

CF Terminal User's Guide

Chapter 1	Using This Guide	1-1
	<i>Introduction.....</i>	1-1
	<i>Key Concepts.....</i>	1-2
	Chapter Organization	1-2
	Questions or Comments	1-2
Chapter 2	Getting Started	2-1
	<i>Introduction.....</i>	2-1
	<i>Key Concepts.....</i>	2-2
	Panel Unit Introduction	2-2
	FMS Components	2-3
	Panel Unit Concepts	2-5
	CF Terminal Screens	2-8
	Mouse Capabilities	2-11
	Printing from CF Terminal	2-11
	Panel Unit Menus	2-11
	Panel Unit Keystrokes	2-13
	Entering Information	2-15
	Online Help	2-16
	<i>Procedure Overview.....</i>	2-20
	<i>Detailed Procedures.....</i>	2-21
	Changing Colors in CF Terminal	2-21
	Changing the CF Terminal Font Size	2-21

Setting the Printer Destination in CF Terminal.....	2-22
Chapter 3 Displaying Summaries.....	3-1
<i>Introduction</i>.....	3-1
<i>Key Concepts</i>.....	3-2
Summaries	3-2
Group Summary	3-3
Point Summary.....	3-3
Trend Log Summary	3-4
Scheduling Summary	3-4
Totalization Point Summary	3-4
Energy Profile Summary	3-4
<i>Procedure Overview</i>.....	3-5
<i>Detailed Procedures</i>.....	3-6
Displaying a Group Summary	3-6
Displaying a Point Summary	3-8
Displaying a Trend Log Summary.....	3-10
Displaying a Scheduling Summary	3-12
Displaying a Totalization Point Summary.....	3-13
Displaying an Energy Profile Summary.....	3-14
Chapter 4 Commanding Points	4-1
<i>Introduction</i>.....	4-1
<i>Key Concepts</i>.....	4-2
Command Points.....	4-2
<i>Procedure Overview</i>.....	4-4
<i>Detailed Procedures</i>.....	4-5
Commanding a Point from the Point Menu	4-5
Commanding a Point from the Group Menu	4-7
Chapter 5 Managing Alarms	5-1
<i>Introduction</i>.....	5-1

Key Concepts.....	5-2
Alarm Management.....	5-2
Application.....	5-4
Types of Alarm Report	5-5
Alarm Reports Displayed on Terminal	5-6
View Alarms	5-8
Alarm Report Printer Destinations.....	5-10
Alarm Report Format.....	5-11
Network Alarms.....	5-12
Acknowledgement.....	5-12
Alarm Management Screens and Parameters	5-13
Point Alarm Summaries	5-13
Design Considerations	5-14
Procedure Overview.....	5-15
Detailed Procedures.....	5-16
Engineering Alarms.....	5-16
Acknowledging Alarms Displayed on the Terminal Screen.....	5-19
Defining Alarm Horn Point.....	5-19
Chapter 6 Setting Up the Panel Unit	6-1
Introduction.....	6-1
Key Concepts.....	6-2
System Setup.....	6-2
Date and Time.....	6-2
Daylight Saving Time	6-2
Holidays	6-3
Passwords.....	6-3
Communications	6-4
Procedure Overview.....	6-5
Detailed Procedures.....	6-6
Entering the Date and Time	6-6
Scheduling Daylight Saving Time	6-7

Modifying Daylight Saving Time Settings.....	6-8
Deleting Daylight Saving Time Settings.....	6-9
Adding Holidays.....	6-9
Modifying Holidays.....	6-10
Deleting Holidays.....	6-10
Adding Passwords.....	6-11
Modifying Passwords.....	6-13
Deleting Passwords.....	6-13
Setting Up Communications.....	6-14
Chapter 7 Defining the Supervisory Control Network.....	7-1
<i>Introduction.....</i>	<i>7-1</i>
<i>Key Concepts.....</i>	<i>7-2</i>
Network Definition.....	7-2
Network Summary.....	7-4
Network Diagnostics.....	7-4
Controller Address.....	7-6
Reset Statistics.....	7-7
Print Diagnostic Messages.....	7-7
<i>Procedure Overview.....</i>	<i>7-8</i>
<i>Detailed Procedures.....</i>	<i>7-9</i>
Defining the Supervisory Control Network.....	7-9
Adding a Controller.....	7-9
Modifying a Controller.....	7-10
Deleting a Controller.....	7-11
Displaying a Network Summary.....	7-12
Displaying Network Diagnostics.....	7-13
Resetting Statistics.....	7-13
Interpreting Statistics.....	7-14
Printing Diagnostic Messages.....	7-14
<i>Troubleshooting.....</i>	<i>7-15</i>
Network Diagnostic Fields.....	7-15
Chapter 8 Defining Dial-up.....	8-1

	<i>Introduction</i>	8-1
	<i>Key Concepts</i>	8-2
	Dial-up I/O	8-2
	Configurations	8-4
	Operator Interface	8-5
	Capabilities.....	8-5
	Dial Sequence Priority.....	8-6
	Design Considerations	8-10
	<i>Procedure Overview</i>	8-11
	<i>Detailed Procedures</i>	8-12
	Defining Dial-up.....	8-12
	Defining Automatic Dial-up for Alarm Reporting	8-14
Chapter 9	Defining Points	9-1
	<i>Introduction</i>	9-1
	<i>Key Concepts</i>	9-2
	Point Definition	9-2
	Types of Point	9-3
	Point Definition Tables	9-4
	<i>Procedure Overview</i>	9-9
	<i>Detailed Procedures</i>	9-10
	Adding a Point.....	9-10
	Copying Controller Points	9-12
	Modifying Controller Points	9-14
	Deleting Controller Points	9-15
	<i>Troubleshooting</i>	9-16
	Point Delete Not Successful.....	9-16
Chapter 10	Using Controller Snapshot	10-1
	<i>Introduction</i>	10-1
	<i>Key Concepts</i>	10-2

Controller Snapshot	10-2
Controller Snapshot Display.....	10-3
Command Points from the Controller Snapshot.....	10-3
Design Considerations	10-4
Procedure Overview.....	10-5
Detailed Procedures.....	10-6
Defining a Template	10-6
Adding a Snapshot Template.....	10-7
Modifying a Snapshot Template.....	10-8
Deleting a Snapshot Template	10-9
Displaying a Controller Snapshot.....	10-10
Commanding a Point from the Controller Snapshot.....	10-12
Chapter 11 Creating Alarm Messages	11-1
Introduction.....	11-1
Key Concepts.....	11-2
Alarm Messages	11-2
Procedure Overview.....	11-4
Detailed Procedures.....	11-5
Adding Alarm Messages	11-5
Modifying Alarm Messages	11-6
Deleting Alarm Messages	11-6
Chapter 12 Defining Totalization.....	12-1
Introduction.....	12-1
Key Concepts.....	12-2
Totalization	12-2
Process	12-3
Capabilities.....	12-4
Operator Interface	12-6
Design Considerations	12-8
Procedure Overview.....	12-9

	<i>Detailed Procedures</i>	12-10
	Defining Totalization.....	12-10
	Adding Totalization for a Point	12-11
	Modifying Totalization for a Point	12-12
	Deleting Totalization for a Point	12-13
Chapter 13	Defining Groups	13-1
	<i>Introduction</i>	13-1
	<i>Key Concepts</i>	13-2
	Group Definition	13-2
	Group Summary	13-2
	<i>Procedure Overview</i>	13-3
	<i>Detailed Procedures</i>	13-4
	Adding Groups	13-4
	Modifying Groups	13-6
	Deleting Groups	13-6
Chapter 14	Defining Schedules	14-1
	<i>Introduction</i>	14-1
	<i>Key Concepts</i>	14-2
	Schedules	14-2
	Schedule Types	14-4
	Power-Fail Restart	14-7
	Point Cross-Reference.....	14-8
	Scheduling Summary	14-8
	Design Considerations	14-9
	<i>Procedure Overview</i>	14-10
	<i>Detailed Procedures</i>	14-11
	Engineering the Weekly Schedule Feature	14-11
	Adding a Weekly Schedule	14-12
	Modifying a Weekly Schedule	14-14
	Deleting a Weekly Schedule	14-14

Creating a Temporary Schedule	14-15
Deleting a Temporary Schedule.....	14-15
Copying a Weekly Schedule	14-16
Displaying a Point Cross-Reference	14-18
Displaying a Scheduling Summary	14-19
Chapter 15 Defining Trend.....	15-1
<i>Introduction.....</i>	15-1
<i>Key Concepts.....</i>	15-2
Trend.....	15-2
Capabilities.....	15-4
Trend Logs	15-4
Design Considerations	15-5
<i>Procedure Overview.....</i>	15-6
<i>Detailed Procedures.....</i>	15-7
Creating a Trend Log	15-7
Modifying a Trend Log	15-9
Deleting a Trend Log.....	15-9
Stopping Trend for a Point	15-10
Chapter 16 Understanding Energy Management.....	16-1
<i>Introduction.....</i>	16-1
<i>Key Concepts.....</i>	16-2
Demand Limiting	16-2
Load Rolling	16-7
Load Rolling Loadsets.....	16-9
Optimal Start/Stop.....	16-9
Energy Profile Summary	16-9
Design Considerations	16-10
<i>Procedure Overview.....</i>	16-13
<i>Detailed Procedures.....</i>	16-14
Defining the Demand Meter	16-14

Setting Up the Demand Limiting Schedule	16-16
Adding Demand Limiting Loadsets	16-18
Modifying Demand Limiting Loadsets	16-20
Deleting Demand Limiting Loadsets	16-20
Adding Load Rolling Loadsets	16-21
Modifying Load Rolling Loadsets	16-23
Deleting Load Rolling Loadsets	16-23
Adding an OST System.....	16-24
Modifying an OST System	16-26
Deleting an OST System.....	16-26
Displaying an Energy Profile Summary.....	16-27
Chapter 17 Creating Control Logic	17-1
<i>Introduction.....</i>	17-1
<i>Key Concepts.....</i>	17-2
Control Logic.....	17-2
Control Logic Processes	17-3
Design Considerations	17-6
<i>Procedure Overview.....</i>	17-7
<i>Detailed Procedures.....</i>	17-8
Defining Control Logic.....	17-8
Adding a Control Logic Process.....	17-9
Modifying a Control Logic Process.....	17-13
Deleting a Control Logic Process.....	17-13
Chapter 18 Defining Signal Select	18-1
<i>Introduction.....</i>	18-1
<i>Key Concepts.....</i>	18-2
Signal Select	18-2
Capabilities.....	18-3
Design Considerations	18-5
<i>Procedure Overview.....</i>	18-6

Detailed Procedures.....	18-7
Defining Signal Select.....	18-7
Adding Signal Select.....	18-8
Modifying Signal Select.....	18-10
Deleting Signal Select.....	18-11
Chapter 19 Defining Auto Shutdown	19-1
Introduction.....	19-1
Key Concepts.....	19-2
Auto Shutdown.....	19-2
Capabilities.....	19-4
Design Considerations	19-4
Procedure Overview.....	19-5
Detailed Procedures.....	19-6
Defining Auto Shutdown.....	19-6
Adding Auto Shutdown.....	19-7
Modifying Auto Shutdown	19-9
Deleting Auto Shutdown.....	19-9
Chapter 20 Defining Global Data Sharing	20-1
Introduction.....	20-1
Key Concepts.....	20-2
Global Data Sharing.....	20-2
Procedure Overview.....	20-4
Detailed Procedures.....	20-5
Defining Global Data Sharing.....	20-5
Adding Global Data Sharing Processes.....	20-5
Modifying Global Data Sharing Processes.....	20-7
Deleting Global Data Sharing Processes.....	20-7
Deleting a Point from the Global Data Sharing Process	20-8
Chapter 21 Scheduling and Printing Reports	21-1

	<i>Introduction.....</i>	21-1
	<i>Key Concepts.....</i>	21-2
	Reports.....	21-2
	Capabilities.....	21-4
	Reports Summary	21-5
	Print Reports Immediately	21-5
	Printing Options.....	21-5
	<i>Procedure Overview.....</i>	21-7
	<i>Detailed Procedures.....</i>	21-8
	Defining the Reports Feature	21-8
	Adding Report Schedules	21-9
	Modifying Report Schedules	21-11
	Deleting Report Schedules	21-11
	Printing a Report Immediately	21-12
	Displaying a Reports Summary.....	21-13
Chapter 22	Defining Accumulator (AC) Point Software.....	22-1
	<i>Introduction.....</i>	22-1
	<i>Key Concepts.....</i>	22-2
	Accumulator Point	22-2
	Design Considerations	22-6
	Group Parameters.....	22-6
	<i>Procedure Overview.....</i>	22-7
	<i>Detailed Procedures.....</i>	22-8
	Defining AC Points	22-8
Chapter 23	Defining Analog Input (AI) Point Software.....	23-1
	<i>Introduction.....</i>	23-1
	<i>Key Concepts.....</i>	23-2
	AI Point.....	23-2
	Design Considerations	23-7
	Group Parameters.....	23-7

<i>Procedure Overview</i>	23-8
<i>Detailed Procedures</i>	23-9
Defining AI Points.....	23-9
Chapter 24 Defining Analog Output (AO) Point Software	24-1
<i>Introduction</i>	24-1
<i>Key Concepts</i>	24-2
Analog Output Points	24-2
Design Considerations	24-6
Group Parameters.....	24-6
<i>Procedure Overview</i>	24-7
<i>Detailed Procedures</i>	24-8
Defining AO Points.....	24-8

Chapter 1

Using This Guide

Introduction

This guide is a learning and reference guide for Metasys®, Companion™ and Facilitator™. It describes the procedures used in the CF Terminal application to monitor and control your facility.

This guide:

- gives you an overview of the Panel unit
- explains the procedures you need to know to use the Panel unit to effectively manage your facility
- complements the online help available at the terminal

For Panel unit installation information, please see the *Metasys Companion Technical Manual (FAN 628.1)* or the *Facilitator FMS Technical Manual (FAN 1628.1)*.

For information on establishing a connection between the Panel unit and the M-Series Workstation, refer to *Companion/Facilitator OPC Server User's Guide (LIT-11531100)* in this manual.

This manual assumes you are familiar with general Facility Management System (FMS) and Heating, Ventilating, and Air Conditioning (HVAC) concepts and terminology.

Key Concepts

Chapter Organization

Each chapter in the *CF Terminal User's Guide* is divided into five main sections (Table 1-1).

Table 1-1: Chapter Organization

Section	Description
<i>Introduction</i>	Briefly outlines the contents of the chapter.
<i>Key Concepts</i>	Describes key concepts necessary to perform specific tasks.
<i>Procedure Overview</i>	Describes general steps for performing procedures. This section is geared toward users already experienced in using the CF Terminal.
<i>Detailed Procedures</i>	Details the steps needed to complete these tasks described within the chapter. This section is geared toward users who are new to the CF Terminal.
<i>Troubleshooting</i>	Provides troubleshooting tips.

Questions or Comments

Direct any questions you have regarding this manual to your authorized Johnson Controls representative.

If you have any suggestions for how this manual could be made more useful to you, please send us your ideas on the enclosed Reader's Comments card.

Chapter 2

Getting Started

Introduction

This chapter describes Panel unit screens, menus, and keystrokes, and the basic procedures used to monitor and control your facility.

This chapter includes:

- Panel unit introduction
- FMS components
- Panel unit concepts
- CF Terminal screens
- mouse capabilities
- printing from CF Terminal
- Panel unit menus
- Panel unit keystrokes
- entering information
- online Help
- how to change colors in CF Terminal
- how to change the CF Terminal font size
- how to set the printer destination in CF Terminal

This section assumes the Panel unit is already installed. For information on installation, refer to the *Metasys Companion Technical Manual (FAN 628.1)* or the *Facilitator FMS Technical Manual (FAN 1628.1)*.

Key Concepts

Panel Unit Introduction

With the Panel unit, you can monitor and control the HVAC equipment in your facility and use powerful data gathering and energy management tools (e.g., Totalization, Demand Limiting) to make your facility economical and cost-effective.

Panel Unit Capabilities

With the Panel unit, you can perform the following FMS functions:

- detect and respond to alarms
- monitor facility conditions
- control equipment
- automate routine functions
- schedule and print reports
- collect trend and totalization data
- reduce energy consumption and costs
- create and alter the FMS database

Panel and LTD Versions

There are two versions of the Panel unit: Panel and *LTD*. FMS functions are performed at the Panel or *LTD*, which houses the Panel unit software and database.

The *LTD* is a limited version of the Panel unit that is better suited for smaller facilities.

FMS Components

A typical FMS configuration has the following major components:

- Panel unit
- M-Series Workstation
- Companion/Facilitator
- printer
- N2 Bus (local communications network)
- Application Specific Controllers (ASCs), including:
 - Air Handling Unit (AHU) Controller
 - Lab and Central Plant (LCP) Controller
 - Unitary (UNT) Controller
 - Variable Air Volume (VAV) Controller
 - Metasys Integrator® Device (MIG)
 - Phoenix Fume Hood (PHX)
 - Extended Digital Controller (DX-9100)
 - Intelligent Lighting Controller (ILC)
 - Generic Vendor Controller (VND)
 - Intelligent Fire Controller (IFC)
 - Terminal Unit Controller (TUC)
 - Rooftop Unit Controller (RTX)
 - Expansion Module (XTM)
 - N2 Dialer (NDM)
- HVAC equipment (e.g., sensors and actuators)

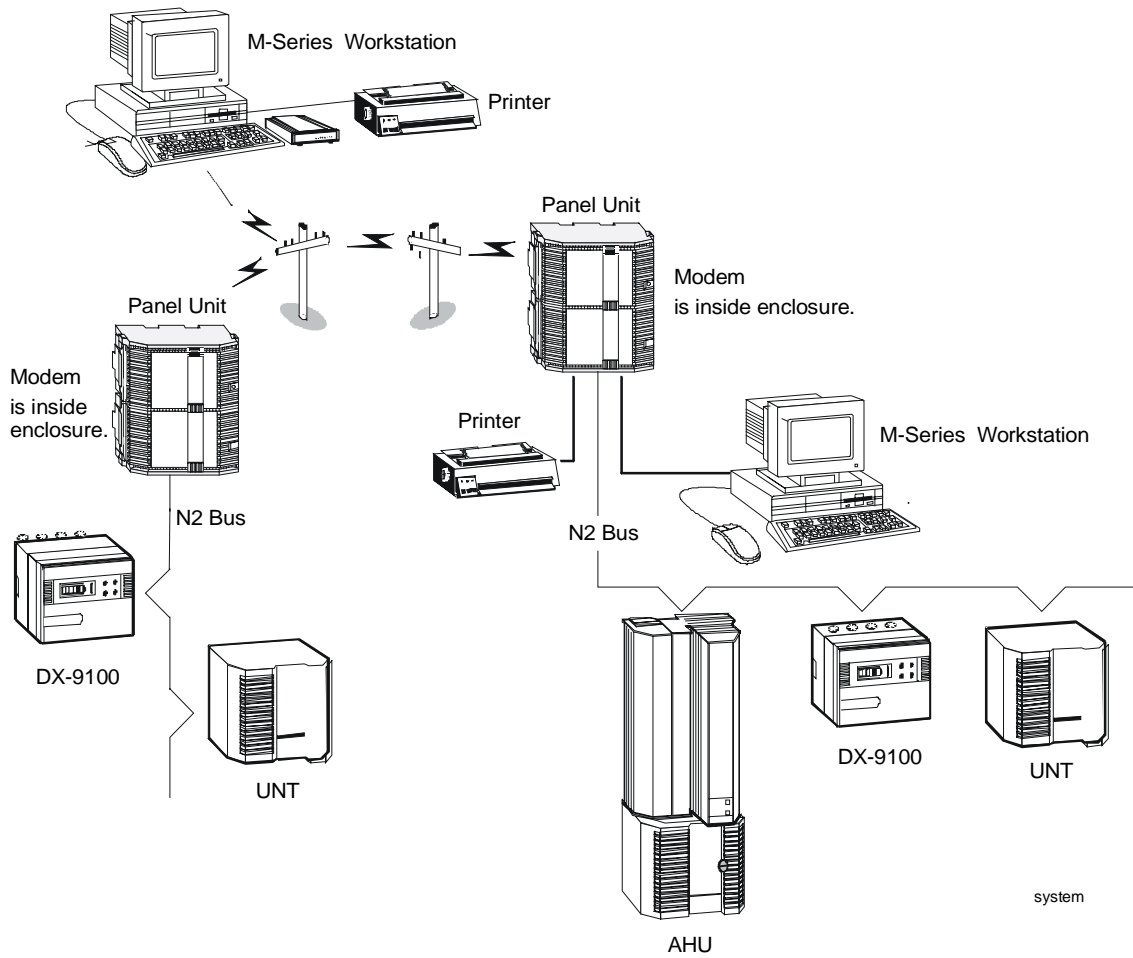


Figure 2-1: Example of FMS Components

Panel Unit Software

The Panel unit software performs supervisory, control, and data collection functions for the facility. The software also allows you to set up and modify the facility database.

The Panel unit software has an easy-to-use text-based operator interface. It uses a simple menu structure, prompts to guide you through the fill-in-the-blank process, and provides online Help messages appropriate to your position in the program.

Local M-Series Workstation

The M-Series Workstation application suite includes CF Terminal applications to interact with the Panel unit. The M-Series Workstation also provides dynamic graphical operator displays and historical trend archive and display functions.

Remote M-Series Workstation

A remote workstation can connect to the network via modem and phone lines. The Panel unit can dial out to this remote workstation when a Fire, Critical, or Network alarm is detected, and display alarm reports on the remote workstation screen or print reports to a file on the remote workstation. In addition, an operator at the remote workstation can dial up the network to issue a command, add a point, or perform any other Panel unit function.

Printer

The Panel unit sends data, such as alarm messages or summaries to a printer file according to your specifications (automatically, by operator command, or by scheduled command). The printer file is defined in the CF Terminal application on the M-Series Workstation. The printer file can then be viewed in Notepad and printed.

Remote Printer

A remote printer can connect to the Panel unit's remote terminal. You can schedule reports to this remote printer.

N2 Bus

The N2 Bus is the communication cable that allows the controllers to communicate with the Panel unit.

Controllers

Intelligent controllers provide the actual point contact between the Panel unit and the HVAC equipment (e.g., sensors and actuators).

Panel Unit Concepts

This section explains some of the concepts you need to know to use the Panel unit. Refer to the *Glossary* in this manual for a complete list of definitions.

Point

To organize information about the facility and allow you to control specific equipment, the Panel unit uses the concept of *point*. A point is the software representation of a piece of equipment (hardware) or a value (software), which is monitored and controlled by the Panel unit.

For example, fans and temperature sensors may be considered points in the Panel unit.

A point must be given a number and address so that the Panel unit can identify, locate, and control the point and a name so that you can more easily identify the point. You can give the point any name that is meaningful to you (e.g., Supply Fan 1, AHU Outside Air).

Point Types

Points are either analog or binary. The motor on a fan, because it can be either on or off, is a binary point. A temperature sensor, because it measures temperature over a continuous range of values, is an analog point.

The Panel unit further breaks down points into the following five types:

- Accumulator (AC)
- Analog Input (AI)
- Analog Output (AO)
- Binary Input (BI)
- Binary Output (BO)

The different types of points are explained in this manual.

Group

A group is a set of points related by function, location, or any other convenient association. By putting points in groups, operators can quickly find information. For example, an operator concerned with room temperatures can go straight to the group called Room Temps, which contains all the temperature sensor points in the facility. An operator concerned with the operation of a particular air handler can go straight to the group called AHU Floor 3, which contains the points involved in the third floor air handler.

A Group Summary displays the points in the group. The Group Summary is the only screen that allows you to command points, and the only screen that displays updating point values. The values update every 10 seconds.

Change-of-State (COS)

A COS indicates a point has changed from one state to another. For example, a binary point might change from On to Off, or from Start to Stop. An analog point might pass a preset limit such as change from 72 degrees (normal temperature) to 85 degrees (abnormal temperature).

Alarm

An alarm is most often used to refer to a change-of-state from normal to abnormal. The Panel unit informs you of alarms that might need immediate attention by displaying alarm reports on the screen.

Database

The database contains all the information the Panel unit uses to operate the facility. For example, point names, point addresses, and Weekly Schedules are part of the database. The Panel unit has only one database, contained in a battery-backed memory.

Database Generation

Database Generation is the process you perform to set up the Panel unit database. For example, adding controllers to the network, adding points, setting up Trend data collection, and creating Control Logic processes are all Database Generation activities.

Password Capability

There are four password capability levels in the Panel unit: System, Operate, Command, and Monitor. Each capability level allows different access to the Panel unit. The System level allows access to all functions, including Database Generation.

Table 2-1: Password Capability

Password Level	Tasks Allowed
System	<ul style="list-style-type: none"> • database generation • define weekly schedules • view controller snapshots • monitor the system • command points • acknowledge alarms
Operate	<ul style="list-style-type: none"> • define weekly schedules • view controller snapshots • monitor the system • command points • acknowledge alarms
Command	<ul style="list-style-type: none"> • monitor the system • command points • acknowledge alarms
Monitor	<ul style="list-style-type: none"> • monitor the system • acknowledge alarms only

If a password does not allow access to a function, the menu option for that function is not available.

Network

A network is the Panel unit with optional printer and HVAC Application Specific Controllers (ASCs) communicating over the N2 Bus.

CF Terminal Screens

Note: This manual simulates online screens using artificially generated data. Care has been taken to make this data as realistic as possible. However, some inconsistencies may occur.

CF Terminal screens have four major areas (Figure 2-2).

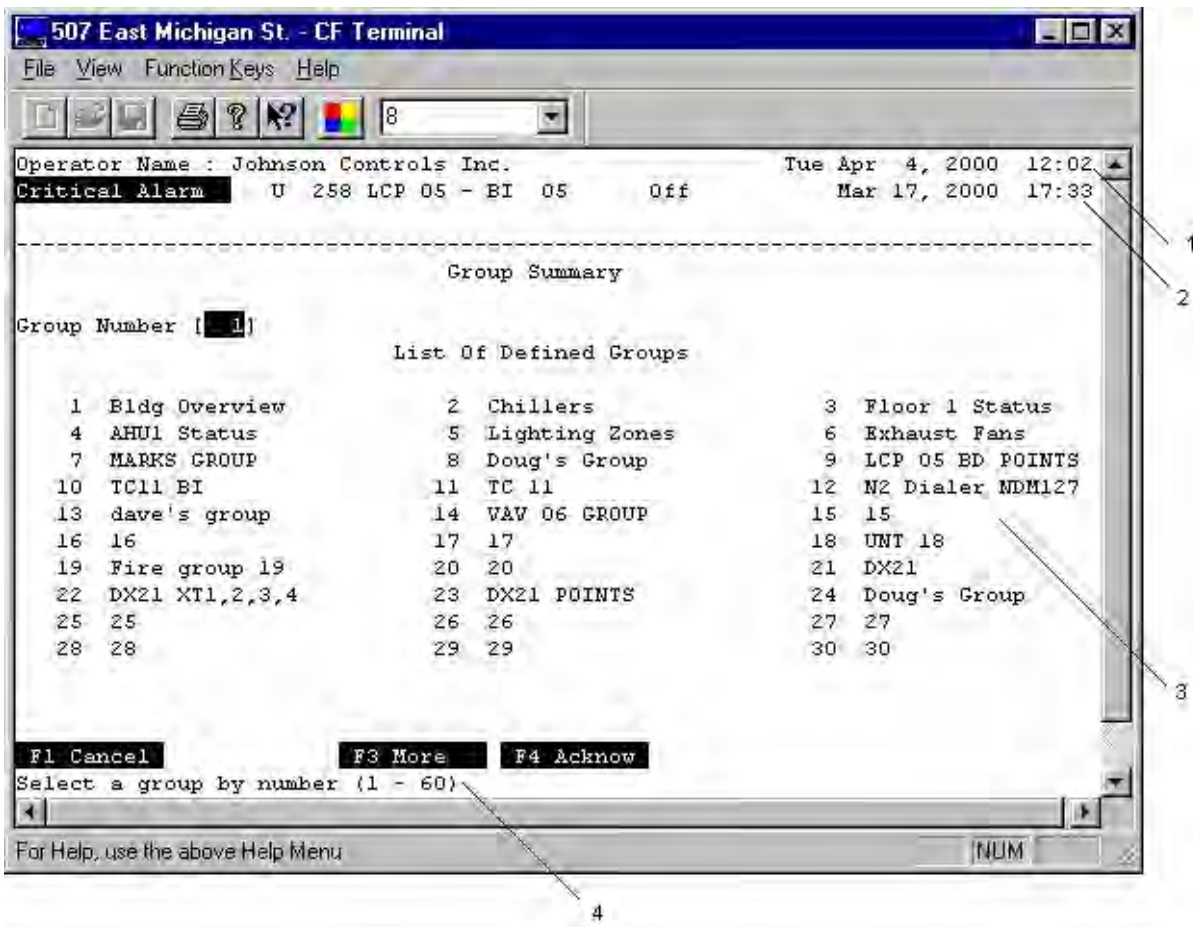


Figure 2-2: Areas of the CF Terminal Screen

Table 2-2: Areas of the CF Terminal Screen Callouts

Callout	Description
1	Time and Date Line
2	Alarm Report Area
3	Main Area
4	Message Line

Time and Date Line

At the top of the Terminal screen, the name of the currently logged on operator appears, along with the system time and date.

Alarm Report Area

Below the name of the operator in an area that displays Critical and Network alarm reports. When an alarm occurs, a tone sounds (if the tone is enabled), and detailed information about the point or controller in alarm is displayed. This information includes the type of alarm and the time and date the alarm occurred. If a point is in alarm, the report includes status information about the point. If an alarm message is assigned to the point, this message text appears on the next line.

To acknowledge the alarm, press the (F4) Acknowledge function key. The alarm report disappears. For additional lower priority alarms to be displayed, you must acknowledge the currently displayed alarm.

Main Area

In the Main area, make menu selections and view and enter information. This area displays the selected menu or screen. For example, if you select Point from the Main menu, this area displays the Point menu. If you select Summary from the Point menu, this area displays a Point Summary.

The currently available function keys and their purpose are displayed at the bottom of the Main area.





Message Line

Two types of messages appear in the Message line: Help messages and error messages.

If Help is enabled for your password, Help messages that are appropriate to the current position of the cursor appear in the Message line. Using online Help is described at the end of this chapter.

If you type an invalid entry into a field, a tone sounds and an error message flashes in the Message line. This message tells you the valid range so you can enter a correct value.

Table 2-3: CF Terminal Toolbar Buttons

Button	Name	Description
	About	Displays copyright and version information.
	Help	Display help for clicked on buttons, menus, and windows.
	Point Size	Lists available font sizes for the text in the Terminal.
	Change Colors	Opens the Color dialog box, allowing a user to change the text, highlight, and background colors.

When using the CF Terminal you have two options: standalone application or as an M3 Workstation workspace. The available menus have slight differences. The standalone CT Terminal menus are listed in Table 2-4. Refer to the *Getting Started* chapter of the *Companion/Facilitator OPC Server User's Guide (LIT-11531100)* for information about the M3 Workstation workspace menus.

Table 2-4: CF Terminal Menus

Menu	Command	Description
File	<u>N</u> ew	Windows option, not available from this menu.
	<u>O</u> pen	Windows option, not available from this menu.
	<u>S</u> ave	Windows option, not available from this menu.
	Save <u>A</u> s	Windows option, not available from this menu.
	<u>P</u> rint	Prints current CF Terminal screen.
	Print <u>P</u> review	Windows option, not available from this menu.
	<u>P</u> rint Setup	Sets up the printer.
	Recent File List	Windows option, not available from this menu.
	<u>E</u> xit	Closes CF Terminal.
View	<u>T</u> oolbar	If checked, the Terminal toolbar appears.
	<u>S</u> tatus Bar	Enables/disables status bar.
	<u>C</u> hange Colors	Opens the Color dialog box allowing a user to change the text, highlight, and background color.
	<u>V</u> iew Printer File	Opens the printer file so the user can view the contents. The application used to view the file depends on the file extension.
	Set Printer <u>D</u> estination	Opens a dialog box, where the user can either suppress printing or select the printer file name and location.
	<u>C</u> lear Printer File	Clears the contents of the printer file.
Function <u>K</u>eys	<u>F</u> 1	Cancels the previous operation.
	<u>F</u> 2	Save
	<u>F</u> 3	More
	<u>F</u> 4	Acknowledge
	<u>E</u> nter	Enter
Help	Help Topics	Displays copyright and version information.
	About CF Terminal	Display help for clicked on buttons, menus, and windows.

Mouse Capabilities

The CF Terminal provides limited mouse functionality. When a string of characters which has the first character highlighted is clicked on, a simulated key stroke of the highlighted character is initiated. In this way, the Companion/Facilitator menus may be navigated completely with the mouse.

A right-click anywhere in the CF Terminal workspace pops up a list of function keys (F1, F2, F3, F4, Enter), which simulate those keystrokes when selected. These keys are also available in the Function Keys menu option.

Printing from CF Terminal

The CF Terminal provides two printing options. The first is printing the contents of the screen to any Windows® 95, Windows 98, or Windows NT® supported printer. The second is printing the data from the Panel unit such as alarm messages or summaries (automatically, by operator command, or by scheduled command) to a printer file.

The application used to view and print the file depends on the file extension specified for the printer destination. For example, a .txt extension normally launches Notepad to view and print the file. Printing is only available in black and white.

Panel Unit Menus

Menus are lists of options. From the menu, you select the option you want to perform. For example, from the Main menu, you can select the Point option to access the Point menu, or the Quit menu option to log off the Panel unit.

The Panel unit has a simple menu structure, as shown in Figure 2-3.

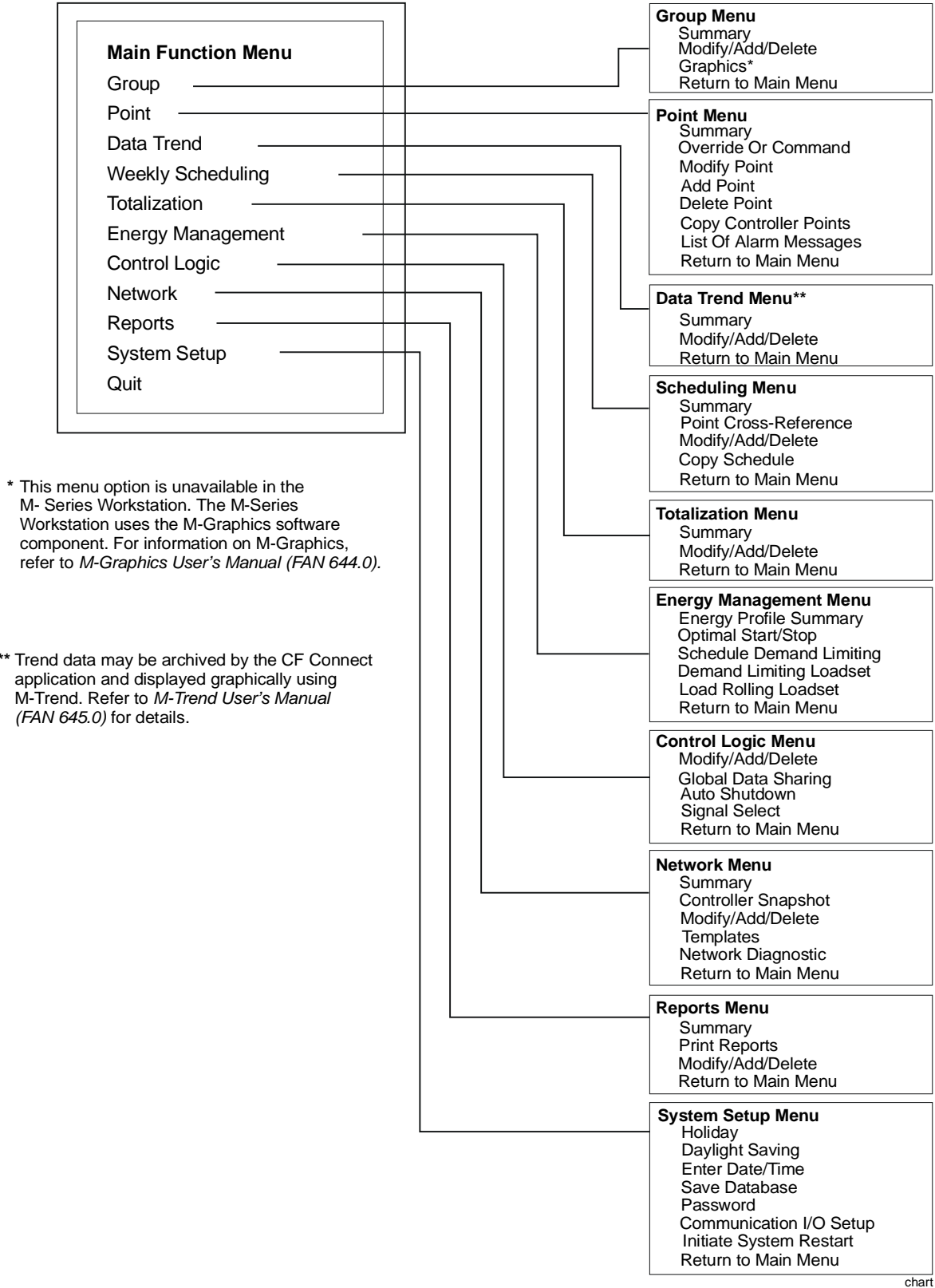


Figure 2-3: Panel Unit Menus

The titles of menu options are self-explanatory. For example, in the Data Trend menu, select Summary to display a summary of Trend data. Select Modify/Add/Delete to set up the Trend feature. Similarly, in the Point menu, select Summary to display a Point Summary, and select Point Add to add a new point to the system.

Unavailable Menu Options

The menu options that are available to you depend on your password. For example, if you have a Monitor capability password, the Modify/Add/Delete option does not appear in the Group menu. If this manual mentions a menu option that you do not see on your screen, it is because your password does not allow access to the option.

Selecting Menu Options

The Main menu gives you access to all Panel unit functions. To select a menu option, use the arrow keys to move the highlight to the option you want to select. Then press Enter. For example, to access the Network menu, press the Down Arrow key until the highlight is on the Network option. Then press Enter.

Shortcut

A shortcut for accessing a menu option is to type or click on the first letter of the option. This immediately accesses the option, without you pressing Enter. For example, to access the Totalization menu, press T. The Totalization menu appears.

Panel Unit Keystrokes

The Panel unit uses a number of shortcut keys and the mouse to make operation easy. For example, if the cursor is in a field with a fixed set of options (e.g., AI, AO, BI, BO, or AC point types), press the space bar to scroll through the options rather than typing in your selection.

In many cases, there is more than one way to perform a function. For example, you can press either Tab or Enter to move the cursor from field to field. Usually, the steps in this manual show only one way to perform the function. Table 2-5 reviews all methods so you can select the most convenient one.

Function Keys

The Panel unit uses four function keys. The function keys are available only when they are appropriate to the current mode of the program. For example, the function key for acknowledging alarms, (F4) Acknow, is available only when an alarm is displayed on the screen. The function key for saving, (F2) Save, is available only when a screen used to make changes is displayed. For example, (F2) Save appears in

the Point Modify screen so that you can save the changes you make to points.

In the lower left corner of the screen, the currently available function keys are listed. You can also right click on the Terminal or click on the Function Keys menu for a list of the function keys.

Table 2-5 lists and describes the function keys.

Panel Unit Keystrokes

The following table explains the standard Panel unit keystrokes.

Table 2-5: Panel Unit Keystrokes

To:	Press:
In Menus	
Move between menu options	Arrow keys
Move between menu options	Space bar
Access highlighted menu option	Enter
Access menu option	First letter of menu option
Return to previous menu	Esc
In Summary Screens	
Scroll to next screen of information	Page down
Return to previous screen	Esc
In Data Entry Screens (e.g., Point Modify)	
Move from field to field	Arrow keys
Move to next entry field	Enter
Move to next entry field	Tab
Move to previous entry field	Shift-Tab
Scroll through options in multiple choice field	Space bar
Enter blank spaces	Space bar
Specify value in field	Alphanumeric character keys
Clear entry field	Any key in first space of entry field
Scroll to next screen of information	Page down
Return to previous screen	Esc
In All Screens	
Print current screen (if printer is connected to Terminal, and in the textual mode)	Print Screen (or equivalent key)
Function Keys	
Return to previous screen (without saving entries)	(F1) Cancel
Save entries or changes to database	(F2) Save
Save entries to database and scroll to next screen of information	(F3) More
Acknowledge currently displayed alarm	(F4) Acknow
Allow next alarm to be displayed	(F4) Acknow

Entering Information

There are three types of fields used for entering information:

- multiple choice fields (in Figure 2-4, Software Type)
- alphanumeric fields (in Figure 2-4, Point Type)
- numeric fields (in Figure 2-4, Dial Sequence Number)

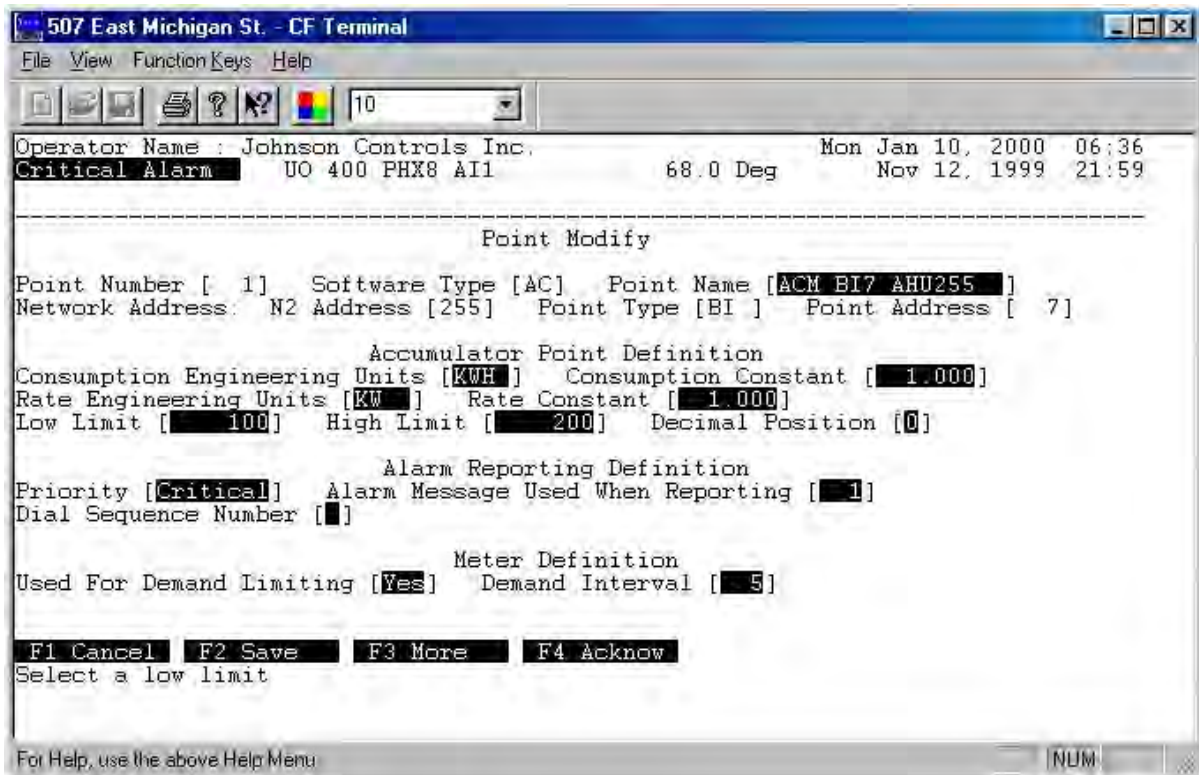


Figure 2-4: Point Modify Screen Showing Types of Fields

Multiple Choice

A multiple choice field is used for making a selection from a fixed list of options. For example, since the only valid choices for software point type are AI, AO, BI, BO, or AC, the Software Type field is a multiple choice field.

Multiple-choice fields allow you to enter information in two ways. You can type your selection, or you can press the space bar to scroll through the options until the one you want is displayed. Besides being quicker and eliminating typing errors, scrolling lets you know what the options are.

Alphanumeric

In an alphanumeric field (Point Name Figure 2-4), you can type either letters or numbers. For example, you can type Supply Fan 10 in the Point Name field.

An alphanumeric field can also be a multiple choice field. For example, you can either type your selection for Normal Contact state (State 0, State 1) or press the space bar to scroll through the options.

Numeric

In a numeric field (Dial Sequence Number in Figure 2-4), you can type numeric values only. If help is enabled, a line of help text usually appears at the bottom of the screen to tell you the valid numeric range.

A numeric field can also be a multiple choice field. For example, you can either type your selection for local terminal baud rate (1200, 2400, 4800, and 9600) or press the space bar to scroll through the options.

Online Help

If Help is turned on for the currently logged on password, the Panel unit provides online Help for every field where you enter information or select an option. This Help is displayed in the Message line at the bottom of the screen.

Online Help is appropriate to the current position of the cursor. For example, let's say the Point Modify screen is Figure 2-5.

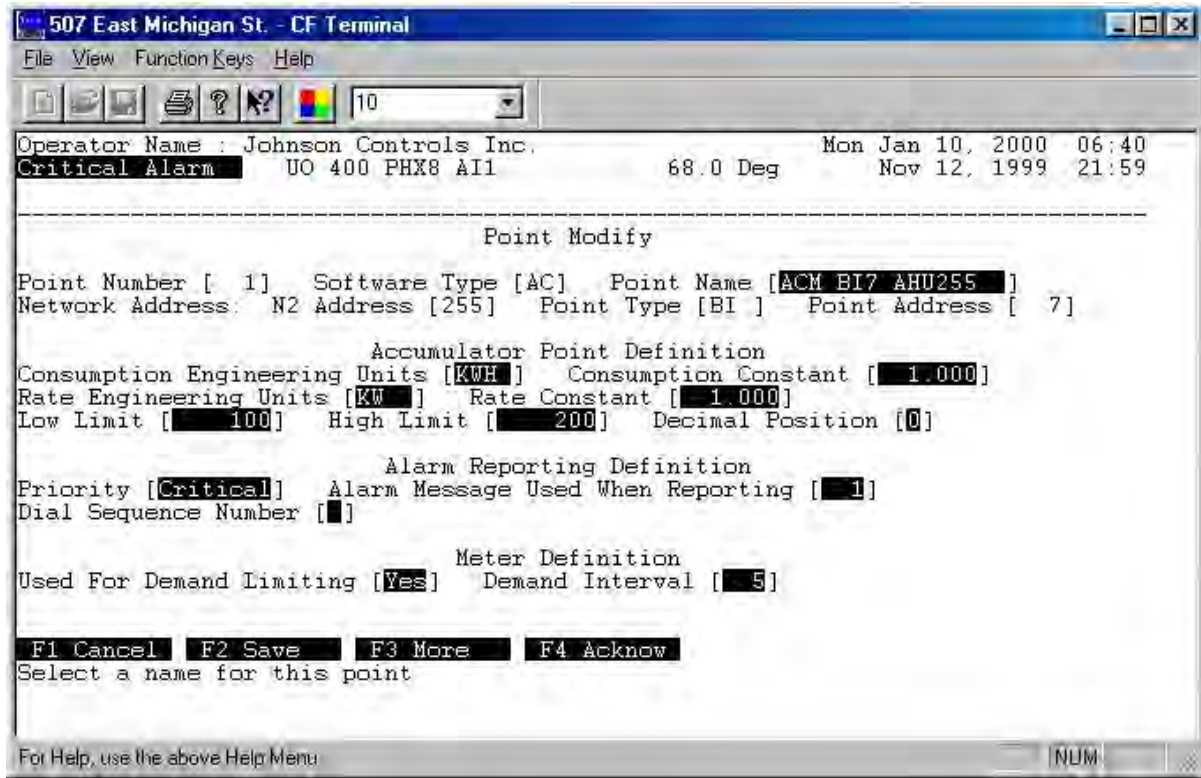


Figure 2-5: Point Name Help in Point Modify Screen

When the cursor is in the Point Name field, the Help message displays instructions for that field. If you moved the cursor to the Priority field, the Help message would change to display the instructions displayed in Figure 2-6.

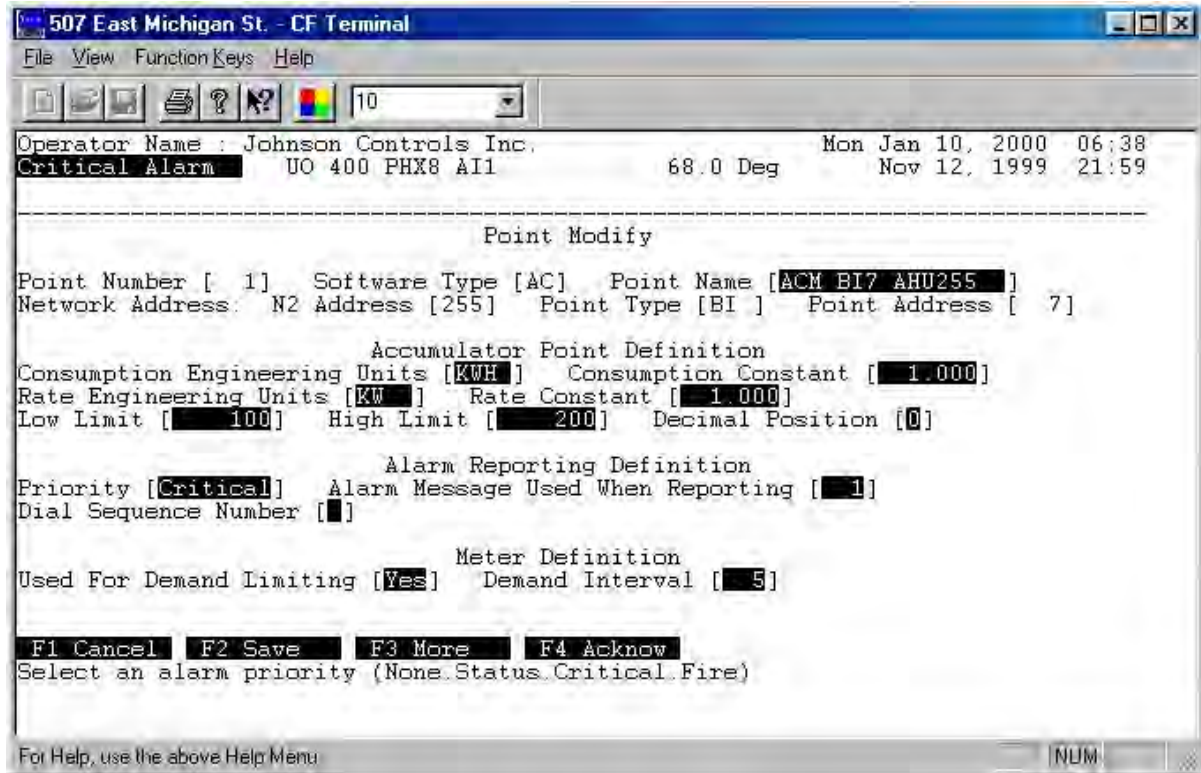


Figure 2-6: Priority Help in Point Modify Screen

Each time you move the cursor to another field, the Help message changes to display information appropriate to the field.

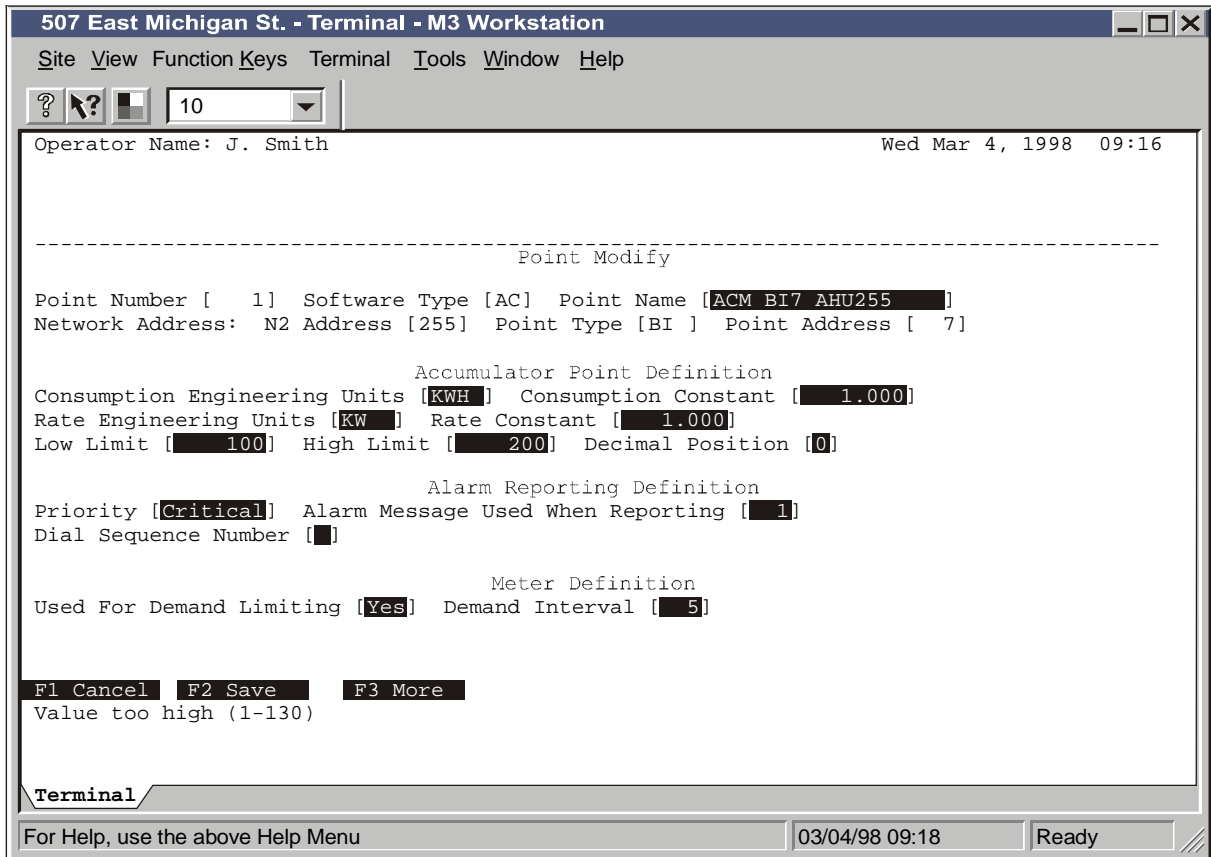
Enabling Help

The Panel unit displays online Help only if Help is turned on for your password. When passwords are defined or modified, Help can be turned either on or off.

Error Messages

If you type an invalid entry into a field (for example, if you type 12 in a field that accepts only Yes or No), the brackets around the field change to flashing pointers, and an error message flashes at the bottom of the screen.

In most cases, this error message tells you what the valid choices are. For example, if you enter 500 in the Alarm Message Number field, the error message shown in Figure 2-7 appears at the bottom of the screen. This message tells you that only numbers 1 through 130 can be entered in the field.



Error message

Figure 2-7: Error Message Displayed in Point Modify Screen

Displaying an Error Message

You might want to display an error message so you know what the valid options are. To display an error message, type a question mark (?) into the field you need help on and press Enter. The error message for that field appears at the bottom of the screen. (This will not work in engineering units or name fields.)

Procedure Overview

Table 2-6: Getting Started

To Do This	Follow These Steps:
Change Colors in CF Terminal	On the View menu, click Change Colors. Click on the Browse button to open the color palette. Select another color and click OK. Click OK in the Colors dialog box.
Change the CF Terminal Font Size	On the Terminal toolbar, select the font size from the drop-down box.
Set the Printer Destination in CF Terminal	On the View menu, select Set Printer Destination. Choose either Suppress Printing or Print To File. If you choose Print To File, select the name and location of a printer file.

Detailed Procedures


Changing Colors in CF Terminal

To change colors:

1. Select View > Change Colors. The Colors dialog box appears (Figure 2-8).



Figure 2-8: Colors Dialog Box

2. Click on the Browse button  to open the color palette.
3. Select another color and click OK.
4. Click OK in the Colors dialog box.

Changing the CF Terminal Font Size

To change the CF Terminal text font size:

On the CF Terminal toolbar, select the font size from the drop-down box.

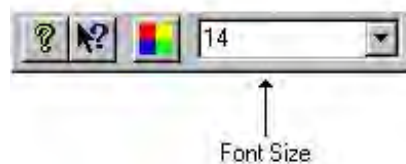


Figure 2-9: Font Size Drop-Down Box

Setting the Printer Destination in CF Terminal

To set the printer destination:

1. Select View > Set Printer Destination. The Terminal - Set Printer Destination dialog box appears.



Figure 2-10: Terminal – Set Printer Destination Dialog Box

2. Choose either suppress printing or print to file. If you choose print to file, select the name and location of a printer file.

Notes: The application used to view and print the contents of this file is the program associated with the file extension. If printing is suppressed, no record of alarm messages or other terminal printer output is available.

The CF Terminal application must be running on the M-Series Workstation to correctly capture any alarms or reports destined for the VT100 attached printer.

Chapter 3

Displaying Summaries

Introduction

Summaries allow you to carefully monitor facility conditions.

This chapter describes how to:

- display a Group Summary
- display a Point Summary
- display a Trend Log Summary
- display a Scheduling Summary
- display a Totalization Point Summary
- display an Energy Profile Summary

Two summaries are not described in this chapter, Network and Reports. For information on the Network Summary, refer to the *Defining the Supervisory Control Network* chapter in this manual. For information on the Reports Summary, refer to the *Scheduling and Printing Reports* chapter in this manual.

Key Concepts

Summaries

Summaries are available for all password capability levels. Summaries allow you to carefully monitor facility conditions. For example, in an All Points summary, you can view the status and current values of all points in your system. In an Energy Profile, you can monitor your facility's consumption of energy.

Point Information Format

For summaries that display point information, the format is as shown in Figure 3-1. Table 3-1 explains the format.

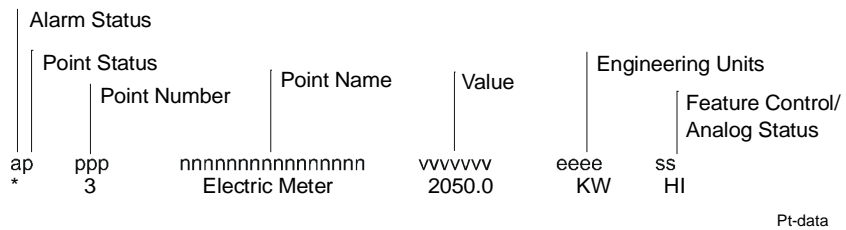


Figure 3-1: Point Information Format

Table 3-1: Point Information Format Fields

Field	Character	Definition
Alarm Status	U	Alarm is unacknowledged.
	*	Point is in an abnormal state.
	T	Point is in a trouble state.
	S	Point is shut down.
Point Status	X	Point is offline or unreliable.
	O	Point is in an override condition at the controller.
Point Number		3-digit point number
Point Name		16-character point name
Value or State		Ranged analog rate or binary state
Engineering Units		4 characters, defined by user
Binary Points: Feature Control	OV	Manual Override
	CL	Control Logic
	GD	Global Data Sharing
	SS	Signal Select
	DL	Demand Limiting
	LR	Load Rolling
	WS	Weekly Scheduling
	MC	Manual Command
Analog Points: Analog Status	LO	Low Limit
	HI	High Limit
	OR	Over-Range

Group Summary

A Group Summary lists all the points in a selected group and displays data about the points. For example, a Group Summary indicates whether points are offline or online, and their current values. These values update every 10 seconds. The Group Summary is the only screen that displays dynamic point data.

For information on creating groups, refer to the *Defining Groups* chapter of this manual.

Point Summary

There are six Point Summary types. Each type includes a specific set of points. For example, an All Points summary displays all the points in the system. An Overridden Points summary displays only those points that are overridden. Table 3-2 explains the Point Summary types.

Table 3-2: Point Summary Types

Point Summary Type	Description
All Points	Lists current status, software type, controller type, network address, and alarm message assigned to each point in the Panel unit database.
All Alarms	Lists current status, software type, controller type, network address, and alarm message assigned to each point currently in alarm.
Critical Alarms	Lists current status, software type, controller type, network address, and alarm message assigned to each point currently in alarm with either Fire or Critical priority.
Status Alarms	Lists current status, software type, controller type, network address, and alarm message assigned to each point currently in alarm with Status priority.
Offline Points	Lists current status, software type, controller type, network address, and alarm message assigned to each offline point.
Overridden Points	Lists current status, software type, controller type, network address, and alarm message assigned to each overridden point.

You access all Point Summary types in the same way. In addition, all Point Summary types display the same point data.

Trend Log Summary

A Trend Log Summary displays trends of current values for up to four points. The summary displays the time of the sample and the values of the points at that time sample. The Trend feature records 168 samples before new samples overwrite the old samples.

For information on setting up Trend Logs, refer to the *Defining Trend* chapter of this manual.

Scheduling Summary

The Scheduling Summary displays all the weekly schedules defined for your system. The summary includes whether the schedule is enabled, Time 1 and Time 2, the days, and the points involved in each weekly schedule. This summary helps you review the scheduled operations in the facility.

For information on creating schedules, refer to the *Scheduling and Printing Reports* chapter of this manual.

Totalization Point Summary

The Totalization Point Summary displays the points defined for Totalization, the Totalization values, limits, and the number of the alarm message to be printed if Totalization limits are exceeded.

For information on setting up Totalization, refer to the *Defining Totalization* chapter of this manual.

Energy Profile Summary

The Energy Profile summary displays detailed information about the energy consumption of your facility. The summary can include up to four energy profiles. Each profile displays data for one Accumulator point. (There can be up to four Accumulator points defined for each facility.)

For information on Energy Profile summaries, refer to the *Understanding Energy Management* chapter of this manual.

Procedure Overview

Table 3-3: Displaying Summaries

To Do This	Follow These Steps:
Display a Group Summary	From the Main menu, press G. Press S. Type the number of the group whose summary you want to display in the Group Number field. Press Enter.
Display a Point Summary	From the Main menu, press P. Press S. Type the number of the point where you want the summary to start. Press Enter.
Display a Trend Log Summary	From the Main menu, press D. Press S. Enter the number of the Trend log you want to view. Press Enter.
Display a Scheduling Summary	From the Main menu, press W. Press S. Type the number of the schedule where you want the summary to start. Press Enter.
Display a Totalization Point Summary	From the Main menu, press T. Press S. Enter the number of the point where you want the Totalization summary to start, or accept the default. Press Enter.
Display an Energy Profile Summary	From the Main menu, press E. Press E. Press F3 (More). Press F3 (More) again to display the next Energy Profile.

Detailed Procedures

Displaying a Group Summary

To display a Group Summary:

1. From the Main menu, press G to select the Group option. The Group menu appears.
2. Press S to select the Summary option. The List of Defined Groups appears (Figure 3-2). This list displays the number and name of all defined groups in the facility.

```
Operator Name: J. Smith                               Thu Jan 8, 1998 14:40
-----
                                Group Summary
-----
Group Number [ 1 ]                                List Of Defined Groups
1 Bldg Overview                                   2 Chillers                                       3 Floor 1 Status
4 AHU1 Status                                     5 Lighting Zones                               6 Exhaust Fans
7 MARKS GROUP                                     8 Doug's Group                                 9 LCP 05 BD POINTS
10 TC11 BI                                        11 TC 11                                       12 N2 Dialer NDM127
13 dave's group                                  14 VAV 06 GROUP                               15 15
16 16                                             17 17                                         18 UNT 18
19 Fire Group 19                                 20 20                                         21 DX21
22 DX21 XT1,2,3,4                               23 DX21 POINTS                               24 Doug's Group
25 25                                             26 26                                         27 27
28 28                                             29 29                                         30 30

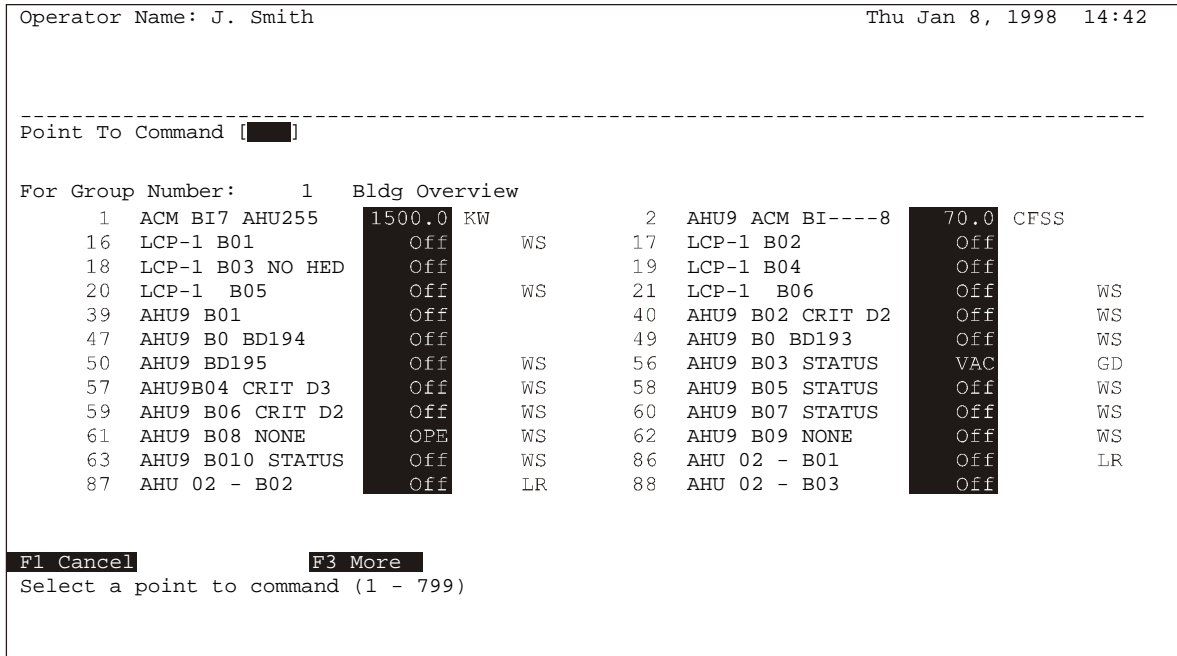
F1 Cancel                                         F3 More
Select a group by number (1 - 60)
```

Defined groups

Figure 3-2: List of Defined Groups

3. Type the number of the group whose summary you want to display in the Group Number field.
4. Press Enter. The summary for the selected group appears.

Figure 3-3 shows an example of a Group Summary.



Group summary

Figure 3-3: Group Summary

Displaying a Point Summary

To display a Point Summary:

1. From the Main menu, press P to select the Point option. The Point menu is displayed.
2. Press S to select the Summary option. The Point Summary selection screen appears (Figure 3-4). This screen allows you to select the starting point number and summary type.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 14:44
-----
                                Point Summary
-----
Point Number [ 1 ]
Summary Type [All Points]

List Of Summary Types:
  All Points           All Alarms
  Critical Alarms     Status Alarms
  Offline Points      Overridden Points

F1 Cancel
Select a starting point number (1 - 799)

```

Point summary

Figure 3-4: Point Summary Selection Screen

3. Type the number of the point where you want the summary to start.

Note: Accept the default (1) if you want all points to be included in the summary.

4. Press Enter. The selected Point Summary appears.

Figure 3-5 shows an example of an All Points Summary.

Operator Name: J. Smith				Thu Jan 8, 1998 14:45					
----- Point Summary -----									
Summary of All Points				Software	Controller	Network	Alarm		
Point Information				Type	Type	Address	Message		
1	ACM BI7 AHU255	1500.0	KW	AC	AHU	255 BI	7	1	
2	AHU9 ACM BI----8	70.0	CFSS	AC	AHU	9 BI	8	1	
3	DX21 PMA1	1500.0	KW	AC	DX	21 PMA	1		
4	LCP-1 AI2	0.0	%	AI	LCP	1 AI	2		
5	LCP-1 AI3	69.0	Deg	AI	LCP	1 AI	3		
6	LCP-1 AI4	70.0	Deg	AI	LCP	1 AI	4	11	
7	LCP 01 AI5	61.0	Deg	AI	LCP	1 AI	5		
8	DX21 ADI2	1500.0	KW	AC	DX	21 ADI	2		
9	LCP-1 BI2	Off		BI	LCP	1 BI	2	6	
10	LCP-1 BI3 CRIT	Off		BI	LCP	1 BI	3	6	
11	LCP-1 BI4 status	Off		BI	LCP	1 BI	4	6	
12	LCP-1 BI5 status	Off		BI	LCP	1 BI	5	6	
13	LCP-1 BI6 CRIT 1	Off		BI	LCP	1 BI	6	6	
14	LCP-1 BI BD5	Off		BI	LCP	1 BD	5		
F1 Cancel				F3 More					

All points summary

Figure 3-5: All Points Summary

Note: The Network Address column includes three pieces of information: the address of the controller on the N2 Bus, the type of point in the controller, and the address of the point in the controller.

Displaying a Trend Log Summary

To display a Trend Log Summary:

1. From the Main menu, press D to select the Data Trend option. The Data Trend menu appears.
2. Press S to select the Summary option. The Trend Log Number field appears with a list of defined Trend Logs (Figure 3-6), prompting you to enter the number of the Trend Log you want to view.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 14:46
-----
                                Trend Log Summary
Trend Log Number [ 1 ]
                                List Of Defined Trends Logs
Trend Log 1   396 AHU2 BD245                53 AHU9 A0 ADF24
               55 AHU9 AI ADF25            35 AHU9 A02 CRIT D2
Trend Log 2     1 ACM BI7 AHU255           2 AHU9 ACM BI----8
               3 DX21 PMA1                4 LCP-1 AI2
Trend Log 3    40 AHU9 B02 CRIT D2         16 LCP-1 B01
               17 LCP-1 B02              18 LCP-1 B03 NO HED
Trend Log 4    58 AHU9 B05 STATUS          59 AHU9 B06 CRIT D2
               690 UNT18 AI3              61 AHU9 B08 NONE
Trend Log 5    80 AHU 02 - A01             100 AHU 02 - ADF 07
               90 AHU 02 - B05           70 AHU 02 - AI7
F1 Cancel      F3 More
Select a trend log number (1 - 32)

```

Trend log prompt

Figure 3-6: Trend Log Prompt with List of Defined Trend Logs

3. Type the number of the Trend Log you want to view. This must be a defined log with collected data.
4. Press Enter. The selected Trend Log appears.

Figure 3-7 shows an example of a Trend Log Summary.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 14:48
-----
                                Trend Log Summary
-----
Trend Log Number 1                                Sample Rate 24 Hours
  AHU2 BD245                                AHU9 A0 ADF24                                AHU9 AI ADF25                                AHU9 A02 CRIT D2
Jan 8--- Point 396---                                --- Point 53 ---                                --- Point 55 ---                                --- Point 35 ---
 13:25 X Off                                    X 0.0 CFM                                    X 0.0 CFM                                    X 0.0 %
...End...
-----
F1 Cancel                                F3 More

```

Trend log summary

Figure 3-7: Trend Log Summary

Displaying a Scheduling Summary

To display a Scheduling Summary:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **S** to select the Summary option. The Schedule Number field appears:
Schedule Number []
3. Type the number of the schedule where you want the summary to start. For example, type 1 if you want the Scheduling Summary to start with Schedule 1.
4. Press **Enter**. The Scheduling Summary appears (Figure 3-8).

Operator Name: J. Smith							Thu Jan 8, 1998 14:46						

Scheduling Summary													
Schedule	Enable	Time1	Time2	Schedule Days	Calendar Date	Referenced Points							
1	Yes	19:00	15:30	MTWTF		208							
2	Yes	08:00	10:00	S		31							
3	No	13:32	13:33	MTWTF		56	57	58	59				
4	Yes	07:45	13:15	S		56	57	58	59				
5	Yes	07:30	17:30	MTWTF		60	61	62	63				
6	No	16:28	16:29	SMTWTFSH		16							
7	Yes	07:32	00:00	W		698	707	708	709	710	711	712	713
				F1 Cancel		F3 More							

Scheduling summary

Figure 3-8: Scheduling Summary

Displaying a Totalization Point Summary

To display a Totalization Point Summary:

1. From the Main menu, press T to select the Totalization option. The Totalization menu appears.
2. Press S to select the Summary option. The Point Number field is displayed. This field defaults to the first point that is defined for totalization:

Point Number [187]

3. Enter the number of the point where you want the Totalization Point Summary to start, or accept the default. For example, enter 187 if you want the summary to start with Point 187.
4. Press Enter. The Totalization Point Summary appears (Figure 3-9).

Point Information				Current Value	Alarm Limit	Units	Alarm Message
9	LCP-1	BI2	Off	3	1	Counts	
12	LCP-1	BI5 status	Off	0	0	Counts	
14	LCP-1	BI BD5	Off	20432	567	Minutes	
16	LCP-1	B01	Off	WS 1599	500	Counts	2
17	LCP-1	B02	Off	4169	500	Hours	2
18	LCP-1	B03 NO HED	Off	12680	11840	Counts	3
19	LCP-1	B04	Off	611915	50	Minutes	2
20	LCP-1	B05	Off	WS 499	500	Counts	2
21	LCP-1	B06	Off	WS 101316	88888	Counts	3
30	AHU9	BI1 CRIT D1	No	79	68	Counts	2
31	AHU9	B02 STATUS	No	WS 352618	110	Minutes	1
32	AHU9	BI3 CRIT D2	No	9392	0	Hours	
33	AHU9	BI4 CRIT D3	No	0	0	Minutes	
39	AHU9	B01	Off	6245	2000	Hours	4

F1 Cancel

F3 More

Totalization summary

Figure 3-9: Totalization Point Summary

Displaying an Energy Profile Summary

To display an Energy Profile Summary:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press E to select the Energy Profile Summary option. The first screen of the Energy Profile appears (Figure 3-10). The first screen displays daily information for the current week.

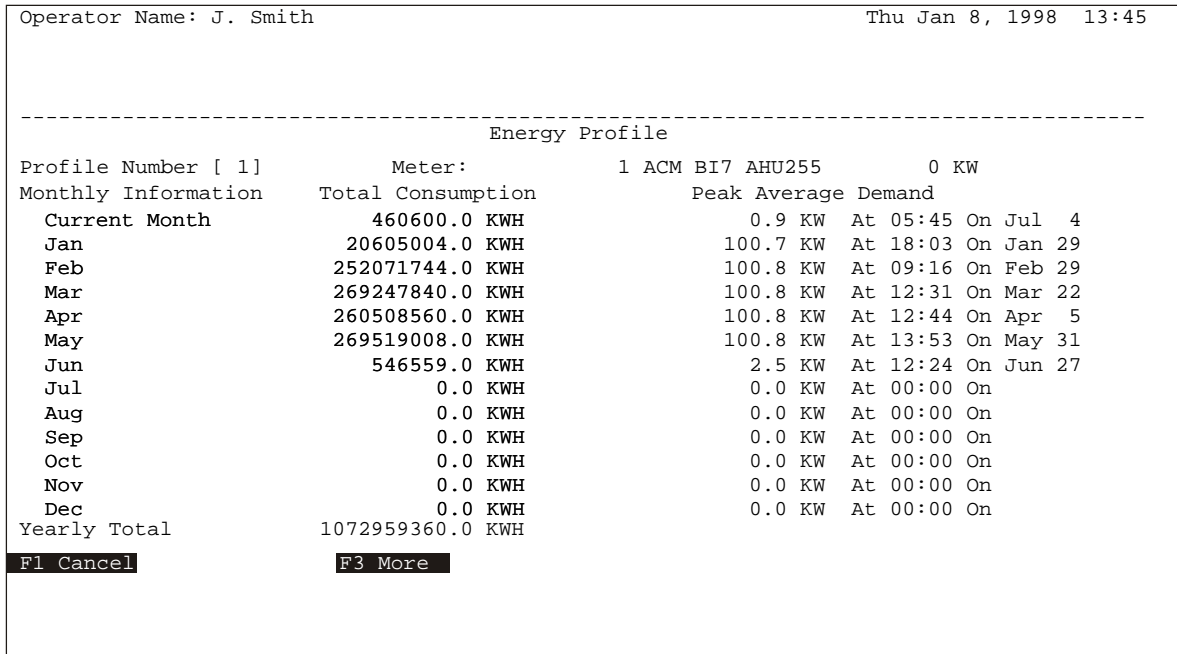
Operator Name: J. Smith		Thu Jan 8, 1998 13:45	

Energy Profile			
Profile Number [1]	Meter:	1 ACM BI7 AHU255	0 KW
Current Information			
Instantaneous Demand:	0.0 KW	Current Demand Target:	70 KW
Average Demand:	0.8 KW	Demand Interval:	5 Min
Daily Information			
	Total Consumption	Peak Average Demand	
Today	27660.0 KWH	0.9 KW	At 02:40
Sun	72155.0 KWH	0.9 KW	At 04:27
Mon	72155.0 KWH	0.9 KW	At 12:55
Tues	72155.0 KWH	0.9 KW	At 01:56
Wed	72160.0 KWH	0.9 KW	At 10:09
Thu	72155.0 KWH	0.9 KW	At 15:58
Fri	72155.0 KWH	0.9 KW	At 05:45
Sat	72160.0 KWH	0.9 KW	At 01:39
F1 Cancel		F3 More	

First screen energy

Figure 3-10: First Screen of Energy Profile

- Press F3 (More) to display the second screen of the profile, which contains monthly information for the current year (Figure 3-11).



Second screen energy

Figure 3-11: Second Screen of Energy Profile

- Press F3 (More) again to display the next Energy Profile.

Chapter 4

Commanding Points

Introduction

This chapter tells you how to command and override points.

This chapter describes how to:

- command a point from the Point menu
- command a point from the Group menu

Key Concepts

Command Points

To command points, you must have a Command, Operate, or System capability password.

Use commands to control equipment and facility conditions. For example, use commands to:

- set a controller to its Occupied or Unoccupied mode
- change the setting of a zone setpoint
- override a fault sensor condition

Note: You can command all points, except Accumulator (AC) points.

To command points, use the Group Summary. You can access the Group Summary from both the Group menu and the Point menu.

Available Commands

Table 4-1 lists the command types available to each point.

Table 4-1: Available Commands

Point	Command	Release	Override	Auto	Adjust
Analog Input (AI)			X	X	
Analog Output (AO)			X	X	X
Binary Input (BI)			X	X	
Binary Output (BO)	X	X	X	X	

Differences between Commands and Overrides

Note that the BO point supports both Commands and Overrides. For BO points, a Command does not have priority over other features: the commanded state can be altered by either a Release command or by a command issued from another feature. For BO points, the Override does have priority over other features: an Override On or an Override Off to a BO point *cannot* be altered except by an Auto or Release command.

In contrast, for all other point types (AI, AO, BI), the Override does not have priority over other features: the overridden state can be changed by an Auto command or by a command issued from another feature.

Command Priority

A BO point can be issued commands from more than one feature at the same time. The Panel unit has a command priority table to resolve these command conflicts.

Read Only Points

When you add points, you map them to points in the controllers. In the controllers, there are Read Only and Read/Write points. The Panel unit cannot command Read Only points. Therefore, when you map the points to the controller points, be careful to consider which points are Read Only.

For more information on Read Only points and point mapping, see the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or the *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

Adjust Commands to AO Points

You can issue Adjust commands to AO points that are mapped to ADF, ADI, and BD points in the controller. This command permanently alters the controller point's configuration. If N2 communications are lost, the controller still uses the last adjusted value until manually adjusted. In contrast, all other commands alter the controller state by overriding the hardware.

For more information on Analog Data Float (ADF), Analog Data Integer (ADI), and Binary Data (BD) points and point mapping, see the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or the *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

Scheduling and Control Logic Commands

You can schedule when Start and Stop (On/Off) commands take place. For example, you can specify that a fan turns on every morning at 7:00. Scheduling commands are explained in the *Defining Schedules* chapter of this manual.

In addition, you can use the Control Logic feature to command points when the conditions of the logic are met. For example, you can specify that if the temperature exceeds an alarm limit, a supply fan is turned on. Control Logic is explained in the *Creating Control Logic* chapter of this manual.

Procedure Overview

Table 4-2: Commanding Points

To Do This	Follow These Steps:
Command a Point from the Point Menu	<p>From the Main menu, press P. Press O. Type the number of the point you want to command in the Point To Command field. Press Enter. In the first command field, specify the type of command. In the second command field, specify the command value. Press Enter.</p> <p>To command another point, enter the number in the Point To Command field and press Enter. In the first command field, specify the type of command. In the second command field, specify the command value. Press Enter.</p> <p>Press F3 (More) to display additional groups of points.</p>
Command a Point from the Group Menu	<p>While the Group menu is displayed, press S. In the Group Number field, type the number of the group that contains the point you want to command. Press Enter. Type the number of the point you want to command in the Point To Command field. Press Enter. In the first command field, specify the type of command. In the second command field, specify the command value. Press Enter.</p>

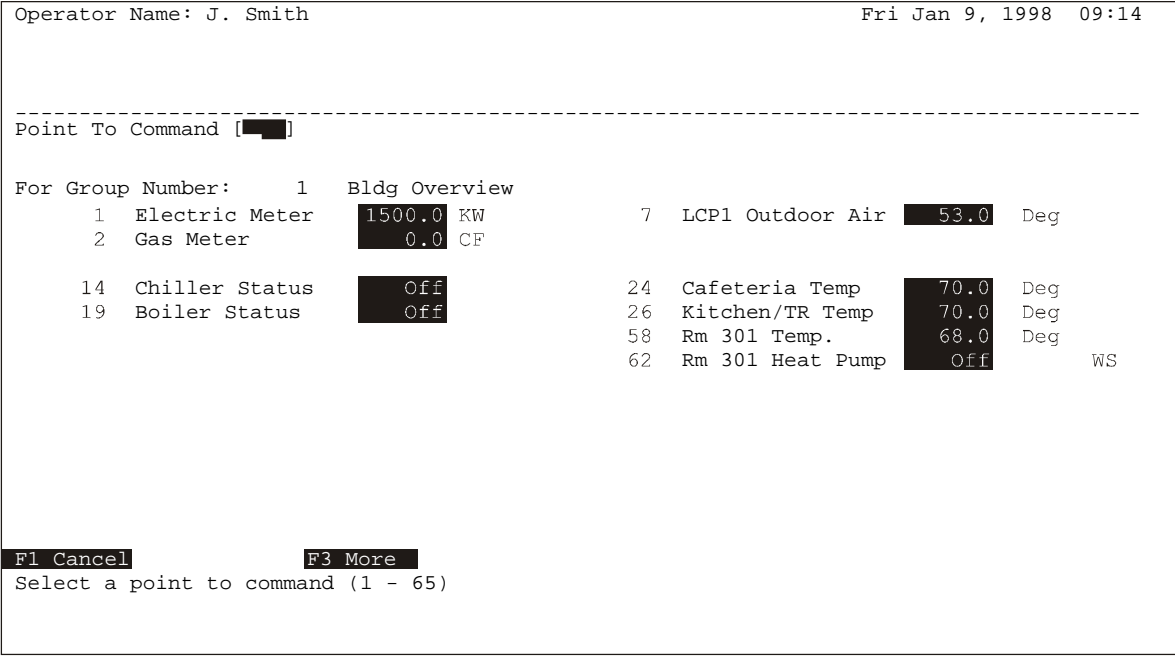
Detailed Procedures

Commanding a Point from the Point Menu

Note: The command options are appropriate to the type of point selected. For example, for a BO point, the command options are Override, Auto, Command, and Release. For an AI point, the command options are Override and Auto. Refer to Table 4-1.

To command a point from the Point menu:

1. From the Main menu, press P to select the Point option. The Point menu appears.
2. Press O to select the Override or Command option. Group Summary 1 appears as the default group. The Point To Command field appears above the summary (Figure 4-1).



Group summary

Figure 4-1: Group Summary

3. Type the number of the point you want to command in the Point To Command field. If this point is not in Group 1, the first group containing the point appears when you press Enter.

- Press Enter. The first group containing the point is displayed, along with the name of the point and command fields (Figure 4-2).

```

Operator Name: J. Smith                               Fri Jan 9, 1998 09:18
-----
Point To Command  20 HW Setpoint
-----
For Group Number: 1 Bldg Overview
  1 Electric Meter 1500.0 KW          7 LCP1 Outdoor Air 53.0 Deg
  2 Gas Meter      0.0 CF
 14 Chiller Status Off
 19 Boiler Status  Off
 24 Cafeteria Temp 70.0 Deg
 26 Kitchen/TR Temp 70.0 Deg
 58 Rm 301 Temp.   68.0 Deg
 62 Rm 301 Heat Pump Off           WS

F1 Cancel      F3 More

```

Command fields

Figure 4-2: Command Fields in Group Summary

- In the first command field, specify the type of command. You can accept the default, type your choice, or press the space bar to scroll through the options.
- In the second command field, specify the command value. You can accept the default, type your choice, or press the space bar to scroll through the options.
- Press Enter to issue the command. The Panel unit sends the command to the controller, which then executes the command. The new commanded value appears in the Group Summary (when the summary updates).
- To command another point, enter the number in the Point To Command field and press Enter. Then repeat Steps 5 through 7.

Note: Press F3 (More) to display additional groups of points. If you press F3 (More) when the last group is displayed, the summary wraps around to the beginning and displays the first group.

Commanding a Point from the Group Menu

To command a point from the Group menu:

1. While the Group menu is displayed, press S to select the Summary option. The List of Defined Groups appears (Figure 4-2). This list displays the number and name of all defined groups in the facility.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 09:20
-----
                                Group Summary
Group Number [ 1 ]
                                List Of Defined Groups
1 Bldg Overview                2 Chiller                      3 Common Area
4 AHU6 Status                  5 Lighting Zones              6 Exhaust Fans
7 Boiler

F1 Cancel                      F3 More
Select a point to command (1 - 60)

```

Defined groups

Figure 4-2: List of Defined Groups

2. In the Group Number field, type the number of the group that contains the point you want to command.
3. Press Enter. The Group Summary for the selected group appears (Figure 4-1).
4. At the top of the Group Summary is the Point To Command field. Type the number of the point you want to command in the Point To Command field. If this point is not in the currently displayed group, the first group containing the point appears when you press Enter.
5. Press Enter. The first group containing the point is displayed, along with the name of the point and command (Figure 4-2).
6. In the first command field, specify the type of command. You can accept the default, type your choice, or press the space bar to scroll through the options.

7. In the second command field, specify the command value. You can accept the default, type your choice, or press the space bar to scroll through the options.
8. Press Enter to issue the command. The Panel unit sends the command to the controller, which then executes the command. The new commanded value appears in the Group Summary (when the screen updates).

Chapter 5

Managing Alarms

Introduction

This chapter tells you about the alarm reports the Panel unit sends to the printer and displays on the screen to keep you informed about changing facility conditions.

This chapter describes how to:

- engineer alarms
- acknowledge alarms displayed on Terminal screen
- define Alarm Horn Point

For information on creating alarm messages, refer to the *Creating Alarm Messages* chapter of this manual. For information on setting up points for alarm reporting, refer to the *Defining Points* and *Defining Totalization* chapters of this manual.

Key Concepts

Alarm Management

The Alarm Management feature monitors the network and reports:

- abnormal or otherwise significant states for binary points
- out of normal range status for analog points
- Totalization advisories to the optional local printer
- Demand Limiting advisories to the optional local printer
- when an operator logs on and off
- difficulties communicating with network components
- energy requirement comparisons for the demand interval to a user-defined target for maximum interval demand

To make these reports, the Alarm Management feature looks for and records Change-of-State (COS) reports from the point software. When Alarm Management detects a COS, it:

1. Records the COS in a COS queue.
2. Examines the alarm priority from point definition.
3. Sends the report to the operator terminal (Critical Alarm, Critical Normal, Network Alarm only).
4. Initiates call to remote terminal (Critical Alarm, Network Alarm only) if Dial-Up is enabled.
5. Prints all alarm types.

Critical Alarm, Critical Normal, and Network Alarm are displayed on the Terminal and must be acknowledged by the operator to allow subsequent alarms to be displayed. The operator can acknowledge the alarm from a local or remote terminal.

In Point and Group summaries, unacknowledged alarms are marked with a “U” and abnormal point conditions are marked with an asterisk (*).

Figure 5-1 illustrates the Alarm Management feature.

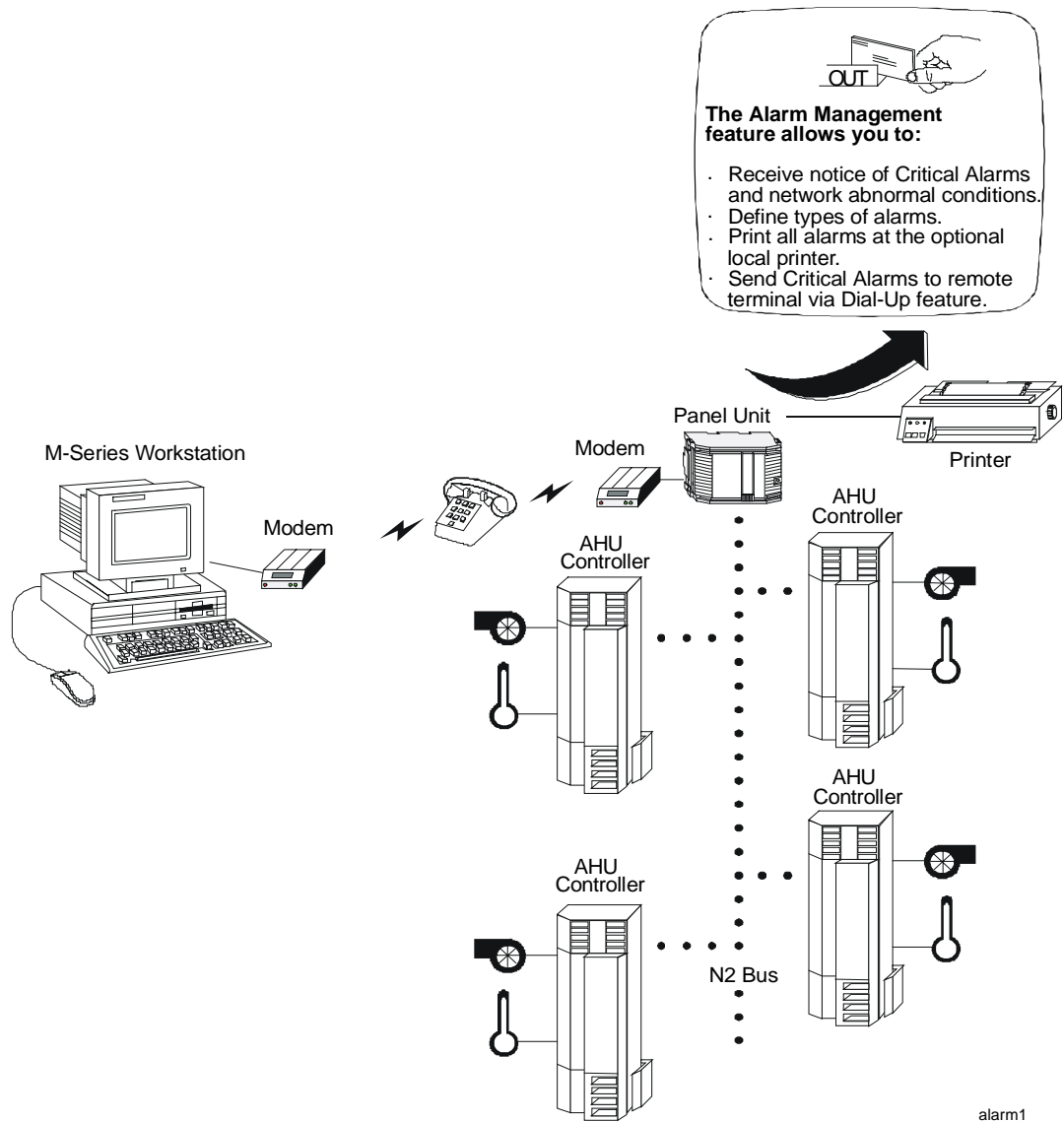


Figure 5-1: Basic Alarm Management Operation

The Fire Reporting Panel unit is a secondary reporting station for Fire Alarm and Fire Normal reports.

Note: This system is **not** UL Listed for fire.

Application

Possible uses of Alarm Management include:

- When a designated Binary Input senses an open contact, Alarm Management immediately displays a Critical Alarm report.

```
Critical Alarm U 30 AHU1 Sup Airflow No Aug 05,  
1990 02:00
```

The status of this AHU O point is not normal -
check equip.

- When a designated Binary Output exceeds a Totalization limit, Alarm Management immediately prints a Totalization Alarm report.

```
Totalized limit * 131 AHU1 RetFan S/S Aug 05,  
1990 02:00
```

Replace fan belt - schedule service with
maintenance.

- An operator can get a printout of all current alarms.

Types of Alarm Report

Table 5-1: Alarm Report Types

Priority	Alarm Type	Description	Alarm Displayed At:	Requires Ack?
1	Fire Alarm	A point assigned Fire priority has gone into alarm.	<ul style="list-style-type: none"> Terminal Remote terminal (dials out) Alarm printer destination 	Y
2	Fire Normal	A point in Fire Alarm has returned to Normal state.	<ul style="list-style-type: none"> Terminal Alarm printer destination 	Y
3	Critical Alarm	A situation that may require immediate operator intervention.	<ul style="list-style-type: none"> Terminal Remote terminal (dials out) Alarm printer destination 	Y
4	Critical Normal	A point in Critical Alarm has returned to Normal state.	<ul style="list-style-type: none"> Terminal Alarm printer destination 	Y
5	Network Alarm	A problem with the Panel unit network (e.g., controller offline) is occurring.	<ul style="list-style-type: none"> Terminal Remote terminal (dials out) Alarm printer destination 	Y or N (See note.)
6	Network Normal	A problem with the Panel unit Network is resolved (e.g., controller back online).	Alarm printer destination	N
7	Status Alarm	A situation that does not require immediate operator intervention.	Alarm printer destination	N
8	Status Normal	A point in Status Alarm has returned to Normal state.	Alarm printer destination	N
9	Totalized Limit	A binary point has exceeded its Totalization limit.	Alarm printer destination	N
10	Demand Limiting Advisory	A feature has exceeded a limit.	Alarm printer destination	N
11	Operator Log On/Off Advisory	An operator has logged on or off the Panel unit.	Alarm printer destination	N

Note: A field in the Communication I/O Setup screen allows you to select whether Network Alarms are displayed on the screen, requiring acknowledgment. See the *Setting Up the Panel Unit* chapter for more information.

Alarm Reports Displayed on Terminal

Five types of alarm reports are displayed on the Terminal screen: Fire Alarm, Fire Normal, Critical Alarm, Critical Normal, and Network Alarm.

Only three types of alarms cause a dial-out to a remote dial terminal: Fire Alarm, Critical Alarm, and Network Alarm.

An alarm report displayed on a local or remote terminal screen appears immediately below the Operator Name. For additional alarm reports to be displayed, you must acknowledge the currently displayed alarm by pressing the F4 (Acknow) key.

The alarms are displayed on the screen when no one is logged on. However, to acknowledge the alarm, you must log on.

An alarm tone sounds when an alarm is displayed on the screen. (See *Alarm Tone* in this chapter.)

If an alarm of higher priority occurs while a lower priority alarm is displayed on the screen, the higher priority alarm overrides the lower priority alarm.

Alarm Tone

If enabled, the alarm tone on the PC sounds (beeps) every time a new alarm is displayed on your screen. The tone beeps once per minute for 5 minutes or until all alarms have been acknowledged.

Enable the alarm tone by entering Yes in the Enable Alarm Tone field in the Communication I/O Setup screen.

Disable the alarm tone by typing No in the Enable Alarm Tone field in the Communication I/O Setup screen.

Alarm Horn Point

An Alarm Horn Point is a binary output point—defined in the Communication I/O Setup screen—that turns on when a COS occurs that requires acknowledgment (i.e., Critical Alarm, Critical Normal, Network Alarm). The Alarm Horn Point can be assigned to any type of signaling device, such as a horn, siren, or light.

The Alarm Horn Point gives you additional control over how operators are informed of Fire, Critical, and Network alarms.

You can define a Binary Output point as an Alarm Horn Point. When a COS occurs that requires operator acknowledgment (Fire Alarm, Critical Alarm, or Network Alarm), the Alarm Horn Point is sent an On command at the manual command priority level. The On command activates the horn. When an operator acknowledges all COS, the Alarm Horn Point is sent an Off command at the manual command priority level.

Operators can turn the Alarm Horn Point off either by acknowledging all COS, or by commanding the point Off. However, if the operator commands the point off when a COS remains unacknowledged, the horn immediately goes on again.

Operators can disable the Alarm Horn Point by overriding the point to its Off state (since the operator override priority level has precedence over the manual command priority level). Until an operator releases the overridden Alarm Horn Point with an Auto or Release command, the alarm horn remains disabled.

The Alarm Horn Point must be a BO point and can reside on any controller on the network. You can select any type of alarm indicator device to connect to the BO point contacts (e.g., horn, siren, light). For information on the Alarm Horn Point parameters, refer to the *Managing Alarms* chapter of this document.

For information on defining the Alarm Horn Point, refer to the *Setting Up the Panel Unit* chapter in this manual.

Auto Shutdown

The Auto Shutdown feature gives you more flexibility in managing alarms by preventing COS alarm reports from being displayed or printed when these reports would be unnecessary or inappropriate.

An application for Auto Shutdown is a supply fan (binary output) being scheduled to remain off overnight because the room will not be occupied. The analog temperature sensors in the room would normally start generating alarms as the temperature in the room exceeded alarm limits (as a result of the fan being off). With the Auto Shutdown feature, you can prevent these points from generating alarms by “shutting them down” while the supply fan is off.

An Auto Shutdown process has one binary control point and up to 12 dependent points. When the control point is in a specified state (e.g., the supply fan is off), the dependent points are shut down, meaning their COS alarms are suppressed. When the control point is not in the specified state, the points are not shut down, and their COS alarms are reported as usual. For complete information on Auto Shutdown, refer to the *Defining Auto Shutdown* chapter of this manual.

View Alarms

You can view alarm information in:

- a Critical report displayed at the top of the screen
- Status, Critical, All Alarm, Point, and Group summaries
- formatted reports to optional printer

Critical Alarm Display

When a Critical Alarm, Critical Normal, or Network Alarm occurs, the operator immediately receives an alarm report at the top of the Terminal screen. If the alarm tone is enabled, a warning tone sounds each time an alarm is displayed. For alarms generated by points or totalization limits, a 60-character, user-definable alarm message can appear below the alarm report. This message can further explain the alarm. The alarms are also sent to the optional local printer.

Status Alarms

The Panel unit sends status alarms to the local printer and displays the information in Point summaries (with an asterisk). No direct message is sent to the operator.

Alarms Displayed in Point Summaries

Alarms are shown in summaries with an asterisk (*). Unacknowledged alarms are shown with a “U.” Figure 5-2 shows a Point Summary with points in alarm.

Operator Name: J. Smith				Fri Jan 9, 1998 10:04			
Critical Alarm		U 10 HW Return Temp	55.6 Deg	OR	Jan 9, 1998	09:59	
Hot water temperature too low or too high							

Point Summary							
Summary of All Points		Software	Controller	Network	Alarm		
Point Information		Type	Type	Address	Message		
1	Electric Meter	0.0 KW	AC	AHU	6 BI	7	1
2	Gas Meter	0.0 CF	AC	AHU	6 BI	8	
*	3 CW Supply Temp	55.6 Deg	OR	AI	DX	3	3
*	4 HW Supply Temp	55.6 Deg	OR	AI	DX	1	2
*	5 CHW Supply Temp	55.6 Deg	OR	AI	DX	3	1
*	6 CHW Return Temp	55.6 Deg	OR	AI	DX	3	2
	7 LCP1 Outdoor Air	55.6 Deg	OR	AI	DX	1	1
	8 CHW Pump Status	Off		BI	DX	3	1
	9 CW Pump Status	On		BI	DX	3	2
U	10 HW Return Temp	55.6 Deg	OR	AI	DX	1	3
	11 Boiler OCC/UNOCC	No	WS	B0	DX	1	1
	12 HW Pump Status	Off		BI	DX	1	1
	13 Boiler S/S	On		B0	DX	1	4
	14 Chiller Status	Off		BI	DX	1	3
F1 Cancel		F3 More		F4 Acknow			

Points in alarm

Figure 5-2: Point Summary with Points in Alarm

Alarm Report Printer Destinations

All alarm report types can be sent to the alarm printer destination, which is defined in the Communication I/O Setup screen. (See the *Setting Up the Panel Unit* chapter for more information.) For any printer to receive alarm reports, it must be currently connected. If it is not connected, the report is lost.

Table 5-2 shows the three alarm printer destination options.

Table 5-2: Alarm Printer Destinations

Destination	Connection
Local	Printer connected to local terminal.
Remote	Printer connected to remote terminal.
Printer	Printer connected to Panel unit serial port.

Notes: The Panel unit does not dial out to remote dial printers defined as alarm report destinations in the case of alarm reports. For a report to be sent to a dial printer defined as an alarm report destination, there must already be a dial connection to the remote printer. If the printer is not already connected, the reports are lost.

The Reports feature offers another method of printing hard copies of alarm reports, allowing you to schedule when reports are printed. For example, you can specify that a Critical Alarm report be printed every day at 7 a.m. This report includes all the points that are currently in Critical Alarm. You can also print Status Alarm and All Alarm reports. See the *Scheduling and Printing Reports* chapter of this manual for more information.

Alarm Report Format

All alarms (except Network Alarm and Network Normal) have the same format, whether they are displayed on the screen or printed.

Figure 5-3 shows an example of a typical Critical Alarm. The associated alarm message text appears below the alarm report. Note that the F4 (Acknow) key appears in the lower left corner of the screen. This key allows you to acknowledge the alarm.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 10:06
Critical Alarm U 10 HW Return Temp                   55.6 Deg OR Jan 9, 1998 09:59
Hot water temperature too low or too high

-----
Point Modify
Point Number [ 15] Software Type [B0] Point Name [CHW Pump S/S ]
Network Address: N2 Address [ 3] Point Type [BD] Point Address [ 1]

Binary Output Point Definition
Status Pair: State 0 [Off] State 1 [On] Heavy Equipment Delay (sec) [ 3]

Totalization Definition
Totalization Type [Cycle Counts]
Totalization Limit [ 500] Alarm Message Used When Limit Exceeded [ 2]
Totalization Preset Value [ 0] Change To Preset Value Now [No]

F1 Cancel F2 Save F3 More F4 Acknow
Select a name for this point
    
```

Critical alarm

Figure 5-3: Critical Alarm Displayed on Screen

Alarm Messages

If an alarm message number is assigned to the point in alarm, or to the totalization limit, the text corresponding to this number appears below the alarm report on the screen and in printouts. In Figure 5-3, note the alarm message text that appears under the actual alarm report. For information about alarm messages, refer to the *Creating Alarm Messages* chapter of this manual.

Network Alarms

A Network Alarm occurs when a controller goes offline. A Network Normal occurs when a controller goes online. Network Alarms can be displayed on the local/remote terminal screen and printed at the alarm printer destination. Network Normal report types are sent to the alarm printer destination only.

You can define whether Network Alarms are displayed on the local or remote screen using the Acknowledge Network Alarms field in the Communication I/O Setup screen. If you select Yes, a Network alarm is displayed at the local and/or remote terminal, and the user is required to Acknowledge the alarm (by pressing F4 [Acknow]) to remove it from the screen. If you select No, Network Alarms are not displayed on the screen, but they are printed at the selected printer destination.

Network Alarm and Network Normal alarm types have the same format whether they are displayed on the screen or printed.

Acknowledgement

When an alarm is displayed on the Terminal screen, you must acknowledge it so additional alarms can be displayed. (Only one alarm can be displayed at a time.)

All password capability levels can acknowledge alarms.



CAUTION: Once a database transfer is requested, COS messages no longer appear on your screen. All COS messages update and appear on your screen when the transfer is complete.

When a point is shut down, it is always considered Normal, despite any changes in its state. An S (indicating shutdown) appears before the point number in summaries. For complete information on Auto Shutdown, refer to the *Defining Auto Shutdown* chapter in this manual.

Alarm Management Screens and Parameters

Defining Alarm Management involves specifying how Changes-of-State messages (COSs) are reported for each point, defining alarm messages, defining the Alarm Horn Point, and the alarm report destination.

Point Alarm Summaries

There are three point alarm summaries: All Alarms, Critical Alarms, and Status Alarms. These summaries display information about points that are currently in alarm. When the point transitions out of alarm (returns to normal), it is removed from the summary. Access these summaries with the Summary option in the Point menu. See *Displaying Summaries* chapter of this manual for more information.

You can also print these point alarm summaries using the Reports option. See the *Scheduling and Printing Reports* chapter of this manual for more information.

Design Considerations

As you engineer Alarm Management, consider the following:

- To set up alarms, you must have a System capability password.
- Fire Alarms, Fire Normals, Critical Alarms, Critical Normals, and Network Alarms display the report on the local terminal screen, requiring acknowledgment.
- Only Fire Alarms, Critical Alarms, and Network Alarms cause a dial-out to a remote terminal (using Dial-Up).
- All alarm types are sent to the alarm printer destination.
- For an alarm printer destination to print alarms, the printer must be connected when the alarm occurs. Otherwise, the alarm report is lost.
- The Panel unit is a secondary reporting station for Fire Alarm and Fire Normal reports.
- Use the alarm messages to clarify the alarm (e.g., what happened, where) and to specify appropriate action.
- You can define 130 alarm messages, each up to 60 characters in length.
- Attempt to re-use alarm messages. For example, only one message is needed to remind an operator to replace a fan belt. All fan points requiring fan belt replacement can then use this same message.
- Use the Alarm Horn Point if you want enhanced control of how operators are informed of alarms. This point must be a BO point, and can be on any controller in the network. Use the Communication I/O Setup screen to specify the Alarm Horn Point.
- Use the Auto Shutdown feature to suppress unnecessary or inappropriate COS alarm reports under certain conditions.
- Any user logged on can acknowledge all alarms.

Procedure Overview

Table 5-3: Managing Alarms

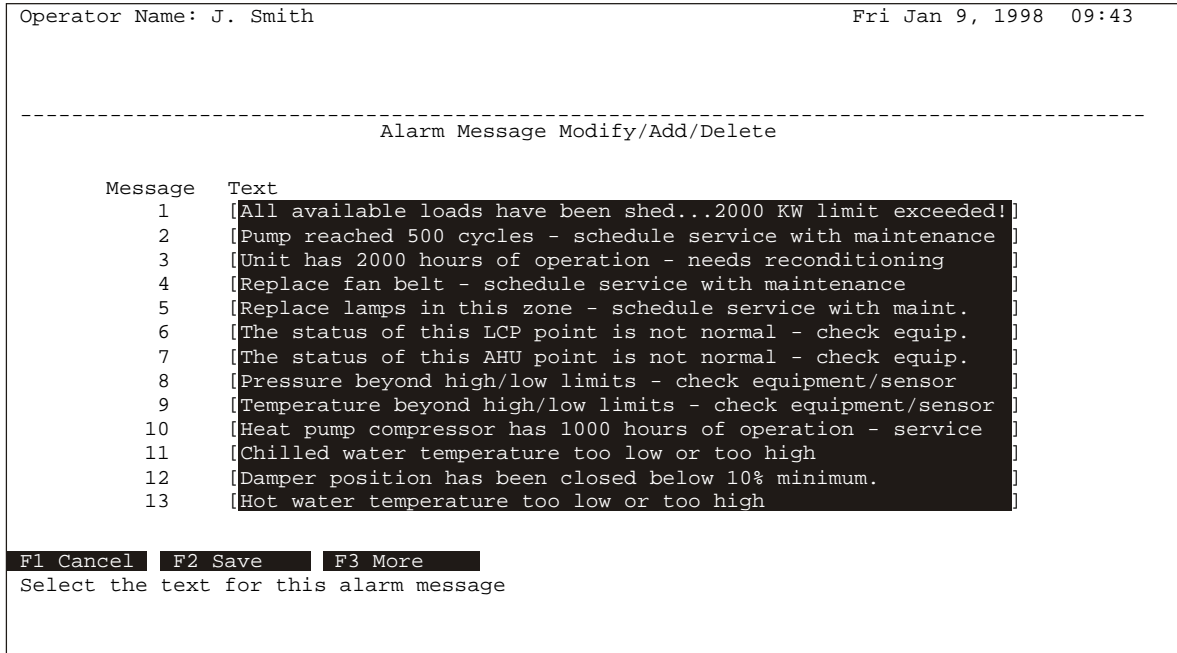
To Do This	Follow These Steps:
Engineer Alarms	<p>To engineer alarms:</p> <ol style="list-style-type: none"> 1. Identify all points requiring alarms. Determine alarm limits or alarm state, priority for alarms (None, Status, Critical, Fire), and appropriate alarm messages. 2. Identify all BO and BI points needing totalization alarms. Determine totalization limits, appropriate alarm messages for reporting when totalization limits are exceeded. 3. In Alarm Message Modify/Add/Delete screen, define alarm messages. 4. Use the Point Add/Modify screen to set alarm parameters for each point requiring alarms. 5. In the Communication I/O Setup screen, enable alarm tone (if desired), specify whether Network alarms require acknowledgment, select alarm printer destination, and define Alarm Horn Point if desired (must be defined BO point). 6. If any alarms are Dial-Up alarms, configure the Dial-Up feature. 7. If you want COS reports to be suppressed under certain conditions, configure the Auto Shutdown feature.
Acknowledge Alarms Displayed on Terminal Screen	View the alarm and write down any important information. Press F4 (Acknow).
Define Alarm Horn Point	<p>Define the BO point that controls the alarm indicator device using the Point Add screen.</p> <p>Specify the number of this point in the Alarm Horn Point field in the Communication I/O Setup screen.</p>

Detailed Procedures

Engineering Alarms

To engineer alarms:

1. Identify all points requiring alarms. Determine:
 - alarm limits or alarm state
 - priority for alarms (None, Status, Critical, Fire)
 - appropriate alarm messages
2. Identify all BO and BI points needing totalization alarms. Determine:
 - Totalization limits
 - appropriate alarm messages for reporting when Totalization limits are exceeded
3. Define alarm messages in the Alarm Message Modify/Add/Delete screen. The Alarm Message Modify/Add/Delete screen, used to define alarm messages, is shown in Figure 5-4. See Table 5-4 for parameters.



Alarm message

Figure 5-4: Alarm Message Modify/Add/Delete Screen

Table 5-4: Alarm Message Modify/Add/Delete Screen Parameters

Field	Description	Options/ Range	Required?	Default
Text	Alarm message text	1 to 60 characters	Yes	N.A.

4. Use the Point Modify screen to set alarm parameters for each point requiring alarms. The Point Modify screen is shown in Figure 5-5. The parameters for this screen are defined in Table 5-5.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 09:42
-----
Point Modify
Point Number [ 8] Software Type [BI] Point Name [CHW Pump Status]
Network Address: N2 Address [ 3] Point Type [BI] Point Address [ 1]

Binary Input Point Definition
Status Pair: State 0 [Off] State 1 [On] Normal Contact State [State 0]

Alarm Reporting Definition
Priority [Status] Alarm Message Used When Reporting [ 6]
Dial Sequence Number [ ]

Totalization Definition
Totalization Type [Cycle Counts]
Totalization Limit [ 500] Alarm Message Used When Limit Exceeded [ 2]
Totalization Preset Value [ 0] Change To Preset Value Now [No]

F1 Cancel F2 Save F3 More
Select a name for this point

```

BI point

Figure 5-5: BI Point Modify Screen (Alarm Definition)

Table 5-5: Point Add/Modify Screen Alarm Parameters

Field	Description	Options/ Range	Required?	Default
Priority	Sets the priority for change-of-state alarms.	None, Status, Critical, Fire	Yes	None
Alarm Message Used When Reporting	Designates the alarm message the Panel unit displays when reporting an alarm.	1 to 130	No	N.A.
Dial Sequence Number	Dial sequence for a COS Critical priority alarm message.	1 to 4	No	N.A.
Alarm Message Used When Limit Exceeded	Alarm message displayed when totalization limit is exceeded.	1 to 130	No	N.A.

5. In the Communication I/O Setup screen:
 - enable alarm tone (if desired)
 - specify whether network alarms require acknowledgment
 - select alarm printer destination
 - define alarm horn point if desired (must be defined BO point)
6. If any alarms are Dial-Up alarms, configure the Dial-Up feature.
7. If you want COS reports to be suppressed under certain conditions, configure the Auto Shutdown feature.

Acknowledging Alarms Displayed on the Terminal Screen

To acknowledge an alarm displayed on the Terminal screen:

1. View the alarm and write down any important information about the alarm.
2. Press F4 (Acknow). The alarm disappears from the screen. The next alarm with highest priority appears.

If the point is still in alarm, you can view the alarm in the Point Alarm Summary. You can also view the printed version of the alarm at the alarm printer destination (if a printer is connected).

Defining Alarm Horn Point

To define an Alarm Horn Point:

1. Define the BO point that controls the alarm indicator device, using the Point Add screen. Name this point appropriately (e.g., Alarm Horn Point, Remote Alarm). Add the point to Group summaries, if desired (so users can easily find the point to disable it).
2. Specify the number of this point in the Alarm Horn Point field in the Communication I/O Setup screen (Figure 5-6). The parameters for this screen are defined in Table 5-6.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 09:45
-----
                                Communication I/O Setup
Local Terminal Baud Rate [9600]      Enable Alarm Tone [Yes]
Remote Terminal Baud Rate [2400]     Enable Alarm Tone [Yes]
Printer Baud Rate [9600]            Number Lines/Page [0]
Network Baud Rate [9600]           Acknowledge Network Alarms [Yes]
Alarm Printer Destination [Printer]  Alarm Horn Point [ ]

                                Dial-Up I/O Definition
Building Name [507 East Michigan Street] Enable Dial-Up [No]
Number of Retries [3] Minimum Connect Time (minutes) [5]
Sequence Primary Phone Number Secondary Phone Number Dial Both
1 [T 5146] [T 4428] [Yes]
2 [ ] [ ] [No]
3 [ ] [ ] [No]
4 [ ] [ ] [No]

F1 Cancel F2 Save
Select from (1200,2400,4800,9600)
    
```

Alarm parameters

Figure 5-6: Alarm Parameters in Communication I/O Setup Screen

Table 5-6: Alarm Parameters in Communication I/O Setup

Field	Description	Options/ Range	Required?	Default
Enable Alarm Tone	Enables tone that sounds at Terminal when Fire, Critical, or Network alarm is sent. Tone sounds once a minute for 5 minutes or until all alarms are acknowledged.	Yes or No	Yes	No
Acknowledge Network Alarms	Specifies whether Network alarms are displayed on the screen, requiring acknowledgment.	Yes or No	Yes	Yes
Alarm Printer Destination	Selects the destination for the printout.	Printer, Local, Remote (See note.)	Yes	Printer
Alarm Horn Point	Specifies the number of the BO point that is sent an On command (activating the horn) when a COS occurs that requires operator acknowledgment (e.g., Critical Alarm, Network Alarm).	1 to 800 must be a defined BO point	No However, for the Alarm Horn to be functional, the Alarm Horn Point must be specified.	Blank

Note: Printer means the printer directly connected to the Panel's serial port; Local means the printer connected to the local terminal; and Remote means the printer connected to the remote terminal.

Chapter 6

Setting Up the Panel Unit

Introduction

This chapter tells you how to set up the Panel unit for operation. It explains how to use the System Setup menu to set up basic functions such as time, date, and passwords.

This chapter describes how to:

- enter or change the date and time
- schedule daylight saving time
- modify daylight saving time
- delete daylight saving time
- add holidays
- modify holidays
- delete holidays
- add passwords
- modify passwords
- delete passwords
- set up communications

Key Concepts

System Setup

To set up the Panel unit, you must have an Operate or System capability password. However, some setup activities require a System capability password (e.g., defining passwords and setting up communications). The options in the System Setup menu are not available unless you are logged on with the appropriate password.

You can set up the Panel unit after you have used the database generation worksheets to map out the database for your facility. Refer to the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

Date and Time

Use the Enter Date/Time option to enter or change the Panel unit date or time. The Panel unit uses the current date and time to perform commands according to weekly schedules and control logic processes, and to print scheduled reports. In addition, the date and time appear in the upper right corner of the screen.

Note: Changing the time affects Trend Sampling, Weekly Scheduling, Optimal Start/Stop functions, Control Logic, Demand Limiting, and Load Rolling features.

Daylight Saving Time

Use the Daylight Saving menu option to modify, add, or delete settings for daylight saving time. The settings take effect at 2:00 a.m. on the day you specify.

Note: On the specified day in the spring, all schedules between 2 a.m. and 3 a.m. are missed. On the specified day in the fall, all schedules between 1 a.m. and 2 a.m. are executed twice.

Automatic Update

The daylight saving settings can be automatically updated each year. Selecting Yes for Automatic Update automatically defines and saves the correct daylight saving months and days for the current year and on January 5 for each subsequent year.

Note: An Automatic Update uses standard United States daylight saving settings. If your Panel unit requires settings that are different from these U.S. standards, do not use Automatic Update; instead, manually enter the settings in the month and day field.

Holidays

Use the Holiday Schedule option to specify which days in a calendar year are holidays. These settings are used by the Weekly Scheduling, Reports, and Control Logic features.

To help you remember to update your Holiday schedule each year, the Panel unit automatically sends the following message to the printer on January 5:

```
Remember to update the Holiday Schedule for the
current year
```

If the current date is designated as a holiday, Hol appears next to the date and time displayed in the upper right corner of the screen.

There can be up to 16 separate holidays. Each holiday can be up to 99 days long. For example, if you specify July 4 as a holiday with duration of three days, July 4, 5, and 6 are considered one holiday. You can schedule holidays up to one year in advance. If you schedule a holiday on a date previous to the current date, the holiday will be in effect for the following year.

Passwords

To gain access to the Panel unit, operators must enter their passwords. By preventing unauthorized access to the Panel unit and determining the level of functionality permitted to the operator, passwords provide security for the facility. You can have up to eight passwords per network.

Note: To define passwords, you need a System capability password.

Password Capability Levels

There are four levels of password capability: Monitor, Command, Operate, and System. The capability level determines which functions a user has access to. If a function is not permitted by a password, the menu option for that function does not appear on the screen. Refer to Table 6-1.

Table 6-1: Password Capability Levels

Capability Level	Access Allowed
System	<ul style="list-style-type: none"> • all features • password setup • communications setup • point and feature modify/add/delete • saving the database • acknowledging alarms
Operate	<ul style="list-style-type: none"> • scheduling modify/add/delete • scheduling copy • scheduling holidays • scheduling daylight saving • setting system time and date • controller snapshot • reports modify/add/delete • saving the database • commanding points • system summaries • acknowledging alarms
Command	<ul style="list-style-type: none"> • commanding points • system summaries • acknowledging alarms
Monitor	<ul style="list-style-type: none"> • system summaries • acknowledging alarms

Communications

Use the Communication I/O Setup screen to select the baud rate (the transmission speed) of communication and phone numbers used when communicating to remote terminals. In addition, use this screen to enable the Dial-Up feature, select the destination for printed alarm reports, enable the alarm tone, and specify the Alarm Horn Point.

The baud rate determines the speed that data is transferred between the Panel unit and the remote terminal. The modem baud rate must match the remote terminal baud rate. For information on baud rate settings, refer to your modem manual.

Note: Before a remote connection can be established, you must program the modem. Refer to the *Metasys Companion Technical Manual (FAN 628.1)* or the *Facilitator FMS*

Technical Manual (FAN 1628.1) under Component Data Sheets.

Procedure Overview

Table 6-2: Setting Up the Panel Unit

To Do This	Follow These Steps:
Enter or Change the Date and Time	From the Main menu, press S. Press E. Fill in the fields. Press F2 (Save).
Schedule Daylight Saving Time	From the Main menu, press S. Press D. For both the spring and fall, specify the month and day you want the change to take place. Press F2 (Save).
Modify Daylight Saving Time	From the Main menu, press S. Press D. For both the spring and fall, specify the month and day you want the change to take place. Press F2 (Save).
Delete Daylight Saving Time	From the Main menu, press S. Press D. Type blank spaces in the field. Press F2 (Save).
Add Holidays	From the Main menu, press S. Press H. Move the cursor to a blank field. Fill in the fields. Press F2 (Save).
Modify Holidays	From the Main menu, press S. Press H. Modify the fields. Press F2 (Save).
Delete Holidays	From the Main menu, press S. Press H. Type blank spaces in the month field. Press F2 (Save).
Add Passwords	From the Main menu, press S. Press P. Move the cursor to a blank field and fill it in. If four passwords are already defined, type over an existing password to add a new password. Press F2 (Save).
Modify Passwords	From the Main menu, press S. Press P. Modify the fields. Press F2 (Save).
Delete Passwords	From the Main menu, press S. Press P. Move the cursor to the Capability column and enter blank spaces. Press F2 (Save).
Set Up Communications	From the Main menu, press S. Press C. Fill in the Communication fields. Press F2 (Save).

Detailed Procedures

Entering the Date and Time

To enter or change the date and time:

1. From the Main menu, press S to select the System Setup option. The System Setup menu appears.
2. Press E to select the Enter Date/Time option. The Enter Current Date and Time screen appears (Figure 6-1). This screen displays the currently defined settings.

```
Operator Name: J. Smith                               Thu Jan 8, 1998 09:13
-----
                        Enter Current Date And Time
Date (month day)      Year [1998]
                        [Jan] [ 8]
Time (hh:mm)         [09:13]

WARNING: Changing Of Time Will Affect The Accuracy Of Trend
          Sampling, Schedule Execution, OST Times, Etc.

F1 Cancel  F2 Save
Select the current year (1990 - 2099)
```

Enter current date

Figure 6-1: Enter Current Date and Time Screen

3. Fill in the fields. Press Tab or Enter to move the cursor to the next field.
4. Press F2 (Save) to save the new date and time settings. The Panel unit database updates immediately.

Scheduling Daylight Saving Time

To schedule daylight saving time:

1. From the Main menu, press S to select the System Setup option. The System Setup menu appears.
2. Press D to select the Daylight Saving option. The Daylight Saving Modify/Add/Delete screen appears (Figure 6-2).

```

Operator Name: J. Smith                               Thu Jan 8, 1998 09:13
-----
Daylight Savings Modify/Add/Delete

Spring (month day) [ ] [ ]
Fall   (month day) [ ] [ ]

Automatic Update   [No]

Blank Month To Delete Date

F1 Cancel  F2 Save
Select month (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)

```

Daylight saving

Figure 6-2: Daylight Saving Modify/Add/Delete Screen

3. For both the spring and fall, specify the month and day you want the change to take place. Refer to Table 6-3.
4. Press F2 (Save) to save the new daylight saving settings. The Panel unit database updates immediately.

Modifying Daylight Saving Time Settings

To modify daylight saving time settings:

1. From the Main menu, press S to select the System Setup option. The System Setup menu appears.
2. Press D to select the Daylight Saving option. The Daylight Saving Modify/Add/Delete screen appears (Figure 6-2).
3. For both the spring and fall, specify the month and day you want the change to take place. Press Enter to move the cursor to the next field. Refer to Table 6-3.

Table 6-3: Daylight Saving Time Fields

Field	Description	Options/Range	Required?	Default
Spring	Date (month and day) when daylight saving time begins.	Jan to Dec Only valid dates may be entered.	Yes	N.A.
Fall	Date (month and day) when daylight saving time ends.	Jan to Dec Only valid dates may be entered.	Yes	N.A.
Automatic Update	Specifies whether the Panel unit automatically defines and saves the correct daylight saving settings for the current year, and on January 5 of each subsequent year. The Panel unit uses standard U.S. daylight saving times.	Yes/No	Yes	No

4. Press F2 (Save) to save the new daylight saving settings. The Panel unit database updates immediately.

- Fill in the fields. Press Enter to move the cursor to the next field. Refer to Table 6-4.

Table 6-4: Holiday Definition Fields

Field	Description	Options/Range	Required?	Default
Month	Specifies the month in which the holiday begins.	Jan to Dec	Yes	N.A.
Day	Specifies the day of the month on which the holiday begins.	Only valid days can be entered.	Yes	N.A.
Duration	Specifies the length of the holiday, in days. A holiday with a duration of 1 ends at midnight.	1 to 99 Note: If nothing is entered, the default value is accepted during the save.	Yes	1 Note: Defaults to 1 if no numeric value is entered.

- Press F2 (Save) to save the new Holiday Settings. The Panel unit database updates immediately.

Modifying Holidays

To modify holidays:

- From the Main menu, press S to select the System Setup option. The System Setup menu appears.
- Press H to select the Holiday Schedule option. The Holiday Modify/Add/Delete screen appears (Figure 6-3). This screen displays the currently defined settings.
- Modify the fields. Refer to Table 6-4.
- Press F2 (Save) to save the new Holiday Settings. The Panel unit database updates immediately.

Deleting Holidays

To delete holidays:

- From the Main menu, press S to select the System Setup option. The System Setup menu appears.
- Press H to select the Holiday Schedule option. The Holiday Modify/Add/Delete screen appears (Figure 6-3). This screen displays the currently defined settings.
- Type blank spaces in the Month field.
- Press F2 (Save). The holiday is deleted. The Panel unit database updates immediately.

3. Move the cursor to a blank field and fill it in. If four passwords are already defined, you have to type over an existing password to add a new password. Press Enter to move the cursor to the next field. Refer to Table 6-5.

Table 6-5: Password Definition Fields

Field	Description	Options/Range	Required?	Default
Password	Specifies the password the user uses to log on the Panel unit. This password must be four characters long, with no spaces. Passwords are case sensitive.	Must have four alphanumeric characters.	Yes	N.A. There is a default system capability password: 2468
Operator Name	Specifies a name for the operator.	1 to 24 alphanumeric characters	No	N.A.
Capability	Specifies extent of user's system access. Refer to Table 6-1.	System, Operate, Command, Monitor	Yes	N.A.
Timeout	Sets the amount of idle time the Panel unit allows before logging off automatically.	1 to 999 minutes	Yes	N.A.
Help	Activates the Help line at the bottom of the Panel unit screens. Note: Experienced users will probably want to turn this feature off (No) when accessing the Panel unit across phone lines.	Yes/No	Yes	No

4. Press F2 (Save) to save the new password settings. The Panel unit database updates immediately.

Note: If you changed the Help setting for the currently logged on password, this does not take effect until you log off and log on again.

Modifying Passwords

To modify passwords:

1. From the Main menu, press S to select the System Setup option. The System Setup menu appears.
2. Press P to select the Password option. The Password Modify/Add/Delete screen appears (Figure 6-4). This screen displays the currently defined passwords.
3. Modify the fields. Refer to Table 6-5.
4. Press F2 (Save) to save the new password settings. The Panel unit database updates immediately.

Note: If you changed the Help setting for the currently logged on password, this does not take effect until you log off and log on again.

Deleting Passwords

To delete passwords:

1. From the Main menu, press S to select the System Setup option. The System Setup menu appears.
2. Press P to select the Password option. The Password Modify/Add/Delete screen appears (Figure 6-4). This screen displays the currently defined passwords.
3. Move the cursor to the Capability column and enter blank spaces.
4. Press F2 (Save). The password is deleted. The Panel unit database updates immediately.

Note: If you changed the Help setting for the currently logged on password, this does not take effect until you log off and log on again.

Setting Up Communications

To set up Communications:

1. From the Main menu, press **S** to select the System Setup option. The System Setup menu is displayed.
2. Press **C** to select the Communication I/O Setup option. The Communication I/O Setup screen appears (Figure 6-5).

```

Operator Name: J. Smith                               Thu Jan 8, 1998 09:20
-----
                                Communication I/O Setup
Local Terminal Baud Rate [9600]      Enable Alarm Tone [No ]
Remote Terminal Baud Rate [9600]    Enable Alarm Tone [No ]
Printer Baud Rate [9600]           Number Lines/Page [ 0 ]
Network Baud Rate [9600]          Acknowledge Network Alarms [Yes]
Alarm Printer Destination [Printer]  Alarm Horn Point [  ]

                                Dial-Up I/O Definition
Building Name [Holodeck Companion]  Enable Dial-Up [Yes]
Number of Retries [ 0] Minimum Connect Time (minutes) [ 1]
Sequence  Primary Phone Number      Secondary Phone Number      Dial Both
1         [  ]                      [  ]                      [No ]
2         [  ]                      [  ]                      [No ]
3         [  ]                      [  ]                      [No ]
4         [  ]                      [  ]                      [No ]

F1 Cancel  F2 Save
Select from (1200,2400,4800,9600)

```

Communication IO

Figure 6-5: Communication I/O Setup Screen

3. Fill in the Communication fields. Press **Enter** to move the cursor to the next field. Refer to Table 6-6.
4. Press **F2** (Save) to save the new Communication settings. The Panel unit database updates immediately.

Table 6-6: Communication and Dial-Up Setup Fields

Field	Description	Options/Range	Required?	Default
Local Terminal Baud Rate	Specifies data transfer speed between the Panel unit and local terminal.	9600	Yes	9600
Remote Terminal Baud Rate	Specifies data transfer speed between the Panel unit and remote terminals. Set the value to the speed of the modem with which you are communicating.	1200, 2400, 4800, 9600	Yes	1200
Printer Baud Rate	Specifies data transfer speed between the Panel unit and printer.	9600	Yes	9600
Network Baud Rate	Specifies data transfer speed of communication over the N2 Bus.	9600	Yes	9600
Number of Lines Per Page	Specifies number of lines printed on a page before the Panel unit generates a page break. For page breaks and form feeds to be generated, it must be greater than 0. Recommended setting is 55 lines per page.	0 to 999	No	0
Enable Alarm Tone	Enables tone that sounds at local or remote terminal when a Critical or Network alarm is sent.	Yes or No	Yes	No
Acknowledge Network Alarms	Specifies whether Network Alarms are displayed on the Terminal screen, requiring acknowledgment.	Yes or No	Yes	No
Alarm Printer Destination	Specifies printer destination for alarm messages.	Printer, Local, Remote	Yes	Printer
Alarm Horn Point	Specifies defined BO point used to turn on signaling device when a COS requiring acknowledgment occurs. Point must be an already defined BO point.	Any defined BO point	No	N. A.
Building Name	Identifies the building the Panel unit is controlling. This name appears at the top of the screen when no one is logged on the Panel unit.	0 to 24 characters	Yes	N. A.
Enable Dial-Up	Specifies whether or not the Panel unit sends alarm messages to remote terminals.	Yes or No	Yes	No
Number of Retries	Specifies the number of times the Panel unit redials a phone number before disconnecting.	1 to 30	Yes	3
Minimum Connect Time	Specifies the length of time, in minutes, that the Panel unit waits for a user at a remote terminal to log on with a valid password.	1 to 9	Yes	5
Primary/Secondary Phone Number	Identifies the phone number for a primary remote terminal, and optional phone number for a secondary terminal.	Up to 28 characters, if pulse, must begin with P.	No	N. A.
Dial Both	Specifies whether or not both phone numbers in the Dial Sequence should be called. If answered "No," the second number is called only if the first number is not reached.	Yes or No	Yes	No

Chapter 7

Defining the Supervisory Control Network

Introduction

This chapter tells you how to assign controllers to addresses on the N2 Bus. In addition, this chapter tells you how to display a Network Summary, which displays all points in the system according to their network addresses.

This chapter describes how to:

- define the supervisory control network
- add a controller
- modify a controller
- delete a controller
- display a Network Summary
- display Network Diagnostics
- reset statistics
- interpret statistics
- print diagnostic messages

For technical information on the N2 Bus, refer to *N2 Communications Bus Technical Bulletin (LIT-6281120 or LIT-16281120)*.

For technical information on the Controller Snapshot, refer to the *Using Controller Snapshot* chapter of this manual.

Key Concepts

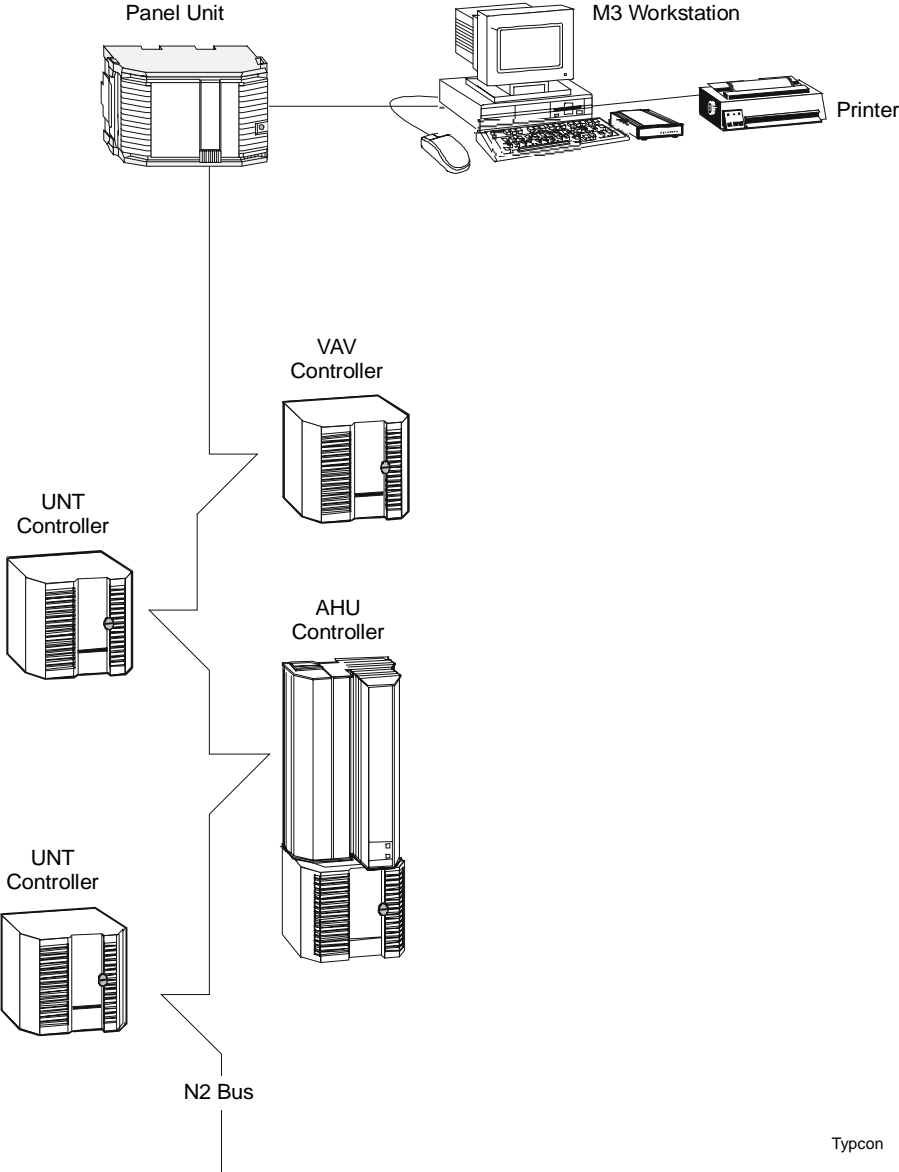
Network Definition

To define the network, you must have a System capability password.

The controllers connected to the N2 Bus are configured before they are connected to the Panel. Therefore, to define the network, assign the proper controller type to the N2 Bus address where the controller resides. This allows the Panel to know what controllers are installed on the network and allows the Panel to communicate with the controllers.

There can be up to 255 controllers (1 to 255) for the Panel. See the *Data Base Generation Guide Technical Bulletin (LIT-628270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* for a listing of supported controllers. The help text at the bottom of the Network Modify/Add/Delete screen also lists supported controllers.

Figure 7-1 shows a typical N2 Bus configuration with multiple controllers.



Typcon

Figure 7-1: Typical N2 Bus Configuration

Network Summary

A Network Summary displays all the points currently defined for the Network according to their network addresses. This differs from a Point Summary, which displays all the points according to their point numbers.

All password levels can display a Network Summary.

Network Diagnostics

The Network Diagnostics screen displays information about internal system parameters and metrics. Use this screen to troubleshoot the Panel unit.

All password levels can display Network Diagnostics.

Use Network Diagnostic information to determine whether the network is operating efficiently to isolate faults in the network and to quickly diagnose network problems. By decreasing the amount of time required for troubleshooting, the Network Diagnostics feature improves the quality and efficiency of network operations.

Possible Applications

Here are some examples of how you might use the Network Diagnostics feature:

- During initial setup, use Diagnostics to check overnight system performance.
- When the Panel unit is set up and operating efficiently, print (or record) these normal statistics to use as a standard for future checks. Then, periodically compare network statistics to these standard statistics to maintain system efficiency.
- If Network Alarm reports (which indicate controllers are going offline) are occurring frequently, check the Offline Occurrences statistic.
- If communications seem sluggish, for example, if points are responding slowly to commands, check Point Scan Time value.

Table 7-1 describes the capabilities of the Network Diagnostics feature.

Table 7-1: Network Diagnostics Feature

Capability	Description	Purpose
Records Statistics	Records and displays communication statistics about the network.	Provides troubleshooting information to help you quickly isolate system faults.
Updates Statistics	Updates statistics every minute.	Keeps you informed about changing communication metrics.
Resets Statistics	Allows statistical reset.	Allows you to change condition, reset statistics, and see results of change in new statistics. Allows you to measure changes over time.
Provides Remote Access	Through Dial-up, displays Network Diagnostics screen at remote terminal.	Allows operator at remote site to troubleshoot local network.
Diagnostic Messages	Sends diagnostic messages to the printer.	Maintains hard copy record of diagnostic messages.

The Diagnostics feature continuously monitors the network, records communications statistics, and displays the statistics on the direct-connect or dial-up terminal screen. This information helps you maintain efficient network communications and quickly diagnose problems if they occur. You can also have diagnostic messages sent to the printer.

The statistics are displayed in Figure 7-2. Access this screen from the Network menu.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 09:37
-----
                                Network Diagnostic

Reset Statistics [No]                               Last Reset Jan 6, 1998 17:01
Diagnostic Messages [No]

  - N2 Statistics -
    Polls [ 27842]
    Writes [ 62272]
    Retries [ 0]
    Checksums [ 0]
    NAKs [ 0]
    Offline Occurrences [ 0]
    Transmissions Per Minute [ 1093]
    Timeout Value (ms) [ 220]
    Retry Count [ 3]

  - COS Statistics -
    COS (Change-of-state) [ 24504]
    COS Per Minute [ 10]
    Point Scan Time (sec) [ 5]

  - System Statistics -
    FP Count/Task/Code [ 0] [ 0] [ 0]
    METASYS COMPANION CPN201 REL 6.03

F1 Cancel  F2 Save
Select from (No,Yes)

```

Network diagnostic

Figure 7-2: Network Diagnostic Screen

Controller Address

The address you assign to the controller must match the address assigned to the controller in the HVAC PRO™ Configuration Tool. For Air Handling Units (AHUs), you can find this address in the .SYM file. For LCP controllers, the address is set with switches on the board. For more information, refer to the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

Reset Statistics

You can reset some of the statistics to zero using the Reset Statistics toggle field. You might want to reset statistics to zero to see how many Offline Occurrences happen during a controlled period. For example, you can reset statistics at 5 p.m. and check them at 7 a.m. the following day to see how many times controllers went offline during the night.

Print Diagnostic Messages

You can select to have diagnostic messages sent to the local printer by entering Yes in the Diagnostic Messages field. No is the default. The printed diagnostic message indicates the type of error, the controller's network address, and a coded error message.

The first three characters of the message indicate the type of error:

RTY retry error

NAK no acknowledge

CSE checksum

TYP device type error

The network address is indicated by the first two numbers of the message, which are in hexadecimal format. (Ignore the coded error message following the network address.)

Here are a few examples of printed diagnostic messages.

```
RTY >0604CA. .
```

The controller at network address 06 was sent a message but did not respond within the preset time (within the timeout value).

```
NAK >1073070091. N11.
```

The controller at network address 16 was sent a command that it would not accept, so it returned an error code of 11 hex.

```
CSE >0414000287. A006A.
```

The controller at network address 04 returned data from a data request, but the checksum in the returned data was incorrect.

```
TYP >07FAD. A736A.
```

The controller at network address 07 returned a device type code 73 that did not match what the system expected.

For more information on interpreting diagnostic messages, call an authorized Johnson Controls representative.

Procedure Overview

Table 7-2: Defining the Supervisory Control Network

To Do This	Follow These Steps:
Define the Supervisory Control Network	From the Main menu, press N. Press M. Fill in the Controller Type fields. Press F2 (Save) or F3 (More).
Add a Controller	From the Main menu, press N. Press M. Move the cursor to the Controller Type field for the address where the new controller resides and fill it in. Press F2 (Save) or F3 (More).
Modify a Controller	From the Main menu, press N to select the Network option. Press M. Fill in the Controller Type field you want to change. Press F2 (Save) or F3 (More).
Delete a Controller	From the Main menu, press N. Press M. Move the cursor to the Controller Type field you want to delete. Press the space bar until the field appears blank. Press F2 (Save).
Display a Network Summary	From the Main menu, press N. Press M. Type the starting network address number. Press Enter.
Display Network Diagnostics	From the Network menu, press N. Press N.
Reset Statistics	From the Network menu, press N. Press N. Type Yes. Press Enter. Press Enter, again.
Interpret Statistics	Get a printout of the Network Diagnostics screen when your facility is running efficiently. Then use this printout of your facility's normal statistics as a standard for periodically checking network operations.
Print Diagnostic Messages	Send diagnostic messages to the local printer by entering Yes in the Diagnostic Messages field.

Detailed Procedures

Defining the Supervisory Control Network

Assign controller types to N2 Bus Addresses by adding, modifying, and deleting controllers.

Operator Name: J. Smith Thu Jan 8, 1998 09:39

Network Modify/Add/Delete

N2 Bus Address	Controller Type	N2 Bus Address	Controller Type	N2 Bus Address	Controller Type	N2 Bus Address	Controller Type
1	[AHU]	2	[AHU]	3	[AHU]	4	[AHU]
5	[AHU]	6	[MIG]	7	[MIG]	8	[]
9	[]	10	[]	11	[]	12	[]
13	[]	14	[]	15	[]	16	[]
17	[]	18	[]	19	[]	20	[]
21	[]	22	[]	23	[]	24	[]
25	[]	26	[]	27	[]	28	[]
29	[]	30	[]	31	[]	32	[]

F1 Cancel F2 Save F3 More

Select type (UNT, VAV, AHU, DX, XTM, NDM, VND, TC, MIG, PHX, RTX, LCP, ILC, IFC)

Network modify

Figure 7-3: Network Modify/Add/Delete Screen for PC

Adding a Controller

To add a controller:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press M to select the Modify/Add/Delete option. The Network Modify/Add/Delete screen appears (Figure 7-3). This screen displays the first 32 N2 Bus addresses (1 to 32) and any controllers that are already assigned to addresses.
3. Move the cursor to the Controller Type field for the address where the new controller resides.
4. Fill in the Controller Type fields. Press the space bar to scroll through the controller options. Press Enter to move the cursor from field to field.
5. Press F2 (Save) to save the new network settings to the Panel unit database. Or press F3 (More) to save the new settings and display the next screen of N2 Bus addresses (32 to 63).

Modifying a Controller

To modify a controller:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press M to select the Modify/Add/Delete option. The Network Modify/Add/Delete screen appears (Figure 7-3). This screen displays the first 32 N2 Bus addresses (1 to 32) and any controllers that are already assigned to addresses.
3. Move the cursor to the Controller Type field you want to change. Press the space bar to scroll through the options (e.g., Unitary [UNT] controller, Variable Air Volume [VAV] controller, and Air Handling Unit [AHU]).

Note: You cannot change the controller type if points are already assigned to it. If points are assigned, you have to delete the points first, and then modify the controller. Refer to the *Defining Points* chapter of this manual for information on deleting points.

4. Press F2 (Save) to save the new network settings to the Panel unit database. Or press F3 (More) to save the new settings and display the next screen of N2 Bus addresses (32 to 63).

Deleting a Controller

To delete a controller:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press M to select the Modify/Add/Delete option. The Network Modify/Add/Delete screen appears (Figure 7-3). This screen displays the first 32 N2 Bus addresses (1 to 32) and any controllers that are already assigned to addresses.
3. Move the cursor to the Controller Type field you want to delete.
4. Press the space bar until the field appears blank.
5. Press F2 (Save) to save the new network settings to the Panel unit database. Or press F3 (More) to save the new settings and display the next screen of N2 Bus addresses (32 to 63).

The controller is deleted. You cannot delete a controller if points are currently assigned to it. You have to delete the points first, and then delete the controller. Refer to the *Defining Points* chapter of this manual for information on deleting points.

Displaying a Network Summary

To display a Network Summary:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press S to select the Summary option. The Network Address field appears, prompting you to enter the address where you want the summary to start.

Network Address []

3. Type the starting network address number.
4. Press Enter. The Network Summary screen appears, displaying all the points in the network (Figure 7-4).

Controller		Network		Software		Point Information		
Type	Address	Type	Type	Type	Value	Unit	Limit	
AHU	1 AI 1	AI	AI	*O 1	Outdoor Air Temp	5908.3 Deg	HI	
AHU	1 AI 2	AI	AI	2	Supply Temp	0.9 Deg	LO	
AHU	1 AI 3	AI	AI	3	Mixed Temp	58.0 Deg	LO	
AHU	1 AI 4	AI	AI	4	Return Temp	74.0 Deg		
AHU	1 AI 5	AI	AI	5	Outdoor Humidity	0.0 Deg	LO	
AHU	1 AI 6	AI	AI	6	Supply Humidity	74.0 Deg		
AHU	1 AI 7	AI	AI	7	Return Humidity	65.0 Deg		
AHU	1 AO 1	AO	AO	10	Supply Fan Speed	72.0 Deg		
AHU	1 AO 2	AO	AO	11	Return Fan Speed	5.0 Deg		
AHU	1 AO 3	AO	AO	12	Damper	50.0 Deg		
AHU	1 AO 4	AO	AO	13	Supply Pressure	60.0 Deg		
AHU	1 AO 5	AO	AO	14	Return Pressure	60.0 Deg		
AHU	1 AO 6	AO	AO	15	Supply Flow	70.0 Deg		
AHU	1 AO 7	AO	AO	16	Return Flow	0.0 Deg		

F1 Cancel F3 More

Network summary

Figure 7-4: Network Summary Screen

Displaying Network Diagnostics

To display Network Diagnostics:

1. From the Network menu, press N to select the Network option. The Network menu appears.
2. Press N to select the Network Diagnostic option. The Network Diagnostic screen appears (Figure 7-5).

```

Operator Name: J. Smith                               Thu Jan 8, 1998 09:37
-----
                                Network Diagnostic
Reset Statistics [No]                                Last Reset Jan 6, 1998 17:01
Diagnostic Messages [No]
- N2 Statistics -
    Polls [ 27842]
    Writes [ 62272]
    Retries [ 0]
    Checksums [ 0]
    NAKs [ 0]
    Offline Occurrences [ 0]
    Transmissions Per Minute [ 1093]
    Timeout Value (ms) [ 220]
    Retry Count [ 3]
- COS Statistics -
    COS (Change-of-state) [ 24504]
    COS Per Minute [ 10]
    Point Scan Time (sec) [ 5]

F1 Cancel  F2 Save
Select from (No,Yes)

```

Network diagnostic1

Figure 7-5: Network Diagnostic Screen

Resetting Statistics

To reset statistics to zero:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press N to select Network Diagnostic. The cursor appears in the Reset Statistics field.
3. Either type Yes or press the space bar until Yes is displayed.
4. Press Enter. The first seven fields below the Diagnostic Messages field are reset to zero. (The last five fields do not reset.) The Network menu is displayed, with the cursor on the Network Diagnostic option.
5. Press Enter again to return to the Diagnostic screen.

Interpreting Statistics

The process of interpreting statistics is different for each system because every facility is unique.

Each facility has its own normal statistics based on network configuration, the number of controllers on the network, and the number of points. We advise that you get a printout of the Network Diagnostic screen when your facility is first set up and running efficiently. Then use this printout of your facility's normal statistics as a standard for periodically checking network operations.

Printing Diagnostic Messages

To print diagnostic messages:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press N to select the Network Diagnostic option.
3. Enter Yes in the Diagnostic Messages field. The printed diagnostic message indicates the type of error, the controller's network address, and a coded error message.

Troubleshooting

Network Diagnostic Fields

Table 7-3 explains the fields in the Network Diagnostic screen (Figure 7-2). This table explains the statistics and indicates normal readings.

Table 7-3: Network Diagnostic Fields

Field	Description	Normal Readings
Reset Statistics	Lets you reset statistics to zero.	No is default.
Diagnostic Messages	Allows you to select whether messages are sent to printer.	No is default.
Polls	Number of offline and online polls	Depends on the number of points in the network.
Writes	Number of general communications messages	Depends on the number of points in the network.
Retries	Number of retries for polls and writes for online devices only	0
Checksums	Message from controller back to headend is garbled. (Module 256 checksum of the reply message is incorrect.)	0
NAKs	The controller receiver had a checksum error, did not understand the message, or does not support the message.	0
Offline Occurrences	Number of online to offline transitions for all devices on the N2 Bus	0
Transmissions per Minute	Number of polls and writes that occurred in last minute	Typically around 500. Depends on the number of controllers on the network and their online/offline status.
Timeout Value (ms)	Number of the N2 subordinate response timeout values	220
Retry Count	Number of times a message may be unsuccessfully sent before the non-responding device is put offline	3
COS (Change-of-State)	Number of times points have changed state since the last reset	Depends on the number of points in the network.
COS Per Minute	Number of times points have changed state in last minute	Depends on the number and type of points in the network.
Point Scan Time (sec)	Number of seconds it takes for all points in network to be scanned	Depends on the number of points in the network.
FP Count/Task/Code	Internal Johnson Controls use only. For information, consult a Johnson Controls representative.	0

If statistics are not normal:

1. See the *N2 Communications Bus Technical Bulletin (LIT-6281120)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *N2 Communications Bus Technical Bulletin (LIT-1628120)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* for detailed information on network configuration. This document also includes troubleshooting tables that tell you what to do in the case of specific problems with the network.
2. Check N2 wiring.
3. Check device addressing.

Chapter 8

Defining Dial-up

Introduction

This chapter explains the Dial-up I/O feature. Dial-up provides an operator located at a distant site with a link to the Panel unit network. This link allows the remote workstation to operate in the same way as a local, direct connection.

This chapter describes how to:

- define Dial-up I/O
- define automatic Dial-up for alarm reporting

Key Concepts

Dial-up I/O

The Dial-up I/O feature allows the Panel unit to communicate through telephone lines with remote workstation class terminals or PCs with Terminal emulation capabilities. This communication is necessary to send alarm messages to an off-site facility or to call in to check facility status.

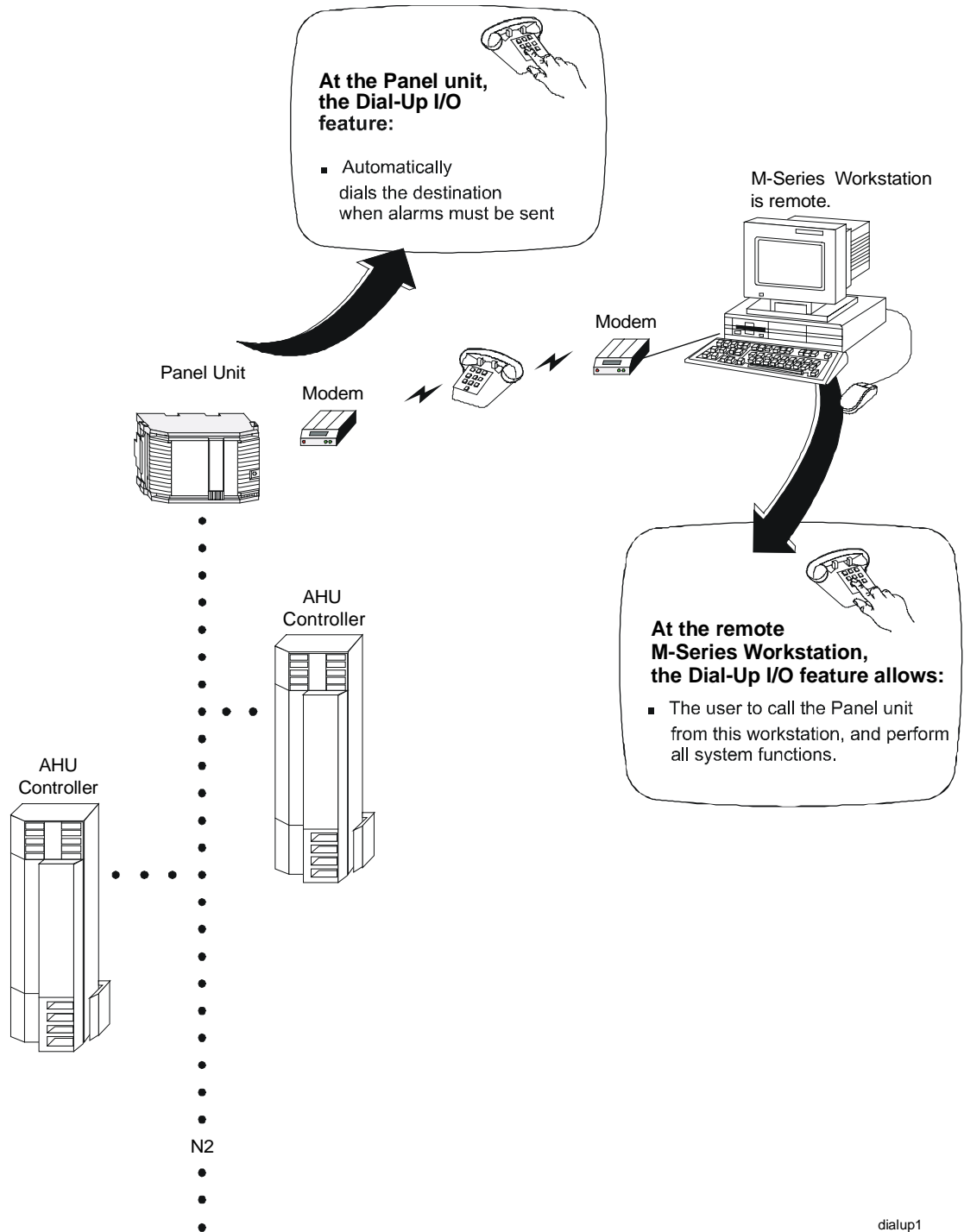
The Panel unit also supports connection to a remote printer. This printer can be defined as a remote dial-up destination, in which case it prints the highest priority COS message (Critical Alarm, Critical Normal, Network Alarm) that exists in the queue when the dial connection is made. The name of the facility sending the COS precedes the message.

Application

Examples of Dial-up applications are:

- automatically send alarms to remote or third-party facility maintenance services, for immediate diagnosis and response
- dial into the Panel unit to request information, such as a point summary
- dial into the Panel unit to command points, such as a fan
- dial into the Panel unit to collect Trend Data for an M3 Workstation

Figure 8-1 diagrams a basic configuration, and identifies the software functions.



dialup1

Figure 8-1: Basic Dial-up Operation

Figure 8-2 shows a Panel unit facility connected by dial-up to both a remote printer and a M-Series Workstation.

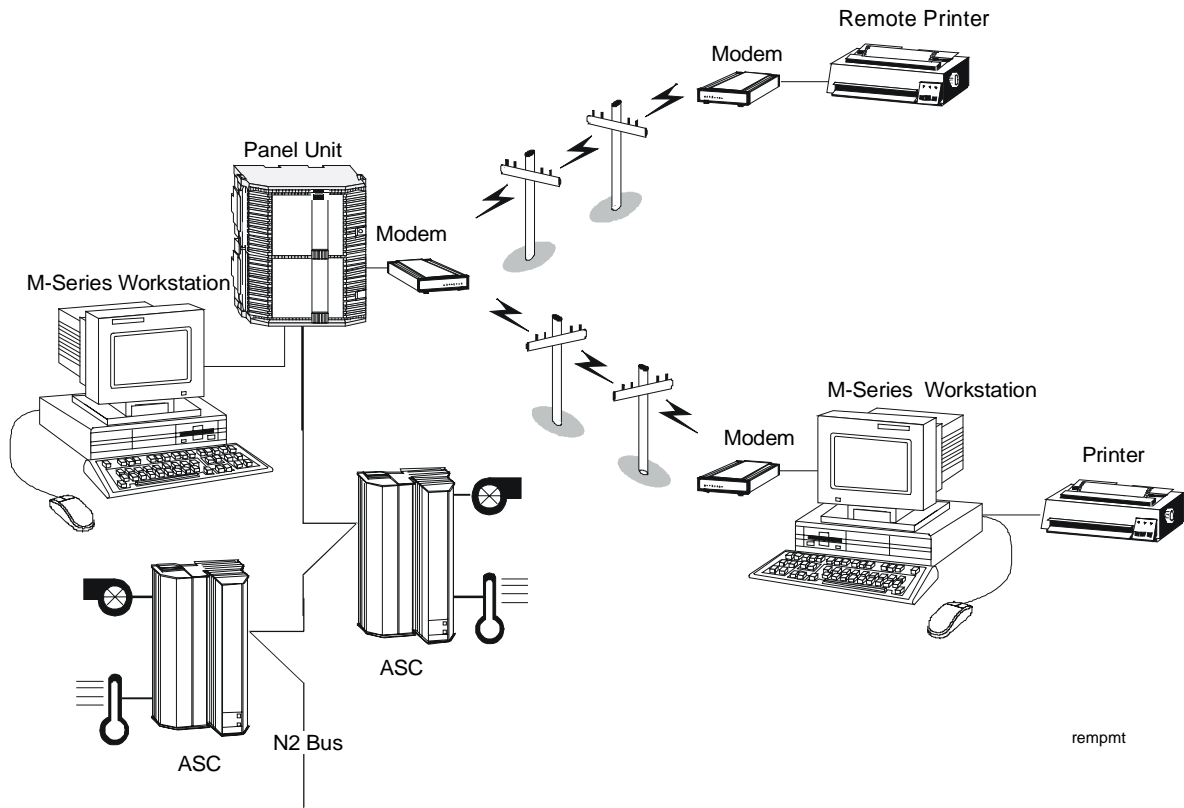


Figure 8-2: Panel Unit Connected to Remote Printer and Remote M-Series Workstation

Configurations

The Panel unit can dial up remote workstations using four different dialing sequences or allow a remote workstation to dial in to gain system control.

- Connections *to* the remote workstation are initiated when the Panel unit receives a Change-of-State (COS) for a Critical or Network Alarm condition.
- Connections *from* the remote workstation are initiated by the caller. Once connected to the Panel unit, callers must log on with a password.

Operator Interface

Dial-up provides connection to remote workstations without the operator having to request a connect or disconnect. For normal operation, Dial-up operates automatically. Dial-up also allows remote workstations to gain access to the Panel unit. The Panel unit then prompts the user for a password before allowing access to the system.

Capabilities

Table 8-1 summarizes the capabilities of the Dial-up feature.

Table 8-1: Dial-up Capabilities

Capability	Description	Purpose
Automatic Alarm Reporting	Generates automatic connection from the Panel unit to remote workstation when a Critical alarm is generated.	Provides connection to remote workstation that is comparable to direct connection.
Redial	The Panel unit redials the remote device if it gets a busy signal. It keeps redialing until it connects or until a specified number of attempts has been reached.	Enhances system integrity.
Secondary Phone Number	Dials secondary number automatically after not connecting to the primary number within the specified number of tries. Can also be set to call secondary number after session with primary number is completed.	Provides primary and backup response to a Critical alarm.

Dial Sequence Priority

Dial-up calls a primary and/or secondary phone number for each of four dial sequences. To resolve alarm conflicts, Dial-up uses a Dial Sequence Priority process to determine which Dial Sequence to process first.

When processing an alarm, Dial-up:

- receives a Change-of-State (COS) request that specifies which Critical Alarm or Network Alarm has been issued and what Dial Sequence to use
- performs the Basic Calling process on the phone number specified in the current Dial Sequence
- uses the Dial Sequence Process to determine what to do after completing the Basic Calling process
- uses the Dial Sequence Priority to determine what to do after completing the previous Dial sequence

Dial-up also supports dialing in. This feature is described in *Dial-in Process*, later in this chapter.

Acknowledge Alarms

Critical Alarm, Critical Normal, and Network Alarm can be acknowledged at the remote workstation with the F4 (Acknow) function key. However, if a database transfer is in progress, operators are not allowed to acknowledge any alarms until the transfer is over.

Alarm Tone

If the alarm tone is enabled when a COS alarm occurs, a tone sounds at the direct or remote operator terminal (M3 Workstation or Terminal). This tone sounds once each minute for 5 minutes, or until all alarms have been acknowledged. To enable and disable the alarm tone, use the Communication I/O Setup screen.

Auto Shutdown

You can prevent COS alarm reports from being sent to remote operator terminals, using the Auto Shutdown feature. An Auto Shutdown process works by shutting down a group of dependent points if a binary point is in a specified state. When a point is shut down, its COS alarm reports are not sent to *any* direct or dial-up operator terminals or printers.

For more information on Auto Shutdown, refer to the *Defining Auto Shutdown* chapter in this manual.

Basic Calling Process

Figure 8-3 shows the basic process Dial-up uses to make calls.

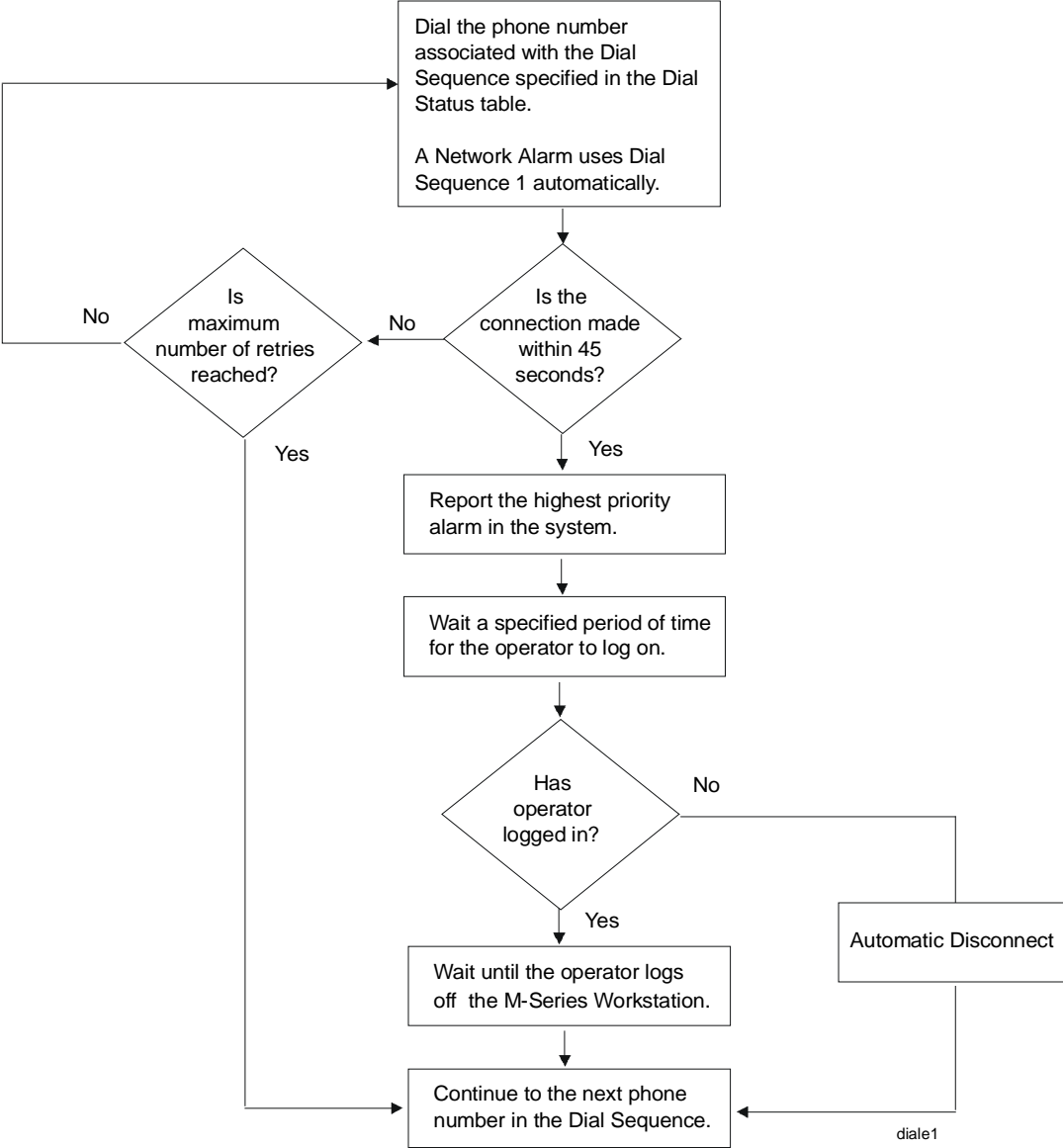


Figure 8-3: Basic Calling Process

Dial Sequence Process

The Panel unit provides the operator flexibility to determine how the alarms are reported.

There are three different processes for Dial-up Sequences.

- Call the primary number only:
 - Perform the Basic Calling process on the primary phone number.
 - Clear the Dial Status table entries for this sequence.
- Call the primary number, then call the secondary number only if the first does not answer:
 - Perform the Basic Calling process on the primary phone number.
 - If unable to connect to the primary phone number, perform the Basic Calling process on the secondary phone number.
 - Clear the Dial Status table entries for this sequence.
- Call both the primary and secondary numbers:
 - Perform the Basic Calling process on the primary phone number.
 - Perform the Basic Calling process on the secondary phone number.
 - Clear the Dial Status table entries for this sequence.

If the alarm could not be delivered, the operator must use a summary to view the alarms.

If an alarm occurs while Dial-up is processing calls, the alarm waits in the Dial Status table until its Dial Sequence has the highest remaining priority.

Dial Sequence Priority

The Dial Sequence Priority process is used by Dial-up to resolve alarm conflicts. New alarms are added to the Dial Status table and prioritized by Dial Sequence number. A Dial Sequence number of one is serviced first, followed by two, three, and four.

- If an alarm is received and no other alarms are being processed, begin the Dial Sequence process immediately.
- If alarms are received during the current alarm process, complete the current Dial Sequence process, and process the highest priority alarms. For example, a Critical Alarm has greater priority than a Network Alarm. Therefore, if a Network Alarm and Critical Alarm are received simultaneously, the Network Alarm waits in the Dial Status table until the Dial Sequence process is complete for the Critical Alarm.
- Network Alarms use Dial Sequence 1 automatically. This cannot be changed.

Dial-in Process

The Dial-in process allows remote operators to call into the Panel unit. If a Critical Alarm occurs when a remote operator is logged into the Panel unit, the alarm message is displayed to the remote operator.

- If the remote operator acknowledges the alarm:
 - The Panel unit runs the Dial Sequence for the alarm once the remote operator logs off.
 - The dialed operators must look at the Point Summary or Group Summary screens to determine the alarm condition.
- If the remote operator does not acknowledge the alarm:
 - The Panel unit runs the Dial Sequence for the alarm once the remote operator logs off.
 - The first dialed operator sees the alarm message, just as if the first remote operator was never logged in.

Design Considerations

As you engineer the Dial-up I/O feature consider the following:

- To define Dial-up, you must have a System capability password.
- You can identify up to eight unique remote workstations for Dial-up.
- You can connect a printer at the remote location (instead of a terminal) to produce hard copy records of COS reports.
- You can establish four different Dial-up sequences, and each can call one or two locations.
- You can assign each alarm to a single Dial-up sequence, if any.
- A Network Alarm is automatically assigned to Dial Sequence 1.
- You must identify the building the Panel unit is controlling. This building name is the only identification available to the remote operator.
- You must determine whether you want any points to be shutdown under certain conditions. When a point is shutdown, its COS alarm reports are not sent to *any* direct or dial-up operator terminals or printers. For more information, see the *Defining Auto Shutdown* chapter in this manual.

Procedure Overview

Table 8-2: Defining Dial-up

To Do This	Follow These Steps:
Define Dial-up	Determine which Critical alarms you want sent to remote workstations. Identify the remote locations and phone numbers to which you want to send alarms. Group the remote locations into a maximum of four groups, with a maximum of two locations per group. Set each group to call both locations, or to call the second location if the first does not answer. Prioritize the groups. Assign top priority group to Dial Sequence 1. Enter the phone numbers in the Communication I/O Setup screen, placing the highest priority phone numbers at sequence number 1. Assign Dial-up sequence numbers to the Critical Alarms. Check modem speeds of all remote workstations, and enter the baud rate in the remote workstation Baud Rate field. Set the rest of the Dial-up I/O parameters.
Define Automatic Dial-up for Alarm Reporting	From the Point Modify screen, set up Priority, Alarm Message, and Dial Sequence number fields.

Detailed Procedures

Defining Dial-up

To define Dial-up:

1. Determine which Critical alarms you want sent to remote workstations. Refer to the *Managing Alarms* chapter in this manual.
2. Identify the remote locations and phone numbers to which you want to send alarms.
3. Group the remote locations into a maximum of four groups, with a maximum of two locations per group. Set each group to call both locations, or to call the second location if the first does not answer.
4. Prioritize the groups. Assign top priority group to Dial Sequence 1.
5. Enter the phone numbers in the Communication I/O Setup screen (Figure 8-4), placing the highest priority phone numbers at sequence number 1.

```

Operator Name: J. Smith                                     Thu Jan 8, 1998 09:43
-----
                                Communication I/O Setup
Local Terminal Baud Rate [1200]      Enable Alarm Tone [No ]
Remote Terminal Baud Rate [9600]    Enable Alarm Tone [No ]
Printer Baud Rate [9600]           Number Lines/Page [ 0 ]
Network Baud Rate [9600]          Acknowledge Network Alarms [Yes]
Alarm Printer Destination [Printer] Alarm Horn Point [  ]

                                Dial-Up I/O Definition
Building Name [Holodeck Companion] Enable Dial-Up [Yes]
Number of Retries [ 0 ] Minimum Connect Time (minutes) [ 1 ]
Sequence Primary Phone Number Secondary Phone Number Dial Both
  1 [  ] [  ] [No ]
  2 [  ] [  ] [No ]
  3 [  ] [  ] [No ]
  4 [  ] [  ] [No ]

F1 Cancel F2 Save
Select from (1200,2400,4800,9600)

```

Communication IO setup

Figure 8-4: Communication I/O Setup Screen

6. Assign Dial-up sequence numbers to the Critical alarms. Refer to the *Managing Alarms* chapter in this manual.
7. Check modem speeds of all remote workstations, and enter the baud rate in the remote workstation Baud Rate field. All modems must have the same baud rate.

8. Set the rest of the Dial-up I/O parameters, using Table 8-3.

Table 8-3: Dial-up Parameters

Field	Description	Options/ Range	Required?	Default
Remote Workstation Baud Rate	Specifies the data transfer speed between the Panel unit and remote workstations. Set the value to the speed of the modem with which you are communicating.	1200, 2400, 4800, 9600	Yes	2400
Enable Alarm Tone	Enables a tone that sounds at a remote workstation when a Critical Alarm or Network Alarm is sent. The tone sounds once every minute for 5 minutes or until all alarms are acknowledged.	Yes or No	Yes	No
Building Name	Identifies the building the Panel unit is controlling. This name appears at the top of the screen before a user logs in from a remote workstation.	0 to 24 characters	Yes	N.A.
Enable Dial-up	Specifies whether or not the Panel unit sends any alarm messages to remote workstations.	Yes or No	Yes	No
Number of Retries	Specifies the number of times the Panel unit redials a phone number before disconnecting.	1 to 30	Yes	3
Minimum Connect Time	Specifies the length of time, in minutes, that the Panel unit waits for a user at a remote workstation to log in with a valid password.	1 to 9	Yes	5
Primary/Secondary Phone Number	Phone number for a primary remote workstation, and optional phone number for a secondary terminal.	Up to 19 characters. Must begin with P or T (pulse or tone).	No	N.A.
Dial Both	Specifies whether or not both phone numbers in the Dial Sequence should be called. If answered "No," the second number is called only if the first number is not reached.	Yes or No	Yes	No

Defining Automatic Dial-up for Alarm Reporting

Fill in the fields using the parameters in Table 8-4.

```

Operator Name: J. Smith                                     Thu Jan 8, 1998 10:32
-----
Point Modify
Point Number [ 1 ] Software Type [AI] Point Name [Outdoor Air Temp]
Network Address: N2 Adress [ 1 ] Point Type [AI ] Point Address [ 1 ]

Analog Input Point Definition
Engineering Units [Deg ] Decimal Position [1]
Low Limit [ 65.0 ] High Limit [ 75.0 ] Differential [ 3.0 ]

Alarm Reporting Definition
Priority [None ] Alarm Message Used When Reporting [ ]
Dial Sequence Number [ ]

F1 Cancel F2 Save F3 More
Select a name for this point

```

Example alarm

Figure 8-5: Example Alarm Reporting Screen

Table 8-4: Alarm Reporting Definition Parameters

Field	Description	Options/ Range	Required?	Default
Priority	Determines if a value or state is monitored for an alarm condition, and if so, determines if the alarm is critical information.	None, Status, Critical	Yes	None
Alarm Message Used When Reporting	Identifies, by number, one of the messages defined on the Alarm Message screen.	1 to 130	No	N.A.
Dial Sequence Number	Identifies, by number, one of the phone number sequences defined on the Communication I/O Setup screen.	1 to 4	No However, for automatic dial-up to occur, a dial sequence must be specified.	N.A.

Chapter 9

Defining Points

Introduction

This chapter explains how to define software points. Points are software representations of input and output data. The Panel uses the following five types of software points: Accumulator (AC), Analog Input (AI), Analog Output (AO), Binary Input (BI), and Binary Output (BO).

This chapter describes how to:

- add a point
- copy controller points
- modify controller points
- delete controller points

Key Concepts

Point Definition

To modify, add, or delete points, you must have a System capability password.

When defining points, use the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* to map the points in the controllers to the points in the Panel unit.

When mapping controller points to the Panel points, be careful to consider which controller points are Read Only, and which are Read/Write. The Panel cannot command Read Only points. The Panel can monitor both types of points. For more information on Read Only points, refer to the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

Copy Controller Points

The Copy Controller Points feature allows you to save significant time during database generation. With this feature, you can copy all of the points defined for an existing controller and assign them to a newly defined controller.

Note: AC points cannot be copied. They must be defined separately after the copying process is complete.

Delete Points

The Panel does not allow you to delete currently involved points. For example, if a point is in a group or defined for Trend or Demand Limiting, you are not allowed to delete the point. Therefore, before deleting a point, you must remove the point from each feature it is involved in. Refer to the appropriate chapter of this manual for details on removing points from a feature.

Types of Point

Accumulator (AC)

The AC point uses a Binary Input point that provides a pulse when a specific quantity of energy or material is measured. The AC point accumulates the pulses and provides consumption totals. Typically, an AC point is used to measure electrical consumption.

Analog Input (AI)

The AI point filters and scales a voltage, current, or pneumatic input from a field device. The result is a value for the field device input that is reported in engineering units such as °F or psi. Typically, an AI point is used to measure temperature.

Analog Output (AO)

The AO software point prioritizes and scales output signals from the Panel unit. The result is a voltage, current, or pneumatic signal that controls or positions a field device. Typically, an AO point is used to control the position of a valve or damper.

Binary Input (BI)

The BI software point monitors a switch or relay contact and provides a status signal in the appropriate engineering units (e.g., Off/On, Open/Closed, Start/Stop). Typically, a BI point indicates whether a fan (or other device) is on or off.

Binary Output (BO)

The BO software point prioritizes output signals from the Panel unit and generates appropriate control signals to binary field devices such as switches and relays. Typically, a BO point is used to change a controller to either its Occupied or Unoccupied mode.

Point Definition Tables

The following tables explain the fields in the Point Add and Point Modify screens.

Table 9-1: AI Definition Fields

AI Fields	Description	Options/Range	Required?	Default
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the controller's location on the N2 Bus.	1 to 255 1 to 16 for the <i>LTD</i>	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	AI, ADF, ADI, BD, LRS, PMK, PMO, PML, PMA	Yes	AI
Point Address	Indicates physical location of point on the controller.	1 to 255	Yes	1
Engineering Units	Designates the units to be displayed with this point in point and group summaries.	4 characters	No	Deg
Decimal Position	Sets number of decimal places.	0 to 3	Yes	1
Low Limit	Sets the low range for COS analysis. Alters point configuration in the controller, not just the Panel database.	-999999 to 9999999	Yes	65.0
High Limit	Sets the high range for COS analysis. Alters point configuration in the controller, not just the Panel database.	-999999 to 9999999 Must be greater than the low limit.	Yes	75.0
Differential	Sets a buffer zone for alarm values. Keeps the Panel from sending nuisance COS alarms. Alters point configuration in the controller, not just the Panel database.	-999999 to 9999999	Yes	3.0
Priority	Sets the priority for change-of-state alarms.	None, Status, Critical, Fire	Yes	None
Alarm Message Used When Reporting	Designates alarm message the Panel unit displays when reporting an alarm.	1 to 130	No	N.A.
Dial Sequence Number	Dial sequence for COS alarm message. Only for Critical and Fire priority.	1 to 4	No	N.A.

Table 9-2: AO Definition Fields

AO Fields	Description	Options/Range	Required?	Default
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the controller's location on the N2 Bus.	1 to 255 1 to 16 for the <i>LTD</i>	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	AO, AI, ADF, ADI, BD, LRS, PMK, PMO, PML, PMA	Yes	AO
Point Address	Indicates the physical location of the point on the controller.	1 to 255	Yes	1
Engineering Units	Designates the units to be displayed with this point in point and group summaries.	4 characters	No	Deg
Decimal Position	Sets the number of decimal places for display.	0 to 3	Yes	1
Low Range Limit	Sets the low range for operator commands.	-999999 to 9999999	Yes	0.0
High Range Limit	Sets the high range for operator commands.	-999999 to 9999999 Must be greater than the low range limit.	Yes	100.0

Table 9-3: AC Definition Fields

AC Fields	Description	Options/Range	Required?	Default
Point Number	Identifies, by number, the point you want to define. Accumulator points must be in the lowest eight positions.	1 to 8	Yes	First undefined point number
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the controller's location on the N2 Bus.	1 to 255 1 to 16 for the <i>LTD</i>	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	BI, ADI, PMA	Yes	BI
Point Address	Indicates the physical location of the point on the controller.	See <i>Data Base Generation Guide Technical Bulletin (LIT-6281270)</i> in the <i>Metasys Companion Technical Manual (FAN 628.1)</i> or <i>(LIT-16281270)</i> in the <i>Facilitator FMS Technical Manual (Fan 1628.1)</i> for valid ranges.	Yes	1
Consumption Engineering Units	Indicates the units for the accumulated value.	3 characters	No	kWh
Consumption Constant	Converts the pulse count into meaningful units.	-999999 to 9999999	Yes	1.000
Rate Engineering Units	Indicates the units for the calculated consumption rate.	3 characters	No	kW
Rate Constant	Converts the consumption value into convenient engineering units. Related to the Consumption Engineering Units (CEU) time base in seconds. kWh = 3600 seconds GPM = 60 seconds	-999999 to 9999999	Yes	3600
High Limit	Sets the high limit for the consumption rate. Sends a COS when the limit is exceeded.	-999999 to 9999999 Must be greater than the low limit.	Yes	2000
Low Limit	Sets the low limit for the consumption rate. Sends a COS when the limit is exceeded.	-999999 to 9999999	Yes	0.0
Decimal Position	Sets the number of decimal places.	0 to 3	Yes	1
Priority	Sets the priority for change-of-state alarms.	None, Status, Critical, Fire	Yes	None
Alarm Message Used When Reporting	Designates the alarm message the Panel unit displays when reporting an alarm.	1 to 130	No	N.A.
Dial Sequence Number	Designates a dial sequence for the COS alarm message. Used only with Critical priority alarms.	1 to 4	No	N.A.
Used For Demand Limiting	Indicates if the Accumulator points used for Demand Limiting.	Yes/No	Yes	No
Demand Interval	Sets the demand interval for determining demand value.	1 to 60 minutes	Yes	15

Table 9-4: BI Definition Fields

BI Fields	Description	Options/Range	Required?	Default
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the controller's location on the N2 Bus.	1 to 255 1 to 16 for the <i>LTD</i>	Yes	0
Point Type	Indicates physical point hardware on which the point software operates.	BI, BD, LRS PML	Yes	BI
Point Address	Indicates the physical location of the point on the controller.	1 to 255	Yes	1
State 0	Describes the State 0 position of the point.	3 characters	Must differ from State 1.	Off
State 1	Describes the State 1 position of the point.	3 characters	Must differ from State 0.	On
Normal Contact State	Sets the normal position of the point.	State 0 or State 1	Yes	State 0
Priority	Sets the priority for change-of-state alarms.	None, Status, Critical, Fire	Yes	None
Alarm Message Used When Reporting	Designates the alarm message the Panel displays when reporting an alarm.	1 to 130	No	N.A.
Dial Sequence Number	Designates a dial sequence for the COS alarm message. Used only with Critical priority alarms.	1 to 4	No	N.A.
Totalization Type	Indicates the kind of Totalization you want for the point.	None, Cycle Counts, Runtime Min, Runtime Hour	Yes	None
Totalization Limit	Limit for the Totalization counter. Sends COS when limit is exceeded.	0 to 99999999	No	0
Alarm Message Used When Limit Exceeded	Alarm message displayed when the Totalization limit is exceeded.	1 to 130	No	N.A.
Totalization Preset Value	Sets the totalized value for the point.	0 to 99999999	No	0
Change to Preset Value Now	Changes the totalized value for the point to the Totalization Preset Value.	Yes, No	Yes	No

Table 9-5: BO Definition Fields

BO Fields	Description	Options/Range	Required?	Default
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the controller's location on the N2 Bus.	1 to 255 1 to 16 for the <i>LTD</i>	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	BI, BD, BO, PML	Yes	BO
Point Address	Indicates the physical location of the point on the controller.	1 to 255	Yes	1
State 0	Describes the State 0 position of the point.	3 characters	Must differ from State 1.	Off
State 1	Describes the State 1 position of the point.	3 characters	Must differ from State 0.	On
Heavy Equipment Delay	Sets a delay time between the start of this point and the start of the next BO point with a Heavy Equipment Delay.	1 to 30 seconds	No	N.A.
Totalization Type	Indicates the kind of totalization you want for the point.	None, Cycle Counts, Runtime Min, Runtime Hour	Yes	None
Totalization Limit	Sets a limit for the Totalization counter. Sends a COS when the limit is exceeded.	0 to 99999999	No	0
Alarm Message Used When Limit Exceeded	Designates the alarm message the Panel unit displays when the totalization limit is exceeded.	1 to 130	No	N.A.
Totalization Preset Value	Sets totalized value for the point.	0 to 99999999	No	0
Change to Preset Value Now	Changes the totalized value for the point to the Totalization Preset Value.	Yes, No	Yes	No

Procedure Overview

Table 9-6: Defining Points

To Do This	Follow These Steps:
Add a Point	From the Main menu, press P. Press A. Fill in the Point Number and Software Type fields. Press Enter. Fill in the Point Definition fields. Press F2 (Save).
Copy Controller Points	From the Main menu, press P. Press C. Fill in the N2 Bus address of the controller containing the points you want to copy and press Enter. Fill in the N2 Bus address of the newly defined controller. Press F2 (Save).
Modify Controller Points	From the Main menu, press P. Press M. Fill in the Point Number. Press Enter. Modify the fields as necessary. Press F2 (Save).
Delete Controller Points	Remove the point from all features it is involved in. From the Main menu, press P to select the Point option. Press D. Type the number of the point you want to delete. Type Yes to delete the point. Type No to cancel. If the point delete is successful, a message appears stating the database is updated. If you press F2 (Save), but the point cannot be deleted, remove the point from all the features it is involved in and try deleting it again.

Detailed Procedures

Adding a Point

To add a point:

1. From the Main menu, press P to select the Point option. The Point menu appears.
2. Press A to select the Add Point option. The following line appears on the screen, prompting you to enter a point number and type.
Point Number [] Software Type []
3. Refer to the Point Definition Tables in the *Key Concepts* section of this chapter. Fill in the Point Number and Software Type fields. Press Enter to move the cursor to the next field.
 - a. Specify the point number. If Points 1 through 25 have already been added, the point number defaults to 26. You can either accept the default or enter a different number.
 - b. Specify the software type. Press the space bar to scroll through the following options:
 - AI (Analog Input)
 - AO (Analog Output)
 - BI (Binary Input)
 - BO (Binary Output)
 - AC (Accumulator)
4. Press Enter to access the second Point Add screen. This screen displays defaults appropriate to the software type you specified. Figure 9-1 shows the Point Add screen with AI default settings.

Operator Name: J. Smith Thu Jan 8, 1998 10:38

Point Add

Point Number [57] Software Type [AI] Point Name []
Network Address: N2 Address [0] Point Type [AI] Point Address [1]

Analog Input Point Definition

Engineering Units [Deg] Decimal Position [1]
Low Limit [65.0] High Limit [75.0] Differential [3.0]

Alarm Reporting Definition

Priority [None] Alarm Message Used When Reporting []
Dial Sequence Number []

F1 Cancel F2 Save

Select a network address (1 - 255)

Point add screen

Figure 9-1: Point Add Screen (for AI Point)

5. Fill in the Point Definition fields. The tables in the *Key Concepts* section of this chapter explain the definition fields for each point type.
6. Press F2 (Save) to save the new point to the Panel unit database.

Copying Controller Points

To copy controller points:

1. From the Main menu, press P to select the Point option. The Point menu appears.
2. Press C to select the Copy Controller Points option. The Copy Controller Points screen appears (Figure 9-2).

```
Operator Name: J. Smith                               Thu Jan 8, 1998 10:42
-----
                          Copy Controller Points
Copy Points From Controller N2 Bus Address [ 1 ]
                          To Controller N2 Bus Address [ 6 ]

F1 Cancel  F2 Save
Select a controller address on the network (1 - 7)
```

Copy controller

Figure 9-2: Copy Controller Points Screen

3. Fill in the N2 Bus address of the controller containing the points you want to copy and press Enter. (See *Restrictions* that follow.)
4. Fill in the N2 Bus address of the newly defined controller. (See *Restrictions* that follow.)
5. Press F2 (Save). The points are copied to the new controller and new point numbers are assigned to each point copied.

Note: Point numbers are assigned according to the next available number on the network. They may or may not be numbered in sequence.

Restrictions

When copying a controller, make sure:

- The controllers are the same type (e.g., copy AHU to AHU only).
- The controller to which you are copying points has been defined using the Network Modify/Add/Delete screen.
- No points are already assigned to the controller you are copying to.
- The copying process does not exceed your system's database memory limit (i.e., no more than 800 points for the Panel unit).
- The controller addresses are not the same.

All of the above statements must be true or an error message appears at the bottom of the screen, and the copying process is not executed.

Modifying Controller Points

To modify a point:

1. From the Main menu, press P to select the Point option. The Point menu appears.
2. Press M to select the Modify Point option. The following line appears on the screen, prompting you to enter the number of the point you want to modify:
Point Number []
3. Refer to the Point Definition tables in the *Key Concepts* section of this chapter. Fill in the Point Number.
4. Press Enter to access the Point Modify screen that displays the current settings for the point. Figure 9-3 shows an example of a Point Modify screen for a BO point.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 12:33
-----
                                Point Modify
Point Number [ 8] Software Type [BO] Point Name [Supply Fan]
Network Address: N2 Adress [ 1] Point Type [BO] Point Address [ 1]

                                Binary Output Point Definition
Status Pair: State 0 [Off] State 1 [On] Heavy Equipment Delay (sec) [ ]

                                Totalization Definition
Totalization Type [Runtime Min]
Totalization Limit [ 4] Alarm Message Used When Limit Exceeded [ 1]
Totalization Preset Value [ 0] Change To Preset Value Now [No]

F1 Cancel F2 Save F3 More
Select a name for this point

```

Point modify BO

Figure 9-3: Point Modify Screen (for BO Point)

5. Modify the fields as necessary. The tables in the *Key Concepts* section of this chapter explain the definition fields for each point type.

Note: You are not allowed to change any of the Network Address fields (N2 Address, Point Type, and Point Address).

6. Press F2 (Save) to save the modified point to the Panel unit database.

Note: When changing and saving the limits and differential for an Analog Input point, these changes are sent to the controller and modify the controller's point configuration. All other point modifications alter the Panel unit's database only.

Deleting Controller Points

To delete a point:

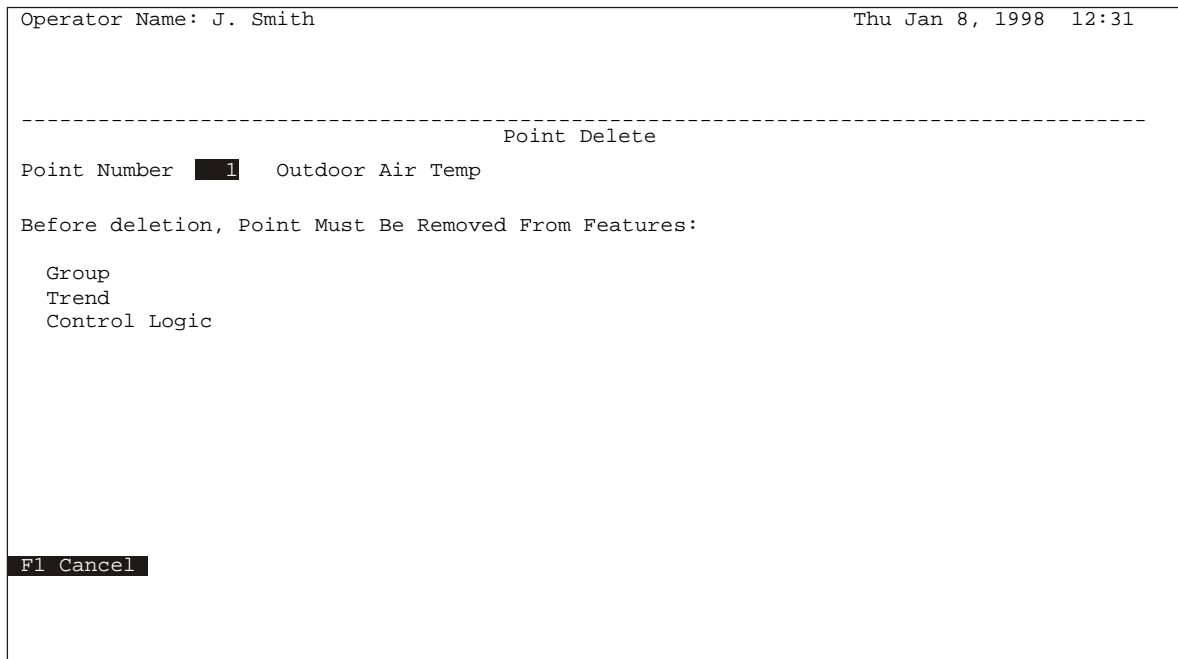
1. Remove the point from all features it is involved in.
2. From the Main menu, press P to select the Point option. The Point menu appears.
3. Press D to select the Delete Point option. The following line appears on the screen, prompting you to enter the number of the point you want to delete:
Point Number []
4. Type the number of the point you want to delete. The point you specify should be a defined point that is not involved in any features such as Groups, Weekly Scheduling, Demand Limiting, or Trend. The following prompt appears:
Point is not involved. Delete point now? [No]
5. Type Yes to delete the point. Type No to cancel.

If the point delete is successful, a message appears stating the database is updated.

Troubleshooting

Point Delete Not Successful

If you press F2 (Save) but the point cannot be deleted because it is involved in a feature, the Point Delete screen appears (Figure 9-4).



Point delete screen

Figure 9-4: Point Delete Screen (for Involved Point)

This screen lists the features the point is involved in. Remove the point from all the features it is involved in and try deleting it again.

Using Controller Snapshot

Introduction

This chapter tells you how to define templates for controller snapshots, display snapshot data, and command points from a controller snapshot.

This chapter describes how to:

- define templates
- add templates
- modify templates
- delete templates
- display controller snapshots
- command points from the controller snapshot

Key Concepts

Controller Snapshot

A controller snapshot allows you to monitor and command points in a controller without these points being defined in the Panel unit database. This helps you expand the controller point capacity, conserve memory and database space, and simplify database generation for controller points that do not need to be involved in Panel unit features.

The controller snapshot displays up to twelve points in a controller from one screen. This screen looks very much like a Group Summary, and includes point names, current values, and a Point To Command field.

You define up to twelve templates to specify which points in the controllers are displayed in the snapshots. The template specifies point name, software type, units, network point type, and network point address for up to twelve controller points. A template is defined for one specific controller type (e.g., Air Handling Unit [AHU] or Unitary [UNT] controller) and can only be used for controllers of the same type. You can use one template for many controllers with similar configurations. For example, create one template for all rooftop UNT controllers in your facility (provided these controllers have the same configuration). Then use this one template to display controller snapshots for all the rooftop UNTs, without defining any of the UNT points in the database. The templates are saved as part of the database.

Snapshot Details

- When defining templates, use printouts of the controllers' configuration for hardware point information. See the configuration tool documentation (e.g., *HVAC PRO User's Manual*, FAN 637.5) for information on generating these printouts. Refer to the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* for information on how points can be mapped into the Panel unit.
- You can command a point in the currently displayed snapshot or any point defined in the Panel unit. Commands work as they do in the Group Summary.
- Point values update every 10 seconds (as they do in the Group Summary).

- Binary Input and Binary Output values are displayed as either Off or On, corresponding to State 0 and State 1.
- Offline and Override status are displayed for the points in the snapshot.
- Alarm status is not displayed for the points (because points in a snapshot are not defined in the database).
- To allow you to select a point to command from a snapshot, the controller points are automatically assigned numbers 801 through 812. The point number assignment lasts only as long as the snapshot is displayed. When you press F3 (More) to scroll to the next controller snapshot, the points in the new snapshot are likewise numbered 801 to 812.
- Defining snapshot templates requires a System capability password.

Controller Snapshot Display

Displaying a controller snapshot requires a System or Operate capability password.

A controller snapshot displays point data for one controller according to the selected template. The template determines which points in the controller are displayed and their names and units.

Command Points from the Controller Snapshot

IMPORTANT: If you override a point, the point remains overridden until commanded otherwise; however, once the snapshot is not displayed, no summary displays the point's overridden status.

Design Considerations

When you define templates or use snapshots, consider the following:

- Displaying snapshots requires an Operate or System capability password.
- When defining templates, use printouts of the controllers' configuration for hardware point information (e.g., network point type and network point address). See the configuration tool documentation (e.g., *HVAC PRO User's Manual, [FAN 637.5]* or *Facilitator HVAC PRO User's Manual, [FAN 1637.5]*) for information on generating these printouts. See the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* for information on how points can be mapped into the Panel unit.
- Snapshot templates can include all Panel unit software point types except AC.

<p>IMPORTANT: If you override a point, the point remains overridden until commanded otherwise; however, once the snapshot is not displayed, no summary displays the point's overridden status.</p>

- Press F3 (More) to scroll to a snapshot of the next controller of the same type (using the same template).
- Only one operator (local or remote) can display a snapshot at one time.
- Snapshots are not available for the IFC controller type.

Procedure Overview

Table 10-1: Using Controller Snapshot

To Do This	Follow These Steps:
Define Templates	Decide which controllers have similar point configurations that can be represented by one template. Decide which points in these controllers you want to include in the template (up to twelve). Select Template from the Network menu. Define a new template. Save the database.
Add Templates	From the Main menu, press N. Press T. Specify the number of the template you want to add. Fill in the field or press Enter to accept the default. Enter a name for the template. Fill in the template fields. Press F2 (Save) or F3 (More).
Modify Templates	From the Main menu, press N. Press T. Specify the number of the template you want to modify. Fill in the field or press Enter to accept the default. Enter a name for the template. Move the cursor to the field you want to change and fill it in. Press F2 (Save) or F3 (More).
Delete Templates	From the Main menu, press N. Press T. Specify the number of the template you want to delete. Fill in the field or press Enter to accept the default. While the cursor is in the Template Name field, press the space bar until the field appears blank. Press F2 (Save) or F3 (More).
Display Controller Snapshots	From the Main menu, press N to select the Network option. Press C to select the Controller Snapshot option. Select the number of the template you want to use. Type the template number and press Enter. Type the network address. Press Enter. Press F3 (More).
Command Points from the Controller Snapshot	From the Main menu, press N. Press C. Specify the number of the template and the network address of the controller, and press Enter. Type the number of the point you want to command in the Point To Command field and press Enter. In the first command field, specify the type of command. In the second command field, specify the command value.

Detailed Procedures

Defining a Template

To define a template:

1. Decide which controllers have similar point configurations that can be represented by one template.
2. Decide which points in these controllers you want to include in the template (up to twelve).
3. From the Main menu, press N to select the Network option. The Network menu appears.
4. Press T to select the Templates option.
5. Fill in the fields. Refer to Table 10-2.

Table 10-2: Snapshot Template Definition Fields

Field	Description	Options/Range	Required?	Default
Template Number	Identifies the number of the template to be modified, added, or deleted.	1 to 12	Yes	1
Template Name	Describes template. The template name appears in controller snapshots.	Up to 16 characters	Yes	N. A.
Controller Type	Specifies type of controller template applies to.	Any supported controller	Yes	N.A.
Point Name	Describes the point.	Up to 16 characters	Yes	N.A.
Software Type	Specifies type of software point in Panel unit.	AI, AO, BI, BO	Yes	N.A.
Units	Designates the units to be displayed with the point in controller snapshot (AC, AI, AO).	Up to 4 characters	No	N.A.
Network Point Type	Specifies type of hardware point in the controller.	AI, BI, AO, BO, ADF, ADI, BD, LRS, PMK, PMO, PML, PMA	Yes	N.A.
Network Point Address	Specifies the physical location of the hardware point on the controller.	1 to 255	Yes	N.A.

6. Press F2 to save the database.

Adding a Snapshot Template

To add a snapshot template:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press T to select the Templates option. The Template Selection screen appears, displaying a list of defined templates. The cursor is in the Template Number field, prompting you to specify the number of the template you want to add.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 12:42
-----
                          Snapshot Template Modify/Add/Delete
Template Number [ 2]

                          List of Defined Templates
Name           Controller Type      Name           Controller Type
1 Ahu Template AHU

F1 Cancel
Select a template by number (1 - 12)

```

Template selection

Figure 10-1: Template Selection Screen

3. Fill in the field or press Enter to accept the default. The Snapshot Template Modify/Add/Delete screen appears (Figure 10-2). The cursor is in the Template Name field, prompting you to enter a name.
4. Fill in the template fields. Press the space bar to scroll through the options. Press Enter to move the cursor from field to field. The fields are described in Table 10-2.
5. Move the cursor to the field you want to change. Press the space bar to scroll through the options.
6. Press F2 (Save) to save the changes to the Panel unit database.
Or press F3 (More) to save the new settings and display the next template.

Deleting a Snapshot Template

To delete a snapshot template:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press T to select the Templates option. The Template Selection screen appears, displaying a list of defined templates. The cursor is in the Template Number field, prompting you to specify the number of the template you want to delete.
3. Fill in the field or press Enter to accept the default. The Snapshot Template Modify/Add/Delete screen appears (Figure 10-2). The cursor is in the Template Name field, prompting you to enter a name.
4. Fill in the template fields. Press the space bar to scroll through the options. Press Enter to move the cursor from field to field. The fields are described in Table 10-2.
5. While the cursor is in the Template Name field, press the space bar until the field appears blank. Press F2 (Save) to delete the template.

Displaying a Controller Snapshot

To display a controller snapshot:

1. From the Main menu, press **N** to select the Network option. The Network menu appears.
2. Press **C** to select the Controller Snapshot option. The Controller Snapshot screen appears, displaying a list of defined templates (Figure 10-3). The cursor is in the Template Number field, prompting you to select the number of the template you want to use.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 12:38
-----
                        Controller Snapshot
Template Number [ 1 ] Network Address [ 1 ]

                        List of Defined Templates
Name      Controller Type      Name      Controller Type
1 Ahu Template      AHU

F1 Cancel
Select a template by number (1 - 12)

```

Controller snapshot template

Figure 10-3: Controller Snapshot Template Selection Screen

3. Type the template number and press **Enter** to move the cursor to the Network Address field.
4. Type the network address.

Note: The network address specifies the address of the controller you want to snapshot. The controller type at that address must match the controller type for the template. If they do not match, the following error results:

```
Controller type does not match template.
```


5. Press Enter. The Controller Snapshot appears, displaying online data for the points specified in the template (Figure 10-4).

Note: The template name and network address are also shown. A Point To Command field also appears, allowing you to command a point in the currently displayed snapshot (or any point defined in the Panel unit database). Commanding points from a snapshot is described in the next section.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 12:46
-----
Point To Command [ ]

Template: Ahu Template                               On AHU At Network Address 1
0 801 Outdoor Air                                73.1 degf           802 Supply Fan           Off
803 Return Fan                                  Off

F1 Cancel                                         F3 More
Select a point to command (1 - 812)

```

Controller snapshot

Figure 10-4: Controller Snapshot Screen

- Note: The point numbers in a snapshot are always 801 through 812, no matter which template is selected and which snapshot is displayed.
6. Press F3 (More) to display a snapshot of the next addressed controller of the same type (using the same template).
 7. To display a snapshot of a controller of a different type, or to use a different template, return to the Network menu and select Controller Snapshot again to display a List of Defined Templates. Then select the new template.

Commanding a Point from the Controller Snapshot

To command a point from the controller snapshot:

1. From the Main menu, press N to select the Network option. The Network menu appears.
2. Press C to select the Controller Snapshot option. The following line appears, prompting you to specify the number of the template you want to use and the network address of the controller you want to snapshot:

```
Template Number [ ] Network Address [ ]
```

3. Specify the number of the template and the network address of the controller, and press Enter. The snapshot appears, with the Point To Command line at the top (Figure 10-5).

```
Operator Name: J. Smith                               Thu Jan 8, 1998 12:46
-----
Point To Command [ ]

Template: Ahu Template                               On AHU At Network Address 1
0 801 Outdoor Air                                73.1 degf                802 Supply Fan           Off
803 Return Fan                                   Off

F1 Cancel                                         F3 More
Select a point to command (1 - 812)
```

Controller snapshot screen

Figure 10-5: Controller Snapshot Screen

4. Type the number of the point you want to command in the Point To Command field and press Enter. The name of the point and command fields appears (Figure 10-6).

This point can be a point in the currently displayed snapshot or any point defined in the database.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 12:47
-----
Point To Command [803] Return Fan                    [Command] State To [On]

Template: Ahu Template                               On AHU At Network Address 1
0 801 Outdoor Air                                75.5 degf                802 Supply Fan      Off
803 Return Fan                                  Off

F1 Cancel                                         F3 More
Select binary output command (Override,Auto,Command,Release)

```

Point command

Figure 10-6: Point Command Fields

5. In the first command field, specify the type of command. You can accept the default, type your choice, or press the space bar to scroll through the options.

The command options are appropriate to the type of point selected.

6. In the second command field, specify the command value. You can accept the default, type your choice, or press the space bar to scroll through the options.

The value options are appropriate to the point and command types.

7. Press Enter to issue the command. The Panel unit sends the command to the controller, which then executes the command. The new commanded value appears in the controller snapshot (when the snapshot updates).
8. To command another point, enter the number in the Point To Command field and press Enter. Then repeat Steps 5 through 7.
9. Press F3 (More) to display a snapshot of the next addressed controller of the same type.

Creating Alarm Messages

Introduction

This chapter tells you how to create the alarm messages that display on, and print from, the Terminal screen when points go into alarm or change state, or when Totalization limits are exceeded. This chapter describes how to:

- add alarm messages
- modify alarm messages
- delete alarm messages

Key Concepts

Alarm Messages

Alarm reports are automatically generated by the Panel unit to inform you of facility conditions that might need attention. These reports provide standard point, feature, or controller data. For example, the name, status, and current value of the point in alarm are displayed. For point and Totalization alarm reports, the Panel unit allows you to write *additional* alarm messages that further explain the report. These user-defined alarm messages appear immediately after the standard alarm report on the screen and in printouts.

For example, the following message can appear on the Terminal screen when the temperature in a room exceeds the limit established during point definition. Note that the message appears below the alarm report point data.

```
Critical Alarm U 37 AHU1 RoomTemp Dec 1, 1994 14:00
Temperature beyond high/low limits—check
equipment/sensor
```

The following message can be printed when the Totalization feature determines the fan has been running too long:

```
Totalized Limit * 131 AHU1 RetFan L/L Dec 1, 1994 14:00
Runtime limit exceeded—equipment requires
maintenance
```

You can create up to 130 alarm messages. Each message can be up to 60 characters long.

When you define points and Totalization in the Point Add/Modify screens, you can assign an alarm message number to the point and to the Totalization limit. This number corresponds to the message text that appears when the alarm is generated. You can assign one alarm message to more than one point or Totalization limit.

To create or modify alarm messages, you must have a System capability password.

For alarm messages to be printed, your system must have a printer connected to the local terminal or Panel unit.

Additional Information

For information on assigning alarm messages to points, refer to the *Defining Points* chapter of this manual. For information on assigning alarm messages to Totalization limits, refer to the *Defining Totalization* chapter of this manual.

For information on managing alarms, refer to the *Managing Alarms* chapter of this manual.

For information on setting up Alarm Horn Points, refer to the *Setting Up the Panel Unit* chapter of this manual.

Procedure Overview

Table 11-1: Creating Alarm Messages

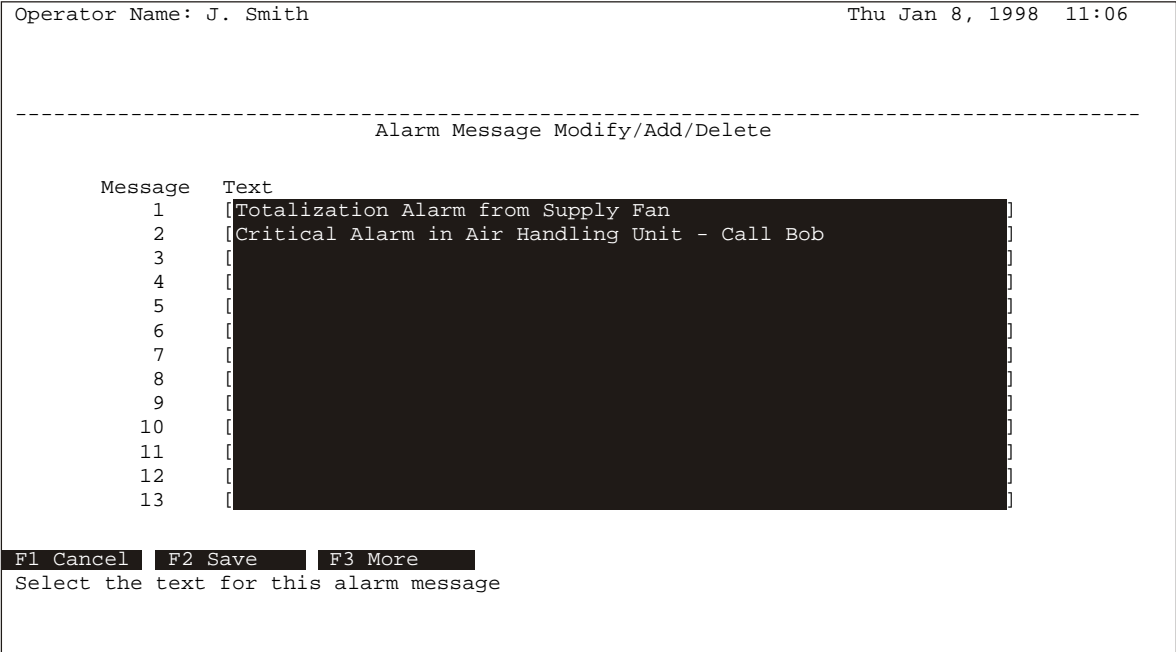
To Do This	Follow These Steps:
Add Alarm Messages	From the Main menu, press P. Press L. Press Enter to move to the field you want to add. Type in the new alarm message text in any blank text field. Press F2 (Save) or F3 (More).
Modify Alarm Messages	From the Main menu, press P. Press L. Press Enter to move the cursor to the field you want to modify. Type over the existing text you want to change. Press F2 (Save) or F3 (More).
Delete Alarm Messages	From the Main menu, press P. Press L. Press Enter to move the cursor to the field you want to delete. Press the space bar to insert spaces until the text field appears blank. Press F2 (Save) to delete the message.

Detailed Procedures

Adding Alarm Messages

To add alarm messages:

1. From the Main menu, press P to select the Point option. The Point menu appears.
2. Press L to select the List of Alarm Messages option. The Alarm Message Modify/Add/Delete screen appears (Figure 11-1).



Alarm message mod

Figure 11-1: Alarm Message Modify/Add/Delete Screen

3. Press Enter to move the cursor to the text field to which you want to add.
4. Type in the new alarm message text in any blank text field. The alarm message text can be up to 60 characters long.
5. Press F2 (Save) to save the new message to the System database. Press F3 (More) to save the message and scroll to the next screen of alarm messages (numbers 14-26).

Modifying Alarm Messages

To modify alarm messages:

1. From the Main menu, press P to select the Point option. The Point menu appears.
2. Press L to select the List of Alarm Messages option. The Alarm Message Modify/Add/Delete screen appears (Figure 11-1).
3. Press Enter to move the cursor to the text field you want to modify.
4. Type over the existing text you want to change. The alarm message text can be up to 60 characters long.
5. Press F2 (Save) to save the changed message to the Panel unit database. Press F3 (More) to save the message and scroll to the next screen of alarm messages (numbers 14-26).

Deleting Alarm Messages

To delete alarm messages:

1. From the Main menu, press P to select the Point option. The Point menu appears.
2. Press L to select the List of Alarm Messages option. The Alarm Message Modify/Add/Delete screen appears (Figure 11-1).
3. Press Enter to move the cursor to the text field you want to delete.
4. Press the space bar to insert spaces until the text field appears blank. The alarm message text can be up to 60 characters long.
5. Press F2 (Save) to delete the message.

Defining Totalization

Introduction

This chapter tells you how to define Totalization for Binary Input (BI) and Binary Output (BO) points.

This chapter describes how to:

- define Totalization
- add Totalization for a point
- modify Totalization for a point
- delete Totalization for a point

For information on displaying a summary of Totalization data, refer to the *Displaying Summaries* chapter of this manual.

Key Concepts

Totalization

Totalization is a feature that calculates:

- numbers of Changes-of-State (COS) for BI and BO points (Cycle Count Totalization)
- amount of time BI and BO points are in a normal state (Runtime Totalization)

You can display Totalization data at either a local or remote terminal, or print the data.

Totalization keeps track of how long a piece of equipment has been running (Runtime Totalization), or how many times the equipment has been turned Off and On (Cycle Count Totalization). For example, the Totalization program can identify, gather, and store information to answer questions, such as:

- How many hours has a fan run since its belts were replaced?
- How many times has a pump started since its last maintenance?

This information helps you keep the equipment in your facility properly maintained.

You can define Runtime or Cycle Count Totalization for any BI or BO point in your facility. You can specify that the Totalized value be displayed in counts, minutes, or hours. You can also define a limit for the Totalized value so that when the limit is exceeded, the Panel unit generates an alarm report.

For Runtime Totalization, Totalization samples points once a minute. For Cycle Count Totalization, Totalization adds one to the counter whenever the point changes from State 0 to State 1 (e.g., Off to On).

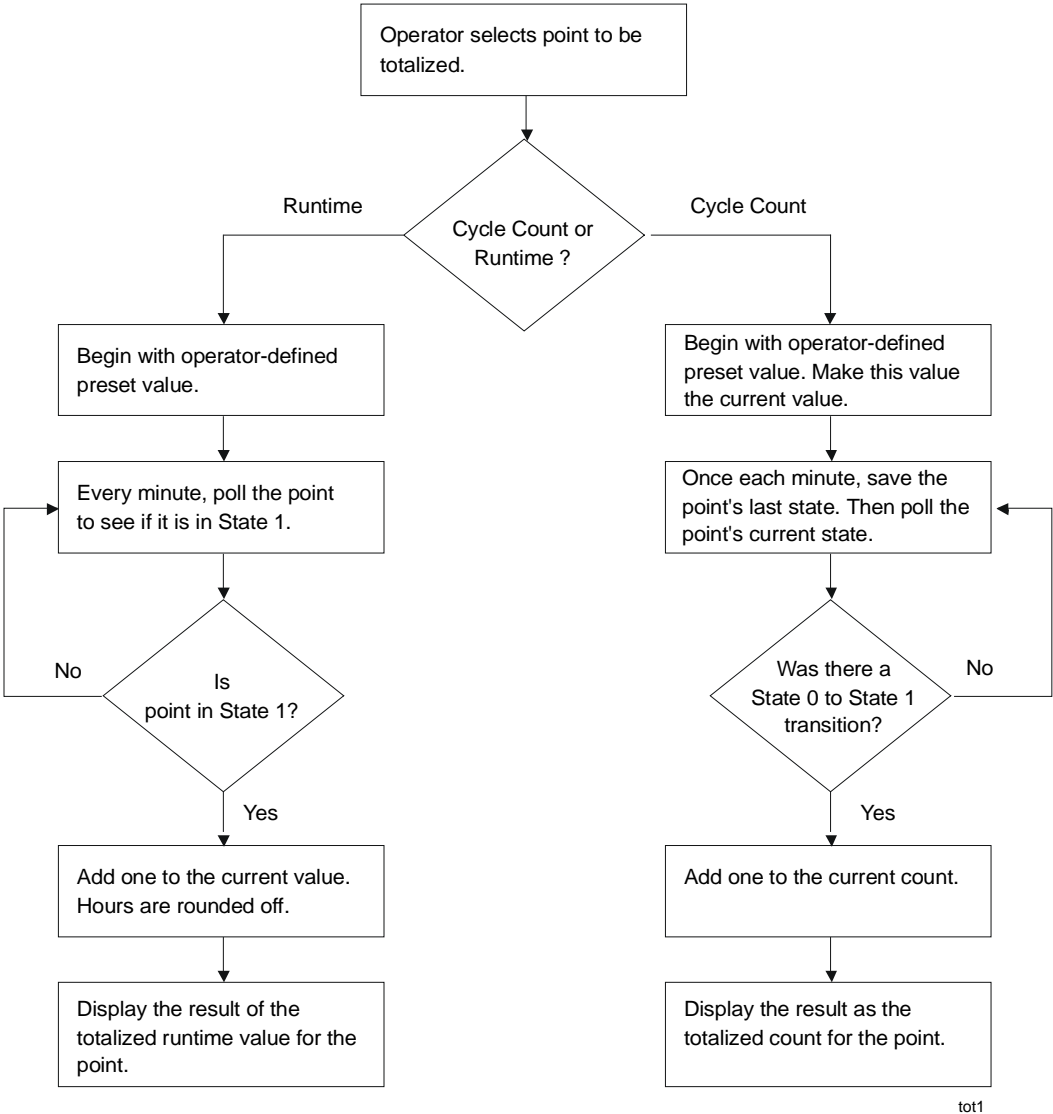
To define Totalization for a point, you must have a System capability password.

Totalization definition is actually a part of point definition. You can define Totalization for a BO or BI point when you initially add the point, or at a later time when you modify the point.

The Totalization Definition fields appear in two screens: the Point Add screen and the Point Modify screen. The fields are the same for both screens. This chapter tells you how to set up Totalization for an already defined point using the Point Modify screen.

Process

Figure 12-1 shows the basic operation of the Totalization feature.



tot1

Figure 12-1: Basic Totalization Operation

Types of Totalization

There are two types of Totalization: Runtime and Cycle Count. The types differ in the kind of information Totalized and/or in the type of binary input or output point providing the data.

Runtime Totalization

Runtime Totalization accumulates total time only while a particular condition is satisfied (for instance, Supply Fan 1 is on). It is typically used to even out equipment use or to schedule maintenance after a certain amount of use. Data is recorded and displayed in minutes, or it may be converted to hours for the display.

Typical uses for Runtime Totalization are to determine:

- fan or pump runtime
- runtime of fixed loads, such as lighting, for energy Totalization, and tenant billback

Cycle Count Totalization

Cycle Count Totalization records a total for the number of times a binary point transitions from State 0 to State 1. It is typically used to determine the frequency of an event. Cycle Count Totalization calculates a new value every minute in which there is a transition from State 0 to State 1.

Typical uses for Cycle Count Totalization are to determine how many:

- times a pump started
- cars entered a parking lot

Capabilities

Table 12-1 describes special capabilities of Totalization.

Table 12-1: Totalization Capabilities

Capability	Description	Purpose
Point and Totalization Type Selection	Operator can select any BI or BO point and get totals for "how much" or "how long."	Allows collection of precisely the data needed.
Alarms Display	Operator can define limits for totals. If or when limit is exceeded, alarm messages are sent to the printer.	Alerts staff to special or undesirable conditions.
Operator Intervention	For any Totalization, operator can: <ul style="list-style-type: none"> • reset total • set current total to new value • delete Totalization • modify parameters • define new Totalization 	Allows flexibility. Useful for testing the network.

Operator Interface

The operator accesses the Totalization feature through the Terminal. The following special screens are available for this interface:

- The Point Definition or Point Modify screens allow the operator to define Totalization parameters for binary points.
- The Totalization Point Summary allows the operator to display Totalization data for the Totalized points.
- The Reports feature allows the operator to print Totalization results.

As an example, Figure 12-2 shows the Totalization Point Summary screen.

Operator Name: J. Smith		Thu Jan 8, 1998 11:09				

Totalization Point Summary						
Point Information			Current Value	Alarm Limit	Units	Alarm Message
X 8 Supply Fan	Off	WS	50	4	Minutes	1
...End...						
F1 Cancel		F3 More				

Totalization

Figure 12-2: Totalization Point Summary Screen

Databases

When Totalization begins for a point, the Panel unit saves the calculated values to its database. For Totalization data to be retained, the database must be saved (either automatically or manually). If the system is shut down before the database is saved, Totalization data is lost.

Control Logic

You can create a Control Logic process that resets a Totalization value to zero when the Totalization limit is exceeded. In this process, use a BI or BO point as a master point and select TL Alarm as its condition. This defines the exceeded Totalization limit as an input condition. Then, in the same process, use the BI or BO as a subordinate point and select Reset as the command sent to the point when the input conditions are met.

Offline, Unreliable Status

When a point being totalized goes offline or is unreliable, the Panel unit suspends Totalization for that point. When the point goes online or becomes reliable again, Totalization resumes.

Sample Intervals

Runtime Totalization samples point values at one minute intervals. Cycle Count Totalization adds one to the cycle counter whenever a COS occurs (e.g., when the points changes from State 0 to State 1, or from Off to On).

Calculation

Runtime Totalization records the length of time that a binary condition has existed. The Panel unit records totals in minutes, but converts the displayed value to hours if you select (hours are rounded off). Runtime Totalization records the amount of time spent in State 1.

If the point to be totalized currently matches the state condition, the Runtime Totalization formula is:

$$\text{New Total} = \text{Old Total} + 1 \text{ minute}$$

Cycle Count Totalization records a total for the number of times any binary COS (State 0 to State 1 transition) has occurred. It calculates a new value every time the State 0 to State 1 transition occurs. This type of Totalization can be assigned to any BO or BI point.

The Cycle Count Totalization formula is:

$$\text{New Total} = \text{Old Total} + 1 \text{ count}$$

Design Considerations

As you define Totalization, consider the following:

- To set up Totalization, you need a System capability password.
- You can use the Totalization Preset Value parameter to reset the Totalized value after equipment maintenance. This parameter is found on the Point Add and Point Modify screens.
- The Totalization limit alarm report is sent to a local printer after the Totalization limit has been exceeded. For instance, if the limit is 1000 cycles, the alarm report is sent on the 1001st cycle.
- User-defined alarm messages can be printed with the Totalization limit alarm report. See the *Managing Alarms* chapter of this manual.
- You can use the Reports feature to print Totalization reports.
- Totalization values reset to 0 after reaching a count of 99999999.
- You can use the Control Logic feature to reset a Totalization value when the Totalization limit is exceeded.

Procedure Overview

Table 12-2: Defining Totalization

To Do This	Follow These Steps:
Define Totalization	Determine which BI and BO points need Totalization. Identify the type of Totalization required: Runtime or Cycle Count. Identify: Which points need Totalization limit alarms, the messages to be sent with the alarms. Enter the Totalization and alarm definition in the Point Add or Point screens for the Point you wish to totalize.
Add Totalization for a Point	From the Main menu, press T. Press M. Type the number of the point you want to set up for Totalization. Press Enter. Fill in the Totalization fields. Press F2 (Save).
Modify Totalization for a Point	From the Main menu, press T. Press M. Type the number of the point you want to set up for Totalization. Press Enter. Fill in the Totalization fields. Press F2 (Save).
Delete Totalization for a Point	From the Main menu, press T. Press M. Type the number of the point you want to delete. Press Enter. Type blanks in the Totalization fields. Press F2 (Save).

Detailed Procedures

Defining Totalization

To define Totalization:

1. Determine which BI and BO points need Totalization.
2. Identify the type of Totalization required:
 - Runtime
 - Cycle Count
3. Identify:
 - which points need Totalization limit alarms
 - the messages to be sent with the alarms
4. Enter the Totalization and alarm definition in the Point Add or Point screens for the Point you wish to totalize.

Adding Totalization for a Point

To add Totalization for a point:

1. From the Main menu, press T to select the Totalization option. The Totalization menu appears.
2. Press M to select the Modify/Add/Delete option. The following field appears on the screen, prompting you to specify the number of the point you want to set up for Totalization:

Point Number []

3. Type the point number.
4. Press Enter. The Point Modify screen for the selected point appears. Figure 12-3 shows an example of a Point Modify screen for a Binary Input point.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 11:11
-----
                                Point Modify
Point Number [ 56] Software Type [BI] Point Name [Tower Fan Relay]
Network Address: N2 Address [ 7] Point Type [BI] Point Address [ 1]

                                Binary Input Point Definition
Status Pair: State 0 [Off] State 1 [On] Normal Contact State [State 0]

                                Alarm Reporting Definition
Priority [None] Alarm Message Used When Reporting [ ]
Dial Sequence Number [ ]

                                Totalization Definition
Totalization Type [None]
Totalization Limit [ 0] Alarm Message Used When Limit Exceeded [ ]
Totalization Preset Value [ 0] Change To Preset Value Now [No]

F1 Cancel F2 Save F3 More
Select a totalization type (None,Cycle Counts,Runtime Min,Runtime Hour)

```

Totalization BI

Figure 12-3: Totalization Fields in BI Point Modify Screen

5. Fill in the Totalization fields by typing over the existing setting. Totalization starts counting from the value you enter. For example, if you enter 100 and enter Yes in the Change to Preset Value Now field, Totalization starts counting from 100 rather than from 0.

Note: You can use the Control Logic feature to reset the Totalization Preset Value to zero when the Totalization Limit is reached. For detailed information on defining Control Logic, refer to the *Creating Control Logic* chapter in this manual.

Table 12-3 explains the Totalization Definition fields.

Table 12-3: Totalization Definition Fields

Field	Description	Options/Range	Required?	Default
Totalization Type	Indicates the kind of Totalization you want for the point.	None, Cycle Counts, Runtime Min, Runtime Hour	Yes	None
Totalization Limit	Sets a limit for the Totalization counter. Sends a COS when the limit is exceeded.	0 to 99999999	No	0
Alarm Message Used When Limit Exceeded	Designates the alarm message the Panel unit sends to printer when the Totalization limit is exceeded.	1 to 130	No	N.A.
Totalization Preset Value	Sets the Totalization value to any number, including zero.	0 to 99999999	No	0
Change to Preset Value Now	Changes the Totalized value for the point to the Totalization Preset Value.	Yes, No	Yes	No

- Press F2 (Save) to save the new Totalization settings to the Panel unit database. Totalization begins as soon as you press F2 (Save).

Modifying Totalization for a Point

To modify Totalization for a point:

- From the Main menu, press T to select the Totalization option. The Totalization menu appears.
- Press M to select the Modify/Add/Delete option. The following field appears on the screen, prompting you to specify the number of the point you want to set up for Totalization:


```
Point Number [ ]
```
- Type the point number.
- Press Enter. The Point Modify screen for the selected point appears. Figure 12-3 shows an example of a Point Modify screen for a Binary Input point.
- Modify the Totalization fields by typing over the existing settings. Press Enter to move the cursor from field to field.
- Press F2 (Save) to save the changed Totalization settings to the Panel unit database. Totalization begins as soon as you press F2 (Save).

Deleting Totalization for a Point

To delete Totalization for a point:

1. From the Main menu, press T to select the Totalization option. The Totalization menu appears.
2. Press M to select the Modify/Add/Delete option. The following field appears on the screen, prompting you to specify the number of the point you want to set up for Totalization:
`Point Number []`
3. Type the point number.
4. Press Enter. The Point Modify screen for the selected point appears. Figure 12-3 shows an example of a Point Modify screen for a Binary Input point.
5. Type blank spaces in the Totalization fields.
6. Press F2 (Save) to delete the point.

Chapter 13

Defining Groups

Introduction

This chapter explains group definition.

This chapter describes how to:

- add groups
- modify groups
- delete groups

For information on displaying Group Summaries, refer to the *Displaying Summaries* chapter of this manual.

Key Concepts

Group Definition

The Panel unit allows you to create your own customized groups of points. For example, you can create a group that contains all the points involved in one Air Handling Unit (AHU). Or, you can create a group that contains all the points involved in one floor of the building.

You can create up to 60 groups. Each group can have up to 24 points. A point can appear in more than one group and more than once in the same group.

To define groups, you must have a System capability password.

Group Summary

Once you create a group of points, you can display a summary of the group. This Group Summary is the primary screen you use to monitor and control your facility. It displays all the points in the group and information about the points. In addition, a Group Summary offers two functions not available from any other screen. A Group Summary:

- allows you to command points
- displays refreshing point data. Point values update every 10 seconds.

This chapter tells you how to define groups only. For information on displaying a Group Summary, refer to the *Displaying Summaries* chapter of this manual. For information on commanding points, refer to the *Commanding Points* chapter of this manual.

Procedure Overview

Table 13-1: Defining Groups

To Do This	Follow These Steps:
Add Groups	From the Main menu, press G. Press M. Fill in the Group Number field. Enter the number of an undefined group. Press Enter. Fill in the Group Name field. Fill in the Point fields by moving the cursor to an empty Point field and typing in the point number you want to add. Press F2 (Save).
Modify Groups	From the Main menu, press G. Press M. Fill in the Group Number field. Enter the number of the group you want to modify. Press Enter. Fill in the Group Name field. Fill in the Point fields. Press F2 (Save).
Delete Groups	From the Main menu, press G. Press M. Enter the number of the group you want to delete. Press Enter. Enter blank spaces in the Group Name field. To delete a point from the group, move the cursor to the number field of the point you want to delete and press the space bar until the field is blank. Press F2 (Save).

Detailed Procedures

Adding Groups

To add groups:

1. From the Main menu, press G to select the Group option. The Group menu appears.
2. Press M to select the Modify/Add/Delete option. The List of Defined Groups appears, displaying the currently defined groups (Figure 13-1).

```

Operator Name: J. Smith                               Thu Jan 8, 1998  11:14
-----
                                Group Modify/Add/Delete

Group Number [ 2 ]
                                List Of Defined Groups

    1  Test for ZWS

F1 Cancel          F3 More
Select a group by number (1 - 60)

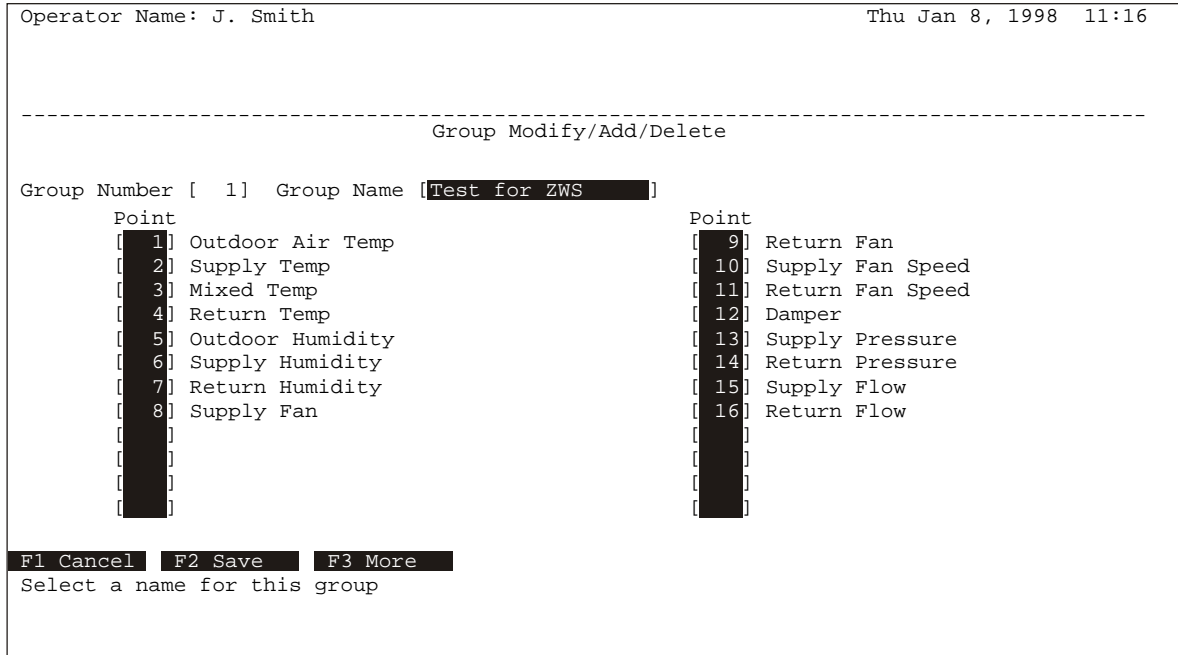
```

List of groups

Figure 13-1: List of Defined Groups

The Group Number field at the top of the list defaults to the next undefined group number. If no groups are defined, the default is 1.

3. Enter the number of an undefined group. Either accept the default or type a number in the range of 1 to 60.
4. Press Enter to access the Group Modify/Add/Delete screen for the number you specified (Figure 13-2). This screen displays the name of the group and the points in the group. If the group is undefined, the fields are blank.



Group modify

Figure 13-2: Group Modify/Add/Delete Screen

Table 13-2 explains the fields.

Table 13-2: Group Definition Fields

Field	Description	Options/Range	Required?	Default
Group Name	Describes the group's location and/or function.	16 characters	Yes	None
Point (24 possible fields)	Identifies, by number, a point to include in the group.	All valid point numbers	No	None

5. Fill in the Group Name field. The name can be up to 16 characters long and can include any combination of alphanumeric characters and spaces.
6. Fill in the Point fields by entering the point numbers you want to include in the group.
 Add a point to the Group by moving the cursor to an empty Point field and type in the point number you want to add. The point name appears when you move the cursor to the next field.
7. Press F2 (Save) to save the new group to the System database. The Group menu appears. You can now display the group's summary with the Summary option in the Group menu.

Modifying Groups

To modify groups:

1. From the Main menu, press G to select the Group option. The Group menu appears.
2. Press M to select the Modify/Add/Delete option. The List of Defined Groups appears, displaying the currently defined groups (Figure 13-1).
3. Enter the number of the group you want to modify. Either accept the default or type a number in the range of 1 to 60.
4. Press Enter to access the Group Modify/Add/Delete screen for the number you specified (Figure 13-2). This screen displays the name of the group and the points in the group. If the group is undefined, the fields are blank. Table 13-2 explains the fields.
5. Type the new name over the old name. The name can be up to 16 characters long and can include any combination of alphanumeric characters and spaces.
6. Fill in the Point fields by entering the point numbers you want to include in the group.
7. Press F2 (Save) to save the new group to the System database. The Group menu appears. You can now display the group's summary with the Summary option in the Group menu.

Deleting Groups

To delete groups:

1. From the Main menu, press G to select the Group option. The Group menu appears.
2. Press M to select the Modify/Add/Delete option. The List of Defined Groups appears, displaying the currently defined groups (Figure 13-1).
3. Enter the number of the group you want to delete. Either accept the default or type a number in the range of 1 to 60.
4. Press Enter to access the Group Modify/Add/Delete screen for the number you specified (Figure 13-2).
5. Enter blank spaces in the Group Name field. The group is deleted when you press F2 (Save).

Defining Schedules

Introduction

This chapter tells you how to create schedules that specify when the Panel unit turns equipment on and off.

This chapter describes how to:

- engineer the Weekly Scheduling feature
- add a weekly schedule
- modify a weekly schedule
- delete a weekly schedule
- create a temporary schedule
- delete a temporary schedule
- copy a weekly schedule
- display a Point Cross-Reference
- display a Scheduling Summary

Key Concepts

Schedules

The Panel unit allows you to automate routine functions. For example, you can create a weekly schedule that automatically turns a fan on at 7:00 in the morning, and off at 5:00 in the afternoon.

Once each minute, the Panel unit reads the schedules (in order) to see if commands should be issued. If the current system time is the same as the time in the schedule, the Weekly Scheduling feature issues the commands. The BO points are started, stopped, or released in the order they appear in the schedule. For start commands, Weekly Scheduling implements the Heavy Equipment Delay.

For each schedule, you specify two times: Time 1 and Time 2. These times cannot be the same; Time 2 can be earlier than Time 1.

For each point, you specify two commands: a Time 1 command and a Time 2 command. The Time 1 command takes place at Time 1, and the Time 2 command takes place at Time 2. (You also have the option of scheduling only one command for the point.)

There are three command options: Release, State 0, and State 1. State 0 and State 1 correspond to the status pair for the BO point (e.g., Off/On, Stop/Start). Release releases the command at the weekly schedule priority level, allowing the command at the next lower level to occur. (For more information on priority levels, see the *Defining Binary Output (BO) Point Software* chapter in this manual.

You can create up to 130 schedules. Each schedule can include up to 16 binary output points. Points can be in more than one schedule. You can schedule commands to be issued on specified days of the week, on only one specific calendar date, or both.

Weekly Scheduling Process

Figure 14-1 shows the basic Weekly Scheduling feature process.

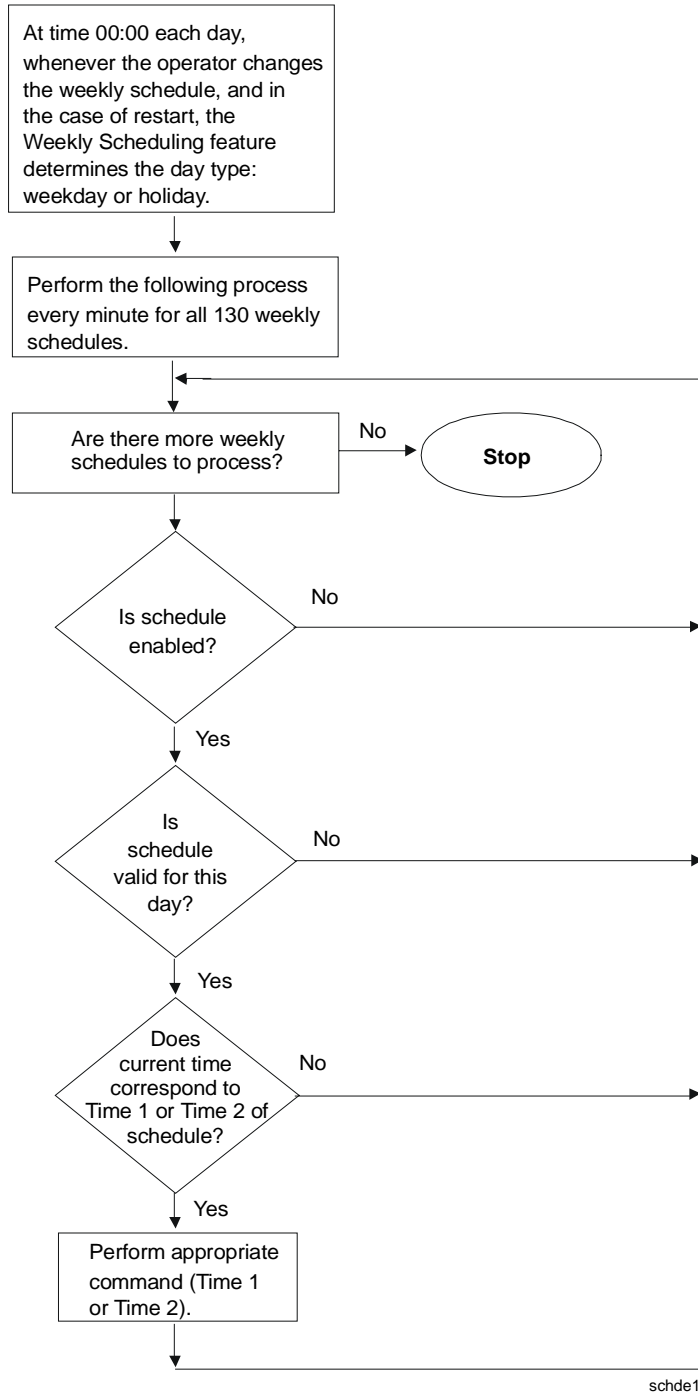


Figure 14-1: Basic Scheduling Process

Schedule Types

There are two types of schedules:

- weekly, which executes on specified days of the week and/or dates identified as holidays
- calendar date, which executes only on specified dates

When you define a schedule for a group of points, you can set up a weekly schedule, a calendar date schedule, or both. Within the same schedule, the two types of schedules can have different command times. The temporary calendar date schedule has precedence over the permanent weekly schedule.

Weekly Schedules

The basic form of a schedule is weekly. Each weekly schedule defines:

- whether the schedule is enabled, disabled, or deleted
- days the schedule applies (selections are the seven days of the week and holidays)
- Time 1 and/or Time 2
- BO points for which the schedule applies
- Time 1 command and/or Time 2 command (State 0, State 1, Release)

Use this type of schedule to command points used frequently and regularly, such as automatic lighting and ventilation systems. These types of points are often set to coincide with the business activity in a building, where the Monday through Friday schedules are different from the Saturday, Sunday, and holiday schedules. In addition, use this type of schedule to put an Application Specific Controller (ASC) to Occupied or Unoccupied mode.

Typical uses for weekly scheduling are:

- starting a fan at 7:00 a.m. and stopping it at 6:00 p.m. Monday through Friday
- changing the timing of parking lot security lamps from a summer schedule to a winter schedule
- issuing a command to an Application Specific Controller (ASC) to go into Occupied or Unoccupied mode

You need an Operate or System capability password to create weekly schedules.

For more information, see the *Setting Up the Panel Unit* chapter of this manual. On January 5 of each year, the Panel unit prints a message reminding you to update the holidays for the new year. Table 14-1 defines the parameters.

Table 14-1: Holiday Modify/Add/Delete Parameters

Field	Description	Options/ Range	Required?	Default
Month	Specifies the month in which the holiday begins.	Jan to Dec	Yes	N.A.
Day	Specifies the day of the month on which the holiday begins.	Only valid days can be entered	Yes	N.A.
Duration	Specifies the length of the holiday, in days. A holiday with a duration of 1 ends at midnight.	1 to 99 Note: If nothing is entered, the default value is accepted during the save.	Yes	1 Note: Defaults to 1 if no numeric value is entered.

Daylight Saving Schedules

Use the Daylight Saving Modify/Add/Delete screen (Figure 14-3) to define the dates on which daylight saving time begins and ends.

```

Operator Name: J. Smith                               Thu Jan 8, 1998  11:30
-----
Daylight Savings Modify/Add/Delete

Spring (month day) [ ] [ ]
Fall   (month day) [ ] [ ]

Automatic Update  [No]

Blank Month To Delete Date

F1 Cancel  F2 Save
Select month (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)

```

Daylight saving

Figure 14-3: Daylight Saving Modify/Add/Delete Screen

Weekly schedules that have been set to operate between 1 a.m. and 2 a.m. operate twice on the Fall date. Schedules that have been set to operate between 2 a.m. and 3 a.m. are skipped on the Spring date. The Panel unit changes the time at 02.00 on the dates you enter.

Table 14-2 defines the parameters.

Table 14-2: Daylight Saving Modify/Add/Delete Parameters

Field	Description	Options/Range	Required?	Default
Spring	Date (month and day) when daylight saving time begins.	Jan to Dec	Yes	N.A.
Fall	Date (month and day) when daylight saving time ends.	Jan to Dec	Yes	N.A.
Automatic Update	Specifies whether the Panel unit automatically defines and saves the correct daylight saving settings for the current year, and on January 5 of each subsequent year. The Panel unit uses standard U.S. daylight saving times.	Yes/No	Yes	No

Temporary Schedules

The temporary schedule allows you to automate a one-time-only function, overriding a point's weekly schedule. The temporary schedule is automatically deleted at midnight of the day for which it is assigned.

To create a temporary schedule, you must have an Operate or System capability password. Use the Scheduling Modify/Add/Delete screen to modify, add, or delete temporary schedules.

Power-Fail Restart

The Power-Fail Restart capability commands BOs to their appropriate scheduled states if power fails and the system has to be restarted.

When the system restarts, the Panel unit evaluates all schedules for the current day from midnight to the current time. The Panel unit then updates the command priority table for each BO point. Once the BO points return online, the Panel unit commands them to the states determined by the schedules. The Heavy Equipment Delay is in effect during the restart process to prevent large surges in electrical current.

Note: Power-Fail Restart does not send release commands defined in weekly schedules.

Schedule Conflict and Precedence

When a schedule includes both a calendar date and weekly schedule, the calendar date schedule has precedence over the weekly schedule. When the calendar date schedule completes (at midnight), the weekly schedule takes over (if one exists).

When two schedules are set for the same date and time, they execute in order of schedule number (1 to 130).

Note: The Panel unit does not check for scheduling conflicts in either weekly or temporary schedules. For example, you can create one schedule that commands a point to start at 7:00, and another schedule that commands the same point to stop at 7:00. To prevent scheduling conflicts, use the Point Cross-Reference to see which schedules the point is already involved in. See *Displaying a Point Cross-Reference* later in this chapter.

Point Cross-Reference

When you schedule a point, you might need to see which schedules the point is already involved in to avoid scheduling conflicts. The Point Cross-Reference provides this information. The Point Cross-Reference displays the numbers of the schedules the point is involved in, the Time 1 and Time 2 commands, the command times, and the days of the week and/or calendar date for each schedule.

Note: You can also use the Reports feature to print a hard copy of the Point Cross-Reference. For more information, refer to the *Scheduling and Printing Reports* chapter of this manual.

Scheduling Summary

A Scheduling Summary displays each defined schedule's command times (Time 1 and Time 2), the specified days of the week and/or calendar dates, and the BO points controlled by the schedule. This information provides you with an overview of the scheduled operations of your facility. In addition, like the Point Cross-Reference, this information can help you avoid creating scheduling conflicts.

Design Considerations

As you engineer the Weekly Scheduling feature, consider the following:

- To define weekly schedules, you need an Operate or System capability password.
- For schedules in which a calendar date is specified, the calendar date schedule overrides the weekly schedule.
- Schedules are processed in numerical order. If two schedules act on the same point at the same time, the second schedule processed (higher schedule number) may replace the command sent by the first schedule.
- You can schedule a stop command followed by a start command. This technique relies on successive schedules to stop the points. Make sure the points are always scheduled for stops as intended.
- The Release command releases the current scheduled priority command.
- You can use Scheduling Copy to quickly duplicate schedules to make minor changes for use in new schedules.
- You can use the Scheduling Point Cross-Reference screen to check for conflicts in your schedules.
- To start a controller, you can schedule a Start command to an Occupied Mode point (a BO point). When the Occupied point is commanded to Start, the entire controller sequence of operation (e.g., AHU) begins.
- The Power-Fail Restart capability ensures that BO points are commanded to their appropriate scheduled states when the system is restarted in the case of a power failure.

Procedure Overview

Table 14-3: Defining Schedules

To Do This	Follow These Steps:
Engineer the Weekly Scheduling Feature	Gather data on: building and occupant schedules, local daylight saving time dates, holiday periods. Determine which BO points need to be scheduled. Determine schedule for each BO point (time and days or date). Arrange points to be scheduled into groups that all turn on and off at the same times. Use the Schedule Modify/Add/Delete screen to create or copy schedules for each group. Make sure holiday and daylight saving dates are defined.
Add a Weekly Schedule	From the Main menu, press W. Press M. Accept the default number. Press Enter. Select whether the schedule is enabled. Fill in the Schedule fields. Press F2 (Save).
Modify a Weekly Schedule	From the Main menu, press W. Press M. Type the number of the schedule you want to modify. Press Enter. Select whether the schedule is enabled. Fill in the Schedule fields. Press F2 (Save).
Delete a Weekly Schedule	From the Main menu, press W. Press M. Type the number of the schedule you want to delete. Press Enter. Select Del in the event enabled field. Press F2 (Save).
Create a Temporary Schedule	From the Main menu, press W. Press M. Type the number of the schedule to which you want to add a temporary schedule; or, if you are adding a temporary schedule alone, accept the default. Press Enter. Select whether the schedule is enabled. Fill in the Temporary Schedule fields. Press F2 (Save).
Delete a Temporary Schedule	From the Main menu, press W. Press M. Type the number of the schedule to which you want to add a temporary schedule; or, if you are adding a temporary schedule alone, accept the default. Press Enter. Select Del in the event enabled field. Press F2 (Save).
Copy a Weekly Schedule	From the Main menu, press W. Press C. Type the number of the schedule you want to copy in the Copy Schedule Number field. Press Enter to move the cursor to the To Schedule Number field. Either type the number you want the schedule copied to or accept the default. Press Enter. Either accept all the copied settings, or modify them as necessary. If you modify the settings, press F2 (Save).
Display a Point Cross-Reference	From the Main menu, press W. Press P. Type the number of the point you want cross-referenced. Press Enter. If necessary, press F3 (More) to scroll through the schedules the point is involved in.
Display a Scheduling Summary	From the Main menu, press W. Press S. Type the number of the schedule you want the summary to start with. Press Enter. Either type the number you want the schedule copied to or accept the default. Press Enter. Either accept all the copied settings, or modify them as necessary. If you modify the settings, press F2 (Save).

Detailed Procedures

Engineering the Weekly Schedule Feature

To engineer the Weekly Scheduling feature:

1. Gather data on:
 - building and occupant schedules
 - local daylight saving time dates
 - holiday periods
2. Determine which BO points need to be scheduled.
3. Determine schedule for each BO point (time and days or date).
4. Arrange points to be scheduled into groups that all turn on and off at the same times.
5. Use the Schedule Modify/Add/Delete screen to create or copy schedules for each group.
6. Make sure holiday and daylight saving dates are defined.

Adding a Weekly Schedule

To add a weekly schedule:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **M** to select the Modify/Add/Delete option. The following field appears, prompting you to enter the number of the schedule you want to add. The next undefined schedule number appears as the default. For example, if Schedules 1 through 15 are defined, 16 appears.

```
Schedule [ 16 ]
```

3. Accept the default number (which is the next available schedule).
4. Press **Enter**. The Scheduling Modify/Add/Delete screen appears (Figure 14-4).

```
Operator Name: J. Smith                               Thu Jan 8, 1998  11:39

-----
                          Scheduling Modify/Add/Delete
-----
Schedule [ 23]  Event Enabled [Yes]
Permanent: Schedule Days (SMTWTFSH) [SM]
Temporary: Calendar Date (month day) [ ] [ ]

Time 1         Time 2
[12:10]       [12:15]
[00:00]       [00:00]

Point          Time 1      Time 2          Point          Time 1      Time 2
Command       Command    Command        Command       Command    Command
[ 8] Supply Fan [On]      [Off]          [ ]           [ ]         [ ]
[ ]           [ ]         [ ]           [ ]           [ ]         [ ]
[ ]           [ ]         [ ]           [ ]           [ ]         [ ]
[ ]           [ ]         [ ]           [ ]           [ ]         [ ]
[ ]           [ ]         [ ]           [ ]           [ ]         [ ]
[ ]           [ ]         [ ]           [ ]           [ ]         [ ]
[ ]           [ ]         [ ]           [ ]           [ ]         [ ]
[ ]           [ ]         [ ]           [ ]           [ ]         [ ]

F1 Cancel  F2 Save  F3 More
Select enable (No, Yes, Del)
```

Modify schedule

Figure 14-4: Scheduling Modify/Add/Delete Screen

5. Select whether the schedule is enabled. Press the space bar to scroll through the options (Yes, No, Del).
6. Fill in the Schedule fields. Press **Enter** to move the cursor from field to field. Table 14-4 explains the fields. Leave the fields on the Temporary line empty, unless you are defining a temporary schedule.

Table 14-4: Weekly Scheduling Fields

Field	Description	Options/Range	Required?	Default
Schedule	Identifies the schedule by number. Also designates the order in which conflicting schedules send commands to BO points.	1 to 130	Yes	First unused schedule
Event Enabled	Specifies whether the schedule is enabled, disabled, or deleted.	Yes, No, Del	Yes	Del
Time 1	Specifies when the Time 1 command executes. Must be different than Time 2.	00:00 to 23:59, in 24-hour time format	No	00:00
Time 2	Specifies when the Time 2 command executes. Must be different than Time 1.	00:00 to 23:59, in 24-hour time format	No	00:00
Permanent: Schedule Days	Sets the days of the week on which the permanent schedule sends commands to BO points. Selects the weekly schedule day types (days of the week, holiday) to which the schedule applies.	Sunday through Saturday, Holiday. Valid entries are position dependent. They require a space or the appropriate letter in the sequence: SMTWTFSH.	Yes	SMTWTFSH
Temporary: Calendar Date	Sets the month and day for the temporary schedule to execute.	Jan 1 to Dec 31 The Panel unit only accepts valid dates. For instance, February 30 is not valid, but February 29 is. The Panel unit does check for leap year.	Yes	N.A.
Point (16 Fields)	Sets the BO point to be commanded.	Any BO point	At least one point must be in the schedule.	N.A.
Time 1 Command	The command that occurs at Time 1. State 0 and State 1 command options correspond to the point's defined status pair.	Rel State 0 (Off, No) State 1 (On, Yes)	No	
Time 2 Command	The command that occurs at Time 2. State 0 and State 1 command options correspond to the point's defined status pair.	Rel State 0 (Off, No) State 1 (On, Yes)	No	

7. Press F2 (Save) to save the new or modified schedule to the Panel unit database.

Modifying a Weekly Schedule

To modify a weekly schedule:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **M** to select the Modify/Add/Delete option. The Schedule field appears, prompting you to enter the number of the schedule you want to modify.
3. Type the number of the schedule you want to modify.
4. Press **Enter**. The Scheduling Modify/Add/Delete screen appears (Figure 14-4).
5. Select whether the schedule is enabled. Press the space bar to scroll through the options (Yes, No, Del).
6. Fill in the Schedule fields. Press **Enter** to move the cursor from field to field. Table 14-4 explains the fields. Leave the fields on the Temporary line empty, unless you are defining a temporary schedule.
7. Press **F2** (Save) to save the new or modified schedule to the Panel unit database.

Deleting a Weekly Schedule

To delete a weekly schedule:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **M** to select the Modify/Add/Delete option. The following field appears, prompting you to enter the number of the schedule you want to delete. The next undefined schedule number appears as the default. For example, if Schedules 1 through 15 are defined, 16 appears.

```
Schedule [ 16 ]
```
3. Type the number of the schedule you want to delete.
4. Press **Enter**. The Scheduling Modify/Add/Delete screen appears. Refer to Figure 14-4.
5. Select **Del** in the Event Enabled field.
6. Press **F2** (Save) to save the new or modified schedule to the Panel unit database.

Creating a Temporary Schedule

To create a temporary schedule:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **M** to select the Modify/Add/Delete option. The following field appears, prompting you to enter the number of the schedule you want to create. The next undefined schedule number appears as the default. For example, if Schedules 1 through 15 are defined, 16 appears.

```
Schedule [ 16 ]
```

3. Type the number of the schedule to which you want to add a temporary schedule; or, if you are adding a temporary schedule alone (a temporary schedule with no weekly schedule), accept the default.
4. Press **Enter**. The Scheduling Modify/Add/Delete screen appears. Refer to Figure 14-4.
5. Select whether the schedule is enabled. Press the space bar to scroll through the options (Yes, No, Del).
6. Fill in the Temporary Schedule fields. Press **Enter** to move the cursor from field to field. Table 14-3 explains the fields.
7. Press **F2** (Save) to save the new or modified schedule to the Panel unit database.

Deleting a Temporary Schedule

To delete a temporary schedule:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **M** to select the Modify/Add/Delete option. Enter the number of the schedule you want to delete.
3. Press **Enter**. The Scheduling Modify/Add/Delete screen appears. Refer to Figure 14-4.
4. Select **Del** in the Event Enabled field.

Note: If you choose Delete, you delete the entire schedule, not just the temporary schedule. Temporary schedules are automatically deleted at midnight on the day that they are run.

Copying a Weekly Schedule

To copy a weekly schedule:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **C** to select the Copy Schedule option. The Scheduling Copy screen appears (Figure 14-5).

```

Operator Name: J. Smith                               Thu Jan 8, 1998  11:21
-----
                                Scheduling Copy
Copy Schedule Number [2] To Schedule Number [3]

F1 Cancel
Select a schedule number (1 - 130)

```

Scheduling copy

Figure 14-5: Scheduling Copy Screen

3. Type the number of the schedule you want to copy in the Copy Schedule Number field. Table 14-5 explains the fields.

Table 14-5: Scheduling Copy Parameters

Field	Description	Options/Range	Required?	Default
Copy Schedule Number	Number of the source schedule you want to duplicate.	1 to 130	Yes	N.A.
To Schedule Number	Number of the destination schedule you want this to be.	1 to 130	Yes	Next available schedule

4. Press Enter to move the cursor to the To Schedule Number field. This field defaults to the next available undefined schedule. For example, if Schedules 1 through 10 are defined, this field displays 11.
5. You can either type the number you want the schedule copied to or accept the default.
6. Press Enter to copy the schedule. As soon as you press Enter, the copied schedule is entered into the Panel unit database. Unlike most operations, you do not need to press F2 (Save).

The Schedule Modify/Add/Delete screen appears, displaying the settings from the copied schedule (Figure 14-6).

```

Operator Name: J. Smith                               Thu Jan 8, 1998 11:39
-----
                                Scheduling Modify/Add/Delete
Schedule [ 23] Event Enabled [Yes]                  Time 1   Time 2
Permanent: Schedule Days (SMTWTFSH) [SM          ] [12:10] [12:15]
Temporary: Calendar Date (month day) [          ] [00:00] [00:00]

Point          Time 1   Time 2          Time 1   Time 2
Command       Command  Command       Command  Command
[ 8] Supply Fan [On]    [Off]         [          ] [          ]
[          ]    [          ] [          ]    [          ] [          ]
[          ]    [          ] [          ]    [          ] [          ]
[          ]    [          ] [          ]    [          ] [          ]
[          ]    [          ] [          ]    [          ] [          ]
[          ]    [          ] [          ]    [          ] [          ]
[          ]    [          ] [          ]    [          ] [          ]

F1 Cancel  F2 Save  F3 More
Select enable (No,Yes,Del)

```

Modify schedule

Figure 14-6: Modify/Add/Delete Screen for a Copied Schedule

You can either accept all the copied settings, or modify them as necessary.

7. If you modify the settings, press F2 (Save) to enter the changes into the Panel unit database.

Displaying a Point Cross-Reference

To display a Point Cross-Reference:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **P** to select the Point Cross-Reference option. The following field appears, prompting you to enter a point number. This field defaults to the first point involved in a schedule.

```
Point Number [ 1 ]
```

3. Type the number of the point you want cross-referenced.
4. Press **Enter**. The cross-reference for the specified point appears. Figure 14-7 shows an example of a cross-reference for a point involved in three schedules.

Operator Name: J. Smith		Thu Jan 8, 1998 11:42						

Scheduling Point Cross-Reference								
Point	Schedule	Enable	Time 1	Cmd	Time 2	Cmd	Days	Calendar
8 Supply Fan	1	Yes	14:55	On	15:00	Off	M F	
	2	Yes	12:10	On	12:15	Off	SM	
	23	Yes	12:10	On	12:15	Off	SM	
...End...								
F1 Cancel			F3 More					

Point cross reference

Figure 14-7: Point Cross-Reference

Note: If the Days column contains any days of the week, the function is performed weekly (permanent). If the Calendar column contains a date, the function is performed one time only (temporary).

5. If necessary, press **F3** (More) to scroll through the schedules the point is involved in. When you reach the last screen of schedules, the summary wraps around to the first screen of schedules.

Displaying a Scheduling Summary

To display a Scheduling Summary:

1. From the Main menu, press **W** to select the Weekly Scheduling option. The Weekly Scheduling menu appears.
2. Press **S** to select the Summary option. The following field appears, prompting you to enter a starting schedule number. The field defaults to the first defined schedule.

Schedule []

3. Type the number of the schedule you want the summary to start with. For example, if you enter 10, the summary starts with Schedule 10.
4. Press **Enter**. The Scheduling Summary appears, starting with the number you entered. Figure 14-8 shows an example of a Scheduling Summary.

Operator Name: J. Smith				Thu Jan 8, 1998 11:43		

Scheduling Summary						
Schedule	Enable	Time1	Time2	Schedule Days	Calendar Date	Referenced Points
1	Yes	14:55	15:00	M F		8
2	Yes	12:10	12:15	SM		8
23	Yes	12:10	12:15	SM		8
...End...						
F1 Cancel		F3 More				

Weekly scheduling

Figure 14-8: Weekly Scheduling Summary

Note: If the Schedule Days column contains any days of the week, the function is performed weekly (permanent). If the Calendar Date column contains a date, the function is performed one time only (temporary).

5. If necessary, press **F3** (More) to scroll through the schedules. When you reach the last page of schedules, the summary wraps around to the first screen of schedules.

Defining Trend

Introduction

This chapter tells you how to define Trend data collection for points.

This chapter describes how to:

- create a Trend Log
- modify a Trend Log
- delete a Trend Log
- stop Trend for a point

For information on displaying a summary of Trend data, refer to the *Displaying Summaries* chapter of this manual. For information on printing Trend data, refer to the *Scheduling and Printing Reports* chapter of this manual.

Key Concepts

Trend

The Trend feature keeps track of how values change over time. The Trend feature gathers the data needed to review the performance of an entire building, or of an individual piece of equipment. The operator can sample or monitor any point at given intervals and use the results to diagnose problems in the facility. For example, Trend can keep track of how the temperature of a room changes during the course of the day by sampling and recording the temperature once every hour.

When you start Trend for a point, the Panel unit saves the point information into its database. This database records a block of samples for the point. When you display information from this data base, the Panel unit shows you the:

- name of the point
- engineering units for the point
- time of each sample
- value and status of the point at the time of each sample

You can create up to 32 Trend Logs of 4 points each. You specify a sample rate in either hours or minutes for each log. Trend takes 168 samples at the sample rate you specify.

When you define a Trend Log, you specify the time trending starts. If the system restarts (e.g., due to a power failure), trending automatically restarts for all defined Trend Logs, regardless of the start time.

When you define the Trend Log, you can specify to either stop trending or overwrite the collected samples when the last sample (168) is taken. For example, if you specify a sample rate of one hour, the points in the log are sampled once every hour for seven days. If you specify Rollover for the Trend Log, the new samples overwrite the old samples after the last sample is taken. (The oldest samples are overwritten first.) If you specify Stop for the Trend Log, the Trend Log stops after the last sample is taken.

Trend data is not kept in permanent memory; therefore, if the Panel unit loses power, Trend data is lost. To generate a permanent record of Trend data, use the Reports or Print Screen feature to periodically print Trend Logs. (Refer to the *Scheduling and Printing Reports* chapter in this manual for information on scheduling reports.)

Basic Trend Process

Figure 15-1 shows the basic process the Trend feature uses to gather data.

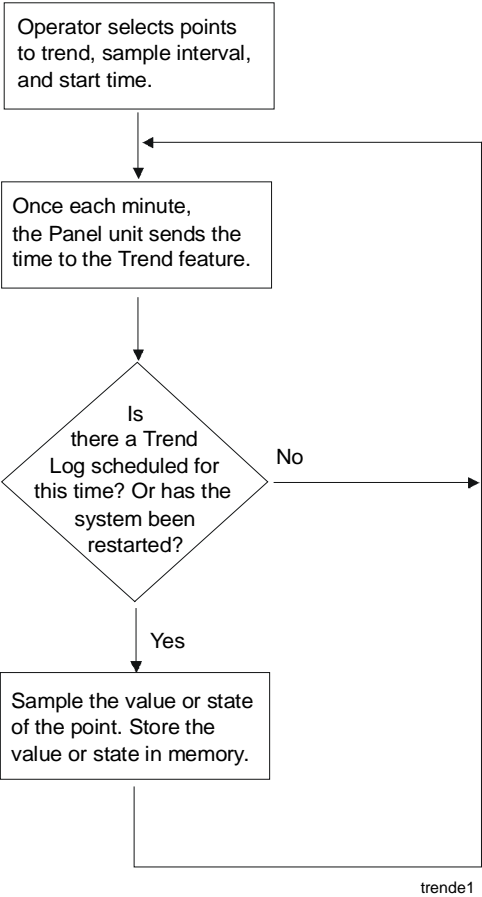


Figure 15-1: Basic Trend Process

Capabilities

Once the desired Trends are defined, the Panel unit samples the point value and status at each interval and stores them.

Table 15-1 describes the capabilities of Trend.

Table 15-1: Trend Capabilities

Capability	Description	Purpose
Selection	Operator can select any point and Trend the point value or status.	Allows the collection of precisely the data needed.
Interval	Operator can define sample selection intervals from one per minute to one per 60 minutes, or from one per hour to one per 24 hours.	Allows the operator to determine the optimum data collection rate.
Display	Trend data is presented in tabular form.	Provides data in most convenient form.
Operator Intervention	For any Trend, operator can: <ul style="list-style-type: none">• begin at any time• modify point selection and sample interval• delete Trend• define new Trend	Allows flexibility. Useful for testing the Panel unit network.

Trend Logs

A Trend Log displays trends of current values for up to four points. The log displays the time of the sample and the values of the points at that time sample.

Display Trend Logs from the Data Trend menu.

Design Considerations

When engineering the Trend feature, consider the following:

- You must have a System capability password to define Trend.
- You can use Trend Logs to monitor the performance of points that affect each other. For instance, you can compare values for chillers, outside air temperature, and relative humidity.
- The Trend Log restarts if you change definition for a Trend Log definition. All samples taken before the new definition are lost.
- Trending automatically restarts for all defined Trend Logs—regardless of their Start Times—if the system restarts (e.g., due to a power failure).
- Trend samples are lost between system shutdowns.
- Use the Reports feature to periodically print Reports. Refer to the *Scheduling and Printing Reports* chapter in this manual.
- The M3 Workstation may be used to transfer the Trend Logs from the Panel unit into its disk drive to be viewed via M-Trend.

Procedure Overview

Table 15-2: Defining Trend

To Do This	Follow These Steps:
Create a Trend Log	Press D. Press M. Press Enter. The Point fields are blank. Fill in the Trend Log Definition fields. Press F2 (Save) or F3 (More).
Modify a Trend Log	Press D. Press M. Enter the number of the Trend Log in the Trend Log Number field. Fill in the Trend Log Definition fields. Press F2 (Save) or F3 (More).
Delete a Trend Log	Press D to select the Data Trend Option. Press M to select the Modify/Add/Delete option. Enter the number of the Trend Log in the Trend Log Number field. Enter 0 in all four Trend Point Fields. Press F2 (Save) or F3 (More). All Trend data is lost.
Stop Trend for a Point	Press D. Press M. Enter the number of the Trend Log in the Trend Log Number field. Fill in the Trend Log Definition fields. Move the cursor to the point's Trend Point field. Type 0 in the field. Trending stops for the point when you press F2 (Save) or F3 (More).

Detailed Procedures

Creating a Trend Log

To create a Trend Log:

1. From the Main menu, press D to select the Data Trend option. The Data Trend menu appears.
2. Press M to select the Modify/Add/Delete option. The first undefined Trend Log Number is displayed.
3. Press Enter. A new Trend Log Modify/Add/Delete screen appears (Figure 15-2). The point fields are blank.

```

Operator Name: J. Smith                               Thu Jan 8, 1998  11:49
-----
                                Trend Log Modify/Add/Delete
Trend Log Number [  4 ]
 1st Trend Point [  3 ] Mixed Temp
 2nd Trend Point [  2 ] Supply Temp
 3rd Trend Point [  6 ] Supply Humidity
 4th Trend Point [ 23 ] Flame Signal

Sample Rate Units (Minutes, Hours) [Minutes]   Sample Rate [  5 ]
Start Time Of First Sample (hh:mm) [00:00]
After Last Sample (Rollover, Stop) [Rollover]

F1 Cancel  F2 Save  F3 More
Select a trend sample rate unit (Minutes,Hours)
  
```

Trend log modify

Figure 15-2: Trend Log Modify/Add/Delete Screen

4. Fill in the Trend Log Definition fields. You can specify up to four defined points. Press Enter to move the cursor from field to field. Table 15-3 explains the fields.

Table 15-3: Trend Log Definition Fields

Field	Description	Options/Range	Required?	Default
Trend Log Number	Identifies, by number, the Trend Log you are currently displaying.	1 to 32	Yes	1
1st Trend Point 2nd Trend Point 3rd Trend Point 4th Trend Point	Identifies, by number, the points you are including in this Trend Log. Once the number is entered, a point description appears next to the point number.	Any defined point numbers	At least one point is required in the Trend Log.	N.A.
Sample Rate Units	Selects the time units for the sample rate.	Minutes, Hours	Yes	Minutes
Sample Rate	Selects the number of minutes or hours between samples.	1 to 60 minutes 1 to 24 hours	Yes	5
Start Time Of First Sample	Sets the time when the first sample is taken for this Trend Log.	00:00 to 23:59, 24-hour format	Yes	00:00
After Last Sample	Either Stops Trend or overwrites Trend samples after the last sample is taken.	Rollover, Stop	Yes	Rollover

5. Press F2 (Save) to save the new Trend Log to the System database.
Or press F3 (More) to save the new Trend Log and scroll to the next Trend Log Modify/Add/Delete screen.

Modifying a Trend Log

To modify a Trend Log:

1. From the Main menu, press D to select the Data Trend option. The Data Trend menu appears.
2. Press M to select the Modify/Add/Delete option. The first undefined Trend Log number is displayed.
3. Enter the number of the Trend Log in the Trend Log Number field. The Trend Log appears.
4. Fill in the Trend Log Definition fields. You can specify up to four defined points. Press Enter to move the cursor from field to field. Table 15-3 explains the fields.
5. Press F2 (Save) to save the new Trend Log to the System database.
Or press F3 (More) to save the new Trend Log and scroll to the next Trend Log Modify/Add/Delete screen.

Deleting a Trend Log

To delete a Trend Log:

1. From the Main menu, press D to select the Data Trend option. The Data Trend menu appears.
2. Press M to select the Modify/Add/Delete option.
3. Enter the number of the Trend Log in the Trend Log Number field. Enter 0 in all four Trend Point fields.
4. Press F2 (Save) to save the new Trend Log to the System database.
Or press F3 (More) to save the new Trend Log and scroll to the next Trend Log Modify/Add/Delete screen.

Note: The Trend definition is deleted when you press F2 (Save) or F3 (More). All Trend data is lost.

Stopping Trend for a Point

To stop Trend for a point:

1. From the Main menu, press D to select the Data Trend option. The Data Trend menu appears.
2. Press M to select the Modify/Add/Delete option. The first undefined Trend Log Number is displayed.
3. Enter the number of the Trend Log in the Trend Log Number field. The Trend Log appears.
4. To stop trend for a point, move the cursor to the point's Trend Point field. Type 0 in the field. Trending stops for the point when you press F2 (Save) or F3 (More).

Understanding Energy Management

Introduction

This chapter tells you how to use the Panel unit's energy management features: Demand Limiting (DL), Load Rolling (LR), and Optimal Start/Stop (OST). By reducing energy costs and consumption, the Panel unit's energy management features help you make your facility more cost-effective and safe for the environment.

This chapter describes how to:

- define the Demand Meter
- set up the Demand Limiting Schedule
- add Demand Limiting loadsets
- modify Demand Limiting loadsets
- delete Demand Limiting loadsets
- add Load Rolling loadsets
- modify Load Rolling loadsets
- delete Load Rolling loadsets
- add an OST system
- modify an OST system
- delete an OST system
- display an Energy Profile summary

For information on displaying an Energy Profile, refer to the *Displaying Summaries* chapter of this manual.

For additional information about energy management, refer to the *ASHRAE Fundamentals* manual and the *Johnson Controls Engineering Data Book*.

Key Concepts

Demand Limiting

Demand Limiting reduces energy costs by turning off designated equipment when the amount of energy consumed by the facility approaches a specified target. The purpose of Demand Limiting is to keep the demand for energy at any given time below this target. This reduces energy costs because utility companies often determine charges by the day's peak demand for energy.

Demand Limiting requires you to specify:

- number of minutes for the demand interval your energy company uses when calculating its bill for you
- time schedule during which you limit energy use
- an accumulator meter point
- targets for the maximum consumption in the demand interval
- loads (BO software points) that can be shed, each grouped into 1 of 16 loadsets (sets of loads that are shed and released by DL and LR [Demand Limiting and Load Rolling] as the appropriate conditions arise)
- when, relative to your target consumption, each loadset is shed and released
- time schedules for peak demand targets

See Figure 16-1 for a flowchart of the Demand Limiting process.

Notes: If the demand meter (AC point) goes offline during a Demand Limiting cycle, all loadsets which are being commanded by Demand Limiting are shed for their minimum shed time, and then released for their minimum release time. If the demand meter is still offline, Demand Limiting stops.

If you change any Demand Limiting parameters during a DL cycle, the changes do not take effect until the beginning of the next cycle.

Application

As an example, on a very warm day, all of the building's HVAC loads might tend to run in similar cycles, creating large demand peaks when all are on, and relatively low demand when all are off. To level the demand, Demand Limiting can:

- turn off power on the domestic water heater, and similar low priority loads, when power consumption reaches 95% of the demand target
- release loads when power consumption drops below 85% of the demand target. For more information, refer to the appropriate Point software chapter (e.g., *Defining Analog Output (AO) Point Software*) of this manual.

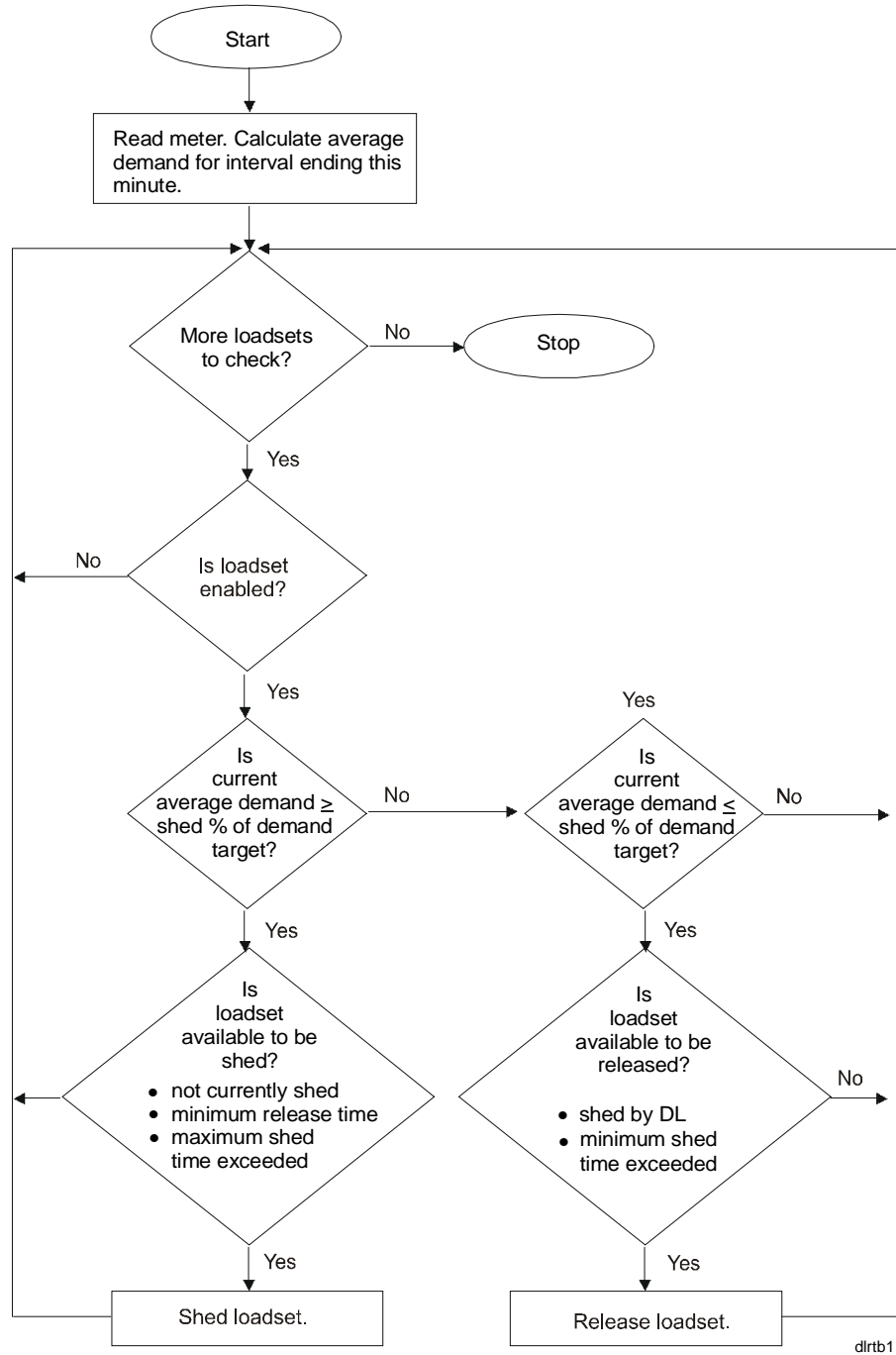


Figure 16-1: Demand Limiting Process

Capabilities

Table 16-1 describes the capabilities of the Demand Limiting feature.

Table 16-1: Demand Limiting Capabilities

Capability	Description	Purpose
Load Shedding	Intelligently controls loadsets to satisfy the calculated Demand Limiting control actions.	Averages energy demand to reduce interval demand peaks.
Demand Calculation	Calculates total interval demand during each interval using a sliding interval. Does not use an end of interval pulse.	Maintains energy efficiency.
Flexibility	Provides: <ul style="list-style-type: none"> • <i>Loads</i> - points that are acceptable shed candidates can be grouped into loadsets. Loadsets can be shed progressively as consumption approaches target. • <i>Minimum Release Time</i> - the minimum time a load must be left on before being considered for shedding. • <i>Minimum Shed Time</i> - the minimum time that a load must be kept off before being released. • <i>Maximum Shed Time</i> - the maximum time a load can be kept off by Demand Limiting. • <i>Demand Target</i> - the maximum interval demand average to be maintained by Demand Limiting. 	Demand Limiting feature: <ul style="list-style-type: none"> • Allows user definition of candidates for shedding. • Maintains occupant comfort. • Prevents excessive equipment cycling. • Maintains occupant comfort. • Customizes automatic shedding decisions for particular savings goals
Energy Profile Data	Maintains statistical information that specifies total consumption of energy and peak demand during daily, weekly, monthly, or annual periods.	Summarizes information on effectiveness of Demand Limiting. View information in Energy Profile summary, or print with Reports feature.
Operator Intervention	Allows operator to: <ul style="list-style-type: none"> • disable or enable loadsets • change target value 	Allows user to handle special situations or changes.
System Integration	Allows operator to change target value on a time schedule.	Controls demand in response to time-of-day billing rates.

Demand Meter

The first part of setting up Demand Limiting is to define an Accumulator point as the demand meter. This AC point measures the facility's current demand for energy (or some other measurable commodity such as water or gas). For example, if Demand Limiting is controlling electrical consumption, define the electric company's electric meter as an AC point. Then specify that this point be used for Demand Limiting.

Only one AC point can be used for Demand Limiting.

Demand Limiting Schedule

The second part of setting up Demand Limiting is to create the Demand Limiting Schedule, which specifies the targets that you do not want energy consumption to exceed.

Demand Limiting needs target values to use when it is attempting to limit energy peaks during a demand interval. The three demand targets, specified for the day, do not need to be scheduled in time order. For example, Start Off Peak may be set for 9:00 a.m. while the Start On Peak is set for 10:30 p.m.

The target demands can span across days. The last target value of the day stays in effect until the next scheduled target, which may occur the following day. You specify these peak demand targets as a function of a schedule on the Demand Limiting Schedule screen shown in Figure 16-4. The parameters for this screen are defined in Table 16-4.

Demand Limiting Loadsets

The third part of setting up Demand Limiting is to set up the loadsets. A loadset is a group of loads. A load is a Binary Output (BO) point corresponding to a piece of equipment that Demand Limiting turns off to limit energy consumption. An exhaust fan is a typical load.

You can define up to 16 loadsets, and each loadset can have up to 8 BO points.

Load Rolling

Load Rolling reduces energy consumption by repeatedly turning off designated equipment at specified intervals. For example, instead of running a fan continuously, Load Rolling can save energy by turning the fan off for 15 minutes of every hour.

Load Rolling requires you to specify:

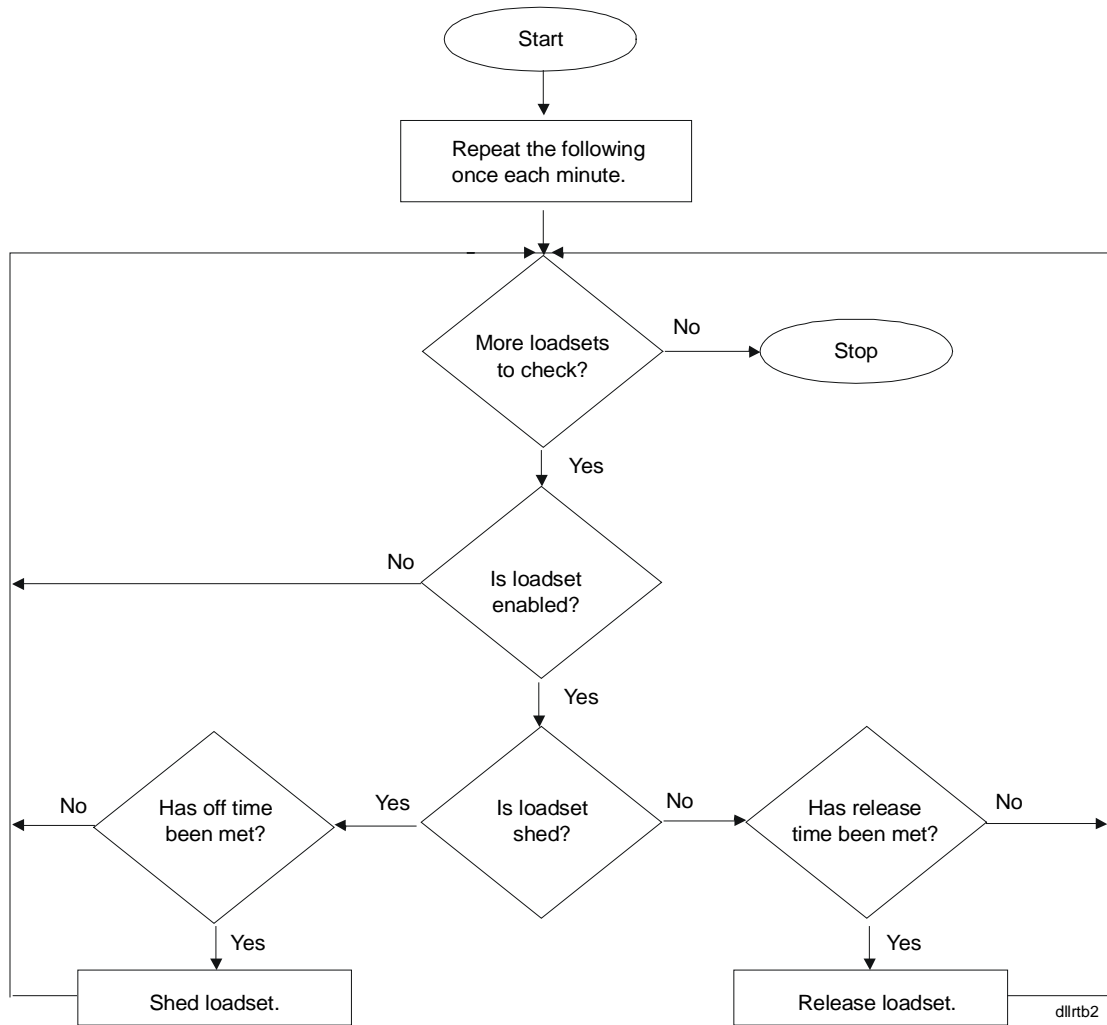
- time schedule when LR can command loads
- loads (BO software points) that can be shed, each grouped into 1 of 16 loadsets
- number of minutes that each loadset is shed and released

To define Load Rolling loadsets, you must have a System capability password.

Load Rolling works as follows:

- You define up to 16 Load Rolling loadsets. These are groups of Binary Output points corresponding to the equipment Load Rolling turns off. You specify the amount of time the equipment is turned off, the amount of time the equipment is released, and the time of day that Load Rolling is active.
- If the loadset is enabled, Load Rolling turns the equipment off for the time you specified. After the time elapses, Load Rolling releases the equipment for the release time you specified. After the release time elapses, if the loadset is still enabled, Load Rolling starts the off/release cycle again.

Figure 16-2 is a flowchart of the Load Rolling process.

**Figure 16-2: Load Rolling Process**

Note: If you change any Load Rolling parameters during a LR cycle, the changes do not take effect until the beginning of the next cycle.

Data Access

The Panel unit allows you to look at energy consumption data, including reports on Demand Limiting and Load Rolling performance. This information is contained in the Energy Profile, shown in Figure 16-8.

Load Rolling Loadsets

A loadset is a group of loads—binary output points corresponding to the equipment that Load Rolling turns off according to the time you specify. For example, you can specify that all loads in the loadset be turned off for ten minutes of every half hour.

Typically, the equipment specified as a load can be turned off without sacrificing safety or comfort. For example, an exhaust fan is a good candidate for a load.

You can define up to 16 loadsets, and each loadset can have up to 8 BO points.

Optimal Start/Stop

Optimal Start/Stop (OST) reduces energy consumption by keeping a facility in its Unoccupied mode for as long as possible, and by putting it in its Unoccupied mode as soon as possible, without sacrificing comfort.

To define the OST feature, you must have a System capability password.

OST reduces energy consumption by keeping a facility in Unoccupied mode for as long as possible, and by putting the facility in Unoccupied mode as early as possible, without sacrificing comfort.

You can create one OST system for each air handler. The points involved in OST do not need to be controlled by the same controller; however, all points must be online in order for the process to work.

You can define up to 30 OST systems.

Energy Profile Summary

The Energy Profile Summary displays detailed information about the energy consumption of your facility. The summary can include up to four energy profiles. Each profile displays data for one Accumulator point. (There can be up to four Accumulator points defined for each facility.)

Design Considerations

To define the DL/LR features, you need to gather data.

Energy Consumption Profile

Get an energy profile for the facility, including the type and amount of consumables typically used. This information helps you select an appropriate setting for DL Target. There are two ways to gather and use this information:

- Use the Reports feature to print, or Energy Profile screen to view, the demand meter point energy profile for the building.
- Look at the building's utility bill.

Utility Company Parameters

Get data on consumption charges. For DL, you need to know:

- What is the demand interval defined by the utility? For example, if the utility uses a 15 minute interval, you must define DL with a 15 minute interval.
- What are the premium charges for demand interval peaks? Are the charges tied to a time of day, or day of week?

Input Power Meter

Identify the power meter to use for the DL feature. Consider the meter constant when installing the meter. The meter constant specifies the amount of energy consumed for each meter pulse and is defined on the Point Modify screen for an AC point. Higher counts per minute result in greater accuracy.

Potential Load Candidates

DL/LR operates on the principle that some loads are not critical or even required under certain circumstances. Determine when each load is not necessary to the facility and its occupants. For example, you might determine that:

- Ventilation fans that have been on more than one hour can normally be turned off for ten minutes each hour.
- Except during a specific high usage period, an electric water heater can be shut off for a period of time.
- An HVAC unit can normally be off 15 minutes before internal temperature changes become noticeable.
- Decorative lighting during the day might not be worth the cost associated with peak energy charges.

Based on the above information, determine:

- Which loads can be considered for shedding?
- Is scheduling needed to limit the availability of a load as a shed candidate?

Targets

Set your initial target values. After using the initial setting for a period of time, “tune” the target values until you minimize your utility costs without disturbing occupant comfort.

- either set the target to a value that is less than the peak average demand for the previous month or,
- set the target a few percent below the peak shown on you utility bill

Shedding Priorities

The DL/LR shed candidates must be binary output (BO) points that exist on the Panel unit network. Refer to the *Defining Binary Output (BO) Point Software* chapter for details on defining these software points.

Load Rolling

Establish which loads are expendable. Determine:

- the time periods that LR can act on each load
- appropriate shed/release cycle times for each load
- how the loads group into loadsets based on similar requirements for active time and shed/release cycle times

Demand Limiting

Actions that defer, but do not reduce consumption, are DL shed candidates.

- Identify any loads that might be deferred without significant impact on facility function during periods that you can schedule.
- Determine the relative importance of each load:
 - minimal impact on the facility
 - noticeable, but still acceptable, impact on the facility
- Estimate an appropriate minimum shed time, minimum release time, and maximum shed time for each load.
- Group the loads into loadsets that may be shed/released during a given interval, depending on how much “granularity” or control you want DL to have.

Procedure Overview

Table 16-2: Defining Demand Limiting

To Do This	Follow These Steps:
Define the Demand Meter	Determine the AC point used as the demand meter. This point must be from Points Numbers 1 through 4. Define the point for Demand Limiting using the Meter Definition fields in the Point Add screen. Press F2 (Save).
Set up the Demand Limiting Schedule	From the Main menu, press E. Press S. Fill in the fields. Press F2 (Save).
Add Demand Limiting Loadsets	From the Main menu, press E. Press D. Fill in the loadset fields. Specify the points you want to include in the loadset. Press F2 (Save) or F3 (More).
Modify Demand Limiting Loadsets	From the Main menu, press E. Press D. Enter the number of the loadset in the Loadset Number field. Fill in the loadset fields. Specify the points you want to include in the loadset. Press F2 (Save) or F3 (More).
Delete Demand Limiting Loadsets	From the Main menu, press E. Press D. Enter the number of the Load Rolling loadset in the Load Rolling Loadset Number field. Enter Del in the Loadset Enabled field. Type blank spaces in the point number field of the load you want to delete. Press F2 (Save) or F3 (More).
Add Load Rolling Loadsets	From the Main menu, press E. Press L. Press Enter. Fill in the fields. Press F2 (Save) or F3 (More).
Modify Load Rolling Loadsets	From the Main menu, press E. Press L. Enter the number of the Load Rolling loadset in the Loadset Number field. Fill in the fields. Press F2 (Save) or F3 (More).
Delete Load Rolling Loadsets	From the Main menu, press E. Press L. Enter the number of the Load Rolling loadset in the Load Rolling Loadset Number field. Enter Del in the Loadset Enabled field. To delete a load, type blank spaces in the point number field of the load you want to delete. Press F2 (Save) or F3 (More).
Add an OST System	From the Main menu, press E. Press O. Press Enter. Fill in the OST fields. Press F2 (Save) or F3 (More).
Modify an OST System	From the Main menu, press E. Press O. Enter the number of the OST in the OST Number field. Fill in the OST fields. Press F2 (Save) to save. Press F3 (More) to save the system and scroll to the next OST system to add or modify.
Delete an OST System	From the Main menu, press E. Press O. Enter the number of the OST in the OST Number field. Enter Del in the OST Enabled field. Press F2 (Save) or F3 (More).
Display an Energy Profile Summary	From the Main menu, press E. Press E. Press F3 (More) to display the second screen of the profile. Press F3 (More) again to display the next Energy Profile.

Detailed Procedures

Defining the Demand Meter

To define a demand meter:

1. Determine which AC point to use as the demand meter. This point must be from Points 1 through 4. (In the Panel unit, AC points are restricted to Point Numbers 1 through 4.)
2. Define the point for Demand Limiting using the Meter Definition fields in the Point Add screen. (You can also use the Point Modify screen.) Table 16-3 explains the Demand Meter Definition fields.

Table 16-3: Demand Meter Definition Fields

Field	Description	Options/Range	Required?	Default
Used for Demand Limiting	Specifies the point that is monitored for Demand Limiting calculations.	Yes or No	Yes	No
Demand Interval	Specifies what the utility company defines as their demand interval time in minutes.	1 to 60	Yes	15

Figure 16-3 shows an example of a Point Add screen for an AC point. (For complete information on defining points, refer to the *Defining Accumulator (AC) Point Software* chapter of this manual.)

```

Operator Name: J. Smith                               Fri Jan 9, 1998 10:12
-----
Point Add
Point Number [ 1] Software Type [AC] Point Name [Electric Meter]
Network Address: N2 Adress [ 6] Point Type [BI] Point Address [ 7]

Accumulator Point Definition
Consumption Engineering Units [KWH] Consumption Constant [ 1.000]
Rate Engineering Units [KW] Rate Constant [3600.00]
Low Limit [ 0.0] High Limit [ 2000.0] Decimal Position [1]

Alarm Reporting Definition
Priority [Critical] Alarm Message Used When Reporting [ 1]
Dial Sequence Number [1]

Meter Definition
Used For Demand Limiting [Yes] Demand Interval [ 15]

F1 Cancel F2 Save F3 More
Select a name for this point

```

Meter definition

Figure 16-3: Meter Definition Fields in Accumulator Point Add Screen

3. Press F2 (Save) to save the AC point to the Panel unit database. You are now ready to set up the Demand Limiting Schedule.

Setting Up the Demand Limiting Schedule

To set up the Demand Limiting Schedule:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press S to select the Schedule Demand Limiting option. The Demand Limiting Schedule screen appears (Figure 16-4).

Notes: Note that the name of the AC point defined as the Demand Meter appears at the top of the screen.

If no AC point is defined for Demand Limiting, an error message appears and you are not allowed to access the Demand Limiting Schedule screen. In this case, define an AC point for Demand Limiting and try accessing the Demand Limiting Schedule screen again.

```

Operator Name: J. Smith                                     Thu Jan 8, 1998 13:40
-----
                                Demand Limiting Schedule
Demand Meter      1 ACM BI7 AHU255
Current Demand Target:      70 KW

   Day      Start      Demand      Start      Demand      Start      Demand
   Mon - Fri  [07:00]  [ 80]  [12:00]  [ 70]  [17:00]  [ 90]
   Sat       [07:00]  [ 60]  [00:00]  [9999999] [00:00]  [9999999]
   Sun       [08:00]  [ 50]  [00:00]  [9999999] [00:00]  [9999999]

F1 Cancel  F2 Save
Time is in 24 hour format. Example [14:00] for 2 P.M.

```

Demand limiting

Figure 16-4: Demand Limiting Schedule Screen

3. Fill in the fields. Press Enter to move the cursor from field to field. Table 16-4 explains the fields.

Table 16-4: Demand Limiting Schedule Fields

Field	Description	Options/Range	Required?	Default
Start On Peak, Start Mid Peak, or Start Off Peak	Specifies the starting times for three different Demand Limiting schedule periods. Times are specified in 24-hour format.	00:00 to 23:59 in 24-hour format	Yes	00:00
Demand Target	Specifies a maximum acceptable value (target) for peak energy demand. This "peak" is an average in any interval during a scheduled period. Rate engineering units are specified.	1 to 9999999	Yes	9999999

4. Press F2 (Save) to save the new Demand Limiting Schedule to the Panel unit database.

Adding Demand Limiting Loadsets

To add a Demand Limiting loadset:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press D to select the Demand Limiting loadset option. The first undefined loadset number is displayed
3. A new Loadset Modify/Add/Delete screen appears.

```

Operator Name: J. Smith                               Thu Jan 11, 1998 09:39
                                                    Jun  5, 1998 14:43
-----
                                Demand Limiting Loadset
Demand Meter      1 ACM BI7 AHU255
Loadset Number [  ]

F1 Cancel                               F4 Acknow
Loadset Number (1 - 16)

```

Demand limiting loadset

Figure 16-5: Demand Limiting Loadset Screen

4. The point fields are blank. Fill in the loadset fields. Press Enter to move the cursor from field to field. Table 16-5 explains the Demand Limiting Loadset fields.

Table 16-5: Demand Limiting Loadset Fields

Field	Description	Options/Range	Required?	Default
Loadset Number	Identifies a group of loads by number.	1 to 16	Yes	N.A.
Loadset Enabled	Yes - available for DL control. No - removed from DL control. Del - inappropriate for DL and therefore removed as a DL loadset.	Yes, No, Del	Yes	Del
If Current Demand Is > = [] % Of Demand Target THEN Shed This Loadset	Specifies when DL sheds this loadset relative to the target consumption.	1 to 100 percent	Yes	N.A.
If Current Demand Is < = [] % Of Demand Target THEN Release This Loadset	Specifies when DL releases this loadset relative to the target consumption.	1 to 100 percent, but must be less than the value specified above.	Yes	N.A.
Minimum Shed Time (minutes)	Specifies the shortest period of time that this loadset can be shed. Use this parameter to avoid cycling the loadset excessively.	1 to 240 minutes	Yes	N.A.
Maximum Shed Time (minutes)	Specifies the maximum period of time this loadset can be kept from operating before it must be released. Use this parameter to force DL to release loads before their absence is significantly missed.	1 to 240 minutes, but must be greater than minimum shed time value specified above.	Yes	N.A.
Minimum Release Time (minutes)	Specifies the shortest period of time that this loadset must remain released. Use this parameter to allow loads to have some functional impact before being shed again by DL.	1 to 240 minutes	Yes	N.A.
Point	At least one and as many as eight points can be specified for each loadset. Each point specifies a particular load. Entries must be defined, BO software points that are unique to that loadset.	Any defined BO point	Yes	N.A.

5. Specify the points you want to include in the loadset.
6. Either press F2 (Save) to save the loadset to the Panel unit database. Or press F3 (More) to save the loadset and scroll to the next loadset to define or modify.

Modifying Demand Limiting Loadsets

To modify a Demand Limiting loadset:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press D to select the Demand Limiting loadset option. The first undefined loadset number is displayed.
3. Enter the number of the loadset in the Loadset Number field. The loadset appears.
4. Fill in the loadset fields. Press Enter to move the cursor from field to field. Table 16-5 explains the Demand Limiting Loadset fields.
5. Specify the points you want to include in the loadset.
6. Either press F2 (Save) to save the loadset to the Panel unit database. Or press F3 (More) to save the loadset and scroll to the next loadset to define or modify.

Deleting Demand Limiting Loadsets

To delete a Demand Limiting loadset:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press D to select the Demand Limiting loadset option. The first undefined loadset number is displayed.
3. Enter the number of the Load Rolling loadset in the Load Rolling Loadset Number field. The Load Rolling loadset appears. Enter Del in the Loadset Enabled field.
4. Type blank spaces in the Point Number field of the load you want to delete.
5. Either press F2 (Save) to save the loadset to the Panel unit database. Or press F3 (More) to save the loadset and scroll to the next loadset to define or modify.

Adding Load Rolling Loadsets

To add Load Rolling loadsets:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press L to select the Load Rolling Loadset option. The first undefined Load Rolling Loadset Number is displayed.
3. Press Enter. A new Load Rolling Loadset Modify/Add/Delete screen appears. The point fields are blank.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 13:42
-----
Load Rolling Loadset
Loadset Number [ 3]                                Loadset Enabled [Yes]
From [07:00] To [18:00]
Off Time (minutes) [ 2]
Release Time (minutes) [ 5]

Point
[ ]
[152] LCP 03 - BO 03
[ ]

Point
[ ]
[ ]
[ ]

F1 Cancel  F2 Save  F3 More
Select enable (No,Yes,Del)

```

Load rolling

Figure 16-6: Load Rolling Loadset Screen

4. Fill in the fields. Press Enter to move the cursor from field to field. Table 16-6 explains the fields.

Table 16-6: Load Rolling Loadset Fields

Field	Description	Options/Range	Required?	Default
Loadset Number	Identifies a group of loads by number.	1 to 16	Yes	N.A.
Loadset Enabled	Yes - available for LR control. No - removed from LR control. Del - inappropriate for LR and therefore removed as a LR loadset.	Yes, No, and Del	Yes	Del
From [] To []	Specifies the time period that LR is active for this loadset. When active, LR cycles the loadset between shed and release states. Use this parameter to activate LR according to a schedule.	00:00 to 23:59 in 24-hour format	Yes	00:00
Off Time (minutes)	Specifies how long the loadset is shed during each shed/release cycle.	1 to 240 minutes	Yes	N.A.
Release Time (minutes)	Specifies how long the loadset is released during each shed/release cycle.	1 to 240 minutes	Yes	N.A.
Point	At least one and as many as eight points can be specified for each loadset. Each point specifies a particular load. Entries must be defined, BO software points.	Any defined BO point	Yes	N.A.

5. Either press F2 (Save) to save the loadset to the Panel unit database. Or press F3 (More) to save the loadset and scroll to the next loadset to define or modify.

Modifying Load Rolling Loadsets

To modify Load Rolling loadsets:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press L to select the Load Rolling loadset option. The first undefined Load Rolling loadset number is displayed.
3. Enter the number of the Load Rolling loadset in the Loadset Number field. The Load Rolling loadset appears.
4. Fill in the fields. Press Enter to move the cursor from field to field. Table 16-6 explains the fields.
5. Either press F2 (Save) to save the loadset to the Panel unit database. Or press F3 (More) to save the loadset and scroll to the next loadset to define or modify.

Deleting Load Rolling Loadsets

To delete Load Rolling loadsets:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press L to select the Load Rolling loadset option. The first undefined Load Rolling loadset number is displayed. For example, if you have 15 Load Rolling loadsets defined, number 16 appears in the Loadset Number field. If the maximum number of loadsets (16) has been defined, the Loadset Number field appears blank.
3. Enter the number of the Load Rolling loadset in the Load Rolling Loadset Number field. The Load Rolling loadset appears. Enter Del in the Loadset Enabled field.
4. To delete a load, type blank spaces in the Point Number field of the load you want to delete.
5. Either press F2 (Save) to save the loadset to the Panel unit database. Or press F3 (More) to save the loadset and scroll to the next loadset to define or modify.

Adding an OST System

To add an OST system:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press O to select the Optimal Start/Stop option. The first undefined OST number is displayed.
3. Press Enter. A new OST Modify/Add/Delete screen appears. The point fields are blank.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 12:07
-----
Optimal Start/Stop Modify/Add/Delete
OST System Number [ 1]                               OST Enabled [Del]
  Zone Occupied Mode Point [ ]
  Zone Warmup/Cooldown Mode Point [ ]
  Heating Set Point Point [ ]
  Cooling Set Point Point [ ]
  Zone Temperature Point [ ]
  Outdoor Air Temperature Point [ ]
Building Heating/Cooling Constant [ 50]
Building Design Temperatures: Heating (degrees) [ -5] Cooling (degrees) [ 95]
  Maximum Preheat/Precool Time (minutes) [ 120]
  Maximum Prestop Time (minutes) [ 30]

Scheduled Zone Occupied Mode Start/Stop Time
  Computed Warmup/Cooldown Mode Start Time
  Computed Zone Occupied Mode Stop Time

F1 Cancel  F2 Save  F3 More
Select enable (No, Yes, Del)

```

Optimal

Figure 16-7: Optimal Start/Stop Modify/Add/Delete Screen

4. Fill in the OST fields. Press Enter to move the cursor from field to field. Table 16-7 explains all the OST Definition fields in the OST Modify/Add/Delete screen.

Table 16-7: OST Definition Fields

Field	Description	Options/Range	Required?	Default
OST System Number	Identifies the zone controlled by this OST process.	1 to 30	Yes	N.A.
OST Enabled	Shows: Yes - system available for OST control. No - system removed from OST control. Del - inappropriate for OST and therefore deleted.	Yes, No, and Del	Yes	Del
Zone Occupied Mode Point	Identifies the BO point used to determine if a zone is occupied or vacant. This BO point must also be specified on a weekly schedule.	Any defined BO point	Yes	N.A.
Zone Warmup/Cooldown Mode Point	Identifies the BO point used to determine if the zone is presently in a Warmup/Cooldown mode of operation.	Any defined BO point	Yes	N.A.
Heating Set Point Point	Identifies the point used to define the Heating Set Point for the zone. Can be the same as the Cooling Set Point.	Any defined AI or AO point	Yes	N.A.
Cooling Set Point Point	Identifies the point used to define the Cooling Set Point for the zone. Can be the same as Heating Set Point.	Any defined AI or AO point	Yes	N.A.
Zone Temperature Point	Identifies the point used to determine the actual zone temperature.	Any defined AI point	Yes	N.A.
Outdoor Air Temperature Point	Identifies the point used to determine the actual outside air temperature.	Any defined AI point	Yes	N.A.
Building Heating/Cooling Constant	Provides an initial value for a constant used in the OST time calculation. It is adapted by the system once per day without operator intervention. This value is specified as minutes per degrees squared.	1 to 999	Yes	50
Building Design Temperatures	Heating (degrees): Indicates the lowest outside temperature at which the heating system maintains zone comfort in the Heating mode. Values are obtained using ASHRAE manuals.	-30 to 90°F	Yes	-5
	Cooling (degrees): Indicates the highest outside temperature at which the cooling system maintains zone comfort in the Cooling mode. Values are obtained using ASHRAE manuals.	0 to 120°F	Yes	95
Maximum Preheat/Precool Time	Indicates the maximum period of time required to bring the zone up to occupancy set point temperature under the worst conditions.	5 to 240 minutes	Yes	120
Maximum Prestop Time	Indicates the earliest the heating/cooling system can be shut down and still maintain the occupied zone temperature until entering the vacant mode.	5 to 60 minutes	Yes	30

5. Either press F2 (Save) to save the new OST system to the Panel unit database. Or press F3 (More) to save the loadset and scroll to the next loadset to define or modify.

Modifying an OST System

To modify an OST system:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press O to select the Optimal Start/Stop option. The first undefined OST number is displayed.
3. Enter the number of the OST in the OST Number field. The OST appears.
4. Fill in the OST fields. Press Enter to move the cursor from field to field. Table 16-7 explains all the fields in the OST Modify/Add/Delete screen.
5. Either press F2 (Save) to save the new OST system to the Panel unit database. Or press F3 (More) to save the loadset and scroll to the next loadset to define or modify.

Deleting an OST System

To delete an OST system:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press O to select the Optimal Start/Stop option. The first undefined OST number is displayed.
3. Enter the number of the OST in the OST Number field. The OST appears. Enter Del in the OST Enabled field.
4. Either press F2 (Save) to save the new OST system to the Panel unit database. Or press F3 (More) to save the system and scroll to the next OST system to add or modify.

Displaying an Energy Profile Summary

To display an Energy Profile summary:

1. From the Main menu, press E to select the Energy Management option. The Energy Management menu appears.
2. Press E to select the Energy Profile Summary option. The first screen of the Energy Profile appears (Figure 16-8). The first screen displays daily information for the current week.

```

Operator Name: J. Smith                                     Thu Jan 8, 1998 13:45
-----
                                Energy Profile
-----
Profile Number [ 1]           Meter:  X   1 ACM BI7 AHU255           0 KW
Current Information
  Instantaneous Demand:       0.0 KW      Current Demand Target:    70 KW
  Average Demand:             0.8 KW      Demand Interval:          5 Min

Daily Information      Total Consumption      Peak Average Demand
Today                 27660.0 KWH                0.9 KW At 02:40
Sun                   72155.0 KWH                0.9 KW At 04:27
Mon                   72155.0 KWH                0.9 KW At 12:55
Tue                   72155.0 KWH                0.9 KW At 01:56
Wed                   72160.0 KWH                0.9 KW At 10:09
Thu                   72155.0 KWH                0.9 KW At 15:58
Fri                   72155.0 KWH                0.9 KW At 05:45
Sat                   72160.0 KWH                0.9 KW At 01:39

F1 Cancel           F3 More

```

First energy profile

Figure 16-8: First Screen of Energy Profile

- Press F3 (More) to display the second screen of the profile, which contains monthly information for the current year (Figure 16-9). Press F3 (More) again to display the next Energy Profile.

Operator Name: J. Smith		Thu Jan 8, 1998 13:46	

Energy Profile			
Profile Number [1]	Meter: X	1 ACM BI7 AHU255	0 KW
Monthly Information	Total Consumption	Peak Average Demand	
Current Month	460600.0 KWH	0.9 KW	At 05:45 On Jul 4
Jan	20605004.0 KWH	100.7 KW	At 18:03 On Jan 29
Feb	252071744.0 KWH	100.8 KW	At 09:16 On Feb 29
Mar	269247840.0 KWH	100.8 KW	At 12:31 On Mar 22
Apr	260508560.0 KWH	100.8 KW	At 12:44 On Apr 5
May	269519008.0 KWH	100.8 KW	At 13:53 On May 31
Jun	546599.0 KWH	2.5 KW	At 12:24 On Jun 27
Jul	0.0 KWH	0.0 KW	At 00:00 On
Aug	0.0 KWH	0.0 KW	At 00:00 On
Sep	0.0 KWH	0.0 KW	At 00:00 On
Oct	0.0 KWH	0.0 KW	At 00:00 On
Nov	0.0 KWH	0.0 KW	At 00:00 On
Dec	0.0 KWH	0.0 KW	At 00:00 On
Yearly Total	1072959360.0 KWH		
F1 Cancel		F3 More	

Second energy

Figure 16-9: Second Screen of Energy Profile

Table 16-8 explains the Energy Profile fields.

Table 16-8: Energy Profile Fields

Field	Description
Meter	Specifies the hardware point in the system to which the demand meter is connected.
Instantaneous Demand	Specifies the rate of consumption or amount of energy being consumed in the current minute.
Current Demand Target	Specifies the current maximum acceptable value (target) for peak energy demand. The peak is an average in any interval during a scheduled period. Rate engineering units are specified.
Average Demand	Specifies the average rate of consumption or amount of energy being consumed over the demand interval defined.
Demand Interval	Specifies what the utility company defines as their demand interval in minutes.
Daily/Monthly Information	Specifies the total consumption and peak average demand in both daily and monthly formats.
Total Consumption	Specifies the total amount of energy consumed since the period started. The periods for this display are daily and monthly.
Peak Average Demand	Specifies the highest average demand detected over the period. The periods for this display are daily and monthly.

Chapter 17

Creating Control Logic

Introduction

This chapter tells you how to create Control Logic processes that specify when the Panel unit issues commands.

This chapter describes how to:

- define Control Logic
- add a Control Logic process
- modify a Control Logic process
- delete a Control Logic process

Key Concepts

Control Logic

Control Logic processes allow you to specify the conditions under which commands are issued. For example, you can specify that when the temperature exceeds an alarm limit, a chiller is turned on. Or you can reset Totalization after a Totalization point has exceeded its limit.

Basically, a Control Logic process contains an IF condition, THEN command statements, and ELSE command statements. The Panel unit evaluates the IF condition once each minute. If the condition is true, the Panel unit issues the THEN commands. If the condition is false, the Panel unit issues the ELSE commands.

Figure 17-1 shows an example of a typical Control Logic process.

```

Operator Name: J. Smith                                     Thu Jan 8, 1998 13:55
-----
Control Logic Modify/Add/Delete

Process Number [ 25]
Point          Process Enabled [Yes]
A [ 34] AHU9 A01 CRIT D1      [EQ] [Normal] [ 0.0]
B [ 45] AHU9 A0 ADF194       [GT] [Normal] [ 0.0]
C [    ]                    [  ] [  ] [ 0.0]
D [    ]                    [  ] [  ] [ 0.0]

IF ( A [  ] B ) [  ] ( C [  ] D )

THEN
Point          Command          Priority      Value
[ 18] LCP-1 B03 NO HED         [Start]      [CL]         [ 0.0]
[ 21] LCP-1 B06                 [Start]      [CL]         [ 0.0]
[ 42] AHU9 A0 ADF129           [Override]   [  ]         [ 57.7]
[  ]                    [  ]         [  ]         [ 0.0]

ELSE
Point          Command          Priority      Value
[ 18] LCP-1 B03 NO HED         [Start]      [WS]         [ 0.0]
[ 21] LCP-1 B06                 [Start]      [WS]         [ 0.0]
[ 42] AHU9 A0 ADF129           [Override]   [  ]         [ 80.0]
[  ]                    [  ]         [  ]         [ 0.0]

F1 Cancel  F2 Save  F3 More
Select a point number (1 - 799)
    
```

Control logic

Figure 17-1: Example of Control Logic Process

In this example, the Panel unit checks if Points 3, 4, and 45 are normal. If all of these points are normal, the Panel unit issues the THEN commands (because the condition is true). If all of these points are not normal, the Panel unit issues the ELSE commands (because the condition is false).

In the case of start commands to Binary Output points, Control Logic implements the heavy equipment delay.

If one of the points used in the IF condition is offline, and the process is not checking the offline or online status of that point, the process is not performed. In addition, commands issued to offline points are ignored.

You can create up to 30 processes. Each process can involve up to 12 points. In the IF condition statement, all point types can be used. In the THEN and ELSE command statements, BI, BO, AI, and AO points can be used.

The Control Logic feature of the Panel unit provides network-wide interlocking of control information. Data received from one controller can control other points on that controller, or on other controllers on the N2 Bus.

The Control Logic feature allows the user to identify which points, days, time, and schedule to monitor. Each minute, the Panel unit compares each of these with conditions the user has set up and commands the appropriate AO or BO points to specified values.

The Control Logic feature specifies an input condition using master points in order to determine how the subordinate points should be commanded.

Control Logic Processes

To create or modify a Control Logic process, you must have a System capability password.

Note: The Panel unit does not check for Control Logic conflicts. For example, you can create one process that commands a point to turn on at the same time that another process commands it to turn off. To prevent Control Logic conflicts, view existing processes before you create a new one. To view existing processes, press F3 (More) to scroll through the processes.

Figure 17-2 shows a diagram of the Control Logic process.

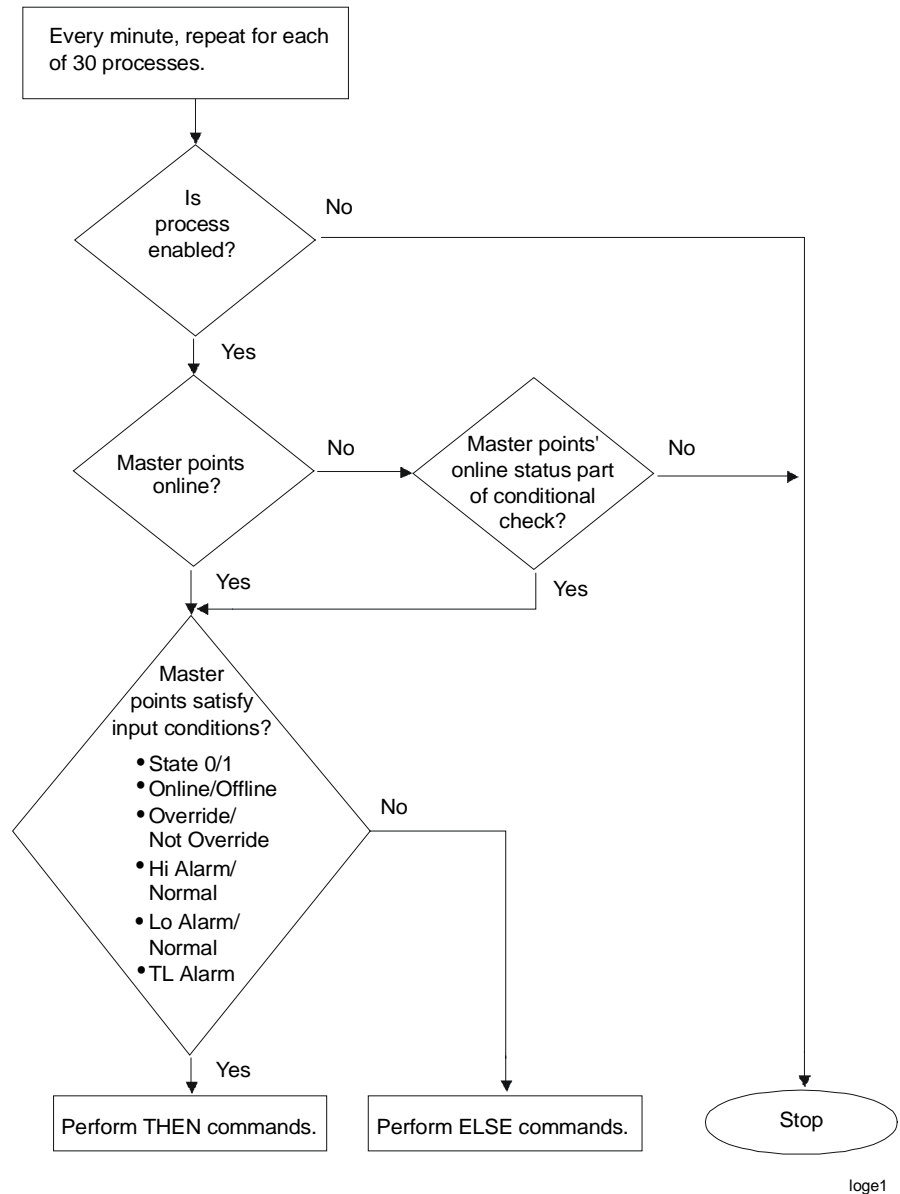


Figure 17-2: Control Logic Process

The Panel unit uses information from any point type as input data for Control Logic processing.

Control Logic

When the outside air point equals its Hi Alarm limit and the Occupied mode point equals OCC, then the chiller is commanded to start, regardless of its present setting. If the conditions are *not* satisfied, the chiller is left in the Automatic mode to be controlled by its ASC.

Capabilities

Table 17-1 summarizes the capabilities of the Control Logic feature.

Table 17-1: Control Logic Capabilities

Capability	Description	Purpose
Automatic Operation	Once per minute, the Panel unit evaluates each defined process to determine how and then to command the subordinate points.	Provides precise, timely control without user intervention.
Input Flexibility	The Control Logic process can use combination of current values or current status from AI, AO, BI, BO, or AC point types.	Specifies facility status information as input for designing the Control Logic.
Output Flexibility	A single Control Logic process can control the values or status for up to eight AO or BO point types. These points are called subordinates.	Specifies point commands as output from the Control Logic.
Logical Operators	Logical operators include: <ul style="list-style-type: none"> • IF • THEN • ELSE • AND • OR Each point that is used as Control Logic input is evaluated by using the equal or not equal operator.	Uses standard, easy-to-use logic statements.
Scheduled Control	The Control Logic process can follow a schedule.	Tailors facility control actions for a specific schedule.

Control Logic Process Scheduling

To schedule a Control Logic process, map a controller's reserved Binary Data (BD) point to an output point, and schedule it using the Weekly Scheduling feature. Refer to the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* for details on available reserved BD points. Refer to the *Defining Schedules* chapter in this manual for details on the Weekly Scheduling feature.

Totalization

You can create a Control Logic process that resets a Totalization value to zero when the Totalization limit is exceeded. In this process, use a BI or BO point as a master point and select TL Alarm as its condition. This defines the exceeded Totalization limit as an input condition. Then, in the same process, use the BI or BO as a subordinate point and select Reset as the command sent to it when the input conditions are met.

You can use a Control Logic process to reset Totalization. To do this, define the Totalization point as a master point with a condition equal to TL Alarm. Then define the same point as an output point with a THEN command of Reset. This resets the Totalization Preset Value in the Point Modify screen to zero.

Design Considerations

As you engineer the Control Logic feature, consider the following:

- To define Control Logic, you need a System capability password.
- Points must be online in order to be evaluated (except when Control Logic is testing the offline condition of a master point).
- To schedule a Control Logic process, you can map a Panel unit BO point to one of the reserved controller BD points. Refer to the *Database Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Database Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* for available reserved BD points. Use Weekly Scheduling to command this point on at a specific time/date. Then use the point as one of the master points in a Control Logic process.
- All point types can be master points: AC, AI, AO, BI, and BO.
- The following points can be subordinate points, receiving commands from Control Logic processes: AI, AO, BI, and BO.
- The logical operators in a Control Logic process are left to right associative. This follows standard mathematical conventions. Therefore, the statement If (A [AND] B) [OR] (C [] D) (where D is not used) evaluates as IF (A AND B) OR C. It does not evaluate as IF A AND (B OR C).

Procedure Overview

Table 17-2: Creating Control Logic

To Do This	Follow These Steps:
Define Control Logic	Determine what control processes are used in the system. Determine: what points to evaluate for input conditions, what point input conditions to check, what subordinate points to command, in some cases, what adjusted values to apply. Define Control Logic process on the Control Logic Modify/Add/Delete screen.
Add a Control Logic Process	From the Main menu, press C. Press M. Fill in the fields. Press F2 (Save) or F3 (More).
Modify a Control Logic Process	From the Main menu, press C. Press M. Enter the number of the process in the Process Number field. Fill in the fields. Press F2 (Save) or F3 (More).
Delete a Control Logic Process	From the Main menu, press C. Press. Enter the number of the Control Logic process in the Process Number field. Enter Del in the Process Enabled field. Press F2 (Save) or F3 (More).

Detailed Procedures

Defining Control Logic

To define Control Logic:

1. Determine what control processes are used in the system:
 - What points to evaluate for input conditions?
 - What point input conditions to check?
 - What subordinate points to command?
 - In some cases, what adjusted values to apply?
2. Define Control Logic process on the Control Logic Modify/Add/Delete screen.

Adding a Control Logic Process

To add a Control Logic process:

1. From the Main menu, press C to select the Control Logic option. The Control Logic menu appears.
2. Press M to select the Modify/Add/Delete option. The Control Logic Modify/Add/Delete screen appears (Figure 17-3).
3. Press Enter. A new Control Logic Modify/Add/Delete screen appears (Figure 17-3). The point fields are blank.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 13:55
-----
Control Logic Modify/Add/Delete
Process Number [ 25]                               Process Enabled [Yes]
Point                                               Operator   Condition   Value
A [ 34] AHU9 A01 CRIT D1                          [EQ]       [Normal]    [ 0.0]
B [ 45] AHU9 A0 ADF194                             [GT]       [Normal]    [ 0.0]
C [    ]                                           [    ]     [    ]     [ 0.0]
D [    ]                                           [    ]     [    ]     [ 0.0]
IF ( A [    ] B ) [    ] ( C [    ] D )
Point                                               Command     Priority     Value
THEN [ 18] LCP-1 B03 NO HED                        [Start]    [CL]        [ 0.0]
      [ 21] LCP-1 B06                               [Start]    [CL]        [ 0.0]
      [ 42] AHU9 A0 ADF129                          [Override] [    ]     [ 57.7]
      [    ]                                         [    ]     [    ]     [ 0.0]
ELSE [ 18] LCP-1 B03 NO HED                        [Start]    [WS]        [ 0.0]
      [ 21] LCP-1 B06                               [Start]    [WS]        [ 0.0]
      [ 42] AHU9 A0 ADF129                          [Override] [    ]     [ 80.0]
      [    ]                                         [    ]     [    ]     [ 0.0]
F1 Cancel  F2 Save  F3 More
Select a point number (1 - 799)
    
```

Control logic

Figure 17-3: Control Logic Modify/Add/Delete Screen

4. Fill in the fields. Press Enter to move the cursor from field to field. Either press the space bar to scroll through the options or type your selection. Table 17-3 and Table 17-4 explain the fields.

Table 17-3: Control Logic Definition Fields

Field	Description	Options/Range	Required?	Default
Process Number	Identifies, by number, each Control Logic process.	1 to 30	Yes	1
Process Enabled	Provides master control switch for the process. Yes - enables operation of the process. No - disables operation of the process. Del - deletes the process from memory.	Yes, No, and Del	Yes	Del
Point	Specifies the number of the input point that is evaluated or the output point that is commanded.	Any defined point	Yes	N.A.
Operator	Defines the comparison made between the input point status or state and the specified condition.	Equal (EQ) and, Not Equal (NE) If Condition is Value: Greater Than (GT), Greater Than or Equal (GE), Less Than (LT), Less Than or Equal (LE)	Yes	Blank
Condition	Specifies the condition to which the master point is compared.	State 0 State 1 Online Normal Override Hi Alarm Lo Alarm TL Alarm Value (for AI, AO, or ACM point)	Yes	Blank
Value	Specifies the value to which the master point is compared.	-999999 to 999999	Yes (if AI, AO, or AC)	Blank
IF Operands	Specifies which master points should be checked for conditions specified in the Condition field. (If there is more than one master point.)	And Or	Yes	Blank

Table 17-4: Control Logic Definition Fields (THEN/ELSE Statements)

Field	Description	Options/Range	Required?	Default
Point	Specifies the number of the subordinate point that is commanded.	Any defined AI, AO, BI or BO point	Yes	N.A.
Command	Provides instructions to issue to the subordinate output point.	Stop, Start, Release, Auto, Override, and Reset (Totalization and Alarm Flag)	Yes	N.A.
Priority	BO point type only. For AI, AO, and BI points, this field should be left blank. Specifies the highest command priority controlling a Binary Output point. If the point is a BO point, and an invalid command priority (i.e., OV or MC) is entered, or if the field is left blank, the Panel unit defaults to CL. (Command priorities are explained in detail in the <i>Defining Binary Output (BO) Point Software</i> chapter in this manual.)	(CL) Control Logic (GD) Global Data Sharing (SS) Signal Select (DL) Demand Limiting (LR) Load Rolling (WS) Weekly Scheduling	Yes (if BO point)	Blank
Value	Provides the overridden value for an AI or AO point.	0.0 to 9999999	Yes, (if AI or AO point)	0.0

Valid Commands, Conditions, and Operators

Table 17-5: Valid Operators and Conditions by Point Type

Point Type	Operator	Valid Conditions
AI	EQ, NE	Online, Override, Lo Alarm, Value, Normal, Hi Alarm
	GT, GE, LT, LE	Value
BI	EQ, NE	Online, Override, State 0, State 1, TL Alarm, Normal
AO	EQ, NE	Online, Override, Value, Normal
	GT, GE, LT, LE	Value
BO	EQ, NE	Online, Override, State 0, State 1, TL Alarm, Normal
AC	EQ, NE	Online, Value, Normal, Hi Alarm
	GT, GE, LT, LE	Value

Table 17-6: Valid Commands by Point Type

Point Type	Stop	Start	Release	Auto	Override	Reset_Tot
AI				X	X	
AO				X	X	
BI	X	X		X		X
BO	X	X	X	X		X

5. Either press F2 (Save) to save the new or modified process to the Panel unit database. Or press F3 (More) to save the process and scroll to the next process to create or modify.

Modifying a Control Logic Process

To modify a Control Logic process:

1. From the Main menu, press C to select the Control Logic option. The Control Logic menu appears.
2. Press M to select the Modify/Add/Delete option. The Control Logic Modify/Add/Delete screen appears (Figure 17-3).
3. Fill in the fields. Press Enter to move the cursor from field to field. Either press the space bar to scroll through the options or type your selection. Table 17-3 and Table 17-4 explain the fields.
4. Either press F2 (Save) to save the new or modified process to the System database. Or press F3 (More) to save the process and scroll to the next process to create or modify.

Deleting a Control Logic Process

To delete a Control Logic process:

1. From the Main menu, press C to select the Control Logic option. The Control Logic menu appears.
2. Press M to select the Modify/Add/Delete option. The Control Logic Modify/Add/Delete screen appears (Figure 17-3).
3. To delete a process, enter the number of the Control Logic process in the Process Number field. The Control Logic process appears. Enter Del in the Process Enabled field.
4. Either press F2 (Save) to save the new or modified process to the Panel unit database. Or press F3 (More) to save the process and scroll to the next process to create or modify.

Chapter 18

Defining Signal Select

Introduction

This chapter tells you how to define a Signal Select process so that you can use the calculated values of some input points to control an output point.

This chapter describes how to:

- define Signal Select
- add Signal Select
- modify Signal Select
- delete Signal Select

Key Concepts

Signal Select

The Signal Select feature allows you to create processes that either calculate the average, high, and low values from a set of analog points, or perform logical OR and logical AND operations on a set of binary points. The results of these calculations are sent to selected output points as commands. A Signal Select process can include either all analog points (AI and AO), or all binary points (BI and BO).

A Signal Select process can be used in Multizone applications where values from multiple zones are processed and used by the AHU to adjust setpoints.

For example, you have a thermostat controlling the temperature in several different rooms. You can use the Signal Select feature to calculate the average, highest, or lowest value of the temperature sensors (analog input) monitoring the rooms, and use the calculation to control the setpoint for the thermostat.

With Signal Select, you can:

- determine the highest, lowest, and average values of a set of analog input points
- command analog points to the average, highest, or lowest values calculated from a set of analog points
- calculate the state of a set of binary input points (using AND and OR logical operations) and use the calculated value to command a binary output point

Up to 30 Signal Select processes can be defined on one Panel unit system.

Each process is scanned and calculated once per minute.

Capabilities

Table 18-1 shows the capabilities of the Signal Select feature.

Table 18-1: Fields in the Signal Select Modify/Add/Delete Screen

Capability	Description	Purpose
Multiple Processes	Allows up to 20 different processes.	Provides flexibility in computing average, high, and low values, and in performing logical operations.
Automatic Operation	Performs calculations and sends values to outputs once each minute.	Provides precise, timely control without user-intervention.
Logical Operations	Performs logical AND and logical OR calculations on binary points.	Automatically performs logic calculations without complicated programming.
Input Flexibility	Allows up to 12 different inputs for each process.	Specifies facility status information as input for designing Signal Selection.
Output Flexibility	Allows a high, low, or average value to be output to an ASC.	Provides point commands as outputs from Signal Select processes.

Analog Signal Select Process

The Signal Select feature scans the defined and enabled processes once each minute. For each process, Signal Select reads the inputs (up to 12) and computes the average, highest, and lowest values. Signal Select then commands the Average Output to the average value, the Highest Output to the highest value, and the Lowest Output to the lowest value.

Binary Signal Select Process

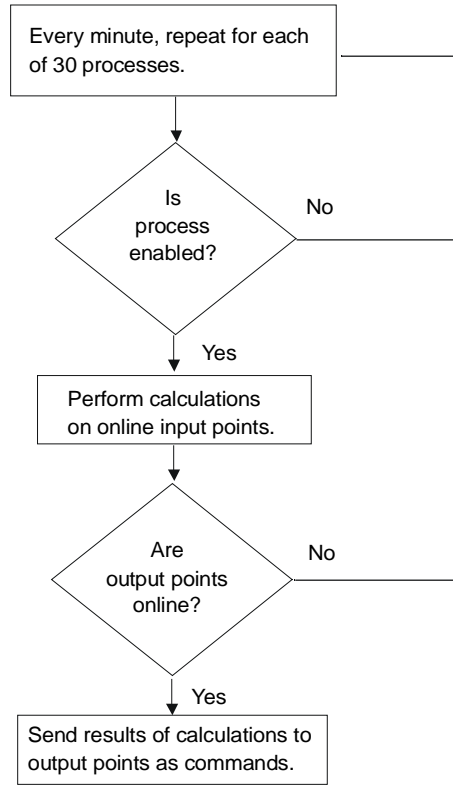
The Signal Select feature scans the defined and enabled processes once each minute. For each process, Signal Select reads the inputs (up to 12) and computes the average state. The Average Output is commanded to the state which is most represented by the inputs. For example, if more inputs are State 1, the Average Output is commanded to State 1. If the inputs are evenly split between 0 and 1, the Average Output is commanded to State 1.

The OR Output is a result of a logical OR equation: the OR Output is commanded to State 1 if *any* input is State 1.

The AND Output is a result of a logical AND equation: the AND Output is commanded to State 1 if *all* inputs are State 1.

Signal Select Process Flowchart

Figure 18-1 illustrates the Signal Select process.



sige1

Figure 18-1: Signal Select Process

Design Considerations

As you engineer the Signal Select feature, keep the following considerations in mind:

- To create Signal Select processes, you must have a System capability password.
- A process can contain either all AI and AO points, or all BI and BO points.
- A point can be used only once as an Output point. (You cannot use the same point as more than one output in the same process, or in another process.)
- Output points cannot be Read Only. To determine whether a point is Read Only or Read/Write, see the *Point Mapping* section of the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.
- A process must contain at least two inputs and at least one output.
- If an input point is offline, it is ignored.

Procedure Overview

Table 18-2: Defining Signal Select

To Do This	Follow These Steps:
Define Signal Select	Determine which points should be inputs for calculations. Determine which points should receive results of calculations in the form of commands. Define Signal Select process on the Signal Select Modify/Add/Delete screen.
Add Signal Select	From the Main menu, press C. Press S. Press Enter. Fill in the definition fields. Press F2 (Save) or F3 (More). To cancel the Signal Select definition, press F1 (Cancel).
Modify Signal Select	From the Main menu, press C. Press S. Enter the number of the process in the Process Number field. Fill in the definition fields. Press F2 (Save) or F3 (More). To cancel the Signal Select definition, press F1 (Cancel).
Delete Signal Select	From the Main menu, press C. Press S. Enter the number of the process in the Process Number field. Enter Del in the Process Enabled field. Press F2 (Save) or F3 (More).

Detailed Procedures

Defining Signal Select

To define Signal Select:

1. Determine which points should be inputs for calculations.
2. Determine which points should receive results of calculations in the form of commands.
3. Define a Signal Select process on the Signal Select Modify/Add/Delete screen.

Adding Signal Select

To add a Signal Select process:

1. From the Main menu, press **C** to select the Control Logic menu. The Control Logic menu appears.
2. Press **S** to select the Signal Select option. The first undefined Signal Select process number is displayed.

Note: If the maximum number of processes (30) has been defined, the Process Number field is blank.

3. Press **Enter**. A new Signal Select Modify/Add/Delete screen appears. The point fields are blank.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 13:58
-----
Signal Select Modify/Add/Delete
Process Number [ 1]      Process Enabled [Yes]
Inputs:                Point
                    [ 5] LCP-1 AI3                [ 4] LCP-1 AI2
                    [ ] [ ] [ ] [ ] [ ] [ ]
                    [ ] [ ] [ ] [ ] [ ] [ ]
                    [ ] [ ] [ ] [ ] [ ] [ ]
Outputs:              Point
Average              [ 44] AHU9 A0 ADF196
Highest/OR           [ ] [ ] [ ] [ ] [ ] [ ]
Lowest/AND           [ ] [ ] [ ] [ ] [ ] [ ]

F1 Cancel  F2 Save  F3 More
Select enable (No,Yes,Del)

```

Signal select

Figure 18-2: Signal Select Modify/Add/Delete Screen

4. Fill in the definition fields with the desired settings.

Table 18-3 gives a detailed explanation of each of the Signal Select definition fields.

Table 18-3: Fields in the Signal Select Modify/Add/Delete Screen

Field	Description	Options/Range	Required?	Default
Process Number	Identifies the process by number.	1 to 30	Yes	1
Process Enabled	Provides master control switch for the process: Yes - enables the process. No - disables the process. Del - deletes the process from memory.	Yes, No, and Del	Yes	Del
Inputs: Point	Specifies the number of the input point. Input and output points must be either all analog (AI and AO) or all binary (BI and BO). Up to 12 input points can be defined.	Any defined non-AC type point	Yes (At least two input points are required.)	N.A.
Average Point	Analog Process: Identifies the point that is commanded to the average value of the inputs. Binary Process: Identifies the point that is commanded to the state most represented by the inputs. (If inputs are split between State 0 and State 1, average output point is commanded to State 1.)	Any defined non-AC type point (must be Read/Write point)	No (However, at least one output is required. It can be any type of output.)	N.A.
Highest/OR Point	Analog Process: Identifies the point that is commanded to the highest value of the inputs. Binary Process: (OR point) Identifies the point that is commanded to State 1 if <i>any</i> input is State 1.	Any defined non-AC type point (must be Read/Write point)	No (However, at least one output is required. It can be any type of output.)	
Lowest/AND Point	Analog Process: Identifies the point that is commanded to the lowest value of the inputs. Binary Process: (AND point) Identifies the point that is commanded to State 1 if <i>all</i> inputs are State 1.	Any defined non-AC type point (must be Read/Write point)	No (However, at least one output is required. It can be any type of output)	N.A.

5. Press F2 (Save) to save the changes and return to the Control Logic menu, or press F3 (More) to define another process. A message appears telling you the changes have been saved.

To cancel the Signal Select definition, press F1 (Cancel).

Note: A check is made when you save a Signal Select process. If the output point type and the input point type do not match (i.e., analog or binary), or if the points in the output fields are read-only, an error message displays and the process is not saved.

When you use F3 (More) to scroll, the number in the Process Number field raises sequentially until it gets to 20. Then it returns to 1.

Modifying Signal Select

To modify a Signal Select process:

1. From the Main menu, press C to select the Control Logic menu. The Control Logic menu appears.
2. Press S to select the Signal Select option. The first undefined Signal Select process number is displayed.

Note: If the maximum number of processes (30) has been defined, the Process Number field is blank.

3. Enter the number of the process in the Process Number field. The process appears.
4. Fill in the definition fields with the desired settings. (Use the Enter key to move from one field to the next.)
5. Table 18-3 gives a detailed explanation of each of the Signal Select definition fields.
6. Press F2 (Save) to save the changes and return to the Control Logic menu, or press F3 (More) to define another process. A message appears telling you the changes have been saved.

To cancel the Signal Select definition, press F1 (Cancel).

Deleting Signal Select

To delete a Signal Select process:

1. From the Main menu, press C to select the Control Logic menu. The Control Logic menu appears.
2. Press S to select the Signal Select option. The first undefined Signal Select process number is displayed.

Note: If the maximum number of processes (30) has been defined, the Process Number field are blank.

3. Enter the number of the process in the Process Number field. The Signal Select process appears. Enter Del in the Process Enabled field.
4. Press F2 (Save) to save the changes and return to the Control Logic menu, or press F3 (More) to define another process. A message appears telling you the changes have been saved.

To cancel the Signal Select definition, press F1 (Cancel).

Defining Auto Shutdown

Introduction

Auto Shutdown is a control process that disables alarm reports when these reports are unnecessary or inappropriate.

This chapter tells you how to define the Auto Shutdown process for the Panel unit binary input and output points. This chapter describes how to:

- define Auto Shutdown
- add Auto Shutdown
- modify Auto Shutdown
- delete Auto Shutdown

Key Concepts

Auto Shutdown

An example application using Auto Shutdown is a supply fan being scheduled to remain off overnight, because the room will not be occupied. The analog temperature sensors in the room would normally start generating alarms as the temperature in the room exceeded alarm limits (as a result of the fan being off). With the Auto Shutdown feature, you can prevent these points from generating alarms by “shutting them down” when the supply fan is off.

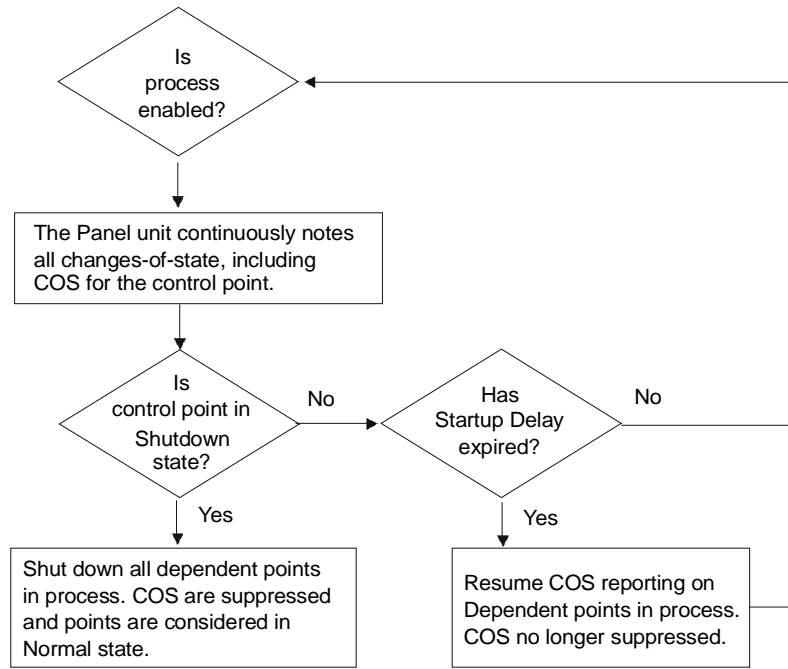
You define the supply fan as a control point. You define up to 12 dependent points (e.g., analog temperature sensors) to shutdown when the control point enters a specified state. In this example, when the control point is off, the dependent points are shut down, and does not generate alarm reports.

With Auto Shutdown, you can:

- define a control point whose state determines whether dependent points are shutdown
- suppress Change-of-State (COS) and alarm messages generated by selected shutdown points when these alarm messages are unnecessary or inappropriate
- specify a start-up delay so that points are not immediately released from shutdown

To define Auto Shutdown, you must have a System capability password.

Figure 19-1 shows the basic Auto Shutdown process.



Autoe1

Figure 19-1: Auto Shutdown Process

Capabilities

Table 19-1 summarizes the capabilities of Auto Shutdown.

Table 19-1: Auto Shutdown Capabilities

Capability	Description	Purpose
Multiple Processes	Allows up to 30 different processes.	Provides flexibility in minimizing nuisance alarms.
Automatic Operation	Checks whether control point is in Shutdown state once each minute.	Provides automatic and consistent screening of unnecessary data.
Input Flexibility	Allows any BI or BO point as input.	Enhances control process capabilities.
Dependent Point Flexibility	Allows up to 12 dependent points for each process. The outputs can be AI, AO, BI, or BO points.	Provides additional capacity for processes.
Startup Delay	Prevents points from being released from shutdown until specified period elapses.	Further prevents unnecessary alarms.
Shutdown Indicator	Indicates which points are currently shutdown.	Allows operators to know which points are shutdown.

Design Considerations

As you engineer Auto Shutdown, consider the following:

- For effective operation, the control point should be a point that is commanded by the Panel unit.
- To define Auto Shutdown processes, you need a System password.
- The control point must be a binary input or binary output point.
- At least one dependent point must be defined.
- Dependent points cannot be AC points.
- A point can be a dependent point in only one Auto Shutdown process.
- A shutdown point's state is always considered Normal.
- Consider how Auto Shutdown interacts with the Control Logic feature. Specifically, if the dependent point is part of a Control Logic process that uses the dependent point's Normal state in an IF statement, the shutdown of this dependent point could trigger the Control Logic process, since shutdown points are considered in Normal state.

Procedure Overview

Table 19-2: Defining Auto Shutdown

To Do This	Follow These Steps:
Define Auto Shutdown	Determine what control situations produce unnecessary or inappropriate COS alarms. Determine which BI or BO point is the control point and which state causes the dependent points to have their COS suppressed. Determine length of delay in minutes before points are released from shutdown after control point leaves Shutdown state. Determine which points should have their COS suppressed when the control point is in the Shutdown state. Enter information in Auto Shutdown Modify/Add/Delete screen.
Add Auto Shutdown	From the Main menu, press C. Press A. Press Enter. Fill in the definition fields. Press F2 (Save) or F3 (More).
Modify Auto Shutdown	From the Main menu, press C. Press A. Enter the number of the process in the Process Number field. Fill in the definition fields with the desired settings. Press F2 (Save) or F3 (More).
Delete Auto Shutdown	From the Main menu, press C. Press A. Enter the number of the process in the Process Number field. Enter Del in the Process Enabled field. Press F2 (Save) or F3 (More).

Detailed Procedures

Defining Auto Shutdown

To define the Auto Shutdown feature:

1. Determine what control situations produce unnecessary or inappropriate COS alarms.
2. Determine which BI or BO point should be the control point and which state causes the dependent points to have their COS suppressed.
3. Determine length of delay in minutes before points are released from shutdown after control point leaves Shutdown state.
4. Determine which points should have their COS suppressed when the control point is in the Shutdown state.
5. Enter information in Auto Shutdown Modify/Add/Delete screen.

Adding Auto Shutdown

To add an Auto Shutdown process:

1. From the Main menu, press C to select the Control Logic menu. The Control Logic menu appears.
2. Press A to select the Auto Shutdown option. The first undefined Auto Shutdown process number is displayed
3. Press Enter. A new Auto Shutdown Modify/Add/Delete screen appears. The point fields are blank (Figure 19-2).

```

Operator Name: J. Smith                               Thu Jan 8, 1998 14:00
-----
                                Auto Shutdown Modify/Add/Delete
Process Number [ 1]          Process Enabled [Yes]
Point
Control Point [396] AHU2 BD245
Shutdown State [Off]
Startup Delay [ 99] (minutes)

Dependents          Point
[ 53] AHU9 A0 ADF24          [ 54] AHU9 AI ADF26
[ 55] AHU9 AI ADF25          [ 41] AHU9 A0 ADF180
[ 42] AHU9 A0 ADF129         [ 43] AHU9 A0 ADF150
[ 23] AHU9 AI2 STATUS        [ 29] AHU9 AI8 CRIT
[ 24] AHU9 AI3 STATUS        [ 27] AHU9 AI6 CRIT D3
[ 35] AHU9 A02 CRIT D2
[ ]

F1 Cancel  F2 Save  F3 More
Select enable (No,Yes,Del)

```

Auto shutdown

Figure 19-2: Auto Shutdown Modify/Add/Delete Screen

4. Fill in the definition fields with the desired settings. (Use the Enter key to move from one field to the next.)

Note: If Help is enabled, a message appears at the bottom of the screen telling you what kind of information to enter in each field, and what limits there are, if any. If your entry is unacceptable, both the field and the message at the bottom of the screen flash.

Table 19-3 gives a detailed explanation of each of the Auto Shutdown definition fields.

Table 19-3: Auto Shutdown Definition Fields

Field	Description	Options/ Range	Required?	Default
Process Number	Identifies the process by number.	1 to 30	Yes	1
Process Enabled	Provides master control switch for the process: Yes - enables the process. No - disables the process. Del - deletes the process from memory.	Yes, No, and Del	Yes	Del
Control Point	Specifies the number of the binary input or binary output point whose state determines whether dependent points are shut down. You can define more than one Auto Shutdown process for the same control point.	Any defined BI or BO point	Yes	N.A.
Shutdown State	Defines the state of the control point that causes the dependent points to shut down (if the process is enabled).	3 characters off = State 0 on = State 1	Yes	Off (State 0)
Startup Delay	Defines the time period, in minutes, that the dependent points remain shut down, after the control point leaves its Shutdown state.	1 to 99	Yes	1
Dependents	Specifies the numbers of the points that are shut down (their COS reports are suppressed) when the control point is in its Shutdown state. Up to 12 points can be defined as dependent points. AC points cannot be defined as dependent points.	Any defined point	Yes (at least one dependent point is required)	N.A.

- Press F2 (Save) to save the changes and return to the Control Logic menu, or F3 (More) to save the changes and define another process. A message appears telling you the changes have been saved.

To cancel the Auto Shutdown definition, press F1 (Cancel).

Notes: When you use F3 (More) to scroll, the number in the Process Number field raises sequentially until it gets to 30. Then it returns to 1.

A check is made when you attempt to save an Auto Shutdown process. If the Control Point is not defined as a Panel unit binary point, or if the dependent points are already defined in another Auto Shutdown process, an error message is displayed and the process is not saved.

Modifying Auto Shutdown

To modify an Auto Shutdown process:

1. From the Main menu, press C to select the Control Logic menu. The Control Logic menu appears.
2. Press A to select the Auto Shutdown option. The first undefined Auto Shutdown process number is displayed.
3. Enter the number of the process in the Process Number field. The process appears.
4. Fill in the definition fields with the desired settings. (Use the Enter key to move from one field to the next.) Table 19-3 gives a detailed explanation of each of the Auto Shutdown Definition fields.

Note: If Help is enabled, a message appears at the bottom of the screen telling you what kind of information to enter in each field, and what limits there are, if any. If your entry is unacceptable, both the field and the message at the bottom of the screen flash.

5. Press F2 (Save) to save the changes and return to the Control Logic menu, or F3 (More) to save the changes and define another process. A message appears telling you the changes have been saved. To cancel the Auto Shutdown definition, press F1 (Cancel).

Deleting Auto Shutdown

To delete an Auto Shutdown process:

1. From the Main menu, press C to select the Control Logic menu. The Control Logic menu appears.
2. Press A to select the Auto Shutdown option. The first undefined Auto Shutdown process number is displayed.
3. Enter the number of the process in the Process Number field. The Auto Shutdown process appears.
4. Enter Del in the Process Enabled field.
5. Press F2 (Save) to save the changes and return to the Control Logic menu, or F3 (More) to save the changes and define another process. A message appears telling you the changes have been saved.

Chapter 20

Defining Global Data Sharing

Introduction

This chapter explains how to define Global Data Sharing.

This chapter describes how to:

- define Global Data Sharing
- add Global Data Sharing processes
- modify Global Data Sharing processes
- delete Global Data Sharing processes
- delete a point from the Global Data Sharing process

Key Concepts

Global Data Sharing

The Global Data Sharing feature provides network-wide interlocking of control information. Data received from one ASC can control other points on that ASC, or on another ASC on the N2 Bus.

For example, you can specify that AO points 16, 71, 78, and 90 all share the analog value of AO Point 5. Or specify that when BO Point 20 turns On, BO Points 25, 26, 27, and 28 are also turned On.

Each process has 1 master point and up to 16 subordinate points. The master point determines the value of the subordinate points. For example, if the master point changes state from On to Off, all subordinate points are commanded Off.

Each process is scanned every minute. If the process is enabled, the master point is online, and the value of the master point changes, the subordinate points are commanded to the master point's value. Only online subordinate points are commanded. However, if a subordinate point is unreliable, but its controller is online, the command is still issued.

You can specify up to 20 Global Data Sharing processes. Within each process, all points must be of the same software type.

All point types except AC can be used in Global Data Sharing processes. Points must be online to be evaluated.

Global Data Sharing requires you to specify the:

- master point whose values you want to transfer to subordinate points
- subordinate points that receive master point values

To add or modify a Global Data Sharing process, you must have a System capability password.

Figure 20-1 shows a diagram of the Global Data Sharing process.

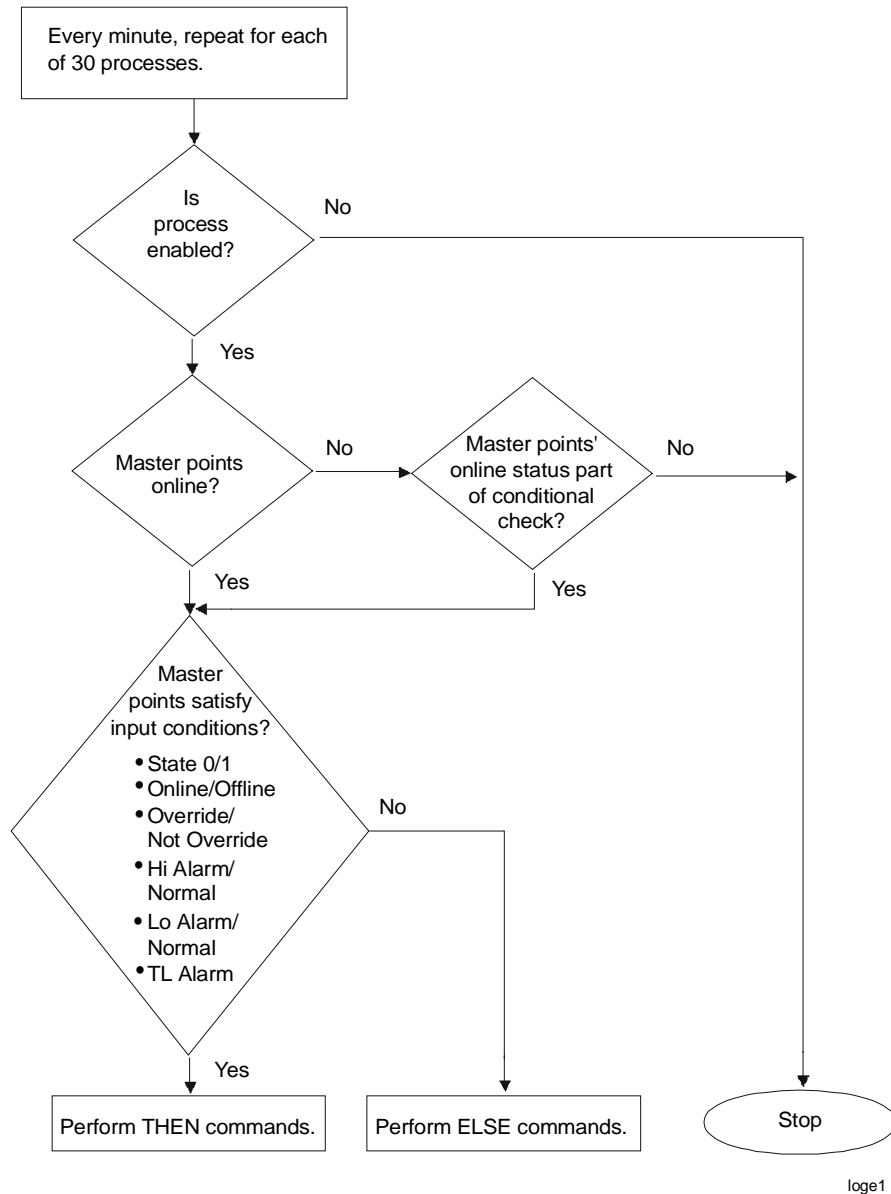


Figure 20-1: Global Data Sharing Process

Procedure Overview

Table 20-1: Defining Global Data Sharing

To Do This	Follow These Steps:
Define Global Data Sharing	Determine which points should share data in the system. Define Global Data Sharing process on the Global Data Sharing Modify/Add/Delete screen.
Add Global Data Sharing Processes	From the Main menu, press C. Press G. Press Enter. Fill in the fields. Press F2 (Save) or F3 (More).
Modify Global Data Sharing Processes	From the Main menu, press C. Press G. Enter the number of the process in the Process Number field. Fill in the fields. Press F2 (Save) or F3 (More).
Delete Global Data Sharing Processes	From the Main menu, press C. Press G. Enter the number of the process in the Process Number field. Enter Del in the Process Enabled field. Press F2 (Save) or F3 (More).
Delete a Point from the Global Data Sharing Process	From the Main menu, press C. Press G. Enter the number of the process in the Process Number field. Fill in the fields. Type blank spaces in the point number field. Press F2 (Save) or F3 (More).

Detailed Procedures

Defining Global Data Sharing

To define Global Data Sharing:

1. Determine which points should share data in the system.
2. Define Global Data Sharing process on the Global Data Sharing Modify/Add/Delete screen.

Adding Global Data Sharing Processes

To add a Global Data Sharing process:

1. From the Main menu, press C to select the Control Logic option. The Control Logic menu appears.
2. Press G to select the Global Data Sharing option. The first undefined Global Data Sharing process number is displayed.
3. Press Enter. A new Global Data Sharing Modify/Add/Delete screen appears. The Point fields are blank (Figure 20-2).

```

Operator Name: J. Smith                               Thu Jan 8, 1998  14:04
-----
                        Global Data Sharing Modify/Add/Delete
Process Number [  1]          Process Enabled [Yes]
Point
Master   [ 18] LCP-1 B03 NO HED
Point
Subordinate [ 93] AHU 02 - B08          Point [ 63] AHU9 B010 STATUS
[ ]
[ ]
[ ]
[ ]
F1 Cancel  F2 Save  F3 More
Select enable (No, Yes, Del)

```

Global data sharing

Figure 20-2: Global Data Sharing Modify/Add/Delete Screen

4. Fill in the fields. Press Enter to move the cursor from field to field. Either press the space bar to scroll through the options or type your selection. Table 20-2 explains the fields.

Table 20-2: Global Data Sharing Parameters

Field	Description	Options/Range	Required?	Default
Process Number	Identifies the unique data sharing process you have created.	1 to 20	Yes	1
Process Enabled	Provides master control switch for the process. Yes - enables operation of the process. No - disables operation of the process. Del - deletes the process from memory.	Yes, No, and Del	Yes	Del
Master Point	Specifies the point number whose values, state or status you want to transfer to other points.	Any defined non-AC type point	Yes	N.A.
Subordinates Point	Specifies from 1 to 16 points that receive the value, status, or state of the master point.	Any defined non-AC type point that is the same software type as the master point	Yes	N.A.

5. Press F2 (Save) to save the new or changed process to the System database. Press F3 (More) to save the process and scroll to the next process to set up or modify.

Modifying Global Data Sharing Processes

To modify a Global Data Sharing process:

1. From the Main menu, press C to select the Control Logic option. The Control Logic menu appears.
2. Press G to select the Global Data Sharing option. The first undefined Global Data Sharing Process Number is displayed (Figure 20-2).
3. Enter the number of the process in the Process Number field. The process appears.
4. Fill in the fields. Press Enter to move the cursor from field to field. Either press the space bar to scroll through the options or type your selection. Table 20-2 explains the fields.
5. Press F2 (Save) to save the new or changed process to the System database. Press F3 (More) to save the process and scroll to the next process to set up or modify.

Deleting Global Data Sharing Processes

To delete a Global Data Sharing process:

1. From the Main menu, press C to select the Control Logic option. The Control Logic menu appears.
2. Press G to select the Global Data Sharing option. The first undefined Global Data Sharing Process Number is displayed (Figure 20-2).
3. Enter the number of the process in the Process Number field. The Global Data Sharing process appears.
4. Enter Del in the Process Enabled field. Table 20-2 explains the fields.
5. Press F2 (Save) to save the new or changed process to the System database. Press F3 (More) to save the process and scroll to the next process to set up or modify.

Deleting a Point from the Global Data Sharing Process

To delete a point from the Global Data Sharing process:

1. From the Main menu, press **C** to select the Control Logic option. The Control Logic menu appears.
2. Press **G** to select the Global Data Sharing option. The first undefined Global Data Sharing process number is displayed.
3. Enter the number of the process in the Process Number field. The process appears.
4. Type blank spaces in the point number field. The point name disappears when you move the cursor to another field. Table 20-2 explains the fields.
5. Press **F2** (Save) to save the new or changed process to the System database. Press **F3** (More) to save the process and scroll to the next process to set up or modify.

Scheduling and Printing Reports

Introduction

The Reports feature provides a means for retrieving system information in hard copy format. This chapter tells you how to use the Reports feature to schedule when reports are printed.

This chapter describes how to:

- define the Reports feature
- add report schedules
- modify report schedules
- delete report schedules
- print a report immediately
- display a Reports Summary

Key Concepts

Reports

The Reports feature allows you to print hard copies of the information the Panel unit records about your facility.

The Reports feature simplifies the operator's task of recognizing and responding to the variety of information available from the Panel unit.

The reports range from energy consumption to a list of alarms. The Reports feature allows the operator to print lists of these events and alarms in a convenient form. The operator can schedule the printouts, or can obtain printouts on demand.

Reports requested from either the local or remote terminals print at the local printer. A remote operator can print Panel unit screens at a remote site printer by using the File Print menu selection from the M3 Workstation Terminal tab, or the print screen capability of the terminal.

The Panel unit provides 12 different report types (e.g., Critical Alarms, Offline Points, Totalization Points). You can create up to 20 different report schedules. For example, Report Schedule 1 can print a Critical Alarms report at 7 a.m. every weekday, and Report Schedule 2 can print an Offline Points report at 3 p.m. every weekday. You can also use the Reports feature to print reports immediately.

Table 21-1 shows the destinations that may be specified for scheduled reports.

Table 21-1: Destinations for Scheduled Reports

Destination	Connection
Local	Printer connected to local terminal
Remote	Printer connected to remote terminal
Printer	Printer connected to Panel/LTD serial port

Scheduling a report to print at a remote dial printer causes a dial-out using Dial Sequence 1 (as defined in the Communication I/O Setup screen). Dial-up must be enabled.

If the printer is not properly connected when the report is scheduled to be printed, either portions of the report or the entire report may not be printed.

To schedule reports, you need an Operate or System capability password.

Typical examples of Reports feature uses are:

- automatically print steam consumption trend values
- print list of Critical alarms for review
- automatically print energy consumption totals

Figure 21-1 shows an overview of the Reports feature operation.

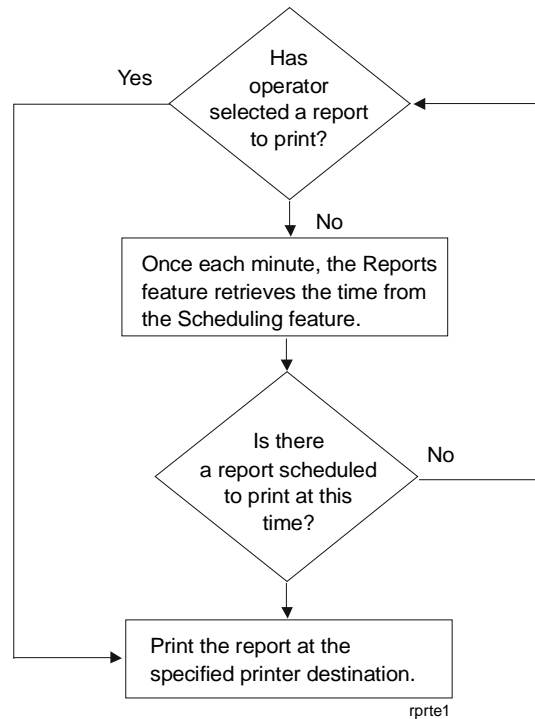


Figure 21-1: Basic Reports Feature Operation

If the printer is busy, reports are placed in a queue. The queue handles reports on a first-in-first-out basis. If the printer is shut off or goes offline, portions of the report may be lost.

Capabilities

Table 21-2 describes the capabilities of the Reports feature.

Table 21-2: Reports Capabilities

Capability	Description	Purpose
Selection	Operator can select from 11 report types.	Reports precisely the data needed.
Scheduling	Operator can select the days and times for reports to print.	Allows the operator to collect data: <ul style="list-style-type: none"> • when not on site • at convenient times
Immediate Report Request	Operator can retrieve data immediately in a hard copy format.	Allows the operator to document the system condition at any time.
Printout	Hard copy is similar to screen displays.	Provides data in familiar form.

Report Types

You can schedule and print the following report types:

Table 21-3: Report Types

Report Type	Description
All Points	Lists current status, software type, controller type, network address, and alarm message assigned to each point in the Panel unit database.
All Alarms	Lists current status, software type, controller type, network address, and alarm message assigned to each point currently in alarm.
Critical Alarms	Lists current status, software type, controller type, network address, and alarm message assigned to each point currently in alarm with Critical or Fire priority.
Status Alarms	Lists current status, software type, controller type, network address, and alarm message assigned to each point currently in alarm with Status priority.
Offline Points	Lists current status, software type, controller type, network address, and alarm message assigned to each offline point.
Overridden Points	Lists current status, software type, controller type, network address, and alarm message assigned to each overridden point.
Totalization Points	Lists all BI and BO points currently being totalized, and the current totals for those points.
W/S (Weekly Scheduling) Point Cross-Reference	Cross-references point numbers to the schedules in which they appear. Lists the start time, stop time, and days the points are scheduled.
Scheduling Summary	For each defined schedule, lists Time 1, Time 2, days of the week, calendar dates, and involved points.
Group Summaries	Lists the current status of all points in a group.
Trend Log Data	Lists the status or value of points at defined sample intervals.
Energy Profiles	Lists current use rate, daily, monthly, and yearly totals, and peak average demand for accumulator points.

Reports Summary

A Reports summary allows you to review the existing report schedules so you know when reports are scheduled to be printed. All password capability levels can display a Reports summary.

Print Reports Immediately

The Reports feature also allows you to print a selected report immediately, without scheduling. All password capability levels can print reports using the method described in this chapter.

Printing Options

Use the Communication I/O Setup screen to specify the printer baud rate, the number of lines printed per page, and to enable dial-up. You need a System capability password to modify communications settings.

Note: The Number Lines/Page parameter, which specifies the number of lines printed per page, must be set to greater than 0 for page breaks (form feeds) to be generated in report printouts. If you do not want page breaks to be generated, set this parameter to 0.

Table 21-4 defines the Reports parameters for the Communication I/O Setup screen.

Table 21-4: Reports Parameters on Communication I/O Setup Screen

Field	Description	Options/Range	Required?	Default
Printer Baud Rate	Specifies the data transfer speed between the Panel unit and the printer.	1200, 2400, 4800, 9600	Yes	9600
Number Lines/Page	Specifies the number of lines printed on each page before the Panel unit generates a page break (form feed). The Number Lines/Page parameter, which specifies the number of lines printed per page, must be set to greater than 0 for page breaks (form feeds) to be generated in report printouts.	0 to 999	Yes	0
Enable Dial-Up	Specifies whether or not the Panel unit initiates dial-out to remote device. For reports scheduled to a remote printer, dial up must be enabled.	Yes or No	Yes	No

Procedure Overview

Table 21-5: Scheduling and Printing Reports

To Do This	Follow These Steps:
Define the Reports Feature	Identify: type of point information needed frequently, what points or groups generate the needed information, and what type of feature information is needed frequently. Determine: how often each kind of information is required, the times and days when the information is most needed, and the destination printer for the report. Enter the information using the Reports Modify/Add/Delete screen. Enter the printer baud rate and the number of lines per page in the Communication I/O Setup screen.
Add Report Schedules	From the Main menu, press R. Press M. Press Enter. Fill in the fields. Press F2 (Save) or F3 (More).
Modify Report Schedules	From the Main menu, press R. Press M. Enter the number of the process in the Process Number field. Fill in the fields. Press F2 (Save) or F3 (More).
Delete Report Schedules	From the Main menu, press R. Press M. Enter the number of the process in the Process Number field. Enter Delete in the Report field. Press F2 (Save) or F3 (More).
Print a Report Immediately	From the Main menu, press R. Type P. Fill in the fields. When the cursor is in the Destination field, press Enter.
Display a Reports Summary	From the Main menu, press R. Press S. Press F3 (More) to scroll to the next ten defined report schedules. Press F1 (Cancel) to return to the Reports menu.

Detailed Procedures

Defining the Reports Feature

To define the Reports feature:

1. Identify:
 - What type of point information is needed frequently?
 - What points or groups generate the needed information?
 - What type of feature information is needed frequently?
2. Determine:
 - How often each kind of information is required?
 - What are the times and days when the information is most needed?
 - What is the destination printer for the report?
3. Enter the information you identified using the Reports Modify/Add/Delete screen.
4. Enter the printer baud rate and the number of lines per page in the Communication I/O Setup screen.

Adding Report Schedules

To add report schedules:

1. From the Main menu, press R to select the Reports option. The Reports menu appears.
2. Press M to select the Modify/Add/Delete option. The first undefined report schedule number is displayed (Figure 21-2).
3. Press Enter. A new Reports Modify/Add/Delete screen appears. The point fields are blank.

```

Operator Name: J. Smith                               Thu Jan 8, 1998 14:26
-----
                                Reports Modify/Add/Delete
Report Schedule Number [ 1]                        [Schedule] Report
Report Type [All Alarms]                          Low Range [ 1] High Range [ 30]
List Of Report Types:
  All Points           All Alarms
  Critical Alarms     Status Alarms
  Offline Points      Overridden Points
  Totalization Points W/S Point Cross-Ref
  Schedule Summary    Group Summaries
  Trend Log Data      Energy Profiles

Scheduled Print Time [15:07] On Schedule Days (SMTWTFSH) [ TW F H]
Destination [Printer]

F1 Cancel  F2 Save  F3 More
Select from (Delete,Schedule)

```

Reports modify

Figure 21-2: Reports Modify/Add/Delete Screen

4. Fill in the fields. Press Enter to move the cursor to the next field.
Table 21-6 explains the fields.

Table 21-6: Report Schedule Fields

Field	Description	Options/Range	Required?	Default
Report	Defines what you want done with the report. Schedule: delays printing until some future time and saves information to the database. Delete: removes report from database.	Schedule, Delete	Yes	Delete
Report Type	Sets the kind of information that appears in the report.	12 Types: All Points All Alarms Critical Alarms Status Alarms Offline Points Overridden Points Totalization Points W/S Point Cross-Ref Schedule Summary Group Summaries Trend Log Data Energy Profiles	Yes	All Points
High Range/ Low Range	Sets high and low limits for report (e.g., to print a report for Group Summaries 3 through 7, enter 3 for low range and 7 for high range).	Only valid limits for the report type may be entered.	No If no value is entered, all available reports of the selected type print.	N.A.
Scheduled Print Time	Sets the time when the report prints.	00:00 to 23:59, 24-hour format	Required for scheduled reports.	00:00
On Schedule Days	Sets the days of the week when the report prints.	Sunday through Saturday, Holiday	Required for scheduled reports.	SMTWTFSH
Destination	Selects the destination for the printout.	Printer, Local, Remote (See note.)	Yes	Printer

Note: Printer means the printer directly connected to the Panel's serial port; Local means the printer connected to the local terminal; and Remote means the printer connected to the remote terminal

5. Press F2 (Save) to save the report schedule to the System database, or press F3 (More) to save the report schedule and scroll to the next schedule.

Modifying Report Schedules

To modify report schedules:

1. From the Main menu, press R to select the Reports option. The Reports menu appears.
2. Press M to select the Modify/Add/Delete option. The first undefined report schedule number is displayed (Figure 21-2).
3. Enter the number of the process in the Process Number field. The process appears.
4. Fill in the fields. Press Enter to move the cursor to the next field. Table 21-6 explains the fields.
5. Press F2 (Save) to save the report schedule to the System database, or press F3 (More) to save the report schedule and scroll to the next schedule.

Deleting Report Schedules

To delete report schedules:

1. From the Main menu, press R to select the Reports option. The Reports menu appears.
2. Press M to select the Modify/Add/Delete option. The first undefined report schedule number is displayed (Figure 21-2).
3. Enter the number of the process in the Process Number field. The report schedule process appears.
4. Enter Delete in the Report field.
5. Press F2 (Save) to save the report schedule to the System database, or press F3 (More) to save the report schedule and scroll to the next schedule.

Printing a Report Immediately

To print a report immediately:

1. From the Main menu, press R to select the Reports option. The Reports menu appears.
2. Type P to select the Print Reports screen. The Print Reports screen appears (Figure 21-3).

```

Operator Name: J. Smith                               Thu Jan 8, 1998 14:22
-----
                                Print Reports
Report Type [All Points]      Low Range [ ] High Range [ ]
List Of Report Types:
  All Points           All Alarms
  Critical Alarms     Status Alarms
  Offline Points      Overridden Points
  Totalization Points W/S Point Cross-Ref
  Schedule Summary    Group Summaries
  Trend Log Data      Energy Profiles
Destination [Local]

F1 Cancel
Choose from displayed list of report types
  
```

Print reports

Figure 21-3: Print Reports Screen

3. Fill in the fields. Press Enter to move the cursor from field to field. Table 21-6 explains the fields.
4. When the cursor is in the Destination field (the last field), press Enter. The report is printed.

Displaying a Reports Summary

To display a Reports Summary:

1. From the Main menu, press R to select the Reports option. The Reports menu appears.
2. Press S to select the Summary option. The Scheduled Reports Summary appears, displaying the first ten defined report schedules (Figure 21-4).

Operator Name: J. Smith		Thu Jan 8, 1998 14:30					

Scheduled Reports Summary							
Report	Schedule	Range		Schedule		Destination	
		Low	High	Time	Days		
1	All Alarms	1	30	15:07	TW F H	Printer	
2	W/S Point Cross-Ref	50	70	15:01	T H	Remote	
3	Group Summaries	60	60	15:01	T H	Printer	
4	Status Alarms	1	20	15:01	T H	Remote	
5	Energy Profiles	1	1	15:01	T T	Printer	
6	Trend Log Data	1	1	07:44	T	Remote	
7	Overridden Points	1	50	07:44	T H	Remote	
8	Totalization Points			13:00	H	Printer	
9	W/S Point Cross-Ref			21:00	H	Printer	
10	Status Alarms	1	20	08:37	F H	Local	

F1 Cancel F3 More

Reports summary

Figure 21-4: Reports Summary

3. Press F3 (More) to scroll to the next 10 defined report schedules.
4. When you are done viewing the summary, press F1 (Cancel) to return to the Reports menu.

Chapter 22

Defining Accumulator (AC) Point Software

Introduction

This chapter is about Accumulator Point (AC) Software.

This chapter describes how to define AC points.

Key Concepts

Accumulator Point

An AC point is a software representation of a hardware device that measures flow or consumption by measuring a rate of contact state change. AC points convert binary input pulses from a meter into a rate for use in operator displays, alarm analysis, and control programs. AC points also accumulate the number of binary pulses for use by the Demand Limiting feature.

Figure 22-1 shows the general operation of an AC point. The blocks represent functions performed by the software. Each major block (software function) is explained in detail after this figure.

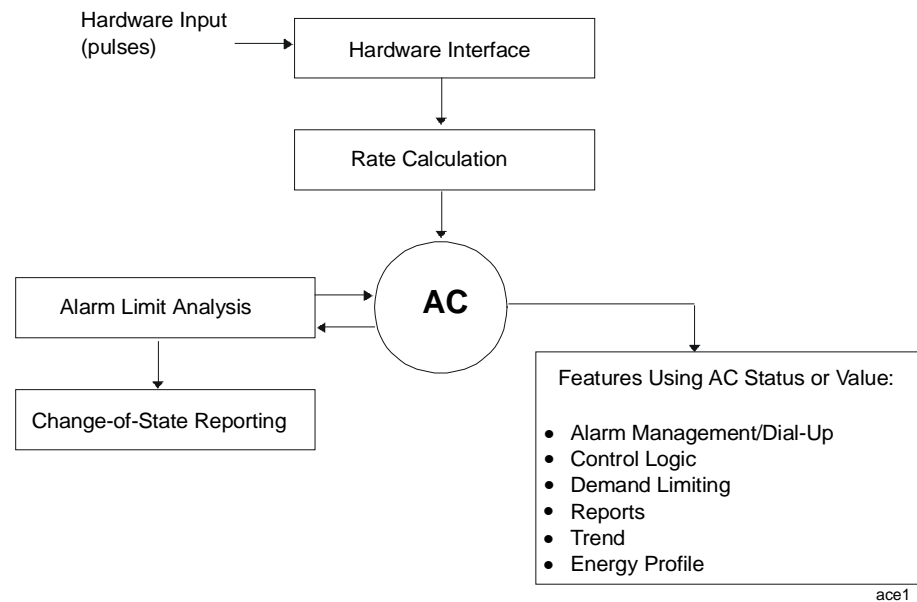


Figure 22-1: Accumulator General Model

Hardware Interface

AC points map to controllers. Mapping means that the field device is wired to a specific module, and the AC software point is defined for that module and physical location. For information on devices that support AC point definition and point restrictions, see the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*. The controller converts the raw pulse signal from a field device into digital counts. Input rates up to 100 Hz can be processed.

Rate Calculation

The Rate Calculation function derives a new rate value once each minute, each time the AC total is updated. The function then:

- Converts the AC total to a rate value, based on a conversion factor for the AC point. For example, one pulse equals 0.1 cubic ft of gas.
- Divides the accumulation total by the time period of the sample, changing the value to a rate. For example, 1100 cubic ft in a 55 second period equals 20 cubic ft/sec.
- Converts the rate into convenient engineering units. For example, cubic ft/sec might be converted to cubic ft/min.

The equation is

$$\text{Rate} = \frac{\text{pulses (now)} - \text{pulses (last sample)}}{\text{time (now)} - \text{time (last sample)}} \times \text{consumption constant} \times \text{rate constant}$$

$$\text{Rate} = \frac{\text{pulses}}{\text{seconds}} \times \frac{\text{consumption units}}{\text{pulse}} \times \frac{\text{seconds}}{\text{time unit}}$$

(consumption units: e.g., kWh, gallons, liters)

(time units: e.g., hours, minutes, seconds)

ace2

Figure 22-2: Rate Calculation Example 1

For example, assume the AC counted five pulses since it was last sampled 50 seconds ago and that one pulse = 10 kWh. Using the above equation:

$$\text{Rate} = \frac{5 \text{ pulses}}{50 \text{ seconds}} \times \frac{10 \text{ kWh}}{\text{pulse}} \times \frac{3600 \text{ seconds}}{\text{hour}}$$

$$\text{Rate} = 3600 \text{ kW}$$

ace3

Figure 22-3: Rate Calculation Example 2

Alarm Limit Analysis

Alarm limit analysis is a software process that compares the AC point value with user-defined high and low rate limits to identify an abnormal, or otherwise significant value. The results of this analysis for an AC point can be one of the results in Table 22-1.

Table 22-1: AC Point Alarm Conditions

Result of Analysis	AC Point Rate Condition
Normal	Within normal limits
High Alarm	Above high rate limit
Low Alarm	Below low rate limit

Approximately once each minute, when the new AC rate is calculated, the rate value is compared to the high rate alarm limit and low rate alarm limit to determine if the AC is in high or low alarm. AC points use a 5% differential of the high rate alarm limit as a buffer zone, preventing excessive alarms from fluctuations around the high or low rate limits.

COS Reporting

The Panel unit monitors each software point for any Change-of-State (COS). For AC points, a COS occurs when any change is identified in the alarm limit analysis.

Features Using AC Status or Value

The following features can use AC point status information. For detailed information on feature software, refer to the appropriate chapter in this manual.

- The Alarm Management and Dial-Up features send critical messages to operator terminals based on COS alarm limit analysis. Refer to the *Managing Alarms* and *Defining Dial-up* chapters.
- Control Logic can use the status of an AC point as input for a logic formula. Refer to the *Creating Control Logic* chapter.

- Demand Limiting requires meter input from an AC point to determine demand. Refer to the *Understanding Energy Management* chapter.
- Reports can send formatted output to a printer for:
 - point summaries reflecting AC point information
 - group summaries reflecting those groups containing AC point information

Refer to the *Scheduling and Printing Reports* chapter.

- Trend can record the AC point rate at specified intervals. Refer to the *Defining Trend* chapter.
- Energy Profile keeps track of AC point information and calculates daily, monthly, and yearly totals for total consumption and peak average demand. Refer to the *Understanding Energy Management* chapter.

Point Display Format

You can tell which feature is acting on a point by using the Point or Group Summary screens. These screens display point information as shown in Figure 22-4. Table 22-2 defines the fields.

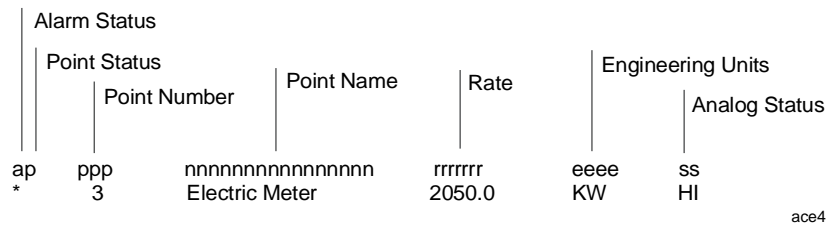


Figure 22-4: Point Summary Fields

Table 22-2: AC Point Display Format Fields

Field	Character	Definition
Alarm Status	U	Alarm is unacknowledged.
	*	Point is in an abnormal state.
Point Status	X	Point is offline or unreliable.
Point Number	PPP	3-digit point number
Point Name		16-character point name
Rate		Ranged analog rate
Engineering Units		4 characters, defined by user
Analog Status	HI	High Limit
	LO	Low Limit

Design Considerations

As you engineer AC points, consider the following:

- Point definition requires a System password.
- For information on devices that support AC point definition and point restrictions, see the *Data Base Generation Guide Technical Bulletin LIT-6281270* in the *Metasys Companion Technical Manual Technical Bulletin (FAN 628.1)* or *Data Base Generation Guide (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.
- You can define up to eight AC points. The AC points must occupy the lowest eight point numbers (1 through 8).
- You may define up to 60 groups. AC points can be a member of one or more groups.
- Points should be grouped so that various users have group summaries matching their needs.
- The Rate Constant is equal to the number of seconds of measure used for the Consumption engineering units. For example, if the units in the Consumption Engineering Units field is KWH, the Rate Constant is 3600, since there are 3600 seconds in 1 hour. If the units in the Consumption Engineering Units field is gpm, the Rate Constant is 60, since there are 60 seconds in 1 minute.
- In some utility pulse meters, the pulse counts are read from low to high as one count, while the reading from high back to low is counted as another (for a total of two counts). However, the Panel unit counts the pulse from low to high and back to low again as a single count. In cases where the utility meter reads the High-to-Low-to-High pulse as two, multiply the number in the Consumption Constant field by two.
- The differential for the high and low limits is automatically calculated as 5% of the high rate alarm limit.

Group Parameters

AC points can be defined to be part of a group. A group is a method of displaying related point information conveniently. For instance, an operator may want to see all meters displayed in the same group.

The Group Summary is the only Panel unit screen that refreshes and displays new point information automatically.

Procedure Overview

Table 22-3: Defining Accumulator Point (AC) Software

To Do This	Follow These Steps:
Define AC Points	Identify all AC points in system controllers, N2 Bus address, Network Point type, Network Point address, consumption and rate constants, consumption and rate units, and the number of decimal places. Identify the AC to be used with Demand Limiting, and the Demand Interval. Determine if any of the AC points have rate limits requiring monitoring. Decide high and low rate alarm units, if alarm is Critical or Status priority, the alarm message used when reporting, and the Dial sequence (Critical alarms only). Define each AC point. Determine appropriate groups for each AC point. Define groups. Determine if any AC points need to be trended. Decide the Sample rate, the Start time, and add AC points to facility drawings.

Detailed Procedures

Defining AC Points

To define AC points:

1. Identify:
 - all AC points in system controllers
 - N2 Bus address
 - Network Point type
 - Network Point address
 - consumption and rate constants
 - consumption and rate units
 - number of decimal places
2. Identify the:
 - AC that is used with Demand Limiting
 - Demand Interval
3. Determine if any of the AC points have rate limits requiring monitoring. Decide:
 - high and low rate alarm units
 - if alarm is Critical or Status priority
 - alarm message used when reporting
 - dial sequence (Critical alarms only)
4. Use the Point Add screen to define each AC point. AC points must be Point Numbers 1 through 8.

The AC Point Add screen is shown in Figure 22-5. The definition parameters are defined in Table 22-4.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 10:12
-----
                                Point Add
Point Number [ 1] Software Type [AC] Point Name [Electric Meter]
Network Address: N2 Address [ 6] Point Type [BI] Point Address [ 7]

                                Accumulator Point Definition
Consumption Engineering Units [KWH] Consumption Constant [ 1.000]
Rate Engineering Units [KW] Rate Constant [3600.00]
Low Limit [ 0.0] High Limit [2000.0] Decimal Position [1]

                                Alarm Reporting Definition
Priority [Critical] Alarm Message Used When Reporting [ 1]
Dial Sequence Number [1]

                                Meter Definition
Used For Demmand Limiting [Yes] Demand Interval [ 15]

F1 Cancel F2 Save F3 More
Select a name for this point
    
```

AC add

Figure 22-5: AC Point Add Screen

Table 22-4: AC Point Definition Parameters

Field	Description	Options/Range	Required?	Default
Point Number	Identifies, by number, the point you want to define. AC points must be in the lowest eight positions.	1 to 8	Yes	First undefined point number
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the controller's location on the N2 Bus.	1 to 255 (For <i>LTD</i> 1-16)	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	BI PMA ADI	Yes	BI
Point Address	Indicates the physical location of the point on the controller.	Depends on controller. <i>See Data Base Generation Guide Technical Bulletin (LIT-6281270 or LIT-1628270).</i>	Yes	1
Consumption Engineering Units	Indicates the units for the accumulated value.	3 characters	No	KWH
Consumption	Converts the pulse count into meaningful units. (See <i>Design Considerations</i> earlier in this chapter.)	-999999 to 9999999	Yes	1.000
Rate Engineering Units	Indicates the units for the calculated consumption rate. (Measures how fast the item is being consumed.)	3 characters	No	KW
Rate Constant	Converts the consumption value into convenient engineering units. (See <i>Design Considerations</i> earlier in this document.)	-999999 to 9999999	Yes	3600
High Limit	Sets the limit for the consumption rate. Sends a COS when limit is exceeded. Differential is 5% of high limit.	-999999 to 9999999	Yes	0.0
Low Limit	Sets the low limit for the consumption rate. Sends a COS when limit is exceeded. Differential is 5% of high limit.	-999999 to 9999999	Yes	0.0
Decimal Position	Sets the number of decimal places.	0 to 3	Yes	1
Priority	Sets the priority for change-of-state alarms.	None Status Critical Fire	Yes	None
Alarm Message Used When Reporting	Designates the alarm message the Panel unit displays when reporting an alarm.	1 to 130	No	N.A.
Dial Sequence Number	Designates a dial sequence for the COS alarm message. Used only with Critical priority alarms.	1 to 4	No	N.A.
Used for Demand Limiting	Indicates if the AC point will be used for Demand Limiting.	Yes/No	Yes	No
Demand Interval	Sets the demand interval for determining demand value.	1 to 60 minutes	Yes	15

Note: For information on devices that support AC point definition and point restrictions, see the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

5. Determine appropriate groups for each AC point.
6. Use the Group Modify/Add/Delete screen to define groups (Figure 22-6). The parameters for this screen are defined in Table 22-5.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 10:16
-----
                                Group Modify/Add/Delete

Group Number [ 8 ]

                                List Of Defined Groups
1 Bldg Overview          2 Chiller          3 Commons Area
4 AHU6 Status           5 Lighting Zones  6 Exhaust Fans
7 Boiler

[F1 Cancel]           [F3 More]
Select a group by number (1 - 60)
    
```

Group modify

Figure 22-6: Group Modify/Add/Delete Screen

Table 22-5: Group Definition Parameters

Field	Description	Options/Range	Required?	Default
Group Name	Describes the group's location and/or function.	16 characters	Yes	N.A.
Point (24 possible fields)	Indicates, by number, a point to include in the group.	All valid point numbers	No	N.A.

7. Determine if any AC points need to be trended. Decide:
 - sample rate
 - start time

Chapter 23

Defining Analog Input (AI) Point Software

Introduction

This chapter tells you about Analog Input (AI) points.

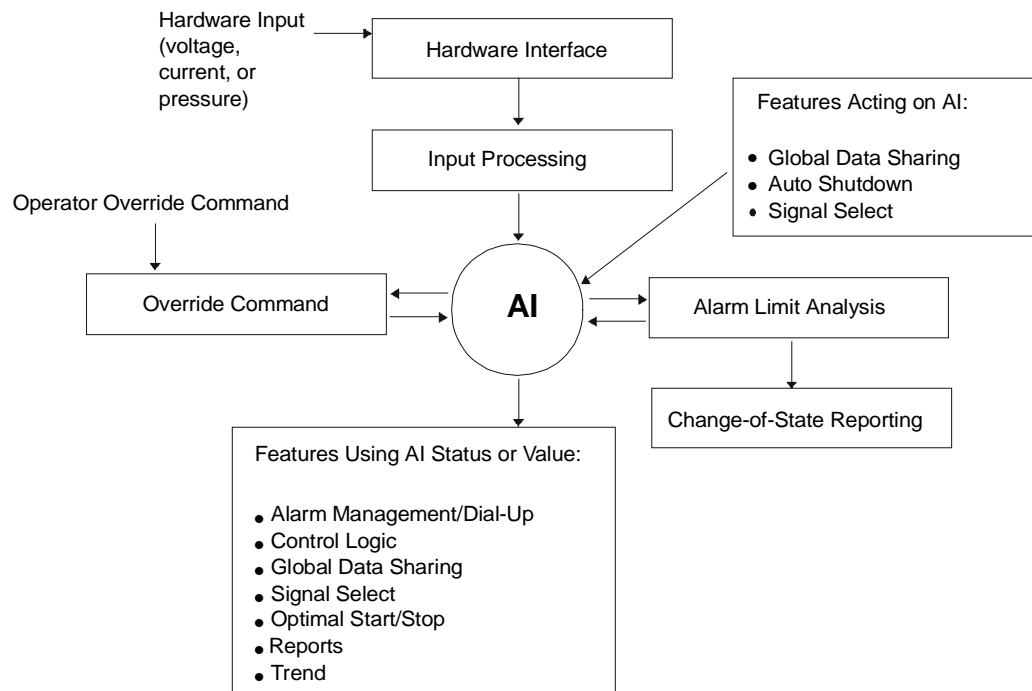
This chapter describes how to define AI points.

Key Concepts

AI Point

An AI point is a software representation of a hardware device that monitors an analog (continuously variable) value. AI points convert the raw hardware signal (analog-to-digital counts) from an analog input device to data that can be used in operator displays, alarm limit analysis, and control processes.

Figure 23-1 shows the general operation of an AI point. The blocks represent functions performed by the software. Each major block (software function) is explained in detail after this figure.



aie1

Figure 23-1: AI Point General Model

Hardware Interface

Analog Input points map to Application Specific Controllers (ASCs). Mapping means the:

- analog input device is connected to a specific place on a specific controller
- software references the analog input device's location to the AI point

Input Processing

The hardware input is processed by software calculations to convert the analog signal from the sensor into a digital value that can be used for display and analysis.

Features Acting on AI Points

- Global Data Sharing can control the value of up to 16 AI points based on the master AI point's value. Refer to the *Defining Global Data Sharing* chapter in this manual.
- Signal Select can command the AI based on the results of average, high, and low calculations performed on a group of analog point values. Refer to the *Defining Signal Select* chapter in this manual.
- Auto Shutdown can prevent the AI from generating Change-of-State (COS) alarm reports under user-defined conditions. Refer to the *Defining Auto Shutdown* chapter in this manual.

Override Command

You can use the Override command (except on the LCP) to change the value of the AI point to a specific setting, such as changing a sensor point to 68°F. An Override command forces the Panel unit to ignore the actual reading from the point and substitute a value you define.

You may use the Override command if there is faulty hardware or if you want to simulate a field condition. For example, an outside air temperature sensor may become defective and start generating nuisance changes-of-state. In this situation, you could use an Override command to force the sensor to a temperature that accurately reflects the weather conditions.

Override commands are always processed immediately. The commanded value is sent to the controller and becomes the new value, taking priority over the field condition. While the point is overridden, change-of-state reporting continues to receive the overridden value.

Overridden points are indicated with an “O” preceding the point in the Point Summary and Group Summary screens. There is also an Overridden Point Summary screen that displays all overridden points. Use the Auto command to remove the override and give control back to the controller.

Alarm Limit Analysis

Alarm limit analysis is a software process that compares the AI point value with user defined limits to identify an abnormal, or otherwise significant AI value. The result of this analysis for an AI point can be one of the results in Table 23-1.

Table 23-1: AI Point Alarm Conditions

Result of Analysis	AI Point Condition
Normal	In Normal state
Low Alarm	Below a level that is significant to the operator
High Alarm	Above a level that is significant to the operator

Approximately once each minute, the AI value is compared to a high limit and a low limit, with consideration of the differential, a “buffer zone.” Figure 23-2 shows this comparison in graphical form.

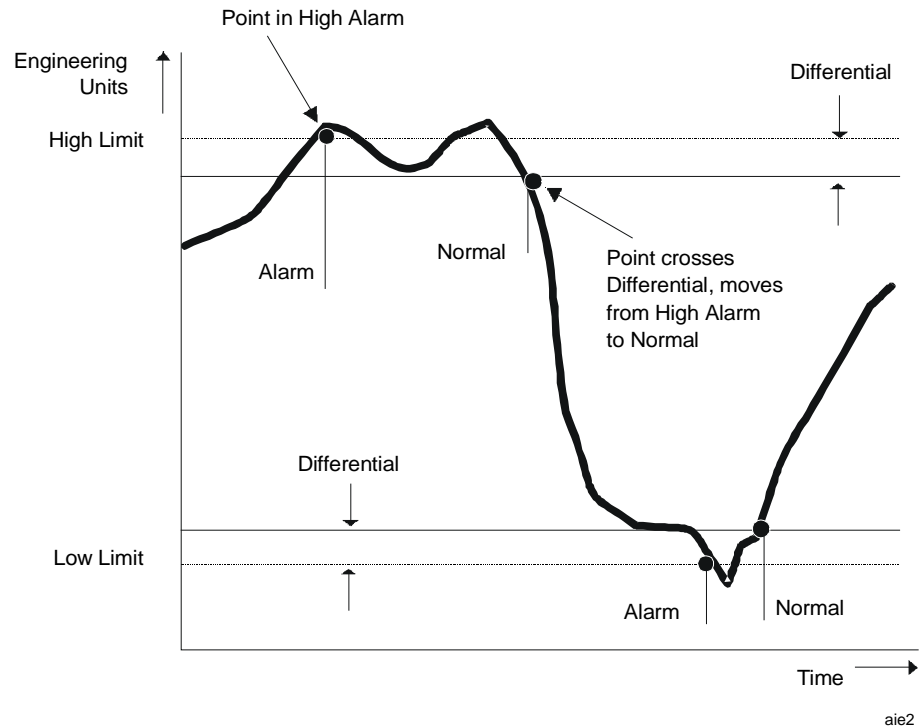


Figure 23-2: Alarm Limit Analysis Example

The differential defines a buffer zone between the normal range and the high and low limits. The differential prevents excessive alarms that could result from fluctuations in the AI value near one of the limits.

To change from a normal to an alarm condition, the value must cross the differential and the limit. To return to the normal condition, the value must cross the limit and the differential again. See Figure 23-2.

COS Reporting

The Panel unit monitors each software point for any Change-of-State (COS). For AI points, a COS occurs when any change is identified in the alarm analysis.

Note: COS reporting defined in the Panel unit automatically overrides previously defined HVAC PRO™ definitions for COS reporting for the controller.

The Auto Shutdown feature can prevent unnecessary COS alarm reports from being generated under certain user-defined conditions. When an AI point is shut down, its COS reports are not printed or displayed on the screen, and S (indicating shutdown) appears before the point number in summaries. For more information on Auto Shutdown, see the *Defining Auto Shutdown* chapter in this manual.

High and Low Limits and Differential

When you use the AI Point Modify/Add/Delete screen to specify or change the high and low limits or the differential for an AI point, these changes are sent to the controller and modify the controller's point configuration.

Features Using AI Status or Value

The following features can use AI point value or status information. For detailed information on feature software, refer to appropriate chapters in this manual.

- Alarm Management and Dial-Up can send critical messages to appropriate operator terminals based on the COS from the point's alarm limit analysis. Refer to the *Managing Alarms* chapter in this manual.
- Control Logic can use the status of an AI point as input for a logic formula. Refer to the *Creating Control Logic* chapter in this manual.
- Global Data Sharing can use the value of a master AI point to control the value of up to 16 other subordinate AI points. Refer to the *Defining Global Data Sharing* chapter in this manual.

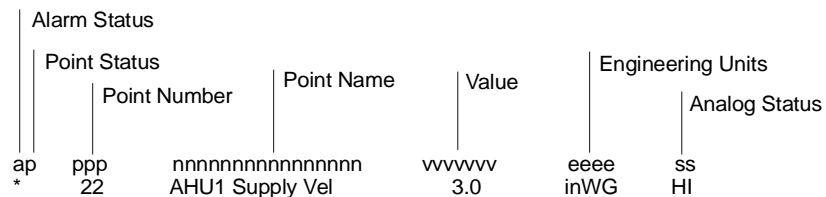
- Signal Select can use the AI point's current value and perform average, low, and high calculations on the values of analog points in a Signal Select process. The results of the calculations are sent as commands to selected analog points. Refer to the *Defining Signal Select* chapter in this manual.
- Optimal Start/Stop can use the value of an AI point as input for the control process. Refer to the *Understanding Energy Management* chapter.
- Reports can send formatted output to a printer for:
 - point summaries reflecting AI point information
 - group summaries reflecting those groups containing AI point information

Refer to the *Scheduling and Printing Reports* chapter in this manual.

- Trend can record the AI point values at specified sample intervals. Refer to the *Defining Trend* chapter in this manual.

Point Display Format

You can tell the current state of an AI point by using the Point or Group Summary screens. These screens display point information as shown in Figure 23-3. Table 23-2 defines the fields.



aie3

Figure 23-3: Point Summary Fields

Table 23-2: AI Point Display Format Fields

Field	Character	Definition
Alarm Status	U	Alarm is unacknowledged.
	•	Point is in an abnormal state.
	S	Point is shut down.
Point Status	X	Point is offline or unreliable.
	O	Point is in an override condition from the Panel unit.
Point Number		3-digit point number
Point Name		16-character point name
Value		Ranged analog value
Engineering Units		4 characters, defined by user
Analog Status	LO	Low Limit exceeded
	HI	High Limit exceeded
	OR	Over-Range

Design Considerations

As you engineer AI points, keep the following considerations in mind:

- Point definition requires a System password.
- If you use the AI Point Add or Point Modify screen to specify or change the high and low limits and the differential, these changes are sent to the controller and alter the *controller's* point configuration.
- You may define up to 60 groups, and an AI point may belong to one or more groups.
- Points should be grouped so that various users have group summaries matching their needs.

Group Parameters

AI points can be defined to be part of a group. A group is a method of displaying related point information conveniently. For instance, an operator may want to see all temperatures on one floor of a building displayed in the same group.

Group Summary is the only Panel unit screen that refreshes and displays new point information automatically.

Procedure Overview

Table 23-3: Define AI Points

To Do This	Follow These Steps:
Define AI Points	Identify all AI points mapped into the Panel unit database, ASC N2 Bus Address, Field Device type, AI point number in ASC, Engineering Units, and number of decimal places. Determine if any of the AI points have limits requiring monitoring. Decide alarm high and low limits, differential, alarm message to use, alarm priority, and dial sequence to use for Dial-up. Define each AI point. Determine appropriate groups for each AI point. Define groups. Determine if any AI points need to be trended. Decide the sample rate start time. Determine if any AI points are involved with any other features. If desired, add AI points to facility drawings.

Detailed Procedures

Defining AI Points

To define AI points:

1. Identify:
 - all AI points mapped into the Panel unit database
 - ASC N2 Bus address
 - Field Device type
 - AI point number in ASC
 - Engineering Units
 - number of decimal places
2. Determine if any of the AI points have limits requiring monitoring. Decide:
 - alarm high and low limits
 - differential
 - alarm message to use
 - alarm priority
 - dial sequence to use for Dial-up
3. Use the Point Add screen to define each AI point.

The AI Point Add screen, used to define AI points, is shown in Figure 23-4. The parameters for this screen are defined in Table 23-4.

Note: When you use the AI Point Add or Point Modify screens to specify or change the high and low limits and the differential, these changes are sent to the controller.

```
Operator Name: J. Smith                               Fri Jan 9, 1998 10:18

-----
                          Point Add
Point Number [ 3] Software Type [AI] Point Name [CW Supply Temp]
Network Address: N2 Address [ 3] Point Type [AI ] Point Address [ 3]

                          Analog Input Point Definition
Engineering Units [Deg] Decimal Position [1]
Low Limit [ 0.0] High Limit [ 100.0] Differential [ 3.0]

                          Alarm Reporting Definition
Priority [Status] Alarm Message Used When Reporting [ ]
Dial Sequence Number [ ]

F1 Cancel F2 Save F3 More
Select a name for this point
```

AI Point

Figure 23-4: AI Point Add Screen

Table 23-4: AI Point Definition Parameters

Field	Description	Options/Range	Required?	Default
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the ASC's location on the N2 Bus.	1 to 255 (for LTD, 1 to 16)	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	AI, ADF, ADI, BD	Yes	AI
Point Address	Indicates the physical location of the point on the ASC.	1 to 256	Yes	1
Engineering Units	Designates the units to be displayed with this point in point and group summaries.	4 characters	No	Deg
Decimal Position	Sets the number of decimal places.	0 to 3	Yes	1
Low Limit	Sets the low range for COS analysis. Alters point configuration in the controller, not just in the Panel unit.	-999999 to 9999999	Yes	65.0
High Limit	Sets the high range for COS analysis. Alters point configuration in the controller, not just in the Panel unit database.	-999999 to 9999999 Must be greater than the low limit.	Yes	75.0
Differential	Sets a buffer zone for alarm values. Keeps the Panel unit from generating nuisance COS alarms. Alters point configuration in the controller, not just in the Panel unit database.	-999999 to 9999999	Yes	3.0
Priority	Sets the priority for change-of-state alarms.	None, Status, Critical	Yes	None
Alarm Message Used When Reporting	Designates the alarm message the Panel unit displays when reporting an alarm.	1 to 130	No	N.A.
Dial Sequence Number	Designates a dial sequence for the COS alarm message. Used only with Critical priority alarms.	1 to 4	No	N.A.

Note: To find out the number of AI points that can be defined per controller point and type, refer to the *Data Base Generation Guide Technical Bulletin (LIT-6281270 or LIT-1628270)*.

4. Determine appropriate groups for each AI point.
5. Use the Group Modify/Add/Delete screen to define groups.

The Group Modify/Add/Delete screen, used to define groups, is shown in Figure 23-5. The parameters for this screen are defined in Table 23-5.

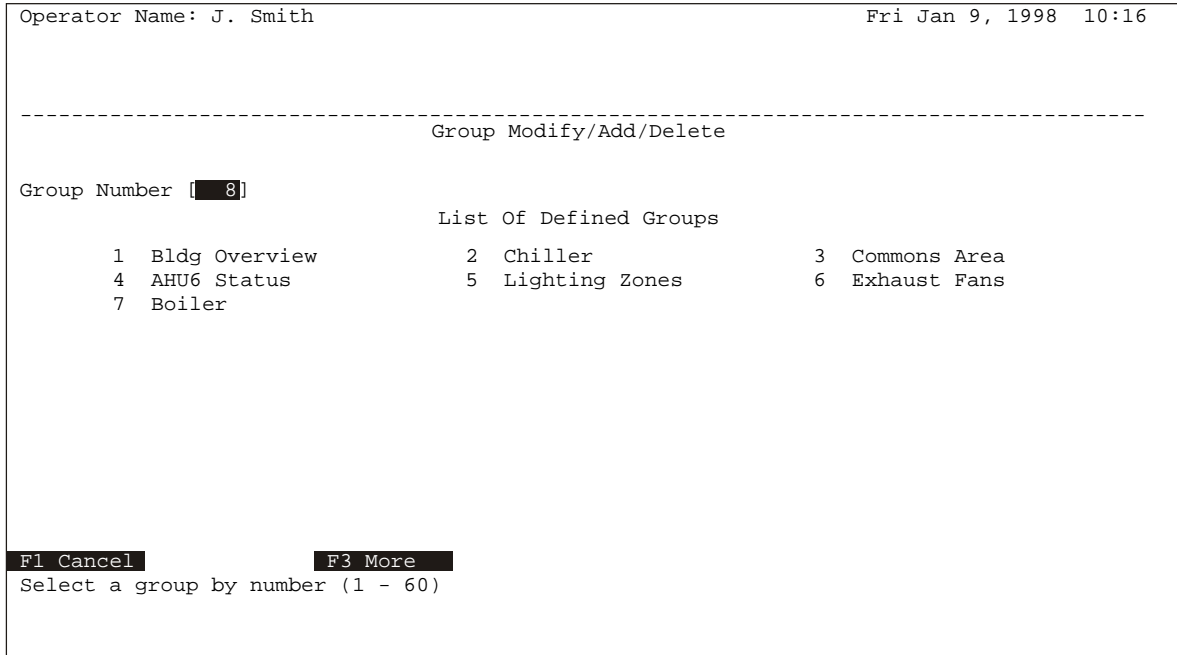


Figure 23-5: Group Modify/Add/Delete Screen

Table 23-5: Group Definition Parameters

Field	Description	Options/Range	Required?	Default
Group Name	Describes the group's location and/or function.	16 characters	Yes	N.A.
Point (24 possible fields)	Indicates, by number, a point to include in the group.	All valid point numbers	No	N.A.

6. Determine if any AI points need to be trended. Decide:
 - Sample rate
 - Start time
7. Determine if any AI points are involved with any other features (i.e., Global Data Sharing, Signal Select). For more details, refer to the appropriate feature chapter in this manual.

Chapter 24

Defining Analog Output (AO) Point Software

Introduction

This chapter tells you about Analog Output (AO) points.

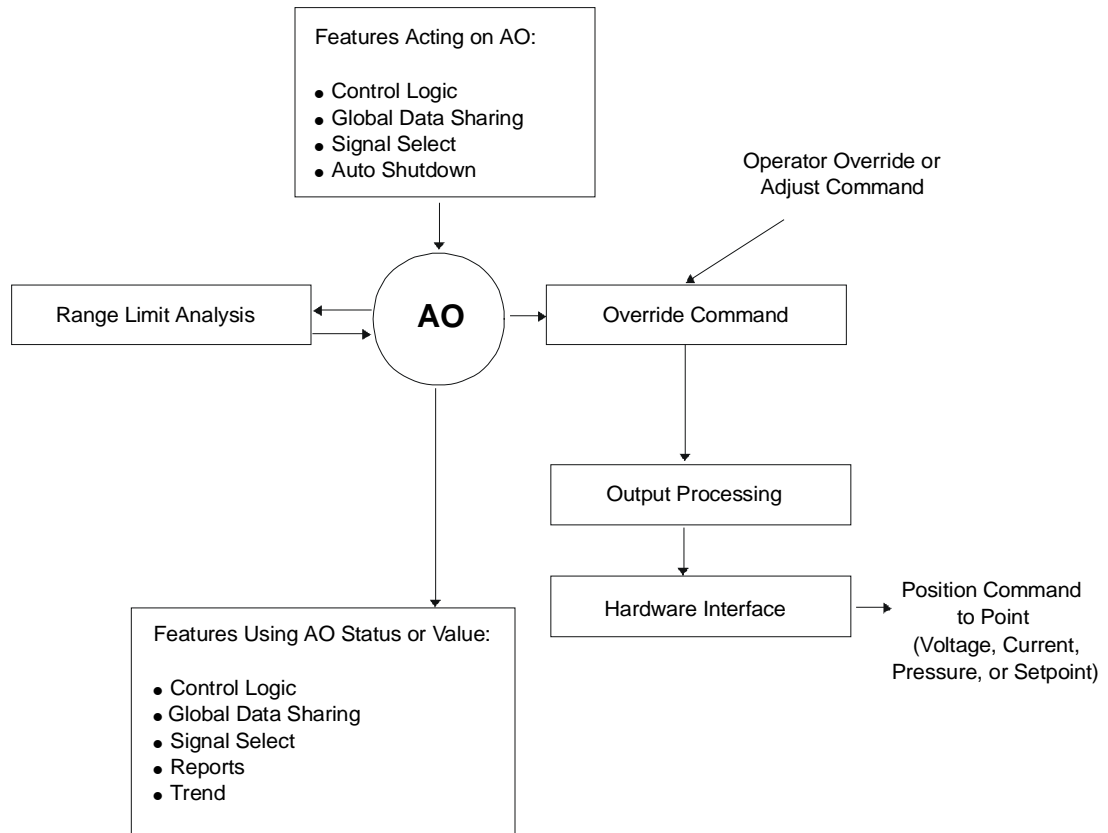
This chapter describes how to define AO points.

Key Concepts

Analog Output Points

An Analog Output (AO) point is a software representation of an analog device used for position control. AO points allow you to command analog devices such as dampers and valves and to change setpoints in controllers.

Figure 24-1 represents the general operation of an AO point. The blocks represent functions performed by the software. Each major block (software function) is explained in detail after this figure.



aoe1

Figure 24-1: AO Point General Model

Features Acting on AO Points

The following features provide input information for AO points. For detailed information on feature software, refer to the appropriate chapters in this manual.

- Control Logic can command an AO point based on a logic formula. Refer to the *Creating Control Logic* chapter in this manual.
- Global Data Sharing can control the current value of up to 16 AO points based on the master AO point value. Refer to the *Defining Global Data Sharing* chapter in this manual.
- Signal Select can command the AO based on the results of average, high, and low calculations performed on a group of analog point values.

Range Limit Analysis

Range Limit analysis compares the AO point value to predefined high and low saturation limits. The results of this analysis can be one of the states shown in Table 24-1.

Table 24-1: Limit Analysis Conditions

Result of Analysis	AO Point Condition
Normal	In Normal state
Abnormal	Either the high or low range limit (saturation value) has been reached

Override Command

You can use the Override command to change the value of the AO point to a specific setting, such as changing a valve to a position of 100%. An Override command forces the Panel unit to override the value calculated by the ASC and substitutes a value you define.

You might also decide to override an AO point if there is faulty hardware, or if you want to simulate a field condition.

Override commands are always processed immediately. The commanded value becomes the new value, taking priority over the field condition. While in an overridden state, change-of-state reporting continues to receive the overridden state.

Overridden points are indicated with an “O” preceding the point in the Point Summary and Group Summary screens. There is also an Overridden Points Summary screen where all overridden points are displayed.

Note: An override to an LCP ADF is considered an adjust command.

Adjust Command

You can use an adjust command on AO points that are mapped to Analog Data Float (ADF) and Analog Data Integer (ADI) points in the ASC. An adjust command permanently alters the ASC's point configuration. For information on using the Group Summary to command points, refer to the *Commanding Points* chapter of this manual.

Features Using AO Status or Value

The following features can use AO point values or status information. For detailed information on feature software, refer to the appropriate chapters of this manual.

- Control Logic can use the status of an AO point as input for a logic formula. Refer to the *Creating Control Logic* chapter in this manual.
- Global Data Sharing can use the value or status of a master AO point to control the value of up to 16 other subordinate AO points. Refer to the *Defining Global Data Sharing* chapter in this manual.
- Signal Select can use the AO point's current value and perform average, high, and low calculations on the values of the analog points in a Signal Select process. The results of these calculations are sent as commands to specified analog points. Refer to the *Defining Signal Select* chapter in this manual.
- Reports can send formatted output to a printer for:
 - point summaries reflecting AO point information
 - group summaries reflecting groups containing AO point informationRefer to the *Scheduling and Printing Reports* chapter in this manual.
- Trend can record the AO point value at specified sample intervals. Refer to the *Defining Trend* chapter in this manual.

Output Processing

Processing in the ASC converts the AO software point commanded values, such as 100%, to an appropriate voltage, current, or pressure for the field device.

Hardware Interface

AO points map to an ASC. Mapping means that the field device is wired to a specific module, and the AO software is defined for that same module and physical location.

Point Display Format

You can tell which feature is acting on a point by using the Point or Group Summary screens. These screens display point information as shown in Figure 24-2. Table 24-2 defines the fields.

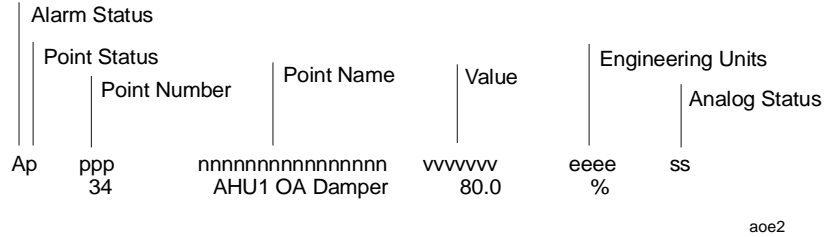


Figure 24-2: Point Summary Fields

Table 24-2: Point Display Format Fields

Field	Character	Definition
Alarm Status	*	Point is in an abnormal state.
Point Status	X	Point is offline or unreliable.
	O	Point is in an override condition from the Panel unit.
Point Number		3-digit point number
Point Name		16-character point name
Value		Ranged analog value
Engineering Units		4 characters, defined by user
Analog Status	LS	Low Saturation
	HS	High Saturation
	OR	Over-Range

Design Considerations

As you engineer AO points, consider the following:

- Point definition requires a System password.
- ADF or ADI points specified as Network Point Types must be Read/Write points and not Read Only points. The *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* includes point mapping tables that tell you which ADF and ADI points are Read/Write and which are Read Only.
- Up to 60 groups may be defined, and AO points may belong to one or more groups.
- Points should be grouped so that various users have group summaries matching their needs.

Group Parameters

AO points can be defined to be part of a group. A group is a method of displaying related point information conveniently. For instance, an operator may want to see the position of all valves displayed in the same group.

Group Summary is the only Panel unit screen that refreshes and displays new point information automatically.

Procedure Overview

Table 24-3: Defining AO Points

To Do This	Follow These Steps:
Define AO Points	Identify all AO points mapped into the Panel unit data base, ASC N2 Bus address, Field Device type, AO point number in ASC, Engineering Units, and number of decimal places. Determine if any of the AO points require monitoring. Define each AO point. Determine appropriate groups for each point. Define groups. Determine if any AO points need to be trended. Determine if any AO points are involved with any other features. If desired, add AO points to dynamic facility drawings.

Detailed Procedures

Defining AO Points

To define AO points:

1. Identify:
 - all AO points mapped into the Panel unit data base
 - ASC N2 Bus address
 - Field Device type
 - AO point number in ASC
 - Engineering Units
 - number of decimal places
2. Determine if any of the AO points require monitoring. Refer to the *Managing Alarms* chapter in this manual.
3. Use the Point Add screen to define each AO point.

The AO Point Add screen is shown in Figure 24-3. The parameters for this screen are defined in Table 24-4.

Note: If you specify an ADF or ADI point as the Network Point Type, make sure it is a Read/Write point and not a Read Only point. You'll find tables that specify which ADF and ADI points are Read/Write and which are Read Only in the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 10:23
-----
                                Point Add
Point Number [ 17] Software Type [A0] Point Name [CHW Setpoint ]
Network Address: N2 Address [ 3] Point Type [ADF] Point Address [ 1]

                                Analog Output Point Definition
Engineering Units [Deg] Decimal Position [1]
Low Range Limit [ 40.0] High Range Limit [ 48.0]

F1 Cancel F2 Save F3 More
Select a name for this point

```

AO Point

Figure 24-3: AO Point Add Screen

Table 24-4: AO Point Definition Parameters

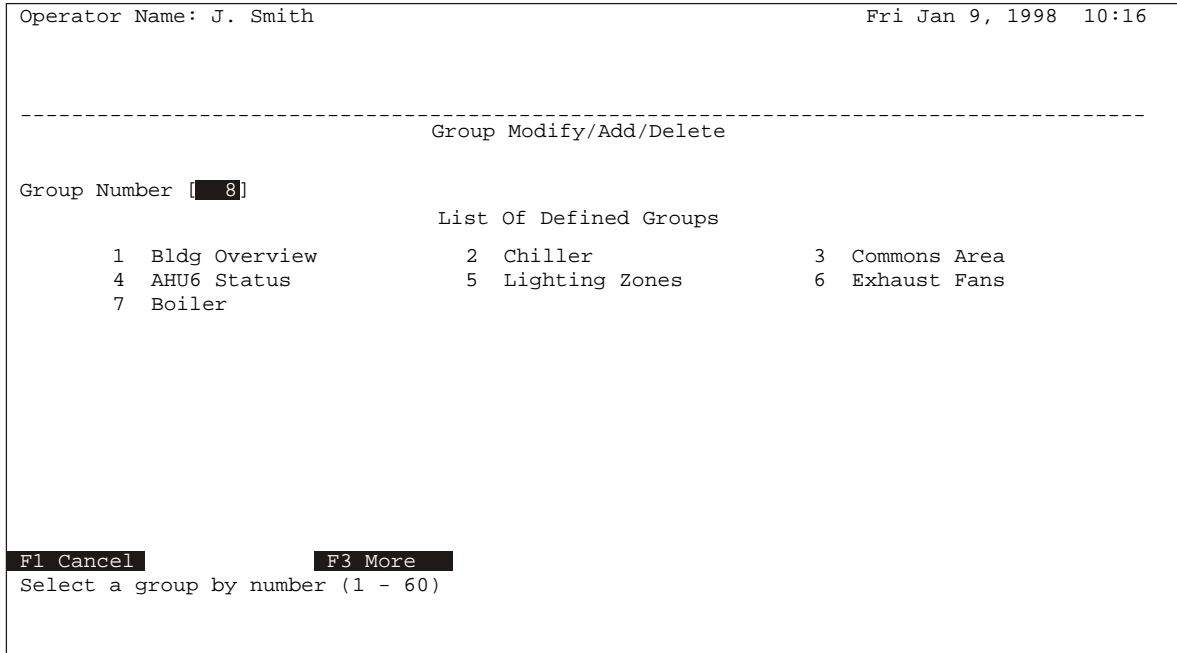
Field	Description	Options/Range	Required?	Default
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the ASC's location on the N2 Bus.	1 to 255 (For <i>LTD</i> , 1 to 16)	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	AO, AI, ADF, ADI, BD	Yes	AO
Point Address	Indicates the physical location of the point on the ASC.	1 to 256	Yes	1
Engineering Units	Designates the units to be displayed with this point in point and group summaries.	4 characters	No	Deg
Decimal Position	Sets the number of decimal places for display.	0 to 3	Yes	1
Low Range Limit	Sets the low range for operator commands.	-999999 to 9999999	Yes	0.0
High Range Limit	Sets the high range for operator commands.	-999999 to 9999999; Must be greater than the low range limit	Yes	100.0
Priority	Sets the priority for change-of-state alarms.	None, Status, Critical	Yes	None

Note: To find out the number of AO points that can be defined per controller point and type, refer to the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

- Determine appropriate groups for each point.

5. Use the Group Modify/Add/Delete screen to define groups.

The Group Modify/Add/Delete screen, used to define groups, is shown in Figure 24-4. The parameters for this screen are defined in Table 24-5.



Group modify

Figure 24-4: Group Modify/Add/Delete Screen

Table 24-5: Group Definition Parameters

Field	Description	Options/Range	Required?	Default
Group Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Point (24 possible fields)	Identifies, by number, a point to include in the group.	All valid point numbers	No	N.A.

6. Determine if any AO points need to be trended. Refer to the *Defining Trend* chapter in this manual.
7. Determine if any AO points are involved with any other features (i.e., Global Data Sharing, Signal Select).

Chapter 25

Defining Binary Input (BI) Point Software

Introduction

This chapter tells you about Binary Input (BI) points.

This chapter describes how to define BI points.

Key Concepts

Binary Input Points

A BI point is a software representation of a hardware sensor that monitors a two state (on/off) field condition. BI points convert raw hardware signals into data that can be used for operator displays, alarm analysis, and control processes.

Figure 25-1 illustrates the general operation of a BI point. The blocks represent the functions performed by the software. Each major block (software function) is explained in detail after this figure.

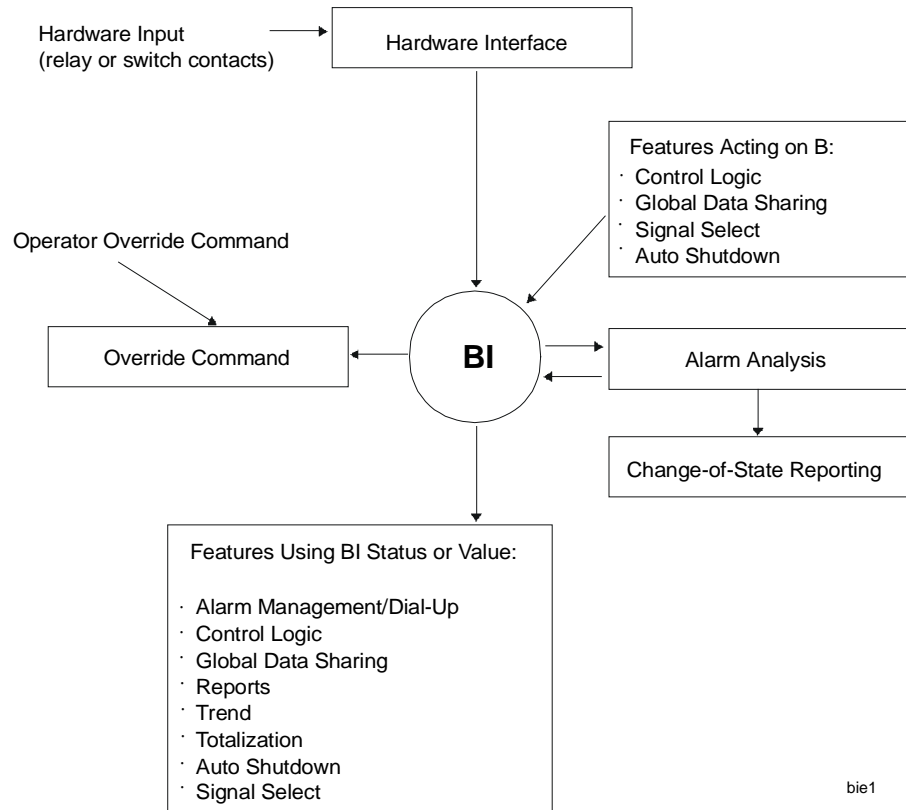


Figure 25-1: BI Point General Model

Hardware Interface

BI points map to hardware controllers. Mapping means:

- The binary input device is connected to a specific place on a specific controller.
- This place is referenced in software so the BI point is defined for that same physical location.

Features Acting on BI

BI points are acted on by the following features:

- Control Logic can command a BI point based on a logic formula. Refer to the *Creating Control Logic* chapter in this manual.
- Global Data Sharing can control the state of up to 16 BI points based on the master BI point state. For detailed information on feature software, refer to the appropriate chapter later in this manual. Refer to the *Defining Global Data Sharing* chapter in this manual.
- Signal Select can perform logical AND and logical OR operations on a group of binary points. The results of the logic are interpreted as commands, which are sent to specified binary points. Refer to the *Defining Signal Select* chapter in this manual.
- Auto Shutdown can prevent the BI from generating unnecessary Change-of-State (COS) alarm reports under certain user-defined conditions. Refer to the *Defining Auto Shutdown* chapter in this manual.

Override Command

Use the Override command to set the BI contact to one of the two states. This overrides the controller's actual value and forces the controller to see the point as if it were in the state you commanded.

You might also decide to override a BI point if there is faulty hardware, or if you want to simulate a field condition. For example, a device that is monitoring a filter may become defective and start generating nuisance changes-of-state. In this situation, you could override the point to force the controller to see the point in Normal state. Overridden points remain overridden until they are released with an Auto command.

Overridden points are indicated with an "O" preceding the point in the Point Summary and Group Summary screens. There is also an Overridden Points Summary screen, where all overridden points may be displayed as a group.

Alarm Analysis

Alarm analysis is a software process that compares the BI point state with a user-defined Normal state to identify an abnormal or otherwise significant BI state. The results of the analysis for a BI point are displayed in Table 25-1.

Table 25-1: Alarm Conditions

Result of Analysis	BI Point Condition
Normal	In Normal state
Alarm	In an abnormal state
Trouble*	In a trouble state
Unreliable	Point or hardware offline

*Trouble status is available only if the N2 device the BI is mapped to supports trouble.

COS Reporting

The Panel unit monitors each software point for any Change-of-State (COS). For BI points, a COS occurs when the point changes to a state that does not match the normal contact state.

Note: COS reporting defined in the Panel unit automatically overrides previously defined HVAC PRO definitions for COS reporting for the controller.

The Auto Shutdown feature can prevent points from generating unnecessary COS alarm reports under user-defined conditions. The point is “shut down” when a specified binary “master” point is in a certain state. When the point is shut down, its COS alarm reports are not printed or displayed on the screen, and “S” (indicating shutdown) appears before the point number in summaries. For more information, see the *Defining Auto Shutdown* chapter in this manual.

Features Using BI Status or Value

The following features can use BI point values or status information. For detailed information on feature software, refer to appropriate chapter in this manual.

- Alarm Management and Dial-Up can send critical messages to appropriate terminals based on the COS from the point's alarm analysis. Refer to the *Managing Alarms* chapter in this manual.
- Auto Shutdown can use the BI point as a “master” point in an Auto Shutdown process. If the BI is in the specified state, the group of dependent points is shut down, preventing them from generating COS alarm reports. Refer to the *Defining Auto Shutdown* chapter in this manual.
- Control Logic can use the state of a BI point as input for a logic formula. Refer to the *Creating Control Logic* chapter in this manual.
- Global Data Sharing can use the value or status of a master BI point to control the status of up to 16 other subordinate BI points. Refer to the *Defining Global Data Sharing* chapter in this manual.
- Reports can send formatted output to a printer for:
 - point summaries reflecting BI point information
 - group summaries reflecting those groups containing BI point information

Refer to the *Scheduling and Printing Reports* chapter in this manual.

- Signal Select can use the BI point's current status in logical AND and logical OR operations. Refer to the *Defining Signal Select* chapter in this manual.
- Trend can record the point state at specified sample intervals. Refer to the *Defining Trend* chapter in this manual.
- Totalization can accumulate a total value for the:
 - time the point is in State 1 condition (Runtime)
 - number of COS from State 0 to State 1 (Cycle Count)

Refer to the *Defining Totalization* chapter in this manual.

Design Considerations

As you engineer BI points, keep the following considerations in mind:

- Point definition requires a System password.
- Up to 60 groups may be defined, and BI points can be in one or more groups.
- Points should be grouped so that various users have group summaries matching their needs.

Group Parameters

BI points can be defined to be part of a group. A group is a method of displaying related point information conveniently. For instance, an operator may want to see all filter status points displayed in the same group.

Group Summary is the only Panel unit screen refreshes and displays new point information automatically.

Procedure Overview

Table 25-3: Defining BI Points

To Do This	Follow These Steps:
Define BI Points	Identify all BI points mapped into the Panel unit database, controller N2 Bus address, Field Device type, BI point number in controller, State 0/State 1 positions, and Normal Contact state. Determine if any of the BI points need COS monitoring. Set Alarm status, Alarm message, and dial sequence. Determine if any of the BI points require Totalization limits. Set: Totalization type, Totalization limit, alarm message (if Totalization limit is exceeded). Define each BI point. Determine appropriate groups for each BI point. Define groups. Determine if any BI points need to be trended. Decide sample rate and start time. Determine if any BI points are involved with any other features. If desired, add the BI points to dynamic graphic drawings.

Detailed Procedures

Defining BI Points

To define BI points:

1. Identify:
 - all BI points mapped into the Panel unit database
 - controller N2 Bus address
 - Field Device type
 - BI point number in controller
 - State 0/State 1 positions
 - Normal contact state
2. Determine if any of the BI points need COS monitoring. Set:
 - alarm status
 - alarm message
 - dial sequence
3. Determine if any of the BI points require Totalization limits. Set:
 - Totalization type
 - Totalization limit
 - alarm message if Totalization limit exceeded

- Use the Point Add screen to define each BI point. The BI Point Add screen is shown in Figure 25-3. The parameters for this screen are defined in Table 25-4.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 10:27
-----
Point Add
Point Number [ 8] Software Type [BI] Point Name [CHW Pump Status]
Network Address: N2 Address [ 3] Point Type [BI] Point Address [ 1]

Binary Input Point Definition
Status Pair: State 0 [Off] State 1 [On] Normal Contact State [State 0]

Alarm Reporting Definition
Priority [Status] Alarm Message Used When Reporting [ 6]
Dial Sequence Number [ ]

Totalization Definition
Totalization Type [Cycle Counts]
Totalization Limit [ 500] Alarm Message Used When Limit Exceeded [ 2]
Totalization Preset Value [ 0] Change To Preset Value Now [No]

F1 Cancel F2 Save F3 More
Select a name for this point

```

BI point

Figure 25-3: BI Point Add Screen

Note: To find out the number of BI points that can be defined per controller point and controller type, refer to the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

Table 25-4: BI Point Parameters

Field	Description	Options/Range	Required?	Default
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the controller's location on the N2 Bus.	1 to 255 (for <i>LTD</i> , 1 to 16)	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	BI, BD, LRS, PML	Yes	BI
Point Address	Indicates the physical location of the point on the controller.	1 to 256	Yes	1
State 0	Describes the State 0 position of the point.	3 characters	Must differ from State 1	Off
State 1	Describes the State 1 position of the point.	3 characters	Must differ from State 0	On
Normal Contact State	Sets the normal position of the point.	State 0 or State 1	Yes	State 0
Priority	Sets the priority for change-of-state alarms.	None, Status, Critical, Fire	Yes	None
Alarm Message Used When Reporting	Designates the alarm message the Panel unit displays when reporting an alarm.	1 to 130	No	N.A.
Dial Sequence Number	Designates a dial sequence for the COS alarm message. Used only with Critical priority alarms.	1 to 4	No	N.A.
Totalization Type	Indicates the kind of Totalization you want for the point.	None, Cycle Counts, Runtime Min, Runtime Hour	Yes	None
Totalization Limit	Sets a limit for the Totalization counter. Sends a COS when the limit is exceeded.	0 to 99999999	No	0
Alarm Message Used When Limit Exceeded	Designates the alarm message the Panel unit displays when the Totalization limit is exceeded.	1 to 130	No	N.A.
Totalization Preset Value	Sets the totalized value for the point.	0 to 99999999	No	0
Change to Preset Value Now	Changes the totalized value for the point to the Totalization Preset Value.	Yes, No	Yes	No

5. Determine appropriate groups for each BI point.
6. Use the Group Modify/Add/Delete screen to define groups. The Group Modify/Add/Delete screen is shown in Figure 25-4. The parameters for this screen are defined in Table 25-5.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 10:16
-----
                                Group Modify/Add/Delete

Group Number [ 8 ]

                                List Of Defined Groups
1 Bldg Overview          2 Chiller          3 Commons Area
4 AHU6 Status           5 Lighting Zones  6 Exhaust Fans
7 Boiler

F1 Cancel          F3 More
Select a group by number (1 - 60)

```

Group modify

Figure 25-4: Group Modify/Add/Delete Screen**Table 25-5: Group Definition Parameters**

Field	Description	Options/Range	Required?	Default
Group Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Point (24 possible fields)	Indicates, by number, a point to include in the group.	All valid point numbers	No	N.A.

7. Determine if any BI points need to be trended. Decide:
 - sample rate
 - start time
8. Determine if any BI points are involved with any other features (e.g., Signal Select). Refer to appropriate features chapters in this manual.

Chapter 26

Defining Binary Output (BO) Point Software

Introduction

This chapter tells you about Binary Output (BO) points.

This chapter describes how to define BO points.

Key Concepts

Binary Output Points

A BO point is a software representation of a 2-state (on/off) controlled device. The primary function of a binary output is to command HVAC and other equipment to an off or on state.

Figure 26-1 illustrates the general operation of a BO point. The blocks represent functions performed by the software. Each major block (software function) is explained in detail after this figure.

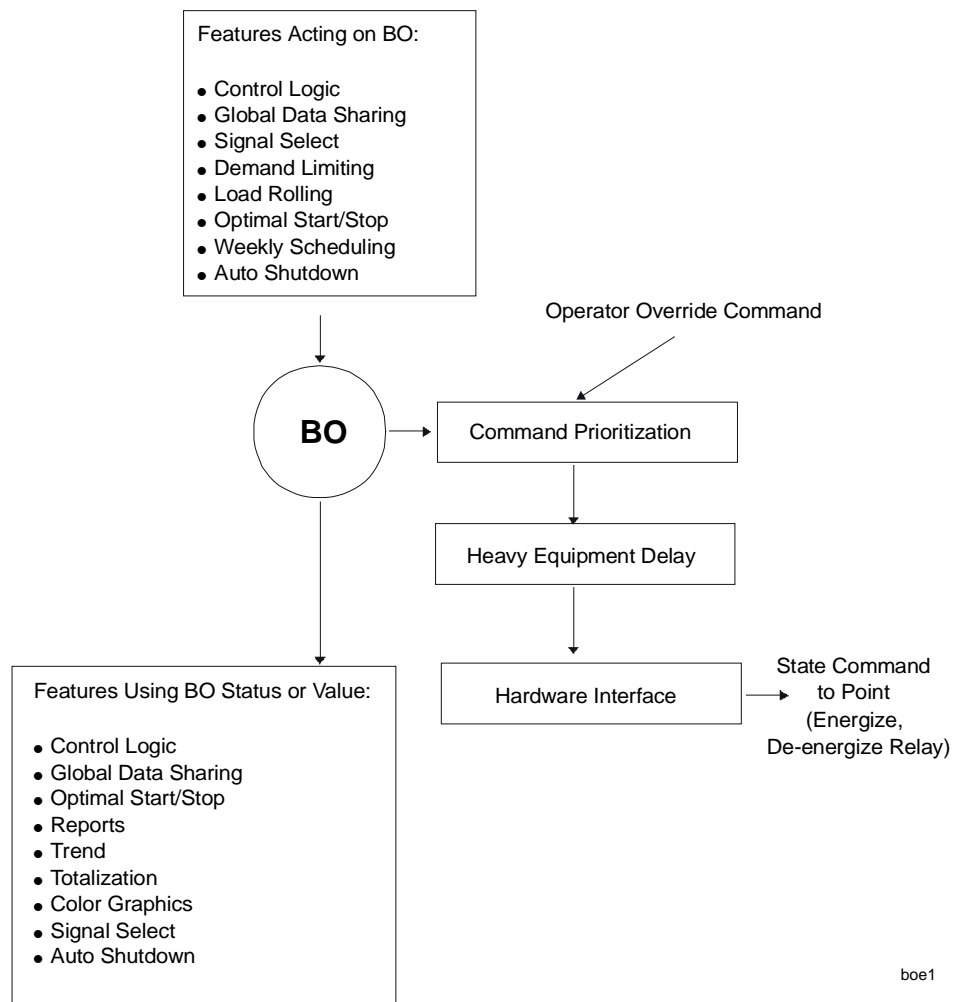


Figure 26-1: BO Point General Model

Features Acting on BO Points

The following features issue commands to BO points, except Auto Shutdown, which prevents the points from generating COS alarm reports. For detailed information on features, refer to the appropriate chapters in this manual. Points can be commanded only when their associated controller is online.

- Auto Shutdown can prevent unnecessary COS alarm reports from being printed or displayed on the screen under certain user-defined conditions. Refer to the *Defining Auto Shutdown* chapter in this manual.
- Control Logic can command a BO point based on a logic formula. Refer to the *Creating Control Logic* chapter in this manual.
- Global Data Sharing can command the state of up to 16 subordinate BO points based on the master BO point state. Refer to *Defining Global Data Sharing* chapter in this manual.
- Signal Select performs logical AND and logical OR operations on a group of binary point states. The results of the logic are interpreted as commands sent to specified binary points. Refer to the *Defining Signal Select* chapter in this manual.
- Demand Limiting/Load Rolling can send shed (stop) and release commands to the BO point. Refer to the *Understanding Energy Management* chapter.
- Optimal Start/Stop can command a BO point based on the control process calculations. Refer to the *Understanding Energy Management* chapter.
- Weekly Scheduling can command a BO point based on a time of day and day of week (or calendar day) schedule. Weekly Scheduling can issue start, stop, and release commands to the BO. Weekly Scheduling includes a Power-Fail Restart feature that ensures BO points are commanded to their appropriate states when they come back online after a power failure. Refer to the *Defining Schedules* chapter in this manual.

IMPORTANT: After deleting a BO point from a feature, you must issue a manual command (start or stop) to clear the point's command priority table and command the point to the desired state.

Point Display Format

You can tell which feature is acting on a point by using the Point or Group Summary screens. These screens display point information as shown in Figure 26-2. Table 26-1 defines the fields.

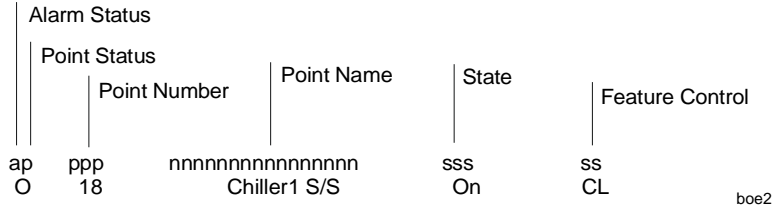


Figure 26-2: Point Summary Fields

Table 26-1: BO Point Display Format Fields

Field	Character	Definition
Alarm Status	U	Alarm is unacknowledged.
	*	Point is in an abnormal state.
	T	Point is in a trouble state.
	S	Point is shutdown.
Point Status	X	Point is offline or unreliable.
	O	Point is in an override condition from the Panel unit.
Point Number		3-digit point number
Point Name		16-character point name
State		Binary state
Feature Control	OV	Manual Override
	CL	Control Logic
	GD	Global Data Sharing
	SS	Signal Select
	DL	Demand Limiting
	LR	Load Rolling
	WS	Weekly Scheduling
	MC	Manual Command

Command Prioritization

The valid commands that may be sent to BO points on the Panel unit are shown in Table 26-2.

Table 26-2: Commands for BO Points

Commands from Features	Commands from Operator
Start	Override (Start/Stop)
Stop	Manual (Start/Stop)
Auto	Auto
Release	Release

Associated with each start, stop, or release command is a command priority. This priority determines the order in which the commands are executed when more than one feature sends commands to the same BO point.

There are eight command priorities: six for system features and two for the operator. The priorities are as shown in Figure 26-3.

The Panel unit manages a command priority table for each BO point in the system. When two or more commands from different sources are sent to the same BO point, the Panel unit evaluates the table, finds the highest priority command, and sends that command to the point.

For example, if a BO point is commanded by the Global Data Sharing feature, and at 8:00 the point receives a command from the Weekly Scheduling feature, both commands are stored in the BO point's command priority table. Refer to Figure 26-3.

Increasing priority—the highest priority command is executed.

Commands	Table at 7:00	Table at 8:00	Table at 9:00
Operator Override			
Control Logic			STOP
Global Data Sharing	START	START	START
Signal Select			
Demand Limiting			
Load Rolling			
Weekly Scheduling		STOP	STOP
Operator Manual			

boe3

Figure 26-3: BO Point Command Priority Table at Different Times

In this case, Global Data Sharing has higher priority and only its command is sent to the point. If the Control Logic feature commanded the same BO point at 9:00, its command would become the highest priority and would be sent to the point. See Figure 26-3.

Operator Override

The operator has two priority levels: the highest being an operator override, the lowest being a manual command. An operator override is always sent to a point and overrides all other commands sent to that point. Any other commands sent to an overridden point are stored in the point's command priority table but are not sent to the point. There are three ways to change the state of a BO point after an override command:

- An Auto command clears the priority table, allowing the controller to control the point.
- A Release command releases the current command. If a lower priority command is in the table, this command is issued.
- Another Override command reverses the current overridden state.

Start/Stop Commands

A start/stop Manual command has a different effect than an operator override. The Manual command erases a point’s command priority table (except for an override command) and is then sent to the point. The next feature to command the point is given priority. This dual priority command scheme allows the operator to change a point’s value and also gives the operator the choice of issuing a command at two priority levels.

Auto Command

Auto and Release are special commands used to control the command priority of a BO point. These commands, in effect, alter a BO point’s command priority table.

The Auto command issues a hardware override release. This Special command does not have a command priority and is always executed. An Auto command erases a BO point’s command priority table and passes control of the point to hardware. Only the operator and Control Logic may issue auto commands. If an Auto priority command is issued at 10:00, the command priority table would look like Figure 26-4.

Commands	Table at 7:00	Table at 8:00	Table at 9:00	Table at 10:00
Operator Override				
Control Logic			STOP	
Global Data Sharing	START	START	START	
Signal Select				
Demand Limiting				
Load Rolling				
Weekly Scheduling		STOP	STOP	
Operator Manual				

boe4

Figure 26-4: BO Point Command Priority Table After Auto Command

Release Command

The Release command works from an operator or from a feature. A Release command from the operator deletes a BO point's current highest priority command from the command priority table. If there are more commands stored in the table, the point software sends the command with the next highest priority to the field point. If an operator Release command is issued at 10:00, the command priority table would look like Figure 26-5.

Commands	Table at 7:00	Table at 8:00	Table at 9:00	Table at 10:00
Operator Override				
Control Logic			STOP	
Global Data Sharing	START	START	START	START
Signal Select				
Demand Limiting				
Load Rolling				
Weekly Scheduling		STOP	STOP	STOP
Operator Manual				

boe5

Figure 26-5: BO Point Command Priority Table After an Operator Release Command

A Release command from a feature erases that feature's last command to the point from the command priority table. If a command with higher priority is being sent to the point, the Release command has no effect on the point. If a Release command was the highest priority command, the command with the next highest priority is sent to the point. In all cases, if a point is released and there are no more commands in the command priority table, the point is automatically put under hardware control. This is the same as issuing an Auto command. If a Load Rolling shed command is issued at 10:00 and a Load Rolling release command is issued at 11:00, the command priority table would look like Figure 26-6.

Note that from 10:00 to 11:00, the Load Rolling command did not affect the point, since a higher priority feature, Control Logic, controlled the point.

Commands	Table at 7:00	Table at 8:00	Table at 9:00	Table at 10:00	Table at 11:00
Operator Override					
Control Logic			STOP	STOP	STOP
Global Data Sharing	START	START	START	START	START
Signal Select					
Demand Limiting					
Load Rolling				STOP	
Weekly Scheduling		STOP	STOP	STOP	STOP
Operator Manual					

boe6

Figure 26-6: BO Point Command Priority Table After LR Release Command

Heavy Equipment Delay

Heavy Equipment Delay (HED) prevents surges in electric current due to the simultaneous starting of multiple inductive loads. It prevents surges by delaying starts of BO points until a specified amount of time passes between the start of the previous BO point and the start of the next BO point.

For example, 20 heavy equipment BO points are each given a 5 second delay time. Although the delay times in this example are all the same, each point may have a unique delay time. If a Start command is simultaneously issued to all 20 points at once, the first Start command is executed immediately. The second Start command is issued 5 seconds later, the third Start command is issued 5 seconds after the second command, and so on. The last Start command is sent out 95 seconds after the first command.

Note: A point must have a Heavy Equipment Delay defined before it delays its start based on the previous BO point’s HED time.

Power-Fail Restart

The Power-Fail Restart feature ensures that BO points are automatically commanded to their appropriate states when the system comes online after a power failure. When the system is restarted, the weekly schedules for the current day from midnight to the current time are evaluated. The Panel unit then updates the command priority table for the BO accordingly. When the BO point comes online, the hardware for the point is commanded to the appropriate state. The Heavy Equipment Delay is in effect during a Power-Fail Restart to prevent large surges in electrical demand.

Note: Power-Fail Restart does not send release commands defined in Weekly Schedules.

Features Using BO Status or Value

The following features can use BO point values or status information. For detailed information on feature software, refer to the appropriate chapters later in this manual.

- Auto Shutdown can prevent a group of points from generating unnecessary alarm reports when the BO is in a specified state. Refer to the *Defining Auto Shutdown* chapter in this manual.
- Control Logic can use the state of a BO point as input for a logic formula. Refer to the *Creating Control Logic* chapter in this manual.
- Global Data Sharing can use the value or status of a master BO point to control the status of up to 16 other subordinate BO points. Refer to the *Defining Global Data Sharing* chapter in this manual.
- Signal Select can perform logical AND and logical OR operations on a group of binary point states. The results of the logic are interpreted as commands sent to specified binary points. Refer to the *Defining Signal Select* chapter in this manual.
- Optimal Start/Stop can use the status of a BO point as input for the control process.
- Reports can send formatted output to a printer for:
 - point summaries reflecting BO point information
 - group summaries reflecting those groups containing BO point informationRefer to the *Scheduling and Printing Reports* chapter in this manual.
- Trend can record the point state at specified sample intervals. Refer to the *Defining Trend* chapter in this manual.

- Totalization can accumulate a total value for:
 - the time the point is in State 1 condition (Runtime)
 - the number of COS from State 0 to State 1 (Cycle Count)
 Refer to the *Defining Trend* chapter in this manual.

Hardware Interface

BO points map to hardware controllers. Mapping means:

- The binary output device is connected to a specific place on a specific controller.
- This place is referenced in software so the BO point knows where to issue output commands.

Design Considerations

As you engineer BO points, keep these considerations in mind:

- Point definition requires a System password.
- If you specify a BD as the Network Point Type, make sure it is a Read/Write (commandable) point and not a Read Only point. The *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)* includes Point Mapping tables that tell you which BD points are Read/Write and which are Read Only.
- You may define up to 60 groups, and BO points may belong to one or more groups.
- Points should be grouped so that various users have group summaries matching their needs.

IMPORTANT: After deleting a BO point from a feature, you must issue a manual command (start or stop) to clear the point's command priority table and command the point to the desired state.

Group Parameters

Like all points, BO points can be grouped. A group is a method of displaying related point information conveniently. For instance, you may want to see all lighting zone points displayed in the same group. The Group Summary is the only Panel unit screen that automatically refreshes (every 10 seconds) and displays new point information.

Procedure Overview

Table 26-3: Defining BO Points

To Do This	Follow These Steps:
Define BO Points	Identify all BO points mapped into the Panel unit, Controller N2 Bus address, Field Device type, BO point number in controller, and State O/State 1 conditions. Determine heavy equipment delays. Determine Totalization limits, Totalization type, and the message to use when the Totalization limit is exceeded. Use the Point Add screen to define BO points. Determine appropriate groups for each BO point. Use the Group Modify/Add/Delete screen to define groups. Determine if any BO points need to be trended. Determine if any BO points are involved with any other features. If desired, add BO points to dynamic facility drawings.

Detailed Procedures

Defining BO Points

To define BO points:

1. Identify:
 - all BO points mapped into the Panel unit
 - controller N2 Bus address
 - Field Device type
 - BO point number in controller
 - State O/State 1 conditions
2. Determine heavy equipment delays.
3. Determine Totalization limits, Totalization type, and the message to use when the Totalization limit is exceeded.
4. Use the Point Add screen to define BO points. Determine appropriate groups for each BO point.

The BO Point Add screen, used to define BO points, is shown in Figure 26-7. The parameters for this screen are defined in Table 24-4.

Note: If you specify a BD point as the Network Point Type, make sure it is a Read/Write (commandable) point, and not a Read Only point. You'll find tables that specify which BD points are Read/Write and which are Read Only in the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

```

Operator Name: J. Smith                               Fri Jan 9, 1998 10:31
-----
Point Add
Point Number [ 11] Software Type [B0] Point Name [Boiler OCC/UNOCC]
Network Address: N2 Address [ 1] Point Type [BD ] Point Address [ 1]

Binary Input Point Definition
Status Pair: State 0 [No] State 1 [Yes] Heavy Equipment Delay (sec) [ ]

Totalization Definition
Totalization Type [None]
Totalization Limit [ 0] Alarm Message Used When Limit Exceeded [ ]
Totalization Preset Value [ 0] Change To Preset Value Now [No]

F1 Cancel F2 Save F3 More
Select a name for this point

```

BO point

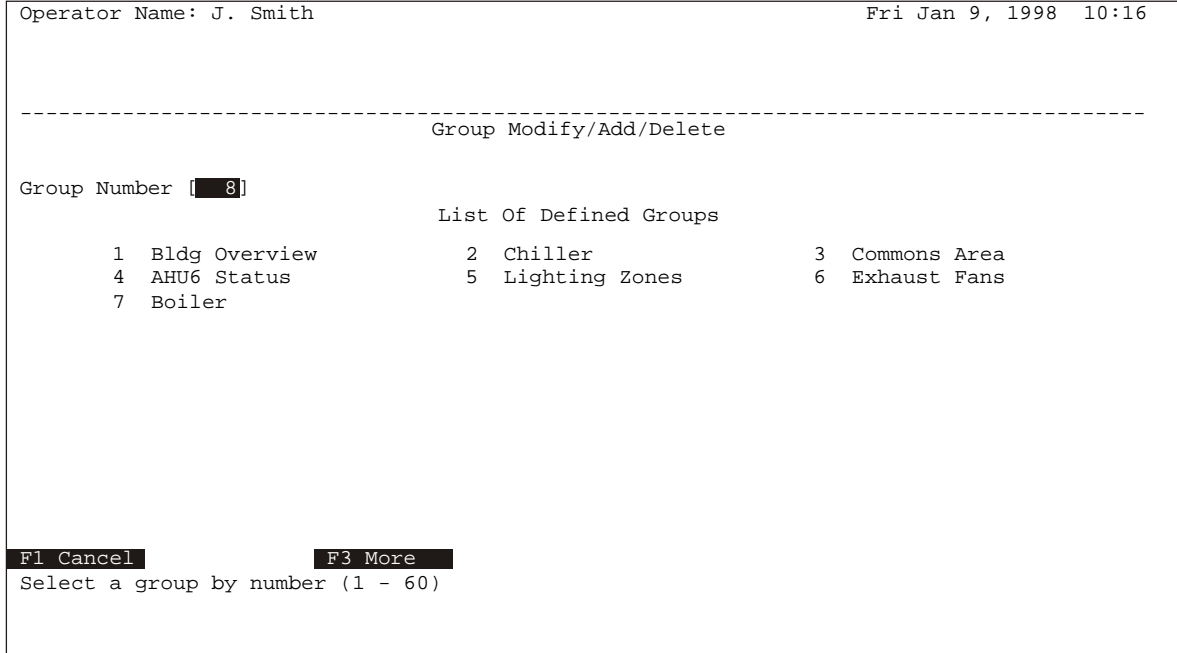
Figure 26-7: BO Point Add Screen

Note: To find out the number of BO points that can be defined per controller point and type, refer to the *Data Base Generation Guide Technical Bulletin (LIT-6281270)* in the *Metasys Companion Technical Manual (FAN 628.1)* or *Data Base Generation Guide Technical Bulletin (LIT-1628270)* in the *Facilitator FMS Technical Manual (FAN 1628.1)*.

Table 26-4: BO Point Definition Tables

Field	Description	Options/Range	Required?	Default
Point Name	Describes the point's location and/or function.	16 characters	Yes	N.A.
Network Address	Describes the controller's location on the N2 Bus.	1 to 255 (For <i>LTD</i> , 1 to 16)	Yes	0
Point Type	Indicates the physical point hardware on which the point software operates.	BI, BD, BO, PML	Yes	BO
Point Address	Indicates the physical location of the point on the controller.	1 to 255 must be Commandable (Read/Write) point	Yes	1
State 0	Describes the State 0 position of the point.	3 characters	Must differ from State 1	Off
State 1	Describes the State 1 position of the point.	3 characters	Must differ from State 0	On
Heavy Equipment Delay	Sets a delay time between the start of this point and the start of the next BO point with a Heavy Equipment Delay.	1 to 30 seconds	No	N.A.
Totalization Type	Indicates the kind of Totalization you want for the point.	None, Cycle Counts, Runtime Min, Runtime Hour	Yes	None
Totalization Limit	Sets a limit for the Totalization counter.	0 to 99999999	No	0
Alarm Message Used When Limit Exceeded	Designates the alarm message the Panel unit displays when the Totalization limit is exceeded.	1 to 130	No	N.A.
Totalization Preset Value	Sets totalized value for the point.	0 to 99999999	No	0
Change to Preset Value Now	Changes the totalized value for the point to the Totalization Preset Value.	Yes, No	Yes	No

- Use the Group Modify/Add/Delete screen to define groups. The Group Modify/Add/Delete screen, used to define groups, is shown in Figure 26-8. The parameters for this screen are defined in Table 26-5.



Group modify

Figure 26-8: Group Modify/Add/Delete Screen

Table 26-5: Group Definition Parameters

Field	Description	Options/Range	Required?	Default
Group Name	Describes the group's location and/or function.	16 characters	Yes	N.A.
Point (24 possible fields)	Indicates, by number, a point to include in the group.	All valid point numbers	No	N.A.

- Determine if any BO points need to be trended.
- Determine if any BO points are involved with any other features (i.e., Global Data Sharing, Signal Select).

Chapter 27

Glossary

Adjust	A command you perform on AO (Analog Output) software points that are mapped to ADF hardware points in the Application Specific Controller (ASC). Unlike other commands, which alter the Panel unit database only (overriding the hardware), the Adjust command permanently alters the point's configuration in the ASC.
Air Handling Unit (AHU) Controller	A complete digital control system for most common packaged air handling configurations, including single zone, variable air volume, and dual duct.
Alarm Horn Point	A binary output point that will turn on a signaling device, such as a light or siren when a COS requiring acknowledgment occurs.
Alarm Management	An information distribution feature that prioritizes change-of-state alarm reports and informs you of those alarms that need immediate attention.
Alarm Tone	A tone on the Personal Computer (PC) that sounds when a new alarm is displayed. The tone sounds once per minute for five minutes, or until all alarms have been acknowledged.
Application Specific Controller (ASC)	A family of standalone control devices with hardware and software preconfigured to meet the functional needs of specific applications. The Panel unit supports the following ASCs: AHU (Air Handling Unit), LCP (Lab and Central Plant), UNT (Unitary), and VAV (Variable Air Volume).
Auto Shutdown	A control process that disables alarm reports when these reports are unnecessary or inappropriate.

Baud	Speed of data transmission between communicating devices (bits per second).
Change-of-State (COS)	The act of transferring from one condition to another (e.g., a binary output point changes from Off to On, an analog point changes from normal to abnormal).
Control Logic	A feature that allows you to specify which points will be commanded or adjusted, based on IF, THEN, and ELSE statements.
Control Point	A binary input or output point defined within the Auto Shutdown Modify/Add/Delete screen whose state will shut down its dependent points to prevent unnecessary alarm reports from being generated.
Database	Contains all the data files. The Panel unit uses to run the facility. For example, the names and addresses of points and Control Logic processes are part of the database.
Database Generation	The process you perform to set up the Panel unit database. Includes adding points and setting up Weekly Schedules.
Demand Limiting	An energy management feature that lowers energy cost by turning off designated equipment to avoid exceeding predetermined demand peak targets.
Dependent Point	A point within the Auto Shutdown Modify/Add/Delete screen that is shut down when its Control Point is in a given state.
Dial-Up	A software feature that provides automatic phone connections to remote terminals in the case of Critical or Network alarms. Also allows operator at a remote terminal to log on and perform any action allowed by his or her password.
DX-9100 Extended Digital Controller	A digital controller (standalone or networked to the Panel unit) for multiple chiller or boiler plant applications, air handling units, or distributed lighting control.

Global Data Sharing	Provides data interlocks. Each Global Data Sharing process has 1 master point and up to 16 subordinate points. The master point determines the values of the subordinate points.
Groups	Sets of points related by function, location, or any other convenient association.
Help	Lines of text on the bottom of the screen that display information appropriate to the position of the cursor.
Intelligent Lighting Controller (ILC)	A programmable application specific controller (standalone or networked to the Panel unit) that performs On/Off control of building light circuits and other switchable loads.
Lab and Central Plant (LCP) Controller	A digital control system for single chiller or boiler plant operations, or for controlling the HVAC processes of a laboratory environment.
Load Rolling	An energy management feature that reduces energy consumption by turning off designated equipment.
N2 Bus	A local network that interconnects the Terminal or Panel unit and the Application Specific Controllers (ASCs).
Offline	Refers to equipment (such as a controller) that is not logically or physically connected to a communications line.
Operator Interface	The medium an operator uses to interact with the system. The Terminal provides an easy-to-use, menu-driven operator interface for the Panel unit.
Optimal Start/Stop	An energy management feature that reduces energy consumption by keeping a facility in its unoccupied mode as long as possible, and by putting it in its occupied mode as soon as possible, without sacrificing occupancy comfort.
Override	A manual command available at the Terminal that allows the operator to change a current value of a point. The Override replaces the current value with the user-defined value.

Password	A security feature that controls operator access to the Panel unit.
Password Capability Level	A password can have one of three capability levels: Monitor, Command, and System (with System allowing the most functionality). Determines which functions the operator can perform. If a function is not available to the operator's password level, the menu option for that function does not appear on the screen.
Points	A software representation of a piece of equipment or a value which is monitored and controlled by the Panel unit. For example, fans and temperature sensors may be considered points.
Point Mapping	The process of assigning points in the ASC to the Panel unit points.
Point Types	Points are either analog or binary. The motor on a fan, because it can be either on or off, is a binary point. A temperature sensor, because it measures temperature over a continuous range of values, is an analog point. The Panel unit further breaks down points into the following five types: Accumulator, Analog Input, Analog Output, Binary Input, and Binary Output.
.PRN File	The configuration file generated by the HVAC PRO configuration tool that lists the points in the controller. Provides the information you need to map the points in the AHU, UNT, or VAV to points in the Panel unit.
Reports	A feature that allows you to schedule when reports are printed. Offers 12 report types (e.g., All Points, Offline Points, Critical Alarms).
Signal Select	A feature that automatically calculates the average, high, and low values of two or more input points, and uses the calculation to override the value of an output point.
Summary	Displays detailed information about points. Summary types include: Overridden Points, Offline Points, Critical Alarms, Status Alarms.

Totalization	A feature that counts the number of times a binary point transitions from State 0 to State 1 (e.g., turns on), or the length of time the binary point remains in State 1 (e.g., remains on).
Trend	A feature that records how point values change over time.
Unitary (UNT) Controller	A digital control system for packaged air handling units, unit ventilators, fan coils, heat pumps, and other terminal units serving a single zone or room.
Variable Air Volume (VAV) Box Controller	A digital control system for single duct, dual duct, fan-powered, and supply/exhaust VAV box configurations.
Generic Vendor Controller (VND)	A digital controller developed by a third-party vendor that can connect to a network.
Weekly Scheduling	A feature that allows you to schedule when binary output points are turned on and off.

