GE Fanuc Automation

CIMPLICITY® OpenProcess

CIMPLICITY OpenProcess

Getting Started

GFK-1753 *April 2000*

GFL-005

Following is a list of documentation icons:

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in the equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

Caution provides information when careful attention must be taken in order to avoid damaging results.

Important flags important information.

To do calls attention to a procedure.

Note calls attention to information that is especially significant to understanding and operating the equipment.

Tip provides a suggestion.

Guide provides additional directions for selected topics.

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Contents of this Manual

Chapter 1. Introducing CIMPLICITY OpenProcess. Provides an overview of the CIMPLICITY OpenProcess components and benefits. It also describes the options available to you and what you should receive in the OpenProcess package.

Chapter 2. Installing CIMPLICITY OpenProcess. Provides detailed procedures in the order in which the CIMPLICITY OpenProcess components should be installed.

Chapter 3. Registering the CIMPLICITY OpenProcess System. Describes how to prepare the information required for registration and how to register each component in CIMPLICITY OpenProcess.

Chapter 4. Planning for Control Configuration. Provides an overview of the suggested planning steps to follow to follow before starting an OpenProcess project.

Chapter 5. Setting up the PA 30, 70 and 70H Controllers. Provides detailed procedures for setting up each controller.

Chapter 6: Configuring Ladder Logic in the PA Controller. Provides details about memory allocation for configureing ladder logic.

Related Publications

For more information, refer to these publications:

CIMPLICITY HMI User's Manual (GFK-1180)

CIMPLICITY Control User's Guide (GFK-1295)

Contents

Introducing CIMPLICITY OpenProcess

Welcome to CIMPLICITY OpenProcess

CIMPLICITY OpenProcess is an Open System approach to process automation, and provides a fully integrated solution for control and process design and management.

Comprised of advanced software and hardware features, CIMPLICITY OpenProcess delivers the tools required to:

- Design,
- Implement,
- Document, and
- Maintain a process control system.

CIMPLICITY Open Process is a hybrid system that uses the strategies and utilities typically associated with distributed control systems.

This new hybrid technology reflects the industry's migration from closed; proprietary distributed control systems to more cost-effective open architectures, resulting in an effective standards-based system capable of more than just control.

OpenProcess Package Contents

Your OpenProcess package includes:

- Three CDs that contain the three CIMPLICITY OpenProcess components.
- An SNP Cable.
- A registration packet.
- CIMPLICITY OpenProcess User Manual.
- CIMPLICITY OpenProcess Reference Manual.

Checking the OpenProcess three CDs

The OpenProcess package includes three CDs, each of which contains one of the three OpenProcess software components.

The CDs are:

CD	Contains	Provides
1	CIMPLICITY HMI	Numerous capabilities for real-time monitoring and control of the process, including: • Advanced graphics, • Device communication, • Trending and • Logging.
2	CIMPLICITY OpenProcess Designer	The development tools to configure complete control systems including advanced control strategies, I/O configuration, and project documentation.
3	Control 90	A window into the Process Automation Controller allowing for hardware configuration of the controller and initial downloading of the OpenProcess C-loadables to the controller.

Important: Please read the installation instructions in this manual before you install any of the software.

Checking the SNP Cable

A ***Series Ninety Protocol (SNP) cable*** is in the package. This cable is necessary to communicate from the COMM port on the Engineering Workstation or Operator Console to the process automation controller RS485 port. This communication is necessary for the initial configuration of the controller hardware.

Checking the Registration Packet

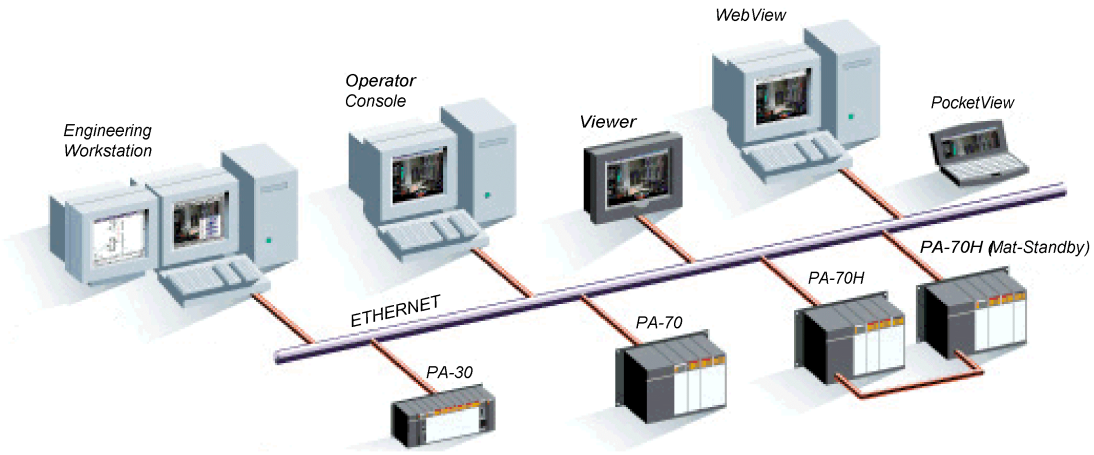
A ***registration packet*** contains serial numbers to register CIMPLICITY HMI and OpenProcess Designer.

Checking the Reference Manual

The ***Reference manual*** provides information on all OpenProcess functionblocks.

OpenProcess System Solution

The scalable CIMPLICITY OpenProcess system comprises all the necessary software and hardware components to configure a complete process control solution.



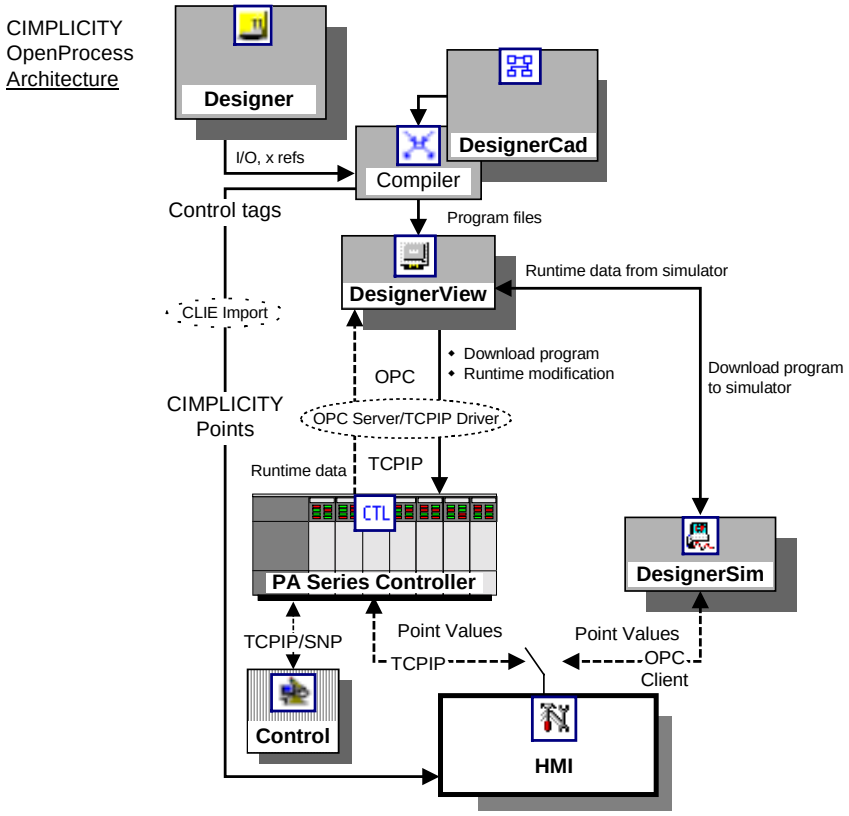
OpenProcess Software Components

The OpenProcess software features a complete tool set for process control system development and maintenance in an open Windows NT client/server architecture. Starting with a PI&D and a control Specification, CIMPLICITY OpenProcess simplifies the process of:

- Creating an instrument index,
- Developing control strategies,
- Producing the graphical user interface and
- Commissioning and maintaining a system.

Reviewing CIMPLICITY OpenProcess Architecture

The CIMPLICITY OpenProcess architecture integrates the three software components: HMI, Designer and Control.



See the next page for definitions of the integrated components.

The integrated components in the CIMPLICITY OpenProcess architecture include:

Designer is used to model the process systems input/output by assigning rack, module, and point destinations. The Designer uses this information to build the instrument index. This instrument index is used to cross-link the instrument tag attributes to the process control diagrams.

DesignerCad provides the forum to develop Process control logic diagrams. The control strategy is built by selecting the appropriate function blocks, assigning symbolic tags, and then connecting the blocks with analog or digital lines, all using standard drawing forms and commands.

DesignerSim is a real-time control emulator for control strategy testing and training.

DesignerView allows the animation of logic diagrams with either simulated or live real-time data. The viewer is also used for timing, operator control purposes and for adjusting runtime "turnable" parameters. The other primary function is to download compiled drawings to PA controllers.

PA Series Controller consists of a CPU that is loaded with OpenProcess.

CLIE Import is an automatic HMI utility that enables point data to be imported into and exported from HMI. (There is no configuration.)

Control is a tool to configure the hardware and ladder logic.

HMI Workbench, which is the is at the center of your OpenProcess project, provides you with the power you need to view, configure, organize, and manage every component of your project through one easy to use window. Working through the Workbench enables you to seamlessly import points from the OpenProcess Designer into the HMI project..

Reviewing OpenProcess Software License Options

CIMPLICITY OpenProcess software offers the following software license options.

- Engineering Workstation–used to develop and commission control strategies and HMI software screens,
- Operator Console–provides the interface for monitoring, tuning and maintaining the process control system, and
- Viewer Station–provides equipment monitoring and tuning.

See the next page for a list of functions included with each license option.

OpenProcess Product Functions

Following is a list of CIMPLICITY OpenProcess product functions that are included in each license option.

Functionality	Engineering Workstation	Operator Console	Viewer
Designer			
Add/Edit/Delete instrument tags	Yes	View	No
Add/Edit/Delete PA Controllers	Yes	View	No
Add/Edit/Delete Modules	Yes	View	No
Assign instrument tags to modules	Yes	No	No
DesignerCAD			
Develop control drawings	Yes	View	View
Compiler			
Compiler project	Yes	No	No
DesignerView			
Project upload/download	Yes	Yes	No
DesignerSim			
Control Simulation	Yes	No	No
Tools			
Instrument tag checkout	Yes	Yes	No
Tuning	Yes	Yes	Yes
CAD Helper tool	Yes	No	No
Controller Register tool	Yes	No	No
Input/Output Control tool	Yes	No	No
Import Module tool	Yes	No	No
Suggestive Tuning tool	Yes	Yes	No
Reports			
Address List	Yes	Yes	No
FAT Required	Yes	Yes	No
Field Test Required	Yes	Yes	No
Tag Overview`	Yes	Yes	No
Cross Reference	Yers	Yes	No
HMI			
HMI Development Server	YES	NO	NO
HMI Runtime Server	NO	YES	NO
HMI Viewer	NO	NO	YES

OpenProcess Control Hardware

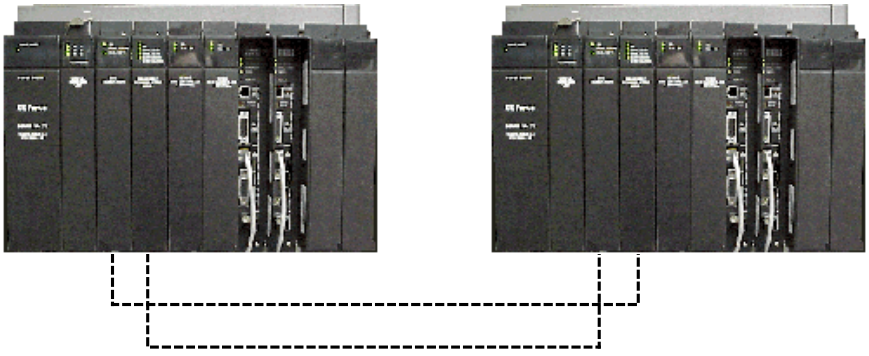
OpenProcess Control hardware comes from a proven controller and I/O family with connectivity to a variety of open control networks.

Users can choose from several CIMPLICITY OpenProcess controllers to meet their specific application requirements.

PA 30 controllers are ideal for applications with up to 100 loops. The PA 30/364 comes with built in Ethernet communication.

PA 70 controllers are ideal for applications with up to 250 control loops. You can choose between the PA 70/772 and PA 70/935 basing your choice on the performance and digital I/O requirement needs.

The PA 70H offers a redundant controller solution for critical control and other applications requiring uninterrupted availability. You can choose between PA 70H/772 and PA 70H/935 basing your choice on performance and digital I/O requirements.



CIMPLICITY Open Process Hardware and Software Requirements

CIMPLICITY Open Process extensive capabilities come with some minimum hardware and software requirements.

Reviewing CIMPLICITY Open Process Hardware Requirements

Minimum Processor: Intel Pentium-based CPU

RAM Requirements: 128 Megabytes

Networking: Ethernet, Novell, Token Ring, and TCP/IP

Reviewing CIMPLICITY Open Process Software Requirements

Operating System: Microsoft NT Service Pack 4 or higher

Database Options: Microsoft Access97 (recommended)

Installing CIMPLICITY OpenProcess

About CIMPLICITY OpenProcess Installation

Important: Please read the installation instructions before you install any software.

Because CIMPLICITY OpenProcess provides the tools for the complete configuration of a process control system, from the hardware to the software, it requires the installation of all the software necessary to address the wide range of requirements.

Therefore, the entire CIMPLICITY OpenProcess software comes on three CDs.

The CDs include:

CD 1 HMI 4.01, which includes installation for:

Step 1. HMI 4.01

Step 2. HMI Service Pack 5.

CD 2 Designer 5.2, which includes installation for:

Step 1. Microsoft Data Access 2.1 (required before the Designer core product is installed).

Step 2 The OpenProcess core product.

Step 3. OPC Server, a communications utility.

CD 3 Control 2.3 with Service Pack 1.

Note: You will be asked to register three components of the CIMPLICITY Open Process system, HMI, Designer and Control.

A registration envelope that is included in the CIMPLICITY OpenProcess package includes serial numbers needed for HMI and Designer registration.

You can register each component separately when a Registration screen appears during installation or you can wait and register them in one telephone call after you install the complete CIMPLICITY OpenProcess system.

See the "Registering the OpenProcess System" chapter in this manual for detailed information about registration.

Important: You must install HMI 4.01 with SP5 or higher before installing Designer. The order in which Control is installed is not important; i.e. it can be installed before or after the other two packages.

This chapter takes you through the entire installation process from CD 1 through CD 3. It also provides you with information about registration.

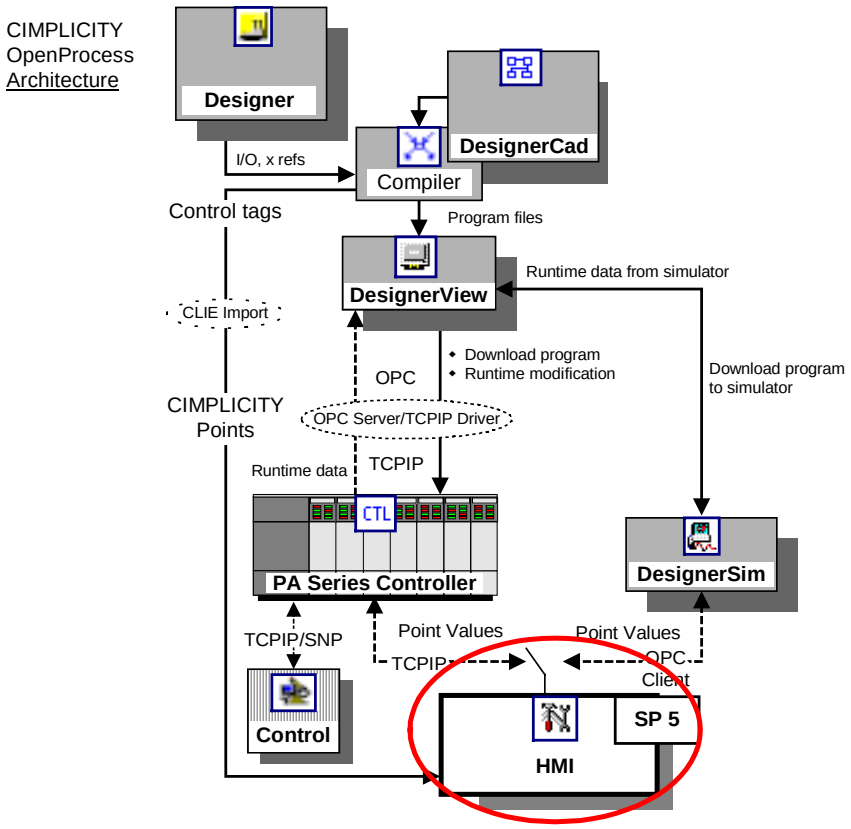
CD 1. HMI 4.01

The CIMPLICITY 4.01 installation can be divided into steps. Each step requires one or more steps.

The steps in the OpenProcess installation are:

Step 1. HMI 4.01.

Step 2. HMI 4.01 Service Pack 5.



CD 1. Step 1
HMI 4.01

HMI 4.01 installation tasks include:

Task 1. Begin the HMI 4.01 installation.

Task 2. Review the HMI Welcome screen.

Task 3. Review the HMI licensing terms.

Task 4. Choose the HMI Server or Viewer.

Task 5. Choose the HMI destination.

Task 6. Choose HMI Server or Viewer options.

Task 7. Choose the HMI program group.

Task 8. HMI is installed.

Task 9. Skip HMI registration.

Task 10. Complete HMI 4.01 installation.

CD 1. *Step 1*
Task 1
Begin HMI 4.01 Installation

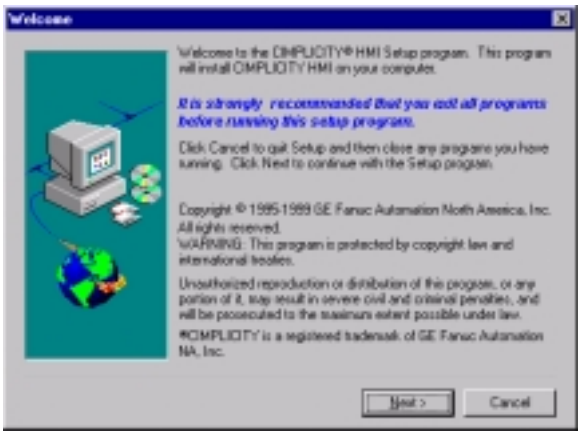
1. Insert the HMI 4.01 CD in the CD-ROM drive.

   A HMI Setup screen appears.

2. Click Install CIMPLICITY HMI.

Result: A Welcome screen appears.

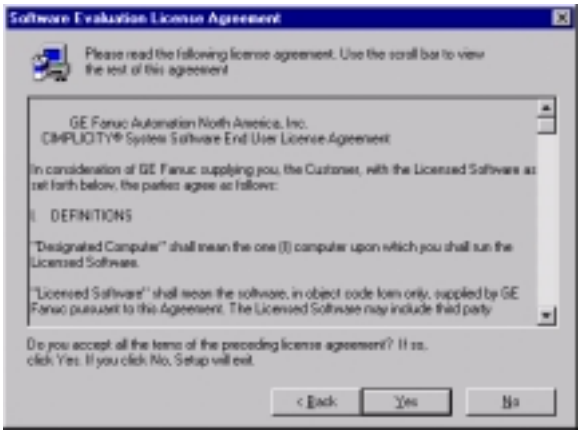
CD 1. *Step 1*
Task 2
Review the HMI Welcome Screen



1. Read the Welcome screen.
2. Click **Next**.

Result: A Software License Agreement screen appears.

CD 1. *Step 1*
Task 3
Review the HMI Licensing Terms

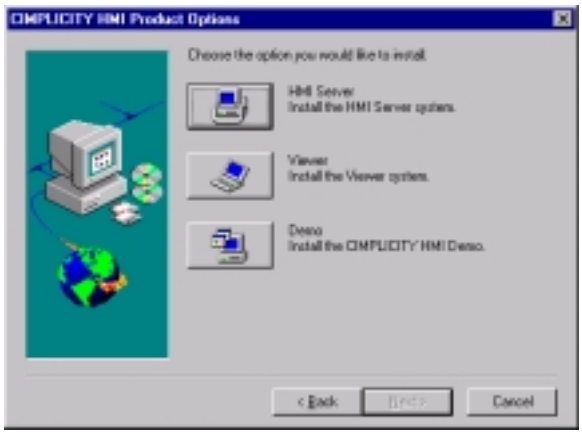


1. Read the license agreement in the Software License Agreement ***screen***.
2. Click **Yes** to agree to the licensing terms.

Result: A CIMPLICITY HMI Product Options screen appears.

CD 1. *Step 1*
Task 4
Choose HMI Server or Viewer

CIMPLICITY Open Process provides you with three purchase options. The option you purchased determines what you will install.



If you purchased:

An Engineering Workstation (a development server), or

An Operator Console (runtime server).

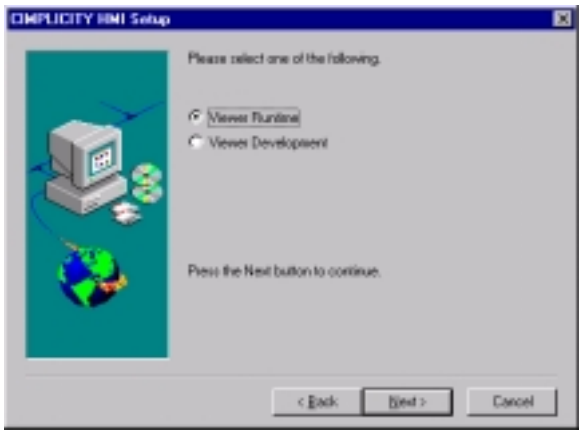
Click the **HMI Server button** to install the HMI Server system.

If you purchased:

A Viewer (runtime viewer).

1. Click the **Viewer** button to install the HMI Viewer.

   A CIMPLICITY HMI Setup screen appears.

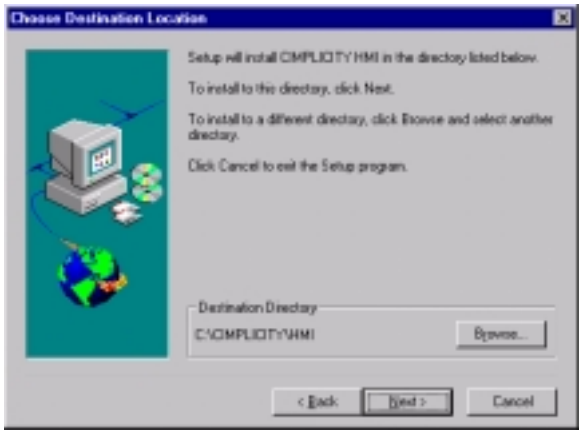


2. Check Viewer Runtime.

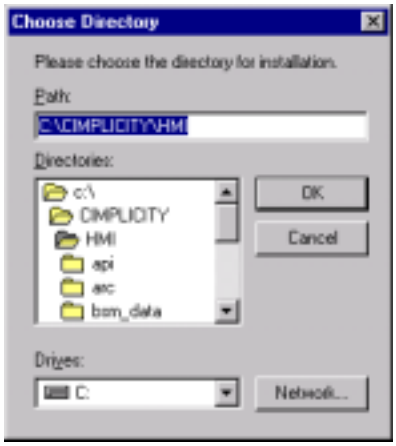
3. Click **Next**.

Result: The Choose the Destination Location screen appears.

CD 1. *Step 1*
Task 5
Choose the HMI Destination



1. If the destination directory should be different from the default that appears in the Destination Directory box, e.g., **`C:\CIMPLICITY\HMI`**:
   A. Click **Browse**
   B. Select the correct directory in the Choose Directory dialog box.
   C. Click **OK**.



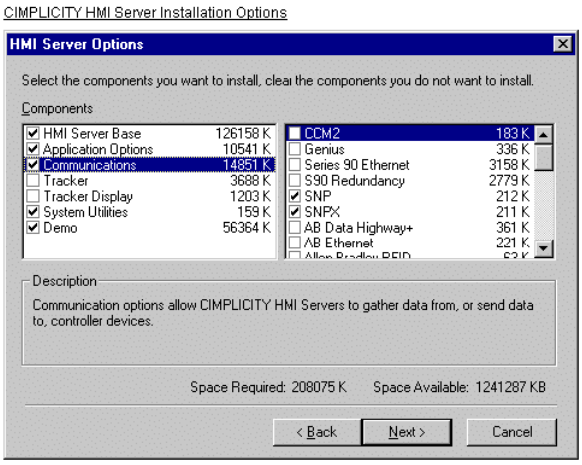
2. Click **Next** when the correct destination displays in the Destination Directory box.

Result: The HMI Server Options dialog box appears.

CD 1. *Step 1*
Task 6
Choose HMI Server or Viewer Options

The options available to you depend on whether you are installing HMI Server or HMI Viewer.

HMI Server Options



To choose HMI server options:

1. Check Application Options in the Components box.

   A list of HMI options appears in the right column.

2. Check the options you want installed.
3. Check Communications in the left column of the HMI Server Options dialog box.

   The devices available for HMI appear in the right column.

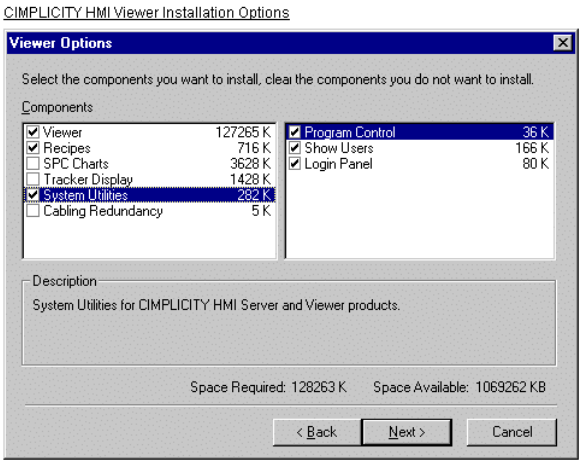
4. Check at least the following for installation:
   - OPC Client and
   - SNP,

   And

   - Series 90 Ethernet (for Simplex PA-30 and PA-70), or
   - S90 Redundancy (for PA_70H).
5. Leave HMI Server Base, System Utilities and Demo checked in the left column.
6. Click **Next**.

Result: The Choose Program Group dialog box appears.

HMI Viewer Options

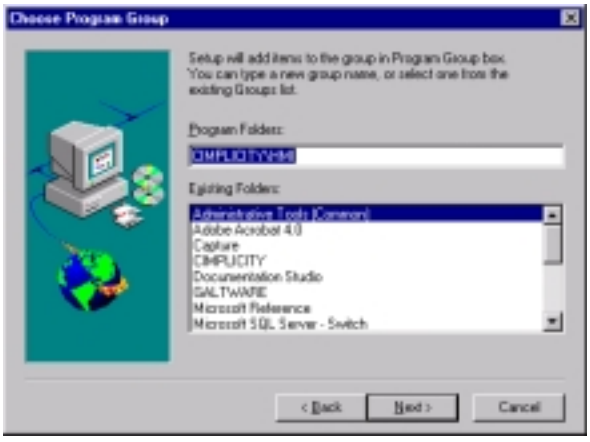


To choose HMI Viewer options:

1. Check the components you want in the Components box.
2. Check any options you want that are available with a selected component.
3. Click **Next**.

Result: The Choose Program Group dialog box appears.

CD 1. Step 1
Task 7
Choose the HMI Program Group



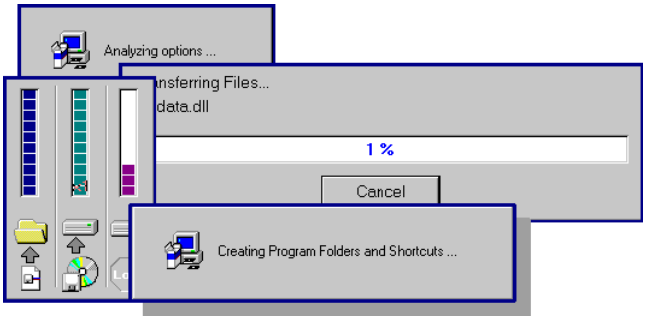
1. If the default Program Folder name is not what you want, find or enter a name in the Program Folders field.
2. Click **Next** when the name you want appears in the Program Folders field.

Result: Installation begins.

CD 1. *Step 1*
Task 8
HMI is Installed

A series of messages appear to inform you of the **HMI** installation progress.

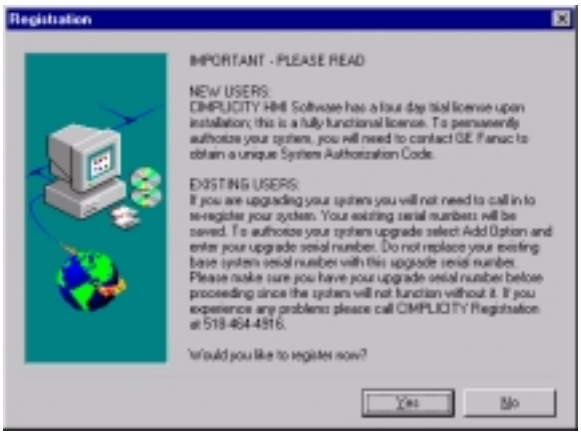
Messages include:



Result: When installation is complete a Registration screen appears.

CD 1. *Step 1*
Task 9
Skip HMI Registration

There is a HMI envelope with registration information included in the CIMPLICITY Open Process System package. You can use this information to register now or wait until you have installed the entire CIMPLICITY OpenProcess system. At that time you can register HMI and CIMPLICITY OpenProcess in one phone call.

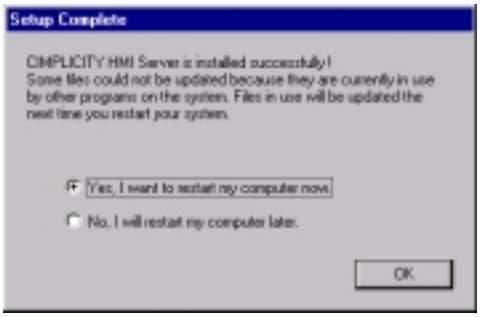


Either:

1. Click **Yes** to register during installation. *See "Registering the CIMPLICITY OpenProcess System" for details about registering HMI.*
2. Click **No** to register later (Recommended).

Result: When you have completed registration or if you click No, a Setup Complete screen appears.

CD 1. *Step 1*
Task 10
Complete HMI 4.01 Installation



1. Either:
   A. Check Yes, I want to restart my computer now. to make HMI immediately available for use, or
   B. Check No, I will restart my computer later.
2. Click **OK**.

Result: Setup is complete. You can begin to take full advantage of HMI as soon as the computer reboots and you have registered with GE Fanuc Automation.

CD 1. Step 2.
HMI 4.01 Service Pack 5

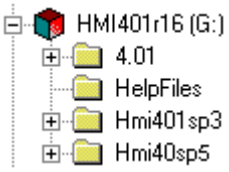
The HMI CD provides you with HMI 4.01 Service Pack 5. This Service Pack will update HMI to adhere to the CIMPLICITY OpenProcess system requirements.

During installation, the service pack looks for installed options and updates those options, if updates are included. Therefore, you install the service pack both on the Server and the Viewer.

To install HMI 4.01 Service Pack 5:

1. Insert the HMI CD into the HMI Server or Viewer CD-ROM drive.
2. Close the HMI Setup screen, if it appears.
3. Open Windows Explorer.

4. Expand the drive that contains the HMI 4.01 CD in the Windows Explorer left pane.



5. Select Hmi401sp3.
6. Double-click **`setup.bat`** in the right pane.

Result: Service Pack 3 will update HMI 4.01.

You are now ready to go to CD 2.

CD 2. Designer

The Designer installation can be divided into steps. Each step requires a few tasks.

The steps in the Designer installation are:

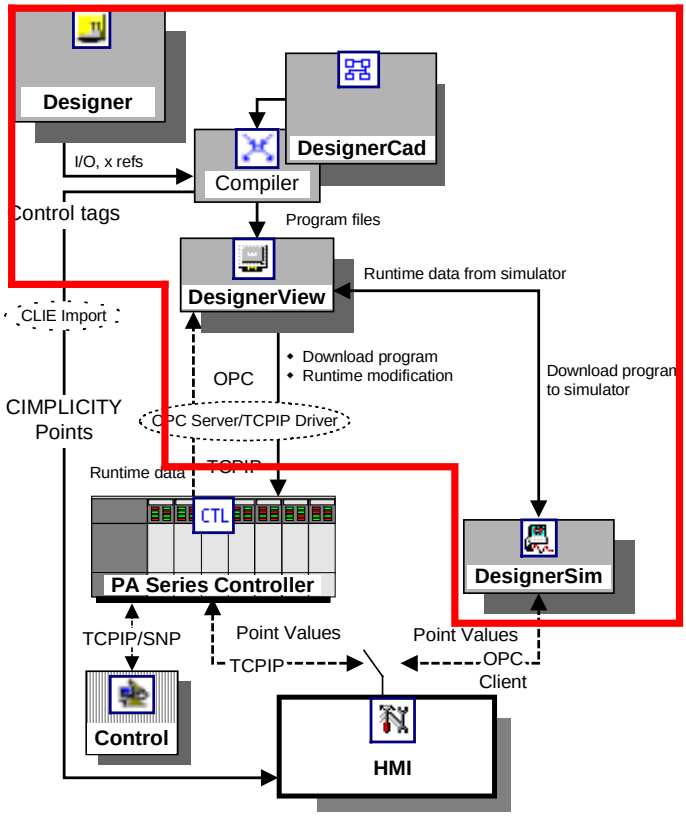
Step 1. Microsoft Data Access 2.1 (required before the Designer core product is installed).

If Microsoft Data Access 2.1 or over is already on your system, this step will be automatically skipped.

Step 2. Designer product.

Step 3. Open Process OPC Server, a communications utility.

CIMPLICITY OpenProcess Architecture

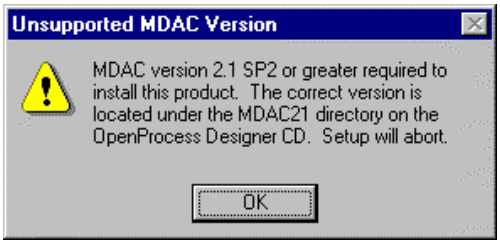


CD 2. Step 1
Microsoft Data Access 2.1

The Designer installation will automatically detect whether or not your system has Microsoft Data Access 2.1 or higher.

If your current system:

- Does have Microsoft Data Access 2.1 or higher, this step of the installation will be skipped.
- Does not have Microsoft Data Access 2.1 or higher, the first time you install ***Designer*** you will be required to install Microsoft Data Access 2.1. If you try to begin the ***Designer*** installation first, an Unsupported MDAC Version message box will display telling you that setup will abort.



The tasks for Microsoft Data Access 2.1 installation include:

Task 1. Begin Microsoft Data Access 2.1 installation.

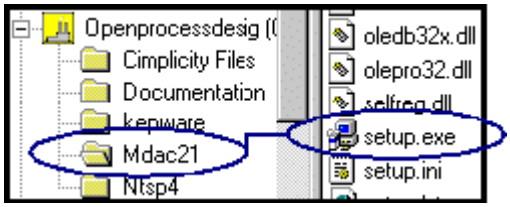
Task 2. Microsoft Data Access 2.1 is installed.

Task 3. Complete Microsoft Data Access 2.1 setup.

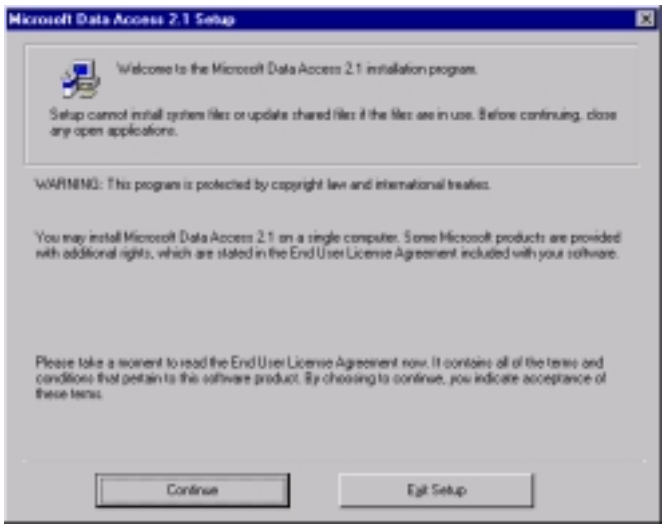
CD 2. *Step1*
Task 1
Begin Microsoft Data Access 2.1 Installation

Note: This task is required only if Microsoft Data Access 2.1 or over is not already installed.

1. Insert the OpenProcess Designer CD in the CD drive.:
2. Open the Mdac21 folder on the OpenProcess Designer CD.
3. Click **`setup.exe`**.



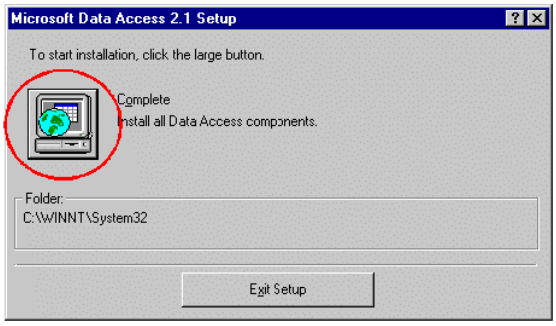
The Microsoft Data Access 2.1 Setup screen appears.



4. Click **Continue**.

   Microsoft Data Access searches for installed components.

The Microsoft Data Access 2.1 Setup screen appears.



5. Either:
   A. Click the **Complete** button to continue installation, or
   B. Click **Exit Setup** to halt installation.

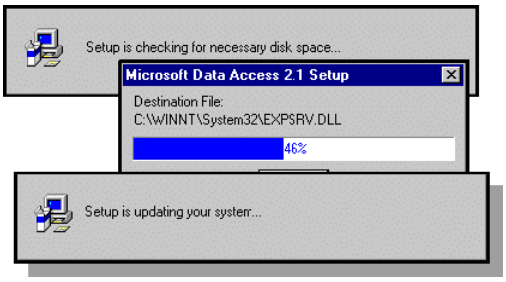
Result: Installation begins when you click the complete button.

Note: Microsoft Data Access 2.1 setup determines the folder into which the components will be installed. You must install these components before you continue with the Designer installation.

CD 2. Step 1
Task 2
Microsoft Data Access 2.1 is Installed

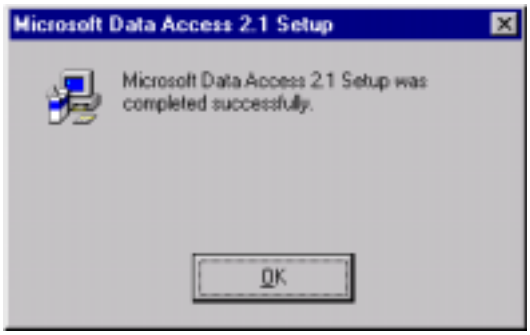
A series of messages appear to inform you of the Microsoft Data Access 2.1 installation progress.

Messages include:



Result: When installation is complete a Microsoft Data Access 2.1 Setup message appears.

CD 2. *Step 1*
Task 3
Complete Microsoft Data Access 2.1 Setup



1. Click **OK**.

   The Windows NT desktop appears.

2. Reboot the computer.

Result: Microsoft Data Access 2.1 is installed.

You can now continue to Step 2 of the Designer installation.

CD 2. Step 2
Designer Product

You follow the Designer installation tasks either:

- Immediately when you begin the ***Designer*** core product installation if Microsoft Data Access 2.1 or over was already on your computer when you began, or
- After you have installed Microsoft Data Access 2.1 and rebooted your computer.

The tasks for the Designer installation include:

Task 1. Begin Designer installation.

Task 2. Choose whether or not to backup replaced files

Task 3. Select the Designer components to install.

Task 4. Start the Designer installation.

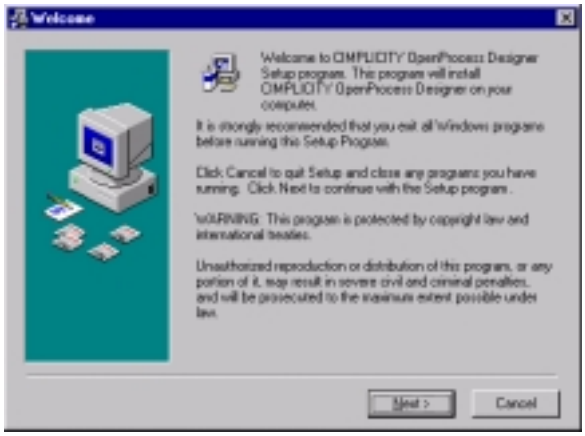
Task 5. Designer is installed.

Task 6. Complete the Designer installation.

CD 2. *Step 2*
Task 1
Begin Designer Installation

1. Insert the Designer CD in the CD drive.

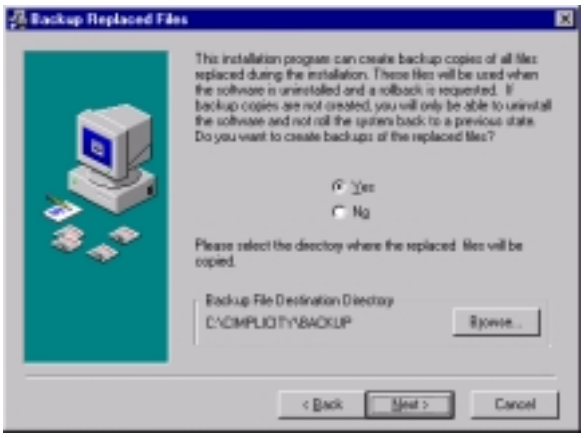
   A familiar Welcome screen appears.



2. Review the Warnings.
3. Click **Next**.

Result: A Backup Replaced Files dialog box appears.

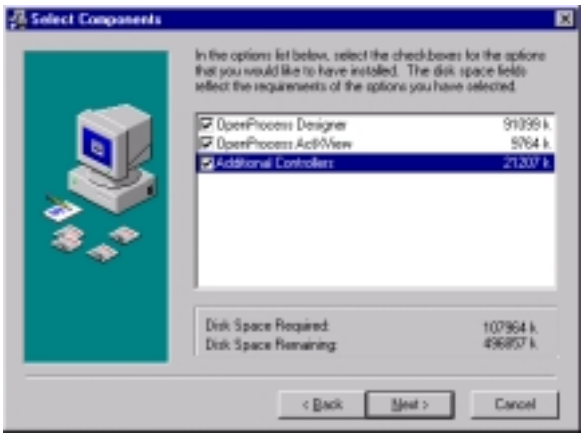
CD 2. *Step 2*
Task 2
Choose whether or not to Backup Replaced Files



1. Either:
   A. Check Yes if you want to create backups of the files that the CIMPLICITY Open Process installation will replace, or
   B. Check No.
2. (If you checked Yes) Specify a Backup File Destination directory.
3. Click **Next**.

Result: The Select Components dialog box appears.

CD 2. *Step 2*
Task 3
Select the Designer Components to Install



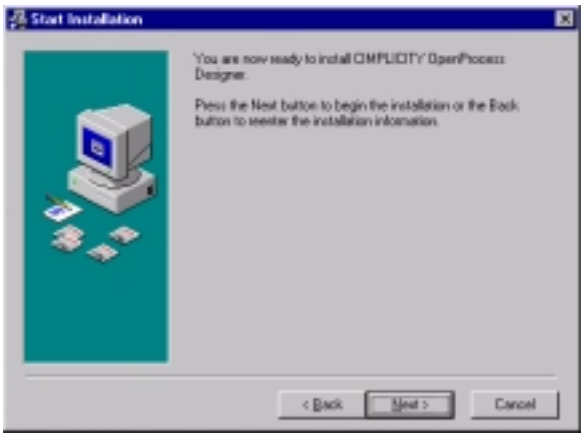
1. Check the options that you need:

Option	Purpose
OpenProcess Designer	Is for Engineering and Operator workstations and Viewer. The OpenProcess Designer includes support for GE controllers.
OpenProcess ActXView	Allows the animation of the logic diagrams with either simulated or live real-time process data in a variety of ActiveX containers.
Additional Controllers	Is necessary if the user wishes to use the Designer with Modicon, Allen Bradley, or Siemens PLCs.

2. Click **Next**.

Result: The Start Installation screen appears.

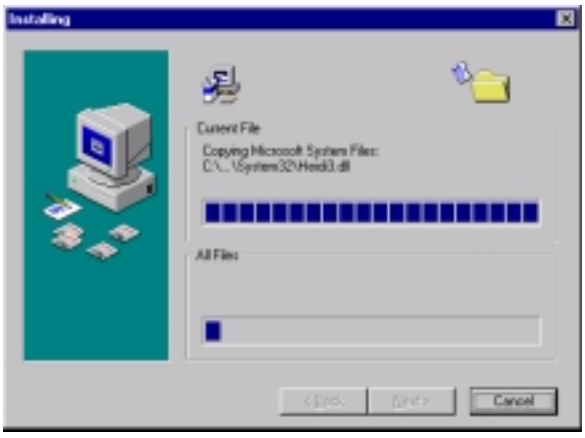
CD 2. *Step 2*
Task 4
Start the Designer Installation



Click **Next**.

Result: An Installing screen appears and provides you with the installation status.

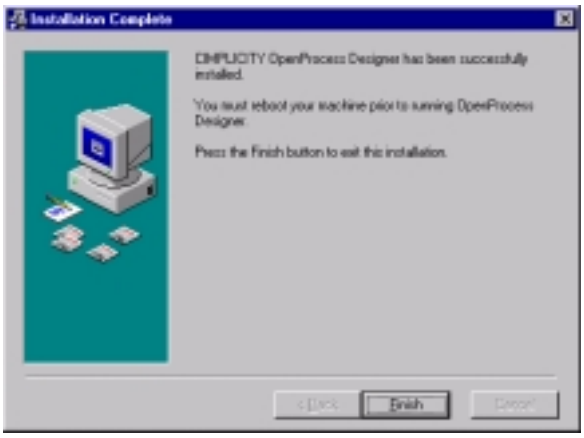
CD 2. *Step 2*
Task 5
Designer Installation



Click **Next** when the installation is complete.

Result: An Installation Complete screen appears.

CD 2. *Step 2*
Task 6
Complete the Designer Installation



Click **Finish** to complete the installation.

Result: The Designer installation begins.

CD 2. Step 3

Designer **OPC Server**

OpenProcess OPC Server is a Designer communications utility. Installation of this utility automatically begins as soon as Designer is installed.

OpenProcess OPC Server installation tasks include:

Task 1. Review the OpenProcess OPC Server Welcome screen.

Task 2. Review the OpenProcess OPC Server licensing terms.

Task 3. Choose the OpenProcess OPC Server destination.

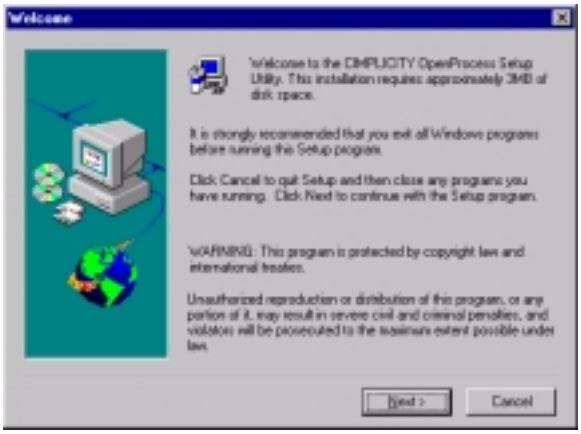
Task 4. Choose the OpenProcess OPC Server program group.

Task 5. Review the OpenProcess OPC Server selected setup.

Task 6. OpenProcess OPC Server is installed.

Task 7. Complete OpenProcess OPC Server installation.

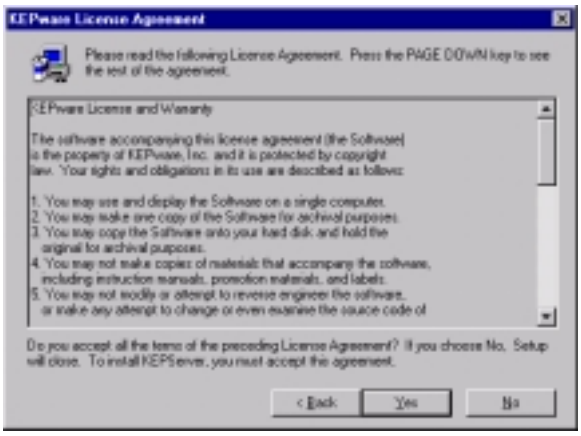
CD 2. Step 3
Task 1
Review the OpenProcess OPC Server Welcome Screen



1. Read the Welcome screen.
2. Click **Next**.

Result: A Software License Agreement screen appears.

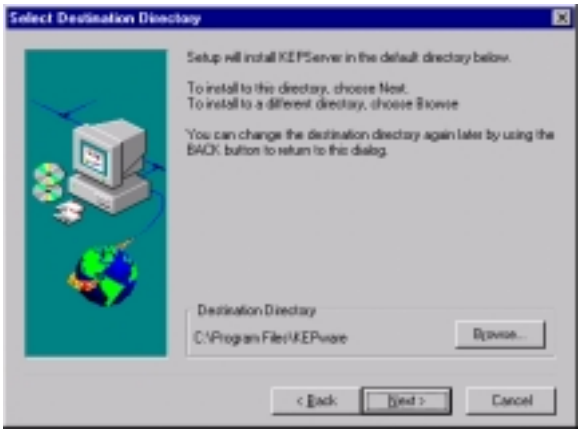
CD 2. *Step 3*
Task 2
Review the OpenProcess OPC Server Licensing Terms



1. Read the license agreement in the Software License Agreement ***screen***.
2. Click **Yes** to agree to the licensing terms.

Result: A Select Destination Directory dialog box appears.

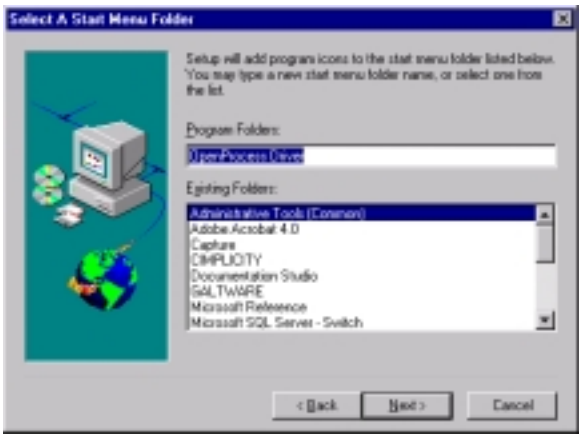
CD 2. *Step 3*
Task 3
Choose the OpenProcess OPC Server Destination



1. If you want to change the Destination directory, click **Browse** to select a new location.
2. Click **Next** when the correct destination displays in the Destination Directory box.

Result: A Select A Start Menu Folder dialog box appears.

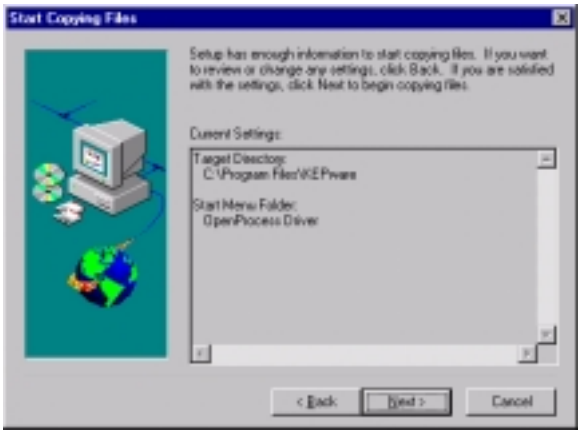
CD 2. *Step 3*
Task 4
Choose the OpenProcess OPC Server Program Group



1. If the default Program Folder name is not what you want, find or enter a name in the Program Folders field.
2. Click **Next** when the name you want appears in the Program Folders field.

Result: the Start Copying Files screen appears.

CD 2. *Step 3*
Task 5
Review OpenProcess OPC Server Selected Setup



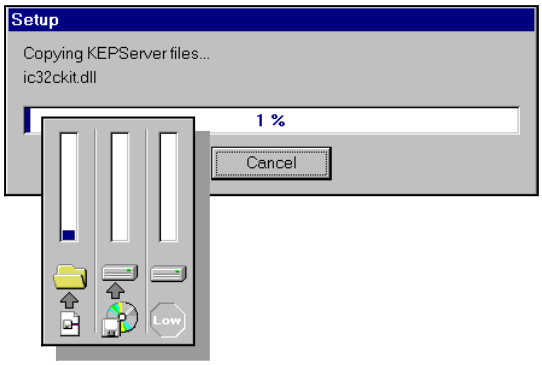
Click **Next** to install OpenProcess OPC Server, or

Click **Back** if you need to change a setting.

Result: OpenProcess OPC Server will begin installation or return to the previous screen, based on your selection.

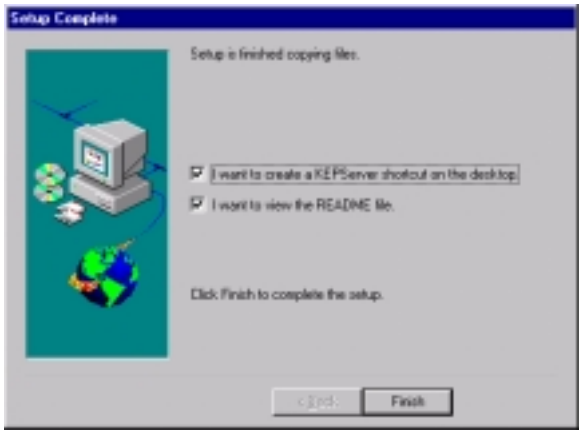
CD 2. *Step 3*
Task 6
OpenProcess OPC Server is Installed

A status message informs you of the OpenProcess OPC Server installation progress.



Result: When installation is complete a OpenProcess OPC Server Setup Complete screen appears.

CD 2. *Step 3*
Task 7
Complete OpenProcess OPC Server Installation



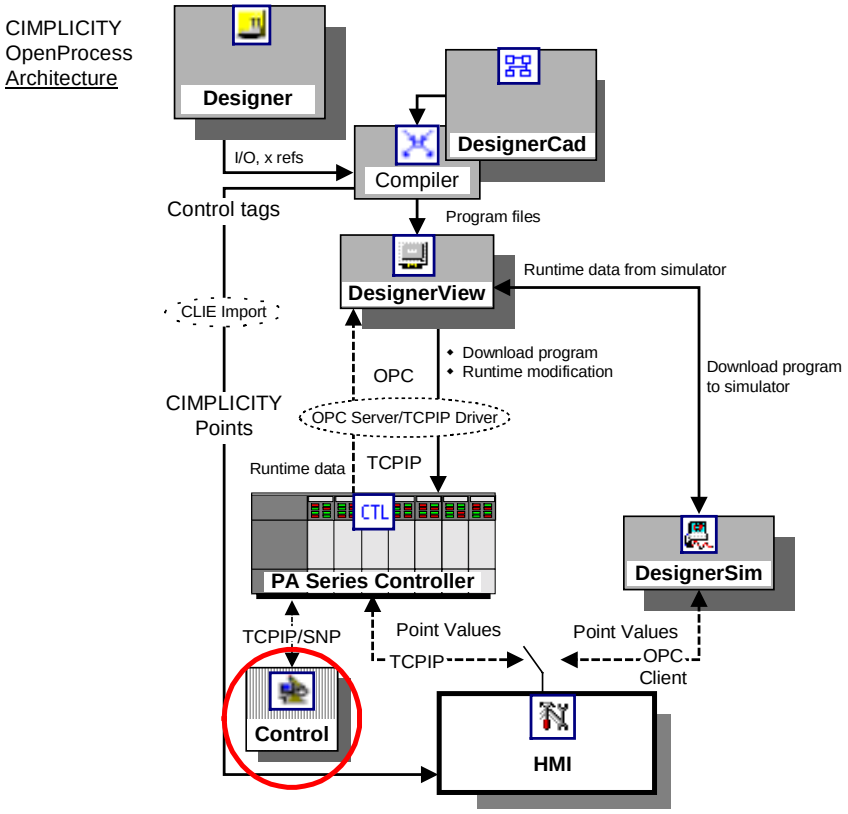
1. Either:
   A. Check Yes, I want to restart my computer now. to make ***HMI*** immediately available for use, or
   B. Check No, I will restart my computer later.
2. Click **OK**.

Result: Setup is complete. You can begin to take full advantage of Designer as soon as the computer reboots and you have registered with GE Fanuc Automation.

CD 3. Control Software

Control provides you with a window into the process automation controller (PA CPU). It allows the user to:

- Configure the PA hardware,
- Download the C-loadables to the PA CPU, or
- Use ladder logic in addition to the Designer capabilities.



Control software installation steps include:

Step 1. Begin Control software installation.

Step 2. Review Control software licensing terms.

Step 3. Choose the Control system product options.

Step 4. Choose the Control destination directory.

Step 5. Control Software is installed.

Step 6. Skip Control software registration.

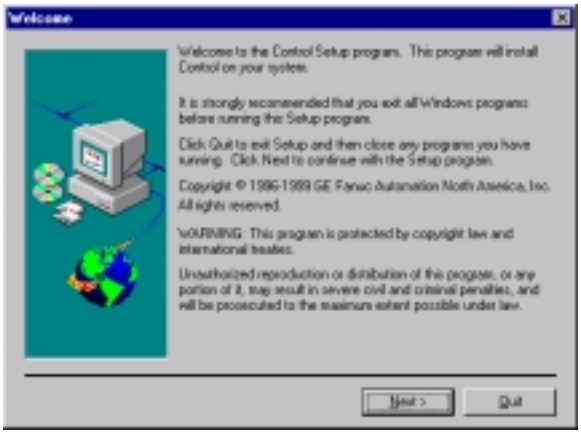
Step 7. Choose to keep or overwrite GEF_CFG.INI.

Step 8. Complete the Control software installation.

CD 3. Step 1
Begin Control Software Installation

1. Insert the CIMPLICITY OpenProcess CD in the CD drive.

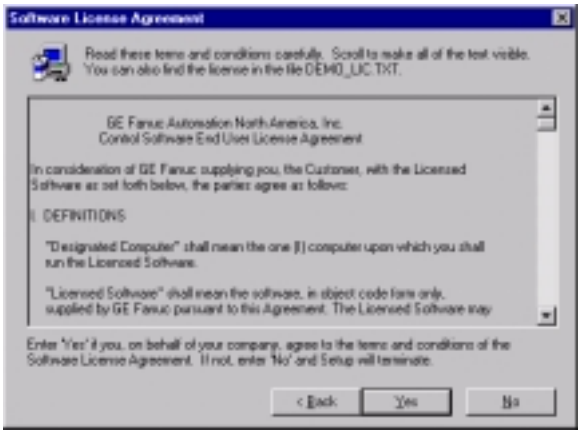
   A familiar Welcome screen appears.



2. Review the Warnings.
3. Click **Next**.

Result: A Software License Agreement screen appears.

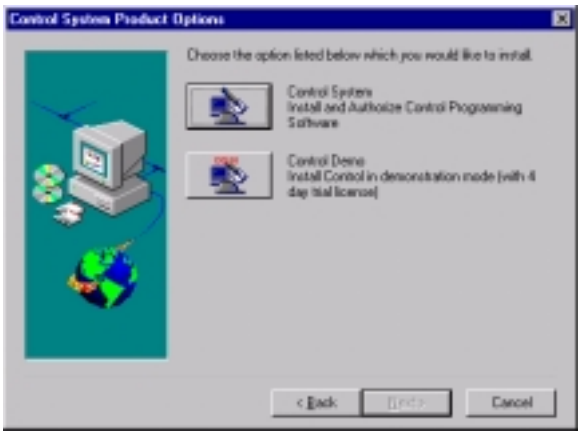
CD 3. Step 2
Review Control Software Licensing Terms



1. Read the license agreement in the Software License Agreement screen.
2. Click **Yes** to agree to the licensing terms.

Result: A Control System Product Options screen appears.

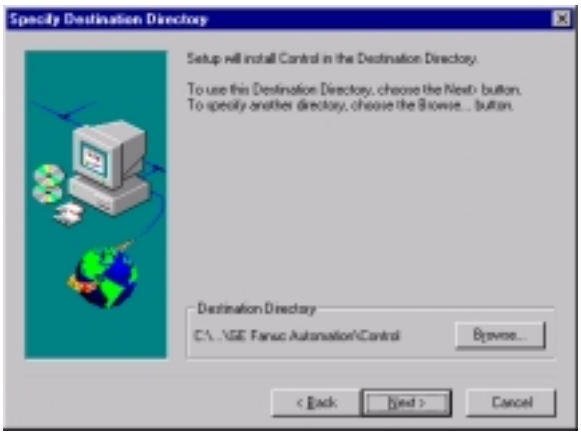
CD 3. Step 3
Choose the Control System Product Options



Click the **Control System** button to install the Control Programming software.

Result: The Specify Destination Directory screen appears.

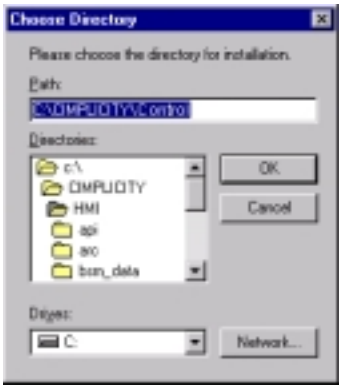
CD 3. Step 4
Choose the Control Destination Directory



1. If the destination directory should be different from the default that appears in the Destination Directory box, e.g., **`C:\…\GE C:\…\GE Fanuc Automation\Control`**:

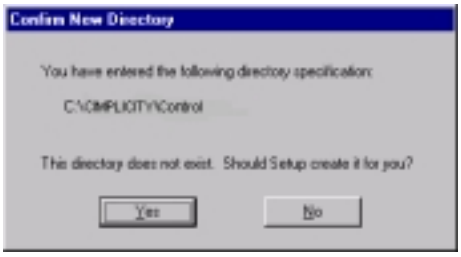
   A. Click **Browse**.

B. Select a new directory in the Choose Directory dialog box, e.g., **`C:\CIMPLICITY \Control`**.



C. Click **OK**.

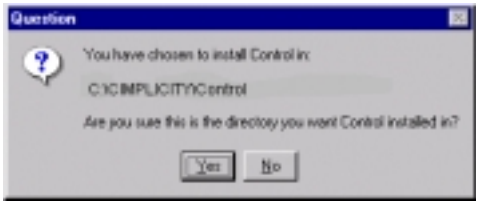
If the directory does not exist, a Confirm New Directory message box appears.



D. Click **Yes**.

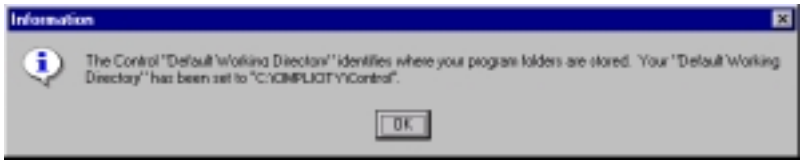
2. Click **Next** when the correct destination displays in the Destination Directory box.

   A Question message appears asking you if you are sure you want to install Control in the selected directory.



3. Click **Yes**.

An Information message appears telling you the directory has been set as your "Default Working Directory."



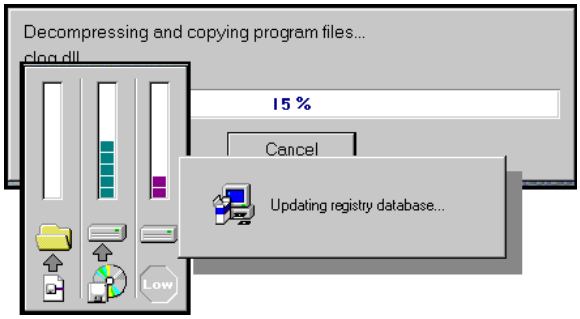
4. Click **OK**.

Result: Installation begins.

CD 3. Step 5
Control Software is Installed

A series of messages appear to inform you of the installation progress.

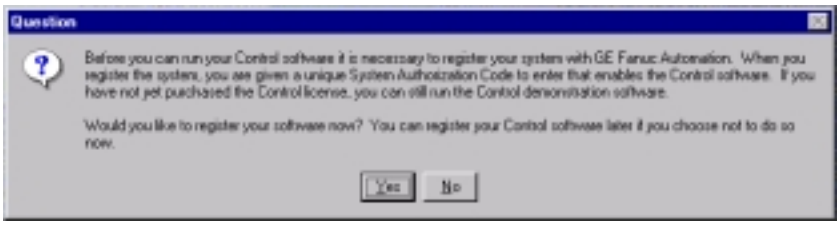
Messages include:



Result: A Question message appears, asking you if you want to register the Control software during installation.

CD 3. Step 6
Skip Control Software Registration

Note: You can register after you complete the installation, if you want to.



Either:

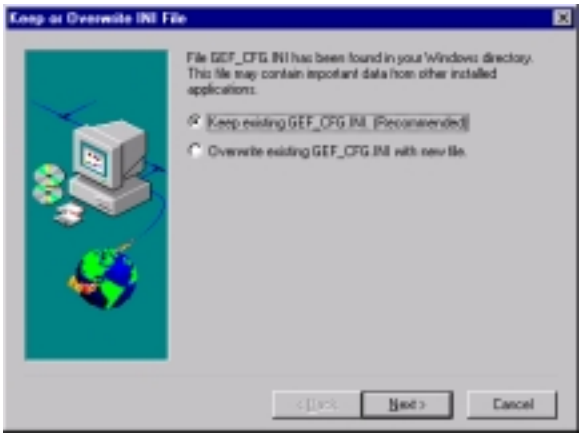
1. Click **Yes** to register during installation.

Or

2. Click **No** to register later.

Result: When you have completed registration or if you click No, a Keep or Overwrite INI File dialog box appears if a GEF_CFG.INI file is found on your computer.

CD 3. Step 7
Choose to Keep or Overwrite GEF_CFG.INI



1. Either:
   A. Check Keep existing GEF_CFG.INI (recommended).

      If you check this options the file you choose not to install will be stored as GEF_CFG.SMP.

   Or

   B. Check Overwrite existing GEF_CFG.INI.

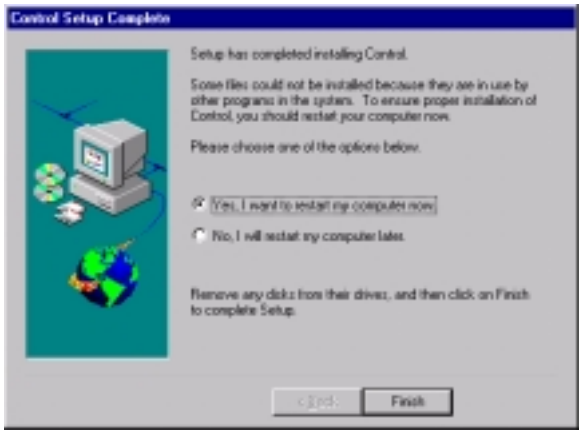
2. Click **Next**.

   An Information message box appears informing you of how the Control installation handles the GEF_CFG.INI as a result of your selection.

3. Click **OK**.

Result: A Setup Complete screen appears.

CD 3. Step 8
Complete the Control Software Installation



1. Either:
   A. Check Yes, I want to restart my computer now. to make HMI immediately available for use, or
   B. Check No, I will restart my computer later.
2. Click **Finish**.

Result: Setup is complete. You can begin to take full advantage of Control as soon as the computer reboots and you have registered with GE Fanuc Automation.

Installation Check List

Following is a checklist to help you keep track of what you installed. The checklist follows the required installation order.

CD	Step	Component	Done
1	1	HMI 4.01	
	2	HMI 4.01 SP 5	
2	1	Microsoft Data Access 2.1 (when needed)	
	2	CIMPLICITY OpenProcess Designer Core Product	
	3	CIMPLICITY OpenProcess OPC Server	
3		Control Software	

Registering the CIMPLICITY OpenProcess System

About CIMPLICITY OpenProcess System Registration

You can register the CIMPLICITY OpenProcess system with one telephone call to GE Fanuc Automation customer service.

The telephone number is: **(518) 464-4619**

You will receive registration numbers for three components of the CIMPLICITY OpenProcess system.

- Control.
- CIMPLICITY OpenProcess Designer.
- HMI

The serial number required to register Control is located on the back of the Control CD.

An envelope that is included in the CIMPLICITY OpenProcess package includes serial numbers needed for HMI and CIMPLICITY OpenProcess Designer registration.

Have these numbers ready when you begin registration.

CIMPLICITY OpenProcess System Pre-Registration

Your GE Fanuc Automation representative will ask you for information about the three components in your CIMPLICITY OpenProcess system that you will register.

And efficient way to prepare the information includes:

Step 1. Enter initial registration information for Control.

Step 2. Enter initial registration information for CIMPLICITY Open Process Designer.

Step 3. Enter initial registration information for HMI.

Step 1. Prepare for Control Registration

Tasks to prepare for Control registration include:

Task 1. Begin the Control Setup program.

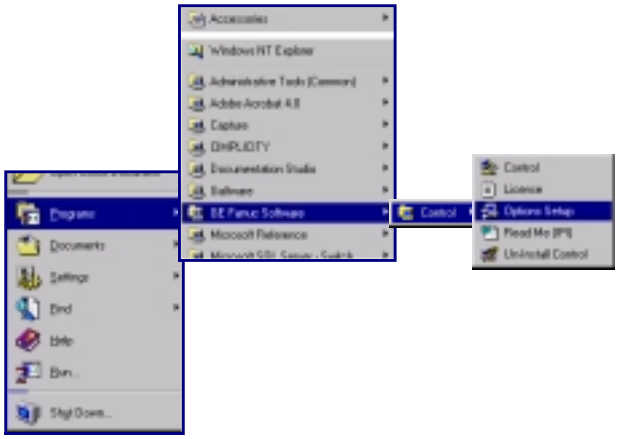
Task 2. Review the Control Setup Welcome screen.

Task 3. Review the Control Software License agreement.

Task 4. Enter User information.

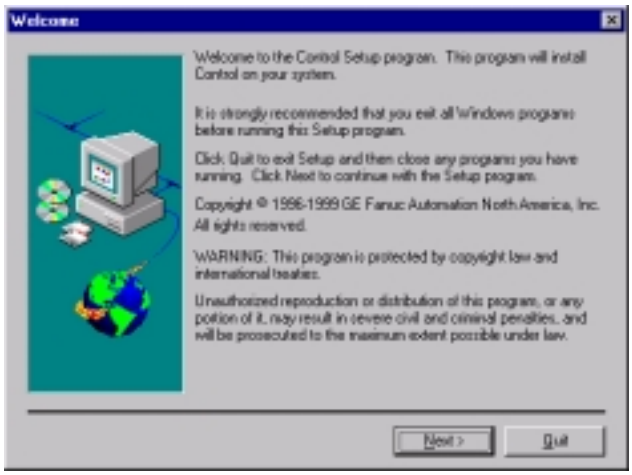
Step 1. Task 1
Begin the Control Setup program.

1. Click **Start** on the Windows task bar.
2. Select Programs on the Start menu.
3. Select GE Fanuc Software on the extended menu.
4. Select Control on the next extended menu.
5. Select Options Setup on the next extended menu.



Result: The Control Setup program Welcome screen appears.

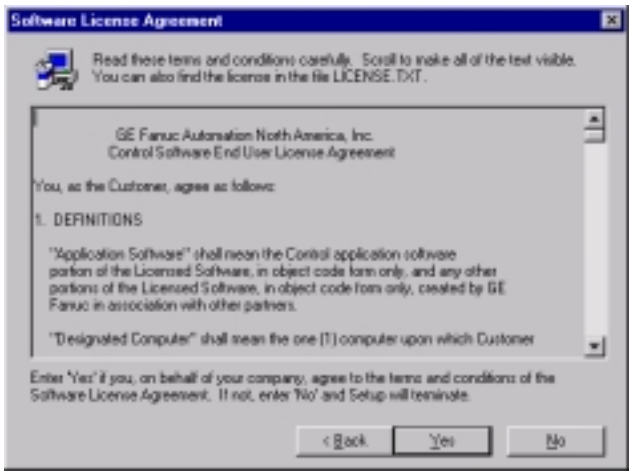
Step 1. Task 2
Review the Control Setup Welcome Screen



1. Read the Welcome screen.
2. Click **Next**.

Result: A Software License Agreement screen appears.

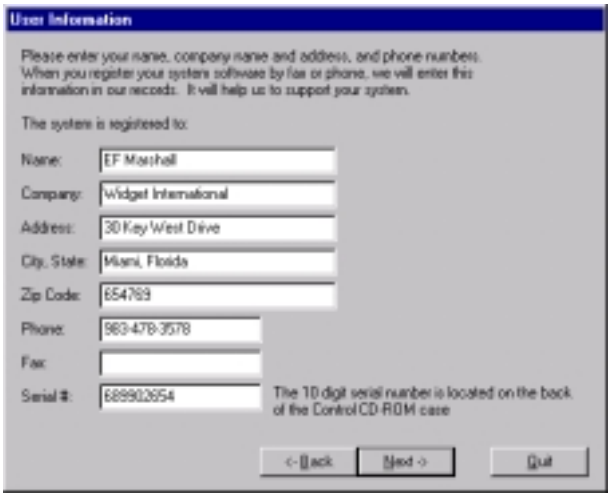
Step 1. Task 3
Review the Control Software License Agreement



1. Read the license agreement in the Software License Agreement screen.
2. Click **Yes** to agree to the licensing terms.

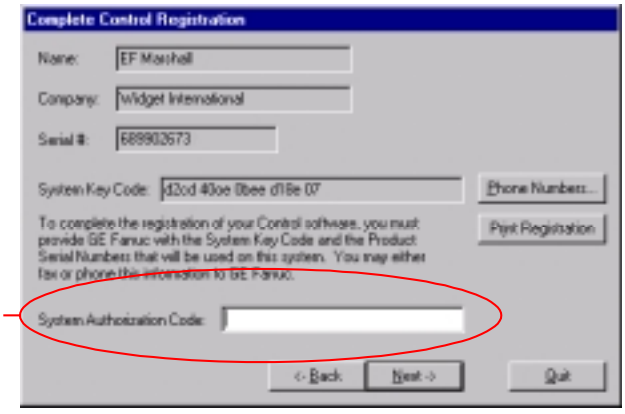
Result: A User Information dialog box appears.

Step 1. Task 4
Enter User Information



1. Enter the user information that you will give to your GE Fanuc Automation representative including your: Registration: Enter user information for Control"
   - Company's GE Fanuc contact (first and last name).
   - Company name
   - Company location
   - Company telephone.
2. Enter the 10 digit serial number that is located on the back of the Control CD-ROM case.
3. Click **Next**.

Result: When the serial number you enter is correct a Complete Control Registration dialog box appears displaying the System Key Code which you will give to your GE Fanuc Automation representative.



Enter the code System Authorization code supplied by your GE Fanuc Representative

Result: Control is ready for registration.

Step 2. Prepare for Designer Registration

The tasks to prepare for Designer registration include:

Task 1. Open the OpenProcess Designer window.

Task 2. Fill in the Product Registration dialog box.

Step 2. Task 1
Open the OpenProcess Designer Window

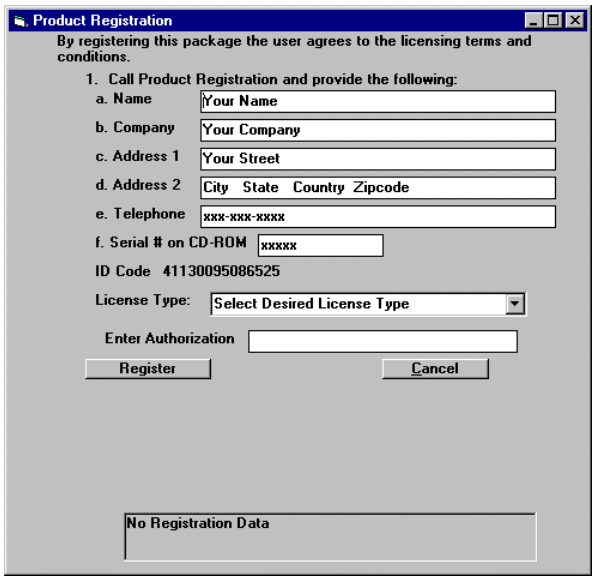
1. Click **Start** on the Windows task bar.
2. Select Programs.
3. Select CIMPLICITY.
4. Select OpenProcess.
5. Select Designer.

   A Designer message appears directing you to the registration form.

5. Click **OK**.
9. Click Help on the Designer menu bar.
8. Select Register.

Result: The Product Registration dialog box opens.

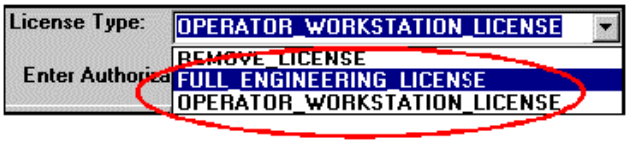
Step 2. Task 2
Fill in the Product Registration Dialog Box



1. Enter the user information that you will give to your GE Fanuc Automation representative including your:
   - Company's GE Fanuc contact (first and last name).
   - Company name
   - Company location
   - Company telephone.
2. Enter the serial number for CIMPLICITY OpenProcess in the Serial # on CD-ROM field.

   You can find the serial number in the CIMPLICITY OpenProcess registration envelope that is included in the CIMPLICITY OpenProcess system package.
3. Select for the desired license type either:

License Type	For an
FULL_ENGINEERING_LICENSE	Engineering workstation
OPERATOR_WORKSTATION_LICENSE	Operator workstation or Viewer



See "Reviewing OpenProcess Components" in the "Introducing CIMPLICITY OpenProcess" chapter for the product components available with each license.

Your GE Fanuc Automation representative will need to know the license type.

Result: CIMPLICITY OpenProcess Designer is ready for registration.

Note: The ID Code changes when you close and then reopen Product Registration dialog box. Therefore, when you call your GE Fanuc Automation representative, you will give him or her the ID Code that displays while you are on the telephone.

Step 3. Prepare for HMI Registration

The tasks to prepare for HMI registration include:

Task 1. Open HMI Registration: instructions.

Task 2. Agree to the HMI Licensing terms.

Task 3. Enter user information.

Task 4. Enter Your Base System serial number.

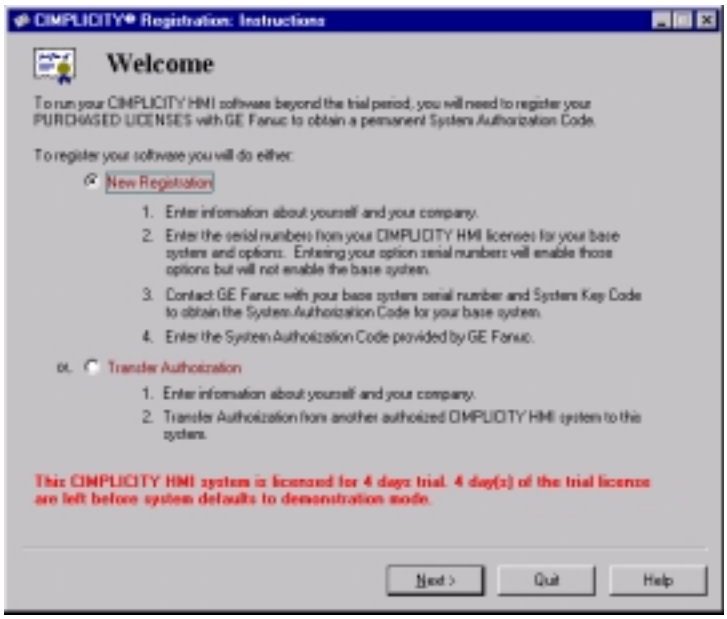
Task 5. View a Generated system key code.

Step 3. Task 1
Open HMI Registration: Instructions

To open HMI registration:

1. Select CIMPLICITY on the Windows Start menu.
2. Select HMI.
3. Select Registration.

The CIMPLICITY® Registration Instructions dialog box opens.



4. Click New Registration.
5. Click **Next** to continue with registration.

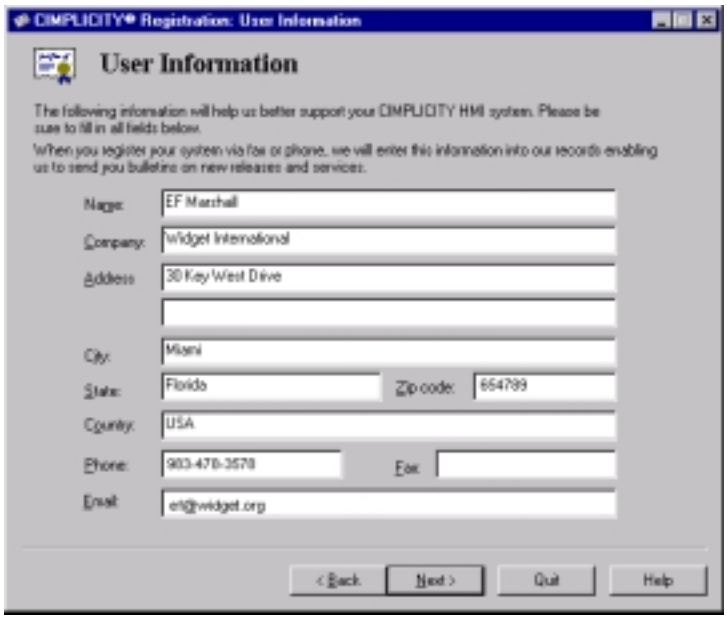
Result: The Registration License Agreement dialog box appears.

Step 3. Task 2
Agree to the HMI Licensing Terms

1. Read the license agreement in CIMPLICITY® Registration: License Agreement dialog box.
2. Click **Yes**.

Result: A CIMPLICITY® Registration: User Information dialog box opens.

Step 3. Task 3
Enter User Information



1. Enter company contact name, company name, address, telephone number, fax number and email address.

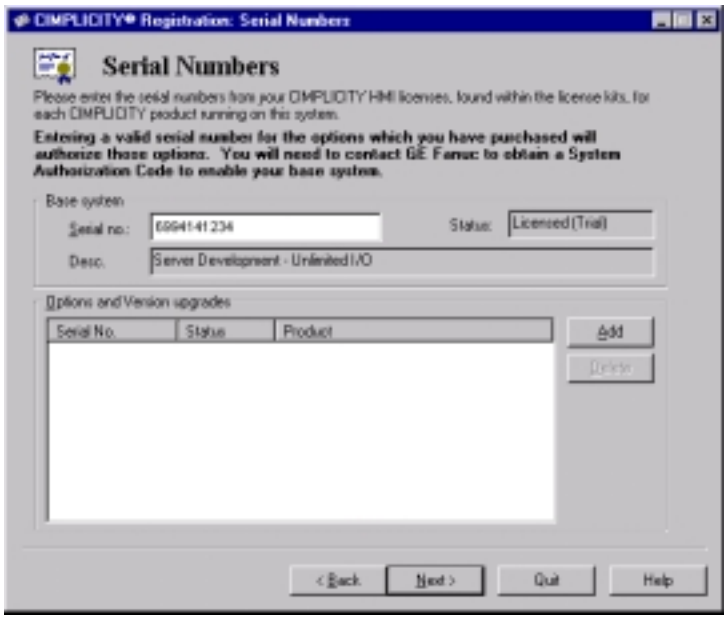
   When you request your System Authorization Code you will need to furnish your GE Fanuc Automation representative with the information that you enter.

   Note: The license is issued to a company, not to an individual.

2. Click **Next**.

Result: The CIMPLICITY® Registration: Serial Numbers dialog box appears.

Step 3. Task 4
Enter Your Base System Serial Number



1. Enter the serial number for your base system in the Serial no. field.

   You can find the serial number in the CIMPLICITY OpenProcess registration envelope that is included in the CIMPLICITY OpenProcess system package.

2. Enter the serial numbers for your **HMI** options and version upgrades.

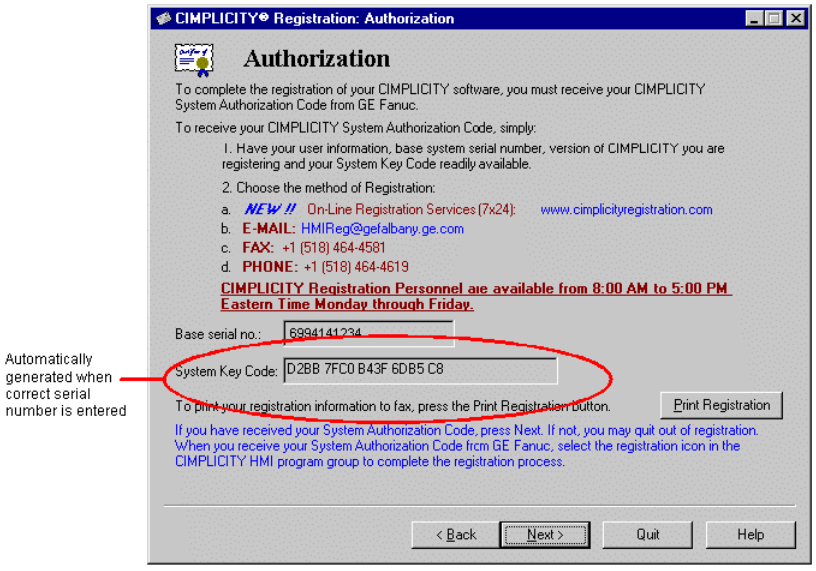
   These serial numbers are also in the CIMPLICITY OpenProcess registration envelope.

3. Click **Next**.

Result: The CIMPLICITY® Registration: Authorization dialog box opens.

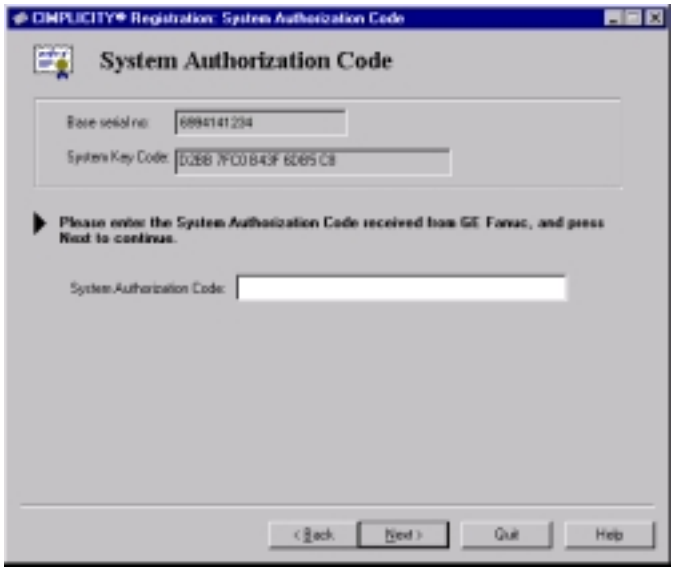
Step 3. Task 5
View a Generated System Key Code

When a correct base serial number is entered **HMI** registration generates a system key code. You will supply the GE Fanuc Automation representative with this code.



Click **Next**.

Result: The CIMPLICITY® Registration: System Authorization Code dialog box opens.



Result: HMI is ready for registration.

CIMPLICITY OpenProcess System Registration

When you are ready to register the CIMPLICITY OpenProcess system you can call your GE Fanuc Automation representative at:

518-464-4619

A representative is available between 8 A.M. and 5 P.M. Eastern time, Monday through Friday, except for regularly scheduled holidays.

Calls received after hours, on weekends, or holidays are processed as soon as possible on the following business day.

In summary, you will provide the following information

For all products	Name of the individual who is the company contact.
	Company Name.
	Company address.
	Company telephone and fax numbers.
	Email address of the company contact.
Control	System Key Code
OpenProcess Designer	ID Code that appears in the Product Registration dialog box when you are on the telephone with your GE Fanuc Automation representative.
HMI	Serial number(s) found in the CIMPLICITY OpenProcess Registration envelope.
	System Key Code generated during the registration procedure.
	Version number (***HMI*** 4.01, Service Pack 3).

When you speak with your GE Fanuc Automation representative you will be asked for registration information in the following order:

Step 1. User information

Your company's GE Fanuc contact (first and last name).

Company Name.

Company address.

Company telephone and fax numbers.

GE Fanuc contact email address.

Step 2. Control

Serial number found on the back of the Control CD-ROM case.

System Key Code.

Version number.

Step 3. CIMPLICITY OpenProcess Designer.

ID Code.

License Type.

Version number.

Step 4. HMI

Serial number(s) found in the CIMPLICITY OpenProcess Registration envelope.

System Key Code generated during the registration procedure.

Version number (HMI 4.01, Service Pack 3).

As soon as HMI is registered, you will reboot your computer. Congratulations, you will have the power of the CIMPLICITY OpenProcess system ready to be configured to your specifications.

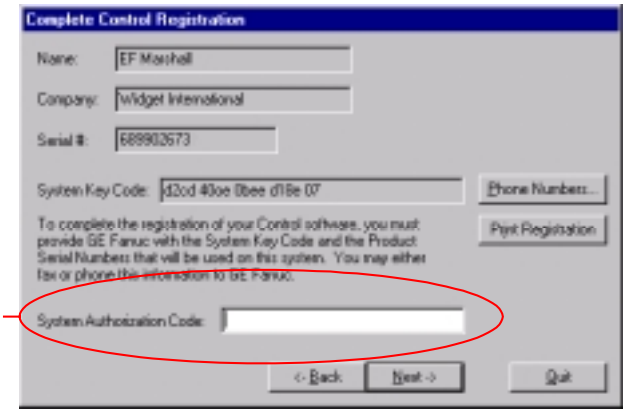
Step 1. Provide User Information

The first thing you will be asked for when you call your GE Fanuc Automation representative is the CIMPLICITY OpenProcess system user information. This information includes your company's:

- GE Fanuc contact (first and last name).
- Name.
- Address.
- Telephone and fax numbers.
- GE Fanuc contact email address.

Step 2. Register Control

1. Display the Complete Control Registration dialog box.



Enter the System Authorization code supplied by your GE Fanuc representative

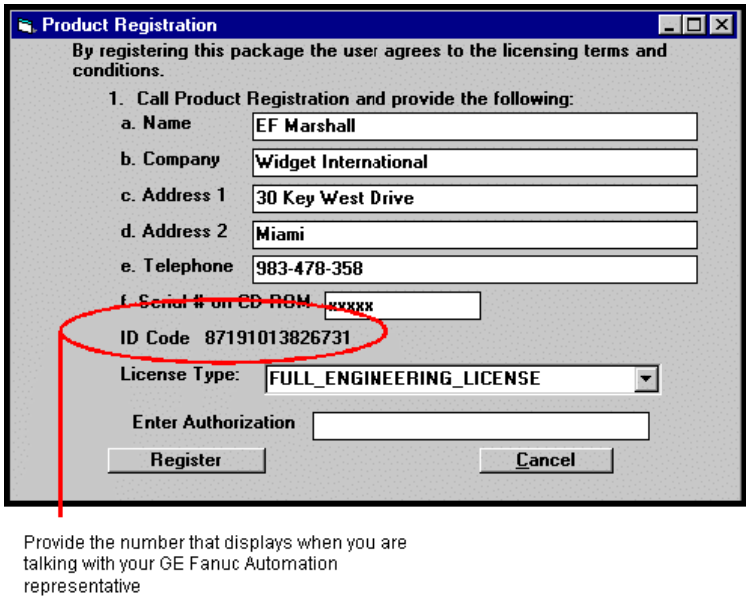
2. Enter the System Authorization code supplied to you by your GE Fanuc representative.
3. Click Next.

Result: You are now ready to register Designer.

Step 3. Register Designer

Designer provides you with one registration screen.

1. Display Designer's Product Registration dialog box.

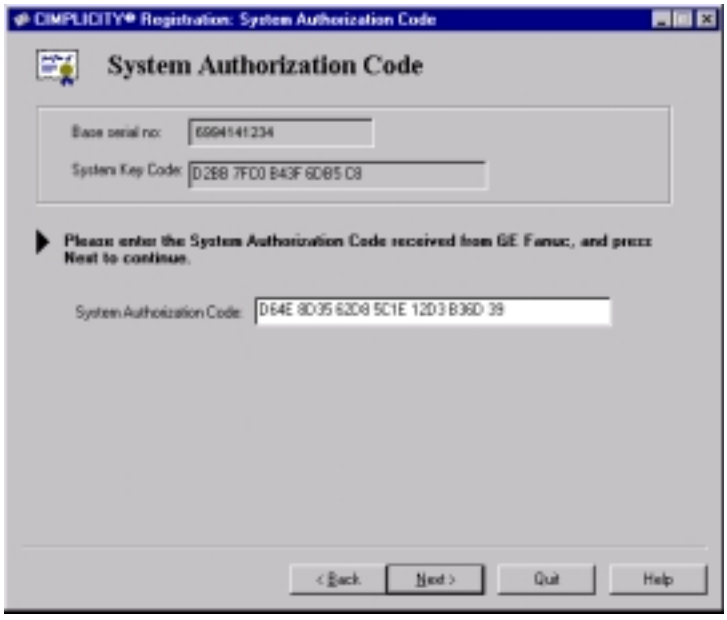


2. Provide your GE Fanuc Automation representative with the:
   - Serial number.
   - ID Code that appears in the dialog box.
   - License type.
3. Enter code you receive in the Enter Authorization field.
4. Click **Register**.

Result: CIMPLICITY OpenProcess Designer is registered. When you complete registering the entire CIMPLICITY OpenProcess system, you will need to re-boot to have full access to the Base System and all options you installed and registered.

Step 4. Register HMI

Based on the information you provide your GE Fanuc Automation representative you will be given a System Authorization Code.



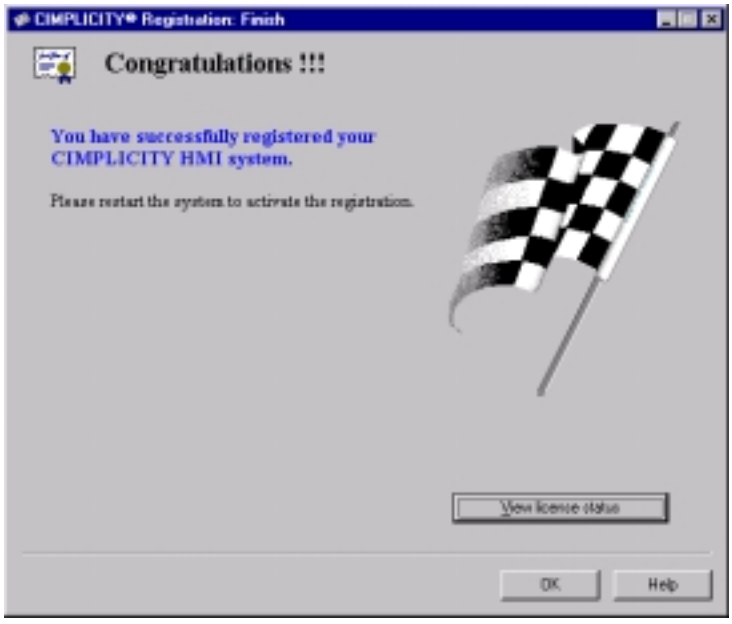
1. Enter the code that is supplied by your GE Fanuc Automation representative in the System Authorization Code field.
2. Click **Next**.

   Result: The CIMPLICITY® Registration: Finish screen appears.

   You need to reboot your computer.

   As soon as you reboot,

   - If you registered the entire CIMPLICITY OpenProcess system, you will be able to start configuring it immediately.
   - If you registered HMI alone, you will be able to take advantage of the many features it offers. You will still have to register Control and the OpenProcess Designer to take full advantage of its functionality.


CIMPLICITY® Registration: Finish
Congratulations !!!
You have successfully registered your CIMPLICITY HMI system.
Please restart the system to activate the registration.
View license status
OK
Help

Planning for Control Configuration

Planning for Control Configuration Overview

It is recommended that before configuring the OpenProcess project you lay out a control strategy.

Recommended *basic* steps to lay out a control strategy include:

Step 1. Use a PI&D diagram as the definition of your process you begin to develop your control configuration. Develop a Piping and Instrumentation Diagram (PI&D) and a Process Flow diagram.

The ***PI&D*** is a pictorial representation of the process to be controlled and all the instrumentation in the process that can be used to control it.

The ***Process Flow*** diagram defines the process to be controlled.

Step 2. Formulate a list of all the instruments included in the process.

Step 3. Formulate a list of all the control loops required to control the process

Step 4. Strategize the organization of the control logic in OpenProcess.

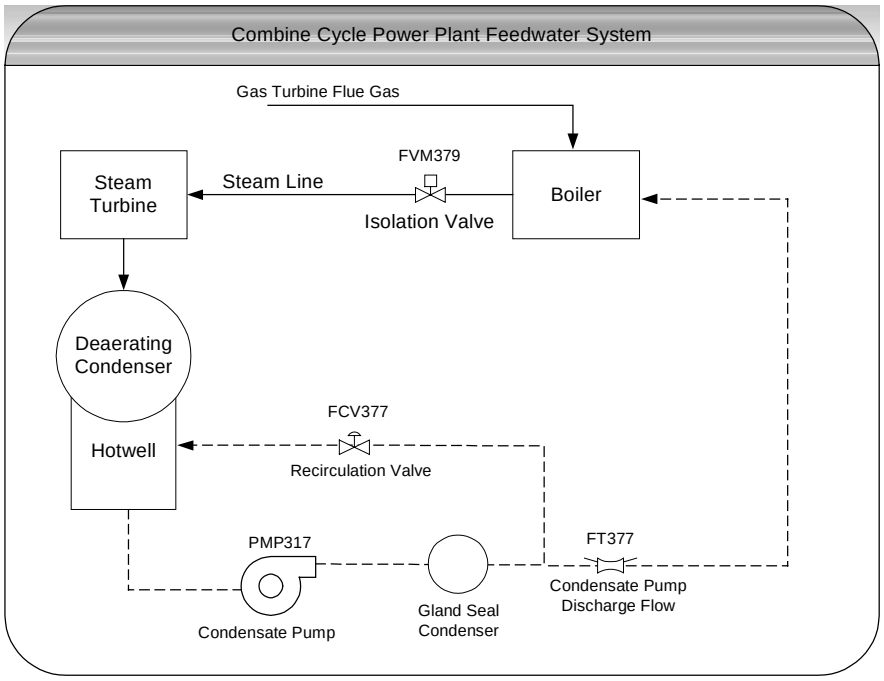
The following sections give a simple overview of each of the above steps.

Note: Examples in this manual for planning and configuring an OpenProcess project use a simple Combine Cycle Power Plant Feedwater System to clearly illustrate each step for developing a project.

Step 1. Develop a PI&D and Process Flow Diagram

The development of a control system begins typically with a Piping and Instrumentation Diagram (PI&D) and a Process Flow Diagram. The PI&D is a pictorial representation of the process to be controlled and all the instrumentation in the process that can be used to control it. The Process Flow Diagram shows the process equipment and the operating conditions of the process.

Example. Feedwater System PI&D



Note: These steps are basic to provide you with a starting point. Your system may require more planning steps than are described in this chapter.

Step 2. Formulate a List of all the Instruments Included in the Process

The instrument index defines all the physical I/O in OpenProcess. The instrument index is formulated from the PI&D and includes I/O for indication and control.

The minimum information necessary to define an instrument point in OpenProcess is:

- Tag Name
- Description
- Minimum Engineering Units
- Maximum Engineering Units
- Engineering Units
- Physical Signal Type
- Physical Signal Minimum Value
- Physical Signal Maximum Value

You can either:

- Formulate the instrument index in a spreadsheet application such as Excel and import it into the OpenProcess Designer or
- Construct the instrument index in OpenProcess using the Instrument Tag dialog box.

Example. Feedwater System Instrument List

An example of an instrument list for a simple feedwater system is:

Case Study Project Instrument List

Tag Name	Description	Eng. Min - Max	Eng. Units	Signal Type	Signal Min – Max
FT377	Condensate Pump Discharge Flow	0 - 100	KPPH	MA	4 - 20
FY377	Condensate Recirculation Valve Command	0 - 100	PCT	MAO	4 - 20
ZIR317	Condensate Pump Running	OFF - ON	NONE	DI	115
ZYR317	Condensate Pump Start Command	STOP - START	NONE	DO	115
ZYO397	Steam Isolation Valve Open Command	Close - Open	NONE	DO	115
PT177	Boiler Drum Pressure	0 - 120	PSIG	MA	4 - 20

Step 3. Formulate a list of all Control Loops Required to Control the Process

The PI&D is typically a comprehensive pictorial illustration of the process. The PI&D can be partitioned into individual loops, thus formulating a control loop diagram.

A control loop consists of three connected parts. The parts are:

- Measured variable(s) (e.g. pressure, temperature, and flow rates),
- A control action and
- Manipulated variable(s) (e.g. pumps, valve positions)

The measured variable(s), control action and manipulated variable(s) are connected together to achieve a control objective such as maintaining the level in a tank at a certain setpoint.

It is critical to break up the process into individual loops for subsequent organization of the control logic in OpenProcess.

Example. Feedwater System List of Control Loops

The Control Loop list includes:

Loop FIC377–Condensate Pump Minimum Flow Control

The condensate pump minimum flow control keeps the flow of condensate through the pump from falling below a certain setpoint.

If the flow through the pump falls below a certain setpoint the re-circulation valve (FCV377) is opened to re-circulate flow back to the condenser hotwell.

Loop FIC377 requires the

- Input from the flow transmitter (FT377) and
- Outputs a control signal (FY377) to the re-circulation valve.

Loop ZIC317–Condensate Pump Control

The condensate pump control interfaces with the MCC to control the condensate pump.

Loop ZIC317 requires:

- Input (ZIR317) from the MCC indicating whether the pump is on or off and
- A command to the MCC to turn the pump on (ZYR317).

Loop ZIC397 - Steam Line Loading

The loading of the steam line requires the logic to open the isolation valve. This requires a simple sequence that will open the valve after a command to start the plant is received and the boiler drum pressure (PT177) is above a certain setpoint.

Loop ZIC397 requires a command signal (ZYO397) to open the valve.

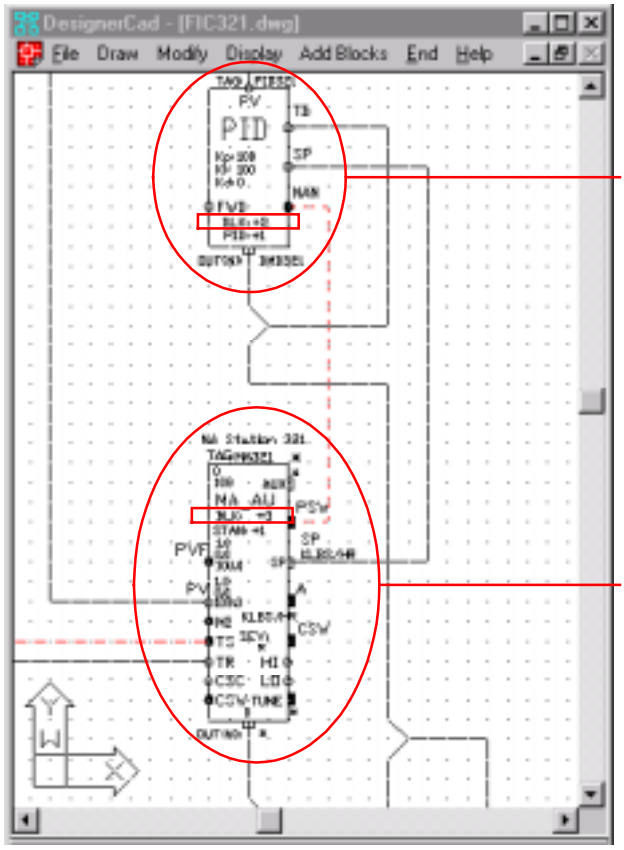
Step 4. Strategize the Organization of the Control Logic in OpenProcess

It is important to formulate the organization of the control logic, to some degree, in the initial phase of the project. This will minimize the effect of making changes during the course of the project implementation.

A control strategy is realized in OpenProcess by connecting function blocks together in DesignerCad to form drawings. Each block in a drawing is numbered. The block number dictates the order in which the block is executed; e.g., Block 1 is executed first, Block 2 second, Block 3 is third.

Note: Typically, the method for organizing control logic in OpenProcess is to create one OpenProcess drawing for each control loop enumerated in Step 3.

DesignerCad Drawing Example



Drawings are organized into Program Files. The amount of blocks used in a set of drawings that comprise a Program File must not exceed 100 blocks. Therefore, a Program File can contain five drawings with 20 blocks per drawing or 1 drawing with 100 blocks.

For each PA series controller the number of Program Files possible is thirty, which translates into a maximum of 3000 blocks.

Tip: Put buffers between drawings.

For example, if a Program File contains two drawings and the first drawing has 17 blocks then the second drawing should start with a block number that includes a buffer like 25. This allows modifications to be inserted into the first drawing without affecting the block numbering in the second drawing.

Take these guidelines into account when you organize your control logic into drawings and Program Files. The process on how to organize control logic will be exemplified by the following example.

Example. Feedwater System Organizational Strategy for the Control Logic

The best method to organize the control logic is to create a drawing for each loop in the Control Loop List. The drawings should then be grouped into Program Files. For this case study the grouping is simple and shown below.

Program File 2

- Loop FIC377
- Loop ZIC317

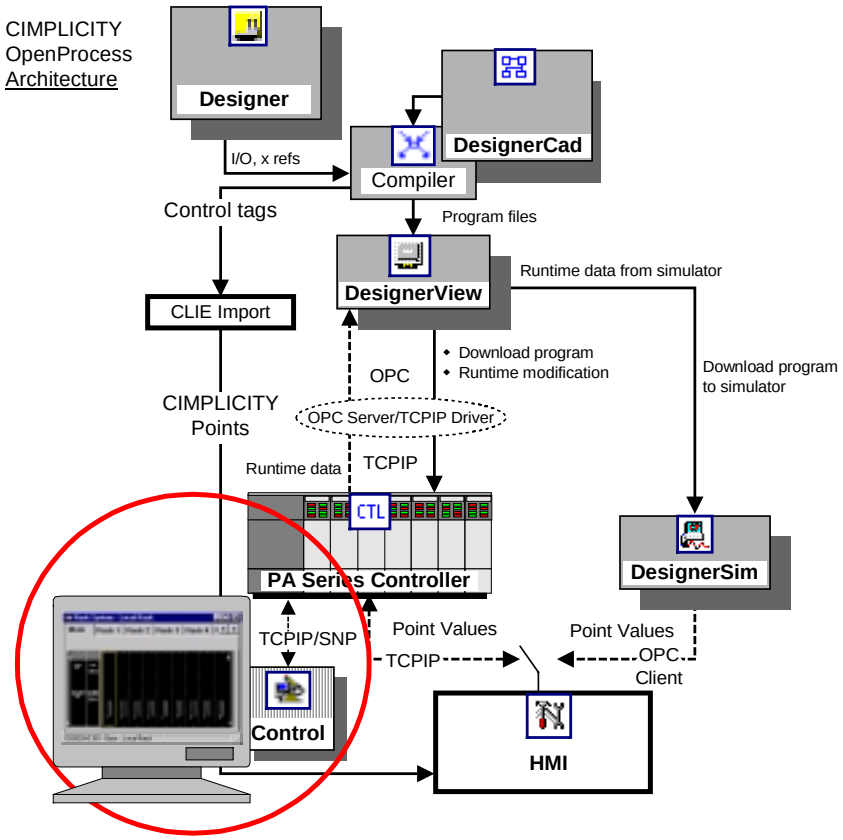
Program File 3

- Loop ZIC397

Setting up the PA 30, 70 and 70H Controllers

Basic Control Overview

The OpenProcess environment includes the Control Workbench in which you can easily set up the PA 30, PA 70 or PA 70H controller.



In the context of OpenProcess the Control Workbench is only used to:

- Configure PA Series Controller Hardware.
- Store the OpenProcess C Loadable to the Controller CPU.

After the PA Controller is initialized or setup all control system configuration is completed in the OpenProcess Designer.

Optionally, in addition to initializing the PA controller for use with OpenProcess the user may elect to use the Control Workbench to configure ladder logic.

Selecting the Controller

The number of loops in a process and the speed of execution in which the loops must be executed determine the required performance of the controller.

Controller	Is Ideal for Applications With Up to:
PA 30 series	100 control loops. The PA 30 executes a control loop in about 3 milliseconds.
PA 70 series	250 control loops. The PA 70 series executes a control loop in about 0.3 milliseconds.

This information gives a rough estimate of which PA Controller would be ideal for a particular application. The PA 70 series is available in two versions: PA70/935 and PA70/772. The PA70/935 allows for more digital input/outputs and has a faster processor than the PA/70/772.

The requirements of a system to tolerate failures determine the level of redundancy to be employed within the control system. The PA 70H is a fully redundant controller with options to expand redundancy to cabling and HMI Servers.

Selecting the I/O

The instrument index determines the I/O modules to select; i.e. the amount and type of modules to select. The configuration of the I/O is dependent on redundancy and criticality of the I/O point. For example, if dual redundant level transmitters are used to measure a process variable then each transmitter should be wired to separate analog input modules.

Note: The I/O is configured and instrument tags are assigned to the modules in the OpenProcess Designer.

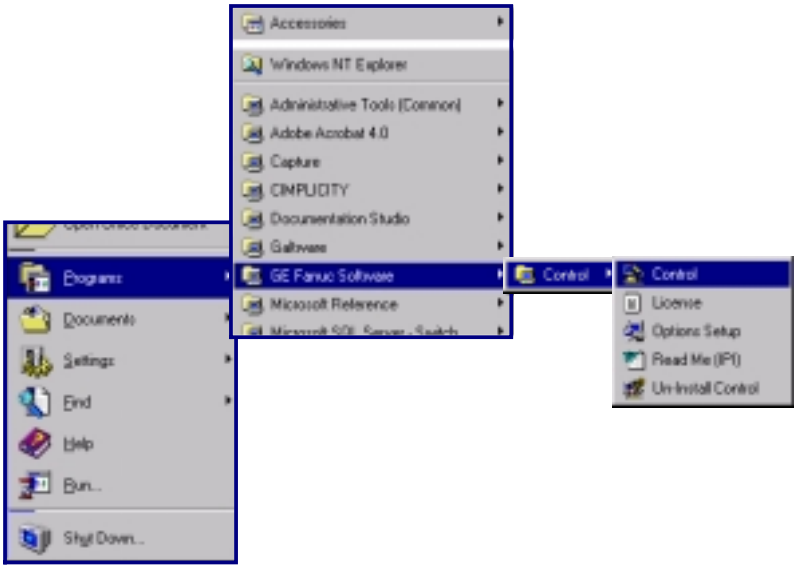
A Control Equipment Folder

You open the Control Workbench through the GE Fanuc Software group on the Windows Start menu. (You can also open it through the HMI Workbench.)

Starting Control for the First Time

To open the Control Workbench:

1. Click **Start** on the Windows task bar.
2. Select GE Fanuc Software.
3. Select Control.



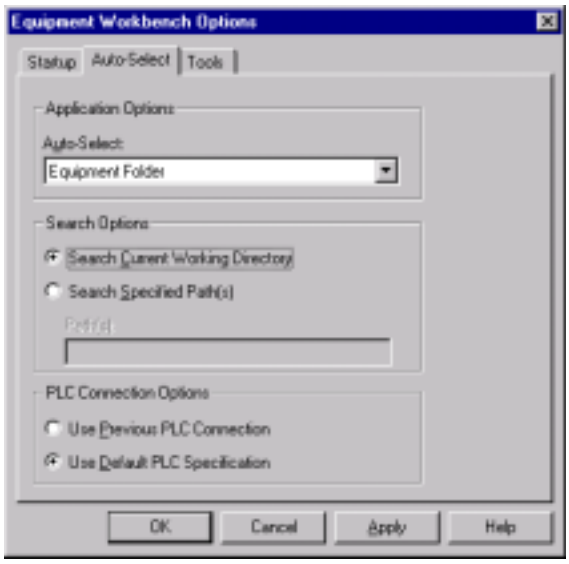
The first time you enter Control, the following message will appear:

There are no Auto_Select options in the registry.

Click OK to modify Auto-Select options.

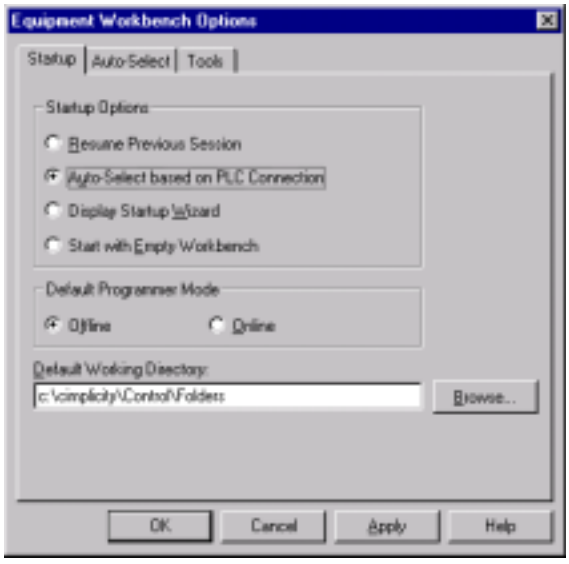
4. Click **OK**.

   The Auto-Select tab in the Equipment Workbench Options dialog box appears.



The Auto-Select options specify where Control will search for Equipment Folders and which PA controller information it will use at startup.

5. Keep the defaults.
6. Select the Startup tab in the Equipment Workbench Options dialog box.



7. Set what will appear when you enter Control.
   A. Click one of the options in the Startup Options box. The default is Auto-Select based on PLC Connection.
   B. Click Offline or Online to specify whether Control will be offline or online when the Control Workbench is open. The default is Offline.
   C. Specify a default location for equipment folders in the Default Working Directory field if it is different from the default.
8. Click **OK**.

Result: The first time you open Control (regardless of which Startup Option you selected) the Equipment folder Startup dialog box appears.

Creating New Equipment Folders

To create a new Equipment Folder:

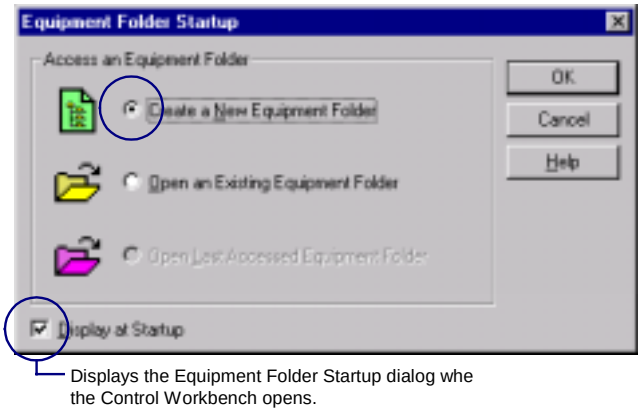
1. Open the New dialog box using any of the following methods.

   Method 1

   A. Open the Control Workbench.

   An Equipment Folder Startup dialog box appears if you checked:

   - Display Startup Wizard in the Equipment Workbench Options dialog box or
   - Display at Startup on the Equipment Folder Startup dialog box.



   B. Click Create a New Equipment Folder.

Method 2

A. Click **New** on the Control Workbench menu bar.

B. Select New.

Method 3

Click the **New** button  on the Control Workbench toolbar.

Method 4

Press **Ctrl+N** on the keyboard.

The New dialog box appears when you use any method.

2. Type the Equipment Folder name in the Name field.

   Limit the characters to 7 or fewer if you want the name to exactly match the name that is stored to the PA Controller.

   This is because the PA controller CPU only recognizes names of seven characters or fewer. If you make the name longer, only the last seven characters will be stored to the PA Controller.

   Click **Help** for information about other restrictions on Equipment Folder names.

3. Navigate through the Directories box to select the drive and directory you want, if you want your Equipment Folder to be stored in a location other than the default.

4. Check the Type field. If the PA controller type is a
   - PA 30 then the Type must be 90-30 Extended Equipment Folder.
   - PA 70 or PA 70H then the Type must be 90-70 Equipment Folder.

5. Click **OK** to create the Equipment Folder.

Opening Existing Equipment Folders

To open a pre-existing equipment folder:

1. Choose any of the following methods.

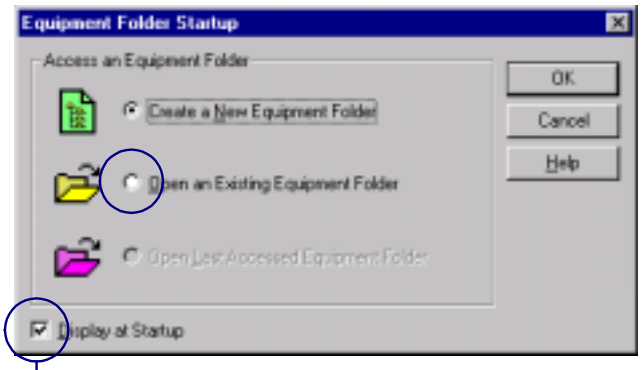
   Method 1

   A. Open the Control Workbench.

      An Equipment Folder Startup dialog box appears if you checked:

      - Display Startup Wizard in the Equipment Workbench Options dialog box or

- Display at Startup on the Equipment Folder Startup dialog box.



Displays the Equipment Folder Startup dialog whe the Control Workbench opens.

B. Check Open an Existing Equipment Folder.

Method 2

A. Click New on the Control Workbench menu bar.

B. Select Open.

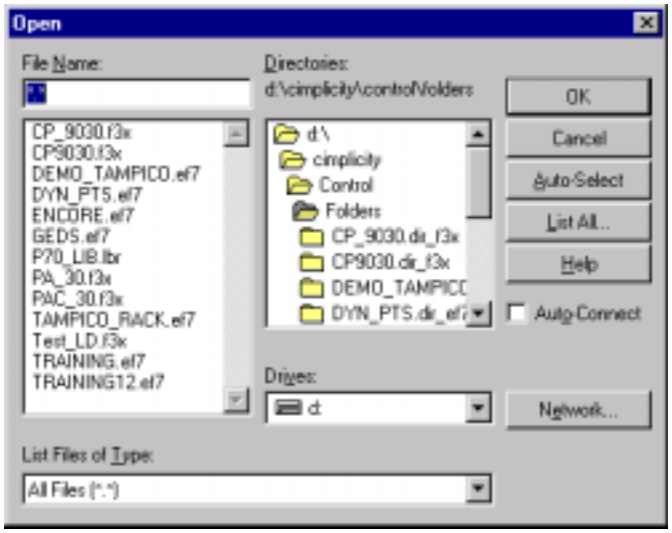
Method 3

Click the **Open** button  on the Control Workbench toolbar.

Method 4

Press **Ctrl+O** on the keyboard.

The Open dialog box to appears when you use any method.



2. Either:
   A. Double-click the Equipment Folder's name in the File Name list, or
   B. If the name does not appear in the list,
      i. Navigate through the Directories scroll field to specify the Equipment Folder’s drive and folder.

         The Equipment Folder will appear in the File Name list.

      ii. Double-click the Equipment Folder's name.
3. Click **OK**.

Result: The selected Equipment Folder opens.

Hardware Configuration

It is important that the hardware configuration in Control match the physical hardware of your system.

Basic steps must be carried out for any PA controller hardware configuration.

These steps include configuring the:

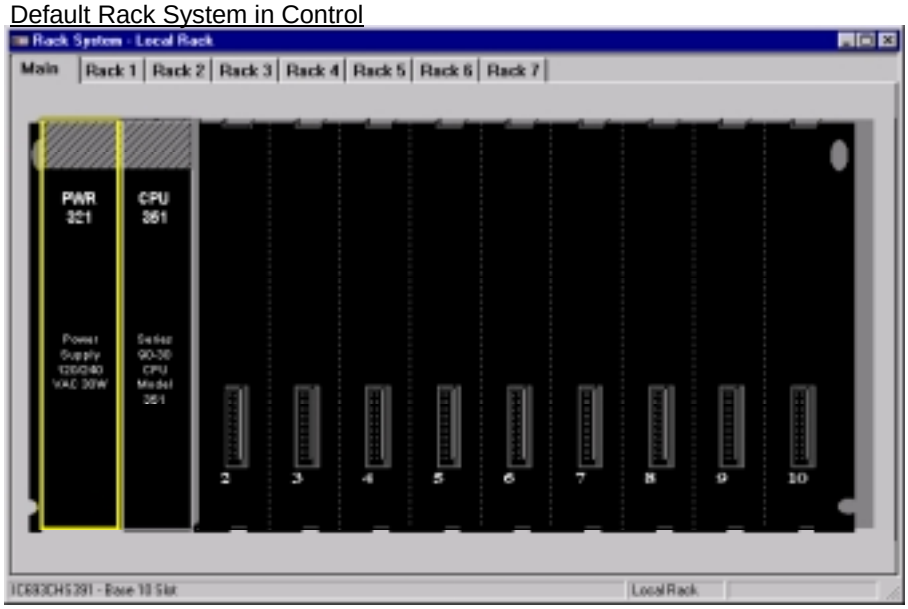
1. Rack type and power supply.
2. CPU.
3. Ethernet Modules.
4. If applicable, Redundant Communication Modules.

More specifically, the hardware configuration for each model includes the following.

Model	Requires the Configuration of the
PA30	Power supply
	CPU
PA70	Power supply
	CPU
	Ethernet modules
PA 70H	Power supply
	CPU
	Ethernet modules
	Redundant Communication Cards.

The following sections cover the details involved in configuring each OpenProcess model type.

Default Rack System in Control



Note: The I/O configuration is application specific and is configured in the OpenProcess Designer. After the configuration is complete in the Designer the Designer will output a file called **`IODOC.txt`** that gives the user the necessary information to configure the I/O in Control. This is an integral part of the project development process. *See the "Creating an OpenProcess Project" chapter for the required steps to complete an OpenProcess Project.*

Tip: Detailed technical information about configuring specific modules is available through Control's online Help. This information is available by clicking the **Help** button in the module's Parameters dialog box.

Opening the PA Controller Local Rack Window

The Local Rack window contains configuration information for the PA rack modules.

To open the Local Rack window:

1. Open an Equipment Folder. *See page 5-6.*
2. Do either of the following:

Method 1

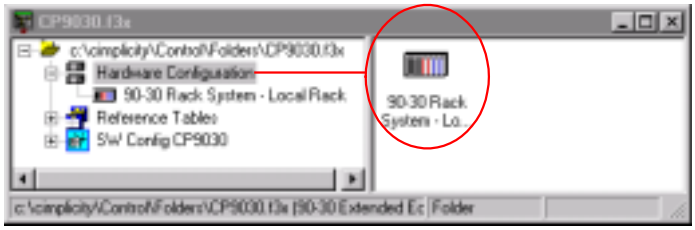
Click the Hardware Configuration icon in the right pane of the Equipment Folder browser.

Method 2

A. Expand the Equipment folder in the left pane of the Equipment Folder browser.

B. Select Hardware Configuration.

C. Click the Local Rack icon.



Configuring PA 30 Hardware

The PA 30 Series Controllers comes with built-in Ethernet capability.

The hardware configuration of the PA 30 primarily involves configuring the:

- Rack,
- Power supply,
- CPU and
- I/O modules.

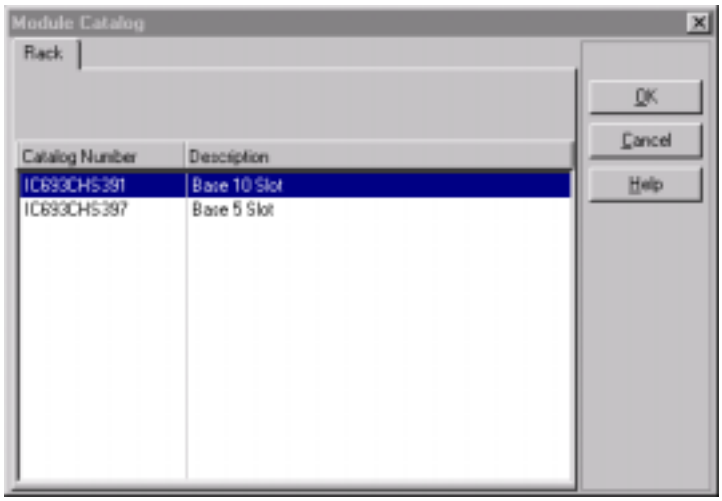
The configuration of the I/O modules is application specific and must be done as part of the project development. Therefore, this section will cover the configuration of the rack, power supply, and CPU only.

PA 30 Rack Configuration

To change rack type if it is different from the default:

1. Position the cursor anywhere in the Local Rack window.
2. Click the right mouse button.
3. Select Change Rack Type from the popup menu.

   A Rack Catalog appears.



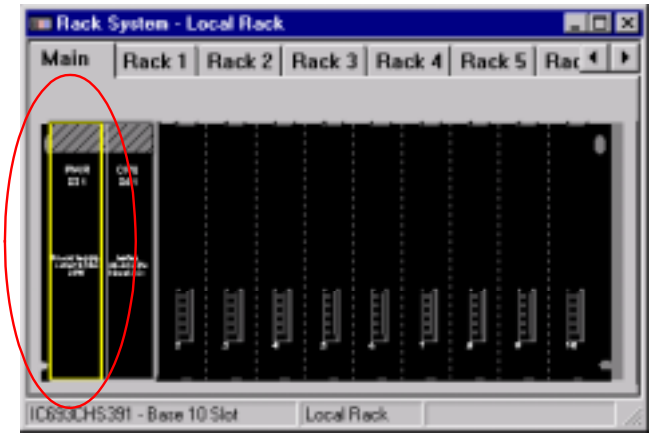
4. Click the catalog number and description of the type matching your system
5. Click **OK**.

PA 30 Power Supply Configuration

The default power supply is the PWR321.

To change the default power supply:

1. Click the power supply slot in the Local Rack window.



2. Click the right mouse button.
3. Choose Replace Module from the popup menu.

   A Power Supply catalog appears.
4. Click the catalog number and description of the power supply in your system
5. Click **OK**.
6. Respond to prompts if any appear.

   The Parameters dialog box appears allowing you to view detailed power consumption information.
7. Click **OK**.

Note: If you are using the default power supply double-click on the power supply slot in the Local Rack window to view the details.

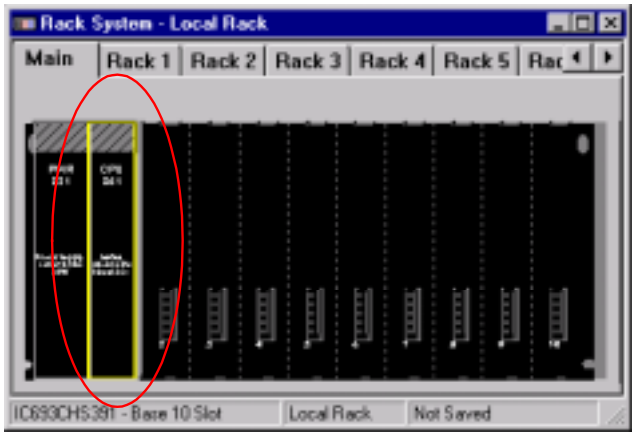
PA 30 CPU Configuration

The default CPU is the CPU351.

The CPU type must be changed to a CPU PA 30/364.

To change the default PA 30 CPU type:

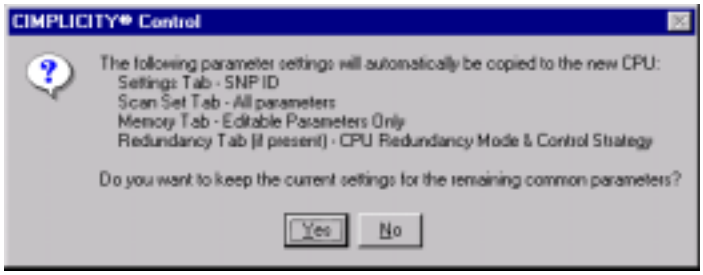
1. Click the CPU slot in the Local Rack window.



2. Click the right mouse button.
3. Choose Replace Module from the popup menu.

   The Central Processing Unit (CPU) catalog appears.
4. Click the catalog number and description of the CPU in your system.
5. Click **OK**.

   A message box appears asking if you want to keep the current settings for the common parameters (listed) that are not automatically copied to the new CPU.

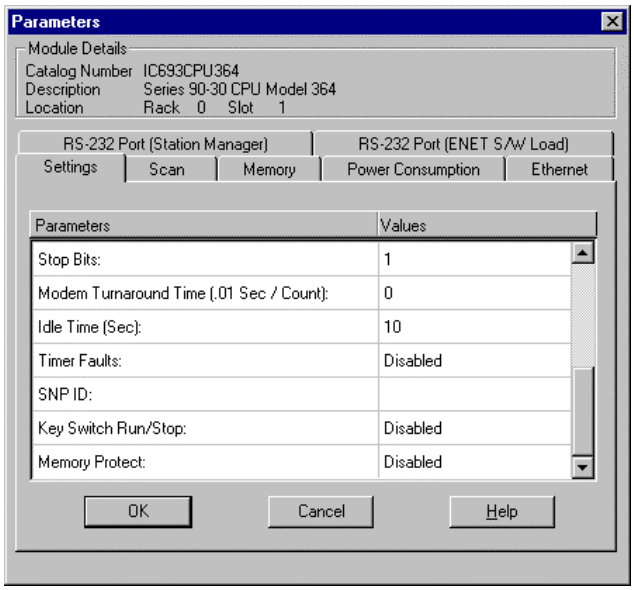


6. Click **Yes**.

Result: The Parameters dialog box appears.

PA 30 CPU Parameters Configured

When you replace the CPU, the Parameters dialog box appears.



In general to edit any parameter you must select the tab pertaining to the parameter you want to view or modify and then edit the parameter's individual field.

The required configuration for both the PA 30/364 involves the CPU memory. The memory must be configured so that it is compatible with OpenProcess.

To configure the memory for the PA 30/364:

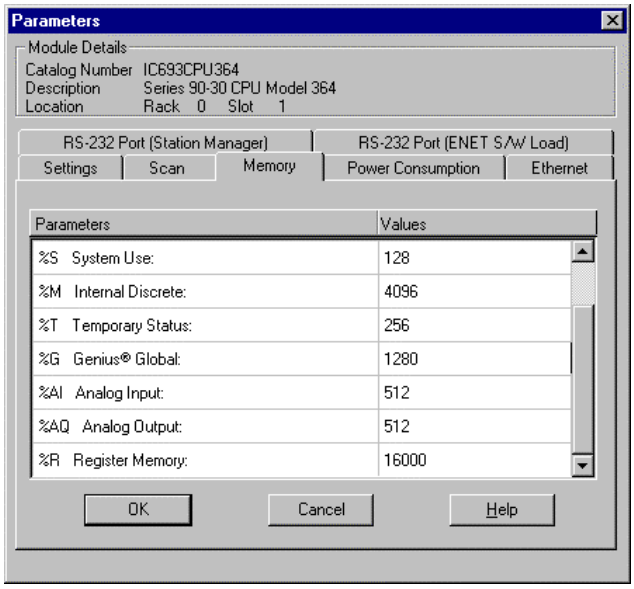
1. Select on the Memory Tab.

   The configurable memory types are %AI, %AQ, and %R.

2. Enter the configurable memory values as follows.

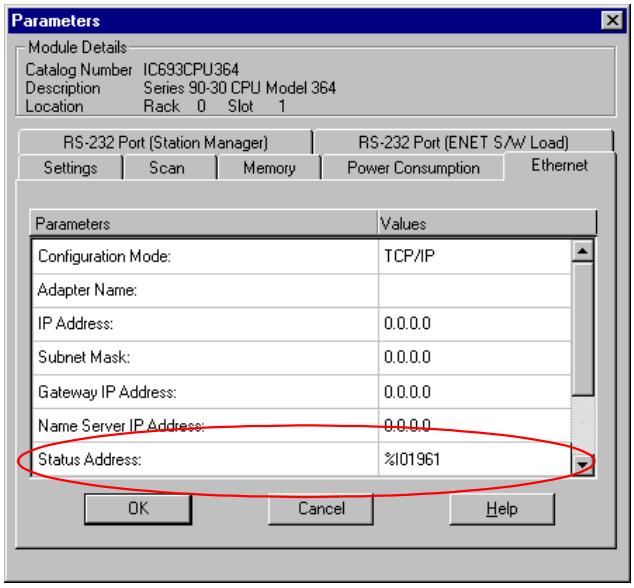
Parameters	Values
%AI Analog Input:	512
%AQ Analog Output:	512
%R Register Memory:	16000

Note: The memory values are default values for OpenProcess. If the application requires a larger memory space, the memory space can be reconfigured in OpenProcess to match the configured memory in Control.



3. Click the Ethernet tab. .

   The Ethernet parameters appear.



4. Enter the TCPIP configuration per the requirements of the network being used.

5. Enter the Status Address value as %I01961.

   The ***Status Address*** is a 60-bit address space that gives information on the LAN interface and channel status.

Configuring PA 70 Hardware

The PA 70 controller is available in two models the:

- PA 70/772 or
- PA 70/935.

The difference between the two models is CPU performance and the amount of discrete I/O that can be configured in memory.

The hardware configuration of the PA 70 involves configuring the rack, power supply, CPU, Ethernet Module, and I/O modules primarily. The configuration of the I/O modules is application specific and must be done as part of the project development. Therefore, this section will cover the configuration of the rack, power supply, CPU, and Ethernet Module only.

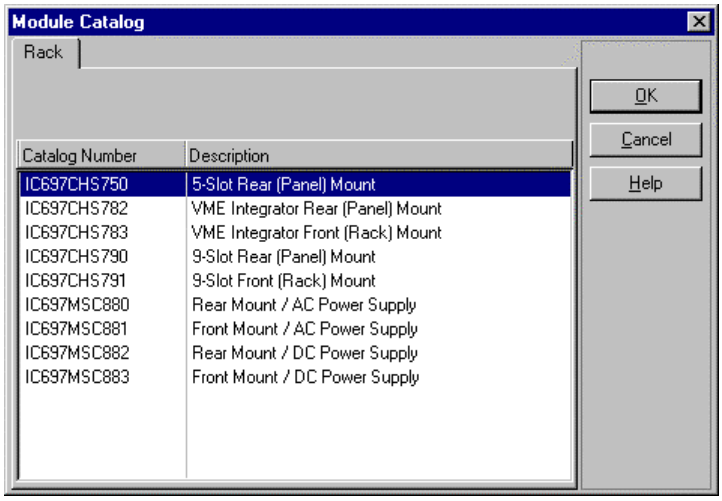
PA 70 Rack Configuration

The default rack type is the 9-Slot Rear Mount.

To change PA 70 rack type if different from the default:

1. Position the cursor anywhere in the Local Rack window.
2. Click the right mouse button.
3. Choose Change Rack Type from the popup menu.

   A Rack Module Catalog appears.



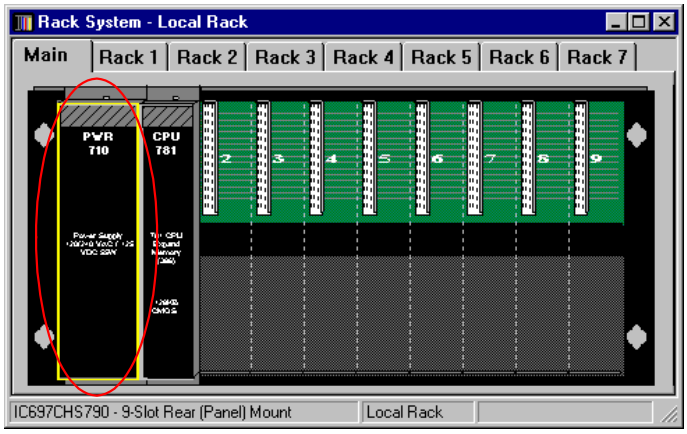
4. Click the catalog number and description of the type matching your system
5. Click **OK**.

PA 70 Power Supply Configuration

The default power supply is the PWR710.

To change the default power supply:

1. Click the power supply slot in the Local Rack window.



2. Click the right mouse button.
3. Choose Replace Module from the popup menu.

   A Power Supply catalog appears.

   A Power Supply catalog appears.
4. Click the catalog number and description of the power supply in your system
5. Click **OK**.
6. Respond to prompts if any appear.

   The Parameters dialog box appears allowing you to view detailed power consumption information.
8. Click **OK**.

Note: If you are using the default power supply double-click on the power supply slot in the Local Rack window to view the details.

PA 70 CPU Configuration

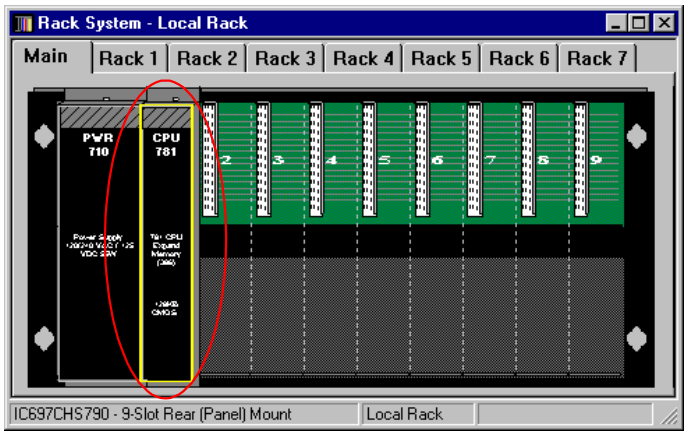
The default CPU is the CPU781.

The CPU type must be changed to either a:

- CPX772 or
- CPX935.

To change the default PA 70 CPU type:

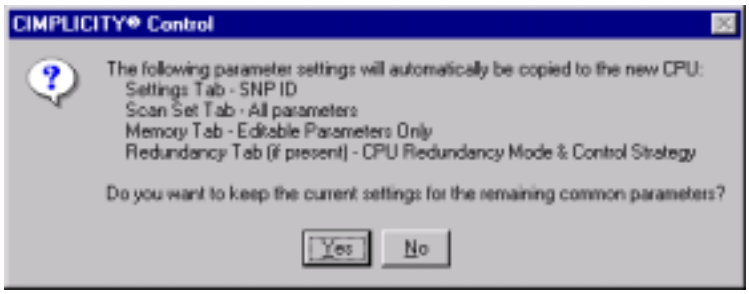
1. Click the CPU slot in the Local Rack window.



2. Click the right mouse button.
3. Choose Replace Module from the popup menu.

   The Central Processing Unit (CPU) catalog appears.
4. Click the catalog number and description of the CPU in your system.
5. Click **OK**.

   A message box appears asking if you want to keep the current settings for the common parameters (listed) that are not automatically copied to the new CPU.

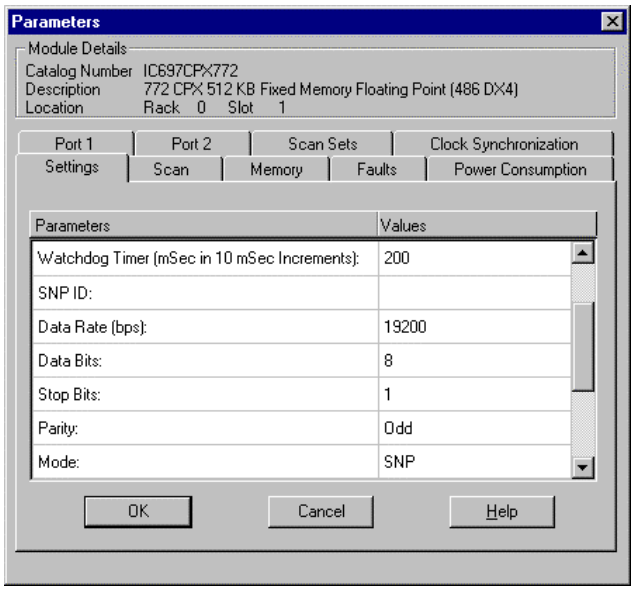


6. Click **Yes**.

Result: The Parameters dialog box appears.

PA 70 CPU Parameters Configuration

When you replace the CPU, the Parameters dialog box appears.



In general to edit any parameter you must select the tab pertaining to the parameter you want to view or modify and then edit the parameter's individual field.

The required configuration for the PA 70 is to configure the CPU memory for use with OpenProcess.

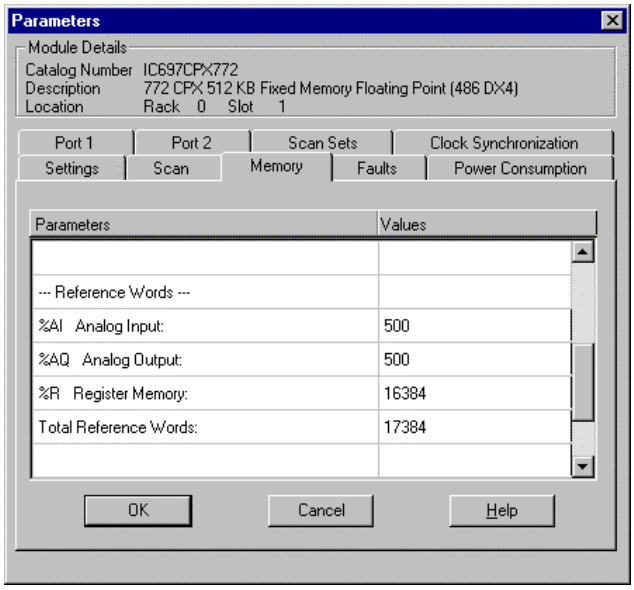
To configure the PA 70 CPU memory for use with OpenProcess:

1. Select on the Memory Tab.

   The configurable memory types are %AI, %AQ, and %R.

2. Enter the configurable memory values as follows.

Parameters	Values
---Reference Words---	
%AI Analog Input:	500
%AQ Analog output:	500
%R Register memory:	16384



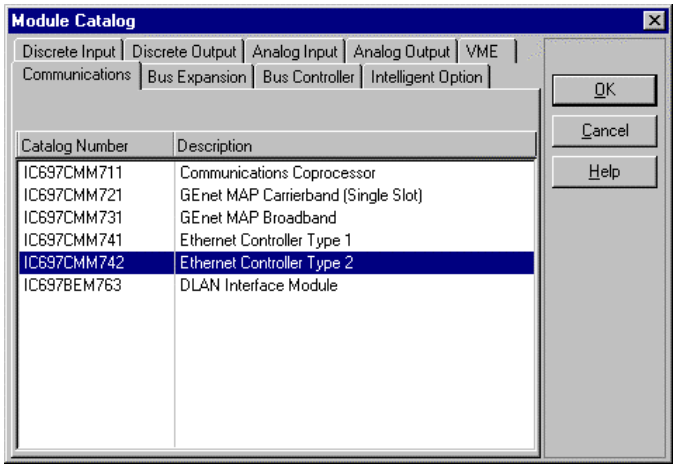
PA 70 Ethernet Module Configuration

You configure the PA 70 Ethernet module in the Module Catalog.

To configure the Ethernet module:

1. Click on the empty slot in the Local Rack in which the Ethernet Module will be installed.
2. Click the right mouse button.
3. Choose Add Module from the popup menu.

   The Module Catalog appears.
4. Select the Communications Tab

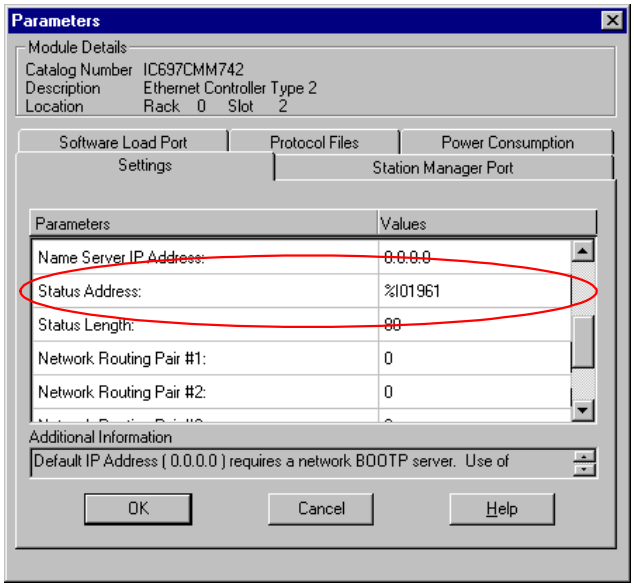


5. Select the module IC697CMM742.
6. Click **OK**.

   The Parameters dialog appears for the Ethernet module.
7. Select the Settings tab.
8. Enter the TCPIP configuration per the requirements of the network being used.

9. Enter the Status Address value as %I01961.

   The ***Status Address*** is a 60-bit address space that gives information on the LAN interface and channel status



10. Click **OK**.

Configuring PA 70H Hardware

The PA 70H controller is available in two models, the

- PA 70H/772 or
- PA 70H/935.

The difference between the two modules is CPU performance and the amount of discrete I/O that can be configured in memory.

The hardware configuration of the PA 70H primarily involves configuring the:

- Rack,
- Power supply
- CPU,
- Ethernet Module,
- Redundant Communication Cards and
- I/O.

The configuration of the I/O modules is application specific and must be done as part of the project development. Therefore, this section will cover the configuration of the rack, power supply, CPU, Ethernet Module, and Redundancy Modules only.

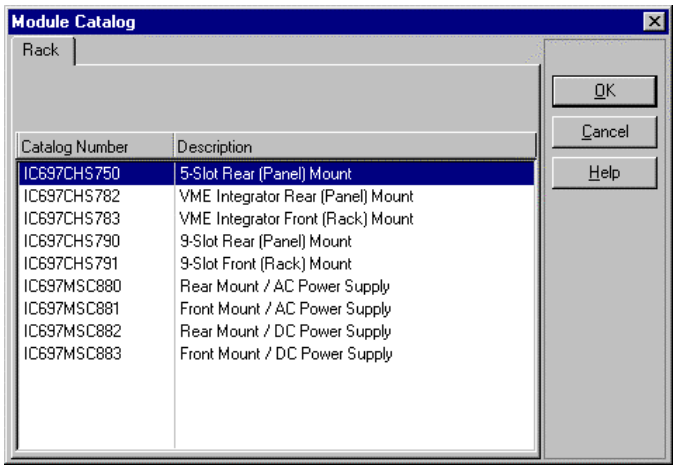
PA 70H Rack Configuration

The default rack is the 9-Slot Rear Mount.

To change rack type if it is different from the default:

1. Position the cursor anywhere in the Local Rack window
2. Click the right mouse button.
3. Select Change Rack Type from the popup menu.

A Rack Catalog appears.



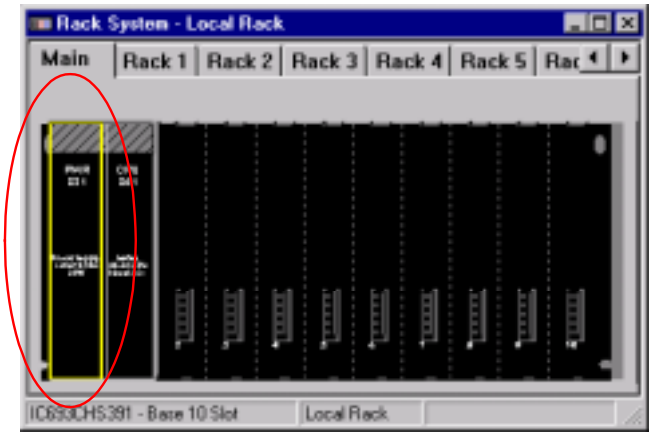
4. Click the catalog number and description of the type matching your system
5. Click **OK**.

PA 70H Power Supply Configuration

The default power supply is the PWR710.

To change the default power supply:

1. Click the power supply slot in the Local Rack window.



2. Click the right mouse button.
3. Choose Replace Module from the popup menu.

   A Power Supply catalog appears.
4. Click the catalog number and description of the power supply in your system
5. Click **OK**.

6. Respond to prompts if any appear.

   The Parameters dialog box appears allowing you to view detailed power consumption information.

7. Click **OK**.

Note: If you are using the default power supply double-click on the power supply slot in the Local Rack window to view the details.

PA 70H CPU Configuration

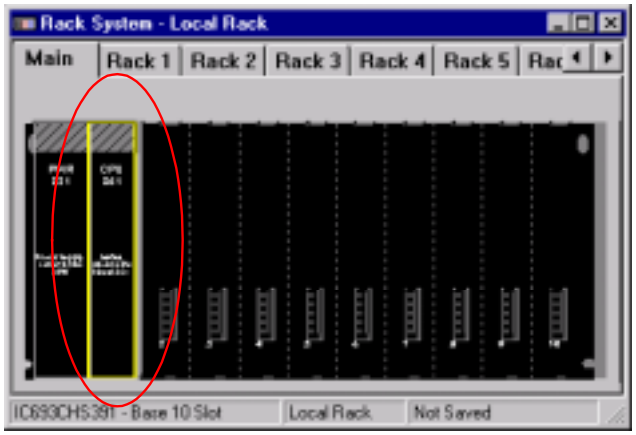
The default CPU is the CPU781.

The CPU type must be changed to either a:

- CGR772 or
- CGR935.

To change the default PA 70H CPU type:

1. Click the CPU slot in the Local Rack window.



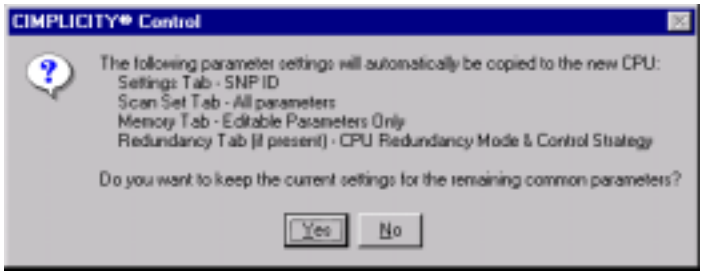
2. Click the right mouse button.
3. Choose Replace Module from the popup menu.

   The Central Processing Unit (CPU) catalog appears.

4. Click the catalog number and description of the CPU in your system.
5. Click **OK**.

   Click the catalog number and description of the CPU in your system, then click the OK button

A message box appears asking if you want to keep the current settings for the common parameters (listed) that are not automatically copied to the new CPU.

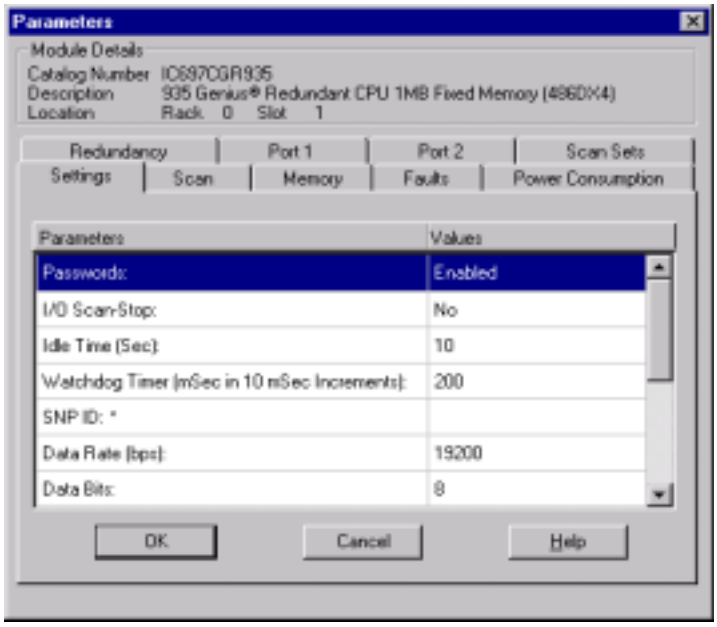


6. Click **Yes**.

Result: The Parameters dialog box appears.

PA 70H CPU Parameters Configuration

When you replace the CPU, the Parameters dialog box appears.



In general to edit any parameter you must click on the tab pertaining to the parameter you want to view or modify and then edit the parameter's individual field.

The required configuration for the PA 70H is to configure the CPU memory and Redundancy parameters.

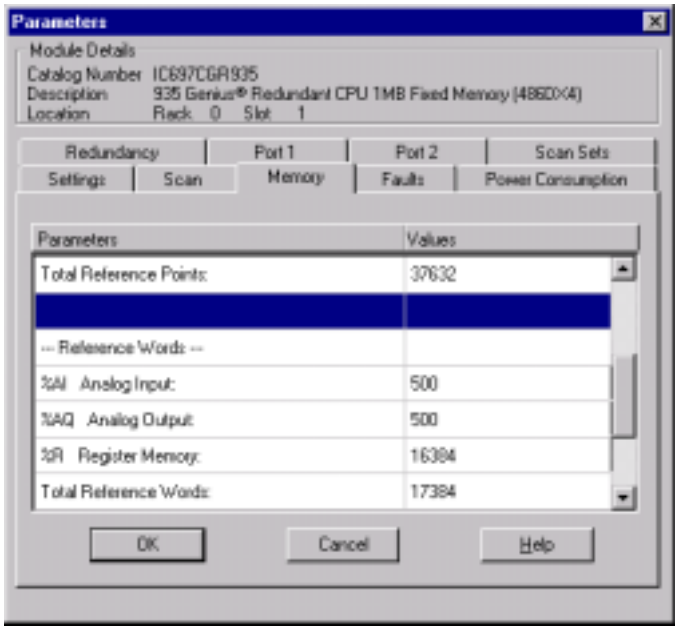
To configure the PA 70H CPU memory and redundancy parameters:

1. Select on the Memory Tab.

   The configurable memory types are %AI, %AQ, and %R.

2. Enter the configurable memory values as follows.

Parameters	Values
---Reference Words---	
%AI Analog Input:	500
%AQ Analog output:	500
%R Register memory:	16384



3. Select the Redundancy Tab.

4. Configure the Redundancy Parameters including the Shared I/O per the following table. The shared I/O is configured per OpenProcess defaults. The length should be configured based on the application's requirements. *See the note below.*

Parameter	Setting
Redundant	Yes
Redundancy Mode	Primary
Control Strategy	GDB
Fail Wait Time	60
%I Reference	%I1
%I Length	2048
%Q Reference	%Q
%Q Length	2048
%M Reference	%M1
%M Length	4096
%AI Reference	%AI1
%AI Length	500
%AQ Reference	%AQ1
%AQ Length	500
%R Reference	%R500
%R Length	8499

Important: The starting address of the shared I/O *must* be configured based on the above table but the length may vary depending on application requirements, e.g., if your application only uses 25%AI then the length should be configured for 25.

The transferring of shared I/O has an impact on scan time. Therefore, only used I/O should be transferred. It was calculated that for the following the scan time was increased by 21 ms.

- 512 %I,
- 512 %Q,
- 512 %M,
- 256 %AI,
- 256 %AQ and
- 2048 %R.

5. Click **OK**.

Result: The Parameters dialog closes. The menu bar displays Rack System – Primary Local Rack.

The configuration of the Secondary Rack is done automatically. Therefore, you only need to configure the redundant components in the Primary Local Rack window and the corresponding configuration for the Secondary Rack will be configured automatically based on the configuration of the Primary Rack.

To view the Secondary Rack:

1. Click View on the main menu.
2. Select Redundancy.
3. Select Secondary Rack System from the extended menu.

PA 70H Bus Transmitter Module Configuration

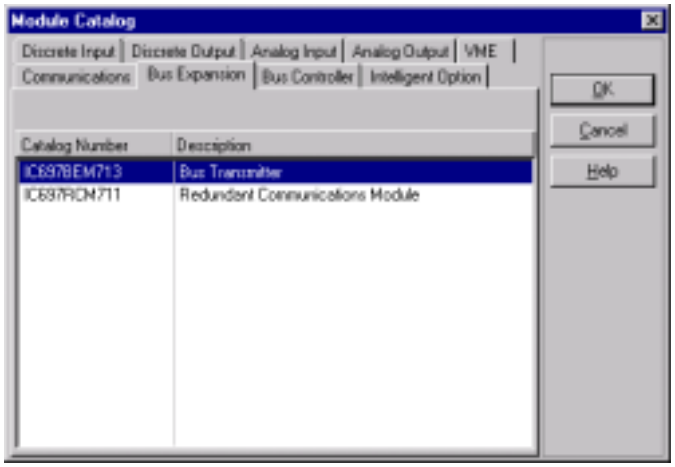
A Bus Transmitter Module is required in both the Primary PA CPU Rack and the Secondary PA CPU Rack for a redundant system. The BTM provides a path for redundancy communications when connected to the Redundancy Communications Module (RCM). Each PA system (Primary and Secondary) has a BTM and an RCM in rack 0. The BTM in one unit connects to the RCM in the other unit.

It is preferable to install the BTM in the second slot in rack 0 for both the Primary and Secondary systems.

To configure the BTM in the second slot in rack 0:

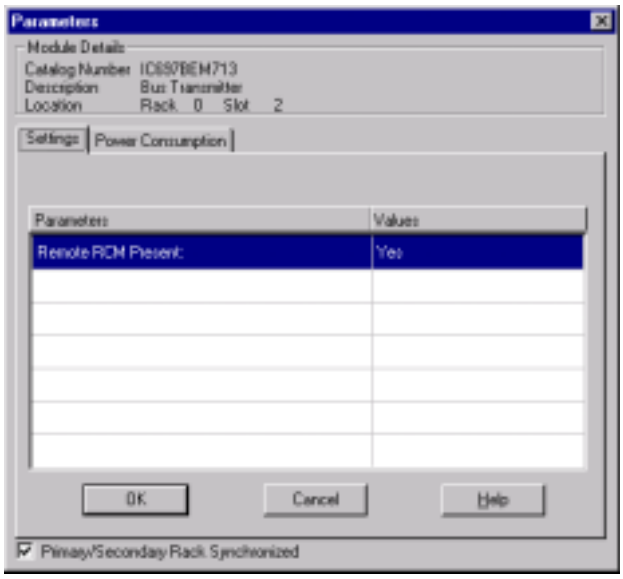
1. Click on the second slot in the Primary Local Rack.
2. Click the right mouse button.
3. Choose Add Module from the popup menu.

   The Module Catalog appears.



4. Select the Bus Expansion Tab
5. Select the module IC697BEM713.
6. Click **OK**.

The Parameters dialog appears for the Bus Transmitter Module.



7. Set the parameter *Remote RCM Present* to Yes.
8. Check the Primary/Secondary Rack Synchronized checkbox.

Result: The Bus Transmitter Module in the Secondary rack is automatically configured.

PA 70H Redundancy Communication Module Configuration

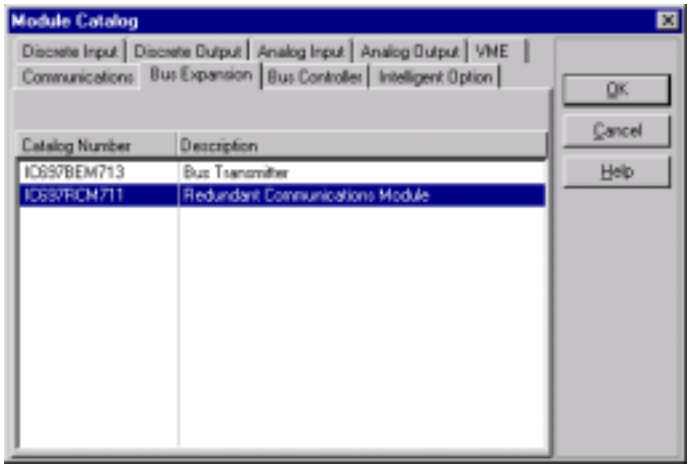
The Redundancy Communication Module (RCM) provides a communications path for sharing data between the two CPUs in the redundant system. In a synchronized system, I/O data is controlled by one unit (the active unit) but is shared between both units (active and backup units). The RCM provides the communications path between the two units.

It is preferable to install the RCM in the third slot in rack 0 for both the Primary and Secondary systems.

To configure the RCM in the third slot in rack 0:

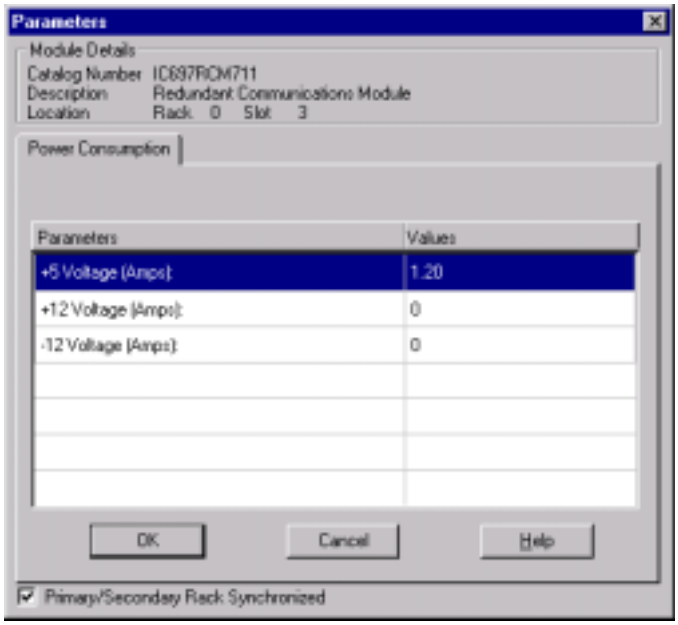
1. Click on the third slot in the Primary Local Rack.
2. Click the right mouse button.
3. Choose Add Module from the popup menu.

The Module Catalog appears.



4. Select the Bus Expansion Tab
5. Select the module IC697RCM711.
6. Click **OK**.

   The Parameters dialog appears for the Redundant Communications Module.



7. Check the Primary/Secondary Rack Synchronized checkbox.

Result: Again, the Secondary Rack is automatically configured for the RCM.

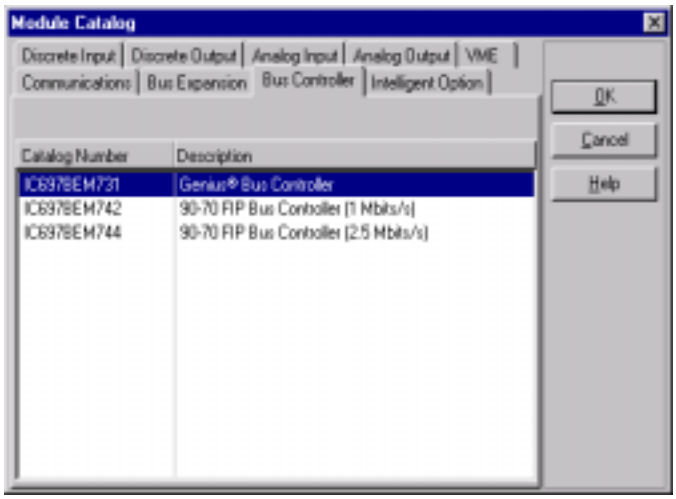
PA 70H Genius Bus Controller Configuration

The Genius Bus Controller (GBC) is the interface for the PA 70H to the Genius I/O communications system.

To configure the GBC for redundancy:

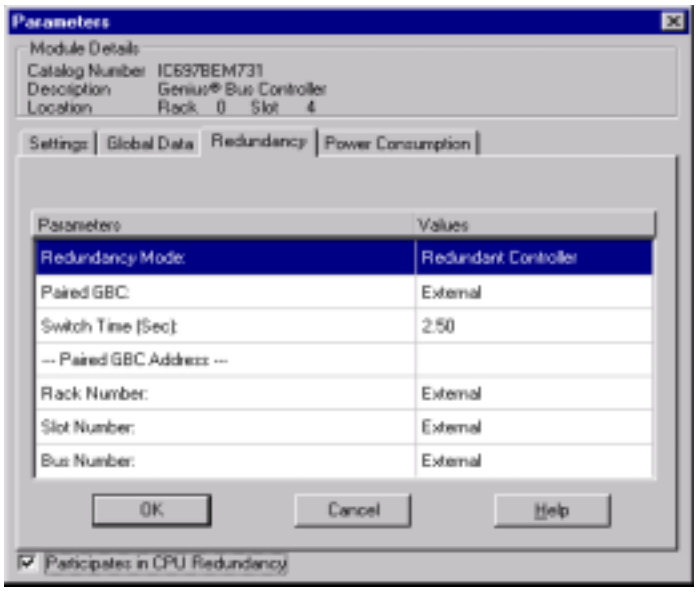
1. Click the empty slot in the Primary Local Rack in which the GBC will be installed.
2. Click the right mouse button.
3. Choose Add Module from the popup menu.

   The Module Catalog appears.



4. Select the Bus Controller Tab.
5. Select the module IC697BEM731.
6. Click **OK**.

The Parameters dialog appears for the Genius Bus Controller.



7. Set the Settings, Global Data, and Power Consumption Parameters per system requirements.
8. Configure the Redundancy tab parameters for any GBC that has Genius I/O Shared between the Active and Backup Controllers.
9. If the PA 70H system:

	Set the Redundancy Mode for:
Requires dual Genius Buses	Dual Bus/Redundant Controller.
Does not require dual Genius Buses	Redundant Controller.

   The other parameters are typically left set to the default values.

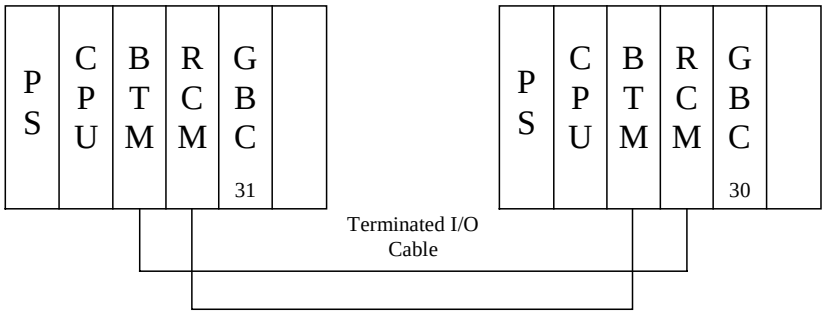
10. Check the Participates in CPU Redundancy checkbox.
11. Click **OK**.

Result: The Secondary Rack will have a GBC configured automatically.

The GBC in the Primary Rack will have the Serial Bus Address of 31 and the GBC in the Secondary Rack will have the Serial Bus Address of 30.

PA 70H Cabling

The communication path between the Primary and Secondary PA Controller is realized with a pair of terminated I/O Cables (Catalog Number IC697CBL811/826). Two cables are necessary for a redundant system. The following diagram illustrates the proper configuration of the racks and cabling.



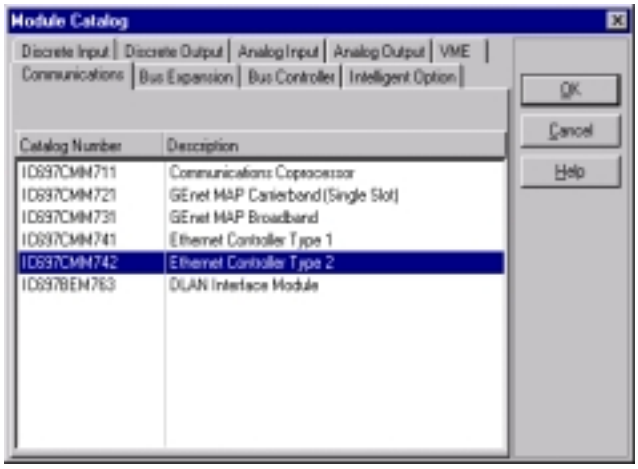
PA 70H Ethernet Modules Configuration

You configure the PA 70H Ethernet module in the Module Catalog.

To configure the Ethernet module:

1. Click on the empty slot in the Local Rack in which the Ethernet Module will be installed..
2. Click the right mouse button.
3. Choose Add Module from the popup menu.

   The Module Catalog appears.

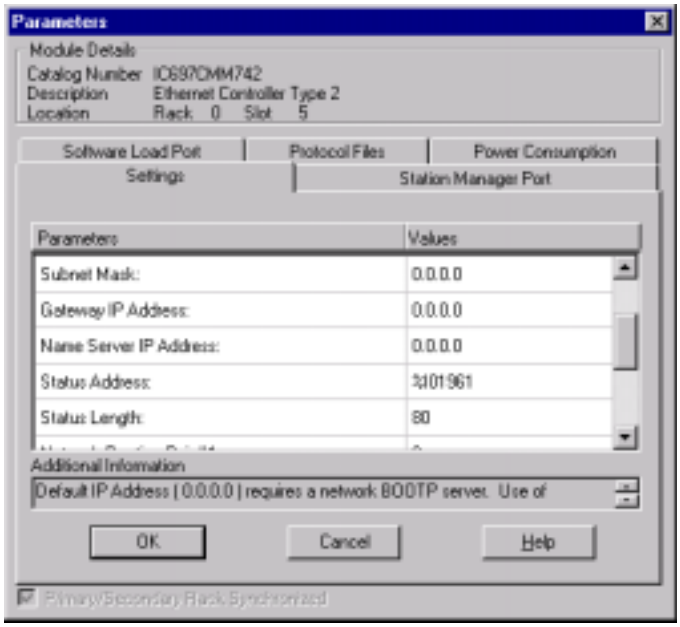


4. Select the Communication Tab.
5. Select the module IC697CMM742.
6. Click **OK**.

The Parameters dialog appears for the Ethernet module.

7. Enter the TCPIP configuration per the requirements of the network being used.
8. Enter the Status Address value as %I01961..

   The ***Status Address*** is a 60-bit address space that gives information on the LAN interface and channel status



9. Click **OK**.
10. View the Secondary Rack and configure the TCPIP parameters for the Ethernet Module per the requirements of the network being used.

    The Status Address will be automatically configured per the Primary Rack's configuration.

OpenProcess C Loadable Configuration

Once the hardware configuration is complete for the respective system the controller must be stored with the OpenProcess C Loadable.

This section describes the procedures for configuring the OpenProcess C Loadable on a:

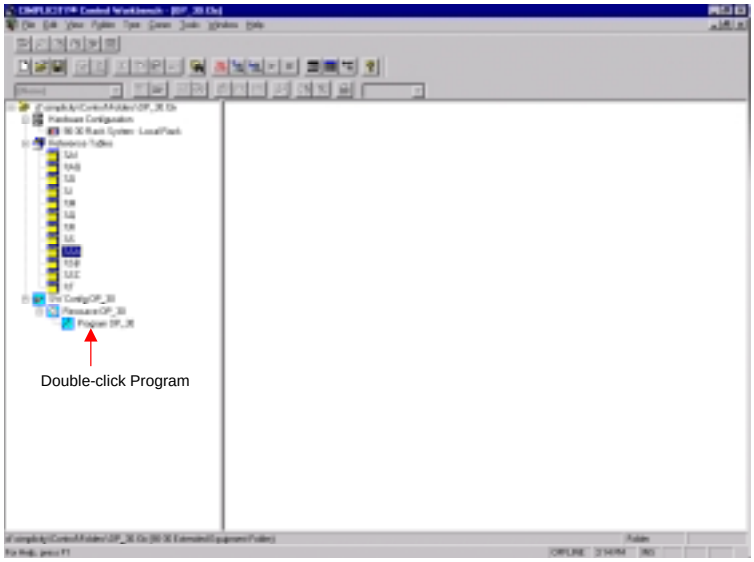
- PA 30 System and
- PA 70 System.

Configuring OpenProcess C Loadable on a PA 30 System

Once the hardware configuration is complete for the respective system the controller must be stored with the OpenProcess C Loadable.

Setting up the OpenProcess C Loadable (PA 30 system):

1. Select Expand All in the Tree menu.
2. Double-click Program.



The LD editor window opens. In addition, the Control Workbench menu bar displays a menu item named Program.

3. Click Program on the menu bar.

4. Select New Block.

   The New Block dialog box appears.

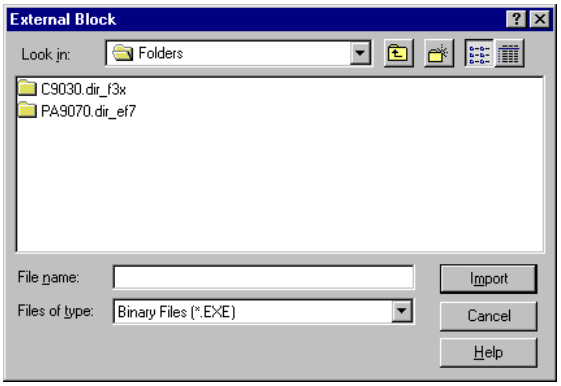
5. Fill in dialog entries as follows:

Field	Enter or Select
Name	CP_9030
Type	EXT
Language	C
Description	OpenProcess C Loadable

6. Enter the path to the **`Cp9030.exe`** file as follows.

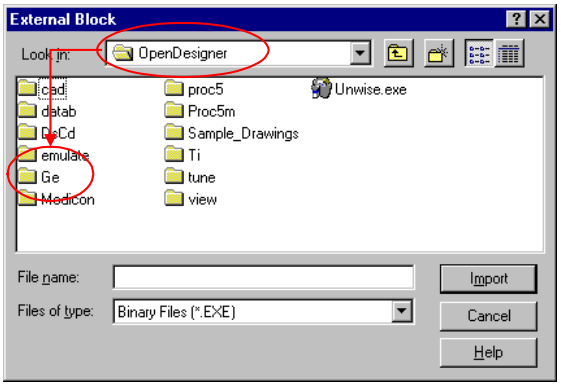
   A. Click **Browse**.

   The External Block browser opens.

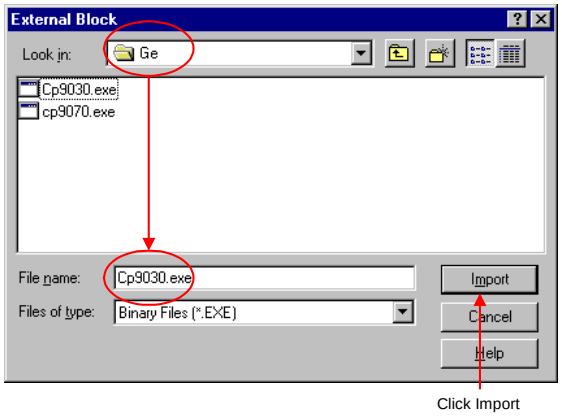


   B. Find and open the OpenDesigner directory (folder)

   C. Find the GE folder in the OpenDesigner directory.



   D. Open the GE folder to find **Cp9030.exe**.



E. Click **Import**.

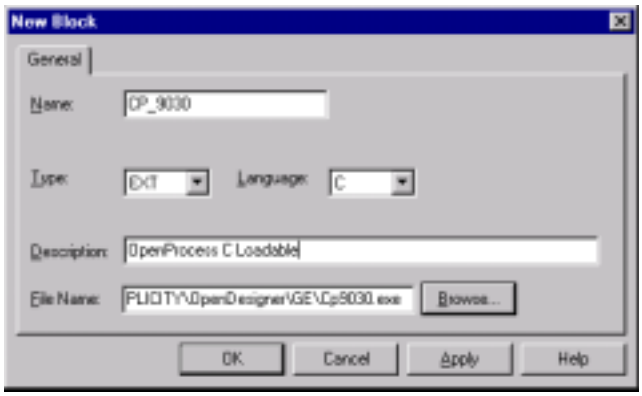
The correct path appears in the File Name field.
\\UserPath\OpenDesigner\GE\Cp9030.exe

where

\\UserPath

\OpenDesigner\GE directory represents the location in your system.

Cp9030.exe is the OpenProcess C Loadable.



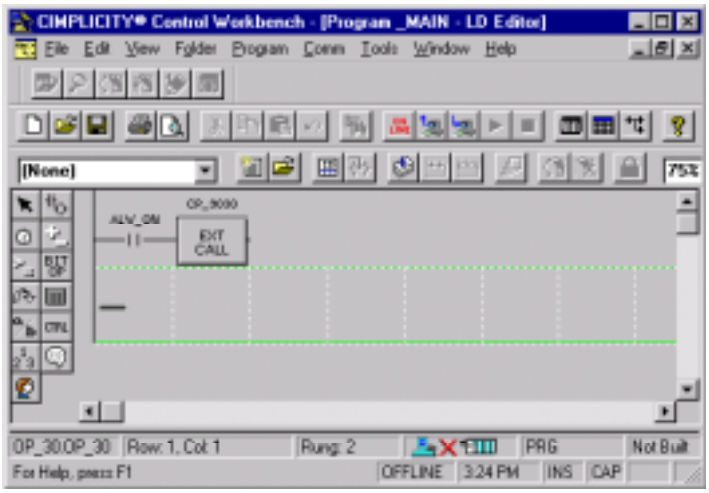
6. Click **OK**.

   The New Block dialog box closes.

7. Configure a rung of ladder logic in the LD Editor to call the OpenProcess C Loadable.

8. Use the relay **ALW_ON** to *energize* the OpenProcess C Loadable every scan.

Example of Relay ALW_ON Configured in the LD Editor



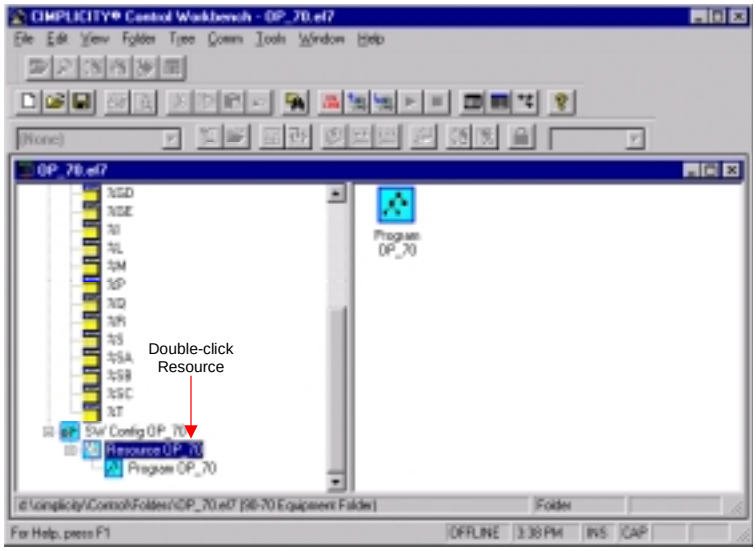
9. Click File on the menu bar.
10. Select Save All.

Configuring OpenProcess C Loadable on a PA 70 System

After you complete the hardware configuration for the PA 70 system, you will store the controller with the OpenProcess C Loadable..

Setting up the controller with the OpenProcess C Loadable (PA 70 System):

1. Select Expand All in the Tree menu.
2. Double-click Resource



The IEC Resource window opens. In addition, the Control Workbench menu bar displays a menu item named Program.

3. Click Program on the menu bar.
4. Select New Program.

The New Program dialog box appears.

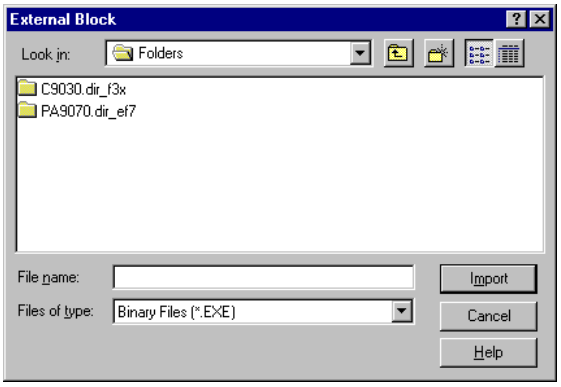
5. Fill in dialog entries as follows:

Field	Enter or Select
Name	CP9070
Type	EXP
Language	C
Description	OpenProcess C Loadable

6. Enter the path to the **`Cp9070.exe`** file as follows.

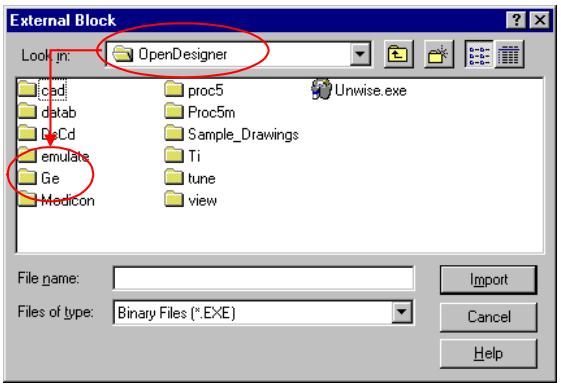
   A. Click **Browse**.

   The External Block browser opens.

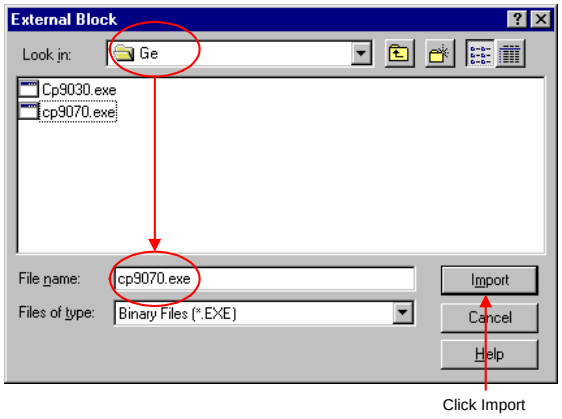


   B. Find and open the OpenDesigner directory (folder)

   C. Find the GE folder in the OpenDesigner directory.



   D. Open the GE folder to find **Cp9070.exe**.



E. Click **Import**.

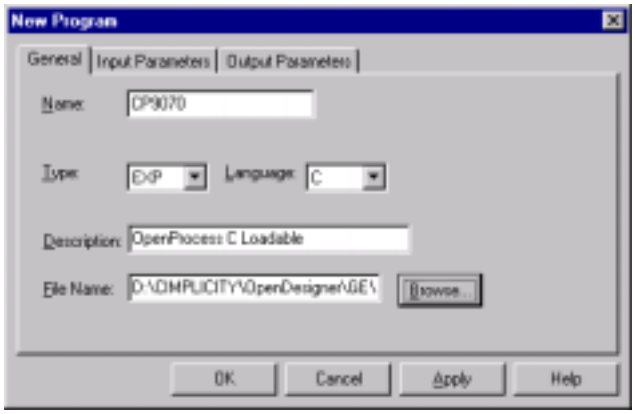
The correct path appears in the File Name field.
\\UserPath\OpenDesigner\GE\Cp9070.exe

where

\\UserPath

\OpenDesigner\GE directory represents the location in your system.

Cp9070.exe is the OpenProcess C Loadable.



6. Click **OK**.

   The New Program dialog box closes.

7. Click File on the Control Workbench menu bar.
8. Select Save All.

Building and Storing Equipment Folder

Before you can store your equipment folder to the PA Controller, the elements in software configuration must be built.

Building Equipment Folder Elements

To build the equipment folder elements in software configuration:

1. Click Folder on the Control Workbench menu bar.
2. Select Build.

Note: If you did not configure any ladder logic in your PA 70 system there will be a warning saying that no rungs were detected. This can be ignored.

Storing to the PA Controller

It is necessary to communicate with the PA Controller through Control in order to store the Hardware Configuration and OpenProcess C Loadable.

Storing only needs to be done once for each CPU.

The steps to set up the PA Controller include:

Step 1. Connect to the PA Controller.

Step 2. Store the Equipment folder.

Step 3. Place the PA Controller in run mode.

Step 1. Connect to the PA Controller

You can connect to a PA Controller from Control over a serial or Ethernet connection.

Identifying a device and selecting a port is required to make the connection.

- The device specifies information necessary to successfully connect including the:

  Default PC communication port,

  Target PA type,

  PA SNP address and

  PA IP address.

- The port identifies the PC port used to initiate communications to the PA controller.

The Connect dialog box enables you to select a device and port in order to initiate communication with the PA Controller.

You will use Series Ninety Protocol (SNP) to carry out the initial communication with the PA Controller. You use SNP because the TCPIP configuration must be stored before using Ethernet.

To make a connection, you can either:

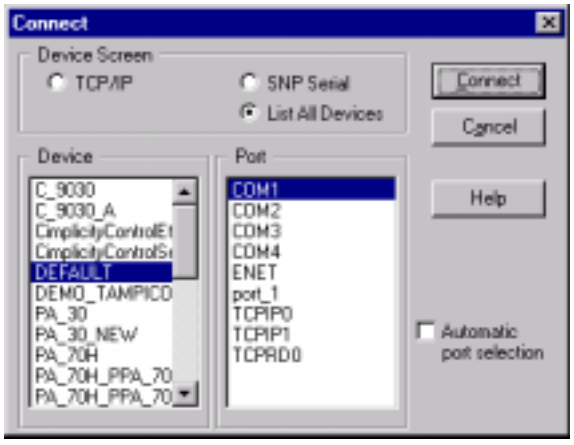
Option 1. Easily connect using a special device name, DEFAULT, which is pre-configured for SNP over COM1. DEFAULT will work for and directly connect SNP using default protocol settings (19200, odd parity, 1 stop bit).

Option 2. Use the Communication Setup Utility to configure connections using either SNP or TCPIP.

Option 1. Use DEFAULT for connection:

1. Connect the SNP cable (contained in the OpenProcess Package) from the COM1 port on your PC to the RS-485 port on your PA Controller.
2. Click Comm on the Control Workbench menu bar.
3. Select Connect.

   The Connect dialog box displays.



4. Select DEFAULT in the Device field.
5. Select COM1 in the Port field.
6. Click **Connect** to establish communication.

   A Connection in Progress message box displays.

   When the connection is made, a Connection Successful message box will display.
7. Click **OK** to complete the connection.

Result: Communication with the PA Controller will be established and the mode will default to Online.

Note: If you see a Connection Attempt Failed message box, check the physical connection from your PC to the PA Controller.

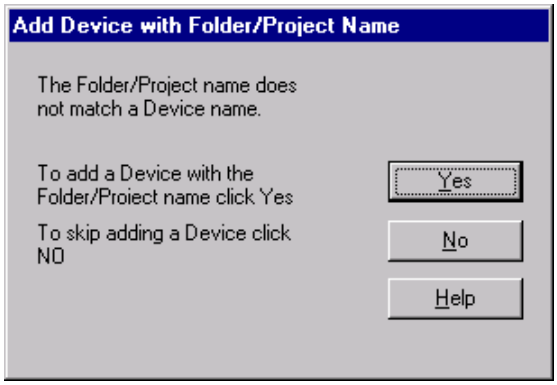
Option 2. Configure connections using user-configured settings:

1. Click Comm on the Control Workbench menu bar.
2. Choose Communication Setup.

   A password dialog box displays.
3. Enter your password.
4. Click **OK** to continue.

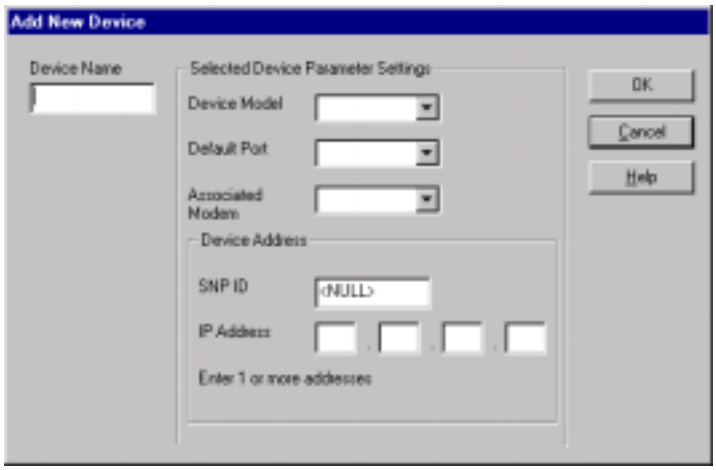
   Note: The default password is netutil.

   The Add Device with Folder/Project Name message box appears.



5. Click **Yes** to add a new device.

   The Add New Device dialog box appears.



6. Enter a name in the Device Name field.
7. Select the appropriate Device Model.

8. Set the Default Port to match the PC port.

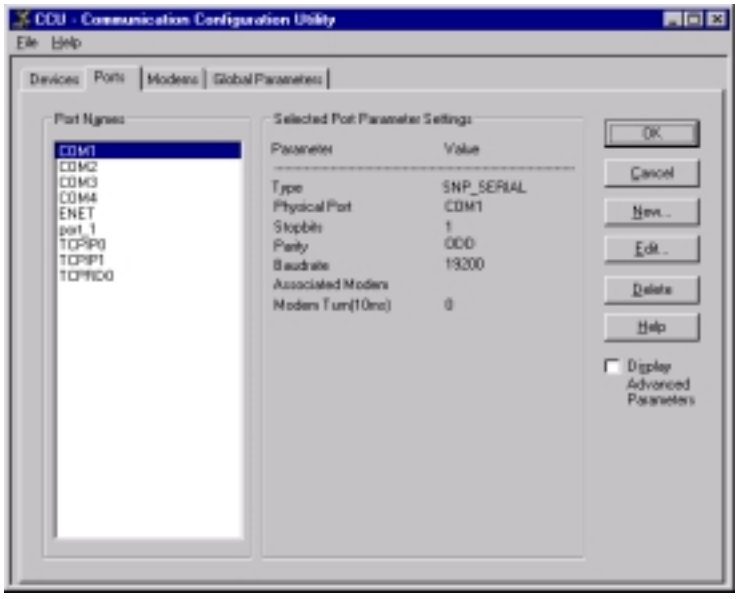
   You will be using:

   - COM1 through COM4 for serial or
   - ENET for Ethernet.

9. Enter the SNP ID for COM ports or the IP Address for an ENET port.

   Remember that the IP Address for the Ethernet module must be stored using an SNP connection first before connecting via Ethernet.

10. Select the Ports tab to change default port settings.
11. Highlight the PC port you want to modify and click **Edit**.



12. Click **OK**.
13. Click Comm on the Control Workbench menu bar.
14. Select Connect.

    The Connect dialog box displays.

15. Connect to the PA Controller using the configured device and port.

Step 2. Store Equipment Folders

After you have established a connection to the PA Controller and you are online, you can transfer Equipment Folders between your computer and the PA Controller.

To store the Equipment folder:

1. Confirm that your are connected to and online with the PA Controller
2. Open the PLC dialog box using either method.

   Method 1

   Click the **Store** Button  .

   Method 2

   A. Click Tools on the menu bar.

   B. Select Transfer Utilities.

   C. Select Store from the extended menu.

   The Store to PLC dialog box opens when you use either method.
3. Select the folder components you want to store to the PA Controller. You must select the hardware configuration and software configuration.
4. Click **Stop** to put the PA Controller in Stop Mode
5. Click **Store**.

Result: Control performs a preliminary check of the items to be stored to the PA Controller, displays the results of that check in the Store to PLC Preliminary Check Results dialog box, and prompts you to cancel or continue the store procedure.

The Store to PLC Final Results dialog box appears at the conclusion of the store operation. This dialog box enables you to review the status of each item that was processed during the store procedure. If the store is not successful, correct the problems identified in this dialog and repeat the Store procedure.

Step 3. Place the PA Controller in Run Mode

You must place the PA Controller in Run Mode in order for it to work with OpenProcess.

To place the PA controller in Run Mode:

1. Confirm that you are connected to the PA Controller and the you are online.
2. Open the Switch to Run Mode dialog box using either method.

   Method 1

   Click the **Run** button  .

   Method 2

   A. Click Comm on the menu bar.

   B. Select Run PLC..

   The Switch to Run Mode dialog box opens when you use either method.
3. Enable Outputs.
4. Click **OK**.

Configuring Ladder Logic in the PA Controller

About Ladder Logic

Ladder logic can be configured to work in concert with OpenProcess on a PA Controller. The Control Workbench is used to configure the ladder logic.

Caution: Do the ladder logic configuration with circumspection, so that the memory that is used by OpenProcess is not overwritten by ladder logic.

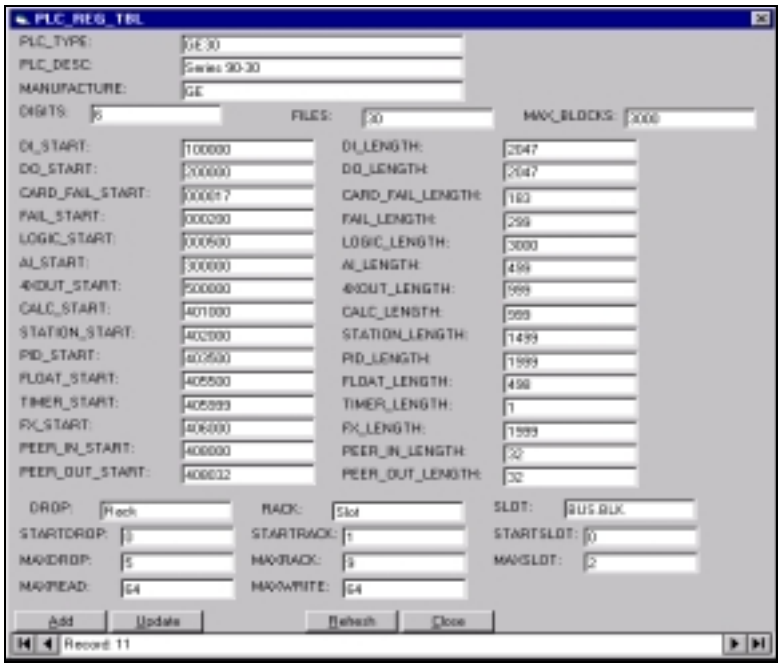
The controller memory that is used by OpenProcess is specified in the Controller Register Tool in the Designer.

To access the Register tool:

1. Click Help on the Designer menu bar.
2. Select Tools.

Result: The PLC_REG dialog box opens. You can use this tool be to view and modify the controller memory that is used by OpenProcess.

Caution: Modifications should be done with extreme care so that the integrity of the system is not jeopardized.



Converting 6-Digit Addresses for the GE Fanuc Controller

The conversion from 6 digit addresses to addressing native to GE Fanuc controllers is described in the list below:

If the Register Address Begins with:	The Equivalent Type =
00	%M
10	%I
20	%Q
30	%AI
40	%R
50	%AQ

Guidelines for each memory allocation field in the tool

OpenProcess memory can be configured to meet specific application requirements per the following list.

DI	Digital Input Instrument Tags.
Start Register	Must remain at the default value.
Length Field	Increased or decreased based on DI instrument tags used.
DO	Digital Output Instrument Tags.
Start Register	Must remain at the default value.
Length Field	Increased or decreased based on DO instrument tags used.
CARD_FAIL	Contains Card fail registers used to alarm the operator interface if a module has failed.
Start Register	Must remain at the default value. **Note:** The initial 16 %M registers are reserved for internal use.
Length Field	Increased or decreased based on Modules used.
FAIL	Contains the channel fail registers used to alarm the operator interface if a channel has failed.
Start Register	May change depending on the number of modules used but it must not overlap with any other register range.
Length Field	Increased or decreased based on analog input instrument tags used.
LOGIC	Contains logic registers used to store all discrete logic variables.
Start Register	May change depending on the number ofanalog inputs instrument tags but it must not overlap with any other register range.
Length Field	Increased or decreased based on Logic used.
AI	Analog Input Instrument Tags.
Start Register	Must remain at the default value.
Length Field	Increased or decreased based on AI instrument tags used.
4XOUT	Analog Output Instrument Tags.
Start Register	Must remain at the default value.
Length Field	Increased or decreased based on AO instrument tags used.

CALC	Is a range that contains memory registers used to store calculation variables.
Start Register	Must remain at the default value. Note: The initial 500 %R registers are reserved for internal use.
Length Field	Increased or decreased based on Calculations used.
STATION	Is a range that stores all registers used with the MA_AU, S3DRV, STRTSTOP, and TPC function blocks.
Start Register	May change depending on the number of calculation variables used but it must not overlap with any other register range.
Length Field	Increased or decreased based on Station blocks used.
PID	Is a range stores all registers used with the PID block.
Start Register	May change depending on the number of calculation variables and stations used but it must not overlap with any other register range.
Length Field	Increased or decreased based on PID blocks used.
FLOAT	Is a range that stores all registers used with the CNTR2F, CPT, and F2CNTR function blocks.
Start Register	May change depending on the number of calculation variables, stations, and PID used but it must not overlap with any other register range.
Length Field	Increased or decreased based on Floating-point blocks used.
TIMER	Is a range that stores all registers used with the TIMER and TIMER-R function blocks.
Start Register	May change depending on the number of calculation variables, stations, PID and floating point variables used but it must not overlap with any other register range.
Length Field	Increased or decreased based on Timer blocks used.
FX	Is a range that includes all registers created with the FX and IFX function blocks.
Start Register	May change depending on the number of calculation variables, stations, PID and floating point variables used but it must not overlap with any other register range.
Length Field	Increased or decreased based on Function generator blocks used.

PEER_IN	Is a range that includes all registers used to communicate between two controllers in a peer to peer network.
Start Register	May change depending on the number of calculation variables, stations, PID, floating point variables and IFX blocks used but it must not overlap with any other register range.
Length Field	Increased or decreased based on Peer to peer communication.
PEER_OUT	Is a range that includes all registers used to communicate between two controllers in a peer to peer network.
Start Register	May change depending on the number of calculation variables, stations, PID, floating point variables, IFX blocks, and PEER_IN communications used but it must not overlap with any other register range.
Length Field	Increased or decreased based on Peer to peer communication.

Important: OpenProcess uses the first 500 %R registers for commands. This register space is fixed and cannot be configured or modified.

The following table summarizes the default memory allocation for OpenProcess.

Memory Type	OpenProcess Memory	Configurable/Fixed
%R	1-500	Fixed
%R	501-8500	Configurable
%Q	1-2048	Configurable
%I	1-2048	Configurable
%AI	1-500	Configurable
%AQ	1-500	Configurable
%M	1-4096	Configurable

Important: Depending on the application the memory table above might vary. The end result is that the final memory allocation in OpenProcess must not be overwritten by Ladder Logic.

Ladder Logic configured in the PA Controller

To configure ladder logic in a:

PA 70 system	Use the **`Program _Main`**. This program is named with the last seven characters of the Equipment Folder name). This program is created when a 90-70 Folder is created.
PA 30 system	Use the same program that calls the OpenProcess C Loadable. You do this by inserting rungs after the call to the OpenProcess Loadable.

Guidelines for what references can be used in ladder logic include:

Input references	%I and %AI Ladder logic can reference digital and analog inputs used with OpenProcess.
Output references	%Q and %AQ used in OpenProcess Must *not* be used in Ladder.
Internal references	%M and %R used in OpenProcess Must *not* be used in Ladder Logic.

Creating an OpenProcess Project

Easy Steps in OpenProcess Project Configuration

The steps required to develop an OpenProcess Project are:

Step 1. Create an OpenProcess Project.

Use the HMI Workbench to access all the components necessary to configure and maintain a complete control system.

Step 2. Create the Instrument Index in the Designer.

Either use the New Instrument Tag Definition dialog box or import the instrument list from a spreadsheet application into the Designer.

Step 3. Create a PA Controller by adding it to the project through the Add Controller dialog box.

Select a controller configured in HMI in the Add Controller dialog box drop down list.

Step 4. Add and configure I/O Modules for a given controller using the Module Add/Delete dialog box..

Complete the configuration by defining the Rack, Slot, and Block position for the module and then by selecting the appropriate catalog number for the block from the drop down list.

Step 5. Assign an I/O tag to each channel on the module.

Click on the module in the OpenProcess Explorer Tree and from the project instrument index select the appropriate I/O tag.

Step 6. Create a Control Strategy.

Use DesignerCad to create drawings for the control logic.

Step 7. Compile the control drawings into program files.

Step 8. Simulate and debug compiled program files.

Download the control drawings to the simulator to be debugged. If revisions are necessary modify the drawings and re-compile them.

Step 9. Import HMI Tags from Designer into HMI once the control logic is debugged.

Step 10. Download the Control logic to the Controller.

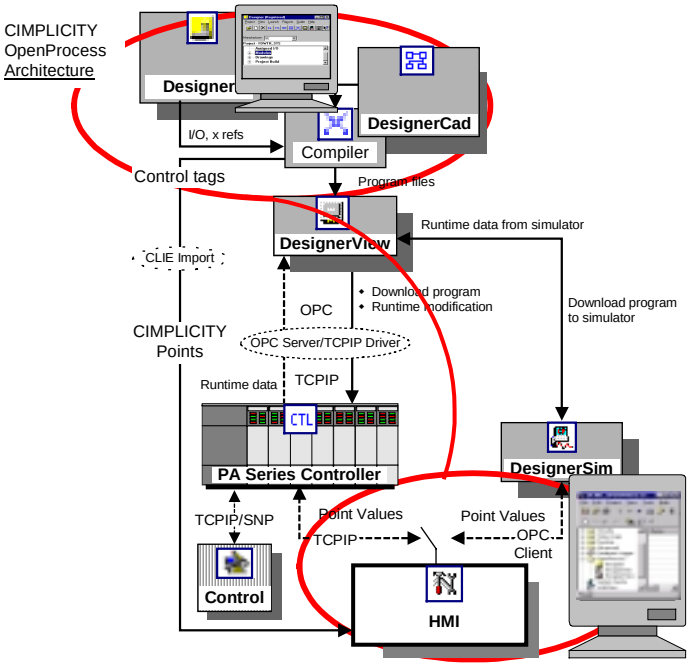
Important: It is recommended that you plan your OpenProcess project before you begin these tasks. *See the "Planning for Control Configuration" chapter in this manual for details.*

Note: Examples in this manual for planning and configuring an OpenProcess project use a simple Combine Cycle Power Plant Feedwater System to clearly illustrate each step for developing a project.

Step 1. Create an OpenProcess Project in the HMI Workbench

The CIMPLICITY OpenProcess project is subdivided into two parts: the HMI project and Designer project. The parts have the same name and automatically interact with each other.

It is through the HMI project that you access the other OpenProcess software components.



You basically create an HMI OpenProcess project the same way you create any HMI project. The OpenProcess project requires creating

- Two ports:
  1. For communication to the PLC:
     - TCP/IP, or
     - SNP/SNPX, or
     - S90 Redundancy.
  2. For communication to DesignerSim
     - OPC Client or
     - TCP/IP.
- One device for each OpenProcess controller that can switch between ports.

You can divide the configuration of the OpenProcess project into four easy tasks. Each task has its own series of actions.

Tasks include:

Task 1. Create the HMI part of the OpenProcess project.

Task 2. Create two ports for the HMI OpenProcess project.

Task 3. Create one device for the HMI OpenProcess project.

Task 4. Create the Designer part of the OpenProcess project.

Step 1. Task 1
Create the HMI Part of the OpenProcess Project

You begin to create an OpenProcess project in the (CIMPLICITY) HMI Workbench.

Note: You can configure several aspects of the project through the HMI project Wizard that appears during configuration. However, you can choose to finish project creation and configure applications, including the ports and device, separately. The configuration steps listed below choose the latter option.

The actions to begin creating the Feedwater system HMI OpenProcess project are:

Action 1. Open the HMI Workbench.

Action 2. Create a new HMI project.

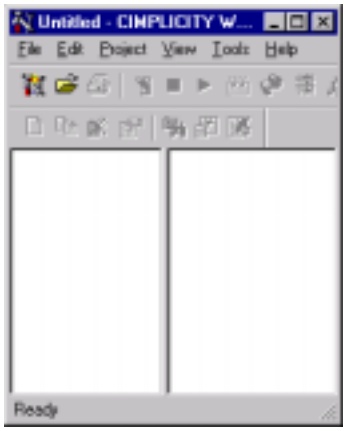
Action 3. Configure the new project's general properties.

Action 4. Finish the HMI project creation.

Step 1. Task 1
Action 1
Open the HMI Workbench

1. Click **Start** on the Windows task bar.
2. Select Programs.
3. Select CIMPLICITY.
4. Select HMI.
5. Select Workbench.

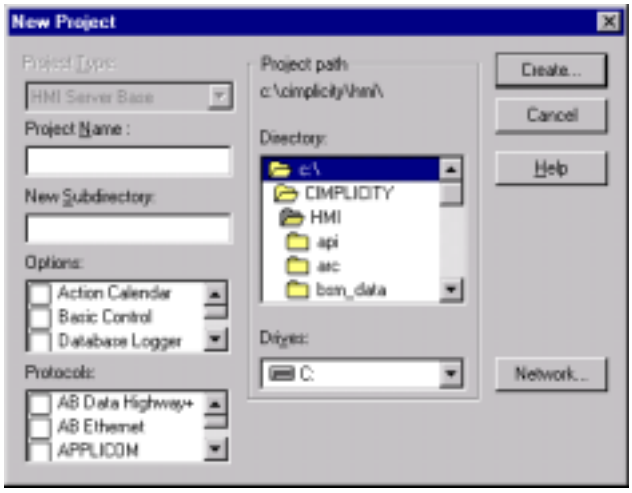
Result: A blank HMI Workbench opens.



Step 1. Task 1
Action 2
Create a New HMI Project

1. Click File on the Workbench menu bar.
2. Select New.
3. Select Project from the extended menu.

   The New Project dialog box opens.



4. Enter a name for the project in the Project Name field.

   The New Subdirectory field is automatically filled in as you type.

5. Check OpenProcess in the Options scroll field. (Also check any other HMI options that you want to include.)
6. Check the following in the Protocols scroll field.

   Tto communicate through the serial port

   - Series 90 Ethernet (TCP/IP) and/or
   - SNP and/or
   - Series 90 Redundancy.

   And to communicate with the Open Process simulator

   - OPC Client

7. Open the folder for the directory in which you want to create the project.

   Tip: Create a directory on the same drive as your HMI project, but not in the CIMPLICITY folder. This will help insure the project's safety in case you decide to delete and re-install HMI at a future date.

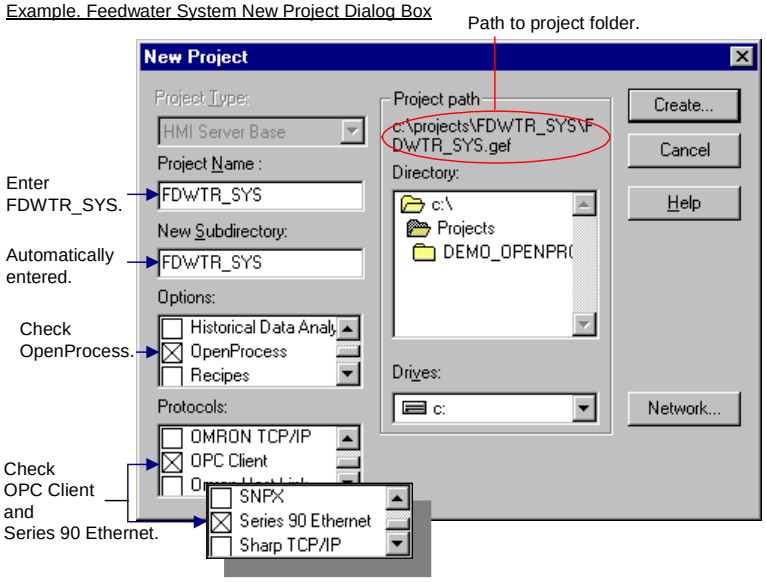
9. Click **Create**.

Result: The Options tab of the Project Properties dialog box opens.

Tutorial Example. Create a New HMI Project

1. Enter FDWTR_SYS in the Project Name field.
2. Check the following protocols.
   - Series 90 Ethernet (TCP/IP) to communicate through the serial port.
   - OPC Client to communicate with the OpenProcess simulator.

Example. Feedwater System New Project Dialog Box



End of Tutorial Example

Step 1. Task 1
Action 3
Create an HMI OpenProcess Project

1. Enter general information in the Options tab of the Project Properties dialog box, including:

   A. Check Enable project broadcast if you want to broadcast the project name on the network.

   When you broadcast the project name, users on other nodes that request point data can use the project name in fully qualified points. Otherwise, they can only use the node name in fully qualified points.

   B. Select the computer on which the project will reside in the Computer name field.

   C. Enter the number of minutes in the Startup timeout field that HMI should wait for the project to start before it times out.

   The default is 10 minutes.

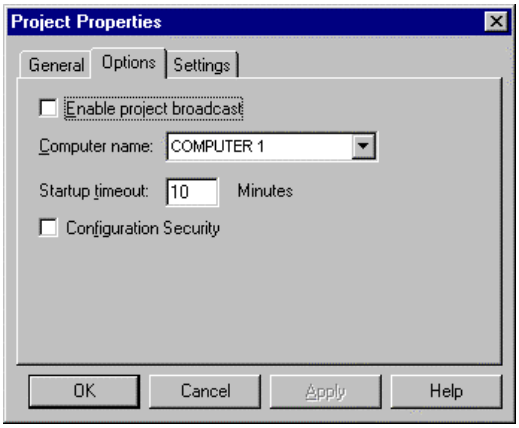
D. Check Configuration security to restrict user configuration access to any or all of HMI's applications. *See the "Setting up an HMI Project" chapter in the HMI Base System User's Manual (GFK-1180) for more information about configuration security.*

2. Click **OK**.

Result: the CIMPLICITY Project Wizard Step 1 of 3 dialog box opens.

Tutorial Example. Create an HMI OpenProcess Project

Use the default entries.



End of Tutorial Example

Step 1. Task 1
Action 4
Finish the HMI Project Creation

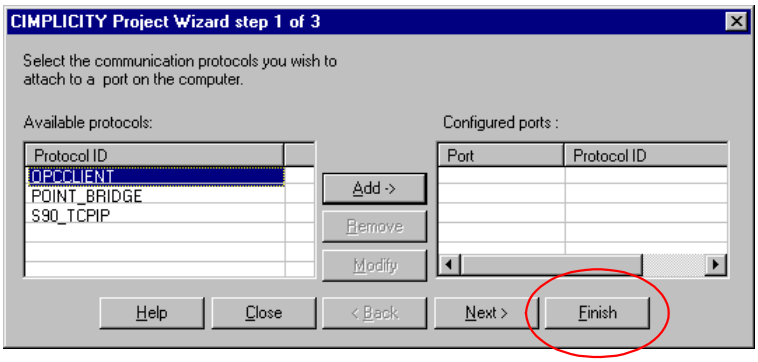
Click **Finish** in the CIMPLICITY Project Wizard step 1 of 3 dialog box.

Result: HMI creates the project with the name and general properties in the folder that you specified.

Note: You can, as an alternative to the procedure described here, use the CIMPLICITY Project Wizard to configure the HMI OpenProcess project ports and device.

Tutorial Example. Finish the HMI Project Creation

Click **Finish**.



End of Tutorial Example

Step 1. Task 2
Create Two Ports in HMI

The HMI OpenProcess project requires two ports in order to connect a device to communicate with the PLC and to DesignerSim.

The steps to create ports are the same as for any ports in an HMI project. The entries are specific to the OpenProcess configuration.

The tasks to create ports in the HMI part of an OpenProcess project include:

Action 1. Enable the protocols required for the OpenProcess project.

Action 2. Configure a port to communicate with the automated programmable controller.

Action 3. Configure an OPC Client port to communicate with DesignerSim.

Step 1. Task 2
Action 1.
Enable Protocols in HMI

Note: If you enabled the required protocols when you created the project you can use this step to confirm that they are enabled or skip it.

Action 1. Enable protocols in HMI:

1. Click Project on the Workbench menu bar.
2. Select Properties.

   The Project Properties dialog box opens.
3. Select the General tab.
4. Scroll up and/or down in the Protocols box to find the protocols selected for your project.
5. Check the protocols' check boxes if they are not already checked.

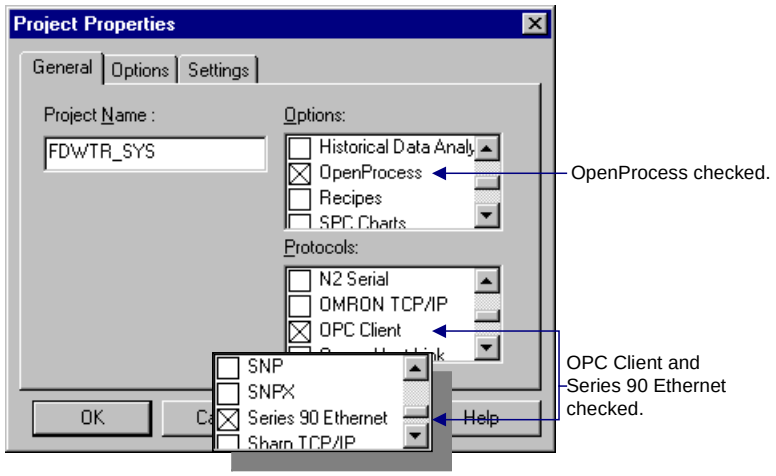
Result: The protocols are now enabled.

Note: If the protocol does not appear in the Protocol box, use the HMI installation CD to add the protocol.

Make sure the following protocols are checked on the General tab in the Project Properties dialog box.

- Series 90 Ethernet (TCP/IP) to communicate through the serial port.
- OPC Client to communicate with the OpenProcess simulator.

Example. Feedwater System Project Properties Dialog Box



End of Tutorial Example

Step 1. Task 2
Action 2
Configure a Port to Communicate with the Controller

One port that you configure will connect with the PA Series controller.

See the "Port Configuration" chapter in the HMI Base System User's Manual, GFK-1180, for general information about configuring ports.

See the relevant chapter in the HMI Device Communications Manual, GFK-1181, for detailed information about a specific port.

Action 2. Configure a port to communicate with the controller:

1. Expand the Equipment folder in the left pane of the Workbench.
2. Double-click **Ports** 

   The New Port dialog box opens.
3. Select the protocol that applies to your configuration in the Protocol field.
   - For TCP/IP, or
   - SNP/SNPX, or
   - S90 Redundancy.

The next available port for that protocol appears in the Port field.

4. Select the port to which the device will be attached in the Port field, if the port is different from the port that displays.
5. Click **OK**.

   The Port Properties dialog box opens.
6. Configure the General tab of the Port Properties dialog box.
   A. Enter a description of the port in the Description field.

      This description aids you in identifying the port by appearing in the Description column in the right pane of the Workbench (default view).

   B. Enter the interval length between scans in the Scan Rate field. The time type options are:
      - Seconds
      - Minutes
      - Hours

   C. Enter the number of times HMI should retry scanning the device if a communications error is encountered in the Retry Count field.

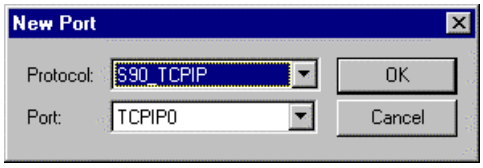
      If communications cannot be established, devices on this port are considered to be down, and a **$DEVICE_DOWN** alarm is generated for each device.

      Once a device is down, periodic attempts are made to resume communications to the device.

   D. Check the Enable checkbox to enable communications on this port.
7. Configure the specific tab for the port you have selected.
8. Click **OK**.

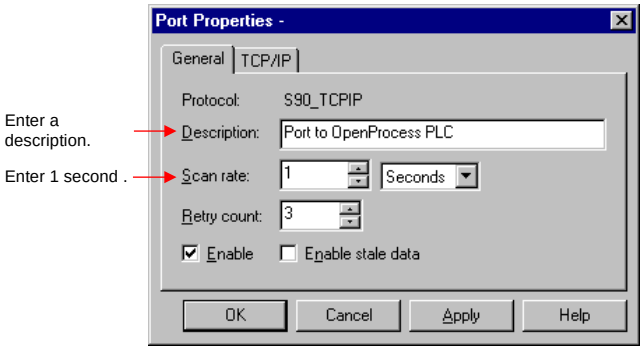
Result: The port for the PLC is configured.

1. Select the S90_TCPIP protocol in the New Port dialog box.
2. Click **OK**.

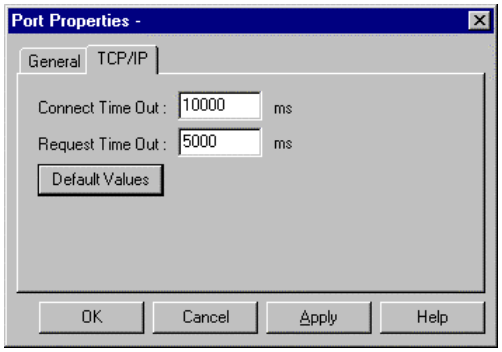


3. Enter the following on the General tab in the Port Properties dialog box.

Field	Enter
Description	Port to OpenProcess PLC.
Scan rate	1 second.
Other fields	Use the defaults.



4. Use the defaults on the TCP/IP tab.



End of Tutorial Example

Step 1. Task 2
Action 3
Configure an OPC Client Port to Communicate with DesignerSim

OpenProcess uses an OPC Client port in order to communicate with DesignerSim.

Action 3. Configure an OPC Client port to communicate with DesignerSim:

1. Expand the Equipment folder in the left pane of the Workbench.
2. Double-click **Ports**  .

   The New Port dialog box opens.
3. Select OPCClient in the Protocol field.
4. Select an OPC port. In most cases the port will be OPC_0.
5. Click **OK**.

   The Port Properties dialog box opens.
6. Configure the General tab of the Port Properties dialog box.
   A. Enter a description of the port in the Description field.

      This description aids you in identifying the port by appearing in the Description column in the right pane of the Workbench (default view).

   B. Enter the interval length between scans in the Scan Rate field. The time type options are:
      - Seconds
      - Minutes
      - Hours

   C. Enter the number of times HMI should retry scanning the device if a communications error is encountered in the Retry Count field.

      If communications cannot be established, devices on this port are considered to be down, and a **$DEVICE_DOWN** alarm is generated for each device.

      Once a device is down, periodic attempts are made to resume communications to the device.

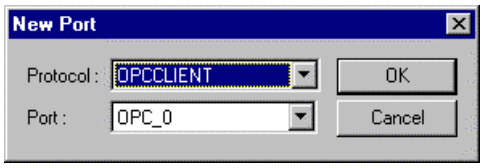
   D. Enter a Scan rate that your equipment can accommodate.

   E. Check the Enable checkbox to enable communications on this port.
7. Leave the default entries on the Default tab.
8. Click **OK**.

Result: The port for DesignerSim is configured.

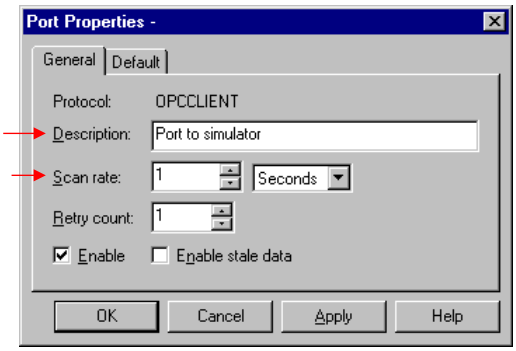
Tutorial Example. Configure an OPC Client Port

1. Select the OPCCLIENT protocol in the New Port dialog box.
2. Click **OK**.

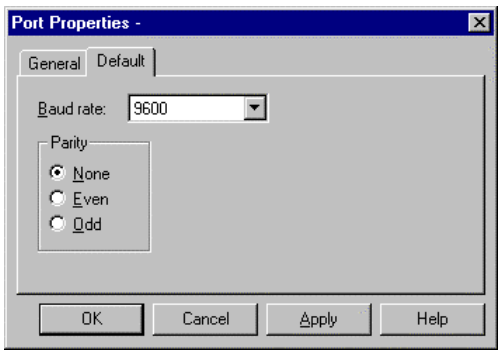


3. Enter the following on the General tab in the Port Properties dialog box.

Field	Enter
Description	Port to Simulator.
Scan rate	1 second.
Other fields	Use the defaults.



4. Use the defaults on the Defaults tab.



End of Tutorial Example

Step 1. Task. 3
Configure a Device in HMI

The device for the HMI OpenProcess project needs to be able to switch between the port that communicates with the PLC and the port that communicates with DesignerSim.

The tasks to configure this type of device include:

Action 1. Create a device in HMI.

Action 2. Configure the OpenProcess device's properties–General Tab.

Action 3. Configure the OpenProcess device's properties–Default Tab.

Step 1. Task 3
Action 1
Create a Device in HMI

1. Expand the Equipment folder in the left pane of the Workbench.
2. Double-click **Devices** 

.

   The New Device dialog box opens.
3. Enter for the device in the Device field.
4. Select **MASTER_OPC_0** in the Port field

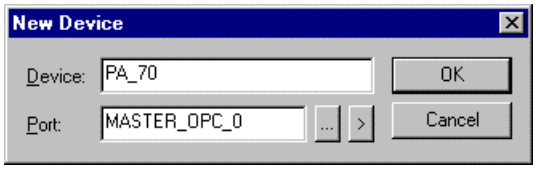
   where

   MASTER_OPC_0 is the port that will be used for communication with DesignerSim.
5. Click **OK**.

Result: The PA70 device's Device Properties dialog box opens.

Tutorial Example. Create a Device in HMI

1. Enter PA_70 in the Device field in the New Device dialog box.
2. Select a MASTER_OPC port. The port most likely will be MASTER_OPC_0.



2. Click **OK**.

End of Tutorial Example

Step 1. Task 3
Action 2
Configure General Properties for the Device

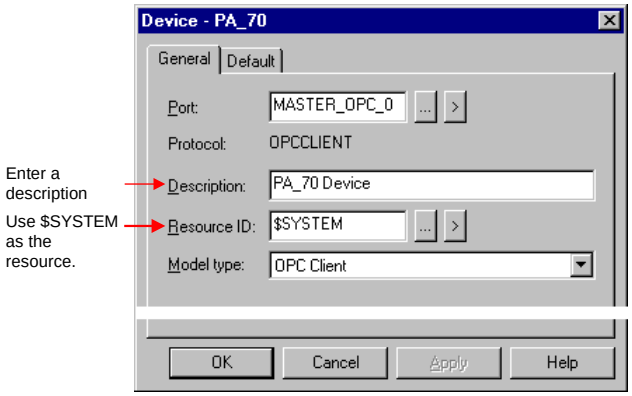
1. Confirm that MASTER_OPC appears in the Port field.
2. Enter a description in the Description field.
3. Choose $SYSTEM in the Resource field.
4. Make sure the Model Type is OPC Client.

Result: HMI uses the default entries. The description displays in the Description field in the Workbench.

Tutorial Example. Configure General Properties for the Device

Enter the following on the General tab in the Device dialog box.

Field	Enter
Description	PA_70 Device.
Resource	$SYSTEM
Other fields	Use the defaults.



End of Tutorial Example

Step 1. Task 3
Action 3
Configure the Device's Specific Properties

1. Select the Default tab in the Device dialog box.
2. Enter **`designersim;<`***controller name***`>`** in the Address field.

   Where

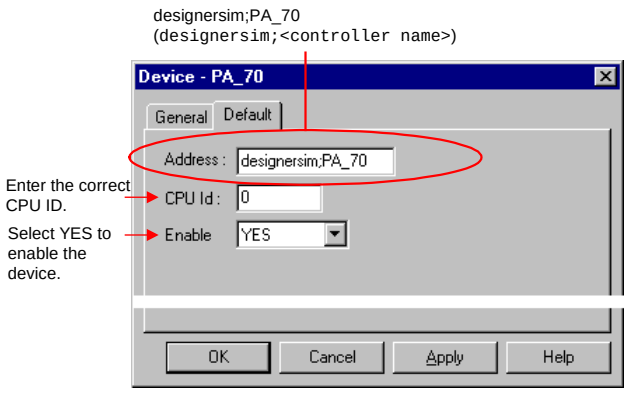
   <*controller name*> is the name of the controller configured for OpenProcess..
3. Check that the CPU ID is correct.
4. Select YES in the Enable field to enable the device.
5. Click **OK**.

Result: The device is now configured to switch between the OpenProcess DesignerSim and a port to a PLC.

Tutorial Example. Configure the Device's Specific Properties

Enter the following on the Default tab in the Device dialog box.

Field	Enter
Address	**`Designersim;PA_70`**.
CPU ID	The correct CPU ID.
Enable	YES, the default.



End of Tutorial Example

Step 1. Task 4
Create the Designer Part of the OpenProcess Project.

The actions to create the Designer part of the OpenProcess project are:

Action 1. Open the Open Process Designer through the HMI Workbench.

Action 2. Create the Designer part of the OpenProcess project.

Step 1. Task 4
Action 1
Open the Designer

Important: You must open the OpenProcess Designer through the Workbench in order to create the required links for importing points.

Action 1. Open the Designer:

1. Open the HMI Workbench.
2. Open the HMI part of the OpenProcess project.
   A. Select Open.

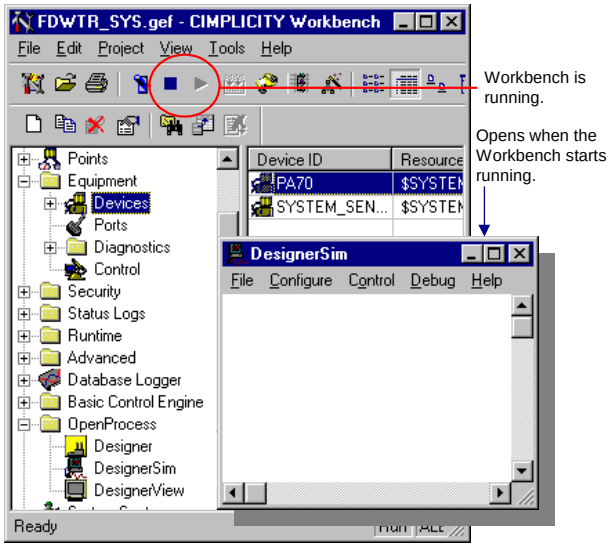
      The Open dialog box appears.

   B. Select the folder that contains your OpenProcess project.
   C. Double-click the .GEF file.

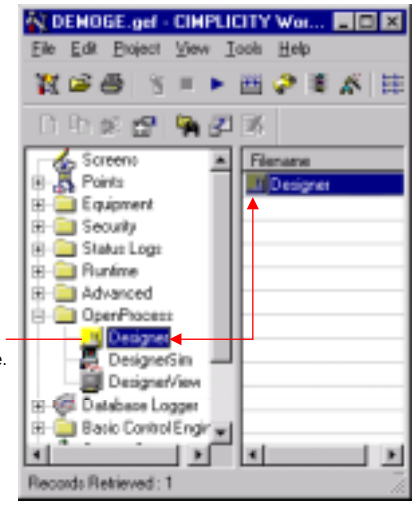
      The OpenProcess project becomes the active project in the Workbench.

3. Click the Run button  on the Workbench toolbar.

The HMI Workbench starts running and the DesignerSim window appears.



4. Expand the OpenProcess folder in the left pane of the Workbench.
5. Double-click **Designer**  Designer in the left pane or right pane (when selected in the left) of the Workbench.



The Log On dialog box displays in front of the Designer window.

8. Enter your Name and Password.
9. Click **Enter**.

   Successful appears above **Enter** if the name and password are correct.

10. Click **Close**.

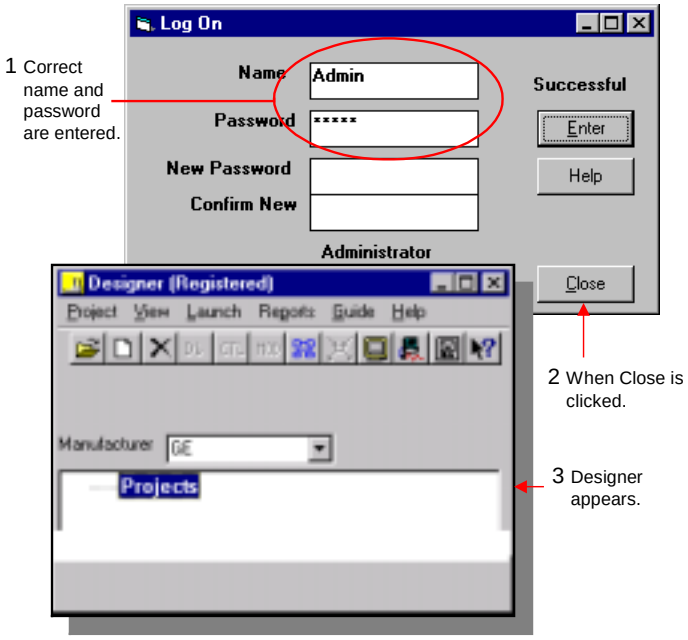
Result: The Designer window displays.

1. Select the **FDWTR_SYS.gef** file to open the HMI part of the FDWTR_SYS project.
2. Click the **Run** button on the HMI Workbench toolbar.
3. Click Designer in the HMI Workbench left pane.

   The Log On dialog box displays in Designer:
4. Log on to Designer.
   A. Enter Admin in the Name field.
   B. Enter Admin in the Password field.
   C Click **Close**.

   Designer displays.

Example: Display Designer



End of Tutorial Example

Step 1. Task 4
Action 2
Create the Designer Part of the OpenProcess Project

Action 2. Create the Designer part of the OpenProcess project:

1. Click Project on the Designer menu bar.
2. Select New.

   The CIMPLICITY Designer New Project dialog box opens displaying the name of the OpenProcess project.
3. Click **Create**.

Result: Open Process Designer creates the Designer part of the OpenProcess project with the same name as the HMI part.

The new Designer project

- Is created in the \\OpenDesigner\Proc5M directory.
- Is added to the tree under Projects.

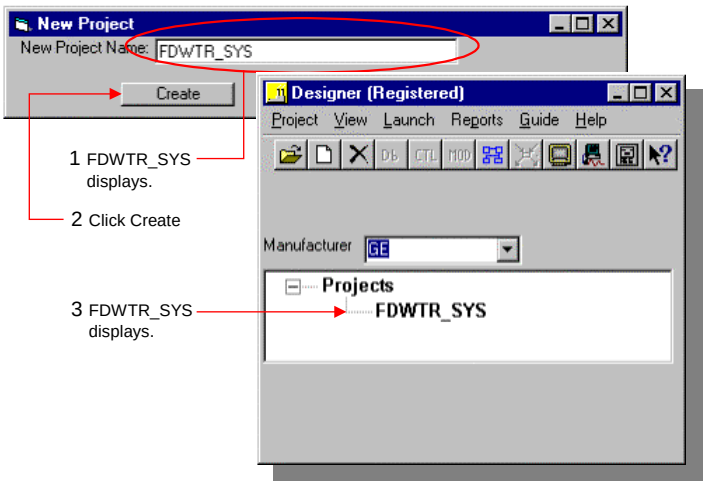
Tutorial Example. Create the Designer part of the OpenProcess Project

1. Open the New Project dialog box.

   FDWTR_SYS displays in the New Project Name field.
2. Click **Create**.

   OpenProcess creates the Designer part of the FDWTR_SYS project.

Example. Create OpenProcess Project in Designer



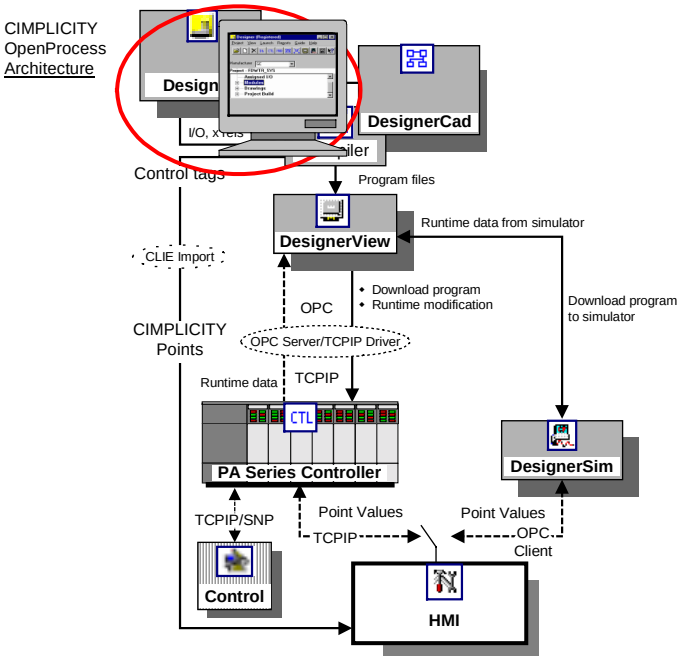
End of Tutorial Example

Step 2. Create an Instrument Index

You create the instrument index for an OpenProcess project in the Designer. You can create the instrument index can be accomplished by

- Using the New Instrument Tag Definition dialog box or
- Importing a spreadsheet into the Designer.

Use the New Instrument Tag Definition dialog box to configure the instrument index.



Step 2. Create an instrument index:

1. Double-click the OpenProcess project in the Designer.

   Designer displays the project's tree.
2. Right-click project I/O in the Designer project tree.
3. Select New Tag from the popup menu.

   The New Instrument Tag Definitions dialog box opens.
4. Fill in the fields as follows information using your project's instrument list.

Field	Value
TAG	Name of the instrument signal.
DESCRIPTION	A description of the tag.
ENGR_MIN	Minimum value of the engineering units.

ENGR_MAX	Maximum value of the engineering units.
ENGR_UNITS	Engineering Units.
SIGNAL TYPE	The physical signal time, e.g. milli-amperes or volts.
SIGNAL_MIN	Minimum physical signal, typically 4 or 20 (automatically entered when the signal type is selected).
SIGNAL_MAX	Maximum physical signal, typically **??** or 20 (automatically entered when the signal type is selected).

5. Click **Add**.

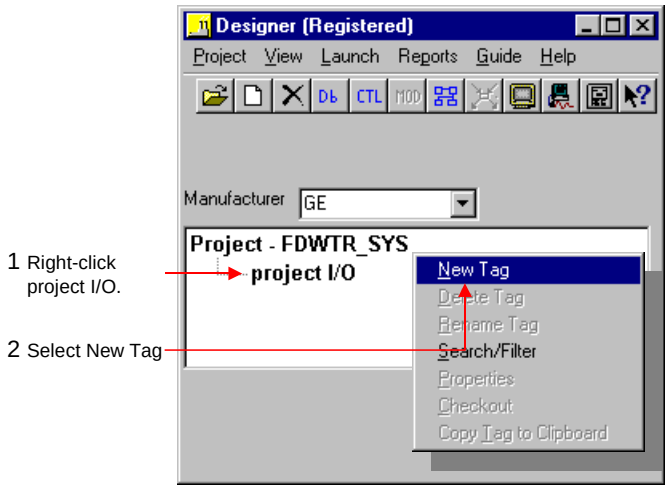
   A blank New Instrument Tag Definition dialog box appears.

5. Enter the information for the next instrument in your project's instrument list.
6. Repeat 4 and 5 in this task until all of the instruments in the list are entered.
7. Click **Add** to add the last instrument entered.
8. Click **Close**.

Result. The Designer displays the list of instrument tags and accompanying data that are now available.

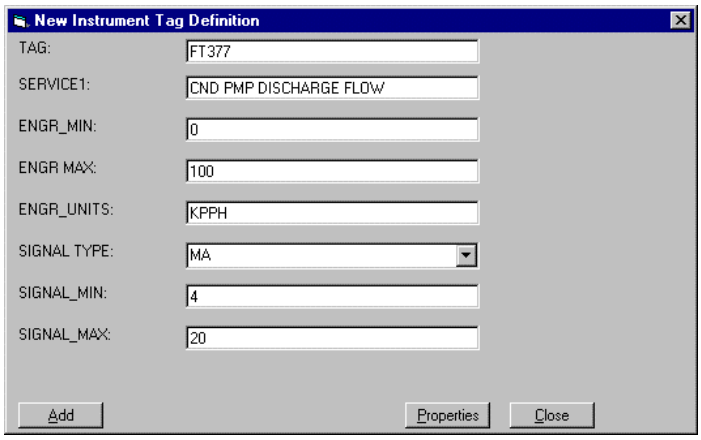
Tutorial Example. Create an Instrument Index

1. Right-click project I/O in the FDWTR_SYS project.



2. Enter the following values in the New Instrument Tag Definitions dialog box fields.

Field	Value
TAG	FT377
SERVICE1	CND PMP DISCHARGE FLOW
ENGR_MIN	0
ENGR MAX	100
ENGR_UNITS	KPPH
SIGNAL TYPE	MA
SIGNAL_MIN	4 (automatically entered)
SIGNAL_MAX	20 (automatically entered)



3. Click **Add**.
4. Enter the information for the next instrument in the FDWTR_SYS Project Instrument List (below).

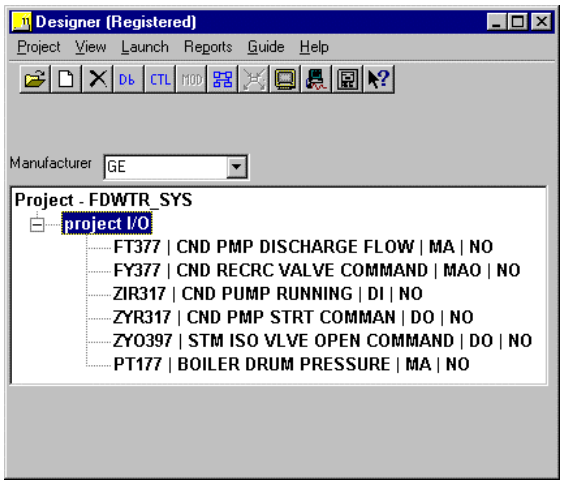
5. Repeat 3 and 4 in this task until all of the instruments in the list are entered.

FDWTR_SYS Project Instrument List

Tag Name	Description	Eng. Min - Max	Eng. Units	Signal Type	Signal Min – Max
FT377	Condensate Pump Discharge Flow	0 - 100	KPPH	MA	4 - 20
FY377	Condensate Recirculation Valve Command	0 - 100	PCT	MAO	4 - 20
ZIR317	Condensate Pump Running	OFF - ON	NONE	DI	115
ZYR317	Condensate Pump Start Command	STOP - START	NONE	DO	115
ZYO397	Steam Isolation Valve Open Command	Close - Open	NONE	DO	115
PT177	Boiler Drum Pressure	0 - 120	PSIG	MA	4 - 20

6. Click **Add** to add the last instrument entered (PT177).
7. Click **Close**.

   The Designer displays the list of instrument tags and accompanying data that are now available.



End of Tutorial Example

Step 3. Create a Controller

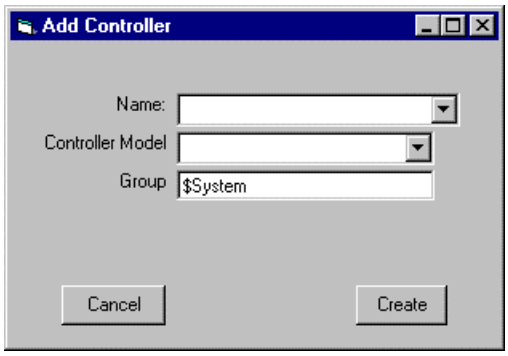
You add the PA controller to the project through the Add Controller dialog box.

Important: The controller name must be the same as the name of the device configured in the HMI Workbench.

Step 3. Create a controller:

1. Make sure the OpenProcess project is open in the Designer.
2. Click Guide on the Designer menu bar.
3. Select Controllers.

   The Add Controller dialog box opens.



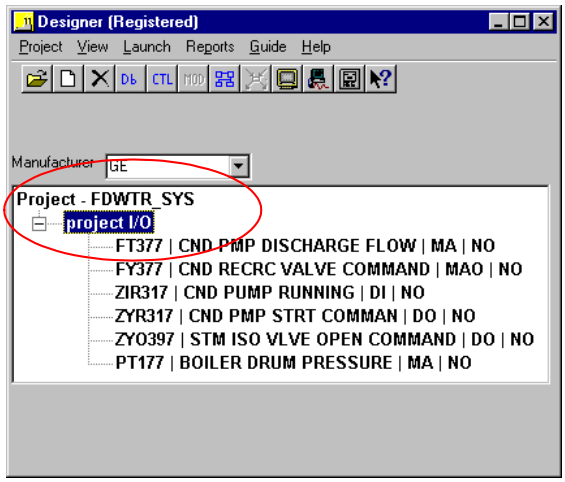
4. Select the controller from the Name drop down list.
5. Select the series from the Controller Model drop down list.

   Important: The controller name and HMI device name must be the same.

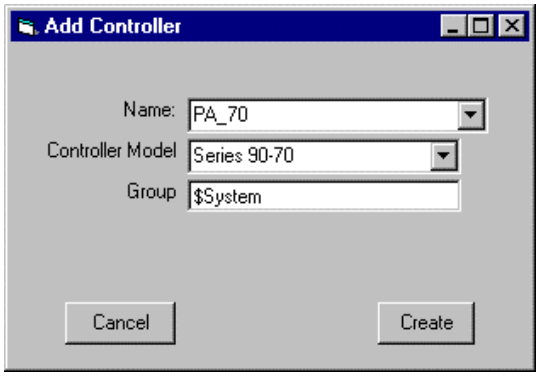
6. Leave $System as the entry in the (resource) Group field.
7. Click **Create**.

Result: OpenProcess creates the controller for this project.

1. Make sure the FDWTR_SYS project is open in the Designer.

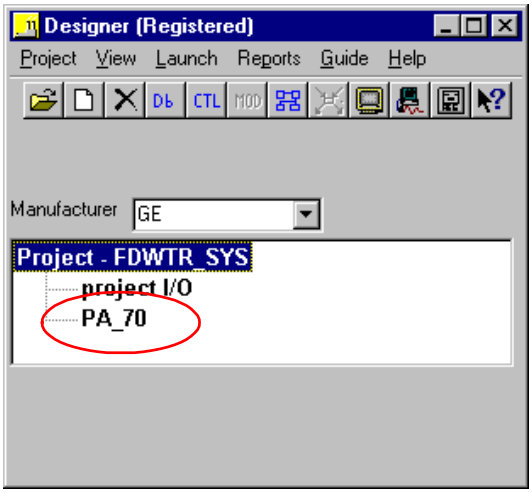


2. Open the Add Controller dialog box.
3. Select PA_70 from the Name drop down list.
4. Select Series 90-70 from the Controller Model drop down list.



5. Click **Create**.

   The PA_70 controller appears in the FDWTR_SYS tree.



End of Tutorial Example

Step 4 Add I/O Modules to the Controller

The Designer tree is split into two levels, Project and Controller.

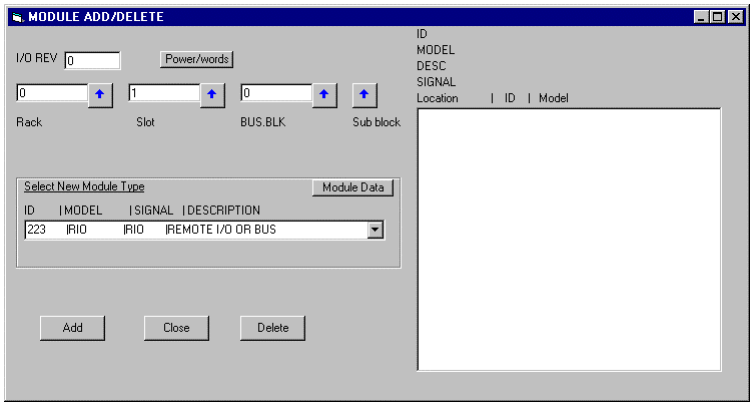
On the project level the project I/O and controllers are defined. For each controller in the project tree you can click on the controller and expand into the Designer controller tree. The controller tree is where you define the I/O modules for a particular controller.

Step 4. Add I/O modules to the controller:

1. Double-click the controller the you created in Step 3. *See page27*

   The controller opens.
2. Select Modules.
3. Click the right mouse button.
4. Select Add Module from the popup menu.

   The Module Add/Delete dialog box opens. .



5. Enter the controller configuration revision number in the I/O Rev field.
5. Select the power supply as follows:
   A. Click **Power/words** to tally the amps remaining for a given power supply.

      The Power/Words dialog box opens.
   B. Select the power supply from the drop down list.
   C. Click **Confirm Selection**.
   D. Click **Update**.
   E. Click **Close**.

      The Module Add/Delete dialog box reappears.

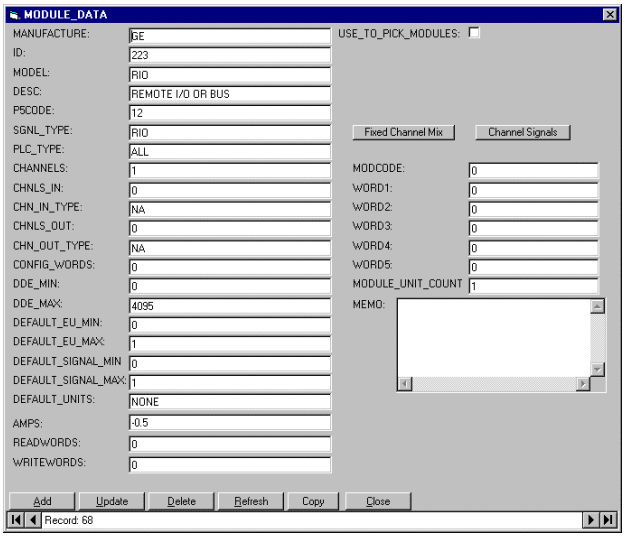
6. Enter data in the following fields:

Field	Enter:
Rack	Controller Rack number. Typically assign a value of zero.
Slot	The physical location of the I/O Card in the Controller rack.
BUS.BLK	The serial bus address for either a Genius Bus Interface or Genius Block.
Sub block	The position of a Field Control Module on a Field Control Stick.

7. Select the module you need in the Select New Module Type drop down list.

   All modules for a given Controller are accessed through this drop-down menu. The model number, I/O type, and description are given for every module.

   Tip: If you need more information about a selected module, click **Module Data** to open the Module Data dialog box. This dialog box should only be edited by technical support or advanced users.



8 Click **Add** to add the selected module to the Module List.

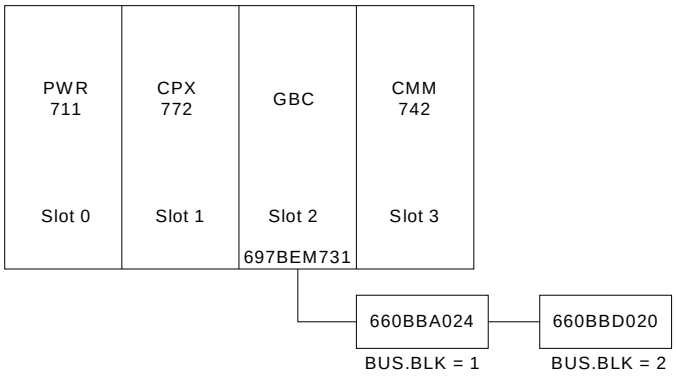
9. Continue until you have added all of the modules to the project:

10. Click Close to close the dialog box.

Result: OpenProcess adds the selected modules to the project.

Tip: Click **Delete** to delete a selected module.

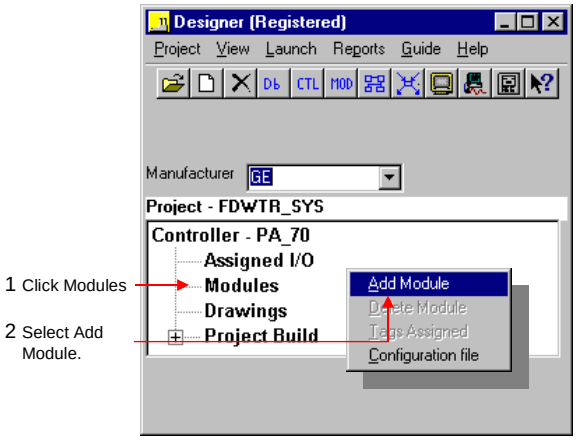
The I/O modules for the PA_70 controller are the Genius blocks BBA024 and BBD020. The physical rack is shown below.



1. Double-click PA_70.

   The PA_70 controller tree displays.

2. Open the Module Add/Delete dialog box.

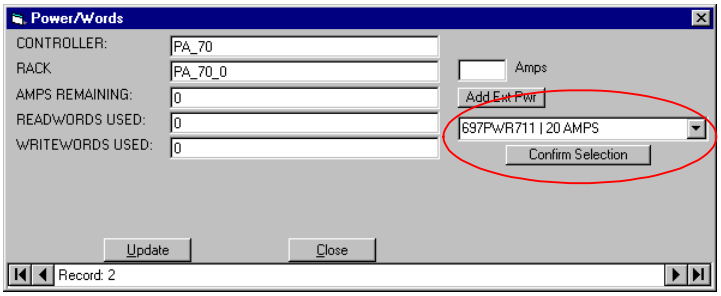


3. Select the power supply.

   A. Click **Power/words.**

      The Power/Words dialog box opens displaying defaults for the PA_70.

   B. Select the power supply 697PWR711 from the drop down list.



C. Update and close the Power/Words dialog box.

The Module Add/Delete dialog box reappears.

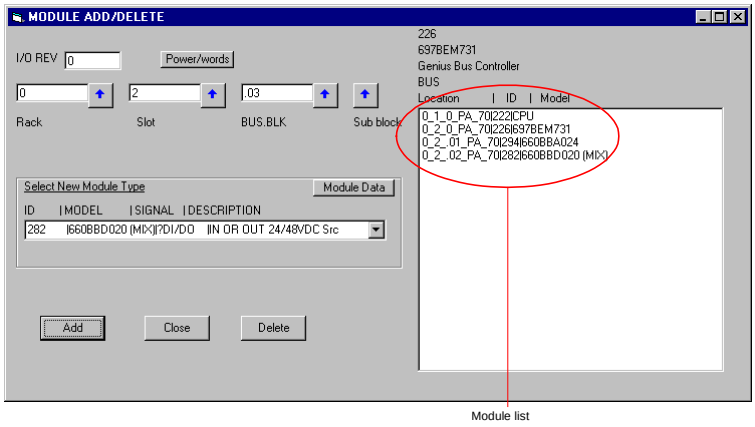
4. Enter the CPU processor as follows.
   A. Enter 0 in the Rack field.
   B. Enter 1 in the Slot field.
   C. Enter 0 in the BUS.BLK field.
   D. Select Model number CPU from the Select New Module Type drop down list.
5. Enter the first module that appears in the Modules table below.
   A. Enter 0 in the Rack field.
   B. Enter 2 in the Slot field.
   C. Enter 0 in the BUS.BLK field.
   D. Select Model number 697BEM731 from the Select New Module Type drop down list.
   E. Click **Add**.

   The module appears in the Module list.
6. Repeat 5 until you have added all the modules in the Modules table.

Modules

Module Number	Rack	Slot	Bus.Blk	Module Type
697BEM731	0	2	0	Bus Controller
660BBA024	0	2	.01	Mixed Analog
660BBD020	0	2	.02	Mixed Digital

The modules appear in the Module list.

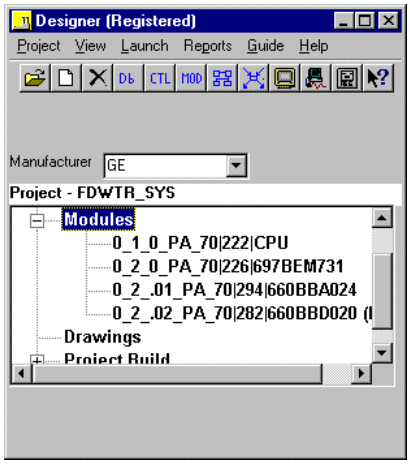


7. Click **Close**.

   The Designer window reappears.

8. Expand Modules.

   The added modules appear in the Modules tree.



End of Tutorial Example

Step 5. Assign an I/O to Each Channel on the Module

You can now assign the instrument tags you configured in Step 2 to the I/O modules configured in Step 4.

Step 5. Assign I/O tags to each channel on the module:

1. Expand Modules in the Controller Tree.
2. Double-click a selected module.

   The Assign Tags dialog box opens.
3. Click in the Tag-field for the point to be associated with the tag..

   The field is activated. An **Apply** button appears.
4. Select a tag from the in the Tag-field drop down list.
5. Click **Apply**.

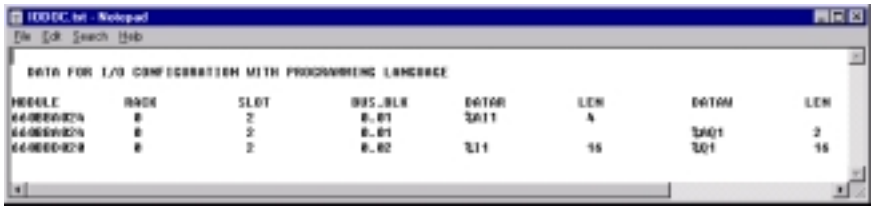
   The selected tag appears in the field. The **Apply** button disappears.
6. Repeat 3-5 to assign remaining instrument tags.
6. Close the Assign Tags Dialog for the selected module.
7. Continue selecting modules and assigning tags until all of the necessary assignments are made.

Result. OpenProcess assigns the selected tags to the selected I/O modules.

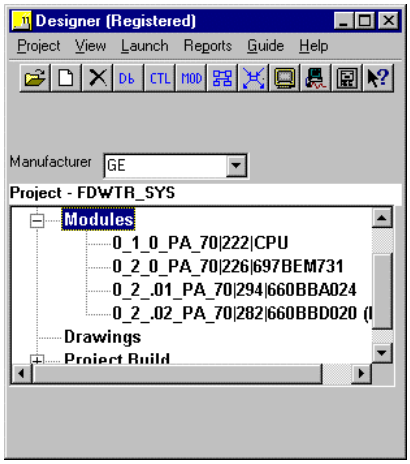
Tip: After compiling the I/O (Step 7), a configuration file will be produced. You can access the configuration file as follows:

1. Select Modules.
2. Click the right mouse button
3. Select Configuration file.

The configuration file is necessary to transfer the information for I/O configuration to the Hardware Configuration in Control. Therefore once the I/O is configured and compiled in the Designer, use the configuration file (IODOC.txt) to transfer the information from the Designer to Control.

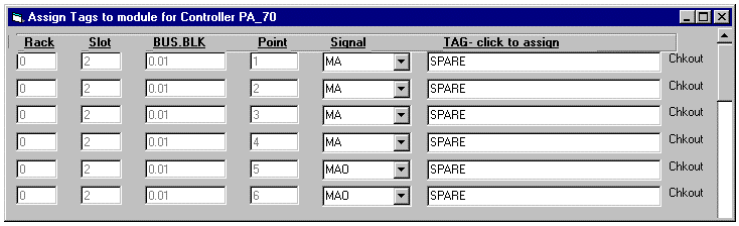


1. Expand Modules in the Controller Tree.



2. Double-click 660BBA024.

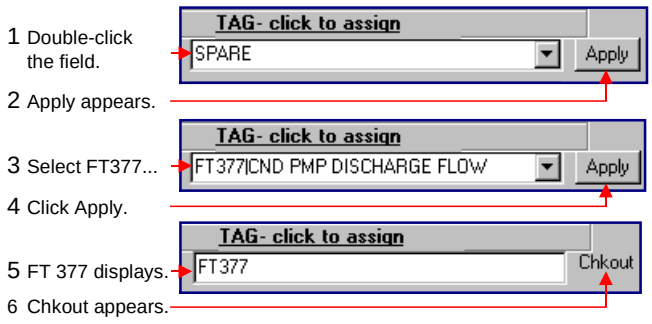
   The Assign Tags dialog box opens.



3. Click in the Tag-field for Point 1.
4. Select FT377 from the drop down list.
5. Click **Apply**.

   FT377 appears in the field.

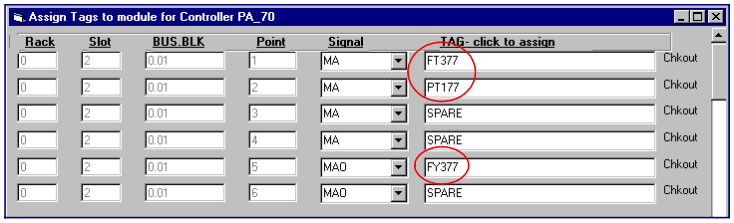
Example. Tag Field in the Assign Tags to Module Dialog Box



6. Repeat 3-5 to assign two other instrument tags as follows.

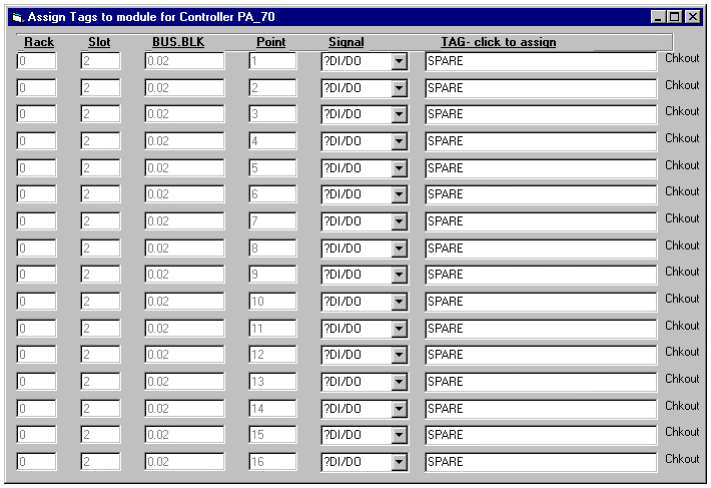
Instrument Tag	Assigned to Point
PT177	2
FY377	5

The filled in Assign Tags To Module dialog box for module 660BBA024 appears as follows.



6. Close the Assign Tags Dialog for the 660BBA024 module.
7. Double-click the 660BBD020 module.

The Assign Tags to Module dialog box opens displaying fields for a mixed digital Genius block. Each point can be configured as a digital input or as a digital output.



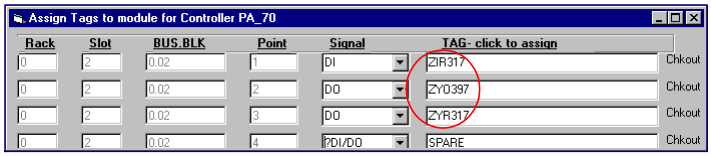
8. Define the signal field as shown below.

Signal	Assigned to Point
DI	1
DO	2
DO	3

9. Assign the instrument tags as follows:

Instrument Tag	Assigned to Point
ZIR317	1
ZYO397	2
ZYR317	3

The filled in Assign Tags To Module dialog box for module 660BBD020 appears as follows.



10. Close the Assign Tags to Module dialog box.

End of Tutorial Example

Step 6. Create a Control Strategy

Process control logic diagrams are developed using DesignerCad.

You do the following to build the control strategy.

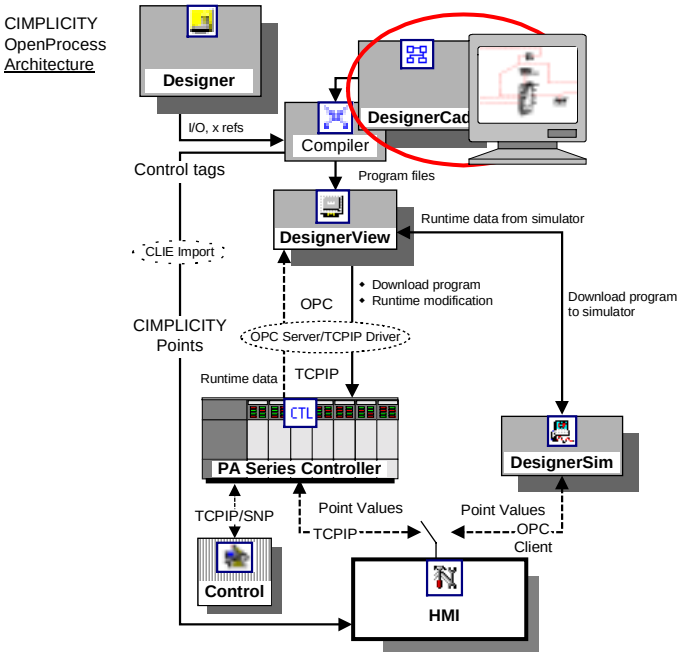
1. Select the appropriate function blocks.
2. Assign symbolic tags.
3. Connect the blocks with analog or digital lines.

Building the control strategy can all be accomplished using standard drawing forms and commands. SAMA style drawings define all the functions and parameters that form a process loop.

Function block choices include manual/auto station, function generators, pulse controllers, sequencers, bumpless transfers, PID, and other standard function blocks.

To further reduce development time, you can create and reuse template diagrams within the current or future project. For example, you can create and save a cascade loop for repetitive use to generate additional control loops.

DesignerCad is a CAD based, block configuration high level language that provides a simple way of designing control loops from complex analog to straightforward digital control.



The tasks to create a Control Strategy are:

Task 1. Define a drawing's properties in Designer.

Task 2. Draw a border in the drawing.

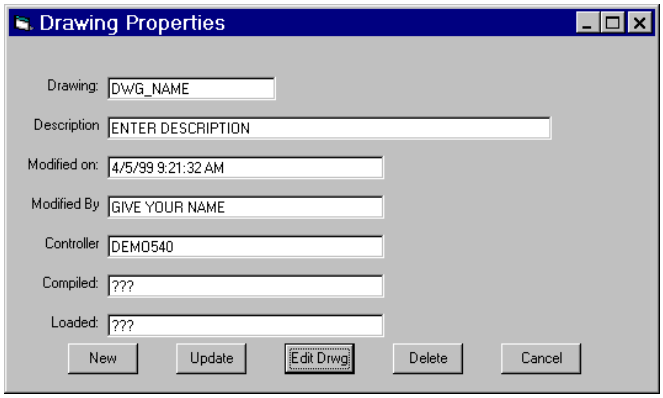
Task 3. Draw the function blocks in the drawing.

Step 6. Task 1
Define a Drawing's Properties in Designer

1. Right-click Drawings in the Controller Tree.
2. Select New from the popup menu.

   Note: If this is the first drawing you are creating the other options on the popup menu are dimmed. When drawings exist, you can edit, delete or review the properties of any one.

   The Drawing Properties dialog box opens.



3. Fill in the fields in the Drawing Properties dialog box as follows:

Field	Enter the:
Drawing	Name of the drawing.
Description	Description of the drawing.
Modified on	Date and time drawing was modified
Modified By	Person who modified the drawing.
Controller	Name of the controller
Compiled	Date of last compiled.
Loaded	Date last loaded.

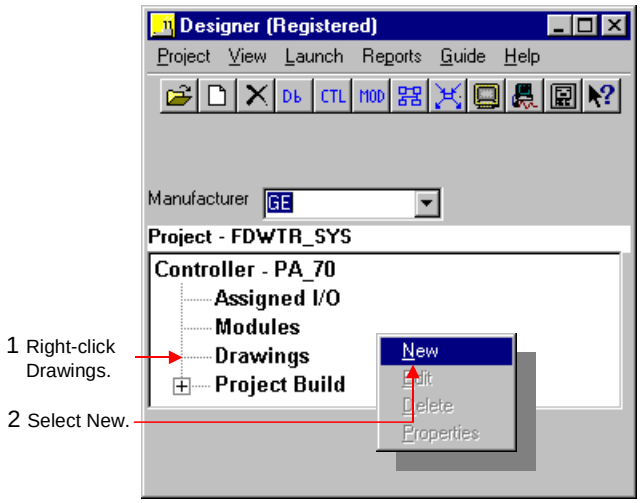
4. Click a button to specify what action DesignerCAD will take as follows.

Click	To
New	Create a new record.
Update	Save changes made to current record.
Edit Dwg	Activate DesignerCad to edit the drawing.
Delete	Delete the current record.
Cancel	Close the dialog without saving changes.

Result. If you click* New *a blank DesignerCAD opens or click* Edit Dwg*, DesignerCAD opens displaying the selected drawing.

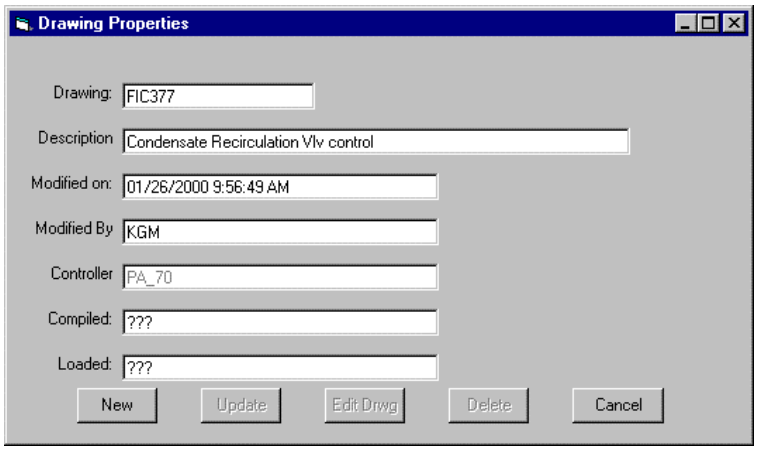
Tutorial Example. Define a Drawing's Properties in Designer

1. Open the Drawing Properties dialog box.



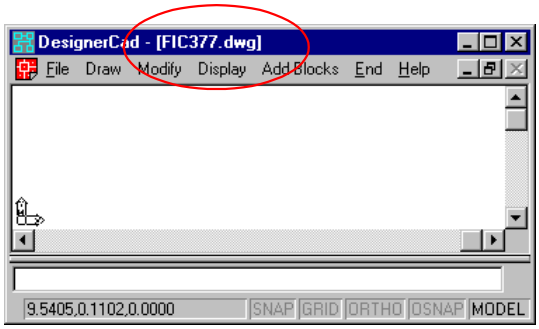
2. Fill in the fields as follows:

Field	Enter (or Keep)
Drawing	FIC377
Description	Condensate Recirculation Vlv Control
Modified on	Current date
Modified By	Your initials
Controller	PA_70
Compiled	???
Loaded	???



3. Click **New**.

   FIC377.dwg opens in DesignerCAD.



End of Tutorial Example

Step 6. Task 2
Draw a Border in the Drawing

The border must be inserted into the DesignerCad drawing before any blocks are inserted.

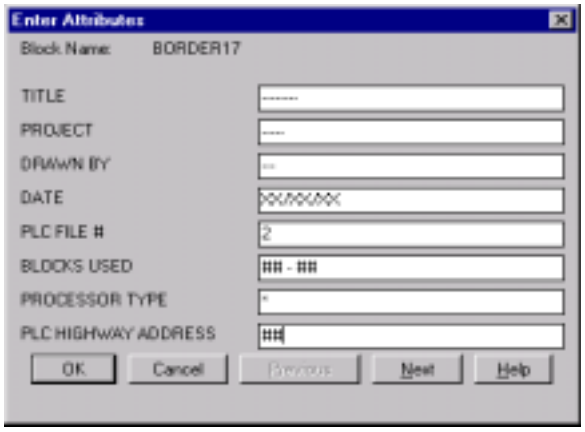
Selecting the border does the following:

- Defines the drawing area. All drawings must be contained within the border selected.
- Activates the snap feature.
- Activates the Grid feature. This can be turned off by toggling F7 as it has no bearing on the drawing or compiling.
- Allows for automatic scaling of inserted blocks.

To insert the border into a drawing:

1. Click Draw on the DesignerCAD menu bar.
2. Select Border Insert (size).

   The Enter Attributes dialog box for the border opens.



3. Fill in the fields to define the border attributes as follows:

Field	Enter the:
Title	Title of the drawing.
Project	Name of project.
Drawn By	Name of designer.
Date	Date the drawing created.
PLC File #	Controller File Number (optional).
Blocks Used	Count of number of blocks (optional).
Processor Type	Type of controller (optional).

PLC Highway Address	Node address of controller on communication highway (optional).
Block Offset	Number allowing for easy block number of multiple drawings in the same program file.
Station Offset	Number defining specific address to blocks using the following formula:

```
Controller address = (station number) *
10 + (predefined controller address word
1-10
```

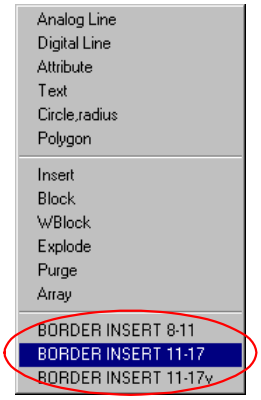
PID Offset	Number assigning specific addresses to the block using the following formula:

```
Controller address = (PID number) * 10 +
(predefined controller address word 1-25)
```

OK	Saves changes and closes the dialog.
Cancel	Closes dialog without saving changes.
Previous	Displays the previous dialog describing the drawing properties.
Next	Displays the next dialog describing the drawing properties.
Help	Activates the help file.

Tutorial Example. Draw a Border in the Drawing

1. Click Draw on the DesignerCAD menu bar.
2. Select /Border Insert 11-17.

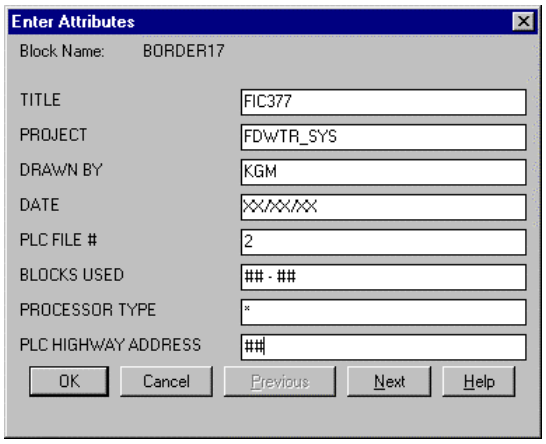


The Enter Attributes dialog opens.

3. Enter data as follows:

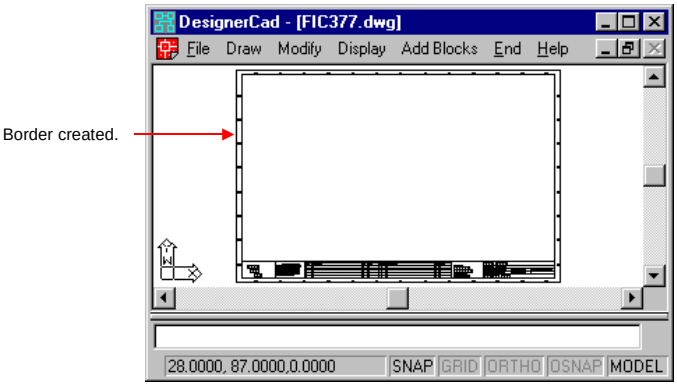
Field	Enter (or Keep)
TITLE	FIC377
PROJECT	FDWTR_SYS
DRAWN BY	Your initials
PLC FILE #	2

Other attributes do not require definitions for this block.



4. Click **OK**.

DesignerCAD reappears with a border.



End of Tutorial Example

Step 6. Task 3
Draw the Function Blocks

A ***function block*** is a set algorithm designed to perform specific logic execution. Function blocks are selected and assigned within DesignerCad using the Add Block menu. The menu is divided alphabetically.

Draw function blocks:

1. Click Add Blocks on the DesignerCAD menu bar.
2. Select an option from the menu.

   See the online help or OpenProcess Reference manual for a detailed description of all the function blocks.
3. Place the block on the drawing.

   An Enter Attributes dialog box appears.
4. Enter information that pertains to the selected block.
5. Repeat 1-4 until all of the blocks you need.
6. Use the Draw menu to connect the blocks.
7. Click File on the DesignerCAD menu bar.
8. Select Save.

   The drawing is saved.
9. Click File on the DesignerCAD menu bar.
10. Select Management.
11. Select Exit from the extended menu.

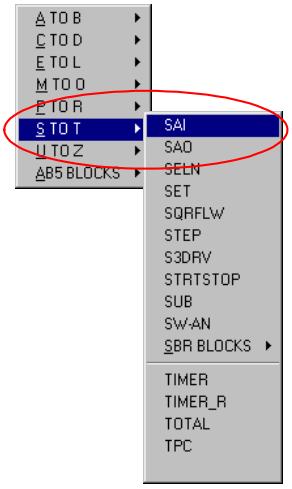
Result. The saved drawing and DesignerCAD closes.

See the online help or OpenProcess Reference manual for a detailed description of how to use DesignerCAD.

Tip: You can view the drawings for the condensate pump control and steam line loading in the OpenProcess demonstration project.

The OpenProcess demonstration project is installed as part of the standard installation.

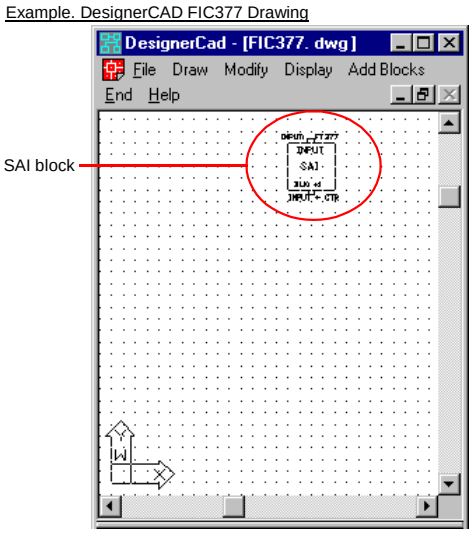
1. Create an SAI block.
   A. Select S to T on the Add Blocks menu.
   B. Select SAI from the extended menu.



   The SAI block scales incoming analog signal ranges to the control range (0 to 4095).

   C. Place the SAI block on the drawing toward the top of the DesignerCAD drawing.

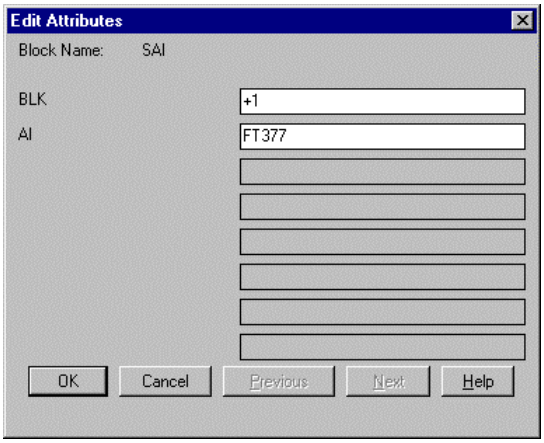
Example. DesignerCAD FIC377 Drawing



   The Enter Attributes dialog appears.

D. Enter data as follows.

Field	Enter (or Keep)
BLK	+1
AI	FT377

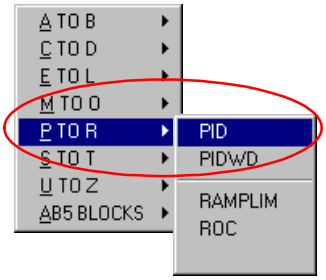


E. Click **OK**.

2. Create a PID block.

A. Select P TO R on the Add Blocks menu.

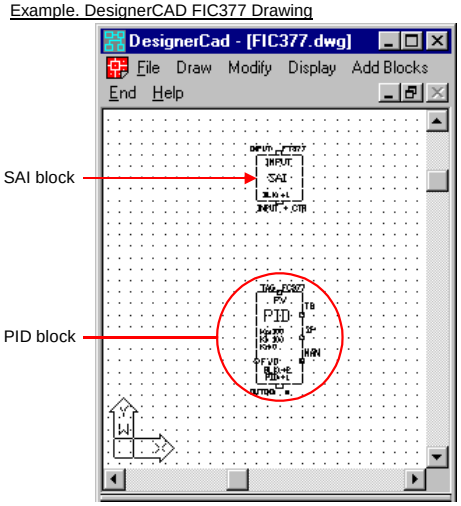
B. Select PID from the extended menu.



The PID block implements a proportional-plus-integral-plus-derivative control action.

C. Place the PID block on the drawing under the SAI block.

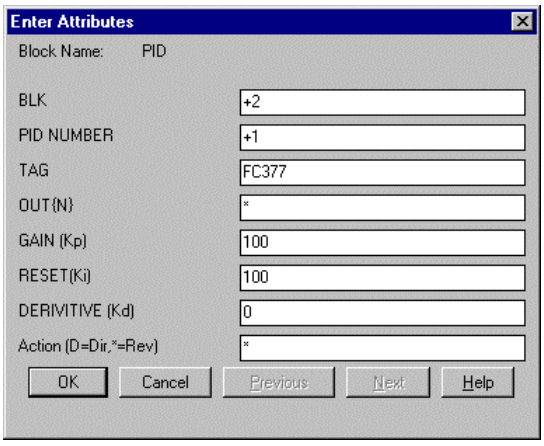
Example. DesignerCAD FIC377 Drawing



The Enter Attributes dialog box appears.

D. Enter data as follows.

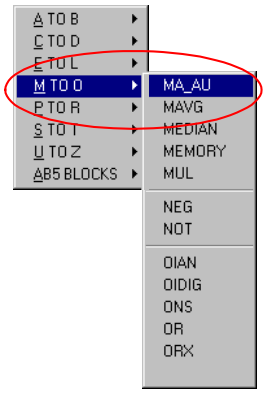
Field	Enter (or Keep)
BLK	+1
PID NUMBER	+1
TAG	FC377
OUT	*
GAIN	100
RESET	100
DERIVITIVE	0
Action	*



3. Create a MA_AU block.

A. Select M TO O on the Add Blocks menu.

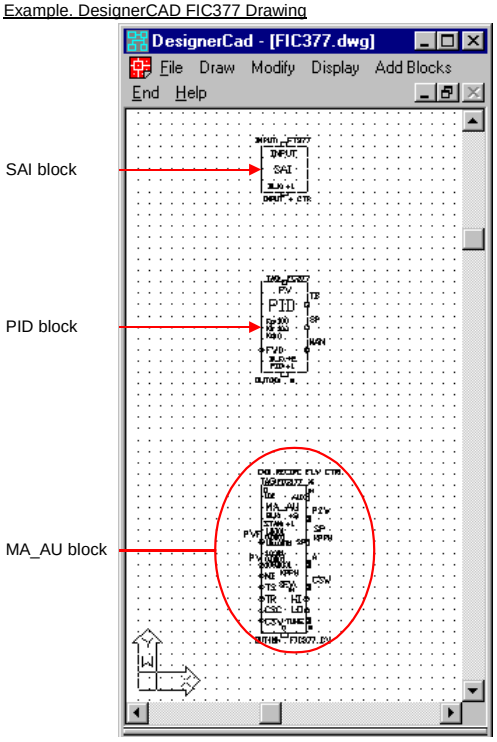
B. Select MA_AU on the extended menu.



The MA_AU block provides the HMI interface for an analog control loop.

C. Place the block under the PID block.

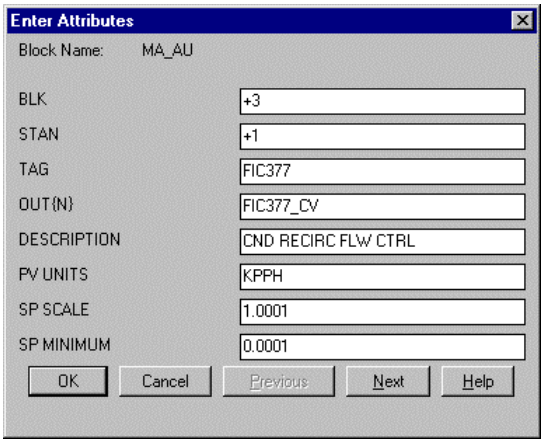
Example. DesignerCAD FIC377 Drawing



The Enter Attributes dialog appears.

D. Enter data as follows.

Field	Enter (or Keep)
BLK	+3
STAN	+1
TAG	FIC377
OUT	FIC377_CV
DESCRIPTION	CND RECIRC FLW CTRL
PV UNITS	KPPH
SP SCALE	1.0001
SP MINIMUM	0.0001

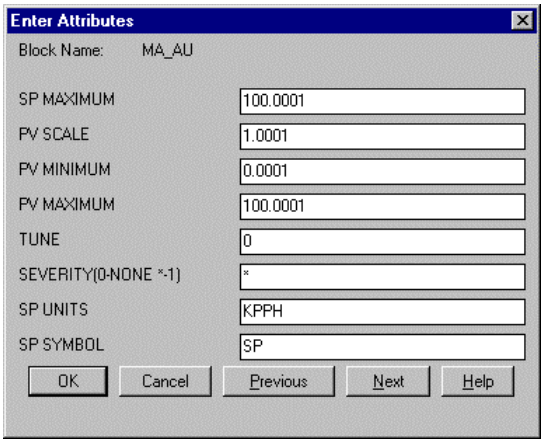


E. Click **Next**.

A new Enter Attributes dialog box appears.

F. Enter data as follows.

Field	Enter (or Keep)
SP MAXIMUM	100.0001
PV SCALE	1.0001
PV MINIMUM	0.0001
PV MAXIMUM	100.0001
TUNE	0
SEVERITY	*
SP UNITS	KPPH
SP SYMBOL	SP

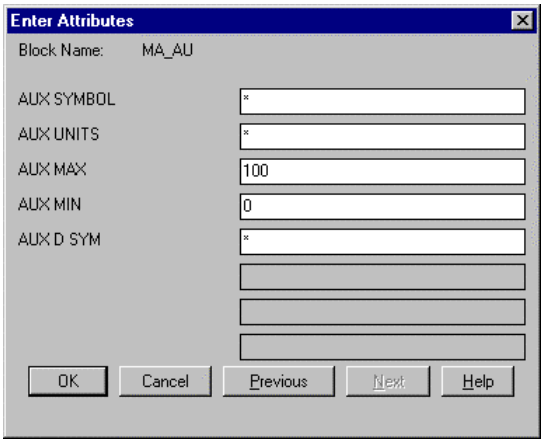


G. Click **Next**.

A new Edit Attributes dialog box appears.

H. Enter data as follows.

Field	Enter (or Keep)
AUX SYMBOL	*
AUX UNITS	*
AUX MAX	100
AUX MIN	0
AUX D SYM	*

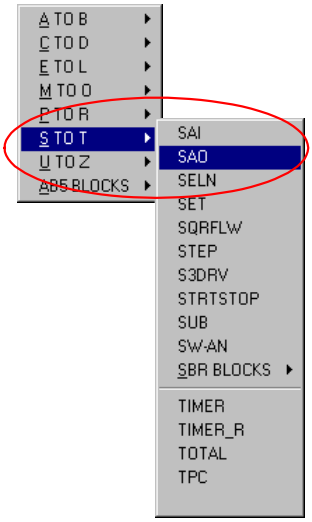


I. Click **OK**.

4. Create an SAO block.

A. Select S TO T on the Add Blocks menu.

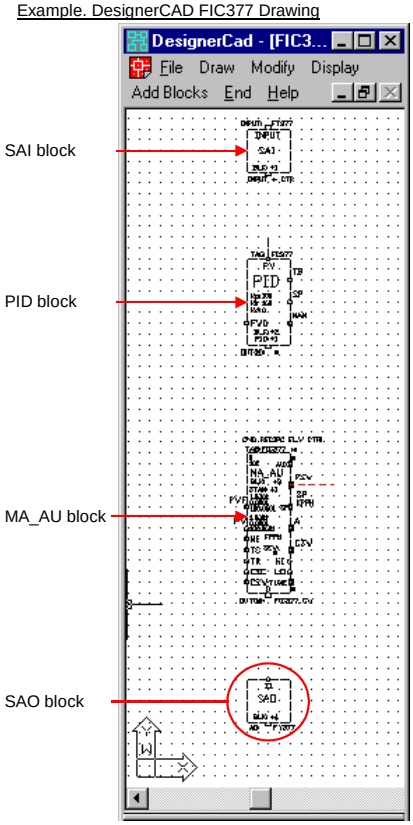
B. Select SAO from the extended menu.



The SAO block scales output analog signal to its appropriate physical signal range (e.g. 4000 to 20000).

C. Place the block underneath the MA_AU block.

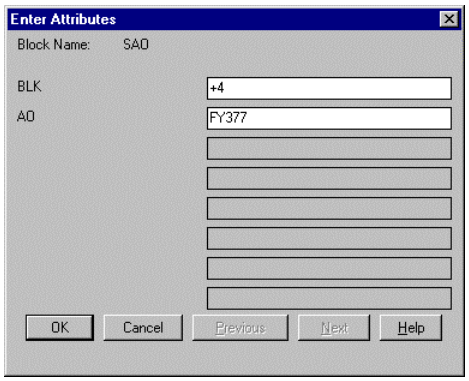
Example. DesignerCAD FIC377 Drawing



The Edit Attributes dialog box opens.

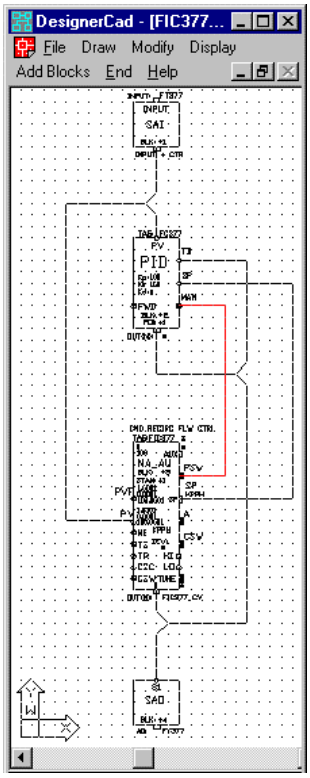
D. Enter data as follows.

Field	Enter
BLK	+4
AO	FY377



E. Click **OK** to save the changes and close the dialog box.

5. Connect the blocks using Analog Line and Digital Line under the Draw menu using the following drawing as a guide.



6. Save the drawing.
7. Close DesignerCAD.

End of Tutorial Example

Step 7. Compile Control Drawings into Program Files

The ***Compiler***:

- Compiles the project instrument tags
- Assigns Controller register addresses to all field data and internal logic.
- Creates:

  The Control Program that is downloaded to the Controller.

  Comprehensive control system documentation

  Operator interfacial database, alarm configuration and links to HMI faceplates

  System maintenance tools

The ***Control Program***, which is comprised of program files, is a complex data structure that is generated from the instrument index and the DesignerCad graphically based control logic.

To compile the Control drawings:

1. Do one of the following.

   Method 1

   Click the Compiler button  on the Designer toolbar.

   Method 2

   A. Click Guide on the Designer menu bar.

   B. Select Compile.

   The Compiler dialog box is launched.

2. Use the Compiler dialog box to:

   A. Organize the control logic for a given project in the Build Project Make File Window. This window is used to organize control drawings into Program Files (a segment of the control program consisting of a maximum 99 function blocks).

   B. Initialize the Controller registers with the command.

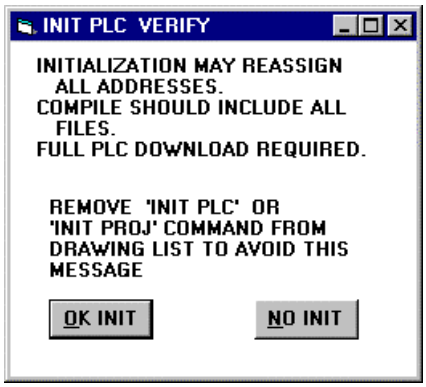
   `INIT`<*CONTROLLER NAME*>

   This command is required for the first compile and then is optional.

   C. Choose different Compiler options.

3. Click **Compile**.

   The Compiler dialog box switches to the Results tab. An INIT PLC VERIFY dialog box appears in front.



4. Click **OK INIT**.

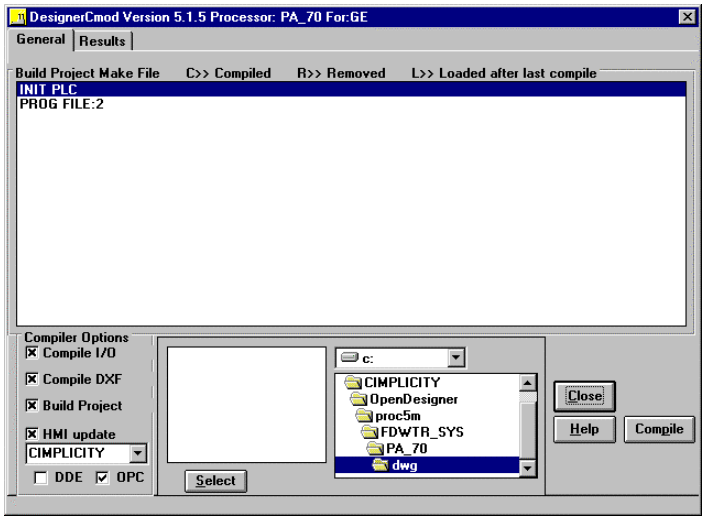
   The Compiler builds the file. A DesignerCmod message box appears when the file is built.

5. Click **OK**.

Note: If there are errors return to the drawing and fix the errors and re-compile.

Tutorial Example. Compile Control Drawings into Program Files

1. Launch the Compiler.



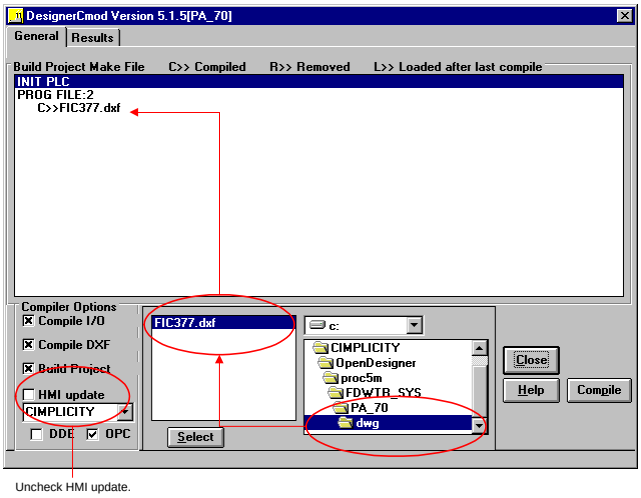
2. Insert the DXF file FIC377 into Program File 2 as follows.

   A. Highlight the line under PROG FILE 2.

   B. Highlight the file FIC377.dxf.

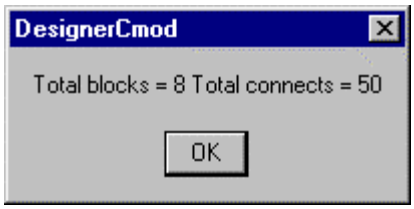
   C. Uncheck HMI Update. (In this example, the compiler will be debugged before updating HMI.)

   D. Click **Select**.



3. Compile your selections.

   A DesignerCmod message box appears when the file is built.



5. Click **OK**.

Note: If there are errors return to the drawing and fix the errors and re-compile.

Go to Step 9, page 70 in this chapter, for details about the HMI Update Compiler Option

See the Designer online documentation for details about other Compiler Options.

End of Tutorial Example

Step 8. Simulate and Debug Compiled Program Files

OpenProcess contains a simulator called DesignerSim.

DesignerSim is a real-time control emulator for control strategy debugging and training. Simulation is an integral part of the development cycle for control system design. DesignerSim provides the control system designer with a method to test control strategies and train operators and maintenance personnel.

Simulating the control design before implementation provides the user with the following benefits:

- Eliminates design bugs and configuration errors before start-up,
- Verifies control logic,
- Tests emergency shutdown procedures,
- Tests the operator interface and
- Tests batch scheduling.

To use the simulator to test a control program it must be downloaded to the simulator using DesignerView.

DesignerView is the OpenProcess component that is used to communicate with the PA controller and to view run-time control drawings.

The tasks include:

Task 1. Specify the Controller.

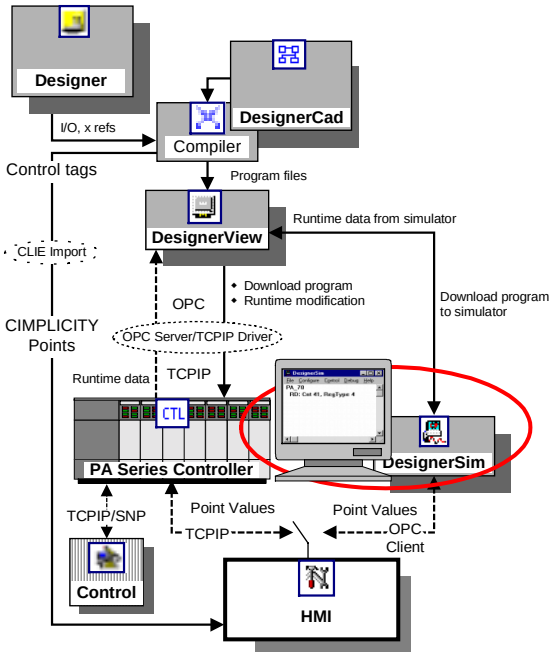
Task 2. Download the Control Program to DesignerSim.

Task 3. View the compiled drawing.

Step 8. Task 1
Specify the Controller

You specify the Controller in DesignerSim.

CIMPLICITY OpenProcess Architecture



To specify the controller:

1. Open DesignerSim using one of the following methods.

   Method 1

   Click the **Run** button  on the HMI Workbench toolbar.

   HMI begins running and DesignerSim opens.

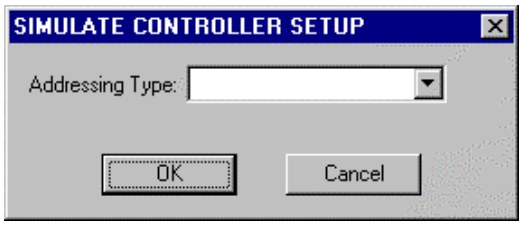
   Method 2

   Double-click DesignerSim in the left pane of the HMI Workbench.

   DesignerSim opens.

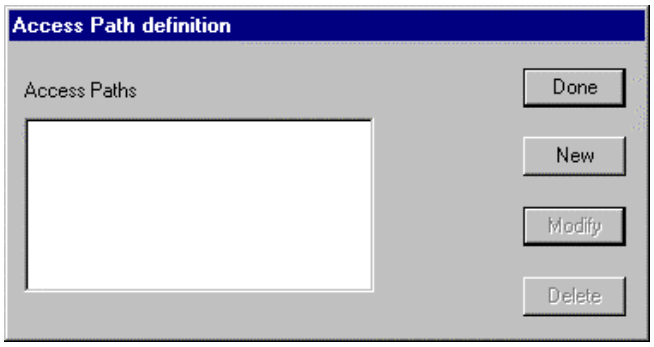
2. Click Configure on the DesignerSim menu bar.
3. Select Controller.

   The Simulate Controller Setup dialog box opens.



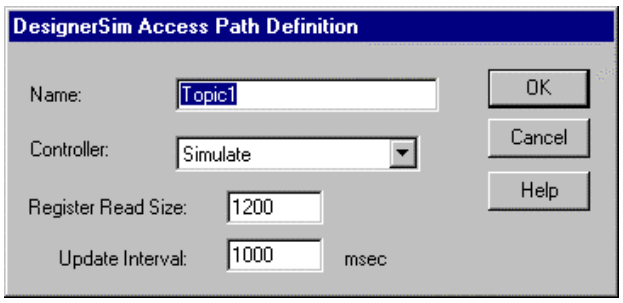
4. Select your system's Controller from the Addressing Type field list.
5. Click **OK**.
6. Click Configure on the DesignerSim menu bar.
7. Select Access Path Definition.

   The Access Path definition dialog box opens.



8. Click **New**.

   The DesignerSim Access Path Definition dialog box opens.

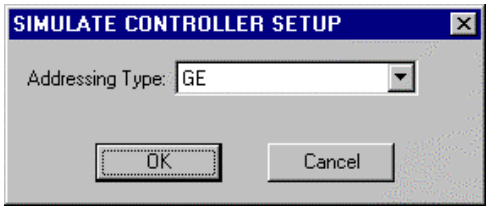


9. Enter the Controller/Device name in the Name field.
10. Click **OK**.

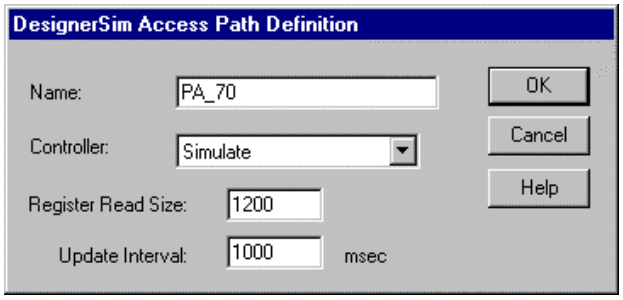
    The Access Path definition dialog box re-appears.

11. Click **Done**.

1. Launch DesignerSim
2. Open the Simulate Controller Setup dialog box.
3. Select GE from the Addressing Type field list.

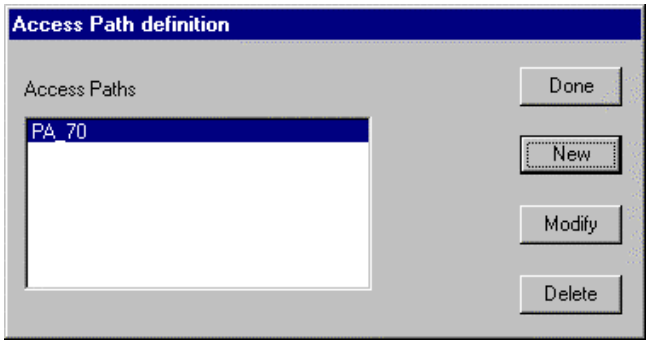


4. Click **OK**.
5. Open the Access Path definition dialog box.
6. Enter PA_70 in the Name field.



7. Click **OK**.

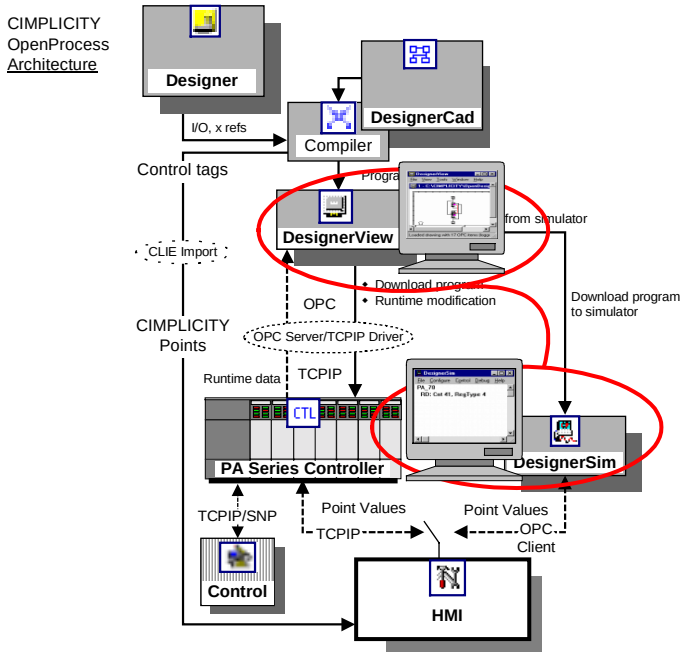
   The Access Path definition dialog box appears with PA_70 in the Access Paths box.



8. Minimize DesignerSim.

Step 8. Task 2
Download the Control Program to DesignerSim

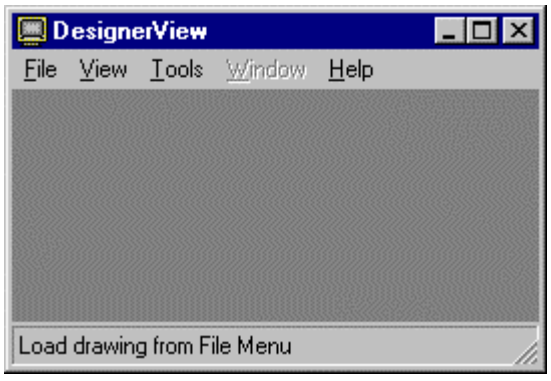
Use DesignerView to download the control program to the controller DesignerSim.



To download the control program to DesignerSim:

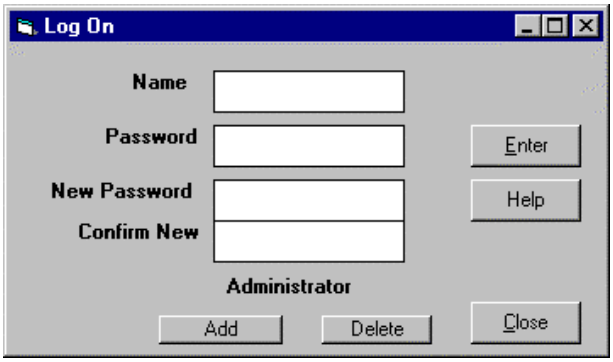
1. (If Designer is not open) double-click Designer in the HMI Workbench left pane.
2. Click Launch on the Designer menu bar (after you have entered your name and password to gain access).
3. Select Viewer.

   DesignerView opens.



4. Log on to DesignerView.
   A. Click Tools on the DesignerView menu bar.
   B. Select Log On…

      The Log On dialog box opens.



   C. Enter the correct Name and Password.

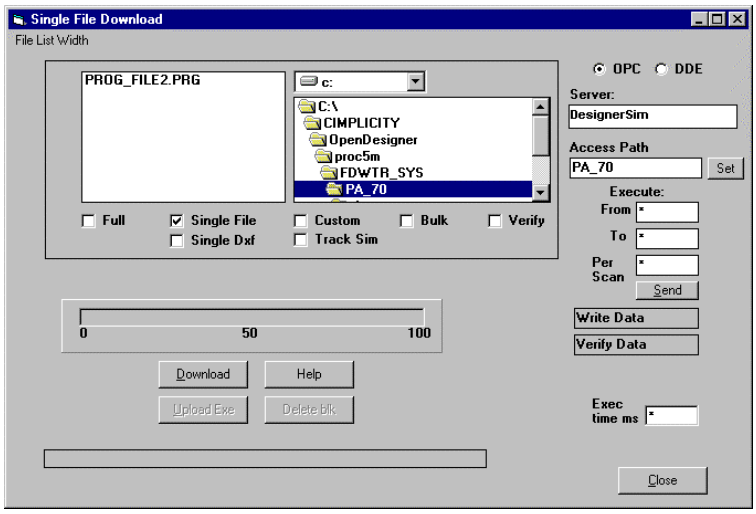
      Note: Logging on provides you with privileges, such as turning Tune on.

   D. Click **Enter**.
5. Open the Download dialog box.
   A. Click Tools on the DesignerView menu bar.
   B. Select Download.

      The Full Download dialog box opens.
6. Select the DesignerSim Server and an Access path you entered in the Access Path Definition dialog box.
7. Select the other options and specifications you want.
8. Click **Download**.

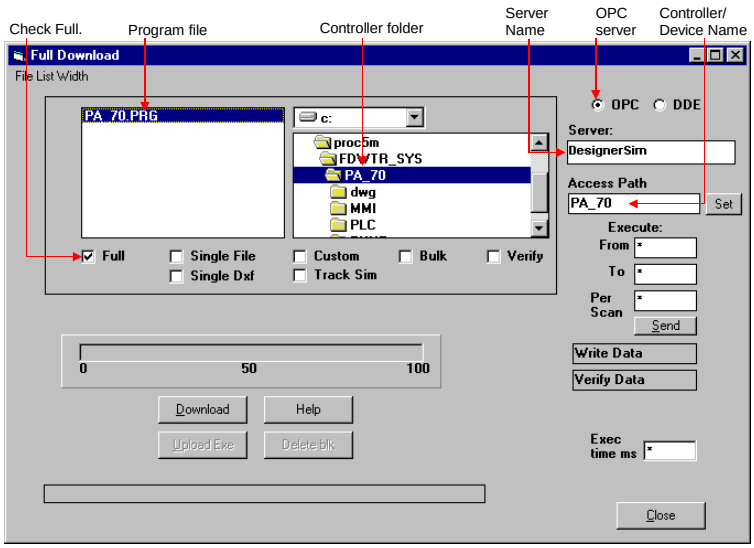
   See the online help or OpenProcess Reference manual for a detailed description of all the download options.

1. (If Designer is not open) open Designer.
2. Open DesignerView.
3. Log on to Designer View.
4. Open the Full Download dialog box.



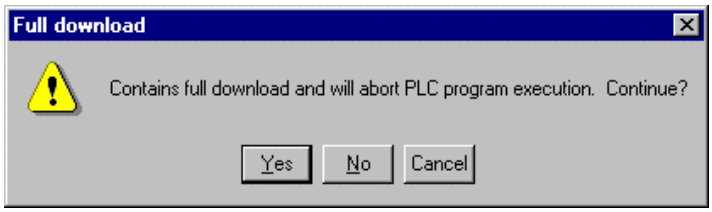
5. Enter DesignerSim in the Server field.
6. Enter PA_70 in the Access Path field.
7. Select **PA_70.PRG** (in the Program box).
8. Check Full.

See the online help or OpenProcess Reference manual for a detailed description of all the download options.



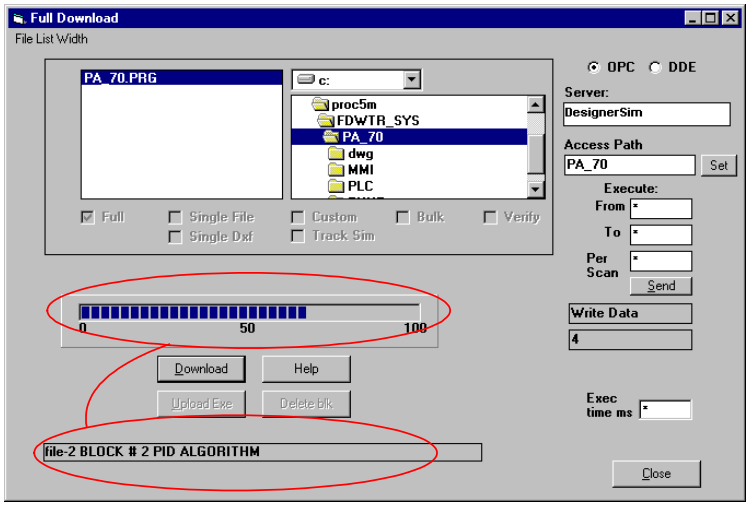
9. Click **Download**.

   A Full download message box appears.

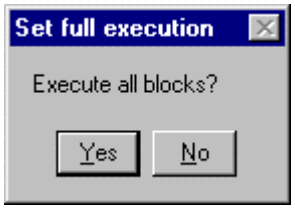


9. Click **Yes**.

   The download begins.



   A Set full execution message box appears.



10. Click **Yes**.

    A Download Complete status appears on the Full Download dialog box.

11. Save the strategy as follows:

    A. Display DesignerSim.

    B. Click File on the DesignerSim menu bar.

    C. Select Save Strategy.

       The Save As dialog box opens with **`*.stg`** in the File name field.

D. Open the folder in which you want to save the strategy.

   OpenDesigner provides a folder **`\\OpenProcess\emulate`** for that purpose.

E. Enter a name in the File name field.

F. Click **OK**.

11. Close the Download dialog box.

    A. Switch back to the Download dialog box.

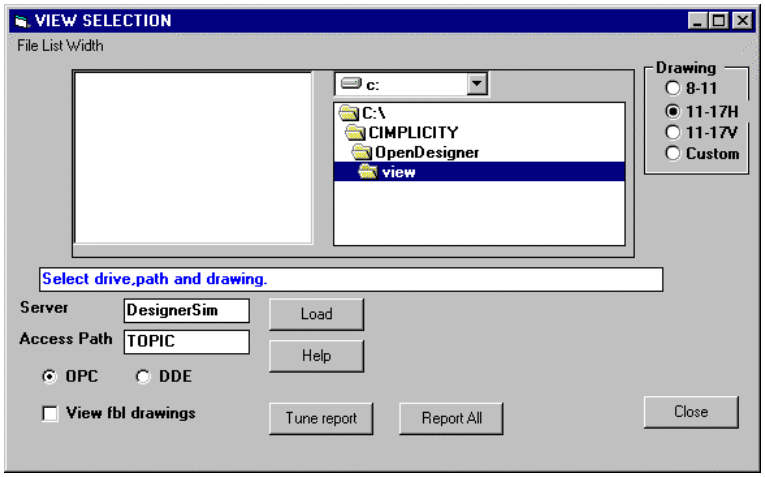
    B. Click **Close**.

Result: The download is complete. DesignerView reappears. You can now work with the compiled drawing in DesignerView at a later date without having to re-compile it.

Step 8. Task 3
View the Compiled Drawing

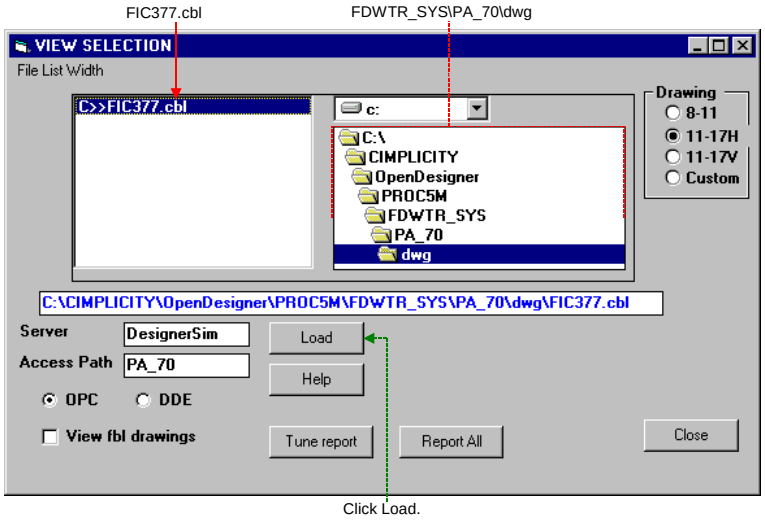
1. Click File on the DesignerView menu bar.
2. Select Load Drawing.

   The View Selection dialog box opens.

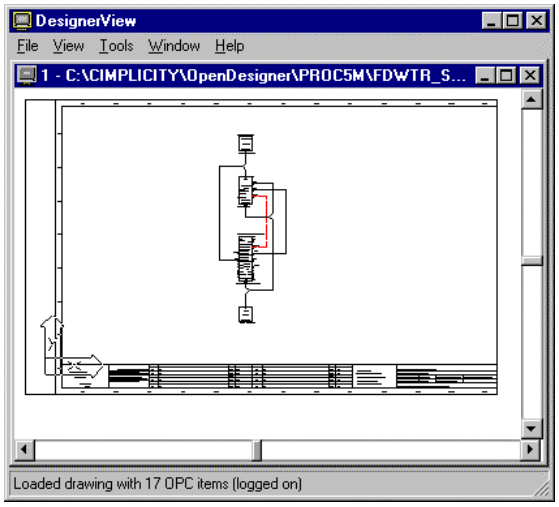


3. Select the appropriate **`dwg`** directory for the project
4. Select the **`CBL`** file.

1. Open the View Selection dialog box.
2. Open the following folders:
   A. OpenDesigner,
   B. PROC5M folder,
   C. FDWTR_SYS,
   D. PA_70 and
   E. dwg.
3. Select **`FIC377.cbl`** file.
4. Click **Load**.



`FIC377.cbl` opens in DesignerView.



5. Turn the Data on.

A. Click View on the DesignerView menu bar.

B. Select Data.

C. Select On from the extended menu.

Data numbers appear on the drawing.

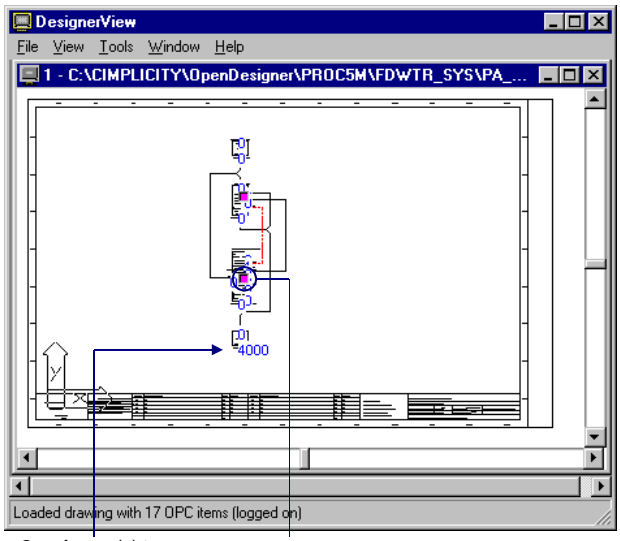
6. Turn on the adjustable parameters.

A. Click View on the DesignerView menu bar.

B. Select Tune.

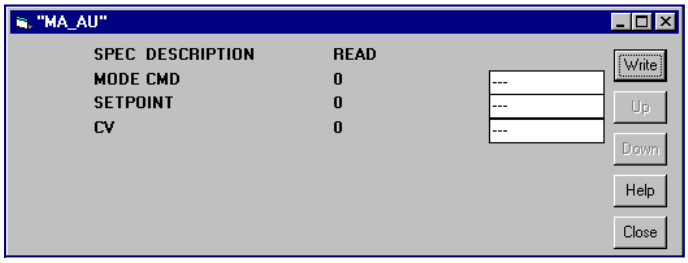
C. Select On from the extended menu.

Magenta squares appear on the drawing.



7. Click the bottom magenta square.

The dialog box for the MA_AU block opens.



8. The fields are as follows.

Field	Used to
MODE CMD	Put the controller into manual or automatic mode
Setpoint	Adjust the setpoint
CV	Specify the final output of the PID loop This parameter can be adjusted if the controller is in manual mode.

Tip: To change the DesignerView drawing's background color:

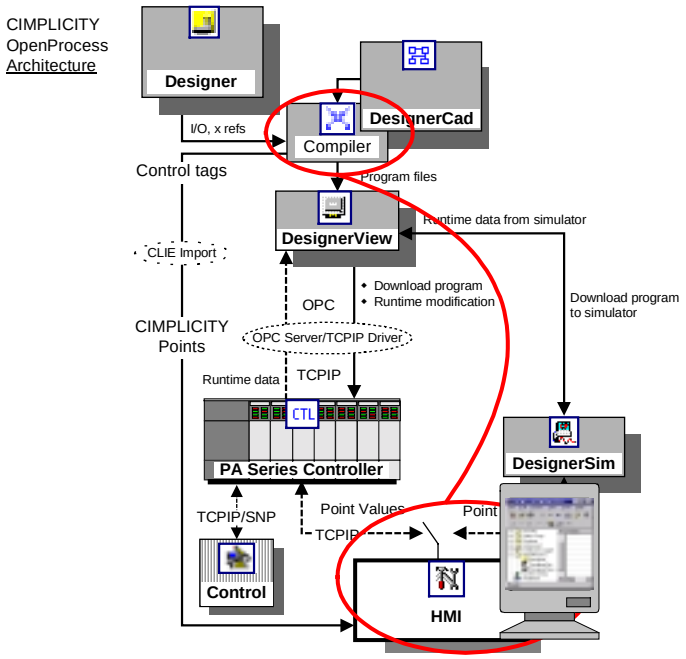
1. Click View on the DesignerView menu bar.
2. Select Drawing Bkg Color…

   A palette appears from which you can select a new color.

Step 9. Import Designer Control Tags into HMI

The Compiler has an Update HMI option that you can select to import Control Tags into the HMI Point database.

During the compiling process, the Compiler assembles the control tags for a given project. If you selected Update HMI for that compiling session or anytime after, the Compiler will import the assembled control tags be into HMI.



To import control tags into HMI:

1. Do one of the following.

   Method 1

   Click the Compiler button  on the Designer toolbar.

   Method 2

   A. Click Guide on the Designer menu bar.

   B. Select Compile.

   The Compiler dialog box is launched.

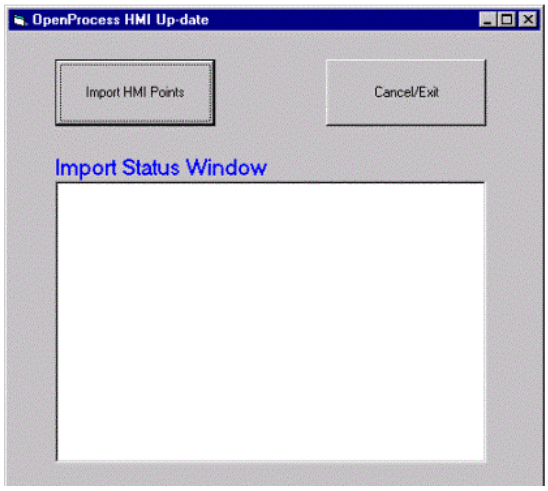
2. Insert the files to compile in the Build Project list.
3. Check HMI Update while choosing the Compiler options.

   This will update the HMI point database with OpenProcess Control Tags.

See Step 7 page 55 for more details about the compiler.

4. Click **Compile**.

   The HMI Update dialog box appears after the other selected Compiler Options are complete.



4. Click **Import HMI Points**.

   The OpenProcess HMI Update dialog box:

   - Displays a status message at the end of the import and
   - References a status log file, **`IE###.log`**, that can be opened to attain more information about the import.

5. Review the list of imported points in the HMI Point database.

   A. Select Points in the left pane of the HMI Workbench.

   B. Scroll up or down in the right pane until points associated with the OpenProcess device display.

      The Control Tags that are automatically imported into the HMI point database are:

      - All instrument tags and their associated quality tags.
      - All quality tags for I/O modules.
      - The tags associated with the following function blocks:

        `MA_AU`
        `TPC`
        PID
        `Timers`
        `Totalizer`
        `OIAN`
        `OIDIG`
        `STRTSTOP`
        `S3DRV`

The points that are associated with function blocks will have the prefix equal to the DesignerCad tag attribute associated with that block and a 1 – 3 character extension.

Example

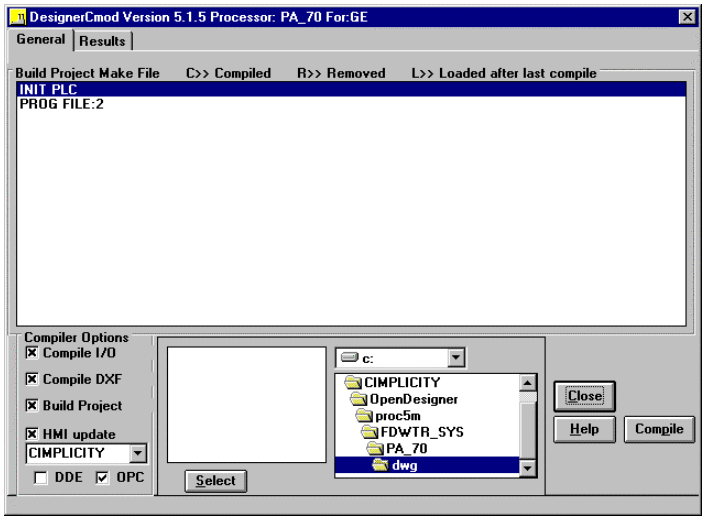
A timer block with the Tag block attribute defined as TI101 the points TI101.ACC (timer accumulator value) and TI101.PRE (timer preset value) will be imported into HMI automatically.

See the Function Block Reference manual for details on the points that are created for specific function block.

6. Open the status log file as follows:
   A. Expand the Status Logs folder in the left pane of the HMI Workbench.
   B. Select Project.
   C. Double-click the **`IE###.log`** displayed in the OpenProcess HMI Update dialog box.

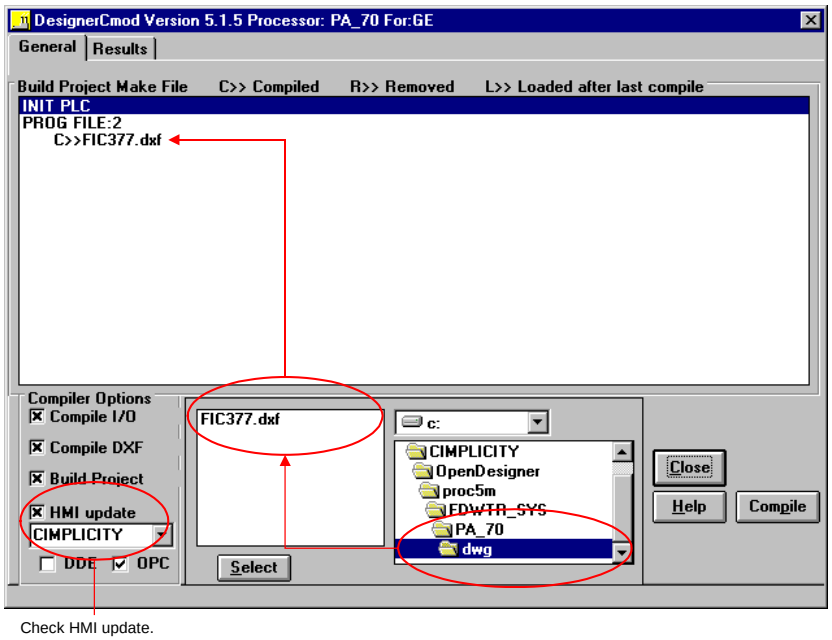
Tutorial Example. Import Designer Control Tags into HMI

1. Launch the Compiler.



2. 2. Insert the DXF file FIC377 into Program File 2 as follows.
   A. Highlight the line under PROG FILE 2.
   B. Highlight the file FIC377.dxf.
   C. Uncheck HMI Update. (In this example, the compiler will be debugged before updating HMI.)
   D. Click **Select**.

3. Check HMI Update while choosing the Compiler options.



3. Click **Compile**.

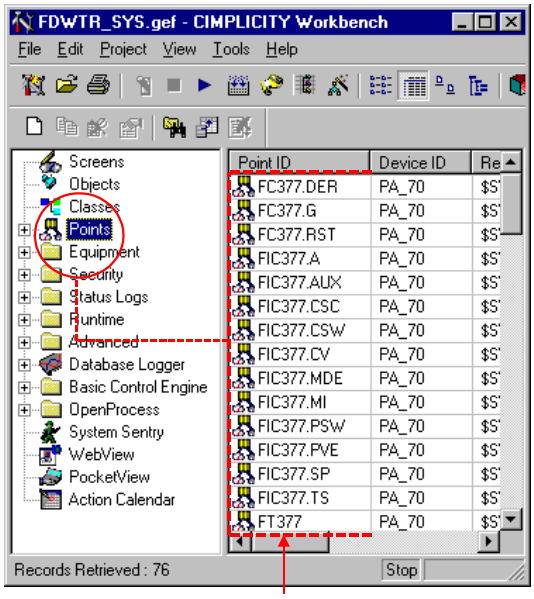
   The HMI Update dialog box appears after the other selected Compiler Options are complete.

4. Click **Import HMI Points**.

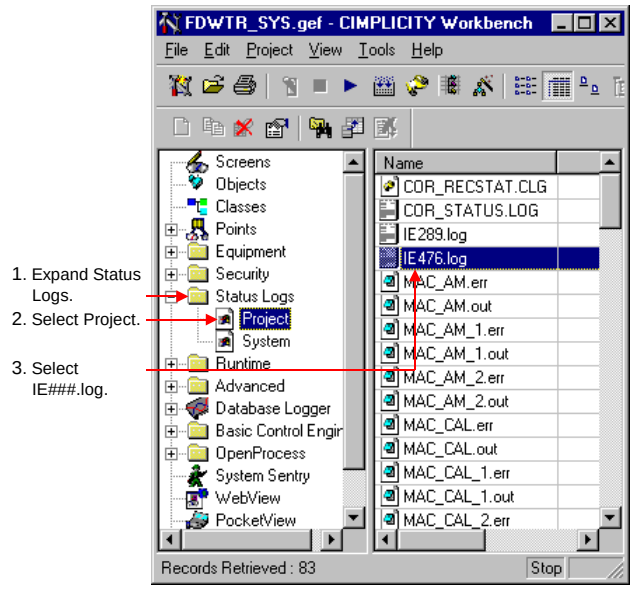
5. Review the list of imported points in the HMI Point database.

   A. Select Points in the left pane of the HMI Workbench.

B. Scroll up or down in the right pane until points associated with the PA_70 device display.



6. Open the status log file in the HMI Workbench.

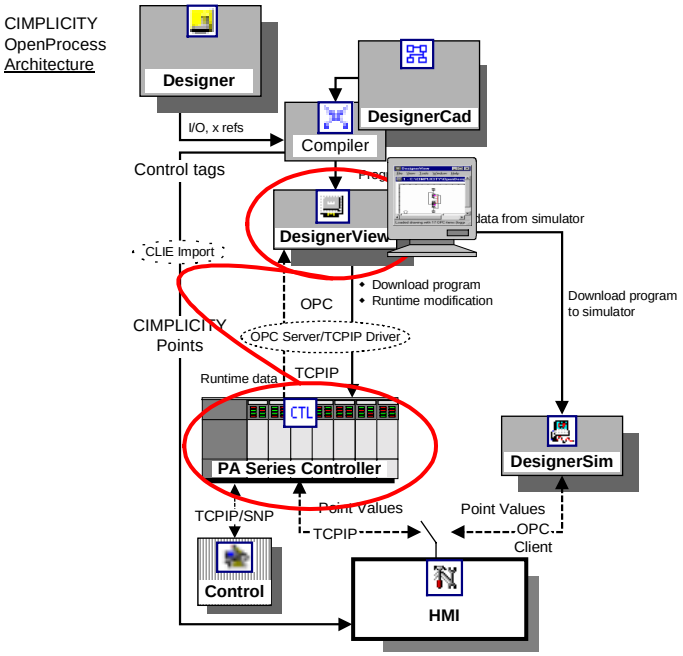


End of Tutorial Example

Step 10. Download to the PA Controller

You use DesignerView to download and view the control program.

DesignerView, generically, is either an OPC or DDE client that communicates to an OPC or DDE server. It receives and sends runtime data from and to the server for viewing.



DesignerView also sends (downloads) the control program to the server. When DesignerView downloads and communicates to:

- DesignerSim, the OPC server is DesignerSim and

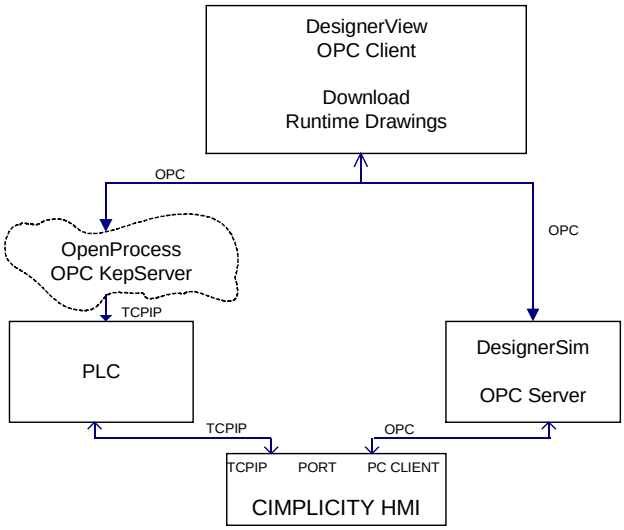
  DesignerSim is specified in the Download screen as the server *(see the previous step)*.

- The PA controller, the OpenProcess KEPServer is the server that is used.

  KEPServer, which is a high performance OPC server with a GE Fanuc TCP/IP driver, is specified in the Download screen as the server.

  The data exchange with the PA Controller is through the OpenProcess KEPServer.

The diagram below illustrates the server / client communication in OpenProcess.



The tasks to download to the PA Controller include:

Task 1. Save a KEPServer file.

Task 2. Create a channel.

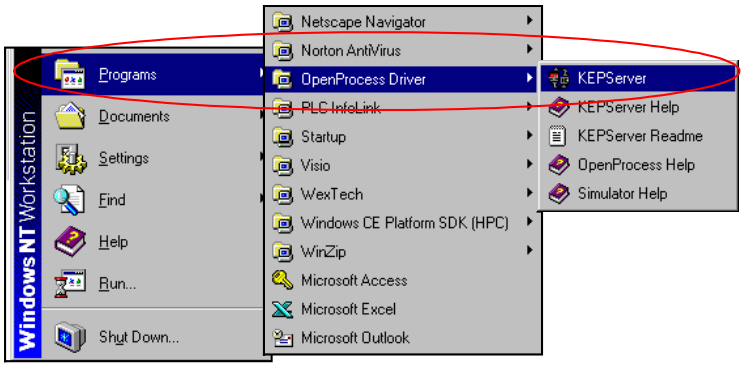
Task 3. Configure a KEPServer device.

Task 4. Connect to the PA Controller.

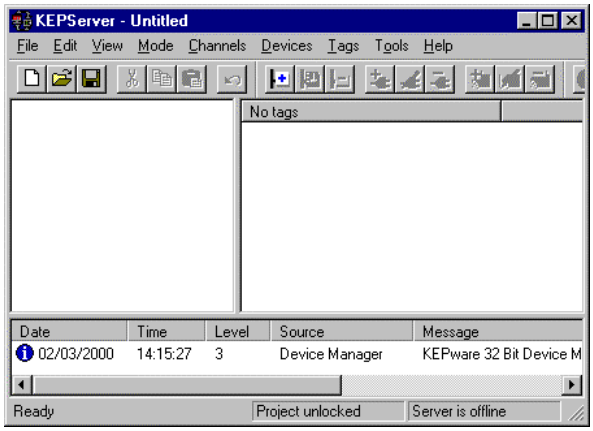
Task 5. Download the Control Program to KEPServer.

Step 10. Task 1.
Save a KEPServer File

1. Click **Start** on the Windows task bar.
2. Select Programs.
3. Select OpenProcess Driver.
4. Select KEPServer from the extended menu.



The KEPServer window opens.

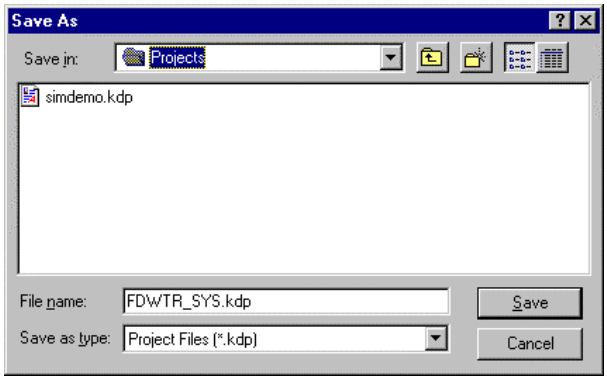


5. Click File on the KEPServer menu bar.
6. Select Save.

   The Save As dialog box opens.
7. Give the KEPServer (.KDP) file the same name as the OpenProcess project. (This is the convention.)

Tutorial Example. Save a KEPServer File

1. Open the KEPServer window.
2. Save the KEPServer file as **`FDWTR_SYS.kdp`**.



End of Tutorial Example

Step 10. Task 2
Create a Channel

The ***channel*** is synonymous with an HMI port. Therefore, typically the channel is named the same as the HMI port.

To create a channel:

1. Click Channels on the KEPServer menu bar.
2. Select Add Channel.

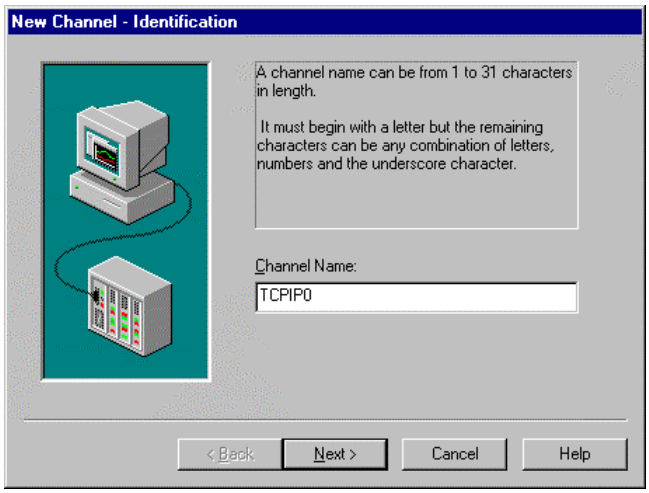
   The New Channel – Identification dialog box opens.
3. Give the channel the same name as the HMI port.
4. Click **Next**.
5. Select the OpenProcess Device Driver.
6. Click **Next**.

   The New Channel - Summary window opens.
7. Click **Finish**.

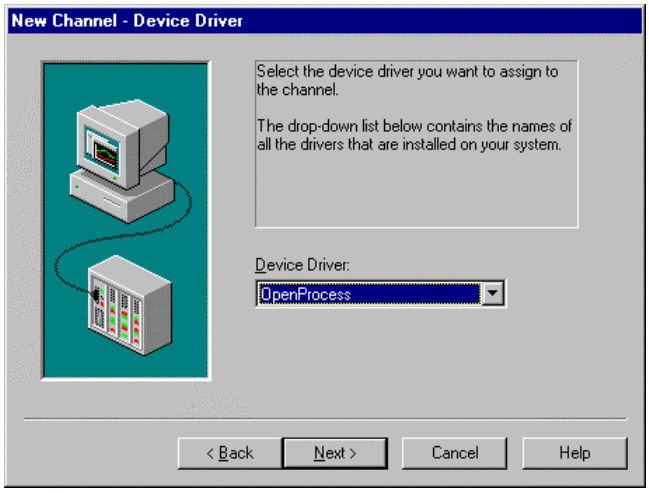
Result: The KEPServer window appears with the new KDP file open.

Tutorial Example. Create a Channel

1. Open the New Channel – Identification dialog box opens.
2. Name the channel TCPIP0.

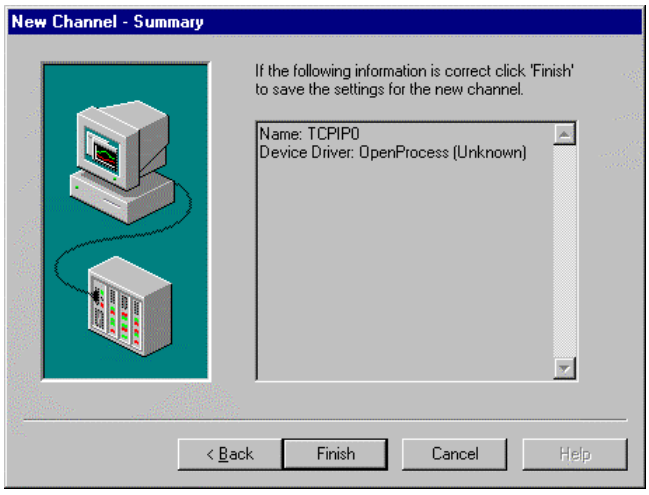


4. Click **Next**.
5. Select the OpenProcess Device Driver.



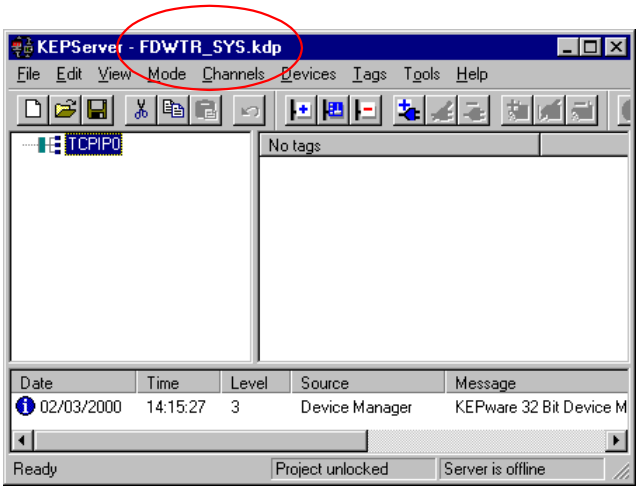
6. Click **Next**.

   The New Channel - Summary window opens.



7. Click **Finish**.

The KEPServer window appears with the FDWTR_SYS.kdp file open.



Step 10. Task 3
Configure a KEPServer Device

The device is the PA Controller.

It is important to configure the device the same as it was configured in OpenProcess with the

- Same name and
- Same IP address.

To configure the KEPServer device:

1. Click Devices on the KEPServer menu bar.
2. Select Add Device.

   The New Device – Name dialog box opens.
3. Enter the same name in the Device Name field as the other parts of OpenProcess.
4. Click **Next**.

   The New Device – ID dialog box opens.
5. Configure the Device ID.
6. Click **Next**.

   The New Device – Communication Parameters dialog box opens.
7. Configure the communication parameters.
8. Click **Next**.

   The New Device – Block Sizes dialog box opens.

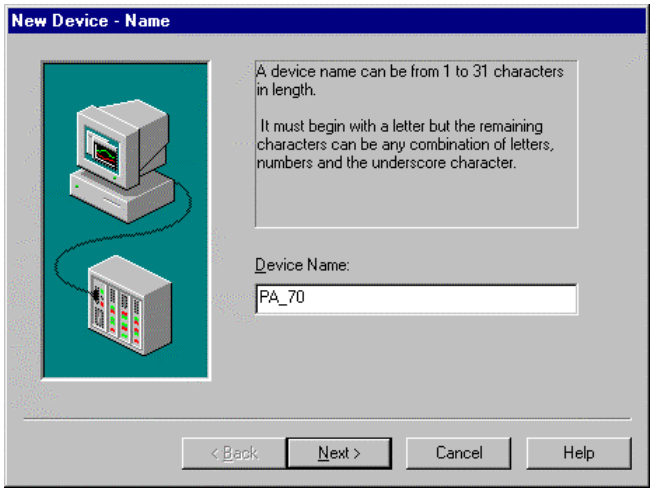
9. Configure the Block Size (the default is acceptable).
10. Click **Next**.

    The New Device – Summary dialog box opens.
11. Click **Finish**.

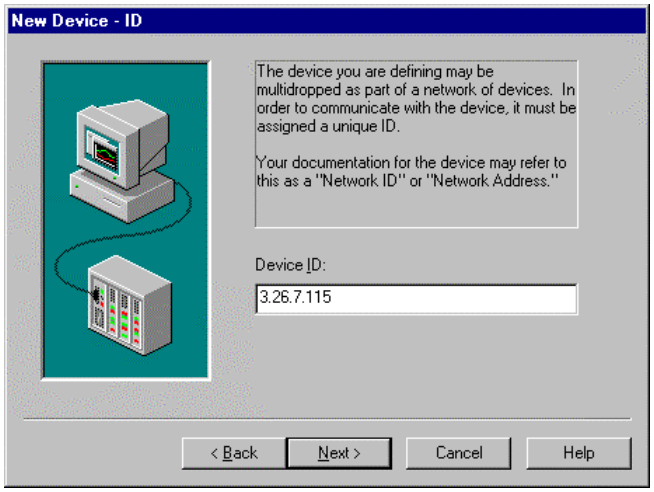
Result: The KepServer window appears displaying a configured device.

Tutorial Example. Configure a PA_70 Device

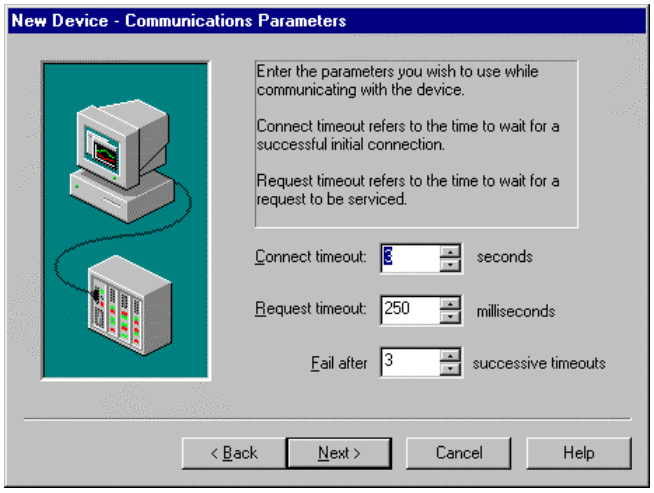
1. Open the New Device – Name dialog box .
2. Enter PA_70 Device Name field.



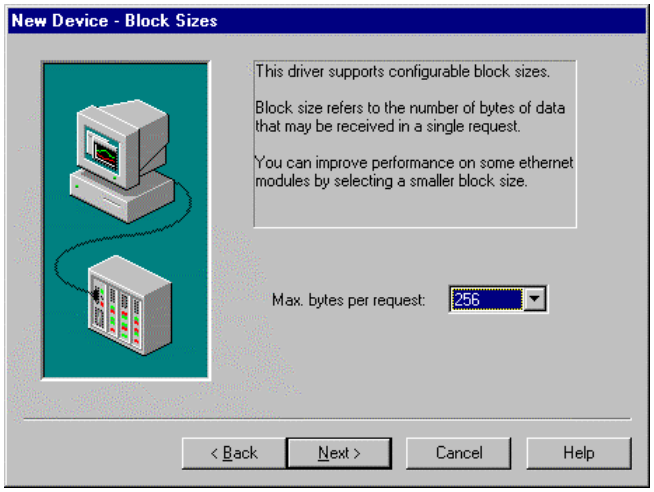
3. Click **Next**.
4. Enter the device ID.



5. Click **Next**.
6. Enter the communication parameters.

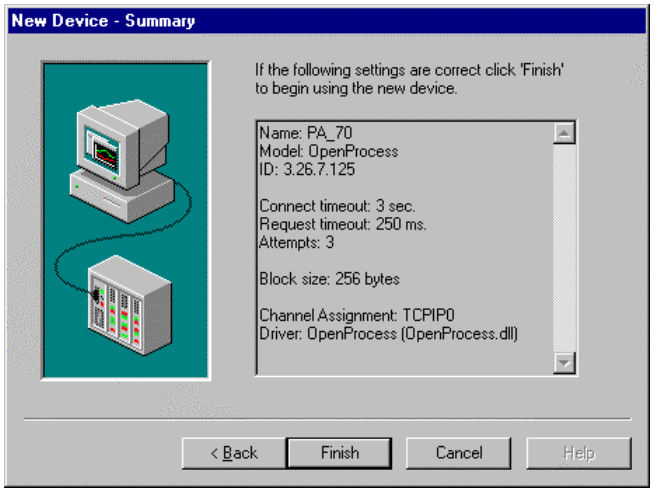


7. Click **Next**.
8. Configure the Block Size (the default is acceptable).



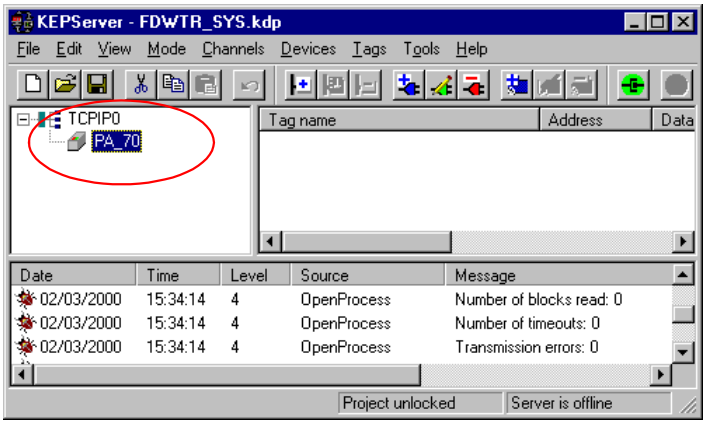
10. Click **Next**.

    The New Device – Summary dialog box opens.



11. Click **Finish**.

The KEPServer window appears displaying a configured PA_70 device.



End of Tutorial Example

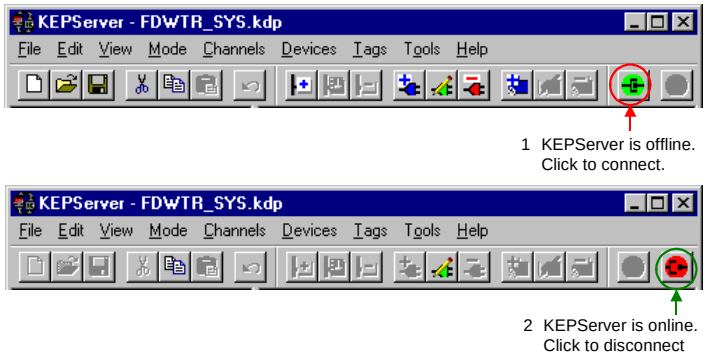
Step 10. Task 4
Connect to the PA Controller

Once the configuration is complete, you can connect to the PA Controller.

To connect to the PA Controller:

1. Click the green **Connect** button on the KEPServer toolbar.

   The green button is dimmed and the button to the right turns red.



2. Minimize the KEPServer window (OPC Server).
3. Open DesignerView. *See page 62 for details.*
4. Open the Download dialog box. *See page 62 for details.*

Tutorial Example. Connect to the PA Controller

Click the green **Connect** button on the KEPServer toolbar.

End of Tutorial Example

Step 10. Task 5
Download the Control Program to KEPServer

The procedure to download the control program to KEPServer is basically the same as downloading to DesignerSim.

To download the control program to KEPServer:

1. (If Designer is not open) open Designer.
2. Open DesignerView.
3. Log on to DesignerView.
   A. Click Tools on the DesignerView menu bar.
   B. Select Log On…
   C. Enter the correct Name and Password in the Log On dialog box.

D. Click **Enter**.

4. Open the Download dialog box.
   A. Click Tools on the DesignerView menu bar.
   B. Select Download.

      The Full Download dialog box opens.
5. Select the KEPServer Server and an Access path you entered in the Access Path Definition dialog box.
6. Select the other options and specifications you want.
7. Click **Download**.

Result: When the download is complete you can view the control drawing running on the PA Controller.

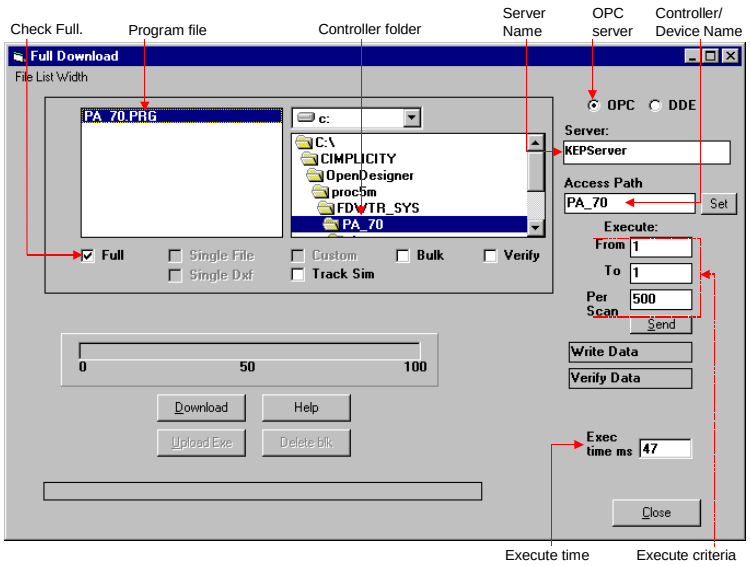
See the online help or OpenProcess Reference manual for a detailed description of all the download options.

Tutorial Example. Download the Control Program to KEPServer

1. (If Designer is not open) open Designer.
2. Open DesignerView.
3. Log on to Designer View.
4. Open the Full Download dialog box.
5. Enter KEPServer in the Server field.
6. Enter PA_70 in the Access Path field.
7. Select **PA_70.PRG** (in the Program box).
8. Check Full.
9. Enter the following in the Execute fields:

Field	Enter
From	1
To	1
Per Scan	500

10. Enter 47 in the Exec time ms. Field.

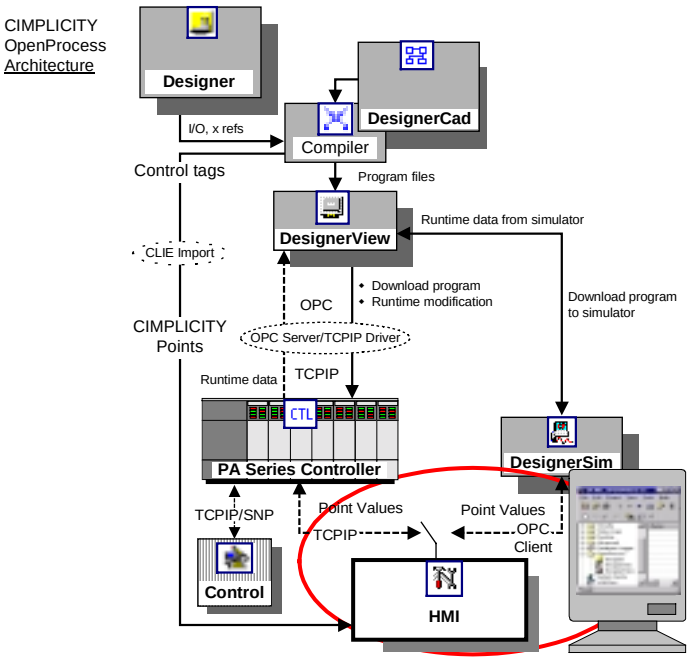


11. Click **Download**.

End of Tutorial Example

Step 11. Use OpenProcess Faceplates

The control blocks that function as operator interfaces, such as the manual/automatic station (MA_AU) in Designer have SmartObjects within HMI. The SmartObjects allow the automatic configuration of faceplates for the operator to control and monitor the process. These faceplates reside with the Object Explorer.



Task 1. Prepare for faceplate configuration.

Task 2. Create a new CimEdit Screen.

Task 3. Place an OpenProcess faceplate on the CimEdit screen.

Step 11. Task 1
Prepare for Faceplate Configuration

You can use either the DesignerSim or KEPServer controllers to test the faceplates.

To prepare for faceplate configuration:

1. Either:
   A. Make sure the KEPServer controller is connected to the OpenProcess project or
   B. Load the DesignerSim strategy as follows:
      A. Open DesignerSim.

B. Stop the Controller.

i. Click Control on the DesignerSim menu bar.

ii. Select Stop Controller.

C. Click File on the DesignerSim menu bar.

D. Select Load Strategy.

The Open dialog box appears.

E. Select the STG file you want to load.

F. Click **OK**.

G. Start the Controller.

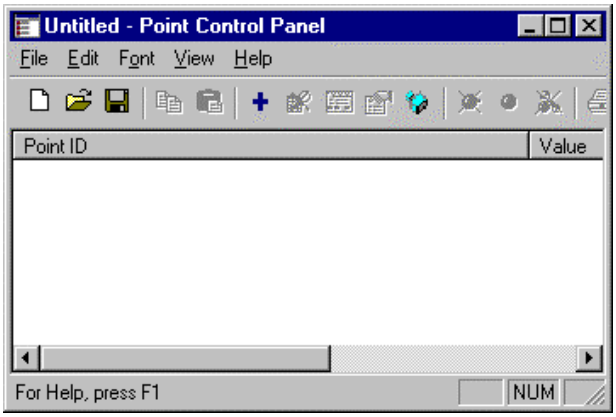
2. Click the **Run** button  on the HMI Workbench menu bar to start the HMI project.
3. Open the HMI Point Control Panel.

A. Expand the Runtime folder in the left pane of the HMI Workbench.

B. Double-click **Point Control Panel** 

.

The Point Control Panel opens.



4. Add all the points imported from the Designer.

A. Click the Add Points button  on the Point Control Panel Toolbar.

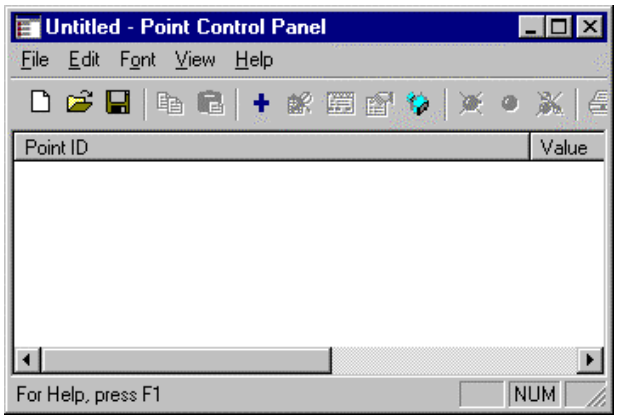
The Select a Point browser opens.

B. Select all the points imported from the Designer.

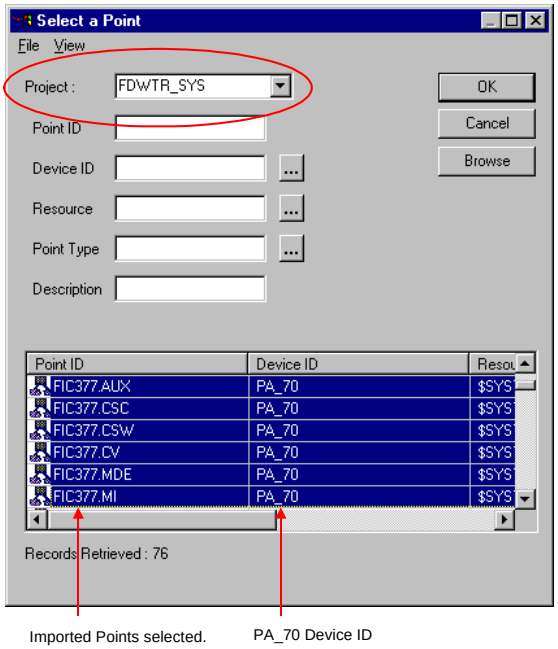
C. Click **OK**.

D. Verify that the point values display in the Point Control Panel.

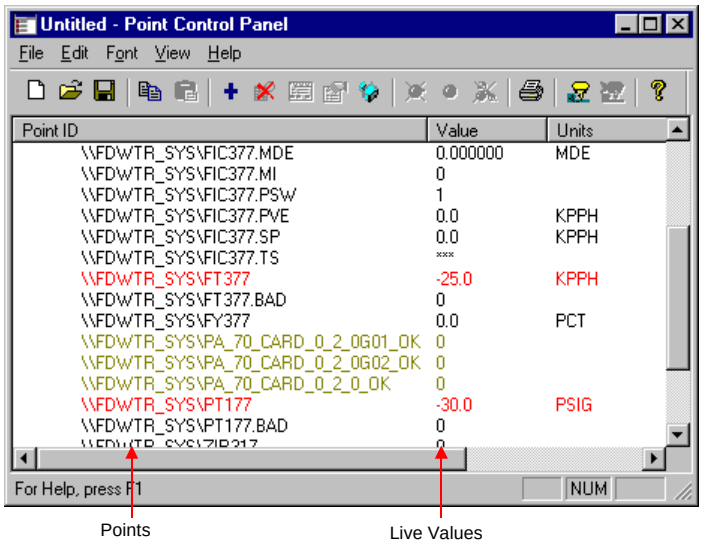
1. Load the DesignerSim strategy.
2. Start the HMI project.
3. Open the HMI Point Control Panel.



4. Add all the points imported from the Designer (attached to the PA_70 device).



D. Verify that the point values display in the Point Control Panel.



End of Tutorial Example

Step 11. Task 2
Create a New CimEdit Screen

You configure the faceplates on a CimEdit screen. At runtime the screens with the faceplates will display in CimView.

To create a new CimEdit screen:

1. Select Screens in the left pane of the HMI Workbench.
2. Click the **New** button  on the HMI Workbench toolbar.

   Either:

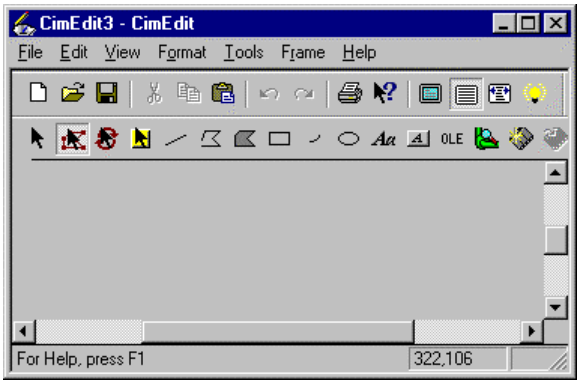
   - If the HMI project is not running,

     A Select CIMPLICITY® Project dialog box opens.

     Click **Start**.

     The HMI project starts and a new CimEdit screen opens.
   - If the HMI project is running:

     A new CimEdit screen opens.



Step 11. Task 3
Place an OpenProcess Faceplate on the CimEdit Screen

OpenProcess faceplates are available in CimEdit's Symbols library.

To place an OpenProcess faceplate on the CimEdit screen:

1. Click the Object Explorer button  on the CimEdit toolbar.

   The Symbols library opens.

2. Expand OpenProcessSmartObjects in the Symbols library left pane.

2. Select a folder under OpenProcess SmartObjects.

   The available SmartObjects appear in the right pane.

3. Drag the faceplate you want onto the CimEdit screen.

   A dialog box appears with fields that correspond to the SmartObject that is selected.

4. Fill in the fields.

5. Click **OK**.

   The faceplate displays.

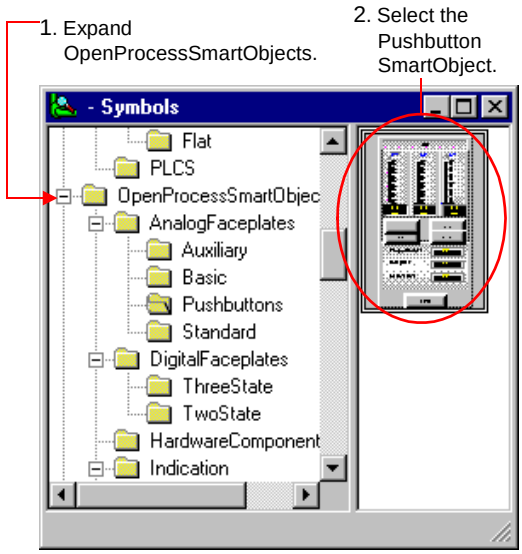
6. Adjust the faceplate to the desired size and location on the screen.

7. Click the Runtime button  on the CimEdit toolbar.

Result: CimView displays the faceplate with the runtime values for the data you entered.

Faceplate 1

1. Open the CimEdit Symbols library.
2. Select the OpenProcess Pushbutton faceplate.

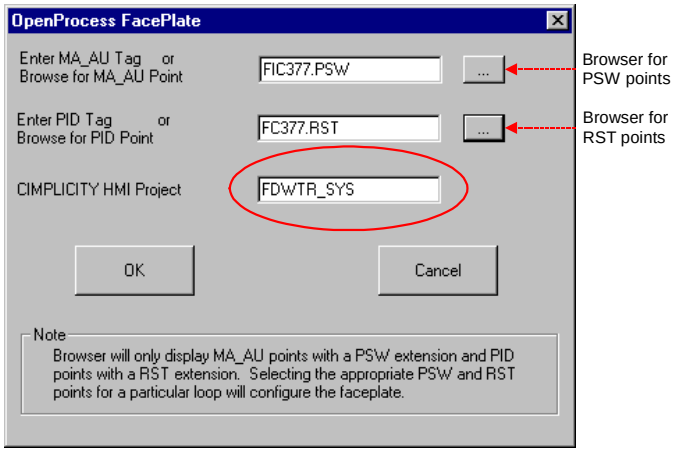


3. Drag the faceplate onto the CimEdit screen.

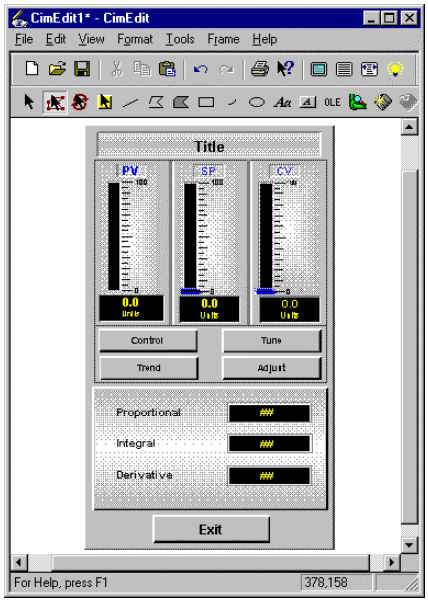
   An OpenProcess Faceplate dialog box displays.

4. Fill in the fields as follows:

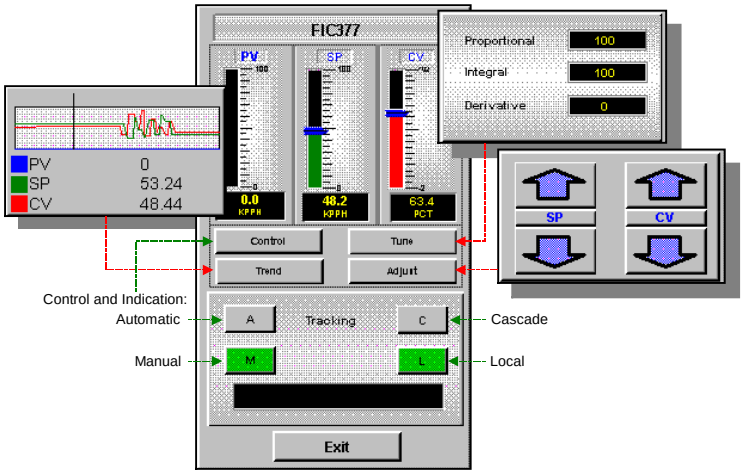
Field	Enter
Enter MA_AU Tag…	FIC321.PSW
Enter PID Tag…	FC321.RST
CIMPLICITY HMI Project	FDWTR_SYS



5. Click **OK**.
6. Adjust the faceplate to the size you want on the CimEdit Screen.



7. Click the Runtime button  on the CimEdit toolbar.
8. Review the faceplate capabilities.



End of Tutorial Example

Appendix A - Using an OpenProcess Project Demo

About the OpenProcess Demo Project

OpenProcess includes a demo project named FDWTR_SYS that you can find in the Projects directory in your **\\CIMPLICITY\HMI** folder.

You can open this project through the HMI Workbench whenever you need to reference a configured OpenProcess project.

You will find this project used as a tutorial example in the "*Creating an OpenProcess Project*" chapter in this manual.

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