PVs for which you want to include statistics in the report. There is no limit to the number of PVs you can add.

— NOTE

You can only use analog PVs with statistical summary reports.

5. If you want to remove a PV, right-click the PV and select **Remove PV** from the popup menu or select one or more PVs and click **Clear PV** to remove an individual or all PVs.
6. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Figure 6-4 shows the configuration screen for statistical summary input.

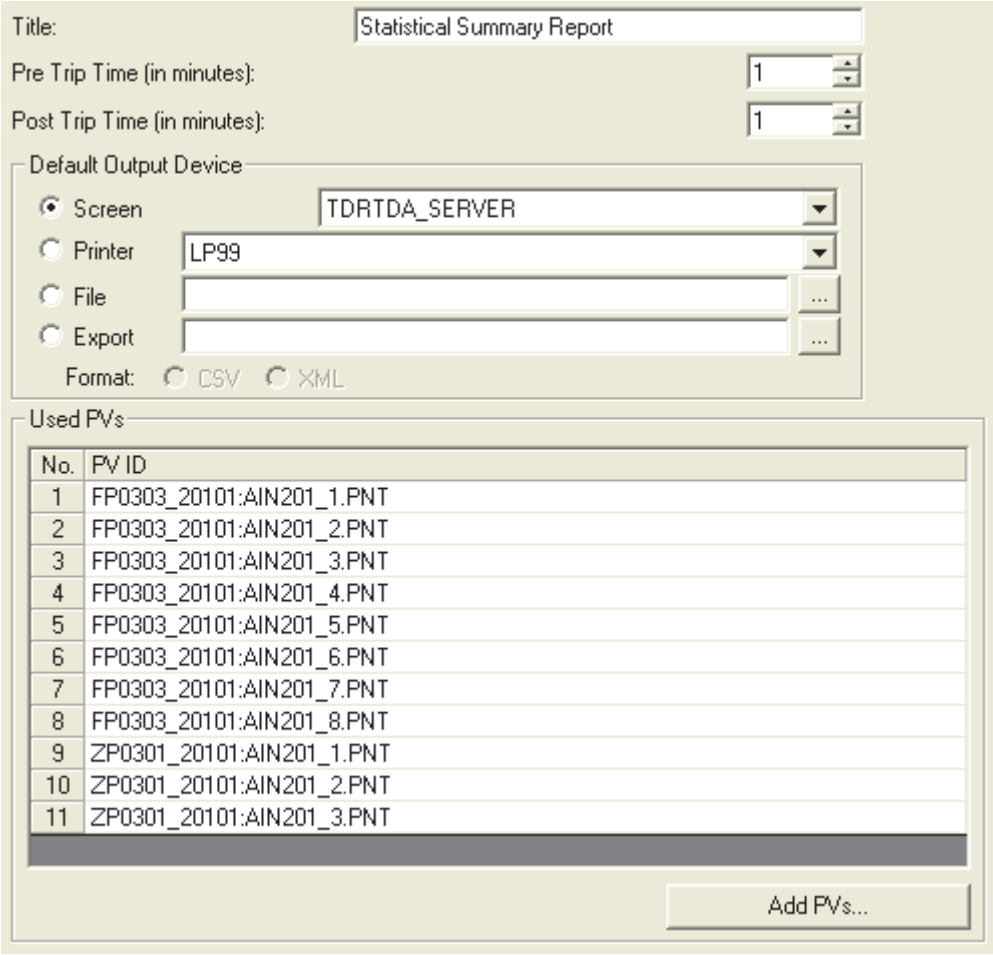


Figure 6-4. Statistical Summary Report Configuration

Statistical Summary Report Output

Figure 6-5 shows an example of a statistical summary report.

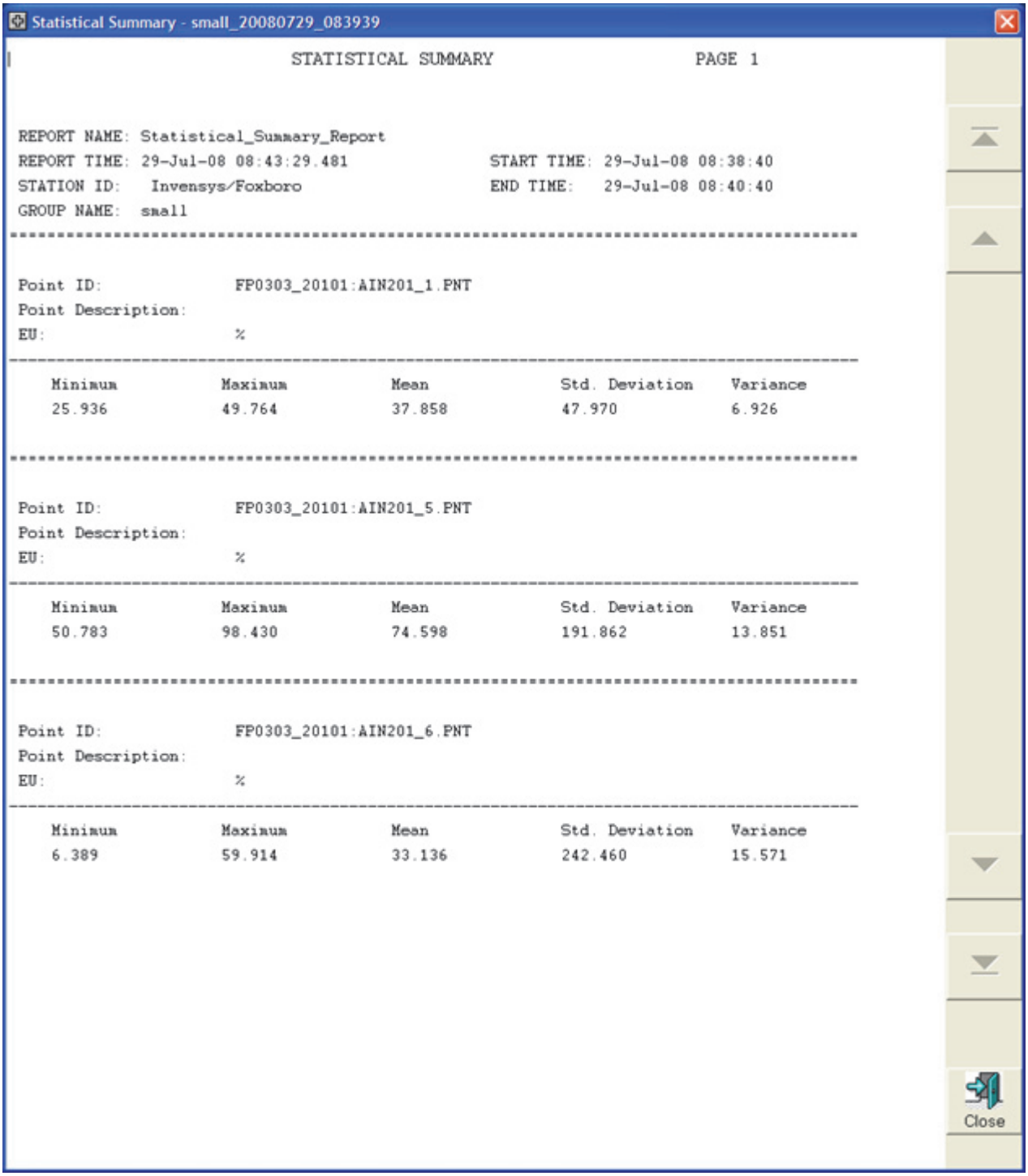


Figure 6-5. Statistical Summary Report Output

Tabular Trending Report

A tabular trending report, shown in Figure 6-7, provides a table of the values of selected process variables (up to 10) over time. The upper portion of the report summarizes and indexes each PV whose values are held in the matrix, including the PV ID, description, and engineering units for an analog PV or low and high state names for a digital PV. Each PV in this list is assigned a chronological number (1 through 4 in Figure 6-7) to make the table of data values easier to read on-screen and on a printed copy. The lower portion contains the actual table of PV values at the specified frequency over the specified time period, where column headings represent the PVs and rows represent the time intervals.

Valid output devices for tabular trending reports are operator screens, printers, or text, CSV, or XML files.

Tabular Trending Report Configuration

The tabular trending report format is fixed, but you can configure the report's contents, time span, and interval by performing the following steps:

1. Enter a unique title for the tabular trending report in the **Title** field.
2. Enter the desired **Pre-Trip Time (in minutes)** and **Post-Trip Time (in minutes)**, and the **Interval (in milliseconds)** at which you want historical data displayed.
3. Enter the default output device. For example, select a console on which you want to display the report, or a printer on which you want to print the report.
4. Click **Add PVs** to enter the PVs that you want to include in the report. You can add a maximum of 10 PVs to a tabular trending report.
5. If you want to remove a PV, right-click the PV and select **Remove PV** from the popup menu, or select one or more PVs and click **Clear PV** to remove an individual or all PVs.
6. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Figure 6-6 shows the configuration screen for tabular trending report input.

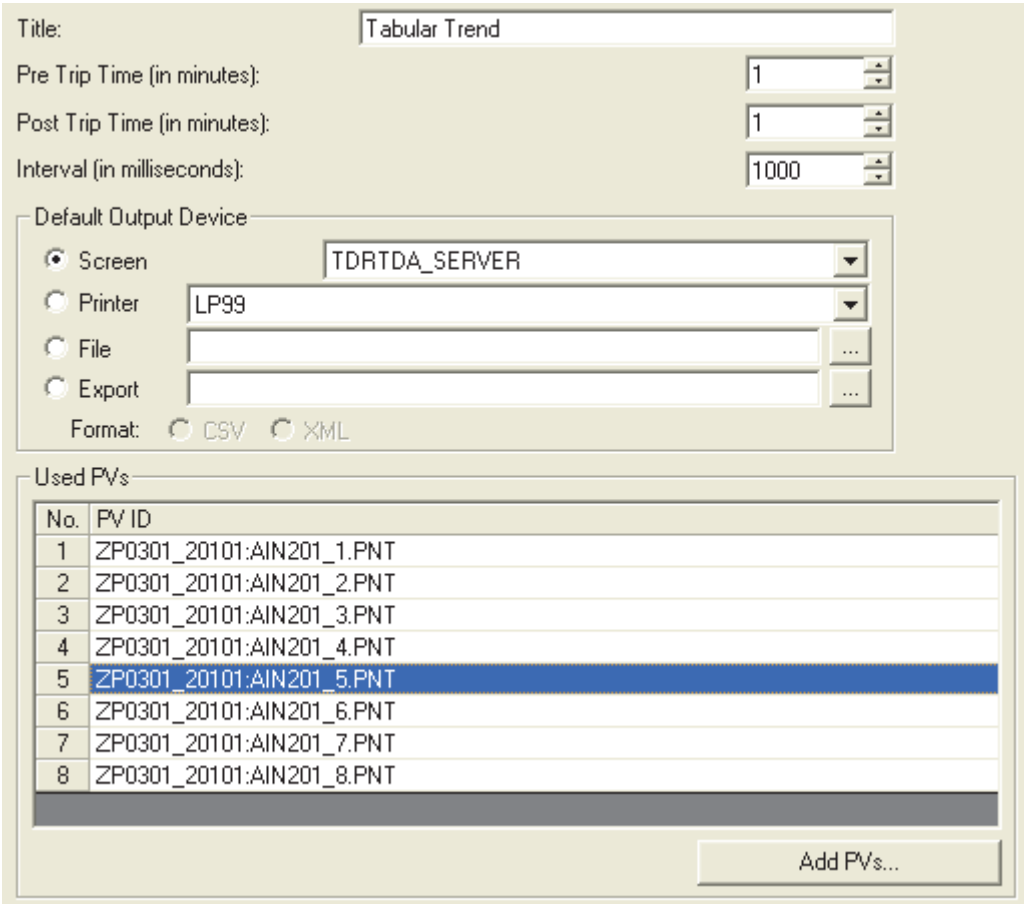


Figure 6-6. Tabular Trending Report Configuration

Tabular Trending Report Output

Figure 6-7 shows an example of the printed output of a tabular trending report.

```
                              TABULAR TREND REPORT                              PAGE 1
                          PLANTNAME: Tabular Trend Test 1

REPORT TIME:        22-Jun-08 16:25:32.399     DATA START: 22-Jun-08 16:20:00.000
STATION ID:         PLANTNAME                  DATA END:   22-Jun-08 16:20:00.060
GROUP NAME:         Test Group 001             DATA MODE:  HISTORICAL
# OF VALUES:        7
PROCESSING RATE:    0.010 SECONDS/SAMPLE

================================================================================
   ID        Description                Analog EUs /
                                        Digital Low and High
                                        State Names
=================================================================
1  A001      LPRM 16-09 B FLUX          %PWR


2  A002      LPRM 16-09 C FLUX          %PWR


3  A003      LPRM 16-09 D FLUX          %PWR


4  D002      VALVE                      CLOSED       OPEN


DATE          TIME                 1       2        3        4        5        6
--------------------------------------------------------------------------------
22-Jun-02     16:20:00.000      33.933   22.639   47.345   CLOSED
              16:20:00.010      33.933   22.639   47.345   CLOSED
              16:20:00.020               22.639            OPEN
              16:20:00.030      33.933   22.639            OPEN
              16:20:00.040               22.639            OPEN
              16:20:00.050               22.639   47.345   OPEN
              16:20:00.060      33.933   22.639            CLOSED
```

Figure 6-7. Tabular Trending Report Output

Tabular Plot

A tabular plot, also called a time based plot, shows the values of up to 7 PVs over a specific period of time in a color-coded line-graph format. The X-axis represents time, and the Y-axis represents the PV's engineering units (EUs) for an analog PV or state for a digital PV. The X- and Y-axes are configurable.

Valid output devices for tabular plots are operator screens or printers. When you display a tabular plot on a screen, a scroll bar allows you to modify the time range of the plot, and the Print button allows you to send the currently displayed chart to the default platform printer. Figure 6-9 on page 96 shows an example of a tabular plot displayed on a console.

Tabular Plot Configuration

The tabular plot format is fixed, but you can configure the report's contents, time span, and interval by performing the following steps:

1. Enter a unique title for the tabular plot in the **`Title`** field.
2. Enter the desired **`Pre-Trip Time (in minutes)`** and the **`Post-Trip Time (in minutes)`**.
3. Enter the number of grids you want in the Y-axis in the **`Number of Y Grids`** field, the time interval that you want for the X-axis in the **`X Grid Time`** field, and the X-axis units in the **`Unit`** field.
4. Click **`Add PVs`** to enter the PVs that you want to include in the report. You can add up to 7 PVs to a tabular plot.
5. For each PV that you entered, set the engineering units per Y-axis grid in the **`EU per Grid`** field.
6. If you are including more than one PV in your plot, entering a number of grid markings in the **`Offset`** field allows you to stagger the plotted PV values for easier viewing.
7. If you want to remove a PV, right-click the PV and select **`Remove PV`** from the popup menu, or select one or more PVs and click **`Clear PV`** to remove an individual or all PVs.
8. Click **`Apply`** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **`Recall`**.

The tabular plot configuration screen appears as shown in Figure 6-8.

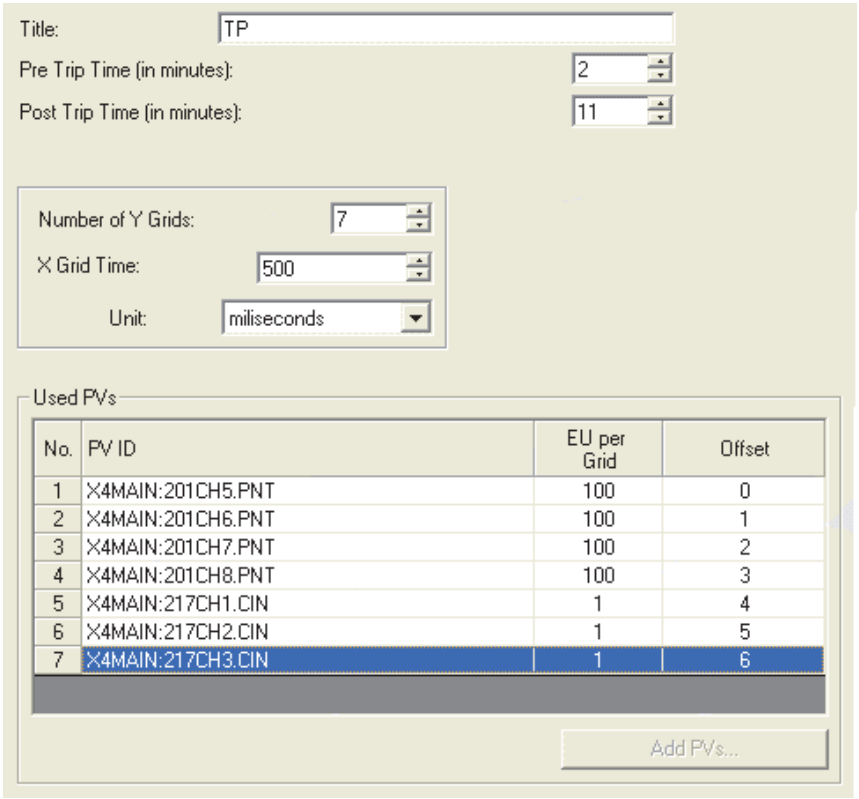


Figure 6-8. Tabular Plot Configuration

Tabular Plot Output

Figure 6-9 provides an example of a tabular plot displayed on a console. To modify the time range of the currently displayed plot, use the scroll bar on the right side of the user interface. Using the scroll bar adjusts the time represented on the X-axis accordingly, and updates the values displayed in the grid.

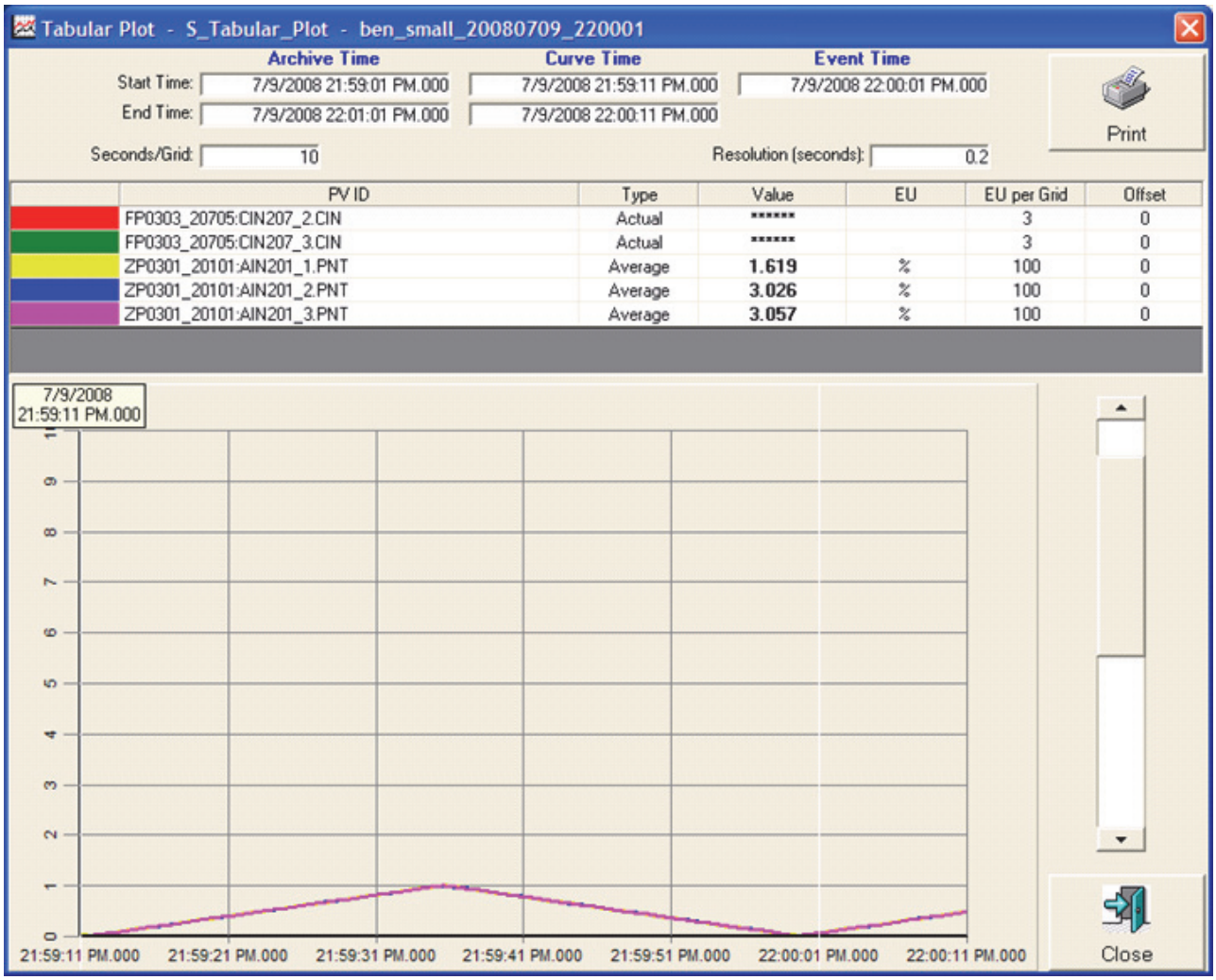


Figure 6-9. Tabular Plot Output – Screen Display

NOTE

The Start and End Curve Times are the time stamps of the first value and the last value of the curve within the archive. Since the trigger is asynchronous to the curves, there may be a difference between the starting point of the archive and the timestamp of the first value stored in the archive. This is true of the last value as well.

You can also print the currently displayed chart to the default platform printer by clicking the **Print** button from the screen display of a tabular plot. Printed output of a tabular plot is organized for page-oriented devices. In other words, the printout will be as many pages as required to plot the selected time interval. Second and subsequent pages contain the first two lines of header information, and the last point plotted on a page is re-plotted as the first point on the next page.

Two Function Plot

A two function plot compares the values of two process variables over the specified time period, and displays the values in a line-graph format. The X-axis represents the value of the independent variable, and the Y-axis represents the value of one selected dependent variable.

Valid output devices for two function plots are operator screens or printers. You can display a two function plot on a screen, and then print the currently displayed plot to the default platform printer using the **Print** button. Figure 6-11 shows an example of a two function plot displayed on a console.

Two Function Plot Configuration

The two function plot format is fixed, but you can configure the report's contents, time span, and interval (see Figure 6-10) by performing the following steps:

1. Enter a unique title for the two function plot in the **Title** field.
2. Enter the desired **Pre-Trip Time (in minutes)** and the **Post-Trip Time (in minutes)**, and the **Interval (in milliseconds)** at which you want historical data displayed.
3. Enter the PV you want to use for the independent variable, or select it from the list using the Browse button (**...**). This PV will appear on the X-axis. Select the **Auto Scale** check box to display a logical number of engineering units per grid on the X-axis.
4. Click **Add PVs** to enter the PV(s) you want to use for the dependent variable. Check **Auto Scale** for each PV that you want to display the most logical number of engineering units per grid on the Y-axis. There is no limit to the number of PVs you can add.
5. If you want to remove a PV, right-click the PV and select **Remove PV** from the popup menu or select one or more PVs and click **Clear PV** to remove an individual or all PVs.
6. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

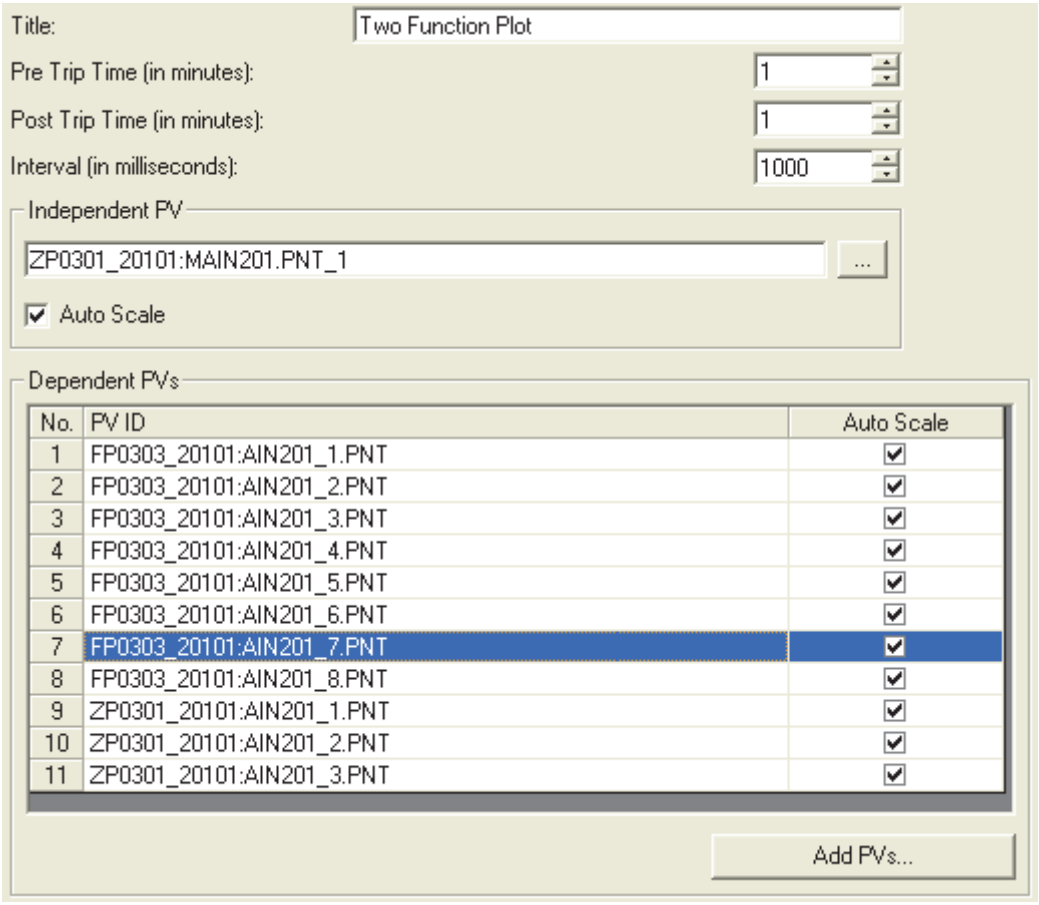


Figure 6-10. Two Function Plot Configuration

Two Function Plot Output

An example of a two function plot is shown in the Figure 6-11. The X-axis represents the independent variable. The dependent variable, represented on the Y-axis, can be selected and changed using the arrow buttons or by clicking a new dependent variable from the PV list. You can change the time of the plot by moving the time slider on the left side of the user interface. This causes the chart to be refreshed with the new PV values corresponding to the newly selected time. Checking the Auto Scale box allows TDR/TDA to display a logical number of engineering units per grid on the X- or Y-axes to allow the entire plot to fit on the screen. When you switch between dependent variables, TDR/TDA automatically adjusts the Y-axis accordingly.

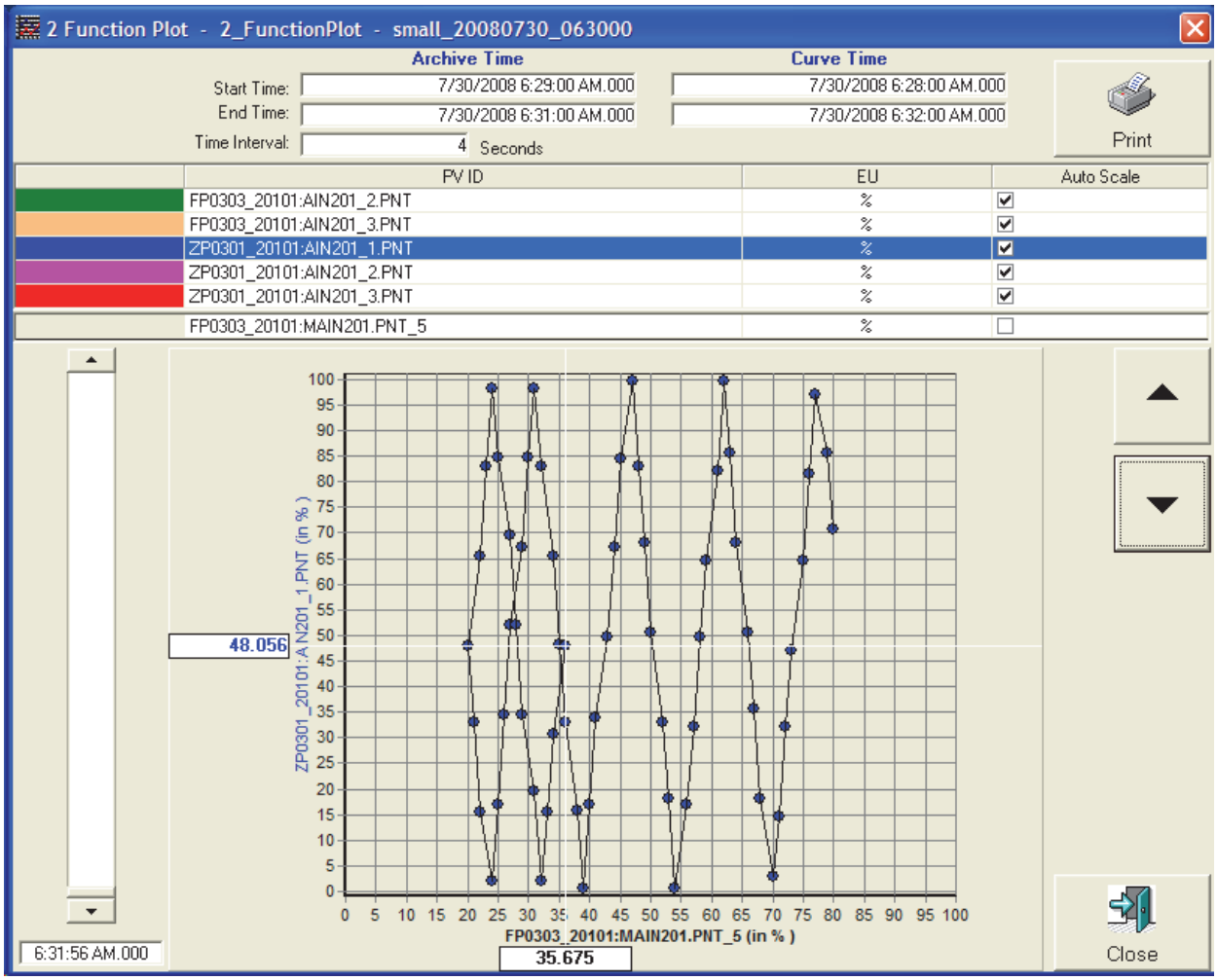


Figure 6-11. Two Function Plot Output – Screen Display

NOTE

The Start and End Curve Times are the time stamps of the first value and the last value of the curve within the archive. Since the trigger is asynchronous to the curves, there may be a difference between the starting point of the archive and the timestamp of the first value stored in the archive. This is true of the last value as well.

The Print button on the two function plot screen display allows you to send the currently displayed chart to the default platform printer. A printed two function plot consists of multiple pages; each page has the same X-axis representing the independent variable, and a different dependent variable on the Y-axis.

Trip/Scram Log

A Trip log is a power industry specific log, and a Scram log is a nuclear power plant specific log. The Trip/Scram log provides a data table comprising the pre-trip, trip, and post-trip values of selected PVs sorted by time stamp. The first part of the log contains all the pre-trip data values. The second part of the log begins on a new page and contains the values of the selected PVs at the

time of the trip and continues reporting the values at the specified interval until the end of the post-trip time span.

Valid output devices for trip/scram logs are operator screens, printers, or text, CSV, or XML files. When you display a trip/scram log on a screen, arrow buttons allow you to scroll up and down. If you select the trip/scram log in operator mode, the Select Report Device dialog box opens, as shown in Figure 6-12. This dialog box allows you to choose to output the log to a screen, a printer, or a file, or export the log to CSV or XML format. Click the desired output device, and click **OK**.

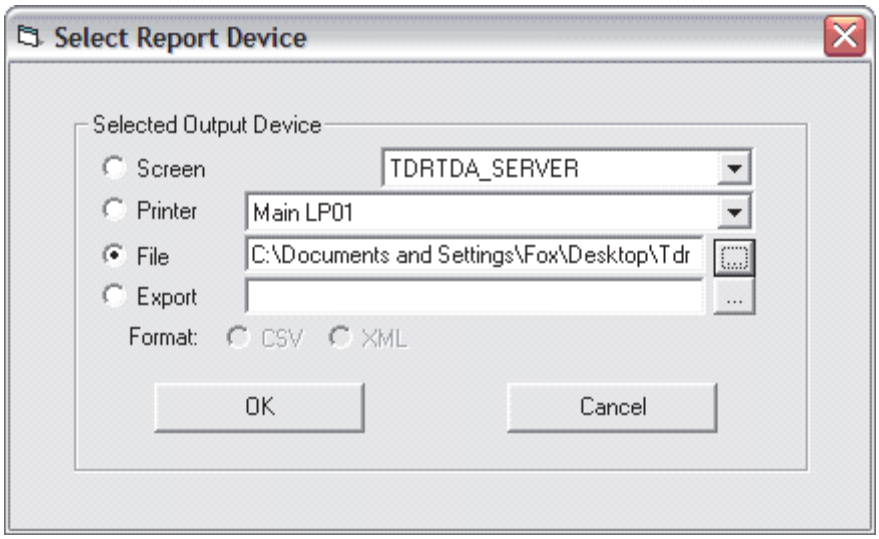


Figure 6-12. Select Report Device Dialog Box

Figure 6-14 is an example of a trip/scram log displayed on a console.

Trip/Scram Log Configuration

The Trip/Scram log format is fixed, but you can configure the log's contents and time span by performing the following steps:

1. Enter a unique title for the log in the **Title** field.
2. Enter the desired **Pre-Trip Time (in minutes)** and the **Post-Trip Time (in minutes)**.
3. Enter the **Default Printer** on which you want the log printed.
4. Click **Add PVs** to enter the PVs that you want to include in the report. There is no limit to the number of PVs you can add.
5. If you want to remove a PV, right-click the PV and select **Remove PV** from the popup menu or select one or more PVs and click **Clear PV** to remove an individual or all PVs.
6. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

The trip log configuration screen appears as shown in Figure 6-13.

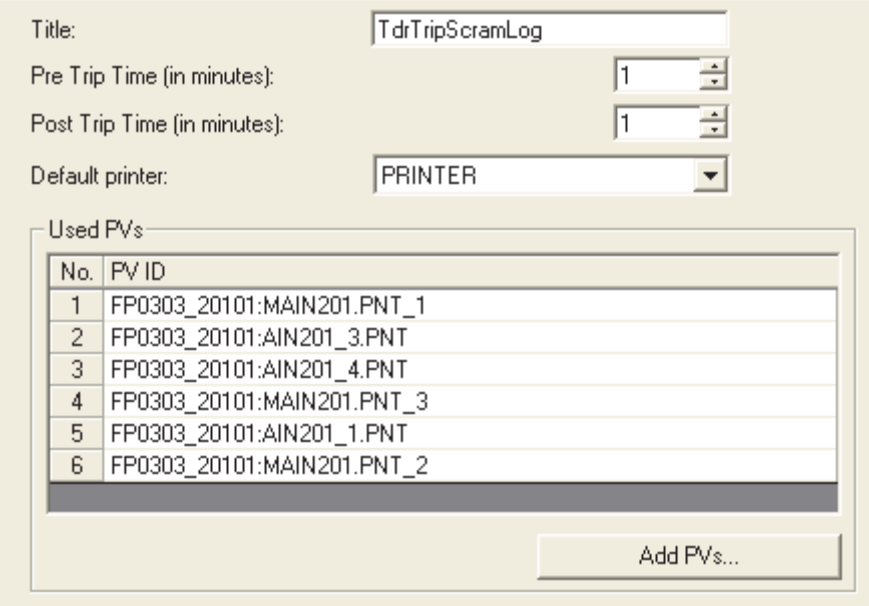


Figure 6-13. Trip/Scram Log Configuration

Trip/Scram Log Output

Figure 6-14 shows an example of a trip/scram log.

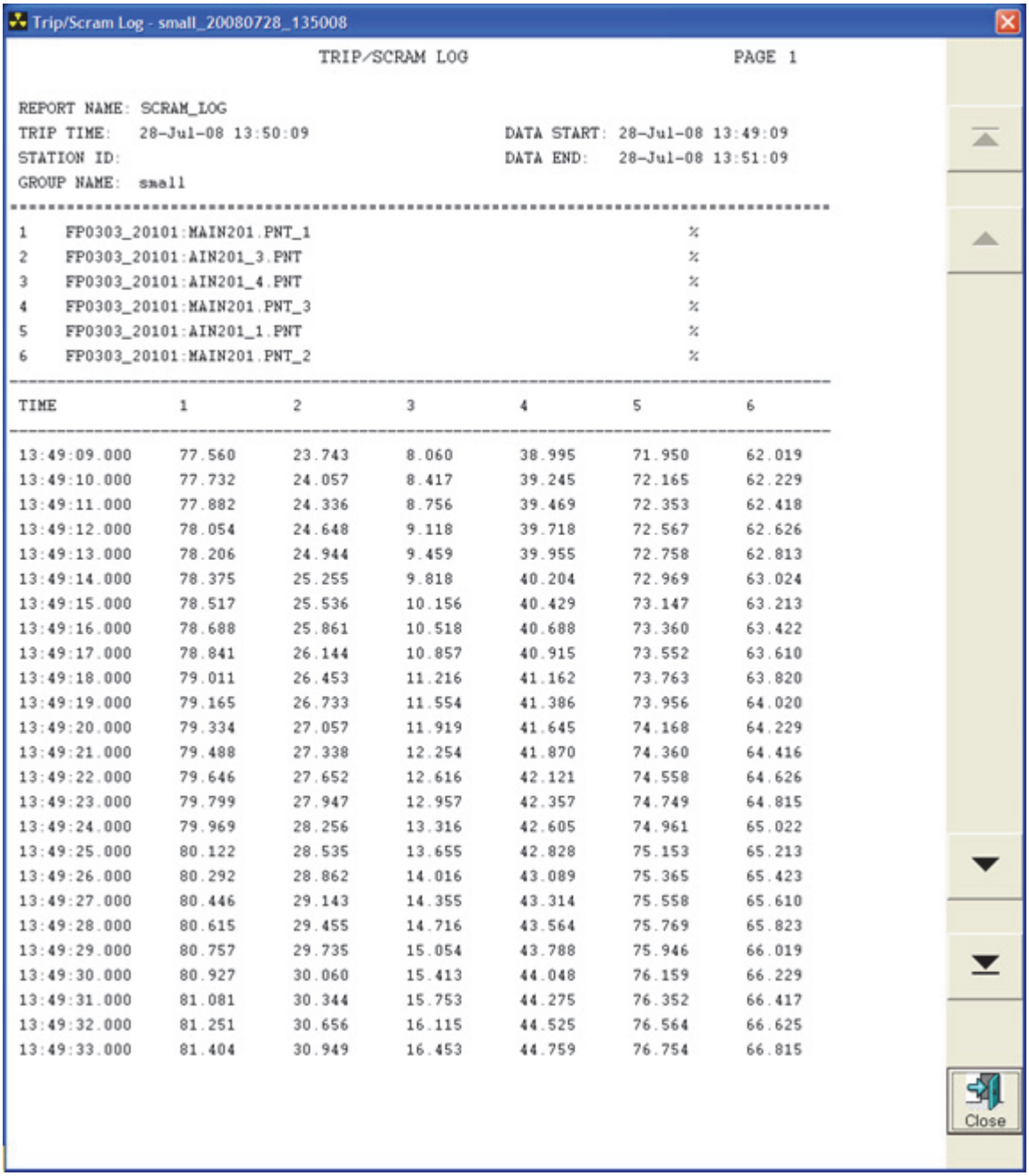


Figure 6-14. Trip/Scram Log Output

Turbine/Generator Log

The turbine/generator log is a power industry specific log that contains a list of varying turbine speed values sorted by time stamp, and a log of varying PV values over the specified time period. These logs can be configured to represent various states through which your process can transition; for example, you can configure an automatic turbine/generator log to record values when your process is starting or when your process is shutting down. You can either configure turbine/generator logs to automatically print on the default printer or you can demand available turbine/generator logs at any time.

Valid output devices for turbine/generator logs are operator screens, printers, or text, CSV, or XML files. When you display a turbine/generator log on a screen, arrow buttons allow you to scroll up and down. If you select the turbine/generator log in operator mode, the Select Report Device dialog box opens, as shown in Figure 6-12. This dialog box allows you to choose to output the log to a screen, a printer, or a file, or export the log to CSV or XML format. Click the desired output device, and click **OK**.

Turbine/Generator Log Configuration

Configuration of the turbine/generator log is accomplished using two screens: the main turbine/generator log configuration window allows you to configure the general display parameters, assign a PV to the turbine speed, and configure specific triggers for this log. The secondary window for turbine/generator log configuration allows you to add the PVs for which you want values to appear in the log.

Using the Main Turbine/Generator Log Configuration Window

The main turbine/generator log configuration window allows you to specify the analog PV that represents the speed of the turbine and to define the specific triggers that cause the log to start and stop recording values. Turbine/generator types of logs require that you configure each of the following trigger conditions:

- Turning Gear Status
- Turbine Load (50%)
- Turbine Trip
- Turbine Control Valve
- Bearing Vibrations
- Main Steam Pressure
- Turbine Load Rate of Change
- First Stage Temperature Rate of Change
- Thrust Bearing Temperature
- Bearing Header Pressure.

Normally, any point available on the network can be used in trigger expressions. However, in the case of Turbine/Generator logs, triggers can only contain those points that have already been added to the group containing the turbine log. To create a group and add points, refer to “Step 5: Adding and Configuring Groups” on page 49.

Perform the following steps in the main configuration window to set general display parameters, assign a turbine speed PV, and configure triggers for the turbine/generator log:

1. In the navigation tree, select the turbine/generator log’s name.
2. Enter a unique title for the turbine/generator log in the **Title** field.
3. Assign the appropriate digital PV to each trigger condition listed in yellow using the drop-down list. Every row in the grid must contain data.
4. Enter the PV that represents the turbine speed in the **Turbine Speed PV** field. The turbine speed must be an analog PV. You can click the browse button (**...**) and select the turbine speed PV or you can enter the PV name manually into the field.

5. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Figure 6-15 shows the turbine/generator log's main configuration screen.

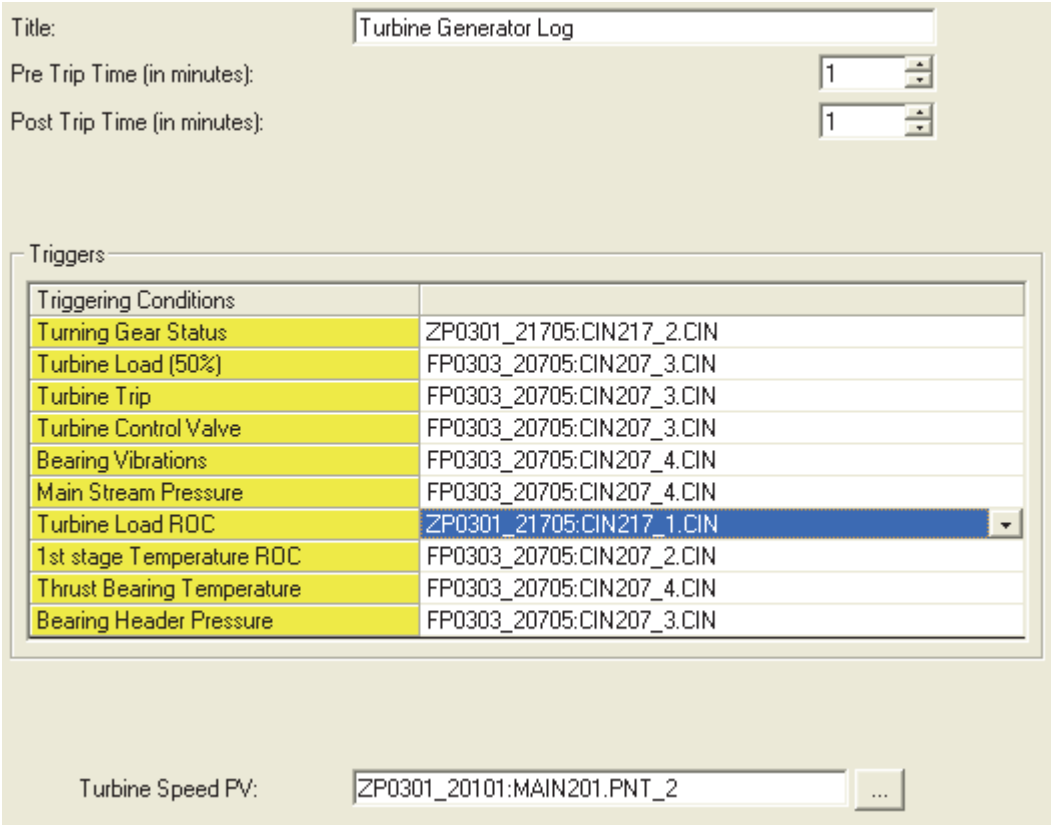


Figure 6-15. Turbine/Generator Log – Trigger Configuration

Using the Secondary Turbine/Generator Log Configuration Window

The secondary window for turbine/generator log configuration allows you to add the PVs for which you want values to appear in the log. You can access the turbine/generator log's secondary configuration window from under the main turbine/generator log item in the navigation tree.

To include the desired PVs in the turbine/generator log, perform the following steps:

1. In the navigation tree, select **PV** from under the main turbine/generator log item to open the PV configuration screen.
2. Click **Add PVs** to enter the PVs that you want to include in the turbine/generator log. There is no limit to the number of PVs you can add.
3. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Figure 6-16 shows the configuration screen for the turbine/generator log's PVs.

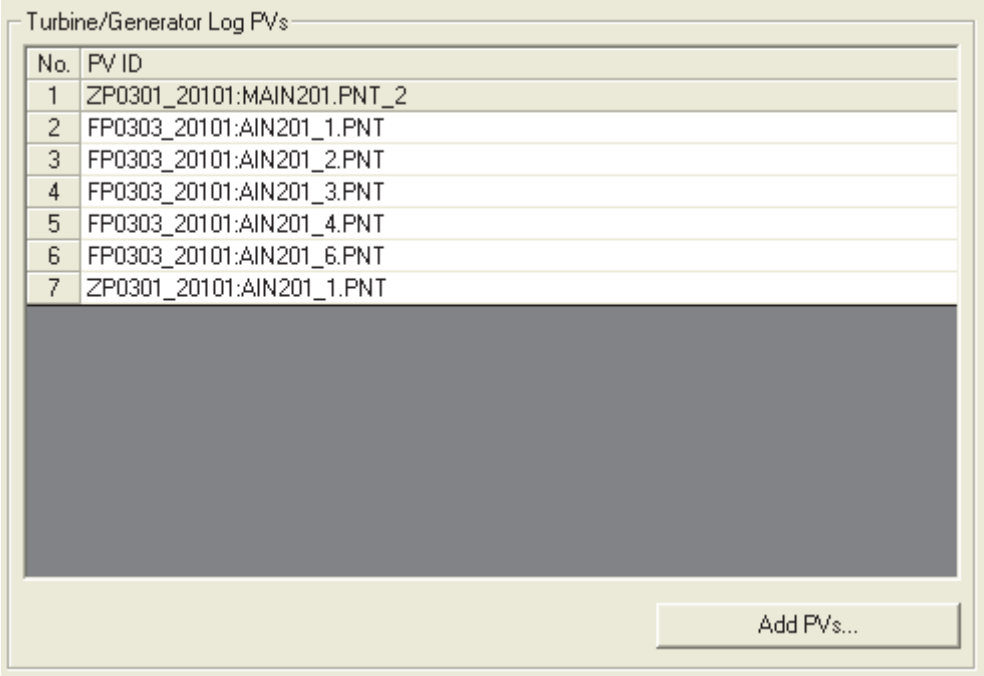


Figure 6-16. Turbine/Generator Log – PV Configuration

NOTE

The first row cannot be modified because this row contains the ID of the turbine speed PV configured in the turbine/generator log trigger configuration screen (shown in Figure 6-15).

Turbine/Generator Log Output

The first page of the turbine/generator log, shown in Figure 6-17, contains the a log of the turbine speed sorted by time stamp. The second page, shown in Figure 6-18, contains data values of the PVs that you configured to appear in the report. The column headings contain the PV IDs and engineering units, and each column is sorted by time stamp and contains the data values for the PV.

```
                              TURBINE GENERATOR LOG                        PAGE 1
                                Shutdown Log

TRIP TIME:          22-Jun-02 16:25:32.000     DATA START: 22-Jun-02 16:05:32.000
STATION ID:         PLANTNAME                  DATA END:
GROUP NAME:         Test Group 001
================================================================================
TURBINE SPEED LOG
--------------------------------------------------------------------------------
16:20:40:  3100
16:20:41:  3100
16:20:42:  3067
16:20:43:  3040
```

Figure 6-17. Turbine/Generator Log Output, Page 1

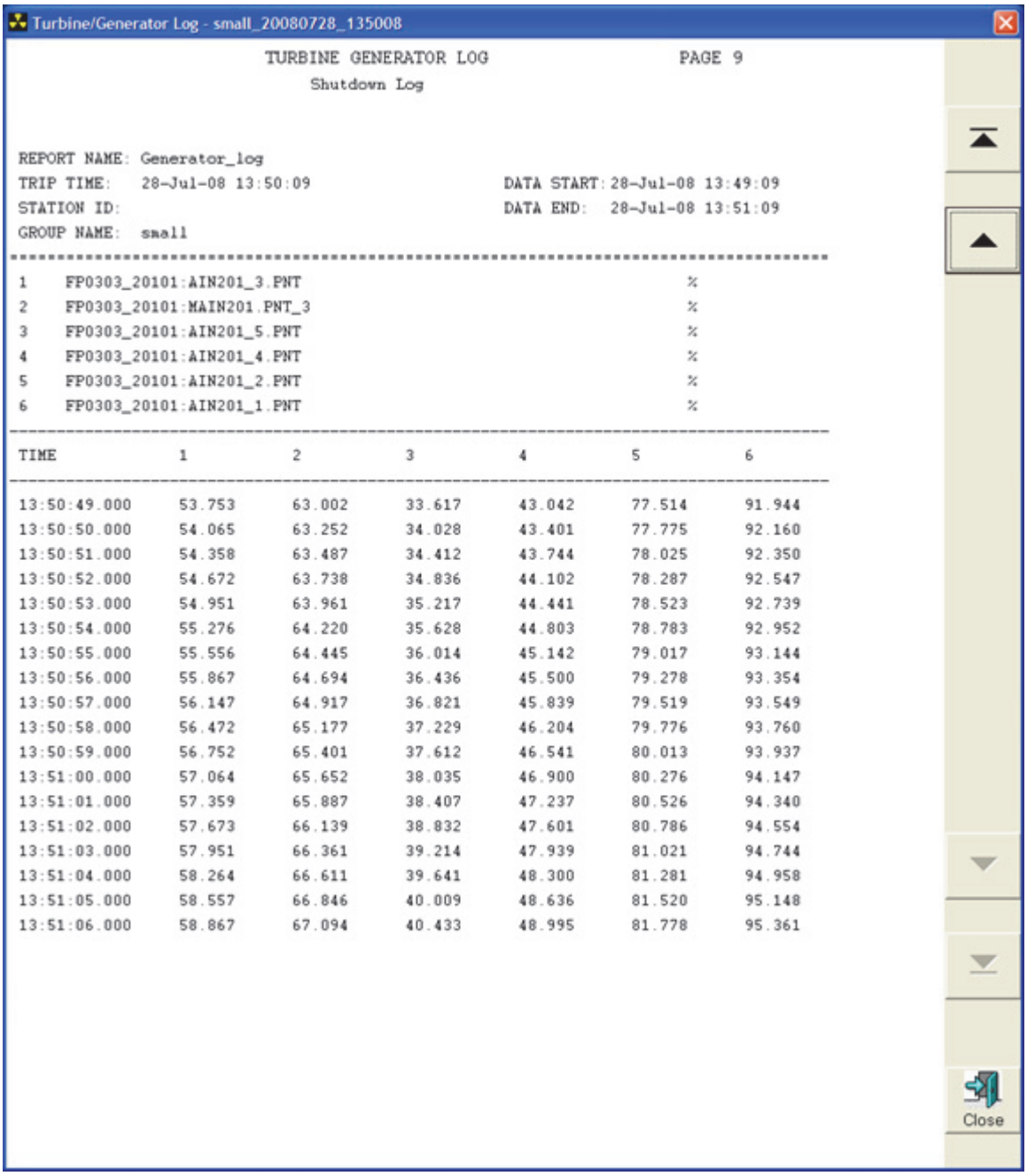


Figure 6-18. Turbine/Generator Log Output, Page 2

Periodic Logs

Periodic logs display data collected for up to 12 specific process variables over a configurable amount of time, and provide statistical analysis of the data for that time period. For each PV selected to appear in a periodic log, you can choose to display actual values or a statistical rollup calculation for the PV's value during the specified time interval. Supported calculations include a count, sum, average, minimum, maximum, peak to peak, standard deviation, or variance.

You can configure four types of periodic logs:

- Hourly Log – This log is generated once per hour at minute 00, and it displays and analyzes data values for the specified PVs collected at one-minute intervals within that hour.
- Daily Log – This log is generated once per day at 12:00 midnight, and it displays and analyzes data values for the specified PVs collected at one-hour intervals within that day.
- Shift Log – This log is generated once per shift, and displays and analyzes data values for the specified PVs collected at one-hour intervals within that shift. In the General Settings window, you can configure the shift start time (hour and minute) and the number of shifts per day (up to 4 shifts per day). Each day has the same shifts; for example, you cannot configure different shifts for weekends. TDR uses the shift start time plus the number of shifts per day to automatically generate a Shift Log at the end of each shift.
- Monthly Log – This log is generated once per month, and it displays and analyzes data values for the specified PVs collected within that month at intervals of one day. Monthly logs are created once per month, on the last day of the month at 12:00 midnight.

The only valid output device for a periodic log is a printer. Each of the four types of periodic log can be scheduled to print automatically to a specific printer. Scheduling is accomplished in individual report configuration window, and the default printer for each log is specified in the Configurator Client's General Settings window. See "Step 6: Configuring TDR/TDA General Settings" on page 57 for information on configuring printers for the periodic logs.

Periodic Log Configuration

First, make sure that your periodic log is configured to print at the correct output device. You can configure the default printer for each log in the General Settings window, as described in "Step 6: Configuring TDR/TDA General Settings" on page 57.

The periodic log format is fixed, but you can configure the report's contents by performing the following steps:

1. Enter a unique title for the periodic log in the **Title** field.
2. Click the button next to the type of log you want to print: **Hourly**, **Shift**, **Daily**, or **Monthly**.
3. Under Auto Print, click the button corresponding to how often you would like the log printed: **Hourly**, **Shift**, **Daily**, **Monthly**, or **None**.
4. Click **Add PVs** to enter the PVs that you want to include in the log. You can add up to 12 PVs to a periodic log.
5. For each PV, select a statistical rollup calculation for the PV's value over the specified time period. Choose one of the following in the **Rollup** drop-down list:
    - Actual Value
    - Count (number of)
    - Sum
    - Average
    - Minimum

- Maximum
- Peak to Peak
- Standard deviation
- Variance.

For example, if you want to display the mean value of a PV over a specified time interval, select **Average** from the drop-down list; if you want to display the actual value of the PV, select **Actual Value**.

6. For each PV, enter three lines of descriptive text in the Heading 1 through 3 columns to display in the log.
7. If you want to remove a PV, right-click the PV and select **Remove PV** from the popup menu or select one or more PVs and click **Clear PV** to remove an individual or all PVs.
8. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Figure 6-19 shows the configuration screen for a periodic log.

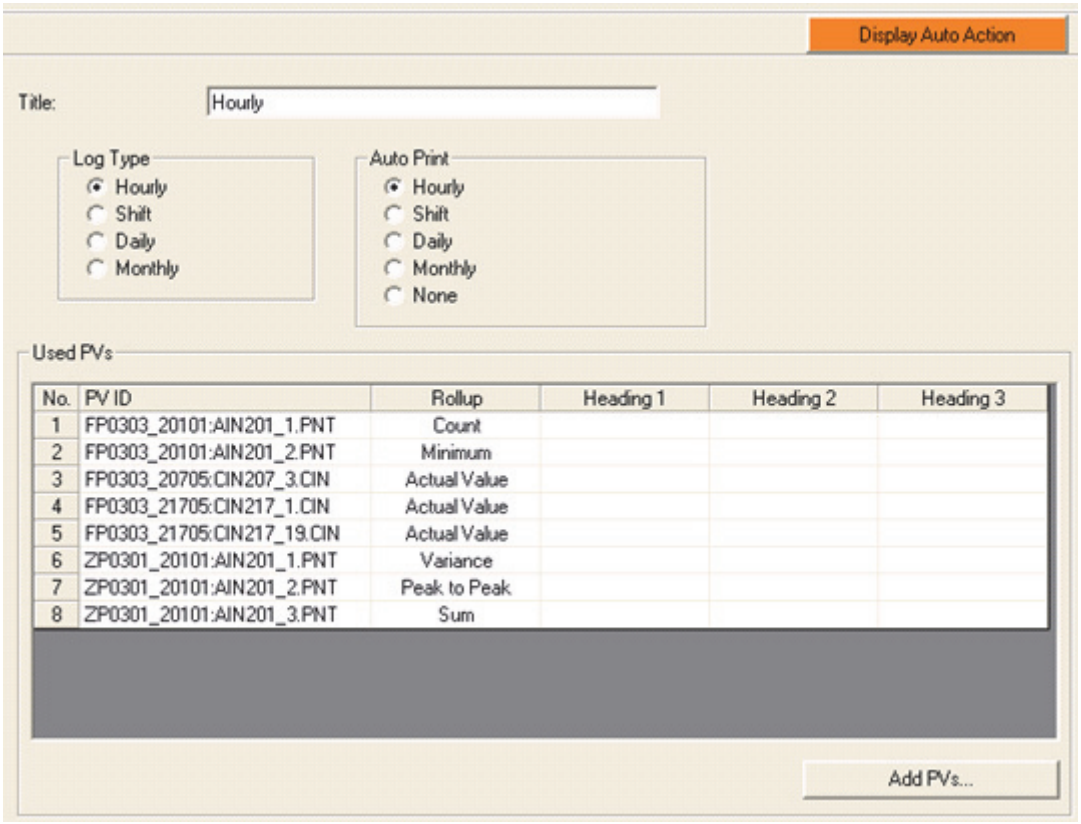


Figure 6-19. Periodic Log Configuration

Periodic Log Output

The periodic log shown in the Figure 6-20 is an hourly log. The first portion of the log contains the basic header information, and the second part contains all PVs you configured and their headers. The third part of the report shows the rollup values of each PV at time intervals of 1 minute.

For daily and shift periodic logs, the time interval is one hour and for a monthly periodic log, the time interval is one day.

The last part of the report shows the statistical analysis of each PV's values over the time span of the entire report, including the minimum, maximum, mean, square sum, variance, and standard deviation.

Figure 6-20. Hourly Periodic Log Output

Real-Time Displays and Trends

TDR/TDA allows you to display real-time data in two formats; the real-time display and the real-time trend. The initial screen is the real-time display, and shows the PVs in the selected group and their associated alarm limits and status. From the real-time display, you can generate a real-time trend showing the changes in a PV's value over a period of time in line-graph format, where the X-axis represents a time span in minutes and the Y-axis represents the PV's current value.

The only valid output device for a real-time display or trend is a screen. There is no printed output available for real-time displays and trends.

Real-Time Display and Trend Configuration

Real-time display and trend formats are fixed, but you can configure the displays' contents by performing the following steps:

1. Enter a unique title for the real-time display in the **Title** field.
2. Click **Add PVs** to enter the PVs that you want to include in the display. You can add up to 20 PVs.
3. If you want to remove a PV, right-click the PV and select **Remove PV** from the popup menu or select one or more PVs and click **Clear PV** to remove an individual or all PVs.
4. If desired, check the **Digital Polarity** box for the digital PVs.

   The Digital Polarity check box controls the "location" of the zero/non-zero states on the displays. Depending on your preferences and the nature of the digital process variable, you may want to reverse the positions of the two possible states. For normal polarity, the Digital Polarity box is not checked, and the zero polarity value appears to the left of the non-zero value. If the box is checked for a particular PV, this indicates that the polarity will appear reversed on the display, that is, the non-zero state is on the left and the zero state is on the right side.
5. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Figure 6-21 shows the configuration screen for a real-time display.

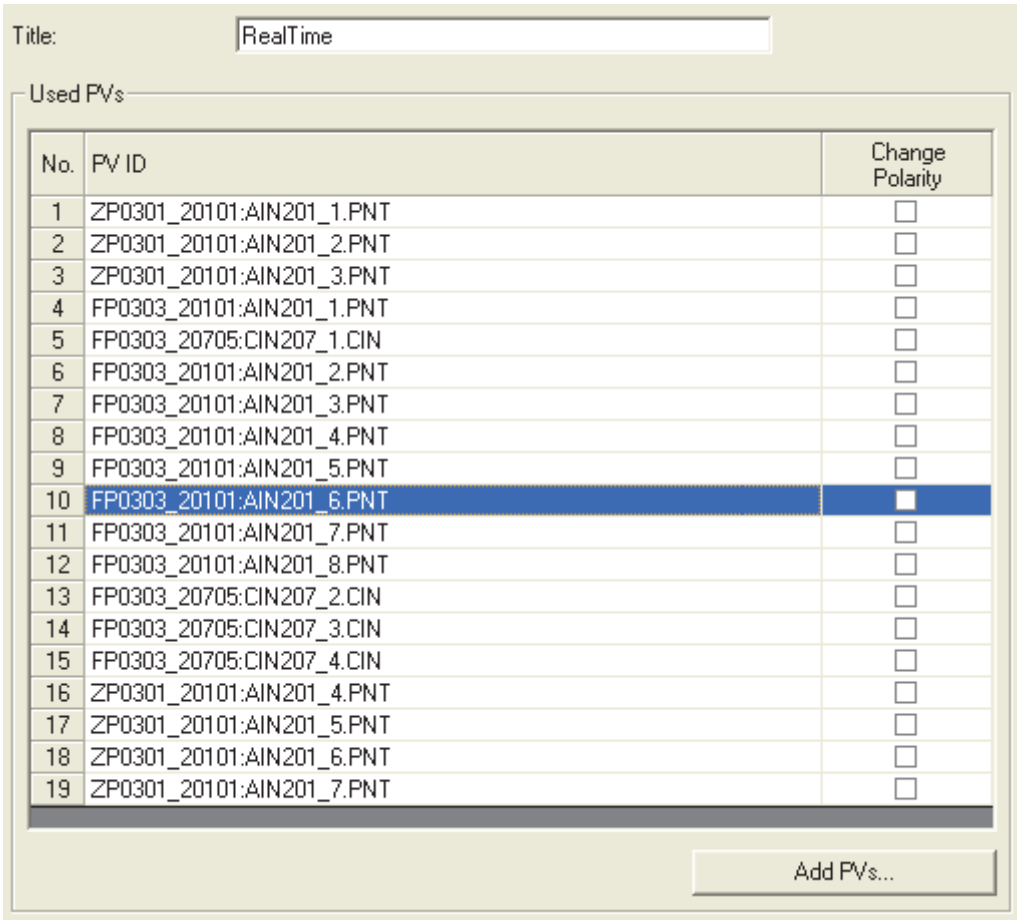


Figure 6-21. Real-Time Display Configuration

Real-Time Display Window

The real-time display shows all the PVs in the selected group, along with additional relevant configuration information. You can use this window to generate a real-time trend.

For each analog PV on the display, the ID, description, current alarm status, current value, and engineering units are provided on the left side of the display. The right side of the interface contains a graphical representation of the PV's value and configuration information, including its minimum and maximum values and range limit values previously configured using the TDR/TDA Configurator Client. Minimum and maximum values appear above the bar representing the PV's value and range limits, including the low outer, low inner, high inner, and high outer limit values.

For each digital PV on the display, the ID, description, current status, and current state are provided on the real-time display. The two possible digital states appear on the right side of the display, and the current state of the PV is highlighted.

In addition, the STATE field shows a NML or OOS status. NML indicates that TDR data collection is being carried out as it usually does, and OOS indicates that TDR data collection is out-of-service.

The real-time display is color coded for easy viewing of abnormal conditions in your plant. For an analog PV, yellow signifies a value above or below the inner limit values, and red signifies a value above or below the outer limit values. Green signifies that the value is within its limits. If a digital PV is in alarm, the current state is highlighted in red. If the data is bad, the current state is highlighted in magenta.

The real-time trend display also provides arrow buttons to navigate through all the process variables in the group, and sequentially numbered buttons that allow you to select a PV and generate a real-time trend, described below. The example shown in Figure 6-22 represents one page of a real-time display window.

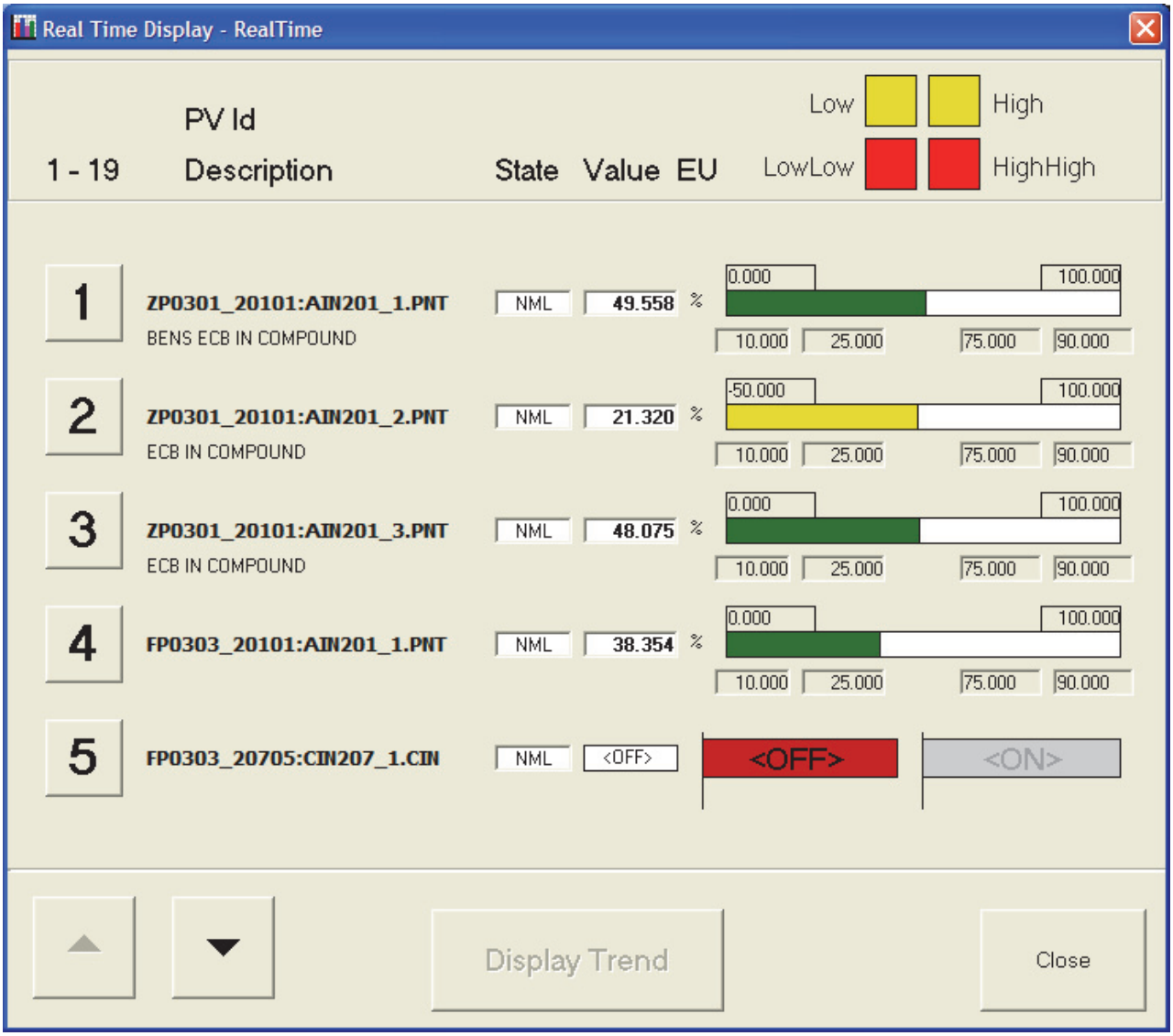


Figure 6-22. Real-Time Display Window

Real-Time Trend

From the real-time display (Figure 6-22), you can generate a real-time trend by selecting a PV and clicking **`Display Trend`**. The real-time trend shows the changes in the PV's value over a period of time in line-graph format, where the X-axis represents time, and the Y-axis represents the PV's current value. Refer to Figure 6-23.

If you want to change the time span represented in the trend, click the appropriate button on the left side of the screen that corresponds to the desired time span, and the X-axis grid marks change accordingly. You can choose to display a trend for a period of 1, 10, 30, or 60 minutes, depending on how much data you want to see at a time.

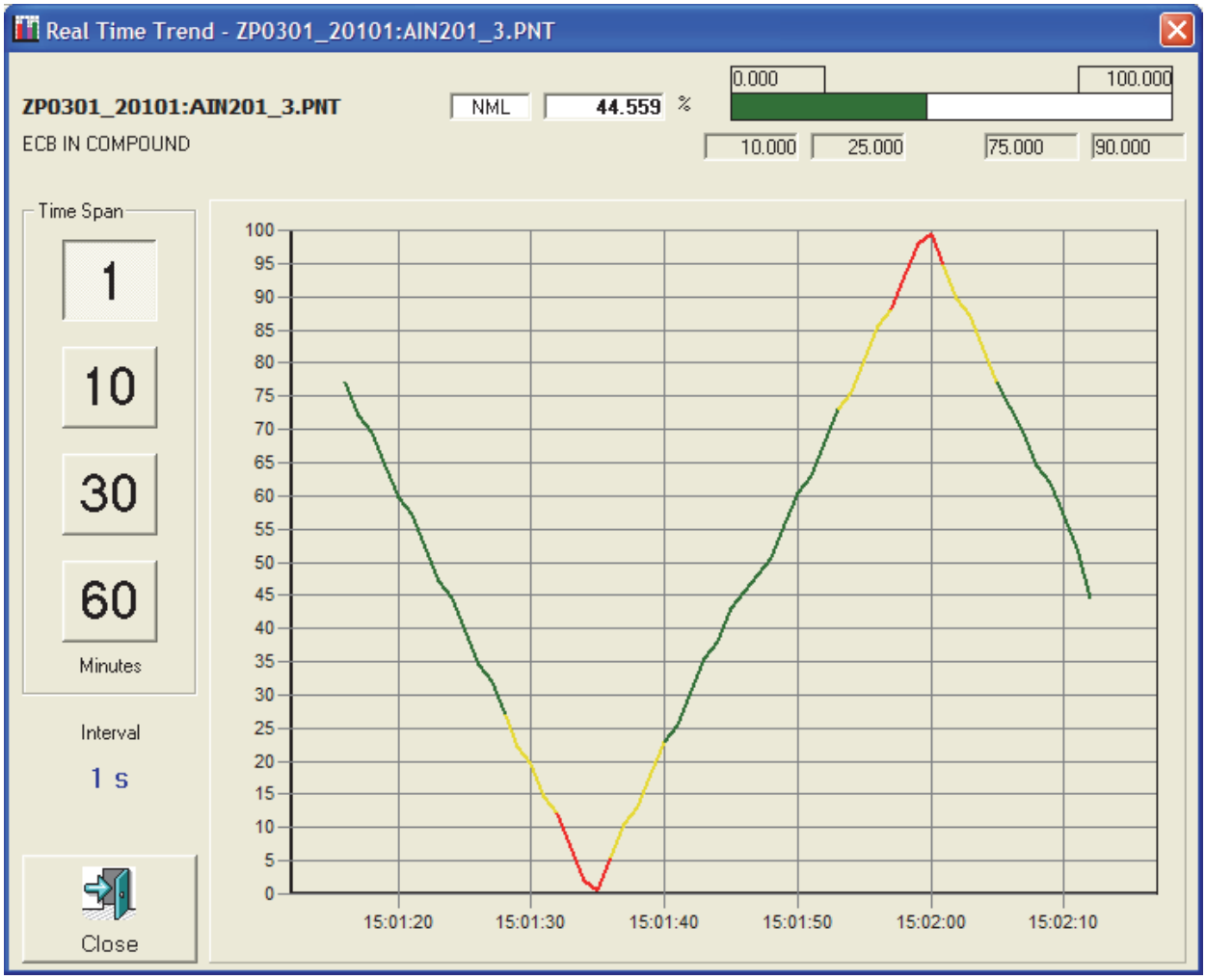


Figure 6-23. Real-Time Trend Display

Sequence of Events Report

A Sequence of Events (SOE) report retrieves the list of designated digital PVs, and for each PV, reports the ID, the time (to the millisecond) at which the digital PV changed its state, the PV's description, and its current state. The SOE report in the TDR/TDA software is limited. For enhanced reporting and archiving of Sequence of Events points, you need to install the Sequence of Events software, available separately, and described in *Sequence of Events User's Guide* (B0700AK).

Valid output devices for sequence of events reports are operator screens, printers, or text, CSV, or XML files. Figure 6-25 shows an example of a Sequence of Events report.

SOE Report Configuration

The SOE report format is fixed, but you can configure the report's contents by performing the following steps:

1. Enter a unique title for the SOE report in the **Title** field.
2. Enter the default output device. For example, select a console on which you want to display the report, or a printer on which you want to print the report.
3. Click **Add PVs** to enter the digital PVs that you want to include in the report. There is no limit to the number of PVs you can add.
4. If you want to remove a PV, right-click the PV and select **Remove PV** from the popup menu or select one or more PVs and click **Clear PV** to remove an individual or all PVs.
5. Click **Apply** to save the current configuration. Otherwise, if you want to cancel your changes to the configuration and retrieve the last saved version, click **Recall**.

Figure 6-24 shows the configuration screen for an SOE report.

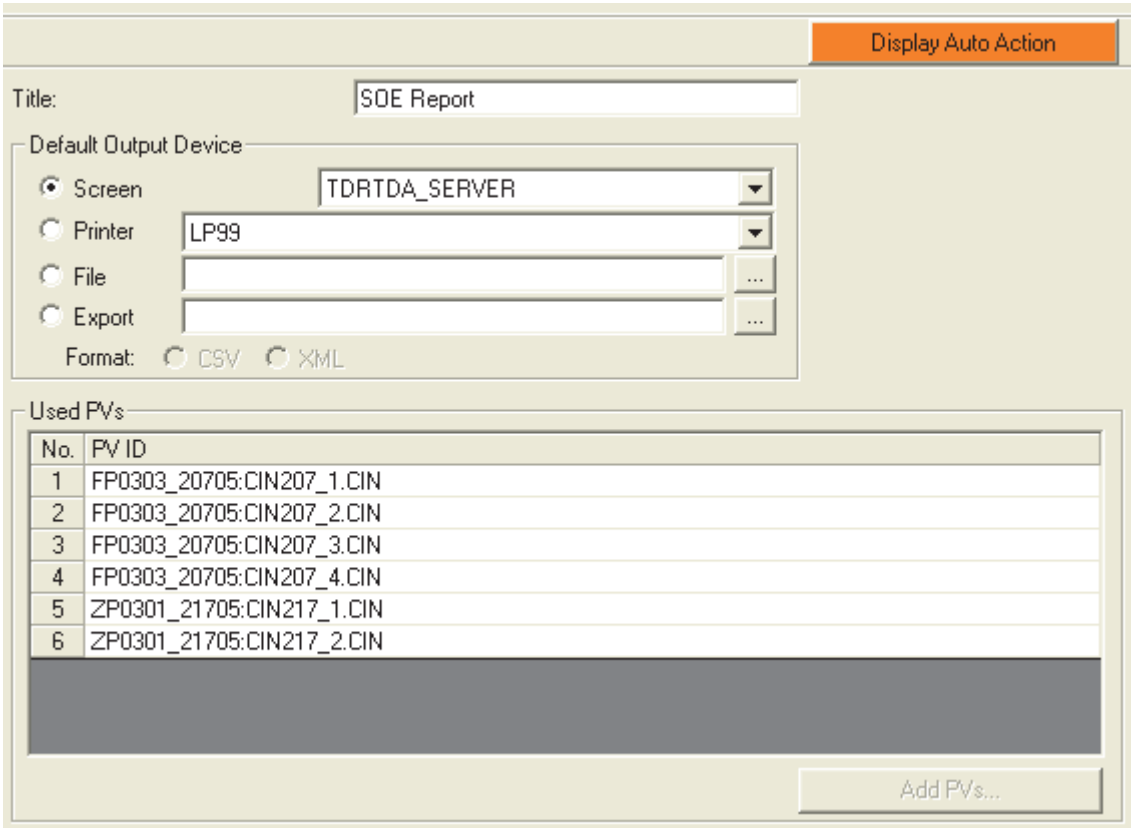


Figure 6-24. SOE Report Configuration

SOE Report Output

Figure 6-25 is an example of the printed output of a Sequence of Events report.

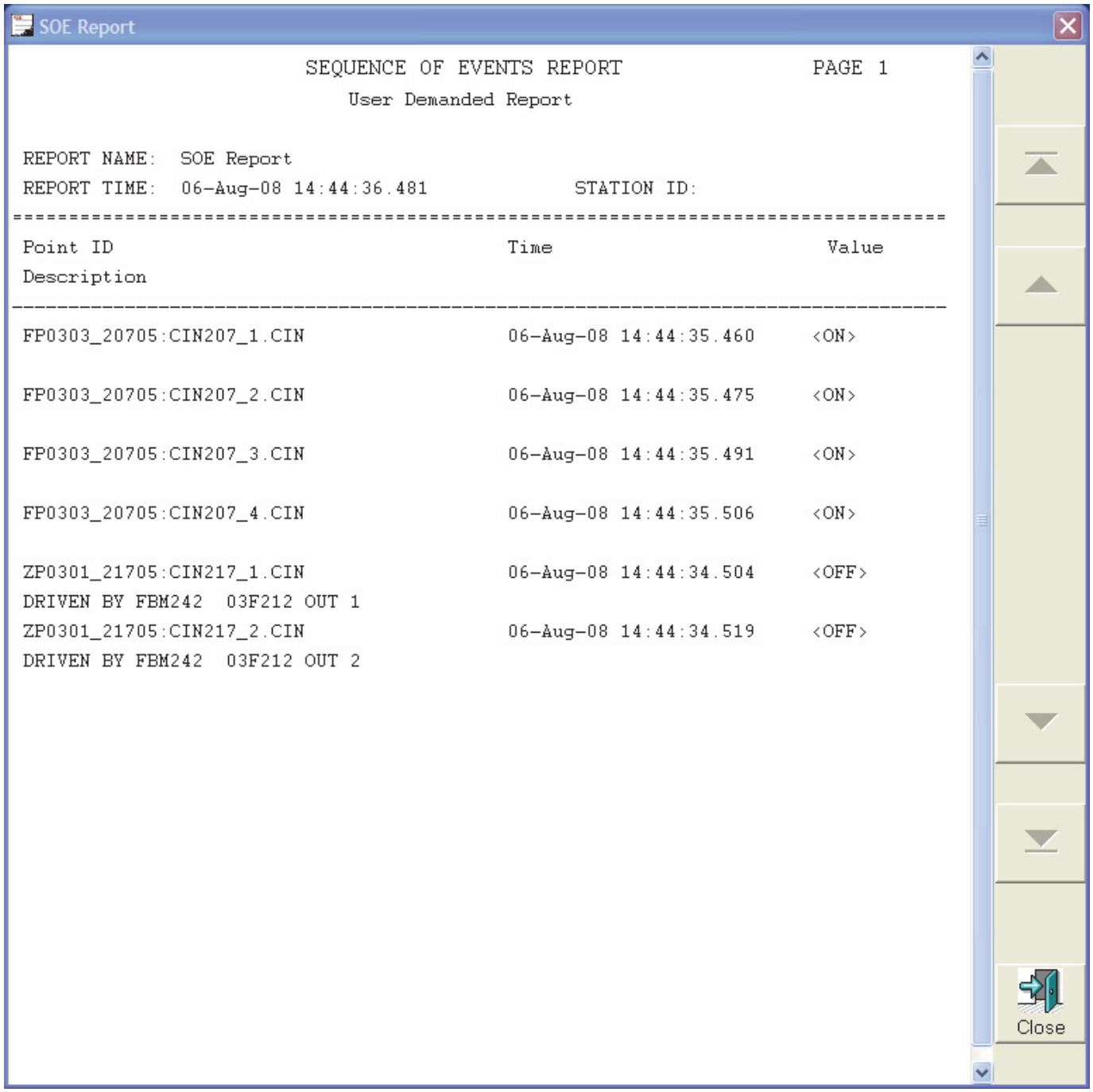


Figure 6-25. Sequence of Events (SOE) Report Output

Exporting Displays

Most displays can be exported as pure data. CSV format (comma separated value) can be used to load data into a Microsoft Excel® spreadsheet or a relational database. XML (extended markup language) format can be used for presentation of data inside HTML pages or as a standardized data exchange mechanism.

To export a display, report, or log:

1. Click on the display in the navigation tree.

   The configuration screen for that display appears in the right pane of the user interface.
2. In the **Default Output Device** section of the configuration screen, click the radio button next to **Export**, and click either the **CSV** or **XML** radio button.
3. Enter a file name or select an existing file using the Browse button (**...**).
4. Apply the changes.

When the display is generated, one or more files are exported in the format you selected, to the specified directory.

The following displays can be exported to CSV or XML format:

- Transient Data Report
- Statistical Summary Report
- Tabular Trending Report
- Tabular Plot
- Trip Log
- Scram Log
- Turbine/Generator Log
- Periodic Logs
  - Hourly Log
  - Daily Log
  - Shift Log
  - Monthly Log
- SOE Report.

Message Log

All abnormal or important events (event detection, archive creation, report generation, and so forth) of the TDR/TDA server are logged in the Windows Event log.

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