
GRID AUTOMATION PRODUCTS

MicroSCADA X SYS600 10.2

Installation and Administration Manual





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This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit. (<https://www.openssl.org/>). This product includes cryptographic software written by Eric Young (eay@cryptsoft.com). This product includes software written by Tim Hudson (tjh@cryptsoft.com).

Section 2 Introduction

2.1 This manual

This manual provides thorough information on the SYS600 software and hardware installation: base systems, LAN connections, process communication systems, workplaces and peripherals.

This manual provides thorough information on the various configuration settings that have to be made in order to use the SYS600 system. The manual also describes how to use the configuration tools.



The rows in some of the SCIL examples in this manual have been split to two rows. Take this into consideration when copying the SCIL examples.

2.2 Use of symbols

This publication includes warning, caution and information symbols where appropriate to point out safety-related or other important information. It also includes tips to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:



Warning icon indicates the presence of a hazard which could result in personal injury.



Caution icon indicates important information or a warning related to the concept discussed in the text. It might indicate the presence of a hazard, which could result in corruption of software or damage to equipment/property.



Information icon alerts the reader to relevant factors and conditions.



Tip icon indicates advice on, for example, how to design a project or how to use a certain function.

Although warning hazards are related to personal injury, and caution hazards are associated with equipment or property damage, it should be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process performance leading to personal injury or death. Therefore, comply fully with all warnings and caution notices.

2.3 Intended audience

This manual is intended for installation personnel, administrators and skilled operators to support installation of the software.

2.4 Product documentation

Name of the document	Document ID
SYS600 10.2 Application Design	1MRK 511 466-UEN
SYS600 10.2 Application Objects	1MRK 511 467-UEN
SYS600 10.2 Communication Gateway, COM500i	1MRK 511 468-UEN
SYS600 10.2 Communication Programming Interface (CPI)	1MRK 511 469-UEN
SYS600 10.2 Connecting LONWORKS Devices	1MRK 511 470-UEN
SYS600 10.2 Cyber Security Deployment Guideline	1MRK 511 485-UEN
SYS600 10.2 DNP V3.00 Master Protocol	1MRK 511 486-UEN
SYS600 10.2 DNP V3.00 Slave Protocol	1MRK 511 487-UEN
SYS600 10.2 External OPC Data Access Client	1MRK 511 471-UEN
SYS600 10.2 IEC 60870-5-101 Master Protocol	1MRK 511 489-UEN
SYS600 10.2 IEC 60870-5-101 Slave Protocol	1MRK 511 490-UEN
SYS600 10.2 IEC 60870-5-103 Master Protocol	1MRK 511 491-UEN
SYS600 10.2 IEC 60870-5-104 Master Protocol	1MRK 511 492-UEN
SYS600 10.2 IEC 60870-5-104 Slave Protocol	1MRK 511 493-UEN
SYS600 10.2 IEC 61107 Master Protocol	1MRK 511 494-UEN
SYS600 10.2 IEC 61850 Master Protocol (OPC)	1MRK 511 495-UEN
SYS600 10.2 IEC 61850 Server	1MRK 511 509-UEN
SYS600 10.2 IEC 61850 System Design	1MRK 511 475-UEN
SYS600 10.2 Modbus Master Protocol	1MRK 511 497-UEN
SYS600 10.2 Modbus Slave Protocol	1MRK 511 498-UEN
SYS600 10.2 OPC Server	1MRK 511 476-UEN
SYS600 10.2 Operation Manual	1MRK 511 499-UEN
SYS600 10.2 Pipeline Application Design	1MRK 511 477-UEN
SYS600 10.2 Pipeline Operation	1MRK 511 501-UEN
SYS600 10.2 Process Display Design	1MRK 511 478-UEN
SYS600 10.2 Process Picture desing manual	1MRK 511 505-UEN
SYS600 10.2 Programming Language SCIL	1MRK 511 479-UEN
SYS600 10.2 Status Codes	1MRK 511 480-UEN
SYS600 10.2 System Configuration	1MRK 511 481-UEN
SYS600 10.2 System Objects	1MRK 511 482-UEN
SYS600 10.2 Visual SCIL Application Design	1MRK 511 483-UEN
SYS600 10.2 Visual SCIL Objects	1MRK 511 484-UEN

Other related documents:

- LONWORKS PCLTA-20 PCI LonTalk Adapter, User's Guide
- Microsoft Windows documentation
- Product documentation of the used multiport serial card
- Product documentation of the used network adapter card
- RTU documentation

2.5 Document conventions

The following conventions are used for the presentation of material:

- The words in names of screen elements (for example, the title in the title bar of a dialog, the label for a field of a dialog box) are initially capitalized.
- Capital letters are used for file names.
- Capital letters are used for the name of a keyboard key if it is labeled on the keyboard. For example, press the CTRL key. Although the Enter and Shift keys are not labeled they are written in capital letters, e.g. press ENTER.
- Lowercase letters are used for the name of a keyboard key that is not labeled on the keyboard. For example, the space bar, comma key and so on.
- Press **CTRL+C** indicates that the user must hold down the CTRL key while pressing the C key (in this case, to copy a selected object).
- Press **ALT E C** indicates that the user presses and releases each key in sequence (in this case, to copy a selected object).
- The names of push and toggle buttons are boldfaced. For example, click **OK**.
- The names of menus and menu items are boldfaced. For example, the **File** menu.
 - The following convention is used for menu operations: **Menu Name/Menu Item/Cascaded Menu Item**. For example: select **File/Open/New Project**.
 - The **Start** menu name always refers to the **Start** menu on the Windows Task Bar.
- System prompts/messages and user responses/input are shown in the Courier font. For example, if the user enters a value that is out of range, the following message is displayed: Entered value is not valid.
- The user may be told to enter the string MIF349 in a field. The string is shown as follows in the procedure: **MIF349**
- Variables are shown using lowercase letters: sequence name

2.6 Document revisions

Revision	Version number	Date	History
A	10.2	31.03.2021	New document for SYS600 10.2

Section 3 Installation



Always run all commands and programs with administrator privileges when configuring the system. In Windows 7 and Windows Server 2008 and later this is not a trivial case. In these operating systems, administrator runs programs with non-admin privileges by default. To run programs with admin privileges:

1. Right-click a program, e.g. Command Prompt
 2. In the popup menu, select Run as administrator to open the program with admin privileges
- Command Prompt is correctly opened with admin privileges when the title of the window shows "Administrator: Command Prompt".

3.1 Installing system servers

3.1.1 Hardware requirements

The base system of MicroSCADA X Control System sets the following minimum configuration requirements as shown in [Table 1](#) below. The hardware requirements are applicable for non-virtual environments only.

Table 1: Hardware requirements

Functionality	Software / Hardware	Hardware Requirement
Operating System / SYS600	Windows Server 2012/2016/2019 Windows 8.1/10	Intel® Core™ i5-3610ME Processor 3.3GHz, 8 GB RAM, 256 GB Hard disk Any keyboard or mouse
Communication	Ethernet adapter	Any adapter supported by Windows
	DuoDriver	The supported Network Interface Cards (NIC) are: <ul style="list-style-type: none"> • Intel PRO/1000 GT/PT/MT Server Adapters • Intel Ethernet Server Adapter I350-T2 and I350-T4 • Broadcom BCM5719 and BCM5720
	COM ports	Serial communication board compatible with the computer hardware or a virtual serial port device. Products from following vendors have been widely used: <ul style="list-style-type: none"> • Comtrol • Digi International • Moxa Compatibility with the selected operating system is required
	Built-in LON Communication <ul style="list-style-type: none"> • Echelon PCLTA-20 LON adapter card (only with 32-bit OS) Network-based LON interface exists for 64-bit operating systems, see manual SYS600 Connecting LONWORKS Devices for more information	1 x PCI-bus slot or Ethernet adapter
	Workplace	Operator workplace Display at least 1024 x 768 resolution
Installation	Network drive, USB storage media or DVD	Ethernet, 1 x USB or DVD drive
Input	Keyboard	1 x USB
	Mouse	1 x USB
Printing	Printer	Network or 1 x USB
Time synchronization	SNTP client software or a GPS receiver connected to serial port.	SNTP Server device in the network or a COM port for GPS receiver. Products from following vendor have been widely used: <ul style="list-style-type: none"> • Meinberg In COM500i the system clock may be set by the NCC protocol, no special hardware needed.
Remote access	Remote Desktop Services	See software and hardware requirements from Remote Desktop Services, Microsoft .

3.1.2 System recommendations

Workplace X operator workplace uses web technology with dedicated Workplace X Windows application or with web browser that allows both local and remote access over network. Workplace X does not need Microsoft's Remote Desktop Services (RDS). The use of web technologies is moving the user interface processing load from the server computer to the client computer. This means that server computer no longer needs to be optimized to serve multiple simultaneous remote desktop connections and could be therefore equipped with e.g. less CPU cores compared to corresponding Monitor Pro/Pro+ system. On the other hand, the client computers need to be able to run web browser efficiently. Web browser performance of the computer can be estimated using the Google Octane Javascript benchmark results. Computer with higher Octane result will typically give better performance and user experience.

Table 2: Some example hardware setups for different use cases

Computer use	Setup / configuration
SYS600 Server with local Workplace X for 4 display monitors	Intel® core™ i7-6700 CPU @ 3.40 GHz; RAM: 32GB Display Adapter: NVIDIA Quadro K620
Remote Workplace X Client	Intel® core™ i5-8500 CPU @3.00GHz: RAM 16 GB Intel UHD Graphics 630 display adapter
Remote Workplace X Client High End for large process pictures with 4 display monitors	Intel® core™ i7-6700 CPU @3.40GHz; RAM 16GB Display Adapters: NVIDIA Quadro K620

3.1.3 Software requirements

The MicroSCADA X SYS600 10.2 Control System supports the following operating systems:

- Windows 8.1 Pro (32/64bit)
- Windows 10 Enterprise LTSB 2016 (32/64bit)
- Windows 10 Enterprise LTSC 2019 (32/64bit)
- Windows Server 2012 R2 Standard (64 Bit)
- Windows Server Standard LTSB 2016 (64 Bit)
- Windows Server Standard LTSC 2019 (64 Bit)



For best user experience, it is recommended to use servers and workstations with 64-bit Windows operating systems.



On 32-bit operating systems, the usage of View Builder is restricted. The maximum number of switching devices in View Builder project is 2000 and the maximum number of switching devices per picture is 400.

Detailed list of supported operating systems can be found from Release Notes. The compatibility of SYS600 product with the latest Windows security updates and service packs is tested and verified monthly by Hitachi Power Grids. We recommend that servers are updated according to SYS600 Patch Compatibility Report. The report does not cover SYS600 workplace computer, but it is recommended to install all updates to the workplace computers.

Other server versions might be compatible with MicroSCADA; however, those are not supported by this software. For more information about operating systems, refer to Microsoft documentation.

The user documentation is available as PDF files, both as part of the product package and as separate files.



Adobe Acrobat Reader is not supplied with MicroSCADA X SYS600, but can be downloaded for free from www.adobe.com.

3.1.4 Deployment in virtual environments

In case the system consists of multiple SYS600 nodes and workstations, deploying the installations in virtual environments provides benefits such as easier maintainability and computer hardware replacement. Furthermore, a virtual environment can offer a new layer of redundancy in addition to a hot stand-by (HSB) solution used in SYS600. If there is a need to install extension cards e.g. for serial or LON communication, it is recommended to make the installation to a non-virtual environment or use network connected devices such as virtual COM ports for serial communication or Loytec device for LON communication. LON setup using Loytec has been described in Application Note

[SYS600 LON setup using Loytec interface](#). SYS600 nodes such as communication front-ends operating in a non-virtual environment may communicate e.g. with SYS600 system server nodes operating in a virtual environment.

Most of the services available in virtual environments are available when SYS600 is used. In general, the limitations that are present in non-virtual environments are present in virtual environments, too. Guidelines for tested environments are described in Application Note [SYS600 Deployment in virtual environments](#). The reader must be familiar with the concepts of virtualization and with the specific virtualization solution to be used. The guideline highlights SYS600-specific conditions and constraints. The installation of the virtual environment should be made according to the instructions of the used environment.

3.1.5 Installation procedure

The MicroSCADA X SYS600 Control System installation procedure:

- Install the network adapter card if a local area network is to be used.
- Install the operating system. If the operating system is pre-installed, get the installation media as it might be required later.
- Install corresponding device drivers and protocols for the local area network.
- Install the PC cards used by MicroSCADA: PC-NET cards, I/O units, LON adapter cards and radio clock cards.
- Install the SYS600 Broker software.
- Install the MicroSCADA X SYS600 software.
- Install optional products, if used: LIB 500 and LIB 5xx.
- Add and prepare applications.
- Configure, test and start the possible drivers.
- Modify the base system configuration files to match the actual configuration.
- Perform administrative tasks: define the startup type, change passwords, share resources, and so on.

3.1.6 Installing SYS600 software

The MicroSCADA X installation package contains an installation program, which creates the directory structure and copies the required files onto hard disk. By default, the installation program also creates a new program folder named MicroSCADA X Control System SYS600 containing icons on the desktop. Any previously installed SYS600 software does not need to be removed before a new installation.

MicroSCADA X SYS600 10.2 and onwards will require SYS600 Broker to be installed manually before the SYS600 main installation.

Files are overwritten with a new version from the package, except the ones related to system and communication configuration:

- SHUTDOWN.CIN (in the folder \sc\prog\exec). Installation preserves the old version of SHUTDOWN.CIN. The new version is copied into the same directory and named SHUTDOWN\$CIN.
- Base system configuration files SYS_BASCON.COM, SYS_CONFIG.PAR and MONITORS.DAT (in the folder \sc\sys\active_sys_). Installation preserves the old versions and the new versions are copied into same directory and named SYS_BASCON\$COM, SYS_CONFIG \$PAR and MONITORS\$DAT.
- Communication configuration files in directories \sc\sys\active\sys_(PC_NET.CF1, SYSCONF.INI, SIGNALS.INI) and in \sc\prog\modbus_slave (CONFIG.INI). New versions are copied into same directories and named PC_NET\$CF1, SYSCONF\$INI, SIGNALS\$INI and CONFIG\$INI. Configuration files for IEC61850 OPC Server, SNMP OPC server and External OPC DA client are not modified during installation.
- SYS600_colors.clut, SYS600_colors_black.clut, SYS600_colors_blue.clut, SYS600_colors_brown.clut, SYS600_colors_dark_grey.clut and SYS600_colors_grey.clut (in the folder \sc\prog\graphicsEngine\etc). Installation preserves the old versions and the new versions are copied into same directory and named SYS600_colors\$clut, SYS600_colors_black\$clut, SYS600_colors_blue\$clut, SYS600_colors_brown\$clut, SYS600_colors_dark_grey\$clut and SYS600_colors_grey\$clut.

The applications located under the \sc\apl directory are not touched.

3.1.6.1 Installation procedure in steps

To install the MicroSCADA X SYS600 software:

1. Restart the computer.
2. Logon as a user with administrator rights.
3. If installing on Windows 8, Windows Server 2012 or later, insert the operating system installation media or allow the computer to connect to the Internet.
4. Double-click the installation file SYS600 broker.msi to start the SYS600 Broker installation.



SYS600 Broker must be installed before installing SYS600.exe. If SYS600 Broker is not installed correctly, the SYS600 installation will fail with following error message: SYS600 Broker.msi has not been installed prior to SYS600.exe, or a wrong SYS600 Broker.msi is installed. Install SYS600 Broker.msi correctly according to instructions before starting the SYS600.exe installation.

5. Double-click the installation file SYS600.exe to start the installation. Select 'Options' to confirm the installation drive and optional packages.
6. The available software packages are listed in the **Product Installation** dialog, see [Figure 1](#). Select the optional package as necessary:

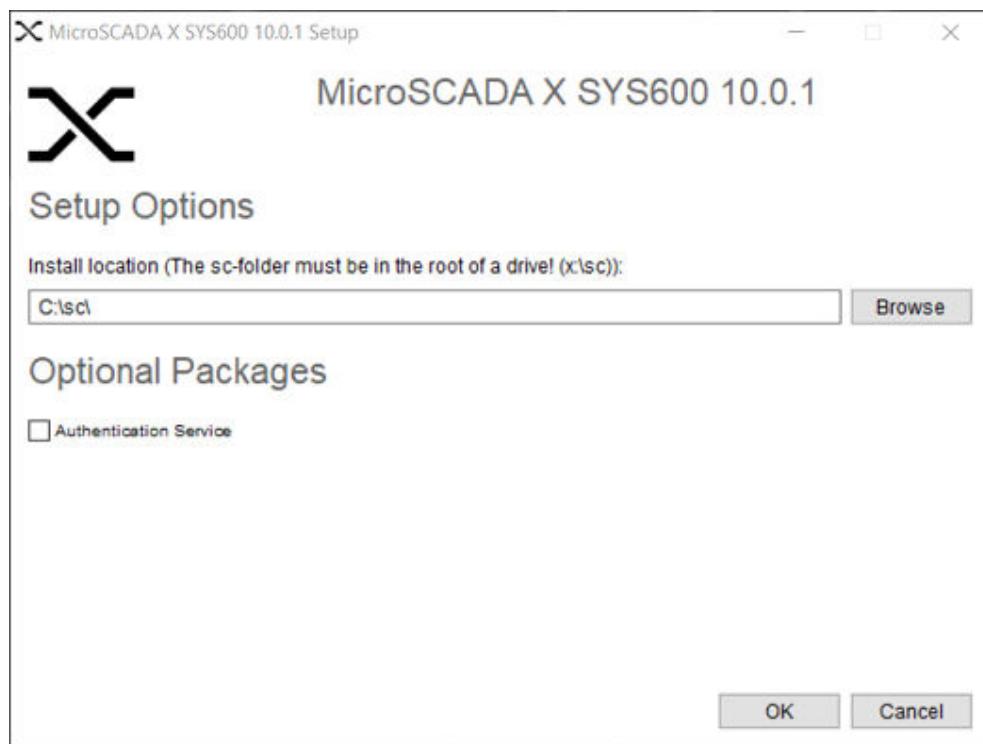


Figure 1: Selecting installation drive and optional packages

ABB Authentication Service Installs a service for replicating user accounts from SDM600. Required if user accounts are managed by SDM600.

7. Select the drive in which the application is to be installed. The installation program suggests a destination drive for the MicroSCADA X SYS600 installation. If SYS600 has been installed before, the destination drive used in the previous installation is shown as a default drive. Otherwise, the default drive is C.



MicroSCADA X SYS600 must be installed on a disk drive physically located in the base system computer. It cannot be installed on a logical disk drive, for example a network drive.

8. After selecting the drive and the packages to be installed, click OK to close the dialog. Click 'Install' to start the installation.
A system reboot may be necessary during or after the installation. If this occurs, restart the SYS600 installation manually after the reboot. If ABB Authentication Service is selected, enter information as requested in step 8, otherwise continue to step 9.
9. ABB Authentication Service installation dialogs will appear if the package was selected earlier. The license must be accepted, customer information must be entered, setup type Complete must be selected and Administrator credentials must be created to accomplish an installation that is compatible with SYS600.

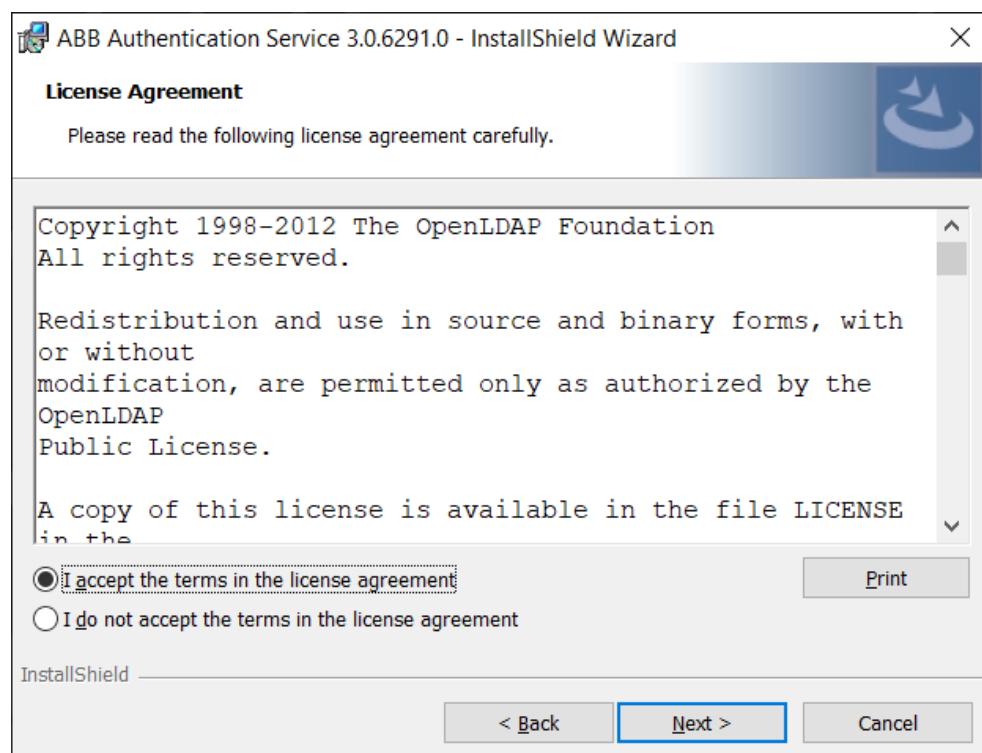


Figure 2: ABB Authentication Service License Agreement

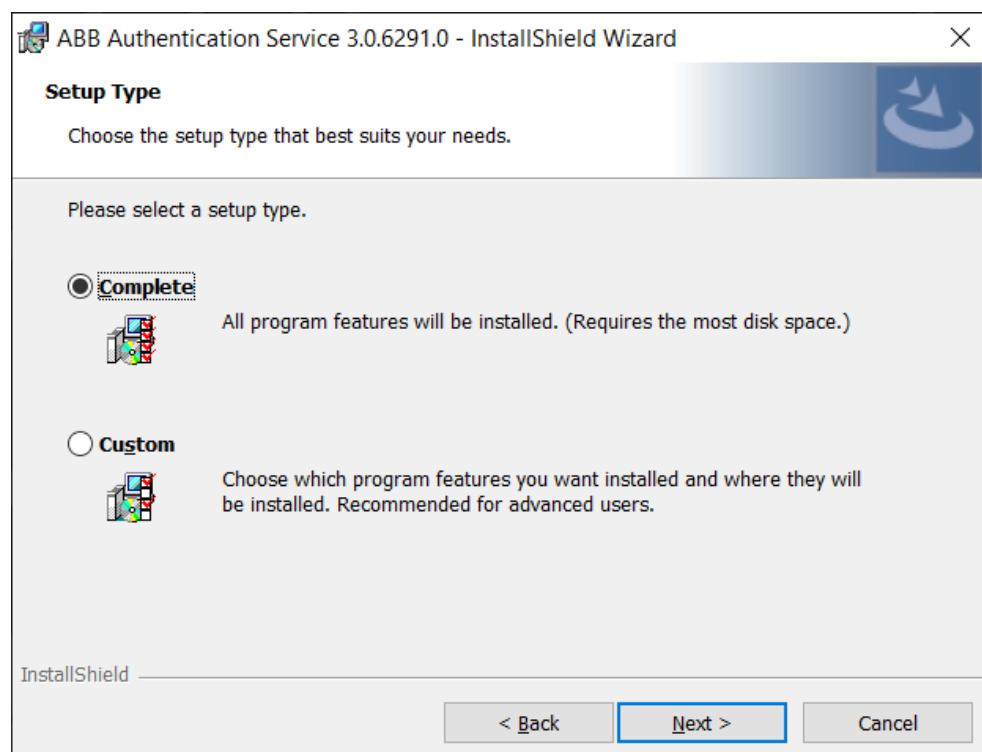
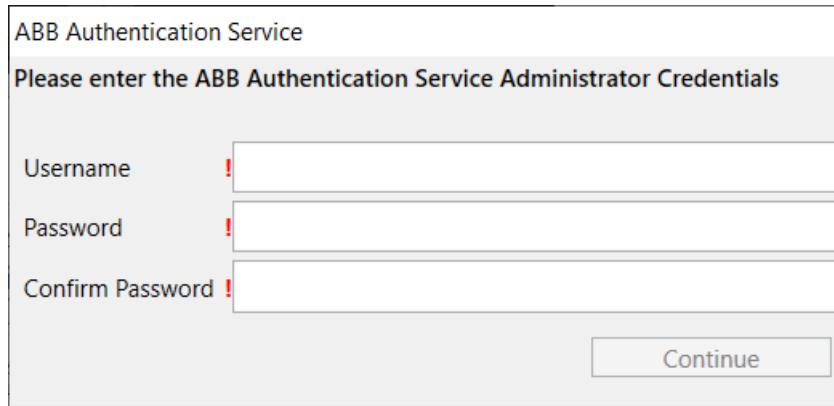


Figure 3: ABB Authentication Service Setup Type



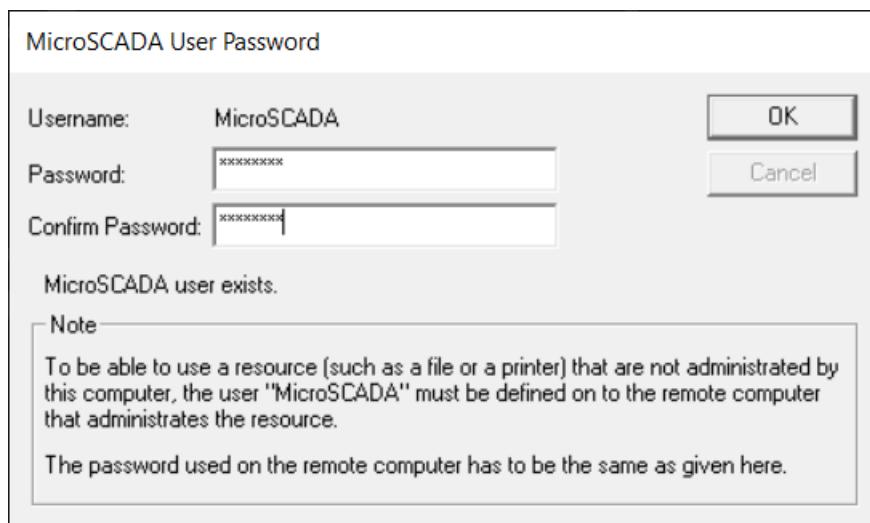
The dialog box is titled "ABB Authentication Service" and "Please enter the ABB Authentication Service Administrator Credentials". It contains three input fields: "Username" (empty), "Password" (empty), and "Confirm Password" (empty). Each field has a red exclamation mark icon to its left. A "Continue" button is located at the bottom right.

Figure 4: ABB Authentication Service Administrator Credentials

10. The MicroSCADA user is created during the first installation, define password for the user, see [Figure 5](#). Re-entering the password is needed also when previous installation exists. MicroSCADA user belongs to the Administrators group and it is the user who owns the MicroSCADA processes. The MicroSCADA user performs all references made by the processes. If two base system computers share resources, the MicroSCADA user should be given the same password on both computers. The password can be changed later from the SYS600 Control Panel.



MicroSCADA user account should not be used for interactive purposes. In SYS600 installation, local security policies are configured so that interactive local and remote login is denied for MicroSCADA user account.



The dialog box is titled "MicroSCADA User Password". It contains three input fields: "Username" (MicroSCADA), "Password" (xxxxxx), and "Confirm Password" (xxxxxx). To the right are "OK" and "Cancel" buttons. Below the fields, a message says "MicroSCADA user exists." A "Note" section contains the text: "To be able to use a resource (such as a file or a printer) that are not administrated by this computer, the user "MicroSCADA" must be defined on to the remote computer that administrates the resource." Another note states: "The password used on the remote computer has to be the same as given here."

Figure 5: MicroSCADA User Password dialog

11. After the base software is installed, other selected packages are installed.
12. The Installation completed dialog is shown when MicroSCADA X SYS600 has been installed.

3.1.6.2 Installing COM500*i*

COM500*i* is a communication gateway running on a MicroSCADA X SYS600 platform. It provides a gateway between process devices and eight Network Control Centers (NCC). The

main tasks of COM500*i* are signal rerouting and protocol conversions. For information about COM500*i* installation see COM500*i* User's Guide, section Installation. COM500*i* functionality is licensed.

3.1.6.3 Installing DuoDriver

DuoDriver is a network driver which provides redundancy for TCP/IP based communication. It is delivered as part of SYS600 package but must be installed separately when used. See SYS600 Duodriver Installation guide for detailed instructions for installation. When upgrading an existing system, see SYS600 Release Notes if the version in question contains a new version and if reinstalling is needed.

3.1.6.4 Installing Security Compliance Manager

Cyber security settings for SYS600 system are defined using Security Compliance Manager (SCM) which is not delivered as part of SYS600 package. A separate installation of SCM is needed, see MicroSCADA X Cyber Security Deployment Guideline manual for instructions for SCM downloading and installing.

3.1.7 Verifying SYS600 installation

During the installation of the MicroSCADA X SYS600 kernel software, two empty applications are created. The two applications are named MAIN and WD.

The desktop icons for the MicroSCADA X Control System SYS600 is created during the installation. See [Figure 6](#).

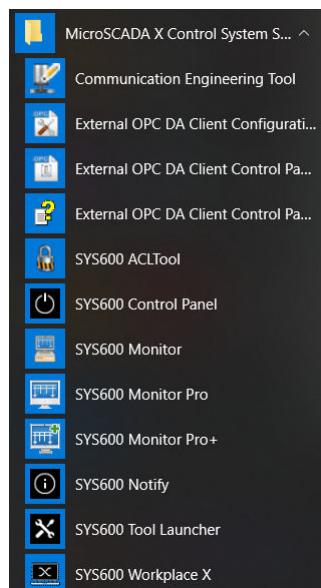


Figure 6: Desktop icon

3.1.7.1 SYS600 Control Panel

The SYS600 Control Panel dialog contains application management tools. The system can be started by clicking **Start** and stopped by clicking **Stop** buttons.

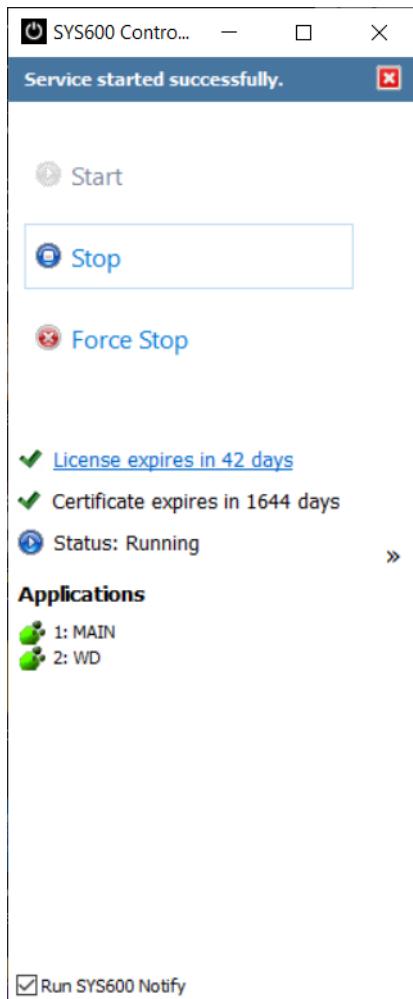


Figure 7: SYS600 Control Panel

3.1.7.2 SYS600 Notify

The revision information and error messages that occurred during the start-up and operation of SYS600 are shown in the SYS600 Notify window. See [Figure 8](#).

localhost - SYS600 Notify						
#	Timestamp	Source	Ap...	Category	Message	System
1	19.11.2019 8.56.38.039	SYS60...	LOG	SYS600 Log Service connected		Package
2	19.11.2019 8.56.38.063	SYS60...	Log Se...	Connected to Message Broker		SYS_600 10.0 PRODUCTION
3	19.11.2019 8.56.38.567	Base S...	SYS	SYS_600 10.0 PRODUCTION 2019-11-15 11:03:47 EET		2019-11-15 11:03:47 EET
				Customer: ABB MICROSCADA PRO DEVELOPMENT A		Base System
				Site: ABB INTERNAL USE ONLY		10.0 PRODUCTION
				System ID: 3017005, Key: 1-HMGE-IOEC-IGPN-BCE		2019-11-15
				Base System: 10.0 PRODUCTION 2019-11-15		System ID
4	19.11.2019 8.56.38.568	Base S...	LICE	This license will expire in 42 days		3017005
5	19.11.2019 8.56.38.869	Applica...	MAIN	INFO Configuring base system...		Key
6	19.11.2019 8.56.39.040	Applica...	MAIN	INFO Base system configuration finished.		1-HMGE-IOEC-IGPN-BCEK
7	19.11.2019 8.56.40.207	Base S...	1	APL MAIN: Starting		Customer
8	19.11.2019 8.56.40.207	Base S...	1	APL MAIN: Hot		ABB MICROSCADA PRO
9	19.11.2019 8.56.40.689	Base S...	2	APL WD: Starting		DEVELOPMENT AND SUPPORT
10	19.11.2019 8.56.41.364	Base S...	2	APL WD: Hot		CENTER
11	19.11.2019 8.56.41.452	Applica...	1	REPR INFO Starting PC_.NET...		Site
12	19.11.2019 8.56.41.453	Applica...	2	LIB5 Paths added from package BGU.		ABB INTERNAL USE ONLY
13	19.11.2019 8.56.41.978	Applica...	2	LIB5 Paths added from package BPU.		Startup Time
14	19.11.2019 8.56.41.979	Applica...	1	LIB5 Paths added from package BGU.		2019-11-19 08:56:38
15	19.11.2019 8.56.42.101	Applica...	1	LIB5 Paths added from package BPU.		License expiration
16	19.11.2019 8.56.42.181	Applica...	1	REPR INFO Configuring NET 3...		Expires in 42 days
17	19.11.2019 8.56.42.892	WebUI	HTTP	INFO NET 3 configuration finished.		Certificate expiration
18	19.11.2019 8.56.43.538	Display...	2	LIB5 Binding HTTPS/1.1 interface to 0.0.0.0:443		Expires in 1644 days
19	19.11.2019 8.56.44.230	Display...	1	MIGR Started display migration (WD)...		Applications
20	19.11.2019 8.56.44.831	Display...	2	MIGR Started display migration (MAIN)...		1: MAIN
21	19.11.2019 8.56.45.588	Display...	1	MIGR Finished display migration (WD)		2: WD
22	19.11.2019 8.56.52.459	Display...	MIGR	Started display migration (System symbols)...		
23	19.11.2019 8.56.52.983	Display...	MIGR	Finished display migration (System symbols)		

Figure 8: SYS600 Notification Window

3.1.7.3 SYS600 Workplace X

When an operator wants to supervise an application on a monitor screen, the operator opens a Workplace X either with dedicated Workplace X application or using web browser.

3.1.7.4 SYS600 Monitor Pro

When an operator wants to supervise an application on a monitor screen, the operator opens a MicroSCADA Pro(+) monitor. Existing Monitor Pro displays are converted to Monitor Pro+ displays during start-up.

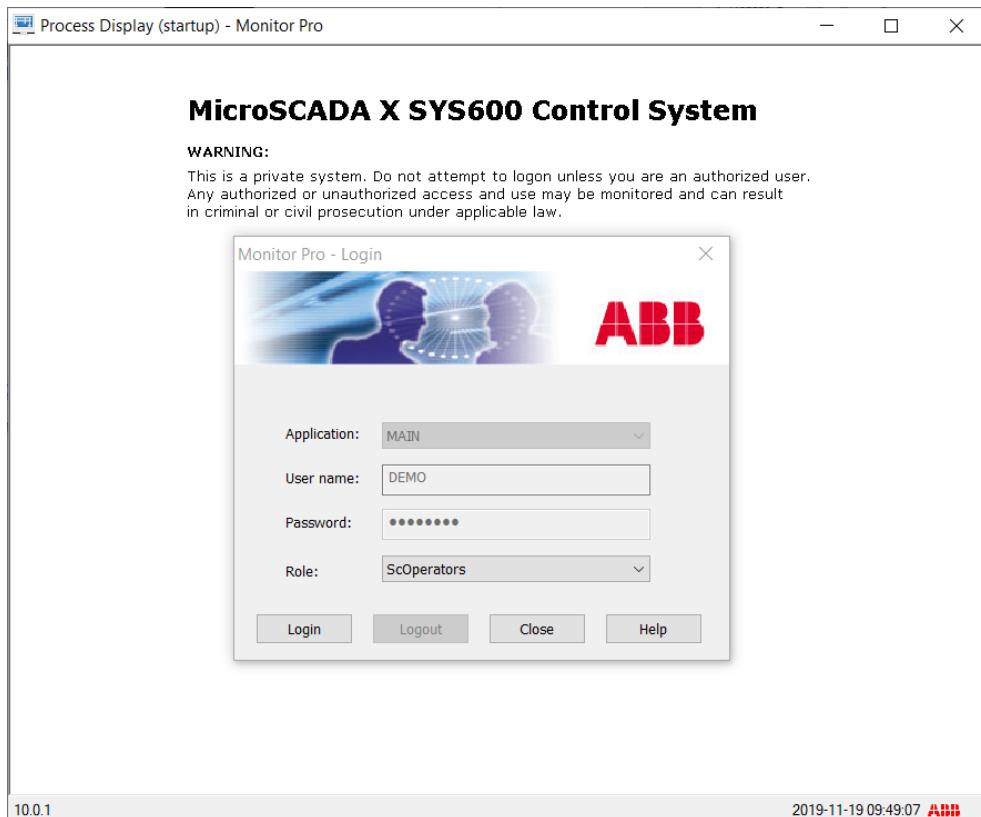


Figure 9: Monitor Pro Startup Window

3.1.7.5 SYS600 Monitor

When an operator wants to supervise an application on a monitor screen of type VS, the operator opens a SYS600 Monitor with the **MicroSCADA Monitor** dialog.

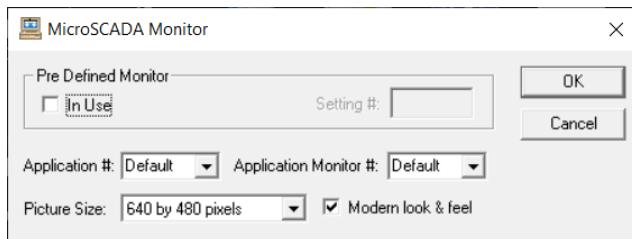


Figure 10: MicroSCADA monitor dialog

3.1.7.6 Applications

Add additional applications by clicking Control MicroSCADA applications... in the Configuration panel from the SYS600 Control Panel. The MicroSCADA administration tools also provide means for listing and removing applications. When an application is added, the application directories for the new application are created. The startup and initialization pictures and dialogs are copied to the application directory apl_.

To open the **Control MicroSCADA Applications** dialog:

1. Open the SYS600 Control Panel by double-clicking the icon.
2. Enlarge the view by clicking ».
3. Click Configuration to open the Configuration Panel.
4. Click Control MicroSCADA applications...

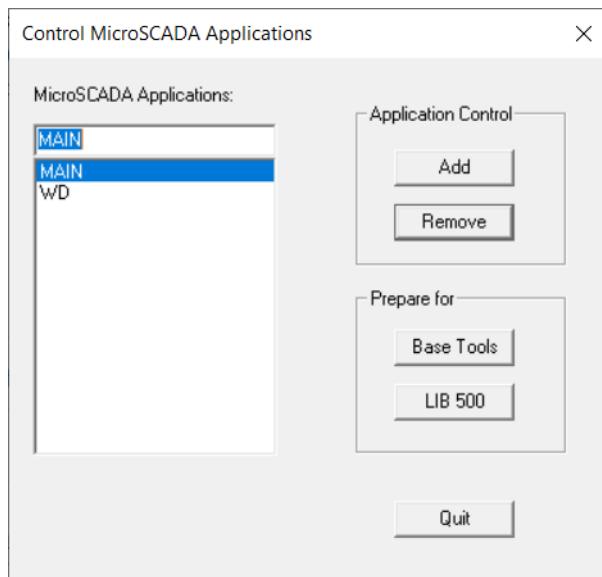


Figure 11: Control MicroSCADA Applications dialog

In this dialog, it is possible to view, add, prepare and remove the applications.

3.1.7.7 Adding applications

To add a new application:

1. In the **Control MicroSCADA Applications** dialog, click **Add** to open the **Add new application** dialog, see [Figure 12](#).

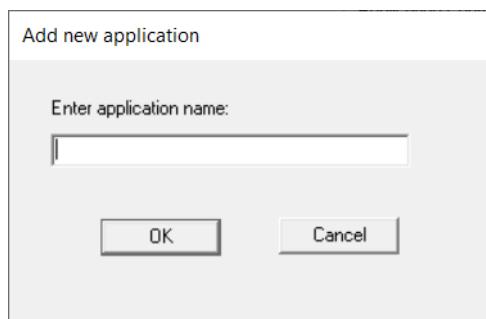


Figure 12: Adding new application

2. Type the name of the application to be created.
3. Click **OK**.

3.1.7.8 Preparing applications

When preparing an application, the necessary startup and initialization files are copied to the application directory.

In case LIB500 is used, a new application needs to be prepared for it. Preparation for Base Tools is optional.



If Classic Monitor is used and existing application is made with older version than SYS600 9.4, it needs to be re-prepared for Base Tools. This is because a new login dialog is required. Login dialog is defined in apl_stl.txt.

To prepare an application:

1. Open the **Control MicroSCADA Applications** dialog.
2. Select the application to be prepared.
3. Click **Base Tools**.
4. Select one of the following options:
 - Full prepare - copies all the initialization files and pictures to the application directory. The possible existing files are overwritten.
 - Limited prepare - to copy initialization files but not the APL_INIT and APL_START pictures. Use this option if the existing APL_INIT and APL_START files need to be kept. For instance, if the application for LIB 500 has been prepared, use Limited prepare.

If LIB 500 is used, prepare the applications for LIB 500.

1. Open the **Control MicroSCADA Applications** dialog.
2. Select the application to be prepared.
3. Click **LIB 500** and refer to the LIB 500 documentation to complete the preparation.

3.1.7.9 Removing applications

To remove an existing application:

1. Open the **Control MicroSCADA Applications** dialog.
2. Select the application to be removed.
3. Click **Remove** to remove the selected application directory and its sub-directories.



Using this utility physically removes the application from the SYS600 computer file system. Therefore it is important to verify that the backup of the application exists, in case it is required for later use.

3.1.8 Installing SYS600 Historian

SYS600 Historian is installed with its own installation program. It is recommended that the SYS600 Historian is not installed to the same system where SYS600 is.

3.1.8.1 Software requirements

Historian is not supported on operating systems with other system default UI languages or install languages than English (EN) United States (US).

The SYS600 Historian supports the following operating systems:

- Windows Server 2012 R2 Standard (64 bit)
- Windows Server Standard LTSB 2016 (64 bit)
- Windows Server Standard LTSC 2019 (64 bit)

The SYS600 Historian User Interface supports the following operating systems:

- Windows 8.1 Pro (32/64 bit)
- Windows 10 Enterprise LTSB 2016 (32/64 bit)
- Windows 10 Enterprise LTSC 2019 (32/64 bit)

- Windows Server 2012 R2 Standard (64 bit)
- Windows Server Standard LTSB 2016 (64 bit)
- Windows Server Standard LTSC 2019 (64 bit)

3.1.8.2 Installation

SYS600 Historian is installed in two phases. First the setup media for the product is installed into the computer. The target location for the setup media is configurable by clicking Options. After finishing this step the SYS600 Historian Setup application is started automatically to complete the installation. The setup application is also started when ABB SYS600 Historian product installation is being repaired from the Windows Programs and Features list and it can be started from the Windows Start Menu items for MicroSCADA X Control System too.

The setup application can perform different operations. Install is used for a new setup or upgrading existing installation and Reinstall can be used for reinstalling everything for example after operating system has been reinstalled and existing database, backup and application folders need to be used. When upgrading existing system with Install or Reinstall operation, a dedicated post install update script is executed by default to set up some default parameters in the same way as in a new setup. It is possible to prevent setting these parameters by unchecking Run update script option. With Uninstall the Historian can be uninstalled, further details are available in the Historian Configuration and Administration manual.

Configurable items for the setup are choosing time zone, database folder, database backup folder, application folder and database size. The database folder and backup folder should be located on different physical disks. With database size it is possible to allocate different amount of system resources for the Historian. If a dedicated system is selected, all computers resources are reserved for the SYS600 Historian. Additional information is available as tooltip messages in the setup user interface.

Installation creates an empty database. If SYS600 Historian is reinstalled the database is preserved. The default database name is formed by adding suffix -RTDB to the computer name, e.g. if the computer name is MY-SERVER, the name of the database will be MY-SERVER-RTDB. Computer name can be viewed from the System view in the Windows Control Panel.

SYS600 Historian creates an online backup of the database automatically. This backup copy can be then used for creating for example tape backups.



SYS600 Historian requires high disk performance for random disk writes. It is recommended that the system has a dedicated physical disk for database and another separate physical disk for backup. For even better performance and reliability separate RAID 1+0 arrays should be used for database disk. For example, a large system might have 7 physical disks, where the first disk is used for Windows installation (drive C:), disks 2 to 5 are used for RAID 1+0 array as drive D: for SYS600 Historian database and the sixth and seventh disks are used as another RAID 1 array as drive E: for SYS600 Historian backup folder. Drive E: should be as big as drive D:. For optimal performance, the database disk should use allocation unit size of 64 KB.

Following table can be used to estimate the required server capacity. It is assumed that dedicated server setting is used. If mixed system is used, memory requirement must be multiplied by factor of 2.

	Small	Medium	Large
Number of tags	10 000	50 000	100 000
Number of writes / s	1 000	5 000	20 000
System memory	4 GB	16 GB	96 GB
Disk configuration	300 GB RAID 1	600 GB RAID 1 for database and 600 GB RAID 1 for backup	2 TB RAID 1+0 for database and 2 TB RAID 5 for backup. Separate disk for operating system.

3.1.8.3 License

Historian license is managed by the setup application. The installation procedure requires that a valid license is available during installation time. The setup media includes expiring demo license. If the validity period has ended or is near ending a warning message is displayed during setup application starting and the license can be updated to newer.

The permanent run-time license is computer limited. The required information needs to be collected using the setup application and sent to Hitachi Power Grids for license generation. After receiving run-time license it can be installed to the computer and RTDB service restarted to take it into use.

3.1.8.4 User Interface

Historian User Interface can be used either in the server or it can be run over remote connection. On the server or through RDP, the Historian User Interface (Vtrin) can be started from the Start Menu. Over the network the client can be started using a ClickOnce executable. This is done by opening <https://<Historian server host>/vtrin> with a browser, configuration details in Historian Configuration and Administration manual. The link can be added to Monitor Pro toolbar.

3.1.9 Installing Security Compliance Manager (SCM)

Since SYS600 10.0, the SCM tool is not included in the SYS600 installation anymore. It is now a separate installable standalone installation package. Refer to the Cyber Security Deployment Guideline manual in order to install SCM.

3.2 Local Area Network (LAN)

A local area network (LAN) is a group of computers and associated devices which are interconnected within a limited area. In MicroSCADA environment, workstations, SYS600 computers, IEDs and other devices and systems are communicating with each other using LAN and the structure and features of the used network depend on system requirements. See related operating system, network device and cyber security documentation for detailed instructions.

3.2.1 Network interface card

Each computer on the LAN contains one or more network interfaces. Driver software for handling the interface may have to be explicitly installed for each adapter, especially if the adapter is installed after the operating system.

The LAN software for built-in network interface cards is installed and configured during or right after the operating system installation.

3.2.2 IP addresses

MicroSCADA supports IPv4 addressing which is composed of four numbers in the range from 0 to 255.

Each node or host in a TCP/IP network has one or more IP addresses and each address need to be unique within a LAN. Consult network administrator for required network addressing, static addressing should be used. In MicroSCADA environment, most of the communication occurs with TCP/IP, but some communication protocols use UDP/IP, too.

IP address 127.0.0.1, 'localhost' is known as the loopback address and it always refers to the local computer. Some software modules of MicroSCADA are interconnected using 'localhost' address by default.

3.2.3 Host names

During Windows installation:

1. Define the computer name so that the computer is recognized within the workgroup. NETBIOS name, if used, is derived from the computer name by default. The computer's name is usually not the same as the host name used by IP protocols.
2. Read the computer's host name and IP address by typing: **ipconfig/all** in a **Command Prompt** window. It is also possible to verify the configuration from the network settings in the Control Panel.

To use host names, DNS must be used or alternatively, the names to be recognized have to be defined in a host table on the computer. In Windows systems the local host name definitions are in file C:\Windows\System32\Drivers\Etc\Hosts. The following is an example of a host table. Here each node has two names, one in lower case letters and one in upper case letters. The items in a host table are separated by spaces or tabs. Consult network administrator for information on solutions applied to used network.

```
# Copyright (c) 1993-2009 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#      102.54.94.97    rhino.acme.com        # source server
#      38.25.63.10    x.acme.com            # x client host
127.0.0.1          localhost
10.58.125.45       apassi                APASSI
10.58.125.46       ws1                   WS1
10.58.125.47       ws2                   WS2
10.58.125.48       fel                   FE1
```



To access Workplace X remotely with host name, the name must be known by the remote computer or mobile device. Typically this requires the use of DNS and configuring the DNS in the remote device.

3.2.4 Verifying the LAN communication

Use the ping utility to test the connectivity on the LAN and determine if a host is available and active. The syntax is: **ping host** where 'host' is the computer's IP address or node name on the network. If the computer responds, a message is produced with some diagnostic information.

3.2.4.1 Example

Ping 192.10.0.210

Reply from 192.10.0.210: **bytes = 32 time < 10ms TTL 255**

The typical reply time is below 10ms. If the reply time exceeds 50 ms on normal Wired or Fibre Optic Network, it is recommended to check the LAN communication equipment.

3.3 Installing Workplace X on workplace computers

There is a separate installation package to install Workplace X application for computers that won't have SYS600 software installed. Alternatively a web browser can be used, but some of the Workplace X features (e.g. linked monitors) will not be available.

To install the Workplace X software:

1. Logon as a user with sufficient rights to install software
2. Double-click the installation file: MicroSCADA X Workplace X.exe
3. Follow instructions of the installation software

When using secured communication, the SYS600 web server certificate needs to be made trusted by the Workplace X application and/or web browser. This might require exporting the certificate from the server computer and installing the certificate to the Workplace computer. See System Configuration manual Web Server Configuration section for details.

3.4 Installing Remote Desktop Services



Remote Desktop Services are not required for Workplace X.

Remote Desktop Services is a component of Microsoft Windows (both server and client versions) that allows a user to access applications and data stored on a remote computer over a network. This feature is needed to be able to open MicroSCADA Monitor Pro pictures on workstations.

Following items need to be checked during installation:

- Terminal Server system requirements
- Licensing service installation
- Installing Windows Server Remote Desktop Services
- Installing Terminal server Client
- Remote Desktop Protocol (RDP) Client

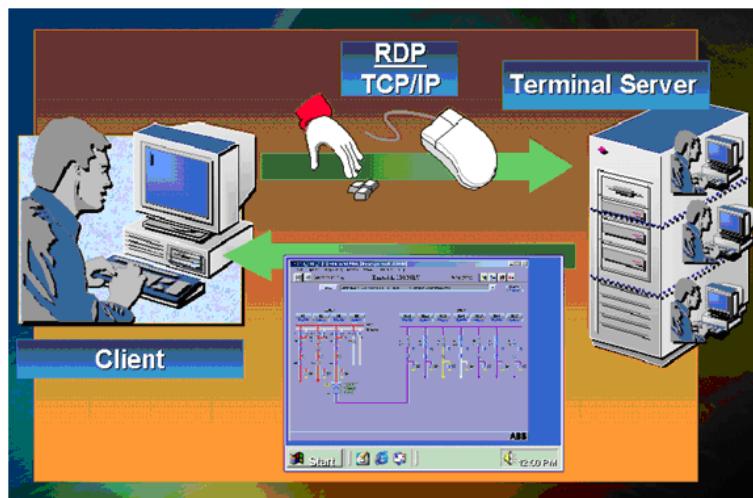


Figure 13: Principles of Terminal Server based computing

3.4.1 Server-based computing

With server-based computing it is possible to deploy, manage, support and execute applications completely on a server. The client devices, whether “fat or thin”, have instant access to it without application rewrites or downloads.

3.4.2 Components of server-based computing

Server-based computing relies on three critical components:

1. A multiuser operating system that allows multiple concurrent users to log on and run applications in separate, protected sessions on a single server.
2. A remote presentation services architecture capable of separating the application's logic from its user interface in such a way that only keystrokes, mouse clicks, and screen updates travel the network.
3. The Remote Desktop Services Server product consists of four components: the Windows Server multiuser core, the Remote Desktop Protocol, the Windows-based client software and enhanced system administration tools.

Remote Desktop Services Server: A multiuser server core that provides the ability to host multiple, simultaneous client sessions on Windows Server systems.

Remote Desktop Protocol (RDP): A key component of Terminal Server is the protocol, which allows a client to communicate with the Terminal Server over the network. It is a multichannel protocol tuned for high-bandwidth enterprise environments. Furthermore, it supports three levels of encryption.

Remote Desktop client: The client software presenting or displaying the Windows user interface on a range of desktop hardware.

Administration Tools: In addition to all the familiar Windows Server administration tools, Terminal Server adds the Terminal Server License Manager, Terminal Server Client Creator, Terminal Server Client Connection Configuration and Terminal Server Administration tools for managing the client sessions. There are two new objects, Session and User, which are also added to the Performance Monitor to allow tuning of the server in a multiuser environment.

3.4.3 Remote Desktop Licensing service

Steps to install and activate the RD Licensing role service in Windows Server 2012 R2 operating system.



The steps below are written for the condition when none of Remote Desktop Services are installed in the system.

1. Click on **Server Manager**. Select **Dashboard**.
2. Under **Configure this local server**, click on **Add roles and features**.
3. Click **Next** on the **Before You Begin** page of the **Add roles and features wizard**.
4. On the **Installation Type** page, select the **R ole-based or feature-based installation** option, and then click **Next** to continue.
5. Click on **Select a server from the server pool** on Server Selection page, select a destination server from the pool, and click **Next**.
6. On the **Server Roles** page, check mark **Remote Desktop Services**, click **Next**.
7. Again click **Next** on the **Features** page.
8. On the **Remote Desktop Services** page, click **Next**.
9. On the **Role Services** page, check mark **Remote Desktop Licensing**, click **Add Features** and click **Next**.
10. On the **Confirmation** page, Click **Install**.
11. Installation begins. When features installation successfully completed message is displayed, **Close** the window.
12. Open **Remote Desktop License Manager** from desktop items. Expand **All servers**. Select the server and right click. Select **Activate Server** item from the context menu.
13. On the **Welcome** page, click on **Next**.
14. Select connection method: **Automatic connection** on connection method page. Click **Next** to continue.
15. Fill **Company Information**, click **Next**. Fill optional information and click **Next**. Status should indicate that the License server is successfully activated. Click **Next**.
16. On **Welcome page of Installation Licenses** wizard, click **Next**.
17. Select **License program** and click Next. (For example, Enterprise Agreement)
18. Write Agreement number. Click **Next**.
19. Select Product Version: **Windows Server 2012**, License Type: **RDS Per Device CAL** and write Quantity. Click **Next**.
20. Status should show Licenses have been successfully installed. **Close** the window.
21. Installed License is used in Remote Desktop session Host.

3.5 Installing process communication units

3.5.1 PC-NET process communication unit

The PC-NET process communication unit is a Windows executable, which is automatically installed when the SYS600 packet is installed or upgraded. The instances of these units are defined with the system configuration tool, see System Configuration manual, section Configuring process communication. In runtime, each configured NET in the system configuration will have a corresponding pc_nets.exe process running.

Depending on configuration, the communication lines configured to PC-NET instances will use serial ports, network adapters or PCLTA extension cards (PCI-bus based LON communication). LON communication can also be achieved using network connected Loytec device. The required hardware must be installed and configured before a complete verification of the system configuration can be done.

The installation of the computer hardware used by PC-NET process communication units is described in [Section 3.5.1.1](#), [Section 3.5.1.2](#), [Section 3.5.1.3](#) and [Section 3.5.1.4](#).

3.5.1.1 Installing multiport serial card

Each PC-NET instance supports 12 communication lines and, in most cases, additional COM ports are required. The usage of standard COM ports 1-4 is also possible.

The multiport serial card is an extension card which is installed to a PCI slot in the motherboard of the PC. As to the installation procedure, refer to the installation manual of the product. In principle, any PCI based serial card can be used but following product lines and manufacturers are verified and widely used in MicroSCADA systems:

- RocketPort from Comtrol Corp.
- DigiBoard from Digi International
- MOXA serial boards from Moxa Technologies, Inc.

The serial port products which are not PCI-based are also widely available. However, as long as the COM ports provided by these products may disappear from the system during runtime, the overall reliability of the system is worse than in PCI-based alternatives.

In all cases, the COM port used by communication line used is defined with the SD-attribute of the line object.

3.5.1.2 Installing LON communication

For installation of LON communication, see Connecting LONWORKS Devices manual.

3.5.1.3 Installing network cards

If the system configuration contains protocols which use LAN, the necessary network adapters must be installed. In most cases, the process communication uses the same network adapter as the MicroSCADA base system and the installation procedure is the same as described in [Section 3.2](#).

The communication lines created to PC-NET instances may use multiple local IP-addresses especially when there are multiple connections to Network Control Centers (slave protocols), or when the IEDs which are connected to MicroSCADA are divided to multiple networks (master protocols).

In Windows, it is possible to define multiple IP-addresses to the same network adapter, but it is also possible that the used IP-addresses are divided to multiple network adapters. Multiple network adapters are often used in systems requiring redundant communication lines. When the installation and the configuration of the network adapters is complete, the successful ping test described in [Section 3.2](#) indicates that the given IP-address is present in the system and it can be used by the PC-NET.

In all LAN protocols supported by PC-NET, line attribute LD defines which local IP-address is used by the communication line.

3.5.1.4 Verifying PC-NET process communication unit

In order to verify the operation of the PC-NET process communication unit, the system configuration must contain at least one configured NET node. When MicroSCADA system is started, printouts about starting each configured PC-NET node are displayed in the notification window [Figure 14](#). Also, printouts about possible configuration errors are shown in notification window.

localhost - SYS600 Notify						
#	Timestamp	Source	Ap...	Category	Message	System
1	19.11.2019 8.56.38.039	SYS60...	LOG	SYS600 Log Service connected	Package	SYS_600 10.0 PRODUCTION
2	19.11.2019 8.56.38.063	SYS60...	Log Se...	Connected to Message Broker		2019-11-15 11:03:47 EET
3	19.11.2019 8.56.38.567	Base S...	SYS	SYS_600 10.0 PRODUCTION 2019-11-15 11:03:47 EET	Customer: ABB MICROSCADA PRO DEVELOPMENT &	Base System
					Site: ABB INTERNAL USE ONLY	10.0 PRODUCTION
					System ID: 3017005, Key: 1-HMGE-IOEC-IGPN-BCE	2019-11-15
					Base System: 10.0 PRODUCTION 2019-11-15	System ID
4	19.11.2019 8.56.38.568	Base S...	LICE	This license will expire in 42 days		3017005
5	19.11.2019 8.56.38.869	Applica...	MAIN	INFO Configuring base system...	Key	1-HMGE-IOEC-IGPN-BCE
6	19.11.2019 8.56.38.903	Applica...	MAIN	INFO Base system configuration finished.	Customer	ABB MICROSCADA PRO
7	19.11.2019 8.56.39.040	Base S...	1 APL	MAIN: Starting	DEVELOPMENT AND SUPPORT	
8	19.11.2019 8.56.40.207	Base S...	1 APL	MAIN: Hot	CENTER	
9	19.11.2019 8.56.40.207	Base S...	2 APL	WD: Starting	Site	
10	19.11.2019 8.56.40.689	Base S...	2 APL	WD: Hot	ABB INTERNAL USE ONLY	
11	19.11.2019 8.56.41.364	Applica...	1 REPR	INFO Starting PC_.NET...	Startup Time	2019-11-19 08:56:38
12	19.11.2019 8.56.41.452	Applica...	2 LIBS	Paths added from package BGU.	License expiration	Expires in 42 days
13	19.11.2019 8.56.41.453	Applica...	2 LIBS	Paths added from package BPU.	Certificate expiration	Expires in 1644 days
14	19.11.2019 8.56.41.979	Applica...	1 LIBS	Paths added from package BGU.	Applications	
15	19.11.2019 8.56.42.108	Applica...	1 REPR	Paths added from package BPU.		
16	19.11.2019 8.56.42.181	Applica...	1 REPR	INFO NET 3 configuration finished.		
17	19.11.2019 8.56.42.892	WebUI	HTTP	Binding HTTPS/1.1 interface to 0.0.0.0:443		
18	19.11.2019 8.56.43.538	Display...	2 MIGR	Started display migration (WD)...		
19	19.11.2019 8.56.44.230	Display...	1 MIGR	Started display migration (MAIN)...		
20	19.11.2019 8.56.44.831	Display...	2 MIGR	Finished display migration (WD)		
21	19.11.2019 8.56.45.588	Display...	1 MIGR	Finished display migration (MAIN)		
22	19.11.2019 8.56.52.459	Display...	MIGR	Started display migration (System symbols)...		
23	19.11.2019 8.56.52.983	Display...	MIGR	Finished display migration (System symbols)		

Figure 14: Notification window

As described in the system configuration manual, the startup of the PC-NET process communication unit can be done also using the SCIL procedures. When this method has been used and system is started, the existence of the NET nodes can be verified e.g. using the Open Online function of the system configuration tool. If the configuration contains errors, the error printout can still be found from the notification window and the used status codes are the same as with the system configuration tool. The status codes are listed in a separate manual 'MicroSCADA X SYS600 Status Codes'.

3.5.2 IEC 61850

The IEC 61850 related process communication units are Windows executables, which have been automatically installed during the SYS600 software installation. Two separate executables exist, IEC 61850 OPC server for process communication operating as IEC 61850 client and IEC 61850 server for NCC (Network Control Center) communication.

Before any actual IEC 61850 process communication occurs from the set of IEC 61850 IED's (that is, process devices) into SYS600 process database, there is a need to configure each of the IEC 61850 process communication units to represent the certain part of the underlying process devices. This is made by using the tools included into SYS600 software, see IEC 61850 System Design manual, section Configuration. At run-time, each configured IEC 61850 process communication unit is called an instance. Each of these instances can be seen that the corresponding opcs_iec61850.exe process is running.

The actual IEC 61850 protocol communication occurs over the physical TCP/IP network. However, depending on the selected configuration, different TCP/IP network related hardware and software has been installed and configured accordingly before the complete verification of the IEC 61850 system configuration can be done, see IEC 61850 System Design manual, section Requirements.

For IEC 61850 server functionality towards NCC, see SYS600 IEC 61850 server manual for configuration details. The usage of IEC 61850 server requires configuration of COM500*i* gateway.

3.6 Installing peripheral equipment

3.6.1 Installing printers

Printers are used for automatic event and alarm print, and for operator initiated hard copy. The automatic event and alarm print requires that the printers are connected to MicroSCADA X Control System. The installation descriptions below apply to the printers used by MicroSCADA. Regarding the installation of Windows hard copy devices, refer to the Windows and the printer manuals.

A printer can be connected in the following ways:

- Directly to a base system computer.
- To a LAN via a printer server.

3.6.1.1 Connecting printers to the base system

A printer connected directly to a base system can also be used by other base systems on the LAN. The printer has to be defined as "shared" in the computer's operating system configuration to which it is directly connected. Printers connected to a LAN can be made accessible to all base systems on the LAN.

On the application level, the printing can be accomplished as SCIL defined printing ("transparent" printing). The SCIL defined printout can contain any characters supported by the printer.

This type of printing is specified by the SCIL function **PRINT_TRANSPARENT**.

Each base system and each application is able to recognize and use up to 20 printers. It is possible to configure virtual printers without a real physical correspondence for logging in a file on a disk. When a printer is defined for printer logging, all printout sent to the printer is stored on a disk. This is useful when configuring an event log, that is a disk copy of the event list. A physical printer can also be given more than one printer object definitions to enable several different types of printouts to the same printer. The printer operation can be supervised and controlled, for example, temporarily stopped and restarted, or the printout can be redirected to another printer. This can be done by means of the ST and CL attributes (see SYS600 System Objects).

3.6.1.2 Connecting printers to LAN

Printers connected to a base system computer or LAN must be configured in all base systems that uses the printers. Configure the printer in each base system as follows:

1. Create a **PRIn:B** base system object, with at least the following attributes (see System Objects manual):

DT	"NORMAL" (black-and-white ASCII based print out) or "TRANSPARENT" (SCIL defined print out)
DC	"LINE"
SD	Printer device name including UNC path (SD="\\My_Computer\\My_printer"). The printer must be shared for the UNC name to be a valid value of the attribute
TT	"LOCAL"

In addition, optional features are defined by the following attributes:

LP	Lines per page, this should be greater or equal to the number defined in the printer
QM	Printer queue length
OD	Output destination: "PRINTER", "LOG" (disk files) or "BOTH"
LD, LL, LF	Printer log attributes, specially the management of log files. The attributes are meaningful, if OD = "LOG" or "BOTH"
OJ	Open on Job Basis, set value to 1. The printer is opened before each print job and closed when the job is completed

2. If needed, map the printer for an application with the APLn:BPR attribute. Printers can be mapped for an application, which means that the application recognizes the devices under logical numbers. The printer mapping is required only if a logical printer number, which is not the same as the printer object number, is used.



Only the printers mapped with the logical printer numbers 1 ...15 can be used as alarm and event printers. Printer 15 is reserved for event lists.

The following is an example of a configuration where a printer is connected directly to a base system:

```
#CREATE PRI2:B = LIST(-
TT = "LOCAL",-
DT = "NORMAL",-
DC = "LINE",-
SD = "\\\My_SYS_name\My_Printer_name",-
LP = 66)
```

3.6.2 Installing SNMP components

Simple Network Management Protocol (SNMP) devices are able to provide information about themselves via network management protocols. Such devices are servers, printers, hubs, switches and routers. It is common that these devices are supervised in MicroSCADA systems via third-party SNMP management software products.

To enable SNMP components in Windows operating systems:

1. Open Windows Components Wizard by selecting **Control Panel /Add and Remove Programs /Add/Remove Windows components**.
2. Select the category **Management and Monitoring Tools**, and click **Details**.
3. Select both **Simple Network Management Protocol** and **WMI SNMP Provider** subcomponents to be installed.

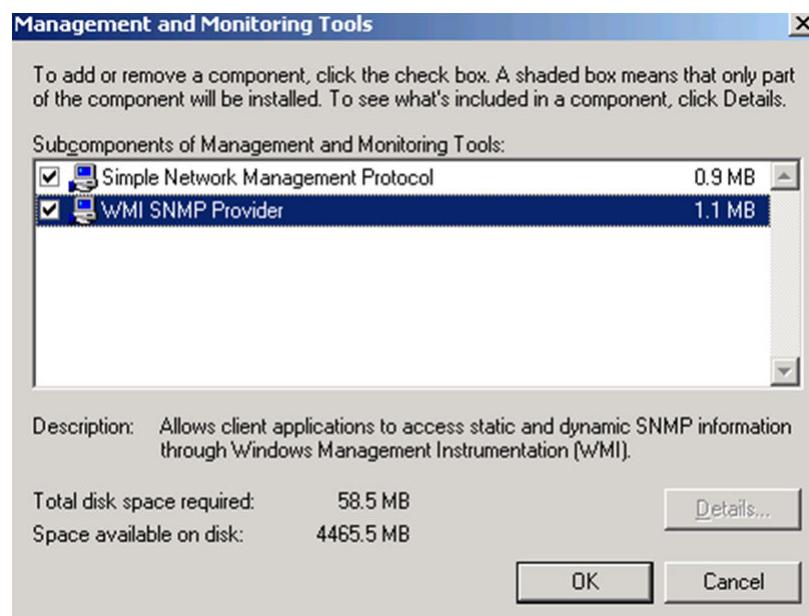


Figure 15: Management and Monitoring Tools dialog

Section 4 System administration

4.1 Exporting/importing objects

The following common functionalities are provided by the Export/Import tool:

- Recognizing all of the application objects from the selected MicroSCADA application.
- Defining the common options for the exported and imported application objects.
- Exporting and importing application objects.

The common options for exported and imported data are provided in the Export and Import section. The application objects to be handled are listed in the Application Objects tab. The progress of operation is indicated by using the progress indicator and the status bar field. The user can operate by clicking the appropriate buttons in the tool. See [Figure 18](#).

The Export/Import tool can also act as a stand-alone tool and be accessed directly through Tool Manager or SYS600 Tool Launcher.

4.1.1 Recognizing application objects

During the start-up of the tool, the list of MicroSCADA applications is read. The application, where the Export/Import tool has been started, is used as a default item.

The list of object types contains the following application objects:

P	Process Object Groups
IX	Process Objects
H	Event Handling Objects
X	Scale Objects
D	Data Objects
C	Command Procedures
T	Time Channels
A	Event Channels
G	Logging Profile Objects
UP	User Defined Process Objects
F	Free Type Objects

It is also possible to select **All Object Types** from the **Object Type** drop-down list. When **All Object Types** is selected, the Export/Import tool operates with all the application objects found from the selected application.

4.1.2 Export/Import Tool composition

The Export/Import Tool is composed of:

- a menu bar
- Export & Import section containing search conditions
- **Import**, **Export** and **Close** buttons
- a tabbed page containing application objects to be handled

On the bottom of the **Export/Import Tool** dialog, there is a status bar showing the number of processed application objects found and selected.

4.1.3 Opening and exiting Export/Import tool

Application Object Export/Import Tool can be run as a stand-alone tool or as a Application Object Navigator's subtool. The stand-alone tool can be started by clicking the Export/Import icon and selecting **File/Open**, see [Figure 16](#) or by clicking Export/Import icon in SYS600 Tool launchers Application Configuration tab.

If the stand-alone tool is used, it is possible to export and import the application objects according to the common options for the exported and imported data.

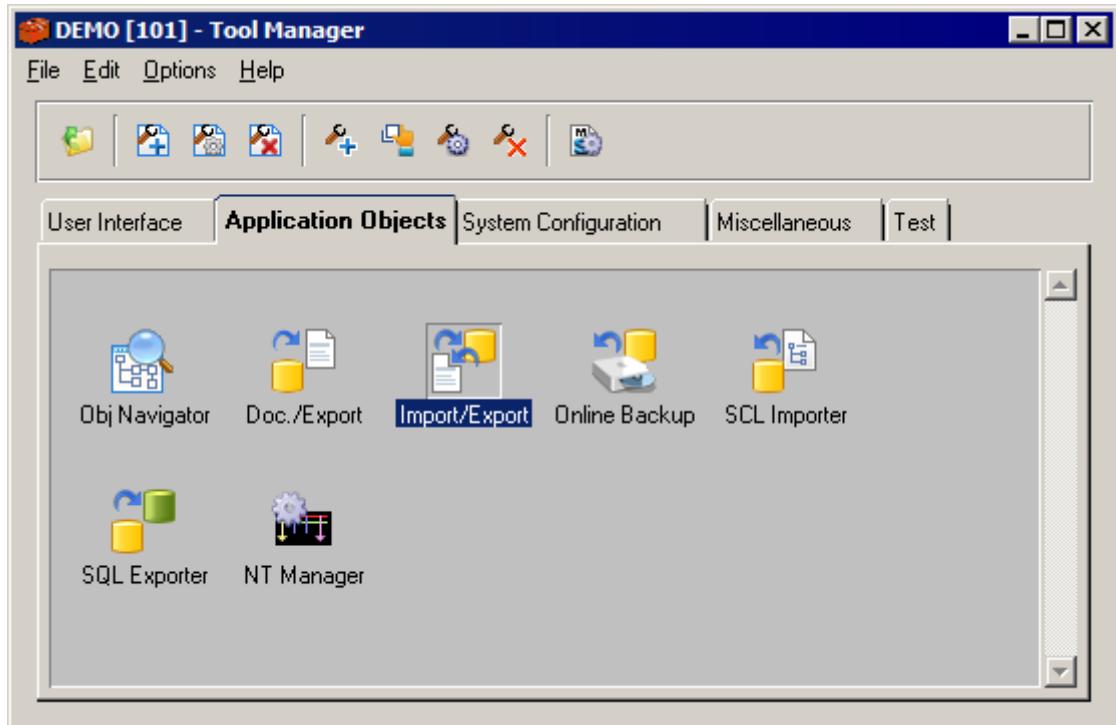


Figure 16: Export/Import icon in Tool Manager

Application Object Export/Import Tool can also be started from the Object Navigator menu item by selecting **Tools/Export...**, see [Figure 17](#). In this case, the tool is started on export mode, which means that it can only be used for exporting the application objects. Depending on the selected application objects in the Object Navigator, the common options in the Application Object Export/Import Tool become assigned as defaults.

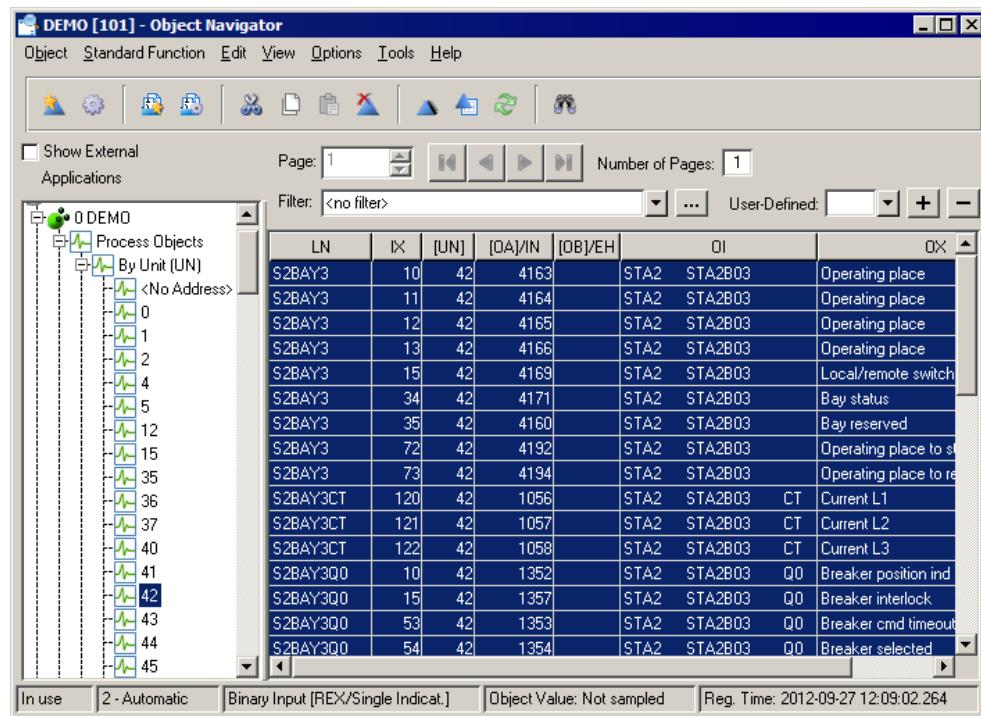


Figure 17: Open the tool from the Object Navigator dialog

Application Object Export/Import Tool can also be started from the Object Navigator menu item by selecting **Tools/Import**, see [Figure 17](#). In this case, the tool is started on import mode, which means that it can only be used for importing the application objects. When the import operation is finished, the selected Object Navigator view becomes updated.

Close the Export/Import Tool by clicking the **Close** button. The tool can also be closed by selecting **File/Exit** or by pressing **CTRL+Q**. See [Figure 18](#).

4.1.4

Exporting objects

Use common options to define the set of application objects to be exported. The application objects that match the common options are listed in the Application Objects tabbed page. Select the application objects that need to be exported. Click **Select All** to select all the objects and **Unselect All** to unselect the objects are selected. To select separate application objects from the list, hold the **CTRL** key down while clicking the objects.

When the selection contains at least one application object, **Export** is enabled. When the button is clicked, a destination (export) file is created. See [Figure 18](#).

When **Export All** is clicked, all objects are exported without selecting any objects. The Application Objects tabbed page shows only the first 10 000 objects in the list. The button also exports the objects that are not shown in the tabbed page.

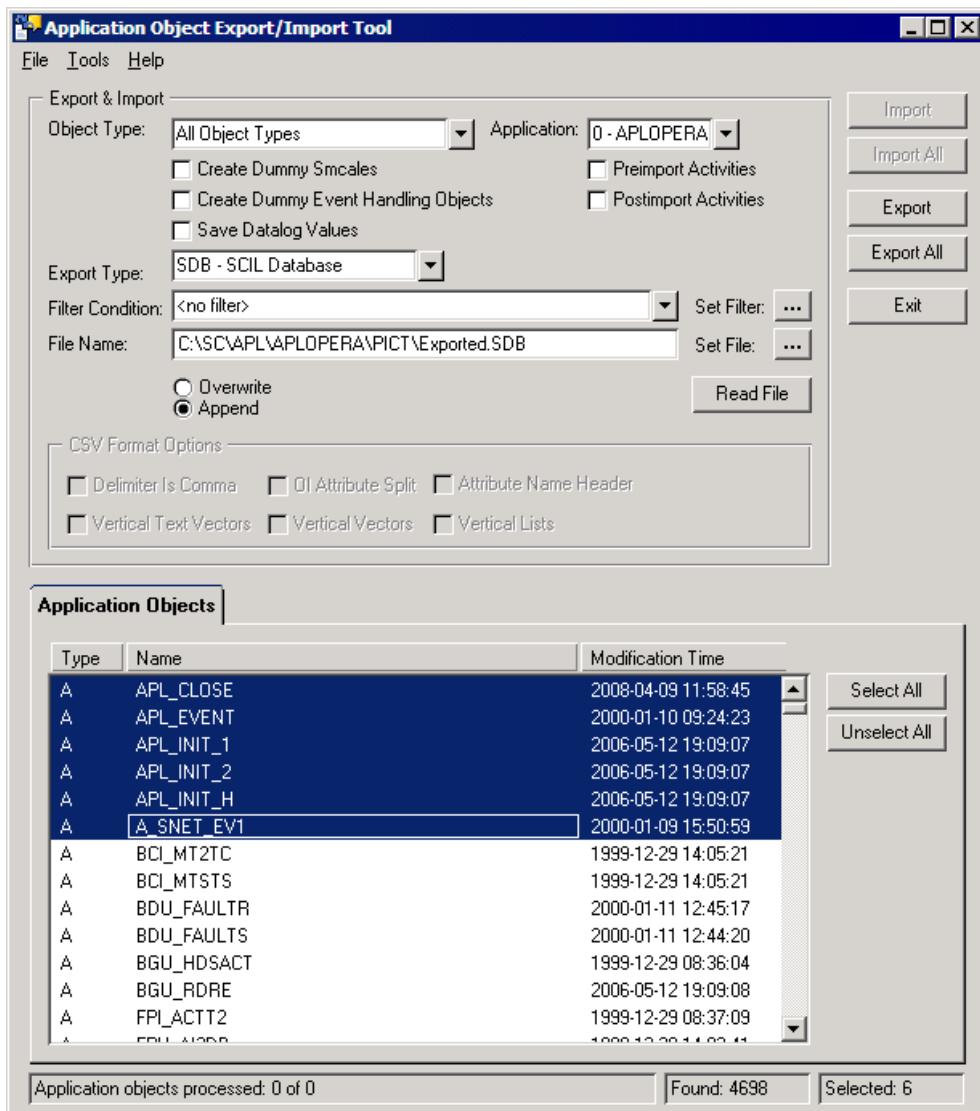


Figure 18: Main dialog of Export/Import Tool

During the export operation, the progress indicator displays the operation progress. See [Figure 19](#).

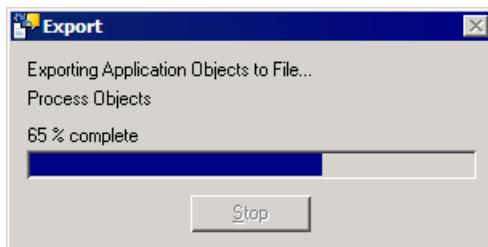


Figure 19: Export operation progress dialog

At the end of the export operation, either the objects were successfully exported dialog is displayed or exceptions summary dialog is displayed. See [Figure 20](#).

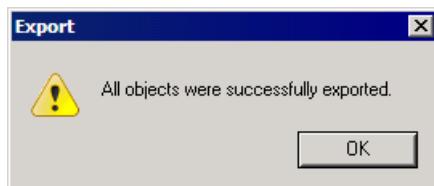


Figure 20: Objects are successfully exported

4.1.4.1 Exporting formats

The Export/Import tool supports two formats:

- SCIL Database Format (SDB)
- Comma Separated Values Format (CSV)

SCIL Database Format (SDB)

The SDB export format is based on the SCIL database files or SCIL data files. The SDB format is not editable. The SCIL database files are not limited and the SCIL database's structure is optimized for fast access. Hence it is possible to transfer a program in one step with the SDB export format. The file name extension is .sdb by default.

Comma Separated Values Format (CSV)

The CSV export format is an editable export format. The file name extension is .csv by default.

4.1.4.2 Defining CSV attributes

To form the CSV data, the following options are available:

- Delimiter is Comma
The data's delimiter is a comma (,) instead of a semicolon (;). Select the Delimiter is Comma check box, if the dot is used as a decimal point instead of comma.
- OI Attribute Split
The OI (Object Identifier) attribute of process objects can have a structure. If the structure exists and the OI Attribute Split check box is selected, the attribute's value is split according to the attribute's structure.
- Attribute Name Header
By default the first row of the CSV data represents the two letter attribute names, which you can select. If the Attribute Name Header check box is selected, the first row represents mnemonic instead of attribute names and the two letter attribute names are represented on the second row.
- Vertical Text Vectors
By default the complicated attribute values are represented as a dumped in a line (compare with SCIL function DUMP). If the Vertical Text Vectors check box is selected, the type text vector's attribute values are represented as vertical.
- Vertical Vectors
If Vertical Vectors check box is selected, the type none-text vector's attribute values are represented as vertical.
- Vertical Lists
If Vertical Lists check box is selected, the type list vector's attribute values are represented as vertical.

Define how to form data, their attributes and their order in the CSV data, using the CSV Attribute Tool dialog as shown in [Figure 21](#). To open the **CSV Attribute Tool** dialog, select **Tools/CSV Attributes** from the **Application Object Export\Import Tool** dialog. See [Figure 21](#).

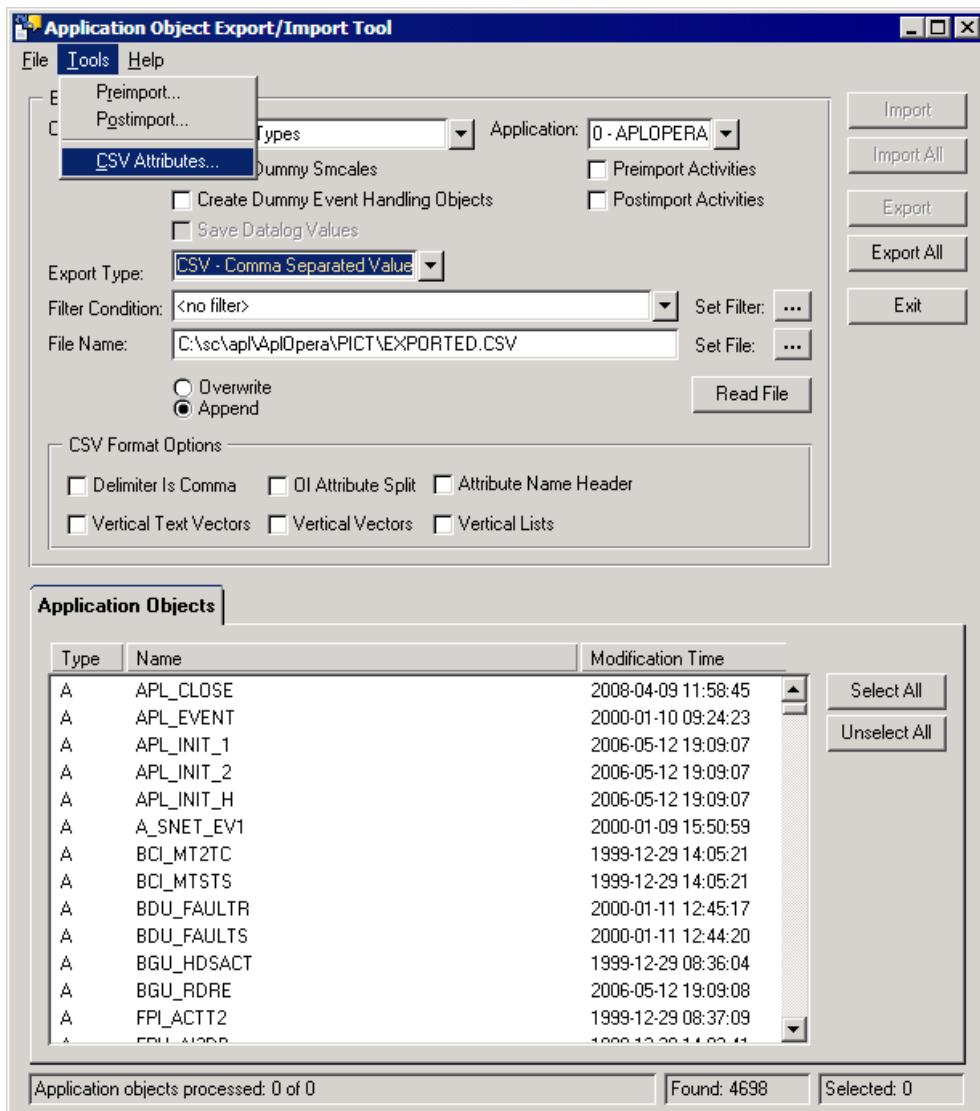
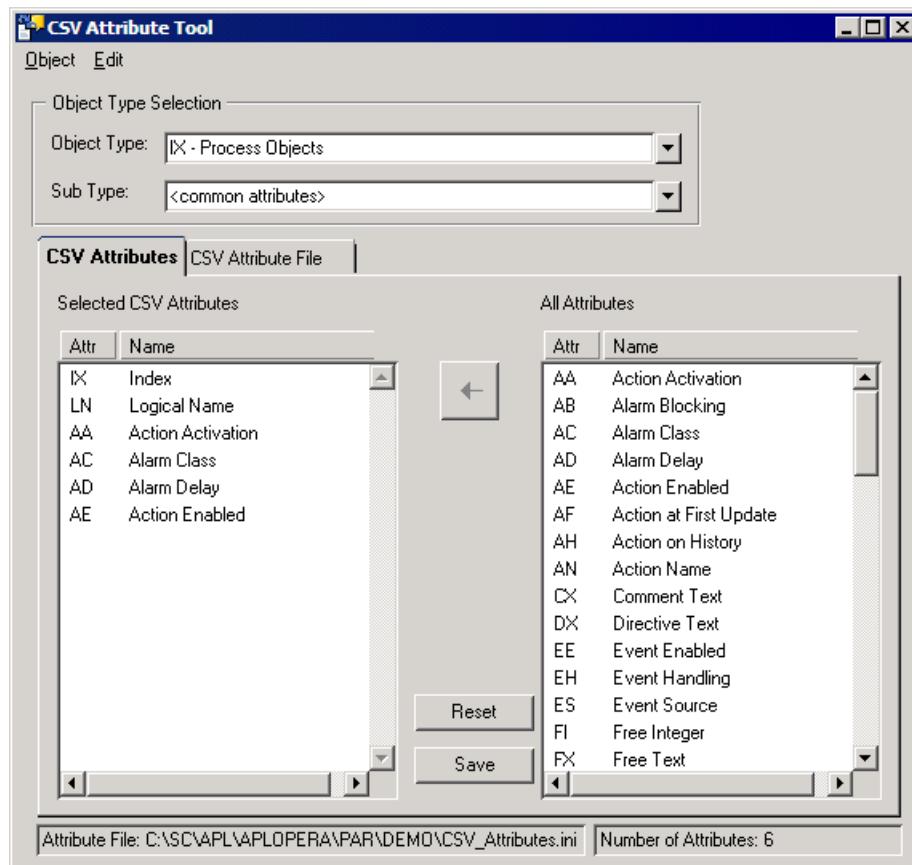


Figure 21: Opening CSV Attribute Tool dialog

To define CSV attributes:

1. In the **CSV Attribute Tool** dialog, select the object type from the **Object Type** drop-down list. If the pre-defined (IX) or user-defined (UP) process object type is selected, select the sub type from the **Sub Type** drop-down list.
2. In the **Sub Type** drop-down list, either select the common attributes or the process object type specific attributes. See [Figure 22](#).
3. On clicking the **CSV Attributes** tab the following two lists are displayed: **All Attributes** and **Selected CSV Attributes**. The **All Attributes** list contains all configurable attribute names, which are available for the current object type. The **Selected CSV Attributes** list contains attribute names, which are selected from the **All Attributes** list. By selecting **Edit** menu, it is possible to edit the **Selected CSV Attributes** list's attributes. See [Figure 22](#).
4. There are three buttons between **Selected CSV Attributes** and **All Attributes** lists: **left arrow**, **Reset** and **Save** button. See [Figure 22](#).

- The **left arrow** button is enabled when one attribute is selected from the **All Attributes** list. Click this button, if you want to copy the selected attributes to the **Selected Attributes** list.
- Click the **Reset** button to select and move the configurable attributes to the **Selected CSV Attributes** list.
- Click the **Save** button to save all selected attribute names of the object types to a file. When opening the CSV Attribute Tool again, the CSV attributes are read from this file. Attribute names are saved during the last export session by default, to the **CSV_ATTRIBUTES.INI** file. See [Figure 22](#).

*Figure 22: CSV Attribute Tool*

- Click the **CSV Attribute File** tab to change a CSV attribute file. Change the file by clicking Set File (the button with three dots). New attribute names can be loaded from the file by clicking the **Load File** button. See [Figure 23](#).

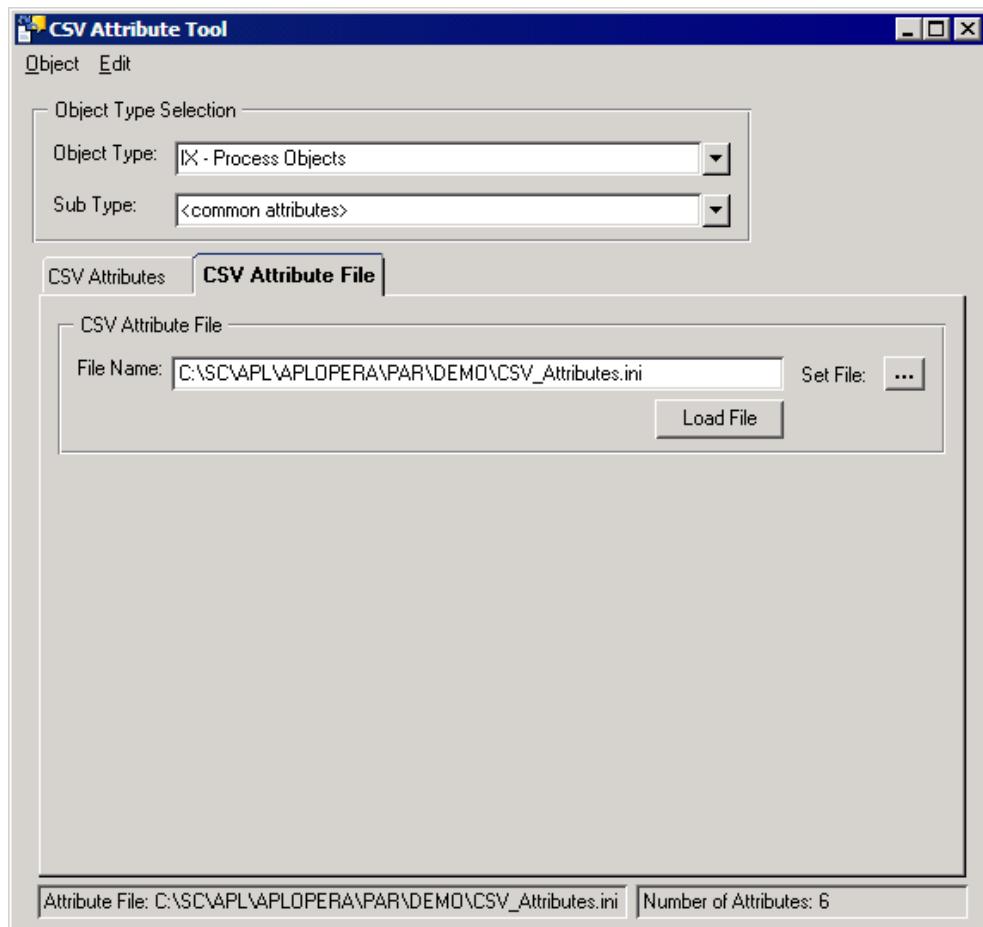


Figure 23: CSV Attribute File tab

4.1.4.3 Defining common options for exported data

In addition to the application and object type definitions, it is possible to define other common options for the exported data. Define also the export type. The available types are CSV (Comma Separated Values) and SDB (SCIL Database) formats.

Furthermore, it is possible to define SCIL Search Condition for the application objects to be handled through this tool during the export. As a default, the SCIL Search Condition is empty. For example, if the Process Object's type is selected and the SCIL Search Condition LN=="KUI_SABAY1" is defined, all the process objects with Logical Name "KUI_SABAY1" become listed in the Application Objects tabbed page. See [Figure 24](#).

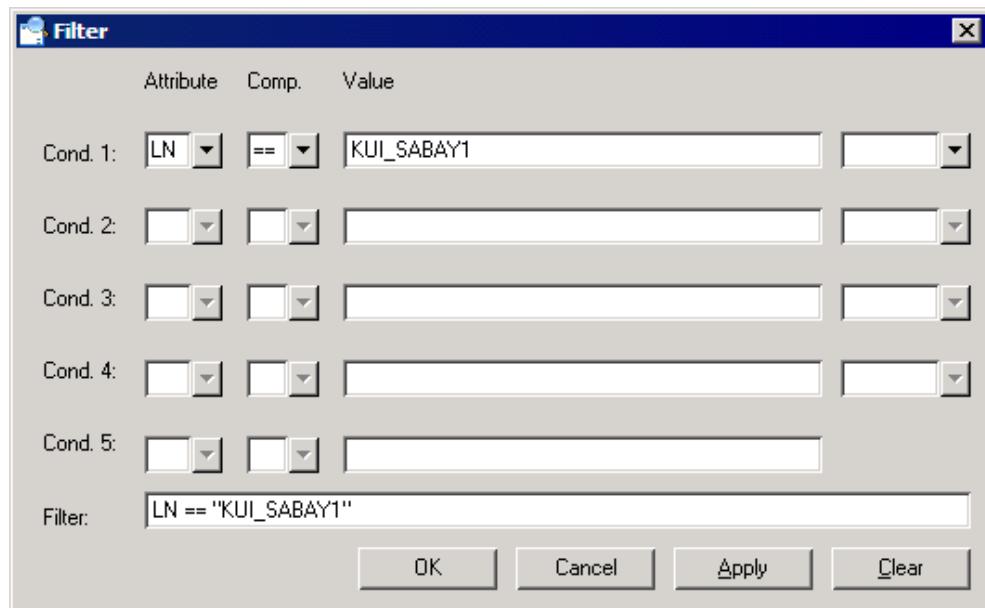


Figure 24: Filter dialog

The existing Filter Condition is applied by selecting the condition from the drop-down list or by using the **SCIL Search Condition** dialog (the button with three dots). The tool stores the 30 latest Filter Conditions in the history list. The history list is read in the tool during its start-up.

The file name to be used as a destination (Export) is defined by selecting the file with the File Chooser component (the button with three dots) on the right of the field. The default file name is assigned to the running application's picture folder (logical path PICT is used). See [Figure 25](#).

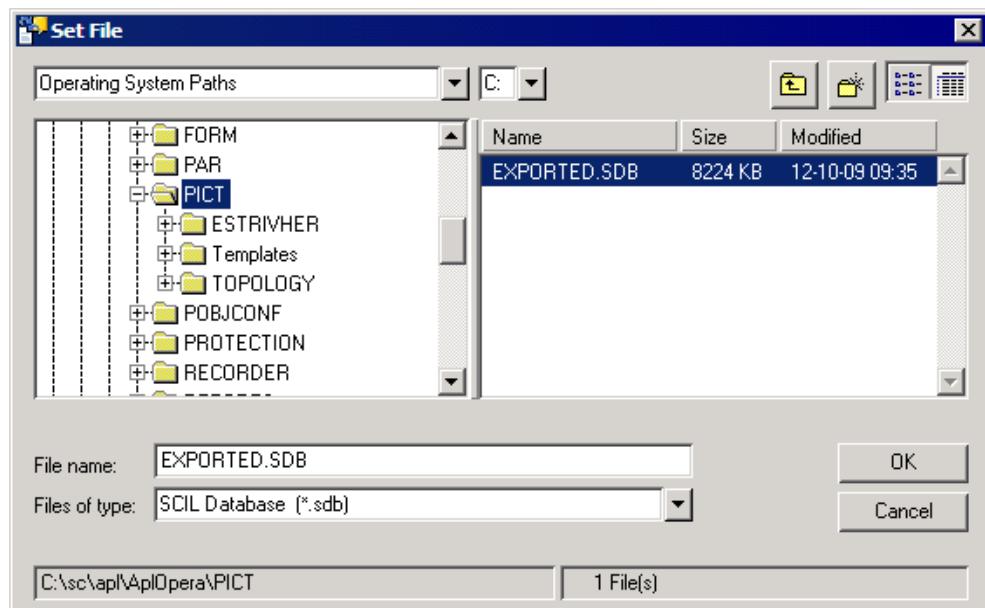


Figure 25: File chooser dialog

It is possible to define either **Overwrite** or **Append** option in the file handling options, see [Figure 18](#). In the **Overwrite** option, the existing destination file becomes always overwritten. Whereas in the **Append** option, the new data is appended into the end of the existing destination file. In the **Append** option, the existing objects are only modified. If you choose SDB (SCIL Database) for export type, the new data is not appended, if the data already exists.

When **Read File** is clicked, the source file defined by file name is read and the result is shown in the **Application Objects** tabbed page.

The **Save Datalog Values** option can be toggled on/off, depending whether the user wants to store the datalog values during the import operation. The default value is off.

4.1.5 Importing objects

The file name that contains the application objects is displayed in the common options. When the application objects are read from the export file by clicking the **Read File** button, the progress indicator displays the read or review operation progress. While previewing objects in the CSV format, the progress indicator cannot show the total number of objects. When all the application objects are read, they are listed into the **Application Objects** tabbed page. Read objects are saved in a temporary SDB data file, except those objects, which are already in SDB format. Exceptions of the preview are shown in the summary dialog. In addition to formats supported in export mode, the Export/Import tool recognizes ASCII File format (ASC files) and Load File format (LOF files) in import mode.

When **Select All** is clicked, all the objects are selected. When **Unselect All** is clicked, none of the objects are selected. To select separate application objects from the list, hold the CTRL key down while clicking the objects.

When the selection contains at least one application object, the **Import** button is enabled, and when the button is clicked a source (import) file is read. See [Figure 26](#).

The **Import All** button also imports those objects that are not shown in the tabbed page. The **Application Objects** tabbed page shows only the first 10 000 objects in the list.

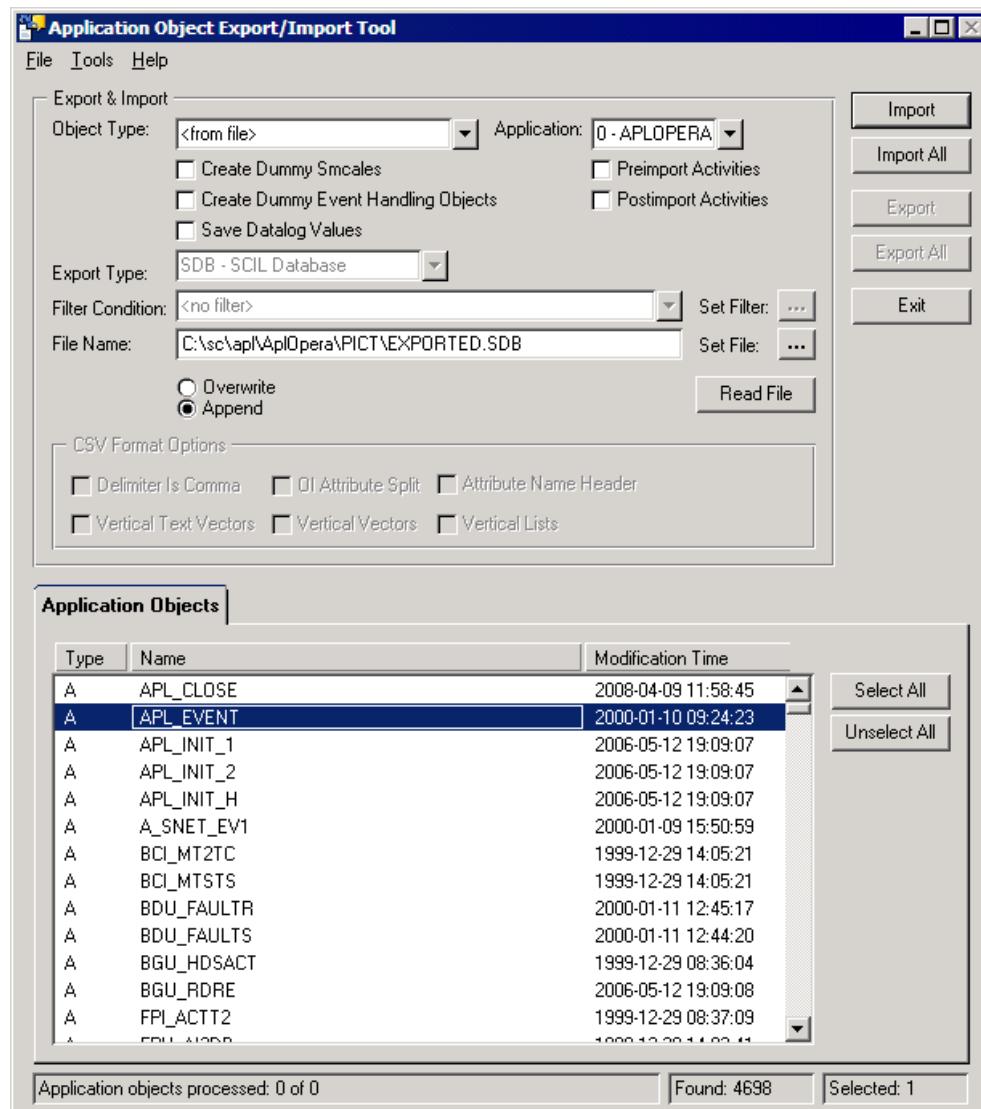


Figure 26: Main dialog of Export/Import Tool

During the import operation, the progress indicator displays the operation progress. See [Figure 27](#). If the file cannot be read, an appropriate notification dialog is displayed for the user.

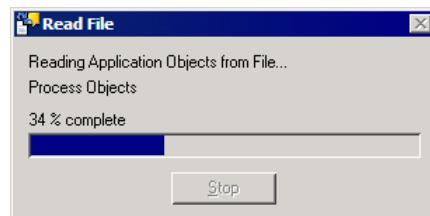


Figure 27: Import operation progress dialog

An exception can occur, when the tool imports application objects. Due to an exception, the application object cannot be created or modified according to the import file. If one or multiple exceptions occur, they are listed in the **Import Exceptions** dialog. See [Figure 28](#). This dialog displays the following information:

Type	Letter that identifies the object type
Name	Name of an object
Exception	Context of exception (create new or modify an existing object)
Status	SCIL status received from the system
Conflicting Object	The name of the object that causes the conflict

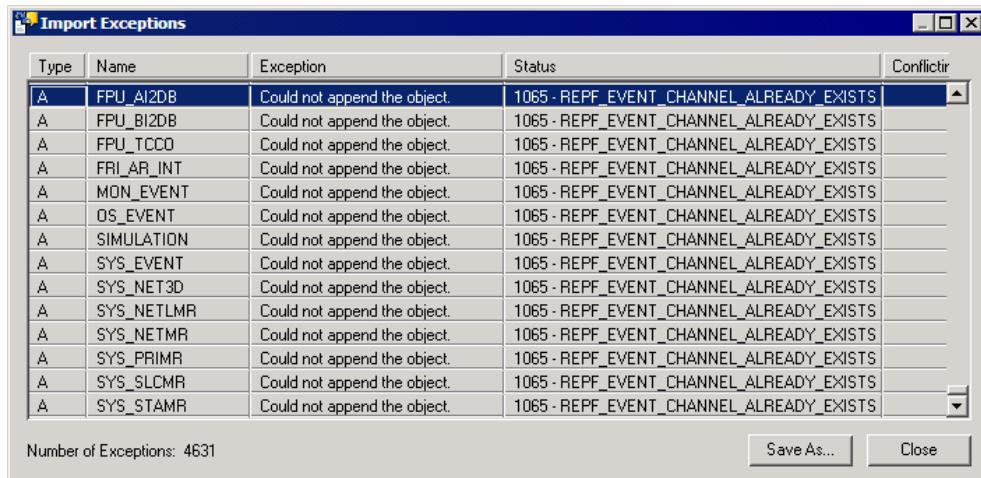


Figure 28: Import Exceptions dialog

Functions of the dialog:

Button	Functions
Save As...	Opens the file chooser to specify the location for .log file to save the occurred exceptions. As a default, the file chooser is opened in the application's PICT folder, and the default file name is Default.log.
Close	Closes the dialog

4.1.5.1 Defining common options for imported data

In addition to the application and object type definitions, it is possible to define other common options for the imported data.

The file name to be used as a destination source (Import) is defined by typing the file name into the appropriate field or by selecting the file by using the File Chooser component (the button with three dots) on the right of the field. The default file name is assigned to the running application's picture folder (logical path PICT is used). See [Figure 25](#).

It is possible to define either Overwrite or Append option in the file handling options. In the Overwrite option, data of the existing destination object are always overwritten. Whereas in the Append option, data of the object are appended to a database, if the object does not exist.

The Create Dummy Scales and Create Dummy Event Handling Objects options can be toggled on/off depending on whether the user wants to create scales and event handling objects that do not exist, while process objects are imported. Objects will be created with their original names, but they are dummy. So, they should be modified afterwards to make process objects work properly. The Import Exceptions dialog informs about created objects.

The Save Datalog Values option can be toggled on/off, depending whether the user wants to store the datalog values during the import operation. The default value is off.

The Preimport Activities and Postimport Activities options can be toggled on/off depending on whether the user wants to execute activities just before and after the proper import. Preimport and postimport definition tools are started from menu **Tools/Preimport...** and **Tools/Postimport...**, respectively. A pre/postimport command procedure/SCIL file is executed by DO function. In postimport an argument in DO function call is a list which includes all imported predefined process objects. The list is in form list (LN, IX), where the vector attribute LN includes logical names and IX indexes. The second argument passed in function call is the number of the application, where objects are imported into. Import tool assumes that procedures/SCIL files return the status of operation. If preimport (or postimport) fails, a notice dialog with the status will be raised to ask whether to do the actual import or not. If preimport (or postimport) totally fails (syntax error, etc.), the standard error dialog will be raised and import will be interrupted.

4.2 Searching strings

The Search Tool is used for searching strings in objects and files. The tool can search strings through command procedure and data objects, text files, pictures and Visual SCIL Object files (VSO files). The Search Tool can be opened through the Object Navigator. The input for the tool is the selected object types in the Object Navigator. If objects or files are also selected, they act as targets for the search. The search type, target names and other search conditions are saved in the SEARCH.INI parameter file when the tool is closed. The Search Tool can also act as a stand-alone tool and be opened through the Tool Manager.

4.2.1 Opening and exiting Search tool

Before opening the Search Tool, the object types can be selected in the Object Navigator. These objects act as an input for the Search Tool. If no object type is selected, Text file search is default. If objects or files are also selected, they act as targets for the search. In [Figure 29](#) command procedures are selected for search in the Object Navigator. Select **Tools/Find** in Object Navigator to open the Search Tool.

The Search Tool can also be opened as a stand-alone tool from the Tool Manager's Miscellaneous tab.

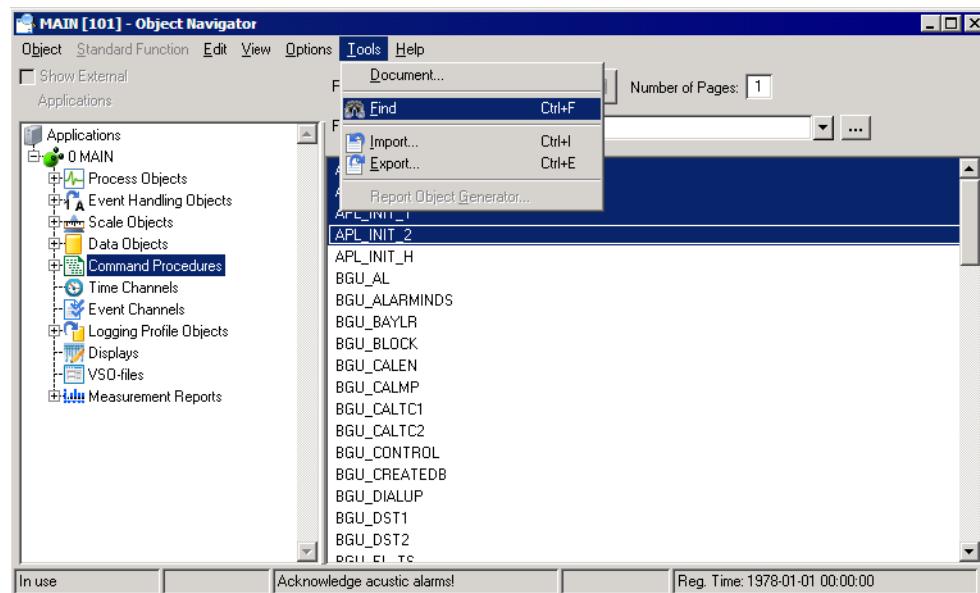


Figure 29: Opening the Search Tool from Object Navigator.

[Figure 30](#) shows the Search Tool when the tool is started through the Object Navigator. Note that in case the Search string(s) field is empty it should be filled out before the search can be completed.

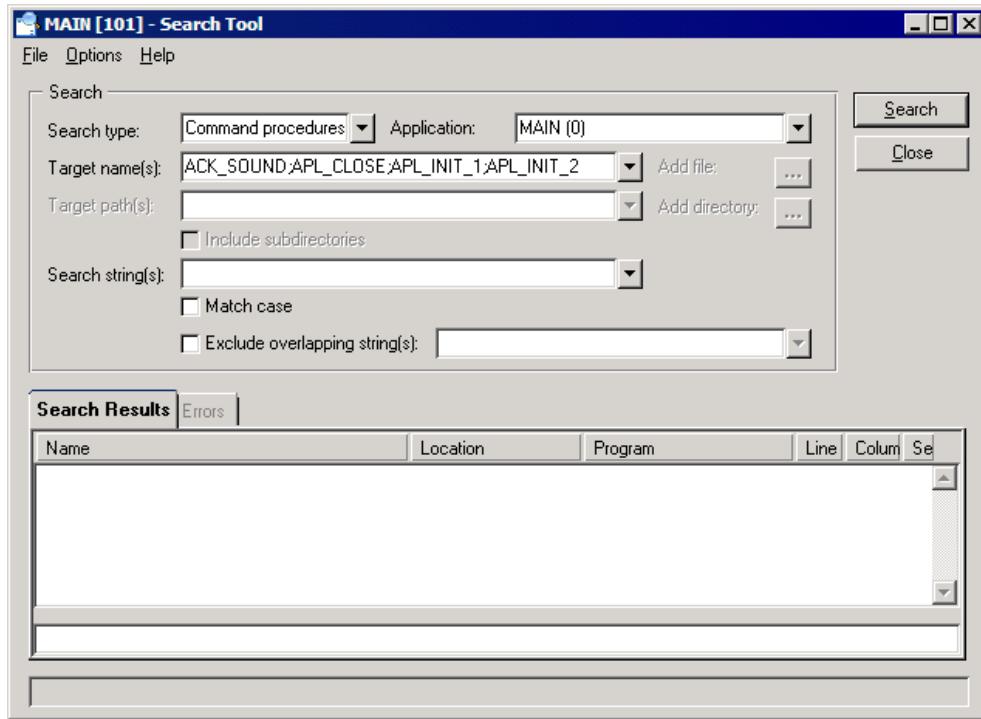


Figure 30: View of the Search Tool started from Object Navigator.

Close the Search Tool by clicking **Close**. The tool can also be closed by selecting **File/Exit** or by pressing **CTRL+Q**.

4.2.2 Making searches

After defining the search conditions, click **Search** to start the search. Search can also be started by pressing **Enter**.

When a search starts, the tool initializes a search first by locating targets according to search conditions. At this stage the empty **Progress Indicator** dialog is displayed and the **Searching** text is shown on the status bar. At initiation stage, it is not possible to stop a search in the Search Tool. After the initiation, the proper search takes place, and the **Stop** button in the indicator dialog is enabled. A search is stopped by clicking **Stop**. The dialog disappears, the result page shows search results and the status bar informs about search statistics.

[Figure 31](#) shows a picture search in progress.

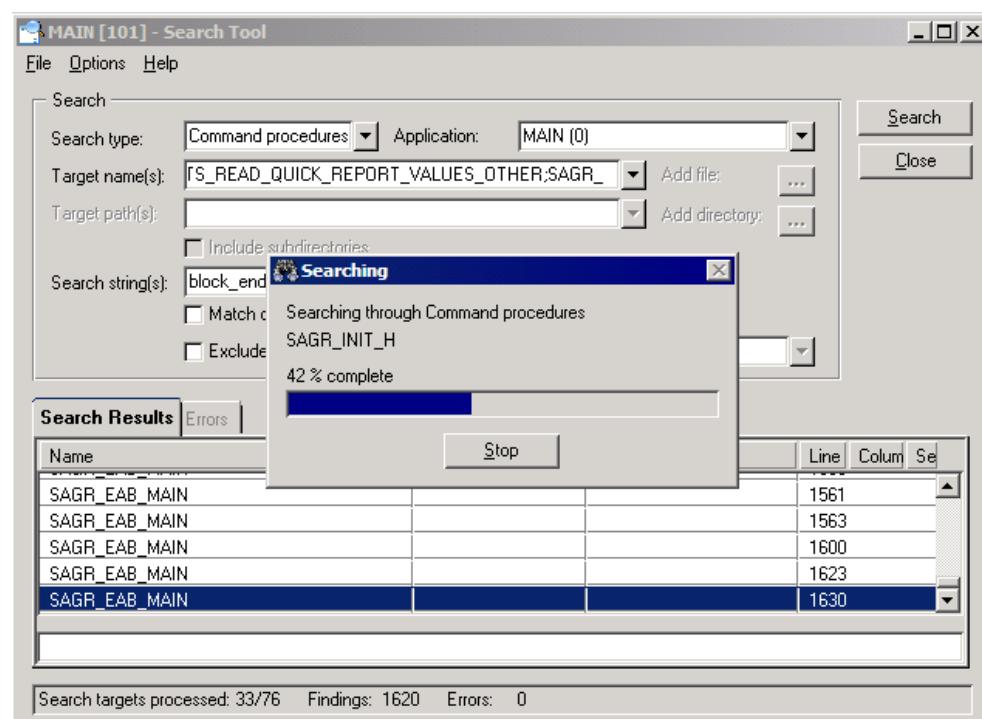


Figure 31: A picture search in progress

[Figure 32](#) shows a completed 'VSO files' search and one error is found.

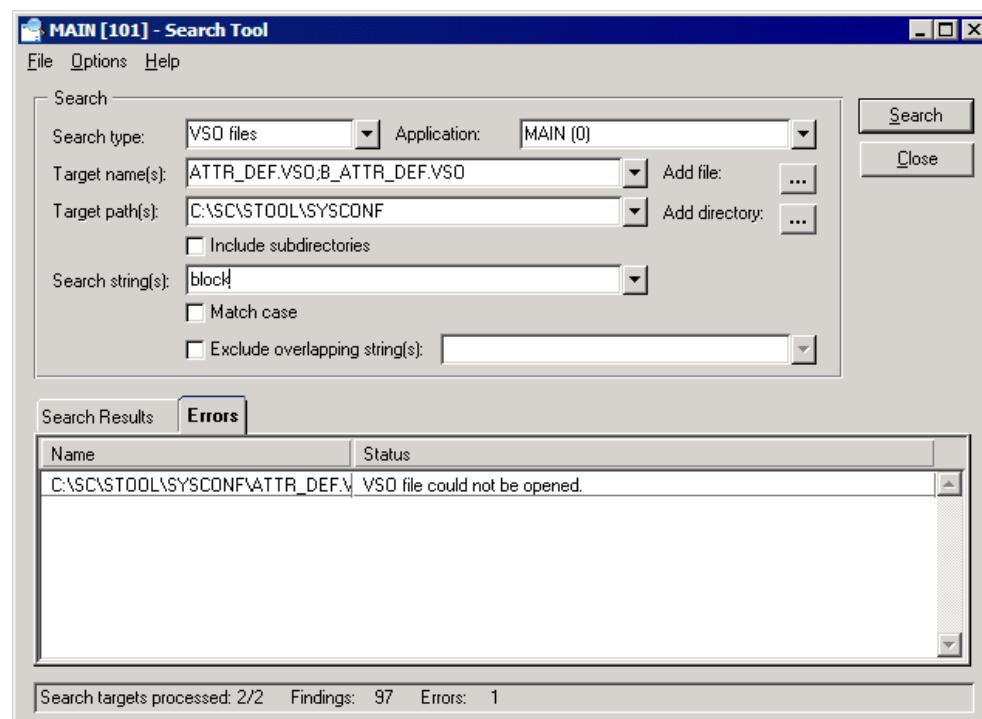


Figure 32: A completed 'VSO files' search with a failure

4.2.3 Defining searches

The search conditions are the input for a search. They consist of a search type, an application, target names and paths, search strings, overlapping strings to be excluded and two boolean options: Include subdirectories and Match case.

Search conditions are saved in the SEARCH.INI parameter file when the Search Tool is closed.

If the search criteria (a search type, target names, target paths) include incompatible files, a warning dialog informs that the incompatible files were skipped from the search. Dialog occurs if, for example, the following criteria are selected:

Search type	Text files
Target name	*
Target path	Folder containing pictures and/or VSO files.
The files are skipped, because they are not text files.	

4.2.3.1 Search types

Select the appropriate search type from the **Search type** drop-down list.

Supported search types for report database search:

- Command procedures
- Data objects

Supported search types for file searches:

- Pictures
- VSO files
- Text files

When the Search Tool is opened, it displays the default search type, which depends on how the tool is started.

If Search Tool is started through Object Navigator, the default search type is selected on Object Navigator, for example, if the VSO files object is selected on Object Navigator and Search Tool is opened. The default search type is VSO files in the **Search type** drop-down list. If no object type is selected or Search Tool does not support the selected type, default search type is Text files.

If the tool is started as stand-alone, default search type is the last saved search type in the SEARCH.INI parameter file while the Search Tool was closed. If the tool is started for the first time, default search type is Command procedures.

When the appropriate type is selected, the **Target names** drop-down list is also changed to correspond the search type, see [Figure 32](#).

4.2.3.2 Application

Select the application, where the search is performed, from the application drop-down list. The application list is updated when the search type is changed. The option is disabled when searching text files.

Applications are in the form <name>(n), where <name> is the application's name and (n) is the application's logical number. Local applications are available for both the file and database searches. External applications are available only for database searches.

If the Search Tool is started through Object Navigator, the default application is the application that was selected before the Search Tool was opened. If the tool is started as stand-alone, the default application is the last saved search type in the SEARCH.INI parameter file while the Search Tool was closed.

4.2.3.3 Target names

The **Target names** drop-down list can be edited. The **Target names** box can be edited as follows:

- Type a name or names separated with a delimiter. Wildcard characters are allowed in the names.
- Select an earlier saved item from the drop-down list.
- Select a file by browsing the directory. Add a file by clicking the **Add file** button. In the **Select File** dialog, select the appropriate file. The file name is the last in the Target names box and it is separated by the delimiter from the other file names. A directory name is added to the target paths box.
- Select objects or files in Object Navigator. The selected items are target names when the Search Tool is started. If the selected objects or files are more than 255 characters long, the extra characters are removed. The search is single search, because of this the Target name box is disabled. To enable the **Target names** drop-down list, make another selection in Object Navigator or click the **Add file** button.

The default target names for the different search types:

Command procedures	*
Picture	*.PIC
VSO files	*.VSO
Text files	*
Data objects	*

4.2.3.4 Target paths

The Target paths option can be used only for file searches. When performing the report database searches, the option is disabled. The **Target paths** box can be edited as follows:

- Type a directory name or names separated with a delimiter.
- Select an earlier saved item from the drop-down list.
- Select a directory by browsing the directory. Add a directory by clicking the **Add file** button. In the **Select Directory** dialog, select the appropriate directory. The directory is the last in the Target paths box and it is separated by the delimiter from the other file names.

If the selected application is the current one (the application number is zero), the field also accepts logical paths as input. For other local applications, logical paths are not available. Therefore, when an application is selected in the Search Tool, the field is changed to 'PICT' and dimmed. The 'PICT' stands for '\sc\apl\<apl_name>\pict'. It is not a logical path anymore.

4.2.3.5 Include subdirectories

If the **Include subdirectories** check box is selected, the tool also searches all subdirectories. The option is used only for file searches and is disabled for other searches.

4.2.3.6 Search strings

The **Search strings** drop-down list can be edited. Its text box shows a string or strings to be searched. Different strings are separated by the delimiter to enable multiple searches. Earlier searched strings can be selected to the text box from the saved choices in the drop-down list.

4.2.3.7 Match case

If the Match case is selected, letters are case sensitive.

4.2.3.8 Exclude overlapping strings

Strings can be typed in the text box, when the Exclude overlapping strings check box selected.

When the check box is selected, a defined string is excluded from a search, if they overlap the strings selected in the **Search strings** box. When the check box is not selected, the text box is disabled.

4.2.3.9 Changing delimiter

The default delimiter is a semicolon (;) and it separates the editable search conditions items. To open the **Delimiter** dialog, select **Options/Set Delimiter**.

When a delimiter is changed, all the choices containing the old delimiter in the drop-down lists are updated with the new one.

4.2.4 Saving searches

Search results can be saved and printed. To save the search results, select **File/Save Results** and to print the search results, select **File/Print Results**.

Both produce the following output:

```
Search type: 'Pictures'  
Target name(s): '*.PIC'  
Target path(s): 'C:\SC\LIB4'  
Search string(s): 'store'  
Exclude overlapping string(s): '!restore'  
Application: 0
```

Name	Location	Program	Line	Column	Search string
C:\SC\LIB4\base\ALARM\USE					
BAU_ALARM1.PIC	PF:ALARM_BASE	EXIT	1	4	store
BAU_ALARM2.PIC	PF:TEMP2_BASE	EXIT	1	4	store
C:\SC\LIB4\base\BBONE\inst					
BGI_BASE.PIC	MAIN PICTURE	EXIT	1	4	store
BGI_BASE2.PIC	MAIN PICTURE	EXIT	1	4	store
C:\SC\LIB4\base\BBONE\use					
BGU_DBTLA.PIC	PF:DBT_BASE	EXIT	1	4	store
C:\SC\LIB4\FMOD\MVPROCESS\Use					

Table continues on next page

FPU_BAY2A.PIC	MAIN PICTURE	.START_PROGRA M2	3	2	store
FPU_C501V.PIC	MAIN PICTURE	.KEY_OK	22	11	store
...					

Standard printer set-up dialog is displayed by selecting **File/Print Setup** from the menu, if the tool is started from the local VS monitor.

4.2.5 Analyzing search results

The **Search Results** page shows results of a search completed according to conditions. The page has a header, a result list and a text box for a program line. When a search proceeds, hits are shown and added to the result list as they are found. When a search is completed or stopped, the last hit is selected and the program line including a searched string is shown and highlighted in the text box, if no errors are encountered. See [Figure 33](#).

Up to 10000 results can be handled on the **Search Results** page. If the limit is exceeded, the search is interrupted and an information dialog pops up.

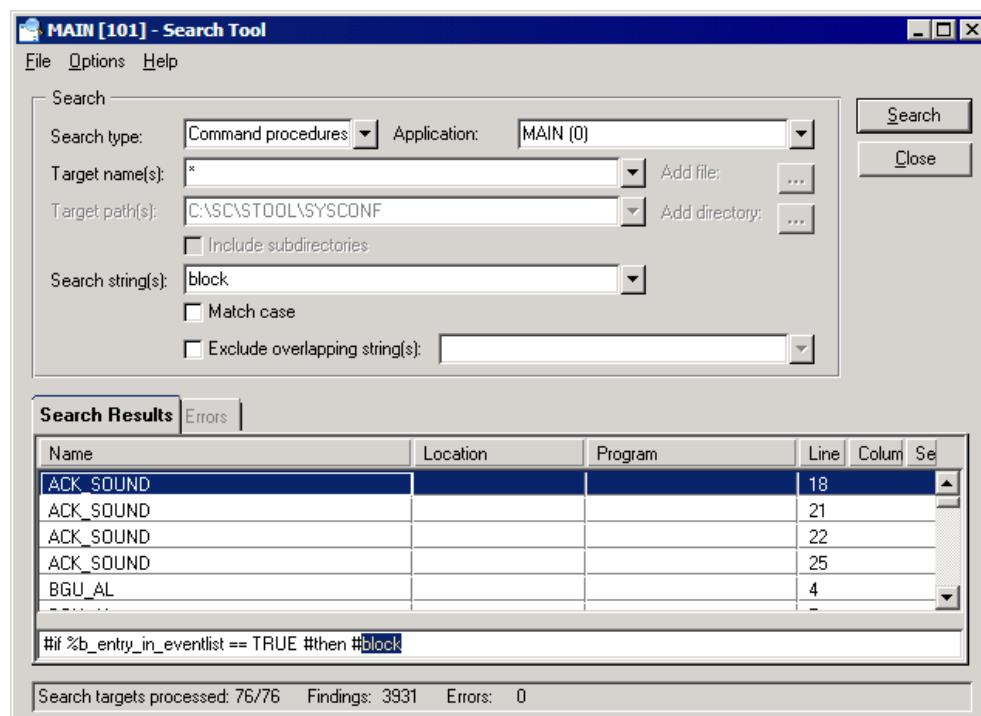


Figure 33: Search completed with no errors

The figure above shows a command procedure search completed with no errors. The last finding is selected and the program line with a searched string is shown as highlighted in the text box.

If the Search Tool is started via the Object Navigator, double-clicking the selected hit result starts the corresponding editor or dialog and brings up the program, where the searched string was found (for 'VSO files' search only VS Dialog editor is started). If the tool is started as stand-alone, straight away editing is possible only for Text files searches.

4.3 Text Translation Tool

The Text Translation Tool is for translating all language dependent texts of SCIL text databases and Visual SCIL tools. In addition to manual translation of texts, the tool also provides the possibility to transfer all translated texts from one revision of MicroSCADA/SYS600 to another. The tool supports a dictionary for automatic translation of common words and phrases.

4.3.1 File formats

The Text Translation Tool is used to translate texts stored in files.

The tool supports the following file formats:

- SCIL Text Databases
- Files exported from VSO files
- VSO files
- Base System tools – Windows Initialisation (.ini) file format
- Base System tools – text file format for language dependent texts

4.3.2 Text Translation Tool layout

The Text Translation Tool consists of a menu bar, a toolbar and a drop-down list boxes for selecting languages. It also includes a table with columns for row numbers, object names, text IDs, texts in reference language and in the edited language, and X indicating the translated texts that were found in the dictionary. At the lower part of the tool there is the **Edit** text box for typing the text in the edited language.

The width of the columns in the table can be adjusted by dragging column borders.

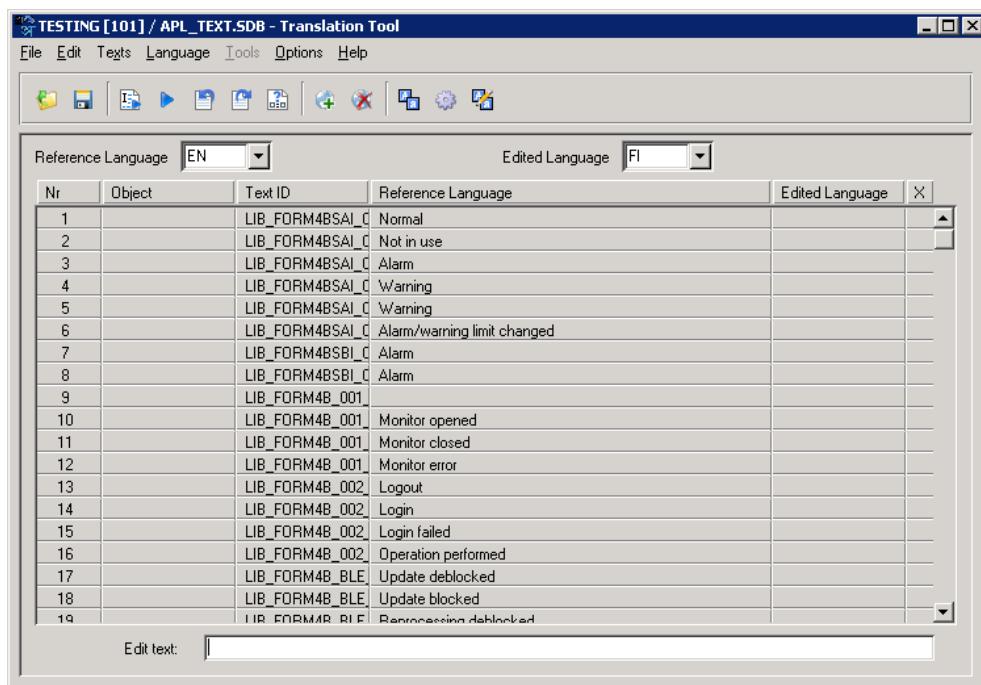


Figure 34: The Text Translation Tool for translating all language dependent texts of LIB 5xx, CAP 500 Visual SCIL tools and MicroSCADA Visual SCIL tools

The buttons in the Text Translation Tool toolbar, from the left, are:

- Open
- Save
- Initialize
- Next line
- Import texts
- Export texts
- Compare
- Add language
- Delete selected language
- Use keywords
- Settings
- Edit keywords

The following mnemonics make the use of the main window controls easier (see [Figure 34](#)):

- ALT+R moves the focus inside the dialog box to the **Reference Language** combo box.
- ALT+I moves the focus inside the dialog box to the **Edited Language** combo box.
- ALT+S moves the focus inside the dialog box to the list box containing the language texts.
- ALT+X moves the focus inside the dialog box to the **Edit text** box.

4.3.3 Opening and exiting Text Translation Tool

To open the Text Translation Tool, double-click the **Text Tool** icon in the **User Interface** page of the MicroSCADA Tool Manager or click the **Text Tool** icon in SYS600 Tool Launcher.

The following properties are preserved from the previous session:

- Maximised
- Size
- Position
- Column widths in the table
- Reference language
- Edited language

To exit, select **Exit** from the **File** menu or click the rightmost button in the upper right corner of the dialog box.

4.3.4 Selecting and opening a file

The tool provides fast navigation to standard directories from which the files can be selected. The navigation is done in a tree structure, which reflects the directory structure. The tree shows the directories starting from the SC directory. When a new directory or file is added, click **Refresh** in the dialog to update the tree structure.

To open a file in standard directories:

1. Select **Open** from the **File** menu.
2. Navigate the tree structure and select a file.
3. Click **Open**.

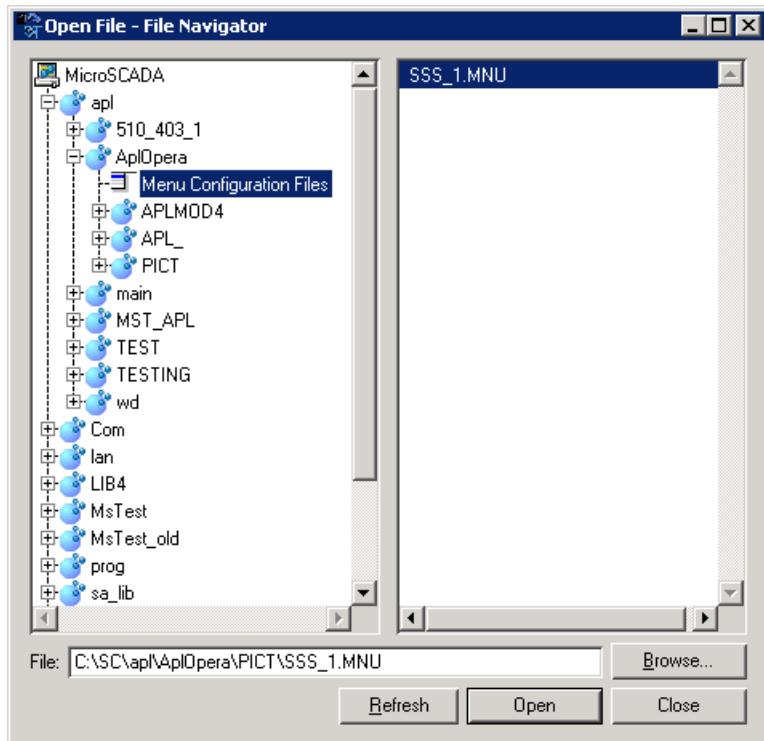


Figure 35: File navigator for opening files for editing

4.3.5 Selecting the languages

When a file is open, all the text IDs in it are shown in the Text Translation Tool. When the Text Translation Tool is used for the first time, English is the reference language. If the Text Translation Tool has been used before, the reference language is the one selected in the previous session. If the language exists in the file, the Text Translation Tool loads the texts in the reference language.

If the Text Translation Tool has been used before, the edited language is the same as in the previous session. If the language exists in the file, the Text Translation Tool loads the texts in the edited language.

To select languages:

1. Select the reference language from the **Reference Language** drop-down list. If the language is the edited language, it is removed from the **Edited Language** column. All the texts in the reference language are loaded from the file and shown in the table. The texts in the **Reference Language** column cannot be edited.
2. Select the edited language from the **Edited Language** drop-down list. All texts in the edited language are loaded from the file and shown in the table.
3. Edit the texts in the **Edited Language** column.

4.3.6 Adding languages

To add a new language:

1. Select **Add Language...** from the **Language** menu.
2. Enter a new language code following ISO 639 standard or select a language from the list.
3. Click **OK** or **Apply**, if several languages are to be added.
4. Select the language from the **Edited Language** drop-down list in the Text Translation Tool.

4.3.7 Deleting edited languages

To delete edited languages:

1. Select **Delete Edited Language** from the **Language** menu. A dialog box appears asking the user to confirm the deletion of the edited language.
2. Click **Yes** to delete the language.

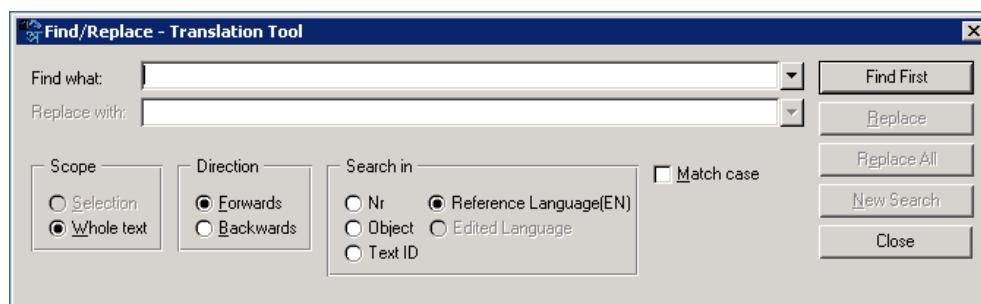
4.3.8 Finding/replacing texts

To find/replace texts:

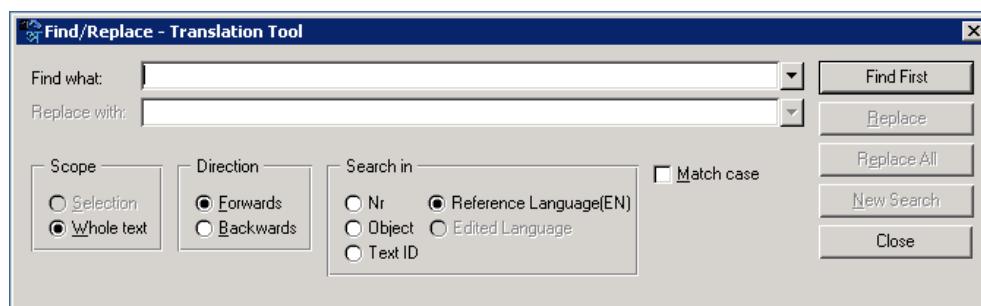
1. Select **Find/Replace** from the **Edit** menu. The **Find/Replace** dialog appears.



2. Select the column to be searched. The **Edited Language** radio button is enabled only when at least one edited language is added.

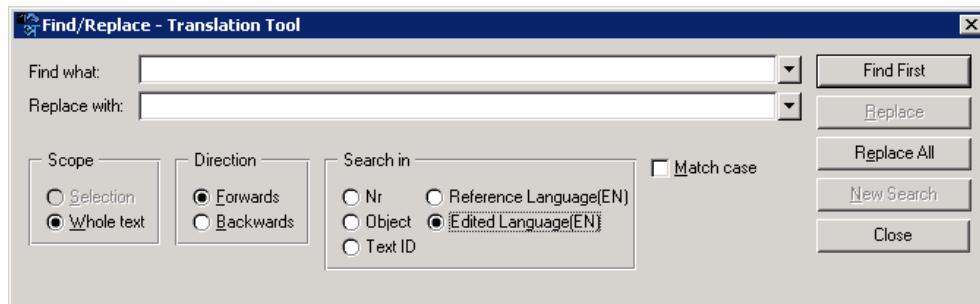


3. Type the text to be searched on the **Find what** field, or select an already searched string from the drop-down list.
4. Click **New Search** to start a new search.



5. Select suitable search options. Select **Match Case** to search for match case results.
6. Click **Find First**, or click **Replace All** to replace all matching words.

7. If you selected **Find First** and a match case is found, replace the matching word by clicking **Replace**.
8. A word can be replaced only for the Edited language. Select the **Edited Language** radio button to enable the **Replace with** field.



9. To replace the found word, type the new word on the **Replace with** field, or select an already used replacement string from the drop down list.

4.3.9 Editing texts

To edit the text:

1. In the **Edited Language** column, click the cell to be edited.
2. Type the correct text in the **Edit text** field.
3. Select the next cell.

The Text Translation Tool gives you a notification when the edited text is longer than the reference text. To enable or disable the notification, select **Options/Warn about long texts**.

4.3.10 Initializing edited languages

Initialization of edited languages copies all the text from the referenced language cells to the corresponding empty (not yet translated) edited language cells. This can be used, for example when editing a very long list of reference language texts to prevent such human errors as having no translated text at all.

To initialize edited languages, select **Initialize** from the **Texts** menu

4.3.11 Setting fonts

Different fonts can be used in the Text Translation Tool.

To select a font:

1. Select **Set Font...** from the **Options** menu. The **Font** dialog appears.
2. Select a font family, style and size. Click **OK**.

4.3.12 Saving file

The edited texts can be saved. To save the texts, select **Save** from the **File** menu.

4.3.13 Compressing file

Files can be compressed in the Text Translation Tool. The original and the new size are shown in a dialog box after the compression. Compressing files removes unnecessary data from the file, so it is useful, for example, after deleting an edited language.

To compress a file, select **Compress File** from the **Tools** menu.

4.3.14 Opening locked files

When you open a file in the Text Translation Tool and a warning about the file being locked appears, the Text Translation Tool or MicroSCADA monitor may have crashed during the previous editing session. In such case you can open the locked file in the Text Translation Tool.

To open a locked file:

1. Click **OK** in the file lock warning dialog box.
2. Choose **Break File Lock** from the **Tools** menu.
3. Open the file.



If a file is locked because it is already open in another tool, for example in the Dialog Editor, the locked file cannot be opened and the **Break File Lock** is disabled.

4.3.15 Exporting texts

The texts in the edited language can be exported to a text file. All texts in the selected edited language in the whole VSO file are exported. Different languages in the same VSO file can be exported to the same file. Texts in a VSO file can be exported into a separate text file and later imported, for example, into a newer version of the VSO file with language dependent text. The texts can also be exported at the same time to all the VSO files in a selected folder and its subfolders.

4.3.15.1 Exporting a single VSO file

To export a single VSO file:

1. Select **Open...** from the **File** menu. To open a single file, first open the file in the Text Translation Tool.
2. Select **VSO Export** from the **Texts** menu. The **Select Export options...** dialog opens, see [Figure 36](#).

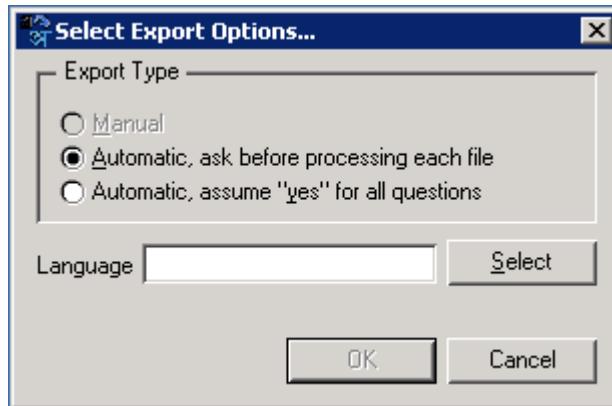


Figure 36: The **Select Export Options...** dialog box

3. Under **Export Type**, click **Manual**. The other two options are for exporting several files.
4. Select the language by clicking **Select**. The **Add Language** dialog appears. For information on using the dialog, see [Section 4.3.6](#), steps 2-4.
5. Click **OK**. The File Chooser dialog appears.
6. Select the destination folder and type in the name of the .vtx file to the **Save as** text box. The default folder is the same as the one that was used in the last import or export action.
7. Click **Save** to save the file and close the dialog, or click **Apply** to just to save the file without closing the dialog. By clicking **Apply** the file can be saved to several locations without having to repeat steps 2-6.

4.3.15.2 Exporting several VSO files



Exporting several VSO files may take several minutes and load the workstation's processor enough to remarkably slow down its operation. Therefore it is not advisable to perform this operation while running a process.

To export several VSO files:

1. Select **VSO Export** from the **Texts** menu. The **Select Export options...** dialog appears, see [Figure 36](#).
2. Click **Automatic, ask before processing each file** or **Automatic, assume "yes" for all questions**. The first option stops before processing each file to ask whether it is OK to proceed. The second option processes files automatically without confirmation.
3. Select the language by clicking **Select**. The **Add Language** dialog appears. For information on using the dialog, see [Section 4.3.6](#), steps 2-4.
4. Click **OK**. The **Select Export Source directory** dialog appears.
5. Select the export source folder. All the VSO files under that folder and its subfolders are included in the export. A subfolder is created to store the generated text files (*.vtx). The subfolder is created into the original file location folder and is named *LangY*, where Y is the language number from the language cross-reference file sc\lib4\base\bbone\use\bgu_lxref.txt.

After the export operation of several VSO files has finished, an **Export Summary** dialog appears. For information on summary dialogs and their reports, see [Section 4.3.20](#).

4.3.16 Importing texts

Texts can be imported from two sources:

- From another file of the same type, for example, another version of the same file.
- From a text export/import file (for information on exporting texts, see [Section 4.3.15](#)).

Texts can be imported in two ways:

- Manually into one file at a time, by selecting the import source file with a file chooser.
- Automatically into one or several files.

Manually imported texts are imported from a file that is selected with a file chooser, into the file, which is translated. Texts can be imported manually for all file types. The tool gives a warning if the source file name is different from the destination file name.

Automatically imported texts are imported into all files selected in the file navigator, from files of same name in another directory. When importing texts automatically, the source directory must first be selected. The tool also provides a list of files/texts, which were not found in the source directory. The list can be printed or saved to file. The tool stops at each file and asks the user to confirm the automatic translation. When importing texts to VSO files automatically, the user can select whether to import from text files or VSO files.

When importing from text files, the same file name is assumed, but with the .txt or .vtx extension. When importing texts into VSO files or menu configuration files, the language of the source and destination must match. The “Object” and “Text ID” must be the same for the source and the destination file.



Importing several files may take several minutes and load the workstation's processor enough to remarkably slow down its operation. Therefore it is not advisable to perform this operation while running a process.

To import a file:

1. Select **Import** from the **Texts** menu.
2. In the appearing **Select Import Options...** dialog, check suitable options for the import action. Click **OK** to proceed.
3. Select the text file with the file chooser that appears. The default file name is the same as the VSO file, with the .txt extension. The default folder is the one that was used in last import or export action.
A warning is shown if the imported texts were originally exported from a VSO file with a different name than the one currently being edited.
4. Click **OK**.

After the import operation has finished, the **Import Summary** dialog shown in [Figure 39](#) appears.

4.3.17 Exporting to a database

All files in one folder and all its subfolders can be exported to a single text file, a database. The database makes it easier to create dictionary files and also enables editing of language files in, for example, Microsoft Access or Excel. For information on the dictionary, see [Section 4.3.23](#). For information on the types of language files the export handles, see [Section 4.3.1](#).



Exporting to a database may take several minutes and load the workstation's processor enough to remarkably slow down its operation. Therefore it is not advisable to perform this operation while running a process.

To export files to a database:

1. Select **Export Database...** from the **File** menu. The **Database Options** dialog appears.
2. Type the operating system relative path and the folder name to the **Source** text box or click **Browse...** next to the **Source** text box to select the path and the folder with the file chooser.
3. Type the operating system relative path and the name of the English source folder to the **English Source** text box or click **Browse...** next to the **English Source** text box to select the path and the folder with the file chooser.
4. Type the operating system relative path and the name of the destination file, that is, the database, to the **Destination** text box or click **Browse...** next to the destination text box to select the path and the file with the file chooser. The destination file is always in .txt format. The file can already exist or it can be a new file that is created during the export operation.
5. Select the separator from the **Separator** drop-down list. The options are semicolon, tab and fixed. An example of the semicolon separator in the database is shown in [Figure 37](#). The tab separator displays a tab instead of the semicolon and the fixed separator displays the unused characters, out of maximum number reserved for the particular file information, as spaces.
6. Select the language by clicking **Select....** The **Add Language** dialog appears. Instructions for using the dialog box are in [Section 4.3.6](#), steps 2-4.
7. Under **Handle existing file(s)**, select **Overwrite** or **Append**. **Overwrite** overwrites all information in an existing destination file and **Append** appends all the information that is missing in an existing destination file.
8. Click **OK** to start the export operation.

After the export operation has finished, an **Export Summary** dialog appears.

The report in the dialog box shows the following information:

- File name and text id with the selected separator.
- Information if any of the file information elements are too long.

For information on summary dialogs and their reports, see [Section 4.3.18](#).

4.3.18 Importing from a database

Text files can be regenerated from a database, which is a text file itself. The import operation handles the type of language files listed in .

The database must contain the following information for the import operation:

- Row ID (number starting from 1 for the first text Id) (String, max. length 6 characters).
- Path (String, max. length 60 characters).
- Filename (String, max. length 50 characters).
- Modification date and time (String, max. length 16 characters: 1999-01- 31_01:45).
- Type of text file (String, max. length 3 characters: VSO, LIF, VVF, EFT,INI, MNU, ...).
- Object(s) (String, max. length 50 characters).
- Text ID(s) (String, max. length 50 characters).
- Row number (String, max. length 2 characters: 0,1,2,3, ...,99).
- Text ID type (String, max. length 1 character: T, V, I).
- Contents (String, max. length 255 characters).

An example of the file information in a database is shown in [Figure 37](#).

```
#Creation date: 1999-11-22_17:00
#Separator type: ;
#Source directory for first export: C:\SC
#Exported language: EN
#MicroSCADA ver 8.4.3
#TTI version 1.6.13
#
#
#C:\SCVAPI\TUTORIAL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;B_LOGIN;0;T>Login
#C:\SCVAPI\TUTORIAL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;B_LOGOUT;0;TLogout
#C:\SCVAPI\TUTORIAL_APPL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;L_COPYRIGHT;0;TCopyright:
#C:\SCVAPI\TUTORIAL_APPL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;L_INTERNAL_USE_ONLY;0;TInternal Use Only
#C:\SCVAPI\TUTORIAL_APPL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;L_MICROCLIENT;0;TMicroCLIENT
#C:\SCVAPI\TUTORIAL_APPL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;L_MICROSCADA;0;TMicroSCADA
#C:\SCVAPI\TUTORIAL_APPL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;L_SYSTEMID;0;TSystem ID:
#C:\SCVAPI\TUTORIAL_APPL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;L_THIS_PRODUCT_IS_LICENSED_TO;0;TThis product is licensed to:
#C:\SCVAPI\TUTORIAL_APPL_APPL_START.USO;1999-09-07:07:15;USO;MAIN;B_LOGIN;0;T>Login Notepad_Importff
```

Figure 37: An example of a database opened in Notepad. In this database the semicolon has been selected as a separator for the row IDs, paths, filenames, etc.

The database can be imported to, for example, Microsoft Access or Excel. For this, a header is needed with information about the drive, path, language, exported date and time. The header information is 10 lines starting with the character #, as shown in [Figure 37](#) and [Figure 38](#). The compatibility of the database with, for example, Microsoft Access enables combining already translated texts with the latest English versions of files containing language dependent texts.

A	B	C	D	E	F	G	H	I	J	K
1	#Creation date: 1999-11-22_17:00									
2	#Separator type:									
3	#Source directory for first export: C:\SC									
4	#Exported language: EN									
5	#MicroSCADA ver 8.4.3									
6	#TTI version 1.6.13									
7	#									
8	#									
9	#									
10	#									
11	1	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	B_LOGIN;0	T	Login				
12	2	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	B_LOGOUT;0	T	Logout				
13	3	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	L_COPYRIGHT;0	T	Copyright:				
14	4	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	L_INTERNAL;0	T	Internal Use Only				
15	5	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	L_MICRO;0	T	MicroCLIENT				
16	6	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	L_MICROSD;0	T	MicroSCADA				
17	7	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	L_SYSTEM;0	T	System ID:				
18	8	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	L_THIS_PRODUCT_IS_LICENSED_TO;0	T	This product is license				
19	9	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	B_LOGIN;0	T	Login				Excel_Importff
20	10	C:\SCVAPI\APL_STAF\1999-09-07\VSO	MAIN	B_LOGOUT;0	T					

Figure 38: An example of a database imported to Microsoft Excel



Importing from a database may take several minutes and load the workstation's processor enough to remarkably slow down its operation. Therefore it is not advisable to perform this operation while running a process.

To import from a database:

1. Select **Import Database..** from the **File** menu. The **Database Options** dialog appears.
2. Type the operating system relative path and the database name to the **Source** text box or click **Browse...** next to the **Source** text box to select the path and the file with the file chooser.
3. Type the operating system relative path and the name of the English source folder to the **English Source** text box or click **Browse...** next to the **English Source** text box to select the path and the folder with the file chooser.
4. Type the operating system relative path and the destination folder name to the **Destination** text box or click **Browse...** next to the destination text box to select the path and the folder with the file chooser.
5. Select the separator from the **Separator** drop-down list. The options are semicolon, tab and fixed. An example of the semicolon separator in the database is shown in [Figure 37](#). The tab separator displays a tab instead of the semicolon and the fixed separator displays the unused characters, out of maximum number reserved for the particular file information, as spaces.
6. Select the language by clicking **Select....** The **Add Language** dialog appears. For information on using the dialog, see [Section 4.3.6](#), steps 2-4.
7. Under **Handle existing ids**, select **Overwrite all existing text ids** or **Overwrite only empty text ids**. **Overwrite all ids** overwrites all IDs in the destination folder and **Overwrite only empty ids** overwrites all the missing IDs in the destination folder.
8. Click **OK** to start the import operation.

A report is shown after the import from the database is completed.

The report contains the following notifications:

- Any empty text ID in a language that is not empty in the English version.
- If there is any attribute or file in other languages not present in the English version.

For information on the summary dialog boxes and their reports, see [Section 4.3.20](#).

4.3.19 Header information in text files

A header of a text file written by the Text Translation Tool includes information about the version of the Text Translation Tool and the date when the file was written.

Example:

```
;OBJECT : BEU_EVENTS.TXT
;COPYRIGHT : ABB Substation Automation Oy
;DEPARTMENT : RSD
;PROJECT : LIB 500 Base 4.0.2 / Event List 2.0
;AUTHOR : S-O LUND ;CREATED : 96-04-18
;MODIFYED : 99-07-26
;
;TTT version 1.6.13 99-01-31
;DESCRIPTION: This is texts for the event list pictures
;-----
```

4.3.20 Reports

A report is generated every time an import or export operation is done. The report shows erroneous and missing Text IDs, see [Figure 39](#). The status of the text is displayed separately for each language.

The header of the error list includes the following information:

- Time and date when the report was generated.
- The selected options.
- Source and destination directories.

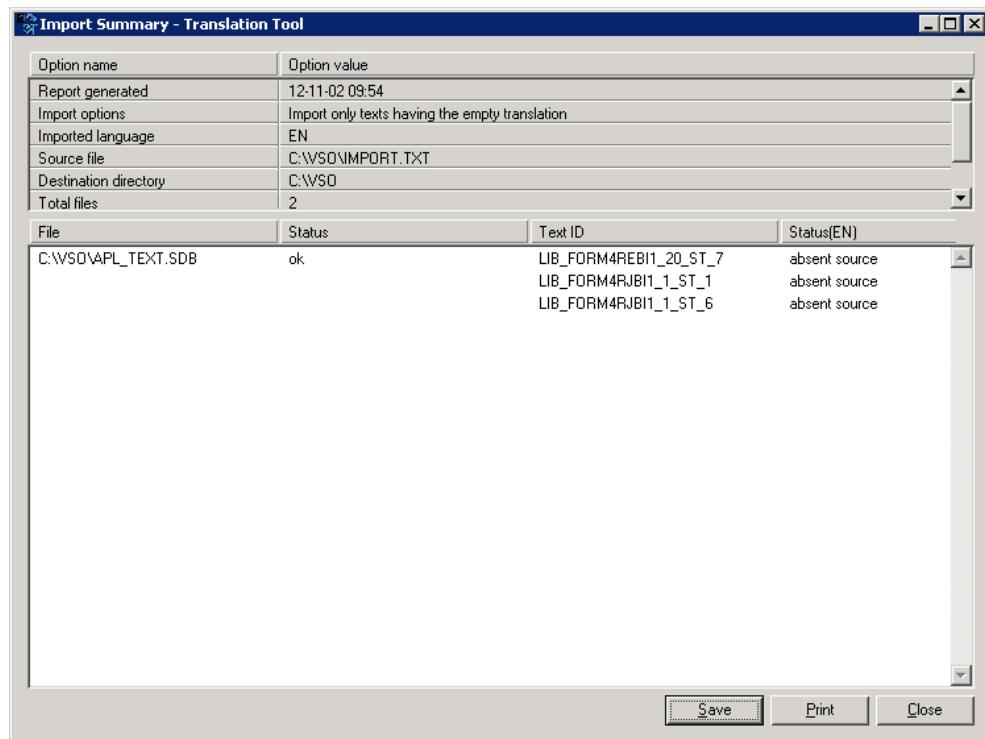


Figure 39: This Import Summary dialog box is an example of a report from an import operation

The command buttons in the dialog allow saving and printing the report, as well as closing the dialog box, see [Figure 39](#).

[Figure 40](#) shows an example that includes the following error information:

- The Text Id MAIN*B_HELP was not translated in the imported file.
- The Text Id MAIN*L_COMPILED was not found from the imported file.

This means that these two Text Ids have to be edited in the Text Translation Tool. The status may be:

Absent destination	The text Id is not found from the destination file.
Non-empty destination	The text was already in the destination file.
Absent source	The Text Id was not found from import file.
Empty source	The Text Id was empty in import file.

```

Report created: 1999-01-31
Import options: Import only texts having empty translation
Import source: Another version of the file
Source directory: sc\De_Tool\ApIBuild
Source directory for English: sc\Stool\ApIBuild
Destination directory: sc\Stool\ApIBuild
File          Status   Text Id           Status (EN)      Status (DE)
...
ObjCp.vso imported MAIN*B_HELP    non-empty destination empty source
                  MAIN*L_COMPILED absent source    absent source
                                         Import_Example.tt

```

Figure 40: An example of information in an error list after an import operation from sc\De_Tool\ApIBuild to sc\Stool\ApIBuild. This example is an import from MicroSCADA version 8.4.2.

4.3.21 Comparing language files

Using the latest translated material and a summary of differences between the English source versions simplifies the translation process. An example of a translation process is shown in [Figure 41](#).

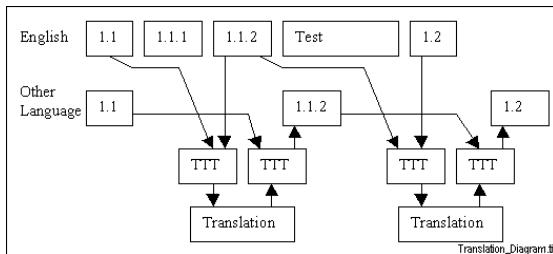


Figure 41: An example of a translation process. The members in the boxes represent different versions of texts, 1.2 being the latest version.

The summary of differences is a result of language file compare operation. Two different versions of files can be compared in the same language.

In [Figure 41](#), for example, the differences between versions 1.1 and 1.1.2 of the English language files are compared in the Text Translation Tool before translating the English file version 1.1.2. The summary shows the differences between the language dependent texts that have been added to the English file 1.1.2 version. Since the English file version 1.1 has already been translated to another language, only the new English texts in the English file version 1.1.2 need to be translated.



The comparison may take several minutes and load the workstation's processor enough to remarkably slow down its operation. Therefore it is not advisable to perform this operation while running a process.

To compare two different versions of a file in a selected language:

1. Select **Compare** from the **Texts** menu. The **Compare options** dialog appears.
2. Type the operating system relative path and the database name to the **First source directory** text box or click **Browse** next to the text box to select the path and the file with the file chooser.
3. Type the operating system relative path and the database name to the **Second source directory** text box or click **Browse...** next to the text box to select the path and the file with the file chooser.
4. Select the language by clicking **Select....** The **Add Language** dialog appears. For information on using the dialog, see [Section 4.3.6](#), steps 2-4.
5. Click **Compare text id values** and/or **Include subdirectories** to compare language dependent texts and include subdirectories to the comparison.
6. Click **OK** to start the comparison.

When the comparison is finished, the summary of differences is displayed. Information on the summary dialog boxes and their reports is found in [Section 4.3.20](#).

[Figure 42](#) shows a more detailed description of the different phases in the simplified translation operation.

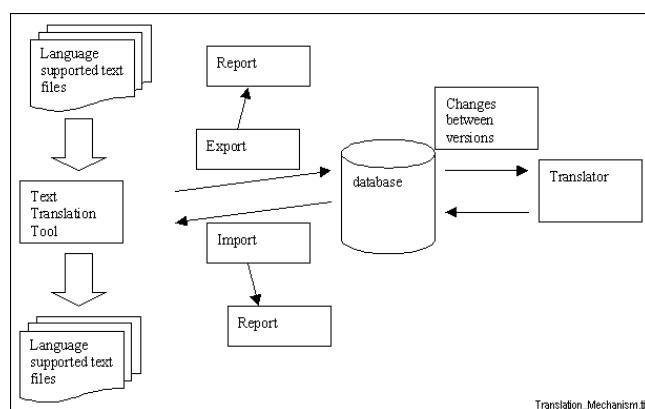


Figure 42: The simplified translation process

4.3.22 Local language directories in LIB4 application libraries

Each time a local language is added by selecting **Menu/Language/Add** in the Text Translation Tool, a LANGn directory is created under all locations where LANG0 folder is present. When a file is selected and edited it in the local language (Edited Language), the file is saved under the LANGn folder. Ex- LANG1 is created at all locations where LANG0 is present. The file BAU_ALARM1.HLP is edited in LANG1 and saved under the LANG1 folder as shown in [Figure 43](#).

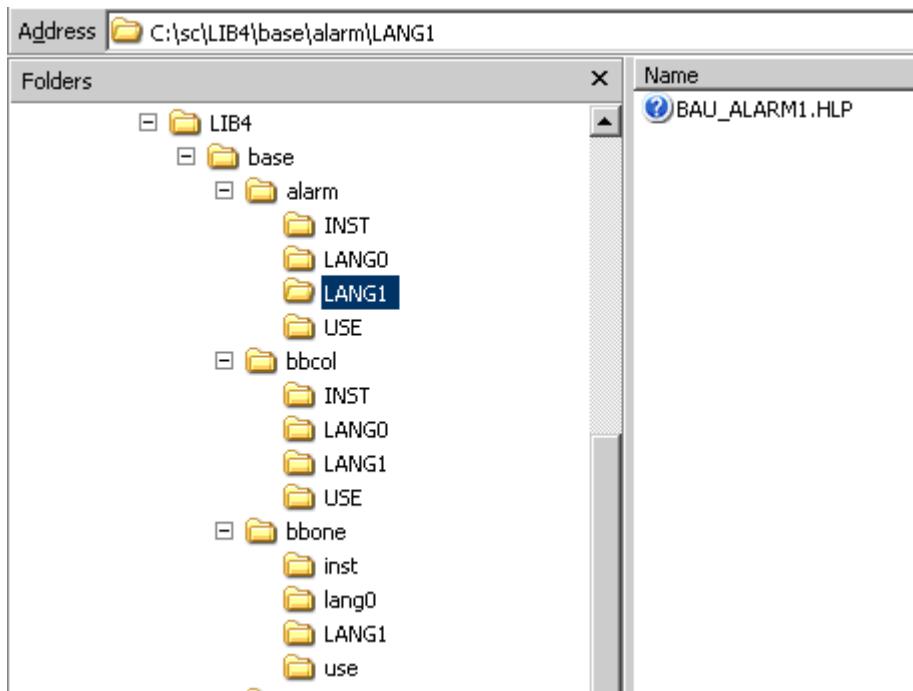


Figure 43: *LANGn* folder location

4.3.23 Dictionary

The Text Translation Tool manages a dictionary, which can contain words and phrases in different languages. The dictionary can be edited with the Text Translation Tool. The dictionary can be used to translate individual texts as well as all texts of a file. In this case all words and phrases which are found in the dictionary are translated.

The dictionary contains the following functionality:

- Add a new word.
- Paste copied text from the Text Translation Tool.
- Delete a word.
- Erase all words from one language.
- Export the words and translations (in one language) to a text file or database.
- Import the words and translations (in one language) from a text file or database.
- Search and replace a word.
- Sort the dictionary in alphabetic order by each language.
- "Use Dictionary" functionality that uses the translations found in the dictionary.

An English version of the dictionary can be built from a database after importing all files (i.e. c:\sc\) with language support to the database. For instructions on exporting to a database, see [Section 4.3.17](#). The English version of the dictionary contains entries only in English. All unique strings from the file (database) should be written to the dictionary when importing from an exported database to a dictionary.

4.3.23.1 Dictionary Editor

The dictionary can be modified and new entries can be added with the Dictionary Editor, see [Figure 44](#). The Dictionary Editor can be accessed from the Text Translation Tool.

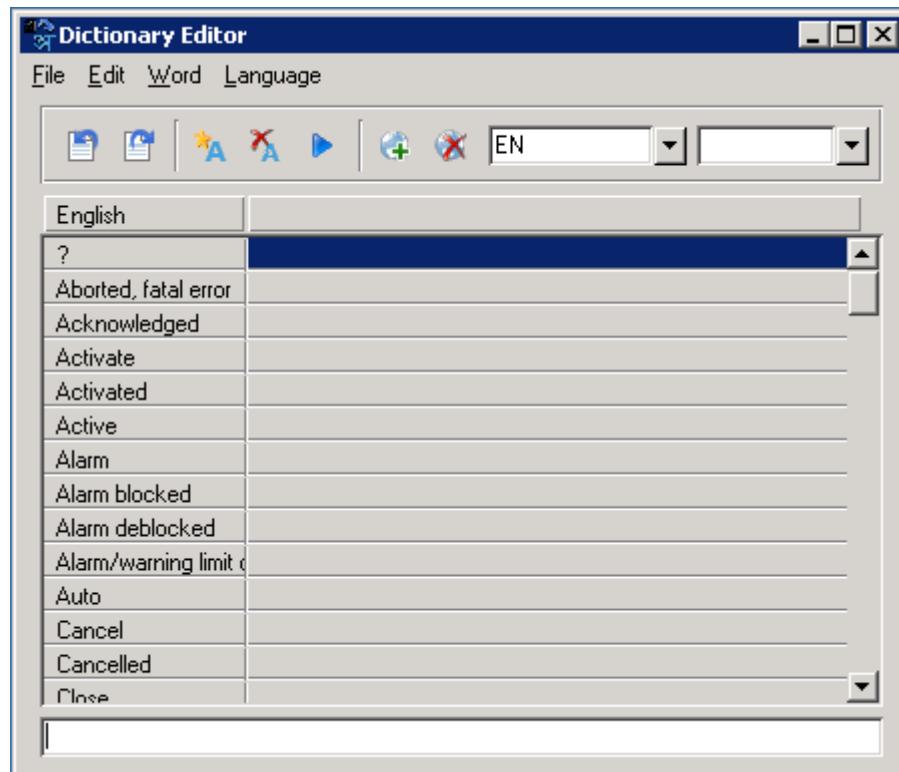


Figure 44: The Dictionary Editor dialog

The Dictionary Editor toolbar includes the following buttons:

- Exit
- Import from file
- Export to file
- Add new word
- Delete current word
- Next cell
- Add language
- Delete current language

4.3.23.2 Using dictionary

To use the dictionary:

1. Select **Use Keywords** from the **Dictionary** menu. All occurrences of the referenced language entries in the dictionary import the corresponding translation into the edited file.
2. If there are two different translations available in the same language, the dialog shown in [Figure 45](#) appears. In the dialog, select the correct translation for the text from the **All translations list** and click **OK**. To cancel the translation of a single word and proceed with the operation, click **Cancel this unit**. **Cancel translation** cancels the Use Keywords operation.

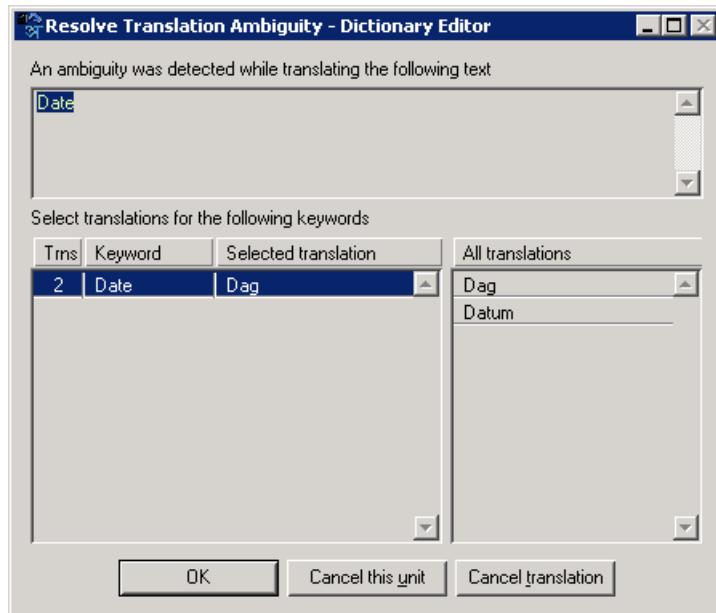


Figure 45: The Resolve Translation Ambiguity dialog

4.3.23.3 Editing dictionary settings

To edit dictionary settings:

1. Select **Settings** from the **Dictionary** menu. The **Dictionary Settings** dialog appears.
2. Select suitable options.
3. Click **OK**.

4.3.23.4 Finding and replacing text

To find/replace text:

1. Select **Find/Replace** from the **File** menu. The **Find/Replace** dialog appears. Before selecting **Find/Replace** only a part of the text can be selected to be searched.
2. Type the text to be searched to the **Find what** field or select an already searched string from the drop-down list.
3. If the found word should also be replaced, type the replacement word to the **Replace with** field or select an already used replacement string from the drop down list.
4. Select suitable search options below the **Replace with** field.
5. Click **Find First**, or click **Replace All** to replace all matching words.
6. If **Find First** was selected and a match case is found, click **Replace** to replace the matching word. **New Search** starts a new search from step 2.

4.3.23.5 Editing a dictionary

To edit the dictionary:

1. Select **Edit Keywords...** from the **Dictionary** menu. The **Dictionary Editor** dialog appears.
2. To add a language to the dictionary, select **Add Language...** from the **Language** menu. Select desired language from the list. Click **OK**.
3. To select the reference language, select the **Select Reference Language** submenu from the **Language** menu. Select an option on the list.
4. To select edited language, select the **Select Edited Language** submenu from the **Language** menu. Select an option on the list.

5. To add a new entry into dictionary, select **Add New Word** from the **Word** menu. An empty cell is selected. Type the new word.
6. To delete an entry from the dictionary, select the cell with the word to be deleted. Select **Delete Current Word** from the **Word** menu.
7. To save the dictionary, select **Save Dictionary** from the **File** menu.

4.3.23.6 Exporting a dictionary

To export a dictionary:

1. Select **Edit Keywords...** from the **Dictionary** menu.
2. Select **Export to file...** from the **File** menu.
3. In the **Save as** dialog, select the appropriate directory and enter a filename without file extension. Click **Save**. The file is saved with the extension .dic by default.

4.3.23.7 Importing a dictionary

To import a dictionary:

1. Select **Edit Keywords...** from the **Dictionary** menu.
2. Select **Import from File...** from the **File** menu. Select directory and file (*.dic).
3. Click **Open**. Entries of the referenced language that are not found in the edited dictionary are imported.

4.3.23.8 Importing from a database



Import from database may take several minutes and load the workstation's processor enough to remarkably slow down its operation. Therefore it is not advisable to perform the operation while running a process.

To import from a database:

1. Select **Edit Keywords...** from the **Dictionary** menu.
2. Select **Import from Database...** from the **File** menu. The file chooser dialog appears.
3. Select the database (*.txt) to be imported to the dictionary with the file chooser.
4. Click **Open** to save the file and close the dialog box, or click **Apply** to save the file without closing the dialog. By clicking **Apply**, several databases can be imported without having to repeat the steps 2-3.

4.3.23.9 Text of VS objects

Texts of the VS_PROGRAM_EDITOR and VS_NOTICE_DIALOG objects can be translated in the stdlang.vso file, which is located in the ..//sc/prog/exec folder. The stdlang.vso file contains texts only in English (EN). They are meant to be used only for referencing, so modifying these texts has no effect. If the language in the monitor is English "EN", the default texts are used. The stdlang.vso file includes also examples, texts in Finnish ("FI") for VS_PROGRAM_EDITOR.

4.4 SCIL Database Tool

In MicroSCADA, it is possible to create SCIL database files that may contain any SCIL data types. For more information on SCIL databases, see the Programming Language SCIL Manual. In the operating system's file system, the SCIL database files are recognized by their file extension .SDB (SCIL Database file).

SCIL Database Tool provides the following functions for these files:

- Creating a new file
- Opening an existing file to display the contents of the file in a structured way
- Editing the file with regard to the sections, element names and their values
- Saving the file
- Copy and paste the contents of the file between two SCIL Database tools open at the same time

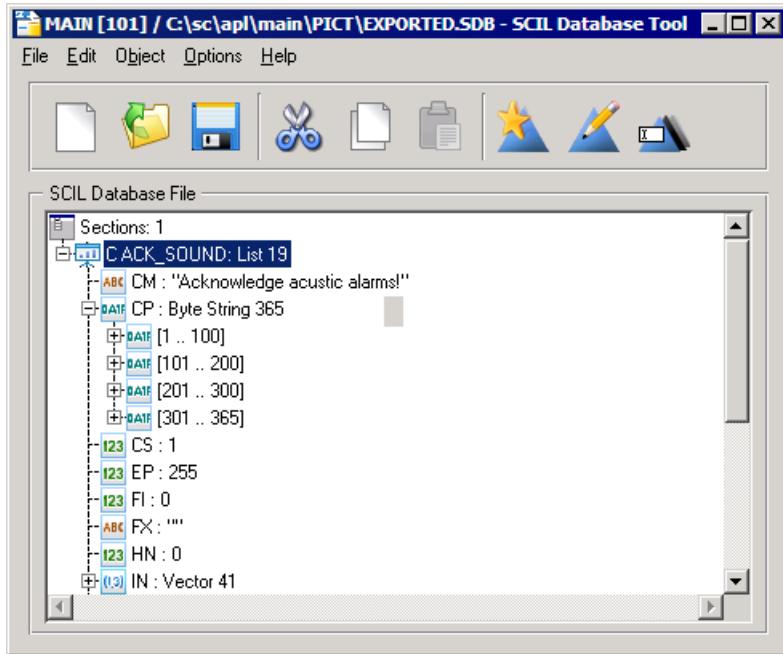


Figure 46: Main view of the SCIL Database Tool

The main view of the tool consists of the following parts, see [Figure 46](#).

- Menubar
- Toolbar
- Area for displaying the file contents in a structured way

4.4.1 Opening the SCIL Database File

When **File/Open** is selected or the appropriate toolbar button is clicked, the File Chooser dialog is opened. See [Figure 47](#).

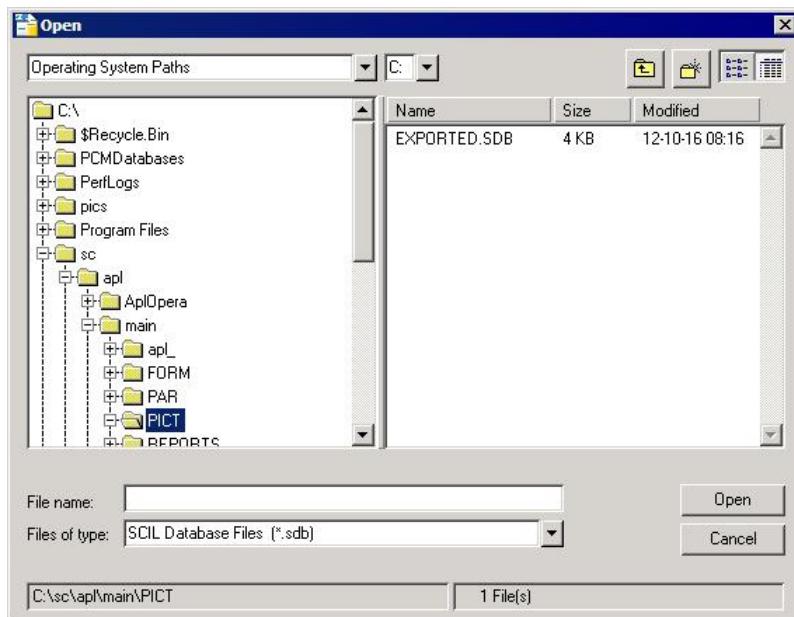


Figure 47: Selecting a file in File Chooser

The default folder for File Chooser is the active application's PICT folder. The files, which have the .SDB extension are shown as default. When the SCIL Database file to be opened is located in another folder, use the File Chooser to select the appropriate drive and folder. To open the file, select the file name from the list or type the name of the file to the File name field. It is also possible to open the latest files from the tool's file history list, located in the File menu of the tool.

When the file is opened, its contents is displayed in the tool in a structured way.



If the Text Database files (SYS_TEXT.SDB, APL_TEXT.SDB or other Text Database files defined by the APL:BTD Text Databases attribute) are opened in SCIL Database Tool, the following dialog is displayed for the user, see [Figure 48](#).



Figure 48: Notification for opened Text Database files

In this case, the tool disables the saving function. This is because the Text Translation Tool should be used for localization purposes of these files. However, it is possible to edit the contents of this file, and save it to another file name.

When the file is opened in the tool, its contents is shown in the tree. Sections node of the tree displays the number of sections included in this file. As a default, the Sections node is expanded, thus displaying all the sections found from the file. The contents of each section becomes displayed, when the appropriate Section node in the tree is expanded.

For each section and element, the following information is displayed:

- Data type of the section or element (with icon)
- Name of the section or element
- Value of the section or element

4.4.2 Creating a New SCIL Database File

When **File/New** is selected or the appropriate toolbar button  is clicked, the contents of the SCIL Database file tree is cleared in the tool. If the current SCIL database file in the tool has been modified before creating a new file, the following dialog is displayed to the user (see [Figure 49](#)).

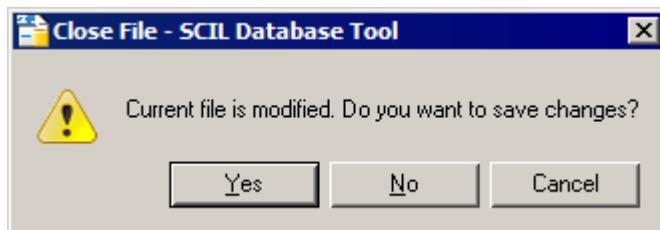


Figure 49: Current file is modified notification

When **Yes** is clicked, the tool saves the current SCIL database file before clearing the contents of tree. If **No** is clicked, the contents of tree is cleared without saving the content of the current SCIL database file. If **Cancel** is clicked, the contents of tree is not cleared.

4.4.3 Creating New Section with Value

When root node **Sections** is selected in the tree, select **Object/New** from the menubar or click the appropriate toolbar button . Then the **New** dialog is opened. See [Figure 50](#).

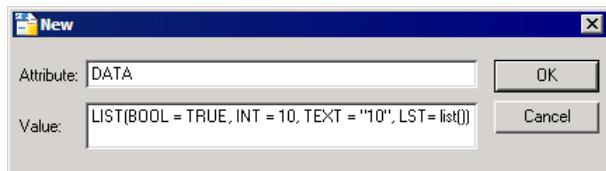


Figure 50: Opening the New dialog

Type the section name in the **Section** text field, and the value in the **Value** text field. Here are some examples for entered values:

TRUE

10

"10"

LIST(FIRST=1, SECOND=VECTOR(1,2,3), THIRD=TIME)

VECTOR(TRUE, FALSE, 12)

Clicking **OK** or pressing ENTER creates a new section in the tool with the entered value and closes the **New** dialog. Clicking **Cancel** discards the entered section with value and closes the dialog.

4.4.4 Editing Section Value

When some section is selected in the tree, select **Object/Edit** from the menubar or click the appropriate toolbar button . The **Edit** dialog is opened. See [Figure 51](#)



Figure 51: Edit dialog

Modify the contents of the existing value in the text field. When **OK** is clicked or ENTER is pressed, the modified value is applied into tool and **Edit** dialog is closed. If the entered value does not follow the SCIL syntax (for more information on this, see the Programming Language SCIL manual), the message dialog (Figure 52) is displayed for the user. Clicking **Cancel** discards the entered value and closes the dialog.

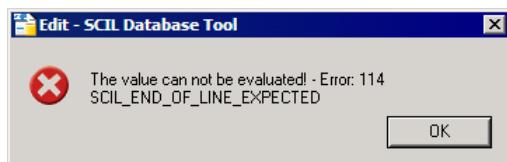


Figure 52: Incorrect value entered in the Edit dialog

4.4.5 Saving SCIL Database File

When **File/Save As** is selected from the menubar, the **Save As** dialog is opened, see Figure 53. The files with .SDB extension are recognized as SCIL Database files and are listed in the default folder. Type the file name in the text field, and click **Save** or select an existing file name in the list to replace the existing file. Clicking **Cancel** discards the operation and closes the dialog.

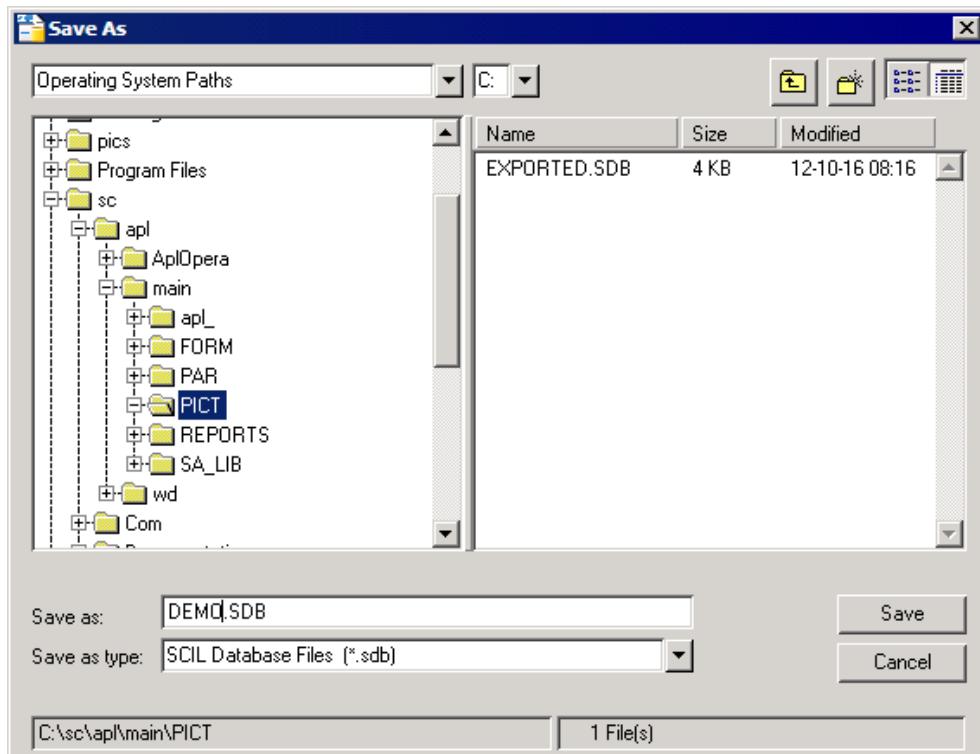


Figure 53: Save as dialog

If an existing file has been modified in the tool, select **File/Save** from the menu bar or click the appropriate toolbar button to save the file with the same name.

4.4.6 Renaming Sections

Select an existing section in the tree, and select **Object/Rename** from the menu or click the appropriate toolbar button. The **Rename** dialog is opened, see [Figure 54](#).

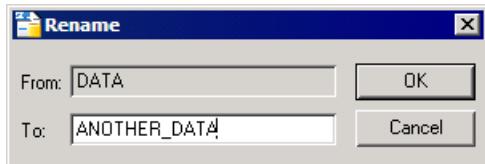


Figure 54: Rename dialog

Type in a new section name in the text field. Clicking **OK** or pressing ENTER accepts the entered section name in the tool and closes the **Rename** dialog. Clicking **Cancel** discards the entered new section name and closes the dialog.

4.4.7 Deleting Selected Content

Select an existing section or value in the tree, and select **Edit/Cut** or click the appropriate toolbar button. The selected content is deleted. However, it is possible to paste this section or value later, because it is saved to the clipboard of tool.

4.4.8 Transferring information between two SCIL Database Tools

It is possible to copy and paste section and value information between two parallel SCIL Database Tools. The purpose of this function is to provide easier engineering, when there is a need to reuse the data from one SCIL Database File to another. This can be done by the following way:

1. Start the first SCIL Database Tool from the Tool Manager.
2. Start the second SCIL Database Tool from the Tool Manager.
3. Open the SCIL Database in this tool. Select some section name in the tree.
4. Select **Edit/Copy** from the menu bar or click the appropriate toolbar button.
The contents of the selected section is copied to the clipboard of the first tool. After this is done, do as follows:
5. Select the root node of the tree, that is, click the **Sections** item.
6. Select **Edit/Paste** from the menubar or click the appropriate toolbar button.

The contents of the copied section is pasted in the contents of the second tool (see [Figure 55](#)).

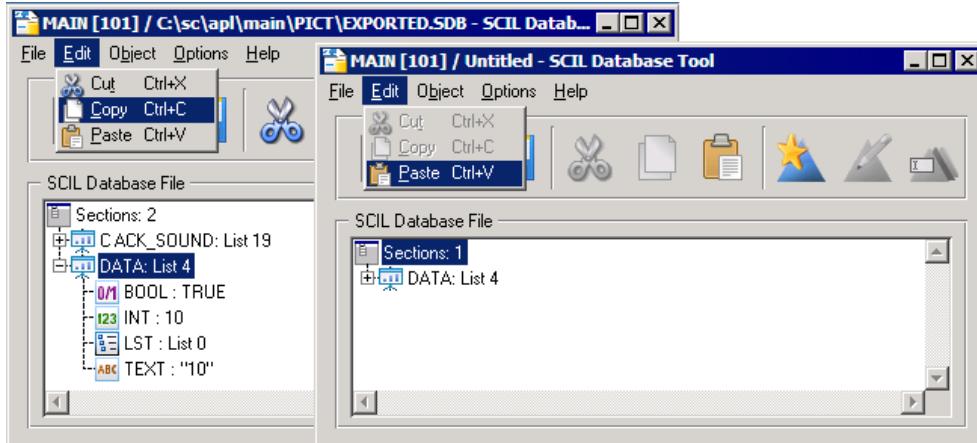


Figure 55: Transferring information between two tools

4.5 Hard disk management

The Disk Management Tool (DMT) is designed for automatic and manual hard disk management in MicroSCADA X Control System. That includes file deleting, moving and compression, in order to free up disk space. The DMT uses external executable 7z.exe (www.7-zip.org) for compression.

The Disk Management Tool is able to perform the following actions to maintain available disk space:

- Deleting files
- Moving files to another hard disk or removable media
- Compressing files and deleting original ones. Archives created by the DMT are handled by the DMT User Interface part.

The DMT can be activated the following ways:

- Manual triggering via the User Interface
- Automatic periodic triggering at predefined time of the day
- Automatic triggering based on hard disk space alarm

4.5.1 Using Disk Management tool

The Disk Management Tool is accessed by double-clicking the Disk Management icon in the Miscellaneous tab of the Tool Manager. When the DMT User Interface part is started, the main dialog box appears. The typical appearance of the main dialog box is shown in [Figure 56](#).

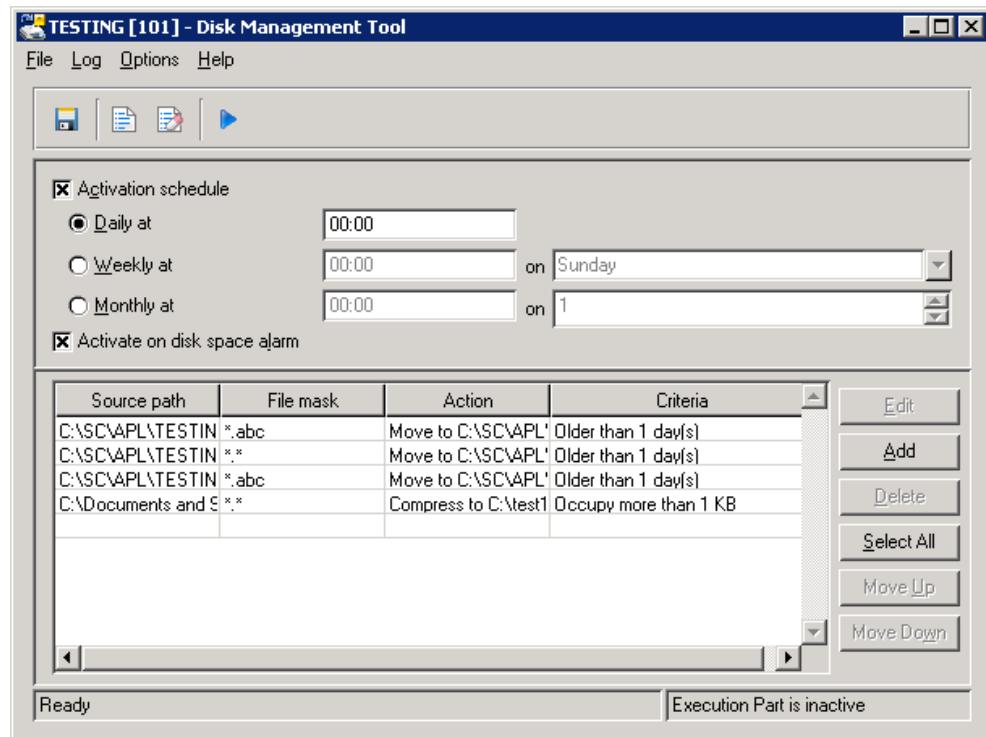


Figure 56: The Disk Management Tool main dialog box

4.5.1.1 Menus

Table 3: File menu commands

Save	This command saves the current activation settings and file sets to the parameter file. Base system objects are updated according to the new activation settings. The left toolbar button also corresponds to this command.
Run now	This command activates the Execution part immediately if it is not already running. If there are unsaved changes in file sets or activation settings, the tool prompts whether to save them prior to activating the Execution part. The fourth toolbar button also corresponds to this command.
View messages	This command shows the dialog box containing recent messages received from the Execution part. The dialog box also opens automatically when a new Critical or Caution message is received. See for more detailed description of the message dialog.
Open archive	This command allows the user to view and extract files from archives created by the Execution part. See for the description of the archive handling dialog.
Exit	This command closes the UI dialog box. If there are unsaved changes in file sets or activation settings, the tool prompts whether to save them.

Table 4: Log menu commands

View Log	<p>This command opens the Viewer dialog box to view the log created by the Execution part. Log messages are displayed as plain text, each one on a single line. Messages include date and time stamp, message type (information, caution and critical), and the message text. There are three types of messages:</p> <ul style="list-style-type: none"> Information messages are those not requiring immediate attention, such as the number of processed files from each file set, the time when the Execution part was started and so on. Caution messages are logged when there is an I/O or other non-critical error, but the DMT is able to recover and continue execution. Critical messages are logged when there is a critical error, which has caused the Execution part to stop. <p>Note that the log viewer is able to display up to 10 000 log messages, so it is necessary to clear the log periodically. The log file is stored in language independent format. When it is viewed in the UI part, messages are translated using the current language. The second toolbar button corresponds to this command.</p>
Clear log	This command empties the log file and immediately logs a message that the log file was cleared. The third toolbar button also corresponds to this command.

Table 5: Options menu command

Toolbar Visible	This option toggles the toolbar state.
-----------------	--

Table 6: Help menu command

About	This command opens the About information sheet.
-------	---

4.5.1.2 Toolbar

	Corresponds to the Save command in the File menu.
	Corresponds to the View log command in the File menu.
	Corresponds to the Clear log command in the File menu.
	Corresponds to the Run now command in the File menu.

4.5.1.3 Activating automatic disk space settings

The following activation methods are supported by the Disk Management Tool (DMT):

- Time-based activation (daily, weekly or monthly)
- Activation based on disk space alarm

These options are independent of each other, but only one instance of the Execution part may run at a time. For example, if the Execution part is triggered by a disk space alarm or manually and it has not finished before a time-based activation occurs, then the time-based activation is ignored.

Setting a daily, weekly or monthly activation in the main dialog:

1. Select the Activation schedule check box in order to activate the option buttons. See
2. Select one of the following options depending on which kind of activation is preferred:
Daily at, Weekly at or Monthly at.
3. Type the activation time in the freely editable text box next to the option button. The time must be typed in 24 hour format, for example 16:30. For Daily at activation, the day of the week has to be selected from the drop-down list next to the time text box in addition to the time of day. For Monthly at activation, the date has to be selected as well from the spin box next to the time text box in addition to the time of the day.
The monthly activation will be ignored on months which do not contain the selected day.
For example, if the 30th day of each month is selected as the activation day, the Execution part will not be activated on February.

Setting activation on disk space alarm is done by selecting the Activate on disk space alarm check box. The disk space alarm limit can be adjusted with the LI attribute of the process object 10 in the B_HDS process object group.

4.5.1.4 Creating new file sets

Each file set consists of the following attributes:

Table 7: File attributes

Source path	This is the directory specification, where the source files are located. It can be either an application related path or an operating system dependent absolute path.
File mask	This attribute is the pattern of the file names to operate on. It is also possible to specify several patterns separated by semicolon (;). The DMT correctly handles file names matching more than one pattern. For example, if A*.* and *.PHD are specified, APL_991004.PHD will be processed only once.
Action	One of the following actions can be performed by DMT on file sets: Delete: Deletes all files matching the pattern and criteria. Move: Moves all files matching the pattern and criteria to another location. Compress: Places all files matching the pattern and criteria into the archive and deletes the original files if the operation was successful. The archive file and extension naming can be followed as per the file systems (FAT32/NTFS) standard naming conventions. The extension selection can be .7z (default), .zip or .tar depending on the compression format requirement. Note that for the compression operation to succeed, the amount of free disk space on the drive where MicroSCADA is installed needs to be more than twice the size of the files to be compressed.
Action Destination	This attribute is only applied for Move and Compress actions. For Move action, it specifies the directory, where to move the affected files. For the Compress action, it specifies the destination archive file. The destination file name is given as an argument to 7z.exe
Criteria	One of the following criteria can be checked by the DMT to find out whether to process the file set: Time: All files older than the specified time stamp and matching the pattern are processed. Size: If the size of a file set matching the pattern is greater than the specified limit, the file set is processed.
Criteria value	This is the number of criteria units, selected for the file set. This value must be between 1 and 999.
Criteria unit	The following units are applied to the Time criteria: <ul style="list-style-type: none">• day• month• year The following units are applied to the Size criteria: <ul style="list-style-type: none">• KB - Kilobyte, is equivalent to 1 000 bytes.• MB - Megabyte, is equivalent to 1 000 000 bytes• GB - Gigabyte, is equivalent to 1 000 000 000 bytes

File sets are processed by the Execution part in the same order as they are listed in the UI main window. Two buttons, Move up and Move down, allow changing the order.

4.5.1.5 Deleting file sets

File Sets can be deleted as follows:

1. Select the file set(s) to be deleted. Several file sets can be selected by holding down the CTRL key and clicking on the sets to be selected. Clicking **Select All** selects all the file sets in the main dialog box.
2. Click **Delete**. The tool prompts to confirm the operation.

4.5.1.6 Defining file set properties

The **File Set Properties** dialog allows the user to create file sets and to edit the attributes of existing file sets. The appearance of the dialog is shown in [Figure 57](#).

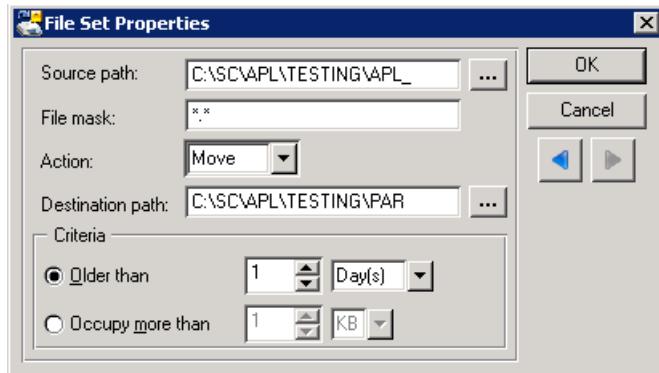


Figure 57: The File Set Properties dialog

The **File Set Properties** dialog contains dialog items for all attributes described in the File sets section. The browse button enables a file chooser allowing selecting the directory or file specification.

Adding new file sets

New file sets can be added as follows:

1. Click the **Add command** button in the DMT main dialog.
2. Select a Source path by typing the path in the freely editable text box, or click the **Browse** button next to the text box and select the path with the file chooser.
3. Insert File mask by typing the pattern in the freely editable text box. Acceptable extensions for the files are .phx, .phz, .phd, .phi, .cfg, .dat, and .inf, files with other extensions are not handled. It is also possible to specify several patterns separated by semicolon (;). If, for example, d*.*;u*.ini is used as the file mask pattern, a warning shown in [Figure 58](#) is displayed. The warning appears after the first file set that may include unsupported files has been approved, but only once every time the DMT is used.



Figure 58: Warning about a file mask that may include files not supported by the DMT

4. Select the appropriate action for processing the files included in the file mask. The drop-down list provides the Delete, Compress and Move options.
5. The destination path has to be defined for the Move and Compress actions. Type the path in the freely editable text box or click the **Browse** button to select the path by file chooser. For Compress action, a file name for the archive file needs to be defined in addition to the destination path, for example \sc\temp\compress.7z.
6. In the Criteria group box, click Older than to select time criteria or Occupy more than to select space criteria.
7. Select the criteria value from its respective spin box and unit from its respective drop-down list.
8. Click **OK** to accept the settings.

The two navigation buttons in the **File Set Properties** dialog can be used to move between file sets in the main dialog. The Left arrow moves to the previous file set in the list and the Right arrow moves to the next one. If there are unsaved changes in the **File Set Properties** dialog, the tool asks whether to save them prior to moving. Saved changes are propagated to the main dialog. A separate Save command should be given to save file sets to the parameter file.



Files compressed with old utility AR.EXE are no longer supported for Compress action, only files can be extracted. If you have existing file sets compressed with AR.EXE, you must edit those file sets and change the old file extension to .7z.

Editing existing file sets

Existing file sets can be edited as follows:

1. Click the file set to be edited in the DMT main dialog.
 2. Click **Edit**.
 3. Do the necessary changes in the **File Set Properties** dialog.
 4. Click **OK**.
- The **OK** button propagates changes to the main dialog and then closes the **File Set Properties** dialog.

The **Cancel** button abandons any changes and closes the dialog. If there are unsaved modifications, the tool prompts whether to save them.

The two navigation buttons in the **File Set Properties** dialog can be used to move between file sets in the main dialog. The Left arrow moves to the previous file set in the list and the Right arrow moves to the next one. If there are unsaved changes in the **File Set Properties** dialog, the tool asks whether to save them prior to moving. Saved changes are propagated to the main dialog. A separate Save command should be given to save file sets to the parameter file.

4.5.1.7 Viewing execution messages

When the Execution part is activated and the UI part is open, the Execution part sends urgent messages to the UI part. All messages sent to the UI are also logged, but not all of the logged messages are sent to the UI. When a Critical or a Caution message is received, see **File/View Log** in [Table 3](#). Using Disk Management tool, the UI part opens the Execution Message dialog. The appearance of the dialog is shown in [Figure 59](#).

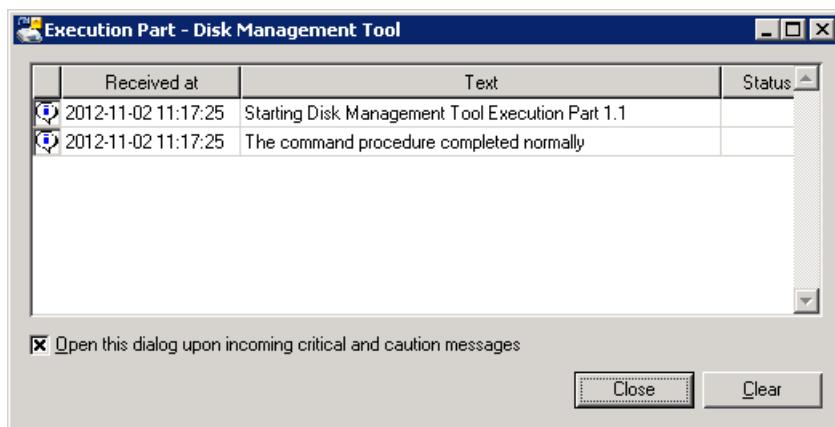


Figure 59: The Execution Part dialog

The dialog shows the message status icon, the time stamp, the message text, and the SCIL status code if any. These messages are not stored permanently. When the main dialog is closed, they are automatically removed.

The **Close** button closes the dialog.

The **Clear** button removes all the messages from the list, but they still remain in the log file.

The **Open this dialog upon incoming critical and caution messages** check box allows turning off the dialog pop-up. If this option is turned on, then incoming Information messages are placed on the list, but the dialog is not automatically opened. However, the last message sent by the Execution part opens the dialog regardless of the message status.

4.5.1.8 Viewing log

The Archive dialog handles archives created and updated by the Execution part. It allows deleting compressed file sets and extracting individual files from archives. The appearance of the Archive dialog is shown in [Figure 60](#).

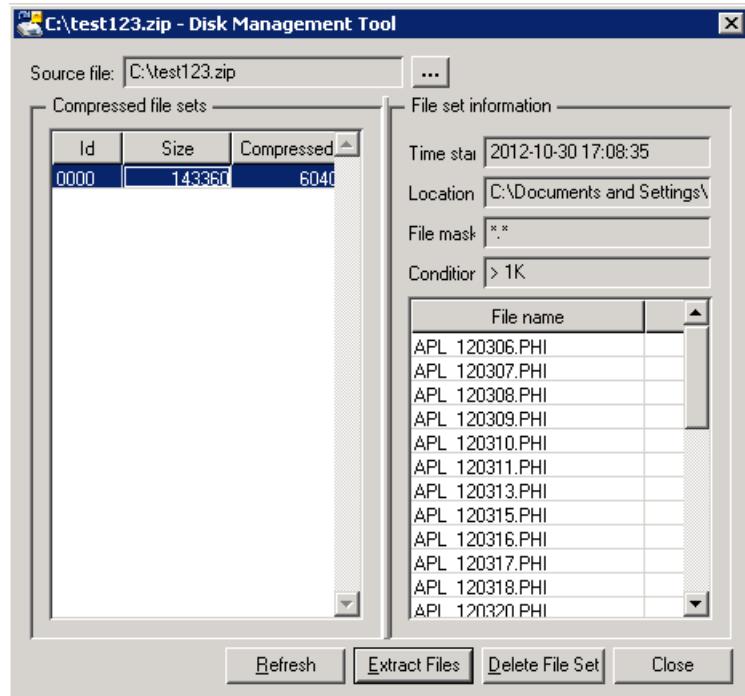


Figure 60: The Execution Part dialog

The Source file text box shows the name and the path of the currently open archive. The corresponding **Browse** button allows selecting another archive.

The leftmost list contains IDs of compressed file sets in the first column. IDs are four-digit numbers assigned in ascending order. The result of the first compression receives the ID 0000, the next one has the ID 0001, and so on. Other two list columns contain the original and the compressed size of the whole data.

The rightmost group box displays the following information related to the selected file set:

- Time stamp: the date/time when the compression was performed
- Location: the original location of files
- File mask: the file mask of the file set
- Condition: the condition used to select files
- The list: the name and the original size for each file

The **Refresh** command button forces the tool to refresh the contents of the archive. It is useful to reflect changes made by the recent activation of the Execution part.

The **Extract files...** command button allows to extract all or only selected files from one file set at a time. When this button is clicked, a dialog is displayed allowing changing the destination directory.

The **Delete file set** button allows deleting one or more selected file sets. Individual files cannot be deleted from a compressed file set.



Delete File Set is no longer supported for the files compressed with old utility AR.EXE, only Extract Files can be performed.

4.6 Configuring Printout Template

Common printout layout for all the Displays in Monitor Pro and VSCIL tools is available in the file \sc\sa_lib\defaults\misc\PrintLayout.XML. It consists of PrintLayout and LayoutFormat elements:

- PrintLayout element describes the placement and styling of the items in the printout.
- LayoutFormat element describes the formatting of the printout like margins and font styling.

4.6.1 Printout Layout Attributes

Printout layout is defined in the PrintLayout element of the PrintLayout.XML. The PrintLayout element includes the following attributes:

- Name: Name of the element
- InUse: 0 (True) or 1 (False)
- Version: Internally used version information.

The PrintLayout element consists of LayoutItem child elements for each text and image items that are visible in the printout. The LayoutItem element always includes the following attributes:

- Type: Text or Image
- Name: Name of the element
- Vertical: Top, Bottom or a numeric value (line number)
- Horizontal: Left, Center, Right or a numeric value (indent).

Rest of the attributes for LayoutItem element depend on the type of the element. The following attributes of LayoutItem element are used only with text items:

- Bold: 0 (False) or 1 (True)
- Italic: 0 (False) or 1 (True)
- Case: Lower or Upper. If empty, no post-processing for the text is done
- Color: RGB (0-255, 0-255, 0-255) color value
- FontFamily: Name of the font. If not defined, using the “global” font definition
- FontSize: Size of the font. If not defined, using the “global” font definition

The following attributes of LayoutItem element are used only with image items:

- Width: Width of the image
- Height: Height of the image

Either width or height has to be defined, otherwise the image will not be printed at all. If both are defined, the size is interpreted as logical units. If only one of the values is defined, the size is interpreted as units related to defined font size with the aspect ratio retained. There are no font definitions for image items.

Font color for DataArea has no effect since the color information is included in the data structure. For DataArea, Legend attribute is also available. With this attribute it is possible to configure the visibility of the Legend:

- Legend: 0 (False, not visible) or 1 (True, visible).

If Legend visibility has been set to 0 (False, not visible) there will not be any Legend shown in the printout.

4.6.2 Printout Layout Format Attributes

Printout layout formatting is defined in the LayoutFormat element of the PrintLayout.XML. The LayoutFormat element includes the following attributes:

- Name: Name of the element (freely configurable)
- InUse: 0 (True) or 1 (False)
- Version: Internally used version information.

The LayoutFormat element consists of FormatItem child elements. The FormatItem element can include the following attributes:

- FontFamily: Name of the font. This is the “global” font definition
- FontSize: Size of the font. This is the “global” font definition
- TopMargin: Top margin of the printout (millimeters)
- BottomMargin: Bottom margin of the printout (millimeters)
- LeftMargin: Left margin of the printout (millimeters)
- RightMargin: Right margin of the printout (millimeters)
- SplitterColor: RGB (0-255, 0-255, 0-255) color value of the table splitter color.

The actual value for appropriate FormatItem is given as an element value. If one is not defined, default value for the formatting is used.

4.6.2.1 Custom Text and Image Items

It is possible to add resource file strings and images from a defined file path or SCIL strings from an appropriate SCIL database to the printout with custom text and image items. This can be achieved by defining the special data key that is related to the key describing the actual layout of the item.

Custom texts can be added by defining attribute named CustomItem (Type="Text") in the PrintLayout.XML (see the configuration possibilities for text items) and element value for the actual text data. Text data should include one of the following values:

- Text string (no localization support)
- Path to the resource file (with or without drive letter) and resource string table ID separated by a comma. This action is indicated by the RES_STR prefix. In order to get localized results, path to the resource file should be of format [path]\[ISO6391LangCode]\File_[ISO6391LangCode].dll
- String ID of the text to be get from SCIL database. This action is indicated by the SCIL_STR prefix.

Custom images can be added by defining attribute named CustomItem (Type="Image") to PrintLayout.XML (see the configuration possibilities for image items) and element value for the actual image data. Image data should include path to the picture (with or without drive letter).

Any of the items can be removed from the layout just by commenting or removing the appropriate key from the PrintLayout.XML. If the file does not exist at all or there are no keys defined in it, the built-in default layout will be used.

4.7 Starting and Stopping SYS600

4.7.1 Manual startup of base system

Manual startup means that SYS600 is started manually from the SYS600 Control Panel. If the base system has not been configured for automatic startup, start it manually.

To start:

1. Log into the operating system as a user belonging to the Administrators group.
2. Double-click the SYS600 Control Panel icon.
3. The SYS600 Control Panel is displayed as shown in [Figure 61](#).

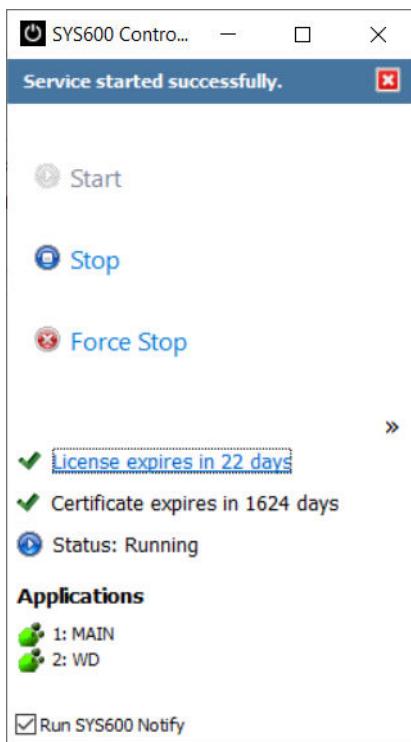


Figure 61: SYS600 Control Panel

4. Click **Start**.
5. The application defined in the configuration is started

4.7.2 Automatic startup of base system

Automatic startup means that MicroSCADA service is started directly after Windows has been started. No user needs to login. In addition to automatic startup, automatic logon into Windows can be used and MicroSCADA monitors can be opened automatically.

To define the automatic startup:

1. Open the SYS600 Control Panel.
2. Select the advanced view.
3. Expand configuration section.
4. Select the **Automatic** Startup type from the Service Startup Type selection box.



Figure 62: Automatic startup of MicroSCADA selection

Disabled startup determines that MicroSCADA cannot be started. Disabled startup is also chosen as described above.

4.7.3 Command-line startup of base system

Base system can be started by running the MS_Serv.exe program together with the parameters described in [Table 8](#). The MS_Serv.exe is located in sc\prog\exec\ folder. The MicroSCADA service can be started, for example from the operating system command prompt with the following command line:

`MS_Serv -start`

When running this command line from the command prompt, the working directory should be the same as the file's location, which in this case is sc\prog\exec\. Command prompt must run as administrator.

Table 8: Parameters of the MS_Serv.exe

Parameter:	Description:
<code>-start</code>	With this parameter MicroSCADA service is started.
<code>-stop</code>	With this parameter MicroSCADA service is stopped.
<code>-forced_stop</code>	With this parameter MicroSCADA service is forcibly stopped.
<code>-no_create_dir</code>	If this parameter is given, additional directories such as "Form" and "Pic" are not created under application directories during service start-up. This parameter can only be used with "-start".
<code>-no_info_dialog</code>	If this parameter is given, the info dialog telling if MicroSCADA is started or stopped successfully is not shown.

The service start and stop access can be granted only for user-defined groups and "Users" group.

The following groups are not granted access:

- Power Users
- Back-up Operators
- Guests
- Replicator

This is because the MicroSCADA monitor and notify window can only be opened by users belonging to the following groups:

- Administrators
- Users

4.7.4 Base system startup procedures

Base system runs as a service in the operating system. This means that the program runs in the background without any visible user interface.

At startup, the MicroSCADA main program runs the following operations:

- The base system is configured with the SYS_BASCON.COM file.
- The remote communication system is configured and communication modules are started (SYS_NETCON.COM).

4.7.5 Application startup procedures

The applications that are configured in the SYS_BASCON.COM are started after the service has started. For each application that has been started and set to "HOT", the following tasks are performed:

- The entire process database of the application is copied from disk to the primary memory. The values for process objects with SS= =2 are marked as not logged (status code 10).
- An event channel (APL_INIT_1) is activated. Often the channel starts an application specific command procedure(s). The function is defined in the event channel configurations.
- All time channels in the active applications, which are connected to data objects and should have started during the system break, are executed. The report data that is missing due to the break is marked as not logged. Command procedures and data objects with SE= =1 are executed. After the marking of data objects is complete, another event channel (APL_INIT_2) starts another command procedure(s).

The tasks are performed regardless of whether they are started from the SYS_BASCON.COM file or later on. If the application is part of a hot stand-by system, the procedures are identical.

The command procedure started by APL_INIT_1 is normally programmed to perform, for example, the following operations:

- Reading process object values from the remote terminal units and updating them in the process database (the primary memory).
- Completing and modifying the equipment/line configuration. The command procedure started by APL_INIT_2 can, for example, be programmed to send messages to printers.

4.7.6 Starting PC-NET

Normally, the PC-NET process communication units do not need to be separately started, but they are started automatically if the system configuration contains NET nodes. In system startup, the PC-NET starting should be seen from the notification window as described in [Section 3.5.1.4](#).

The system configuration tool, as shown in [Figure 63](#), provides a possibility to start and stop PC-NET instances during runtime. This feature is useful when the system is under testing and configuration changes have been done. In normal everyday use of the MicroSCADA X SYS600 Control System, this function is not needed and PC-NET processes are running without interruptions.

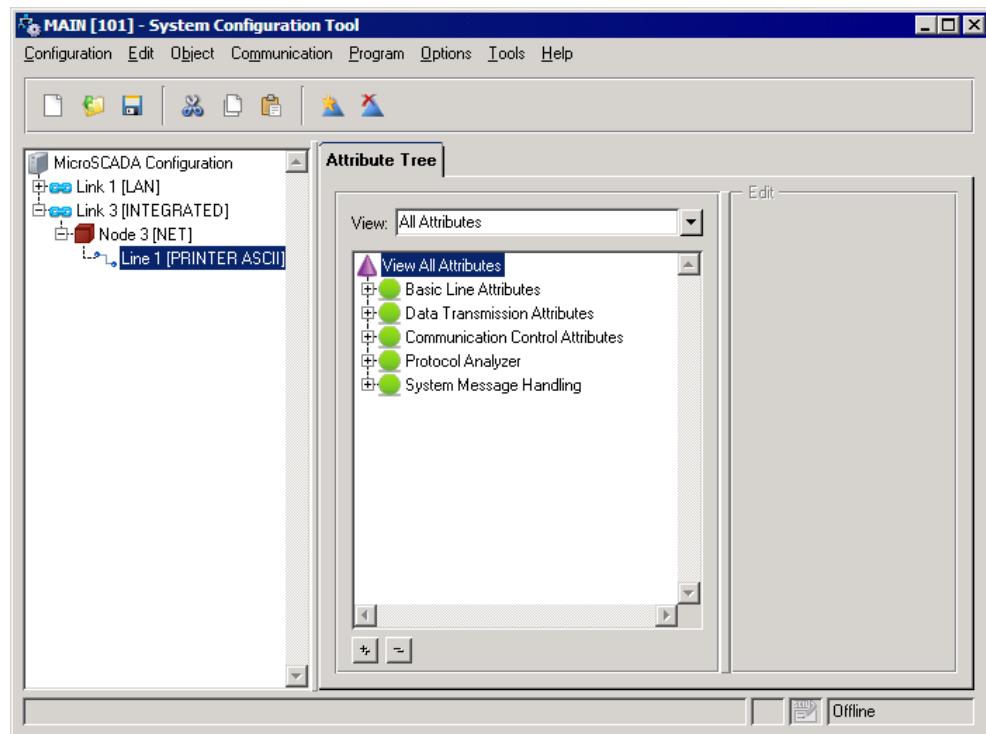


Figure 63: System configuration tool

When PC-NET process is running, online configuration changes can be done in online mode by selecting **Configuration/Open Online**. In this mode, the background of the dialog is purple.

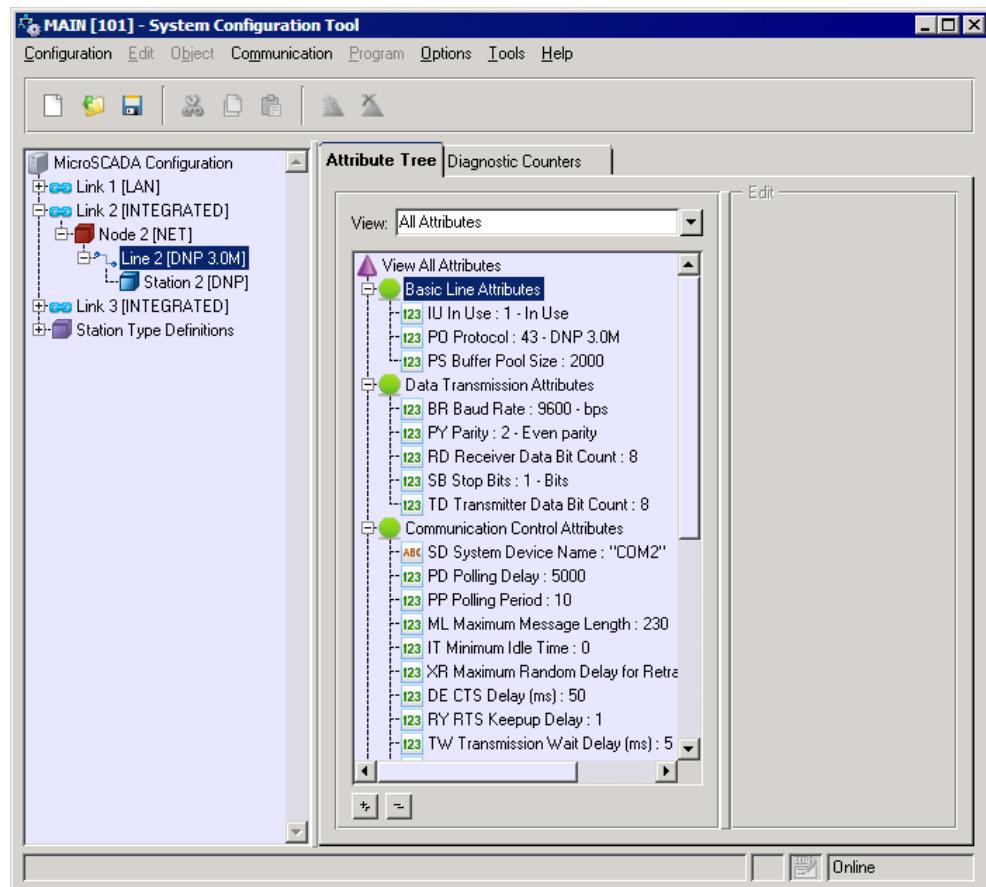


Figure 64: System configuration tool

If the online mode does not show all NET nodes that are configured and saved, most likely the corresponding PC-NET process has not been started and the notification window (and “SYS_LOG.CSV” file) contains related error messages.

4.7.7 Verifying SYS600 startup

Follow this procedure when starting up the entire SYS600 system:

1. Start the process units as described in their respective manuals if they are not already running.
2. Start the remote communication equipment, modems, etc.
3. Start the printers by switching the power on.
4. Switch on the workstations.
5. Start the base systems. If there are hot and stand-by (redundant) base systems, start both the hot and stand-by base systems.
6. Start the communication frontends. If there are redundant frontends, start both the hot and stand-by frontends.
7. Open monitors.
8. Log into the application.

Verify the start of MicroSCADA service and applications by opening the SYS600 Notify window shown in [Figure 65](#) to see information messages and the possible reasons for failure.

Software revision information is available in the SYS600 Notify window.

The screenshot shows a Windows application window titled "localhost - SYS600 Notify". The window has a standard title bar with minimize, maximize, and close buttons. Below the title bar is a menu bar with "File", "Data", and "View". The main area is a table with the following columns: #, Timestamp, Source, Ap..., Category, Message, and System. The table lists numerous log entries from November 19, 2019, at 8:56:38.039 to 8:56:52.983. Some entries are highlighted in yellow, such as row 3 which contains the message "This license will expire in 42 days". To the right of the table, there is a summary section with sections for "System", "Key", "Customer", "Site", "Startup Time", "License expiration", "Certificate expiration", and "Applications". The "System" section shows "SYS_600 10.0 PRODUCTION 2019-11-15 11:03:47 EET". The "Key" section shows "1-HMGE-IOEC-IGPN-BCEK". The "Customer" section shows "ABB MICROSCADA PRO DEVELOPMENT AND SUPPORT CENTER". The "Site" section shows "ABB INTERNAL USE ONLY". The "Startup Time" section shows "2019-11-19 08:56:38". The "License expiration" section shows "Expires in 42 days". The "Certificate expiration" section shows "Expires in 1644 days". The "Applications" section shows "1: MAIN" and "2: WD".

#	Timestamp	Source	Ap...	Category	Message	System
1	19.11.2019 8:56:38.039	SYS60...		LOG	SYS600 Log Service connected	Package
2	19.11.2019 8:56:38.063	SYS60...		Log Se...	Connected to Message Broker	SYS_600 10.0 PRODUCTION 2019-11-15 11:03:47 EET
3	19.11.2019 8:56:38.567	Base S...		SYS	SYS_600 10.0 PRODUCTION 2019-11-15 11:03:47 EET Customer: ABB MICROSCADA PRO DEVELOPMENT & SUPPORT CENTER Site: ABB INTERNAL USE ONLY System ID: 3017005, Key: 1-HMGE-IOEC-IGPN-BCEK Base System: 10.0 PRODUCTION 2019-11-15	Base System 10.0 PRODUCTION 2019-11-15 System ID 3017005
4	19.11.2019 8:56:38.568	Base S...		LICE	This license will expire in 42 days	
5	19.11.2019 8:56:38.869	Aplica...		MAIN	INFO Configuring base system...	Key
6	19.11.2019 8:56:38.903	Aplica...		MAIN	INFO Base system configuration finished.	1-HMGE-IOEC-IGPN-BCEK
7	19.11.2019 8:56:39.040	Base S...	1	APL	MAIN: Starting	Customer
8	19.11.2019 8:56:40.207	Base S...	1	APL	MAIN: Hot	ABB MICROSCADA PRO DEVELOPMENT AND SUPPORT CENTER
9	19.11.2019 8:56:40.207	Base S...	2	APL	WD: Starting	Site
10	19.11.2019 8:56:40.689	Base S...	2	APL	WD: Hot	ABB INTERNAL USE ONLY
11	19.11.2019 8:56:41.364	Aplica...	1	REPR	INFO Starting PC_.NET...	Startup Time
12	19.11.2019 8:56:41.452	Aplica...	2	LIB5	Paths added from package BGU.	2019-11-19 08:56:38
13	19.11.2019 8:56:41.453	Aplica...	2	LIB5	Paths added from package BPU.	License expiration
14	19.11.2019 8:56:41.978	Aplica...	1	LIB5	Paths added from package BGU.	Expires in 42 days
15	19.11.2019 8:56:41.979	Aplica...	1	LIB5	Paths added from package BPU.	Certificate expiration
16	19.11.2019 8:56:42.108	Aplica...	1	REPR	INFO Configuring NET 3...	Expires in 1644 days
17	19.11.2019 8:56:42.181	Aplica...	1	REPR	INFO NET 3 configuration finished.	
18	19.11.2019 8:56:42.892	WebUI		HTTP	Binding HTTPS/1.1 interface to 0.0.0.0:443	
19	19.11.2019 8:56:43.538	Display...	2	MIGR	Started display migration (WD)...	
20	19.11.2019 8:56:44.230	Display...	1	MIGR	Started display migration (MAIN)...	
21	19.11.2019 8:56:44.831	Display...	2	MIGR	Finished display migration (WD)	
22	19.11.2019 8:56:45.588	Display...	1	MIGR	Finished display migration (MAIN)	
23	19.11.2019 8:56:52.459	Display...		MIGR	Started display migration (System symbols)...	
	19.11.2019 8:56:52.983	Display...		MIGR	Finished display migration (System symbols)	

Figure 65: Notification window

More information of installed SYS600 software is available in .log files under sc\Setup directory.

4.7.8 Stopping SYS600

To stop SYS600:

1. Close all monitors.
2. Open the SYS600 Control Panel.
3. Click **Stop**.
4. The dialog box shown in [Figure 66](#) is displayed.

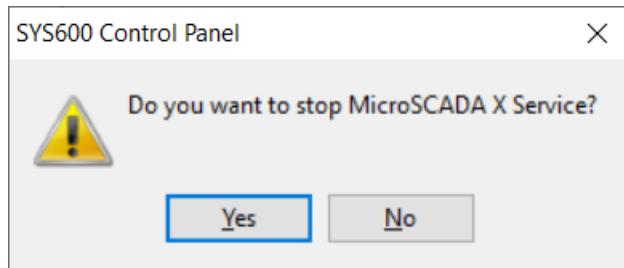


Figure 66: Stopping service confirmation dialog box

5. Click **Yes**.

SYS600 can also be stopped using Forced Stop. This function should only be used when the SYS600 system is not stable and has to be ended fast. However, when the shutdown sequence has started there is no way of changing the operation. The procedure of closing by force should not take longer than 15 seconds.



Do not shut down the base system computers simply by switching off the power, because it might damage the SYS600 system files.

4.8 Opening SYS600 Workplace X

See Operation manual for Workplace X for information about opening and using Workplace X.

4.9 Opening SYS600 Monitor Pro (+)

The following section also applies to Monitor Pro+, which has been introduced in SYS600 9.4 FP2.

The Monitor Pro+ application window executable (framewindow.exe) is located in "<system drive>:\Program Files (x86)\ABB\MicroSCADA Pro\FrameWindow".

4.9.1 Opening Monitor Pro manually

To open Monitor Pro manually, double-click the SYS600 Monitor Pro shortcut in **Desktop > MicroSCADA X Control System SYS600** folder. Monitor Pro window opens with login dialog. Select application, enter user name and password and then click **OK**.

4.9.2 Configure predefined Monitor Pro

Predefined Monitor Pros can be configured to simplify and automate the opening process.

1. Create a .bat file, e.g. `|sc|ap/|<aplname>|StartMonitors.bat`
2. Define to launch Monitor Pro with certain attributes, for example **FrameWindow.exe -login demo DEMO APLOPERA**. See **FrameWindow.exe help** for more information about the command line arguments.
3. Right-click the .bat file and select **Create shortcut**. Copy the shortcut to a place where it can be easily found, for example to **MicroSCADA X Control System SYS600** folder on the desktop.

There can be an unlimited number of .bat files and in each .bat file there can be several Monitor Pros defined to be opened. Use the **Start** command in front of the actual Monitor Pro command so the execution will not stop on the first command and there will not be any command prompts left open.

4.9.3 Configure customized shortcut for Monitor Pro

To configure a shortcut for opening Monitor Pro with predefined properties:

1. Copy the original SYS600 Monitor Pro shortcut icon and rename it as needed
2. Right-click the copied shortcut and select **Properties**. Insert the command line arguments in the **Target** after FrameWindow.exe definition. See **FrameWindow.exe -help** for more information about command line arguments.

4.9.4 Opening Monitor Pro automatically at application startup

Monitor Pro can be configured to start automatically when an application state becomes HOT.

This example shows how this configuration can be done.

1. Add Trigger Event Generation

Add the following line into APL_INIT_1 procedure. This procedure is executed when this application state changes to HOT. In HSB systems the same command should be added into APL_INIT_H, which is executed when switch-over occurs.

```
@callEvent=ops_call("start /b eventcreate /t information /so SCIL /1 application /id 4 /d ""Application 1 is hot"" ")
```

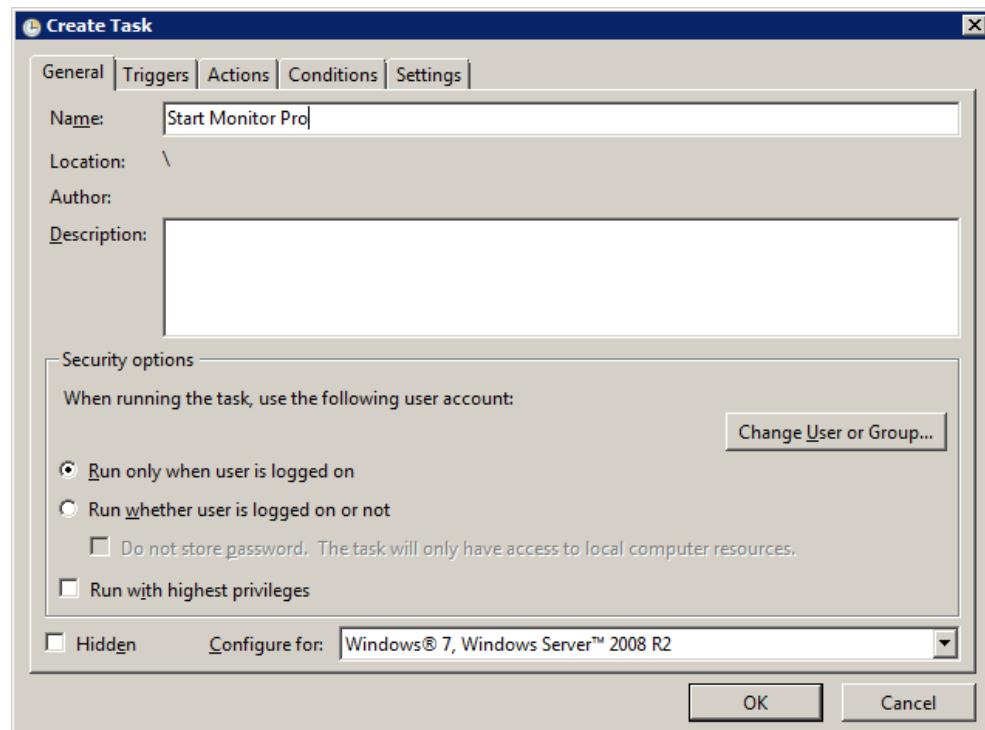


In this example, values /so SCIL, /id 4 are used later but they may differ from the ones used here. Used event ID must be an integer between 1 and 1000. For more information about eventcreate, see Microsoft Windows documentation.

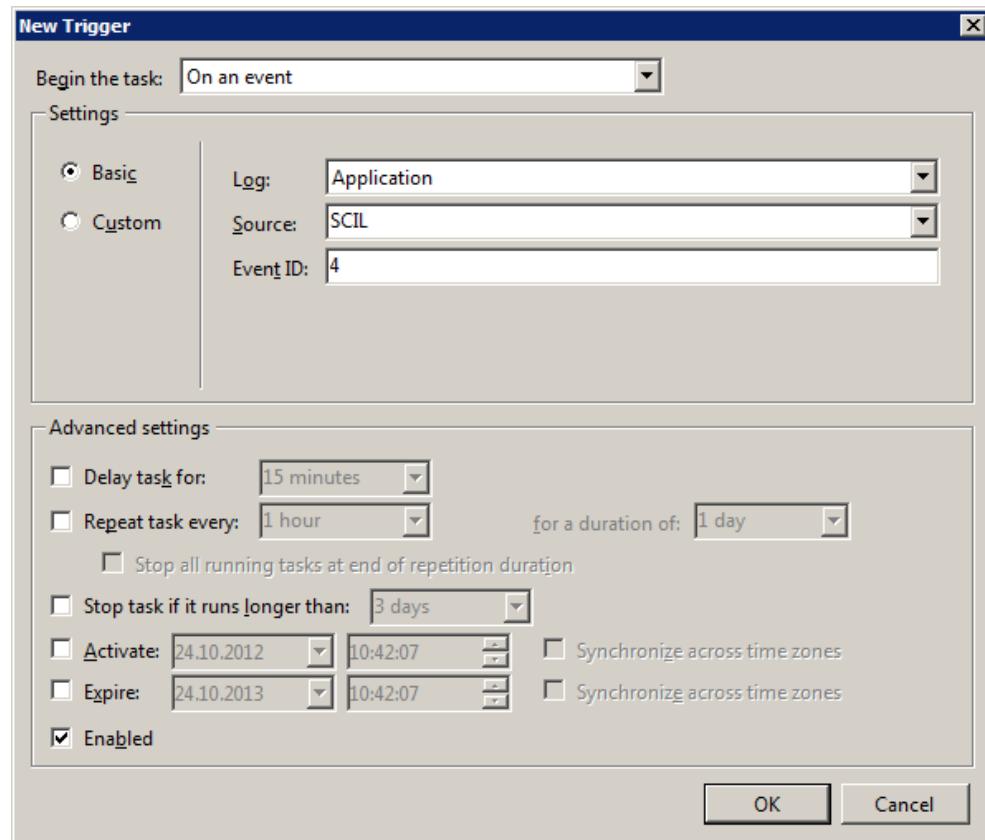
2. Configure Windows Task Scheduler

Start Task Scheduler (**Control Panel/System and Security/Administrative tools/Task Scheduler**) and create a new task.

- 2.1. Start configuring task by giving it a descriptive name.

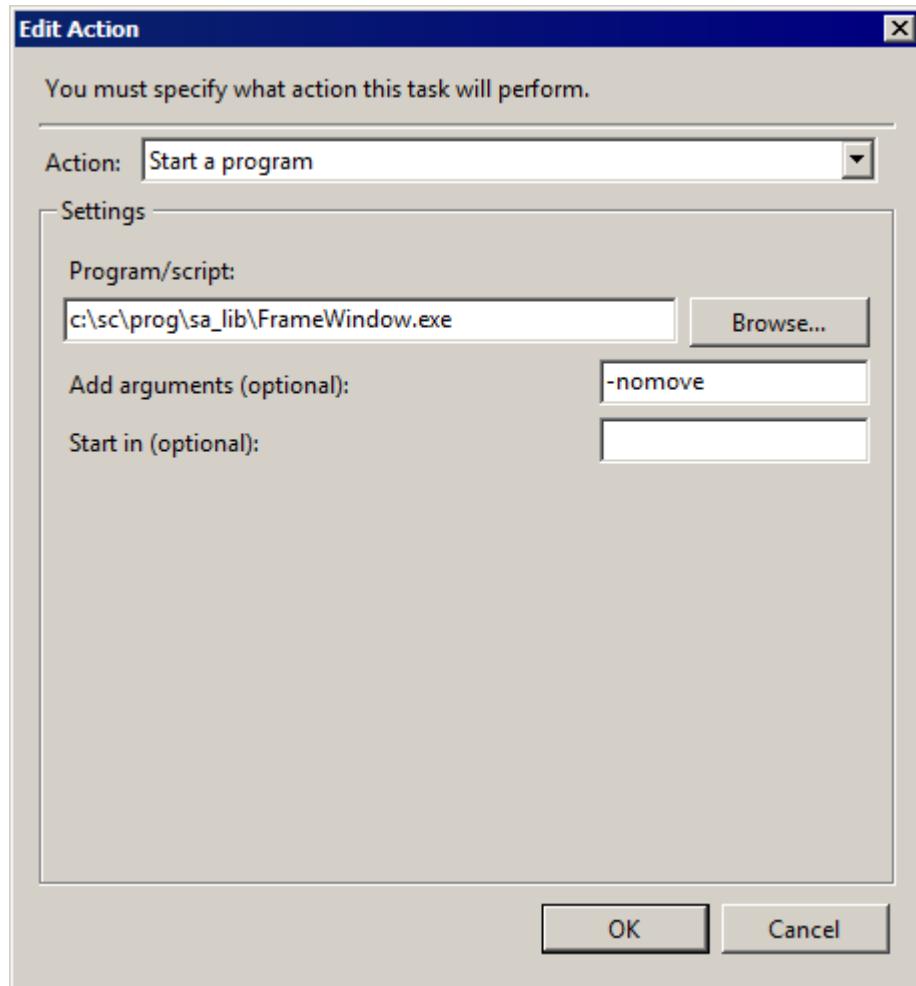


- 2.2. Create a new Trigger which will activate this task. Value for these settings comes from the event create call added to procedure code.



- 2.3. Create a new action, which determines what happens when this task is activated. In this case, start the FrameWindow.exe process from the appropriate location. The framewindow start parameter as e.g. -nomove needs to be added to the "Add

arguments" field. When using Monitor Pro+, the "<system drive>:\Program Files (x86)\ABB\MicroSCADA Pro\FrameWindow" program path must be used.



4.9.5 Opening Monitor Pro automatically at user logon

To configure a Monitor Pro to be opened automatically when a user logs on to Windows:

1. Configure Monitor Pro to start with defined command line arguments, see [Section 4.9.2](#) or [Section 4.9.3](#) for more information.
2. Copy the file into the Startup folder of the user.
3. Add command line argument -wait to Monitor Pro commands defined in the file. This makes Monitor Pro to wait for SYS600 to start.

4.9.6 Opening Monitor Pro using Remote Desktop Services (single system)

Monitor Pro can be opened on a separate workstation computer. The following steps are needed to establish a remote connection between SYS600 server and workstation:

1. Remote Desktop Services and licensing service should be running on the server. Licensing service must be available in the same server or in the same network. For more information, see [Section 3.4](#).
2. Create Windows user account to the SYS600 server
3. Connect from workstation to server
4. Login to Monitor Pro

To create a remote desktop user on the server:

1. Right-click cmd.exe and select “Run as administrator”
2. Execute following commands:

```
net user ScOperator <password> /add
net localgroup "Remote Desktop Users" ScOperator /add
net localgroup ScOperators /comment:"SYS600 Operators" /add
net localgroup ScOperators ScOperator /add
```



Operators should not run with administrative privileges. SYS600 requires file system permissions to be set for non-admin usage. See Security Guide, sections Adding new SYS600 applications and Adding new Windows users.

To connect from workstation to server, follow these steps in the workstation computer:

1. Run mstsc.exe to open Remote Desktop Connection.
2. Enter following information to **General** tab:
IP address of SYS600 server
User name: ScOperator
Password: as given above
3. In the **Display** tab, go to Display configuration and set Large size.
4. In the **Programs** tab, check Start the following program on connection and enter following information:
Program path and file name: c:\sc\prog\sa_lib\FrameWindow.exe or <system drive>:\Program Files (x86)\ABB\MicroSCADA Pro\FrameWindow\FrameWindow.exe for Monitor Pro+.
Start in the following folder: c:\sc\prog\sa_lib or <system drive>:\Program Files (x86)\ABB\MicroSCADA Pro\FrameWindow for Monitor Pro+.
5. Go to General tab, and press **Save as...** to save remote connection details.
6. Press **Connect** and login to Monitor Pro when remote connection is established.

4.9.7 Opening Monitor Pro using Remote Desktop Services (HSB system)

RDP connection is lost if the primary server stops responding. In SYS600, there is an OpenRemoteDesktop program that can be used for opening a connection from a workstation to the active server in the MicroSCADA HSB system. The program that runs on workstation computer inspects both servers, detects the active server of the HSB pair and establishes a Remote Desktop session to it.

4.9.7.1 Configuring OPC connectivity

Preparations



Operators should not run with administrative privileges. SYS600 requires file system permissions to be set for non-admin usage. See Security Guide, sections Adding new SYS600 applications and Adding new Windows users.

1. Create a mutual Windows user group and user account for workstation computers (OPC client) and HSB servers (OPC server). The user name and password has to be same for all computers. Open cmd.exe as Administrator and run following commands in all computers:

```
net user ScOperator <password> /add
net localgroup "Remote Desktop Users" ScOperator /add
net localgroup ScOperators /comment:"SYS600 Operators" /add
net localgroup ScOperators ScOperator /add
```

2. In HSB servers, copy the following to \sc\prog\utils\OpenRemoteDesktop folder:
 - folder sc\Setup\OPC_Core_Components
 - folder sc\Setup\vcredist
3. Create a new folder <drive>:\scws to the workstation computer
4. Copy the folder sc\prog\utils\OpenRemoteDesktop and subfolders from HSB server to newly created folder on the workstation computer

Installing software to the OPC client computer (workstation)

To install OPC and related software:

1. Right-click cmd.exe, select “Run as administrator” and change the directory to <drive>:\scws\OpenRemoteDesktop in the workstation computer.
2. Install "OPC Core Components Redistributable.msi" from <drive>:\scws\OpenRemoteDesktop\OPC_Core_Components directory
3. Install vcredist_x86.exe from <drive>:\scws\OpenRemoteDesktop\vcredist directory
4. Run "Install OpenRemoteDesktop.bat" to register some needed software components.
5. Run services.msc to stop OpcEnum service. Set startup type as Disabled. Since the workstation computer does not have OPC servers running, unused service can be disabled.

To install OpenRemoteDesktop software:

1. Modify <drive>:\scws\OpenRemoteDesktop\OpenRemoteDesktop.ini and remove all RDP settings except those pointing to files SYS_1.RDP and SYS_2.RDP
2. Open Remote Desktop Connection and create two RDP configuration files under scws\OpenRemoteDesktop (SYS_1.RDP and SYS_2.RDP) and configure those to connect to primary and secondary server.
3. Create a shortcut to OpenRemoteDesktop.exe to the Desktop or to Startup folder. The shortcut can be renamed e.g. Connect to SYS600.

Setting up DCOM on OPC client computers (workstation)



OPCDCOM.cmd script configures DCOM Access and Launch and activation permissions for the machine. Both default and limits are configured. It also configures DCOM settings for MicroSCADA OPC DA Server.



If OPC client and server are part of a domain network and the user logged in the OPC client is a domain user, then Default Authentication Level can be set to **Connect** in OPC client and server. If the server is a standalone computer, it cannot authenticate the users unless there is a matching user name/password on both the OPC client and OPC server computer.

To set up DCOM on OPC client computers:

1. Start DCOMCNFG.exe and go to **Component Services/Computers/My Computer**.
2. Right-click My Computer and select **Properties**.
3. Select **Default Properties** tab, set Enable Distributed COM on this computer, set Default Authentication Level = Connect, and set Default Impersonation Level = Identify.
4. Confirm changes and close DCOMCNFG
5. To set other DCOM settings go to <drive>:\scws\OpenRemoteDesktop\ and run:

```
OPCDCOM.cmd workplace ScOperators
```

6. Start wf.msc and allow inbound TCP connections to local port 135 for all profiles. Choosing a private network as a active network profile is preferred but public and domain profiles also work as long the profile in rules is set correspondingly or to "all".

Setting up DCOM on OPC server computers (HSB servers)

Each OPC server has its own DCOM settings for controlling access to this particular server. To set up DCOM on OPC server computers:

1. Start DCOMCNFG.exe and go to **Component Services/Computers/My Computer**.
2. Right-click My Computer and select **Properties**.
3. Go to the **Default Properties** tab, set Enable Distributed COM on this computer, set Default Authentication Level = Connect, and set Default Impersonation Level = Identify.
4. Confirm changes and close DCOMCNFG
5. Go to <drive>:\sc\prog\utils\OpenRemoteDesktop and run:

```
OPCDCOM.cmd server ScOperators
```
6. Start wf.msc and allow inbound connections to programs <drive>:\sc\prog\exec \OPCS.exe and <drive>:\Windows\SysWOW64\OpcEnum.exe. Allow also inbound TCP connections to local port 135. Choosing a private network as a active network profile is preferred but public and domain profiles also work as long the profile in rules is set correspondingly or to "all".

4.9.7.2 Verify HSB-workstation connection

1. Login to workstation computer using ScOperator user account.
2. To verify remote desktop connection to both HSB servers:
 - Login to workstation computer using ScOperator user account
 - Open <drive>:\scws\OpenRemoteDesktop\SYS_1.rdp and press Connect
 - Open <drive>:\scws\OpenRemoteDesktop\SYS_2.rdp and press Connect
3. To verify DCOM settings, open OpenRemoteDesktop shortcut from the Desktop

4.9.7.3 Troubleshooting

The following error messages are displayed in case a HOT application is not found on the servers of the HSB pair. If the server is not found in the network, that is, it does not respond to the ping request, the program displays the error message "Server disconnected from network". If MicroSCADA is not running, the program displays the error message "Failed when making OpcServer Connect (Error: ActiveX component can't create object)" (see [Figure 67](#)).

This error message means that:

- MicroSCADA is not running on the computer, or
- DCOM settings of MicroSCADA OPC DA Server are not correct.



Figure 67: Error: ActiveX component cannot create object

An error message for a running MicroSCADA OPC server (Server 1) without a valid license is shown in [Figure 68](#).



Figure 68: Error: No valid license

If the MicroSCADA application is not in the HOT state, the program displays the error message "Application <application number> state is not "HOT"". See [Figure 69](#) (Server 1). In this case the OPC connection has been successfully established to the server, and the application with given number exists in the system, and it is possible to read application attributes via the OPC server.

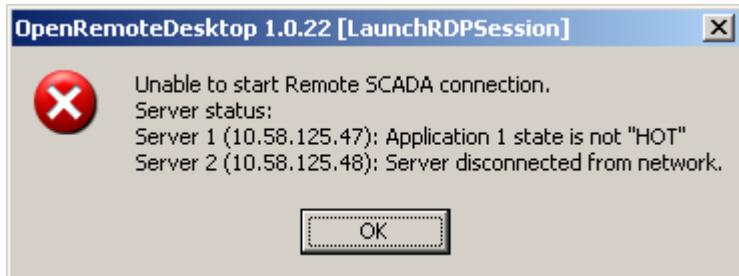


Figure 69: Error: Application 1 state is not HOT

If the MicroSCADA application does not exist in the system, the program displays error message "Application <application number> does not exist in system". See [Figure 70](#) (Server 1). In this case the OPC connection has been successfully established to the server, but an application with the given number did not exist.

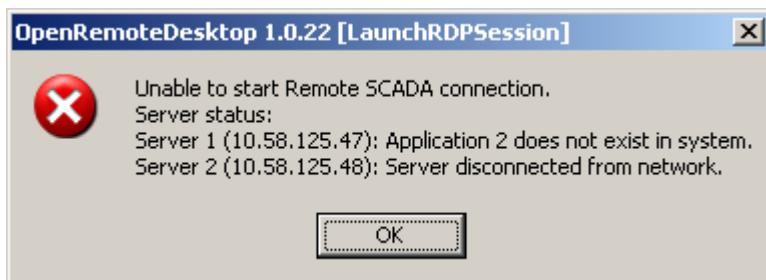


Figure 70: Error: Application 2 does not exist

If there is a DCOM authorization problem, usually the error message "Method '~' of object '~' failed" is produced. See [Figure 71](#). In this case, make a shortcut that launches OpenRemoteDesktop.exe as a user that has DCOM access and launch permissions to MicroSCADA OPC server on the server computer.



Define the same username and password for both the server and client computer, or launch OpenRemoteDesktop.exe as a domain user with an appropriate DCOM authority to the server.



Figure 71: Error: DCOM authorization problem

4.10 Opening SYS600 Monitor (classic)

4.10.1 Opening monitors manually

To open SYS600 Monitor manually:

1. Double click the SYS600 Monitor icon.
2. Define the following:
 - Application number
 - Application Monitor number
 - The size of picture, modern look & feel

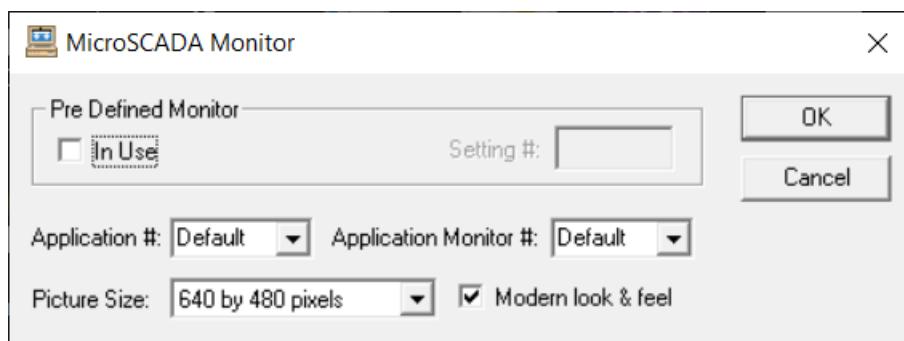


Figure 72: Basic SYS600 Monitor Definitions

3. Click OK.

The options available to define the monitor include:

Application #: Choose the application you want to connect to.

Application Monitor #: Choose the monitor in the application you want to use.

Picture Size: Choose the picture size to be used in the monitor.

The possibilities are:

- 640 by 480 pixels
- 960 by 720 pixels
- 1280 by 960 pixels
- 1600 by 1200 pixels

Modern look & Feel: Selecting Modern look & feel option opens the Classic Monitor equipped with more modern user interface appearance. In practice this means that dialog items will support the highlight event behavior during their selection and menu items in menu bars will

contain icons. Generally, the appearance of each dialog item is drawn in more modern manner, when comparing the standard Classic Monitor without modern look & feel.

4.10.1.1 Opening a predefined monitor

To open a predefined monitor:

1. Select **In Use** check box.
2. Insert the setting number and the name of the base system computer where the monitors.dat file is. These definitions are described in [Section 4.10.2](#)
3. Click **OK**.

4.10.2 Configure predefined monitors

Predefined monitors (up to 999) can be configured to simplify and automate opening of monitors. The monitors are defined in the file monitors.dat located in the \sc\sys\active\sys_ folder of the base system computer.

To configure predefined monitors:

1. Edit the monitors.dat file in a text editor. The monitors.dat file is described in the following section.
2. Copy a monitor definition block of the required type and change the predefined monitor number to a previously unused number.
3. Modify the block to meet your needs regarding:
 - monitor type
 - application
 - logical monitor number
 - semi-graphic font

To change the font, copy the desired font name of the monitor type in question from the comment part of the file.

4. Save the file as an ASCII file.

Monitors.dat

The monitors.dat file is a text file with a specified format. The default monitors.dat file has the following contents:

```
; The comments (lines beginning with ';') can be removed.  
; NOTE no space character is allowed before and after the equal sign  
; The following attributes can be set for the different monitors  
;  
; VS Local Monitor, Modern Look & Feel:  
; SCS_MON_TYPE  
; MVS  
; SCS_MS_WINDOWS_APPLICATION  
; 0 - 250 (0 stands for default)  
; SCS_MS_WINDOWS_MONITOR  
; 0 - 50 (0 stands for default)  
; SCS_X_TERMINAL_FONT  
;   family:MicroSCADA0810-size:10  
;   family:MicroSCADA1215-size:15  
;   family:MicroSCADA1620-size:20  
;   family:MicroSCADA2025-size:25  
; FONT  
;   family:MS Sans Serif-size:8 (default)  
;  
; VS Local Monitor:  
; SCS_MON_TYPE  
; LVS
```

```

; SCS_MS_WINDOWS_APPLICATION
;   0 - 250 (0 stands for default)
; SCS_MS_WINDOWS_MONITOR
;   0 - 50 (0 stands for default)
; SCS_X_TERMINAL_FONT
;   family:MicroSCADA0810-size:10
;   family:MicroSCADA1215-size:15
;   family:MicroSCADA1620-size:20
;   family:MicroSCADA2025-size:25
; FONT
;   family:MS Sans Serif-size:8 (default)

[1]
SCS_MON_TYPE=LVS
SCS_MS_WINDOWS_APPLICATION=0
SCS_MS_WINDOWS_MONITOR=0
SCS_X_TERMINAL_FONT=family:MicroSCADA0810-size:10
FONT=

[2]
SCS_MON_TYPE=MVS
SCS_MS_WINDOWS_APPLICATION=0
SCS_MS_WINDOWS_MONITOR=0
SCS_X_TERMINAL_FONT=family:MicroSCADA0810-size:10
FONT=

```

The first part of the file is composed of comments. The two blocks in the latter half of the file define two monitors, numbered 1 and 2. Monitor number 1 is of type “Local VS” and it uses the smallest semi-graphic font (scada810). Monitor number 2 is of type “Local VS, Modern Look & Feel” and it uses the smallest semi-graphic font (scada810). Both monitors are connected to the default application and given default logical monitor numbers.



The predefined monitors numbered 1, 2 are examples and can be removed from the monitors.dat file.

4.10.3 Configure customized shortcut for monitors

To configure a shortcut for opening a monitor with predefined properties without using the Monitor window:

1. Define a predefined monitor in the monitor.dat definition file.
2. Copy the original SYS600 Monitor shortcut icon and rename it as needed.
3. Right-click the copied shortcut and select **Properties** to change the target. Insert the command for opening a predefined monitor by setting the following flags -d for the predefined monitor. See the example below.

Example

mons -d mycomp 4

The command opens the predefined monitor number 4 on the local base system computer. The parameter -d mycomp is defined for backward compatibility reason. In revision 9.4 and older the name mycomp defined the location of the monitors.dat file. In revision 9.4 FP1 the computer name mycomp is ignored and the local definiton file monitors.dat is used always.

4.10.4 Opening monitor automatically at user logon

To configure a MicroSCADA monitor to be opened automatically when a user logs on to Windows:

1. Define a MicroSCADA monitor in the base system as described in [Section 4.10.2](#).
2. Copy a MicroSCADA Monitor program icon into the Startup folder of the user.
3. Change the target line (found by choosing the properties of the icon/program) by setting the following flag -d for the predefined monitor. See the example below.

Example**mons -d mycomp 4**

The command opens the predefined monitor number 4.

Table 9: Parameters of the Mons Program

Parameter	Description
-d mycomp x	The parameter -d mycomp is defined for backward compatibility reason. In revision 9.4 and older the name mycomp defined the location of the monitors.dat file. In revision 9.4 FP1 the computer name mycomp is ignored and the local definition file monitors.dat is used always.
-n	Non-interactive. Use this parameter when monitor is opened from within MicroSCADA.
-r n	Number of retries, where n = integer (obsolete parameter)
-fl font_local	where font_local is the font to be used in VS monitors. For example "family:MS Sans Serif-size:12".
-s n	Picture size value in the MicroSCADA Monitor dialog, where n = integer, 1...4.
-start_serv	If this parameter is given, MicroSCADA service is started automatically during monitor start if service is not already started.
-serv_create_dir_disabled	If this parameter is given, no directories are created during MicroSCADA service startup. This means that, for example, with current SYS600 default installation, directories "FORM" and "PICT" are not created under application directories. This parameter can only be used with "-start_serv" parameter.
-start_as_logon_user	With this parameter the monitor is started as logged-in user's context.
-default	With this parameter, a monitor with default properties is opened. Properties are: Monitor type: VS Local Application #: 0 Application Monitor #: 0 Font: family:MicroSCADA0810-size:10

4.10.5 Opening monitor using Remote Desktop Services

See [Section 4.9.6](#) for configuring remote desktop connection between a workstation computer and server. Replace the following information in the configuration of remote desktop connection:

1. In the Programs tab, check Start the following program on connection and enter following information:
Program path and file name: mons -start_as_logon_user -default
Start in the following folder: c:\sc\prog\exec

4.11 System info logging for technical support

To solve any problems which may have occurred in the MicroSCADA X Control System, it is important to collect all significant information of the current system for technical support. The data can be collected with a tool for system info logging. Start the tool from the SYS600 Control Panel and follow the steps described below.

1. Open the SYS600 Control Panel.
2. Enlarge the view by clicking ».
3. Click Configuration to open the Configuration Panel.
4. Click System info logging...
5. The following dialog is displayed on the screen.

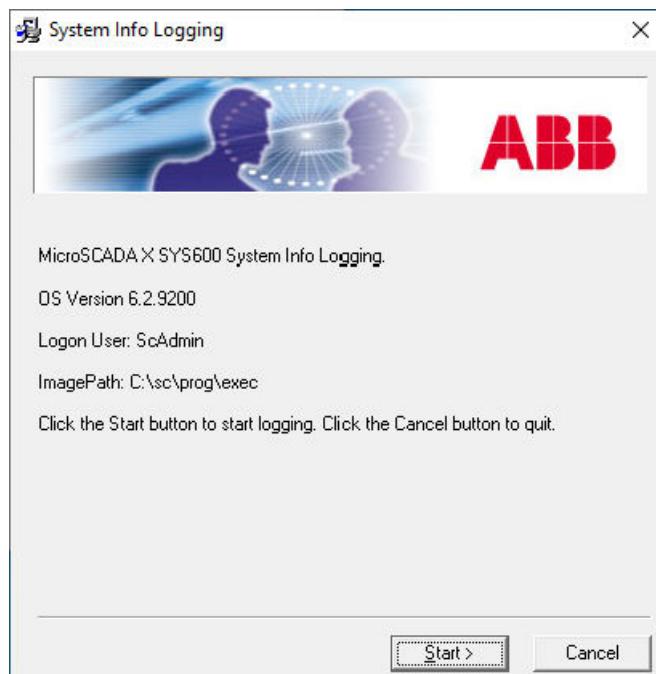


Figure 73: The System Info Logging dialog

Click the **Start** button to start the system info logging. The data collection may take several minutes depending on the contents of the system. While the logging is in progress the following message dialog is displayed:

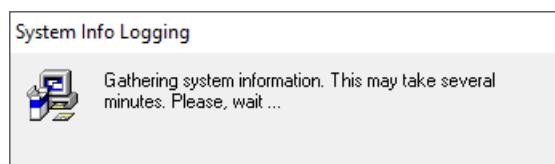


Figure 74: Logging in progress

The following dialog will be displayed when the system info logging has been completed:

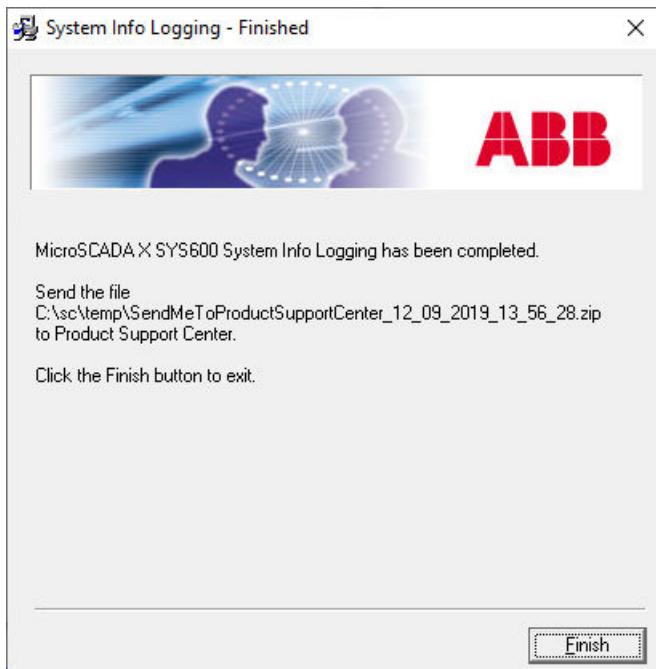


Figure 75: System Info Logging completed

All the collected information is included in a single zip file that should be delivered to the Product Support Center for analysis.

The collected data contains the following information:

- date and time
- SYS600 system configuration information
- base system log files
- Drwtsn32.log
- license data
- system information (Os version, CPU info, RAM info, Network card info)
- list of running processes with properties (CPU usage, VM Size, etc.)
- Windows event logs
- list of files in sc directories including date and time
- the state of the running SYS600 system and applications (memory pool usage, running objects, queues used, etc.)

4.12 Application Backup

With Online Backup tool the user can make a backup of the SYS600 application while SYS600 is running. This tool makes a backup of the main application \SC\APL\'main application name' and the Workplace X user setting database. The setting database is shared between applications and backup will contain settings for all applications. These include e.g. event filters, history layouts and notes in process pictures created by the users in Workplace X.

Online application backup does not contain complete SYS600 backup. This means that separate backup of \SC is needed for SYS_BASCON.COM and other files located outside the application.

Online Backup tool copies the Workplace X setting database into the main application folder \SC\APL\'main application name'\PostgreSQL\Backup and then shadows the main application into a backup application. Previous backup of the Workplace X setting database is moved to \SC\APL\'main application name'\PostgreSQL\Backup_Prev whenever backup is started.

When the shadowing is ready the tool freezes the backup application. If separate Backup Media is configured in the tool, the backup application folder is copied to it.



Online Backup tool is meant to be used in single SYS600 system setups. It cannot be used for the online backup in redundant (HSB) SYS600 systems. In HSB systems the backup can be done in the standby system. To get complete application backup, the SYS600 must be stopped in the standby system. After that either full disk image backup should be taken or copy the application folder and the Workplace X settings database by copying the content of \ProgramData\ABB\MicroSCADA Pro\PostgreSQL\PostgreSQLData folder.

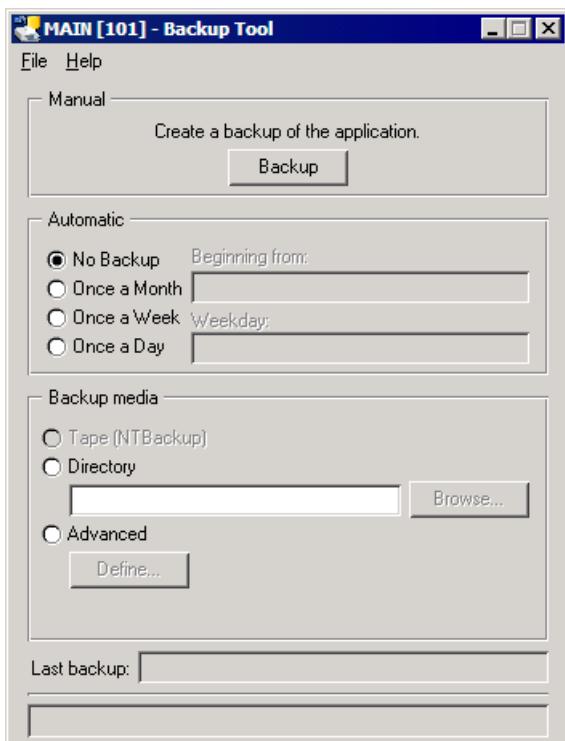


Figure 76: Main view of the Backup Tool

4.12.1 Configuring Backup Tool

The configuration of Backup Tool requires the following steps:

1. Stop MicroSCADA.
2. Open the configuration file SYS_BASCON.COM and change the value of the variable Apl_Backup to TRUE. Make sure that the variable Hot_Standby is defined to be FALSE.


```
#local Hot_Standby = FALSE ;Hot Stand-by enabled/disabled
#local Apl_Backup = TRUE ;Backup enabled/disabled
```
3. Create the backup application with the SYS600 Control Panel. Set the name to BCK_ plus six first characters of the main application name.
4. Start MicroSCADA.
5. Enter the Base System Object Navigator, select Base Object (SYS), then select **Tools/HSB Management**. Verify that the latest Hot Standby package is installed. Press **Install** to

- install the latest package. This will create all the command procedures needed for the shadowing management.
6. Enter the Online Backup tool and select **File/Save**. The tool asks the user to confirm the creation of some backup command procedures and time channels. Click **Yes** to create the backup objects.
 7. Define the backup interval and the backup storage media.

4.12.2 Manual Backup

Click **Backup** in the **Backup Tool** window shown in [Figure 76](#), and after that click **Yes**. The procedure may take several minutes or even hours depending on the size of the application.

When a manual backup is started from this tool, it will trigger the command procedure `BCK_START`, which starts the backup.

4.12.3 Auto Backup

When **No Backup** is selected in the **Backup Tool** window shown in [Figure 76](#), no automatic backup is made. If **Once a month** is selected, the time channel `BACKUP_1` activates the start of backup.

If **Once a week** is selected, the `BACKUP_2` activates the start of backup, and if **Once a Day** is selected then `BACKUP_3` activates the start of backup.

As default, the time channels are started as shown in [Table 10](#). If there is a need to change the time, it can be done with the Time Channel Tool, which is opened from the application object navigator.

Table 10: Backup time channels

<code>BACKUP_1</code>	First day every month at 00:10 (once a month)
<code>BACKUP_2</code>	Every Friday at 18:01 (once a week)
<code>BACKUP_3</code>	Every day at 00:10 (once a day)

4.12.4 Backup Media

It is possible to select where the application backup is copied when it is ready. In Windows XP and Windows 2003 Server it is possible to select the option **Tape**. It will start the Windows Backup program NTBackup, which creates a backup of the backup application to a tape. In Windows 7 and newer Windows versions this option is disabled.

If the option **Directory** is selected, the backup application is copied to a given directory. The directory definition should be in the operating system format.

If the option **Advanced** is selected, then it is possible to define a SCIL program to handle the backup operations.

When the shadowing is ready and the backup creation command has been executed, the tool shows the following message: "Shadowing is ready. Backup to backup media to be created by OS".

This means that the tool does not have any connection for transfer & creation of the backup to the specified backup media, which is normally made by the operating system tools like Windows Backup.

4.12.5 Restoration

Backup is restored either by copying and replacing the application folder from the backup location or by copying and restoring individual files when applicable. Restoring the Workplace X settings requires additional steps that are explained below.



Workplace X settings database backup contains settings for all applications, restoring the database will restore and overwrite settings for all applications.

To restore the Workplace X settings:

1. Stop SYS600
2. Open command prompt as administrator
3. Navigate to setting database folder cd \ProgramData\ABB\MicroSCADA Pro\PostgreSQL
4. Rename or remove the existing PostgreData folder that contains the current settings database. E.g. rename PostgreData PostgreDataOld
5. Create new PostgreData folder. mkdir PostgreData
6. Copy the settings folder from the restored application backup to the PostgreData folder. E.g. xcopy \sc\apl\demo\PostgreData\backup PostgreData /E
7. Run SYS600 ACLTool
8. Restore is now ready and you can start SYS600

4.13 System backup

The procedure explains how to create the system backup from **SYS600 Control Panel**.

- **Procedure**

1. Right click on SYS600 Control Panel icon and run it as **Administrator**. Enlarge the view by clicking ». Expand **Disk Image Backup** and give inputs for Source and Target Drives, then click on **Start Disk Image Backup** link to start the system backup operation.

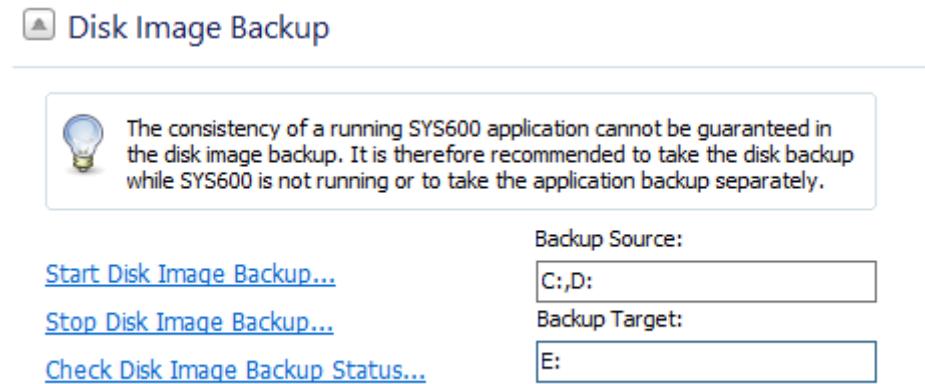


Figure 77: Disk Image Backup from Control Panel

In above figure,

Backup Target: - denotes a backup device which can be either a Disk drive (for example E:) or a network storage path (for example \\server\\share).

Backup Source: - denotes the source partitions to the backup (for example C:,D:)

2. Once backup operation is initiated, the command line window shows a progress on the screen.

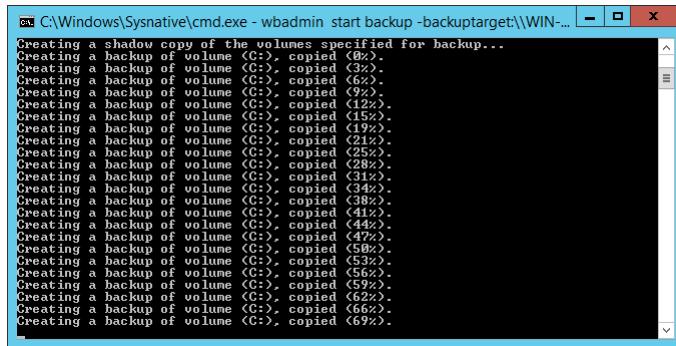


Figure 78: Backup Command Line Window

3. Use **Stop Disk Image Backup** link to interrupt the backup in emergency condition. Even if the backup window is mistakenly terminated, the backup operation continues to run in the background. In such a case, the status can still be seen using **Check Disk Image Backup Status** link.
4. Backup images are stored in the backup drive into the **WindowsImageBackup** folder which consists of sub folders named by computer names. Windows backup logs can be viewed from the %windir%\logs directory.



Windows 7 and newer versions of operating system support system backup.

4.14 ACLTool

The MicroSCADA X SYS600 is bundled with a simple command line tool called **SYS600 ACLTool** which runs automatically after the main install process. This tool is responsible of creating the built-in groups and setting up basic file system permissions of MicroSCADA X SYS600 working data folders. Running this tool manually in a typical system is seldom necessary although user with administrator privileges can run it to reset working data folders to the factory state. There are nevertheless several situations where this needs to be performed. For example:

- After restoring Workplace X settings database
- After restoring application backup
- After copying an application from another system

These basically run down to situations where contents or file permission of either '**\ProgramData\ABB\MicroSCADA Pro**' or '**\SC**' has been manually altered at file system level by the administrator of the computer.

The **SYS600 ACLTool** can encounter errors during the run. It writes a log file after each run in **\Users\'currently logged user name'\AppData\Local\Temp\ABB_SYS600_ACLTool_XXXXXXXXXXXXXXXXXX.log**, where X is representing timestamp of the run.



SYS600 ACLTool should be run only when the SYS600 system is not running. Running it on a running system could lead to applications not functioning properly, broken system or non-secure file system permissions.

4.15 Uninstalling MicroSCADA

At the moment, MicroSCADA X SYS600 can only be partially uninstalled using the Windows operating system control panel function "Programs and Features" (Windows 7 or Windows 2012 Server or older) or "Apps & Features" (Windows 8 / Windows 2016 Server and newer). Stop MicroSCADA before uninstalling. Uninstalling "MicroSCADA X SYS600 Control System" application from the App/Program list will delete its temporary installation files from Program Files directory, but does not delete the contents of the \sc directory where the operational system is installed.

In case optional ABB Authentication Service is installed, uninstall it using same control panel function.

For older versions of MicroSCADA, follow the instructions in the manuals of the version in question.

Following items have to be deleted manually:



Please note that the control set numbering may vary in different computers.



In 64bit OS the below listed Software registry keys can be found in:

`HKEY_LOCAL_MACHINE\SYSTEM\Software\Wow6432Node\ABB`

Delete the following:

1. \sc directory (and subdirectories)
2. Service

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\MicroSCADA`

`HKEY_LOCAL_MACHINE\SYSTEM\ControlSetXXX\Services\MicroSCADA`

if exist. Use uninstall program of the services, if possible.

3. MicroSCADA group from start menu
4. Shortcut to MicroSCADA group on desktop
5. Package & Product information from registry (if exist):

`HKEY_LOCAL_MACHINE\SOFTWARE\ABB\Products\MicroSCADA\..`

`HKEY_LOCAL_MACHINE\SOFTWARE\ABB\MicroSCADA\..`

`HKEY_LOCAL_MACHINE\SOFTWARE\ABB\Products\SA_LIB\..`

6. Startup information from registry:

`HKEY_LOCAL_MACHINE\SYSTEM\Setup\FirstBoot\Services\MicroSCADA`

`HKEY_LOCAL_MACHINE\SYSTEM\Setup\FirstBoot\Services\MicroSCADAProcessHost`

7. Misc event log information from registry:

`HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services\EventLog\Application\MicroSCADA`

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet001\Services\EventLog\Application
\MicroSCADA

HKEY_LOCAL_MACHINE\SYSTEM\ControlSet003\Services\EventLog\Application
\MicroSCADA

8. **Path definition '\sc\prog\exec' from**

HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Session Manager
\Environment\ key "Path"

HKEY_LOCAL_MACHINE\SYSTEM\ControlSetXXX\Control\Session Manager
\Environment\ key "Path"

Please note the following when uninstalling MicroSCADA:

- Service should be uninstalled second. This should be done before deleting sc-directory, because service can be uninstalled with the command "servinst -r".
- MicroSCADA fonts from Exceed directory should be removed too.
- MicroSCADA user should be removed

After the uninstallation MicroSCADA X SYS600, uninstall possible software and driver modules of the used peripheral equipment according to procedure instructed in their own documentation.

Section 5 Upgrading from earlier revisions

This section describes upgrading information related to the base system, communication system and LIB 500 system.

Previous and current program packages available for MicroSCADA usage are shown in [Table 11](#).

Table 11: Previous and current program packages available for usage

SYS revision	Base LIB revision	Application library revision
SYS600	LIB 500 4.2	LIB 510 4.2 LIB 520 4.1 LIB 530 4.0.4 LIB 542 4.2
	LIB 500 4.1	LIB 510 4.1 LIB 520 4.1 LIB 530 4.0.4 LIB 542 4.0.5
SYS 500 8.4.4 SP1 or newer	LIB 500 4.2	LIB 510 4.2 LIB 520 4.1 LIB 530 4.0.4 LIB 542 4.0.5
	LIB 500 4.1	LIB 510 4.1 LIB 520 4.1 LIB 530 4.0.4 LIB 542 4.0.5
	LIB 500 4.0.5	LIB 510 4.0.5 LIB 520 4.0.4 LIB 530 4.0.4 LIB 542 4.0.5
SYS 500 8.4.4 or newer	LIB 500 4.0.4	LIB 510 4.0.4 LIB 520 4.0.4 LIB 530 4.0.4 LIB 542 4.0.4

Application Libraries:

- LIB 510 Application Library for Medium Voltage process
- LIB 520 Application Library for High Voltage process
- LIB 530 Application Library for High Voltage process
- LIB 542 Application Library for Medium Voltage process

5.1 Base system

If the system to be upgraded is running an operating system other than Windows (Unix or iRMX), please consult our Product Support Center for the details of the upgrade.

5.1.1 Windows 7, Windows 8.1, Windows Server 2008 and Windows Server 2012

The new security policy restrictions introduced in new operating Systems have an impact on MicroSCADA applications. When upgrading to SYS600 revision 10.2 or creating a new

application on 10.2, the new behavior described in this section should be carefully considered. The changes are applicable if the version to be upgraded is 9.3 or older.

The most important change in security policy is the isolation of Windows session 0 from the desktop. The applications run as a service, including SYS600, have no access to the desktop. Consequently, no application program that has a visible window or requires user input can be started by a service. Each user of the system has to do a proper Windows login to be able to access the system.

In SYS600 this means that no human interface programs can be started by SCIL executed in SYS_BASCON.COM, in command procedures or via OPC. For example, automatic launching of classic monitors or Monitor Pro windows at application start-up is no longer possible. In addition, external programs (SCIL-API programs) automatically started by SCIL have no access to the desktop.

Extensions to the SCIL functions that start a new Windows process have been implemented to specify the session of the new process. The affected functions are OPS_CALL, OPS_PROCESS, AEP_START and IP_START. These changes are described in SYS600 9.3 Release Notes. When upgrading to revision 9.4, the usage of these functions should be checked. The default value for the session may be inappropriate for the case, or even a bigger design change may be required.

5.1.2 Configuration and revision compatibility

Apart from the Windows requirements described above, no modifications to the application are required to start it after the installation. However, there are some issues to be considered to make the application work exactly as before (or better):

- The configuration file templates SYS_BASCON\$COM, SYS_CONFIG\$PAR and SHUTDOWN\$CIN should be merged to the corresponding old application files SSYS_BASCON.COM, SYS_CONFIG.PAR and SHUTDOWN.CIN to enable new features introduced in newer revisions. The configuration files are described in the System Configuration manual.
- During the development of the product, some errors have been fixed in a way that may have an influence on the old applications that have relied on the error. In addition, the default behavior in some situations, often related to event and alarm handling, have been changed. The Revision Compatibility mechanism, implemented as the RC attribute of the application object (see the System Objects manual) and the REVISION_COMPATIBILITY function (see the Programming Language SCIL manual), may be used to keep the old behavior.

In the following sections, the most important revision compatibility switches to be considered at the upgrade are described. They are listed in the reverse order of the revision of the old system. For example, if the system is upgraded from 8.4.3, the sections down to [Section 5.1.5](#) are relevant.

5.1.3 Mirroring considerations

If the system to be upgraded is or is going to be a part of a mirroring network, the compatibility switch 844_COMPATIBLE_MIRRORING must be set in the following two cases:

- There is a system running revision 8.4.4 in the network.
- 844_COMPATIBLE_MIRRORING is set in the other systems of the network.

5.1.3.1 844_COMPATIBLE_MIRRORING

Mirroring between revision 8.4.4 and any later revision does not work when default settings are used. When upgrading from 8.4.4, both the host system and the image system has to be upgraded to make mirroring work again.

Compatibility switch 844_COMPATIBLE_MIRRORING has been implemented to make it possible to upgrade systems of the mirroring network one by one.

When 844_COMPATIBLE_MIRRORING is set (in revision 8.4.5, or later), the mirroring works with an 8.4.4 application, and also with a newer application that has specified 844_COMPATIBLE_MIRRORING. However, it does not work with an 8.4.5 or later application without 844_COMPATIBLE_MIRRORING.

Using 844_COMPATIBLE_MIRRORING, the upgrading can be done system by system without disturbing the operation of the network. In this case, each new node that is added to the network later must set 844_COMPATIBLE_MIRRORING as well.

The setting of 844_COMPATIBLE_MIRRORING does not affect the functionality of the program or cause any decrease in performance.

5.1.4 Upgrading from revision 8.4.5 SP1 or 9.0

5.1.4.1 COUPLE_AUDIO_ALARMS_AND_PRINTOUTS

Generation of audio alarms has been changed in SYS600 revision 9.1 and in SYS 500 revision 8.4.5 SP2. Audio alarms and alarm printouts are now generated independently of each other. In earlier revisions, an audio alarm was generated only when an alarm row was printed on the event printer.

When COUPLE_AUDIO_ALARMS_AND_PRINTOUTS is set, the audio alarms of the application are generated as in earlier program revisions.

5.1.5 Upgrading from revision 8.4.3

5.1.5.1 DONT_RECALCULATE_AL_AFTER_ALARM_BLOCKING

Since revision 8.4.4, the alarm state is recalculated when AB is set back to 0. However, neither alarm printouts nor event channels are activated (they are not activated when AB is set to 1, either)

DONT_RECALCULATE_AL_AFTER_ALARM_BLOCKING may be set if the application, for some reason, does not want this new behaviour.

5.1.5.2 NO_ALARM_BY_OR_AND_OF

Since revision 8.4.4, the protocol specific attribute OR (Out of Range) and OF (Overflow) value 1 generate an alarm (cf. OS value 1, or FAULTY).

NO_ALARM_BY_OR_AND_OF may be set if the application, for some reason, does not want this new behavior.

5.1.5.3 DEFAULT_DAYLIGHT_POLICY_IS_CALENDAR

In revision 8.4.4, the implementation of time handling was comprehensively rewritten. Both local and UTC time as well as daylight saving time are fully supported. There is a slight incompatibility between the new and old implementation of the scheduling of time channels: the default behaviour of time channels at daylight saving time/standard time transitions has been changed.

Prior to revision 8.4.4, the scheduling of time channels was synchronized to the local time of the system. When the local time was moved backwards at daylight saving to standard time

transition, the time channels stopped for an hour. Correspondingly, at standard to daylight saving time transition, the time channels were excessively scheduled.

In revision 8.4.4, the default behaviour is that the time channels are scheduled evenly (synchronized to UTC time) when the local time changes due to daylight saving and there is a new attribute DP (Daylight Switch Policy) to specify the behaviour, see the Application Objects manual.

When DEFAULT_DAYLIGHT_POLICY_IS_CALENDAR is set, the time channels created with earlier program revisions keep behaving as before. However, even scheduling is the default behaviour of new time channels.

5.1.5.4 **ALLOW_CONFLICTING_F_ATTRIBUTE_NAMES**

When a pre-8.4.3 application is upgraded to 8.4.5 or later, the creation of F (Free Type) objects fails by PROF_FREE_ATTRIBUTE_NAME_ALREADY_EXISTS (2212), if the F object defines attribute names implemented as common process attributes in the base system in revisions up to 8.4.4. Examples of such conflicting attributes are RB, TI, TY, OI, BL, RB, OR and CT.

When ALLOW_CONFLICTING_F_ATTRIBUTE_NAMES is set, such conflicting attribute names are accepted when an F object is created.

This switch should be used only when an old application is upgraded, because the new base system functionality implemented by conflicting attributes will be lost when the name is overloaded. In addition, some common SCIL tools (such as the Object Navigator) and other SCIL software may be confused when the data type and meaning of some common attributes are not that expected.

5.1.6 **Upgrading from revision 8.4.2**

5.1.6.1 **NO_QUALITY_ATTRIBUTE_SEMANTICS**

In revision 8.4.2 and earlier, the quality attributes SB (Substituted), BL (Blocked), OR (Out of Range) and OF (Overflow) have been information only attributes, which means that they have been stored in the process object to be available for SCIL but their values have not affected the behavior of the process object in any way.

In newer revisions the following rules apply:

- A change of a quality attribute generates an event if EE = 1
- A change of a quality attribute activates an event channel, a printout and/or history logging if the activation is enabled (AE == 1, LD >> 0 or HE == 1) and the activation criterion (AA, PA or HA) is NEW VALUE or UPDATE.
- In such activation, the changed attribute is reported as the value of CA pseudo-attribute. If more than one attribute is changed at the same time, each change will be reported separately in any order. For example, if OV changes from 0 to 1 and SB from 1 to 0, two activations occur, one with CA == "BI", BI == 1 and SB == 0, the other with CA == "SB", BI == 1 and SB == 0.
- When the switch state (SS) or the substitution state (SU) of the object is changed, the quality attributes are set to 0.

When NO_QUALITY_ATTRIBUTE_SEMANTICS is specified, the quality attributes behave as in revision 8.4.2 and earlier.

5.1.7 Upgrading from revision 8.4.1

5.1.7.1 NO_ALIAS_CHECKING

Since revision 8.4.2, global variables are guarded against alias references. Status SCIL_VARIABLE_ALIASING_ERROR is generated when aliasing rules are violated.

When NO_ALIAS_CHECKING is set (either by the RC attribute of the application or by REVISION_COMPATIBILITY function), alias checking is not done. Turning on the switch by the RC attribute disables the checking of alias referencing in the whole application. To disable the alias reference checking locally in a program, use the REVISION_COMPATIBILITY function. The REVISION_COMPATIBILITY function is described in the Programming Language SCIL manual.

The arguments of method calls, as well as all the arguments of SCIL functions, are passed by copy instead of reference. This degrades performance when text, bit string, byte string, vector and list arguments are used.

If the base system will be used together with applications created with pre-8.4.2 revisions of the base system, e.g. using LIB 4.0.1, the revision compatibility switch NO_ALIAS_CHECKING should be turned on.

5.1.8 Upgrading from revision 8.4.0

5.1.8.1 SETTING_LA_AND_AG_DOES_NOT_ALARM

In revision 8.4.0 and earlier, setting AG or LA attribute of a process object did not affect the alarm state of the object and no post-processing was done. Since revision 8.4.1, the alarm state is updated according to the new value and normal post-processing is done. Due to the change, some old applications generate unwanted alarms and printouts when run under 8.4.1 or later. To prevent this, this revision compatibility value was implemented.

The value can be used only as the value of the application attribute RC. It cannot be used as an argument of SCIL function REVISION_COMPATIBILITY, because event handling is done by the process database.

5.1.9 Upgrading from revision 8.2

5.1.9.1 DO_NOT_SYNCHRONIZE_PICTURE_UPDATE

The timing of picture update programs is synchronized to the system clock (See the Programming Language SCIL manual, command !UPDATE). In revision 8.2 or older, such a synchronization was not done. When an old application that relies on the old behavior is upgraded, this setting may be used to avoid recoding of the pictures.

When DO_NOT_SYNCHRONIZE_PICTURE_UPDATE is set, the executions of update programs are not synchronized. This setting does not affect the cyclic methods of Visual SCIL objects.

5.1.10 Upgrading from revision 8.1

5.1.10.1 ON_COMMAND_EXPANSION

In revision 8.1 or older, the macros of each SCIL command line were expanded before the line was interpreted. This lead to an incorrect behavior in case of a single line #ON command, as shown in the following example:

```
@A = "XYZ"  
  
#ON EVENT:E1 #EXEC 'A':E2
```

When event EVENT:E1 occurred, command #EXEC XYZ:E2 was executed regardless of the current value of A. Variable expansion is a runtime operation, which should use the current values of variables. The following worked correctly:

```
#ON EVENT:E1 #BLOCK #EXEC 'A':E2 #BLOCK_END
```

When ON_COMMAND_EXPANSION is set, the expansion of macros is done as in revision 8.1, that is, before the line is interpreted.

5.2 LIB 5xx

5.2.1 Language translation

When LIB 5xx is updated, there may be new attributes in language text files. This means that those attributes has to be added and translated to corresponding localized language files.

5.2.2 Revision compatibility switches

If only the base system is updated and LIB 5xx is from an earlier revision, some malfunction may occur in LIB 5xx application. This situation can be handled by means of revision compatibility switches. In this section, the relation of revision compatibility switches having influence to LIB 5xx applications is explained.

5.2.3 NO_ALIAS_CHECKING

If SCIL_VARIABLE_ALIASING_ERROR is generated, turn this switch.

5.2.4 DONT_RECALCULATE_AL_AFTER_ALARM_BLOCKING

If base system is 8.4.4 or newer and LIB5xx application is revision 4.0.3 or older, each switch device control action generates an alarm. This can be avoided by turning this switch on.

5.2.5 Daylight saving time

When LIB 500 is updated to a revision 4.0.4 or later, a new daylight saving time mechanism is taken into use. Command procedures (BGU_SUMMER, BGU_WINTER) and related time channels handling the daylight saving time in an "old" way are disabled. A back up of the command procedures is stored to files PICT/BGU_SUMMER.CIN and PICT/WINTER_SUMMER.CIN.

5.3 Monitor Pro

5.3.1 Common applications with SA_LIB

SYS600 revision 9.2 or newer contain **User Management**, **Calendar** and **Login Dialog** integrated from LIB 500 to SYS600. By default, the user name and password are requested for the applications. If the application has not been previously prepared for the LIB 500 User Management, then the first operator who logs into application will be the System Manager.

By default, the **User Management**, **Calendar** and **Login** Dialog are run from Power Process Library. This is applied also when the application has been prepared for LIB 500.

For the **Login** Dialog, the authentication has become more strict. This means that passwords are case sensitive, i.e. passwords that have been created with SYS600 revision 9.1 or older must be typed with upper case letters.

5.3.1.1 Filters

In SYS600 9.2 and newer versions, the Event and Alarm List filters must be in predefined directory, whereas in 9.0 and 9.1 it was possible to store the filter files anywhere in the directory structure. When updating to 9.2 or newer version, the filter files must be moved to directory \sc\apl\<application name>\PAR\<user name>\<Display type name, e.g. event>\FILTERS, otherwise they are not shown in Save/Load Filter dialog.

5.3.1.2 Command procedures

Monitor Pro functionality uses some command procedures to communicate with base system. These command procedures are overwritten during the update from previous versions. If any modifications have been done to these command procedures, these changes will be overwritten during the update. To avoid this, the code of the command procedures should be copied manually into text files. The following command procedures are overwritten during the update:

```
ACK_SOUND
BGU_AL
BGU_ALARMINDS
BGU_BAYLR
BGU_BLOCK
BGU_CALEN
BGU_CALMP
BGU_CONTROL
BGU_CREATEDB
BGU_EL_TS
BGU_LTRK_SUPPRESS
BGU_POWER_FLOW_CALC
BGU_POWER_FLOW_LN_MAPPING
BGU_POWER_FLOW_SUMMARY
BGU_RDRE
BGU_STALR
BGU_SET_GENERATOR_ON_OFF
BGU_SET_POWER_FLOW_DIRECTION
BGU_SUMMER
BGU_TRAFO
BGU_WINTER
SAGR_EAB_MAIN
SAGR_OBJNAV_MAIN
SAGR_REPORTS_*
```

5.3.1.3 Process objects

The following process objects are recreated during the installation:

```
ACK_SOUND
BGU_ALARMINDS (indexes 1..10)
```

5.3.1.4 Event handling objects

Certain event handling are also recreated and modifications made to these objects are also lost. To avoid loosing such changes, use Import/Export Tool found in Tool Manager to export

the objects and import them back after installation. The name of these event handling objects start with the letters "SAGR".

5.3.1.5 Starting MicroSCADA without preparation for Power Process Library

If MicroSCADA is wanted to run without Power Process Library, do the following actions after version 9.2 or newer is installed and before starting MicroSCADA.

1. Comment SYS_600 specific part from the file \sc\sys\active\sys_\sys_bascon.com
2. Comment SYS_600 specific part from the file \sc\Stool\Misc\Apl_Stl.txt
3. Comment the SA_LIB / LIB5 specific parts from \sc\sys\active\sys_\SYS_APLCON.SCL
4. Rename file \sc\sa_lib\base\bbone\inst\INDEX5_B1.TXT to e.g. _INDEX5_B1.TXT
5. Rename file \sc\LIB4\base\bbone\use\PATH4_Z1.TXT to e.g. _PATH4_Z1.TXT

5.4 Communication units

In principle, the process communication unit PC-NET and Modbus Slave can be upgraded to a newer version without changes in the system behavior. This section provides additional information related to the upgrading of IEC 61850 and External OPC Data Access Client. CDC-II slave is deprecated from version 10.0.

If the system to be upgraded contains DCP-MUX units, they must be replaced with PC-NET process communication units. See [Section 5.4.1.3](#) for more information.

5.4.1 PC-NET

The main issue in the development tasks made to PC-NET is to retain backward compatibility from revision to another. This principle applies also to protocols developed already to DCP-MUX hardware.

However, the differences in processor speeds, operating system versions and communication hardware together with new requirements in system setups and security will require that the system behavior must be verified after the upgrade. Before the upgrade, please read through the backward incompatibility items listed below. The listed PC-NET related issues are protocol specific and if the system to be upgraded does not contain mentioned protocols, the item has no effect in the upgrade. More information about the mentioned attributes can be found from protocol specific manuals and SYS600 System Objects manual.

If the behavior of a communication line after the upgrade is not satisfactory, attribute changes to the system configuration may be required. A systematic proceeding in the problem analysis usually gives best results, sometimes it is needed to record a communication log from the line which is causing problems.

5.4.1.1 PC-NET from SYS600 9.x or COM500 4.2

If the previous version is SYS600 9.3FP1 or older or COM500 4.2, the following upgrade notification must be taken into account:

- After the upgrade, each instance of PC-NET will allocate 96 Megabytes of memory. In principle, the usage of a newer version may lead to lack of memory if the computer resources stay unchanged in the upgrade.

If the previous version is SYS600 9.2SP1 or older or COM500 4.2, the following upgrade notification must be taken into account:

- In case the serial communication line has contained a lot of disturbances, the upgraded PC-NET may reject messages which were not rejected by the previous version. Setting of the bit 0 of the line attribute CM may be helpful in some situations.

5.4.1.2 PC-NET from SYS 500 8.4.x

If the previous version is SYS 500 8.4.5 SP1, SYS 500 8.4.4 SP4, COM500 4.0 SP1 or older, the following upgrade notifications must be taken into account:

- After the upgrade, each instance of PC-NET will allocate 96 Megabytes of memory. In principle, the usage of a newer version may lead to lack of memory if the computer resources stay unchanged in the upgrade.
- In case the serial communication line has contained a lot of disturbances, the upgraded PC-NET may reject messages which were not rejected by the previous version. Setting of the bit 0 of the line attribute CM may be helpful in some situations.

If the previous version is SYS 500 8.4.4 (without service packs), COM500 4.0 (without service packs) or older, the following upgrade notification must be taken into account:

- In DNP 3.0 slave protocol, the response handling of an incoming class 1/2/3/0 request from the DNP 3.0 master is handled differently, and the order of the data points in the response is different. It is possible that the new behavior can be also seen in the process pictures of the master.

If the previous version is SYS 500 8.4.3 SP3, COM500 3.0 SP1 or older, the following upgrade notifications must be taken into account:

- In IEC60870-5-101 slave protocol, the RM attribute bit 4 of a station object controls the acceptance of incoming control commands from the master. In the newer version, the default behaviour is that an execute command is not accepted without preceding select. The behavior stays unchanged if bit 4 of the attribute RM is set. See the corresponding manual for more information.
- In IEC60870-5-101 slave protocol, the TC attribute of the station object controls the handling of incoming time synchronization. In the newer version the default value is 1 which causes the message contents to be sent to a process object also. See the corresponding manual for more information.
- In any serial protocol, the line attribute RY presented in version 8.4.4 also controls the behaviour of the RTS-signal of the RS-232 port. For RocketPort serial cards, the default value RY=1 will cause the RTS signal to be active one character longer compared with the previous version. This is usually harmless. With setting RY=0 the behavior is unchanged with RocketPort. With a standard serial port of PC, the behavior is unchanged with setting RY=1 and, depending on the used modem hardware, setting RY=0 does not necessarily work at all.

5.4.1.3 DCP-MUX from SYS 500 8.x

If the needed protocols can be found from the list presented below, the upgrading of the DCP-MUX unit to PC-NET should be possible. The DCP-MUX card must be replaced with a multi-port serial card which has a sufficient amount of COM-ports. The connected RS232 devices such as modems can usually be used as they are. The existing line and station attribute configuration must be converted to a SCIL script if the DCP-MUX has been configured with a NETCONF program.

Table 12: List of the DCP-MUX protocols supported in the PC-NET communication unit

1	ANSI X3.28 Full Duplex or ACP
2	ANSI X3.28 Half Duplex
4	ASCII protocol for printer
7	RP570/RP571 master protocol
9	P214/INDACTIC 35 master protocol
12	LCU500 master
13	ADLP180 Master
14	SPA protocol
15	General ASCII
16	RP570/RP571 Slave
17	RCOM (Procontic)
18	Westinghouse F4F
23	ABB Alpha meter protocol
25	Modbus RTU master protocol
26	IEC 61107 protocol

If the DCP-MUX to be upgraded contains a protocol which is not listed here, the upgrading is not possible as such. In this situation, please contact the SA-D SupportLine for more information.

5.4.2 IEC 61850

5.4.2.1 Migration of Communication Engineering Tool (CET) configurations before usage

If the IEC 61850 CET project has been originally done with SYS600 revision 9.0 or 9.1, and the appropriate configuration will be now taken in use in SYS600 revision 10.2, the following steps are needed to migrate the project.

- Before installing the SYS600 revision 10.2 take a copy of your {guid}.xml files. For example: 23a247e6-7552-4c58-a202-eff8693f372f.xml from drive>:\sc\prog\61850_OPCT_Server\OPCSCLEExport\[project name].

After finalising the SYS600 revision 10.2 installation, create both a new database and an IEC 61850 OPC Server to CET. Use the SCLImport tool and import your existing configuration from the {guid}.xml file. A {guid} example included into above is an example of such a code, the {guid} in your projects, i.e. related .xml files differs from the example given above.

To successfully use the CET, you will need Full Access rights assigned for everyone to the following folders:

- <drive>:\PCMDATABASES (location depends on Environment Variable PCMDATADIR)
- <drive>:\sc\prog\61850_OPCT_Server\CET\bin
- <drive>:\sc\prog\61850_OPCT_Server\CET\bin\Tools\OPCSCLEExport\[project name]

The reason for this migration is that the CET databases in SYS600 revision 9.0/9.1 and revision 10.2 are not fully compatible.



When existing CET configurations are taken in use with the SYS600 revision 10.2, it is important to also verify that the correct configuration attribute values will be taken in use by IEC 61850 project. For further information, see IEC 61850 System Design manual, sections Timeout handling and Troubleshooting.

5.4.3 Modbus slave

Modbus slave is a separate executable used in systems with COM500*i*. The backward compatibility approach between versions is also used with the modbus slave. The modifications made to modbus_slave.exe have mainly been extensions, but the backward compatibility has been retained in a way that the upgrading to a newer version should not cause problems.

5.4.4 CDC-II slave

CDC-II slave is deprecated from version 10.0 since it used special hardware not supported in latest Windows versions and modern computers.

5.4.5 External OPC Data Access Client

External OPC Data Access Client is a separate executable used in systems including devices communicating via OPC protocol or IEC 61850 systems. Any existing configuration can be used in External OPC Data Access Client. The modifications made to daopcc1.exe have mainly been extensions, but the backward compatibility has been retained in a way that the upgrading to a newer version should not cause problems. Previously, when External OPC Data Access Client was delivered as a separate installation package for SYS/COM products, the destination folder for the executable was always <drive>:\MS_Interfaces\OPC_Client. For all the SYS600 revisions, the installation of External OPC Data Access Client occurs always into folder <drive>:\sc\prog\OPC_Client. Modify the application start-up routines accordingly to start the latest External OPC Data Access Client executable, when needed. Additional about configuration parameters related to the External OPC Data Access Client can be found from the External OPC Data Access Client and IEC 61850 System Design manuals.

5.5 Communication gateway

5.5.1 Upgrading COM500 revision 2.0, 3.0, 4.0, 4.1 and 4.2

If an existing COM500 revision 2.0-4.2 application is updated to COM500*i*/revision 9.2 and newer, please note the following:

COM500*i*/revision 9.2 and newer has a mechanism that makes all the required modifications to the application to update an older revision to revision 9.2 and newer. This mechanism is started when Tool Manager is opened to a COM500*i*/application for the first time after the installation of SYS600 9.2 and newer. After the mechanism has been run, SYS600 must be restarted in order to take all the modifications in use. Also PQ and QD attributes should be defined for queue 16 in SYS_BASCON.

SYS_BASCON modifications:

PQ = 16,- ;Number of parallel queues/ Needed in COM500*i*/Applications

QD = (1,1,0,0,0,0,1,1,1,1,1,1,1,1,1,1),- ;Parallel queue dedication/ Needed in COM500*i*/Applications

If any project specific modifications have been made to the command procedures of the previous COM500 revision, the modifications must be copied to the matching new command

procedures. A back-up of the project specific modifications must be taken before installation of COM500*i*; because all command procedures are updated during COM500*i* start-up.

Base System, LIB 5xx and Communication unit changes are described in [Section 5.1](#), [Section 5.2](#), and [Section 5.4](#). The same changes should be also made when COM500 is updated to COM500*i*. Corresponding COM500 and SYS revisions are shown in the following table:

Table 13: Correspondence of COM500 and SYS revisions

COM500 revision	SYS revision
4.2.SP2	SYS600 9.1.5
4.2 SP1	SYS600 9.1 SP1
4.2	SYS600 9.1
4.1	SYS600 9.0
4.0 SP1	SYS 500 8.4.4 SP1
4.0	SYS 500 8.4.4
3.0 SP2	SYS 500 8.4.3 SP4
3.0 SP1	SYS 500 8.4.3 SP2
3.0	SYS 500 8.4.3
2.0	SYS 500 8.4.2

5.6 Updating device drivers

In general, the device drivers are backwards compatible within a major revision number, that is, drivers in 8.4.2 revision is used with Base System Software of revisions 8.4.1 and 8.4.0.

It is recommended to update device drivers to the latest version when system upgrade is done. The supported versions of drivers can be downloaded from the web sites of the respective manufacturers.

Section 6 Abbreviations

6.1 Abbreviations

Abbreviation	Description
ASCII	American Standard Code for Information Interchange
DNS	Domain Name System
GB	Gigabyte
HSB	Hot Stand-by
LAN	Local area network
LTSB	Long Term Servicing Branch
LTSC	Long Term Servicing Channel
MB	Megabyte
OPC	Open Platform Communications
PCI	Peripheral Component Interconnect
RAM	Random access memory
SCIL	Supervisory Control Implementation Language
TCP	Transmission Control Protocol
TS CAL	Terminal service client access license

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