



Remote

Communications

Software

Manual

Version 5.04

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Welcome

Welcome to the Solidyne ClipperNet/MVAC/IZAC Remote Communication User's Guide. The ability to program and monitor your Solidyne Building Automation System via your personal computer provides you with a powerful and effective tool to maximize the savings, system performance, comfort and convenience of your system.

The introductory section of this User's Guide provides a guide to the documentation so you know where to find information about working with the software. This section also defines typographic conventions used in the documentation.

Updating from a Previous Version of PDC832

This version of the Remote Communications Software is required to communicate with current production controllers. Numerous enhancements have been made to the firmware and software. There is no need to worry about communicating with previously installed systems since this version is downward compatible with older controllers. If you are updating from an earlier version, refer to "*Installing the Software*" (starting on page 2-1) for specific details on how to properly update PDC832.

About the User's Guide

Two versions of the Remote Communications Software are available; standard PDC832 and scheduling PDC832GH. The User's Guide has been laid out to first describe the standard features, followed by the graphics features and ending with the scheduling features. PDC832GH software contains all the features of the standard software (PDC832) with the addition of graphic display capabilities and scheduling capabilities. Both versions are capable of programming and monitoring Clippers, MVACs and IZAC Controllers.

The chapters in this guide have been arranged in a logical order and deal with specific topics, such as Creating a Network, Establishing a Communication Link, Monitoring Inputs, etc. Simply refer to the table of contents for the specific function you wish to perform.

Conventions

To help you locate and interpret information easily, the Solidyne Remote Communication User's Guide uses consistent visual cues and text formats. The following conventions are used throughout this guide.

bold

Anything that you must type exactly as it appears. For example if you are asked to type **cd\SOLIDYNE**, you would type all the bold characters exactly as they appear followed by the RETURN key.

italic

Placeholders for information you must provide. For example, if you are asked to type *filename*, you would type the actual name of the file instead of the word shown in the italic type.

Key Words

Select . . .

An instruction to move the mouse to a specific menu. For example Select Networks requests you to move the mouse to the word Networks on the screen until it lights up and then press the left button on the mouse. Since the software is mouse driven all functions are performed in this manner.



Throughout the software the **SAVE** and **CANCEL** boxes appear in many menu options. Changes made to individual menu options can be accepted by selecting the **SAVE** box. To discard any changes, select the **CANCEL** box. None of the changes will take effect.

The **SAVE** box only saves information in regards to the computer's RAM. Permanent changes that need to be saved to the Hard Drive use the **Network,Save** or **Network,Save As** options.

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- Version # and Serial # of software (from diskette label, manual cover or screen)
- Computer make and model
- Amount of memory (RAM)
- Version of DOS (disk operating system)
- Printer make and model (parallel or serial)
- Mouse make and model (serial or bus)
- Modem make and model
- Graphics card (CGA, EGA, VGA)
- Monitor make and model
- Error messages encountered
- List of other hardware used with your computer (memory expansion boards, etc.)
- TSR programs on computer (Terminate and Stay Resident)

Chapter 1 - System Requirements

Computer

An IBM personal computer or compatible is required to run the software. The software is suitable for use on IBM PC, XT, AT, PS/2, 286, 386 and 486 machines.

RAM

The computer should have at least 640K of internal memory (RAM) available. The Disk Operating System (DOS) can be PC-DOS or MS-DOS, version 3.0 or greater.

Hard Disk Drive

The software is supplied on 5 1/4" or 3 1/2" disks, but should be installed and executed from a hard drive. The size of the hard drive required depends on the number of applications.

Graphics Card and Monitor

The standard software (PDC832) runs in a CGA mode. At minimum a CGA monitor and matching graphics card is required to operate the software. The graphics and scheduling (PDC832GH) version runs in an EGA mode. An EGA monitor and matching graphics card is required to operate these versions of the software. Both versions can operate with EGA, VGA or Super VGA monitors and graphics cards.

Parallel Port

A Parallel Port is required to operate the software. A key must be inserted onto the parallel port to enable communication features. If the computer does not have a parallel port or the key is not properly inserted, the software will run in DEMO mode only.

Mouse

The software is mouse driven for efficiency and convenience. To operate the software simply move the mouse to the chosen field until it is highlighted and press the left button. The mouse must be a Microsoft compatible mouse, either serial or bus. A serial mouse can be used if the computer has two (2) serial ports available, the second port is used for communications. A bus mouse should be

used if only one serial port is available. The controller card for the bus mouse will occupy one (1) expansion slot in the computer.

NOTE: The software can be operated without the mouse if necessary. Boot the software without loading the mouse driver. Move through the software using the Arrow, Tab, Page up, Page down, Home, End, Escape and Return keys. This method is cumbersome and is not recommended but is available for emergencies.

Communications

Modems

Communication with Solidyne's Building Automation System can be established directly and/or remotely. Remote communication requires the use of MODEMs (MOdulator-DEModulator). The modems convert the digital signals from the computer and the controllers to audio tones for transmission over telephone lines. The recommended modem is the Hayes 1200 Smartmodem. Compatibles and internal modems may also work. The Practical Peripheral 1200SA Mini is a Hayes compatible that works well and is offered by Solidyne as a MOD-4.

The modem can be configured for COM1 or COM2 through the software.

Hayes Smartmodem 1200 Switch Settings for LAN Software			
SW#	Computer	Clipper	Function
1	Down	Down	<i>Ignore DTR, assumed true</i>
2	Down	Down	<i>Non-Verbose, Digit Result Codes</i>
3	Down	Down	<i>Non-Quiet, Result codes sent</i>
4	Up	Down	<i>Echo (No Echo)</i>
5	Up	Up	<i>Auto Answer</i>
6	Down	Down	<i>Ignore carrier detect, assumed true</i>
7	Up	Up	<i>Single line RJ11 jack</i>
8	Down	Down	<i>Enables Commands</i>
9	Up	Up	<i>Bell 103/212A compatible</i>
10	Up	Up	<i>Command (Reset) state when DTR low</i>

Table 1-1: Hayes Modem DIP Switch Settings

Two modems are required to establish remote communication, one on the computer end and one on the controller end. The external Hayes 1200 Smartmodem dip switch settings are shown in Table 1-1.

Should an external Hayes compatible or internal modem be used on the computer end, its DIP switches must be configured similar to the Hayes Smartmodem 1200. If the modem does not have all 10 DIP switch settings, the modem may be configured through this software or programs like PCAnywhere™, PROCOMM+™, or BITCOM™ (to name a few). To configure your internal or compatible modem, correlate the Hayes' DIP switches and its functions shown in Table 1-1 with the proper AT commands for your modem. An "AT" like command line can be entered when CLIP.EXE is executed. Refer to Chapter 2 "*Installing the Software*" for details.

The internal or external Hayes compatible modem can be connected to COM1 or COM2.

2400 BAUD/9600 BAUD

The software can run at 1200, 2400 or 9600 BAUD. At 2400 or 9600 BAUD a modem capable of communicating at these BAUD rates is required. The controllers at the network and an M200 or M201 interface module must be properly configured to communicate at 2400 or 9600 BAUD.

Modems today are primarily configured through software settings. A network operating at 1200, 2400 or 9600 BAUD does not require many of the advanced features these modems may offer. Consequently, the modem must be configured to disable these features to insure proper operation with a Solidyne network.

Configuring modems involves addressing the proper "AT" commands. For example, to disable ECHO, the "ATE0" command must be set in the modem.

The tables on the following two pages provide the modem settings required for a modem to operate at the network and PC end.

<u>Parameter</u>	<u>Function</u>
Command Set	
B1	Bell 103/212A compatible
E0	No Echo
Q0	Non-quiet, send responses to terminal
V0	Non-verbose, messages sent numerically
X0	Basic response set
Extended Command Set	
&C1	DCD signal follows the state of the data carrier from the remote system
&D0	Ignore DTR
&G0	Disable guard tones
&J0	RJ11 telephone jack type
&L0	Selects a dial-up line
&P0	Make/Break pulse ration (U.S.)
&Q0 or &Q6	Asynchronous operation, &Q6 disables any error correction
&R0	CTS tracks RTS
&S0	DSR on continuously
&Y0	Profile 0 becomes the Active profile upon power-up
S-Registers	
S0=3	Number of rings modem will answer
S36=1	Modem attempts asynchronous connection
S37=5 or	Modem communicates at 1200 BAUD
S37=6 or	Modem communicates at 2400 BAUD
S37=9	Modem communicates at 9600 BAUD

Depending upon the features available to your modem, settings listed under the Extended Command set and S-registers may or may not be present.

If your modem does not have the setting listed, look through your modem manual and check if another parameter performs the same function. Otherwise ignore the parameter.

Special features including compression, fax capabilities, etc. should be disabled. Consult your modem's manual for details.

Table 1-2: Configuration for modem at Network end

<u>Parameter</u>	<u>Function</u>
Command Set	
B1	Bell 103/212A compatible
*E1	<i>Echo</i>
Q0	Non-quiet, send responses to terminal
V0	Non-verbose, messages sent numerically
X0	Basic response set
Extended Command Set	
&C0	<i>DCD always true</i>
&D0	Ignore DTR
&G0	Disable guard tones
&J0	RJ11 telephone jack type
&L0	Selects a dial-up line
&P0	Make/Break pulse ration (U.S.)
&Q0 or &Q6	Asynchronous operation, &Q6 disables any error correction
&R0	CTS tracks RTS
&S0	DSR on continuously
&Y0	Profile 0 becomes the Active profile upon power-up
S-Registers	
S0=1	Number of rings modem will answer for alarms
S36=1	Modem attempts asynchronous connection
S37=5 or	Modem communicates at 1200 BAUD
S37=6 or	Modem communicates at 2400 BAUD
S37=9	Modem communicates at 9600 BAUD

Depending upon the features available to your modem, settings listed under the Extended Command set and S-registers may or may not be present.

If your modem does not have the setting listed, look through your modem manual and check if another parameter performs the same function. Otherwise ignore the parameter.

Special features including compression, fax capabilities, etc. should be disabled. Consult your modem's manual for details.

* E1 and &C0 are the major differences between network and PC configuration.

Table 1-3: Configuration for modem at PC end

Store the Active Profile at the Network end in Profile 0.

Each time power is cycled to the modem at the Network end, the modem will power up with the configuration stored in Profile 0.

Phone lines

A voice quality telephone line should be dedicated to the system for trouble free communication. The quality of phone lines can vary due to the amount of traffic on the lines. Noisy phone lines can cause communication problems such as "Reply Header" and "Echo" errors. If you encounter a large number of errors during communication, hang up and re-dial the system.

The phone line can be shared with normal business operations if desired. Solidyne controllers can be programmed to delay the answering of incoming calls up to nine rings.

Diskette Care, Handling Dos and Do nots

- *Whenever handling your diskette, DO NOT touch the diskette recording surface. Handle the diskette only by the jacket area.*
- *After using a diskette, place it back in its protective envelope. Left unprotected, the disk is exposed to dust, debris, cigarette smoke, etc. which will quickly damage the disk.*
- *DO NOT allow a magnet or other magnetized objects near your diskette. Magnets will cause your diskette to lose its information.*
- *Diskettes operate best at temperatures between 50° - 120° F.*
- *DO NOT fold or bend your diskette. Handle the diskette carefully so it will always be in good shape to make contact with the read/write heads of the disk drive.*
- *When writing on the diskette ID label, DO NOT use a pencil, ball point pen, fountain pen, or other hard marker. Use only a felt-tip pen. Hard markers can make an impression on the diskette surface, causing data loss.*

Chapter 2 - Installing the Software

First Time Installation

Before proceeding fill out the registration card and mail it to Solidyne. This information will be used for special offers and future updates. The serial number will be registered in your name with our Technical Service Department (required for free assistance over the phone).

Installing the software for the first time is simple. We recommend you follow these steps:

1. Boot the computer, set the time and date. If your computer does not have an internal clock enter the correct time and date.

*Solidyne's Remote Communication Software uses the time and date within the computer to date stamp several logged data files and screen displays.
Make sure the time and date in your computer is correct.*

2. Load the mouse driver (supplied with the mouse). When using a serial mouse, determine if the mouse is in COM1 or COM2. The mouse driver will load automatically if it is added to the AUTOEXEC.BAT file.

3. Execute the following print command:

```
C:\>PRINT /D:PRN
```

This command must be executed if any of the print options are to be used. Add this command to the AUTOEXEC.BAT file along with the mouse driver.

4. Make a backup copy of the software for your own use. Put the original disk in a safe place for future use in case the working copy is lost or damaged. The original disk will also be required for future updates. The copy is authorized for use by the original purchaser only.

5. Create a directory on the hard drive to install the software.

```
C:\>MD SOLIDYNE
```

6. Insert the working copy in drive A: and type:

```
C:\>A:
```

then type,

```
A:\>dir
```

The following files should appear:

```
CLIP.EXE
FPKV.WK1
FQH.WK1
IZACPTS.CFG
IZACTYPE.CFG
UPGRADE.EXE
UPGRADE2.EXE
USERS.
USERS0.
```

If your floppy drive is other than A:, substitute that letter for A: above.

7. Copy all the files to the hard drive.

```
A:\>COPY *.* C:\SOLIDYNE
```

8. Change drives and directories by typing,

```
A:\>C:
C:\>CD\SOLIDYNE
```

9. Accompanied with each piece of software is a key. The key must be attached to a parallel port of your computer to enable remote communications. Upon startup, the software will check parallel ports LPT1, LPT2 and LPT3 for the key. If the key is not found on any parallel port nor inserted properly, all communication capabilities will be disabled. The software will revert to a DEMO mode.

WARNING

*DO NOT plug the key into a serial port. The key may be damaged.
Connect the key only to a parallel port.*

Parallel ports on the PC will be female, Serial ports on the PC are male.

Remove the printer connector from the parallel port if necessary. Plug the key into the parallel port. Make sure the silver button of the key is inserted into the key completely. The printer connector may then be attached to the key. Printer functions will not be affected by the presence of the key.

If a printer is attached to the key, it may have to be powered up and online before running the software.

The key might not be recognized on a network PC if it has been attached to a parallel port that has been redirected to a network printer.

IMPORTANT

Once the software is run, it periodically checks the parallel port for the presence of the key. If the key is removed the software will revert to DEMO mode.

10. Run the software. If you have a modem on COM 1 type:

```
C:\SOLIDYNE>CLIP COM1 MODEM
```

or

```
C:\SOLIDYNE>CLIP COM2 MODEM
```

if you have a modem in COM 2.

As the software boots, the default initialization string sent to the modem is AT E1 V0 T X0 S7=90 S8=5. "AT" commands can be added to the CLIP command line should other registers need to be addressed. An "AT" command can be substituted for the initialization string as the software boots.

Entering,

```
C:\SOLIDYNE>CLIP ATE1V0TX0S7=90S8=5Q0&D0&C0
```

has exactly the same effect as the default initialization string, but would also set the modem for:

Q0	Return Result Codes
&D0	Ignore DTR
&C0	Force DCD signal ON at all times

IMPORTANT

Any parameters entered after the AT command should not be separated by spaces.

CLIP ATE1Q0 is valid

CLIP AT E1 Q0 is invalid

Some modems can store different configurations internally. These configurations may be stored in profiles of the modem. If the modem has been configured for PDC832 communications for profile 1, entering:

```
C:\SOLIDYNE>CLIP ATZ1
```

sets the modem to profile 1's configuration.

The "AT" command cannot be saved and has to be re-entered each time the software is loaded. A batch (.BAT) can be created which will automatically execute a preconfigured command line.

Do not press any keys until instructed to do so. A prompt will appear in the lower left hand corner of the screen. Refer to Chapter 3 *Logging On & Assigning Passwords*.

If you are direct connected through COM 1 type:

```
C:\SOLIDYNE>CLIP COM1 DIRECT
```

or

```
C:\SOLIDYNE>CLIP COM2 DIRECT
```

if you are direct connected through COM 2.

As the software executes, do not press any keys until instructed to do so. A prompt will appear in the lower left hand corner of the screen. Refer to chapter 3 *Logging On & Assigning Passwords*.

Upgrading from Previous Versions of PDC832

Backup Important Files

Important job files should be backed up on a regular basis. Make sure a backup is performed before updating to the current version. The upgrade process is simple but files can be accidentally erased.

Copy New Files from Floppy Disk

Insert the floppy disk into drive A: and type,

```
C:\>A:
```

then type,

```
A:\>dir
```

The following files should appear:

```
CLIP.EXE
FPKV.WK1
FQH.WK1
IZACPTS.CFG
IZACTYPE.CFG
UPGRADE.EXE
UPGRADE2.EXE
USERS.
USERS0.
```

Upgrading Files Prior to 3.10

If you are upgrading from a version prior to 3.10 you must copy the **USERS.** file, the two ***.CFG** files as well as the three **.EXE** files to your existing Solidyne remote communications directory:

```
A:\>COPY USERS. C:\SOLIDYNE
```

```
A:\>COPY *.EXE C:\SOLIDYNE
```

Upgrading from 3.10 or Greater

If you are upgrading from version 3.10 or greater, copy the two **.CFG** files and three **.EXE** files to your existing Solidyne remote communications directory:

Type,

```
A:\>COPY *.EXE C:\SOLIDYNE
```

Executing Upgrade and Upgrade2

Before running the software the program files and data files must be upgraded. First change to the C: Drive:

```
A:\>C:
```

Next, change to the **SOLIDYNE** Directory.

```
C:\>CD\SOLIDYNE
```

UPGRADE will upgrade all existing program files from any previous version to the current format. Type **UPGRADE**:

```
C:\SOLIDYNE>UPGRADE
```

Then type:

```
C:\SOLIDYNE>UPGRADE2
```

UPGRADE2 will upgrade all existing data files from any previous version to the the current version supplied with this manual.

The software can now be run by typing:

```
C:\SOLIDYNE>CLIP xx yy zz
```

where xx is COM1 or COM2 (communication port location), yy is MODEM or DIRECT (method of communications) and zz is the optional "AT" command described on pages 2-3 and 2-4.

As the software executes, do not press any keys until instructed to do so. A prompt will appear in the lower left hand corner of the screen. Refer to chapter 3 *Logging On & Assigning Passwords*.

Chapter 3 - Logging On & Assigning Passwords

Log On Screen

A LOG ON screen will appear as the software executes, Figure 3-1. A USER ID and PASSWORD must be entered before proceeding.

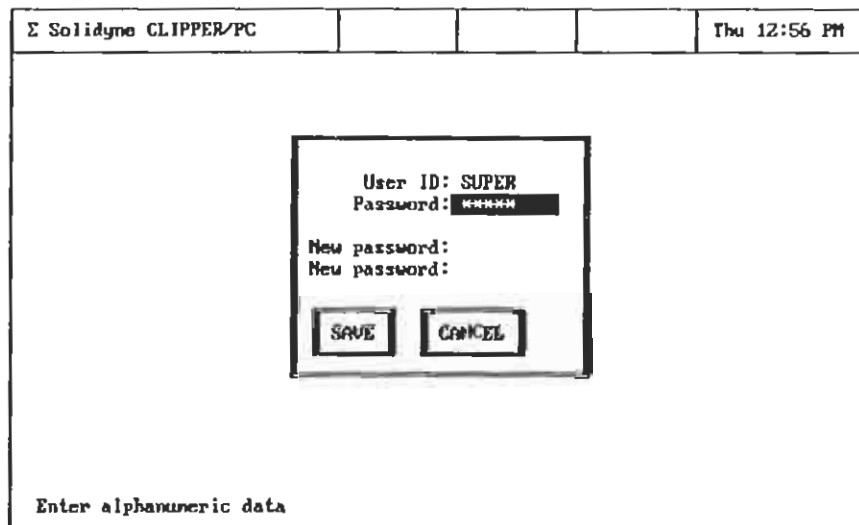


Fig. 3-1: Log On Screen

The individual user identifications and passwords are configured by the system operator, referred to as the SUPER user. Originally the software contains only one user, you must initially log on as the SUPER user.

At the User ID prompt type,

SUPER

At the Password prompt type,

SUPER (must be all capital letters and will appear as asterisks)

The password is case sensitive. The original password must be entered as upper case. If the password is entered incorrectly the software will exit to DOS.

The SUPER user has the ability to create and configure the level of access for new and existing users.

New Password

The password can be changed as the user logs on. After entering a valid User ID and Password a New password can be entered.

Enter the new password at the prompt. The entry can be up to eight characters. The password will not be displayed as it is entered and must be verified by entering it twice before it will be accepted.

The password can be left unchanged by using the DOWN ARROW or RETURN keys to skip these entries.

Select SAVE to accept the entries or CANCEL to exit the software.

The SUPER user has unlimited access to all menus. The PASSWORD for the SUPER user should be changed to avoid unauthorized tampering.

Configuring New Users

Security Option

The User ID, Password and level of access for all users are configured by the SUPER user. A SECURITY option will appear within the main menu only when the SUPER user logs on, Figure 3-2.

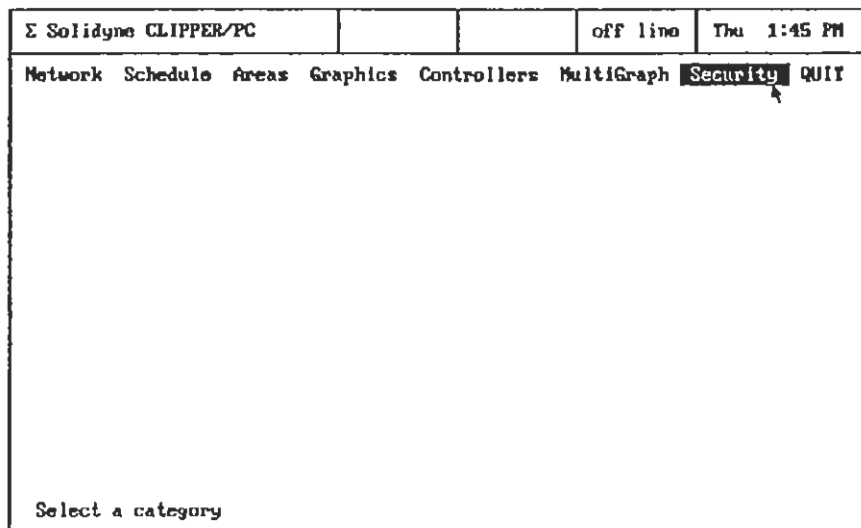


Fig. 3-2: Main Menu with Security Option

The SUPER user will use the SECURITY option to create and configure all other users.

Select SECURITY

A user table will appear displaying the User IDs and associated comments, Figure 3-3.

Security		off line	Sun 9:05 PM
Details	New	Copy	Reconfigure
	Delete	Logon	Exit
User	Comment		
JOHN	Level 1 Access		
MARR	Level 1 Access	▲	
MARY	Level 1 Access	▲	
TEST	Access All		
SUPER		▲	
		▼	
		▼	
		▼	

Select a function

Fig. 3-3: Security Option - User Table

Creating New Users

A new user is created by assigning a User ID and Password.

Select New

A user configuration window will appear, Figure 3-4. The window contains entries for the User ID, Password, Comment, Network and Programs.

User ID - A descriptor used to identify the user. The User ID can be up to eight characters in length and is not case sensitive. Each user can be assigned a unique level of access.

Password - An access code assigned to the user. The case sensitive Password can be up to eight characters in length. The Password, originally assigned by the system operator, can be changed by the user or left blank.

Comment - A brief description of the user. The Comment can be up to 14 characters in length.

Network - A default file to automatically load when the user logs on.

Programs - A program editor lock-out. The Programs option can be toggled from Updateable to Read-only.

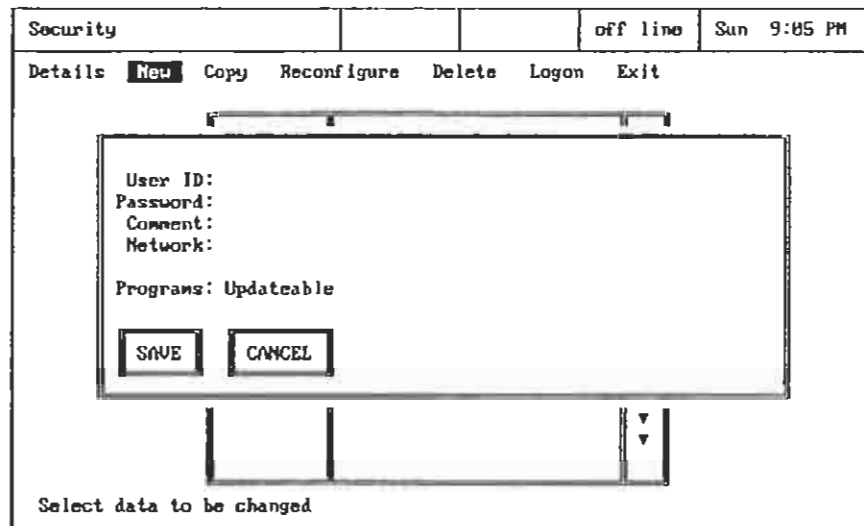


Fig. 3-4: Security Option - User Configuration Window

Selecting a Default Network

Select Network

A network table will appear, Figure 3-5. The top line of the table is the Current Directory Line (CDL). The table displays all subdirectories and networks within the current directory. Subdirectory names are enclosed in angle brackets. Networks' filenames appear below the subdirectories. The description entered for the network appears to the right of the network filename.

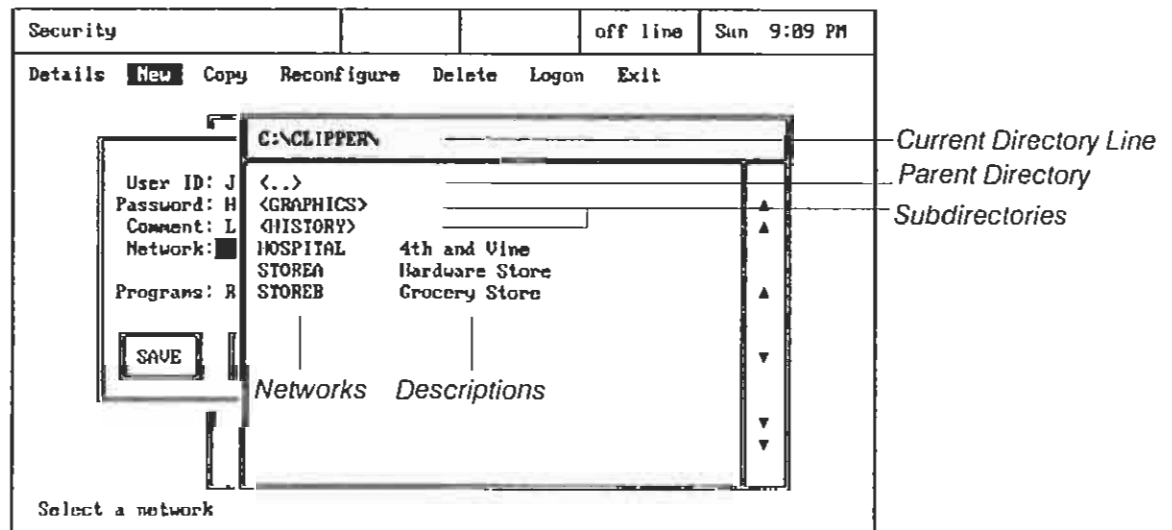


Fig. 3-5: Security Option - Network Table

Select the name of the network to be assigned to the user. Networks within other subdirectories can be viewed by selecting the subdirectory name. Networks within the parent directory can be viewed by selecting the parent directory, <..>.

The CDL can be edited manually to directly access a selected directory, possibly on a different drive. Type the name of the new directory on the CDL using conventional DOS notation, e.g. **D:\XL9600**.

Assigning a network to a user has two effects.

1. Convenience. If the user primarily works with a single network, the network will be loaded during the log on process, eliminating the need to LOAD the file.
2. Security. The user can be locked into accessing only the assigned network, eliminating the possibility of tampering with other jobsites. A user will be locked into the assigned network if denied access to the LOAD option, refer to "*Configuring User Access Level*".

Programs

A program editor lock-out. The Programs option can be toggled from Updateable to Read-only. The Updateable mode allows the user to edit setpoint programs, if allowed access to editing menus. The Read-only mode will not allow the user to edit setpoint programs, even if the user is allowed access to setpoint editing menus.

The Password, Comment and Network entries are optional and can be left blank.

Configuring User Access Level

The level of access given to each user should be determined by the user's knowledge and authority. Users are allowed access to the software on a menu by menu basis.

Initially, all menus are inaccessible to new users. The SUPER user must configure the accessible menus for the new users.

Select Reconfigure

Select a user from the table

The software will now be in the configuration mode. The words "Configuring (selected User ID)" will appear on the top of the screen, while "Entering configuration mode" appears on the bottom, Figure 3-6.

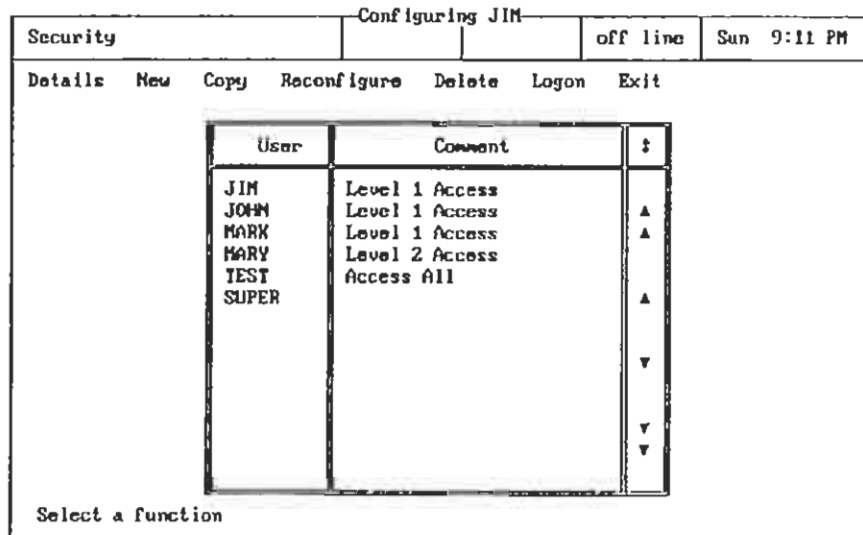


Fig. 3-6: Security Option - Configuration Mode

Exit the Security window

The main menu will appear but the options will be shaded in gray. Gray options are not accessible to the current user.

The options can be toggled to "accessible" by holding the "Alt" or "Shift" key down and selecting the option.

The accessible options will be shaded blue.

Allowing access to an option does not automatically allow access to the options that may be within a pull down menu. Any options within pull down menus or setup screens must be toggled individually.

Example: Allow a new user to monitor the 48 Hour data for Analog Inputs.

The following options must be toggled to blue (accessible to the user):

- Controllers
- Sensors
- Analog Inputs
- 48 Hour

Continue through all the menus, toggling selected options to access. Once all the options for the user have been selected, return to the Security menu.

Select Reconfigure

A validation window will appear for the configuration just created. Select YES to save the configuration or NO to abandon.

The SUPER user cannot be reconfigured.

Copying Similar Users

A system with multiple users may have many similar users. Instead of configuring each user individually, a master user can be created and copied. The master user should be completely configured by the method described above "*Configuring User Access Level*" before being copied.

Select Copy

Select the user to copy

A new user window will appear, Figure 3-7.

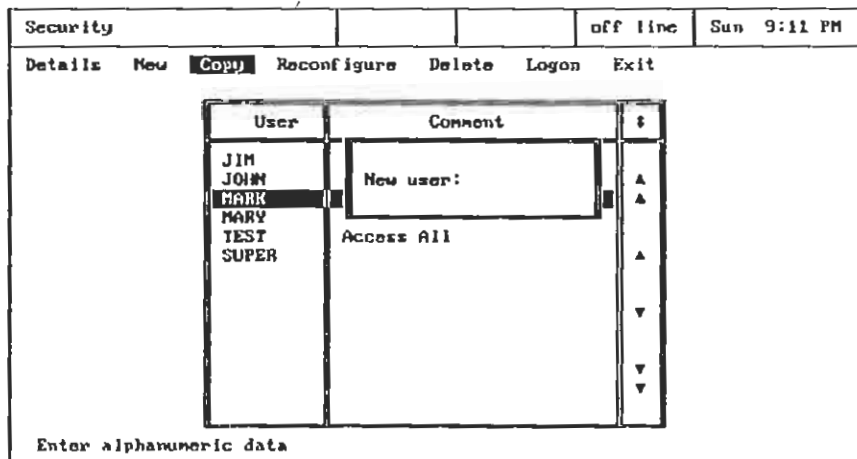


Fig. 3-7: Security Option - Copying Users

Enter the name of the new user. All the setup information for the master user will be copied to the new user except for the password. If the new user is to be allowed or denied access to additional menus refer to *"Editing Existing Users"*.

The SUPER user cannot be copied.

Editing Existing Users

The SUPER user can reconfigure individual users at any time. As the user's knowledge of the system and authority to control it rises, menu access can be increased. Simply follow the steps for *"Configuring User Access Level"*.

Menu access can also be limited by toggling the menus back to gray.

The User ID, Password, Comment, Network and Programs selections can also be modified at any time by the SUPER user.

Select Details

Select a user from the table

A configuration window will appear for the selected user, Figure 3-8. The entries can be modified at this time.

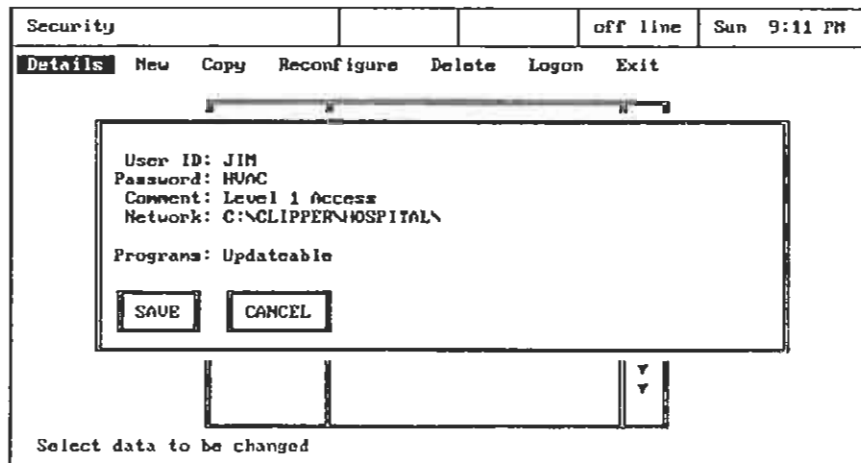


Fig. 3-8: Security Option - Editing Existing Users

If the user had changed the password during the log on process, the new password will be displayed within this window.

Select SAVE to enter the changes or CANCEL to abandon.

Deleting Existing Users

The SUPER user can delete users from the table.

Select Delete

Select the user(s) from the table to be deleted.

The selected user(s) will be removed from the users table and will no longer be valid.

The SUPER user cannot be deleted.

Disabling LogOn Screen

The SUPER user can disable the LogOn screen.

Select LogOn

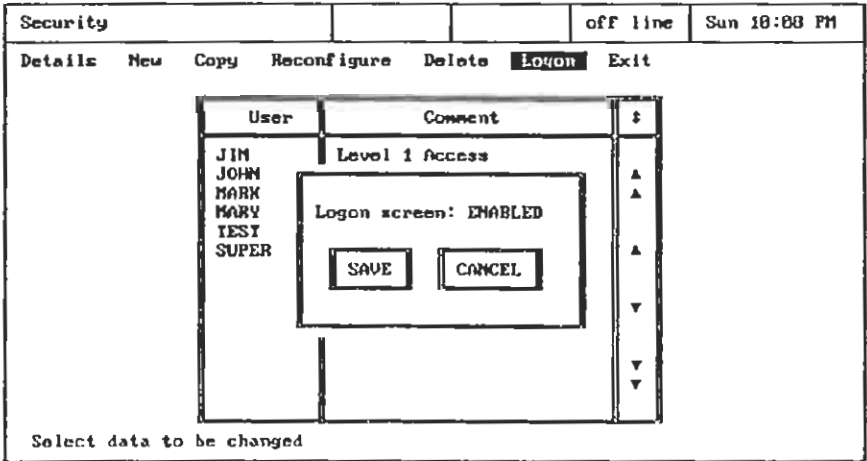


Fig. 3-9: Security Option - LogOn

Toggle Enabled to Disabled

Select SAVE

The software will bypass the initial logon screen allowing unrestricted access to all users.

The logon screen can be re-enabled by adding "LOGON" to the CLIP command line.

Example:

```
C:\SOLIDYNE>CLIP LOGON
```

The software will boot with the logon screen enabled.

Backup/Recovery of Security Codes

The user data, including User ID, Password and Accessible Options, are stored in an encoded form in the file called USERS.

The USERS. file must reside in the same directory as the CLIPEXE file.

The USERS0. file contains one User ID (SUPER) and one Password (SUPER). When the Super user creates and configures additional users the USERS. file is updated automatically.

The USERS0. and USERS. files should be backed up after configuring the additional users. Secure the diskette for future use.

Anyone with access to the USERS0. file will be able to copy it as USERS. and logon as SUPER (User ID) and SUPER (Password). The USERS0. file should be kept in a separate and secure location.

Should the USERS. file be accidentally erased, copy the USERS. or USERS0. file from the original diskette to the CLIPEXE directory as USERS.

Example:

```
C:\>COPYA:USERS.C:\SOLIDYNE\USERS. or
```

```
C:\>COPYA:USERS0.C:\SOLIDYNE\USERS.
```

Chapter 4 - User Log On

Logging On

The user log on process requires the entry of a User ID and Password. Each user has been assigned an ID and Password by the system operator.

The software can be run by typing:

```
C:\SOLIDYNE>CLIP xx yy zz
```

where xx is COM1 or COM2 (communication port location), yy is MODEM or DIRECT (method of communications) and zz is the optional "AT" command described on pages 2-3 and 2-4.

As the software executes, the modem will be initialized for MODEM communications and the Log On Screen appears. Otherwise just the Log On Screen appears. Do not press any keys until instructed to do so. A prompt will appear in the lower left hand corner of the screen, "Select data to be changed".

Enter your User ID and press return. The highlighted box will drop down to Password.

Enter your password and press return. The password is case sensitive and will appear as asterisks on the screen. If the password is not entered correctly the

The screenshot shows a terminal window titled "E Solidyne CLIPPER/PC" with a timestamp "Thu 12:56 PM". In the center, a dialog box prompts for user information:

```
User ID: Chris
Password: *****
New password: [REDACTED]
New password: [REDACTED]
```

At the bottom of the dialog box are two buttons: "SAVE" and "CANCEL". In the bottom left corner of the terminal window, the text "Enter alphanumeric data" is displayed.

Fig. 4-1: Log On Screen

software will automatically exit to DOS. The highlighted box will now drop down to New password, Figure 4-1.

Your password can be changed any time you log on. Enter your new password and press return. Since the password is not displayed it must be entered twice to validate the entry.

Passwords are Case Sensitive

NOTE: Lost or forgotten passwords can be recovered by the system operator.

Select SAVE to log on or CANCEL to quit.

Restricted Access

Menu options that are shaded in gray are not accessible. Your level of access has been configured by the system operator. Only the options shaded blue can be executed.

A default network may automatically load when you log on. This network has been assigned to your user ID. If you have been denied access to the LOAD command, you will not be allowed to work with any other networks.

If you would like to access menus that are currently unavailable contact the system operator.

Chapter 5 - Creating a Network

The first step in programming a Solidyne Building Automation System is to create a network. The creation of a network consists mainly of defining the number and types of nodes in the system.

NETWORK: A building automation system consisting of a group of controllers tied together through a communication bus. A network can contain up to 252 nodes creating a 2016 input, 2016 output system.

Nodes 1 through 32 will share sensor/override information with Nodes 1 through 252. Nodes 33 through 252 are not global nodes and will not share sensor/override information with Nodes 1 through 252.

NODE: An 8 input/8 output controller. A Clipper contains one (1) node, an 8016 (16 input/ with 1 functional output Clipper) contains two (2) nodes and an XL9600 with 32 Analog/32 Digital inputs/32 outputs contains four (4) nodes.

Node Details Screen

From the main menu:

Select Controllers, Detail, Nodes

A table displaying the nodes in the network will appear. The default network contains two (2) nodes, Figure 5-1.

Controllers				off line		Fri 12:48 PM	
Programs	Graphics	Sensors	Loads	Alarms	HVAC Zones	Detail	Exit
Number of nodes in network: 2						Node markdown: AUTO	
Name	Assume	Name	Assume	Name	Assume	Name	Assume
NODE1	UP						
NODE2	UP						
* Node is currently not in the assumed state.							
Select data to be changed							

Fig. 5-1: Node Details Screen

If the number of nodes in your network is other than two, select "Number of nodes in network" and enter the correct number. The nodes will automatically appear, Figure 5-2.

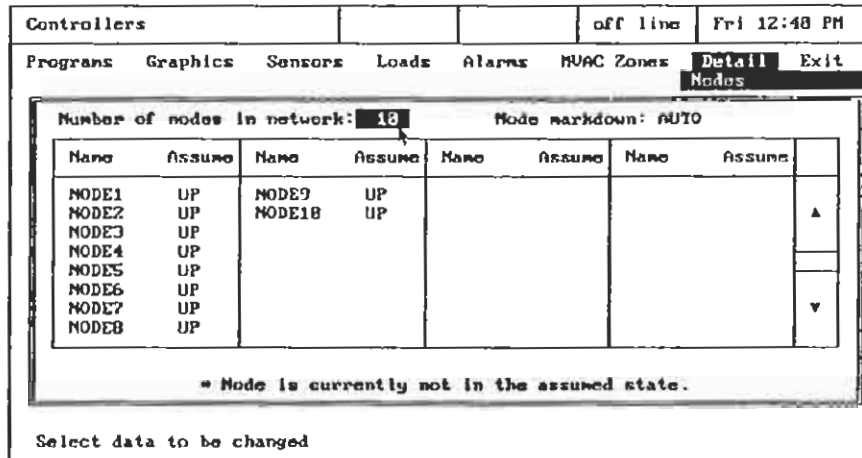


Fig. 5-2: Number of Nodes

*Remember: A Clipper is ONE node
 An 8016 is TWO nodes
 An XL9600 is FOUR nodes*

Example: A system that consists of two XL9600s, three Clippers and an 8016 would contain 13 nodes; $4 + 4 + 1 + 1 + 1 + 2 = 13$.

Markdown Mode

The markdown mode is selectable as AUTO or MANUAL. In the AUTO mode, a node will automatically be marked down if multiple communication errors are encountered. An asterisk will appear next to the node name in the table to identify the DOWN node. Communication will not be attempted to that specific node until the failed status is acknowledged. The status can be acknowledged by toggling the assumed state DOWN and back UP.

In the MANUAL mode, nodes will not be marked down, regardless of the number of communication errors encountered. This mode can be used to save time during the troubleshooting of communication problems. Since the node will not be marked down, the need to constantly toggle the node back up again is eliminated.

Define the Nodes

Since the software is downward compatible with all ClipperNet controllers, a network can actually consist of 12 different types of controllers: CLIPPER LAN, CLIPPER LAN PLUS, CLIPPER LAN XL, XL9600, XL9600 DI, XL9600 LC, XL9600 DI PHONE, XL9600HMT, XLHMT, XLLSP, XL9600LSP and XLHC. The controllers are programmed on a node by node basis and each type of controller has specific capabilities. The software will recognize the type of node being programmed and only allow access to features available for that type. It is very important to define the node type before programming begins.

The default node type is XLHMT. If your network contains other types, the nodes must be redefined before programming. The nodes in a network can be defined automatically through remote communications or manually through the Node details menu.

To automatically define the node types, establish a communication link with the network and receive the network data. The individual node types will be received along with all the other network information (refer to Chapter 10 "Establishing Communications" section *Receive* for detailed instructions).

To manually define the node types, Select the Node Name to be defined, Figure 5-3.

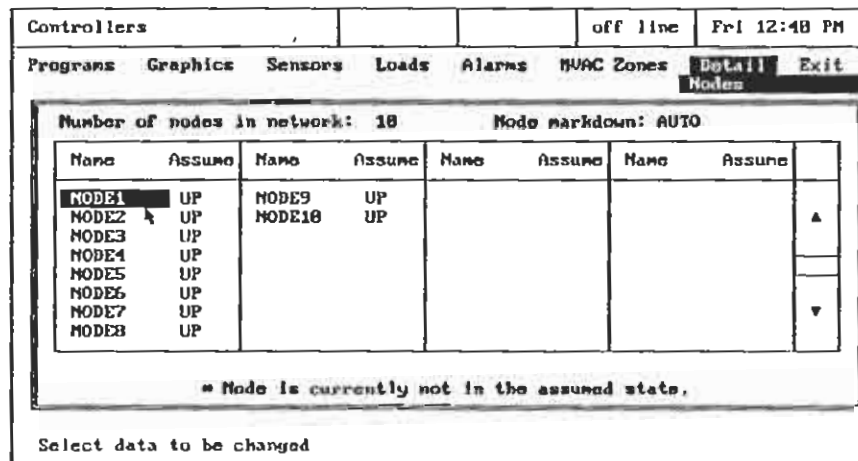


Fig. 5-3: Selecting a Node

A Node Details window will appear, Figure 5-4.

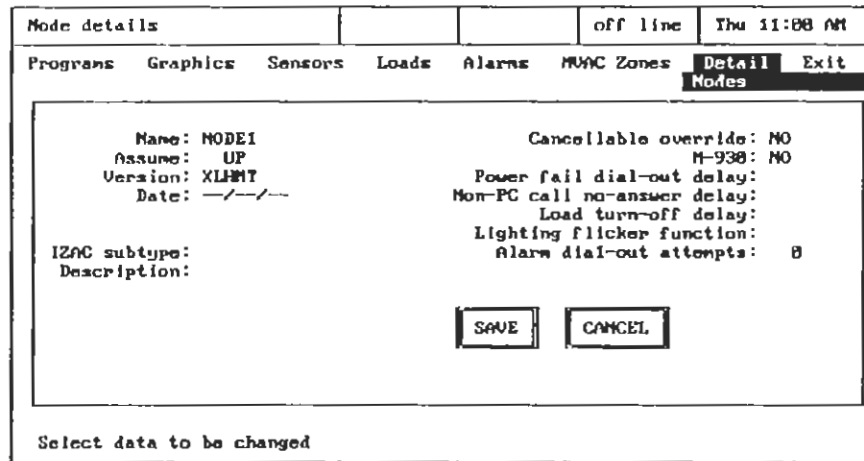


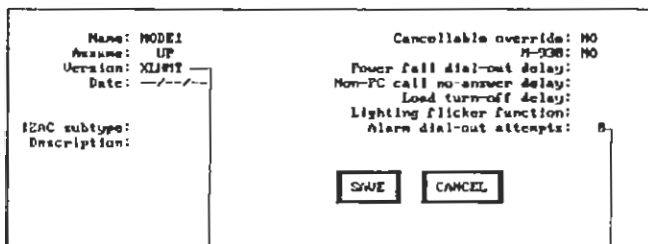
Fig. 5-4: Selected Node Details Screen

Select Version and click the mouse until the correct version appears. The version must match the type of controller installed at the site.

The 8016 should be configured as CLIPPER LAN XL for both its nodes.

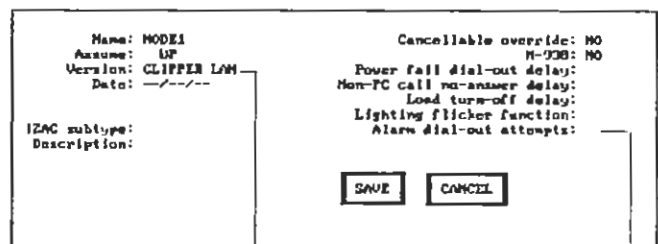
If you are unsure of the type of controllers installed, verify the type before proceeding or use the remote communication method for defining the nodes.

The type of node defined will determine the programmable features available for that node. As you scroll through the version type you will see default data appear and disappear within the Node Details window. If a feature does not display data to the right, then that feature is not available for that node type.



Alarm Dial Out Attempts: 0
 Feature is available for selected node type.

Fig. 5-5: Node Details Window



Alarm Dial Out Attempts: (BLANK)
 Feature is not available for selected node type.

Fig. 5-6: Node Details Window

Node Details Programmable Features

Name

Default entry: NODEXXX. Eight (8) character description used to identify the location or function of the node.

Assume

Default entry: UP. Specifies the assumed communication state of the node. Communication will not be attempted to nodes that are assumed to be DOWN. If a node is marked DOWN it must be toggled back to UP through this menu before further communications will be attempted.

Date

Default entry: --/--/--. Specifies the revision date of the firmware residing in the Node. This entry is not programmable. A date will be entered after a receive is performed on the network.

Cancellable override

Default entry: NO. Specifies whether or not the overrides within the node are cancellable, on a node by node basis.

An entry of NO will not allow a triggered override to be cancelled. The override will remain in effect for the entire length of the programmed duration.

An entry of YES will allow overrides within the node to be cancelled prior to the end of the programmed duration.

M-930

Default entry: NO. Modifies the behavior of the Parallel Variable Duty Cycle setpoint for use with the M930 bi-directional motor control.

An entry of NO will not modify the behavior of the Parallel Variable Duty Cycle setpoint.

An entry of YES will command the Parallel Variable Duty Cycle setpoint to continue to cycle above the High value and below the Low value at the programmed High and Low cycle rates, respectively.

This function should be entered as NO if the Proportional or Prop/Integral PWM setpoints are used for controlling the M930.

Proportional and Prop/Integral PWM setpoints were termed Resettable and Floating PWM setpoints respectively in versions prior to 4.00.

Power fail dial-out delay

Default value: 0. Specifies the number of minutes (0-255) that must elapse, after a power failure, before the XL9600 controller will dial-out. XL9600 must be equipped with a MOD-6 Modem and 12 Volt battery.

Non-PC call no answer delay

Default value: 0. Specifies the number of minutes (0-255) to delay modem answering of incoming calls if the call just received was not originated by a computer. Allows a single phone line to be shared between a Solidyne network and another system, such as a security system.

Load turn off delay

Default value: 0. Works in conjunction with the Lighting flicker function to warn occupants that the lights will be turned off shortly. Specifies the number of minutes (0-15) that must elapse before the lights will be turned off completely.

Lighting flicker function

Default value: 0. Specifies the pattern in which to flash the lighting loads. One of 16 different patterns may be selected by entering a value from 0 to 15. Refer to the XL9600LC Operating manual for details.

Alarm dial out attempts

Default value: 0. Specifies the number (0-15) of dial out attempts to make if the transmission of the alarm condition is not successful. The default value of 0 will actually make 8 attempts.

IZAC Subtype & Description

For Versions designated as IZACs, the IZAC Subtype and Description will become available. Refer to Chapter 23 *IZAC Configuration* for more details.

Chapter 6 - Defining Sensor Details

The physical layout of the system should be completed before any programming is begun. Defining the sensor details before programming the controllers should be common practice. Time spent programming the network will be reduced if the specific purpose for every sensor is defined.

From the main menu:

Select Controllers, Sensors

Two types of sensor inputs exist: Analog and Digital. Digital inputs are only available in XL9600 controllers.

Analog Inputs

Select Analog inputs

A table of 16 sensors will appear, Figure 6-1. A list of functions will be displayed along the top of the screen. The numbers to the left of the table indicate which node the sensors belong to.

Analog Inputs				off line	Mon 12:41 PM	
Details	Peak	Qtr hour	Average	Instantaneous	Cumulative	Exit
1	SENSR1	SENSR2	SENSR3	SENSR4		
	SENSR5	SENSR6	SENSR7	SENSR8		
2	SENSR9	SENSR10	SENSR11	SENSR12		
	SENSR13	SENSR14	SENSR15	SENSR16		

Select a function

Fig. 6-1: Analog Inputs Screen

Details

Select Details

The prompt on the lower left corner of the screen will be "Select a Sensor". The details for each sensor are entered individually.

Select SENSR1

A configuration screen will appear for SENSR1, Figure 6-2. All the details for SENSR1 will be entered through this menu.

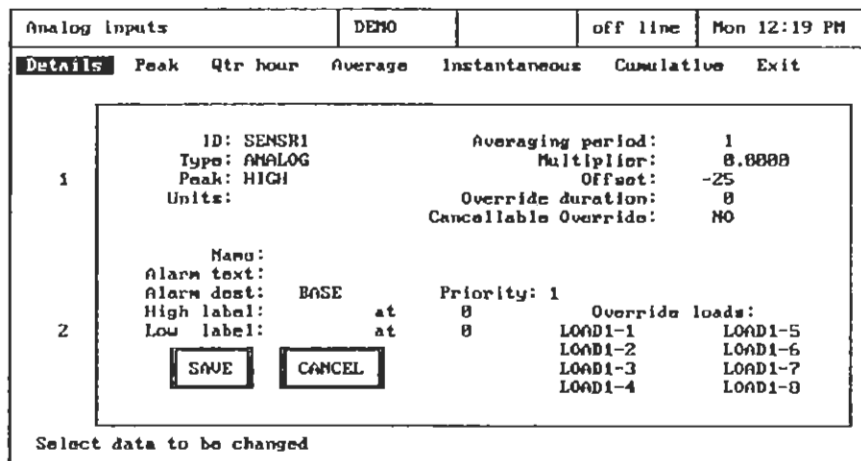


Fig. 6-2: Analog Inputs Details Screen

ID

Default entry: SENSRXXX or SNSRXXXX. XXX is a number from 1 to 2016. Up to eight characters can be used to describe the sensor. The label entered as the ID will be used within all sensor tables instead of the default descriptor.

Type

Default entry: ANALOG. The input type can be configured to be ANALOG or PULSE. An analog input creates a continually varying signal, such as temperature, humidity and pressure. A pulse input is a two position dry contact. The input is either open or closed. Sail switches and utility pulse meters are examples of pulse inputs.

Peak

Default entry: HIGH. The controllers will record the peak HIGH or LOW sensor readings on a daily basis for the last 35 days (32 for XL9600s). This menu item configures the controller to record the peak HIGH or LOW, on a sensor by sensor basis.

Units

No default entry. A four character engineering units descriptor can be entered such as; DegF, %RH, PSI, etc. The descriptor will be displayed in alarm messages created by this sensor.

Name

No default entry. A 24 character Name can be assigned to each sensor. The name will provide a meaningful description of the sensor within alarm messages and graphic displays.

Alarm text

No default entry. A 36 character alarm description can be entered for each sensor. The Alarm Text can be used to describe the alarm condition that has occurred and provide instructions for corrective action. The description will be displayed within alarm message created by this sensor. The detailed alarm message allows untrained personnel to intelligently monitor your building automation system.

Alarm destination and Priority

Default entries: BASE, 1. Alarms can be routed to specific computers (up to 4) on a sensor by sensor basis. If the system is monitored by multiple direct connected computers, each computer will be assigned a network ID number and Name. The alarm created by this sensor can then be instructed to report to a specific computer.

Select Alarm dest

A list of destinations will appear: each represents an ONLINE, direct connected computer, Figure 6-3.

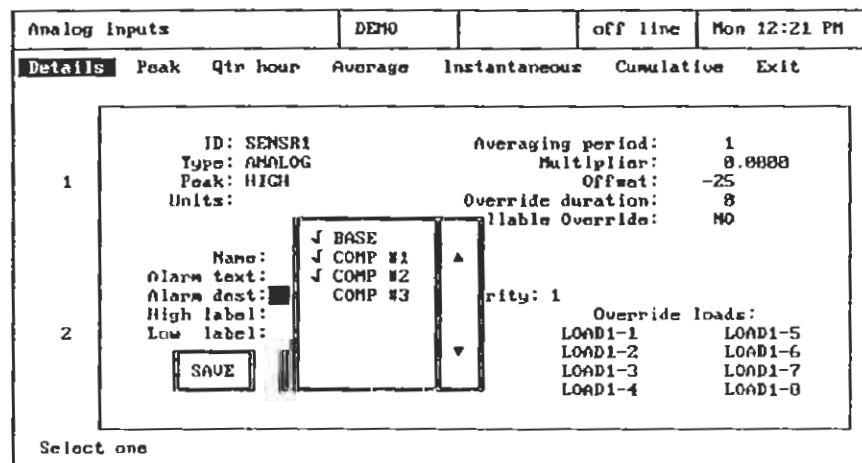


Fig. 6-3: Alarm Destinations

Select the desired destination

The method in which the alarm will be displayed depends on the selected priority. A priority level 1 alarm will display a bright red alarm screen. A priority level 2 alarm will display a cyan alarm screen. A priority level 3 alarm will not display an alarm screen. All three priority levels will flash ALARM along the bottom of the screen, beep occasionally and record the alarm in Current Alarm log.

High/Low labels

No default entry. The High and Low labels can be used to enhance the monitoring capabilities of the software. The High label will be displayed when the actual sensor value is at or above the selected High value. The Low label will be displayed when the actual sensor value is below the selected Low value. Between the High and Low values, the actual sensor value will be displayed.

```

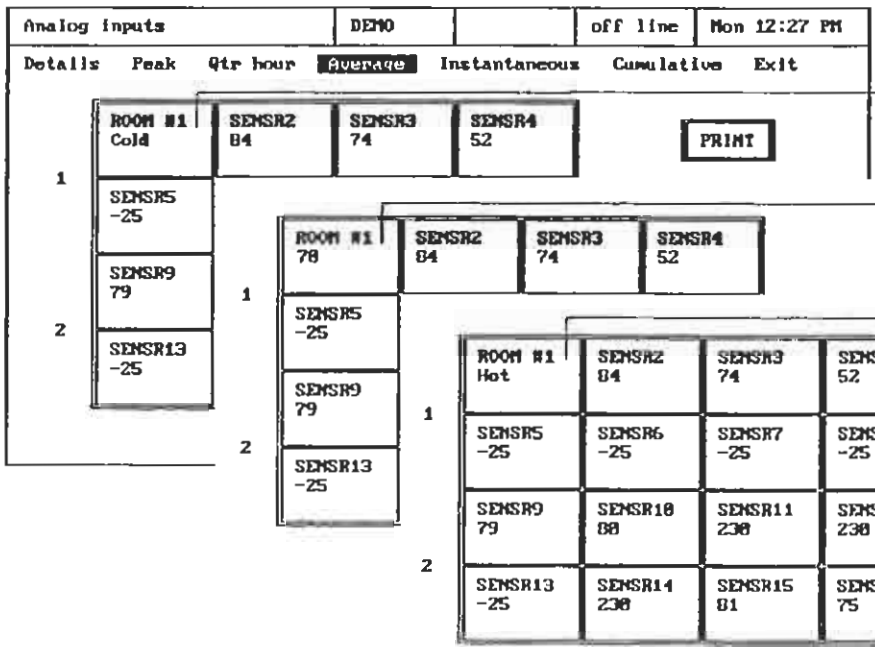
ID: ROOM #1          Averaging period: 1
Type: ANALOG        Multiplier: 8.8888
Peak: HIGH          Offset: -25
Units: Deg          Override duration: 0
                   Cancellable Override: NO

Name: Front Ofc Space
Alarm text: Room Too warm. Call for service.
Alarm dest: J BASE  Priority: 2
High label: Hot    at 88      Override loads:
Low label: Cold    at 65      LOAD1-1  LOAD1-5
                                LOAD1-2  LOAD1-6
                                LOAD1-3  LOAD1-7
                                LOAD1-4  LOAD1-8

[SAVE] [CANCEL]
    
```

Example:

ID: Room #1
 High label: HOT at 80
 Low label: COLD at 65



The sensor status screen will display:

COLD at 65 degrees or less,

The actual sensor value from 66 to 79 and

HOT at 80 degrees or higher

Fig. 6-4: Hi/Low Labels

The sensor ID, Units, Name, Alarm text, Alarm dest, High label and Low label are stored in the computer. These entries are used to enhance the monitoring capabilities of the software and are not transmitted to the controllers.

Averaging period

Default value: 1. Specifies the averaging period in minutes (1-255) for the sensor.

Multiplier

Default value: 0.0000. The multiplier is used to scale analog and pulsed inputs. A value from 0 to 127.9999 can be entered to scale the input. The inputs can display from -32768 to 32767.

Offset

Default value: -25. The offset is used to fine tune sensor readings. The starting point is -25, to raise a temperature sensor reading 1° enter a -24. An entry of 1 will actually raise the reading 26°.

The Offset should be entered as 0 for pulsed inputs.

Override duration

Default value: 0. The sensor inputs can be used to trigger overrides. An override is triggered by momentarily shorting an Analog input. The override duration will determine how long (1-255 minutes) the selected loads will be overridden ON.

Cancellable Override

Default value: NO. This option is only available to sensor inputs on XL9600 type nodes (XL9600 DI, XL9600 HMT, XL9600LSP etc.). This option specifies whether overrides within the XL9600 type nodes are cancellable on a sensor by sensor basis. An entry of NO will not allow a triggered override to be cancelled. The override will remain in effect for the entire length of the programmed duration. An entry of YES will allow overrides triggered by this sensor to be cancelled prior to the end of the programmed duration.

Select SAVE to save the configuration or CANCEL to abandon.

Select the remaining sensors one at a time until all sensors in the network are configured.

Digital Inputs

Select Digital inputs

A table of 16 sensors will appear, Figure 6-5. A list of functions will be displayed along the top of the screen. The numbers to the left of the table indicate which node the sensors belong to. Digital inputs exist only in XL9600 controllers. If the node is not configured to be an XL9600, the sensor details will not be accessible.

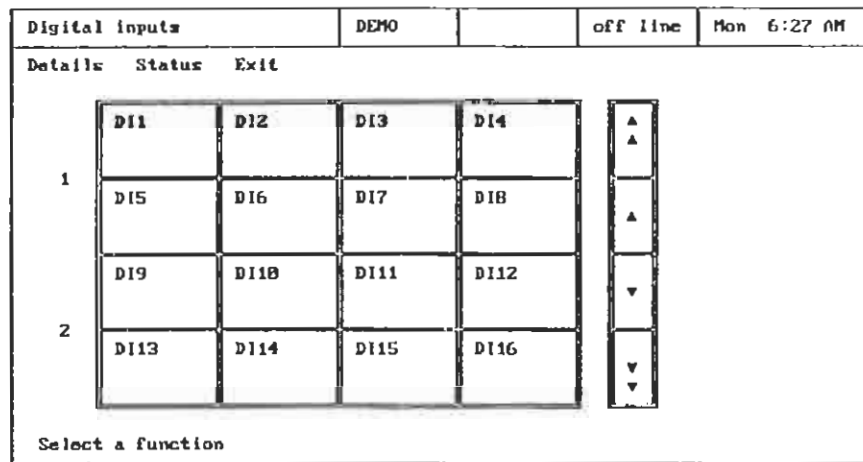


Fig. 6-5: Digital Inputs Screen

Details

Select Details

The prompt on the lower left corner of the screen will be "Select a Digital input". The details for each digital input are entered individually.

Select a Digital Input

Digital inputs with a white background represent digital inputs in XL9600 controllers. Digital inputs with a blue background cannot be accessed.

A configuration screen will appear for the selected digital input, Figure 6-6. All the details will be entered through this menu.

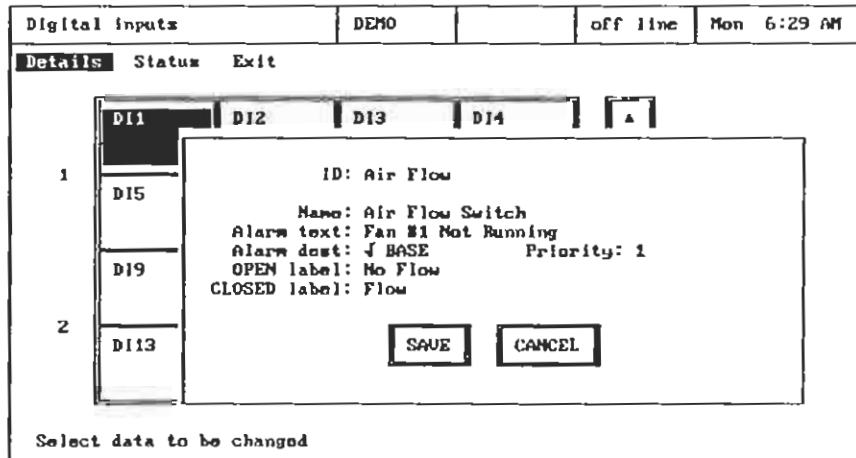


Fig. 6-6: Digital Inputs Configuration Screen

ID

Default entry: DIXXXX. XXXX is 1 number from 1 to 2016. Up to eight characters can be used to describe the sensor. The label entered as the ID will be used within all sensor tables instead of the default descriptor.

Name

No default entry. A 24 character Name can be assigned to each sensor. The name will provide a meaningful description of the sensor within alarm messages and graphic displays.

Alarm text

No default entry. A 36 character alarm description can be entered for each sensor. The Alarm Text can be used to describe the alarm condition that has occurred and provide instructions for corrective action. The description will be displayed within alarm message created by this sensor. The detailed alarm message allows untrained personnel to intelligently monitor your building automation system.

Alarm Destination and Priority

Default entries: BASE, 1. Alarms can be routed to specific computers (up to 4) on a sensor by sensor basis. If the system is monitored by multiple direct connected computers, each computer will be assigned a network ID number and Name. The alarm created by this sensor can then be instructed to report to a specific computer.

Select Alarm dest

A list of destinations will appear: each represents an ON LINE, direct connected computer, Figure 6-7.

Select the desired destination

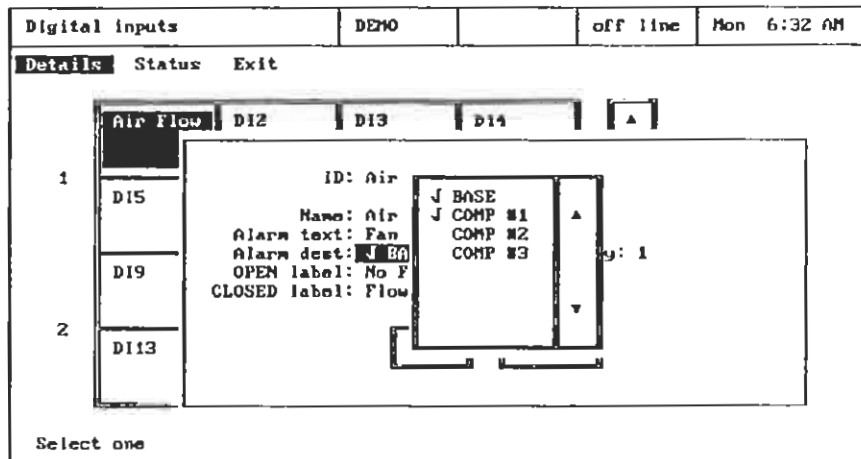


Fig. 6-7: Digital Inputs Alarm Destination

The method in which the alarm will be displayed depends on the selected priority. A priority level 1 alarm will display a bright red alarm screen. A priority level 2 alarm will display a cyan alarm screen. A priority level 3 alarm will not display an alarm screen. All three priority levels will flash ALARM along the bottom of the screen, beep occasionally and record the alarm in Current Alarm log.

OPEN/CLOSED labels

No default entry. The OPEN and CLOSED labels can be used to enhance the monitoring capabilities of the software. The OPEN label will be displayed when the status of the digital input is open. The CLOSED label will be displayed when the status of the digital input is closed. Descriptors such as FLOW, NO FLOW, OCCUPIED, VACANT, etc. can provide meaning to the digital status.

The sensor ID, Name, Alarm text, Alarm dest, Priority, OPEN label and CLOSED label are stored in the computer. These entries are used to enhance the monitoring capabilities of the software and are not transmitted to the controllers.

Select the remaining sensors one at a time until all digital inputs in the network are configured.

Chapter 7 - Defining Load Details

Defining the load details before programming the controllers should be common practice. Time spent programming the network will be reduced if the specific purpose for every load is defined.

From the main menu:

Select Controllers, Loads

A table of 16 loads will appear, Figure 7-1. A list of functions will be displayed along the top of the screen. The numbers to the left of the table indicate which node the loads belong to.

Loads		DEMO	off line	Tue 2:48 PM			
Details	Manual switch	Status	On time	Override time	Qtr hour	RTA	Exit
1	LOAD1-1	LOAD1-2	LOAD1-3	LOAD1-4			
	LOAD1-5	LOAD1-6	LOAD1-7	LOAD1-8			
2	LOAD2-1	LOAD2-2	LOAD2-3	LOAD2-4			
	LOAD2-5	LOAD2-6	LOAD2-7	LOAD2-8			

Select a function

Fig. 7-1: Loads Screen

The prompt on the lower left corner of the screen will be "Select a Load". The details for each load are entered individually.

Select LOAD1-1

A configuration screen will appear for LOAD1-1, Figure 7-2. All the details for LOAD1-1 will be entered through this menu.

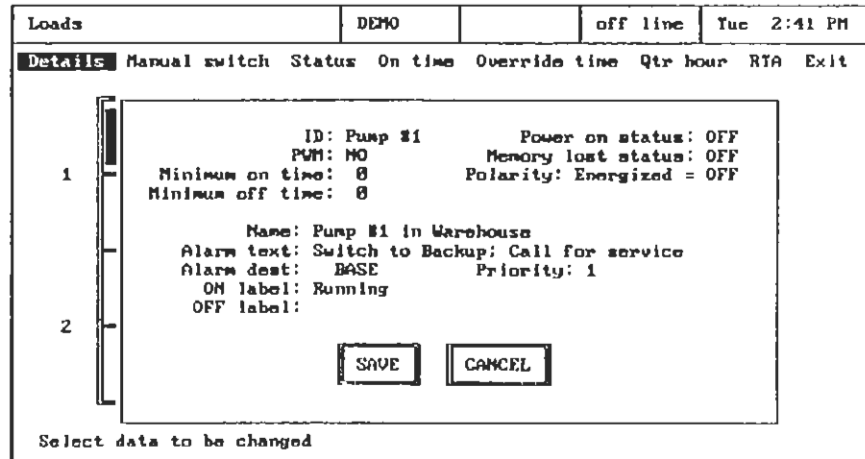


Fig. 7-2: Load Details

ID

Default entry: LOADXX-Y or LDXXX-Y. XXX represents the node number from 1 to 252. Y represents the load number within the node from 1 to 8. Up to eight characters can be used to describe the load. The label entered as the ID will be used within all load tables instead of the default descriptor.

PWM

Default entry: NO (digital output). The output type can be configured to be FAST, SLOW or NO. The configuration is determined by the module physically controlled by the output.

***PWM:** Pulse Width Modulation. The method used by Solidyne controllers to modulate analog outputs. The period of the output pulse remains fixed while the duration of the pulse varies from 4% to 96% of the period.*

***FAST PWM:** Period of pulse = 250 milliseconds. Used to control the M900, M901, M956, M973 and M974 output modules.*

***SLOW PWM:** Period of pulse = 6 seconds. Used to control the M930, M955, M957 and M958 output modules.*

***NO PWM:** Digital on/off control. Used to control R10 relays.*

PWM outputs are not available in all controllers. The PWM option is disabled for these controllers. If the PWM selection cannot be accessed, check the Details, Nodes screen to verify the configuration of the node.

Minimum on time

Default entry: 0. Minimum number of minutes to hold a load ON after being commanded ON. The load will not be allowed to shut OFF until the programmed number of minutes has elapsed. This feature is often used to avoid short cycling when the load has been forced ON by a Maximum OFF within a demand shed program.

Minimum off time

Default entry: 0. Minimum number of minutes to hold a load OFF after being commanded OFF. The load will not be allowed to turn ON until the programmed number of minutes has elapsed. This feature is often used to protect compressors and other equipment that must remain off for a specified number of minutes to prevent damage.

Name

No default entry. A 24 character Name can be assigned to each load. The name will provide a meaningful description of the load within alarm messages and graphic displays.

Alarm text

No default entry. A 36 character alarm description can be entered for each load. The Alarm Text can be used to describe the alarm condition that has occurred and provide instructions for corrective action. The description will be displayed within alarm message created by this load. The detailed alarm message allows untrained personnel to intelligently monitor your building automation system.

Alarm Destination and Priority

Default entries: BASE, 1. Alarms can be routed to specific computers (up to 4) on a load by load basis. If the system is monitored by multiple direct connected computers, each computer will be assigned a network ID number and Name. The alarm created by this load can then be instructed to report to a specific computer.

Select Alarm dest

A list of destinations will appear: each represents an ONLINE, direct connected computer, Figure 7-3.

Select the desired destination

The method in which the alarm will be displayed depends on the selected priority. A priority level 1 alarm will display a bright red alarm screen. A priority level 2 alarm will display a cyan alarm screen. A priority level 3 alarm will not

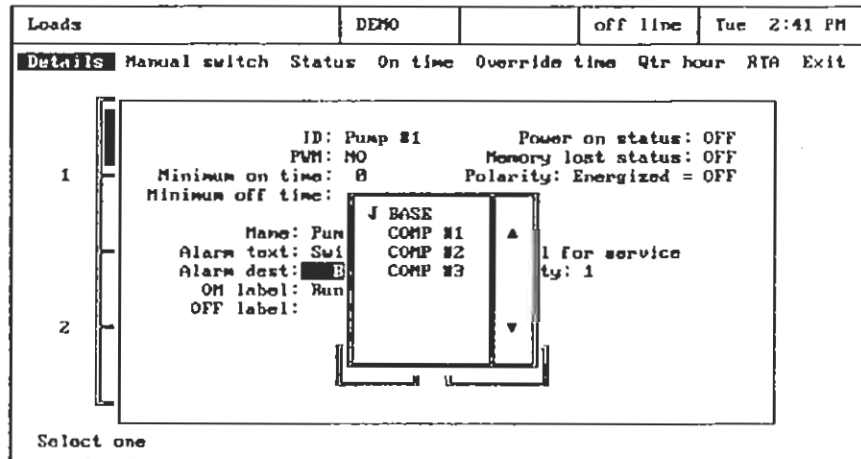


Fig. 7-3: Load Alarm Destinations

display an alarm screen. All three priority levels will flash ALARM along the bottom of the screen, beep occasionally and record the alarm in Current Alarm log.

ON/OFF labels

No default entry. The ON and OFF labels can be used to enhance the monitoring capabilities of the software. The ON label will be displayed instead of the word ON when the load has been commanded ON. The OFF label will be displayed instead of the word OFF when the load has been commanded OFF.

The load ID, Name, Alarm text, Alarm dest, ON label and OFF label are stored in the computer. These entries are used to enhance the monitoring capabilities of the software and are not transmitted to the controllers.

Power on status

Default entry: OFF. Controls the status of digital loads when power is first applied or restored. On power up, the controller automatically re-initializes itself to control the loads based on current conditions. During the initialization process it may be desirable to specify the state of the load. After the initialization is complete, the loads will be controlled according to the program previously entered.

Memory lost status

Default entry: OFF. Specifies the fail-safe state of the load when the controller is in a PF1 condition. The load will be locked in this state until a program is transmitted to the controller.

PF1: Power Failure 1 (memory loss). Designates the controller has returned from a power failure but no longer contains a program or the correct time and date.

Clipper XL Controllers can be ordered with non-volatile memory (NVRAM). Existing controllers can be updated to NVRAM.

Polarity

Default entry: Energized = OFF. Specifies the control of the digital load to be energized when commanded ON or energized when commanded OFF. Allows setpoint logic to remain consistent with the use of Normally Open or Normally Closed relay contacts.

Polarity also affects the operation of PWM outputs. The M900 and M901 must be configured as Energized = OFF. The M930, M955, M956, M957, M958, M973 and M974 must be configured as Energized = ON.

Select SAVE to save the configuration or CANCEL to abandon.

Select the remaining loads one at a time until all loads in the network are configured.

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Chapter 8 - Writing a Program

Programming Preparation

The sequence of operation for the controlled loads should be thoroughly thought out before programming the network.

The following information should be defined within the sequence of operation.

- A. Operating hours for day and night control.
- B. Type of control.
- C. Target values

A few concepts must be understood before an effective program can be written.

I. A program consists of a series of setpoints.

Setpoint: *A program block that performs a specific function. There are 22 different types of setpoints. The types range from basic (ON/OFF) to complex (Prop/Integral PWM).*

The programmer determines the type of control desired, selects the setpoint type that performs the desired control and enters data into the setpoint template. Complex programs can involve the interaction of several setpoints, all controlling the same load at the same time.

II. If multiple setpoints are actively controlling the same load, the setpoint with the highest ID number will have priority. A setpoint will relinquish control to the setpoint entered before it when it becomes satisfied.

PWM setpoints are never satisfied. PWM setpoints must be disabled to relinquish control (Analog Enable or ON/OFF Enables).

Example:

The most commonly used setpoint, Analog Control, will become satisfied when the value of the controlling sensor lies BETWEEN the ON and OFF values.

Analog Control Setpoint	
Start: 8:00 AM	MTWTF
Stop: 5:00 PM	MTWTF
Sensor: 1 (room temperature)	ON: 68 OFF: 72
Load: 2-2 (heat load)	

This setpoint will control the state of the load if the following conditions are met:

- a. It is the last (highest numbered) active setpoint controlling Load 2-2.

- b. The time in the controller is between 8:00 AM and 5:00 PM Monday through Friday.

- c. The controlling sensor value is 72 degrees or greater, or the sensor value is 68 degrees or less. At 69, 70 and 71 degrees the setpoint is satisfied and will relinquish control to setpoints entered before it.

Refer to the Clipper or XL9600 Installation and Programming guides for details on setpoint operation.

Use these concepts, along with a detailed sequence of operation to write the program.

Entering the Program

All setpoint programming and editing is performed through a single menu, Setpoints.

Entry of the program will be quicker and easier if the sensor and load details are defined prior to programming. Refer to chapters six and seven for details.

From the main menu: Select Controllers, Programs, Setpoints

A Setpoint options window will appear, Figure 8-1.

Set points / MODE1		DEMO	off line	Fri 6:13 AM	
Node Details Edit Print Status Gen Registers Check Exit					
Num	Type	Loads	Start/Area	Comment	↓
8	END				↑ ↑ ↑ ↓ ↓
Select a function					

Fig. 8-1: Setpoints Options Window

Node selection

The controllers are represented by nodes. Each node is programmed individually even though a single controller can contain up to four nodes.

Select Node

A Node selection window will appear, Figure 8-2.

Select the desired node to program

If the list of nodes does not appear correctly, the network may not have been configured improperly. Refer to chapter five "Creating a Network" or, if you are editing an existing network, make sure the correct network has been loaded.

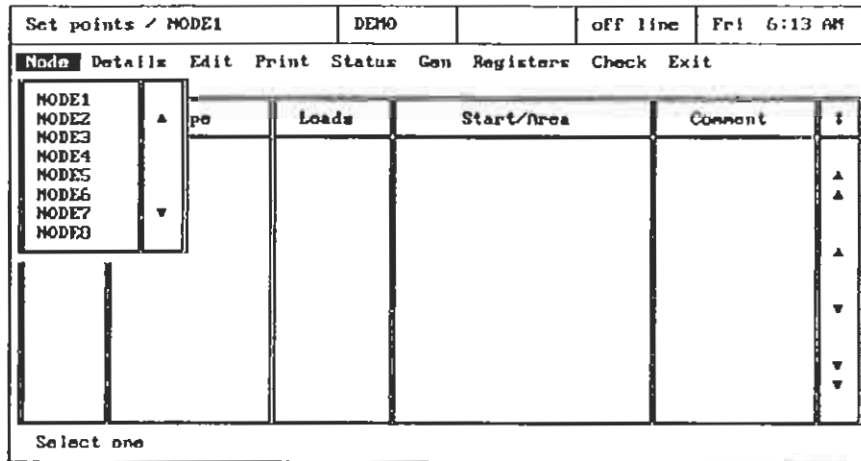


Fig. 8-2: Node Selection

The setpoint programs can be edited by entering "New" setpoints, "Deleting" unwanted setpoints, "Moving" setpoints around within the program, "Copying" setpoints within the node or "Copying" entire programs from other nodes.

New

New is used to add new setpoints to the program.

Select Edit, New

The screen will prompt you to "Select location of new setpoint". The order of entry is very important if multiple setpoints control the same load at the same time.

Select the location for the setpoint

A setpoint selection window will appear, Figure 8-3.

All 22 setpoint types will be displayed within the window. The setpoint types accessible depend upon how the node was configured.

Select the setpoint type to be entered

If the controller does not have the ability to perform the selected function, the software will respond with "Setpoint unsupported by node".

Set points / MODE1		DEMO	off line	Sun 9:12 PM	
Mode Details Edit Print Status Gen Registers Check Exit					
Num	Type	Loads	Start/Area	Comment	↑
0	Off	Optimum off heat			▲
	Temporary off	Optimum off cool			▲
	On	Var analog control			
	Temporary on	Analog dial out			
	Seconds on	Proportional PWM			▲
	Cycle (parallel)	Prop/Integral PWM			
	Cycle (staggered)	Analog enable			
	Var cycle parallel	Global override			▼
	Var cycle staggered	Digital dial out			
	Analog control	Set register			▼
	Optimum start heat	Phone override			▼
	Optimum start cool				▼

Select a set point type

Fig. 8-3: Setpoint Selection Window

A setpoint template will appear for the selected type. The default parameters for the Analog Control setpoint are illustrated in Figure 8-4.

The setpoint parameters will vary depending on the type selected. However, the entry of the parameters will be the same regardless of the type selected.

Setpoint ID number and Node name

The Setpoint ID number and the name of the node currently being programmed will be displayed along the top of the setpoint template. These parameters are used to aid the programmer and cannot be modified within the screen.

New Analog control		DEMO	off line	Fri 6:15 AM
Setpoint 1 is absolute in area (none)		Node: MODE1		
Comment:				
From	12 : 00 AM	on	Mon Tue Wed Thu Fri Sat	
until	12 : 00 AM	on	Mon Tue Wed Thu Fri Sat	
control load(s)	Pump #1	using sensor ROOM #1 to turn loads		
	LOAD1-2			
	LOAD1-3	ON when sensor = 0 and		
	LOAD1-4	OFF when sensor = 0 .		
	LOAD1-5			
	LOAD1-6	The sensor sample RATE is once per MINUTE .		
	LOAD1-7			
	LOAD1-8	The MAXIMUM OFF time is 8 minute(s).		
		<input type="button" value="SAVE"/>	<input type="button" value="CANCEL"/>	
Select data to be changed				

Fig. 8-4: Analog Control Setpoint

Comment

Comment is a 16 character description of the setpoint. Comments can be extremely useful within complicated programs. Notes explaining the logic behind the setpoint entered make it easier to understand in the future. Comments remain resident in the computer only. They are not transmitted to the controllers.

Start and Stop Time/Day entry

Setpoints can only control loads when they are Active. The active time frame is determined by the entry of the Start and Stop time. The setpoint will be active from the Start time until the Stop time, with the exception of Time of Day (ON/OFF) setpoints. Time of Day setpoints are only active for one minute and do not require Stop times.

Suggestions

24 Hour Setpoint

Certain control strategies require the use of a setpoint that is always active. An easy way to create a 24 hour setpoint is to enter at least one Start Day and eliminate the Stop Days, Figure 8-5. The setpoint will activate at the Start time and will never deactivate. The Start and Stop time entries can be left at 12:00 AM.

New/ Analog control	DEMO	off line	Fri 6:16 AM																
Setpoint 1 is absolute in area (none)		Node: NODE1																	
Comment:																			
From	12 : 00 AM	on	<table border="0"> <tr> <td></td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td><td>x</td> </tr> <tr> <td>Hol</td><td>Sun</td><td>Mon</td><td>Tue</td><td>Wed</td><td>Thu</td><td>Fri</td><td>Sat</td> </tr> </table>		x	x	x	x	x	x	x	Hol	Sun	Mon	Tue	Wed	Thu	Fri	Sat
	x	x	x	x	x	x	x												
Hol	Sun	Mon	Tue	Wed	Thu	Fri	Sat												
until	12 : 00 AM	on	<table border="0"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Hol</td><td>Sun</td><td>Mon</td><td>Tue</td><td>Wed</td><td>Thu</td><td>Fri</td><td>Sat</td> </tr> </table>									Hol	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Hol	Sun	Mon	Tue	Wed	Thu	Fri	Sat												
control load(s) x Pump #1 using sensor ROOM #1 to turn loads																			
LOAD1-2																			
LOAD1-3 ON when sensor = 70 and																			
LOAD1-4 OFF when sensor = 65 .																			
LOAD1-5																			
LOAD1-6 The sensor sample RATE is once per MINUTE .																			
LOAD1-7																			
LOAD1-8 The MAXIMUM OFF time is 8 minute(s).																			
<input type="button" value="SAVE"/> <input type="button" value="CANCEL"/>																			
Select data to be changed																			

Fig. 8-5: 24 Hour Setpoint

Night Setpoints

Careful attention must be paid to setpoints that Start at night and Stop in the morning. The Start and Stop day selections are very important. Setpoints can be left Active or Inactive inadvertently if this concept is not thoroughly understood.

Example 1: Factory Night Setback using an Analog Control Setpoint.

The operating hours for the jobsite are 8:00 AM to 5:00 PM Monday through Friday. The plant remains closed all weekend. The following setpoint, Figure 8-6, is ACTIVE every week night (5:00 PM to 8:00 AM) AND all day Saturday and Sunday, until 8:00 AM Monday morning.

New Analog control	DEMO	off line	Fri 6:10 AM
Setpoint 2 is absolute in area (none)		Node: NODE1	
Comment: Fctry Nght StBck			
From	5 : 00 PM	on	Hol Sun Mon Tue Wed Thu Fri Sat
			x x x x x
until	8 : 00 AM	on	Hol Sun Mon Tue Wed Thu Fri Sat
			x x x x x
control load(s)	Pump #1	using sensor ROOM #1 to turn loads	
	LOAD1-2		
	LOAD1-3	ON when sensor = 05 and	
	LOAD1-4	OFF when sensor = 83 .	
	LOAD1-5	The sensor sample RATE is once per MINUTE .	
	LOAD1-6		
	x OFFICE		
	x STKROOM	The MAXIMUM OFF time is 8 minute(s).	
		<input type="button" value="SAVE"/>	<input type="button" value="CANCEL"/>
Select data to be changed			

Fig. 8-6: Factory Night Setback

Example 2: Shopping Center Night Setback using an Analog Control Setpoint.

The operating hours for the jobsite are 8:00 AM to 10:00 PM Monday through Friday. The shopping center has different operating hours on the weekend. The following setpoint, Figure 8-7, is active every weekday night (10:00 PM to 8:00 AM) but is not active on the weekend, past 8:00 AM Saturday morning.

Details/ analog control	DEMO	off line	Fri 6:19 AM
Setpoint 3 is absolute in area (none)		Node: NODE1	
Comment: Shop Night StBck			
From	10 : 00 PM	on	Hol Sun Mon Tue Wed Thu Fri Sat
			x x x x x
until	8 : 00 AM	on	Hol Sun Mon Tue Wed Thu Fri Sat
			x x x x x
control load(s)	Pump #1 using sensor Shop #1 to turn loads		
	LOAD1-2		
	LOAD1-3 ON when sensor = 00 and		
	LOAD1-4 OFF when sensor = 70 .		
x Shop			
LOAD1-6	The sensor sample RATE is once per MINUTE .		
LOAD1-7			
LOAD1-8	The MAXIMUM OFF time is 8 minute(s).		
<input type="button" value="SAVE"/> <input type="button" value="CANCEL"/>			
Select data to be changed			

Fig. 8-7: Shopping Center Night Setback

Global Override

The Global Override setpoint will activate a programmed number of slave setpoints when an override is triggered. The slave setpoints immediately following the Global Override setpoint must NOT have any Start or Stop Days assigned.

Load Selection

Setpoints can be assigned to control any combination of the eight loads within the node. All eight loads appear on the setpoint template.

An X will appear to the left of the selected loads, Figure 8-8.

Details/ analog control	DEMO	off line	Fri 6:21 AM
Setpoint 4 is absolute in area (none)		Node: NODE1	
Comment: Load Selection			
From	8 : 00 AM	on	Hol Sun Mon Tue Wed Thu Fri Sat
			x x x x x
until	10 : 00 PM	on	Hol Sun Mon Tue Wed Thu Fri Sat
			x x x x x
control load(s)	Pump #1 using sensor ROOM #1 to turn loads		
	LOAD1-2		
	LOAD1-3 ON when sensor = 75 and		
	LOAD1-4 OFF when sensor = 73 .		
x LOAD1-5			
x LOAD1-6	The sensor sample RATE is once per MINUTE .		
LOAD1-7			
LOAD1-8	The MAXIMUM OFF time is 8 minute(s).		
<input type="button" value="SAVE"/> <input type="button" value="CANCEL"/>			
Select data to be changed			

Fig. 8-8: Load Selection

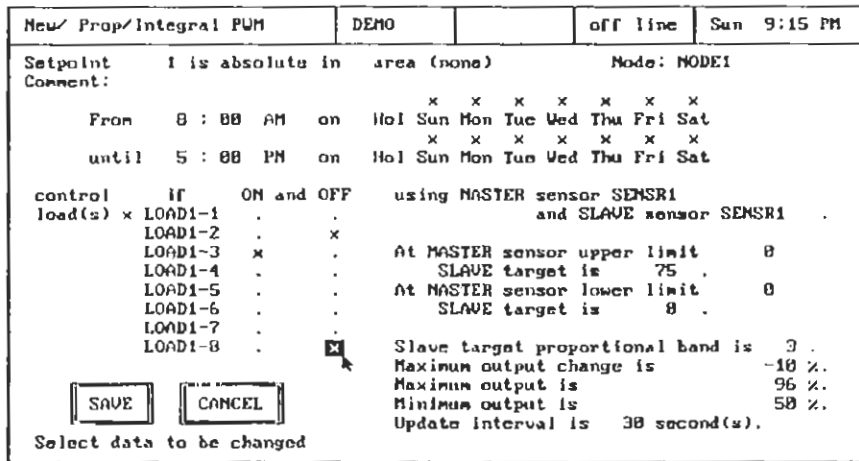


Fig. 8-9: On & Off Enables

On and Off Enables

On and Off Enables link the digital status of selected loads to the enabled/disabled state of the setpoint. All of the On/Off Enable conditions must be true before the setpoint will be allowed to control loads. Proportional PWM, Prop/Integral PWM and Digital Dial Out setpoints support the use of On and Off Enables. The Prop/Integral PWM setpoint shown in Figure 8-9 uses load 3 as an On Enable and loads 2 & 8 as Off Enables.

The setpoint will become active only if the load 3 is On AND loads 2 & 8 are Off. If any of these conditions are not met the setpoint will be disabled. The On/Off Enable feature allows the programmer to use "If/Then" logic within the control strategy.

Sensor Selection

Sensor selections must be made for setpoints that use sensor data to control loads. The default sensor is 1.

Select the controlling sensor to change

For Nodes 1 through 32 a list of sensors will appear eight at a time, Figure 8-10. Scroll through the list until the desired sensor is displayed. Since the controllers share sensor information, any sensor in the network can be accessed, from number 1 to 256.

For Nodes greater than 32 (XLLSP, XL9600LSP or XLHC) a Global/Local option is first displayed when a sensor is to be selected, Figure 8-11.

If Global is selected, Sensors 1-256 can be accessed.

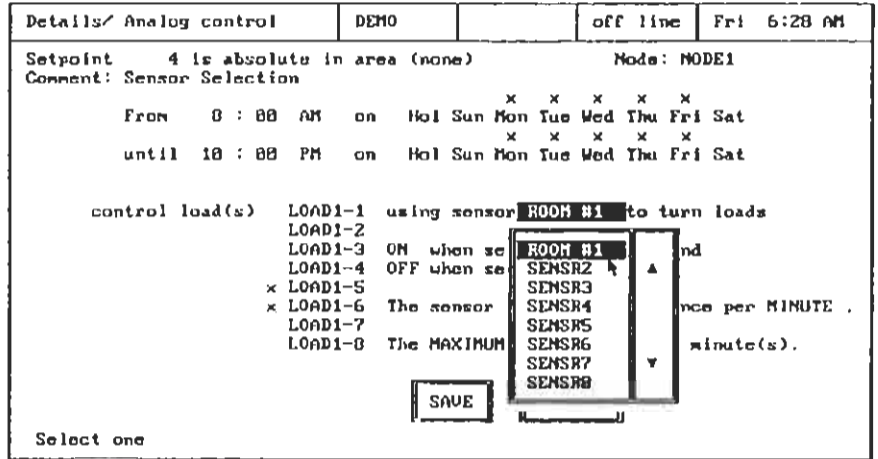


Fig. 8-10: Sensor Selection

If Local is selected, the sensors local to the unit are accessible.

Global Sensors are the first 256 sensors (1-256) connected on the Network. Global Sensors share their sensor information throughout the network.

Local Sensors: XLLSP, XLHC or XL9600LSP controllers with Node numbers greater than 32 configure their sensors as Local Sensors. Local Sensors are the 8 sensors that reside in an XLLSP/XLHC node or the 32 sensors that reside in an XL9600LSP node. Local sensors do not share their sensor information over the network. Nodes with Node numbers 32 or less share their sensor information over the network (Global Sensors).

Select the appropriate sensor type (Global/Local) if applicable. Then select the sensor with which to control the load.

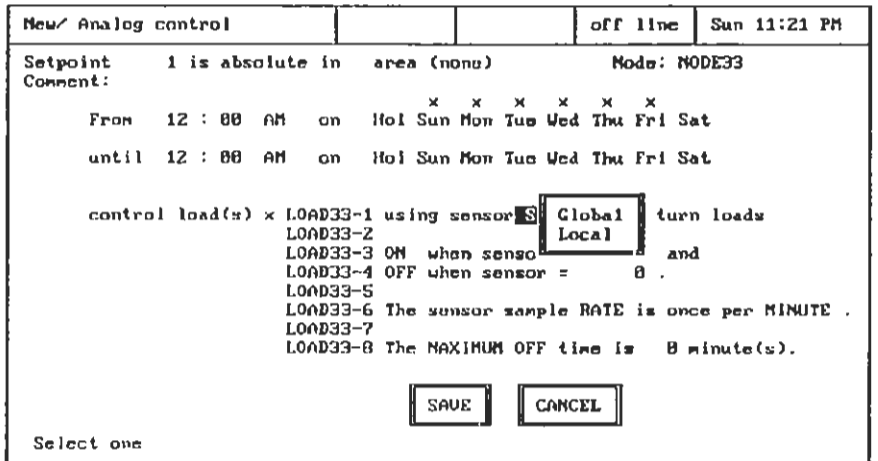


Fig. 8-11: Sensor Selection - Global/Local

```

New/ Analog control      off line   Sun 11:21 PM
Setpoint 1 is absolute in area (none)   Mode: NODE33
Comment:
      x x x x x x
From 12 : 00 AM on  Hol Sun Mon Tue Wed Thu Fri Sat
until 12 : 00 AM on  Hol Sun Mon Tue Wed Thu Fri Sat

control load(s) x LOAD33-1 using sensor S Global turn loads
                  LOAD33-2                    Local
LOAD33-3 ON when senso
LOAD33-4 OFF when sensor = 0 .
LOAD33-5
LOAD33-6 The sensor sample RATE is once per MINUTE .
LOAD33-7
LOAD33-8 The MAXIMUM OFF time is 0 minute(s).

      [SAVE] [CANCEL]

Select one:
    
```

Fig. 8-12: Data Entry

Data Entry

Number entries such as target temperatures, duty cycle rates, update intervals, etc. are entered by selecting the field and entering the data through the keyboard, Figure 8-12.

Delete

Unwanted setpoints can be deleted from the program.

Select Edit, Delete

The prompt on the bottom of the setpoint window will be "Select the setpoint to delete", Figure 8-13.

```

Set points / MODE1      DEMO      off line   Fri 6:29 AM
Mode Details Edit Print Status Gen Registers Check Exit
  
```

Num	Type	Loads	Start/Area	Comment	?
1	Analog ctrl	-----	-SMTWTF 12:00AM		
2	Analog ctrl	-----70	--MTWTF-- 5:00PM	Fctry Nght S	▲
3	Analog ctrl	-----56	--MTWTF-- 10:00PM	Shop Nght St	▲
4	Analog ctrl	-----56	--MTWTF-- 8:00AM	Data Entries	
5	Floating PUM	1-----	-SMTWTF 8:00AM	On Off Enabl	
8	END				▲
					▼
					▼
					▼

Select the set point to delete

Fig. 8-13: Setpoint Delete

Select the setpoint to delete

The setpoint will be deleted from the table. The remaining setpoints will be automatically renumbered to fill the gap created.

A warning message will not be displayed prior to deletion.

Move

The order in which the setpoints are entered determines the hierarchy of the program. If multiple setpoints are actively controlling the same load, the last (highest numbered) setpoint will have priority. The Move command allows you to rearrange the location of individual setpoints within the program.

Select Edit, Move

The prompt on the bottom of the setpoint window will be "Select the setpoint to move", Figure 8-14.

Set points / MODE1		DEMO	off line	Fri 6:29 AM
Mode Details EXIT Print Status Gen Registers Check Exit				
Num	Type	Loads	Start/Area	Comment
1	Analog ctrl	-----	-SMTWIFS 12:00AM	
2	Analog ctrl	-----78	--MTWTF- 5:00PM	Fctry Nght S ▲
3	Analog ctrl	-----56	--MTWTF- 10:00PM	Shop Nght St ▲
4	Analog ctrl	-----56	--MTWTF- 8:00AM	Data Entries ,
5	Floating PWM	1-----	-SMTWTF- 8:00AM	On Off Enabl
0	END			▲
				▼
				▼
				▼

Select the set point to move

Fig. 8-14: Setpoint Move

Select the setpoint to move.

The setpoint will disappear and the prompt will change to "Select new location of setpoint".

Select the new location for the setpoint.

The setpoints will be automatically renumbered.

Set points / MODE1		DEMO	off line	Fri 6:29 AM
Mode Details Edit Print Status Gen Registers Check Exit				
Num	Type	Loads	Start/Area	Comment
1	Analog ctrl	-----	-SMTWFS 12:00AM	
2	Analog ctrl	-----78	--MTWTF- 5:00PM	Fctry Nght S
3	Analog ctrl	----56	--MTWTF- 10:00PM	Shop Nght St
4	Analog ctrl	----56	--MTWTF- 8:00AM	Data Entries
5	Floating PWM	1-----	-SMTWFS 8:00AM	On Off Enabl
8	END			

Select location for copy

Fig. 8-15: Setpoint Copy

*Copy**

The copy command can greatly reduce the time spent programming. The asterisk following the word Copy indicates the command has two functions. Individual setpoints can be copied within a single node or entire programs can be copied between nodes.

Copying individual setpoints

A single setpoint type is often used repetitively within a program. To save time, these setpoints can be copied from similar setpoints.

Select Edit, Copy

The prompt in the setpoint window will change to "Select the setpoint to copy".

Select the setpoint to copy

The prompt will change to "Select location for copy", Figure 8-15.

Select the location for the copy. The setpoint can be placed anywhere in the program. The setpoints will automatically renumber themselves to accommodate the new setpoint.

The duplicate setpoints can be modified using the Details option.

Set points / NODE1		DEMO	off line	Fri 6:29 AM	
Node Details Exit Print Status Gen Registers Check Exit					
Nun	Type	Loads	Copy entire NODE1 program to	Comment	↑
1	Analog ctrl	-----	NODE1		
2	Analog ctrl	-----78	NODE2	▲	▲
3	Analog ctrl	-----56	NODE3		▲
4	Analog ctrl	-----56	NODE4		▲
5	Floating PUM	1-----	NODE5		▲
8	END		NODE6		▼
			NODE7		▼
			NODE8		▼

Select one

Fig. 8-16: Copying Node to Node

Copying Entire Programs

Networks that contain controllers performing identical functions can take advantage of the node copy command. A large amount of programming time can be saved by writing a program for one node and copying it to other similar nodes.

Select Edit

Hold the SHIFT key down and select Copy*

A node selection window will appear, Figure 8-16.

Select a node to copy the program to

The entire program will be copied from the current node to the selected node.

The program in the destination node will be REPLACED by the program in the source node. Setpoint types that are not supported by the destination node will not be copied.

The duplicate program can be modified using the Details option.

Check

Check is a self diagnostic procedure that will examine the general structure of the program, for the current node or for all nodes, and will notify you of any violations.