SIEMENS

SIMATIC

WinAC MP for MP370 V3.1

User Manual

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	Warning Indicates a potentially hazardous situation that, if not avoided, could result in death or severe injury.
	Caution Used with the safety alert symbol indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.
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	Notice NOTICE used without the safety alert symbol indicates a potential situation that, if not avoided, may result in an undesirable result or state.

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Note the following:

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Preface

WinAC MP is a software S7 PLC for the SIMATIC MP370 12" keyboard multi panel and the MP370 Touch 12" and 15" multi panels that you can use to control a network of PROFIBUS-DP devices. ProTool works with WinAC MP to provide process visualization and control.

WinAC MP consists of the following elements:

- WinAC MP controller software for the MP370 and MP370 12" and 15" Touch multi panels
- STEP 7 project for WinAC MP
- ProTool projects for MP370 and MP370 12" and 15" Touch multi panels with WinAC MP example screens, and add-in WinAC MP components for ProTool CS
- *SIMATIC WinAC MP for MP370 User Manual* (electronic)
- Authorization diskette
- Software Product Sheet

Audience

This manual is intended for engineers, programmers, and maintenance personnel who have a general knowledge of SIMATIC programmable logic controllers. Knowledge of STEP 7 programming, ProTool, and WinAC is also required.

Scope of the Manual

This manual describes the features and the operation of version 3.1 of WinAC MP.

How to Use This Manual

This manual provides the following information:

- Product Overview
- Transferring WinAC MP to the Multi Panel
- Developing and Downloading a STEP 7 Project for WinAC MP
- Controlling Your Process with WinAC MP
- Customizing WinAC MP for Your Application
- Reference Information

Other Manuals

For additional information, refer to the following manuals:

Related Manuals	
Title	**Content**
STEP 7 User Manual	Provides information on programming in STEP 7.
ProTool User Manuals	Provide basic information about the configuration of ProTool user interface screens and ProTool on the multi panel.
SIMATIC NET User Manual	Provides information on communication and networking with SIMATIC NET.

Contacting Customer Support

You can find additional information about WinAC MP and updates to this user manual at the Siemens Energy & Automation web site:

www.sea.siemens.com/software

This web site includes useful information, such as application notes, in the Technical Service area.

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Product Overview

The WinAC MP controller on the multi panel can execute a STEP 7 control program that works with a network of PROFIBUS-DP devices to control your process. The multi panel can run a ProTool project that provides the user interface to the controller and process visualization.
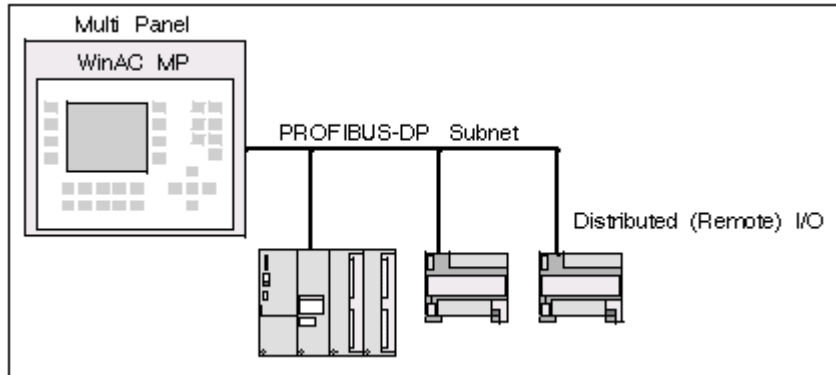
Figure: Process Control with WinAC MP

To use the multi panel for process control with WinAC MP, you must install software on a configuration computer (PC), and transfer components to the multi panel.

System Requirements

To install and use WinAC MP, you must have a configuration computer (PC) with one of the following operating systems:

- Microsoft Windows 98 Second Edition
- Microsoft Windows Millenium Edition
- Microsoft Windows NT 4.0 Workstation with Service Pack 6a or higher
- Microsoft Windows 2000 Professional with Service Pack 1 or higher
- Microsoft Windows XP Professional, Service Pack 1 recommended

This configuration computer must also have the following:

- 10 Mbytes or more on the hard disk drive
- 32 Mbytes or more work memory

This configuration computer must have the following software installed, in the sequence shown:

- STEP 7 V 5.2 or higher
- ProTool CS V 6.0 SP2 or ProTool/Pro CS V 6.0 SP2

You also need:

- An MP370 or MP370 12" or 15" Touch multi panel with 5 MB free flash memory for user application
- A standard cable connecting the Ethernet, serial, MPI, or USB ports of the configuration computer and the multi panel
- SIMATIC NET if you plan to use Ethernet communication (SIMATIC NET CD 11/2002 for Windows XP, SIMATIC NET CD 7/2001 SP5 for all other platforms)
- Any devices necessary for process control connected to your multi panel across a PROFIBUS-DP network

Installation and Transfer Tasks

To use WinAC MP for process control, you must perform installation and development tasks on the configuration computer, and transfer the necessary components to the multi panel. You must perform these tasks:

- Verify that your system meets the system requirements

- Install WinAC MP on the configuration computer and multi panel

    o Install the WinAC MP software on your configuration computer using the WinAC MP installation CD.

    o Transfer the WinAC MP runtime files and authorization from the configuration computer to the multi panel using ProSave, as described in the chapter "Transferring WinAC MP to the Multi Panel" (p. 7)

- Develop a STEP 7 project to control your process from WinAC MP on the multi panel, as described in the chapter "Developing and Downloading a STEP 7 Project for WinAC MP" (p.23)

    o Develop control program logic

    o Configure hardware including PROFIBUS-DP device network

    o Download the STEP 7 project to the multi panel

    Note
    The WinAC MP installation includes an example STEP 7 project, ZEn08_01_WinACMP_Panel.

- Develop a ProTool CS project for the multi panel to be the user interface to WinAC MP and your procsss. You can choose from the following options:

    o Use an example ProTool project as provided with the WinAC MP installation

    o Customize an example ProTool project for your application

    o Create your own ProTool project for your application

    The STEP 7 example project for WinAC MP includes three ProTool CS projects, one each for the MP370 keyboard unit multi panel, the MP370 12" touch panel, and the MP370 15" touch panel. The chapter "Controlling Your Process with WinAC MP" (p.33) describes how to use an example ProTool project for process control.

    For information on developing screens with ProTool CS, refer to the ProTool CS documentation. Also, the chapter "Customizing WinAC MP for Your Application" (p. 45) provides information about using WinAC MP functions and controls with ProTool CS.

The following diagram illustrates the correlation between the configuration computer and the multi panel for the types of files you must transfer:
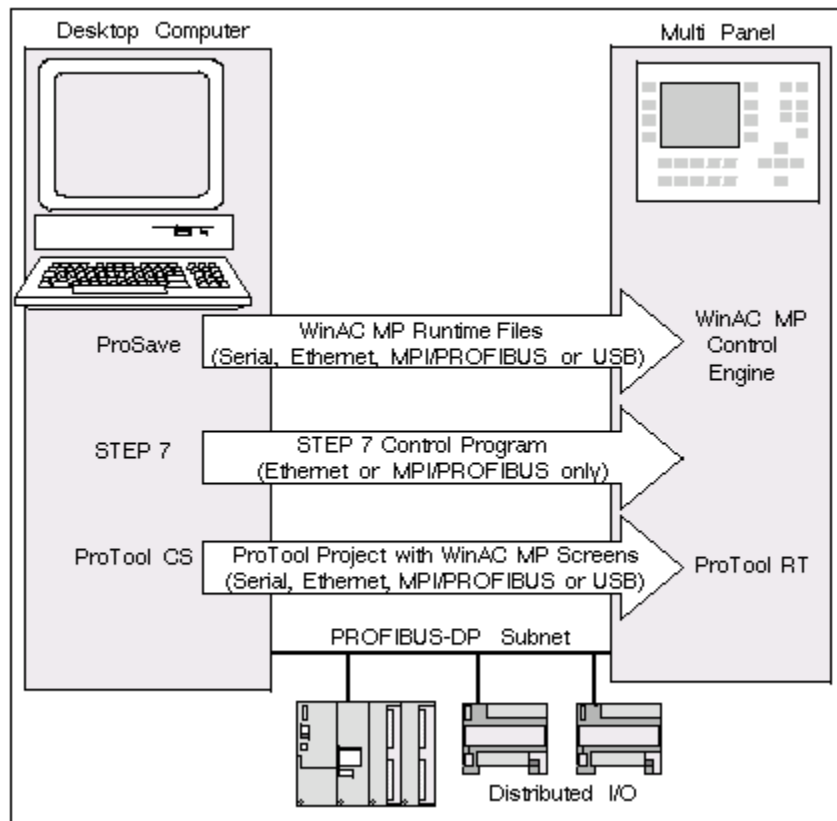
Figure: Overview of Transfers

When you have downloaded all of the necessary files, the multi panel is ready for process control. The chapter "Controlling Your Process with WinAC MP" describes how to use WinAC MP with an example ProTool project.

Screens Provided by the ProTool Example Projects

The example ProTool projects contain WinAC MP functions, ActiveX controls, and two screens with WinAC MP components for process control and monitoring.

Both example screens contain function keys or touch buttons on the left for WinAC MP operations. The chapter "Controlling Your Process with WinAC MP" describes how to use the example screens. The chapter "Customizing WinAC MP for Your Application" lists the available WinAC MP functions and how to use them in ProTool CS to create your own process screens, or modify the example screens.

The first example screen is the WinAC_MP_Panel screen:
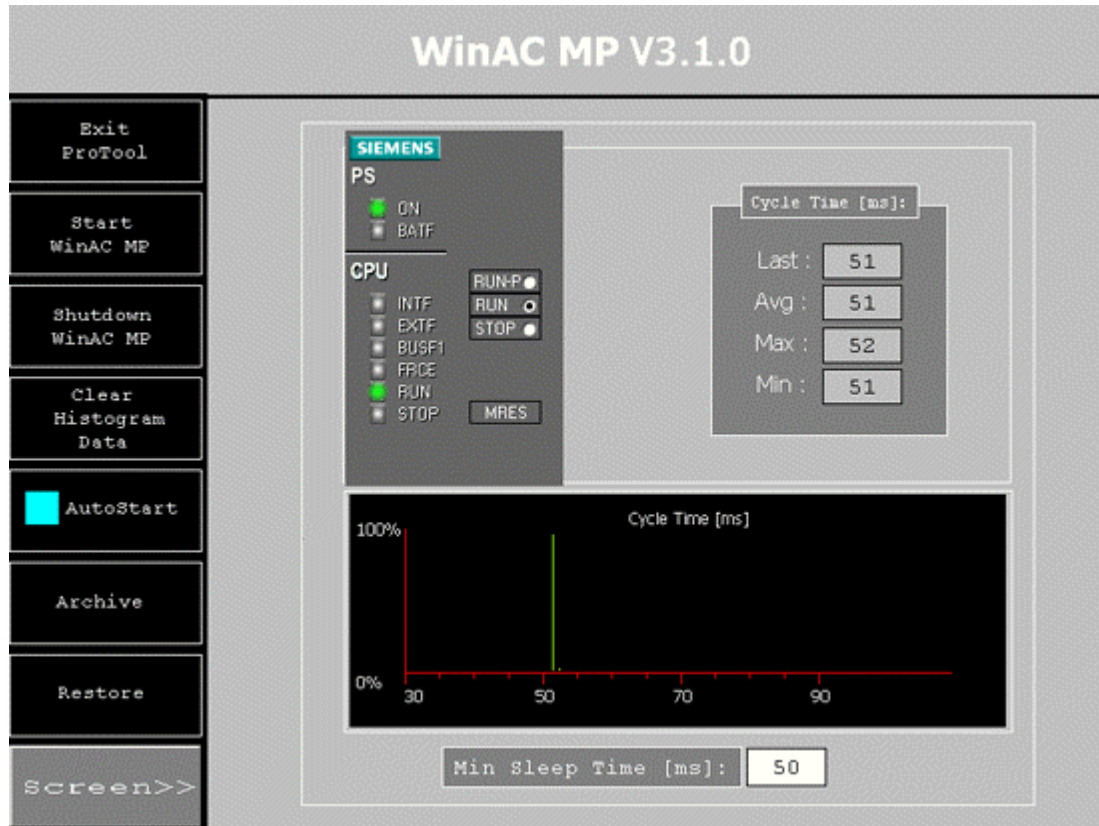
Figure: WinAC_MP_Panel Screen

The WinAC_MP_Panel screen uses a combination of ActiveX controls and screen objects with WinAC MP functions attached:

- The WinAC MP ActiveX control provides a control panel that serves as your interface to the WinAC MP controller. The control panel provides everything you need to monitor and operate the WinAC MP controller: all the status indicators, plus mode buttons that allow you to change the operating mode of the WinAC MP controller.

- The Cycle Time area and the Min Sleep Time field are screen objects with WinAC MP functionality. When the WinAC MP controller is running, you can watch the last cycle time, average cycle time, maximum cycle time, and minimum cycle time update in the Cycle Time area. The Cycle Time screen objects are read-only. You can set the minimum sleep time value (ms) in the Min Sleep Time field, which is a read/write field, to tune the scan cycle.

- The Histogram ActiveX control provides visual information about cycle time (when the WinAC MP controller is running) in the form of a histogram.

The second example screen is the WinAC_MP_Function screen:
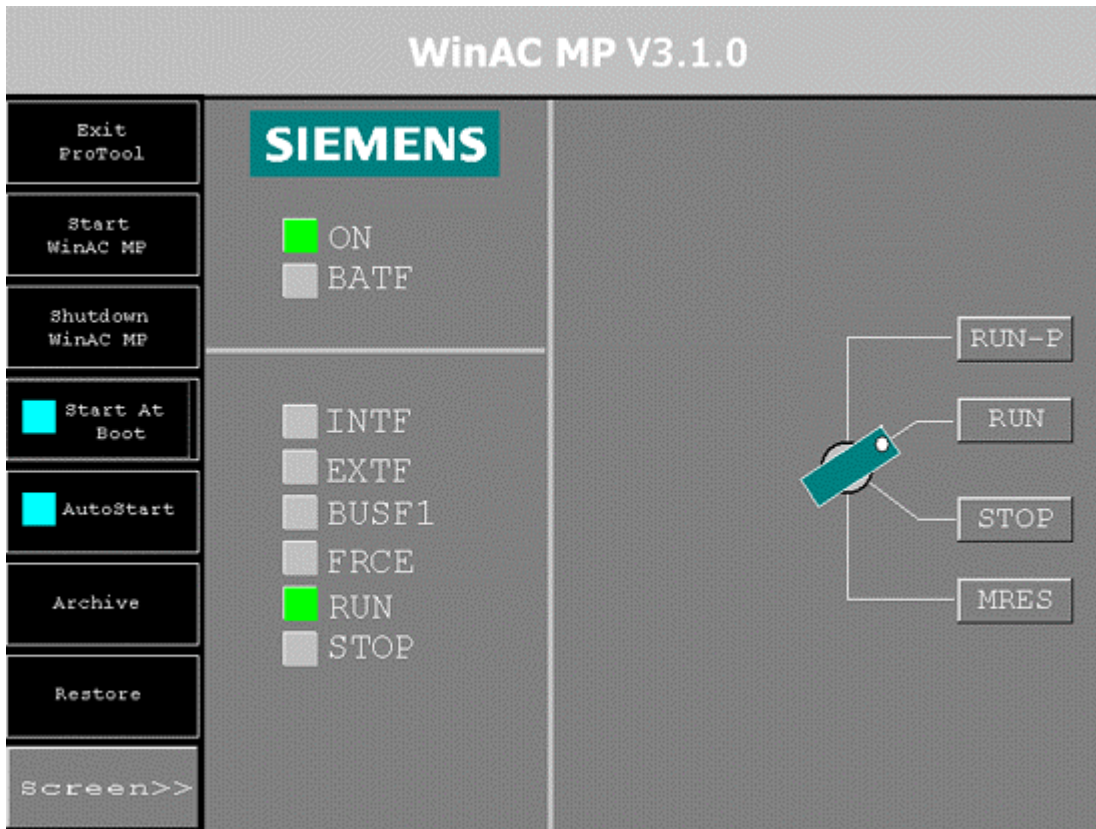
Figure: WinAC_MP_Function Screen

This screen uses screen objects such as buttons and bitmaps, rather than the WinAC MP ActiveX control, to provide a control panel interface for the WinAC MP controller.

Compatibility

WinAC MP V3.1 is compatible with WinAC Basis V4.0. STEP 7 programs developed for WinAC MP can be used without change in WinAC Basis and in S7-300/400 controllers. In the hardware configuration, however, note that WinAC Basis can support up to four submodules, but WinAC MP has only one.

ProTool projects developed for WinAC MP 3.0 can be used without change in WinAC MP 3.1.

What's New?

If you have previously used WinAC MP, these features have been added since the last release:

- Support of the 15" version of the MP370 Touch panel

- Improved handling of retentive data

- WinAC MP functions for archive and restore

- Configurable automatic start after power on

- Peer-to-peer communication

- Ability to reset the cycle time histogram data

- Ability to get the WinAC MP version number

- Fixed WinAC MP controller priority: always higher than ProTool on the multi panel; not tunable by user

For more information on these features, see the related topics in the chapter "Controlling Your Process with WinAC MP" (p. 33) or in the summary of "WinAC MP Functions" (p.47).

Transferring WinAC MP to the Multi Panel

To transfer WinAC MP from the configuration computer to the multi panel, you must perform tasks on both the configuration computer and on the multi panel. This chapter explains how to perform the following tasks:

1. Set parameters on the configuration computer and the multi panel for the communications interface.

2. Connect the multi panel to the configuration computer and set the multi panel to Transfer mode. (See the hardware manual for your multi panel.)

3. Use ProSave to download WinAC MP runtime files from the configuration computer to the multi panel.

4. Use ProSave to download authorization for WinAC MP from the configuration computer to the multi panel.

5. Use ProTool CS to download the example your ProTool project or the WinAC example project from the configuration computer to the multi panel.
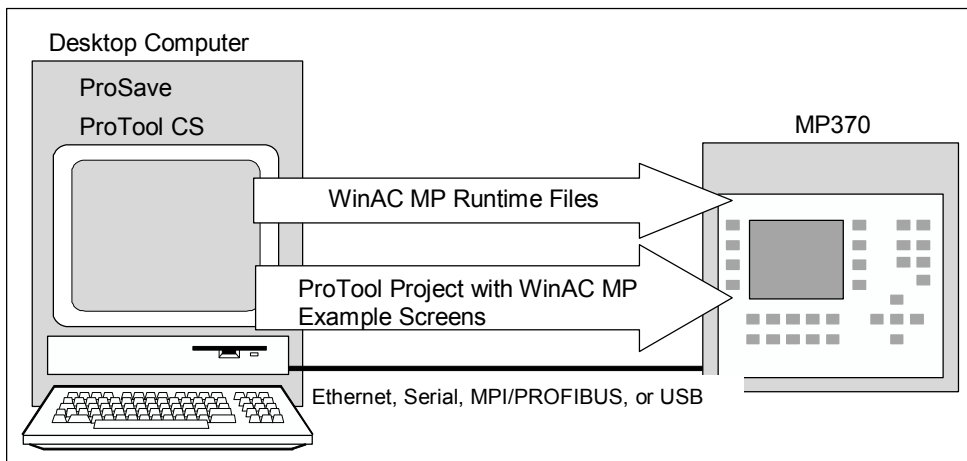
Figure: Download WinAC MP

After you complete these tasks, you can download your hardware configuration and control program from STEP 7 to the WinAC MP controller on the multi panel.

Note
If you must perform an OS Update to reinstall ProTool on the multi panel, or to install a service pack, you replace all existing software and licenses installed on the multi panel. If you have an authorization installed on the multi panel, remove it according to the directions in "Removing an Authorization" (p.20) before you update the operating system. After the update, you must retransfer all of the WinAC MP components from the configuration computer and authorization diskette to the multi panel, as described in this chapter.

Setting Parameters for Communications

WinAC MP supports the following interfaces for communications between the configuration computer and the multi panel:**Error! Bookmark not defined.**

- Ethernet

- Serial

- MPI/PROFIBUS

- USB

You must set parameters in ProSave and ProTool on the configuration computer and also in the Control Panel utilities of the multi panel for the devices to communicate successfully. You use ProSave to download the WinAC MP runtime files to the multi panel, so you must configure communications parameters in both ProSave and the multi panel. You use ProTool to download a project with user interface screens, so you must configure communications parameters in both ProTool and the multi panel. ProSave and ProTool do not have to use the same communications protocol, but if they differ, you have to reconfigure your multi panel settings to match the tool you are using.

Using the Remote Control Option

The Remote Control option allows you to download from the configuration computer without having to set the multi panel to Transfer mode. Remote Control is especially useful when the configuration computer and the multi panel are not physically close to each other.

> **Note**
> To use the Remote Control option, ProTool must be running on the multi panel. The multi panel cannot automatically go to remote transfer mode when ProTool is not running.

If ProTool is running on the multi panel and you have enabled Remote Control, the multi panel closes the ProTool runtime and begins accepting transferred files when you initiate a download from the configuration computer. A Remote Control download while WinAC MP is controlling the process can interfere with process activities.

> **Warning**
> If you select the Remote Control transfer option, it is possible for a user to download from the configuration computer to the multi panel while the controller is running.
>
> If the controller is connected to field equipment, interrupting its operation could cause death or serious injury to personnel and/or damage to equipment.
>
> Ensure that only qualified personnel have access to the configuration computer. Ensure that your equipment is in a safe state before proceeding with a download. Always install a physical emergency stop circuit for your machine or process.

To enable Remote Control on the multi panel, follow these steps:

1. From the Control Panel on the multi panel, open the Transfer utility.

2. If you are using serial communication between ProTool and the multi panel, select the "Enable Channel" and "Remote Control" checkboxes for Channel 1 (Serial).

3. If you are using MPI/PROFIBUS, Ethernet, or USB communication between ProTool and the multi panel, select the "Enable Channel" and "Remote Control" checkboxes for Channel 2.

Connecting the Configuration Computer to the Multi Panel

You must use a direct connection for Serial, MPI/PROFIBUS, or USB communications. For Ethernet communication, you can use either a direct connection or a networked connection. To configure the multi panel to use a direct connection, follow these steps:

1. From the Control Panel on the multi panel, open the Communications utility and select the PC Connection tab.

2. Select the "Enable direct connections to the desktop computer" checkbox.

Establishing Ethernet Communication

To set up a direct Ethernet connection, connect a crossover cable between the multi panel and configuration computer. For a networked Ethernet connection, connect both the configuration computer and the multi panel to the local area network. Then, configure the following parameters:

Ethernet Communication Parameters

On Your Configuration Computer...

To Connect from ProSave

1. From the General tab of ProSave, select the Device Type for your multi panel.

2. From the Connection list, select Ethernet.

3. Under Connection Parameters, supply the IP Address or Computer Name of the multi panel.

To Connect from ProTool CS

1. Open the Download Preferences (**File > Download > Preferences**). The Set Download dialog opens.

2. Select Ethernet from the list box.

3. Supply the IP Address or Computer Name of the multi panel.

On the Multi Panel...

Edit Network Configuration

1. From the Control Panel, open the Network Configuration utility.

2. From the Adapters tab, click the Properties button.

3. Supply an IP address provided by your network administrator.

Edit Transfer Settings

1. From the Control Panel, open the Transfer utility.

2. Under Channel 2, select Ethernet from the list.

3. Select the Enable Channel checkbox.

Save Your New Settings

1. From the Control Panel, open the OP utility.

2. Click the Save Registry button to save your configuration. Otherwise, your settings are reset to the default after the next power cycle.

> ⚠️ **Warning**
>
> Do not use DHCP (Dynamic Host Configuration Protocol) for TCP/IP address assignment on the multi panel.
>
> DHCP does not guarantee the return of the same IP address for the same node every time it is powered on. A changed IP address can cause nodes on the Industrial Ethernet to lose connection or to connect to the wrong node, which could cause unexpected process or machine operation resulting in death, serious injury and/or property damage.
>
> Always specify a static IP address for the multi panel, or at a minimum use DHCP with lease reservations. See your network administrator for address assignment.

Establishing Serial Communication

To set up serial communication, you must connect a serial cable between the serial port on your configuration computer and the Config/Printer port on the multi panel, and configure the following parameters:

Serial Communication Parameters

On Your Configuration Computer...

To Connect from ProSave

1. From the General tab of ProSave, select the Device Type for your multi panel.
2. From the Connection list box, select Serial.
3. Under Connection Parameters, select the COM port that you are using on your configuration computer for this connection.
4. Select the baud rate that is appropriate for your connection.

To Connect from ProTool CS

1. Open the Download Preferences (**File > Download > Preferences**). The Set Download dialog opens.
2. Select Serial from the list box.
3. Select the COM port that you are using on your configuration computer for this connection.
4. Select the baud rate that is appropriate for your connection.

On the Multi Panel...

Edit the Transfer Settings

1. From the Control Panel, open the Transfer utility.
2. Under Channel 1 (Serial), ensure that the Enable Channel check box is selected.

Save Your New Settings

1. From the Control Panel, open the OP utility.
2. Click the Save Registry button to save your configuration. Otherwise, your settings are reset to the default after the next power cycle.

Establishing MPI/PROFIBUS Communication

> **Notice**
> If you have downloaded a DP master hardware configuration from STEP 7 to the multi panel, you cannot perform MPI/PROFIBUS downloads from ProTool when WinAC MP is running on the multi panel. Shut down WinAC MP before downloading from ProTool or use another communications interface from ProTool to the multi panel.
>
> The communication settings on the multi panel must match the settings on the configuration computer.

If you do choose to use MPI/PROFIBUS communication, you must install a card (such as CP 5611 for desktop PCs or CP 5511 for laptops) and driver on the configuration computer. You must connect an MPI/PROFIBUS cable between the 9-pin port of the card on the configuration computer and the DP/MPI/PPI port on the multi panel, and configure the following parameters:

MPI/PROFIBUS Communication Parameters

On Your Configuration Computer...

To Connect from ProSave

1. From the General tab of ProSave, select the Device Type for your multi panel.
2. From the Connection list box, select MPI/PROFIBUS DP.
3. Under Connection Parameters, supply the OP address that has been assigned to the multi panel. (The OP address is the same as the Address parameter in the S7-Transfer Settings utility.)

To Connect from ProTool CS

1. Open the Download Preferences (**File > Download > Preferences**). The Set Download dialog opens.
2. Select MPI/PROFIBUS DP from the list box.
3. Supply the OP address that has been assigned to the multi panel. (The OP address is the same as the Address parameter in the S7-Transfer Settings utility.)

On the Multi Panel...

Edit the S7-Transfer Settings

1. From the Control Panel, open the S7-Transfer Settings utility.
2. Select MPI or PROFIBUS from the list.
3. Click the Properties button.
4. Ensure that the properties match those used by the configuration computer.

Edit the Transfer Settings

1. From the Control Panel, open the Transfer utility.
2. Under Channel 2, select MPI from the list box.
3. Select the Enable Channel check box.

Save Your New Settings

1. From the Control Panel, open the OP utility.
2. Click the Save Registry button to save your configuration. Otherwise, your settings are reset to the default after the next power cycle.

Establishing USB Communication

To set up USB communication, you must connect a USB cable between the USB port on the configuration computer and the USB port on the multi panel, and configure the following parameters:

USB Communication Parameters

On Your Configuration Computer...	**On the Multi Panel...**
To Connect from ProSave	**Edit Transfer Settings**
1. From the General tab of ProSave, select the Device Type for your multi panel.	1. From the Control Panel, open the Transfer utility.
2. From the Connection list box, select USB. (There are no other parameters to configure.)	2. Under Channel 2, select USB from the list box.
	3. Select the Enable Channel check box.
To Connect from ProTool CS	**Save Your New Settings**
1. Open the Download Preferences (**File > Download > Preferences**). The Set Download dialog opens.	1. From the Control Panel, open the OP utility.
2. Select USB from the list box.	2. Click the Save Registry button to save your configuration. Otherwise, your settings are reset to the default after the next power cycle.

Downloading WinAC MP Runtime Files

To be able to run WinAC MP on the multi panel, you must download the WinAC MP runtime files from the configuration computer to the multi panel. To transfer the runtime files that include the WinAC MP controller software, follow these steps:

1. Select Transfer from the Loader dialog on the multi panel if it is not already in Transfer mode. The multi panel displays a "Connecting to host" message.

2. Open ProSave on the configuration computer.

3. From ProSave, click the General tab and select the device that corresponds to your multi panel (MP370, MP370 TOUCH, or MP370 15" TOUCH) from the Device Type list.

4. In the Connection list box, select the type of connection that you are using between the configuration computer and the multi panel. See the topic "Setting Parameters for Communications" (p.8) for supported connection types and configuration instructions.

5. Complete the Connection Parameters for your connection:

    •   For an Ethernet connection, supply the IP address or computer name of the multi panel.

    •   For a serial connection, select the COM port and baud rate.

    •   For an MPI/PROFIBUS connection, supply the OP address of the multi panel.
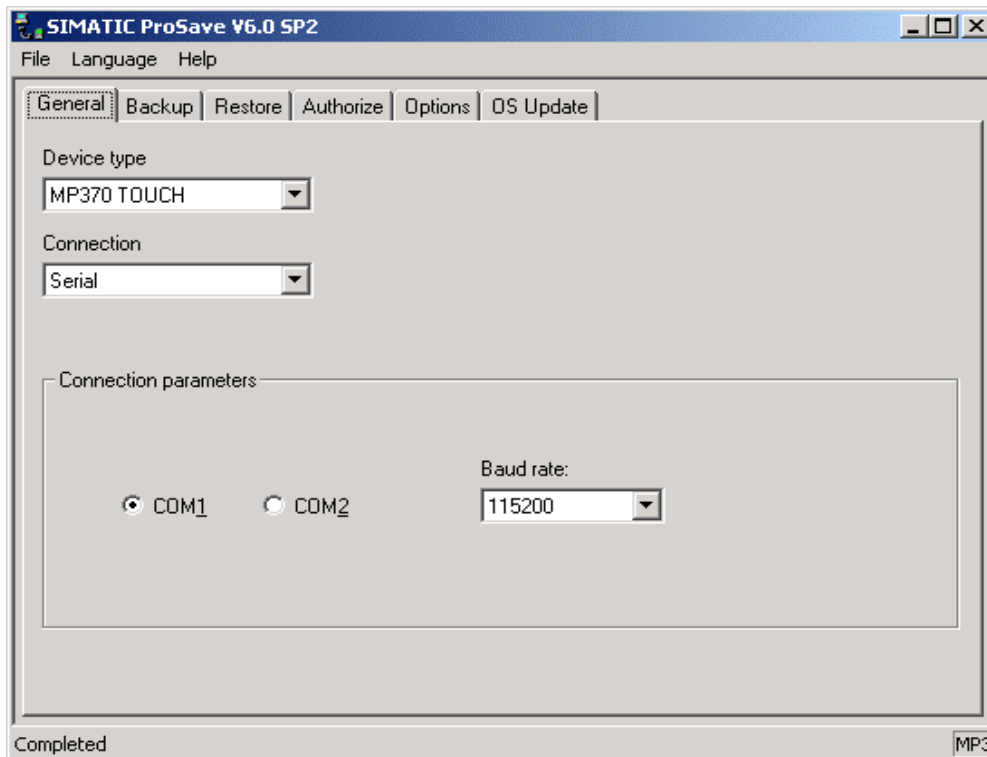
Figure: Setting Connection Parameters

6. Select the Options tab and click the Device Status button with the multi panel in Transfer mode. The communication connection is valid if you do not see an error message.

   Note
   If you have a communication problem, check that the multi panel is in Transfer mode, check your physical cable connections, and check that your settings in ProSave and on the multi panel are correct for your connection, as described in "Setting Parameters for Communications" (p.8).

7. From the Options tab, click WinAC MP V3.1 in the Available Options (left pane) to select it, then click the ⟩⟩ button to add it to the installed options of the multi panel (right pane).

   If an earlier version of WinAC MP has already been installed, you are warned that this option is already installed. You must use the ⟨⟨ button to remove it from the Installed Options pane first. Then you can select WinAC MP from the Available Options and add (reinstall) it to the multi panel.

   ProSave begins downloading the WinAC MP controller software to the multi panel. While the transfer is in progress, the configuration computer displays progress on the transfer. On the multi panel, the Transfer dialog updates with messages containing progress on the files that the multi panel is receiving, uncompressing and writing to the flash file system. At the end of the transfer, a message confirms the success of the transfer.
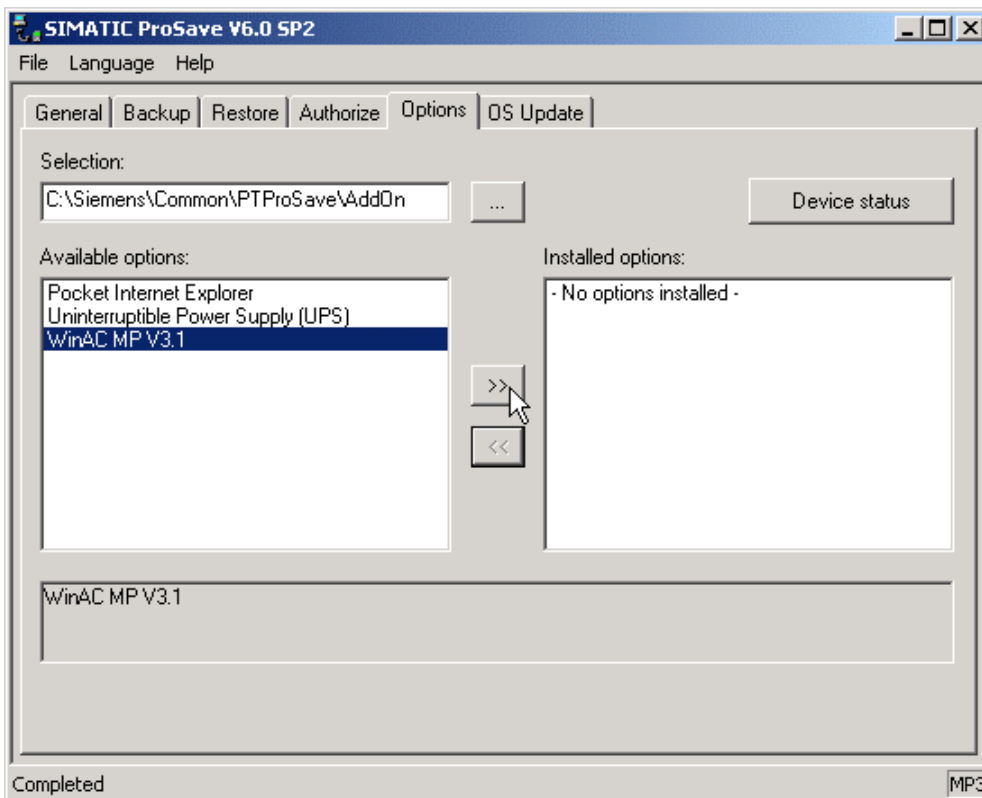
Figure: Transferring the WinAC MP Controller to the Multi Panel

8. When the transfer completes, shut down and restart the multi panel.

The WinAC MP controller is now installed on the multi panel. You do not have a user interface to the controller until you download a ProTool project with WinAC MP screens.

Leave ProSave open to download WinAC MP authorization to the MP370.

Downloading Authorization for WinAC MP

You use ProSave to transfer WinAC MP authorization from an authorization diskette inserted in the drive of your configuration computer to the multi panel. If ProSave is not already open, click **SIMATIC > ProSave > ProSave** from the Windows Start menu.

To transfer the authorization, select Transfer from the Loader dialog on the multi panel. The multi panel opens a communications connection and displays a "Connecting to host" message.

> **Notice**
> You must ensure that the WinAC MP controller is shut down when you use ProSave to download files.
>
> If you attempt to perform downloads from ProSave while the WinAC MP controller is running, the controller process interferes with the download process. The controller process takes precedence and the other operation fails. You may not receive any notification that the process has failed.
>
> Always shut down the WinAC MP controller before you download files from ProSave.

To transfer WinAC MP authorization to the multi panel using ProSave, follow these steps:

1. Click the Authorize tab in ProSave.

2. Select the drive letter for the drive where you have inserted the authorization diskette. The authorization is displayed in the Selection pane. The License counter should display a value of 001 for the WinAC MP authorization, indicating that the license is present on the diskette. (You can use the Device Status button to read the multi panel in order to see whether an authorization has already been installed.)

3. To transfer the authorization from the diskette to the multi panel, select the product authorization in the Selection pane and use the ⟩⟩ button to add it to the Installed Options.

After the authorization transfer completes, you can exit ProSave.

> **⚠ Caution**
> Do not dispose of your authorization diskette! If you later want to reload the multi panel image, or perform a backup restore, you must first remove the authorization for WinAC MP from the multi panel (that is, transfer it back onto the diskette). The authorization can only be transferred back onto the original authorization diskette, as described in "Removing Authorization for WinAC MP from the Multi Panel" (p. 20).
>
> Authorization for WinAC MP is not backed up when you back up the flash memory of the multi panel, nor is it a part of the image on the multi panel. Consequently, if you do not uninstall the existing authorization (restore it from the multi panel to the diskette) before loading a new image or restoring from backup to the multi panel, the authorization information is erased during the load operation, effectively causing you to lose the authorization.
>
> If you lose an authorization, you must contact Siemens technical support for assistance. See the topic "Contacting Customer Support" (p. iv) for contact information.

Downloading a WinAC MP Example ProTool Project

The ProTool example projects provide a user interface for the WinAC MP controller. You use ProTool CS to download an example project to the multi panel, or to create and download a custom ProTool project for your application.

To download a project, select Transfer from the Loader dialog on the multi panel. The multi panel opens a communications connection and displays a "Connecting to host" message.

Opening a ProTool Example Project

From the Windows Start menu, click **Start > SIMATIC > ProTool Pro CS** to open ProTool CS. There are separate ProTool example projects for the MP370, the MP370 Touch, and MP370 15" Touch panels.

The way that you access the example projects depends on whether or not you have selected "ProTool Integration in STEP 7" (from the File menu in ProTool). To open the example project that is appropriate for your multi panel, use the **File > Open** menu command to access the Open dialog. Then choose the procedure that is right for you:

If you have selected ProTool Integration into STEP 7,

1. From the Entry Point list, select Example project.

2. From the Name list, select Zen08_01_WinACMP_Panel.

    ProTool CS displays the project location in the Storage Path field. The WinAC MP example project is in the STEP 7 installation directory under …\Step7\Examples\ZEN08_01.

3. Click the ProTool icon that corresponds to your multi panel. ProTool CS displays its name in the Object Name field and its type (SIMATIC OP) in the Object Type field.

4. Click the OK button to confirm your entries and open the example project.

If you have not selected ProTool Integration into STEP 7,

1. From the Open dialog, navigate to the ProTool project for your multi panel.

    The WinAC MP STEP 7 example project in the STEP 7 installation directory includes the three ProTool projects in the following locations:

    - Keyboard Unit:
      …\Step7\EXAMPLES\ZEN08_01\TDOP\PRO.PDB

    - Touch panel unit:
      …\Step7\EXAMPLES\ZEN08_01\TDOP\PRO___00.PDB

    - 15" Touch panel unit:
      …\Step7\EXAMPLES\ZEN08_01\TDOP\PRO___01.PDB

2. Click the Open button to open the example project file that you have selected.

Downloading an Example Project

To download an example project to the multi panel, click the Download button 🖼. ProTool CS and the multi panel display progress indicators while the download is in progress. ProTool CS displays a success message following a successful download.

If there are communication difficulties, try these troubleshooting tips:

- Make sure that power is on to the multi panel and the multi panel is in Transfer mode.

- Check that the cable is connected properly to the configuration computer and to the multi panel.

- Review the topic "Setting Parameters for Communications" (p.8) to ensure that you have configured the connection properly.

After a successful download, the multi panel displays a screen from the example project. The default is the WinAC_MP_Panel screen:
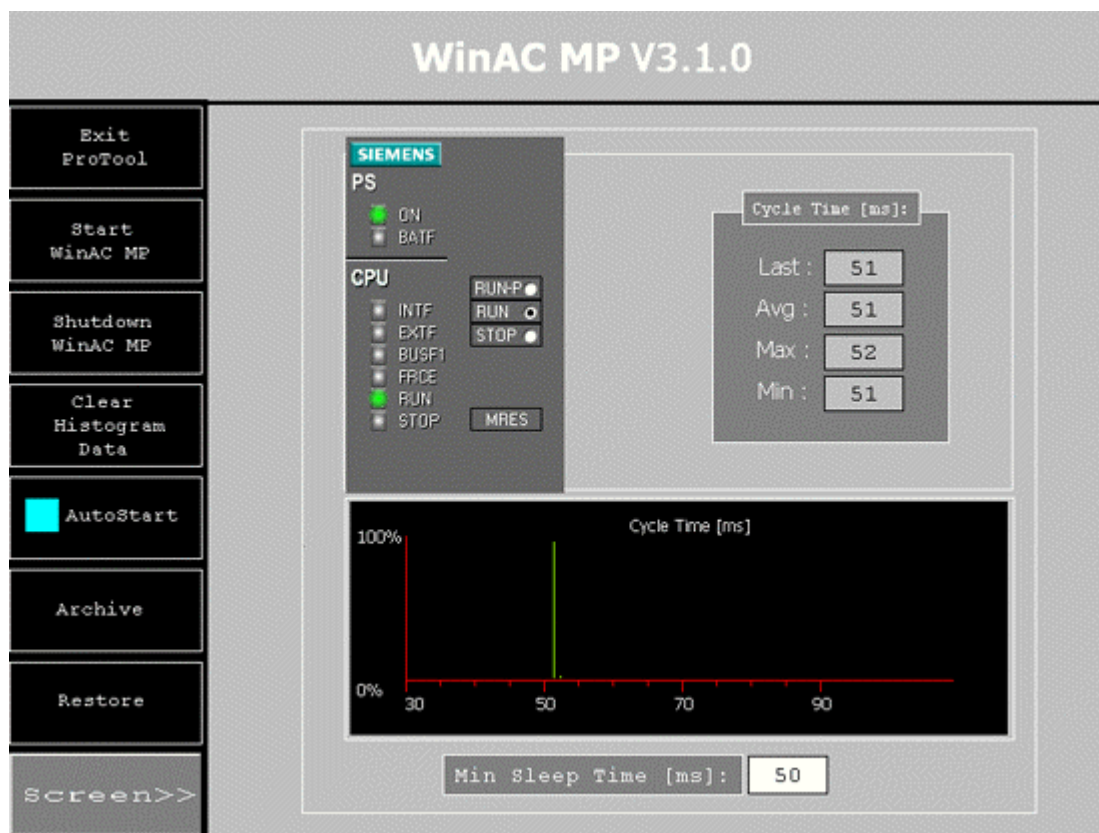
Figure: WinAC_MP_Panel Screen

The chapter "Controlling Your Process with WinAC MP" describes how to use the example ProTool project in more detail.

To use the example ProTool project for process monitoring and control, you must download a STEP 7 control program to WinAC MP, as described in the chapter "Developing and Downloading a STEP 7 Project for WinAC MP".

Getting Started with WinAC MP on the Multi Panel

After you transfer the runtime files, authorization and a WinAC MP example ProTool project, you can view and experiment with the user interface of the controller.

Remember that the controller does not actually contain any program logic until after you download a STEP 7 control program.

Starting the ProTool Project on the Multi Panel

It is easy to start your ProTool project on the multi panel:

1. Ensure that the multi panel is powered on.

2. From the Loader dialog on the multi panel, click the Start button. ProTool opens and displays your project.

Starting the WinAC MP Controller

The type of multi panel you have determines how you start the controller:

• Keyboard units: press the S3 key to start the controller.

• Touch panel units: touch "Start WinAC MP" to start the controller.

Shutting Down the WinAC MP Controller

The type of multi panel you have determines how you shut down the controller:

• Keyboard units: press the S4 key to shut down the controller.

• Touch panel units: touch "Shutdown WinAC MP" to shut down the controller.

Exiting the ProTool Project

The type of multi panel you have determines how you exit the project:

• Keyboard units: press the S2 key to exit ProTool.

• Touch panel units: touch "Exit ProTool" to exit ProTool.

The Difference Between Shutting Down WinAC MP and Exiting ProTool

Exiting ProTool has no effect on the operation of the WinAC MP controller. When you exit ProTool, you close the project that provides the interface to the WinAC MP controller. You cannot see a representation of the controller. However, the controller can run even if the ProTool project is closed.

When you start the WinAC MP controller, the power LED on the control panel representation in the example ProTool project turns green, and it stays green until you issue the "Shutdown WinAC MP" (S4) command. You can exit and restart ProTool on the multi panel and the power LED will remain green.

To shut down the controller, press the S4 key or the touch button for the "Shutdown WinAC MP" command, which is entirely separate from the "Exit ProTool" command.

Restrictions when the Controller Is Running

When the controller is running, the multi panel cannot connect to other PLCs. The WinAC MP controller is configured to use the IP address of the multi panel. Remember that the controller can be running whether or not ProTool is running on the multi panel.

The following restrictions apply when the controller is running:

- Do not attempt to perform ProSave operations between the configuration computer and the multi panel.

- Do not use utilities from the Control Panel of the multi panel. The WinAC MP controller has priority over these other operations on the multi panel. Such operations, if attempted, may fail without notice.

> **Notice**
> Ensure that the WinAC MP controller is shut down when you use ProSave to download files or when you use utilities in the Control Panel of the multi panel.
>
> If you attempt to perform downloads from ProSave or use utilities in the Control Panel while the WinAC MP controller is running, the controller process interferes with the download and/or Control Panel processes. The controller process takes precedence and the other operations can fail. You may not receive any notification that the process has failed.
>
> Always shut down the WinAC MP controller before you perform a download from ProSave or use a utility in the Control Panel of the multi panel.

- Do not attempt to download a project from ProTool CS on the configuration computer to the multi panel when the controller is in RUN or RUN-P mode.

> **Warning**
> Downloading a ProTool CS configuration to the multi panel while the WinAC MP controller is in RUN or RUN-P mode interrupts the execution of the process.
>
> If process equipment is not in a safe state, interrupting the execution of the process could result in death or serious injury to personnel, and/or damage to equipment.
>
> Shut down the WinAC MP controller or set it to STOP mode prior to downloading any ProTool CS configuration. Ensure that your equipment is in a safe state. Always install a physical emergency stop circuit for your machine or process.

Removing WinAC MP

To remove WinAC MP from both the configuration computer and the multi panel, you must perform the following tasks:

- Remove the authorization license from the multi panel.

- Remove the WinAC MP runtime files from the multi panel.

- Remove WinAC MP V3.1 from the configuration computer.

Removing Authorization for WinAC MP from the Multi Panel

To remove the authorization from the multi panel and restore it to the authorization diskette, follow these steps:

7. Insert the authorization diskette in the appropriate diskette drive of your configuration computer.

8. To open ProSave, click **SIMATIC > ProSave > ProSave** from the Windows Start menu.

9. Click the General tab and select the device that corresponds to your multi panel (MP370, MP370 TOUCH, or MP370 15" TOUCH) from the Device Type list.

10. From the Connection list, select the type of connection that you are using between the configuration computer and the multi panel.

11. Complete the Connection Parameters for your connection:

    - For an Ethernet connection, supply the IP address or computer name of the multi panel.

    - For a serial connection, select the COM port and baud rate.

    - For an MPI/PROFIBUS connection, supply the OP address of the multi panel.

12. Click the Authorize tab.

13. Click the Device Status button to read the authorization from the multi panel. ProSave displays the authorization in the Installed Options (right pane).

    Note
    If you have a communication problem and the multi panel is in Transfer mode, check your physical cable connections, and check to make sure that your settings in ProSave and on the multi panel are correct for your connection. Review the topic "Setting Parameters for Communications" (p.8).

14. Select the correct drive letter for the drive where you have inserted the authorization diskette. The contents of the authorization diskette are displayed in the Selection area (left pane). The License counter displays a value of 000 for the WinAC MP authorization, indicating that the license is not currently present on the diskette.

15. To transfer the authorization from the multi panel to the diskette, select the product authorization in the Installed Options (right pane) and use the [<<] button to transfer it to the Selection area (left pane). When the transfer operation is complete, the License counter displays a value of 001, indicating that the license is present on the diskette.

Removing WinAC MP from the Multi Panel

To remove the WinAC MP runtime files from the multi panel, follow these steps.

1. Shut down the WinAC MP controller on the multi panel. ProSave cannot remove the WinAC MP files if they are running on the multi panel.

2. Exit ProTool.

3. Select Transfer mode from the Loader dialog on the multi panel.

4. In ProSave on the configuration computer, click the Options tab.

5. From the Options tab, click the Device Status button to read the WinAC MP runtime files from the multi panel. The runtime files appear in the Installed Options (right pane).

6. Click WinAC MP in the Installed Options (right pane), then click the [<<] button to remove the WinAC MP runtime files from the installed options of the multi panel. This deletes the WinAC MP runtime files from the multi panel.

   Note
   If ProSave takes a suspiciously long time to remove WinAC MP from the multi panel, check the multi panel to see if there is an error message saying the files cannot be removed while a WinAC MP executable file is operating. This error message means you have not shut down the controller.

   Start ProTool on the multi panel, shut down WinAC MP, exit ProTool, switch to Transfer mode, and then reattempt the file removal from ProSave on the configuration computer.

7. Respond to the reboot prompt on the multi panel (click Yes to reboot now, No to reboot later).

After the runtime files are removed from the multi panel, you can exit ProSave. Your ProTool project with a WinAC MP user interface is still present on the multi panel, but it has no function because the controller has been removed.

Removing WinAC MP from the Configuration Computer

You use the Windows Add/Remove Programs procedure to remove (uninstall) the WinAC MP software components on your configuration computer. To remove WinAC MP, follow these steps:

1. If ProSave, ProTool, and/or STEP 7 are running, exit them.

2. Select the **Start > Settings > Control Panel** menu command to display the Windows control panel.

3. Double-click the Add/Remove Programs icon to display the Add/Remove Programs Properties dialog.

4. Select the entry for SIMATIC WinAC MP V3.1 and click the Add/Remove button.

5. Follow the instructions of the dialogs to remove the WinAC MP software. (If the Remove Enable File dialog appears, click the No button if you are unsure how to respond.)

Developing and Downloading a STEP 7 Project for WinAC MP

You can download the WinAC MP example STEP 7 project to WinAC MP on the multi panel, or you can develop your own STEP 7 project. This chapter describes tasks for working with either a new project or one of the example projects.

Configuring the Multi Panel Communication Settings

You can use either MPI/PROFIBUS or Ethernet communications between STEP 7 on the configuration computer and the multi panel. You cannot use Serial or USB communications. If you change your settings, cycle power on the multi panel for the changes to take effect. Refer to the sections "Ethernet Communication Parameters" or "MPI/PROFIBUS Communication Parameters" for complete instructions.

Creating and Configuring a STEP 7 Project

For a new STEP 7 project, you must perform the following tasks:

- Create a project and a SIMATIC PC station with the SIMATIC Manager.
- Create the control program logic.

To use the WinAC MP controller as a master on a PROFIBUS-DP network, you must perform the following tasks:

- Use the HW Config editor to configure the WinAC MP controller and configure the distributed I/O, or to modify the existing configuration of an example project.
- Edit the PG/PC interface in STEP 7 so that you can use an MPI/PROFIBUS or an Ethernet connection to download the hardware configuration and user program to the multi panel.
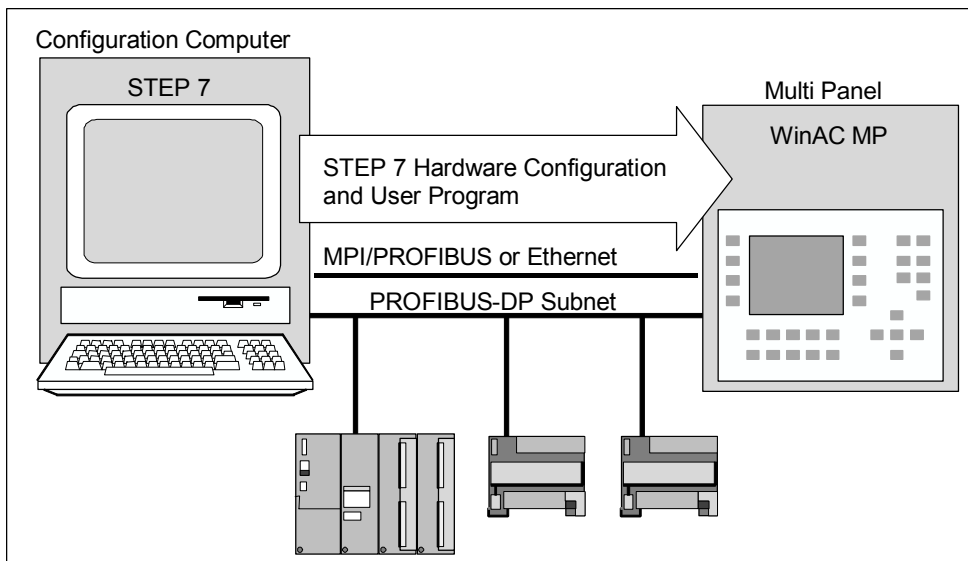
Figure: Download STEP 7 Hardware Configuration and User Program

STEP 7 Connection Options

You can use either an MPI/PROFIBUS connection or an Ethernet connection to communicate from STEP 7 on the configuration computer to the WinAC MP controller on the multi panel.

MPI/PROFIBUS:

> The factory default setting of the MPI/PROFIBUS interface of the multi panel is MPI with a transmission rate of 187.5 Kbps. The first download from the configuration computer must use an MPI interface as the PG/PC interface parameter assignment.

> When you configure the WinAC MP controller as a PROFIBUS-DP master in the Hardware Configuration utility of STEP 7, and download this configuration, STEP 7 changes the MPI/PROFIBUS interface on the multi panel from MPI to PROFIBUS-DP communication. For subsequent downloads to the multi panel using PROFIBUS, you must change the PG/PC interface settings on the configuration computer from MPI to PROFIBUS, as described in the topic "Changing the PG/PC Interface from MPI to PROFIBUS-DP" (p. 30).

Ethernet:

> If you configure the PG/PC interface on the configuration computer to use a TCP/IP connection to download the PROFIBUS-DP master configuration to the multi panel, you do not need to change your PG/PC interface settings to perform subsequent downloads from STEP 7. Your STEP 7 connection uses the Ethernet port of the multi panel, and is unaffected by the configuration of the MPI/PROFIBUS interface.

> **Note**
> In order to configure STEP 7 to use an Industrial Ethernet connection to the multi panel, you must have the SIMATIC NET networking software installed on your configuration computer. No networking software is needed on the multi panel.

Configuring the SIMATIC PC Station and the PROFIBUS-DP Network

When you install WinAC MP, the setup process installs a STEP 7 example project for WinAC MP on your configuration computer. The WinAC MP example project is located with the STEP 7 example projects in the STEP 7 installation directory at …\Step7\EXAMPLES\ZEN08_01. If you choose to use the example project, open it and proceed to the section entitled "Defining I/O Communication Settings and Network Properties" (p. 27).

Configuring a SIMATIC PC Station for a new STEP 7 Project

To create a new project for the WinAC MP controller, follow these steps:

1. From the SIMATIC Manager, select **File > New** and enter a project name such as MyNewProject.

2. With your project selected, use the menu command **Insert > Station > SIMATIC PC Station** to create a SIMATIC PC station.
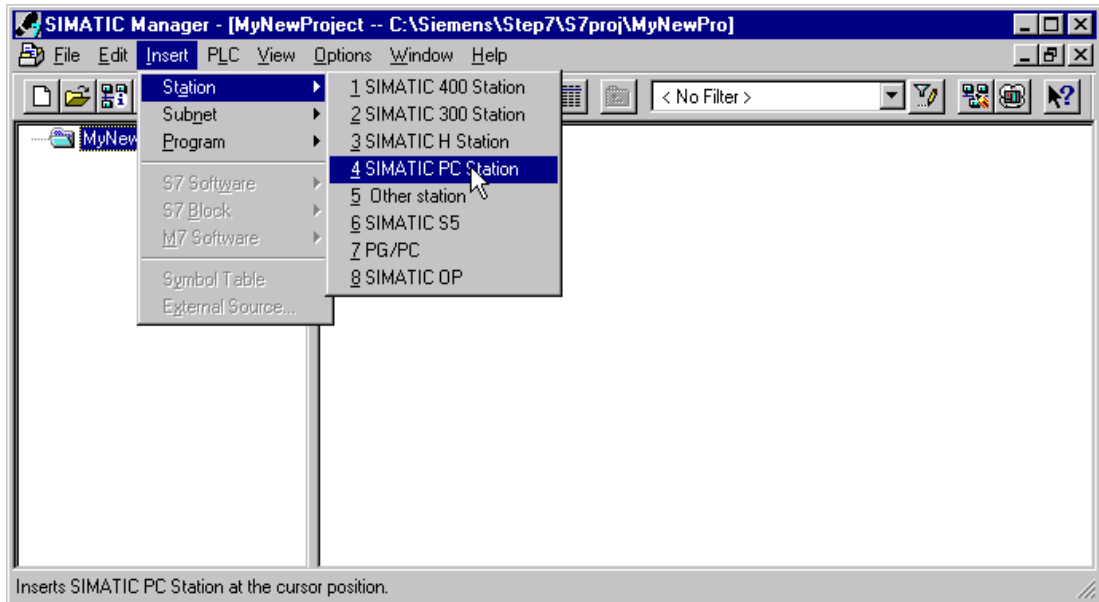
Figure: Inserting a PC Station

3. In the left pane of the SIMATIC Manager, double-click the newly created station. This causes the Configuration icon to appear in the right pane. Double-click the Configuration icon to open the HW Config editor.
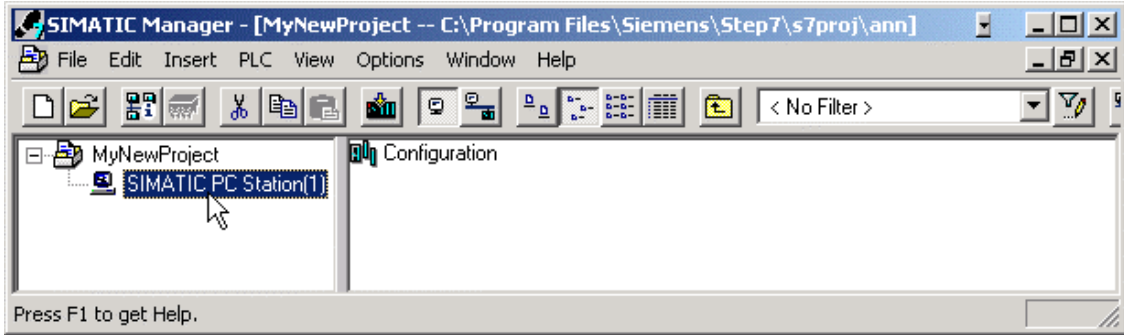
Figure: Opening the SIMATIC PC Station

4. If the HW Catalog is not already open, click the icon to open it.
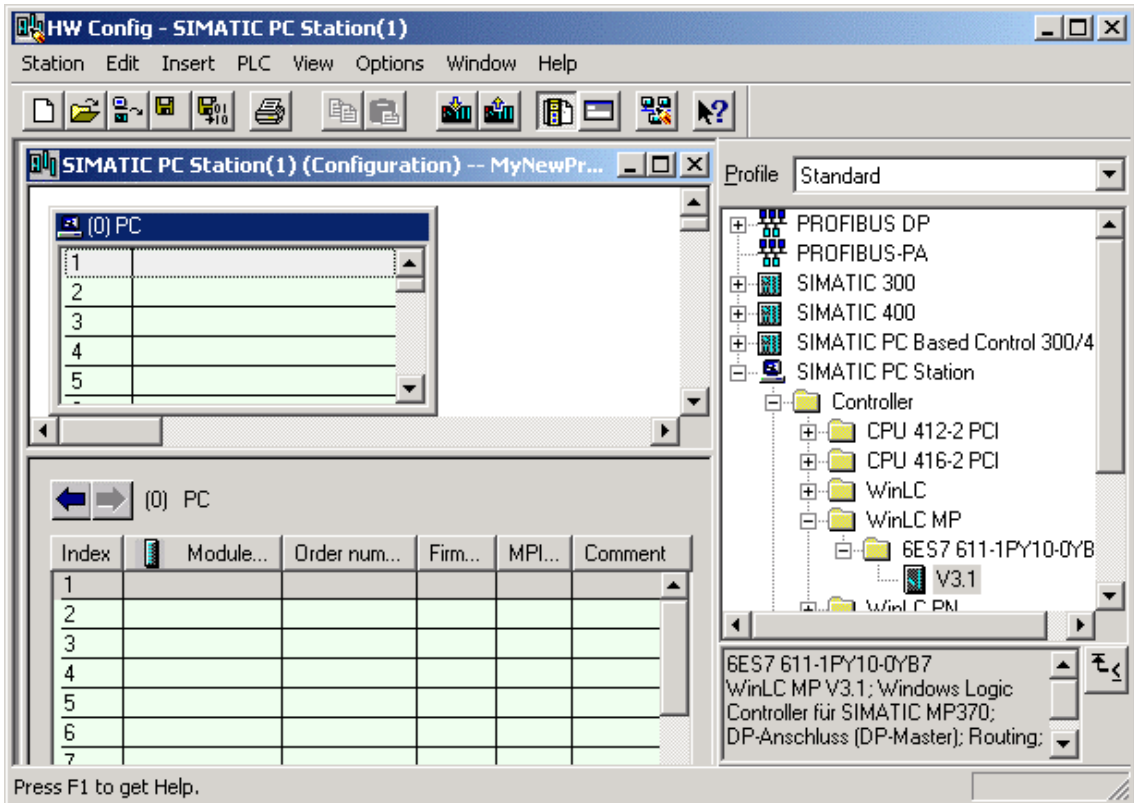
Figure: Hardware Configuration

5. From the HW Catalog, navigate to SIMATIC PC Station\Controller\WinLC MP. Open the folder containing the order number and drag the V3.1 controller to slot 2. The Properties – PROFIBUS interface DP dialog appears.

You have now configured the SIMATIC PC Station with WinLC MP in your STEP 7 project. The next step is the definition of the communication settings and network properties.

Defining I/O Communication Settings and Network Properties

For WinAC MP to communicate to a network of distributed I/O, you must configure a PROFIBUS/DP subnet.To configure the SIMATIC PC station as a DP master that can be downloaded to the WinAC MP controller on the multi panel, follow these steps:

1. From the Parameters tab of the Properties – PROFIBUS interface DP dialog, enter the node address for the WinAC MP controller on the multi panel. The default address for the DP master is 2. Each node on the network must have a unique node address between 0 and 125.

   Note
   STEP 7 displayed the Properties – PROFIBUS interface DP dialog when you dragged the V3.1 controller to slot 2, as described in the preceding section. If this dialog is not open, double-click DP in the IF1 slot for WinLC MP in the Hardware Config utility. Then click the Properties button on the Properties – DP dialog.

2. Click the New button to open the Properties – New subnet PROFIBUS dialog. From the General tab, you can assign a name for the network, or you can use the default name.

3. Select the Network Settings tab. Examine the following settings and make changes if necessary:

   • Highest PROFIBUS Address: Can be reduced to improve polling speed, if you are certain you will never exceed a certain number of stations.

   • Transmission Rate: Default is 1.5 Mbps. Adjustable up to 12 Mbps depending on the speed requirement of the application.

   • Profile: Default is DP.

   For more information about PROFIBUS-DP communications and how to set up PROFIBUS networks, refer to the *SIMATIC NET PROFIBUS User Manual*.

4. Click the OK button to confirm the name and any changes to the network settings that you have configured for the PROFIBUS subnet and close the Properties – New subnet PROFIBUS dialog.

5. Click the OK button to confirm the node address that you have configured for the SIMATIC PC station and close the Properties – PROFIBUS interface DP dialog.

Configuring an Ethernet Connection between STEP 7 and the Multi Panel

If you are using an Ethernet (TCP/IP) connection, you must perform additional tasks from the HW Config utility. For TCP/IP communication between STEP 7 and the multi panel using a static IP address, follow these steps:

1. Select an IE General from the CP Industrial Ethernet folder of SIMATIC PC Station in the Hardware Catalog and drop it in any slot of the SIMATIC PC Station rack. The Properties - Ethernet Interface IE General dialog opens.

2. In the IP Address field, enter the IP address of the multi panel. You can access Network Configuration from the Control Panel on the multi panel to find the IP address.

3. For the subnet, select an Ethernet subnet. If one does not exist, click New. The Properties – New subnet Industrial Ethernet dialog opens. Click OK and a new Ethernet subnet is created for you.

4. Click the OK button to complete the configuration of the Ethernet interface.

For more information about Ethernet communications and setting up Ethernet networks, refer to the *SIMATIC NET Ethernet User Manual*.

Before you close the HW Config editor, you can configure additional PROFIBUS nodes (slaves) according to your application requirements.

When finished, click the save and compile icon to save and compile the configuration.

Downloading the Configuration

To download the hardware configuration to the WinAC MP controller on the multi panel, you must first set the PG/PC interface on the configuration computer to the type of connection, MPI/PROFIBUS or Ethernet (TCP/IP), that you are using between the configuration computer and the multi panel.

> **Note**
> If you use an MPI/PROFIBUS connection, you must set the PG/PC interface to MPI with a transmission rate of 187.5 Kbps for the first download to match the default settings of the mulit panel. You must then change it to a PROFIBUS-DP connection after downloading the DP master hardware configuration, as described in "Changing the PG/PC Interface from MPI to PROFIBUS-DP" (p. 30).

To set the PG/PC interface, follow these steps:

1. From the SIMATIC Manager, select **Options > Set PG/PC Interface**.

2. Examine the Interface Parameter Assignment Used field. If it does not show the appropriate interface parameter, select an interface from the list. For example, select CP5611(MPI) or CP5611(PROFIBUS) for a CP5611 card, or a TCP/IP option that corresponds to an Ethernet card in your PC.

3. Set the Properties for the Interface Parameter Assignment according to your type of connection:

   MPI/PROFIBUS: Set the baud rate for the first download to 187.5 Kbps and use an MPI interface. This is the default setting for the multi panel.

   Ethernet (TCP/IP): Click the Properties button and deselect the checkbox for "Fast Acknowledge". You cannot download from STEP 7 to the multi panel if Fast Acknowledge is selected.

4. Click the OK button to accept the card configuration and close the window.

Before you download the configuration, check the following:

- Ensure that WinAC MP is executing on the multi panel. Start the WinAC MP ProTool project if it is not already running. If WinAC MP is shut down, press the Start WinAC MP key (S3 on the keyboard unit) or touch the Start WinAC MP button (touch panel unit).

- Ensure the multi panel is ready for a Transfer. If you have set the Remote Control option and a ProTool project is running, the multi panel can receive a transfer from the configuration computer. If Remote Control is not set, exit ProTool and select Transfer. The multi panel displays a Transfer dialog with a "Connecting to host" message, and is ready for a transfer. For information on remote control, see "Using the Remote Control Option" (p.8).

To download the configuration, follow these steps:

1. From the Hardware Config utility on the configuration computer, click the ![icon] icon to download the configuration of the STEP 7 project.

2. On the Select Target Module dialog, highlight only the WinLC MP module selection and click the OK button. The Select node address is displayed.

3. For MPI/PROFIBUS connections, enter the Station Address of the multi panel: use the address that is currently configured for the multi panel, not the new address that you are assigning. The default multi panel address, if you have not previously made an address assignment, is MPI 2 or PROFIBUS 2.

   For Ethernet connections, verify that the IP address of the multi panel is correct and click OK.

STEP 7 downloads the hardware configuration to the WinAC MP controller and sets the MPI/PROFIBUS interface on the multi panel to PROFIBUS-DP. A dialog confirms whether the download is successful.

If you used an Ethernet connection to the multi panel, you can continue to perform Ethernet downloads to the multi panel and do not need to make changes to the PG/PC interface settings in STEP 7.

(Optional) Changing the PG/PC Interface from MPI to PROFIBUS-DP

If you used an MPI connection to the multi panel, that connection is no longer functional. Downloading the DP master hardware configuration changed the port protocol from MPI to PROFIBUS-DP on the multi panel. You cannot use the MPI connection to the multi panel.

In order to perform subsequent downloads to the WinAC MP controller from STEP 7, you must switch your PG/PC interface to PROFIBUS-DP, and define the communications settings from the values you noted in the subnet properties of the PROFIBUS-DP master. To change your PG/PC interface, follow these steps:

1. From the SIMATIC Manager, select **Options > Set PG/PC Interface**.

2. Select the interface parameter corresponding to the CP card in your configuration computer using the PROFIBUS-DP bus profile, for example, CP5611(PROFIBUS).

3. Click the Properties button.

4. In the Properties dialog, enter the same values for Network Parameters that you noted for the subnet properties, as described in the section "Defining I/O Communication Settings and Network Properties" (p. 27).

   • Transmission Rate

   • Highest Station Address (Highest PROFIBUS Address field in Properties dialog for the PROFIBUS subnet)

   • Profile (DP)

   Note
   The Address field contains the address of the configuration computer (default 0), not the address of the SIMATIC PC station (default 2). Leave it as it is.

5. Click the OK button to confirm your work and close the Properties dialog.

6. Click the OK button to confirm your work and close the PG/PC Interface dialog.

Testing the Online Connection

After you complete the network configuration, verify that the connection between STEP 7 and the WinAC MP station is operational.

Testing the Online Connection	
	You can verify the connection from the SIMATIC Manager by clicking the online icon.
	If you are communicating directly over the PROFIBUS-DP network from the configuration computer to the multi panel (not using an Ethernet connection), you can also test the connection by selecting the Accessible Nodes icon. The PROFIBUS node of the multi panel appears in the list of network nodes.

If the network configuration is not online, review the steps of the network configuration as described in the preceding topics and correct any errors.

Developing and Downloading the User Program

Develop your control program in the STEP 7 project, creating and editing the blocks necessary for control of your process. Download the created blocks either from the SIMATIC Manager or from the STEP 7 option that you used to create the blocks. For detailed information about developing a project using STEP 7, refer to your STEP 7 documentation.

Controlling Your Process with WinAC MP

This topic describes how to control your process with WinAC MP by using an example ProTool project. You can also customize the example project screens or create your own screens as described in "Customizing WinAC MP for Your Application" (p. 45).

If you have successfully completed the procedures described in the topics "Transferring WinAC MP to the Multi Panel" (p.7) and "Developing and Downloading a STEP 7 Project" (p.23), you now have an executable control program loaded in the WinAC MP controller, and an interface (the example ProTool project) from which to control it. Additionally, you may have developed screens with ProTool CS for your specific process application. The initial screen displayed on the multi panel when you download the example ProTool project is the WinAC_MP_Panel screen. From this screen, you can perform WinAC MP functions, view all of the WinAC MP status indicators, change the operating mode of the controller, and monitor scan cycle data:
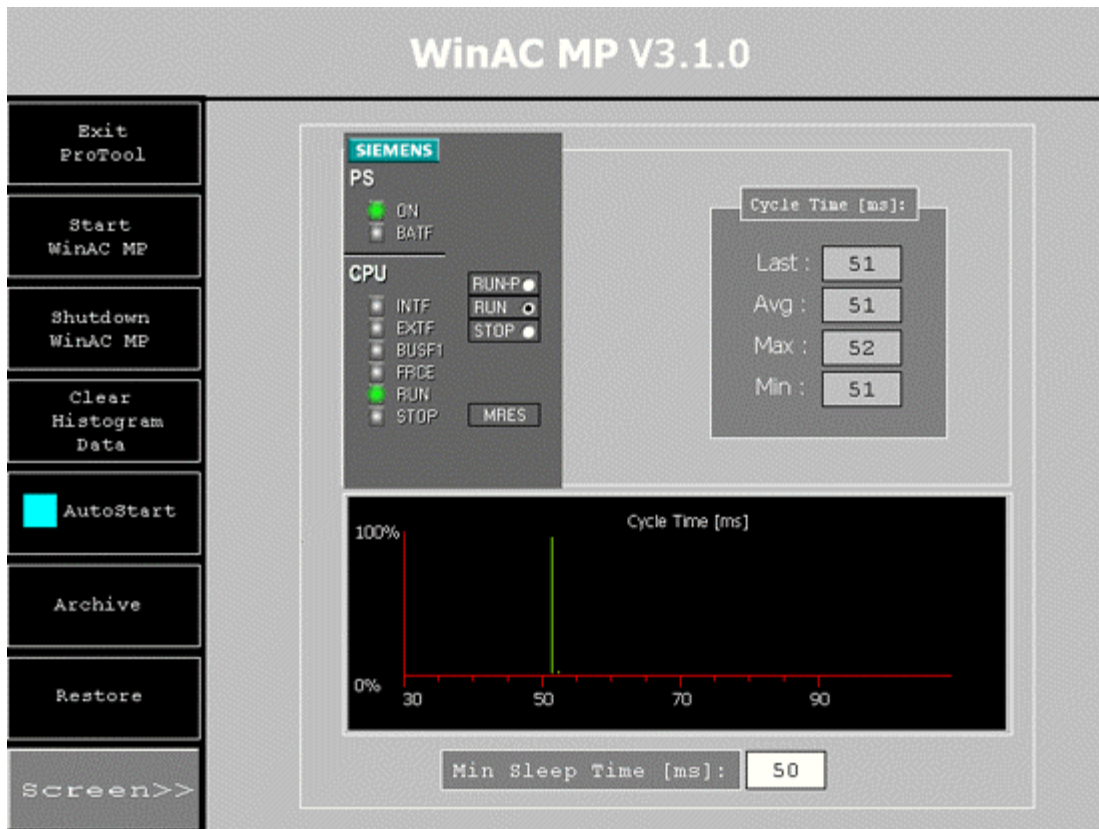
Figure: WinAC_MP_Panel Screen

Functions Available from the Example Screens

The table below describes the functions available from the WinAC MP example screens, and lists the key equivalents for the MP370 keyboard unit. The key assignments are not applicable for the MP370 touch panel units, where you simply touch a button on the screen to select it.

Key	Function Name	Function Description
S2	Exit ProTool	Exits ProTool RT. It does not shut down the WinAC MP controller.
S3	Start WinAC MP	Starts the WinAC MP controller on the multi panel.
S4	Shutdown WinAC MP	Shuts down the WinAC MP controller. When WinAC MP is shut down, the controller and control program are not executing.
S5	Clear Histogram Data (WinAC_MP_Panel screen)	Clears the histogram buffer of cycle time data
	Start at Boot (WinAC_MP_Function screen)	Allows you to configure whether or not the WinAC MP controller starts automatically when the Multi Panel is powered on. Cyan: Start at Boot enabled; Gray: Start at Boot disabled
S6	Autostart	Allows you to enable the WinAC MP controller to start in RUN mode under conditions described in "Enabling the Autostart Feature" (p.38) Cyan: Autostart enabled; Gray: Autostart disabled
S7	Archive	Save the control program to an archive file.
S8	Restore	Restore the control program from an archive file.
F1, F2	Switch Between Screens	Switches the display from one screen to the next on the multi panel.

Note: Starting the ProTool project or exiting it has no effect on whether the WinAC MP controller is executing or shut down. The WinAC MP controller can be executing regardless of whether the ProTool screens are displayed or not.

Status Indicators

The WinAC MP Control Panel that is shown in the ProTool example project displays the normal status indicators found on a WinLC Control Panel or on an S7-300/400 controller. These indicators are view-only: you cannot use them to change modes or set faults in the WinAC MP controller.

The status indicators are described below:

Indicator	Description
ON	The ON indicator is on when the WinAC MP controller is running. The ON indicator is off when a shutdown of the WinAC MP controller finishes saving the program and states to the flash file system.
BATF	Battery fault. Always off for WinAC MP.
INTF	Internal fault. This indicator lights up (solid) to show error conditions that exist within the controller, such as programming errors, arithmetic errors, timer errors and counter errors.
EXTF	External fault. This indicator lights up (solid) to show error conditions that exist outside of the controller, such as hardware faults, parameter assignment errors, communication errors, and I/O fault errors.
BUSF1	The BUSF1 indicator flashes to identify fault conditions in the communication with the distributed I/O.
FRCE	This indicator lights up (solid) to show that a force request in active. Not applicable for WinAC MP.
RUN STOP	The RUN indicator lights up when the operating mode is RUN. The STOP indicator lights up when the operating mode is STOP. The RUN indicator blinks at 2Hz and the STOP indicator lights up (solid) when the WinAC MP controller is executing a restart. The RUN indicator blinks at 0.5Hz and the STOP indicator lights up (solid) when the WinAC MP program has reached a breakpoint. The STOP indicator flashes slowly when WinAC MP requires a memory reset. To recover from this condition, perform a memory reset (MRES).
All status indicators flashing	When all of the status indicators are flashing, the WinAC MP controller has encountered an error condition that cannot be fixed by resetting the memory (MRES). To recover from this condition, you must perform the following tasks: 1. Shut down the WinAC MP controller. 2. Restart the WinAC MP controller. 3. Reset the memory (MRES).

The example projects that are supplied with WinAC MP have all of the functionality described above. If you want to change anything on the example project screens, or put WinAC MP control functions or indicators on any of your other application screens, refer to the topic "Customizing WinAC MP for Your Application" (p. 45).

Operating Mode Change Buttons

Both example screens contain a WinAC MP control panel from which you can change the operating mode of the controller. The mode change buttons correspond to global keys on the MP370 keyboard unit and to touch buttons on the MP370 Touch (12" or 15").

> ⚠️ **Warning**
> Do not attempt to download from ProTool CS to the multi panel when the controller is in RUN or RUN-P mode.
>
> Downloads from ProTool CS while the controller is running interrupt process control and could cause death, serious injury and/or property damage.
>
> Always put the controller in STOP mode, or shut down WinAC MP before downloading from ProTool CS.

The operating modes are described below:

Key	Operating Mode	Description
S12	RUN-P	Put the WinAC MP controller in RUN-PROGRAM Mode. When the controller is in RUN-P mode, you can: • Upload a STEP 7 program from the controller to your configuration computer. • Download a STEP 7 program from your configuration computer to the controller. • Download individual STEP 7 blocks to the controller. • Use external software (such as STEP 7) to change the operating mode of the controller.
S13	RUN	Puts the WinAC MP controller in RUN Mode. In RUN mode you can upload a program from the controller to your configuration computer, but you cannot download a program to the controller.
S14	STOP	Puts the WinAC MP controller in STOP Mode. The program stops executing. You can perform program uploads and downloads, and you can download from ProTool CS.
S15	MRES	Resets the WinAC MP controller memory. This includes resetting the hardware configuration, deleting the WinAC MP program, and resetting the memory areas (I,Q,M,T, and C).

Performing a Memory Reset (MRES)

A memory reset (MRES) erases the STEP 7 project from the WinAC MP controller. You must download your project from STEP 7 again before the WinAC MP controller can resume process control.

Clearing Histogram Data

The WinAC MP controller maintains a buffer of scan cycle time data and uses this historical data to compute and display the last cycle time, the average cycle time, and the maximum and minimum cycle times. The WinAC_MP_Panel screen displays these values numerically, and in a histogram. The histogram displays the percentage of scan cycles executing at the recorded scan cycle times.

To empty this buffer of data, press the Clear Histogram Data key (keyboard unit) or touch the Clear Histogram Data touch button (touch panel units) on the WinAC_MP_Panel screen. When WinAC MP is running, it immediately begins collecting cycle time data again. The screen updates according to the new buffer of scan cycle times.

Starting the Controller when the Multi Panel Boots

By default, you must start the WinAC MP controller manually after the multi panel boots. You can, however, enable the controller to start automatically after the multi panel boots. If you enable the controller to start at boot, you can also use the Autostart feature to determine the initial operating mode.

From the WinAC_MP_Function screen, the Start at Boot key or touch button acts as a toggle. When the button display is cyan, start at boot is enabled. When the button display is gray, start at boot is disabled.

Enabling the Controller for Start at Boot

To configure the WinAC MP controller to start automatically, select the Start at Boot key or touch button so that the button display is cyan.

When enabled to start at boot, the WinAC MP controller starts automatically whenever the multi panel boots.

Disabling the Controller for Start at Boot

To configure the controller so that is does not start automatically, deselect the Start at Boot key (S7 on keyboard units) or Start at Boot touch button (touch panel units) so that the button display is gray.

When you disable start at boot, WinAC MP does **not** start automatically whenever the multi panel boots. To start WinAC MP, you must start the ProTool project, and then use the Start WinAC MP key (S3 on keyboard units) or Start WinAC MP touch button (touch panel units).

Enabling the Autostart Feature

WinAC MP includes an Autostart feature that defines whether the controller starts up in STOP or RUN mode when WinAC MP is configured to start at boot. If WinAC MP is configured for a manual start, then the controller always starts in STOP mode. The following table lists the parameters that the Autostart feature uses to determine the operating mode of the controller when it starts automatically after a boot of the multi panel.

Mode at Shutdown	Autostart	Mode on Restart
STOP	No	STOP
	Yes	STOP
RUN	No	STOP
	Yes	RUN

To enable or disable the Autostart feature, use the Autostart key (S6 on keyboard units) or Autostart touch button (touch panel units) from either of the ProTool project example screens. When the button display is cyan, Autostart is enabled. When the button display is gray, Autostart is disabled.

Archiving and Restoring Control Programs

You can save the configuration and control program to an archive file. You can use this archive file like the removable memory cartridge of a hardware controller. Saving the configuration of the controller and the control program to an archive file makes it easy to restore the controller after a memory reset. However, the archive file does not function like the EEPROM cartridge of the hardware controller in that the WinAC MP controller does not automatically restore the archive file after a memory reset (MRES). You must manually restore the archive file.

You can archive or restore a file only when the operating mode (keyswitch position) is set to STOP.

> **Note**
> You cannot archive or restore a file larger than 1 Mbyte.

Creating an Archive File

An Archive file stores the current control program, the current system configuration, and the initial values of the DBs. The Archive file does **not** store the configuration of the PC station.

To create an Archive file, use the Archive key (S5 on keyboard unit) or the Archive touch button (Touch panel units) on either of the WinAC MP example screens. The Archive command displays a dialog that allows you to navigate and give a name to the file. You can save the archive file to the flash file, a memory card, or a remote computer.

> **Note**
> If you save an archive on the multi panel in a directory other than the Flash directory, the file is lost with the next reboot. To retain the archive file, use the Flash directory, or save it to a remote computer or removable storage media.

You can also use the SIMATIC Manager of STEP 7 to create an Archive file. Select the **File > Memory Card File > New** menu command.

Restoring an Archive File

When you restore an archive file, you reload the configuration and the control program for the controller. You can restore archive files from the flash file, a memory card, or remote computer, depending on where you stored your archive files.

Before you can restore an archive file, you must set the operating mode (keyswitch position) of the controller to STOP mode. To restore an archive file, follow these steps:

1. Click the STOP key (S14 on the keyboard unit) to the STOP touch button (touch panel units) to place the controller in STOP mode.

2. Select the the Restore key (S6 on the keyboard unit) or the Restore touch button (touch panel units).

3. Select the specific archive file to restore from the dialog and click OK.

Understanding the Tuning Parameters

The multi panel processor must perform both WinAC MP control program execution and ProTool screen processing. The example ProTool projects include a WinAC_MP_Panel screen that displays information about the cycle time, and enables you to change the Min Sleep Time value and observe its effect on the cycle time. The WinAC_MP_Panel screen is shown below:
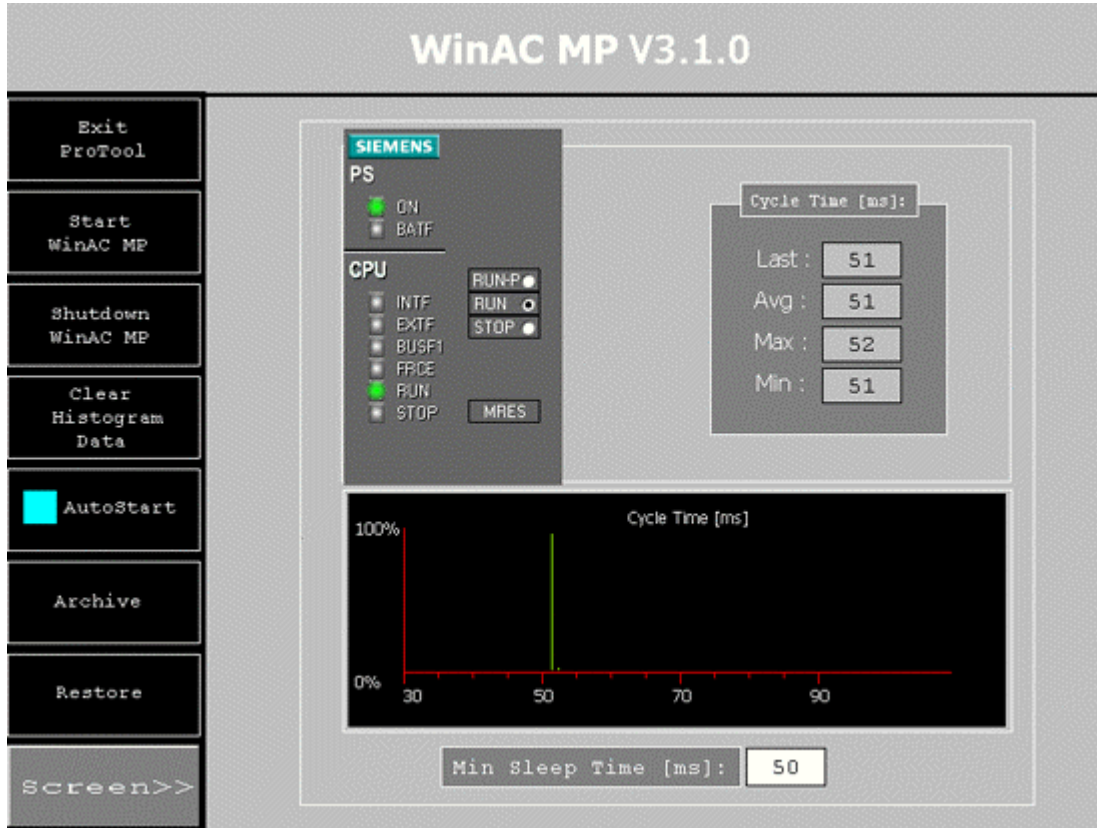
Figure: WinAC_MP_Panel Screen

Viewing Cycle Time Data

The WinAC_MP_Panel screen provides output fields that display the last cycle time, average cycle time, maximum cycle time, and minimum cycle time, as well as a histogram of cycle times (the Histogram control). The histogram shows the percentage of scans that occur at a particular scan time. The WinAC_MP_Panel screen also includes a Clear Histogram Data key (S7 on keyboard units) or Clear Histogram Data touch button (touch panel units) that resets the collected cycle time data.

Configuring the Minimum Sleep Time

The minimum sleep time value allows you to ensure that there is always a specified amount of processing time between scan cycles available to processes other than the WinAC MP controller.

The minimum sleep time value allows you to increase or decrease the execution time of the WinAC MP control program, which has an indirect effect on all other processes that are running on the multi panel. The default minimum sleep time for the WinAC MP controller is 50 ms, and the lowest allowed minimum sleep time is 1 ms.

A high sleep time value increases the execution time of the control program by enforcing a sleep interval between scan cycles. The higher the sleep time value, the more processing time that is available to processes other than the WinAC MP controller. The net effect is to raise the processing time of ProTool on the multi panel relative to the processing time of the WinAC MP controller.

A low sleep time value decreases the execution time of the user program by decreasing or eliminating the sleep time between scan cycles. The lower the sleep time value, the less processing time that is available to processes other than the WinAC MP controller. The net effect is to lower the processing time of ProTool on the multi panel insofar as the processing time of the WinAC MP controller is raised. If ProTool appears to be irregular or erratic in updating the screens, increase the minimum sleep time. Raising the minimum sleep time of the control program allocates more processing time for ProTool.

Peer-to-Peer Communication Functions

Like other S7 controllers, WinAC MP provides peer-to-peer communications between other S7 controllers on the network. The controllers can be either hardware or software logic controllers. The table below lists the SFBs and SFCs that WinAC MP supports for peer-to-peer communications:

SFB/SFC	Designation	Description
SFB8 SFB9	USEND URCV	Exchange data using a send and a receive SFB
SFB12 SFB13	BSEND BRCV	Exchange blocks of data of variable length between a send SFB and a receive SFB
SFB14 SFB15	GET PUT	Read data from a remote device Write data to a remote device
SFB22 SFB23	STATUS USTATUS	Specific query of the status of a remote device Receive status messages from a remote device
SFC62	CONTROL	Query the status of a connection that belongs to an instance of an SFB/FB

For more information on these functions, refer to the *System Software for S7-300/400 System and Standard Functions Reference Manual*. To view this manual from a computer where STEP 7 is installed, select the menu command **Start > Simatic > Documentation > English**, and double-click "STEP 7 - System and Standard Functions for S7-300 and S7-400".

Configuring the Retentive Data

You can use the Retentive Memory tab of the STEP 7 Hardware Configuration tool to configure the following areas of memory to be retained in the event of loss of power or on a transition from STOP mode to RUN mode:

- Number of Memory bytes: up to 2048 bytes (from MB0 to MB2047)

- Number of S7 timers: up to 512 timers (from T 0 to T 511)

- Number of S7 counters: up to 512 counters (from C 0 to C 511)

In the event of an abnormal shutdown such as a loss of power while the controller is running, the current values for these areas, as well as the DBs, are lost. When you use the Shutdown WinAC MP key (S4 on keyboard units) or the Shutdown WinAC MP touch button (touch panel units) to perform a normal shutdown, WinAC MP retains the values according to the configured parameters shown in the table below:

> **Note**
> DBs that were created by SFC22 (CREATE_DB) are not retained following a cold restart. All other DBs are retentive following a normal shutdown.

Parameter	Description	Range	Default
Memory Bytes	Enters the number of memory bytes to be retained (starting from MB0)	0 to 2048	16
S7 Timers	Enters the number of S7 timers to be retained (starting from T 0)	0 to 512	0
S7 Counters	Enters the number of S7 counters to be retained (starting from C 0)	0 to 512	8

Because the retentive data is not saved when a loss of power occurs, you can use SFC82 to SFC84 in your control program to save important data periodically. Then, when you restart WinAC MP following a power outage, you can retrieve the last data saved.

Using SFCs to Retain Data

You can use SFC82 (CREA_DBL), SFC83 (READ_DBL), and SFC84 (WRIT_DBL) to save data at significant events in your process. For example, you may want to store the recipe values into Load memory when changing a recipe without downloading new blocks for the control program.

> **Caution**
> Whenever your control program calls SFC82, SFC83, or SFC84, the SFC reads or writes data to the flash memory. If you call these SFCs every scan (such as from OB1) or from a cyclical OB that is executing rapidly, the constant reading or writing to the flash memory can cause the flash memory to fail or can cause jitter.
>
> You should only call SFC82, SFC83, or SFC84 to record a significant process event, such as a change of recipe.

SFC82 and SFC84 modify the data for the control program that is stored in the Load memory. Saving the blocks to Load memory (instead of keeping the values in Work memory) ensures that these blocks are available even if WinAC MP cannot save the power-down state when shutting down the controller.

SFC82, SFC83, and SFC84 create and update blocks that are stored as part of your control program in Load memory. The blocks are created or modified in Load memory when your control program executes these SFCs.

SFC82, SFC83, and SFC84 are asynchronous SFCs that run in the background.

> **Note**
> If you call SFC82, SFC83, or SFC84 from the startup OB (OB100 or OB102), WinAC MP executes these SFCs synchronously. This differs from the operation of a hardware PLC.

Like the other asynchronous SFCs, SFC82, SFC83, and SFC84 are typically long-running SFCs that can require a relatively long time to complete. (The time for the SFC call itself will be short, but the actual operation for the SFC will be executing in the background.) In order to use asynchronous SFCs, you must allow sufficient sleep time to allow WinAC MP to process the SFCs without encountering jitter.

> **Note**
> Do not use a polling loop that looks for the completion of an asynchronous SFC, especially for SFC82, SFC83, or SFC84. Because the asynchronous SFC is being executed in the background, having your control program loop until the SFC finishes will extend the execution of the OB that is performing the polling loop and can cause jitter.

Customizing WinAC MP for Your Application

ProTool CS is the configuration system of ProTool and is used for the development of process visualization screens. ProTool RT is the runtime version of ProTool that runs on the multi panel. You download a project from ProTool CS on the configuration computer to ProTool RT on the multi panel. You use these screens on the multi panel for controlling and monitoring the process.

You can use the example ProTool projects for the MP370, MP370 Touch, or MP370 15" Touch without modification. You can also use ProTool CS to modify an example project for your application, or to create a new project. The WinAC MP installation integrated all of the WinAC MP functions and ActiveX controls into ProTool CS. You can copy screens or screen objects from one project to another. To open ProTool CS, select the **Start > SIMATIC > ProTool CS > ProTool Pro CS** menu command.

See your ProTool CS documentation for detailed information on contstructing screens and using the features of ProTool.

Mapping Functions in a ProTool Project

With ProTool CS, you can design screens and map functions to control the display of controller data during runtime. You can map functions to Global Keys, Soft Keys, System Keys, input and output display fields, buttons, graphical displays, and other screen objects.

You can configure events that define when these functions execute; for example, you can update the value in an output field whenever the tag value associated with that output field changes. You can configure events for the screen, so that when you enter a screen, the functions that you have configured for it execute.

ProTool CS provides the capability to map functions to the following events, depending on the type of object being configured.

Tag Values:

- A tag value changes
- A tag value is lower than the limit
- A tag value is higher than the limit

Button Events:

- A button is clicked
- A button comes up
- A button goes down

Screen Events:

- A screen is entered
- A screen is exited

Field Events:

- A field is entered
- A field is exited

Alarm Message Events:

- An alarm message arrives
- An alarm message departs
- An alarm message is acknowledged

Event Message Events:

- An event message arrives
- An event message departs
- An event message is acknowledged

Overflow Events:

- An archive overflow occurs
- A screen overflow occurs
- A window overflow occurs
- A password overflow occurs

For information about mapping functions to keys, screen changes, field changes, or any of the activation mechanisms described above, refer to your ProTool CS documentation.

The installation of WinAC MP added the WinAC MP functions to the set of functions already provided by ProTool. You can see these functions in ProTool CS in the WinAC MP function group. The WinAC MP example ProTool projects show how to use many of these functions.

WinAC MP Functions

The following table describes all of the WinAC MP functions that are available when you build screens in ProTool CS. To update values displayed on a ProTool screen, you use the Update and Get functions. To set or change values in the controller, you use the Set functions.

Name	Description
Archive	Saves configuration and program file to flash file
Clear_Cycle_Time_Buffer	Clears the cycle time histogram data
Control_WinAC_MP	Start or shut down the WinAC MP controller
Get_Sleep_Time	Gets the value of the minimum sleep time of the WinAC MP controller (in milliseconds)
Get_WinAC_MP_Start_Mode	Gets the WinAC MP start mode (used in the example screens to display cyan or gray for the Autostart key/button)
Get_WinAC_MP_Version	Gets the release version number of WinAC MP
Restore	Loads configuration and program file from archived flash file
Set_Key_Switch	Sets the key switch of the WinAC MP controller to RUN-P, RUN, STOP, or MRES
Set_Priority	No effect In previous releases, this function set the priority of the WinAC MP controller high or low relative to ProTool.
Set_Restart_Method	Sets the restart method either to cold restart (CRST) or to warm restart (WRST)
Set_Sleep_Time	Set the minimum sleep time of the WinAC MP controller (in milliseconds)
Set_WinAC_MP_Start_Mode	Set the start mode of the WinAC MP controller (enable or disable Autostart)
Set_WinAC_Start_At_Boot	Sets whether or not WinAC MP is automatically started after multi panel boot
Update_Average_Cycle_Time	Updates the display of the average cycle time variable (in milliseconds)
Update_Average_Exec_Time	Updates the display of the average execution time variable (in milliseconds)
Update_BATF_LED_Variable	Updates the status indicator of the BATF LED variable
Update_BUSF1_LED_Variable	Updates the status indicator of the BUSF1 LED variable
Update_BUSF2_LED_Variable	Updates the status indicator of the BUSF2 LED variable. (No effect for WinAC MP V3.1)
Update_Controller_for_Start_at_Boot	Gets the information of whether or not WinAC MP is automatically started after multi panel boot
Update_EXTF_LED_Variable	Updates the status indicator of the EXTF LED variable
Update_FRCE_LED_Variable	Updates the status indicator of the FRCE LED variable
Update_INTF_LED_Variable	Updates the status indicator of the INTF LED variable
Update_Key_Switch_Setting	Updates the display of the key switch setting
Update_Last_Cycle_Time	Updates the display of the last cycle time (in milliseconds).
Update_Maximum_Cycle_Time	Updates the display of the maximum cycle time (in milliseconds)
Update_Minimum_Cycle_Time	Updates the display of the minimum cycle time (in milliseconds)
Update_Power_LED_Variable	Updates the ON/OFF status indicator of the Power LED variable
Update_Priority	Updates the display of the priority of the WinAC MP controller relative to ProTool The priority value is always "High" for WinAC MP V3.1
Update_RUN_LED_Variable	Updates the status indicator of the RUN LED variable
Update_STOP_LED_Variable	Updates the status indicator of the STOP LED variable

You can use ProTool CS to configure any of the WinAC MP functions in your project. You must then download your ProTool project to the multi panel for process control.

> **Note**
> Functions that display a value (Get and Update functions) must be configured to the screen, or else the screen does not show the updates. The examples for configuring a screen output to display the average cycle time describe the use of screen events.

To see how WinAC MP functions are used within ProTool, you can examine the mapping of functions to screen objects in one of the example projects.

Using the WinAC MP ActiveX Controls

The installation of WinAC MP added two ActiveX controls to ProTool CS. The WinAC_MP_Panel screen uses both of these controls. To insert one of these controls on a ProTool screen, copy it from the WinAC_MP_Panel screen, or click the appropriate icon in ProTool CS. The WinAC MP ActiveX controls are described below:

Object	Icon	Description
WinAC MP		Displays a control panel for the WinAC MP controller
Histogram		Displays a histogram of scan cycle times for the WinAC MP controller

Saving, Compiling, and Downloading ProTool Projects

After you finish your changes in ProTool CS, you must save, compile and download your configuration to the multi panel.

To save a ProTool CS project, click ⊟ or select **File > Save** at any time.

To compile your ProTool CS project work to date, click ⚒ or select **File > Compile** at any time.

> ⚠️ **Warning**
> Downloading a ProTool CS configuration to the multi panel while the WinAC MP controller is in RUN mode interrupts the execution of the process.
>
> If process equipment is not in a safe state, interrupting the execution of the process could result in death or serious injury to personnel, and/or damage to equipment.
>
> Shut down the WinAC MP controller or set it to STOP mode before you download any ProTool CS configuration. Ensure that your equipment is in a safe state. Always install a physical emergency stop circuit for your machine or process.

To download your ProTool project from the configuration computer to the multi panel, follow these steps:

1. Shut down WinAC MP on the multi panel.

2. If you have Remote Control enabled on the multi panel, do not exit ProTool on the multi panel. ProTool RT can accept an automatic transfer when configured for Remote Control.

    If you do not have Remote Control enabled on the multi panel, exit ProTool and select Transfer from the Loader dialog on the multi panel. The multi panel opens a connection for your configuration computer and displays a "Connecting to host" message.

3. Save, compile, and download your project from ProTool CS on the configuration computer.

After you download a project to the multi panel, you can begin using it for process control.

Examples

The following sections provide three examples of configuring objects in ProTool CS to work with the WinAC MP controller. An example for the keyboard unit explains how to configure a global key to start or shut down WinAC MP. An example for the touch panel unit shows how to configure a global touch button to start or shut down WinAC MP. The third example is for any type of multi panel and demonstrates how to configure an output field to display the average cycle time.

Keyboard Unit Example: Configuring a Global Key to Start or Shut Down WinAC MP

The Start WinAC MP and Shutdown WinAC MP keys are configured locally for each screen of the example project, but you might want to configure a global key that would work for every screen of the project. The Control_WinAC_MP function can be used to start the WinAC MP controller or shut down the WinAC MP controller. In this example, you learn how to configure a global key that shuts down the WinAC MP controller.

Follow these steps to configure a global function key on the multi panel to shut down WinAC MP:

1. Create or open a ProTool CS project with at least one screen.

2. From ProTool CS, select **System > Screen/Keys**. ProTool CS displays the Screen/Keys dialog that displays the screen area and the keys on the multi panel.

    If you do not see keys on the dialog, you may have opened a project for a touch panel. If so, close the project and open or create a project for the MP370 multi panel. You also do not see the keys if you have clicked the Hide Keys button. Click the Display Keys button to display the keys on the keyboard unit.

3. From the Screen/Keys dialog, click the function key that you want to map to shut down WinAC MP. ProTool displays the Function Key dialog and the Select Object dialog. If the Select Object dialog does not open automatically, select the checkbox for "Show Functions Available for Selection."

4. From the Function Key dialog, select Press Key () from the Selected Functions for Event list. (The number enclosed in the parenthesis marks indicates how many functions have been configured for this event on this key.)

5. From the Select Object dialog, navigate to the WinAC MP function group, and click Control_WinAC_MP.

6. Click the <<Add button. The Parameters-Control_WinAC_MP dialog opens.

7. From the Parameters-Control_WinAC_MP dialog, select Shutdown_WinAC_MP for the winac parameter.

8. Click OK to close the Parameters-Control_WinAC_MP dialog.

9. Close the Select Object dialog.

10. Click OK to close the Function Key dialog.

    The Screen/Keys dialog displays a green triangle in the lower corner of the key that you configured, indicating that a function is globally mapped to the key.

11. Click OK to close the Screen/Keys dialog.

Following successful configuration, the function key displays the green triangle in the Screen window for all the screens, indicating that the key is globally mapped.

After you finish your changes in ProTool CS, you must save, compile and download your project to the multi panel. After a successful download, you can use the global key that you configured to shut down the WinAC MP controller from any ProTool screen on the multi panel.

Touch Panel Unit Example: Configuring a Global Button to Start or Shut Down WinAC MP

The Start WinAC MP and Shutdown WinAC MP functions are configured locally in each screen of the example project, but you might want to configure a global button that would work in every screen of the project. The Control_WinAC_MP function can be used to start the WinAC MP controller or shut down the WinAC MP controller. In this example, you learn how to configure a global button that shuts down the WinAC MP controller.

Follow these steps to configure a global function button on the multi panel to shut down WinAC MP:

1. Create or open a ProTool CS project with at least one screen.

2. Select and double-click any screen in the project to open it.

3. From the ProTool CS Screen Objects toolbar, click the Button toolbar button, then click in the fixed window at the top of the screen. (By placing the button in the fixed window, rather than the basic area, you are defining it as a global rather than a local object.) The button appears where you clicked and the Button dialog opens.

4. From the General tab of the Button dialog, replace the ? in the Text box with the words "Shut down WinAC MP".

5. Click the Functions tab. The Select Object dialog opens above the Button dialog. If the Select Object dialog does not open automatically, select the "Show Functions Available for Selection" checkbox.

6. From the Select Object dialog, navigate to the WinAC MP function group, and click Control_WinAC_MP.

7. Click the <<Add button. The Parameters-Control_WinAC_MP dialog opens.

8. From the Parameters-Control_WinAC_MP dialog, select Shutdown_WinAC_MP for the winac parameter.

9. Click OK to close the Parameters-Control_WinAC_MP dialog.

10. Close the Select Object dialog.

11. From the Functions tab of the Button dialog, select OnClick() from the Selected Functions for Event list. (The number enclosed in the parentheses marks indicates how many functions have been configured for this event on this key.)

12. Click the OK button to dismiss the Button dialog.

Following successful configuration, all the screens in the ProTool project display the global button that you configured.

After you finish your changes in ProTool CS, you must save, compile and download your project to the multi panel. After a successful download, you can use the global button that you configured to shut down the WinAC MP controller from any ProTool screen on the multi panel.

Example for All Units: Configuring an Output Field to Display the Average Cycle Time

This example shows how to insert a field on a ProTool screen that displays a numeric value for the average cycle time of the WinAC MP controller. This example applies to both the keyboard and touch panel units. You use the WinAC MP function Update_Average_Cycle_Time to provide the numeric value to display on the ProTool screen.

Assigning a Tag to an Output Field on a ProTool Screen

To insert an output field on a ProTool screen and map it to the average cycle time of the WinAC MP controller, follow these steps:

1. Create or open a ProTool CS project with at least one screen.

2. Select and double-click any screen in the project to open it.

3. Select the output field icon ![23] from the screen objects toolbar or select **Insert > Output Field** from the menu, and place the output field object on your screen. The Output Field dialog opens.
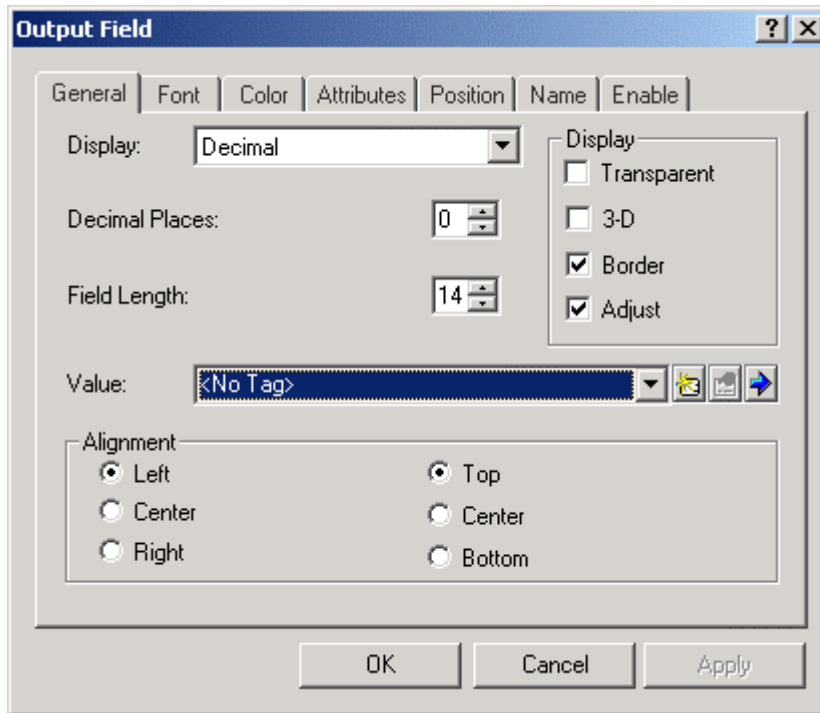

Figure: Configuring an Output Field

4. If a tag for the average cycle time value already exists, select it from the list of tags for the Value field and click the Edit Tag button ![icon]. The Tag dialog opens.

   If a tag for the average cycle time value does not exist, click the New Tag button ![icon] to create a tag for the value that the output field will display. The Tag dialog opens.

5. For a new tag, enter a tag name in the Name field of the Tag dialog, for example, AvgCycle.

    Select <No Controller> from the list for the PLC field. The WinAC MP function supplies the average cycle time; you do not obtain this value from an address in the PLC.
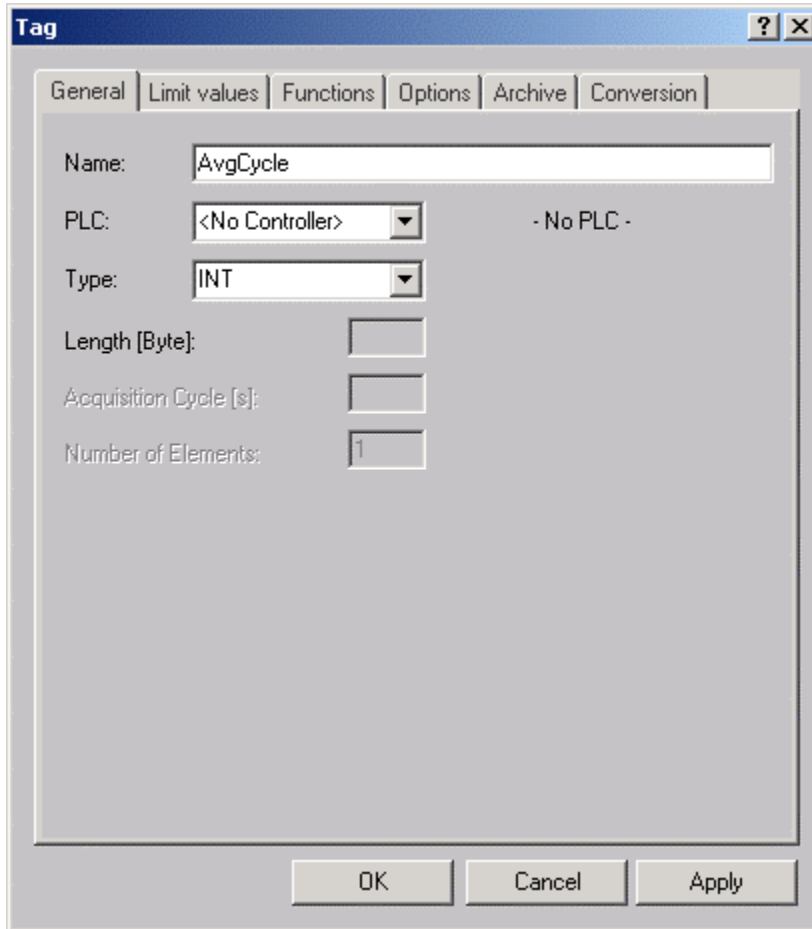

Figure: Entering a New Tag

6. Click OK on the Tag dialog and Output Field dialog.

You now have an output field on your ProTool screen with a tag for the average cycle time assigned to it. Next, you must associate the Update_Average_Cycle_Time WinAC MP function with this tag and this screen. You use the Generate Screen and Clear Screen ProTool events to complete this configuration.

Configuring a Generate Screen Event

For any of the Get and Update functions, you must map the function and the tag to a Generate Screen event for the screen.

To configure the AvgCycle tag and Update_Average_Cycle_Time function for a Generate Screen event, follow these steps:

1. Click anywhere in the background area of screen. Be sure you did not select a screen object.

2. Select **Edit > Properties** for the screen and select the Functions tab. The screen properties dialog opens, and the Select Object dialog opens. If you do not see the Select Object dialog, select the "Show Functions Available for Selection" checkbox on the screen properties dialog.

3. Select a Generate Screen event on the screen properties dialog if it is not already selected.

4. Select the Update_Average_Cycle_Time function from the list of WinAC MP functions in the Select Object dialog and click the <<Add button to map it to the Generate Screen event. The Parameters dialog opens.

5. In the Cycle_Time field of the Parameters dialog, select the tag name you entered for the average cycle time value from the list.

   By default, the Action field is set to Switch_On. If not, select the Action parameter and select Switch_On from the action list.

6. Click OK on the Parameters dialog.

7. Close the Select Object dialog, and click OK on the screen dialog.

You now have a screen that displays the average cycle time for WinAC MP.

Configuring a Clear Screen Event

For screens with functions mapped to generate screen events, you must unmap the functions when the screen is cleared (exited). You must configure a clear screen event that corresponds to each generate screen event.

To configure the AvgCycle tag and Update_Average_Cycle_Time function for a Clear Screen event, follow these steps:

1. Click anywhere in the background area of screen. Be sure you did not select a screen object.

2. Select **Edit > Properties** for the screen and select the Functions tab. The screen properties dialog opens, and the Select Object dialog opens. If you do not see the Select Object dialog, select the "Show Functions Available for Selection" checkbox on the screen properties dialog.

3. Select a Clear Screen event on the screen properties dialog.

4. Select the Update_Average_Cycle_Time function from the list of WinAC MP functions on the Select Object dialog and click the <<Add button to map it to the Clear Screen event. The Parameters dialog opens.

5. In the Cycle_Time field of the Parameters dialog, select the tag name you entered for the average cycle time value from the list.

   By default, the Action field is set to Switch_Off. If not, select the Action parameter and select Switch_Off from the action list.

6. Click OK on the Parameters dialog.

7. Close the Select Object dialog, and click OK on the screen dialog.

   Note
   For each Generate Screen event you configured, you must configure a corresponding Clear Screen event.

After you finish your changes in ProTool CS, you must save, compile and download your configuration to the multi panel. After a successful download, WinAC MP displays the average cycle time in the field that you configured.

Reference

Features of the WinAC MP Controller

The WinAC MP controller has the following features:

- Accumulators: 4 (ACCU 1 to ACCU 4)
- Communications: PROFIBUS-DP master device
- Work memory
- Load memory (RAM)
- Distributed I/O only, no local I/O:

    You can configure the size of both process-image I/O areas (I and Q memory areas) from 0 to 8192 bytes. These memory areas can be accessed directly by the instructions in the user program.

    Using Load (L) and Transfer (T) instructions (for statement list) or the Assign Value (MOVE) instruction (for ladder logic) to the peripheral I/O (PI and PQ memory areas), you can access up to 16384 bytes of inputs and 16384 bytes of outputs.

The WinAC MP controller communicates with the distributed I/O as a PROFIBUS-DP master device. As a master device, the WinAC MP controller can communicate with up to 32 slave devices (either S7-DP slaves or other DP slaves).

Technical Specifications

The table below describes performance characteristics and technical specifications of the WinAC MP controller.

Performance Characteristics and Technical Specifications of WinAC MP Controller	
WinAC MP Controller	**Description**
Work memory	3 Mbytes
Load memory (RAM)	2 Mbytes
Accumulators	4 (ACCU 1 to ACCU 4)
Local data	16 K bytes per priority class
Clock	Real-time system clock, based on the hardware clock of the multi panel
Digital and Analog I/O	16384 bytes total I/O, addressable over a range of 0 to 16383 You can freely assign the I/O between digital and analog inputs and outputs. For example, you can assign all of 16384 bytes to the inputs or all of the 16384 bytes to the outputs. However, the total amount allocated to all of the inputs and outputs cannot exceed the maximum of 16384 bytes.
Process image I/O (user configurable) • Inputs • Outputs	Default 512 bytes (inputs) and 512 bytes (outputs); each configurable from 0 to 8192 bytes • I 0.0 to I 8191.7 • Q0.0 to Q8191.7
Memory bytes • Retentive range (configurable) • Preset as retentive	2 Kbytes • MB0 to MB2047 • 16 bytes (MB0 to MB15)
Counters • Retentive range (configurable) • Preset as retentive	512 • C0 to C511 • 8 (C0 to C7)
Timers (only updated in OB1) • Retentive range (configurable) • Preset as retentive	512 • T0 to T511 • None
Clock memory Bits of the clock memory byte toggle at specific times and are accessible from the user program.	8 bits of clock memory (1 byte) 8 frequencies within 1 byte of M memory: address is configurable

Performance Characteristics and Technical Specifications of WinAC MP Controller, continued	
WinAC MP Controller	**Description**

Address ranges for logic blocks:
  • FB
  • FC
  • DB
  • Total number of blocks that can be downloaded to WinAC MP
	• FB0 to FB65535
	• FC0 to FC65535
	• DB1 to DB65535 (DB0 is reserved)
	• 2500

Nesting depth	24 per OB, with 2 asynchronous OBs (OB121 and OB122) per priority class

PROFIBUS-DP interface:
  • DP address range
 	
  • Number of DP slaves supported
  • Baud rate
  • Baud rate search (as a DP slave)
  • Transfer memory (as a DP slave)
  • Maximum segment distance
	• Address range is 16384 for inputs and outputs (but total amount supported is 1024 bytes for inputs and 1024 bytes for outputs)
	• 32
	
	• Up to 12 Mbps (*)
	• Not applicable
	
	• Not applicable
	
	• Dependent on the baud rate (see table below)

(*) 9.6 Kbps, 19.2 Kbps, 45.45 (31.25) Kbps, 93.75 Kbps, 187.5 Kbps, 500 Kbps, 1.5 Mbps, 3 Mbps, 6 Mbps, 12 Mbps	

As shown in the table below, each segment of the PROFIBUS-DP network is limited to a maximum distance (or cable length), which is determined by the baud rate of the communication.

Maximum Segment Distance Dependent on Baud Rate	
Baud Rate	**Maximum Cable Length**
9.6, 19.2, 93.75 Kbps	1200 m (3936 ft.) with an isolated interface
187.5 Kbps	1000 m (3280 ft.) with an isolated interface
500 Kbps	400 m (1312 ft.)
1.5 Mbps	200 m (656 ft.)
3, 6, 12 Mbps	100 m (326 ft.)

Organization Blocks (OBs) Supported

OBs are the interface between the operating system of WinAC MP and the control program. The table below lists the OBs which are supported. The WinAC MP controller executes OBs according to the priority class.

Organization Blocks (OBs) Supported		
OB	**Description**	**Priority Class**
OB1	Main program cycle	1 (lowest)
OB10	Time-of-day interrupt	2 to 24
OB20	Time-delay interrupt	2 to 24
OB35, OB36	Cyclic interrupt	2 to 24
OB40	Hardware interrupt	2 to 24
OB55	Status alarm interrupt	2 to 24
OB56	Update alarm interrupt	2 to 24
OB57	Manufacturer-specific alarm interrupt	2 to 24
OB80	Time error	26
OB82	Diagnostic interrupt	24 to 26 (or 28) (*)
OB83	Module remove/insert interrupt	24 to 26 (or 28) (*)
OB85	Priority class error	24 to 26 (or 28) (*)
OB86	Rack failure	24 to 26 (or 28) (*)
OB100	Warm restart	27
OB102	Cold restart	27
OB121	Programming error	Priority class of the OB where the error occurred
OB122	I/O access error	Priority class of the OB that was interrupted
(*) Priority class 28 during STARTUP mode of The WinAC MP controller, user-configurable priority class (from 24 to 26) in RUN mode.		

OBs for the Main Program Cycle, Cold Restart, and Warm Restart

The table below shows OBs for the main program cycle and cold and warm restarts. The WinAC MP controller uses OB1 (main program cycle) for continuously executing the user program. On the transition from STOP mode to RUN mode (or RUN-P mode), the WinAC MP controller executes OB100 (warm restart) or OB102 (cold restart), based either on the hardware configuration for the WinAC MP controller or which restart option was selected from a dialog displayed by the CPU panel. After OB100 (or OB102) has been successfully executed, the WinAC MP controller executes OB1.

OBs for the Main Program Cycle, Cold Restart, and Warm Restart			
Organization Block (OB)		**Start Event (in Hex)**	**Priority**
Main program cycle	OB1	1101, 1103, 1104	1
Warm restart	OB100	1381, 1382	27
Cold restart	OB102	1385, 1386	27

Interrupt OBs

The WinAC MP controller provides a variety of OBs that interrupt the execution of OB1. The table below lists the different interrupt OBs that are supported by the WinAC MP controller. These interrupts occur according to the type and configuration of the OB.

The priority class determines whether the WinAC MP controller suspends the execution of the user program (or other OB) and executes the interrupting OB. The priority class is configurable.

Interrupt OBs			
Interrupts		**Start Event (in Hex)**	**Default Priority**
Time-of-Day Interrupt	OB10	1111 (OB10)	2 (Low)
Time-Delay Interrupt Range: 1 ms to 60000 ms	OB20	1121 (OB20)	3
Cyclic Interrupt Range: 1 ms to 60000 ms Recommended: > 10 ms	OB35 OB36	1136 1137	12 13
Hardware interrupt	OB40	1141 (channel 1)	16 (High)
Status alarm interrupt	OB55	2 to 24	
Update alarm interrupt	OB56	2 to 24	
Manufacturer-specific alarm interrupt	OB57	2 to 24	

If the WinAC MP controller has been configured to execute a particular interrupt OB, but that OB has not been downloaded, the WinAC MP controller reacts in the following manner:

- If OB10, OB20, OB40 , OB55, OB56, or OB57 is missing and OB85 has not been downloaded, the WinAC MP controller changes operating mode (from RUN to STOP).

- WinLC remains in RUN mode if a cyclic interrupt OB (OB32 to OB36) is missing. If these OBs cannot be executed at the specified time and OB80 has not been downloaded, WinLC changes from RUN mode to STOP mode

   Note
   You can configure OB35 and OB36 to be executed as frequently as every 10 milliseconds (ms). If you schedule an OB to be executed at a specific interval, make certain that the program can be executed within the time frame and also that your WinAC MP application can process the OB within the allotted time.

Error OBs

As shown in the table below, the WinAC MP controller supports a variety of error OBs. Some of these error OBs have the configured (user-assigned) priority class, while others (OB121 and OB122) inherit the priority class of the block where the error occurred.

The local variables for OB121 and OB122 contain the following information that can be used by the program to respond to the error:

- The type of block (byte 4) and the number (bytes 8 and 9) where the error occurred

- The address within the block (bytes 10 and 11) where the error occurred

If the start event occurs for a particular error OB that has not been downloaded, the WinAC MP controller changes operating mode from RUN to STOP.

Error OBs

Error or Fault	OB	Start Event (in Hex)	Default Priority
Time-out error	OB80	3501, 3502, 3505, 3507	26
Diagnostic Interrupt	OB82	3842, 3942	26
Insert/remove module interrupt	OB83	3861, 3863, 3864, 3961, 3865	26
Priority class error: • Start event occurs for an OB that has not been downloaded. • During the I/O cycle, the WinAC MP controller attempts to access a module or DP slave that is defective or not plugged in. • The WinAC MP controller attempts to access a block (such as a DB) that has not been downloaded or has been deleted.	OB85	35A1 39B1, 39B2, 39B3/38B3, 39B4/38B4 35A3	26
Rack failure (distributed I/O): a node in the PROFIBUS-DP subnetwork has failed or been restored.	OB86	38C4, 39C4, 38C5, 39C5, 38C7, 38C8	26 (or 28)
Programming error (For example: the user program attempts to address a timer that does not exist.)	OB121	2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 253A; 253C, 253E	Same priority class as the OB in which the error occurred
I/O access error (For example: the user program attempts to access a module that is defective or is not plugged in.)	OB122	2942, 2943	Same priority class as the OB in which the error occurred

System Functions (SFCs) Supported

WinLC MP provides SFCs, which are system functions that perform various tasks. The control program calls the SFC and passes the required parameters; the SFC performs its task and returns the result.

- WinLC MP allows a maximum of 5 instances of the asynchronous system function SFC51 (index B1, B3) to be running.

- WinLC MP allows a maximum of 20 asynchronous SFCs from the following set to be running: SFC11, SFC13, SFC55, SFC56, SFC57, SFC58, and SFC59.

- WinLC MP allows a maximum of 32 asynchronous SFCs in any combination from the following set to be running: SFC82, SFC83, and SFC84.

   Note
   An asynchronous SFC is an SFC that has a "Busy" output parameter.

SFCs That Can Cause the Scan Cycle to Vary

The following SFCs can cause the scan cycle to vary ("jitter"):

- SFC22 (CREAT_DB)

- SFC23 (DEL_DB)

- SFC52 (WR_USMG)

Execution Times

The following table lists the execution times for the SFCs that WinLC MP supports. Execution times for asynchronous SFCs refer to the time for the SFC call, not the time for the job to complete.

System Functions (SFCs) Supported			
SFC	Name	Description	Execution Time in microseconds
SFC0	SET_CLK	Sets the system clock	44
SFC1	READ_CLK	Reads the system clock	16
SFC2	SET_RTM	Sets the run-time meter	9
SFC3	CTRL_RTM	Starts or stops the run-time meter	9
SFC4	READ_RTM	Reads the run-time meter	8
SFC5	GADR_LGC	Queries the logical address of a channel	16
SFC6	RD_SINFO	Reads the start information of an OB	15
SFC11	DPSYNC_FR	Synchronize groups of DP slaves	10
SFC12	D_ACT_DP	Deactivating and activating of DP slaves	Not applicable
SFC13	DPNRM_DG	Reads the diagnostic data of a DP slave DP configuration tested: one ET 200M slave with one 8-input/8-output module and one 16-output module	30

System Functions (SFCs) Supported			
SFC14	DPRD_DAT	Reads the consistent data from a DP slave	22
SFC15	DPWR_DAT	Writes the consistent data to a DP slave	22
SFC17	ALARM_SQ	Generates an acknowledgeable block-related message	43
SFC18	ALARM_S	Generates an unacknowledgeable block-related message	52
SFC19	ALARM_SC	Queries the status for the last message (SFC17 or SFC18)	15
SFC20	BLKMOV	Copies variables	21
SFC21	FILL	Initializes a memory area 1 word 50 words 100 words	22 24 26
SFC22	CREAT_DB	Creates a data block	59
SFC23	DEL_DB	Deletes a data block	21
SFC24	TEST_DB	Provides information about a data block	10
SFC26	UPDAT_PI	Updates the process-image input table DP configuration tested: one ET 200M slave with one 8-input/8-output module and one 16-output module	33
SFC27	UPDAT_PO	Updates the process-image output table DP configuration tested: one ET 200M slave with one 8-input/8-output module and one 16-output module	33
SFC28	SET_TINT	Sets the time-of-day interrupt (OB10)	26
SFC29	CAN_TINT	Cancels the time-of-day interrupt (OB10)	13
SFC30	ACT_TINT	Activates the time-of-day interrupt (OB10)	9
SFC31	QRY_TINT	Queries the time-of-day interrupt (OB10)	11
SFC32	SRT_DINT	Starts the time-delay interrupt (OB20)	33
SFC33	CAN_DINT	Cancels the time-delay interrupt (OB20)	19
SFC34	QRY_DINT	Queries the time-delay interrupt (OB20)	18
SFC36	MSK_FLT	Masks synchronous errors	15
SFC37	DMSK_FLT	Unmasks synchronous errors	14
SFC38	READ_ERR	Reads the error register	14
SFC39	DIS_IRT	Disables the processing of all new interrupts	13
SFC40	EN_IRT	Enables the processing of new interrupts	14
SFC41	DIS_AIRT	Disables the processing of new interrupts with higher priority than the current OB	9
SFC42	EN_AIRT	Enables the processing of new interrupts with higher priority than the current OB	18
SFC43	RE_TRIGR	Retriggers the watchdog timer (monitoring the cycle time)	68
SFC44	REPL_VAL	Transfers a value to ACCU1 (accumulator 1)	45
SFC46	STP	Changes the operating mode to STOP	Not applicable
SFC47	WAIT	Delays the execution of the user program	1000
SFC49	LGC_GADR	Queries the module slot belonging to a logical address	13
SFC50	RD_LGADR	Queries all of the logical addresses of a module	28

System Functions (SFCs) Supported, continued			
SFC	**Name**	**Description**	**Execution Time in microseconds**
SFC51	RDSYSST	Reads all or part of a system status list	40
SFC52	WR_UMSG	Writes a user element to the diagnostics buffer	58
SFC54	RD_PARM	Reads the defined parameter	29
SFC55	WR_PARM	Writes the defined parameter	43
SFC56	WR_DPARM	Writes the default parameter	32
SFC57	PARM_MOD	Assigns the parameters to a module	30
SFC58	WR_REC	Writes a data record	44
SFC59	RD_REC	Reads a data record	43
SFC62	CONTROL	Checks status of an SFB instance	Not applicable
SFC64	TIME_TCK	Reads the time from the system clock	7
SFC78	OB_RT	Reports OB runtime information, with resolution to the nearest millisecond	Not applicable
SFC79	SET	Sets a range of outputs	11
SFC80	RESET	Resets a range of outputs	11
SFC82	CREA_DBL	Creates a block in load memory	Not applicable
SFC83	READ_DBL	Copies data from a block in load memory	Not applicable
SFC84	WRIT_DBL	Writes to Load Memory blocks so data is saved immediately. Load memory blocks that are used to recover from an abnormal termination can be updated while the program is running. Use SFC84 only for larger segments of a database, not for frequent variable processing.	Not applicable

System Function Blocks (SFBs) Supported

The WinAC MP controller provides SFBs, which are logic blocks similar to SFCs. When the user program calls an SFB, a data block (DB) must also be assigned. The table below lists the SFBs that WinAC MP supports:

System Function Blocks (SFBs) Supported			
SFB	**Name**	**Description**	**Execution Time in microseconds**
SFB0	CTU	Provides a "count up" timer	15
SFB1	CTD	Provides a "count down" timer	15
SFB2	CTUD	Provides a "count up/down" timer	19
SFB3	TP	Generates a pulse	16
SFB4	TON	Generates an on-delay timer	16
SFB5	TOF	Generates an off-delay timer	16
SFB8	USEND	Sends a data packet of CPU-specific length (two-way)	
SFB9	URCV	Receives a data packet of CPU-specific length (two-way)	
SFB12	BSEND	Sends a data block up to 64 Kbytes (two-way)	
SFB13	BRCV	Receives a data block up to 64 Kbytes (two-way)	
SFB14	GET	Reads data up to a CPU-specific maximum length (one-way)	
SFB15	PUT	Writes data up to a PCU-specific maximum length (one-way)	
SFB22	STATUS	Queries the status of a remote device	
SFB23	USTATUS	Receives the status of a remote device	
SFB32	DRUM	Implements a sequencer	48
SFB52	RDREC	Reads data set	
SFB53	WRREC	Writes data set	
SFB54	RALRM	Reads alarm data for a DP slave	

Other S7 Blocks Supported

In addition to organization blocks (OBs), system functions (SFCs), and system function blocks (SFBs), you can use these other S7 blocks in a control program for WinAC MP:

- Function (FC): the address range for FCs supported by the WinAC MP controller is FC0 to FC65535. Each FC can contain up to 65,570 bytes.

- Function block (FB): the address range for FBs supported by the WinAC MP controller is FB0 to FB65535. Each FB can contain up to 65,570 bytes.

- Data block (DB): the address range for DBs supported by the WinAC MP controller is DB1 to DB65535. (DB0 is reserved.) Each DB can contain up to 65,534 bytes.

> **Notice**
> Although the address ranges higher than 2500 are supported, the WinAC MP controller supports a maximum of 2500 blocks. (In other words, the total number of FBs, FCs, DBs, OBs, and SDBs, together, cannot exceed 2500.)

For more information about OBs, SFCs, and SFBs, see the *System Software for S7-300 and S7-400 System and Standard Functions Reference Manual*.

Execution Times of Instructions

The execution times listed in the tables below, Execution Times of Math Operations and Execution Times of Instructions, reflect the average execution times for STEP 7 programs running on the WinAC MP controller. Actual execution times may vary, depending on your system.

For the performance test, the WinAC MP controller executed a test program with 3000 Boolean operations, reading and writing data to I/O modules over a PROFIBUS-DP network consisting of three ET200M nodes. In addition, the WinAC MP controller performed calculations to determine the distribution of performance data.

Execution Times of Math Operations (in microseconds)			
Math Operation	**Integer**	**Real**	**Double Word**
Addition (+)	0.07	0.10	0.07
Subtraction (-)	0.07	0.10	0.07
Multiplication (*)	0.08	0.12	0.17
Division (/)	0.21	0.18	0.17

Execution Times of Instructions (in microseconds)			
Instructions		**Execution Time in microseconds**	
		Direct addressing	**Indirect addressing**
Boolean operations: Memory areas: A, AN O, ON, X, XN	I	0.19	0.27
	M	0.19	0.43
	L	0.29	0.44
	DB	0.27	0.41
	T	0.53	0.72
	C	0.17	0.38
Boolean operations (on the accumulator): ==I, <>I, >I, <I, >=I, <=I		0.17	0.17
Operations on the bits of the status word: A==0, A<>0, A>0, A<0, A>=0, A<=0		0.17	0.17
Transitional contacts: • Edge Positive FP • Edge Negative FN		0.32 0.32	0.32 0.32
Set/Reset operations (bit operands) Set S Reset R		0.26 0.24	0.42 0.42
RLO Operations Negate RLO NOT Set RLO SET Clear RLO CLR Save RLO SAVE		0.16 0.14 0.14 0.16	0.16 0.14 0.14 0.16
Operations on Timers Pulse timer SP Reset (timer) R Extended pulse timer SE On-delay timer SD Retentive on-delay timer SS Off-delay timer SF		0.59 0.18 0.59 0.59 0.60 0.62	0.79 0.39 0.79 0.79 0.81 0.82
Miscellaneous: Open DB OPN Load L Transfer T		0.51 0.17 0.17	0.51 0.17 0.17

System Status List (SSL)

STEP 7 stores read-only information about the controller in the system status list (SSL) as a set of sublists.

You use SFC51 (RDSYSST) to access the entries in the system status list. You supply the input parameters SSL_ID and Index to access the records stored in the sublist. SFC51 returns a two-word header and a sublist or partial sublist. The header provides the following information about the sublist:

- The first word defines the length (size in bytes) of a record for the sublist.

- The second word defines the number of records contained in the sublist.

The sublist that follows contains all of the information requested. The size of the sublist in bytes is the record length times the number of records.

For more information about the system status list, see the *System Software for S7-300 and S7-400 System and Standard Functions Reference Manual*.

The table below provides an overview of the SSL sublists, sorted according to the SSL-ID. You use the SSL-ID and index (as hexadecimal numbers: 16#) to access the records stored in the sublist.

SSL_ID (hex)	Sublist	Index (hex)	Record Contents
	SSL ID		
0000	All available SSL-IDs	Examples:	Information on all available SSL IDs
0100	Sublist with all sublist excerpts	00xy	List of SSL IDs supported by WinLC in group 00xy (Example: 0024, CPU Operating Status)
0200	A sublist excerpt	0xyz	SSL ID 0xyz if supported by WinLC, 0 if not
0300	All available indices for an SSL_ID	0xyz	List of indices corresponding to SSL ID 0xyz
0F00	Header information only		Number of all SSL IDs of the module
	CPU identification		WinLC type and version number
0011	All records of the sublist		
0111	One record of the sublist	0001	Identification of the module
		0007	Identification of the firmware
0F11	Header information only		

SSL_ID (hex)	Sublist	Index (hex)	Record Contents
	CPU characteristics		
0012	All characteristics		
0112	One group of characteristics	0000	MC7 processing unit
		0100	Time system in WinLC
		0200	System response
		0300	Language description of WinLC
0F12	Header information only		
	Memory areas		
0013	All memory areas		
0113	One memory area	0001	User memory
		0002	Load memory integrated
		0003	Load memory inserted
		0004	Maximum insertable load memory
		0005	Size of backup memory
		0006	Size of PBC memory assigned on the system-side (shadow memory)
0F13	Header information only		
	Operating system areas		
0014	All system areas of a module		
0114	One system area	0001	Process-image input area (bytes)
		0002	Process-image output area (bytes)
		0003	Memory (bits)
		0004	Number of timers
		0005	Number of counters
		0006	I/O address area (bytes)
		0007	Total local data area of CPU (bytes)
0F14	Header information only		

SSL_ID (hex)	Sublist	Index (hex)	Record Contents
	Block types		
0015	All block types of a module		
0115	One block type	0800	OBs (number and size)
		0A00	DBs (number and size)
		0B00	SDBs (number and size)
		0C00	FCs (number and size)
		0E00	FBs (number and size)
0F15	Header information only		
	Status of the module LEDs		
0019	All LEDs		
0119	One LED	0002	INTF Internal failure
		0003	EXTF External failure
		0004	RUN Run
		0005	STOP Stop
		0006	FRCE Force
		0007	CRST Complete restart
		000B	BUSF1 Bus fault
		000C	BUSF2 Bus fault
		0011	BAF Battery failure
		0012	BUSF3 Bus fault
		0013	BUSF4 Bus fault
0F19	Header information only		
	Interrupt/error assignment	Not applicable	Not applicable
0021	All possible interrupts		
0A21	All assigned interrupts		
0F21	Header information only		
	Interrupt status		
0222	One specific interrupt	0001	Event that started OB1
		0050	Event that started OB80

SSL_ID (hex)	Sublist	Index (hex)	Record Contents
	Priority class		
0023	All priority classes		Priority of possible OBs
0123	One specific priority class	Priority class	
0223	All configured priority classes		
0F23	Header information only		
	Operating status of the CPU		
0124	Last executed operating status transition		
0424	Current operating status		
0524	Specified operating status	4520	Defective status
		5000	STOP status
		5010	Startup status
		5020	RUN status
		5030	HALT status
0F24	Header information only		
	Communications performance		
0131	Parameters of the communications type specified	0001	Number of connections and baud rates
		0002	Test and startup parameters
		0003	Operator interface parameters
		0004	Object management system (operating system function)
		0005	Diagnostics functions and diagnostics entries
		0006	PBC performance parameters
		0009	Number of run-time meters
		0010	PMC event parameters
0F31	Header information only		

SSL_ID (hex)	Sublist	Index (hex)	Record Contents
	Communications status information		
0132	Parameters of the communications type specified	0001	Number and type of connections
		0002	Number of test jobs set up
		0004	CPU protection level
		0005	Diagnostics
		0006	PBK status data
		0008	Time system, correction factor, run-time meter, date and time of day
		0009	Baud rate (set by means of the MPI)
		000A	Baud rate (set by means of the S7-300 backplane bus)
		0010	PMC S7-SCAN Part 1
0F32	Header information only		
	Diagnostic Station List	not applicable	not applicable
0033	All entries		
0F33	Header information only		
	Start-up events		
0782	Start-up events of all OBs of a priority class before processing	Priority class	Event ID, priority class, and OB number
	Module status information		
0A91	All DP subsystems and DP masters		
0C91	One module	Logical base address	Features and parameters of the module
0D91	One station	Rack, or DP master system ID, or DP master system ID and station number	All the modules of a station in the PROFIBUS-DP network
0F91	Header information only		

SSL_ID (hex)	Sublist	Index (hex)	Record Contents
	Status information of the stations in a DP network		Status information for the stations connected to a PROFIBUS-DP network
0092	Expected status of nodes in a DP master system	0 / DP master system ID	
0192	Activation status of the stations of a DP master system ID		
0292	Actual status of the nodes in a subnetwork	0 / DP master system ID	
0692	DP slaves indicating failure of one or more modules	0 / DP master system ID	
0F92	Header information only		
	Expanded DP Master system information		Status information regarding synchronicity for the nodes connected to a PROFIBUS-DP network.
0095	All DP master systems known to the CPU	0 / DP master system ID | L-Byte=00H	
0195	One DP master system		
0F95	Header information only		
	Diagnostics buffer		Event information (dependent on the event)
00A0	All entries (event information)		
01A0	Specified number of entries	Number	
0FA0	Header information only		
	Module diagnostics		Module-dependent diagnostics information
00B1	First four diagnostic bytes of one module (data record 0)	Logical base address	
00B3	All diagnostic data of one module (data record 1)	Logical base address	
00B4	Diagnostic data of a DP slave	Configured diagnostic address	

Performance Test: Scan Time "Jitter"

Based on the hardware configuration of your multi panel, and also the CPU utilization by other software applications, the scan cycle for the WinAC MP controller can experience "jitter" (where the scan cycle varies from the configured minimum scan time).

For the performance test, the WinAC MP controller executed a test program with 3000 Boolean operations, reading and writing data to I/O modules over a PROFIBUS-DP network consisting of three ET200M nodes. In addition, the WinAC MP controller performed calculations to determine the distribution of performance data.
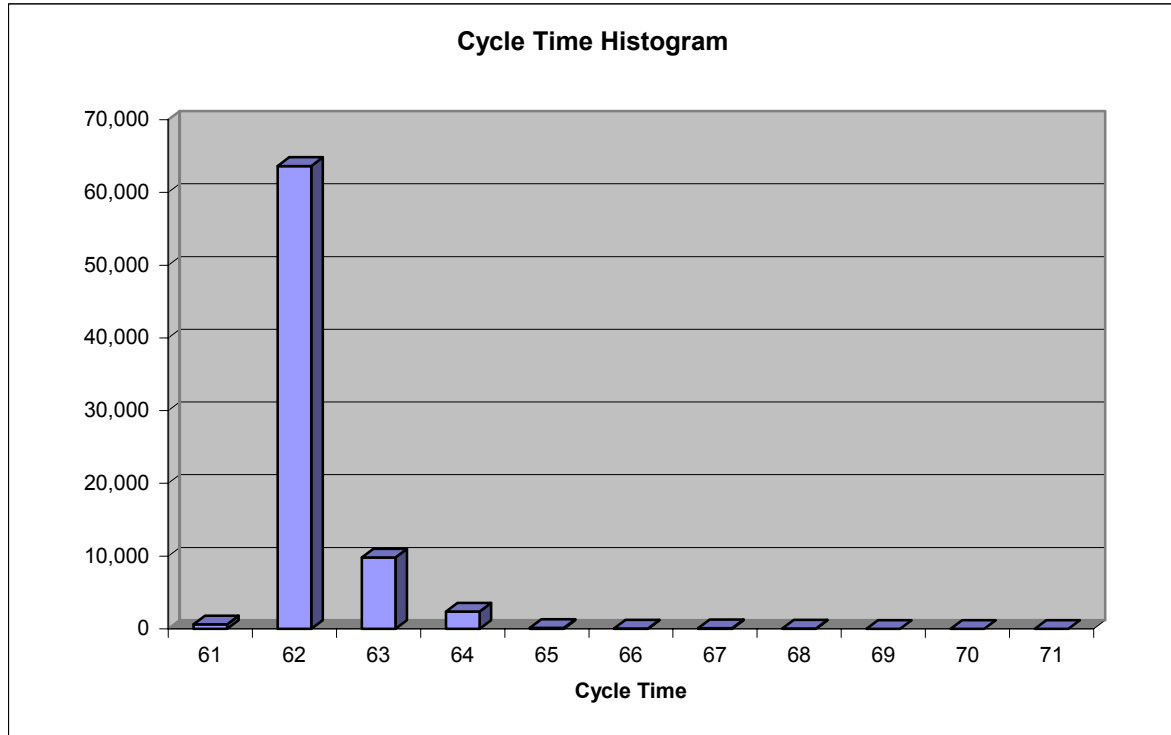
Figure: Sample Jitter

Troubleshooting

Use the table below to troubleshoot difficulties that you encounter.

Troubleshooting		
Problem	**Possible Cause**	**Corrective Action**
Nothing displays on the multi panel after installing the WinAC MP runtime files.	Multi panel does not have a ProTool project with a user interface for the WinAC MP controller.	Use ProTool CS to install the example ProTool project with WinAC MP screens, or a customized project, on the multi panel.
The WinAC MP software did not transfer to the multi panel.	Wrong cable used, wrong ports connected, or wrong parameters specified.	Review the topic "Setting Parameters for Communications" (p.8) and correct any errors.
Ethernet communication has stopped working.	Parameter mismatch.	Make sure you use the IP address of the multi panel in your connection parameters on the configuration computer. Review the topic "Setting Parameters for Communications" (p.8).
	Fast Acknowledge is set	Open Setting the PG/PC Interface from STEP 7 and the Properties dialog for the Interface Parameter Assignment field. Verify that the checkbox for "Fast Acknowledge" is **not** selected. You cannot download from STEP 7 to the multi panel if Fast Acknowledge is selected.
	Cabling problem	**Networked:** Check that you connected the configuration computer to the multi panel using a hub and twisted-pair, category 5 cables. **Direct Connection:** Check that you used crossover, twisted-pair, Category 5 cables. (You can create a crossover cable with a length of Category 5 cable and an RJ-45 connector for each end. Wire one end normally; at the other end, connect 1 to pin 3 and 2 to pin 6.)

Troubleshooting		
MPI or PROFIBUS communication is not working	Communication settings between STEP 7 and the multi panel are different. Possibly a hardware configuration download from the configuration computer changed an MPI setting on the multi panel to PROFIBUS.	Configure the configuration computer and the multi panel to use the same communication setting: • On the configuration computer, set the PG/PC Interface Parameter assignment to either the MPI or PROFIBUS selection for your CP card. • On the multi panel, use the Transfer utility from the Control Panel to set the Transfer Settings for Channel 2 to MPI. Set the S7-Transfer Settings for the multi panel to either MPI or PROFIBUS. The S7-Transfer Settings are accessible through the Advanced button on the Transfer Settings dialog.
The controller doesn't really do anything after installing the WinAC MP runtime files and a ProTool project.	The controller contains no control program.	Use STEP 7 to develop and download a control program. Review the topic "Developing and Downloading a STEP 7 Program for WinAC MP" (p. 23).
The WinAC MP controller is not communicating with the PROFIBUS-DP device network.	Wrong network configuration.	Review the topic "Configuring the SIMATIC PC Station and the PROFIBUS-DP Network" (p. 25) and correct any errors.

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