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.

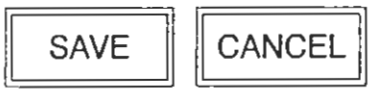
italic

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	*Ignore DTR, assumed true*
2	Down	Down	*Non-Verbose, Digit Result Codes*
3	Down	Down	*Non-Quiet, Result codes sent*
4	Up	Down	*Echo (No Echo)*
5	Up	Up	*Auto Answer*
6	Down	Down	*Ignore carrier detect, assumed true*
7	Up	Up	*Single line RJ11 jack*
8	Down	Down	*Enables Commands*
9	Up	Up	*Bell 103/212A compatible*
10	Up	Up	*Command (Reset) state when DTR low*

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 progams 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 capabale 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.

Parameter	Function
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

Parameter	Function
Command Set	
B1	Bell 103/212A compatible
**E1*	*Echo*
Q0	Non-quiet, send responses to terminal
V0	Non-verbose, messages sent numerically
X0	Basic response set
Extended Command Set	
&C0	*DCD always true*
&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.

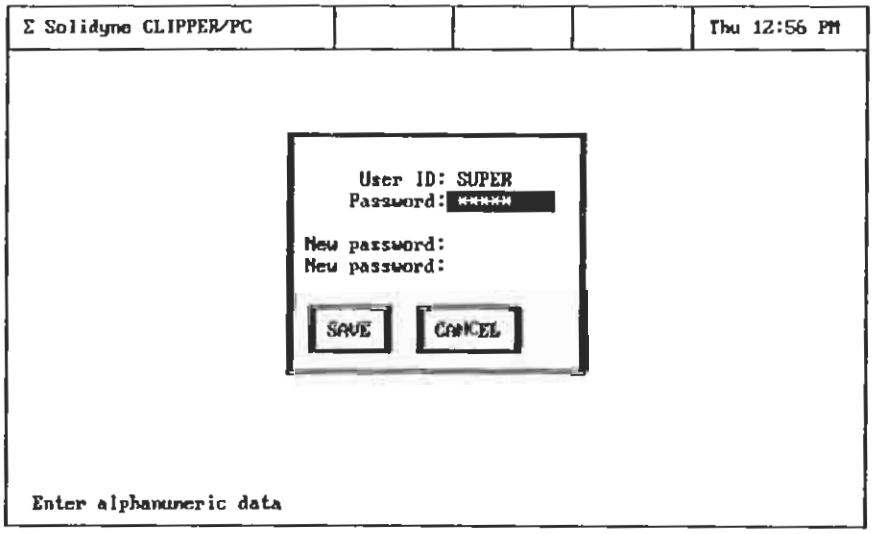


Fig. 3-1: Log On Screen

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.

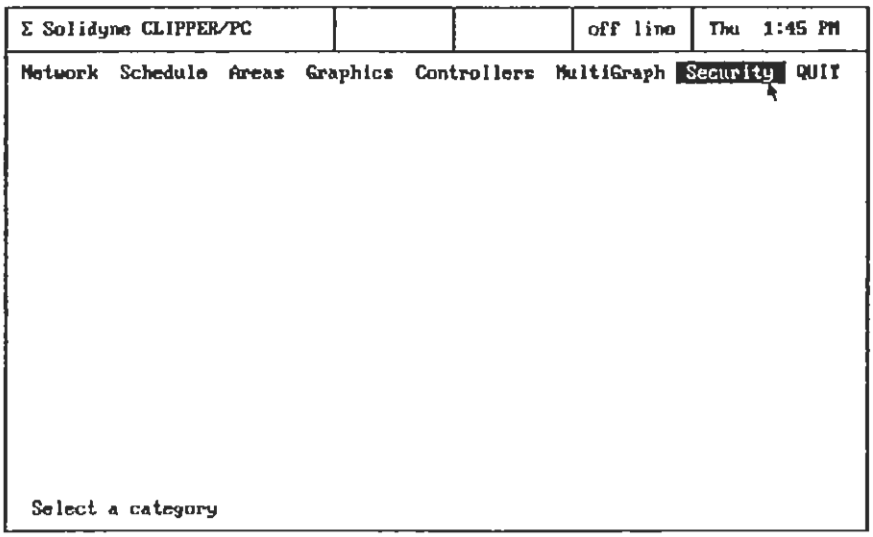


Fig. 3-2: Main Menu with Security Option

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.

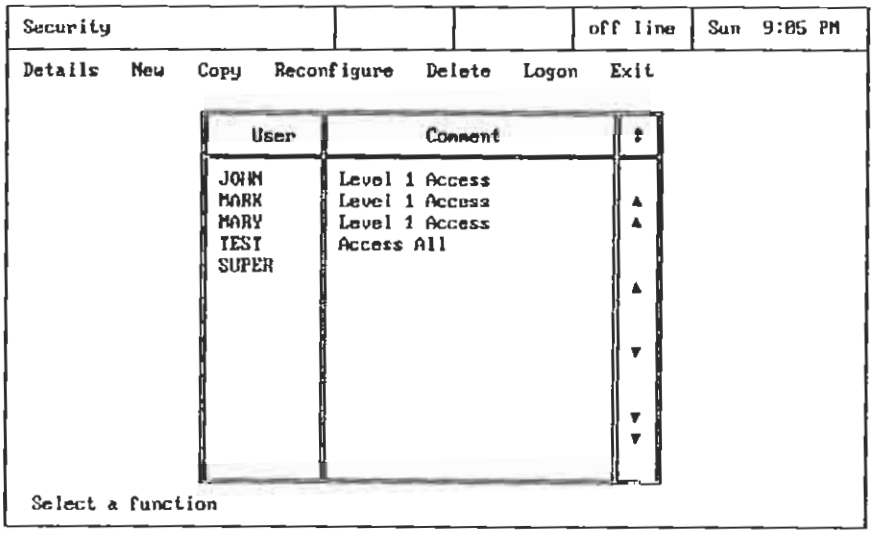


Fig. 3-3: Security Option - User Table

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.*

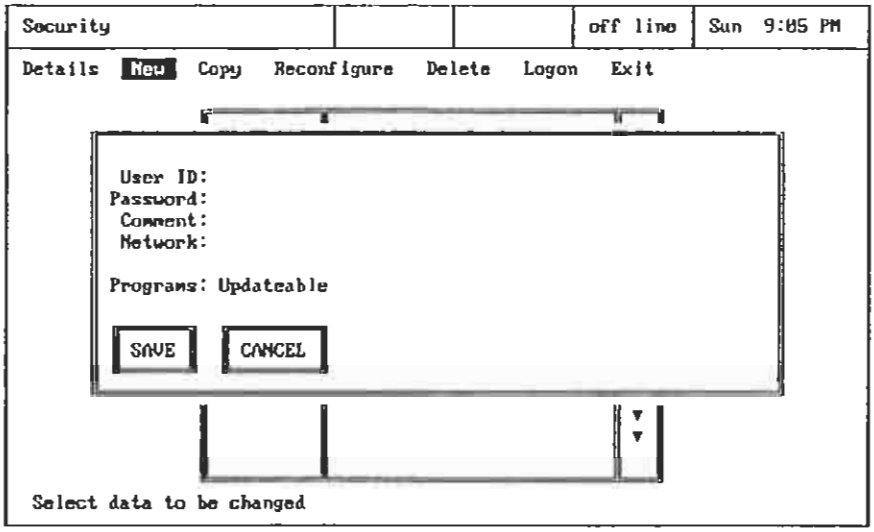


Fig. 3-4: Security Option - User Configuration Window

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.

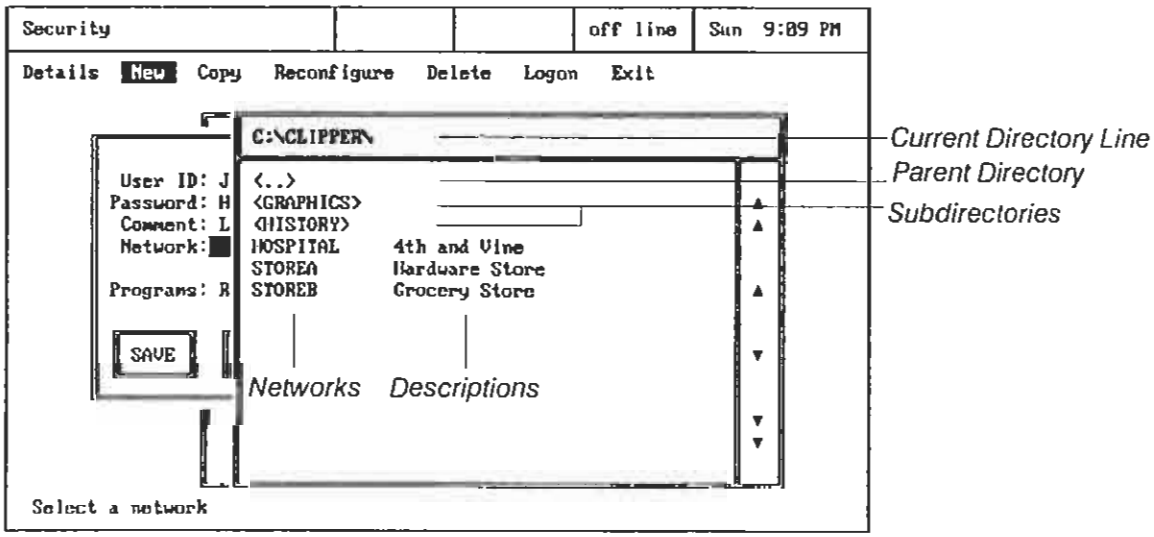


Fig. 3-5: Security Option - Network Table

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.

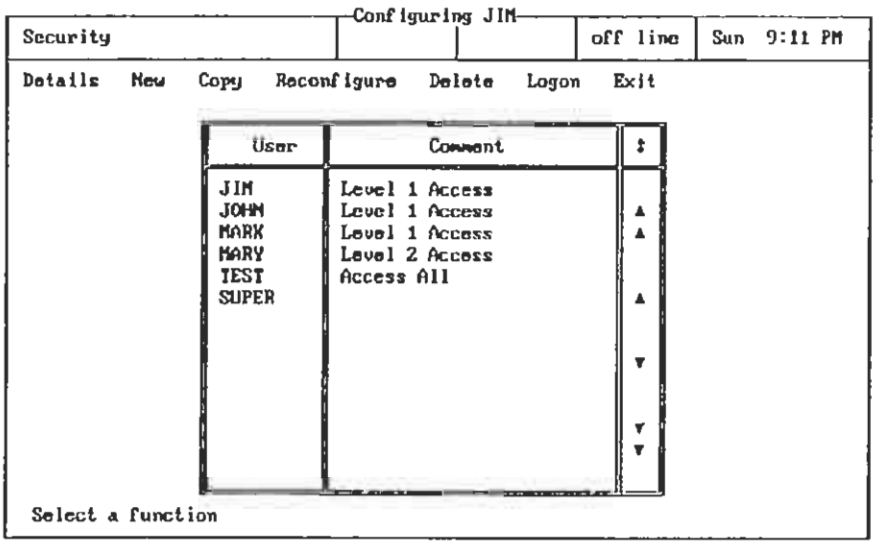


Fig. 3-6: Security Option - Conliguration Mode

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.

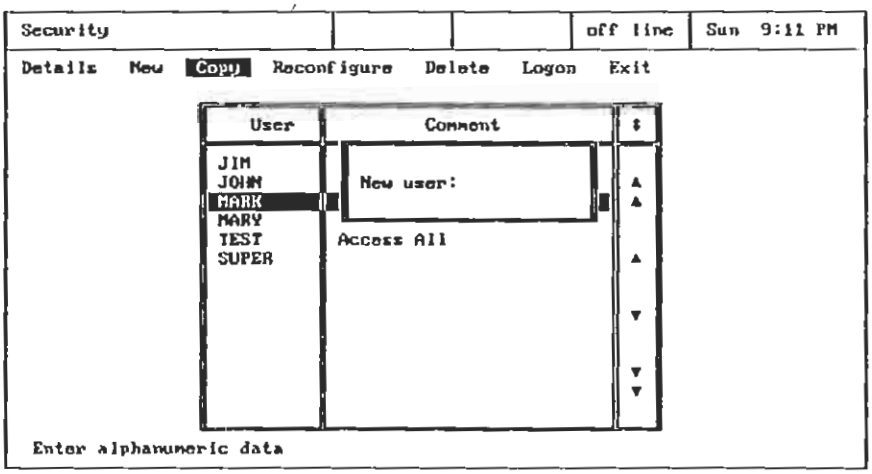


Fig. 3-7: Security Option - Copying Users

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.

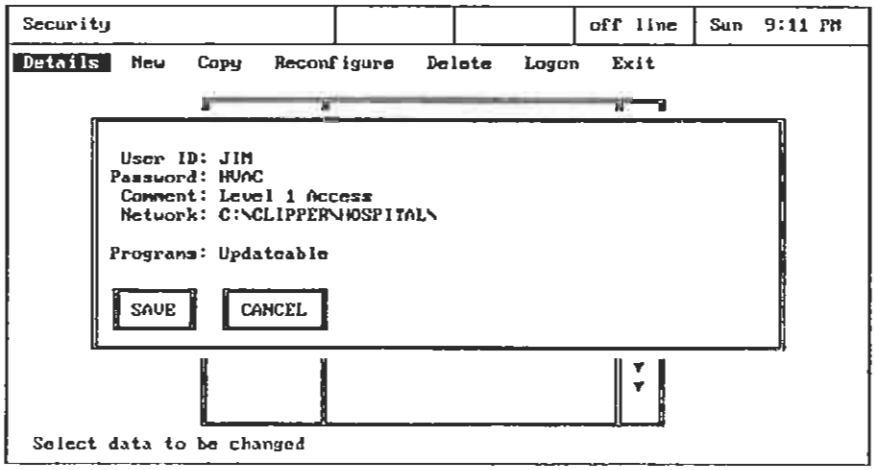


Fig. 3-8: Security Option - Editing Existing Users

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

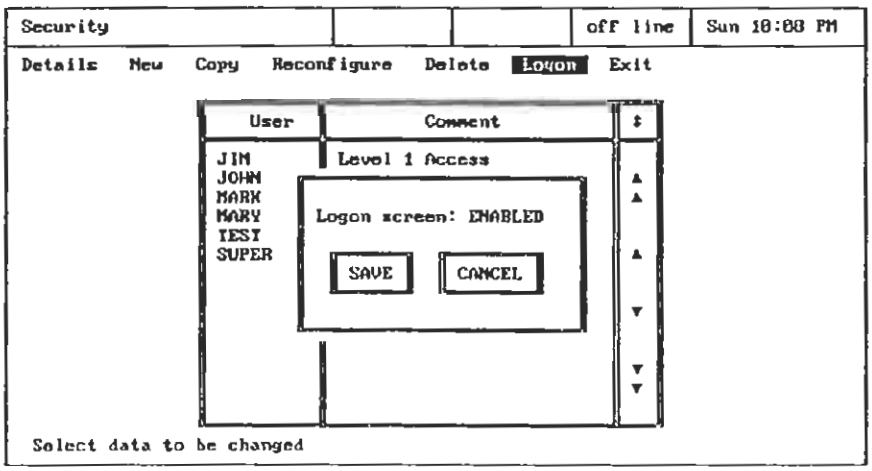


Fig. 3-9: Security Option - LogOn

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 CLIP.EXE 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 CLIP.EXE 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

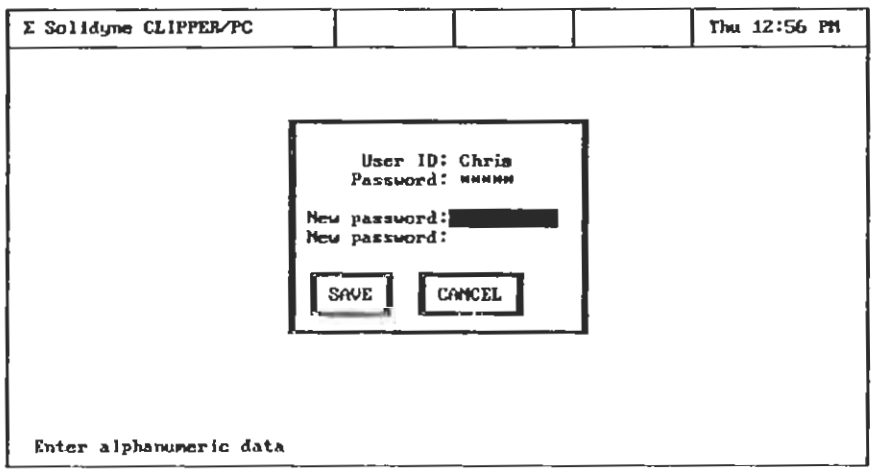


Fig. 4-1: Log On Screen

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.

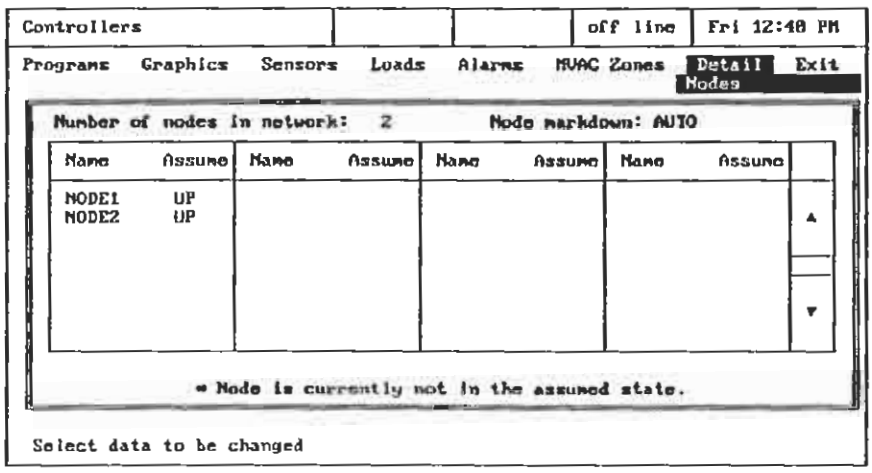


Fig. 5-1: Node Details Screen

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.

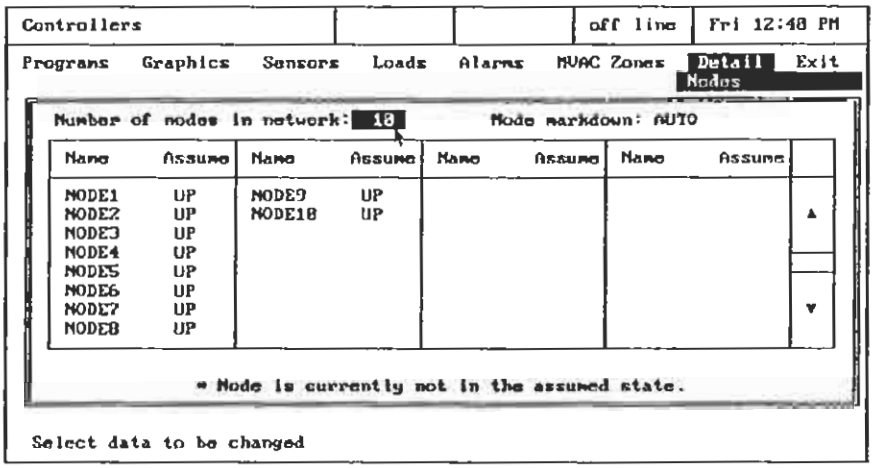


Fig. 5-2: Number of Nodes

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.

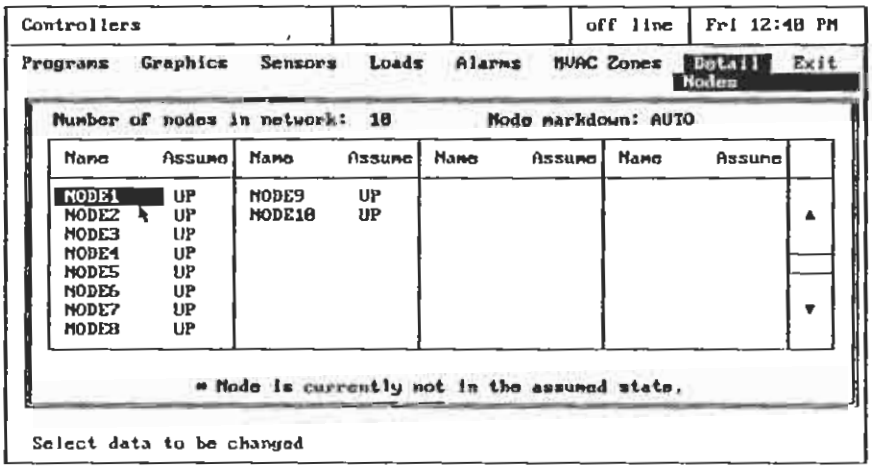


Fig. 5-3: Selecting a Node

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

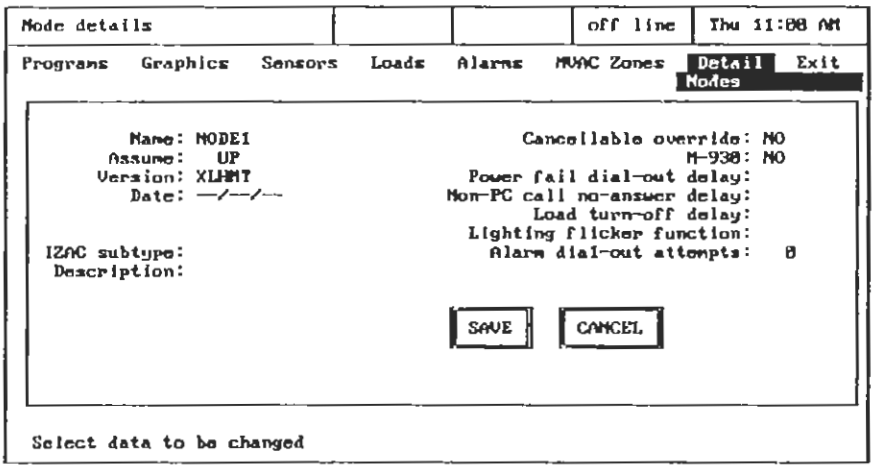


Fig. 5-4: Selected Node Details Screen

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.

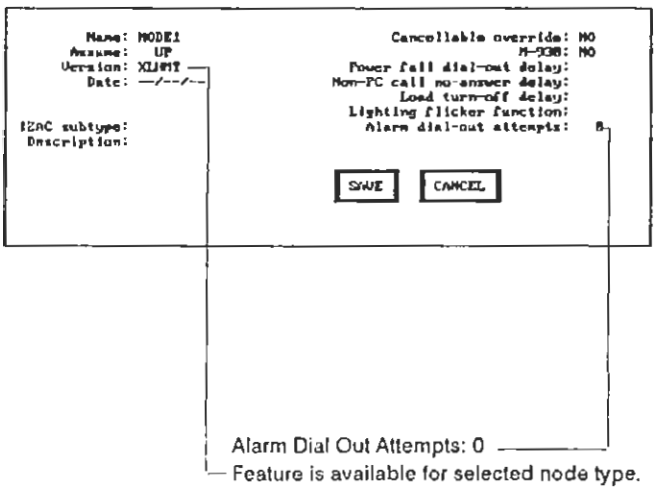


Fig. 5-5: Node Details Window

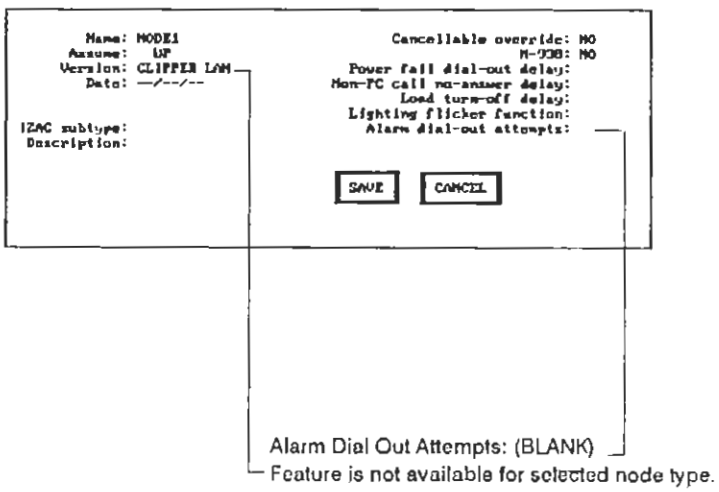


Fig. 5-6: Node Details Window

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.

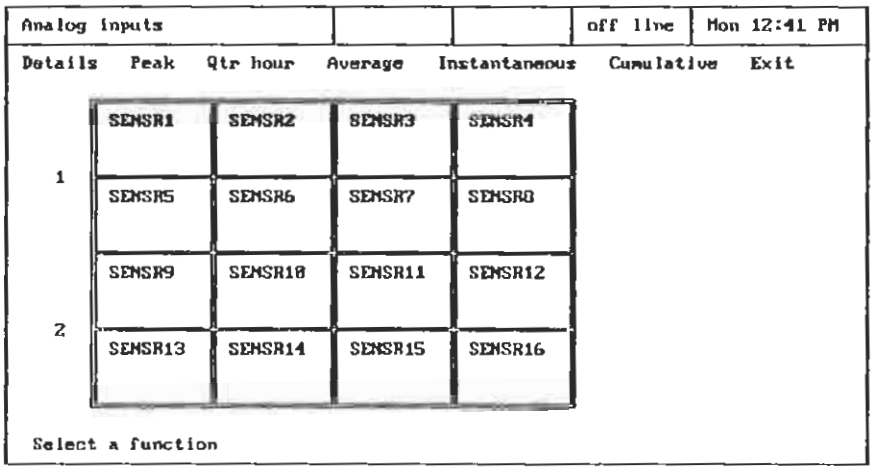


Fig. 6-1: Analog Inputs Screen

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.

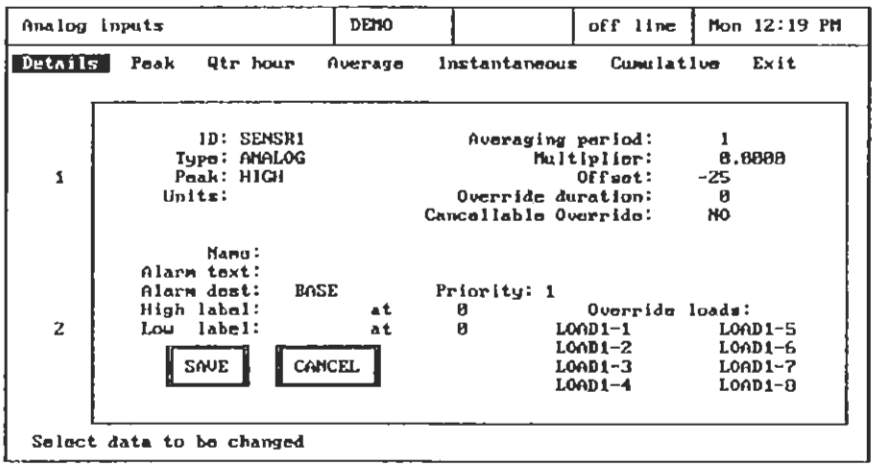


Fig. 6-2: Analog Inputs Details Screen

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.

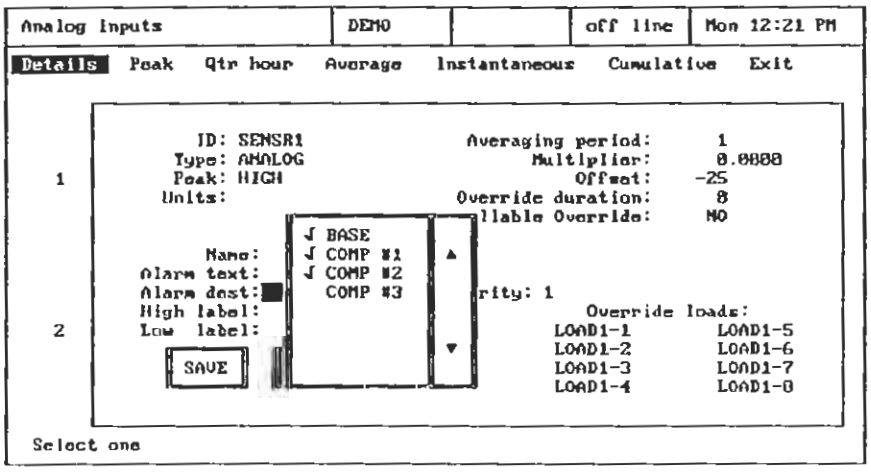


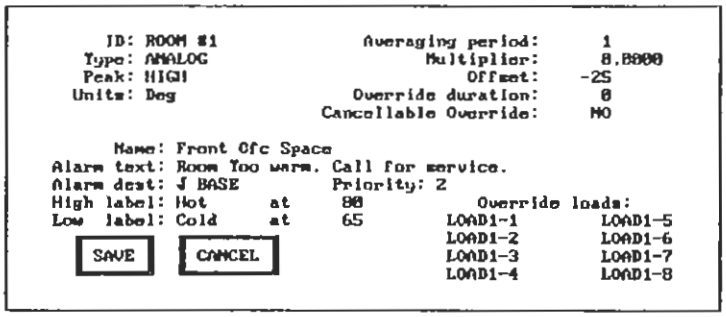
Fig. 6-3: Alarm Destinations

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.

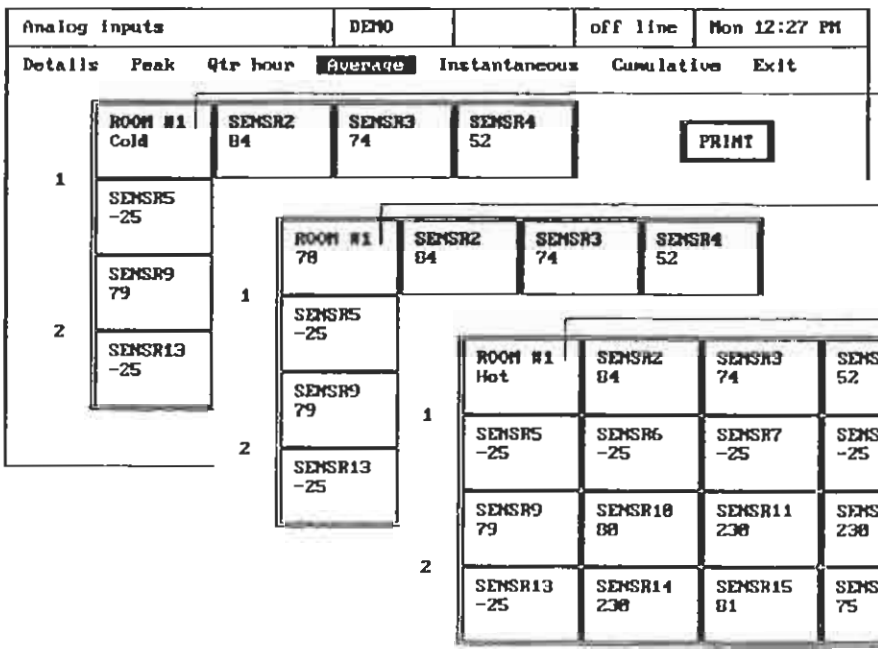
High/Low labels

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.



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 controlfers.

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.

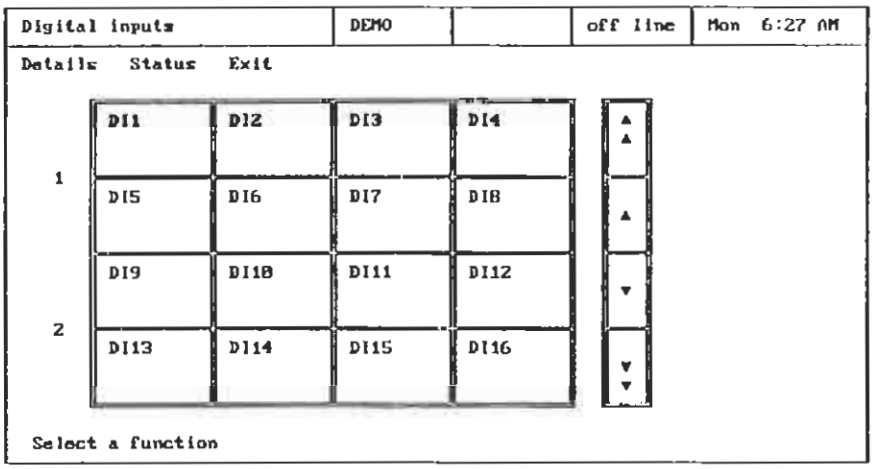


Fig. 6-5: Digital Inputs Screen

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.

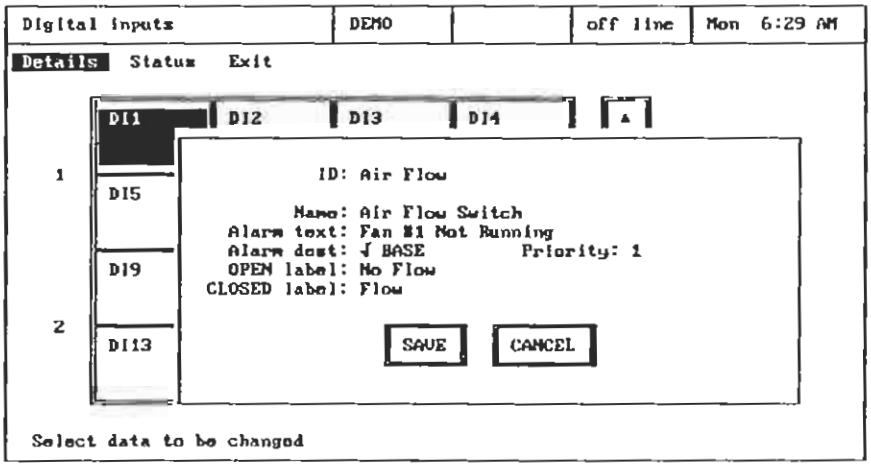


Fig. 6-6: Digital Inputs Configuration Screen

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

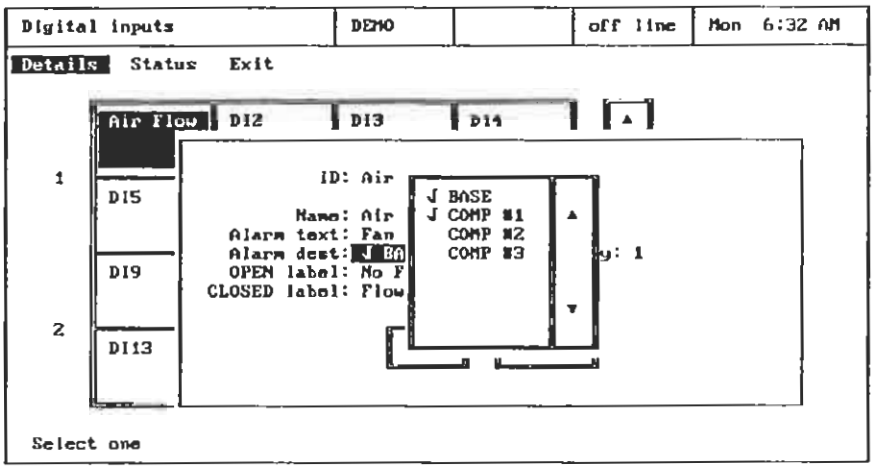


Fig. 6-7: Digital Inputs Alarm Destination

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.

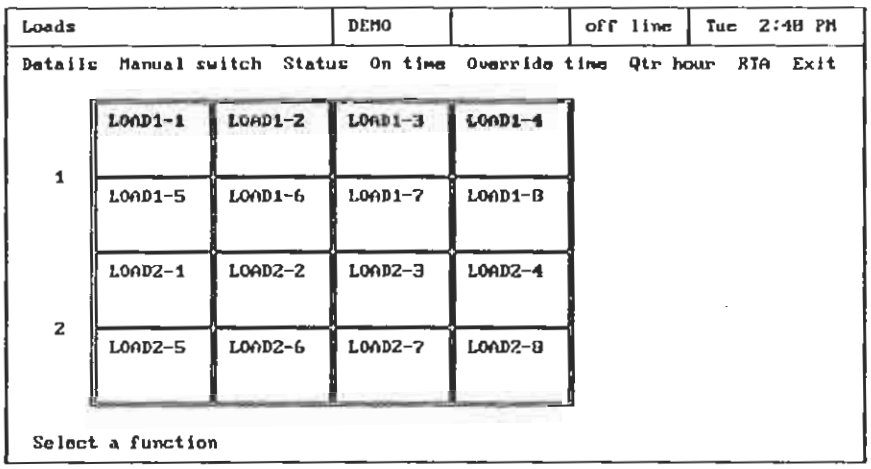


Fig. 7-1: Loads Screen

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.

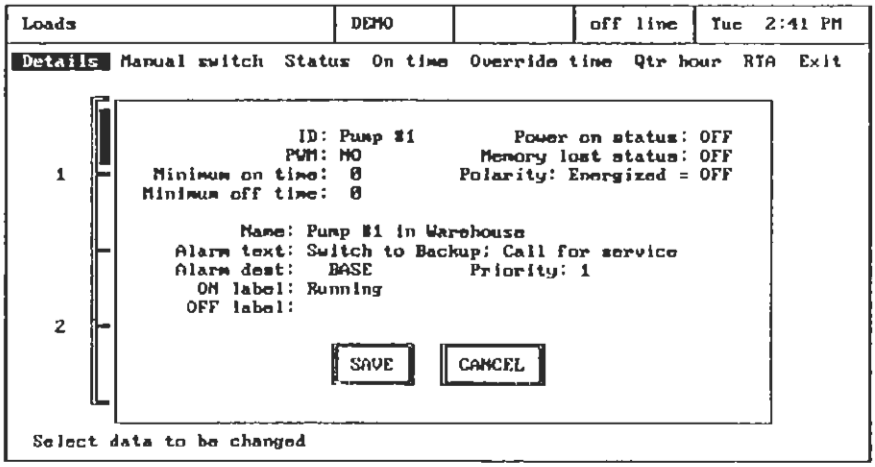


Fig. 7-2: Load Details

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

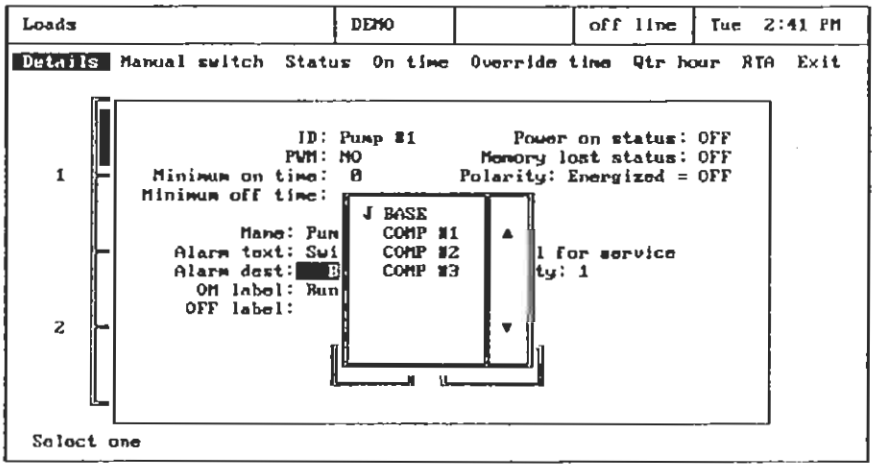


Fig. 7-3: Load Alarm Destinations

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 desireable 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.

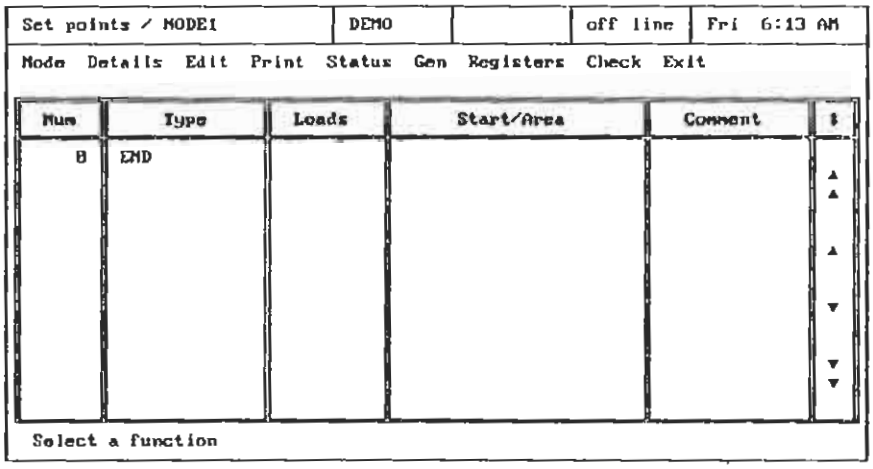

Fig. 8-1: Setpoints Options Window

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.

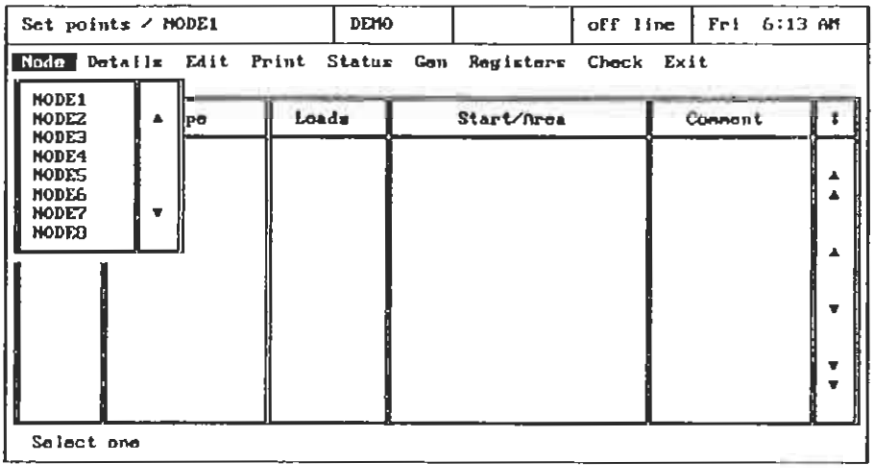

Fig. 8-2: Node Selection

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".

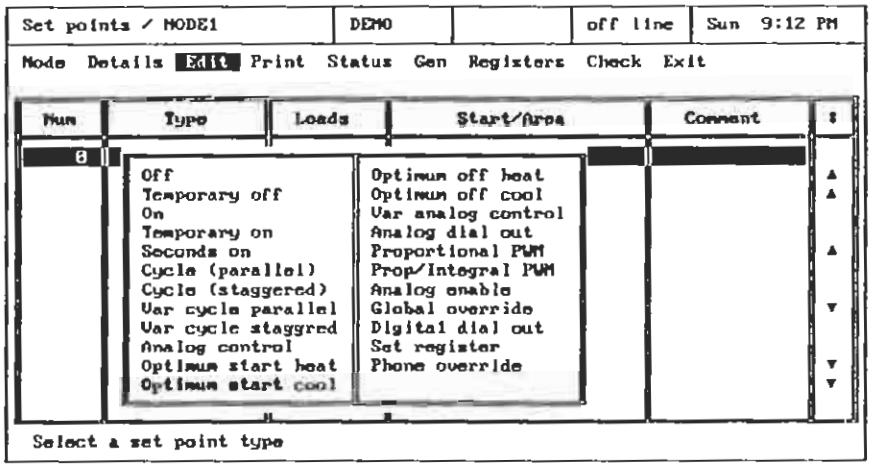

Fig. 8-3: Setpoint Selection Window

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.

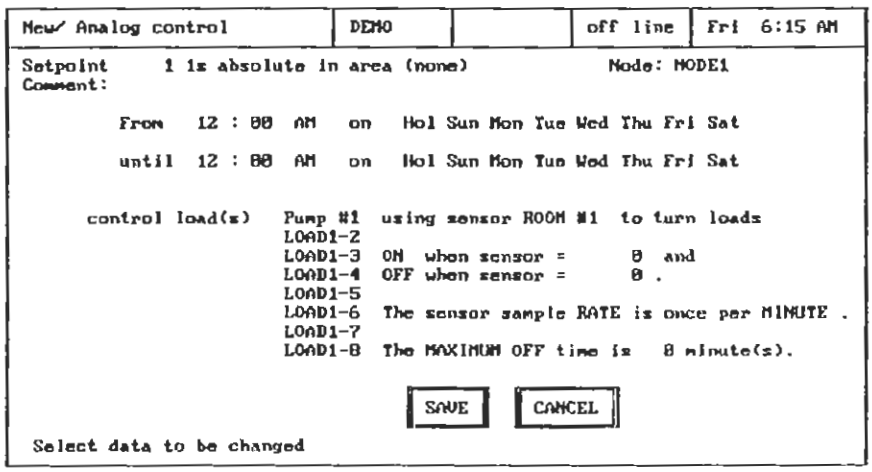

Fig. 8-4: Analog Control Setpoint

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.

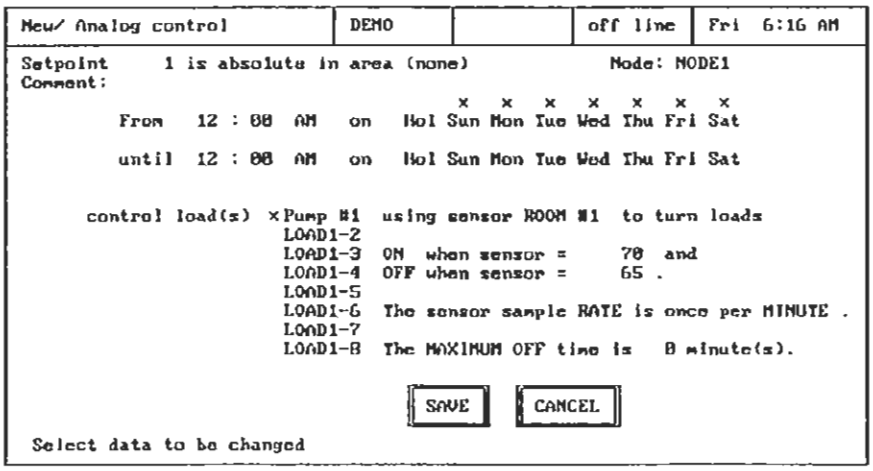

Fig. 8-5: 24 Hour Setpoint

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.

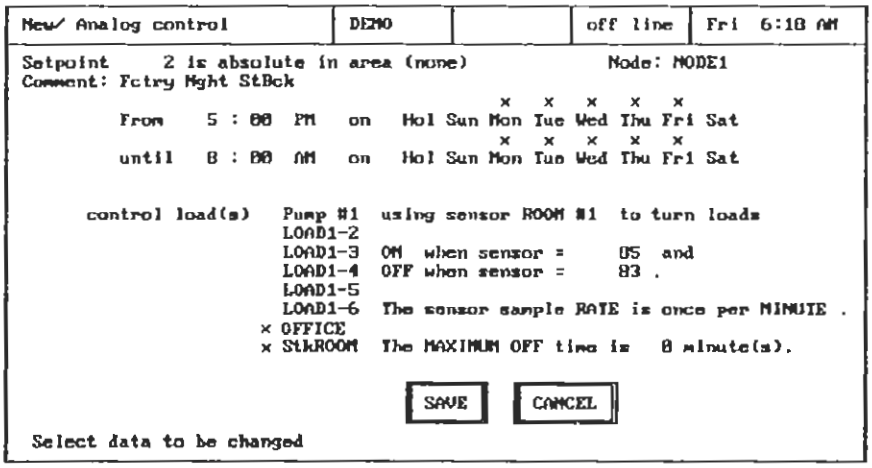

Fig. 8-6: Factory Night Setback

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.

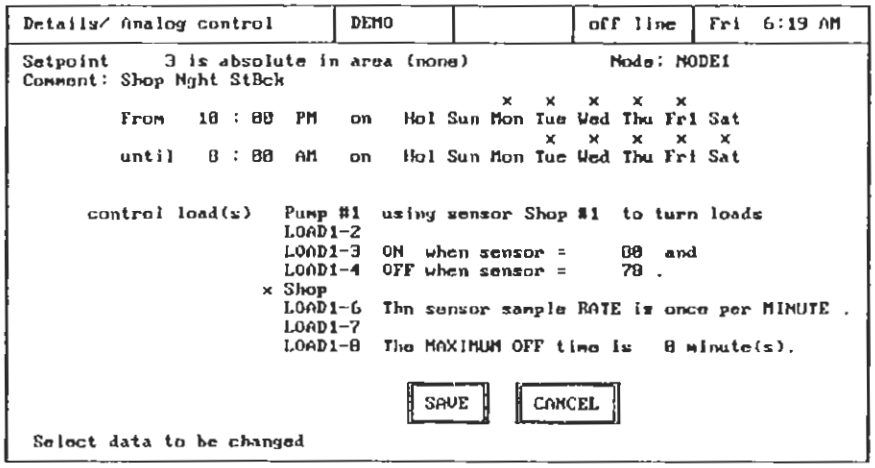

Fig. 8-7: Shopping Center Night Setback

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.

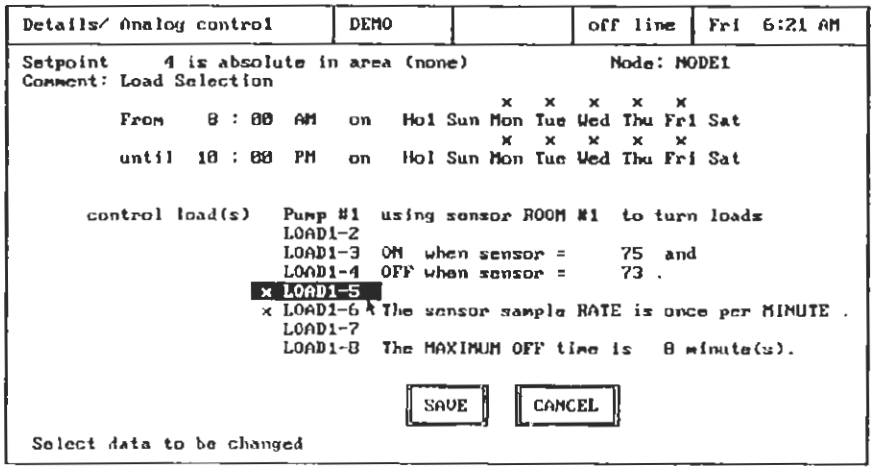

Fig. 8-8: Load Selection

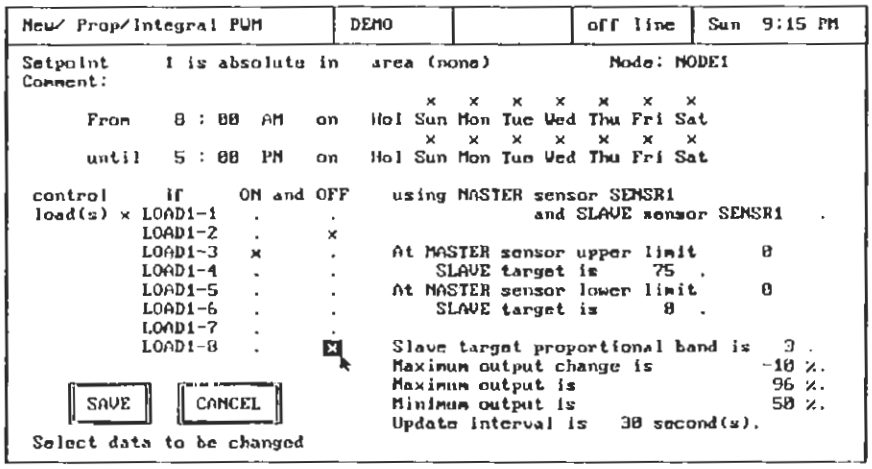

Fig. 8-9: On & Off Enables

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.

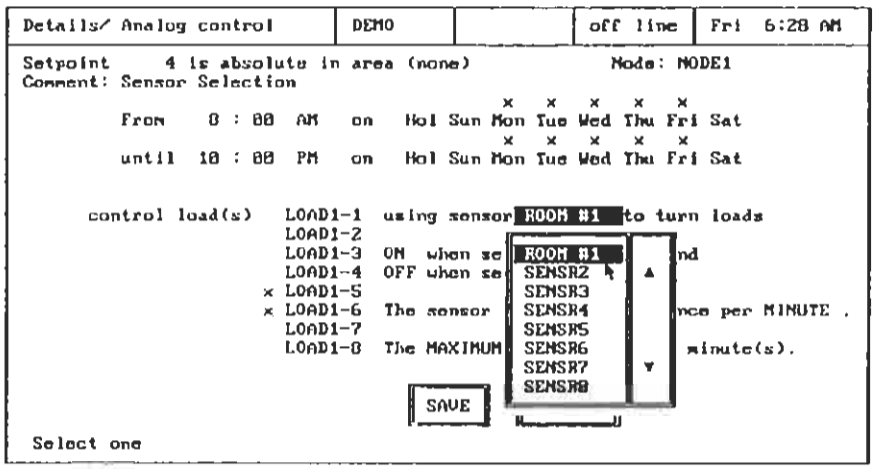

Fig. 8-10: Sensor Selection

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.

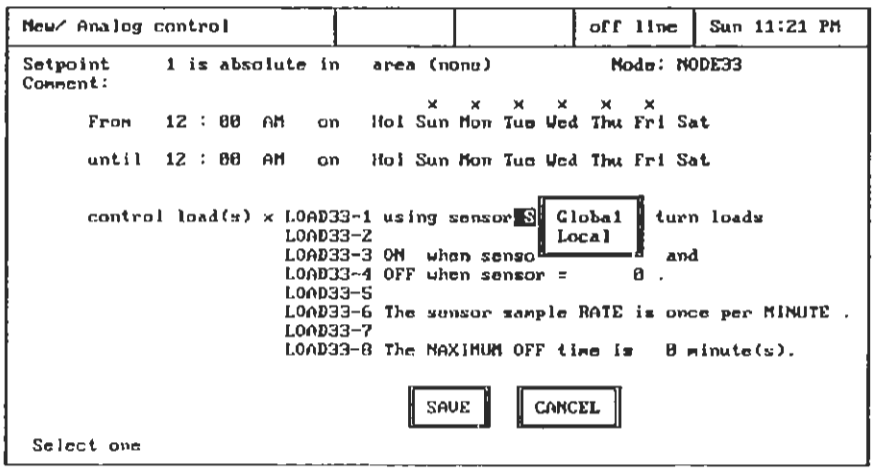

Fig. 8-11: Sensor Selection - Global/Local

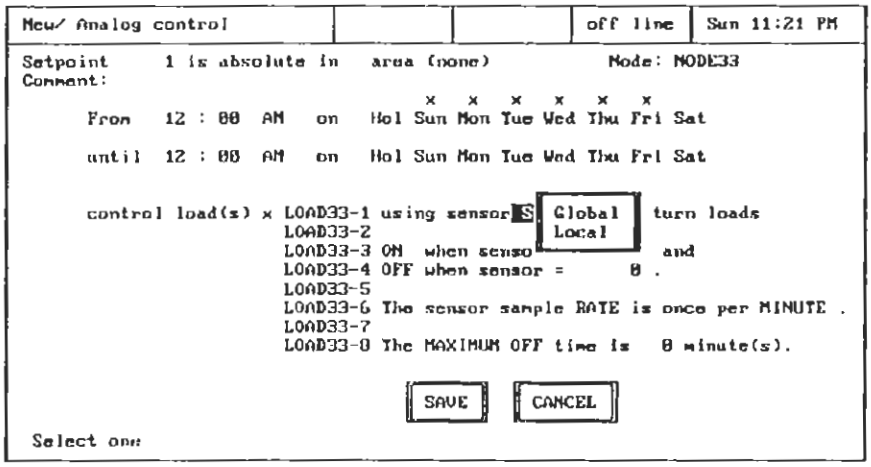

Fig. 8-12: Data Entry

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.

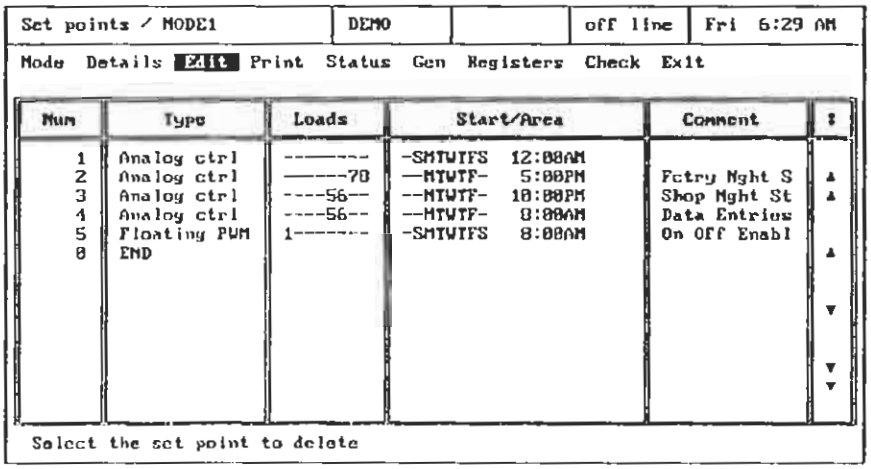

Fig. 8-13: Setpoint Delete

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.

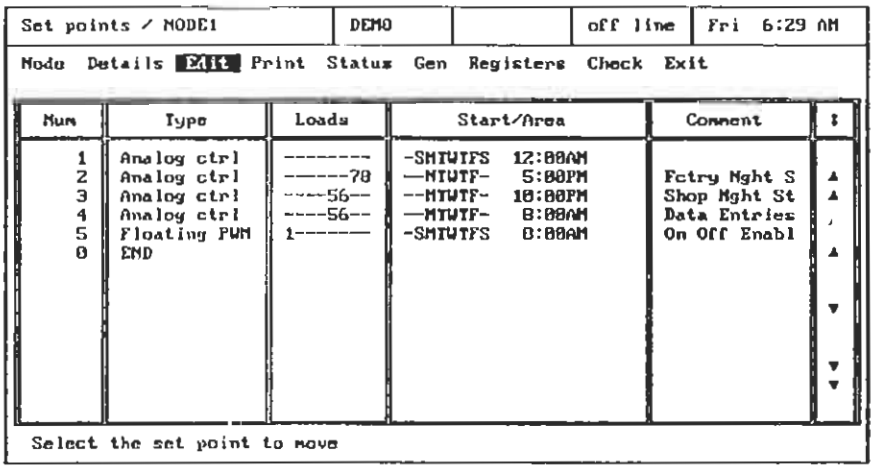

Fig. 8-14: Setpoint Move

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.

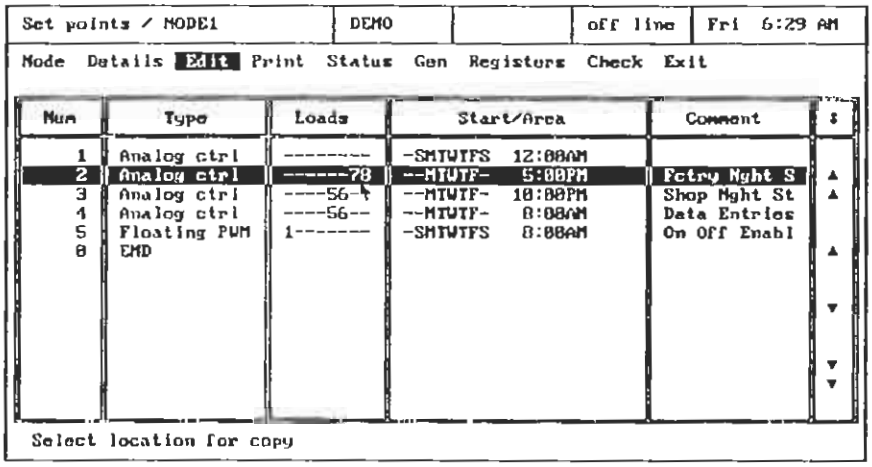

Fig. 8-15: Setpoint Copy

*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.

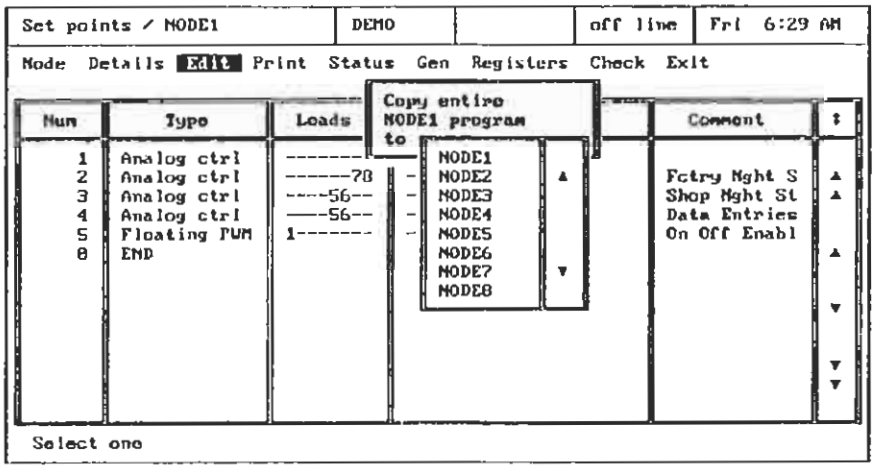

Fig. 8-16: Copying Node to Node

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.

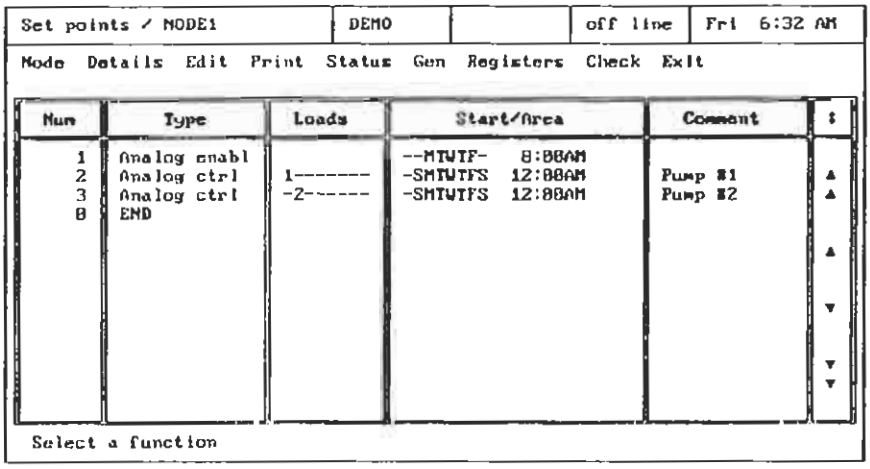

Fig. 8-17: Check Program

The simple program shown in Figure 8-17 has three setpoints. The first setpoint is an Analog Enable followed by two Analog Control Setpoints.

Select Check

A node selection window will appear, Figure 8-18.

Select the current node or all nodes

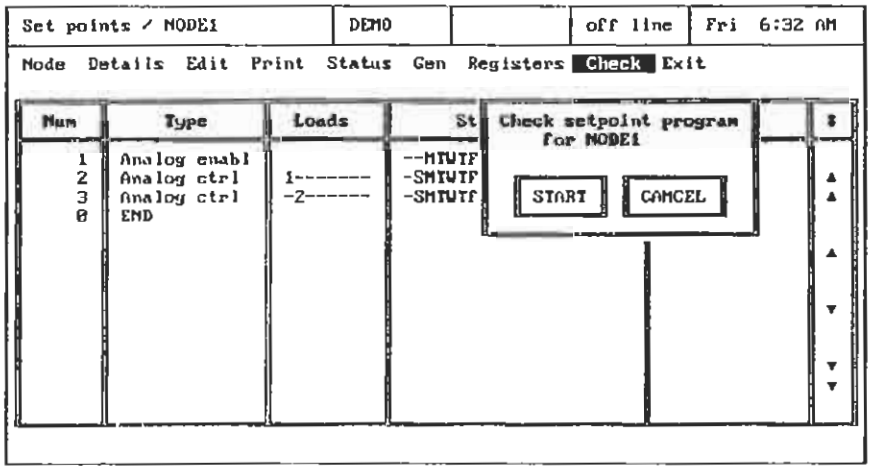

Fig. 8-18: Check Node

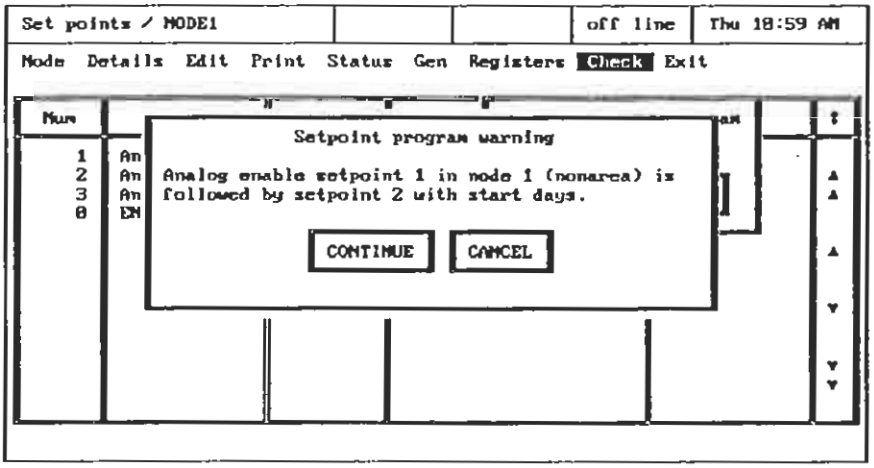

Fig. 8-19: Violation Screen

Violations will be displayed as they are discovered. A description of the violation will appear on the screen, Figure 8-19. The verification will not continue until the violation is acknowledged by the programmer.

The violations should be corrected before the program is transmitted to the controllers. This self diagnostic procedure checks for structural problems only. It does not verify the logic of the program in any way.

Analog Enable Setpoint

The Start and Stop Time/Day entries for the two slave setpoints following the Analog Enable setpoint must not be entered. The Analog Enable will enable and disable the two slave setpoints based on the sensor and daytime entries in the Analog Enable setpoint.

Defining Run Time Based Actions RTA

Clipper XL and XL9600 controllers can use load run time limits to switch control programs between Primary and Backup loads. At a predetermined run time limit, all the control programs for the Primary load will be switched to the Backup load. The Primary load will be shut down. Additionally, an alarm can be generated and an auxiliary load can be turned on.

Select Controllers, Programs, Run-time actions

A table will appear displaying RTAs for the selected node, Figure 8-20. Four RTAs can programmed per node.

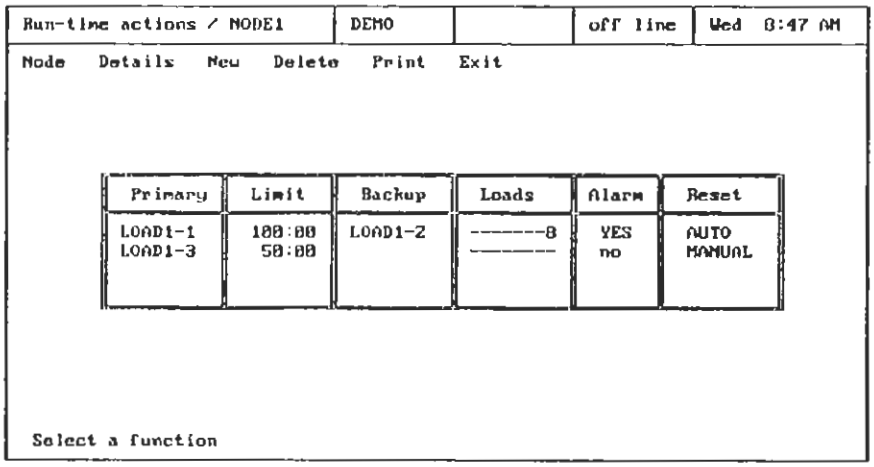

Fig. 8-20: RTA Table

Node

RTAs are entered on a node by node basis, similar to setpoint programs.

Select Node

Select the node to program

The selected node must have an XL designation e.g. Clipper LAN XL, XLHMT, XLLSP, XLHC, XL9600DI, XL9600HMT, XL9600LSP etc. If the selected node is configured as a Clipper LAN or LAN Plus controller the software will respond with "Run-Time Actions Unsupported by Node".

New

Programming RTAs is similar to programming setpoints. All the data for an RTA is entered through a single window. Selecting **New** will display the programming window with default values for all entries, Figure 8-21.

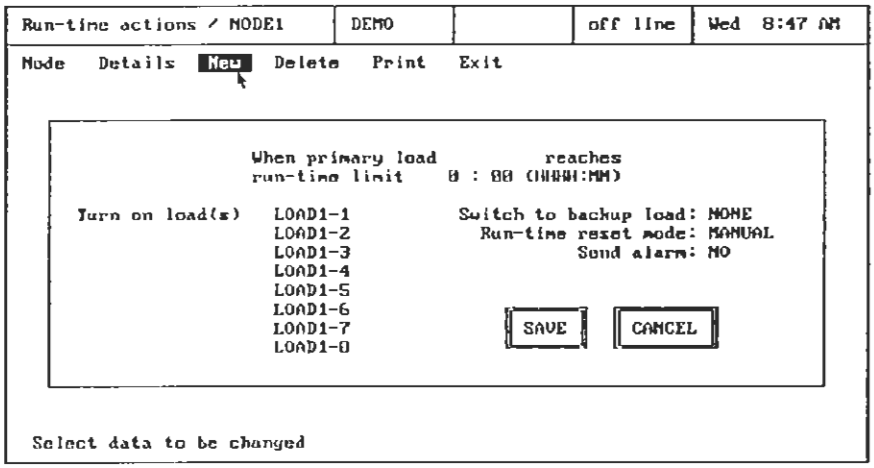

Fig. 8-21: RTA Programming Window

Primary load

The original control sequence will be written for the Primary loads only. Any one of the eight loads can be selected to be a Primary load provided it has not already been selected as a Primary or Backup within another RTA. Each load can only be used once within RTA.

Run-time limit

The run-time limit is the number of hours and minutes of ON TIME that must elapse before the control programs will switch from Primary to Backup. The maximum limit is 9999 hours and 59 minutes.

Backup load (optional)

The Backup load will control equipment similar to the Primary load. If the Primary load controls a compressor, the Backup load will also control a compressor. Control programs should not be written to control the Backup load. The Backup load will remain OFF until the run-time limit is exceeded, at which time the setpoint program written for the Primary load will now control the Backup. Any one of the eight loads can be selected to be a Backup load provided it has not already been selected as a Primary or Backup within another RTA.

Run-time reset mode

The reset mode can be selected as MANUAL or AUTO. The setpoint programs switch from Primary to Backup at the programmed run-time limit. The programs will switch back to the Primary load when the Backup load exceeds the run-time limit if the ON TIME for the Primary load had been reset to 0. In the MANUAL mode, the run-time for the loads must be reset by the operator. The AUTO mode automatically resets the ON TIME of the Primary and Backup loads as the switchover of control programs occurs.

Send alarm

An alarm can be sent when the run-time limit is exceeded. The controller will use the Alarm Dial Out Phone number to transmit the alarm information. The data will be coupled with load and network descriptions stored within the receiving computer.

Turn on loads (optional)

Loads can be turned on when the run-time limit is exceeded. The selected loads can control lights, buzzers or bells to notify personnel on site that a switchover has taken place.

Details

Details can be used to view and edit the parameters of existing RTAs. The programming window will appear with the programmed data for the selected RTA, Figure 8-22.

Delete

Delete will remove a selected RTA from the table.

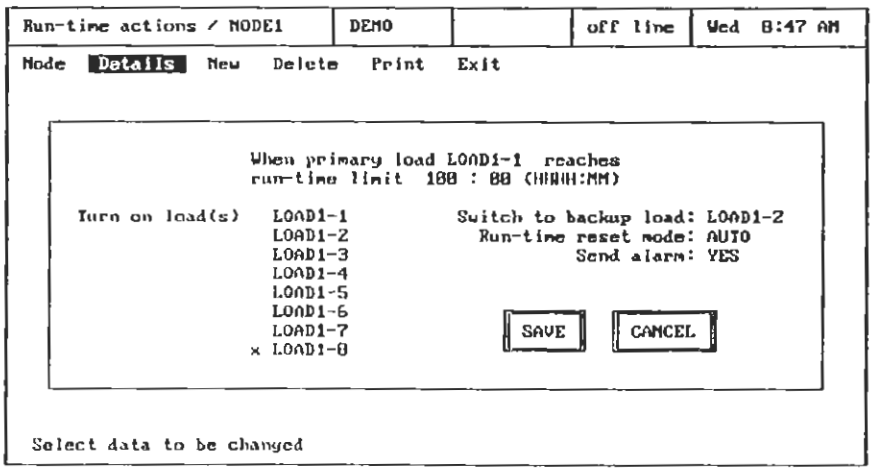

Fig. 8-22: Details Programming Window

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Chapter 9 - Network File Commands

A Network consists of a number of controllers operating independently but tied together through a communication link. The communication link allows the controllers to share sensor information and to be programmed through a computer.

The software is used to configure the network, write the setpoint programs, enter miscellaneous data and monitor the system. All the data for a specific network will be stored under a single filename.

The network file commands, Clear, Load, Save, Save as, Delete and Print are used to maintain the files.

Select Network

A pull down menu will appear displaying file and communications options, Figure 9-1.

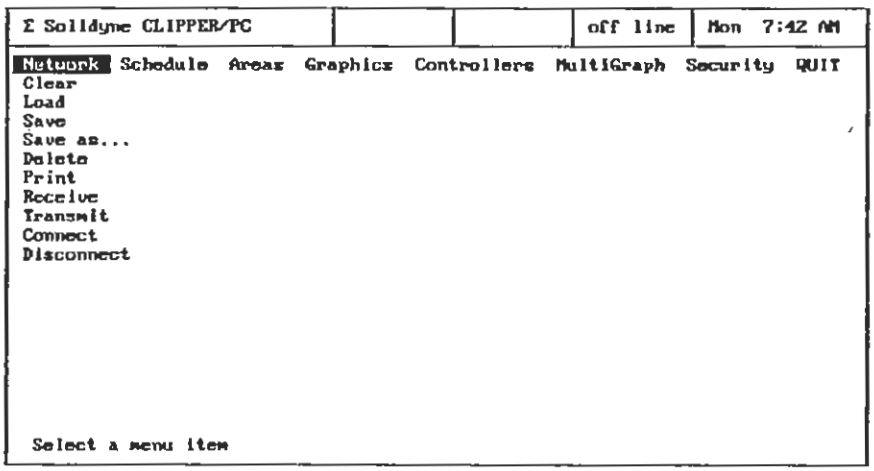

Fig. 9-1: Network Menus

File Commands

Clear

Clear erases all network information from the computer's memory. All programmable network information will be set to the default values. Program files that have been saved to disk are not affected by this function.

Load

Load enables you to select a network from the list of previously saved files and load the data into the computer's memory. The network data can then be examined and modified.

Select Load

A table of network files will appear, Figure 9-2. The top line of the table is the Current Directory Line (CDL). The network table displays all networks and subdirectories that exist within the current directory.

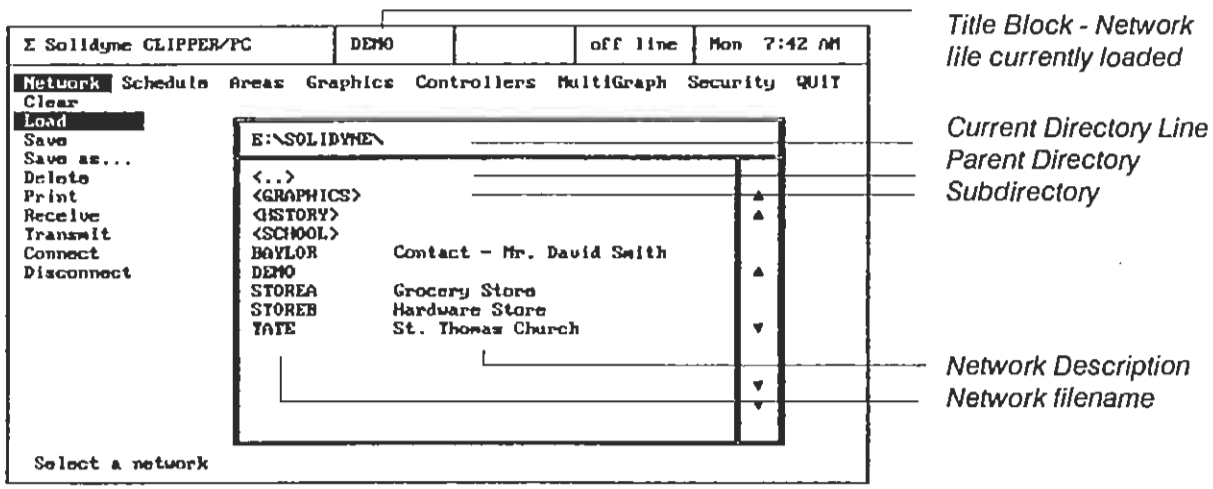

Fig. 9-2: Network Files Table

Select a network file to load

The data for the selected file will be loaded into the computer's memory and the filename will appear in the title block.

Network files can be loaded from other directories by selecting the directory and then selecting the file within the directory. Subdirectories, enclosed in angle brackets, and parent directories <..> can be accessed from the table. Directories can also be accessed by typing the path for the directory on the CDL.

Conventional DOS notation should be used when entering the names of other directories and/or drives, e.g. **D:\Clipper\Solidyne**.

The network description displayed to the right of the filename provides a brief identification of the network.

Save

Save writes the network data in the computer's memory to disk, under the filename previously loaded. Changes made to the network data are not saved to disk until a Save is performed. Previously stored data will be replaced. A Save cannot be performed unless a file had been loaded from the network table.

Save as

Save as writes the network data to disk under a new name. A subdirectory named after the network will be created for network data storage.

Select Save as

The filename can be entered along with the directory path, Figure 9-3. The default directory will be the directory that contains the CLIP.EXE file.

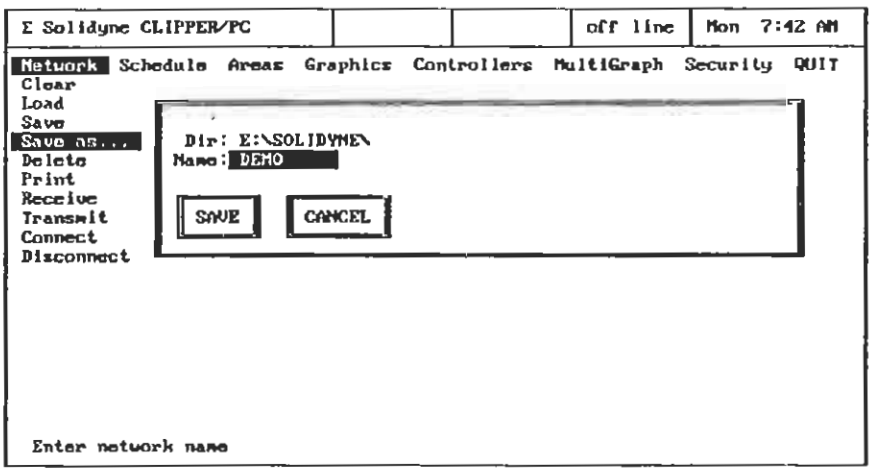

Fig. 9-3: Network - Save as

Select Dir and enter the path for the new directory

Select Name and enter the name of the file

The filename can be up to 8 characters. Select SAVE to save the data to disk or CANCEL to exit without saving.

Delete

Delete erases network files from the disk, removes the subdirectory created for network data storage and deletes the filename from the network table.

Select Delete

The network table functions as described in the "Load" section.

Select the file to delete

A warning message will appear, "Data will be lost, Do you really want to Delete?", Figure 9-4. "Yes" will delete the file. "No" will cancel the Delete function. Once a network has been deleted, data cannot be retrieved.

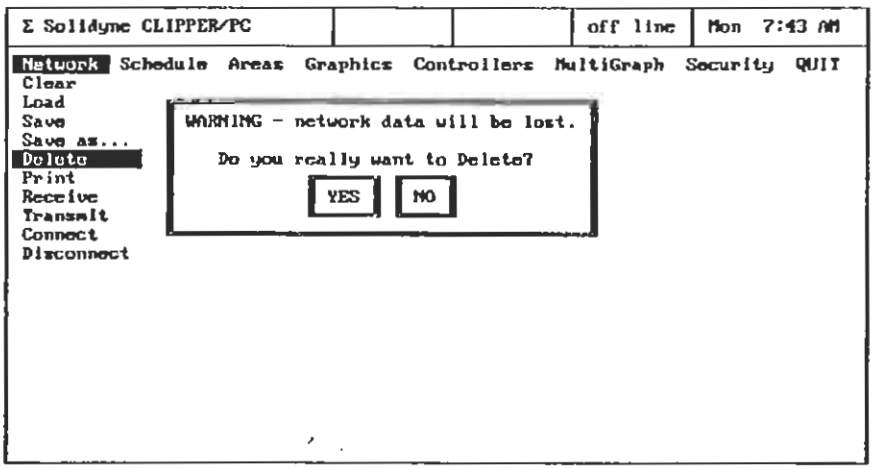

Fig. 9-4: Delete Warning Message

Print

Print is used to obtain a printout of all Network Details for a specific node or for all nodes.

Select Print

A Print option window, Figure 9-5, allows you to select the nodes and the print device. The default node selection will be the last node accessed with the Controllers, Programs, Setpoints, Node menu. The Network Details for all the nodes can be printed by toggling the node selection to "All nodes".

The print device can also be selected. The default device is printer. This device will make use of the DOS PRINT command, allowing the printer to print while the computer is free to perform other tasks. Refer to a DOS manual for more details. However, some computers may require LPT1 to be the specified device.

Select the printer device and enter LPT1

The printout will now be directed to parallel port 1, without the use of the DOS PRINT command.

The Network Details can also be printed to a filename by entering the filename as the device. The details will be written to disk under the selected name in a printout format. The file can then be examined and printed using DOS commands.

The printout will include all Sensor, Load and Node details.

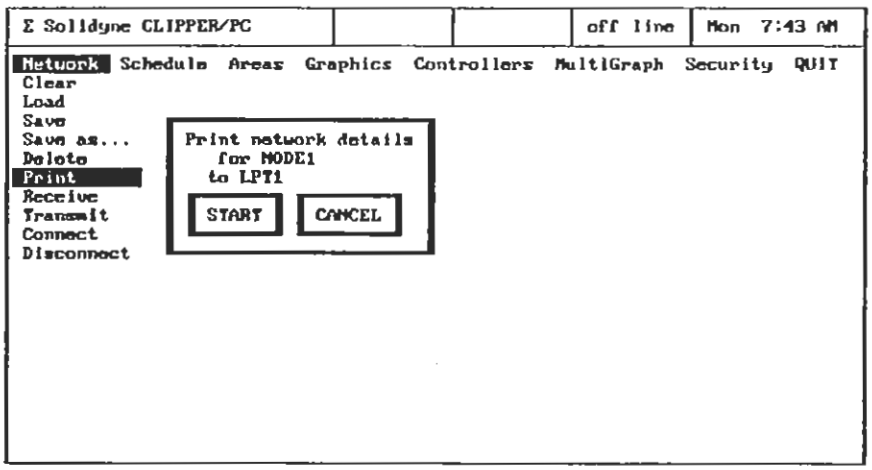

Fig. 9-5: Network - Print

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

*Refer to Chapter 2 "**Installing the Software**" page 2-1 for details.*

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Chapter 10 - Establishing Communications

The computer can be linked to the Network directly or remotely. The Network can then be programmed and monitored.

The software key must be inserted into the parallel port before attempting communications. If the screen displays "FOR DEMONSTRATION ONLY - NOT FOR RESALE", check the parallel port for proper insertion of the key. Exit the software and reboot CLIP.EXE

Direct Connect

A network can be directly connected to one or more computers through an M201 Master Interface Module. A network that contains at least one XL9600 controller can be connected to a computer through a CON-6 Direct Connect Module.

The network communication details must be configured for direct connect.

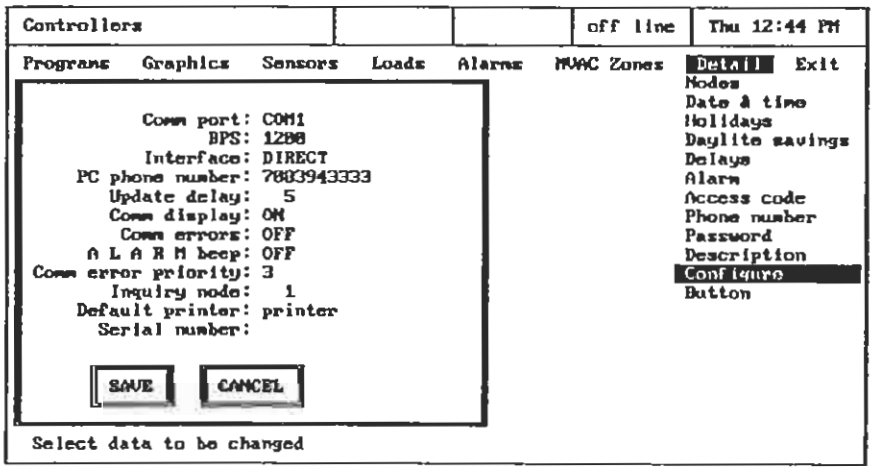

Fig. 10-1: Configuration Screen

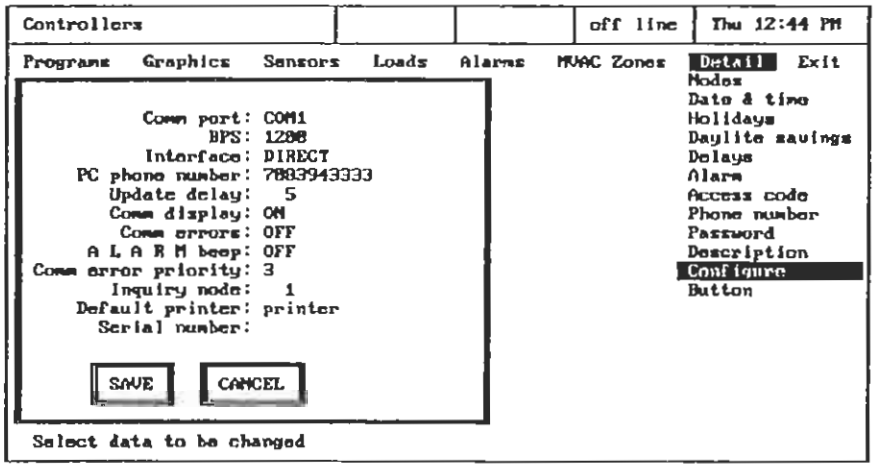

Fig. 10-2: Configuration Screen

Details - Configure

Select Controllers, Details, Configure

A configuration window will appear, Figure 10-2. The Comm port, BPS, Interface, PC phone number, Update delay, Comm display, Comm errors, ALARM beep, Inquiry node, Comm error priority and Default printer are programmable.

Comm port

The serial communication port must be specified as COM1 or COM2. COM3 and COM4 cannot be used. The comm port can be configured at start-up with the command CLIP COM1 or CLIP COM2 (refer to pages 2-2 and 2-3).

BPS

The software supports 1200, 2400, 4800 and 9600 baud. The default is 1200. Toggle this selection to 2400 or 9600 only if all the controllers in the network are capable at the specified BAUD rate.

Interface

The type of interface can be configured as DIRECT or MODEM. Toggle this selection to DIRECT. The interface can be configured at start-up with the command **CLIP DIRECT** (refer to page 2-3).

PC phone number

The purpose of the PC phone number is to enable the software to receive alarms while the computer is ON LINE. The controllers will check the PC phone number of any computer that is currently ON LINE (direct or remote) when an alarm is triggered. The alarm will be sent directly to an ON LINE computer if the last 7 digits of the Alarm Dial-Out phone number within the controller matches the last 7 digits of the PC phone number of the ON LINE computer.

The controller will disconnect any ON LINE computers if the Alarm Dial-Out phone number does not match the PC phone number. A hang up message will be displayed. "Hanging up for alarm dial-out".

Select PC phone number and enter the number

The last 7 digits of the PC phone number must match the last 7 digits of the Alarm Dial-Out phone number exactly, including punctuation.

Example: The following numbers match:

Alarm Dial-Out phone number: 1-708-3943333
PC phone number: 3943333

The following numbers DO NOT match:

Alarm Dial-Out phone number: 1-708-3943333
PC phone number: 394-3333

Update delay

The update delay specifies how often the real-time data is refreshed while monitoring a system. The default value of 5 seconds can be changed to any value between 0 and 180.

NOTE: *The controllers communicate through a bi-directional bus. A bi-directional bus does not support simultaneous communication. If a computer is communicating to one or more controllers, the controllers cannot communicate to each other. The update delay determines how often the computer communicates if left in a monitoring mode. A suggested delay would be to enter a number FOUR (4) times greater than the number of nodes in the network, e.g. a 10 node network should have an update delay of at least 40 seconds. A number significantly less than 40 can interfere with internal network communication.*

Comm display

The display of communication data along the bottom of the screen can be toggled ON or OFF.

Comm errors

The display of communication errors along the bottom of the screen and the beeps associated with the errors can be toggled ON or OFF. However, a "Node marked down" error will be displayed regardless of the Comm errors selection.

ALARM beep

When alarms are received by the software, the message "A L A R M" flashes across the bottom of the screen. While the message flashes, an audible "beep" will sound every minute. The "beep" associated with the "A L A R M" message can be toggled ON or OFF.

Comm error priority

Comm error priority specifies the priority for errors PDC832 reports when it is unable to communicate with a network node. 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 and route the alarm directly to the alarm log.

Inquiry node

General information (Date & time, Holidays, Delays, Daylite savings and Alarm ID number) received from the network are received from node 1 (default). To check the general information from other nodes, the Inquiry node parameter can be changed to any node number within the network.

Default printer

Throughout the PDC832 software, the PRINT functions direct output to "printer" (default). By setting the Default printer to LPT1 or another parallel port that attaches to the printer, all PRINT functions will direct the output to the parallel port entered.

When directed to "printer", the software is allowed to perform other tasks while data is printed. However, "printer" loads the DOS print command into RAM and will cause errors with other PDC832 functions if the PRINT /D:PRN *is not executed prior to running the CLIP.EXE file (see Chapter 2 Installing the Software). If the output is directed to LPT1, PRINT /D:PRN does not need to be run.*

Serial number

The serial number is unique to each diskette and is registered to a specific user. The number is required for technical assistance and future updates.

Remote Connect

A network can be remotely accessed through the use of 1200, 2400 or 9600 baud modems. The modems must be Hayes compatible and configured as described in Chapter 1.

The Interface selection must be changed within the configuration window. Toggle the Interface selection to MODEM. The modem will be initialized as the menu is exited and when the software starts up.

A different modem initialization string can be used prior to running the CLIP.EXE file. Refer to Chapter 2 ***Installing the Software*** for the "AT" command line options.

Automatic Dial

Modems transmit data to each other over telephone lines. The phone number of the modem connected to the network must be entered.

Select Controllers, Details, Phone number

Enter the phone number of the network. A five second pause can be inserted between numbers by placing a comma (,) between the digits. A pause is necessary when the modem is connected to a PBX system.

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*The default pause time for a "," is 5 seconds. The pause time can be adjusted for a shorter pause time by addressing the S8 register of your modem. Refer to Chapter 2 **Installing the Software** for the "AT" command line options and your modem manual for details.*

Example: CLIPPER Phone number: 9,3943333

The modem would dial a nine (9), wait five seconds and proceed with dialing the rest of the number.

Multiple commas can be entered for longer delays: each comma will add five seconds.

Manual dial

In some instances, it may be impossible to automatically dial the network, such as operator assisted calls. A telephone can be used in conjunction with the modem to manually dial the network.

Enter ATD as the CLIPPER Phone number.

Dial the network manually.

Select Connect, Receive or Transmit when the modem answers.

The modems will link and the system will be displayed as ON LINE.

Getting On Line

The communication link can be established after the network is created (chapter five) and communication details are configured. Three commands can be used to establish communication; Connect, Receive and Transmit.

Connect, Receive *and* Transmit *are not supported in DEMO mode.*

All three commands will place the computer ON LINE with the network. A directly connected network will be placed ON LINE immediately. A remotely connected network will automatically dial the modem using the Clipper phone number entered earlier, link with the modem on the network and place the system ON LINE with the computer.

Connect

Connect will establish a communication link and leave the network ON LINE. An ON LINE network can be programmed and monitored on a real time basis.

Receive

Receive will establish a communication link and immediately receive all the setpoint programs and configuration data from the network. The network will be left ON LINE for programming and monitoring after receiving the data.

The length of time required to receive the data depends on the number of nodes, the length of the program within each node and the baud rate of the system.

Receive can also be performed with a system that is already ON LINE. In this case, the data will be immediately received since the communication link has already been established.

Information that is NOT received includes Schedules, Areas, Sensor Status, Load Status, Labels, Password, Access Code and Alarm descriptors. The descriptors and labels enhance the monitoring capabilities of the software and exist only in the computer. The Scheduling version of the software uses the Schedules and Areas to create the program that is sent to the controllers.

CAUTION: *Receiving information from a network will replace the data that is currently in the computer's RAM. Data previously saved to disk will not be overwritten until a Network Save is performed.*

Transmit

Transmit will establish a communication link and immediately transmit all the setpoint programs and configuration data from the network. The network will be left ON LINE for programming and monitoring after transmitting the data.

The length of time required to transmit the data depends on the number of nodes, the length of the program within each node and the baud rate of the system.

Transmit can also be performed with a system that is already ON LINE. In this case, the data will be immediately transmitted since the communication link has already been established.

Information that is NOT transmitted includes Schedules, Areas, Labels, Password, Access Code and Alarm descriptors. The descriptors and labels enhance the monitoring capabilities of the software and exist only in the computer. The Scheduling version of the software uses the Schedules and Areas to create the program that is sent to the controllers.

CAUTION: *Transmitting information to a network will replace the program and configuration data within the controllers. The data cannot be recovered once it is overwritten.*

Troubleshooting Communication Problems

Modem error (Modem will not initialize)

Verify that the modem is a 1200, 2400 or 9600 BAUD Hayes compatible, configured as described in Chapter 1.

Check the modem connections to the computer. The Communication port (COM 1 or COM 2) the modem is connected to should match the configuration in the Controllers, Details, Configure menu. Interface should be selected as MODEM.

Exit the software

Reset the modem. Turn the power to the modem OFF and back ON.

Restart the software, type CLIP. If the modem is configured through software (no dip switches) quit the software and reboot using the "AT" modem initialization string described in Chapter 2.

Frequent Reply Header or Echo errors

Reply Header and Echo errors result when data is not properly transmitted and received. The most common source of the errors is a noisy phone line.

- Noisy phone lines can be detected without the use of sophisticated equipment. Use a handset to listen for static or other noise on the line and try calling the network during off peak hours when the line is cleaner. A direct connect can be used to verify phone line problems. Contact the local phone company to clean up the line.

- For a 2-wire LAN, capacitance build up along the communication bus can also cause communication errors, especially when the bus exceeds 1000 feet. The capacitance can be shunted (eliminated) by terminating the bus with a pair of resistors. Place a 3K to 5K Ohm resistor on each end of the bus. One end of the resistor should be connected to the plus bus (XMT/RCV) and the other end should be connected to the minus bus (COMMON).

- Check the M200 or M201 Master Interface Module for proper wiring and operation. The communication light on the module should flash approximately once every second. The light flashes every time a node transmits its sensor data to the other nodes or to a computer. If the light does not flash the system will not communicate.

- If MVAC controllers are connected to the Clipper LAN disconnect the MVAC-LINK. Troubleshoot the MVAC system if necessary.

- Disconnect all but the first node from the network. Add one controller at a time until the communication errors return. Replace the communication module in the controller that caused the errors.

Comm Line Busy error

Comm line busy errors represent a data collision. The error occurs when an attempt is made to communicate with the network while a controller or other computer is transmitting data.

The error will most likely correct itself when the software automatically retries, unless an ON LINE computer is constantly monitoring the network. Stop the monitoring of the other ON LINE computer.

In rare cases, a communication module that has been damaged by a voltage surge can cause a constant Comm Line Busy error. Follow the method previously described for determining the node with the defective communication module.

Software comes up in DEMO Mode

The software key must be inserted into the parallel port before attempting communications. If the screen displays "FOR DEMONSTRATION ONLY - NOT FOR RESALE", check the parallel port for proper insertion of the key. Exit the software and reboot CLIP.EXE. Refer to Chapter 2 ***Installing the Software*** for proper installation of the software key.

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Chapter 11 - Modifying or Troubleshooting an Existing Program

Setpoint programs are modified for a number of reasons. Simple changes may involve extending daytime operating hours or setting higher target temperatures. Complex changes could involve modifying the entire sequence of operation. Whether the changes are simple or complex they can all be made through the Setpoint menu.

NOTE: Receive the program from the controllers before making any modifications. The program on your computer may not be up to date.

Modifying Individual Setpoints

The control parameters for individual setpoints can be examined and modified through the Details menu.

Select Controllers, Programs, Setpoints, Details

The setpoint table will be displayed along with the prompt "Select a set point".

Select the setpoint to modify, Figure 11-1.

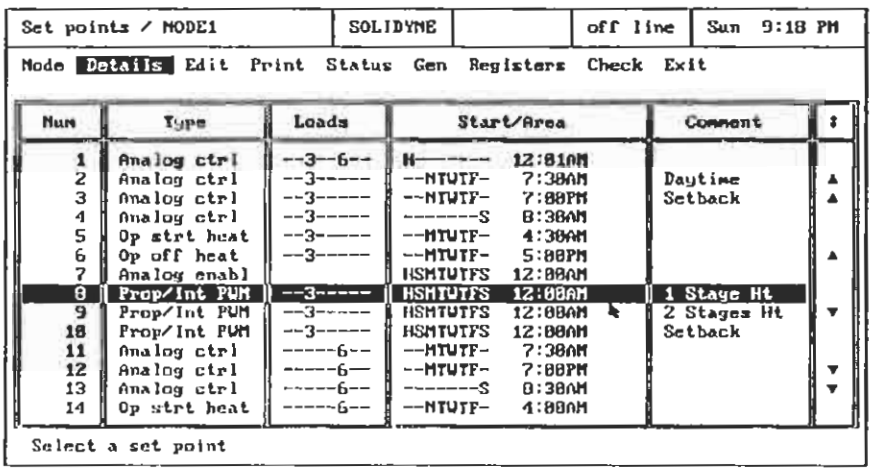

Fig. 11-1: Select the Setpoint to Modify

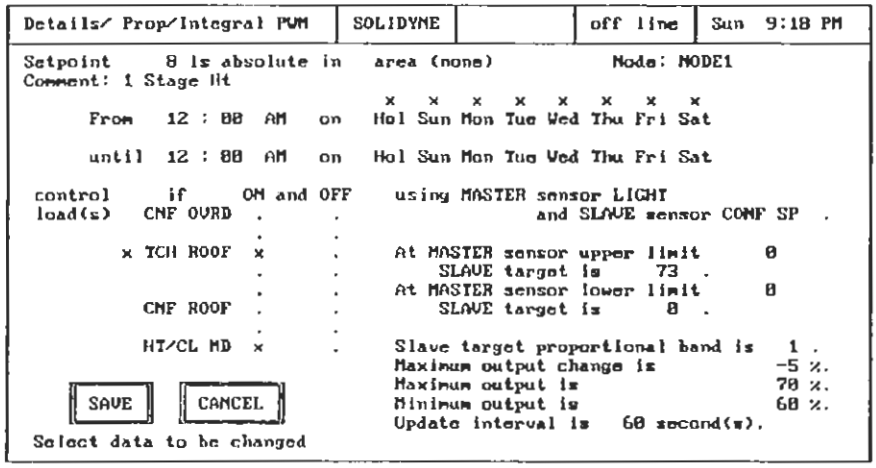

Fig. 11-2: Setpoint Parameters

The template for the selected setpoint will appear with all the previously entered data, Figure 11-2.

Select the parameters to change and enter the new data. If the changes are made while the system is ON LINE, the program for the current node will be automatically transmitted when the Setpoints menu is exited.

Modifications to relative setpoints will not be transmitted automatically, even if the system is ON LINE. A relative setpoint program must be formatted and transmitted by selecting RESCHEDULE, refer to chapter 18 for more information.

Modifying the Program Structure

The program structure is determined by the order in which the setpoints are entered. The four commands within the Edit mode (New, Delete, Move, Copy*) can be used to modify the hierarchy of the program.

Refer to chapter 8 "*Writing a Program*" for details about Edit functions.

Troubleshooting a Program

Programs are seldom perfect the first time they are written. This software package provides you with a powerful tool to use during the troubleshooting process.

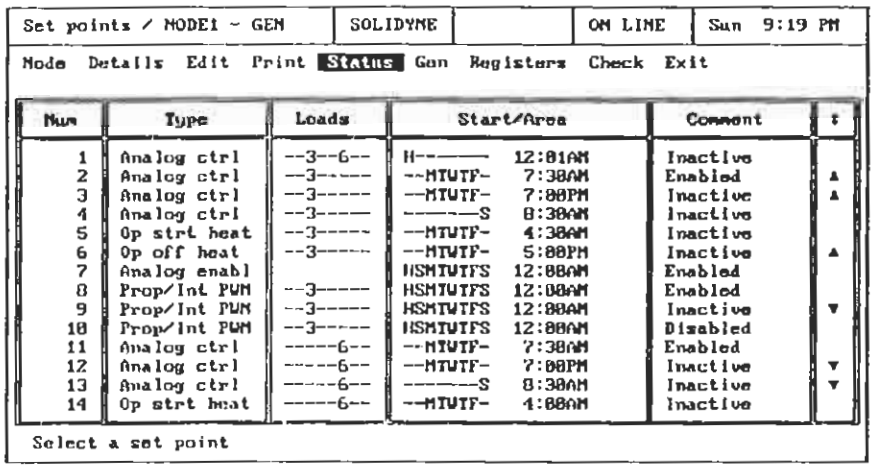

Fig. 11-3: Setpoint Status Screen

Status

The status of a setpoint signifies whether or not the setpoint is capable of controlling loads. The setpoint status, accessible only when the system is ON LINE, will be displayed as Enabled, Disabled or Inactive.

Select Status

The current status for all the setpoints within the node will be received and displayed along the right side of the setpoint table, Figure 11-3.

Enabled setpoints can control their assigned loads, depending on their priority and interaction with other setpoints in the program. These setpoints are within their programmed time range and are not currently disabled by an Analog Enable or ON/OFF Enables.

Remember: *The Enabled setpoint for a specific load with the highest ID number will have the highest priority. Control will be relinquished to Enabled setpoints with lower ID numbers only when the higher numbered setpoints are satisfied.*

Disabled setpoints cannot control loads. These setpoints are within their programmed time range but are currently disabled by an Analog Enable or ON/OFF Enables.

Inactive setpoints cannot control loads. These setpoints are not within their programmed time range.

The status of each setpoint can be manually toggled for testing purposes.

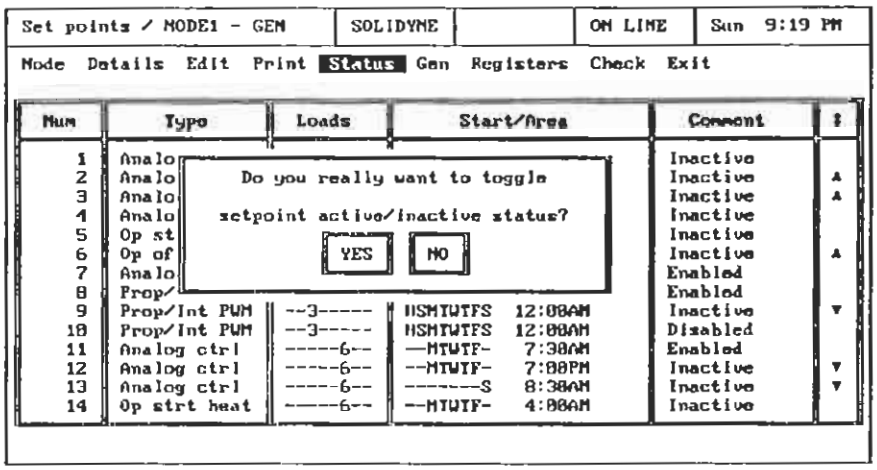

Fig. 11-4: Setpoint Status Warning

Select the status for a specific setpoint

Enabled or Disabled setpoints can be toggled to Inactive. Inactive setpoints can be toggled to Enabled or Disabled. An Inactive setpoint will toggle to Disabled if an Analog Enable or ON/OFF Enable disagrees with the Enabled status.

A warning message will appear as the Status menu is exited, "Do you really want to toggle active/inactive status?", Figure 11-4. "Yes" will transmit the changes. "No" will abort the changes.

CAUTION: *Toggling the status of setpoints will alter the sequence of operation and possibly damage controlled equipment. You must be familiar with the program and the equipment before making changes.*

Modifications to setpoint status are only temporary and should be used for test purposes only. If the setpoint status is incorrect, the source of the problem should be identified.

1) Problem: *Setpoints are Inactive when they should be Enabled.*
Setpoints Enabled when they should be inactive.

Cause: *Incorrect time or date within the controllers.*
Incorrect Start/Stop time within the setpoint.

Solution: *1. Verify the time and date within the controllers. Reset if necessary.*
2. Verify the Start and Stop times for the setpoints.

2) Problem: *Setpoints Disabled when they should be Enabled.*
Setpoints Enabled when they should be Disabled.

Cause: *Control strategies of the Analog Enables or ON/OFF Enables are incorrect.*

Solution: *Check the logic of any Analog Enables or ON/OFF Enables used within the program.*

Print

A hardcopy of the program can simplify the troubleshooting process. The ability to compare setpoint details can often pinpoint the control problem. Also, a printout of the program should be stored in a safe place along with a copy of the program on floppy disk.

Select Print

A printout option window will appear, Figure 11-5.

The setpoint program can be printed for the current node or for all nodes in the network. The default setup is to print the program for the current node. The programs for all the nodes can be printed by toggling the node selection to "All nodes".

The print device can also be selected. The default device is printer. This device will make use of the DOS PRINT command, allowing the printer to print while the computer is free to perform other tasks. Refer to a DOS manual for more details. However, some computers may require LPT1 to be the specified device.

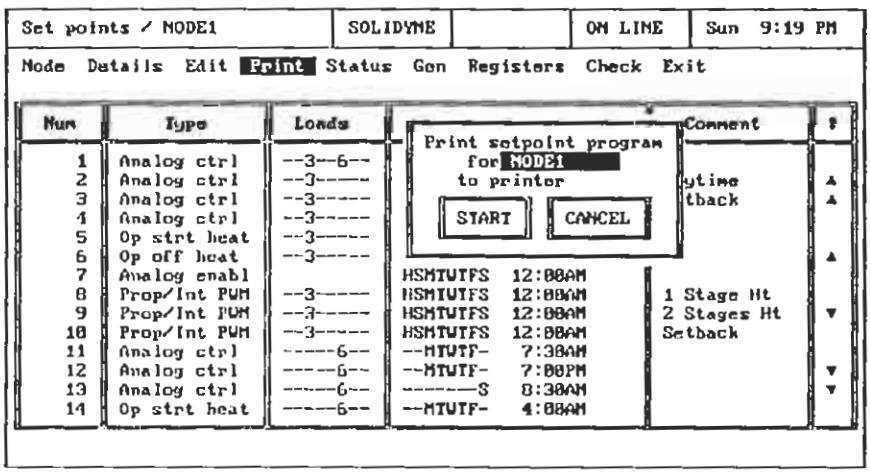

Fig. 11-5: Setpoints Print Function

Select the printer device and enter LPT1

The printout will now be directed to parallel port 1, without the use of the DOS PRINT command.

The program can also be printed to a filename by entering the filename as the device. The program will be written to disk under the selected name in a printout format. The file can then be examined and printed using DOS commands.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

Chapter 12 - Monitoring Inputs

The Analog and Digital Inputs are monitored on a real time basis. The real time data can be used to evaluate and fine tune the efficiency of the system. The effects of program adjustments can be monitored as they happen. The computer must be ON LINE with a network prior to monitoring inputs (refer to Chapter 10 "***Establishing Communications***").

Analog Inputs

The controllers store Peak, Qtr hour, Average, Instantaneous and Cumulative values for all analog inputs. The stored data can be received, monitored and saved to disk.

Note: *Communication Data and Error displays can be suppressed. Refer to the section describing the Configure option under Details described in Chapter 10* "***Establishing Communications***".

Select Controllers, Sensors, Analog inputs

Peak

The peak High or Low value is recorded daily for each sensor. The High/Low selection is made within the Sensor Details menu, chapter 6. The peak value is stored in a table along with the time and date the peak occurred. The controllers store values for the last 35 days in Clippers and 32 days for XL9600s.

Select Peak, then select a sensor

The peak information will be received for the selected sensor and displayed in a table, Figure 12-1.

SAVE

Peak data can be saved if there is a current network loaded. The data will be merged with data that may have been previously saved for the selected sensor. Data that is saved to disk can be viewed OFF LINE by selecting Peak then a sensor.

Select SAVE

The data will be added to a SENSXXY.PKV file and stored in the network subdirectory. The XX represents the node number and the Y represents the

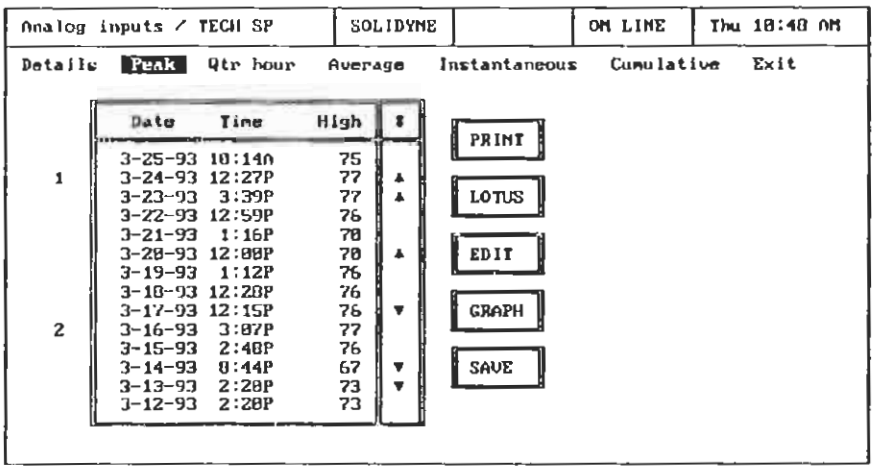

Fig. 12-1: Peak Table

sensor number within that node. The peak data for sensor 7 in node 12 would be stored in SENS127.PKV.

Data will be added to a SENSXXXY.PKV file and stored in the network subdirectory for nodes . 100. The XXX represents the node number and the Y represents the sensor number within that node. The peak data for sensor 4 in node 112 would be stored in SENS1124.PKV.

---

*Data can only be saved if there is a current network or changes have been made to entries in the Peak table (See **Peak, EDIT**)*

PRINT

The tabular data can be output directly to a printer or to a file.

Select PRINT

A printout selection window will appear. If there is a current network, the default setting (ALL) will output all the data displayed, including data saved previously.

Toggling to RECENT will print out up to 35 days of the most recent data.

Select the data to print

The print device can also be selected. The default device is printer. This device will make use of the DOS PRINT command, allowing the printer to print while the computer is free to perform other tasks. However, some computers may require the device to be specified as LPT1.

Select the printer device and enter LPT1

The printout will now be directed to parallel port 1, without the use of the DOS PRINT command.

The peak data can also be written to a filename by entering the filename as the device. The data will be written to disk under the selected name in a tabular format. The file can then be examined and printed using DOS commands.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

LOTUS

LOTUS 123 users can convert the data into a format that can be imported by Lotus.

Select LOTUS

Specify a filename and directory path within the window, e.g. **C:\LOTUS\PEAK2.WK1**. The FPKV.WK1 macro can be used to convert the data to Lotus format. Copy the macro to your Lotus directory and follow the commands in Table 12-1.

COMMANDS FOR LOTUS TRANSFER USING FPKV MACROS

1. Position cursor to upper-left corner of range to load peak date (e.g. {HOME}).

2.	**/FIN** *filename*.WK1. <Return>	loads peak data from macro file
3.	**/FCCE** FPKV.WK1 <Return>	loads peak macro
4.	**/RNLR** <Return>	labels peak macro
5.	<alt>F	executes peak macro on peak data

Boldface letters are Lotus commands.

Note: The macros supplied are not compatible with Lotus 123 for Windows.

Table 12-1: Lotus 123 Commands for Peak data

EDIT

When peak data values are graphed (for PDC832GH), the Y-axis on the graph is determined by the highest and lowest peak data values in the table (autoscale). At times, erroneous peak values may reside in the table due to a sensor failing, false offsets and multipliers etc. The erroneous values may cause difficulty in reading the graph for the values that are correct, due to the autoscaling.

EDIT allows a user to change data values that exist in the table. EDIT does not allow values to be deleted nor added to the table.

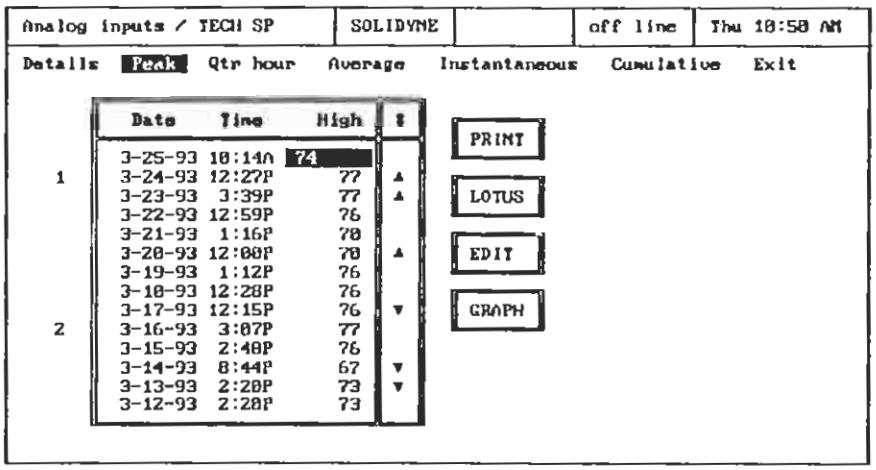

Fig. 12-2: Peak Edit

Select EDIT

The values within the table will become hilighted and can be updated, Figure 12-2. Once a value in the table has been changed, the SAVE box will appear. Select SAVE to save the changes made to the table. Click the mouse off the SAVE button to cancel any changes. A message will appear noting changes have been made to the table and have not been saved.

GRAPH (PDC832GH users only)

The peak data values can be graphically displayed as illustrated in Figure 12-3. The graph is auto-scaling and can display up to 512 peak values at one time.

Select GRAPH

The values displayed in the table will be displayed in the graph. Use the time line button in the lower right corner to view data from previous months. Small adjustments are made by selecting the arrows. Large adjustments are made by selecting the button.

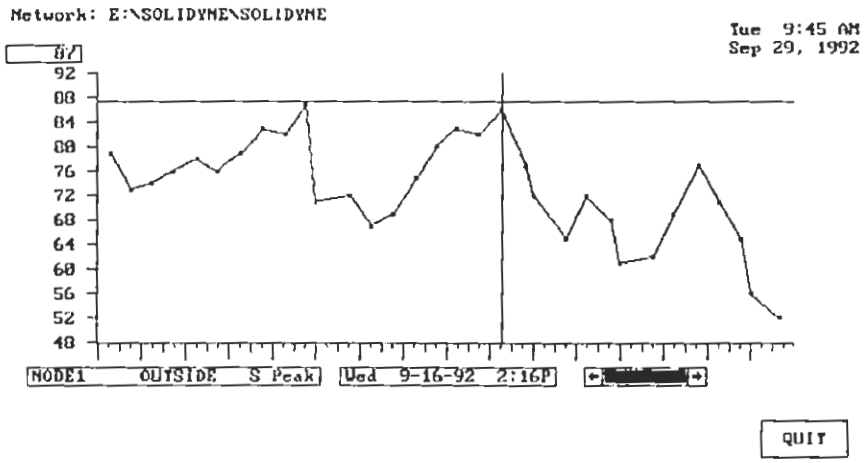

Fig. 12-3: Peak Graph

The mouse can be used to pinpoint the exact time, date and value of the peak. The mouse pointer will change to cross hairs as the mouse is moved onto the graph. The data box in the lower left corner will display the data for the location of the mouse. Move the mouse to the selected point.

The graph is created in an EGA mode. The graph can be output directly to printers with EGA or VGA capabilities. Several after market conversion utilities and printer drivers exist for printers without EGA or VGA capabilities.

Qtr hour

An average value is recorded every 15 minutes for each sensor. The controllers store the average values in a table for the previous 48 hours. The 48 hour data provides an excellent diagnostic tool for troubleshooting and fine tuning the control of the system.

Select Qtr hour, then select a sensor

The 48 hour information will be received for the selected sensor and displayed in a table, Figure 12-4.

SAVE

Qtr hour data can be saved if there is a current network loaded. The data will be merged with data that may have been previously saved for a selected sensor. Data that is saved to disk can be viewed OFF LINE by selecting Qtr hour then a sensor.

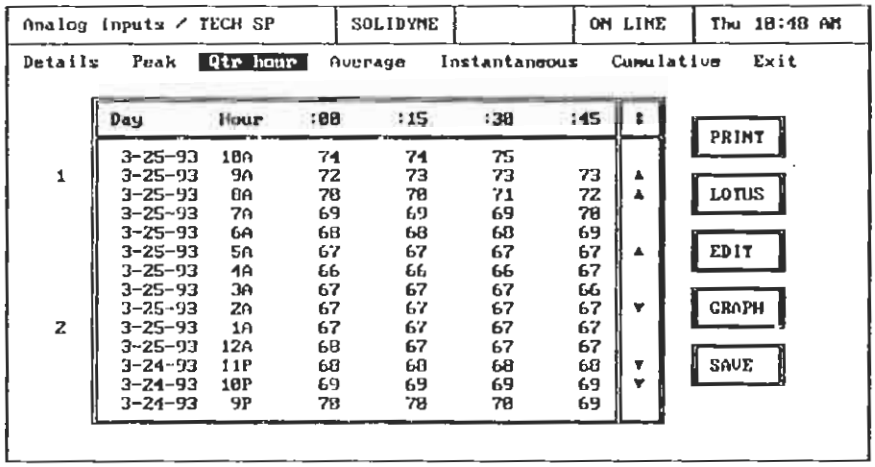

Fig. 12-4: Qtr Hour Table

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*Data can only be saved if there is a current network or changes have been made to entries in the Qtr hour table (See **Qtr hour, EDIT**)*

Select SAVE

The data will be added to a SENSXXY.QHR file and stored in the network subdirectory. The XX represents the node number and the Y represents the sensor number within that node. The quarter hour data for sensor 4 in node 16 would be stored in SENS164.QHR.

Data will be added to a SENSXXXY.QHR file and stored in the network subdirectory for nodes . 100. The XXX represents the node number and the Y represents the sensor number within that node. The quarter hour data for sensor 4 in node 112 would be stored in SENS1124.QHR.

PRINT

The tabular data can be output directly to a printer or to a file. The print operation for Qtr hour data functions as previously described for Peak data except RECENT will print out up to 48 hours of the most recent data.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

*Refer to Chapter 2 "**Installing the Software**" page 2-1 for details.*

COMMANDS FOR LOTUS TRANSFER USING FQH MACROS

1. Position cursor to upper-left corner of range to load peak date (e.g. {HOME}).

2.	**/FIN** *filename*.WK1. <Return>	loads Qtr Hour data from macro file
3.	**/FCCE** FQH.WK1 <Return>	loads Qtr Hour macro
4.	**/RNLR** <Return>	labels Qtr Hour macro
5.	<alt>F	executes macro on Qtr Hour data

Boldface letters are Lotus commands.

Note: The macros supplied are not compatible with Lotus 123 for Windows.

Table 12-2: Lotus Commands for Qhr data

LOTUS

LOTUS 123 users can convert the data into a format that can be imported by Lotus.

Select LOTUS

Specify a filename and directory path within the window, e.g. **C:\LOTUS\QTRHOUR4.WK1**. The FQH.WK1 macro can be used to convert the data to Lotus format. Copy the macro to your Lotus directory and follow the commands in Table 12-2.

EDIT

When Qtr hour data values are graphed (for PDC832GH), the Y-axis on the graph is determined by the highest and lowest Qtr hour data values in the table (auto-scale). At times, erroneous values may reside in the table due to a sensor failing, false offsets and multipliers etc. The erroneous values may cause difficulty in reading the graph for the values that are correct, due to the autoscaling.

EDIT allows a user to change data values that exist in the table. EDIT does not allow values to be deleted nor added to the table.

Select EDIT

The values within the table will become hilighted and can be updated, Figure 12-5. Once a value in the table has been changed, the SAVE box will appear. Select SAVE to save the changes made to the table. Click the mouse off the SAVE button to cancel any changes. A message will appear noting changes have been made to the table and have not been saved.

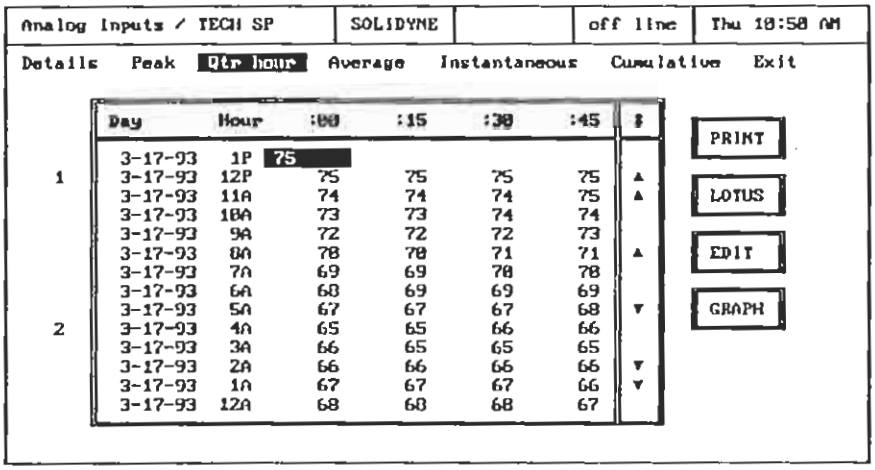

Fig. 12-5: Qtr Hour Edit

GRAPH (PDC832GH users only)

The Qtr hour data values can be graphically displayed as illustrated in Figure12-6. The graph is auto-scaling and can display up to 128 hours of data at one time.

Select GRAPH

The values displayed in the table will be displayed in the graph. Scroll through the table to display saved data from previous days. Use the time line button in the lower right corner to view data from previous months. Small adjustments are made by selecting the arrows. Large adjustments are made by selecting the button.

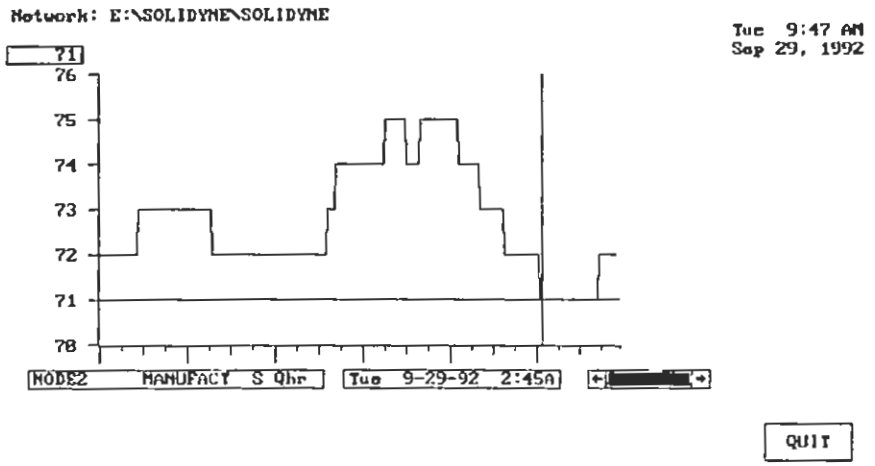

Fig. 12-6: Qtr Hour Graph

The mouse can be used to pinpoint the exact time, date and value of a specific point on the graph. The mouse pointer will change to cross hairs as the mouse is moved onto the graph. The data box in the lower left corner will display the data for the location of the mouse. Move the mouse to the selected point.

The graph is created in an EGA mode. The graph can be output directly to printers with EGA or VGA capabilities. Several after market conversion utilities and printer drivers exist for printers without EGA or VGA capabilities.

Average

The real time Average value is the instantaneous value average over the number of minutes selected within the Sensor Details menu, chapter 6. The setpoint programs will most likely use this value to determine the state of controlled loads.

Select Average

The average sensor values will be received for the two nodes currently displayed, Figure 12-7. These values will be constantly updated based on the update rate specified in the Controllers, Details, Configure menu.

Monitoring inputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

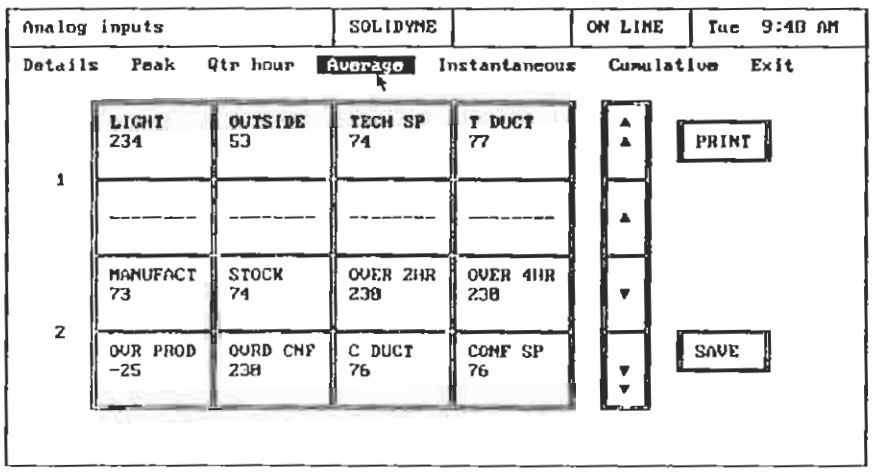

Fig. 12-7: Analog Inputs Average Values

SAVE

If there is a current network loaded, a snapshot of the Average sensor values can be taken using the SAVE option. The values will be written to an AVERAGE.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. Saved Average sensor values can be viewed OFF LINE by loading the network and selecting Average. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The average sensor values can be output directly to a printer or to a file. The print operation functions as previously described for Peak data.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIPEXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

Instantaneous

The real time instantaneous value is the exact value of the sensor at the time it was polled. Setpoint programs that require very fast response times will use this value to determine the state of controlled loads.

Select Instantaneous

The instantaneous sensor values will be received for the two nodes currently displayed, Figure 12-8. These values will be constantly updated based on the update rate specified in the Controllers, Details, Configure menu.

Monitoring inputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

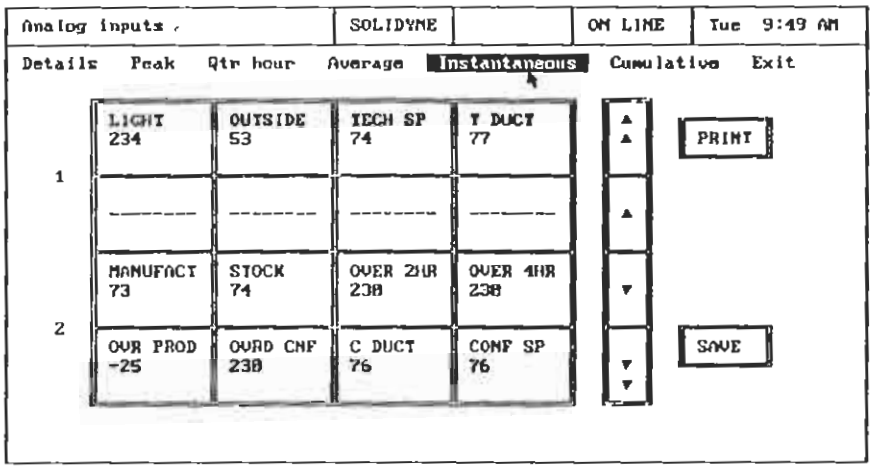

Fig. 12-8: Analog Inputs Instantaneous Values

SAVE

If there is a current network loaded, a snapshot of the Instantaneous sensor values can be taken using the SAVE option. The values will be written to an INSTANT.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. Saved Instantaneous sensor values can be viewed OFF LINE by loading the network and selecting Instantaneous. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The instantaneous sensor values can be output directly to a printer or to a file. The print operation functions as previously described for Peak data.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

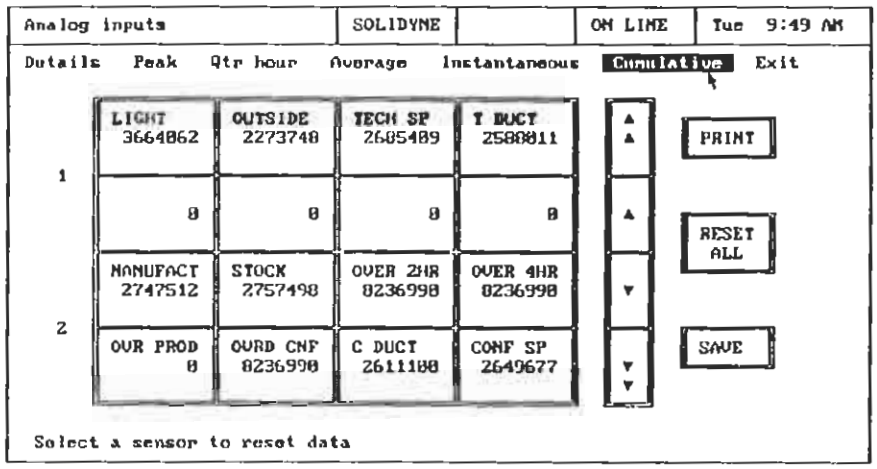

Fig. 12-9: Analog Inputs Cumulative Values

Cumulative

The Average sensor value is added to an accumulator every minute. The accumulation provides totalization data for pulsed inputs.

Select Cumulative

The cumulative sensor values will be received for the two nodes currently displayed, Figure 12-9. These values will be constantly updated based on the update rate specified in the Controllers, Details, Configure menu.

Monitoring inputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

SAVE

If there is a current network loaded, a snapshot of the Cumulative sensor values can be taken using the SAVE option. The values will be written to an ACCUMUL.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. Saved Cumulative sensor values can be viewed OFF LINE by loading the network and selecting Cumulative. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The cumulative sensor values can be output directly to a printer or to a file. The print operation functions as previously described for Peak data.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

RESET

The accumulator can be reset to 0 at any time. The sensors can be reset individually or all together.

Select a sensor

The accumulator for the selected sensor will be reset to 0.

Select RESET ALL

The accumulators for every sensor in the network will be reset to 0.

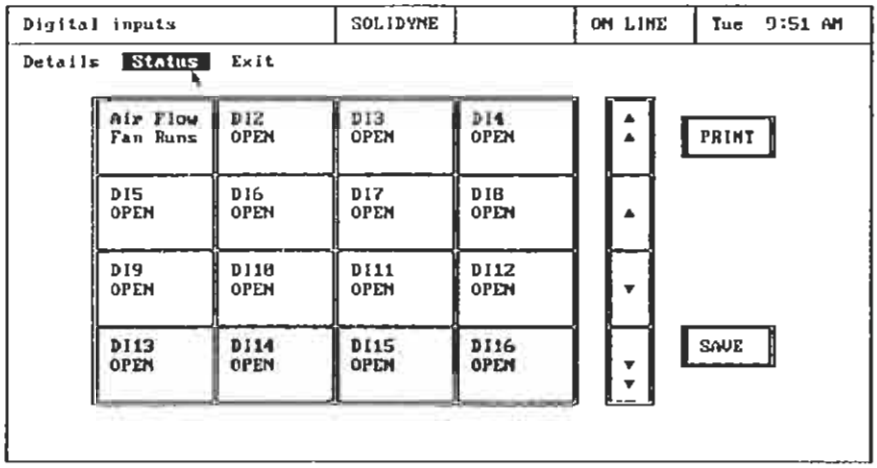

Fig. 12-10: Digital Inputs Screen

Digital Inputs

The status of digital inputs within XL9600 controllers can be monitored.

Select Controllers, Sensors, Digital inputs, Status

The instantaneous status will be received for the two nodes currently displayed, Figure 12-10. The status, displayed as OPEN or CLOSED, will be constantly updated based on the update rate specified in the Controllers, Details, Configure menu. Descriptive labels can be displayed instead of OPEN/CLOSED (refer to Chapter 6 "***Defining Sensor Details***").

Monitoring inputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

SAVE

If there is a current network loaded, a snapshot of the Digital Input status can be taken using the SAVE option. The status will be written to a DISTAT.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. Saved Digital Input Status sensor values can be viewed OFF LINE by loading the network and selecting Digital Input, Status. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The digital input status can be output directly to a printer or to a file. The print operation functions as previously described for Peak data.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

*Refer to Chapter 2 "**Installing the Software**" page 2-1 for details.*

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Chapter 13 - Monitoring Outputs

The Analog and Digital Outputs are monitored on a real time basis. The real time data can be used to evaluate and fine tune the efficiency of the system. The effects of program adjustments can be monitored as they happen. The computer must be ON LINE with a network prior to monitoring outputs (refer to chapter 10 "*Establishing a Communication Link*").

Load Operations

Select Controllers, Loads

ON LINE load operations include Manual Switch, Status, On Time, Override Time, Qtr hour and RTA, Figure 13-1.

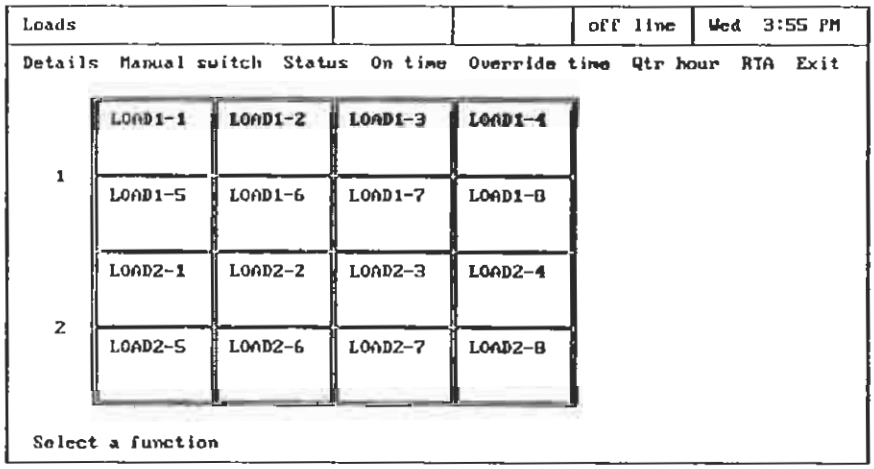

Fig. 13-1: Load Operations

Note: *Communication Data and Error displays can be suppressed. Refer to the section describing the Configure option under Details described in Chapter 10 "**Establishing Communications** ".*

Manual switch

Manual switch can be used to toggle the status of digital loads.

Select Manual switch

The status of the loads will be received and displayed, Figure 13-2. Digital output status will be displayed as ON/OFF while Analog output status (PWM rate) will be represented by a percentage between 0% and 100%. The status will be constantly updated based on the update rate specified in the Controllers, Details, Configure menu.

Monitoring outputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

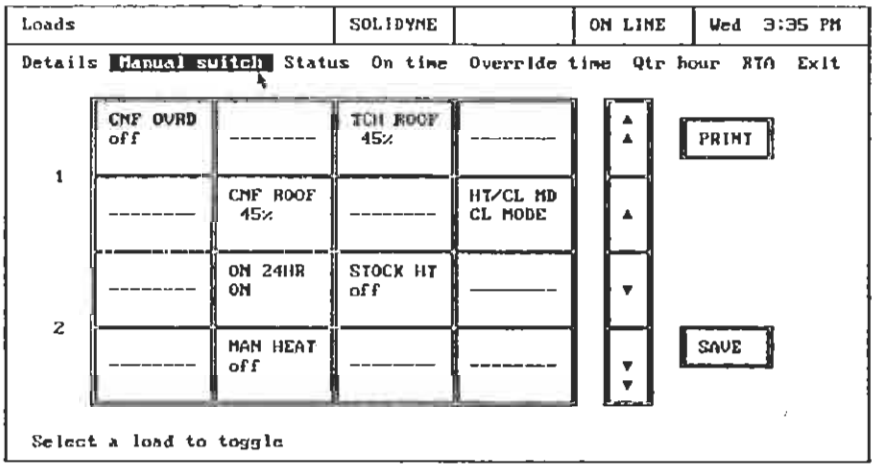

Fig. 13-2: Manual Switch

The digital status can be individually toggled on a load by load basis. Analog outputs are not effected by Manual switch.

Select the load to toggle

A command will be sent to the controller for the selected load. The command, similar to a Time of Day setpoint, will be processed by the controller at the next time change. If the program in the controller does not agree with the manual switch, the load will not be toggled. Manual Switch is not an OVERRIDE.

***CAUTION:** Use extreme care when toggling loads to avoid erralic and/or potentially dangerous equipment operation.*

SAVE

If there is a current network loaded, a snapshot of the Manual Switch status can be taken using the SAVE option. The status will be written to a DORAW.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. Saved Manual Switch status values can be viewed OFF LINE by loading the network and selecting Manual Switch. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The output status can be output directly to a printer or to a file.

Select PRINT

A printout selection window will appear. The print device can be selected. The default device is printer. This device will make use of the DOS PRINT command, allowing the printer to print while the computer is free to perform other tasks. Refer to a DOS manual for more details. However, some computers may require the device to be specified as LPT1.

Select the printer device and enter LPT1

The printout will now be directed to parallel port 1, without the use of the DOS PRINT command.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

*Refer to Chapter 2 "**Installing the Software**" page 2-1 for details.*

The output status can also be written to a filename by entering the filename as the device. The data will be written to disk under the selected name in a tabular format. The file can then be examined and printed using DOS commands.

***NOTE:** The manual switch will be overridden by active setpoints currently controlling the load. Manual switch is not a program override. If a setpoint is currently controlling the selected load, manual switch will not be allowed to toggle the status. Active setpoint programs can be disabled, allowing Manual Switch to control the loads (refer to chapter 11 "**Modifying an Existing Program**").*

Status

Status can be used to monitor the status of digital and analog outputs.

Select Status

The status of the loads will be received and displayed, Figure 13-3. Digital output status will be displayed as ON/OFF while Analog output status (PWM rate) will be represented by a percentage between 4% and 96%. The status will be constantly updated based on the update rate specified in the Controllers, Details, Configure menu.

Monitoring outputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

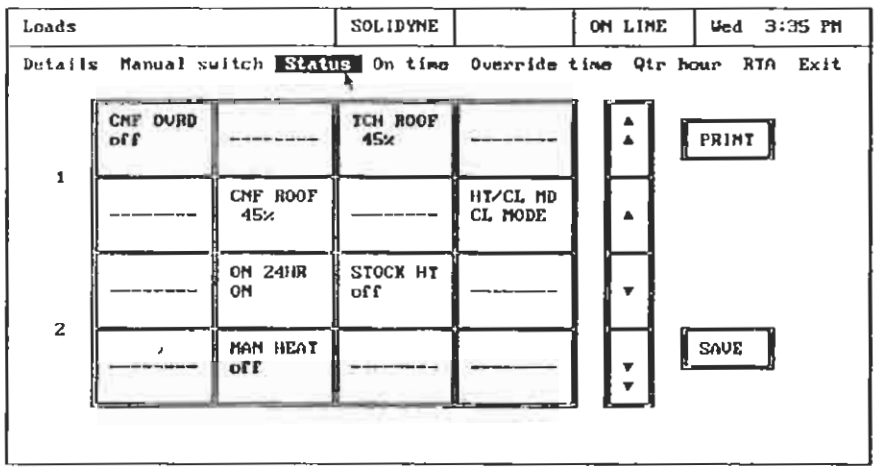

Fig. 13-3: Load Status

SAVE

If there is a current network loaded, a snapshot of the Status screen can be taken using the SAVE option. The status will be written to a DOSTAT.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. A saved Status screen can be viewed OFF LINE by loading the network and selecting Status. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The output status can be output directly to a printer or to a file. The print operation functions as previously described for Manual switch.

On time

The total number of hours and minutes each load has been digitally commanded ON is recorded by the controllers. The run time will be accumulated up to 9999 hours and 59 minutes with 1 minute intervals.

Select On time

The accumulated run time will be received for the two nodes currently displayed, Figure 13-4. These values will be constantly updated based on the update rate specified in the Controllers, Details, Configure menu.

Monitoring outputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

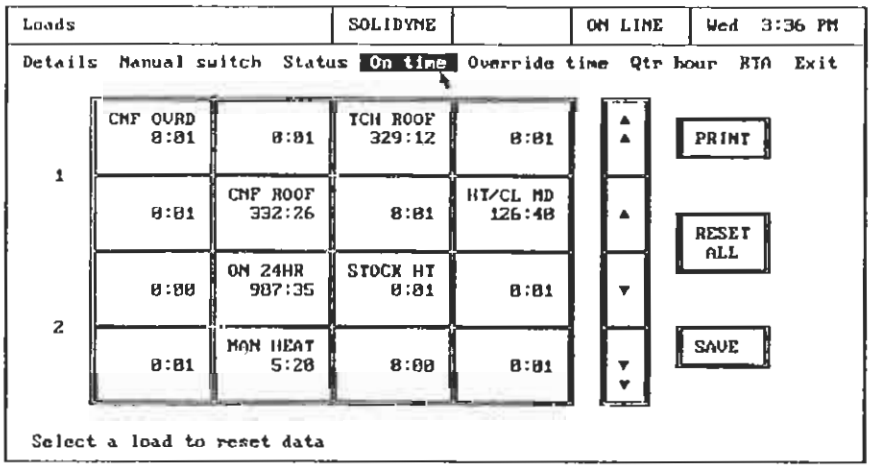

Fig. 13-4: Load On Times

SAVE

If there is a current network loaded, a snapshot of the On time screen can be taken using the SAVE option. The values will be written to an ONTIME.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. A saved On time screen can be viewed OFF LINE by loading the network and selecting On time. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The load run times can be output directly to a printer or to a file. The print operation functions as previously described for Manual Switch.

RESET

The run time accumulators can be reset to 0 at any time. The loads can be reset individually or all together.

Select a load

The run time accumulator for the selected load will be reset to 0.

Select RESET ALL

The run time accumulators for every load in the network will be reset to 0.

Override time

The total number of hours and minutes each load has been Overridden ON is recorded by the controllers. The override time will be accumulated up to 9999 hours and 59 minutes with 1 minute intervals.

Select Override time

The accumulated override time will be received for the two nodes currently displayed, Figure 13-5. These values will be constantly updated based on the update rate specified in the Controllers, Details, Configure menu.

Monitoring outputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

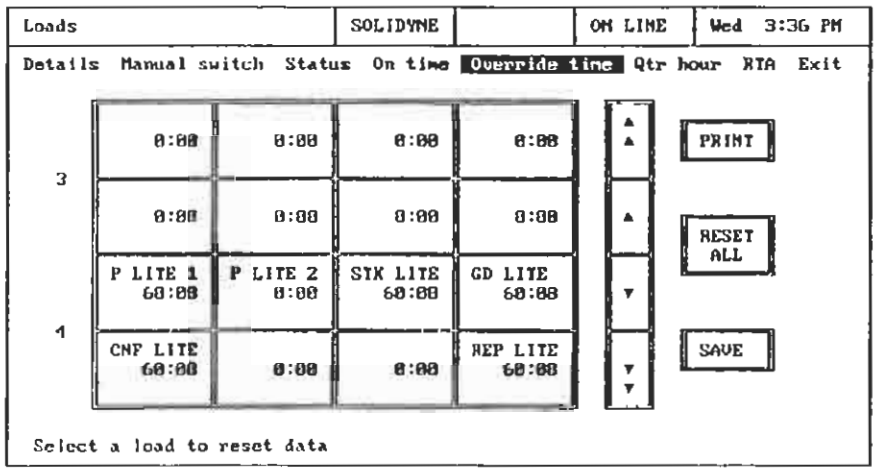

Fig. 13-5: Load Override Times

SAVE

If there is a current network loaded, a snapshot of the Override time screen can be taken using the SAVE option. The values will be written to an OVERRIDE.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. A saved Override time screen can be viewed OFF LINE by loading the network and selecting Override time. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The load override times can be output directly to a printer or to a file. The print operation functions as previously described for Manual Switch.

RESET

The override accumulators can be reset to 0 at any time. The loads can be reset individually or all together.

Select a load

The override accumulator for the selected load will be reset to 0.

Select RESET ALL

The override accumulators for every load in the network will be reset to 0.

Qtr hour

An average run time/PWM value is recorded every 15 minutes for each load of a Clipper XLLSP or XLHC. Digital outputs will record the amount of time the load was commanded ON over the 15 minute period. Analog outputs will record the average PWM percentage for the 15 minute period. The controllers store the average values in a table for the previous 48 hours. The 48 hour data provides an excellent diagnostic tool for troubleshooting and fine tuning the control of the system.

Select Qtr hour

Select a load

The 48 hour information will be received for the selected load and displayed in a table, Figure 13-6. If there is a current network loaded, the data will be merged with any previously saved data for the selected load.

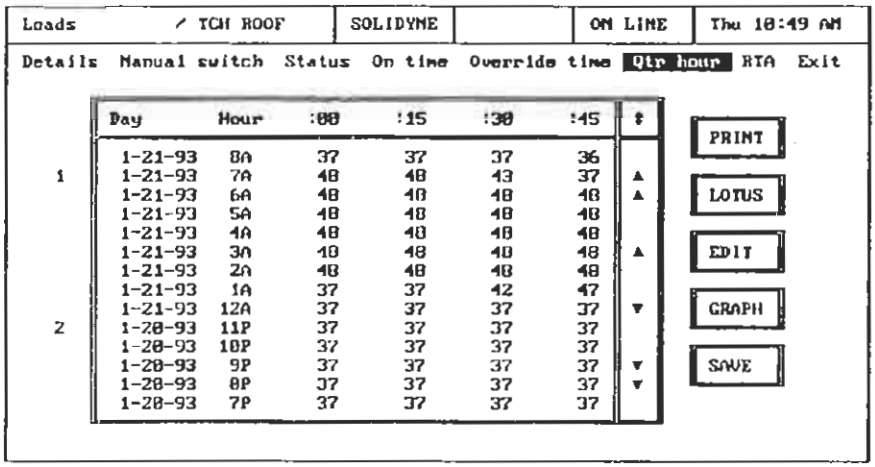

Fig. 13-6: Load Qtr Hour Table

SAVE

Qtr hour data can be saved if there is a current network loaded. The data will be merged with data that may have been previously saved for the selected load.

Select SAVE

The data will be added to a LOADXXY.LDQ file and stored in the network subdirectory. The XX represents the node number and the Y represents the load number within that node. The peak data for sensor 8 in node 10 would be stored in LOAD108.LDQ.

Data will be added to a LOADXXXY.QHR file and stored in the network subdirectory for nodes . 100. The XXX represents the node number and the Y represents the load number within that node. The quarter hour data for load 4 in node 112 would be stored in LOAD1124.QHR.

Data that is saved to disk can be viewed OFF LINE, by selecting Qtr hour then a load.

PRINT

Select PRINT

A printout selection window will appear, Figure 13-7. If there is a current network, the default setting (all) will output all the data displayed, including data saved previously.

Toggling to recent will print out up to 48 hours of the most recent data.

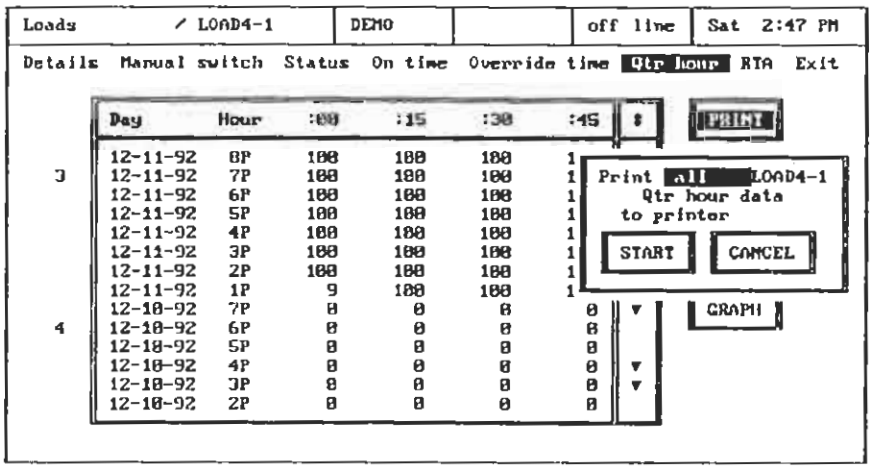

Fig. 13-7: Load Qtr Hour Table - Print

Select the data to print

The print device can also be selected. The default device is printer. This device will make use of the DOS PRINT command, allowing the printer to print while the computer is free to perform other tasks. Refer to a DOS manual for more details. However, some computers may require the device to be specified as LPT1.

Select the printer device and enter LPT1

The printout will now be directed to parallel port 1, without the use of the DOS PRINT command.

The Qtr hour load data can also be written to a filename by entering the filename as the device. The data will be written to disk under the selected name in a tabular format. The file can then be examined and printed using DOS commands.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

COMMANDS FOR LOTUS TRANSFER USING FQH MACROS

1. Position cursor to upper-left corner of range to load peak date (e.g. {HOME}).

2.	**/FIN** *filename*.WK1. <Return>	loads Load Qtr Hour data from macro file
3.	**/FCCE** FQH.WK1 <Return>	loads Load Qtr Hour macro
4.	**/RNLR** <Return>	labels Load Qtr Hour macro
5.	<alt>F	executes Load Qtr Hour macro on data

Boldface letters are Lotus commands.

Note: The macros supplied are not compatible with Lotus 123 for Windows.

Table 13-1: Lotus 123 Commands for Load Qtr Hr data

LOTUS

LOTUS 123 users can convert the data into a format that can be imported by Lotus.

Select LOTUS

Specify a filename and directory path within the window, e.g. **C:\LOTUS\QTRHOUR5.WK1**. The FQH.WK1 macro can be used to convert the data to Lotus format. Copy the macro to your Lotus directory and follow the commands in Table 13-1.

EDIT

When Load Qtr Hour values are graphed (for PDC832GH), the Y-axis on the graph is determined by the highest and lowest data values in the table (auto-scale). Some values may cause difficulty reading the graph.

EDIT allows a user to change data values that exist in the table. EDIT does not allow values to be deleted nor added to the table.

Select EDIT

The values within the table will become hilighted and can be updated. Once a value in the table has been changed, the SAVE box will appear. Select SAVE to save the changes made to the table. Click the mouse off the SAVE button to cancel any changes. A message will appear noting changes have been made to the table and have not been saved.

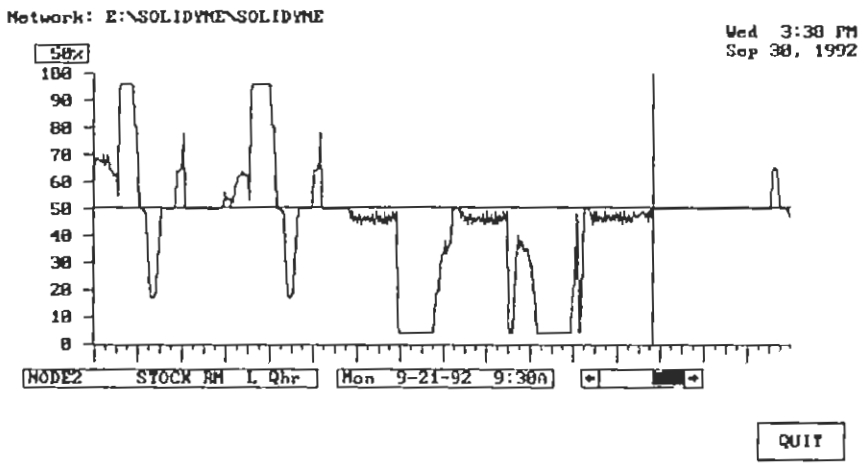

Fig. 13-8: Graph of Load Qtr Hour

GRAPH (PDC832GH users only)

The Qtr hour data values can be graphically displayed as illustrated in Figure 13-8. The graph can display up to 128 hours (about 5 days) of data at one time.

Select GRAPH

The values displayed in the table will be displayed in the graph. Scroll through the table to display saved data from previous days. Use the time line button in the lower right corner to view data from previous months. Small adjustments are made by selecting the arrows. Large adjustments are made by selecting the button.

The mouse can be used to pinpoint the exact time, date and value of a specific point on the graph. The mouse pointer will change to cross hairs as the mouse is moved onto the graph. The data box in the lower left corner will display the data for the location of the mouse. Move the mouse to the selected point.

The graph is created in an EGA mode. The graph can be output directly to printers with EGA or VGA capabilities. Several after market conversion utilities and printer drivers exist for printers without EGA or VGA capabilities.

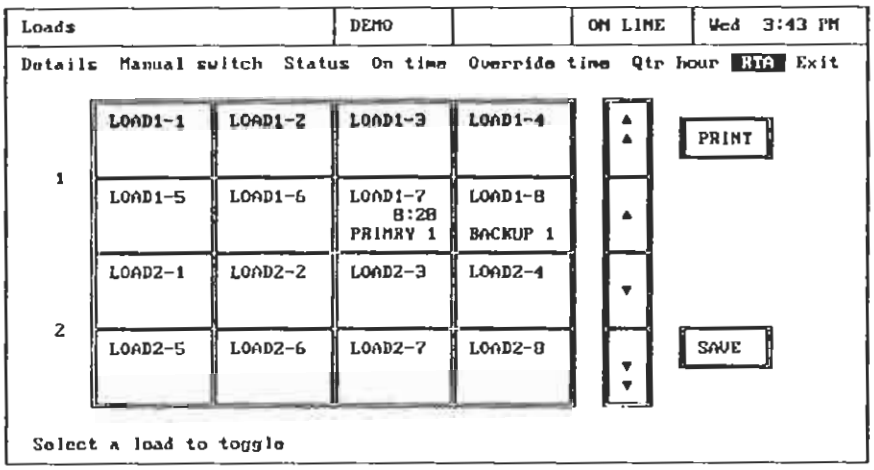

Fig. 13-9: RTA Run Time Actions

RTA Run Time Actions

Run time actions involve the switching control programs from primary loads to backup loads. At a predetermined run time limit the control programs for the primary load will be switched to the backup load. The primary load will be shut down and an alarm can be generated. When RTA is selected, the primary and backup loads will be identified along with the number of hours and minutes of run time remaining before the switch occurs.

Select RTA

The RTA data will be received and displayed for the two nodes currently displayed, Figure 13-9.

A negative time represents the number of hours and minutes that have elapsed since the switch occurred. A flashing load indicates the switch is pending.

Monitoring outputs for an extended period of time can interfere with internal network communications. If the software is to be left in a monitoring mode, enter an Update Rate that is four (4) times greater than the number of nodes in the network.

SAVE

If there is a current network loaded, a snapshot of the RTA status screen can be taken using the SAVE option. The values will be written to a RTBA.SNP file and stored in the network subdirectory. Previous data will be overwritten by the current snapshot. A saved RTA status screen can be viewed OFF LINE by loading the network and selecting RTA. When viewed OFF LINE, the saved data will be displayed along with the time and date of the snapshot.

PRINT

The RTA data can be output directly to a printer or to a file. The print operation functions as previously described for Manual Switch.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

*Refer to Chapter 2 "**Installing the Software**" page 2-1 for details.*

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Chapter 14 - Multigraph (PDC832GH)

Multigraph allows you to display up to four (4) graphs simultaneously. The four graphs can be any combination of peak sensor, quarter hour sensor and quarter hour load data. The ability to compare sensor and load data creates a powerful diagnostic/evaluation tool for system performance. Comparing electric demand to load run time, indoor temperature to A/C run time, static pressure and duct temperature to room temperature, etc., can provide performance information about the system operation that might otherwise go unnoticed. Multigraph presents the data necessary for the programmer to fine tune the control sequence for optimum system performance.

Setup

Load a network in which data has been saved or establish a communication link to retrieve ON LINE data before selecting Multigraph.

Select Multigraph

A Multigraph Plot Specification window will appear, Figure 14-1. The Plot type, Device, Plot start and Plot finish can be selected.

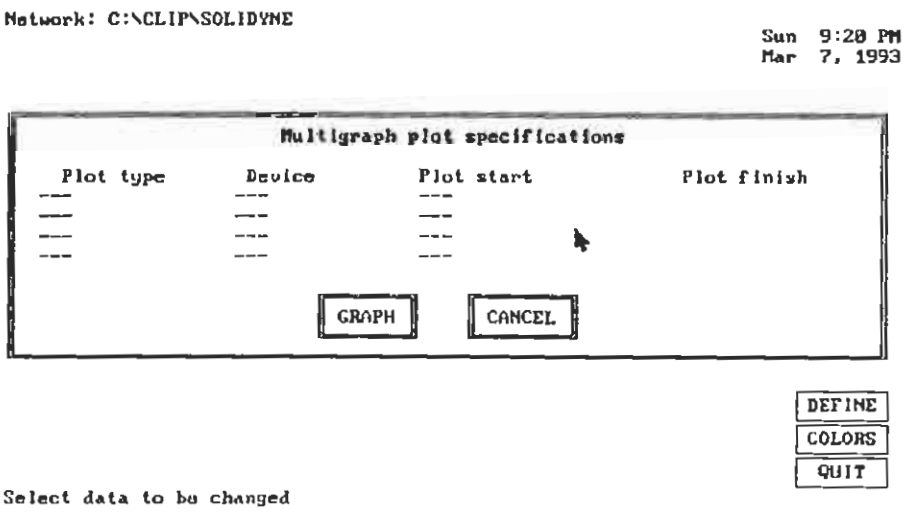

Fig. 14-1: Multigraph Plot Specification Window

Plot type

The plot type can be toggled between Sensor Peak, Sensor Quarter Hour and Load Quarter Hour data. Up to four graphs can be displayed simultaneously using any combination of plot types.

Device

The data will be graphed for the sensor/load selected as the device. The device can be any sensor or load in the network.

Plot Start/Finish

The range of data to be displayed can be specified. The default range will include all data saved to disk. A specific range can be specified by entering the start and finish dates for the graph.

Displaying the Graphs

The color coded graphs for the selected devices will be displayed simultaneously.

Select GRAPH

A system that is OFF LINE can display data that had been saved to disk. An ON LINE system will receive and display the latest data for each device along with the data saved on disk.

Sensor and load information will be displayed on the same screen, Figure 14-2. The Y-axis along the left side will auto-scale based on logged sensor information. The Y-axis along the right side will be scaled for load quarter hour data, from 0% to 100%. The X-axis will provide the time scale.

Identification boxes are displayed for each graph along the bottom of the screen. The values within these boxes will identify the location of the mouse, for the respective graph.

The buttons to the right of the identification boxes are used to adjust the time scale. The time scales can be adjusted individually or as a group. The arrows on each side of the button will individually increment the time scale forward or backward. Select the arrow icon and press the left button on the mouse to increment the graph.

Large adjustments can be made by selecting the button directly. Place the mouse on the button. Pick up the button by depressing the left button on the mouse. Move the mouse up or down the time line. Drop the button when the desired data is displayed by again depressing the left button on the mouse.

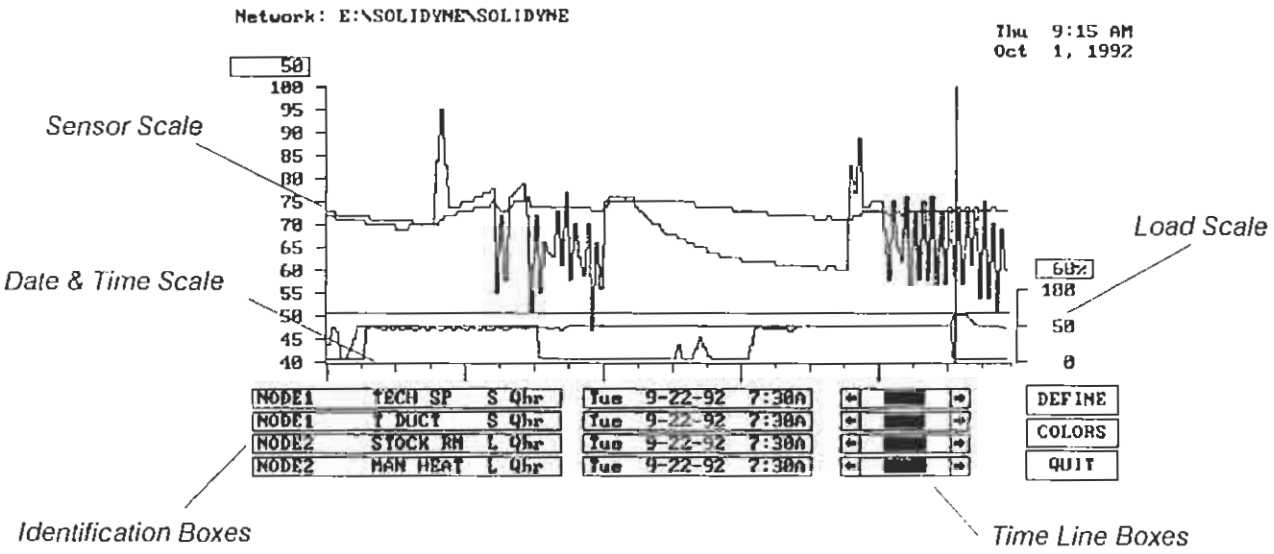

Fig. 14-2: Multigraph Display

The graphs will move as a group when the top button is selected. The second, third and fourth buttons will individually increment their respective graphs.

Define

The displayed graphs can be redefined be selecting DEFINE. The multigraph plot specification window will reappear, Figure 14-3. Changes can be made to the specifications and graphed.

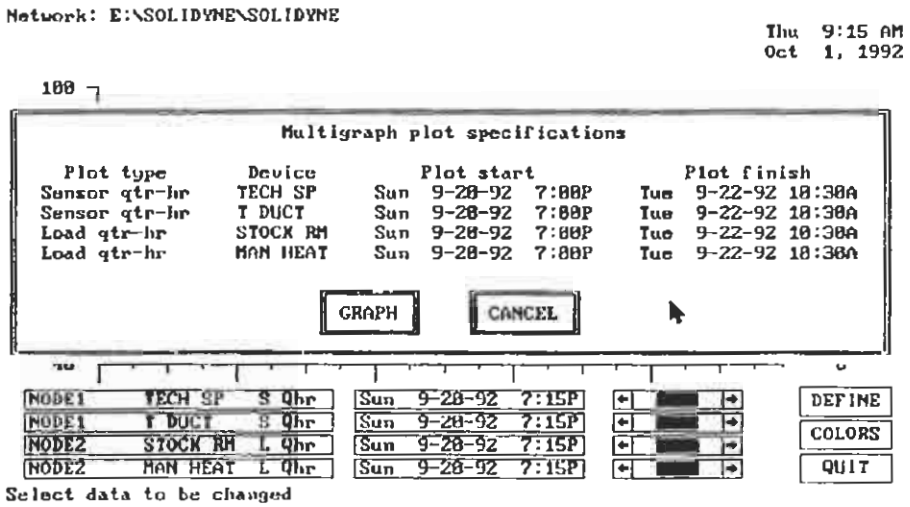

Fig. 14-3: Multigraph Define

Colors

The colors for the background, axes, crosshairs, buttons, lines and dots are user programmable.

Select Colors

A Multigraph Colors window will pop-up, Figure 14-4.

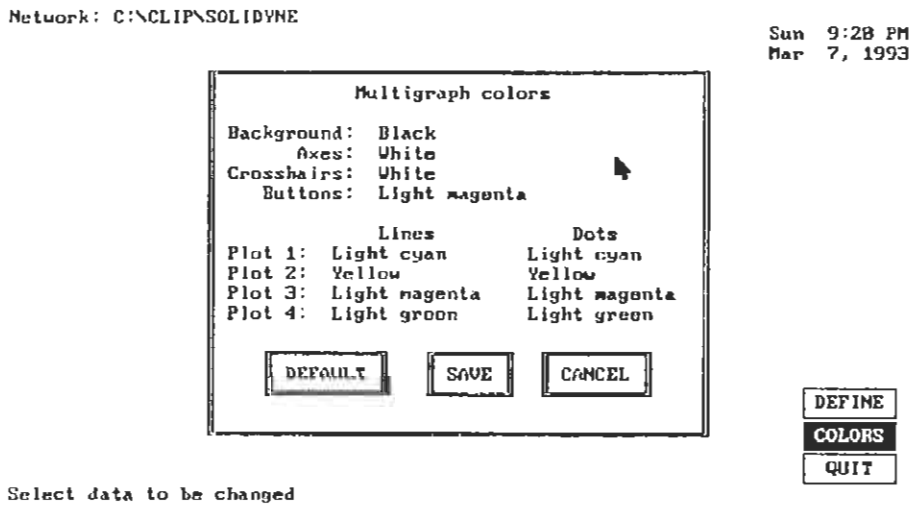

Fig. 14-4: Multigraph Colors Configuration Window

Select the color of the item to change.

Select the desired color for the item, Figure 14-5. Once all the colors have been selected, select SAVE. The new color selection will be displayed in all graph modes. The colors selected for Plot 1 will be displayed in single sensor/load graphs.

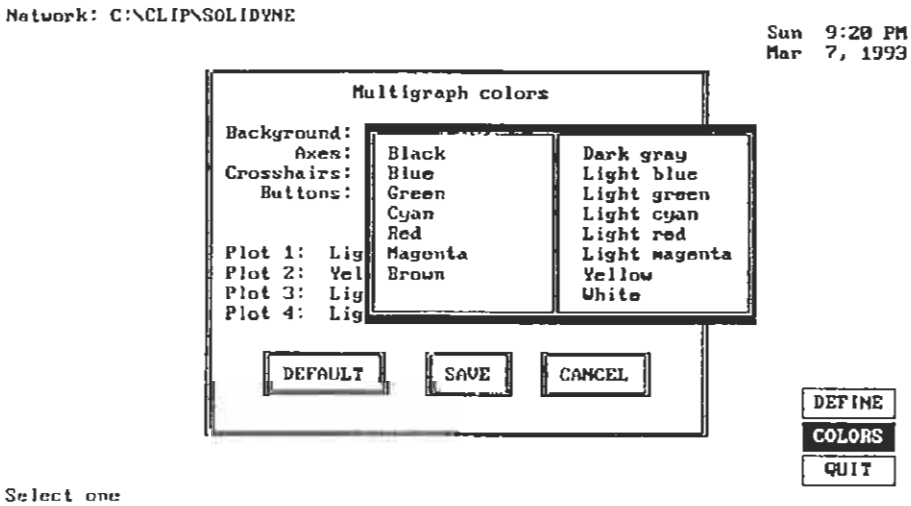

Fig. 14-5: Multigraph Colors Configuration Window

Chapter 15 - Alarms

ClipperNet, IZAC and XL9600 controllers can generate alarms for a variety of situations. Alarms can be triggered by any input in the network when the input exceeds a programmable limit based on temperature, humidity, pressure, demand, light, moisture, contact closure, etc.

Alarms can also be triggered by load ON TIME. Controllers capable of RTA (Run Time Actions) can trigger alarms when a load ON TIME limit is exceeded.

Functions

The alarms are transmitted to direct or remote connect computers. The controllers will check for any ON LINE computers when an alarm is triggered. The alarm condition will be transmitted directly to an ON LINE (direct or remote) computer if the PC Phone Number of the computer matches the Alarm Dial Out number within the controller. If the numbers do not match, the ON LINE computer will be disconnected and the controller will dial the Alarm Dial Out number.

The alarm will be displayed in one of three formats, depending on the priority assigned to alarm. A priority level 1 alarm will display a bright red alarm window on top of the current window, Figure 15-1. A priority level 2 alarm will display a cyan alarm window. A priority level 3 alarm will not display an alarm window. All three priority levels will flash ALARM along the bottom of the screen, beep occasionally and record the alarm in Current Alarm log.

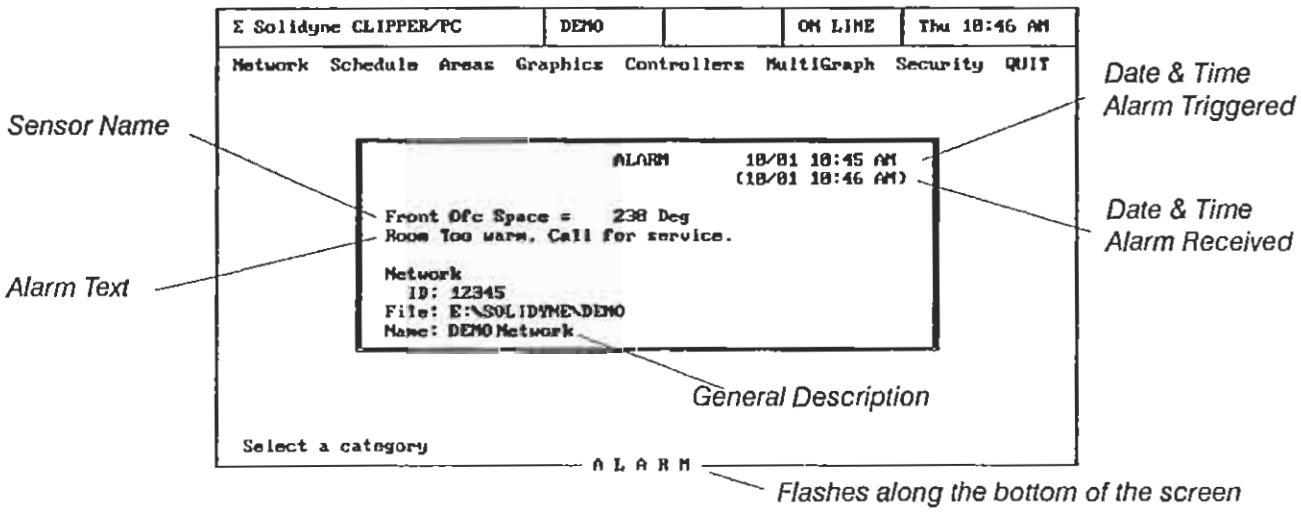

Fig. 15-1: Priority 1 Alarm Screen

The priorities of alarms are specified within the Sensor and Load Details menus. See Chapters 6,7 "Defining Sensor Details, Defining Load Details"

The alarm window will display the time and date the alarm was triggered and received, the sensor or load that triggered the alarm, the alarm text and the network information.

ALARM will flash on the bottom of the screen and an audible beep will sound every minute after an alarm is received, until the alarm is manually acknowledged.

Current

The Current alarm log displays all the alarms that have occurred since the last Save was performed.

Select Controllers, Alarms

Viewing the current alarm log acknowledges alarms that have just occurred. The alarms that have occurred since the current log was last viewed will be displayed with a red background. Current alarms that have already been acknowledged will be displayed with a white background, Figure 15-2.

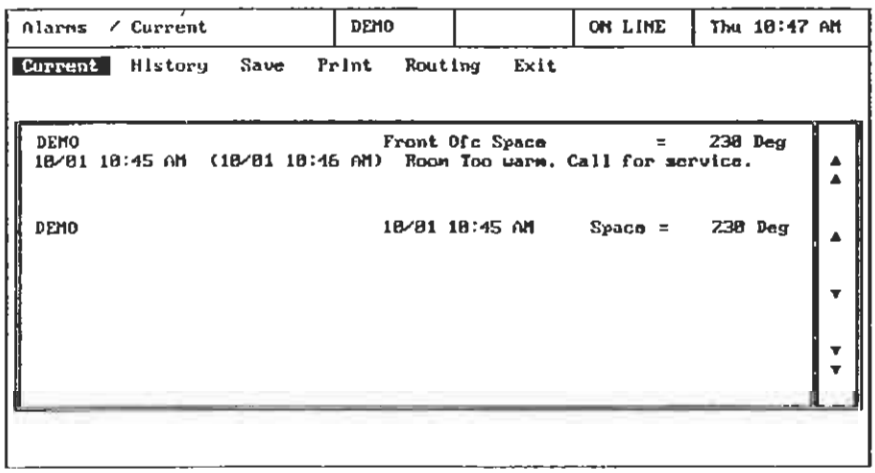

Fig. 15-2: Current Alarm Log

Save

The current log can be saved to disk under a selected filename. Alarm logs can be archived as often as necessary (weekly, monthly, yearly) depending on the number of alarms received.

Select Save

A filename assignment window will appear, Figure 15-3. Enter a filename, up to 8 characters. The entire current alarm log will be saved to disk under the name selected. Alarm logs are always stored in the same directory as the CLIP.EXE file.

The file cannot be appended by saving to the same name twice. It will be overwritten.

The current alarm log will now be empty.

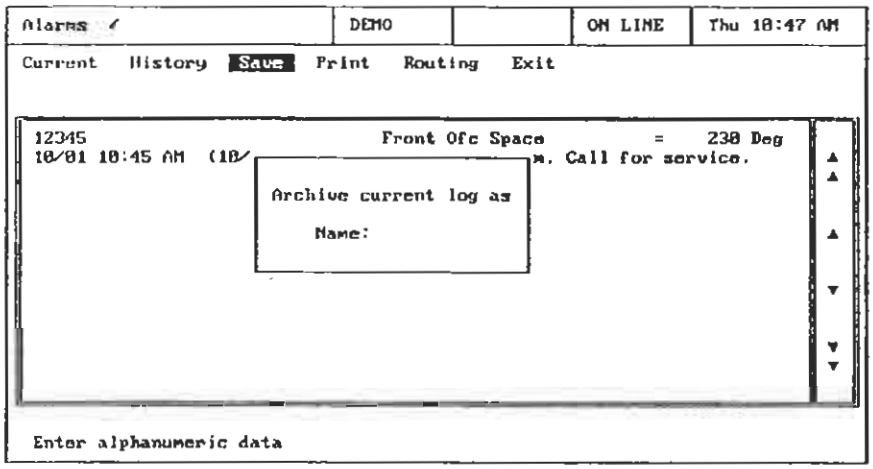

Fig. 15-3: Saving Alarm Logs

History

History allows access to previously saved alarm logs.

Select History

A table of archived alarm logs will appear, Figure 15-4. The top line of the table is the Current Directory Line (CDL). The table displays all the alarm logs and subdirectories that exist within the current directory.

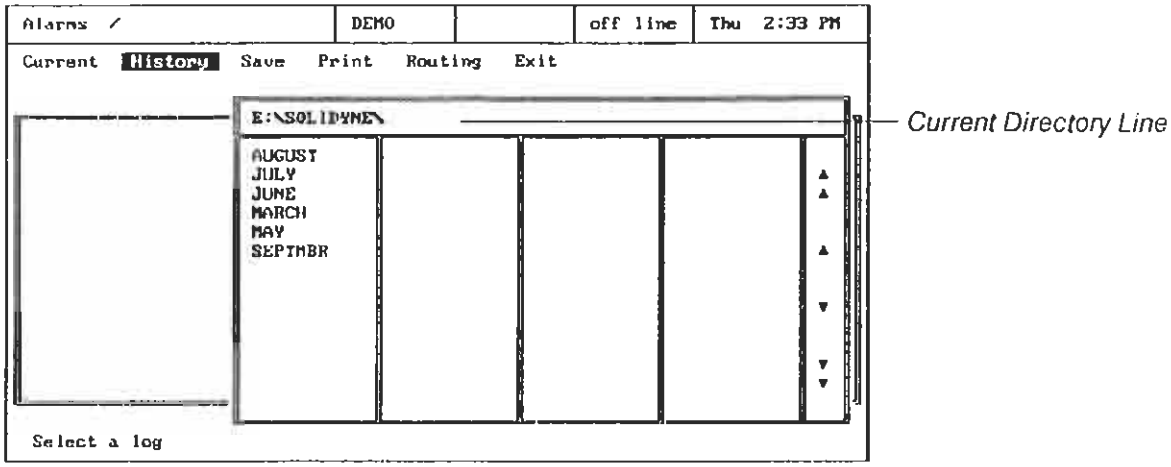

Fig. 15-4: Retrieving History Logs

Select an alarm log

The alarms within the selected file will be displayed.

Since alarm logs are always stored in the same directory as the CLIP.EXE file, the CDL on the Alarm History table is not updateable. Any alarm logs that have been saved will be shown in the table under the current CDL.

Print

The displayed alarm log can be output to a printer or to a file.

Select Print

The print device for the current log can be selected. The default device is printer. This device will make use of the DOS PRINT command, allowing the printer to print while the computer is free to perform other tasks. Refer to a DOS manual for more details. However, some computers may require the device to be specified as LPT1.

Select the printer device and enter LPT1

The printout will now be directed to parallel port 1, without the use of the DOS PRINT command.

The alarm log can also be printed to a filename by entering the filename as the device. The alarm information will be written to disk under the selected name in a printout format. The file can then be examined and printed using DOS commands.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

Routing

Networks that are monitored by multiple direct connect computers may route specific alarms to specific computers. The alarm destination can be selected within the Sensor and Load Details menus. The direct connect computers will be assigned a name and node number.

Select Routing

A configuration window will appear, Figure 15-5. The PC name, Node # and Auxiliary printing information will be entered through this window.

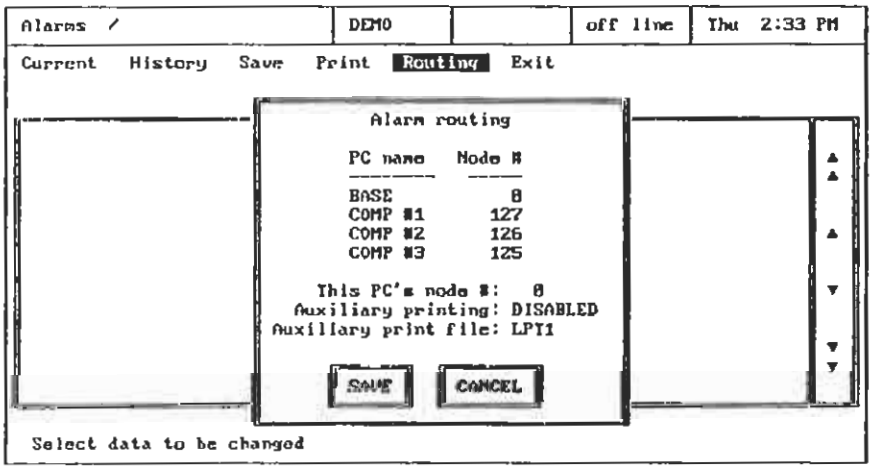

Fig. 15-5: Routing Configuration Window

PC Name

PC Name identifies the computers that are direct connected to the network. The names of the PCs will appear in a table when an Alarm Destination is selected (Configured through the Sensor and Load Details). The "BASE" PC controls the routing of the alarms. The name BASE cannot be changed.

Node #

The node number provides an address for each direct connected computer on the network. The BASE PC is assigned node 0. The node numbers of other PCs will be used by the BASE PC to route alarms. The PC node numbers cannot duplicate node numbers assigned to controllers. The PC name must be assigned prior to entering the node number. Valid PC Node numbers range from 0-127.

The PC Name and Node # assignments should be duplicated in each computer.

This PC's node number

Default value 0. Assigns a node number to the computer currently being programmed. The number entered can be from 0 to 127, as long as it does not duplicate a node number assigned to a controller.

One direct connected computer must be selected to be node 0. The BASE computer controls the routing of alarms to the other computers.

Auxiliary printing

Direct and Remote connect computers can be configured to print alarms as they are received. Toggle Auxiliary printing selection to ENABLED. The alarms will be printed to the selected device as they occur.

Auxiliary print file

The alarms can be output to a printer or to a file.

The print device for the alarms can be selected. The default device is LPT1. The printout will be directed to parallel port 1.

The alarms can also be printed to a filename by entering the filename as the device. The alarm information will be written to disk under the selected name in a printout format. The file can then be examined and printed using DOS commands.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

*Refer to Chapter 2 "**Installing the Software**" page 2-1 for details.*

Operation

The BASE PC acts as a receive and transfer station of alarms. As the BASE PC receives alarms from the Clipper network, it routes the alarms to other PCs that are also direct connected and ONLINE with the network. The BASE PC routes the alarms to other PCs based on the Alarm destinations assigned to the alarms in the Sensor and Load Details screens (Chapter 6 ***Defining Sensor Details*** or Chapter 7 ***Defining Load Details***).

The BASE PC as well as the other direct connected PCs must be ONLINE to receive routed alarms.

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Chapter 16 - Graphics (PDC832GH)

Graphics are created to enhance the monitoring capabilities of the software package. Combining graphic images with real time data enables untrained personnel to intelligently monitor system performance. Graphics can be simple or complex, depending on the application and user knowledge.

Background Graphics

The background graphics must be created in a 640 by 350, 16 color EGA mode with either a .PIC or .PCX extension. PC Paint Plus, a paint program included with the PDC832GH software package, creates graphic files with .PIC extensions. PC Paint Brush, a popular paint program available at most computer stores, creates files with .PCX extensions.

Choose a paint program and create the background graphics for your system. The graphics can reside in separate directories if desired.

The picture will be distorted if the graphic is created in a mode other than 640 by 350.

Creating a Working Graphic

A working graphic is created by combining the background graphic with real time data. Select Controllers, Graphics, New

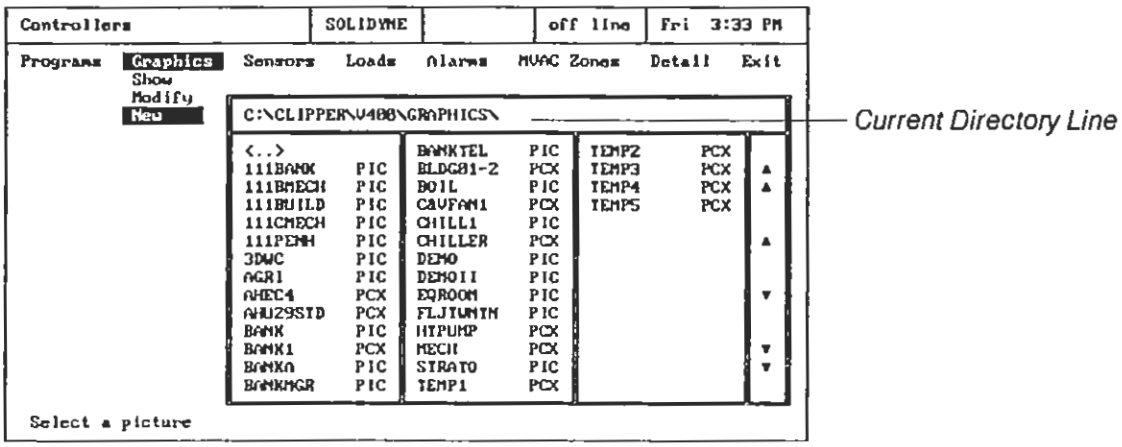

Fig. 16-1: Graphics Files Table

A table of background graphic files will appear, Figure 16-1. The top line of the table is the Current Directory Line (CDL). The table displays all the graphic files and subdirectories that exist within the current directory.

Select a graphic

The selected graphic file will be displayed with a list of functions, Figure 16-2.

Background graphics can be loaded from other directories by selecting the directory and then selecting the file within the directory. Subdirectories, enclosed in angle brackets , and parent directories <..> can be accessed from the table. Directories can also be accessed by typing the path for the directory on the CDL. Conventional DOS notation should be used when entering the names of other directories and/or drives, e.g. **D:\Clipper\Solidyne\Graphics.**

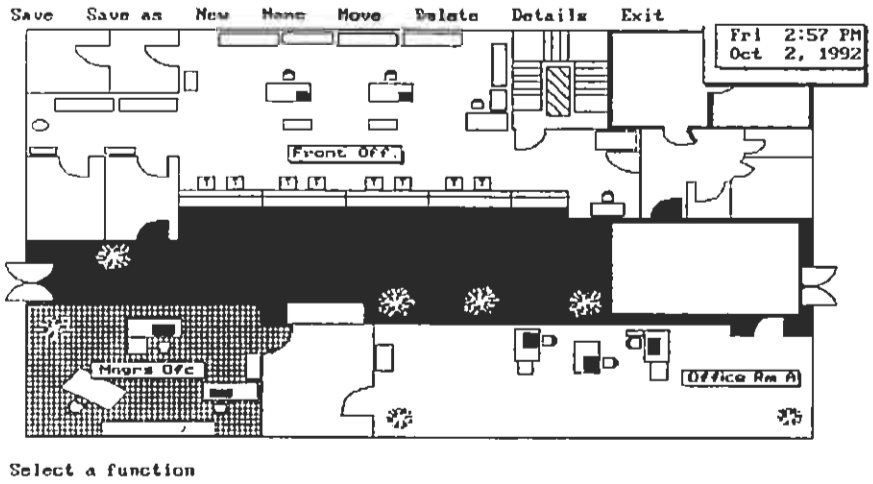

Fig. 16-2: Graphics Setup Screen

New

New devices are added to background graphics, creating working graphics. When a working graphic is activated (Show), the computer will poll the system for specific data and display the current status at the selected locations on the graphic. A single working graphic can display the status of devices from several nodes.

Select New

A device selection window will appear, Figure 16-3. The device options are Load, Analog input, Digital input, Text, Area target & state and MVAC zones.

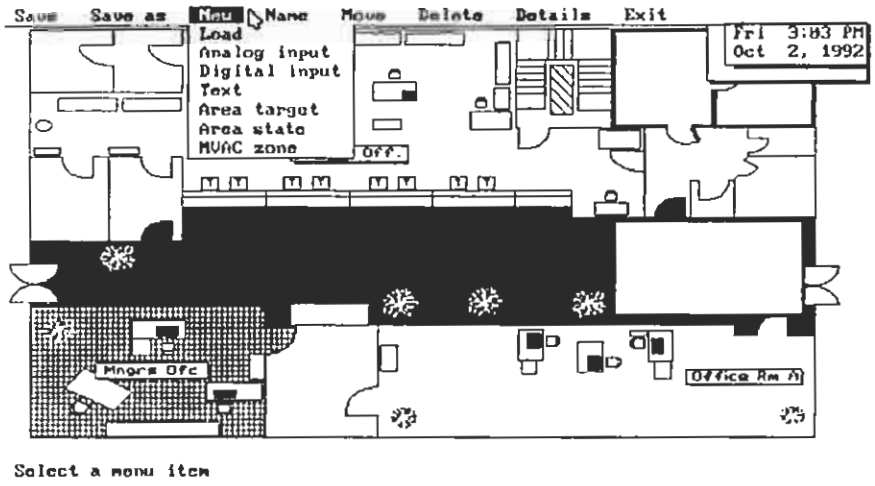

Fig. 16-3: Graphics - New Pull-down Menu

Load

The status of any load in the network can be displayed within the working graphic.

Select Load

A list of loads will be displayed, eight at a time, Figure 16-4. Use the arrow keys along the side of the window to scroll through the loads within the network.

Select a load

A label selection window will appear. The load status can be displayed without a label, with the eight character ID or with the 24 character name.

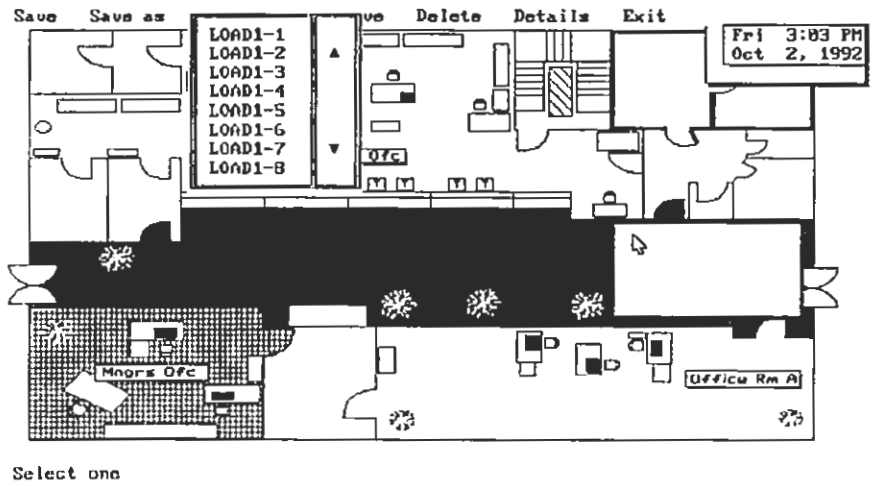

Fig. 16-4: New - Loads

Select the label to display

A box representing the amount of space required to display the selected label and load status will appear.

Select a location to display the load status

The status will be displayed as off line at the selected location.

Analog/Digital input

The instantaneous status of an analog or digital input can be displayed on the graphic.

Select Analog or Digital input

A list of sensors will be displayed, eight at a time, Figure 16-5. Use the arrow keys along the side of the window to scroll through the sensors within the network.

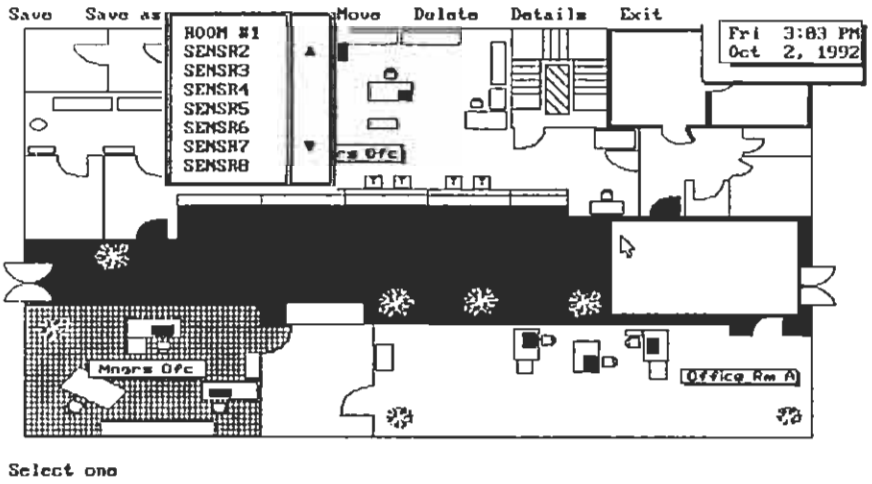

Fig. 16-5: New - Sensors

Select a sensor

A label selection window will appear. The sensor status can be displayed without a label, with the eight character ID or with the 24 character name.

Select the label to display

A box representing the amount of space required to display the selected label and sensor status will appear.

Select a location to display the sensor status

The status will be displayed as off line at the selected location.

Text

Text can be added to the graphic to explain or label a specific area of the graphic without having to edit the background image.

Select Text

A text entry box will appear. Enter up to 29 alphanumeric characters.

Select a location to display the text

Area target and Area state

PDC832GH allows setpoints to be programmed relative to the operating hours and target temperatures of selected areas. An area can have different targets for its three states: Day, Night and Event. The current target temperature and state can be polled and displayed on the graphic. the procedure in selecting an Area target or Area state are similar.

Select Area target/state

A table of areas will appear, Figure 16-6. Scroll through the list of areas using the arrow keys along the side of the table.

Select an Area

A label selection window will appear. The area target/state can be displayed without a label or with the 16 character name.

Select the label to display

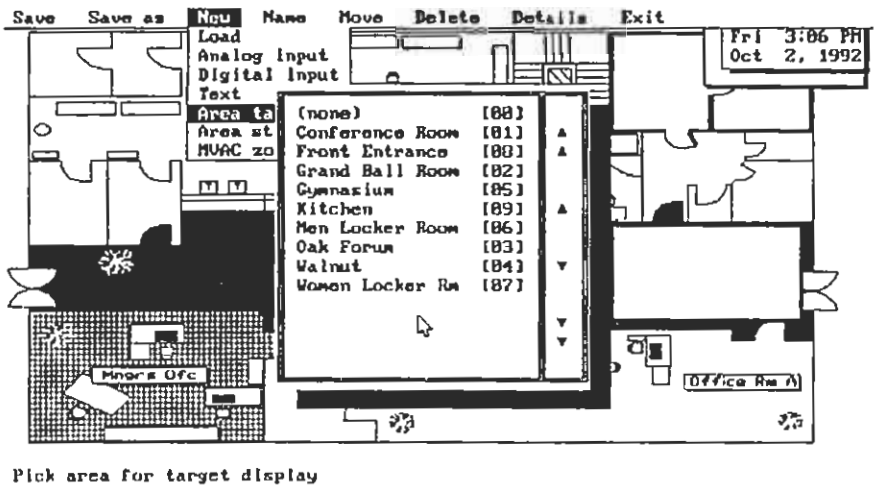

Fig. 16-6: New - Area Targets

A box representing the amount of space required to display the selected label and area target/state will appear.

Select a location to display the area target/state

The area target/state will be displayed as off line at the selected location.

MVAC Zone

Solidyne's Modular Variable Air Control system (MVAC) is designed to modulate dampers, valves and stages of electric reheat. The temperature status within selected zones can be polled and displayed on the graphic.

Select MVAC zones

A table of MVAC zones will appear, Figure 16-7. Scroll through the list of zones using the arrow keys along the side of the table.

Select a MVAC zone

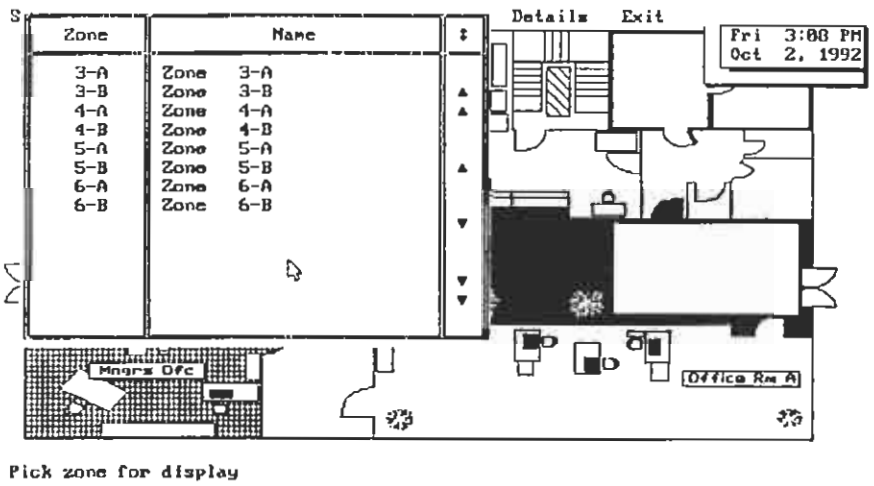

Fig. 16-7: New - MVAC Zones

A label selection window will appear. The MVAC zone temperature status can be displayed without a label or with the 24 character name.

Select the label to display

A box representing the amount of space required to display the selected label and zone temperature will appear.

Select a location to display the MVAC zone temperature status

The temperature status will be displayed as off line at the selected location.

Name

The items displayed on the graphic can be relabelled.

Select Name

Select a device to relabel

The new label selection is made by toggling the labels until the desired label is displayed.

A label with an asterisk represents the selection of the extended name that has not yet been delined. The extended name will be displayed upon entry, otherwise the the eight character ID will be used.

Move

The devices displayed on the graphic can be relocated. The individual items can be picked up, moved around and placed anywhere on the graphic.

Items cannot be placed on top of each other or off the edge of the screen. An "Object Collision" *or* "This display will not fit here" *error will result.*

Select Move

Select an object to move

A box representing the amount of space required to display the selected object will appear.

Select a new location for the object

Delete

Unwanted objects can be individually deleted from the graphic.

Select Delete

Select the object to delete

Save as

Save as writes the graphic configuration data to disk under a new name. The type and location of the objects displayed on the graphic will be written to a file with a .DIS extension.

Select Save as and enter the name of the file

The filename can be up to 8 characters. The file will be stored in the network subdirectory. The working graphic can now be accessed from the Show menu under the selected filename.

Save

Save writes the graphic configuration data to disk under the same name. A Save can only be performed if modifications were made to the graphic after a Save as had been performed.

Details

Details identifies the location and filename of the background graphic currently displayed, Figure 16-8.

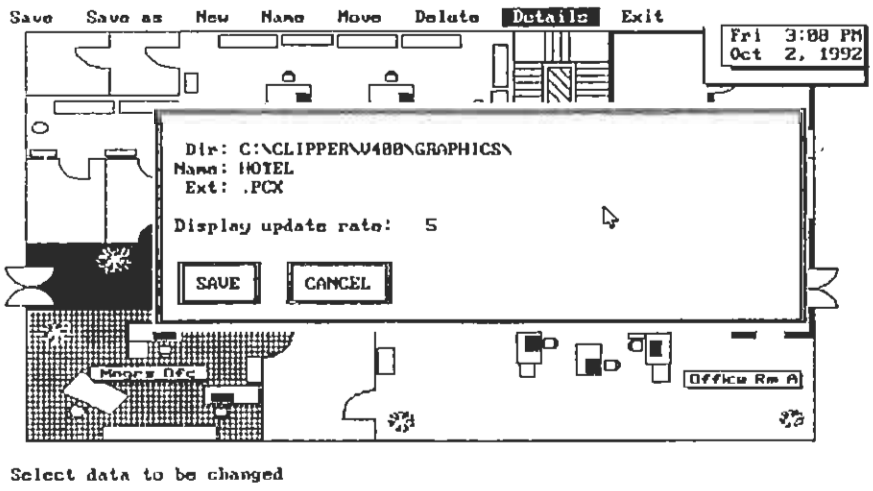

Fig. 16-8: Graphics - Details

The display file (.DIS) is linked to this background graphics file. The directory (Dir), filename (Name) and extension (Ext) of the background graphic can be modified to link the display file (.DIS) to other background graphics. The change will not be written to disk until a Save or Save As is performed. A Save will link the display file to a new background graphic under the same name. The

old graphic will be discarded. A Save as will link the display file to a new background graphic under a new name. The old graphic will remain unaltered.

The rate in which the real time data will be updated for the graphic can be selected to be any value between 1 and 180.

The controllers communicate through a bi-directional bus. A bi-directional bus does not support simultaneous communication. If a computer is communicating to one or more controllers, the controllers cannot communicate to each other. The update delay determines how often the computer communicates if left in a monitoring mode.

A suggested delay would be to enter a number FOUR (4) times greater than the number of nodes in the network, e.g. a 15 node network should have an update delay of at least 60 seconds. A number significantly less than 60 can interfere with internal network communication.

If the Display update rate is left at or reset to 0, the graphic will be refreshed at the system update rate specified within the configure menu (refer to chapter 10).

Modifying an Existing Graphic

Working graphics can be modified. New devices can be added, deleted and moved around as described in the "***Creating a Working Graphic***" section.

Select Modify

A table of previously saved working graphics will appear, Figure 16-9.

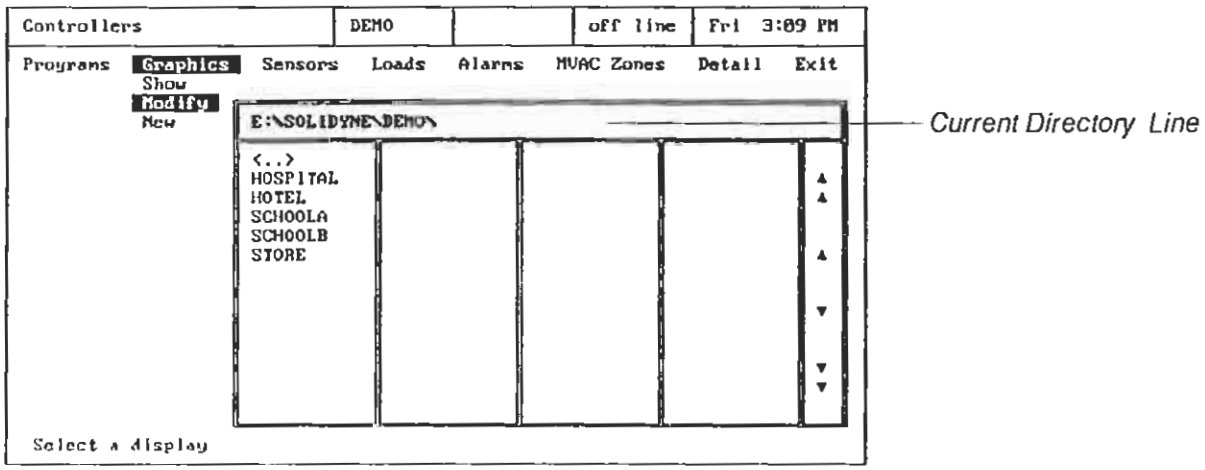

Fig. 16-9: Modify - Display Files Table

Select a graphic

A menu with all the functions for modfying a working graphic will appear.

Select the desired functions and modify the graphic

Select Save or Save as

Save will write the modifications to disk under the current name. The previous graphic configuration will be overwritten. Save as will write the modifications to disk under a new name. The graphic stored under the old name will be left unaltered.

Displaying a Working Graphic (SHOW)

Real time data can be polled and displayed when the computer is ON LINE with a network.

Establish a communication link

Select Graphics, Show or

Select Controllers, Graphics, Show

A table of working graphic files will appear, Figure 16-10. The top line of the table is the Current Directory Line (CDL). The table displays all the graphic files and subdirectories that exist within the current directory.

Select a working graphic to activate

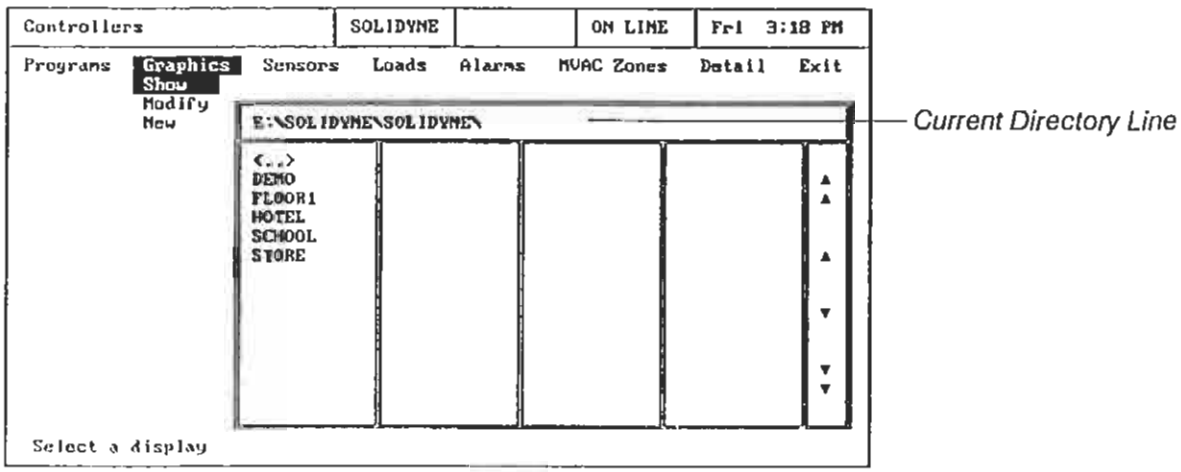

Fig. 16-10: Show Display File

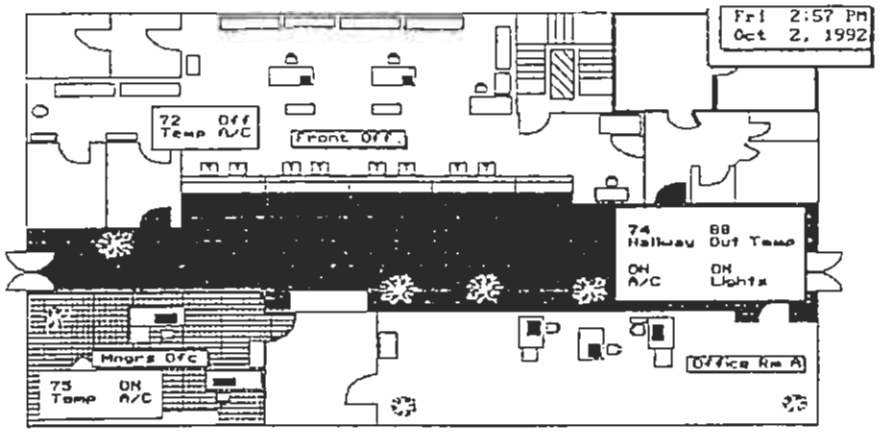

Fig. 16-11: ONLINE Graphics information

Working graphics from other directories can be activated by selecting the directory and then selecting the file within the directory. Subdirectories, enclosed in angle brackets, and parent directories <..> can be accessed from the table. Directories can also be accessed by typing the path for the directory on the CDL. Conventional DOS notation should be used when entering the names of other directories and/or drives, e.g. **D:\Clipper\Solidyne\Graphics.**

The status of the devices will be displayed as OFF LINE if the computer is not ON LINE with the network when the graphic is activated.

The data for selected file will be polled and displayed along with the background graphic, Figure 16-11. The real time data will be continually updated at the rate specified within the Details menu.

If the Display update rate is left at or reset to 0, the graphic will be refreshed at the system update rate specified within the configure menu (refer to chapter 10).

A suggested delay would be to enter a number FOUR (4) times greater than the number of nodes in the network, e.g. a 15 node network should have an update delay of at least 60 seconds. A number significantly less than 60 can interfere with internal network communication.

The status of devices will be displayed as "off line" if the computer is not ON LINE with the network and the graphic is shown, or if the devices are on particular nodes that have been marked down.

Printing Graphics

The graphics are displayed in an EGA mode. Printers capable of printing in the EGA mode can print the graphics directly. Several after market printer drivers exist that can convert EGA displays to a mode that can be printed on virtually any type of printer. Consult your local computer store for information on the latest conversion programs.

Graphics Conversion

Conversion utilities are also available that will convert graphics created with other software packages to a .PIC or .PCX formats.

Chapter 17 - Network Details

Network Setup

General setup information shared by all controllers in the network, or having to do with configuration of the PC itself, is entered through the Details menu. The information entered will be transmitted to every node in the network.

Select Controllers, Details

A list of options will appear, Figure 17-1. Changes to data will be immediately transmitted if the computer is ON LINE. A Network, Transmit must be performed if the data is entered OFF LINE.

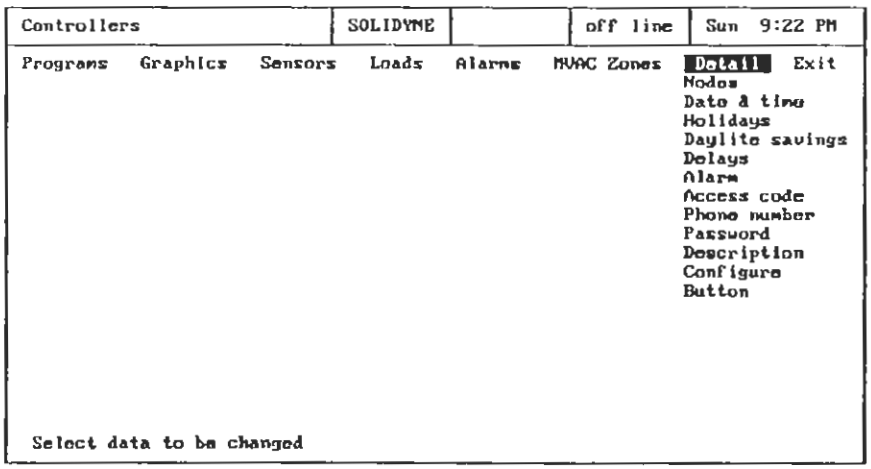

Fig. 17-1: Details Options

Date & time *and* Password *entries can only be made ON LINE.*

Nodes

The first step in programming a system is to configure the network. Nodes defines the number and types of controllers in the network. Refer to chapter 5 "*Creating a Network*" for specific information.

Date & time

Date & time will synchronize the individual time clocks within each controller in the network.

Select Date & time

The current date & time will be retrieved from the first available node (typically node 1), Figure 17-2.

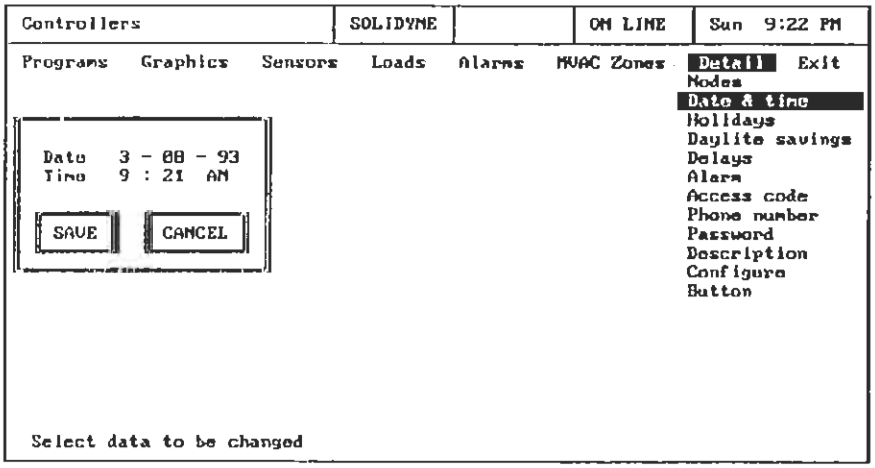

Fig. 17-2: Date and time

If a change is made to the date or time, the new date & time will be transmitted to every controller in the network.

As the network initializes, the controllers on the LAN will be inaccessible for a short period of time. The length of time will depend on the size of the programs within each controller. This allows each controller to go through its entire program and update the status of their setpoints. Once the initialization process is complete, ONLINE communications (Load Status, Sensor Average Values, etc.) can proceed.

IMPORTANT: *Transmitting the date and time to the network will initialize every controller in the network. Each controller will read through its current program and activate/deactivate setpoints based on the date and time just entered. The active setpoints will control the assigned loads. The controllers should be initialized any time a setpoint program is modified.*

Holidays

The controllers can be programmed to perform specific operations on holidays. The holiday can be considered as an eighth day of the week, from a programming point of view. Sixteen (16) holidays can be entered, but the sequence of operation performed on one holiday will be performed on all holidays.

Select Holidays

A table will appear containing the start date and length in days of each holiday, Figure 17-3. Enter the date and length of up to 16 holidays.

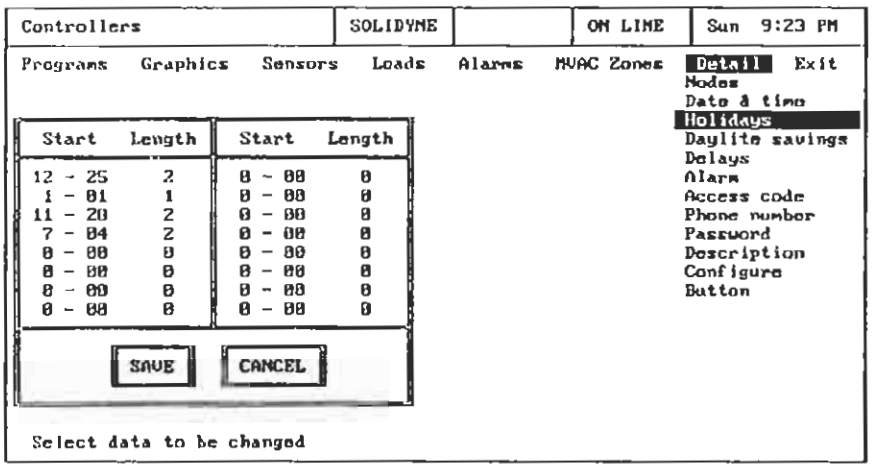

Fig. 17-3: Holidays Table

Daylight savings

The controllers can be programmed to automatically reset the time to accommodate daylight savings.

Select Daylight savings

Enter the dates for spring and fall. The time will be reset at 2:00 AM on the first Sunday after the dates selected. The dates shown in Figure 17-4 are the correct dates to enter if you are in a part of the country that uses daylight savings.

The entries do not need to be changed every year if they are entered as shown. Leave the entries at their default values 0-0, if you are not in an area that uses daylight savings.

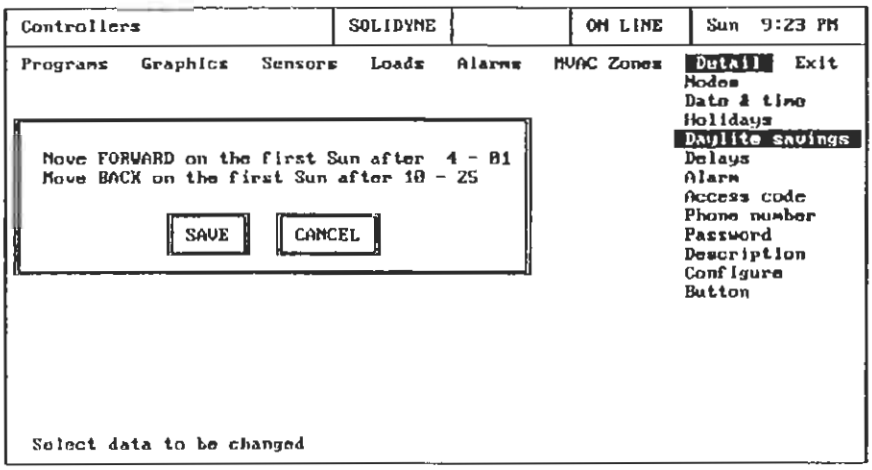

Fig. 17-4: Daylight Savings

Delays

Load switching delays can be programmed to protect equipment. Two types of delays can be entered, "A.C. power on to FAILSAFE delay" and "Sequential load SWITCHING delay", Figure 17-5.

Select Delays

A.C. power on to FAILSAFE delay

The A.C. power on to FAILSAFE is entered in minutes. If a power failure occurs and the memory is lost, the controllers will maintain a programmable

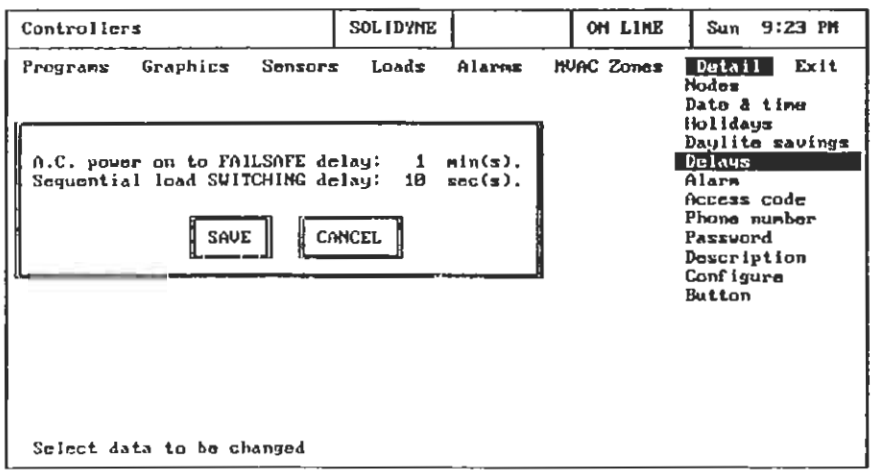

Fig. 17-5: Delays

failsafe state for all loads when power is reapplied. The loads will initially be controlled by the "Power on status". After the A.C. power on to FAILSAFE delay times out, the loads will be commanded to the "Memory lost status". Refer to chapter 7 "*Defining Load Details*" for more information.

Sequential load SWITCHING delay

The setpoint programs within the controllers may command multiple loads to be turned on or off simultaneously. At minimum, the controller will delay one second between the switching of each load. A switching delay of up to 255 seconds can be entered. The delay is most commonly used to avoid large demand peaks during startup. All digital load switching programs will adhere to this delay.

Alarm

The controllers can transmit alarms to direct connect and remote connect computers. The alarm dial-out phone number is the phone number of the computer that will receive the alarm. The alarm dial out ID number is used to identify the network reporting the alarm, Figure 17-6.

Select Alarm

PHONE number

Clipper XL and XL9600 controllers have the capability of assigning dial-out phone numbers within individual setpoints. The network Alarm dial-out PHONE number will be used by RTA alarms and alarm dial out setpoints that were not or cannot be assigned a phone number within the setpoint. Phone numbers entered within the setpoints will have precedence over network dial-out phone number.

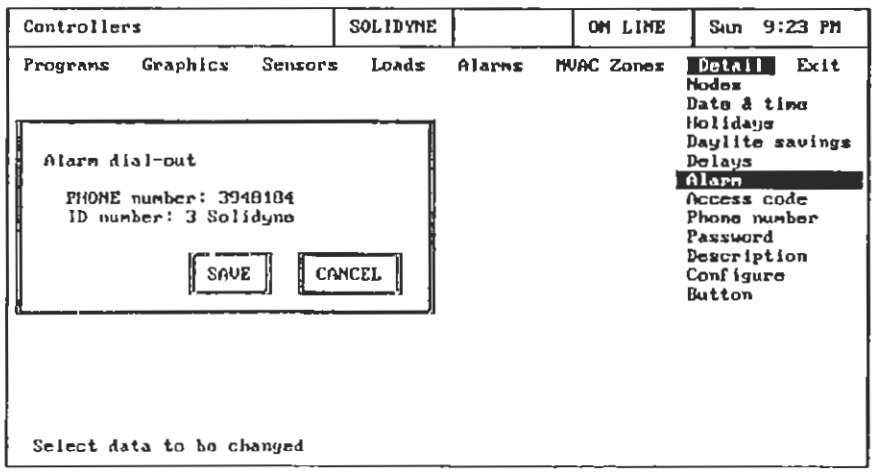

Fig. 17-6: Alarms

A six second pause can be inserted by entering a comma between the digits in the phone number, e.g. 9,17083943333.

Direct connect alarms: *The controllers will transmit alarms directly to any ON LINE computer if the alarm dial-out phone number matches the PC phone number of the ON LINE computer. The last 7 digits of the dial-out phone number must match the last 7 digits of the PC phone number of the computer exactly, including punctuation.*

ID number

The 14 character, alphanumeric ID number identifies the network reporting the alarm. The ID number will be compared by the computer to the ID numbers of all the network files saved to disk. If the network ID number matches the ID number of a file saved on disk, the load labels, sensor labels, network description and alarm descriptions will be used to report the alarm.

The first digit of the ID number is used to initialize the delay answer of the modem. The first digit represents the number of rings the modem will wait to answer. 0 through 3 will answer on the third ring. 4 through 9 will answer on the fourth through ninth ring, respectively.

If an ID number is not entered or the first digit is non-numeric, the modem will answer on the third ring.

Access code

The access code locks the controller's keypad. A locked controller can be examined but cannot be modified or edited in any way, through the keypad. The access code does not restrict computer access. Refer to Password for computer lockout. The access code must be entered through the keypad on the controller. The code is not transmitted to or received from the controllers. It is simply stored as a reminder in case the code is lost.

Phone number

Phone number is the number of the modem connected to the network. Refer to chapter 10 "***Establishing a Communication Link***" for specific information.

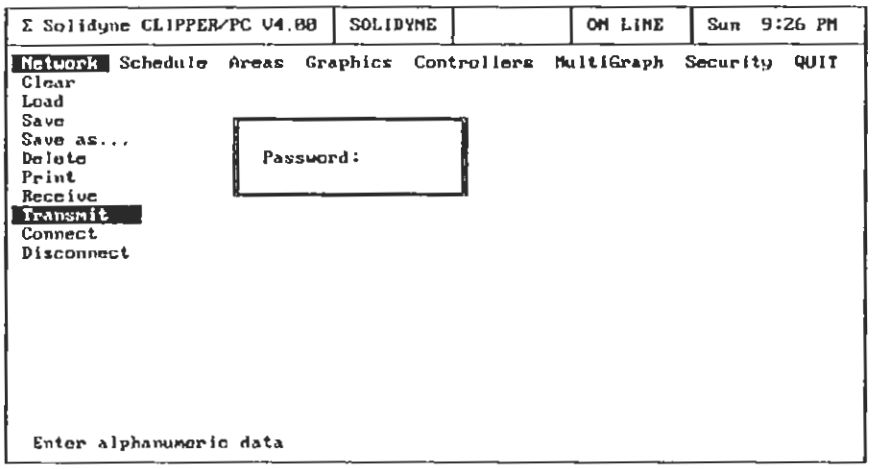

Fig. 17-7: Password

Password

Password is a four character, alphanumeric, case sensitive code used to restrict access to a network via remote communications. The password, entered through the software, will remain resident in the controllers. Data can be received and viewed, but if you attempt to transmit to a network that contains a password you will be prompted to enter the password, Figure 17-7. The communication link will be immediately terminated if the password is entered incorrectly.

The password is optional and can only be accessed if the computer is ON LINE with the network.

Description

The Description is a 30 character label used to identify the network, Figure 17-8. The description will be displayed instead of the network ID number when alarms are reported. The description will also appear next to the network filename when a network is loaded.

Configure

Configure sets up the communication options. Refer to chapter 10 "***Establishing a Communication Link***" for specific information.

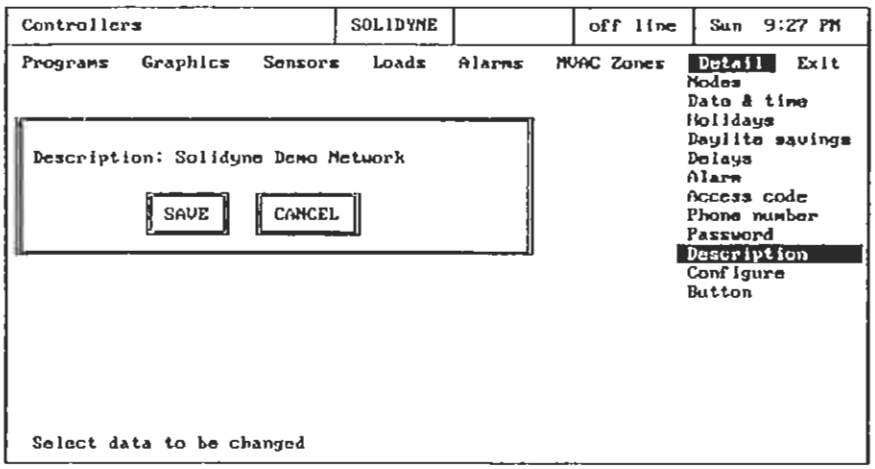

Fig. 17-8: General Description

Button

The software key (and a pre-programmed button) must be attached to a parallel port. The Button option will display important user information received from the software key. The registered User Information is stored in the button and cannot be changed

If the key is removed, communications will be disabled and the software will revert to a DEMO mode.

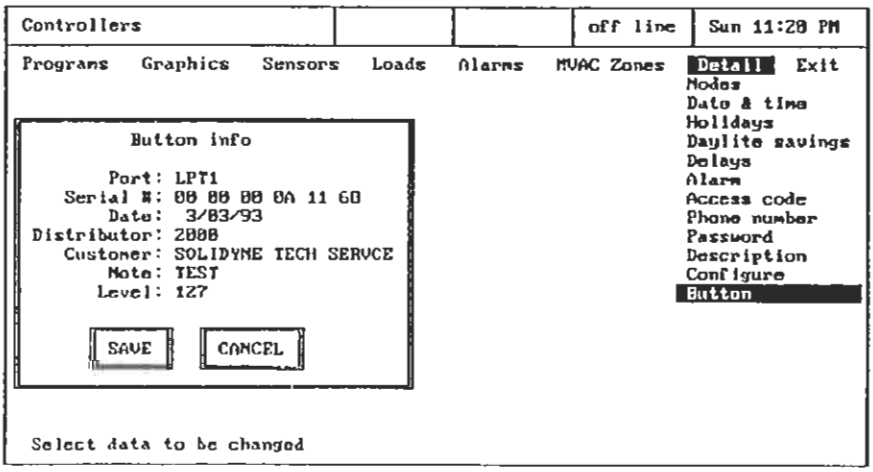

Fig. 17-9: Button

Chapter 18 - Relative Setpoint Programs

For PDC832GH Versions Only

Relative setpoint programs are written for applications that require continual modifications to operating hours and target temperatures. Programs can contain several hundred setpoints, each with its own control parameters, including operating hours and target temperatures. Operating hours may vary on a daily, weekly or monthly basis depending on the type of building controlled. Constantly modifying the control parameters of the individual setpoints can be extremely time consuming, if relative setpoint programming is not utilized.

Relative setpoint programming eliminates the need to individually modify setpoints. Setpoints are written relative to specific areas. The area definitions contain operating hours and target temperatures. If a change is made to the area definition, every setpoint programmed relative to the area will be affected.

Special Events can be scheduled to temporarily change the control program in addition to Day and Night operation.

A few points to keep in mind using relative setpoint programs:

1. Relative Setpoint Programs can be used with Clipper LAN/XLHMT, Clipper LAN/XLLSP, ClipperLAN/XLHC, XL9600HMT and XL9600LSP Controllers only. These controllers can still be combined with a Clipper LAN or Clipper LAN+ for LAN Networks.

IMPORTANT

The Clipper LAN/XLHC Controller has the ability to store and utilize both a Heating and Cooling target for each area. Only the Cooling targets are used for the Clipper LAN/XLHMT, Clipper LAN/XLLSP, XL9600HMT and XL9600LSP Controllers.

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2. A maximum of 15 different Areas can be programmed in an HMT, LSP or HC node.

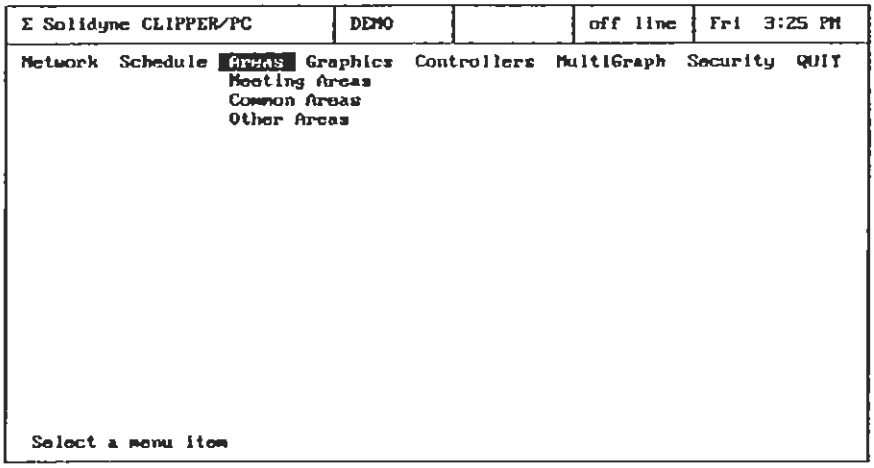

Fig. 18-1: Areas Category

Defining the Areas

The first step in creating a relative program is to define the Areas. Defining an area consists of selecting the type, daytime operating hours, target temperatures and name.

Select Areas

Three types of areas can be selected; Meeting, Common and Other, Figure 18-1. Meeting areas can be scheduled for special events while Common and Other areas cannot.

Select an area type

A table of areas will appear with a list of functions, Figure 18-2. The table contains the names of areas that have been previously defined.

Area indices will be assigned to the areas as they are created. The area indices will be displayed in brackets, next to the area name. If an area is deleted the area indices will not be renumbered.

Example: *There are 20 Areas indexed 1-20 and the area with index number 3 is deleted. 19 Areas will be left indexed 1, 2 and 4 through 20. Should more areas be created they will be assigned the lowest unused index numbers. If three more areas are added, they will have indices of 3, 21 and 22.*

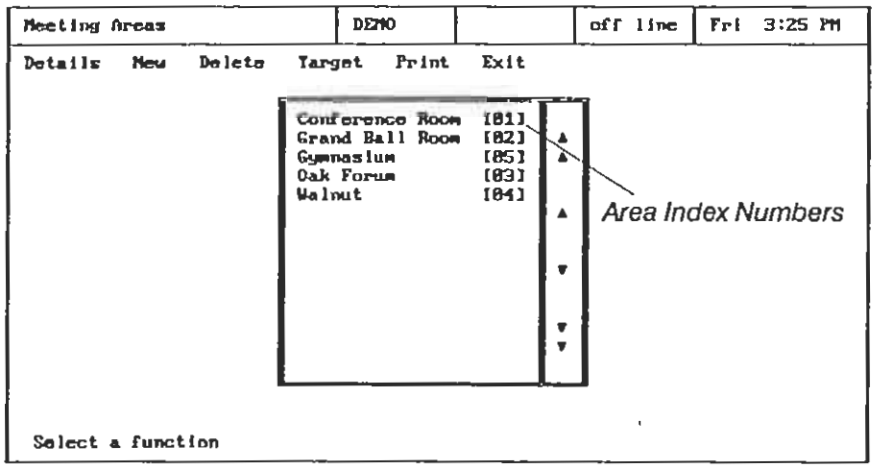

Fig. 18-2: Areas Options

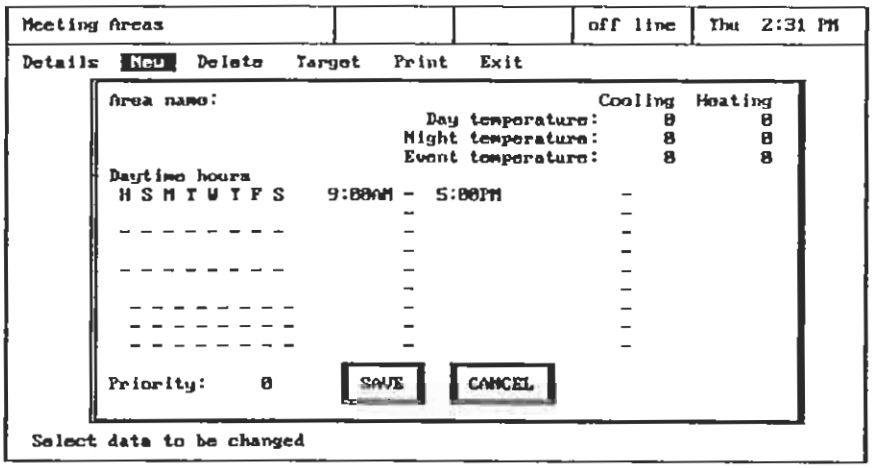

Fig. 18-3: Areas Definition Window

Select New

An area definition window will appear, Figure 18-3.

Select area name

The name can be up to 16 alphanumeric characters and will be used to identify the area within setpoint programs and scheduling menus.

Define the Target Temperature

Enter Day, Night and Event Cooling and Heating target temperatures. The targets can be any value between -32767 and 32767. One of the targets will be used at all times, depending on the current mode of the area.

IMPORTANT

The Clipper LAN/XLHC Controller has the ability to store and utilize both a Heating/ Cooling target for each area. Only the Cooling targets are used for the Clipper LAN/XLHMT, Clipper LAN/XLLSP, XL9600HMT and XL9600LSP Controllers.

***Day Cooling**- Target value used by cooling relative setpoints during daytime hours.*
***Day Heating**- Target value used by heating relative setpoints during daytime hours.*
***Night Cooling**- Target value used by cooling relative setpoints during night time hours.*
***Night Heating** - Target value used by heating relative setpoints during night time hours.*
***Event Cooling** - Target value used by cooling relative setpoints during events.*
***Event Heating** - Target value used by heating relative setpoints during events.*

***Note:** Common and Other areas can not be scheduled for special events. Event target temperatures will be specified for Meeting areas only.*

Define Daytime Operating Hours

Daytime operating hours are entered in groups. Up to six groups can be created: three groups with four time entries per group and three groups with two time entries per group. Each day of the week can appear in only one group.

The days of the week for each group are represented by the eight dashed lines. Each dash is assigned a specific day of the week. The dashes represent, from left to right, Holiday, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday and Saturday. The days of the week are moved between groups by selecting the appropriate dash within the group. The individual days can appear in only one group. As the selected day is added to one group it will be deleted from the other. The day of the week can be deleted from all groups if that day does not contain daytime operating hours by selecting the day and toggling it to a dash.

The operating hours must be defined for each group. The dashes on the right separate the start and stop times for each range. The start time is entered on left side of the dash, while the stop time is on the right. A twelve hour clock must be used for time entry: 8:00 AM would be entered as 0800A. Multiple time ranges can be entered for each group. The first three groups can have four time ranges per group. The last three groups can have two time ranges per group. The first time range in the first group must always be entered. The rest are optional. An example of an area's operating hours are shown in Figure 18-4.

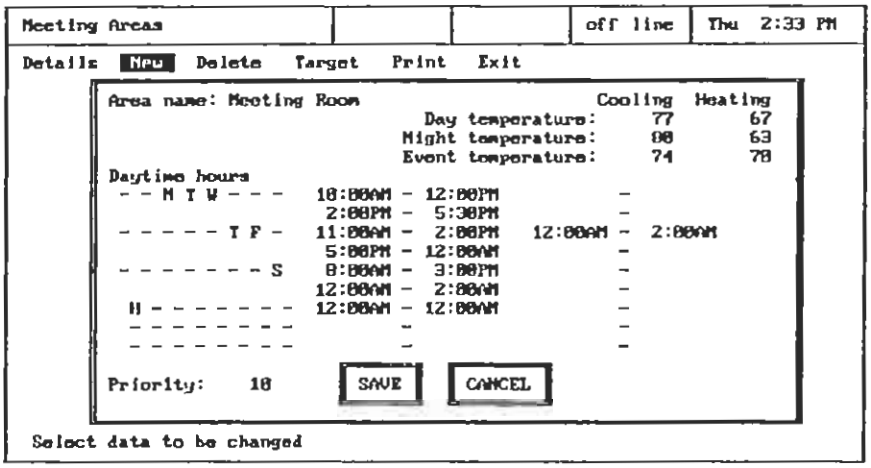

Fig. 18-4: Daytime Hours

Midnight Hours

Entering 12:00 AM to the left of the dash specifies the first minute of the day. Entering 12:00 AM to the right of the dash specifies the last minute of the day.

To define day operating hours that include midnight, specify the daytime hours as two ranges. In Figure 18-4, the Meeting Room is set for daytime hours (in chronological order) from 12:00 AM until 2:00 AM Thursday, between 11:00 AM until 3:00 PM on Thursday, from 5:00 PM Thursday until 2:00 AM Friday, between 11:00 AM until 3:00 PM on Friday and from 5:00 PM Friday until 2:00 AM Saturday. Note the period from 12:00 AM until 2:00 AM Saturday. This is specified under the Saturday entry.

When specifying daytime hours that will overlap midnight do not end one time range at 11:59 PM and begin the second time range at 12:00 AM or 12:01 AM for clarity. This will specify a night time period from 11:59 PM until 12:00 AM.

The start time (left of the dash) must be earlier than the stop time (right of the dash). The software will flip the values if entered incorrectly.

Entering Daytime hours between 11:00 PM - 1:00 AM will be interpretted by the software as Daytime hours from 1:00 AM - 11:00 PM.

The window defines the Day operating hours only. All other hours will be assumed to be Night. Event hours must be entered through the Schedule option.

Priority

Priority controls the order in which area programs are loaded into a node. Programs which use more than one area to control a load can assign different priorities to an area. Because Clipper nodes execute setpoints in numerical order, the higher numbered setpoint programs would have highest priority and override the lower numbered setpoints. Areas with a low Priority will be generated first. Consequently, the lower priority areas will have lower numbered setpoints. Areas with a higher Priority will have higher numbered setpoints.

The default value for Priority is 0. Users who do not write programs that have multiple areas operating a single load can leave Priority to 0.

An area whose setpoints require a higher priority than another area should have its Priority level set higher than the other area.

Priorities among areas do not have to be numbered sequentially. As area programs change, it may be easier to change the priority relationships between areas by initially assigning area priorities by 10's or 100's.

Example:

AREA1	Priority 30
AREA2	Priority 20
AREA3	Priority 100

If a node contained programs for AREA1, AREA2 and AREA3, the setpoints generated would be in the following order:

Setpoints for AREA2
Setpoints for AREA1
Setpoints for AREA3

AREA3 setpoints would have higher priority than AREA1. AREA1 setpoints would have higher priority than AREA2.

Modifying an Existing Area

Details will display selected area definitions. The programmable parameters for the selected area can be viewed and modified.

Select Details, then select an area

Modify the parameters as described earlier under "***Defining the areas***".

Deleting an area

Delete will remove a selected area from the table. Areas cannot be deleted until all setpoints programmed relative to them have been deleted. Special events scheduled for the area must expire or be deleted before the area can be deleted.

Select Delete, then select an area to delete

The area will not be deleted if either of the two messages appears: "Area has setpoints" or "Area has events".

Temporarily Modifying Current Targets

The current target for a selected area can be temporarily modified if the computer is ON LINE with the network.

Select Target

The current targets for all the areas will be received.

Select an Area

The current targets for the selected area will be displayed, Figure 18-5.

The Clipper LAN/XLHC Controller has the ability to store and utilize both a Heating and Cooling target for each area. Only the Cooling targets are used for the Clipper LAN/XLHMT, Clipper LAN/XLLSP, XL9600HMT and XL9600LSP Controllers.

The Heating Default and Current target registers for the Clipper LAN/XLHMT, Clipper LAN/XLLSP, XL9600HMT and XL9600LSP Controllers will be displayed as 0.

If the current target is modified, the new target will be immediately transmitted to the controllers. The new target will remain in effect until the next mode change occurs (Day, Night or Event).

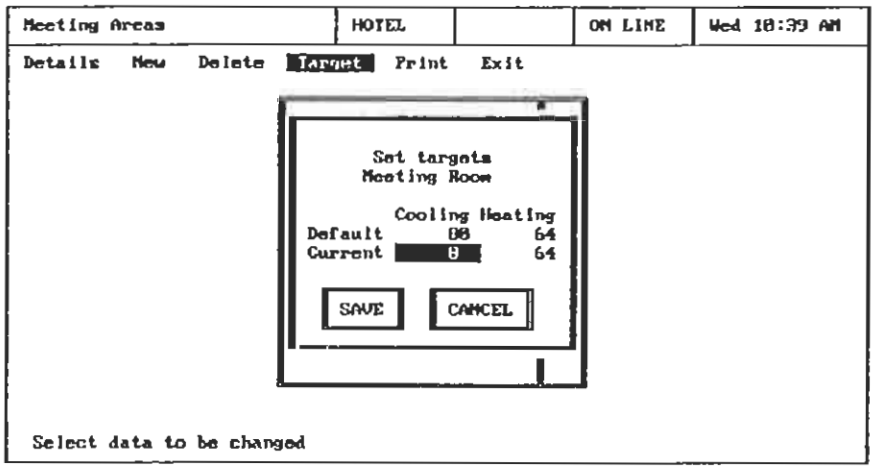

Fig. 18-5: Current Target of Area

Printing Area Definitions

The definitions (target registers, Daytime hours, etc.) for all the areas of the selected type (Meeting, Common, Other) can be output to a printer or to a file.

Select Print

A Print option window allows you to select the print device for the selected area type. The default device is printer. This device will make use of the DOS PRINT command, allowing the printer to print while the computer is free to perform other tasks. Refer to a DOS manual for more details. However, some computers may require the device to be specified as LPT1.

Select the printer device and enter LPT1

The printout will now be directed to parallel port 1, without the use of the DOS PRINT command.

The Area definitions can be printed to a filename by entering the filename as the device. The details will be written to disk under the selected name and reside in the same directory or subdirectory as the CLIP.EXE file. The output file can then be examined and printed using DOS commands.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

Writing Relative Setpoints

Relative setpoints can be written for nodes that are configured to be XLHMT, XLLSP, XLHC, XL9600HMT and XL9600LSP. These five types of controllers accept relative setpoint programs created with the software.

IMPORTANT: *Do not configure a node to be other than the type physically represented by the controller. If you are unsure of the node types within the network, perform a* Network Receive. *The node type will be received along with the programmable data.*

Select Controllers, Setpoints, Edit, New

Select a setpoint type

The programming template for the selected setpoint type will appear, Figure 18-6. The area selection entry along the top of the template will be displayed if the node is capable of accepting relative setpoints. The default is "none". The setpoint will be entered non-relative if the area selection is left at "none".

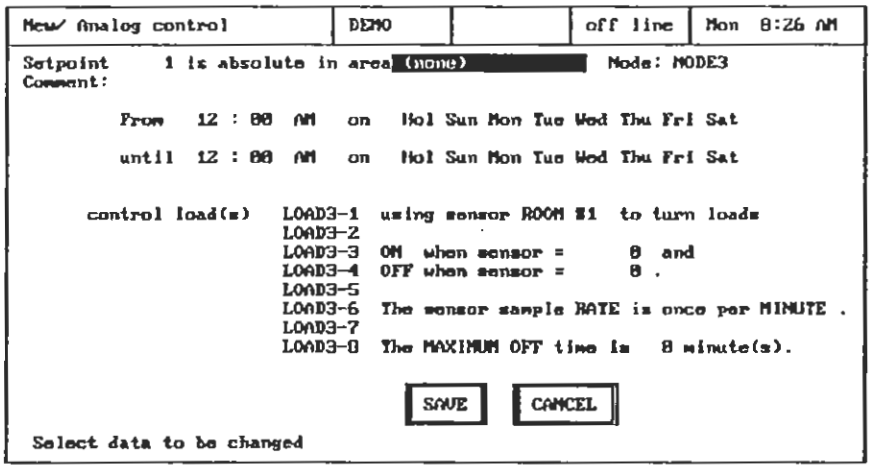

Fig. 18-6: Analog Control Setpoint Template

A relative setpoint will be entered if an area is selected.

Select the area

A table of areas will appear, Figure 18-7. All Meeting, Common and Other areas will be displayed in the table.

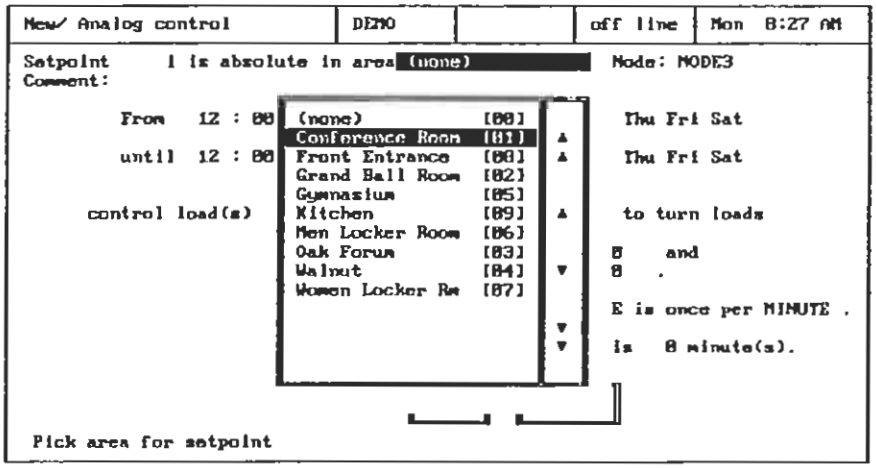

Fig. 18-7: Table of Areas for setpoint

Select an area

The setpoint template will change, Figure 18-8. The start/stop times and target temperatures will now be displayed "relative to" the selected area.

Entering Relative Operating Hours

The operating hours will be entered relative to the selected area.

The mode in which the setpoint will become active is selected by placing an "X" next to Day, Night and/or Event. The default is to select all three. At least one mode must be selected. Although Day, Night and Event can all be selected, the state of an area will only be in one mode (either Day, Night or Event) dependant upon the hours specified for Days, Nights or Events.

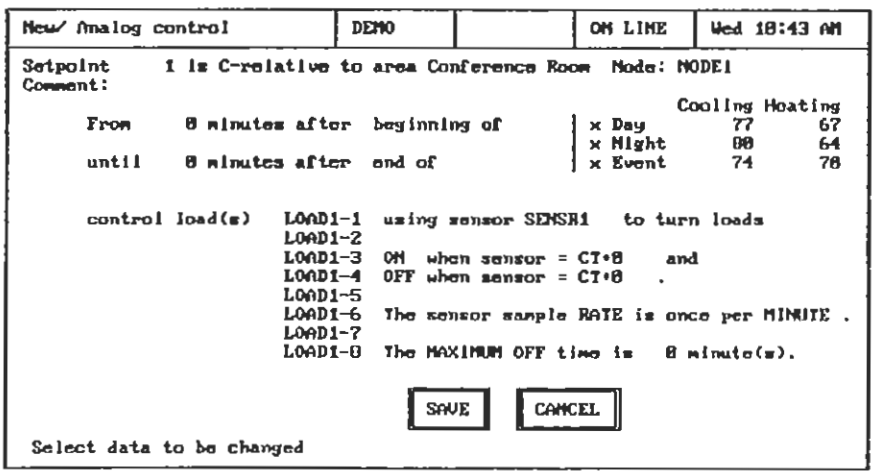

Fig. 18-8: Relative Setpoint

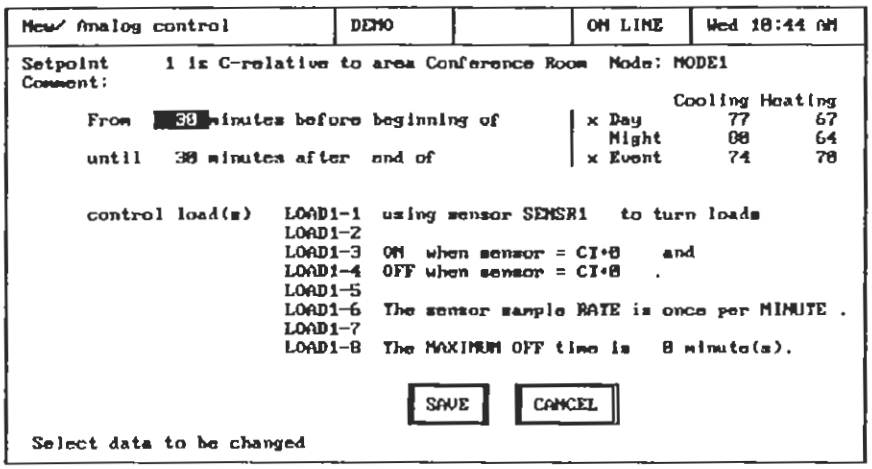

Fig. 18-9: Relative Hours Before/After

The Day hours are specified when the area was defined. Events are specified by entering events in the Reschedule option. After Day and Event hours are established, what remains in a 24 hour period constitutes Night hours.

The "From" time entry specifies the number of minutes before/after the beginning of the selected time range (Day, Night, Event) the setpoint will become enabled, Figure 18-9.

The "Until" time entry specifies the number of minutes before/after the end of the selected time range (Day, Night, Event) the setpoint will become inactive.

Enter the number of minutes

Select before or after (toggle with the mouse)

Choose the mode(s) (Day, Night, Event)

At least one mode, Day, Night or Event must be selected.

Setpoints programmed relative to a specific area can operate in one of two modes, relative or absolute. Relative area setpoint targets are specified as offsets from the area's current target, either negative or positive. Absolute area setpoint targets are specified as specific values, similar to nonarea setpoints.

Entering Relative Sensor Values

Relative area setpoint targets can be either cooling target relative (C-relative) or heating target relative (H-relative). The default mode will be C-relative. Select C-relative if the setpoint is to refer to the Cooling target. Select H-relative if the setpoint is to refer to the Heating target. The Day, Night or Event target offsets are specified as CT+/- an offset for cooling and HT +/- for Heating.

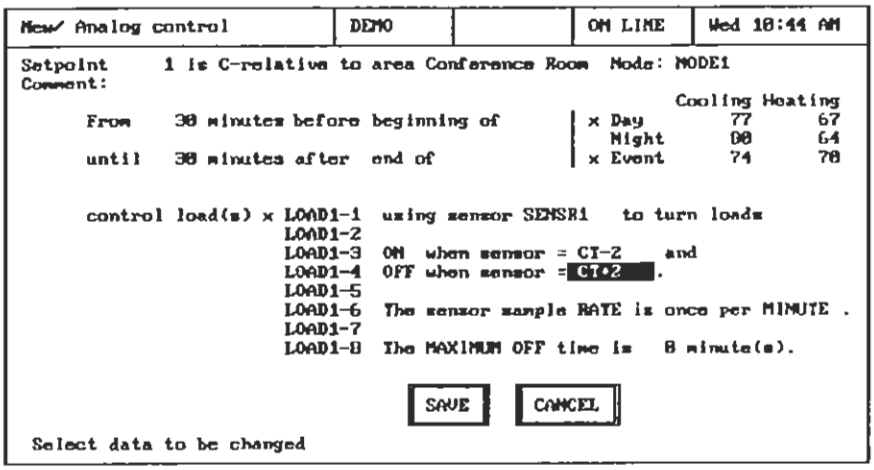

Fig. 18-10: Relative Sensor Values

Example: *A Cooling target of 77 Day and 74 Event, has been assigned for a Conference Room. The analog control setpoint (active during Day and Events) controls LOAD1-1 ON at 72 (CT-2) and OFF at 76 (CT+2) during Events and ON at 75, OFF at 79 during the Day. If the event target for the selected area was changed to 72, the heat would be turned ON at 70 and OFF at 74.*

Entering absolute sensor values

Absolute area setpoints become active based on the area's operating hours, while using absolute setpoint targets.

Toggle the mode to absolute in

CT+0 will change to 0. Finite control values can now be entered.

Example: *The Prop/Integral PWM setpoint modulates a chilled water valve to maintain 55 degree supply air during Day and Event operating hours. The valve is modulated to maintain 55 degrees relative to Day and Event operating hours, regardless of the Day and Event target temperatures.*

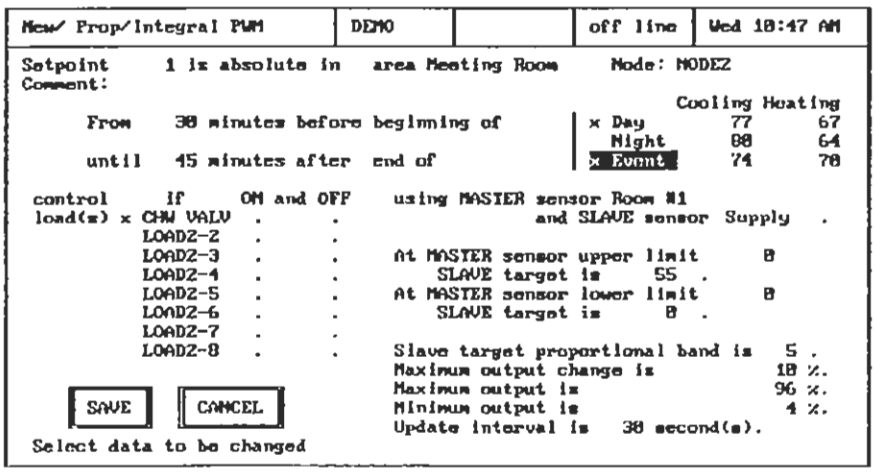

Fig. 18-11: Absolute Sensor Values

Modifying Operating Hours and Target Temperatures

The operating hours and target temperatures for relative setpoints can be modified quickly and easily. Changes made to an area definition will affect every setpoint programmed to be relative to that area.

Select Areas

Select a type of area

Select an area

Make the desired changes to the area definition

Establish a communication link

Reschedule the area

---

*Relative setpoint programs are not transmitted to the Network until a Reschedule is performed. A Network Transmit will not transmit relative programs. Refer to "**Transmitting a Relative Program**" in this Chapter.*

Scheduling Special Events

Meeting areas can operate in one of three modes: Day, Night or Event. The Day and Night operating hours for the entire week are specified within the area definition. The Event mode is similar to Day and Night modes except the operating hours must be scheduled.

Select Schedule, New

An Event definition screen will appear, Figure 18-12. The mouse will not be active within this screen until an area needs to be chosen.

Date

The date of the event. The default entry is the current date held by the computer. Enter a new date by typing two digit numbers for the month, day and year. July 4th 1993 would be entered as 070493. If the new entry is invalid, the Date will revert back to the current date held by the computer.

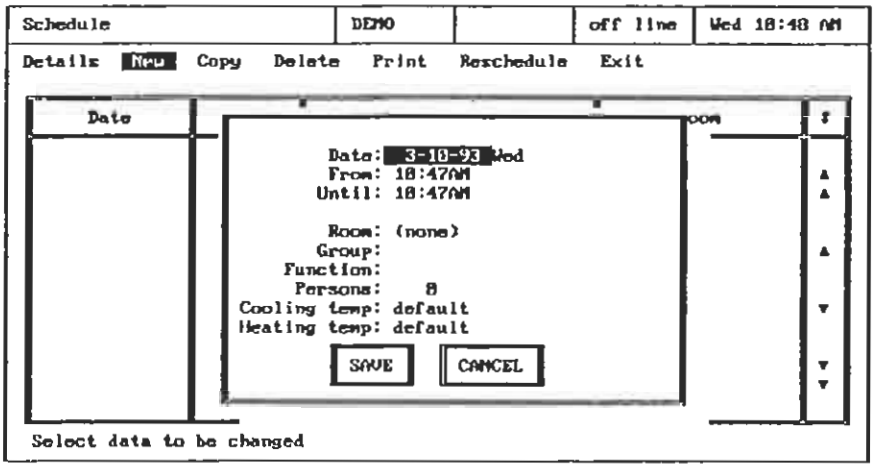

Fig. 18-12: Event Definition Screen

From/Until

The start/stop times of the event. The default entry is the current time. Enter the times by typing two digit numbers for the hours and minutes, followed by an A for AM or a P for PM. 7:00 PM would be entered as 0700P.

Stop time entries that precede start times will be interpreted as the following day. An event with a start time of 8:00 PM and a stop time of 2:00 AM will place the area in event mode from 8:00 PM on the selected day until 2:00 AM the following day. The length of the event can be up to 24 hours long.

Room

The area to be placed in event mode. A table of Meeting areas will be displayed, Figure 18-13. Common and Other areas will not be displayed.

Select an area

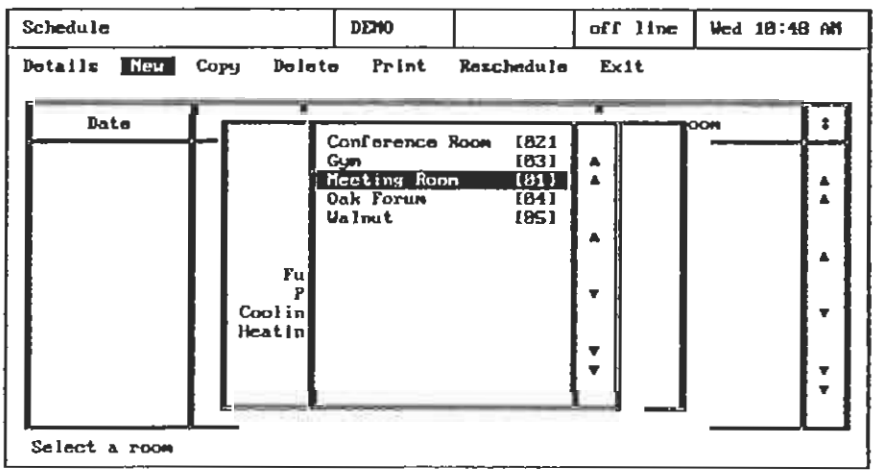

Fig. 18-13: Selecting an Area for an Event

Group, Function, Persons

Descriptions used to identify the purpose of the event. These entries are optional and have no effect on the control of the outputs.

The Group is a 24 character description used to identify the people attending the event.

The Function is a 24 character description used to identify the purpose of the event.

The Number of Persons attending the event can be entered from 0 to 9999.

Cooling/Heating temp

Specifies the Cooling and Heating Event target temperatures. The default targets are the temperatures assigned to the selected area within the area definition, Figure 18-14. Temperatures other than the default values can be entered.

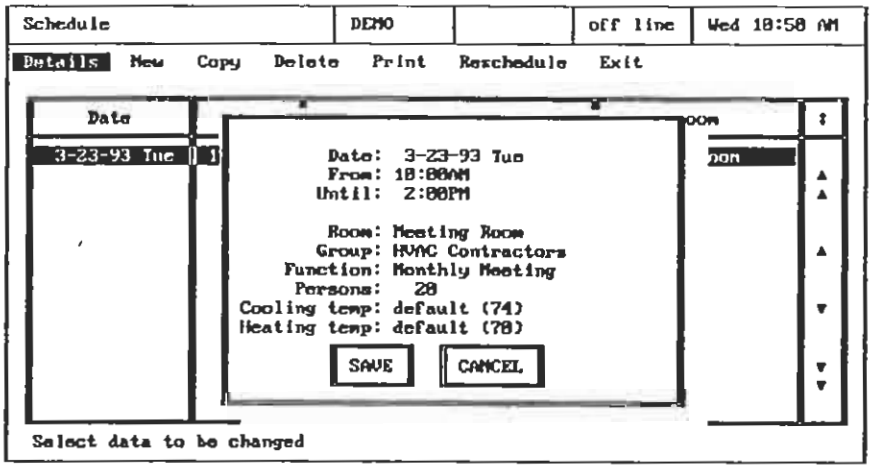

Fig. 18-14: Cooling and Heating Temperatures

IMPORTANT

The Clipper LAN/XLHC Controller has the ability to store and utilize both a Heating and Cooling target for each area. Only the Cooling targets are used for the Clipper LAN/XLHMT, Clipper LAN/XLLSP, XL9600HMT and XL9600LSP Controllers.

The actual temperature the room is controlled to depends on how the relative setpoints for the selected area were entered.

Select SAVE

The highlighted box will return to the Date entry. Modify any incorrect parameters or select CANCEL if all parameters are correct.

The event will be entered in the table of events in chronological order. The date and time of the event will be displayed along with the group and selected area.

Viewing/Modifying an Existing Event

The parameters for scheduled events can be viewed/modified through the Details menu.

Select Details

Select an event

The details for the selected event will appear, Figure 18-15. Modify the individual parameters and select SAVE.

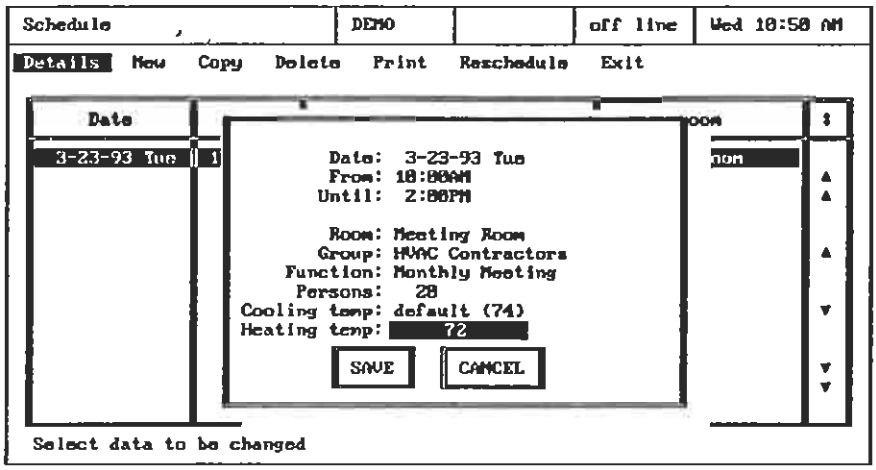

Fig. 18-15: Details of an Event

If the modifications are made while ON LINE the changes will NOT be transmitted automatically. The changes will not take effect until a Reschedule *is performed.*

Copying Events

The Copy command can reduce the time required to create multiple similar events.

Select Copy

Select an event to copy

The details of the selected event will appear. Make the desired modifications and select SAVE. The new event will be displayed in the event table in chronological order.

Deleting Events

Delete will remove unwanted events from the event table.

Select Delete

Select an event to delete

Deleting an event from the table will not remove the event from controllers that have already received it. A Reschedule must be performed after the event is deleted to remove the event from the controllers.

Reschedule will automatically delete event schedules that are more than 24 hours old. Make sure the time in the computer is correct and agrees with the time in the controllers.

Printing Scheduled Events

The scheduled events for all areas or for a selected area can be output to a printer or to a file.

Select Print

A Print option window allows you to select the area, time frame and print device for the output, Figure 18-16. The event schedule can be printed for all areas or for a specific area.

Select an area

The range of dates to print the schedules for can be specified. The default entry for From/Through dates is the current date in the computer.

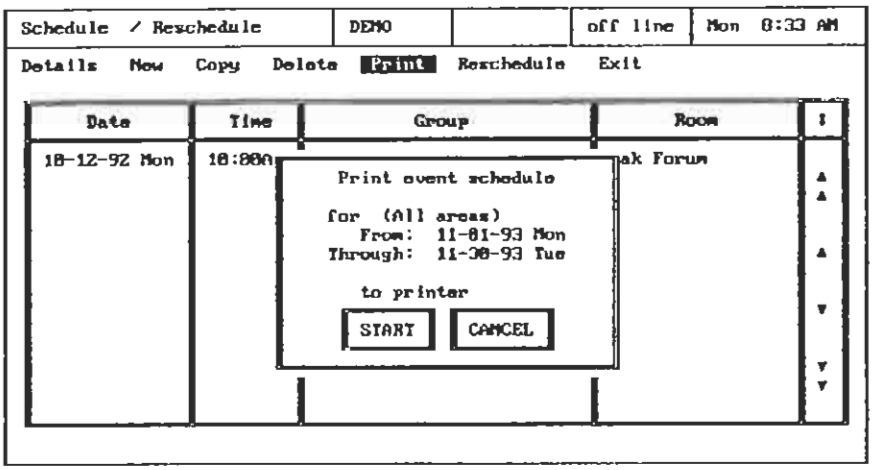

Fig. 18-16: Print Events from selected dates

Example: *To print the event schedules for the entire month of November 1993.*
The From date should be 11-01-93.
The Through date should be 11-30-93, Figure 18-16

Enter the selected dates

Two digits must be entered for the month, day and year. July 22, 1993 would be entered as 072293.

The default device is printer. This device will make use of the DOS PRINT command, allowing the printer to print while the computer is free to perform other tasks. Refer to a DOS manual for more details. However, some computers may require the device to be specified as LPT1.

Select the printer device and enter LPT1

The printout will now be directed to parallel port 1, without the use of the DOS PRINT command.

The scheduled events can be printed to a filename by entering the filename as the device. The details will be written to disk under the selected name in a printout format. The file can then be examined and printed using DOS commands.

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIP.EXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

Transmitting a Relative Program (Reschedule)

Reschedule generates and transmits relative programs. The area definitions and scheduled events are combined with the relative setpoints to create a generated program. For more on generated programs see "***Examining Generated Programs***" in this Chapter. The generated program is then transmitted to the network.

IMPORTANT: *A program for an HMT, LSP or HC node may contain both relative and non-relative setpoints. If so, a RESCHEDULE is necessary to download or when changes are made to relative setpoints or area definitions. A TRANSMIT is necessary for downloading network configuration information or when changes are made to non-relative setpoints.*

Select Reschedule

The controllers can be rescheduled by area or by node, Figure 18-17 and 18-18.

Select the desired method

By node

Rescheduling by node will display a list of all the nodes in the network.

IMPORTANT: *Verify the date and time within the controllers before performing a reschedule. Transmitting the time and date will re-initialize the controllers. A reschedule must be performed if a meeting area is in an event mode at the time of initialization.*

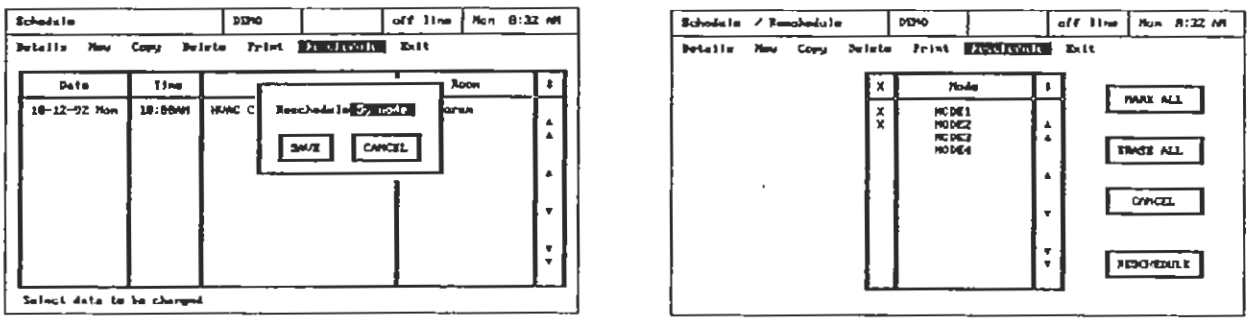

Fig. 18-17: Reschedule by Node

Select the nodes to reschedule

An X will appear next to selected nodes. MARK ALL will select all the nodes in the network. ERASE ALL will deselect all the nodes in the network.

Select Reschedule

Relative programs will be generated for the selected nodes. The generated programs will be immediately transmitted if the computer is ON LINE with the network.

Note: *If there exist areas with relative setpoints in more than one node, rescheduling by node may also reschedule nodes that were not specifically selected. Consider the folllowing distribution of relative setpoints across a three node network:*

Node 1	*Node 2*	*Node 3*
Area 1		
Area 2	*Area 2*	
	Area 3	*Area 4*

If Node 2 is selected in RESCHEDULE by Node, Areas 2 and 3 will be rescheduled.Because Area 2 is rescheduled, Area 2 setpoints in Node 1 will also be rescheduled.

By area

Rescheduling by area will display a list of areas, Fig. 18-18. The areas are listed in the order in which they must be rescheduled, along with a date and time. The areas must be rescheduled no more than 7 days before the suggested date. The area should be immediately rescheduled if the date is displayed as now!.

IMPORTANT: *Verify the date and time within the controllers before performing a reschedule. Transmitting the date and time will re-initialize the controllers. A reschedule must be performed if a meeting area is in an event mode at the time of initialization.*

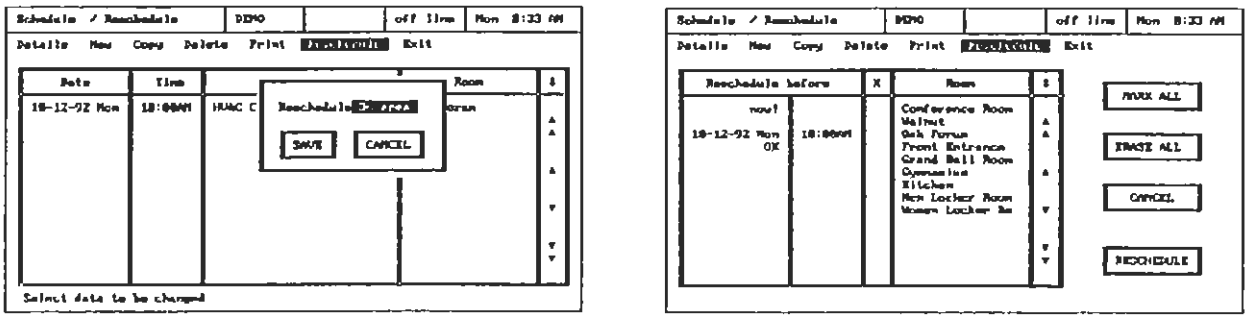

Fig. 18-18: Reschedule by Area

Select the areas to reschedule

The reschedule date is based on changes made to the area definition, relative setpoints or event schedule. now! designates that changes have been made and the controllers have not yet been updated. These areas should be immediately selected. A date represents the latest possible time to transmit the generated program to the controllers. If the area is not rescheduled by the date displayed, the controllers will continue to use last weeks control algorithms instead of implementing the current program. If the date is passed without rescheduling, the date will change to now!. OK designates that the area has not been scheduled to go into event and no changes have been made since the last reschedule. OK areas do not need to be rescheduled.

Select Reschedule

Relative programs will be generated for the selected areas. The generated programs will be immediately transmitted if the computer is ON LINE with the network.

The Reschedule before date will advance to the next programmed date after a Reschedule is performed.

Areas must be Rescheduled:

- If now! is displayed in the table.
- Less than 7 days before the date specified in the table.
- After creating setpoints for a new or existing area.
- After modifying setpoints that were programmed relative to specific areas.

Example: *A 5 hour event is scheduled to occur March 23, 1993 from 9:30 AM to 2:30 PM. A* Reschedule *is performed on Monday, March 22, 1993. The* Reschedule before *date will advance to March 30, 1993 9:30 AM, assuming no events are scheduled for the next week. The reschedule on March 30 will return the controllers to their normal weekly schedule.*

The Clipper and XL9600 are 7 day controllers. The special event for March 23, 1993 is seen only as a command for Tuesday from 9:30 AM to 2:30 PM. If the area is not rescheduled to erase the effects of the event, the controllers will continue to go into event mode every Tuesday from 9:30 AM to 2:30 PM.

The Conference Room, Gym, Oak Forum *and* Walnut *areas are OK (no Reschedule necessary unless their area definitions are changed, their area setpoints are changed or events are scheduled for them).*

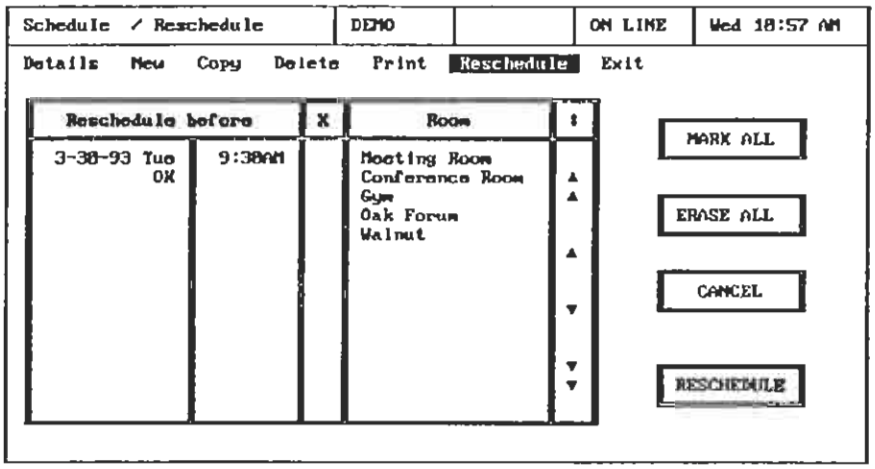

Fig. 18-19: Rechedule before date

Optimum Start/Stop Setpoints

Although Optimum Start/Stop (OSS) setpoints can be made relative to areas, rescheduling hampers the performance of OSS setpoints when they are related to areas and set to the adaptive mode. In the adaptive mode, OSS setpoints calculate new heat/cool and loss factors on a daily basis. These factors are then updated within the controller. However, these factors will not be updated in the setpoints file in the computer running PDC832GH.

PDC832GH is required to utilize scheduling. As a user enters programs relative to areas, a Reschedule will be necessary. Reschedule combines setpoints entered by the user with area targets and daytime schedules (and for Meeting Areas, with Event schedules) to generate a register table and physical setpoints for the controller to use. Each time a Reschedule is performed, a new generated program is downloaded to the controller even though the program entered by the user may not have changed. New generated programs will reset all the factors of OSS setpoints to values as entered in PDC832GH (typically 1): Overwriting any factors that have been calculated by the controller. Avoid using OSS setpoints set to the adaptive mode if made relative to any areas.

Examining Generated Programs

Area setpoints, as entered by a user, comprise half the programming involved with scheduling. The user completes setpoint templates to include which area the setpoint relates to, which sensor and sensor values, before and after times, etc. Area setpoints as entered by a user are called logical setpoints.

Logical setpoints: *Area setpoints as entered by a user.*

Rescheduling combines logical setpoints with area targets and daytime schedules (and for Meeting Areas, with Event schedules) to generate a register table and physical setpoints for the controller.

Generated setpoints: *Setpoints generated from logical setpoints, which include set register setpoints. Generated setpoints are sent to the controllers during rescheduling. Controllers use Generated setpoints as their program.*

The generated setpoint programs sent to the controllers can be examined after the areas/nodes are rescheduled.

Set Register

The relative setpoints operate in three different modes Day(D), Night(N) and Event(E). Set register defines the operating hours of each mode and the target temperatures (Cooling and Heating) during the mode, for each area. Multiple setpoints can refer to the same set register definitions.

Set register *setpoints are generated setpoints and appear only in generated programs (programs that contain setpoints related to areas and have been rescheduled).*

Example:

The area CONFERENCE *is scheduled to operate Monday through Friday from 2:00PM until 10:00PM. A special EVENT is scheduled for Tuesday morning from 8:00 AM until 11:00AM.*

CONFERENCE *has the following Area configuration:*

```
Area name: CONFERENCE                          Cooling  Heating
                                Day temperature:    77       67
                              Night temperature:    80       64
                              Event temperature:    74       70
Daytime hours
 - - M T W T F -    2:00PM - 10:00PM          -
```

Fig. 18-20: Conference Configuration (Partial Screen)

Three Analog Controls, one to control a heating load, and two to control a cooling load for Day/Night and Event, are entered by a user.

```
Details/ Analog control | DEMO |  | off line | Wed 11:01 AM

Setpoint     1 is H-relative to area CONFERENCE      Mode: MODE1
Comment:
                                                    Cooling Heating
      From     0 minutes after  beginning of       x Day      77      67
                                                    x Night    80      64
      until    0 minutes after  end of             x Event    74      78

      control load(s) x Heat     using sensor Conf Rm  to turn loads
                      Cool
                      LOAD1-3  ON  when sensor = HT+1    and
                      LOAD1-4  OFF when sensor = HT-1    .
                      LOAD1-5
                      LOAD1-6  The sensor sample RATE is once per MINUTE .
                      LOAD1-7
                      LOAD1-8  The MAXIMUM OFF time is   0 minute(s).

                                   SAVE    CANCEL

 Select data to be changed
```

```
Details/ Analog control | DEMO |  | off line | Wed 11:01 AM

Setpoint     2 is C-relative to area CONFERENCE      Mode: MODE1
Comment:
                                                    Cooling Heating
      From     0 minutes after  beginning of       x Day      77      67
                                                    x Night    80      64
      until    0 minutes after  end of               Event    74      78

      control load(s)   Heat     using sensor Conf Rm  to turn loads
                      x Cool
                        LOAD1-3  ON  when sensor = CT+3    and
                        LOAD1-4  OFF when sensor = CT+0    .
                        LOAD1-5
                        LOAD1-6  The sensor sample RATE is once per MINUTE .
                        LOAD1-7
                        LOAD1-8  The MAXIMUM OFF time is   0 minute(s).

                                   SAVE    CANCEL

 Select data to be changed
```

```
Details/ Analog control | DEMO |  | off line | Wed 11:01 AM

Setpoint     3 is C-relative to area CONFERENCE      Mode: MODE1
Comment:
                                                    Cooling Heating
      From     0 minutes after  beginning of         Day      77      67
                                                      Night    80      64
      until    0 minutes after  end of             x Event    74      78

      control load(s)   Heat     using sensor Conf Rm  to turn loads
                      x Cool
                        LOAD1-3  ON  when sensor = CT+1    and
                        LOAD1-4  OFF when sensor = CT-1    .
                        LOAD1-5
                        LOAD1-6  The sensor sample RATE is once per MINUTE .
                        LOAD1-7
                        LOAD1-8  The MAXIMUM OFF time is   0 minute(s).

                                   SAVE    CANCEL

 Select data to be changed
```

Fig. 18-21: User entered setpoints

The setpoints entered by a user (logical setpoints) would appear in the setpoint table as shown in Figure 18-22:

Num	Type	Loads	Start/Area	Comment	↕
1	Analog ctrl	1———	DMEh CONFERENCE		▲
2	Analog ctrl	-2———	DM-c CONFERENCE		▲
3	Analog ctrl	-2———	—Ec CONFERENCE		▲
8	END				▼
					▼
					▼

Select a set point

Fig. 18-22: User entered setpoints

The generated setpoints created after a Reschedule *would appear as Figure 18-23.*

Select Controllers, Setpoints, Gen

Set points / MODE1 - GEN	DEMO		off line	Mon 11:04 AM

Mode Details Edit Print Status Gen Registers Check Exit

Num	Type	Loads	Start/Area	Comment	↕
1001	Set register	D-- 77	—MTWTF- 2:00PM	CONFERENCE	
1002	Set register	-M- 90	—MTWTF- 10:00PM	CONFERENCE	▲
1003	Set register	—E 74	——T—— 8:00AM	CONFERENCE	▲
1004	Set register	-M- 00	——T—— 11:00AM	CONFERENCE	
1005	Analog ctrl	1———	-SMTWTFS 12:00AM	DMEh	
1006	Analog ctrl	-2———	-SMTWTFS 12:00AM	DM-c	▲
1007	Analog ctrl	-2———	-SMTWTFS 12:00AM	—Ec	
8	END				▼
					▼
					▼

Select a function

Fig. 18-23: Generated Setpoint Table

The generated program for the selected node will be displayed.
The generated program cannot be modified.

The first Set register setpoint would configure the start of the DAY hours. This setpoint sets CONFERENCE into DAY mode at 2:00PM and sets the cooling target to 77 and the heating target to 68, Figure 18-24.

The next three Set register setpoints set the operating hours and target temperatures for the Night, Event (on Tuesday morning) and Night respectively. The fourth Set register setpoint sets the operating hours and target temperatures back to Night mode since the Event on Tuesday ends at 11:00 AM Tuesday. Day mode does not start until 2:00 PM Tuesday.

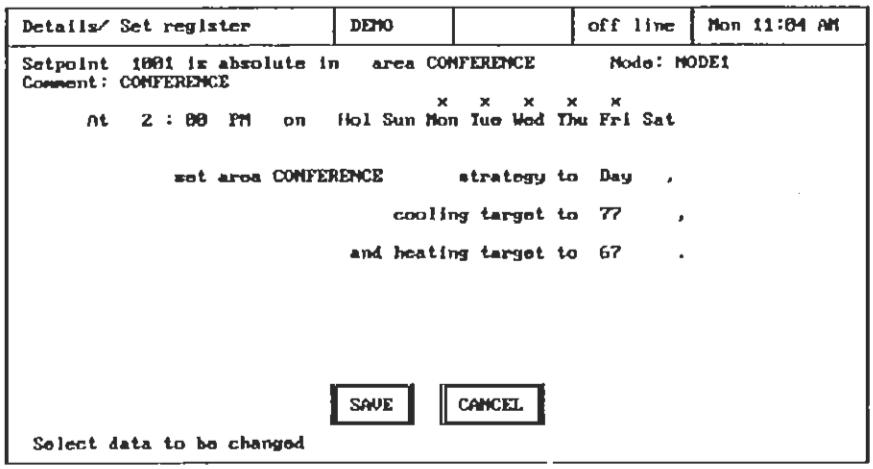

Fig. 18-24: Set register - Day mode (Details)

The Analog Control setpoints respond to the modes configured by the Set register setpoints. The first Analog Control, figure 18-25, controls the Heat load during Day, Night and Event Modes, turning the Heat load ON and OFF at HT+1 and HT-1 (Day 68/66, Night 65/63 and Event 71/69) .

The second Analog Control, figure 18-26, controls the Cool load during Day and Night, turning the Cool load ON and OFF at CT+3 and CT+0 (Day 80/77, Night 83/80).

Day, Night and Event Setpoint

Relative to Heat Target

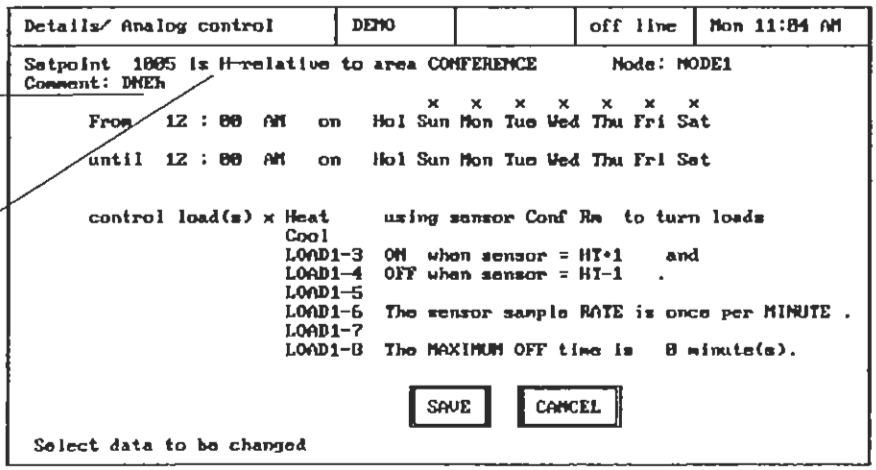

Fig. 18-25: Heating Setpoint - Day, Night and Event

Day & Night

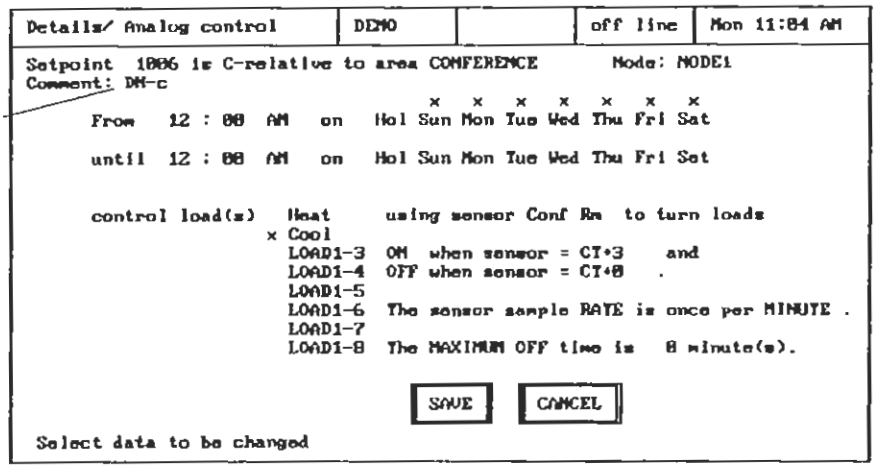

Fig. 18-26: Cooling Setpoint - Day & Night

The third Analog Control, figure 18-27, controls the Cool load only during Events, turning the Cool load ON and OFF at CT+1 and CT-1, Event 75/73 .

Event

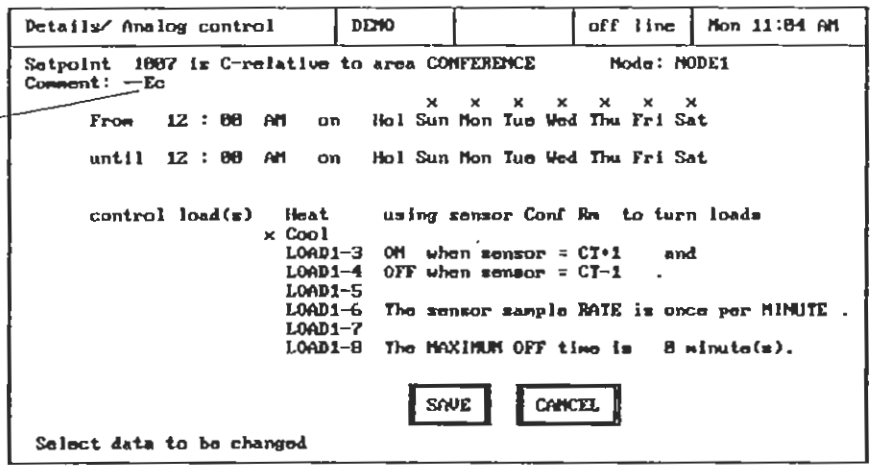

Fig. 18-27: Cooling Setpoint - Event

The need to RESCHEDULE after an Event occurs now becomes obvious. The generated setpoints will remain in the controller until they are replaced. If a RESCHEDULE is not performed after the Tuesday Event expires, CONFERENCE will go into an Event mode every Tuesday from 8:00 AM until 11:00 AM. Rescheduling after an Event eliminates the possibility of the Event being repeated every week.

Examining Register Status

The current status of the registers can be viewed if the computer is ON LINE with the network.

Select Controllers, Setpoints, Registers

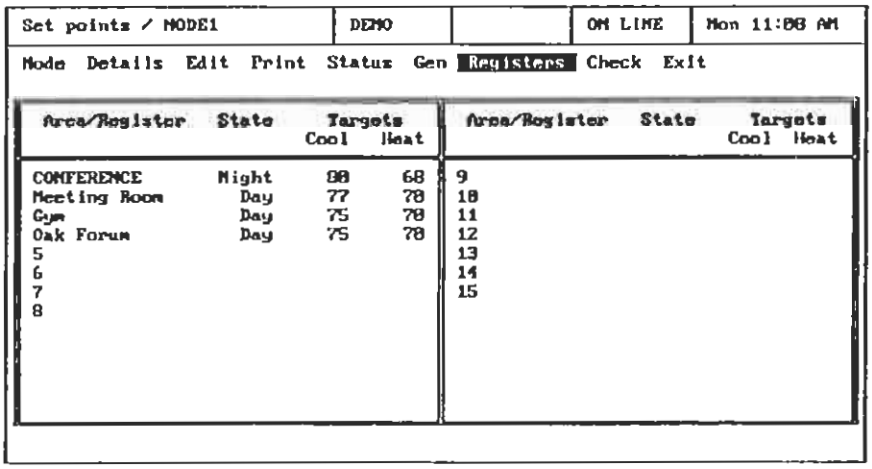

Fig. 18-28: Register Table

The status of the registers for the selected node will be polled and displayed, Figure 18-28. The register table will include the Area name, current state (Day, Night or Event) and current targets (Cool/Heat). The registers cannot be modified from this screen. However, the current targets for an area can be changed ON LINE, without rescheduling, via the Area, Targets menu option (see "***Temporarily Modifying Current Targets***" in this chapter pg. 18-6).

IMPORTANT

The Clipper LAN/XLHC Controller has the ability to store and utilize both a Heating and Cooling target for each area. Only the Cooling targets are used for the Clipper LAN/XLHMT, Clipper LAN/XLLSP, XL9600HMT and XL9600LSP Controllers.

The Heating target registers for the Clipper LAN/XLHMT, Clipper LAN/XLLSP, XL9600HMT and XL9600LSP Controllers will be displayed as 0.

Up to 15 different AREAS can be programmed in a single node of an XLHMT, XLLSP, XLHC, XL9600HMT or XL9600LSP controller.

Combining Relative and Non-Relative Setpoints

Relative and Non-Relative setpoints can be combined in a program.

Figure 18-29 shows both Relative and Non-Relative contained in a setpoint table.

Relative Setpoints 1,2,3 and 6

Non-Relative Setpoints 4 and 5

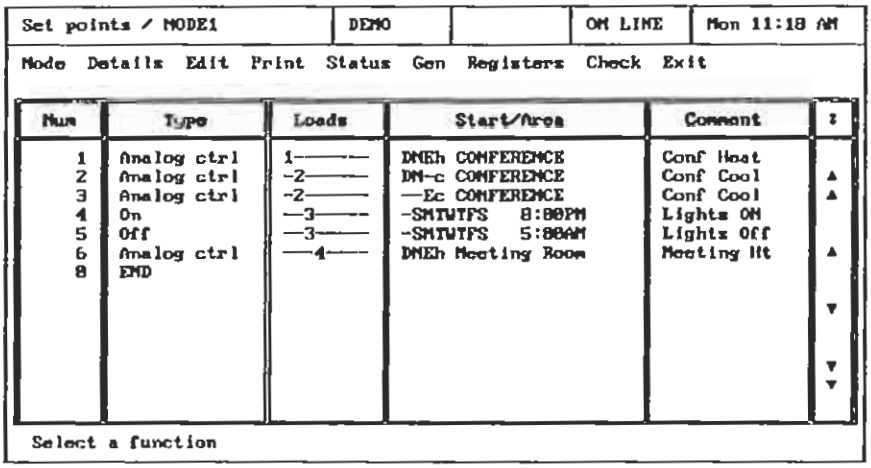

Fig. 18-29: Relative/Non-Relative Program

The setpoints generated for the program (after a RESCHEDULE) are displayed in Figure 18-30.

After a logical program containing both relative and non-relative setpoints has been RESCHEDULED, the generated programs will reorder the setpoints.

Non-Relative Setpoints ordered first

Relative Setpoints entered at end of program

Relative Setpoints start numbering at 1001

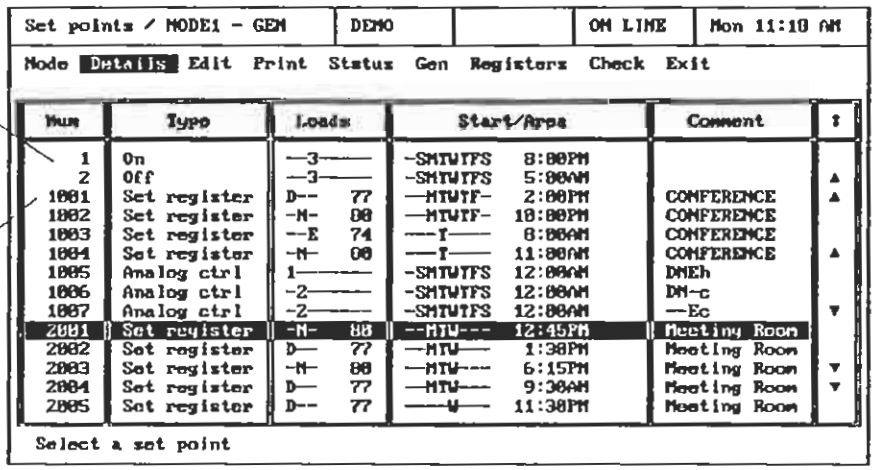

Fig. 18-30: Relative/Non-Relative Generated Program

Non-relative setpoints will be entered first and numbered between 1 to 1000.

Relative setpoints will be numbered starting at 1001.

In a program with both relative and non-relative setpoints, the relative setpoints will have higher priority than non-relative setpoints for common loads.

Relative Setpoint Notes

As shown in Figure 18-30, relative setpoints start their setpoint number at 1001.

There are 15 registers available in a Clipper LAN/XLHMT, Clipper LAN/XLLSP, ClipperLAN/XLHC, XL9600HMT or XL9600LSP node.

15 separate registers allow for a program to contain relative setpoints that reference up to 15 different areas, Figure 18-31.

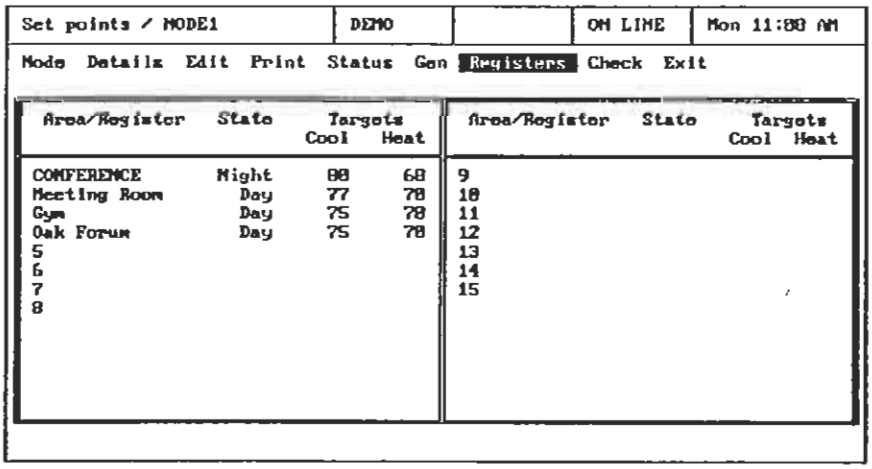

Fig. 18-31: Register Table

As each area occupies a register, the area is assigned a register number.

Example: In figure 18-31, each area in the register table has been assigned a register number. Register numbers 5-15 are available for 11 more areas.

AREA	Assigned register number
CONFERENCE	1
Meeting Room	2
Gym	3
Oak Forum	4

When setpoints are generated for the CONFERENCE, Meeting Room, Gym and Oak Forum areas, the generated setpoints reference the register numbers assigned to each area.

Generated setpoints relating to CONFERENCE will start at 1001. 1 is the CONFERENCE register number and 001 is the first setpoint.

1 001

CONFERENCE *register number: 1* *First setpoint for* CONFERENCE.

Other setpoints relating to CONFERENCE will be numbered 1002, 1003, etc.

Setpoints relating to Meeting Room will start at 2001 and continue with 2002, 2003 etc., Figure 18-32.

Non-Relative Setpoints ordered first

Relative Setpoints entered at end of program

Relative Setpoints start numbering at 1001

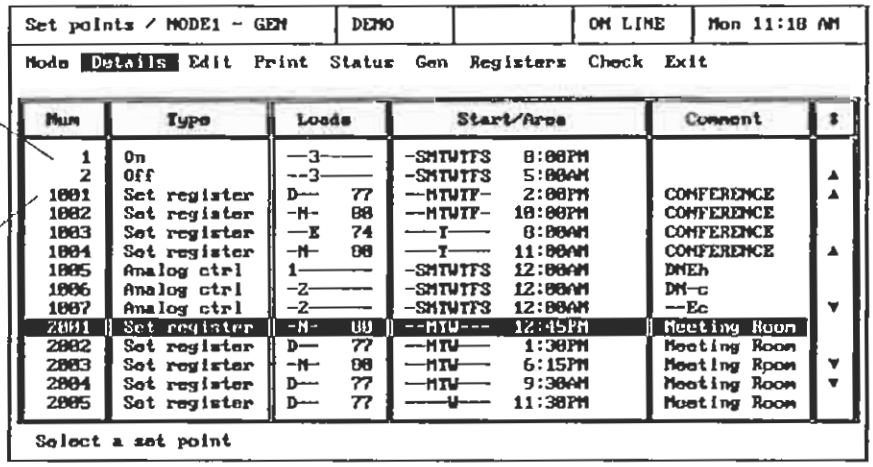

Fig. 18-32: Generated Program Line numbers

Things to consider with Scheduling

1. Daytime hours within the Areas screens establish both Day and Night Nours. If Daytime hours of 9:00 AM to 5:00 PM Monday through Friday are entered, Night time hours of 5:00 PM to 9:00 AM Monday through Friday and 5:00 PM Friday to 9:00 AM Monday are also established. Night hours are established indirectly (Hours not specified as Day are considered Night).

2. Time offsets (XX minute before start of/XX minutes before end of Day, Night and or Event) can be entered within C-relative, H-relative or absolute setpoints related to areas. The status (Day, Night or Event) of an area may be in effect for more or less time than the hours specified due to nonzero time offsets.

   Consider a Conference Area with Daytime hours from 9:00 AM - 5:00 PM Monday through Friday. The relative setpoint shown below has time offsets enabling the setpoint 30 minutes before beginning of Day/Night/Event until 30 minutes after end of Day/Night/Event. This will cause the generated program to interpret Daytime hours to be 8:30 AM until 5:30 PM. Once the Daytime hours have been established Night hours are left with 5:30 PM until 8:30 AM.

Time offsets of 30 minutes before and 30 minutes after end of Day, Night and Event

```
Details/ Analog control                          off line   Wed 12:51 PM

Setpoint     1 is C-relative to area Conference      Mode: MODE1
Comment:
                                                    Cooling Heating
     From    30 minutes before beginning of    x Day      76      68
                                               x Night    65      65
     until   30 minutes after  end of          x Event    73      71

     control load(s) x LOAD1-1  using sensor SENSR1   to turn loads
                       LOAD1-2
                       LOAD1-3  ON  when sensor = CT+1    and
                       LOAD1-4  OFF when sensor = CT-1    .
                       LOAD1-5
                       LOAD1-6  The sensor sample RATE is once per MINUTE .
                       LOAD1-7
                       LOAD1-8  The MAXIMUM OFF time is   8 minute(s).

                                      SAVE      CANCEL

Select data to be changed
```

Fig. 18-33: Time Offsets

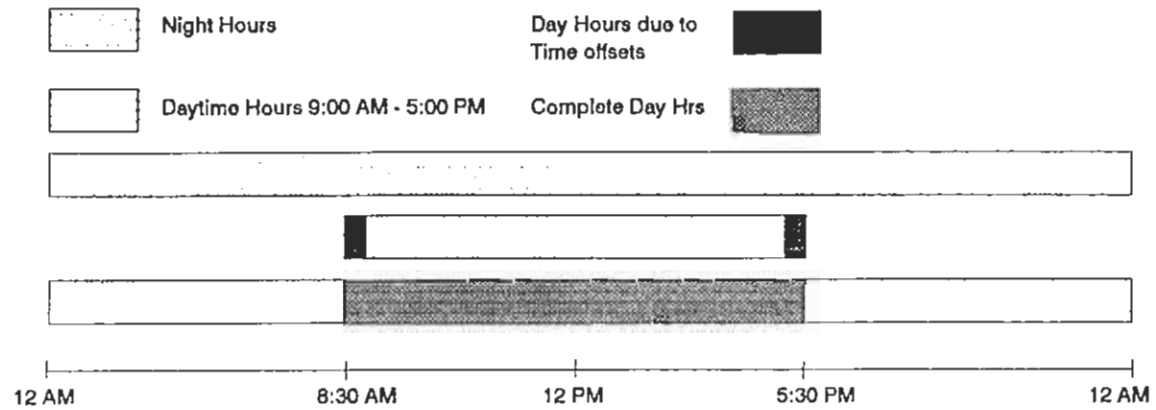

Fig. 18-34: Typical 24 hour schedule (No Events)

3. Areas can only be in one state at a given time throughout the network. To ensure that exactly one state is enabled at a time, Event states overrule Day and Day states overrule Night.

Working with the concepts outlined in points 1 and 2, suppose an Event was scheduled for Monday from 4:00 PM until 6:00 PM. In the 24 hour period for Monday, Day hours are considered from 8:30 AM-5:30 PM. Event hours are from 3:30 PM until 6:30 PM (The Analog Control setpoint has 30 minute before and 30 minute after time offsets for Events as well as Day and Night). Between 3:30 PM until 5:30 PM the area is asked to be in both Day and Event mode. Conforming to the rules using scheduling (Point 3 above), the area would be in an Event mode.Once the Event expires the area will enter Night.

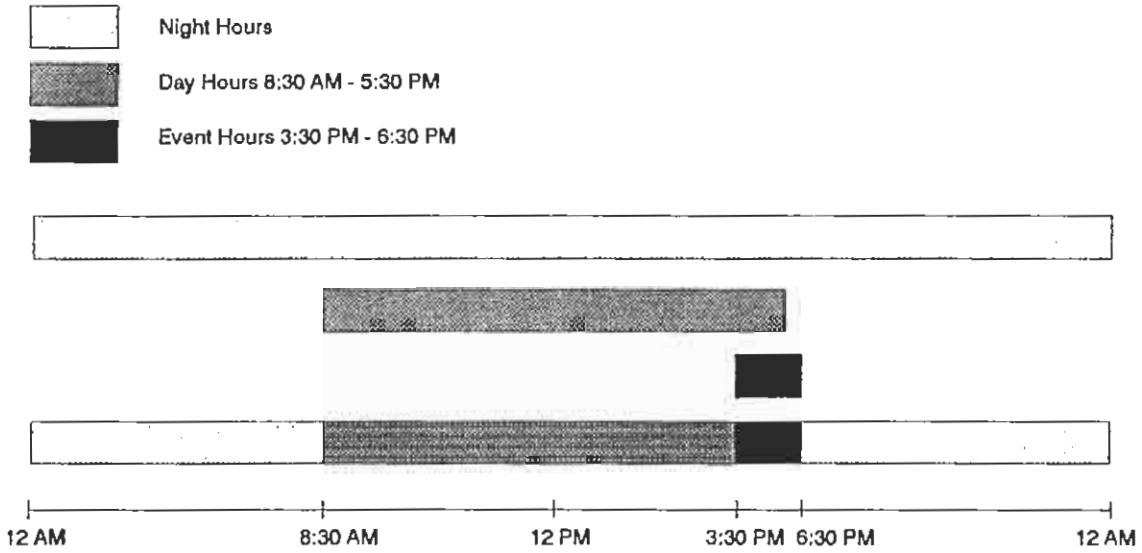

Fig. 18-35: Monday schedule

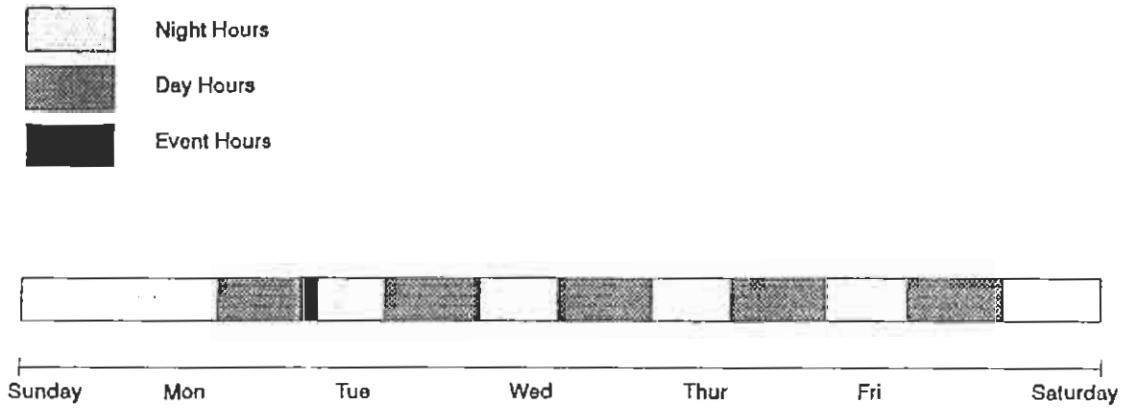

Fig. 18-36: Week schedule

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Chapter 19 - Creating an MVAC Network

MVAC, Solidyne's Modular Variable Air Controller, is an electronic VAV control system. This system is hardware configured to control a variety of VAV terminal boxes including Single duct, Dual duct, Electric heat, Hot water heat and Paired duct. The system can operate stand-alone or be networked with a ClipperNet Network.

The software used to program and monitor ClipperNet controllers can also be used to program and monitor MVAC controllers.

From the main menu:

Select Controllers, MVAC Zones

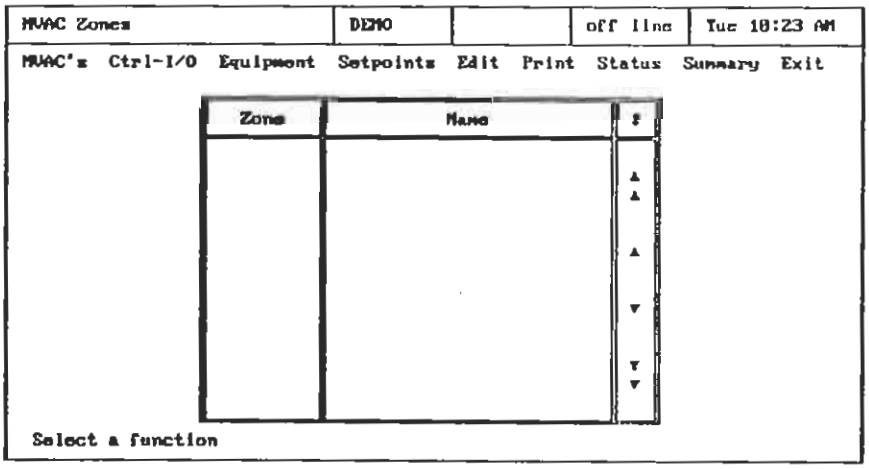

Fig. 19-1: MVAC Zones Menu

MVAC's

An MVAC network is created by specifying the number of MVAC nodes in the system.

> ***MVAC NODE:*** *An MVAC-C main controller. The MVAC-C must be assigned a network ID number to identify it within the system. Each MVAC-C can control two VAV zones (A and B).*

Select MVAC's

If the lowest MVAC node is greater than the highest MVAC node, the network will NOT contain MVAC controllers.

MVAC-C controllers can be assigned ID numbers from 2 to 252. The assigned numbers typically start at 33, reserving 1 through 32 for Clipper LAN controllers. The identification numbers must be entered through an MVAC-STD display stat or through PDC-MVAC sublan software.

Determine the range of ID numbers assigned to the MVAC controllers in the network. The MVAC node numbers should be assigned sequentially starting with a number greater than the highest numbered Clipper LAN controller. It is permissible to leave a large gap between the highest numbered Clipper LAN controller and the lowest numbered MVAC.

Enter the lowest and highest MVAC node numbers. A table of MVACs will appear, Figure 19-2.

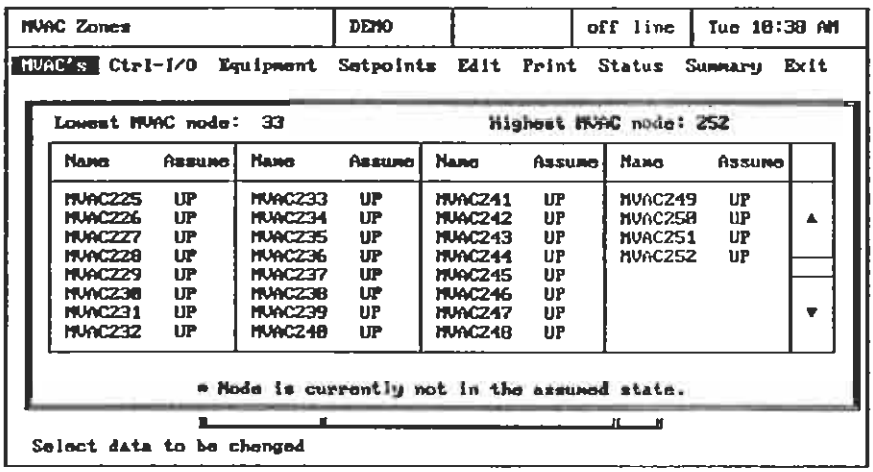

Fig. 19-2: MVAC Zones Table

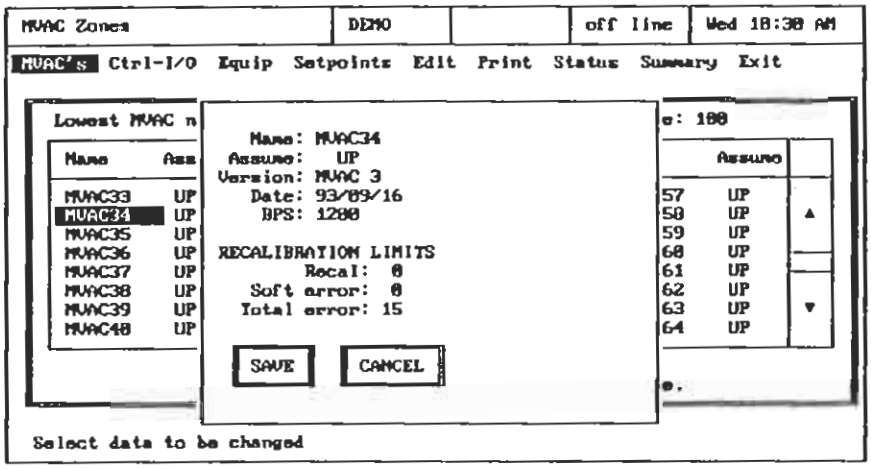

Fig. 19-3: MVAC Node Details

Defining the nodes

The MVAC nodes are defined by assigning a label (Name), configuring the communication status (UP) and selecting the version. The version can be defined automatically through remote communication or manually through the MVAC 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 section ***Establishing Communications - Receive*** for detailed instructions.

To manually define the node types, select the Node Name to be defined.

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

Name

Default entry: MVACXXX. 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 UP through this menu before communications will be attempted.

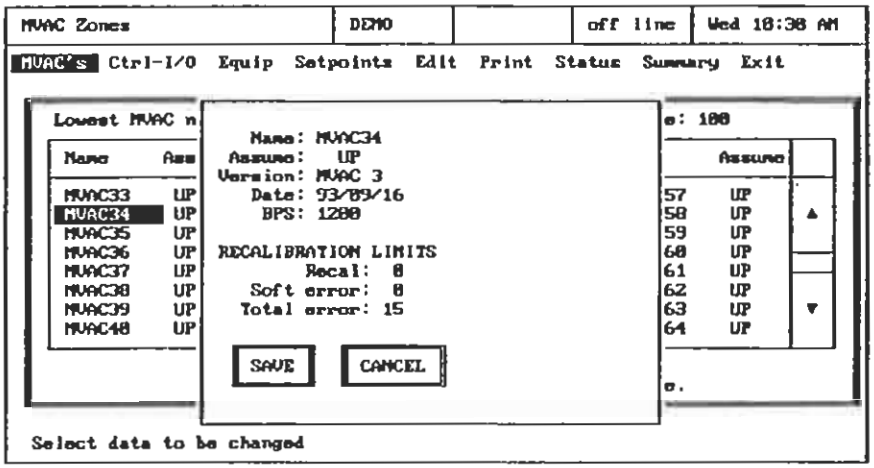

Fig. 19-4: MVAC Node Details

Date

Revision date of the firmware within the MVAC-C controller. DATE is a read-only parameter.

BPS

BPS specifies the baud rate used to communicate with MVACs. Currently 1200 is the only operational BAUD rate used.

Recalibration Limits

The MVAC-C and MVAC-A damper actuators are automatically calibrated at power up. The damper/valve will rotate end to end (maximum range is 0 to 90 degrees), to automatically determine the full range of motion of the actuator. The controllers can also be programmed to recalibrate their actuators based on specific error limits.

The MVAC controllers monitor their own performance. Error counts are recorded for motor stalls and communication timeouts. A motor stall occurs when the actuator bumps the internal stop or physical limit of the valve or damper. A communication timeout occurs when the controlled device failed to carryout the previous command within a specific time period.

Three recalibration limits can be entered: Recal, Soft error and Total error.

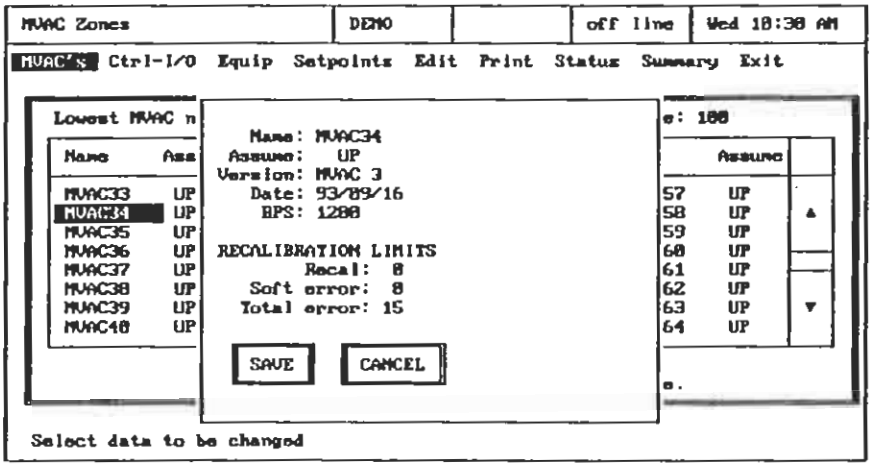

Fig. 19-5: MVAC Node Details

Soft error

The Soft error counter is related to the frequency in which the motor stall and communication timeout errors occur. When a command is given and an error occurs, 3 is added to the associated soft error counter. When a command is successfully carried out, 1 is subtracted from the soft error count. If the count exceeds the limit specified (0, 5, 10 or 15), the actuator will be recalibrated and the soft error counter will be zeroed.

Total error

The Total error counter accumulates a running total of the errors as they occur. When a command is issued and an error occurs, 1 is added to the total error counter. If the count exceeds the limit specified (0, 5, 10 or 15), the actuator will be recalibrated and the soft error counter will be zeroed.

When a controller is shut down, it can be reactivated through the MVAC RESET (see next page), or by cycling power to the zone. The Recal counter is reset when the zone is reactivated.

Recal

The Recal counter specifies the maximum number of recalibrations to perform. When a recalibration is performed after a Soft or Total error limit is exceeded, 1 is added to the recal counter. If the count exceeds the limit specified (1 to 15), the actuator will be shut down and the respective error bit will appear on the status screen. A value of 0 represents an unlimited number of recalibrations.

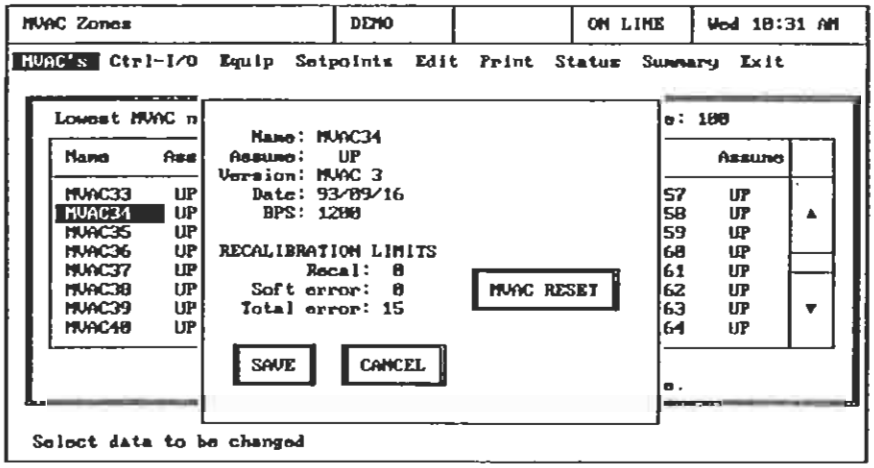

Fig. 19-6: MVAC Node Details - MVAC Reset

When the software is ONLINE with an MVAC network, an MVAC RESET button will appear in the MVAC Node Details screen. By selecting the MVAC RESET button, the software will force a complete hardware reset of the processor. The controller will initialize as if it was just powered up. This reset command provides a method for remotely troubleshooting potential problems, such as a stuck damper.

The MVAC RESET should only be used in extreme cases.

Chapter 20 - Configuring MVAC Zones

The MVAC controllers are programmed via PDC832 or PDC-MVAC software packages. The PDC832 remote communication software package can program and monitor Clipper and/or MVAC controllers that have been networked together. The network communication can be remote, via modems, or direct, via an onsite computer.

The PDC-MVAC software package directly programs individual zones by connecting a laptop computer to a temperature sensor in the zone. Since the zones are programmed individually, PDC-MVAC has the additional capability of assigning network identification numbers to the zones.

Both software packages contain the same MVAC programming menus. The significance of the programming options will be described in this chapter.

MVAC programming is performed on a zone by zone basis. The operation of the controllers is configured through four menus: MVAC's, Ctrl-I/O, Equip and Setpoints.

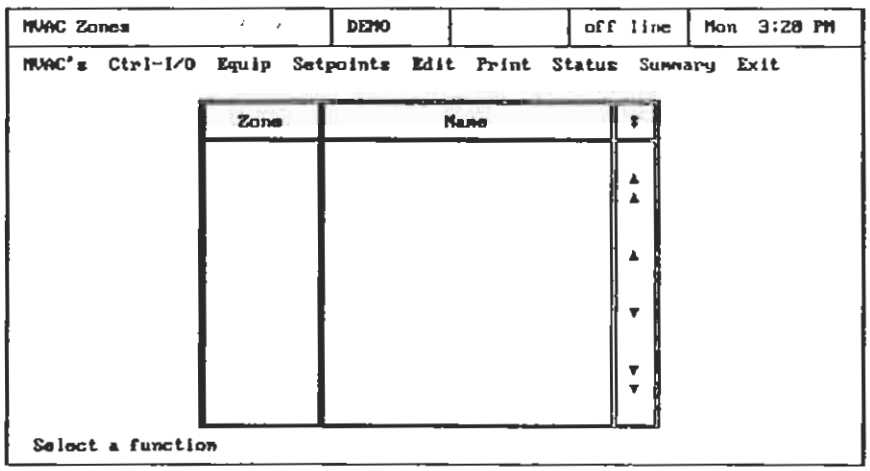

Fig. 20-1: MVAC Zones Main Menu

MVAC's

The MVAC network must be created through the MVAC's menu prior to programming the system. Typically, the lowest MVAC node is entered as 33, nodes 1 through 32 are usually reserved for Clipper controllers. If the system contained 100 MVAC-C controllers (up to 200 zones), the highest MVAC node would be 132. The zones are automatically created when the highest MVAC node is entered as a number greater than the lowest MVAC node.

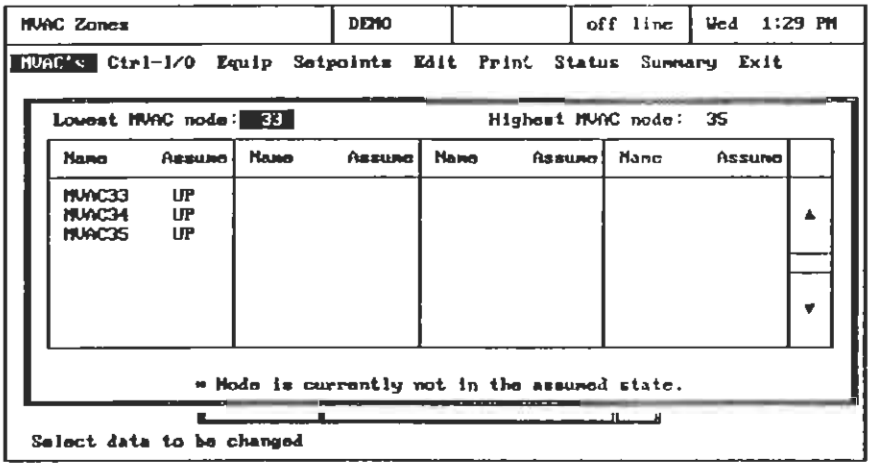

Fig. 20-2: MVAC's Screen

Recalibration Limits

The MVAC-C and MVAC-A damper actuators are automatically calibrated at power up. The damper/valve will rotate end to end (maximum range is 0 to 90 degrees), to automatically determine the full range of motion of the actuator. The controllers can also be programmed to recalibrate their actuators based on specific error limits.

The MVAC controllers monitor their own performance. Error counts are recorded for motor stalls and communication timeouts. A motor stall occurs when the actuator bumps the internal stop or physical limit of the valve or damper. A communication timeout occurs when the controlled device failed to carryout the previous command within a specific time period.

Three recalibration limits can be entered: Recal, Soft error and Total error.

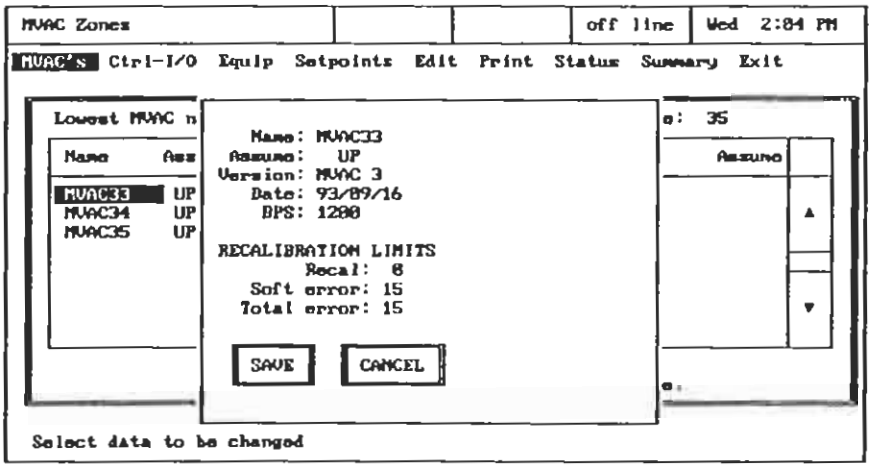

Fig. 20-3: Recalibration Limits

Soft error

The Soft error counter is related to the frequency in which the motor stall and communication timeout errors occur. When a command is given and an error occurs, 3 is added to the associated soft error counter. When a command is successfully carried out, 1 is subtracted from the soft error count. If the count exceeds the limit specified (0, 5, 10 or 15), the actuator will be recalibrated and the soft error counter will be zeroed.

Total error

The Total error counter accumulates a running total of the errors as they occur. When a command is issued and an error occurs, 1 is added to the total error counter. If the count exceeds the limit specified (0, 5, 10 or 15), the actuator will be recalibrated and the soft error counter will be zeroed.

When a controller is shut down, it can be reactivated through the MVAC RESET (see Chapter 19) on the MVAC Node Details screen, or by cycling power to the zone. The Recal counter is reset when the zone is reactivated.

Recal

The Recal counter specifies the maximum number of recalibrations to perform. When a recalibration is performed after a Soft or Total error limit is exceeded, 1 is added to the recal counter. If the count exceeds the limit specified (1 to 15), the actuator will be shut down and the respective error bit will appear on the status screen. A value of 0 represents an unlimited number of recalibrations.

Ctrl-I/O

General setup information is entered through the Ctrl-I/O menu: zone type, name, occupancy detection method, override and sensor selection.

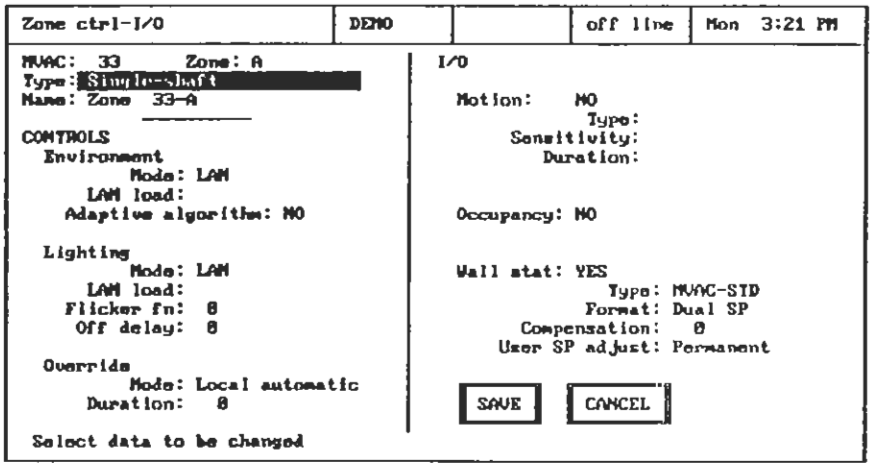

Fig. 20-4: Zone Type

Zone type

The zone type must be selected before entering other parameters. The available programmable parameters within the Equip and Setpoints menus are determined by the selected zone type. A selectable zone type enables programming of the system before installation is complete.

***NOTE:** The zone type is inferred by the MVAC-C based on the hardware configuration of the auxiliary modules. The type cannot be changed through software. Prior to transmitting programmable data, perform a network* Receive *to examine the inferred zone type. If the inferred zone type is not correct a hardware change is required. Refer to MVAC Operating Manual for hardware installation instructions.*

***EXCEPTION:** The hardware configuration of the Paired Duct is identical to the configuration of the Single Shaft. The controllers will allow the Single Shaft zone type to be toggled to Paired Duct.*

Name

A 24 character description can be assigned to each zone for identification. The name will not be transmitted to the controllers, it will reside in the computer only.

Wall stat

The zone temperature is sensed by an MVAC-STD, MVAC-STM or MVAC-ST. The type must be selected for proper operation.

Type: MVAC-STD

The MVAC-STD displays the current zone status, allows the user to modify the control parameters in the occupied mode and enables the user to override the zone. The display mode can be set to single or dual setpoint. The format of the display mode can only be changed through software.

MVAC-STDs manufactured before 9/93 do not have Single Setpoint *capabilities.*

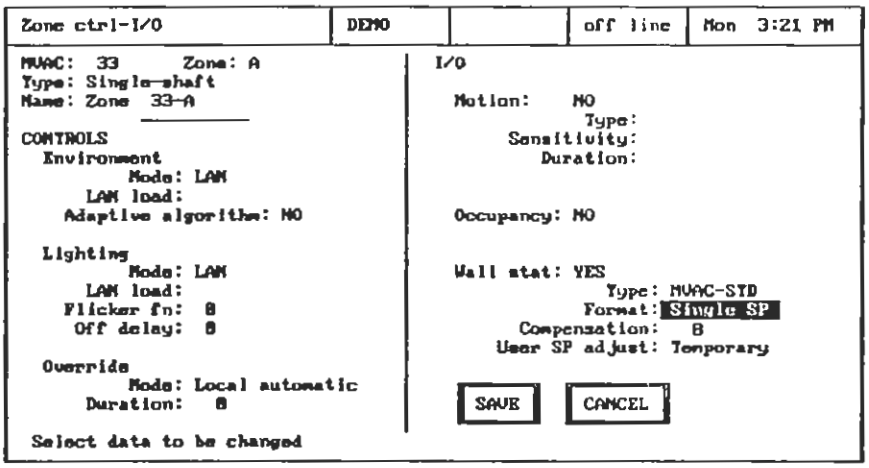

Fig. 20-5: Format: Single SP

Format: Single SP

The wall stat will continually display the zone temperature. The occupied state of the zone will not be displayed. The user will be allowed to adjust the occupied setpoints based on the current zone temperature.

Single Setpoint Adjustment Procedure

Press the up or down button to raise/lower the target temperature. The wall stat will use the current zone temperature as the starting point and will increment or decrement the setpoint value based on the button pressed.

Single Setpoint Adjustment Procedure (continued)

If an up or down button is pressed again, the value will increment or decrement, respectively. If the up or down button is held, the setpoint will auto-increment or auto-decrement, respectively. The setpoint adjustments are reported to the controller as they are made.

Release the button when the desired value is displayed. After 30 seconds the display will revert back to the current zone temperature.

The single setpoint mode provides the user a simple interface. Although the user is only adjusting one temperature target, the zone will be controlled using separate heating and cooling targets. The target affected by the user adjustment will be determined by the current occupied temperature mode. If the zone is in the heating band, heating deadband or changeover heating, user adjustments will be made to the heating target. If the zone is in the cooling band or cooling deadband, user adjustments will be made to the cooling target. The allowable setpoint adjustments are limited to the constraints specified within the Setpoints menu.

Format: Dual Setpoint

The wall stat display will alternate between the current zone temperature and the occupied state of the zone. The occupied states are abbreviated.

"oc" for occupied

"un" for unoccupied

"or" for override

Dual Setpoint Adjustment Procedure

Press the up or down button. The display will show C= for Cooling setpoint equals.

Press the up or down button, again. The display will show the current cooling target.

If the up or down button is pressed again, the cooling target will increment or decrement, respectively. If the up or down button is held, the cooling target will auto-increment or auto-decrement, respectively.

Press the middle button. The display will show H= for Heating setpoint equals.

Press the up or down button, again. The display will show the current heating target.

If the up or down button is pressed again, the heating target will increment or decrement, respectively. If the up or down button is held, the heating target will auto-increment or auto-decrement, respectively. The setpoint adjustments are reported to the controller as they are made. The allowable setpoint adjustments are limited to the constraints specified within the Setpoints menu.

Type: MVAC-STM

The MVAC-STM reports the zone temperature directly to the controller. The three pushbuttons allow the user to modify the occupied temperature targets and override the zone.

The MVAC-STM does not contain a display. Setpoint adjustments are made without feedback of the actual control parameters.

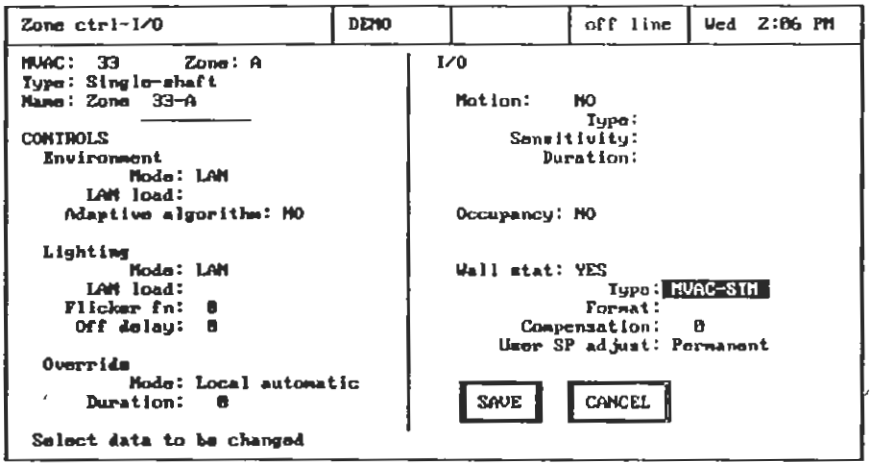

Fig. 20-6: Type: MVAC-STM

Occupied setpoint adjustment procedure

Press and hold the up or down button for five seconds. The current target will be raised or lowered, respectively. The target affected by the user adjustment will be determined by the current occupied temperature mode. If the zone is in the heating band, heating deadband or changeover heating, user adjustments will be made to the heating target. If the zone is in the cooling band or cooling deadband, user adjustments will be made to the cooling target. The allowable setpoint adjustments are limited to the constraints specified within the Setpoints menu.

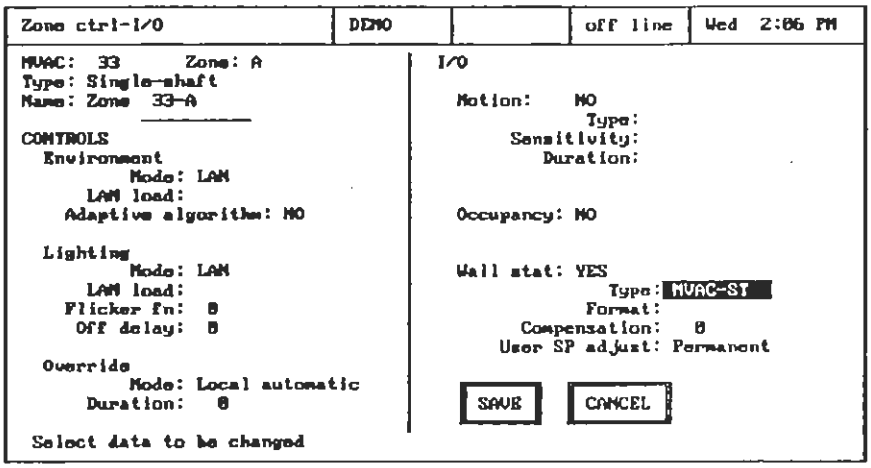

Fig. 20-7: Type: MVAC-ST

Type: MVAC-ST

The MVAC-ST reports the zone temperature directly to the controller. The MVAC-ST cannot adjust control parameters or trigger overrides.

Compensation

The compensation factor enables the user to make 0.25 degree adjustments to the zone temperature reading. A compensation factor of 1 will add 0.25 degrees to the zone temperature. A compensation factor of -2 will subtract 0.5 degrees from the zone temperature.

User SP adjust

The user setpoint adjustment can be selected to be permanent or temporary. If permanent is selected, user adjustments made through an MVAC-STD or MVAC-STM will be stored in the controllers non-volatile memory. The adjusted values will be retained as the new "permanent" control values.

If temporary is selected, the user adjustments will be accepted but will not be stored in the non-volatile memory. The next time the zone makes a transition from the occupied or override state to the unoccupied state, the occupied setpoints will revert back to the values stored in the non-volatile memory.

NOTE: *Temperature adjustments made through the MVAC-STD and MVAC-STM are limited to the values prescribed in the Setpoints menu.*

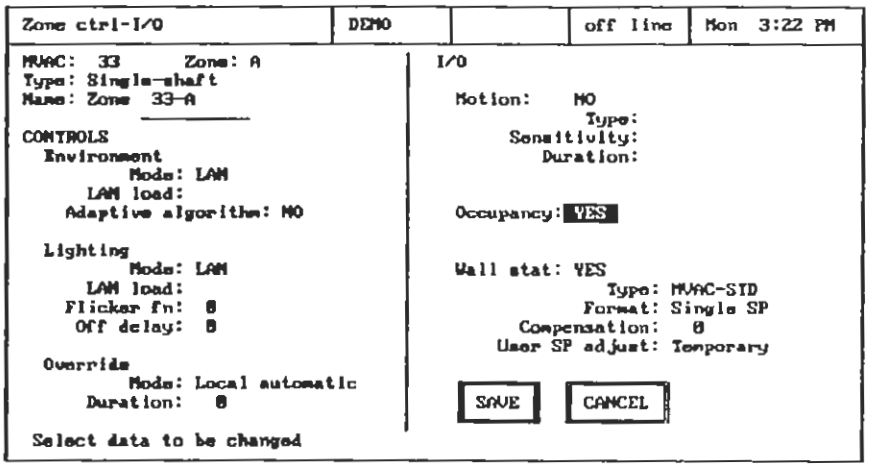

Fig. 20-8: Occupancy: Yes

Occupancy mode

The control of the individual zones is based on the occupied/unoccupied status of the zone. The status of the zone can be determined by a motion detector, toggle switch or digital load status within the Clipper network.

Motion detector

A motion detector can be connected to the AUX IN, auxiliary input, on the MVAC-C or MVAC-A controllers. The system must be programmed to accept the motion detector. Up to four programmable parameters are entered for motion detection.

Toggle the motion detector to YES.

Motion: YES

The type of motion detector can be toggled between Analog or Digital.

Type: Analog

or

Type: Digital

If an analog motion detector is selected, the sensitivity of the sensor must be entered, 0 to 255.

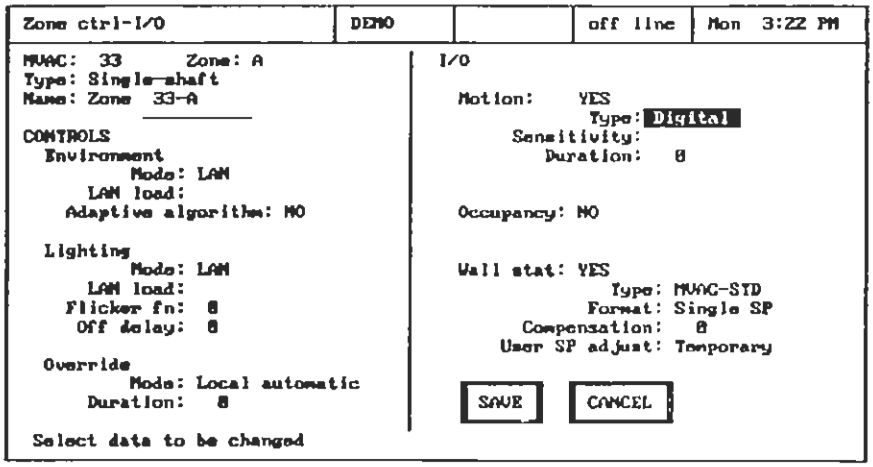

Fig. 20-9: Motion: Yes Type: Digital

Sensitivity

The duration specifies the number of minutes to remain in occupied mode when motion is detected, 0 to 255 minutes.

Duration

The motion detector will monitor the room for occupants. If movement is detected, the zone will enter the occupied mode. The VAV terminal box will be controlled to maintain the temperature targets for the occupied mode, for the duration specified. If motion is detected before the specified duration expires, the timer will be reset. When the timer reaches 0 the zone will enter the unoccupied mode. The VAV terminal box will be controlled to maintain the temperature targets for the unoccupied mode until motion is again detected.

Toggle switch

A toggle switch or other maintained dry contact can be connected to the AUX IN on the MVAC-C or MVAC-A controllers. The system must be programmed to accept an occupancy detector.

Occupancy: YES

When AUX IN is shorted to COMMON, the zone will enter the occupied mode. The VAV terminal box will be controlled to maintain the temperature targets for the occupied mode until the connection is broken. When the connection is broken the zone will enter the unoccupied mode. The VAV terminal box will be controlled to maintain the temperature targets for the unoccupied mode until the AUX IN is shorted.

Load status

The occupied mode can also be based on the digital status of a load on a Clipper controller. The zone will enter the occupied mode only while the load is ON. If the selected load is OFF, the zone will remain unoccupied, unless overridden. Linking the occupied status of MVAC controllers to the digital status of Clipper outputs is an effective way to add scheduling capabilities to MVAC operation.

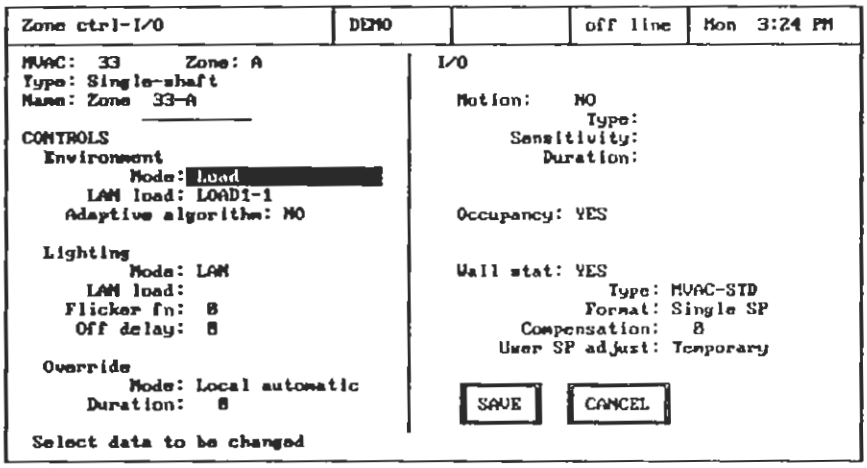

Fig. 20-10: Environment Mode: Load

CONTROLS

The primary function of the MVAC system is to control the temperature of the environment. Lighting control and system override are secondary features. The control method for the environment must be specified, while lighting and override are optional.

Environment

Environment refers to temperature control. The mode selection will specify the type of occupancy detection used for VAV terminal box control. The acceptable modes are Motion detect, Occupancy detect and Load.

Motion detect

Motion detect can be selected if a motion detector has been connected to the AUX IN on the MVAC-C or MVAC-A and Motion has previously been toggled to YES.

Occupancy detect

Occupancy detect can be selected if a maintained dry contact has been connected to the AUX IN on the MVAC-C or MVAC-A and Occupancy has previously been toggled to YES.

Load

Load can be selected if the MVAC networked has been linked to a Clipper network. The MVAC zone can be instructed to monitor the digital status of a selected load in the network.

LAN load

LAN load selects the load to monitor. When Load is selected as the detection mode, the LAN load must be selected. Any load in the Clipper network linked to the MVAC network can be selected as the controlling load.

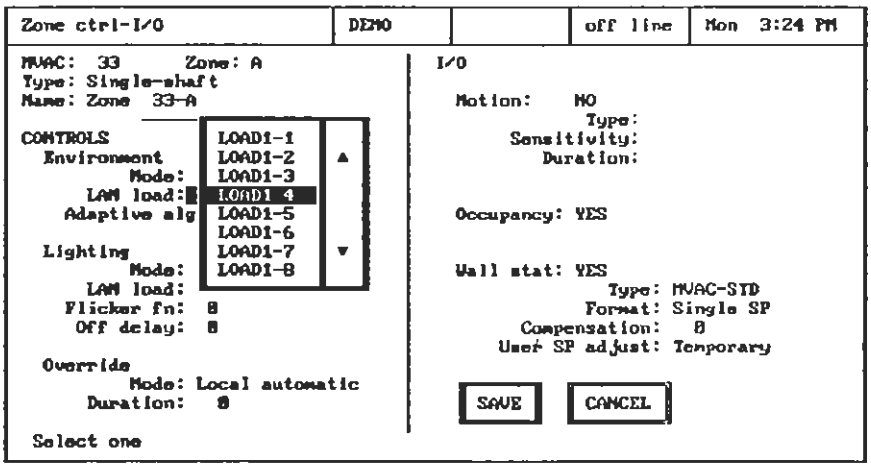

Fig. 20-11: Lan load selection

Lighting

Lighting control is possible on zones that have not used the AUX OUT for fan control. The lights will be turned ON when the zone becomes occupied and will be turned OFF when the zone becomes unoccupied. The methods for determining the occupied status are identical to the methods used for the environment. The mode selected for lighting control does not have to be the same as the mode selected for environment.

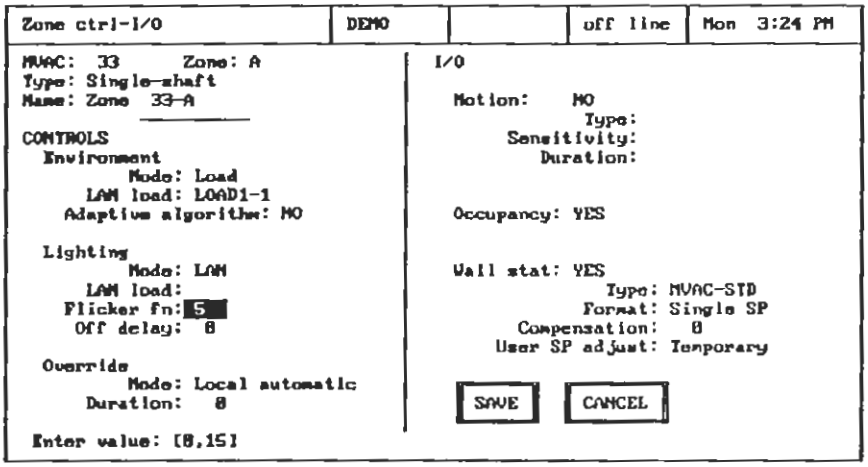

Fig. 20-12: Lighting Flicker fn:

Flicker function

The flicker function is a future feature for lighting control. The flicker function will enable the lights to flash in a selected pattern before turning off completely, providing a warning for occupants.

Off delay

The Off delay specifies the number of minutes to delay the switching of the lights when the controlling zone enters the unoccupied mode.

Override

The system can be programmed for local override if the zone contains an MVAC-STD or MVAC-STM temperature sensor. Toggle Mode to Local automatic.

Mode: Local automatic

Select a duration from 0 to 255 minutes.

Duration: 120

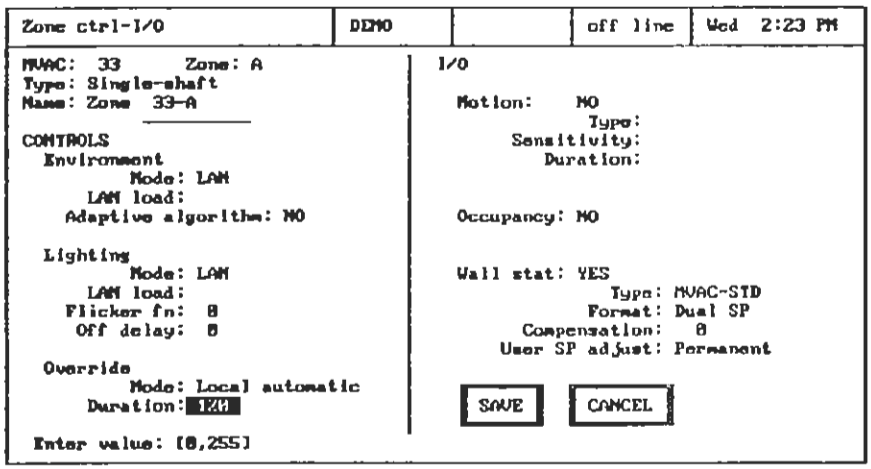

Fig. 20-13: Override Duration

The center buttons on the MVAC-STD and MVAC-STM are now active. If the system is unoccupied and the button is pushed, the zone will enter the override mode for the programmed duration. The override is retriggerable and cancellable. The override can be cancelled by pressing the button twice within 5 seconds. The temperature targets for the occupied mode are used to control the VAV terminal box when the system is in override. The lights will be turned ON if lighting is controlled.

Equip

The operational control parameters for the hardware are programmed through the Equip menu. The shaft direction, flow sensor compensation, control algorithm adjustments, stages of heat, fan limits and actuator range are specified within this menu.

The parameters are separated into cooling and heating columns. The previously selected zone type will determine the parameters to enter. If the selected zone type does not require a parameter to be entered, the default value of that parameter will not be displayed.

Shaft direction

The shaft direction specifies the direction the actuator rotates to OPEN. The direction can be entered as CW (clockwise) or CCW (counter-clockwise).

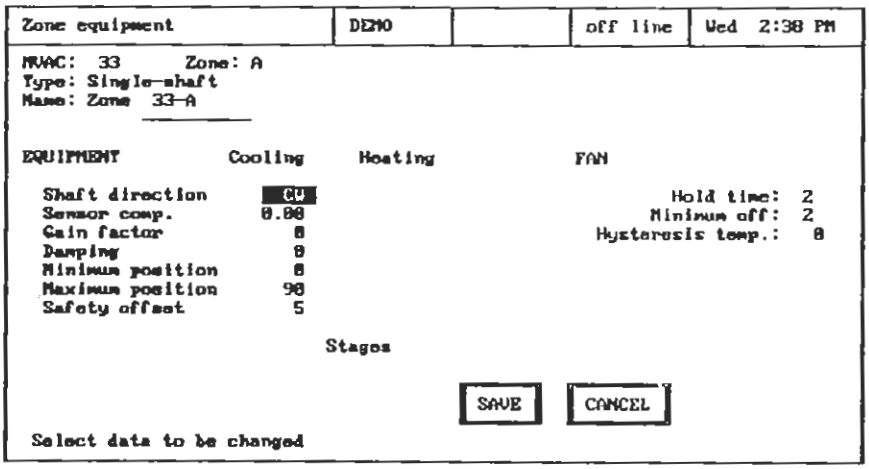

Fig. 20-14: Shaft direction

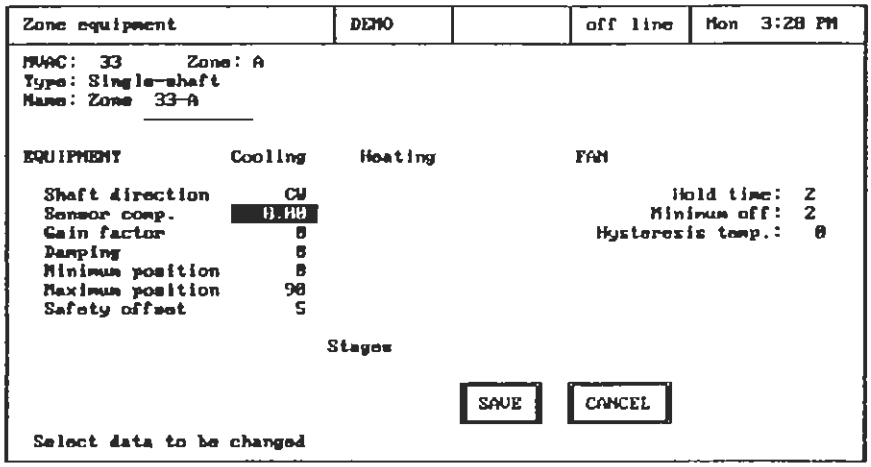

Fig. 20-15: (Flow) Sensor comp.

Sensor Compensation

The sensor compensation converts the velocity reading of the flow sensor to CFM. The velocity reading is affected by the cross velocity Pitot tubes in the duct and the length of tubing used to connect the Pitot tubes to the flow sensor. A good estimate for the flow sensor compensation factor is:

10 * cross sectional area of the duct (in square feet)

Square duct

cross sectional area = width (feet) * height (feet)

Example: width = 6 inches (.5 feet)

height = 8 inches (.66 feet)

Area = 0.5 * 0.66 = 0.33 square feet

Sensor compensation = 10 * Area = 3.33

Round duct

cross sectional area = pi x r^2

Example: 9 inch diameter

radius = (9/2)/12 = 0.375 feet

Area = 3.14 * (0.375)squared = 0.442 square feet

Sensor compensation = 4.42

The flow sensor compensation factor calculation is an estimate only. The flow sensor should be calibrated with a flow hood or manometer for a precise reading.

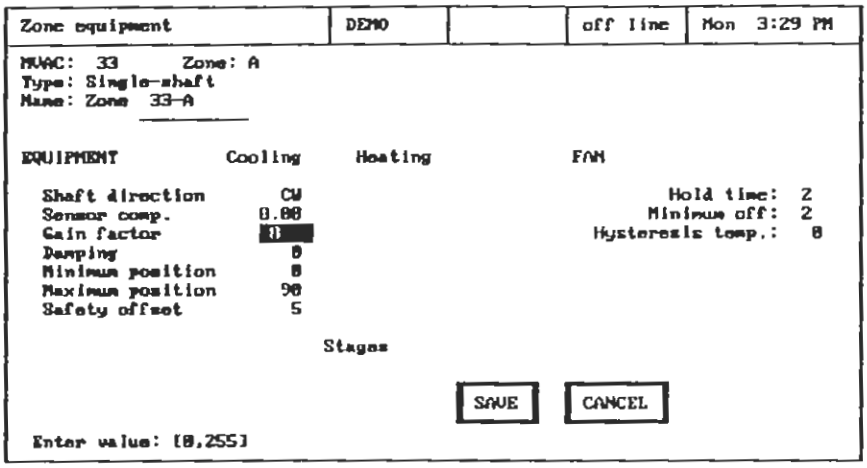

Fig. 20-16: Gain factor

Gain factor

The gain factor is used within the control algorithms to determine the sensitivity of the system. The current temperature band determines the equation used to control the system. A large gain factor will make large adjustments to the damper position, valve position or stages of electric heat.

Cooling band

Heat, if any, is turned off. All stages of electric heat are turned off, hot water valves are fully closed and heating dampers are modulated to maintain the minimum air flow setpoint. The cooling damper will be opened according to the following equation:

Angle adjustment = [(zone temperature - Cooling target) * cooling GAIN factor]/4

Cooling deadband

Heat, if any, is turned off. The cooling damper will be CLOSED according to the following equation:

Angle adjustment =[(Cooling target - zone temperature) * cooling GAIN factor]/4.

Heating deadband

Electric heat is turned off. Hot water valves and heating dampers are CLOSED according to the following equation:

Angle adjustment = [(zone temperature - Heating target) * heating GAIN factor]/4

Heating band

Cooling damper is closed to the minimum air flow setpoint. The stages of electric heat to turn on is determined by the following equation:

Stages of heat = [(Heating target - zone temperature) * heating gain factor] / 16

Hot water valves and heating dampers are OPENED according to the following equation:

Angle Adjustment = [(Heating target - zone temperature) * heating gain factor] / 4

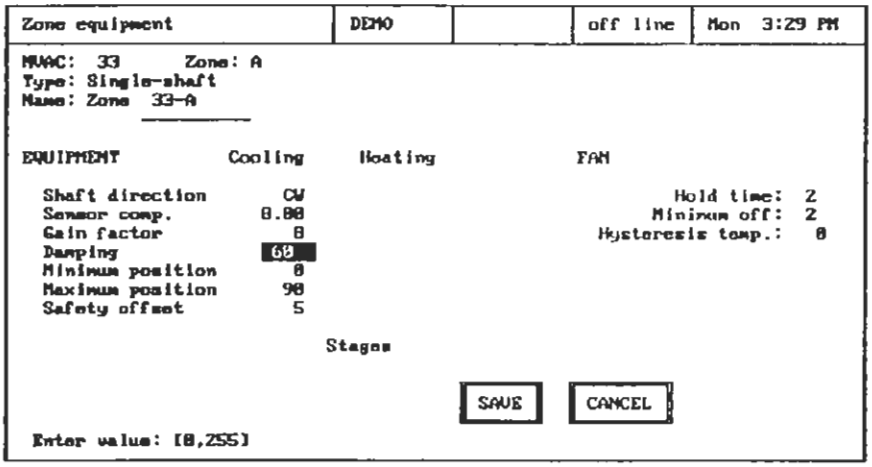

Fig. 20-17: Damping Factor

Damping

The damping factor is used in conjunction with the gain factor to determine the frequency of the adjustments to the actuators and electric heat. The damping factor is entered in seconds. When an adjustment to the system is made, a timer in initialized by the respective damping factor. Future adjustments to the system will not be made until the timer reaches zero. The damping factor fine tunes the control algorithm to eliminate oscillations.

Minimum/Maximum position

The MVAC controllers determine the control range of the actuators during initialization. The control range will be displayed as 0 to 90 degrees unless otherwise specified. If the control range is actually 0 to 45 degrees, change the maximum position to 45. The actuator position will now be displayed as 45 degrees when fully open.

NOTE: *The physical control range can not be limited or expanded through these entries. The controllers determine the control range, these menus specify the DISPLAYED values for the position of the actuator for monitoring purposes only.*

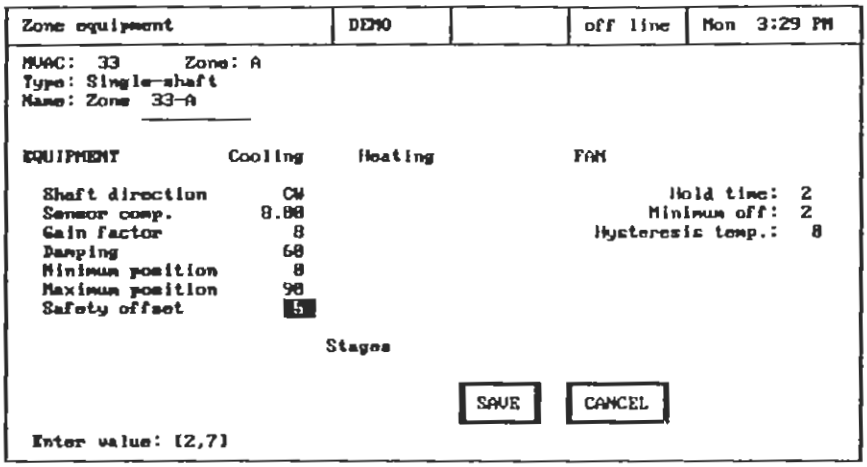

Fig. 20-18: Safety offset

Safety offset

The safety offset is used in conjunction with the Min/Max specifications to determine the range of motion.

Example: Safety offset = 5
minimum position = 0
maximum position = 90

Range of motion = 5 to 85

The safety offset creates an end zone. Full open/closed commands are satisfied as soon as the actuator crosses into the end zone.

The safety offset should be entered as large as possible. The larger the offset, the less likely the actuator is to bump the stop, providing smoother operation.

Systems that require tight control, to prevent leaking, can enter safety offsets as low as 2 degrees.

Stages

The stages of electric heat must be specified. The MVAC-C can sense the presence of an MVAC-E but it cannot determine the number of stages of electric heat (relays) connected to the MVAC-E.

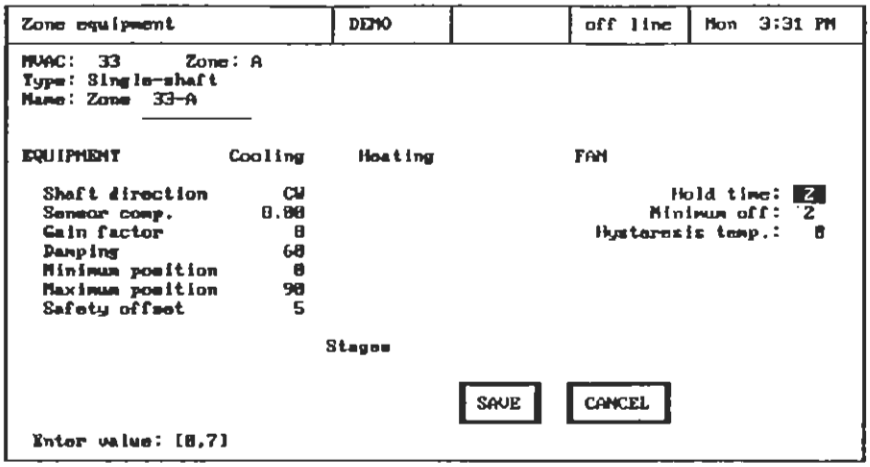

Fig. 20-19: FAN Hold time

FAN

The Hold time, Minimum off and Hysteresis temp. allows the user to fine tune the fan control algorithm.

Hold time

The fan will be held on for a programmable number of minutes, 0 to 7, after the zone conditions are such that the fan should be off. The hold time allows conditioned air to be removed from the terminal box and blown into the space. The hold time is especially important in electric heat VAV boxes where air flow is required to cool the heating elements.

Minimum off

The minimum off time is programmable form 0 to 7 minutes. The minimum off time will eliminate short cycling of the fan in situations where the zone temperature quickly fluctuates in and out of the deadband. Electric heat zone types will lock out stages of electric heat until the fan is turned back on.

Hysteresis temperature

The hysteresis temperature is only applied to electric heat zone types. The value represents a 0.25 degree increment, 0 to 15 equals 0 to 3.75 degrees. The zone temperature must rise above the heating target by the hysteresis temperature before the fan can be turned off. If the fan hold time is non-zero, the timer will start when the zone temperature rises above the heating setpoint plus the hysteresis temperature. After the fan turns off, the zone temperature may drift back down toward the heating target. The fan will not turn back on until the zone temperature falls 0.25 degrees below the heating target, the entry point for the heating band.

Setpoints

The user programmable targets are entered through the Setpoints menu. Target temperatures and CFM levels are entered for occupied and unoccupied modes. The default values contained within the MVAC-C controllers can be modified to customize the control for each zone.

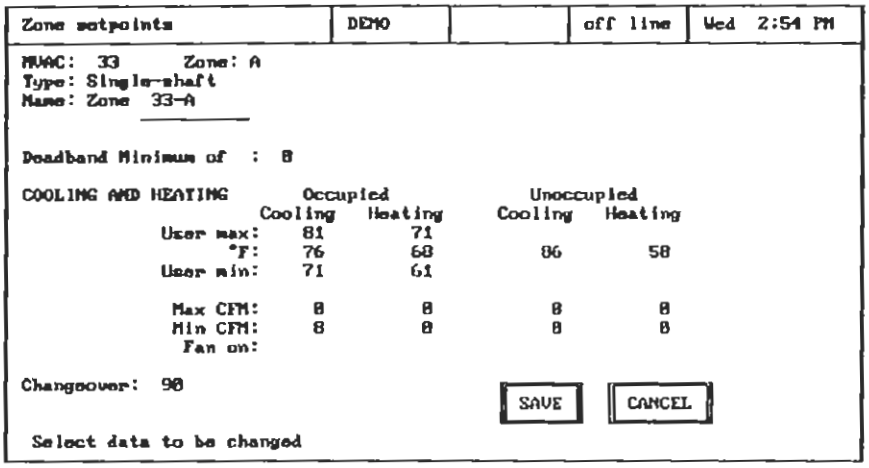

Fig. 20-20: MVAC Setpoints

Temperature control

Four temperature targets are entered for each zone: occupied cooling, occupied heating, unoccupied cooling and unoccupied heating. The target temperatures will define the operating bands: cooling, cooling deadband, heating deadband and heating. The control algorithms for each zone type is dependent on the temperature bands. It is very important to understand the system operation before programming temperature targets. Review the system operation for the selected zone type in the previous chapter. After the operation is thoroughly understood, proceed with programming temperature targets.

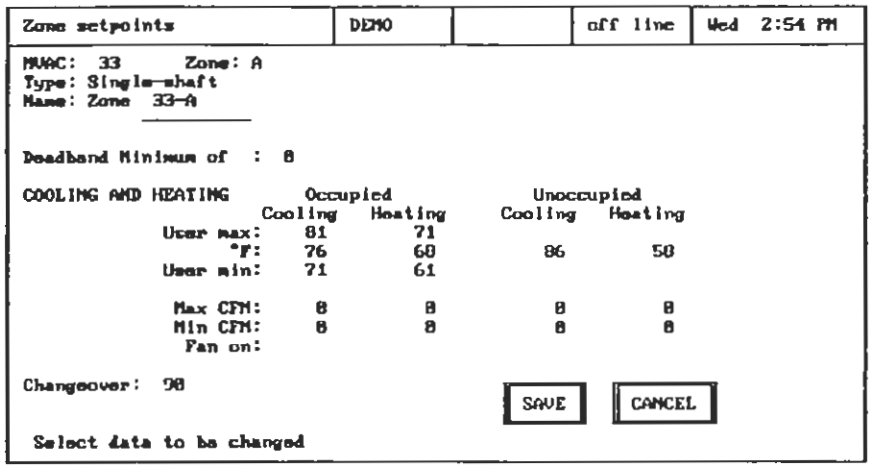

Fig. 20-21: MVAC Default Values

Default values

The default temperature targets are 76 for occupied cooling, 68 for occupied heating, 86 for unoccupied cooling and 58 for unoccupied heating. The default min/max CFM targets are 0 for all modes. The temperature and CFM targets can be modified to the occupants specifications.

The MVAC-STD and MVAC-STM allow the occupant to modify the occupied target temperatures of the zone. The User Max and User Min limit the amount of control the occupant has over the zone temperature. The default values for the User Max and Mins are 81/71 for cooling and 71/61 for heating. The occupant can modify the temperature targets within the prescribed limits, during the occupied mode only.

Occupied temperatures

The temperature targets for the occupied mode are also used during override. The dampers and auxiliary heating equipment will be modulated to maintain this programmable comfort level year round, without seasonal program changes. The only requirement is that the cooling target must be greater than the heating target.

The target temperatures can be modified through software at any time. The targets are limited by the User Max and MIN. If an attempt is made to raise a target above the specified maximum or below the specified minimum, the software will void the change and respond with the acceptable range of values. The target can be re-entered with an acceptable value or the User Max/Min can be modified to accept the new target.

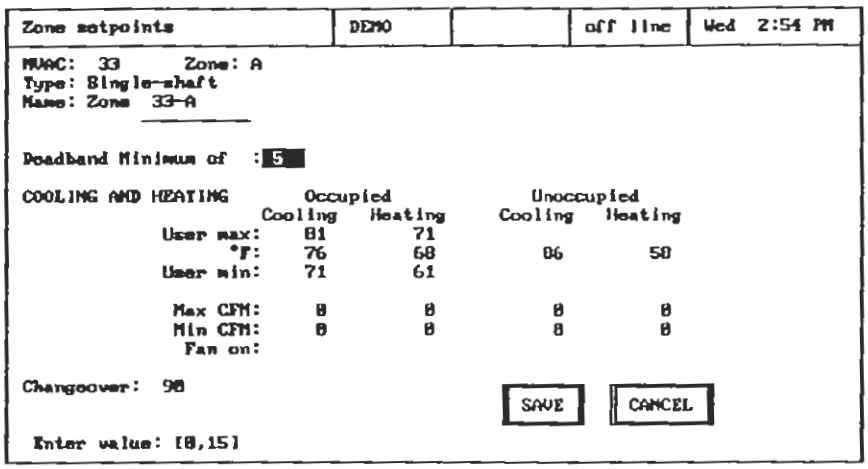

Fig. 20-22: Deadband Minimum

Deadband

The user limits work in conjunction with deadband control. The deadband is defined as the temperature range between the heating and cooling targets. The deadband can be limited to a minimum value or can be locked at a specific value. The programmable range for the selected deadband is 0 to 15.

Minimum

A minimum deadband is used to prevent the user from moving the occupied cooling setpoint too close to or past the occupied heating setpoint and vice versa. The occupied heating and cooling setpoints are independently adjustable, but if one is moved too close to the other, the minimum deadband will be maintained by "bumping" the other setpoint away from the adjusted setpoint.

Example: Deadband minimum of: 5

Cooling target: 76
Heating target: 68

The cooling target is changed to 70, through the software or through a zone temperature sensor. Since the Heating target of 68 is not 5 degrees less than the Cooling target, it will automatically be changed to 65. The deadband can be more than the specified minimum but it cannot be less.

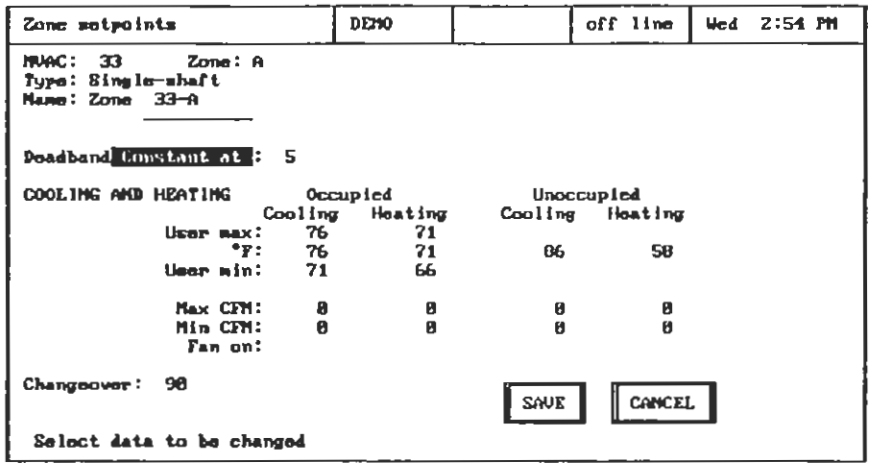

Fig. 20-23: Deadband Constant

Constant

A constant deadband will maintain a fixed interval between the heating and cooling setpoints. If one of the setpoints is adjusted, the other will be "dragged" along with it.

Example: Deadband constant: 5

Cooling target: 75
Heating target: 70

The cooling target is changed to 76. The deadband must be maintain, the heating target will be raised to 71.

Unoccupied temperatures

The occupant cannot modify the target temperature through the zone temperature sensor while the zone is unoccupied. The unoccupied target temperatures can only be modified through the software.

Air flow (CFM) control

Four maximum CFM values and four minimum CFM values are entered for each zone: occupied cooling, occupied heating, unoccupied cooling and unoccupied heating. The min/max CFM limits can only be adhered to if the zone contains a flow sensor. The default value of 0 assumes the zone does not contain a flow sensor. Any combination of CFM limits can be programmed for each zone.

The primary function of the min/max CFM limits is to provide air balancing capabilities. The dampers will be modulated to maintain these limits, regardless of the zone temperature. Thoroughly understand the system operation for the selected zone type before programming CFM limits. Improper limits can disable temperature control and possibly damage equipment.

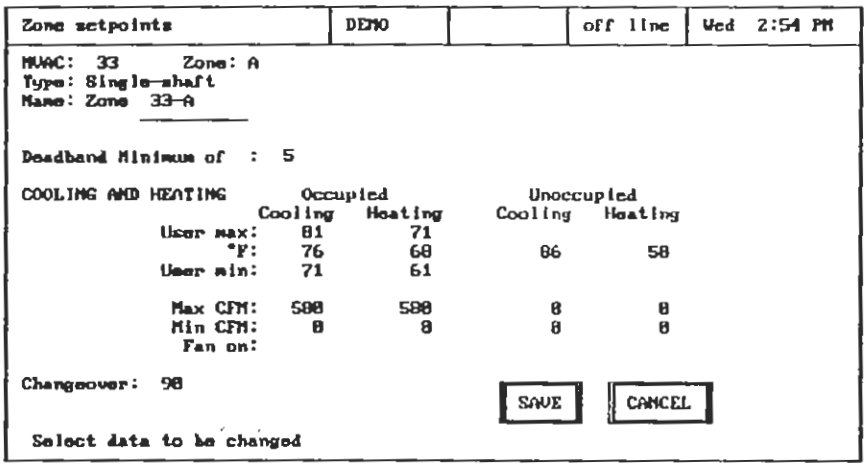

Fig. 20-24: CFM Setpoints

Fan control

The Fan on CFM setpoint sets a CFM level for each mode of operation. If the air flow falls below the specified level the fan will be turned on. The CFM levels are programmable for intermittent and continuous fan zone types only.

If the default value of 0 is not displayed, the zone cannot control the status of the fan.

Before entering CFM control parameters verify the operation and calibration of the flow sensor. CFM control can adversely affect temperature control if it is not applied properly.

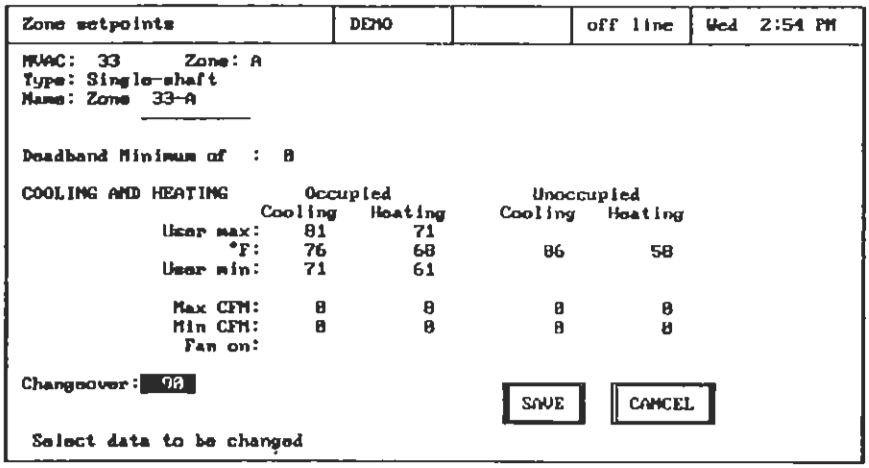

Fig. 20-25: Changeover

Changeover

Changeover refers to a zone heating mode where the central equipment or AHU provides heated air to the cooling duct. All zone types, when equipped with a cooling duct temperature sensor, are capable of auto-changeover for zone heating. If the changeover setpoint is set to 0, changeover will not be used. If this setpoint is non-zero and the cooling duct temperature is equal to or greater than the changeover setpoint, the zone will enter the changeover heating mode.

Certain zones type require the entry of this setpoint for proper operation. Refer to the MVAC Operating Manual for the selected zone type for detailed information.

Chapter 21 - Adding and Deleting MVACs

The size of the MVAC network can be modified by adding and deleting MVAC nodes.

Adding Zones to the MVAC Network

From the MVAC Zones menu:

Select MVAC's

Increase the highest MVAC node number to include the controllers added to the network. The additional nodes will appear in the MVAC node table.

Configuration data from existing nodes can be copied to the nodes added to the network. The current configuration data for the new nodes must be deleted prior to copying.

Deleting Zones from the MVAC Network

Default templates are created for MVAC zones when they are added to the network. These templates must be deleted before the configured templates from another zone can be copied to them.

Select Edit, then Delete

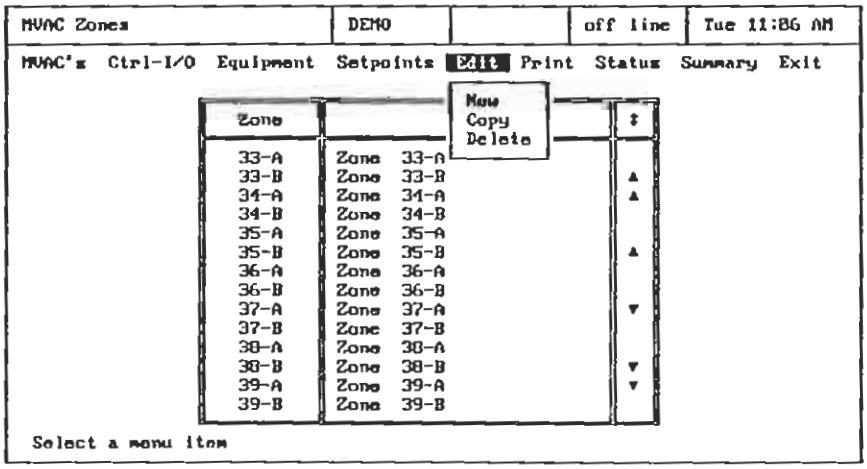

Fig. 21-1: MVAC Edit options

Select the zones to delete. The Hardware and Setpoint data for the selected zone will be erased. The selected zone will be removed from the list.

Note: *If a* Network, Save *was performed prior to an inadvertent deletion, the data can be recovered by performing a* Network, Load *Chapter 9. All changes made since the last save will be lost.*

The Hardware and Setpoint templates from remaining zones can be copied to the deleted zones.

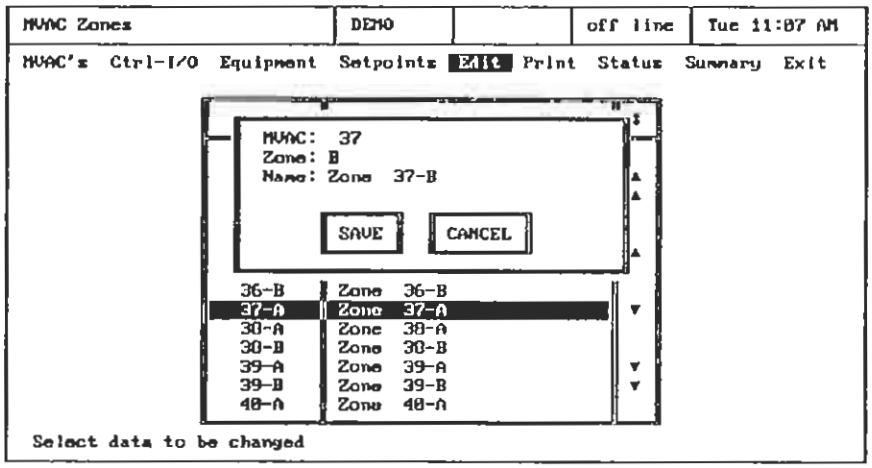

Fig. 21-1: MVAC Copy

Copying Zone configurations

The Hardware and Setpoint templates from zones can only be copied to zones that have been deleted.

Select Edit, then Copy

Select a zone to copy (source). A screen displaying the next available zone will appear, Figure 21-1.

MVAC

The node number of the MVAC controller the data will be copied to.

Zone

The zone (A/B) the data will be copied to.

Name

The eight character descriptor used to identify the selected zone.

Enter the destination node number and zone. The Hardware and Setpoint parameters from the source zone will be copied to the destination zone.

The Hardware and Setpoint templates can be modified as previously described.

The default templates can be reassigned to a deleted zone by copying the default data from another zone, as described above, or by using the New command.

New

Select New

A screen displaying the next available zone will appear. Enter the node number and zone of the deleted MVAC. The default parameters will be assigned to the selected zone.

New and Copy can only be performed if MVAC zones have been deleted from the table. If parameters have been assigned to all zones (A and B) from the lowest MVAC node to the highest MVAC node the following message will appear; "All MVAC zones are already defined".

Decreasing the network

From the MVAC Zones menu:

Select MVAC's

Decrease the highest MVAC node number or increase the lowest MVAC node number to delete the controllers that were physically removed from the network. The parameters for the excluded nodes will be erased and cannot be recovered. These nodes will be removed from the MVAC node table.

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Chapter 22 - Checking MVAC Status

MVAC's can be monitored one zone at a time, (Status), or within a group of up to 14 zones, (Summary). A communication link must be established prior to monitoring the zones.

Status

Status allows the MVAC zones to be monitored in detail, one zone at a time.

From the MVAC Zones menu:

Select Status

Select the zone to monitor

A status screen will appear for the selected zone, Figure 22-1. Up to 25 different parameters can be monitored within a single zone, depending on the configuration. The data will be refreshed at the selected update rate.

The update rate determines how often the computer communicates if left in a monitoring mode. A suggested update rate would be to enter a number FOUR (4) times greater than the number of Clipper nodes in the network, e.g. a 10 node network should have an update delay of at least 40 seconds.

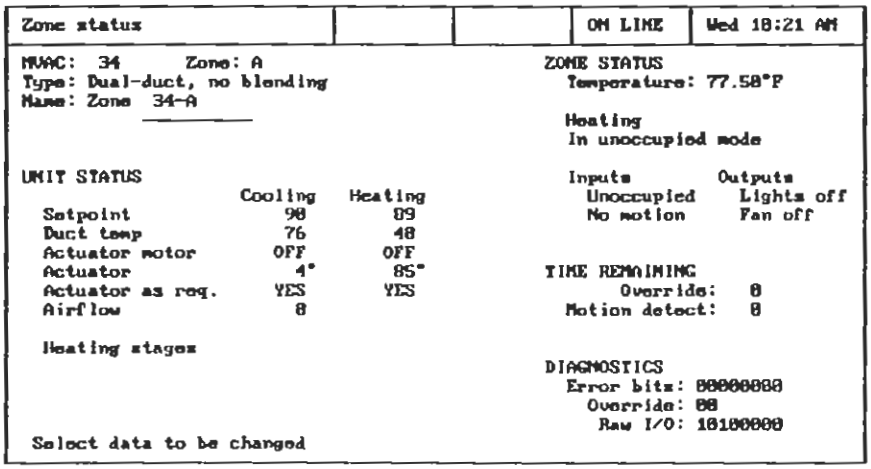

Fig. 22-1: MVAC Zone Status

Summary

Summary provides the capability to monitor up to 3 parameters for 1 to 14 zones, simultaneously.

From the MVAC Zones menu:

Select Summary

A blank summary screen will appear.

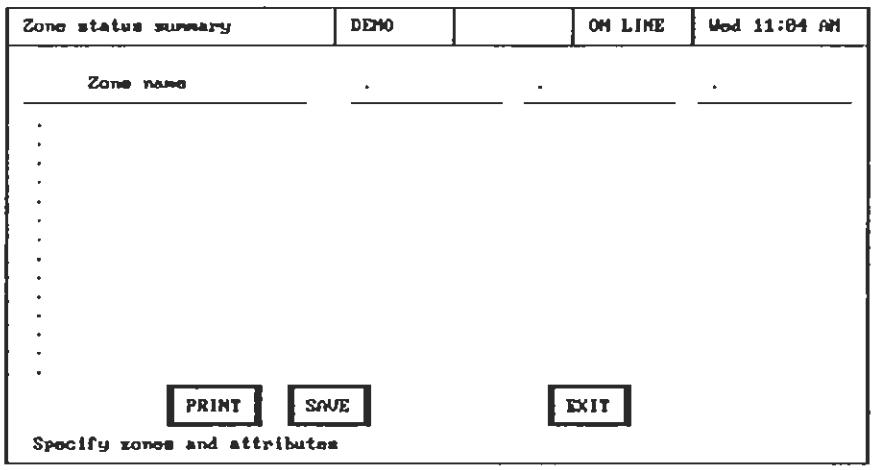

Fig. 22-2: MVAC Zone Summary

The initial summary screen will only appear when ONLINE with the MVAC network.

A saved summary screen will appear if a prior SAVE had been performed (see Save at the end of this chapter).

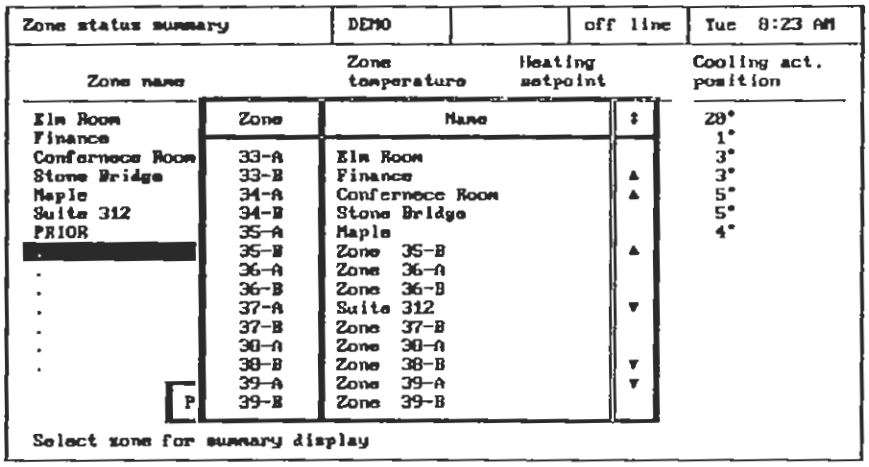

Fig. 22-3: MVAC Zone Summary - Zone Selection

Select one of the blue dots below the Zone name heading. A table of currently configured MVAC zones will appear, Figure 22-3.

Select a zone name from the list. Continue down the column until all desired zones are selected. Up to 14 zones can be selected.

Select the blue dot above the second, third or fourth column. A table of zone parameters will appear, Figure 22-4.

Select a parameter to display. The selected parameter will be displayed for all the zones selected within the first column.

Select the parameters for the remaining columns in the same manner.

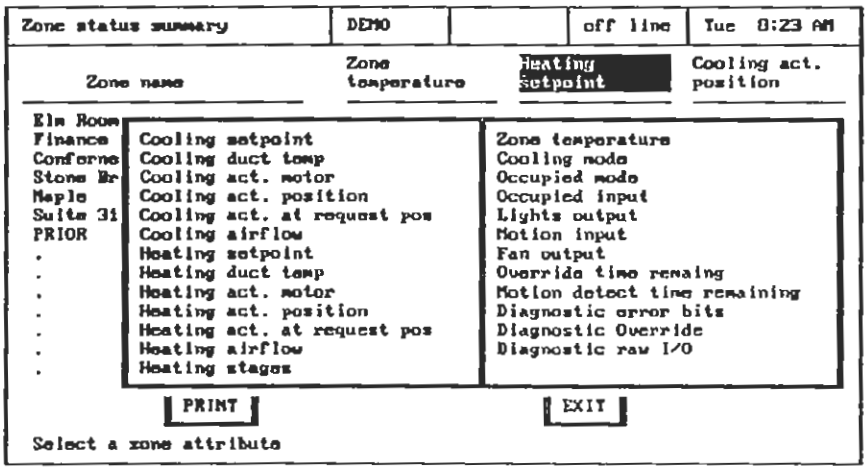

Fig. 22-4: MVAC Zone Summary Parameters

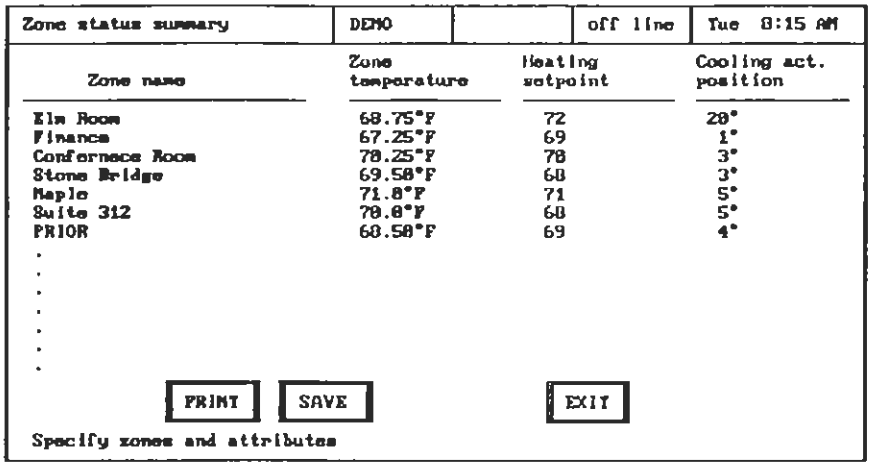

Fig. 22-5: MVAC Summary

The system will poll the selected zones and display the selected parameters for each zone, Figure 22-5.

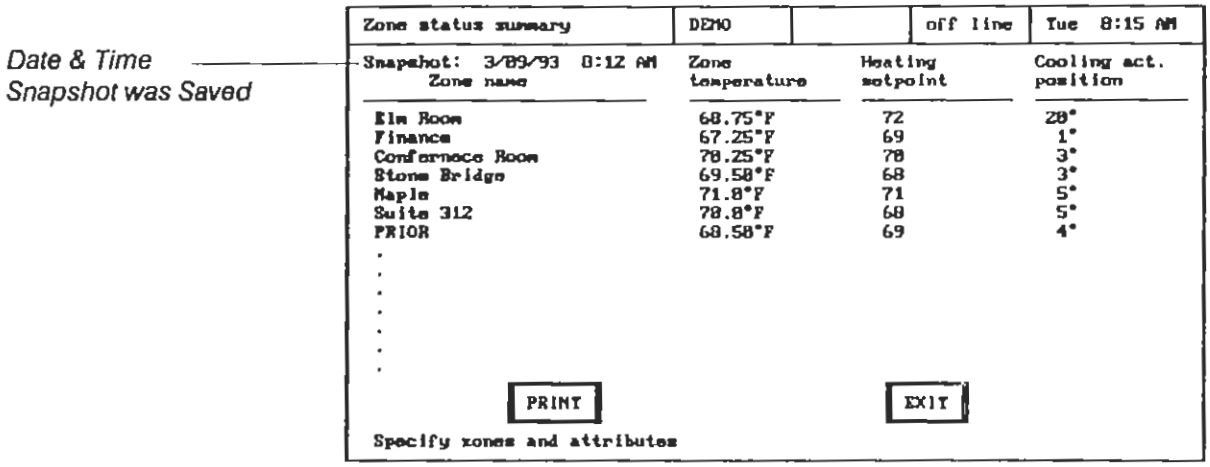

Fig. 22-6: MVAC Summary - Saved Snapshot

Save

If a network is loaded Save will poll all the zones within the table and write the polled data to disk to the file MVZSTAT.SNP. The zones and parameters configured for the Summary screen are saved to the file ZSUM.CFG. The saved data can be accessed OFF LINE, Figure 22-6.

Note: *When a SAVE is performed from the summary screen ALL the parameters for each zone are received and written to disk, not just the three selected parameters. The headings within the summary screen can be changed, while off line, to view the snapshot data for all the parameters.*

The MVAC Zone Status screen can be viewed OFF LINE by having an MVZSTAT.SNP file. A status screen along with a date & time stamp appears if a Save has been performed in the Summary screen. The status screen will appear by selecting Status then a zone.

Print

The status of the zones can be sent to a printer or to a file.

Select Print

IMPORTANT

DO NOT print unless the "Print /D:PRN" command has been executed prior to running the CLIPEXE file. Failure to do this will result in RAM errors on subsequent operations.

Refer to Chapter 2 "Installing the Software" page 2-1 for details.

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IZAC Configuration

IZAC, Solidyne's Intelligent Zone Automation Controller, is a family of intelligent and application specific controllers. IZACs are adaptable to a variety of control applications. The type of IZAC chosen is based on the input/output requirements and sequence of operation of the application. The ease of programming, operation, installation and monitoring combined with program security and low cost provides an excellent package for advanced control.

The software used to program and monitor ClipperNet controllers can also be used to program and monitor IZAC controllers.

IZAC Nodes

As in a ClipperNet system, the first step in programming is to create a network. The creation of a network consists mainly of defining the number and types of nodes in the system.

NOTE: *Because this chapter involves the configuration of IZACs, parameters not pertaining to IZACs will not be discussed. For more information on configuring ClipperNet systems refer to Chapter 5 Creating a Network.*

IMPORTANT

Any combination of IZAC, Clipper or MVAC nodes can comprise a network. The maximum number of nodes in a network is 252.

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 23-1.

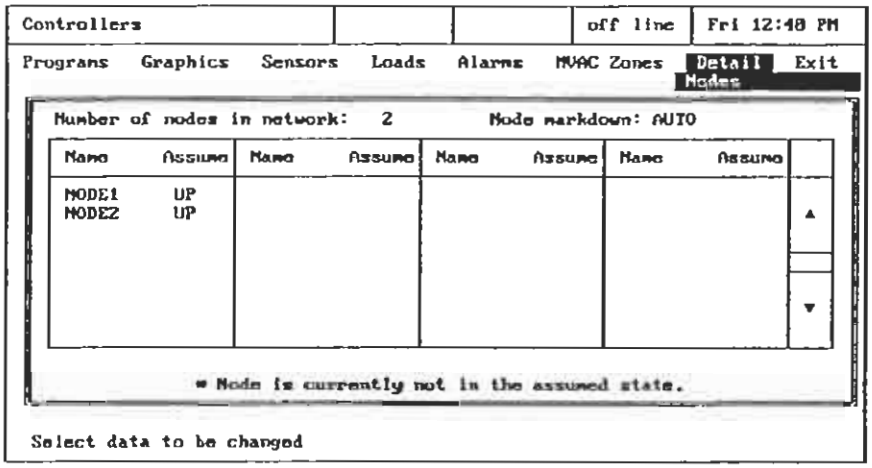


Fig. 23-1: Node Details Screen

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 23-2.

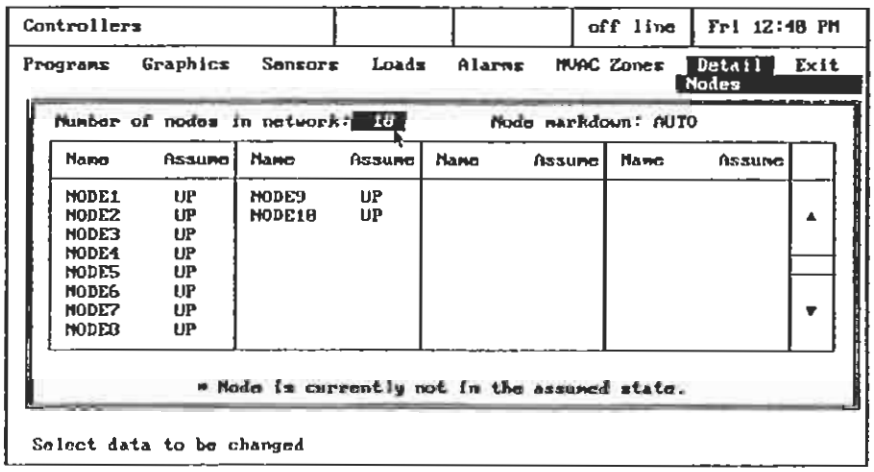


Fig. 23-2: Node Details Screen

Define the nodes

To define a node as an IZAC, select the Node name to be defined, Figure 23-3.

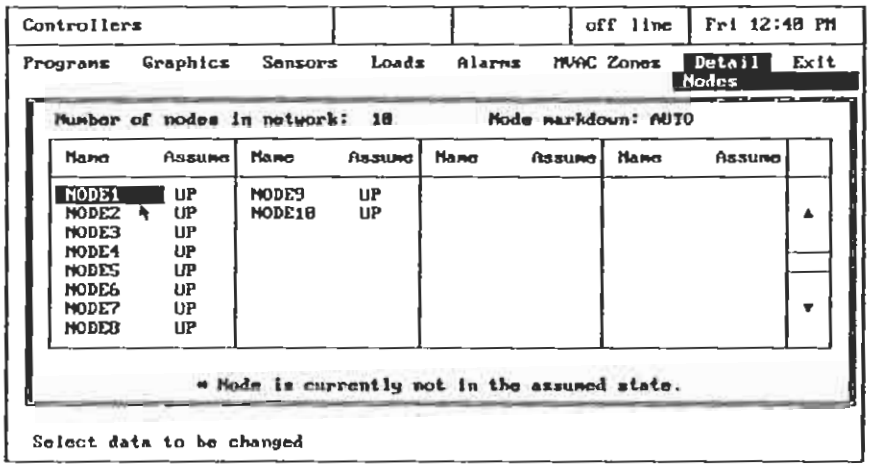


Fig. 23-3: Selecting a Node

A Node Configuration window will appear, Figure 23-4.

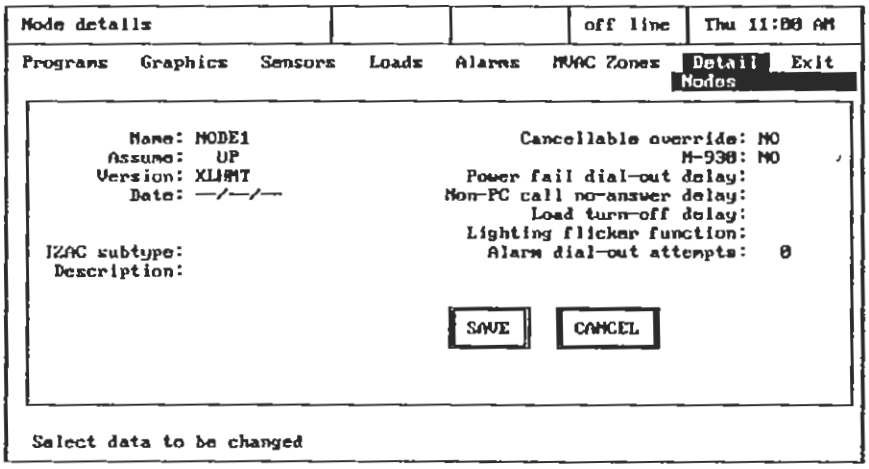


Fig. 23-4: Node Configuration Window

Select Version and toggle through the selections until IZAC appears.

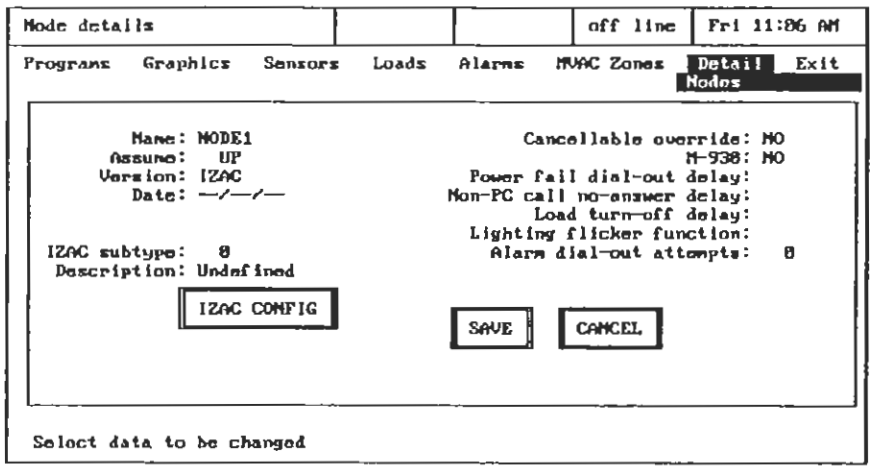


Fig. 23-5: IZAC subtype and Description

Once Version is set to IZAC, IZAC subtype and Description display 0 and Undefined respectively, Figure 23-5.

Note: *Details on the programmable features (Cancellable override, M-930 and Alarm dial-out attempts) available to the IZAC are explained in Chapter 5.*

Presently, there is one IZAC subtype for a Rooftop package unit. As more subtypes are defined Solidyne will provide the files necessary to program these new subtypes.

Note: *The* IZAC subtype *can be selected by either entering the number for the subtype or by toggling* Description *to the desired control algorithm.*

IZAC Programmability

There are two levels of IZAC programmability. The level of programming is determined by the software key "button" plugged onto the parallel port. The level is set to either 127 or 191. Level 127 users can only load programs into IZAC controllers via the IZAC Config screens. All PDC832 users (Level 127 and 191) can access the IZAC Config screens. The IZAC Config screens provide a quick and easy way to program IZACs. The Rooftop personality provides the universal hardware configuration and programming that enables IZACs to control a variety of rooftop package units and heat pumps.

Level 191 users can program IZACs independently with or without the use of the IZAC Config screens. These high level users can enter their own programs in IZAC controllers as if they were programming ClipperNet controllers.

Level 191 users must be certified before they can program their own IZACs. Consult your local distributor for a certification class.

To examine your IZAC programmability level, select the Button option (below Configure) under Detail. the data stored in the button will be read and displayed.

IZAC Config

The IZAC subtype 1 personality is extremely versatile. This personality can control rooftops and heat pumps under a variety of conditions. Controllers that use this personality are configured through two setup screens. The setup screens contain a variety of control options. The user simply selects the options to use and ignores (leaves blank) the rest.

Toggle Description to Rooftop Control, IZAC subtype will automatically change to 1.

Note: *The* IZAC subtype *can be selected by either entering the number for the subtype or by toggling* Description *to the desired control algorithm.*

Select IZAC Config

Select Hardware

The Hardware configuration screen will appear, Figure 23-6.

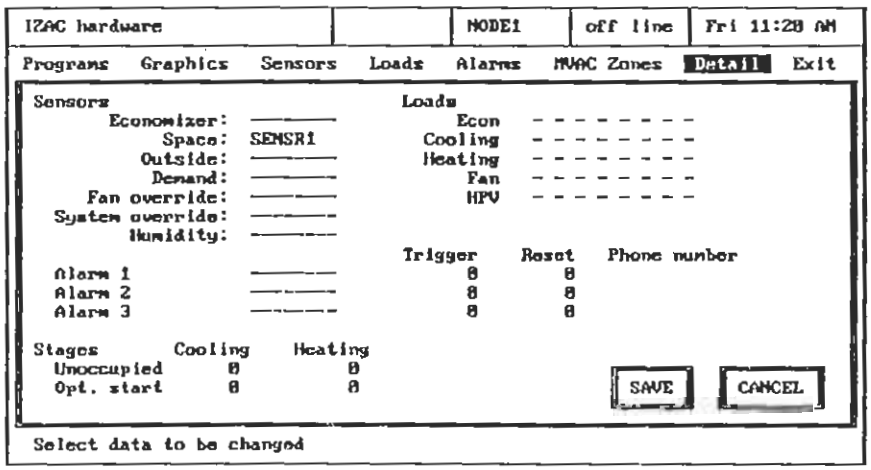


Fig. 23-6: Hardware Configuration Screen

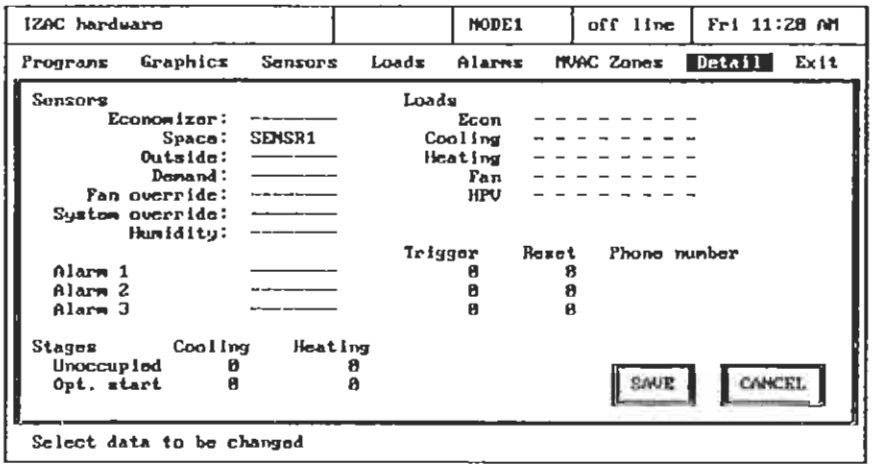


Fig. 23-7: Hardware Configuration Screen

SENSORS

The IZAC contains user configurable analog/digital inputs. The control algorithm requires only one input: SPACE temperature. The rest of the inputs specified on the configuration screen are optional, depending on the desired function. Since IZAC controllers share average sensor information with other controllers, the sensor inputs do not have to be physically connected to the IZAC controlling the rooftop. For optimum performance, the space sensor should always be connected to the IZAC controlling that space.

NOTE: *The IZAC node number determines the sensor input assignments. Node 1 will contain inputs 1 through 8. Node 2 will contain inputs 9 through 16. etc. If the configuration of the IZAC controller contains less than 8 inputs, the unaccessible input values will display a default value of 0.*

First input = ((node number - 1) x 8) + 1

Example: Node 55 input assignments

First input (node 55) = ((55 - 1) x 8) + 1 = 433

Node 55 will contain inputs 433 through 440 (6 inputs).

The desired control functions determine the required sensors. The following descriptions should be used as a guide to determine the input configuration.

Economizer: (optional) Digital dry contact input. For standard economizer operation the sensor multiplier must be set to -1. Open contact (140) signifies BAD AIR. Closed contact (14) signifies GOOD AIR. The economizer input should only be specified if the rooftop contains a digital economizer output. The economizer output will be utilized as the first stage of cooling when GOOD AIR is detected by the economizer input. External detection required. If the economizer operation is non-standard, open contact signifies good air, the multiplier for the economizer input should be set to + 1.

Space: (required) Default = SENSR 1. IZAC specific space temperature sensor. The control of the rooftop/heat pump is primarily based on the space temperature. For optimum performance this sensor should be physically connected to the IZAC controlling the space.

Outside: (optional) IZAC specific outside temperature sensor (3282QI) or Clipper (3282Q). The outside air temperature is required to activate the optimum start and lockout functions. The network should contain only one outside air sensor.

Demand: (optional) Pulsed dry contact or 3270 (Clipper). The maximum pulse frequency for an IZAC is one pulse every two seconds, 50% duty cycle. The demand input is required for demand shedding or demand reset. In most cases the network should contain only one demand input.

Fan override: (optional) Normally open, momentary dry contact. A normally open momentary pushbutton can be placed across any input on the network. The fan override is triggered when the pushbutton is depressed for 2 seconds. The override is cancelled by depressing the button for 2 seconds, releasing for 3 seconds then depressing for a final 2 seconds on an IZAC. To cancel an override on a Clipper depress the button twice for 1 second within 5 seconds. The fan will be overridden for the specified duration.

System override: (optional) Normally open, momentary dry contact. A normally open momentary pushbutton can be placed across any input on the network. The system override is triggered when the pushbutton is depressed for 2 seconds. The override is cancelled by depressing the button for 2 seconds. The override is cancelled by depressing the button for 2 seconds, releasing for 3 seconds then depressing for a final 2 seconds on an IZAC. To cancel an override on a Clipper depress the button twice for 1 second within 5 seconds. The system will be overridden for the specified duration.

Humidity: (optional) Clipper humidity sensor. The humidity sensor is required for high humidity reset. The network may contain several humidity sensors, depending on the application.

At the time of this printing, humidity control is only possible through Clipper controllers networked to IZACs. Currently, humidity sensors cannot be connected to IZAC controllers, future controllers will accept standard 0-10V or 4-20 mA humidity sensor inputs.

Note: *Additional IZAC specific sensors can be connected to unused IZAC inputs if desired. These sensors will not be used within the control algorithm but can be used to enhance the monitoring capabilities of the system.*

OUTPUTS:

The IZAC contains 8 user configurable digital outputs. The outputs can be configured to be any combination of heating, cooling, economizer, fan and reversing valve. The configuration of the loads is constrained by the following rules:

Economizer: Maximum of one output. The assigned load number must be exactly one less than the lowest cooling stage. If the rooftop does not contain a digital economizer, do not select an output.

Cooling: Maximum of eight outputs. The stages of cooling must be sequential. If the system contains an economizer output, the lowest cooling stage must be exactly one greater than the economizer output.

Heating: Maximum of eight outputs. The stages of heating must be sequential.

Fan: Maximum of one output.

HPV: Heat Pump Valve, Maximum of one output. Controls the reversing valve in a heat pump. If the unit is not a heat pump, do not select an output.

Note: *The output assignments must total 8 or less depending on the output configuration of the IZAC controller. Unused outputs cannot be programmed to perform additional functions, unless the user has been certified and has a level 191 software key.*

A possible hardware configuration screen is displayed in Figure 23-8.

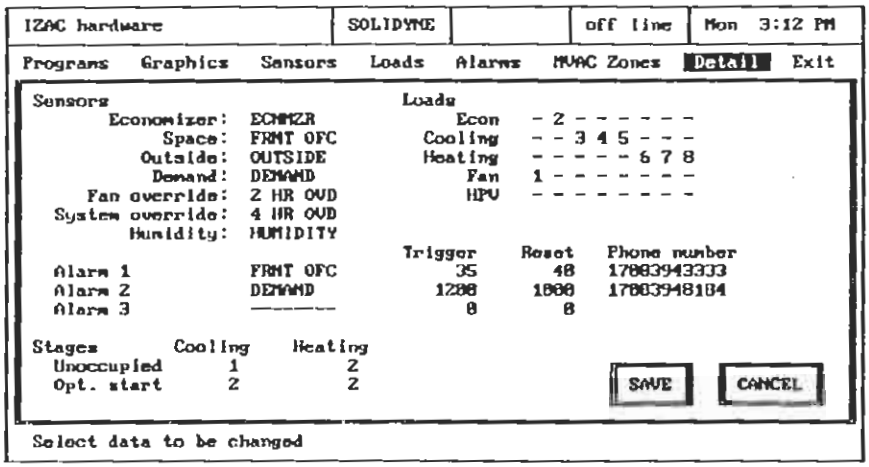
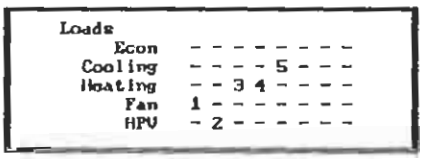


Fig. 23-8: Hardware Configuration Screen

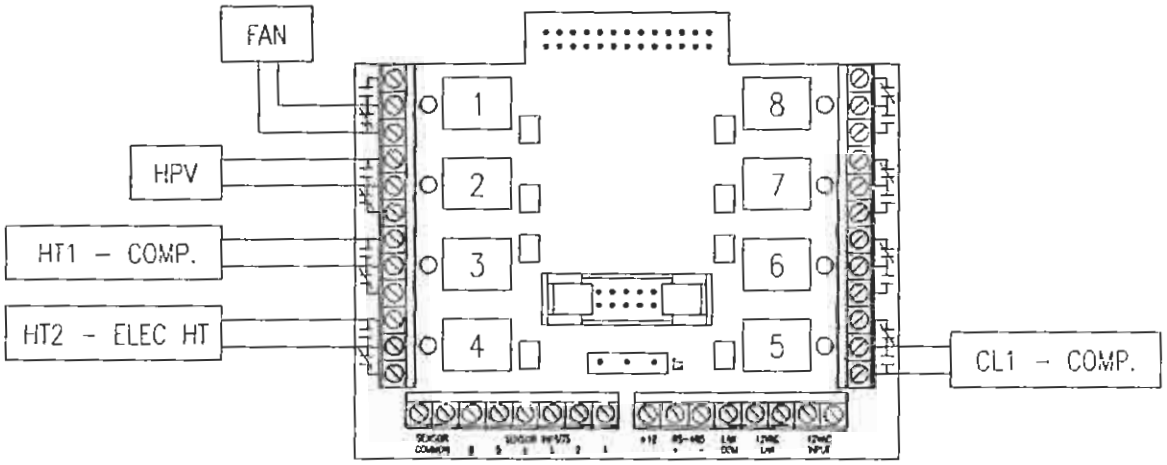
Heat Pumps

In heat pump applications, the compressor must be wired to the first stage heat relay and first stage cool relay.

If the Loads on the Hardware Configuration Screen were selected as:



An 8060 IZAC would be wired as:



PROGRAMMING

The program parameters are entered through the IZAC CONFIG and IZAC HARDWARE screens.

Select IZAC CONFIG, (from the Node Details menu)

The IZAC Configuration screen will appear, Figure 23-9.

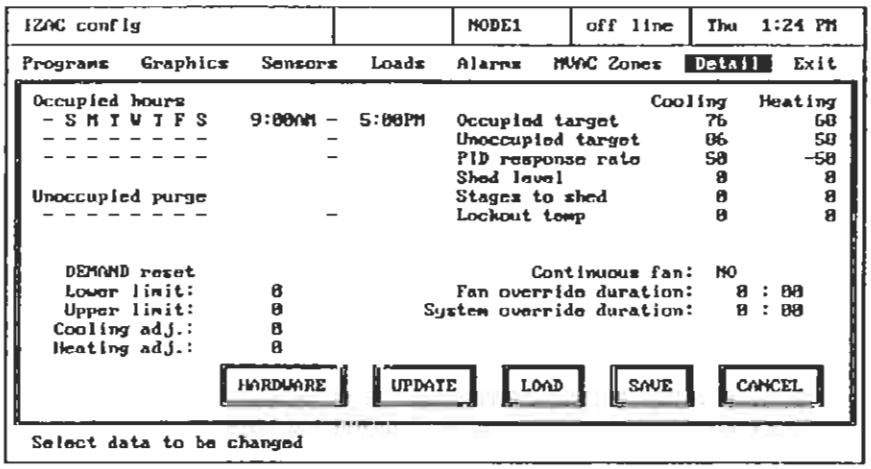


Fig. 23-9: IZAC Configuration Screen

OCCUPIED HOURS: (required: Default = Sun - Sat: 9 AM - 5 PM)

Day selection

Three different daytime periods can be specified. The day selection for each period can be toggled on an individual basis for each day of the week. Each day of the week can appear in one period only.

Hour selection

Operating hours for each period can be specified from 12:00 AM to 11:59 PM. Operating hours cannot cross midnight.

Note: *The hours that are not specified as occupied hours will be classified as unoccupied hours.*

Note: *Three daytime periods can be specified to provide schedule flexibility, without the use of scheduling software. Scheduling software users can convert the program to be relative if desired. Consult the factory for more information.*

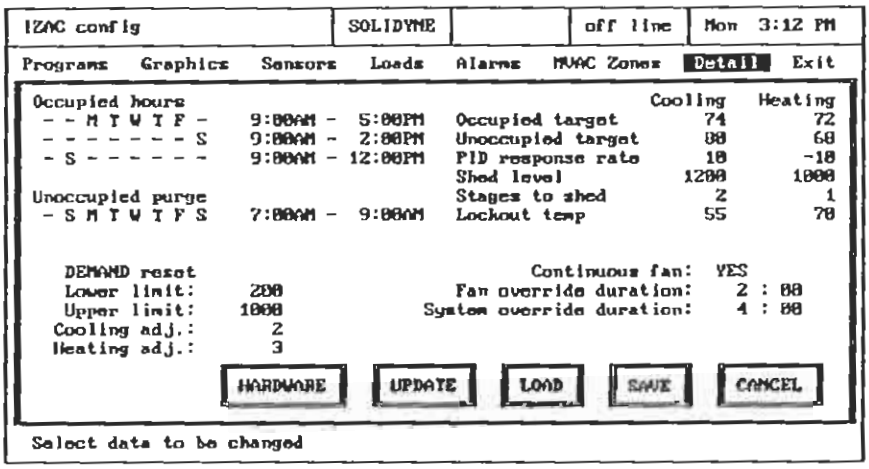


Fig. 23-10: IZAC Configuration Screen

UNOCCUPIED PURGE: (optional)

The unoccupied purge period allows the building to be pre-cooled without the use of mechanical cooling, provided the rooftop is equipped with an economizer damper and input. The purge period should be terminated before the occupied period begins. Select the days and operating hours for unoccupied purge if desired.

OCCUPIED TARGETS: (required: Default 76/68)

The cooling and heating targets must be specified for the occupied hours. The cooling target must be greater than or equal to the heating target.

UNOCCUPIED TARGETS: (required: Default 86/68)

The cooling and heating targets must be specified for the unoccupied hours. The cooling target must be greater than or equal to the heating target.

PID RESPONSE RATE: (required: Default 50, -50)

The PID response rate must be entered as a value between 10 and 100. As the value is increased, the control algorithm reacts faster. Separate rates must be specified for heating and cooling. The PID response rate should be fine tuned by monitoring the reaction time of the system.

SHED LEVEL: (optional)

The shed level specifies the demand level to shed stages of heat and/or cool. A demand input is required to utilize this function. The value of the shed level depends upon the information provided by the demand input. Separate levels can be specified for heating and cooling.

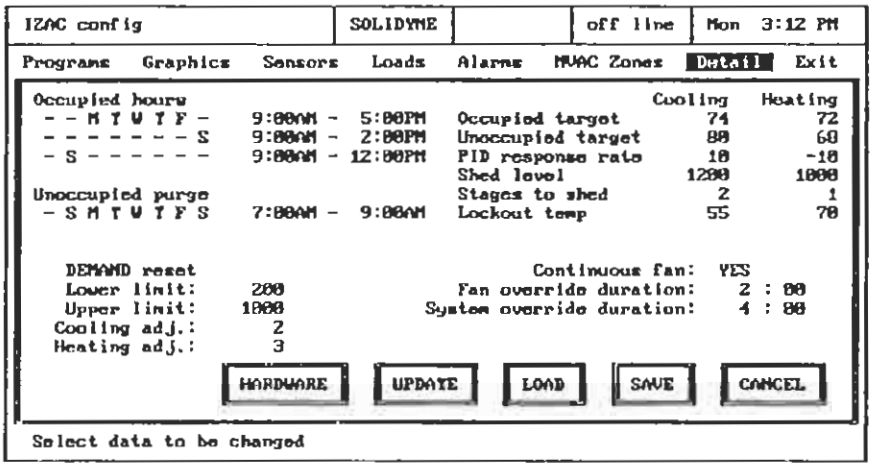


Fig. 23-11: IZAC Configuration Screen

STAGES TO SHED: (optional)

The stages to shed specifies the number of heating and cooling stages to shed when the demand input reaches the shed level. The number of stages must be specified when a shed level is entered. Separate stages can be specified for heating and cooling.

LOCKOUT TEMPERATURE: (optional)

The lockout temperature is based on the outside air temperature. Separate values are entered for heating and cooling. The mechanical cooling is locked off when the outside air temperature falls below the cooling lockout temperature. The mechanical heating is locked off when the outside air temperature rises above the heating lockout temperature.

CONTINUOUS FAN: (toggle)

The fan will run continuously during occupied hours if this selection is toggled to YES. The fan will run as required by temperature during occupied hours if this selection is toggled to NO. The fan will only run as required by temperature during unoccupied hours, regardless of this selection.

FAN OVERRIDE DURATION: (optional)

The fan override will turn the fan ON for the specified duration, regardless of other programming. This option can be utilized to test the fan or to provide air circulation when the program has shut the fan off. The duration can be entered from 5 minutes to 255 hours, in one minute increments. The fan override input must be specified within the IZAC Hardware screen.

SYSTEM OVERRIDE DURATION: (optional)

The system override will return the entire rooftop to the occupied control values for the specified duration. This option can be utilized to maintain occupied comfort levels during unoccupied periods. The duration can be entered from 5 minutes to 255 hours, in one minute increments. The system override input must be specified within the IZAC Hardware screen.

DEMAND/HUMIDITY RESET: (optional)

The demand or humidity sensor can be used to reset the heating and/or cooling targets. The reset input can be toggled between DEMAND and HUMIDITY. The demand/humidity and space sensor function in a master/slave relationship.

Demand

At the upper demand limit the cooling target will be increased to:

Occupied cooling target + Cooling adjustment.

At the upper demand limit the heating target will be decreased to:

Occupied heating target - Heating adjustment.

At the lower demand limit, the space will be maintained at the cooling and heating targets.

Humidity

At the upper humidity limit the cooling target will be decreased to:

Occupied cooling target - Cooling adjustment.

At the upper humidity limit the heating target will be decreased to:

Occupied heating target - Heating adjustment.

At the lower humidity limit, the space will be maintained at the cooling and heating targets.

This option provides temperature compensation at high demand as opposed to load shedding or temperature compensation at high humidity to maintain overall comfort.

User Adjustable Setpoint

The demand/humidity reset function could also be used to allow the tenant to set the desired temperature via a potentiometer. A potentiometer should be installed in the space and connected to the input configured to be either demand or humidity. As the pot is turned the sensor value will rise and fall. As the input value rises and falls the heating and cooling targets will adjust accordingly. Contact the factory for details.

ALARMS

Three alarms can be programmed through the IZAC hardware screen.

Select HARDWARE from the IZAC config screen

Select a sensor for each alarm

Enter a sensor value to trigger and reset each alarm

Enter a phone number for each alarm

The IZAC will dial the programmed phone number when the alarm is triggered and report the alarm condition to the waiting computer. The alarm condition consists of a network description, sensor description, alarm text, the time and date alarm was triggered and the time and date the alarm was received.

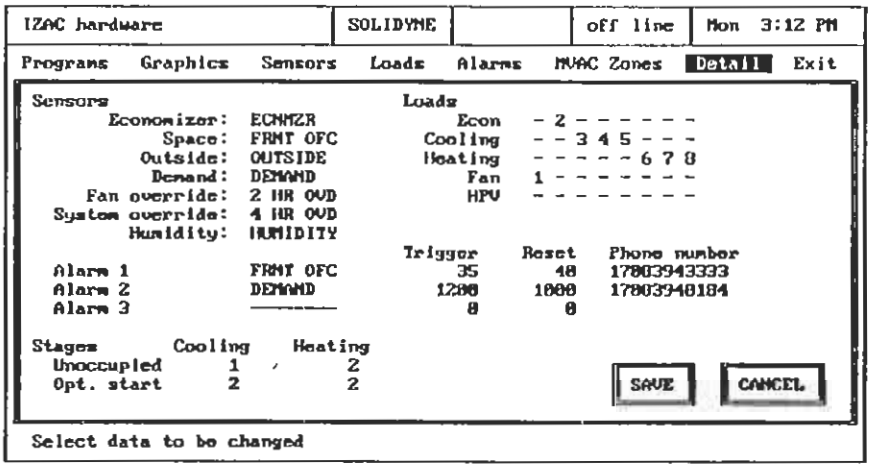


Fig. 23-12: IZAC Hardware Configuration Screen

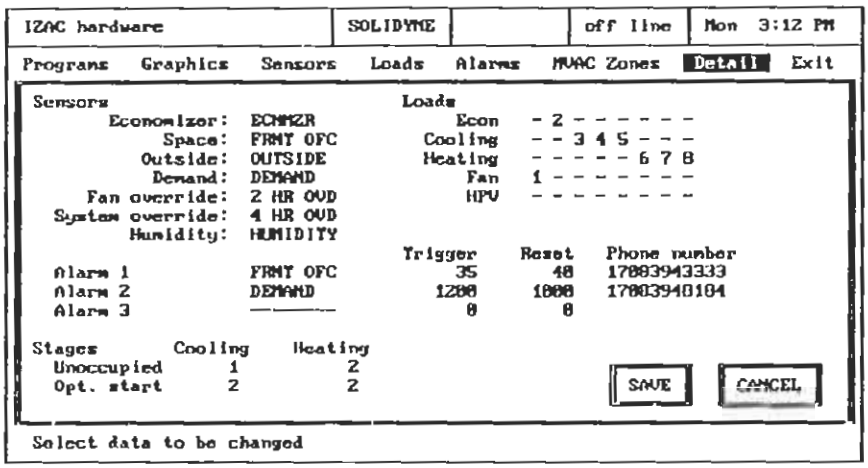


Fig. 23-13: IZAC Hardware Configuration Screen

UNOCCUPIED STAGES

The number of heating and cooling stages utilized to maintain the unoccupied heating and cooling targets can be specified from 0 to the total number of stages available. This option can increase savings by limiting the number of stages that can run during unoccupied hours.

OPTIMUM START STAGES

The number of heating and cooling stages utilized to optimum start the rooftop can be specified from 0 to the total number of stages available. This option can increase savings by limiting the number of stages that can run during the transition from unoccupied periods to occupied periods. Selecting a number other than 0 activates the Optimum Start algorithm. The Optimum Start algorithm will try to achieve the occupied target by the start of the occupied period.

OPERATION

The IZAC controllers must be configured through PDC832 V5.00 or greater. The following procedure should be followed to configure and program IZAC controllers.

Users with button Level 191 can program IZACs similar to ClipperNet controllers. Users with button Level 127 must use the IZAC Configurations screens to program IZACs

---

1. If the two *.CFG files are not already in the PDC832 directory, copy the IZAC configuration files from the software disk to the PDC832 directory.

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

   Two files will be copied:

   IZACPTS.CFG
   IZACTYPE.CFG

   IZACPTS.CFG contains all the programs for the individual personalities created to date.

   IZACTYPE.CFG contains the descriptions for the individual personalities created to date.

2. Execute the PDC832 software.

   A:\>**C:**

   C:\>**CD\SOLIDYNE**

   C:\>**CLIP**

3. Create a network or load an existing network.

4. Configure the IZACs for the desired application.

5. Establish a communication link.

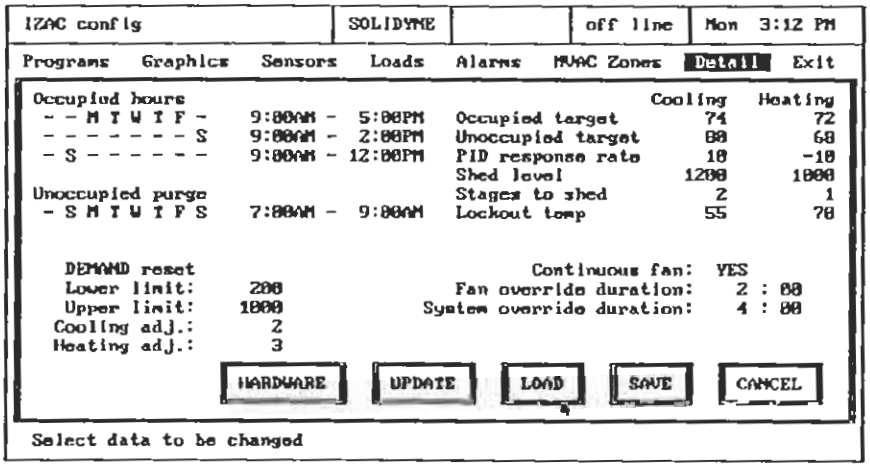


Fig. 23-14: IZAC Configuration Screen - LOAD

6. Once the IZAC and HARDWARE configuration parameters are entered, download the program by selecting LOAD within the IZAC CONFIG screen, Figure 23-14. The configuration and programmable parameters will be combined with the control algorithm and automatically downloaded to the controller.

7. Reset the time and date to initialize the controllers.

8. Monitor the controllers to verify operation. Adjust PID response rate if necessary. A large PID response rate (70 - 100) will react quickly, making large adjustments for small temperature changes. A small PID response rate (10 - 30) will react slowly, making small adjustments for large temperature changes.

Once a program has been entered into an IZAC (through the LOAD function), the user can make changes to the setpoints by selecting:

Controllers, Programs, Setpoints and Details

IMPORTANT

Level 127 users can only make changes to the Details of the setpoints. Level 127 users ***CANNOT*** *add, delete, move or copy setpoints within the existing program.*

In most cases modifications to the control strategy used for the Rooftop Control subtype should be addressed through the IZAC configuration screens.

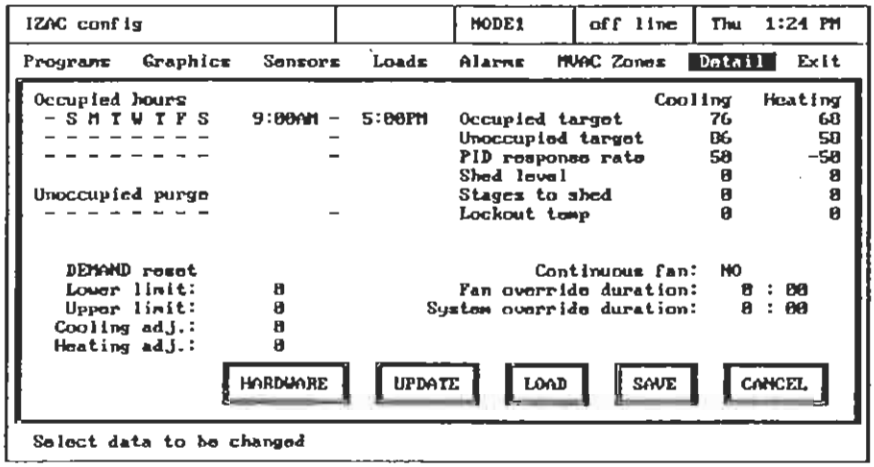


Fig. 23-15: LOAD vs. UPDATE

IZAC LOAD vs. UPDATE

LOAD

Selecting LOAD on the IZAC configuration screen will combine the configuration and programmable parameters of the IZAC Config and Hardware screens with the control algorithm (78 setpoints).

If the user is ON LINE with an IZAC controller, the program will be transmitted automatically when LOAD is selected. If the user is OFF LINE, the program will be created when LOAD is selected. If the program was created OFF LINE, a Network, Transmit must be performed to download the program to the IZAC controller.

Reviewing the created program

When LOAD is selected, the information from the configuration screens is combined with the 78 setpoint control algorithm. The setpoint program details can be reviewed, after the program is created, using the same procedures followed for reviewing programs in Clipper controllers.

Select Controllers, Programs, Setpoints, Details

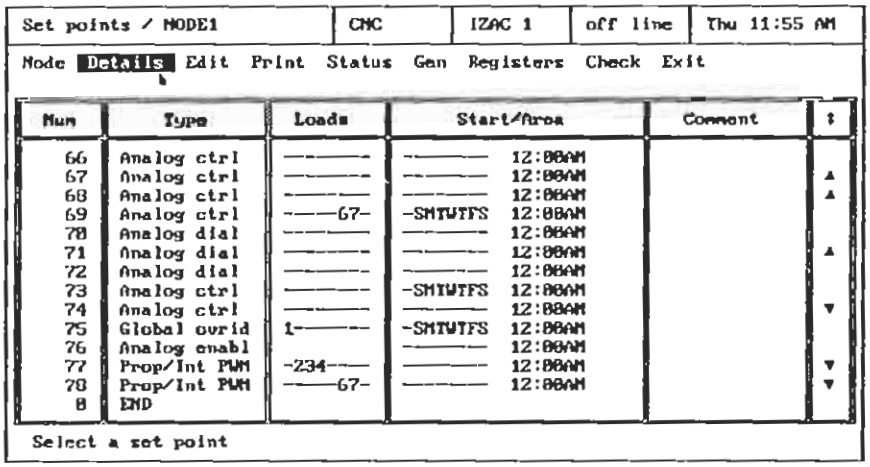


Fig. 23-16: Setpoint Details

The program for the selected IZAC node will contain 78 setpoints. All 78 setpoints are utilized if all the options within the configuration screens are selected. If some of the options are not selected, the setpoints that perform the unwanted operation will be left blank.

Select a setpoint to review

The setpoint details contain data from the configuration screens. The details can be modified. Thoroughly understand the control algorithm prior to modifying setpoints. Many of the setpoints work in conjunction with other setpoints. Modifying setpoints without accounting for these relationships can adversely affect the control algorithm.

IMPORTANT

DO NOT modify the first 5 setpoints. They are used to configure the outputs.

Each time LOAD is selected, the entire program for Rooftop control is created. LOAD will **OVERWRITE** the existing program in the IZAC (if ON LINE) or the existing program in the software (if OFF LINE) including any changes that were made through the Programs, Setpoint, Details function.

UPDATE

The Update function takes any changes within the IZAC Configuration screens and "updates" the existing program with the new parameters. Update will not completely overwrite the existing program with a new one, but rather send only the necessary information to the existing program.

IMPORTANT

Level 191 users who modify the structure of the Rooftop control program (by adding, deleting or moving setpoints) will cause errors with the Update function.

PDC832 keeps track of every parameter in the two IZAC configuration screens. Each parameter is associated with the setpoints in the Rooftop Control program. The software also keeps track on how the setpoints are ordered. By altering the structure of the program, the tracking system PDC832 uses to correlate the configuration parameters to the setpoints will be broken.

Future Subtypes

Currently, there is only one subtype, the Rooftop Control. Solidyne will notify dealers and distributors as more subytpes become available.

As mentioned previously, setpoints for IZAC subtypes are stored in the IZACPTS.CFG file. The subtype descriptions are stored in the IZACTYPE.CFG file. As subtypes and programs are created, revised *.CFG files will be available to IZAC users.

Solidyne encourages dealer/distributor participation in the development of IZAC subtypes.

In the process of developing new subtypes two functions must be performed, program creation and software configuration screen development. Solidyne will be able to quickly create approved subtype programs. However, creating IZAC configuration screens requires additional time.

When the new IZACPTS.CFG and IZACTYPE.CFG files are received, it is possible that there will not be an IZAC configuration screen for the new subtypes. The user will have to edit the setpoints manually.

The process of downloading a new subtype's program to an IZAC controller is similar to the process for the Rooftop Control.

After configuring the node as an IZAC, the IZAC subtype and Description parameters can be toggled to the new subtype, Figure 23-17.

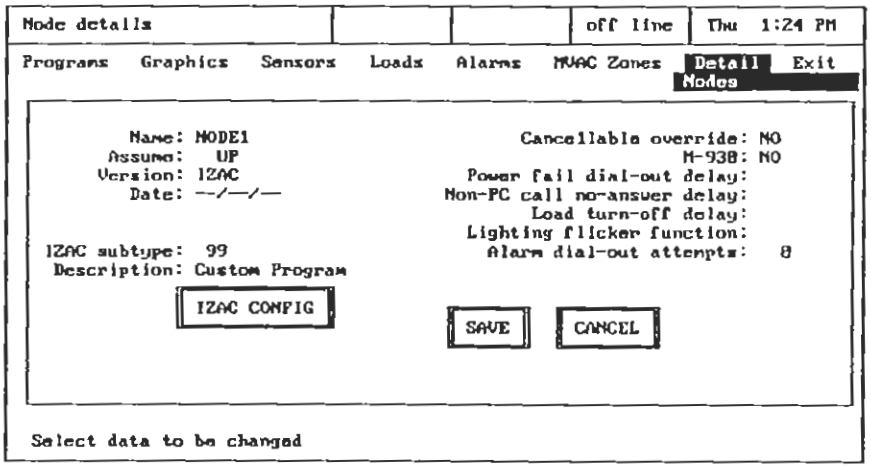


Fig. 23-17: IZAC subtype 99 Description: Custom Program

If the Rooftop Control subtype had been chosen, selecting IZAC Config would pop-up the IZAC configuration screens.

Since the selected subtype does not have a configuration screen, selecting IZAC Config will pop-up a blank configuration screen, Figure 23-18.

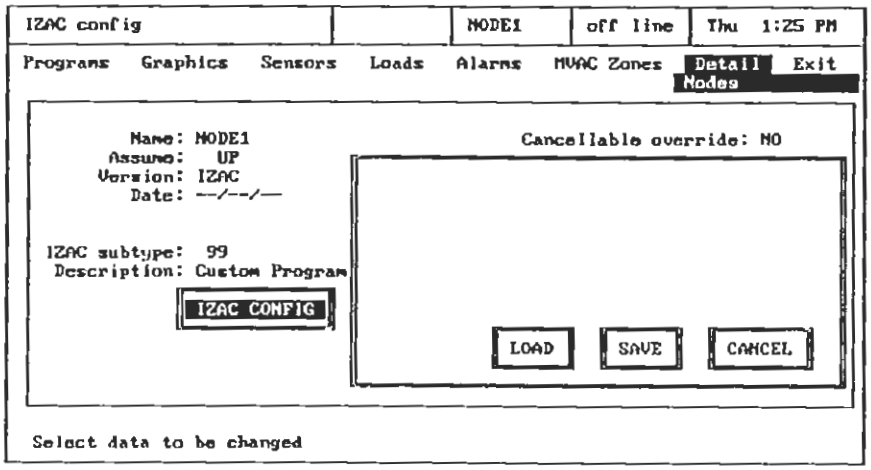


Fig. 23-18: Blank IZAC configuration screen

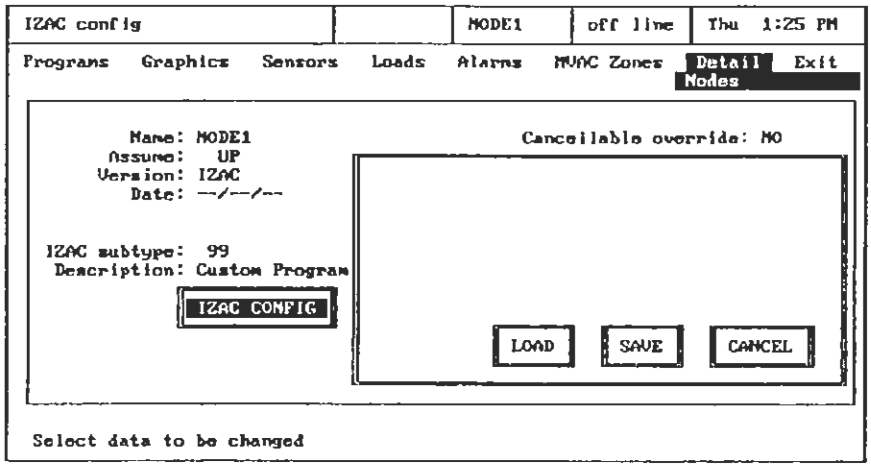


Fig. 23-19: Blank IZAC configuration screen

By selecting LOAD, the algorithm for the new subtype will be created. If the user is ON LINE with an IZAC controller, the program will be transmitted automatically when LOAD is selected. If the user is OFF LINE, the program will only be created when LOAD is selected. If the program was created OFF LINE, a Network, Transmit must be performed to download the program to the IZAC controller.

Reviewing the new subtype program

The new subtype's setpoint program details can be reviewed, after the program is created, using the same procedures followed for reviewing programs in Clipper controllers.

Select Controllers, Programs, Setpoints, Details

The program for the selected IZAC will be displayed.

Select a setpoint to review

The details for individual setpoints can be modified. Thoroughly understand the control algorithm prior to modifying setpoints.

As new subtypes are created, a detailed explanation of the algorithms will be provided.

Appendix

Command Line Options

In addition to the command line options (COM1, COM2, MODEM etc.) mentioned in Chapter 2, "***Installing the Software***" there are other options available. Here is a list of the options available with the CLIP command:

AT

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,

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:

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.

BPS1200

CLIP BPS1200 configures communications at 1200 BAUD.

BPS2400

CLIP BPS2400 configures communications at 2400 BAUD.

BPS9600

CLIP BPS9600 configures communications at 9600 BAUD.

BUTTON

All three versions of PDC832 initially look for the combination key and button on LPT1, LPT2 and LPT3. The second time PDC832 is run, it uses the port the key/button was found on. If there is a port, like a network port, that will hang the button logic, the user will have to specify a port in order to avoid the network port. If the user has moved the key/button from one port to another, he/she will have to tell PDC832 where to look for the key/button.

CLIP BUTTON1 causes CLIP to look for the key/button on LPT1.

CLIP BUTTON2 causes CLIP to look for the key/button on LPT2.

CLIP BUTTON3 causes CLIP to look for the key/button on LPT3.

CLIP BUTTON0 causes CLIP to look for the key/button on LPT1, LPT2 and LPT3.

Note: *Some parallel ports that are used with networks can cause PDC832 to lockup as it searches for the key/button. Use BUTTON0 only if you are uncertain as to which parallel port your key/button is attached to.*

BW

CLIP BW runs CLIP in a Black and White mode.

COM1

CLIP COM1configures communications port as COM1.

COM2

CLIP COM2 configures communications port as COM2.

DIRECT

CLIP DIRECT configures communications for DIRECT mode.

LCD

CLIP LCD gives selected fields a slightly different color. The different colors may display better on LCD displays such as portables and laptop computers.

LOGON

CLIP LOGON enables the LOGON screen if SUPER has diabled the LOGON screen from the Security menu. Refer to Chapter 3 "***Logging On & Assigning Passwords***" for details on disabling the LOGON screen.

ME

Controls the exit string sent to modem as the software is exited. Typically, PDC832 sends the modem an "ATZ" message as the software exits. This will reset the modem to its "Profile 0" configuration. CLIP MEXXX replaces the default PDC832 exit behavior specified by XXX (XXX limited to 40 characters).

CLIP MEZ1 sets the modem to "Profile 1" (MEZ1) when the software exits.

IMPORTANT

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

CLIP MEV1Q0 *is valid* **CLIP ME V1 Q0** *is invalid*

MODEM

CLIP MODEM configures communications for MODEM mode.

NOMOUSE

CLIP NOMOUSE allows the software to run without a mouse. The TAB, ENTER and ARROW keys can be used to run the software.

PRNLPT1

CLIP PRNLPT1 sets the default print destination to LPT1. **LPT1** can replaced by other parallel ports (**LPT2, LPT3** etc.). See page 10-3 for more information about the Default printer destination.

STOP2

Whenever the default initialization string or the "AT" command string is sent to the modem, the information ends with 1 stop bit. Older modems may require that information sent to them end with a data string containing two stop bits.

CLIP STOP2 will end any information sent to the modem with 2 stop bits.

Multiple Command Line Options

Command line options may be combined to configure PDC832 when it boots up.

Example: If a laptop computer was brought to a jobsite where a direct connect will be established on COM2, the following command line options may be used:

CLIP BUTTON1 LCD DIRECT COM2

System Files

There will be files created by PDC832 and stored within the directory that the CLIP.EXE file resides.

GPAL.CFG

The GPAL.CFG contains the color configuration for Multigraph.

LOG.LO

The LOG.LO file contains the alarms log as dispalyed in the ALARMS, CURRENT Screen.

NET.CFG

The NET.CFG file contains setup information. Information displayed in the Network, Details, Configure option is stored in this file.

NET.IDS

Alarm ID numbers programmed for each network are saved in the NET.IDS file. As an alarm is received at the PC running PDC832, the alarm issues its Alarm ID number signifying which network is broadcasting the alarm. The PC looks into its NET.IDS file to find a network matching the Alarm ID number. If a match has been found, the NET.IDS file informs PDC832 the path and network of the matching ID number. The labels (sensors, loads, general descriptions, etc.) associated with the network will appear with the alarm. If there is no match found, default labels will be associated with the alarm.

The NET.IDS file is updated when a Network, Save As or Network, Delete is executed or when network information has been changed to an existing network and a Network, Save is executed.

It is important to delete networks using the Network, Delete command. Deleting networks through DOS will not update the NET.IDS file. Alarms reporting a valid ID number that exist in the NET.IDS will search the computer for the network. If the network had been deleted through DOS, PDC832 will report an error message "Can't find (Alarm ID) network". (Alarm ID) resides in the network file that had been deleted through DOS.

Network Files

The following files are created and saved in the network's subdirectory.

AREAS.

For PDC832GH, the AREAS. file contains the area details.

AROUTE.

The AROUTE. file contains the routing of alarm information for multiple PCs online with a system.

EVENTS.

For PDC832GH, the EVENTS. file contains Event details.

LABELS.

The LABELS. file contains the labels associated with Analog/Digital Inputs and Loads including the Alarm text and status labels.

MVACS.

The MVACS. file contains MVAC node information.

NETWORK.

The NETWORK. file contains Node, Load and Analog/Digital Input configuration parameters.

SETPTS.

The SETPTS. file contains program information: Setpoints associated with the ClipperNet System.

ZONES.

The ZONES. file contains setpoint information and zone configuration for MVAC zones.

.BAK files

A backup file is automatically created for each file if changes are made to any of the parameters within the associated file and then a NETWORK, SAVE is performed.

The data files entered prior to a NETWORK, SAVE can be retrieved by

1. Deleting the current file e.g. **DEL SETPTS.**

2. Rename the backup files to current files:

   RENAME SETPTS.BAK SETPTS.

IZAC Files

IZACPTS.CFG

IZAC programs created at Solidyne are stored in the IZACPTS.CFG file. IZACPTS.CFG should reside in the same directory as the CLIP.EXE file.

IZACTYPE.CFG

The general description to the programs (Rooftop Control, Annunciator panel etc.) written at Solidyne are stored in the IZACTYPE.CFG file.

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PDC AP

Autopoll

Software

Manual

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Welcome

The PDC AP autopoll software enhances the data logging capabilities of PDC832 communications software. Logging input and output data for large Networks can become time consuming using PDC832. Autopoll allows the user to define the data to accumulate, for one or more Networks, and to specify the date and time at which the data should be collected. The operator does not need to be present for the data to be received. Polling can be scheduled for late night or weekend operation, saving both time and money.

This manual provides detailed instructions and examples for using PDC AP autopoll software. Please read the manually carefully before attempting to use the software.

PDC AP is not a standalone software package, it must be used in conjunction with PDC832 communications software. Network details will be shared between the communications software and the autopoll software, eliminating the need to re-enter existing information.

Knowledge of computer programming is not required to use this system. It is assumed however, that the operator has a basic knowledge of his computer system and an in-depth working knowledge of the ClipperNet controllers. This mouse driven software package is operated by simply moving the mouse to the desired feature and clicking the button.

About the User's Guide

The chapters in this guide have been arranged in a logical order and deal with specific topics, such as Creating a Profile, Poll lists, 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, this manual 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

PDC AP runs in conjunction with PDC832. The computer requirements for PDC AP are similar to the computer requirements for PDC832.

Computer

An IBM PC or compatible is required to run the software. The software is suitable to run 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 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

At minimum a CGA monitor and matching graphics card is required to operate the PDC AP software. The graphics and scheduling of PDC832GH runs in an EGA mode. PDC AP can operate with EGA, VGA or Super VGA monitors.

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. 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 progams 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.

Hayes Smartmodem 1200 Switch Settings for LAN Software

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

Table 1-1: Hayes Modem DIP Switch Settings

2400 BAUD/9600 BAUD

The software can run at 1200, 2400 or 9600 BAUD. At 2400 or 9600 BAUD a modem capabale 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.

Parameter	Function
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

Parameter	Function
Command Set	
B1	Bell 103/212A compatible
**E1*	*Echo*
Q0	Non-quiet, send responses to terminal
V0	Non-verbose, messages sent numerically
X0	Basic response set
Extended Command Set	
&C0	*DCD always true*
&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

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Chapter 2 - PDC AP Start Up

Make a back-up copy of the Master Program disk. Follow the instruction in your DOS manual.

Installation

Locate the directory on your hard disk where the PDC832 Remote Communications Software, CLIP.EXE was installed.

Example: C:\SOLIDYNE

Copy AP.EXE from the program disk to the PDC832 directory.

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

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

IMPORTANT

AP.EXE must reside in the same directory as CLIP.EXE.

Running PDC AP

Change drives to your hard disk.

A:\>**C:**

If the mouse driver is not already loaded, do so now.

If PDC AP's Print option is to be used, it is recommended that the DOS command PRINT/D:PRN be executed before AP.EXE is run.

Change to the PDC832 directory.

C:\>**CD\SOLIDYNE**

Run the software.

If you have a modem in COM1 type:

C:\SOLIDYNE>**AP COM1 MODEM**

or

C:\SOLIDYNE>**AP COM2 MODEM**

if your modem is on COM 2.

As the software boots, the default initialization string sent to the modem is:

ATE1V0TX0S7=90S8=5. "AT" commands can be added to the AP 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> **AP 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.
***AP ATE1Q0** is valid* ***AP AT E1 Q0** is invalid.*

Step by Step Autopoll

The process of setting up a Network to be Autopolled is simple.

1. Select a Network.

The Network must previously exist in PDC832.

2. Create a Profile for the Network.

Multiple Profiles can be created for a single Network.

3. Add the Profile to the Poll list.

Only Profiles within the Poll list will be automatically polled.

4. Activate the monitoring of the Poll list.

The WAIT option must be selected to actively poll Networks.

NOTE: *Autopoll has the same background alarm-receiving capabilities as PDC832. While in the* Wait *state, any incoming alarms will be logged to disk and displayed on the screen.*

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Chapter 3 - Selecting a Network

PDC AP uses the Network files created by PDC832. The Network files created by PDC832 contain general setup information such as the number of nodes in a network, the network phone number, and sensor and load labels.

The use of the Network files is a read-only function. In no way will PDC AP alter the Network files.

Select Network

Below the Network pull down menu, select Load

Load enables you to select a network from the list of previously saved files and load the data into the computer's memory.

After LOAD is selected a table of network files will appear, figure 3-1. The top line of the table is the Current Directory Line (CDL). The table displays all networks and subdirectories that exist within the current directory.

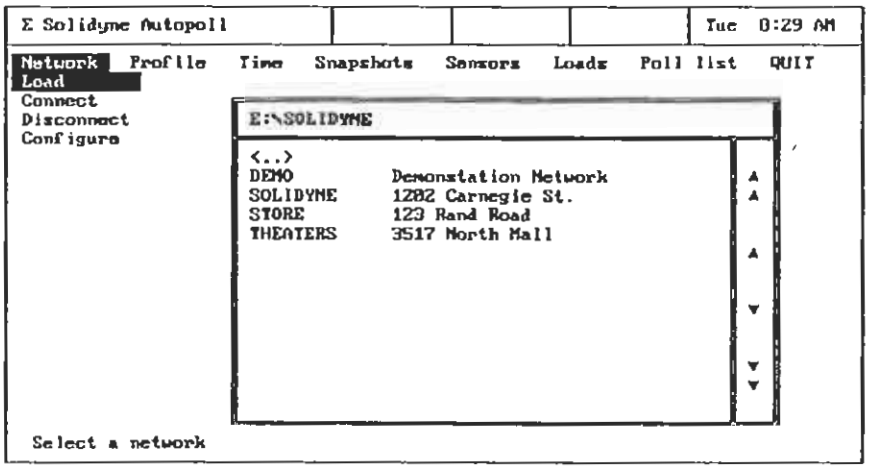

Fig. 3-1: Network Load

Select a network file to load

The data for the selected file will be loaded into the computer's memory and the filename will appear in the title block.

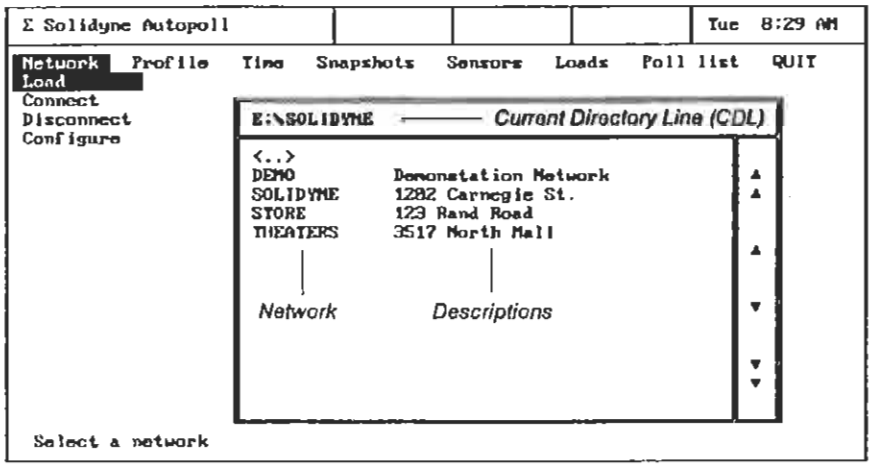

Fig. 3-2: Network Load

Network files can be loaded from other directories by selecting the directory and then selecting the file within the directory. Subdirectories, enclosed in angle brackets, and parent directories <..> can be accessed from the table. Directories can also be accessed by typing the path for the directory on the CDL.

Conventional DOS notation should be used when entering the names of other directories and/or drives, e.g. **D:\CLIPPER.**

The network description displayed to the right of the filename provides a brief identification of the network.

Chapter 4 - Creating a Profile

A Profile contains a list of selected data to be received from a Network. The selected data can include the execution time, a set of Snapshots for load and sensor screens, a list of sensors to poll for 48 hour or Peak data and a list of loads to poll for 48 hour data.

Note: *Only Clipper XLLSPs, Clipper XLHCs and IZAC controllers maintain a 48 hour history for loads.*

After a network has been loaded the options on the menu bar will be selectable.

TIME

TIME is used to specify when the profile is to be polled.

The Profile can be polled on a weekly or monthly basis.

Select Time

Weekly

In Weekly mode, the profile can be polled any day or days of the week.

Select the day or days

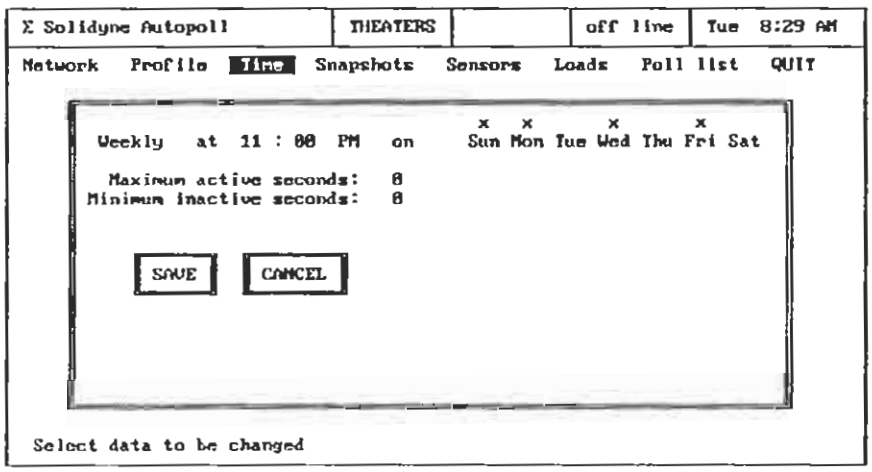

Fig. 4-1: Time - Weekly

An "X" will appear above the days(s) selected.

Enter the time by highlighting the hour or minutes value and entering the desired time. Use a 12 hour format and select AM or PM.

Monthly

In Monthly mode, the profile can be polled based on dates.

Toggle Weekly to Monthly

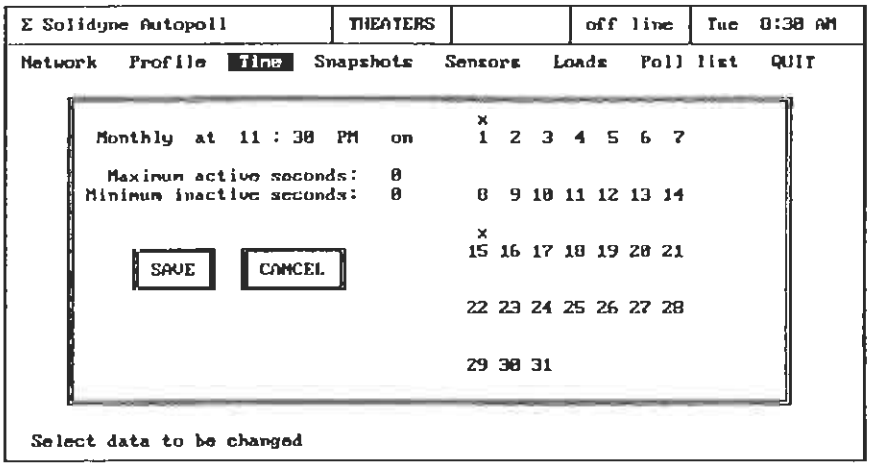

Fig. 4-2: Time - Weekly

Enter the time of day to perform the autopoll, then select the date(s). The Profile will be executed every month on the selected date(s) at the specified time.

Note: *Phone rates are generally cheaper and often cleaner at night and on weekends. Setting up the autopoll to occur during these times can produce considerable savings.*

Maximum active seconds and Minimum inactive seconds

A Profile with numerous data to poll (sensor Peaks, 48 hour, load 48 hour) can prevent nodes on the network from sharing sensor values. Nodes whose programs are dependant on sensors from other nodes may respond slowly and possibly incorrectly.

Maximum active seconds and Minimum inactive seconds can be used to specify an interval at which autopoll should suspend operations. Temporarily suspending autopoll operations will allow sensors to be broadcast onto the network.

Example: Maximum Active seconds: 240
Minimum inactive seconds: 40

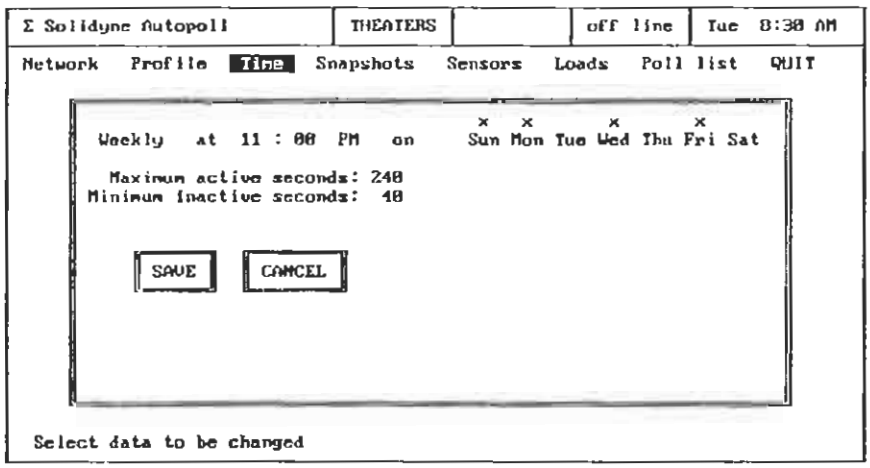

Fig. 4-3: Time - Max. active & Min. inactive seconds

A Profile with the following Max/Min seconds would poll for 240 seconds and then pause for 40 seconds. If the poll was not complete, autopoll would continue for another 240 seconds and then pause 40 seconds. By pausing every 240 seconds for 40 seconds, the network would be allowed to share sensor information.

Using the rule of thumb that sensor value broadcasts require about 4 seconds for each node, a 40 seconds Minimum inactive seconds rate would allow a 10 node network ample time to share sensor information.

Snapshots

A snapshot of the status screens for loads and sensors may be polled.

Select Snapshots

Snapshots for Sensor average values, instantaneous value, cumulative value, digital input status, Load manual switch, status, on time, override time, run time actions and MVAC zone status can be selected.

A snapshot will be received from every node in the network when the polling status is toggled to YES, Figure 4-4.

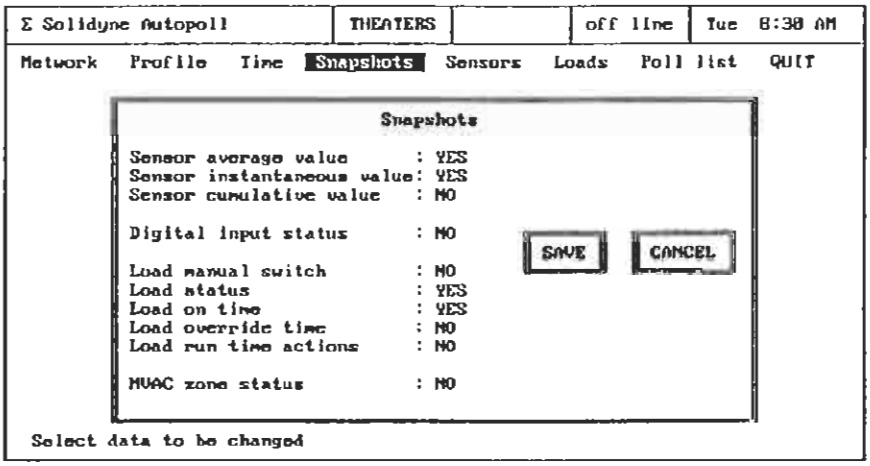

Fig. 4-4: Snapshots

Polling Sensors

Peak and 48 hour sensor information can be polled through the Sensors option.

Select Sensors

A table will display the sensors available for the network selected.

Selecting sensors for Peak or 48 hour information is similar. Selecting Peak or Qtr-hour will prompt the user to select the sensors to poll. A box will appear around the selected sensor(s), Figures 4-5 and 4-6. Use the arrow keys along the right side of the table to scroll to other nodes.

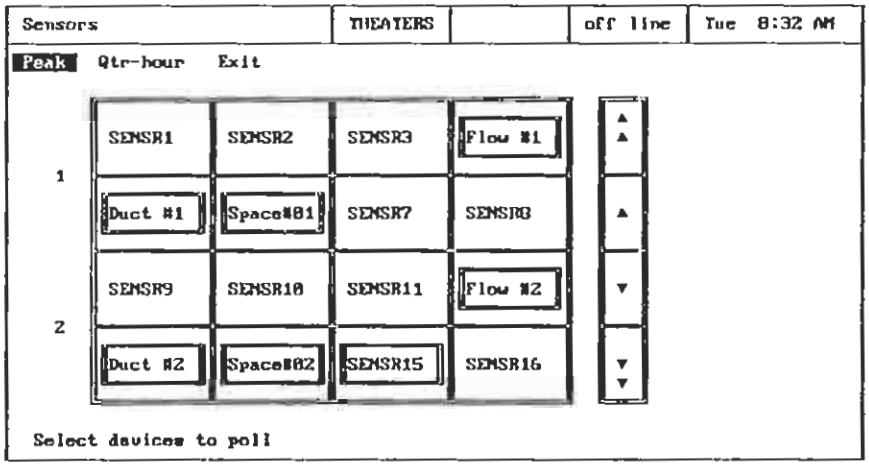

Fig. 4-5: Sensors - Peaks

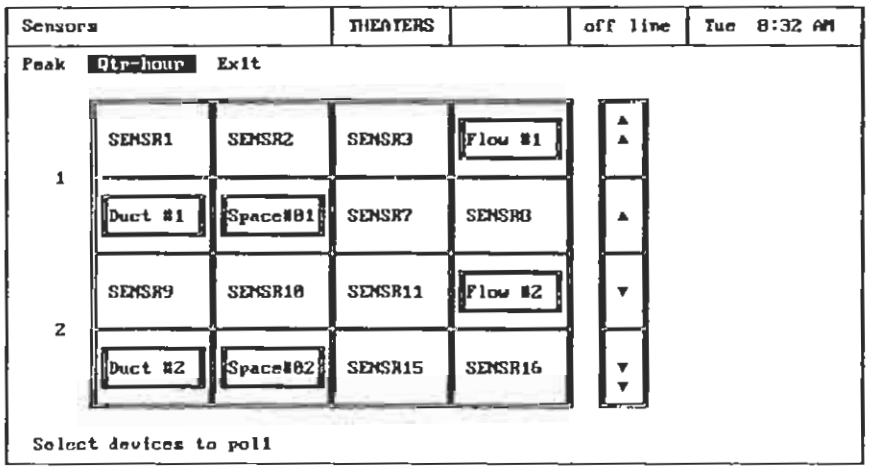

Fig. 4-6: Sensors - Qtr-hour

Polling Loads

48 hour load information can be polled through the Loads option.

IMPORTANT

Only loads in Clipper XLLSPs, Clipper XLHCs and IZAC nodes can be selected for 48 hour information.

Select Loads

A table will display the loads available for the network selected.

Select Qtr-hour

Select the loads to be polled

A box will appear around the selected load, figure 4-7. Use the arrow keys along the right side of the table to scroll to other nodes.

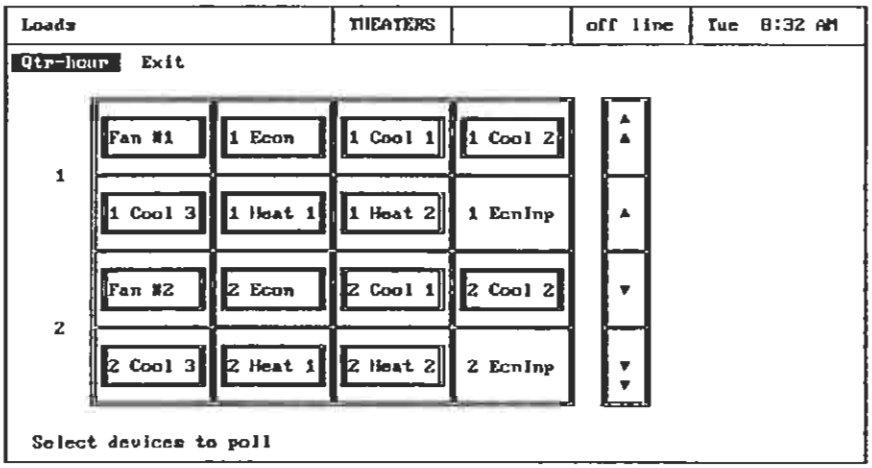

Fig. 4-7: Loads

Saving Profiles

Once the Profile is defined through the Time, Snapshots, Sensor and Loads menus, save the Profile.

Select Profile

Select Save As

The name chosen can be up to 8 characters in length. Do not use any punctuation in assigning a name.

Save As writes the Profile information to disk under the *filename* chosen by the user. The Profile will be saved in the network's subdirectory as *filename*.APS.

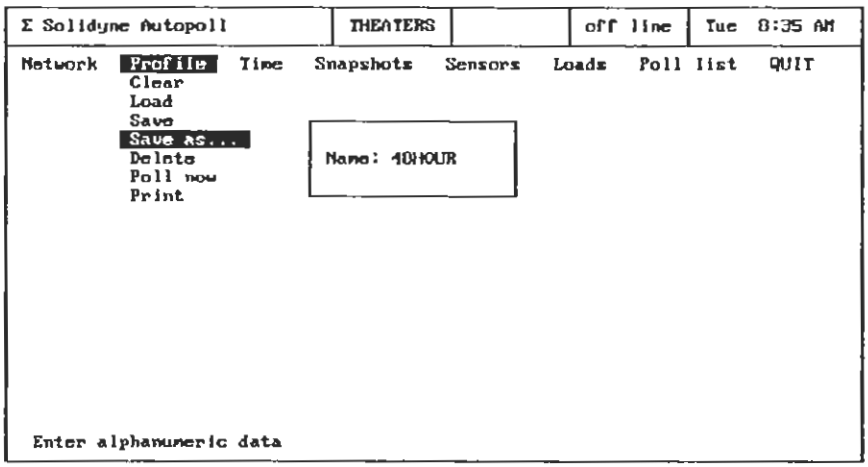

Fig. 4-8: Save As

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Chapter 5 - Polling Profiles

Poll list

Poll list is used to create and activate the Profiles on the poll list. Profiles must appear in the Poll list before they can be polled automatically.

Placing Profiles on the Poll list

Add is used to add Profiles to the poll list.

Select Add

A table of Profiles will appear. Profiles that are already on the poll list will not appear in this table.

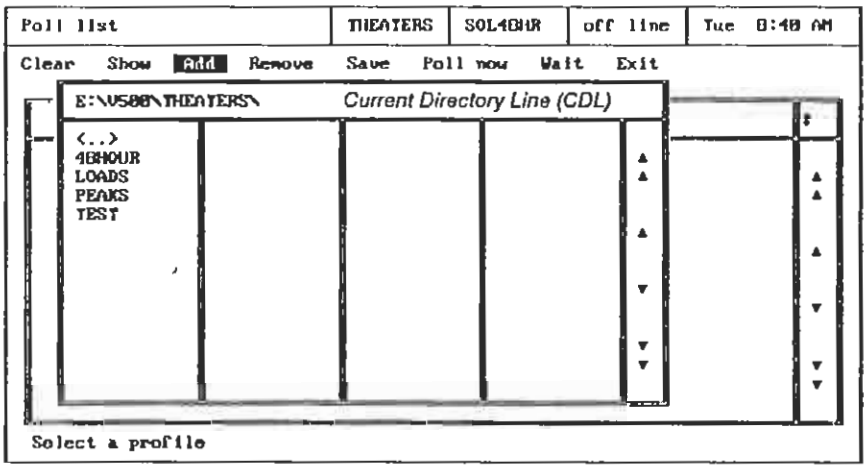

Fig. 5-1: Poll list - Add

If a network was loaded prior to the selection of Add, the Network will appear on the Current Directory Line (CDL). All the Profiles for the current directory (that are not already on the Poll list) will appear in the table.

Select the Profile(s) to be added to the list

To access Profiles for a network other than the current network, select the Parent directory <..>. The main directory containing CLIP.EXE and AP.EXE will appear on the CDL. The table will now display all the networks that exist within this directory.

Select a network

The selected network will appear on the CDL and the table will display the Profiles for the selected network.

The drive and path of a network can also be manually entered on the CDL. Conventional DOS notation should be used when typing in names of other directories (e.g. **D:\CLIPPER**)

Removing Profiles off the Poll list

Remove is used to remove Profiles form the poll list. A Profile that has been removed from the poll list will not be polled.

Select Remove

Select the Profile to remove

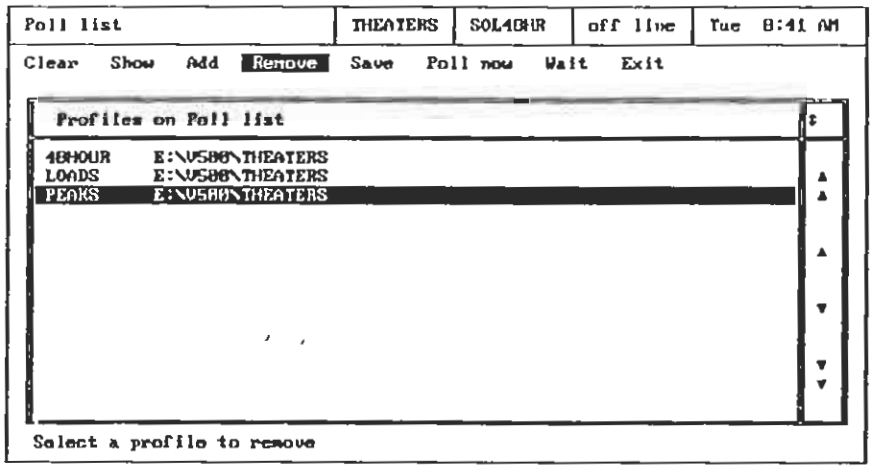

Fig. 5-2: Poll list - Remove

The Profile(s) will not be permanently removed from the list until the SAVE option is selected.

The Profile can also be ADDed to the list again.

Saving the poll list

SAVE is used to store the profiles of the poll list.

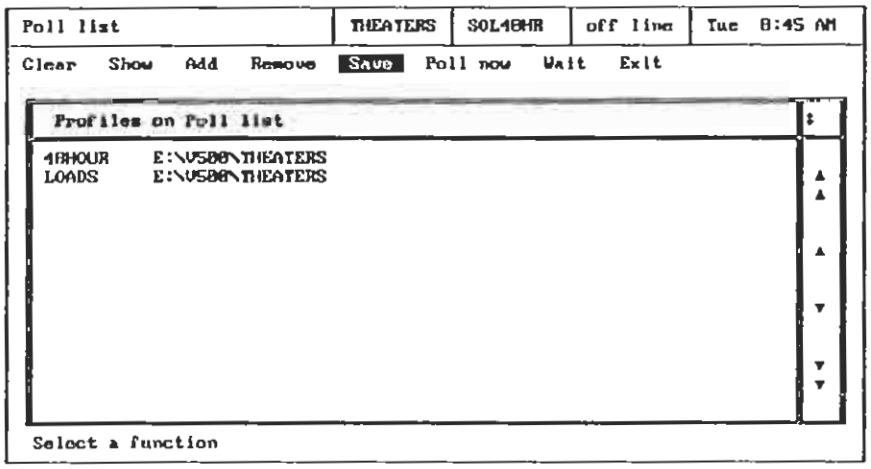

Fig. 5-3: Poll list - Remove

If Profiles are added or removed from the poll list and Exit is selected, the message WARNING - poll list will be lost. Do you really want to Exit? will appear, Figure 5-4.

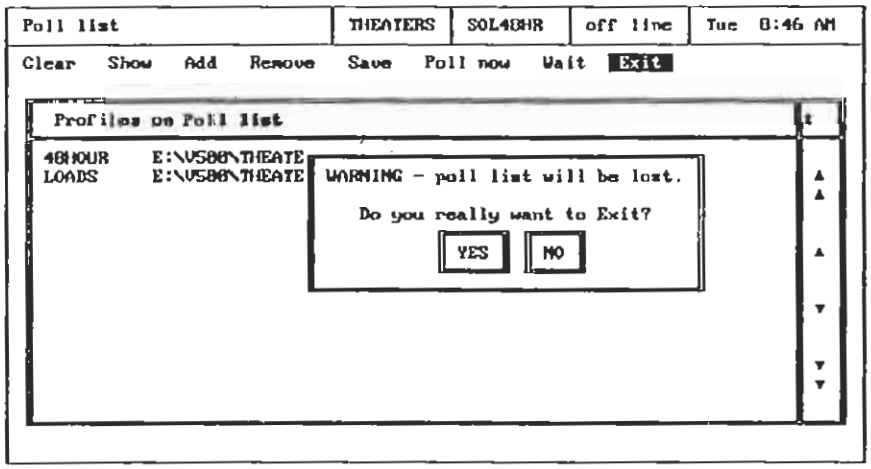

Fig. 5-4: Poll list - Remove

Select YES to Exit

YES will abandon any changes made to the poll list. The list prior to selecting Poll list will remain.

Select No to make further changes to the poll list

By selecting NO, Profiles can be added or removed. Save can then be selected to update and store the changes made to the poll list.

Clearing the poll list

A quick way to clear the poll list is to select Clear. Clear will completely erase the profiles from the poll list. This allows a clean starting point to create a new list without having to remove all of the existing profiles.

When Clear is selected, the message WARNING - poll list will be lost. Do you really want to Exit? will appear.

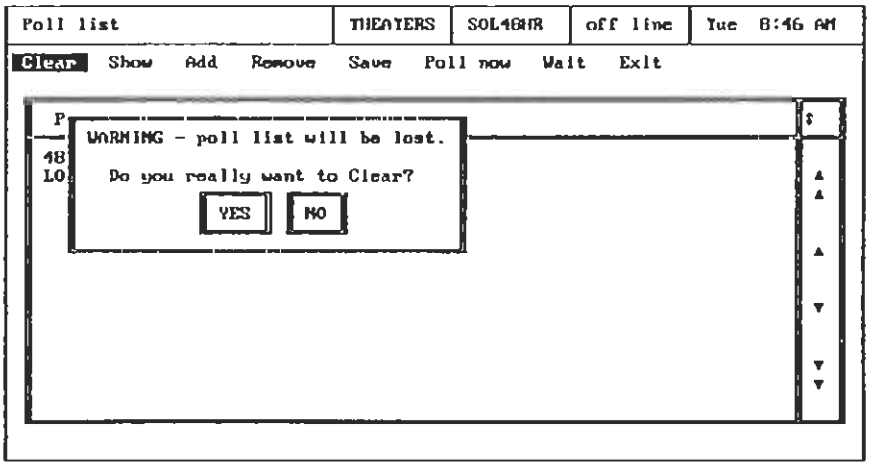

Fig. 5-5: Poll list - Clear

Select YES to execute Clear

Select No to cancel Clear

Accidental Clear

If YES is selected, the poll list will not be permanently lost unless a Save is performed. If an accidental Clear is performed, simply select Exit. The message WARNING - poll list will be lost. Do you really want to Exit? will appear.

Select YES

By exiting out, changes made to the poll list will not be saved. Next time Poll list is selected, the poll list accidentally cleared will appear.

Viewing Profiles on the Poll list

If there are more than 14 Profiles on the poll list, Show allows the user to select the arrows on the right side of the table. Selecting the arrows will scroll the poll list up and down. The single arrows scroll the list 1 Profile at a time. The double arrows scroll the list 1 page at a time.

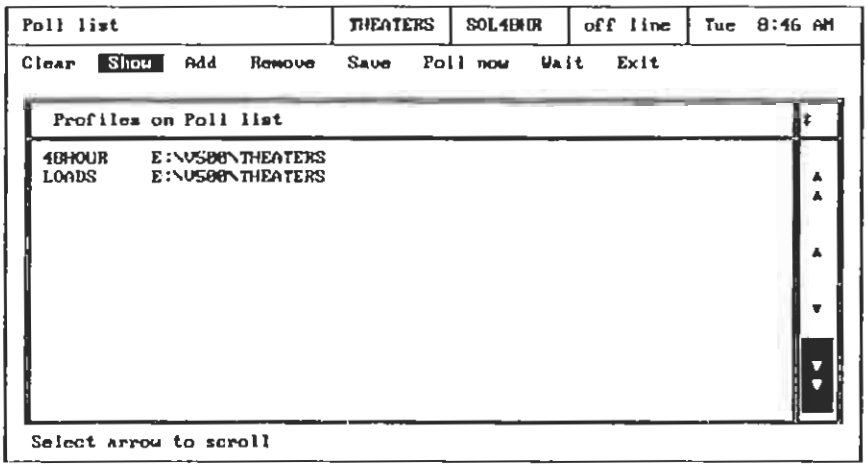

Fig. 5-6: Poll list - Show

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Chapter 6 - When to Poll

Once the poll list has been created, PDC AP can execute the Profiles immediately or by waiting for the execution times specified by the Profiles.

Polling immediately

Poll now is used to immediately poll all the profiles on the poll list, regardless of their execution times.

Select Poll now

A Polling box will appear on the screen, Figure 6-1.

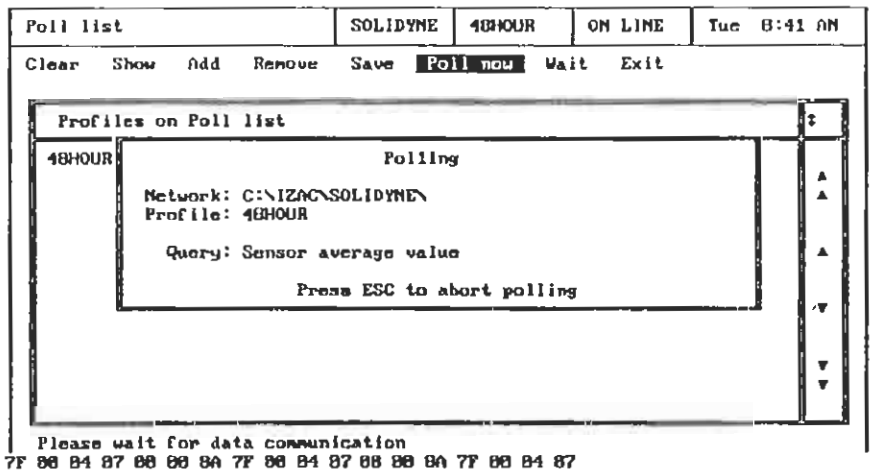

Fig. 6-1: Poll list - Poll now

The network, profile and data currently being received will be displayed.

In the event a communication failure occurs, each profile will be retried up to 4 times.

The data received cannot be examined through PDC AP. PDC AP stores the data into the networks' subdirectories. PDC832 should be used to examine the data.

Wait to Poll

Wait is used to activate the poll list. Once the poll list is activated the computer's date and time will continuously be compared to every profile on the poll list. When a match occurs the profile is executed. PDC AP maintains a queue for profiles to execute. Normally, the queue is empty. When a profile's execution time matches the computer's date and time, the profile is placed onto the queue. This allows multiple profiles to be programmed at the same time. If two or more profiles are to be executed at the same time, both profiles will be placed onto the queue. Once a profile is executed, that profile will be removed from the queue. The next profile in the queue would then be executed.

Select Wait

An "Awaiting poll" screen will appear, Figure 6-2. This screen displays the Network, Profile and Query (data) polled as a profile is executed.

IMPORTANT

PDC AP must be left in WAIT mode to automatically poll the profiles on the poll list. The monitor can be turned off but the PC and PDC AP must be left running.

IMPORTANT

The networks to be polled on the polling list must all communicate at the same BAUD rate. PDC AP can communicate at one BAUD rate every WAIT session. The BAUD rate is specified in the Configure option under Networks.

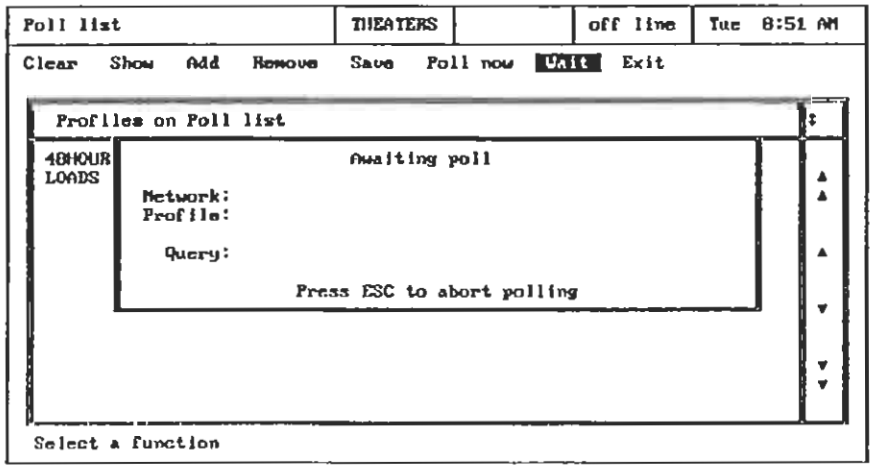

Fig. 6-2: Poll list - Wait

If multiple networks which have different BAUD rates are to be polled via the Wait option a different poll list for each BAUD rate must be created. The various poll lists must be grouped such that the profiles for 1200 BAUD networks be on the same poll list. Similarly, the profiles for 2400 BAUD networks must be on the same poll list and finally the profiles for 9600 BAUD networks must be on the same poll list.

The BAUD rate in the Configure option must also be set manually each time poll lists at 1200, 2400 or 9600 BAUD are to be polled. See chapter 8.

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Chapter 7 - Direct Connects with PDC AP

PDC AP has the same ALARM receive software as PDC832. To receive alarms for a network that is Direct Connected to the computer running PDC AP, the Connect function must be selected. Connect will place PDC AP "ON LINE" with the network and receive any alarms that may occur. PDC AP will still execute the profiles that are Waiting on the poll list.

Note: *If the computer is left in* Connect *mode, the profiles waiting on the poll list should be profiles configured for the direct connected network. Profiles that access networks through a modem should not be on the poll list. PDC AP must be configured differently for remote connections.*

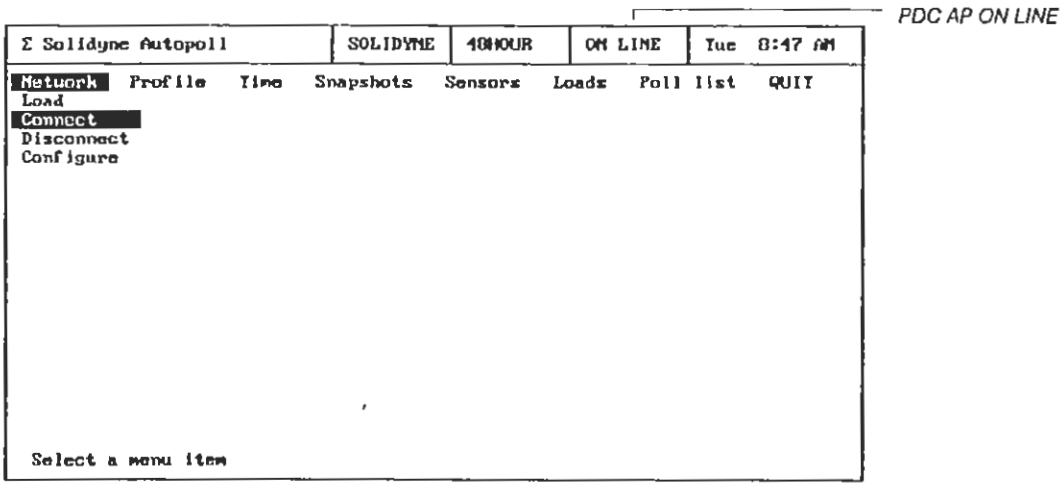

Fig. 7-1: Connect

Disconnect takes PDC AP "OFF LINE" by terminating communications with the direct connect network. After polling a direct connect network, PDC AP may be disconnected and reconfigured for polling remote networks through the modem.

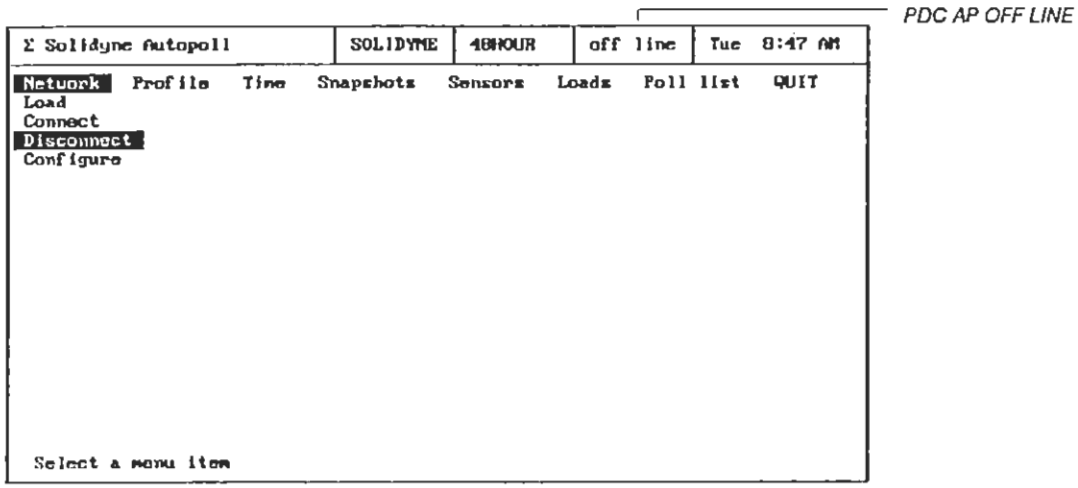

Fig. 7-2: Disconnect

Connect and Disconnect are for Direct Connect networks only. PDC AP automatically establishes and terminates communications with remote networks. Once PDC AP is asked to poll a remote network, it will access the modem, dial the phone number and poll the information associated with the profile. After all the information is received, PDC AP will automatically disconnect with the remote site and wait to call the next network on the poll list.

Chapter 8 - Configure

PDC AP can automatically poll networks that are direct connected or remotely connected. PDC AP can also poll networks that operate at 1200, 2400 or 9600 BAUD.

If multiple networks which have different BAUD rates are to be polled via the Wait option a different poll list for each BAUD rate must be created. The various poll lists must be grouped such that the profiles for 1200 BAUD networks be on the same poll list. Similarly, the profiles for 2400 BAUD networks must be on the same poll list and finally the profiles for 9600 BAUD networks must be on the same poll list.

The Configure option configures the communications setup for PDC AP.

Select Configure

A Configuration window will appear.

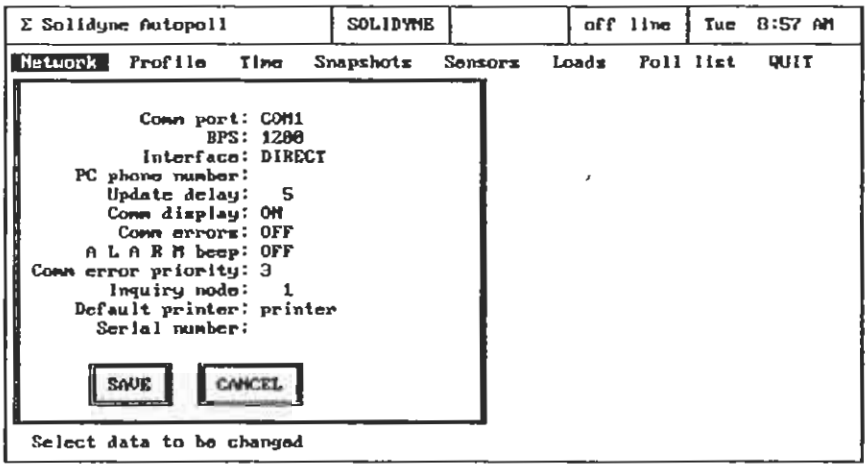

Fig. 8-1: Configure

The Configuration window and parameters for PDC AP is exactly the same as in PDC832.

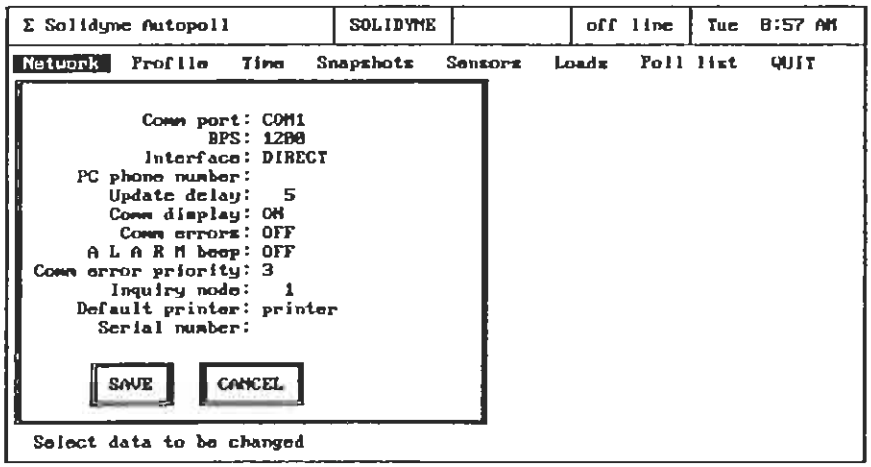

Fig. 8-2: Configure

The Comm port, BPS, Interface, PC phone number, Update delay, Comm display, Comm errors, ALARM beep, Inquiry node, Comm error priority and Default printer are programmable.

Note: *PDC AP only utilizes the* Comm port, BPS, Interface, PC phone number *and* Default printer *parameters.* Update delay, Comm display, Comm errors, ALARM beep, Inquiry node *and* Comm error priority *should be left to their default values.*

Comm port

The serial communication port must be specified as COM1 or COM2. COM3 and COM4 cannot be used. The comm port can be configured at start-up with the command AP COM1 or AP COM2.

BPS

The software supports 1200, 2400, 4800 and 9600 baud. The default is 1200. Toggle this selection to 2400 or 9600 only if all the controllers in the network are capable at the specified BAUD rate.

Interface

The type of interface can be configured as DIRECT or MODEM. Toggle this selection to DIRECT. The interface can be configured at start-up with the command **AP DIRECT**.

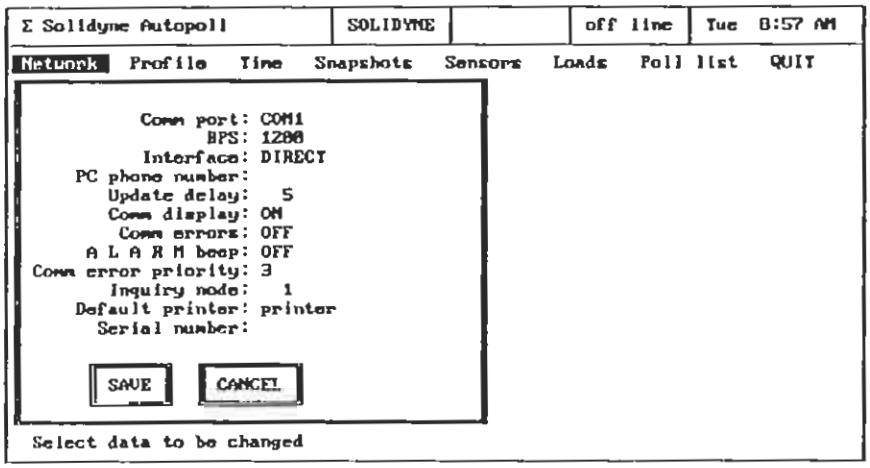

Fig. 8-3: Configure

PC phone number

The purpose of the PC phone number is to enable the software to receive alarms while the computer is ON LINE. The controllers will check the PC phone number of any computer that is currently ON LINE (direct or remote) when an alarm is triggered. The alarm will be sent directly to an ON LINE computer if the last 7 digits of the Alarm Dial-Out phone number within the controller matches the last 7 digits of the PC phone number of the ON LINE computer.

The controller will disconnect any ON LINE computers if the Alarm Dial-Out phone number does not match the PC phone number. A hang up message will be displayed. "Hanging up for alarm dial-out".

Select PC phone number and enter the number

The last 7 digits of the PC phone number must match the last 7 digits of the Alarm Dial-Out phone number exactly, including punctuation.

Example: The following numbers match:

Alarm Dial-Out phone number: 1-708-3943333
PC phone number: 3943333

The following numbers DO NOT match:

Alarm Dial-Out phone number: 1-708-3943333
PC phone number: 394-3333

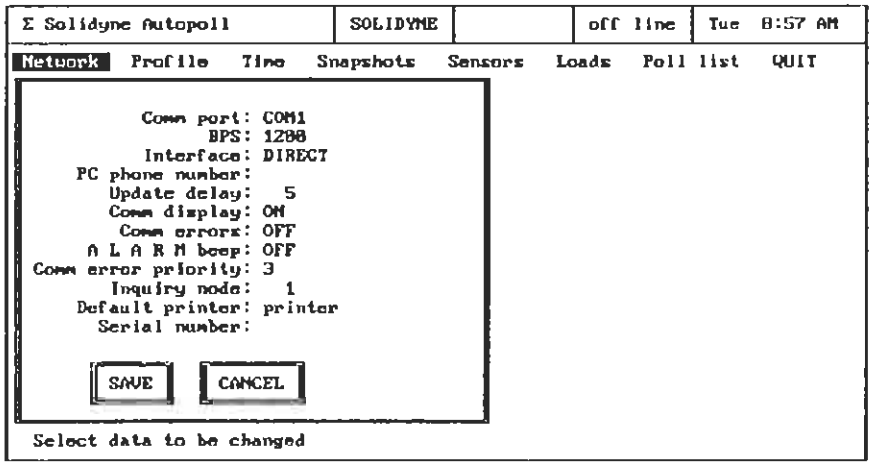

Fig. 8-4: Configure

Default printer

The Profile Print function directs output to "printer" (default). By setting the Default printer to LPT1 or another parallel port that attaches to the printer, all PRINT functions will direct the output to the parallel port entered.

When directed to "printer", the software is allowed to perform other tasks while data is printed. However, "printer" loads the DOS print command into RAM and will cause errors with other PDCAP functions if the PRINT /D:PRN *is not executed prior to running the AP.EXE file If the output is directed to LPT1, PRINT /D:PRN does not need to be run.*

Serial number

The serial number is unique to each diskette and is registered to a specific user. The number is required for technical assistance and future updates.

Chapter 9 - Modifying Profiles

Profiles can be modified for the same reasons programs for networks are modified. Changes may involve the change of the execution time of a profile, the number of sensor to poll for peak or 48 hour information etc.

Selecting a Profile to modify

The network containing the desired profile to modify must first be selected.

Select Network, Load, network

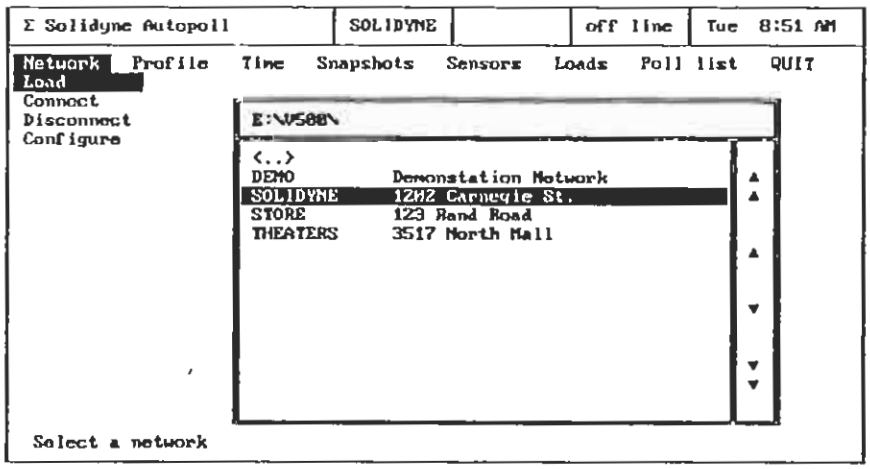

Fig. 9-1: Select a network

Select the profile to be modified

Select Profile, Load

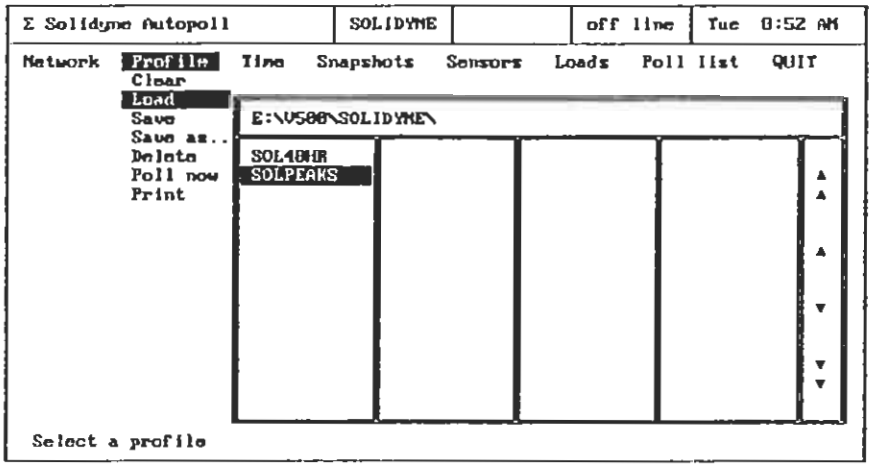

Fig. 9-2: Select a Profile

Load will load the selected Profile into the computer's memory. Once Load is selected, a table of profiles for the selected network will appear. Select a profile to modify. The contents of the profile can now be examined and modified.

The Time, Sensors and Loads configuration options can now be accessed to view or modify the current settings of the selected Profile.

Saving modifications

Once all the changes have been made, the Profile can be updated on the computer's hard drive by saving.

Select Profile, Save

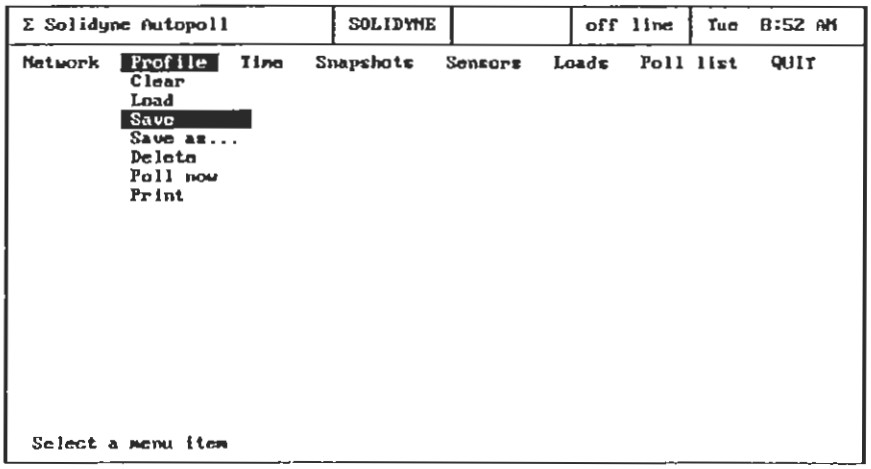

Fig. 9-3: Save modifications

File Commands

Along with the Save and Save As file commands under Profile, Clear, Delete, Poll now and Print options are available.

Clear

Selecting Clear will clear any profile information presently loaded in the computer's RAM. Profiles that have been saved to disk will not be affected by Clear. All programmable information will be set to its default state.

If changes are made to a new or existing profile and Clear is selected, the message Warning - profile data will be lost. Do you really want to Clear? will appear, Figure 9-4.

Select YES to Clear the computer's RAM and start over

Select No to cancel

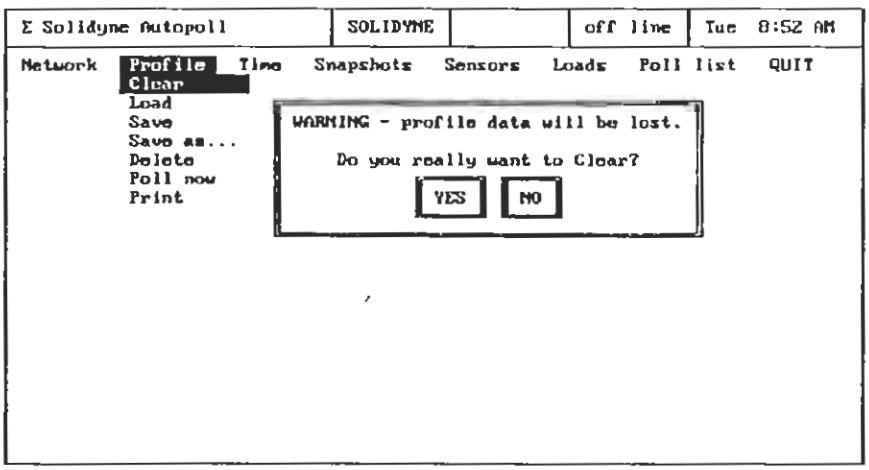

Fig. 9-4: Profile Clear

Delete

Delete is used to delete a profile from the network directory. A table will appear when Delete is selected, Figure 9-5.

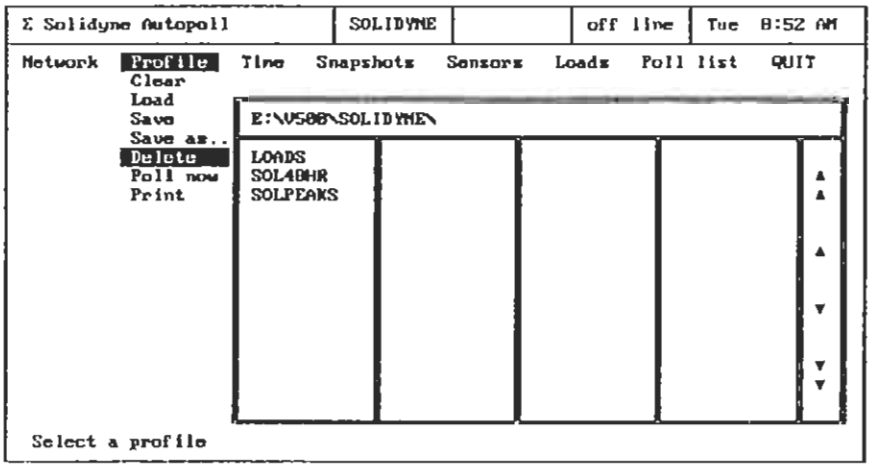

Fig. 9-5: Profile Delete

Select the profile to delete

The message Warning - profile will be lost. Do you really want to delete? appears.

Select YES and the selected profile will be deleted

Select NO to cancel (Clicking the mouse off the table will also cancel the delete option)

Once a profile has been deleted, the profile is permanently lost.

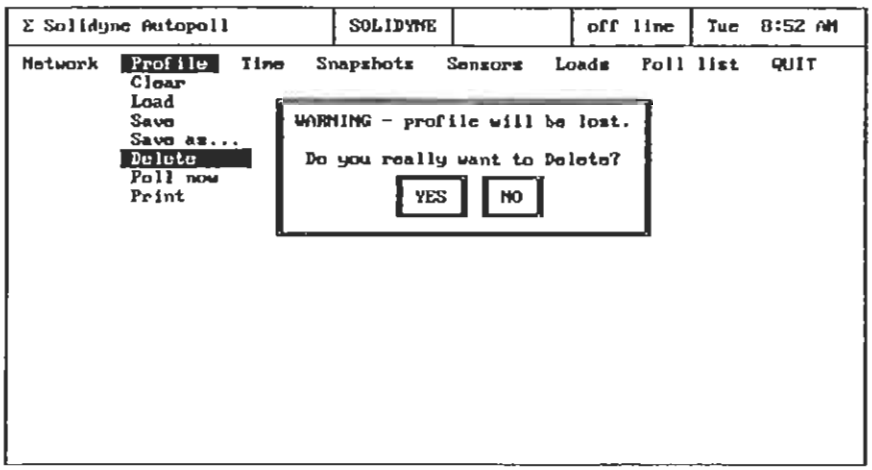

Fig. 9-6: Profile Delete Warning

Poll now

The Poll now option under Profile is similar to the Poll now option within Poll list. Poll now under Profile will immediately poll using the Profile currently loaded. Communications will be established (modem or direct) with the network and the selected information of the current profile will be received.

A polling screen describing the Network, Profile and Query (data currently being received) will appear.

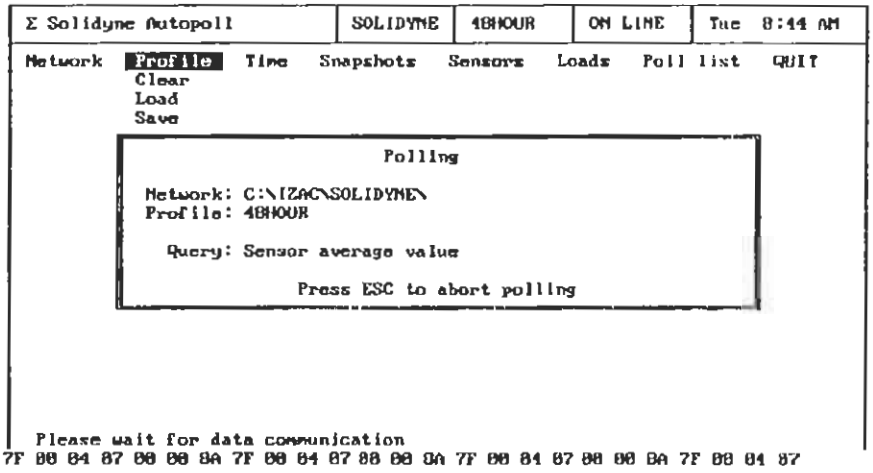

Fig. 9-7: Profile Poll now

Poll now *under* Profile *only polls the current Profile.*
Poll now *within* Poll list *polls all the profiles on the poll list.*

Print

Print is used to obtain printouts of specific data related to the currently selected profile. The default location for the printouts is specified in the Network, Configure screen.

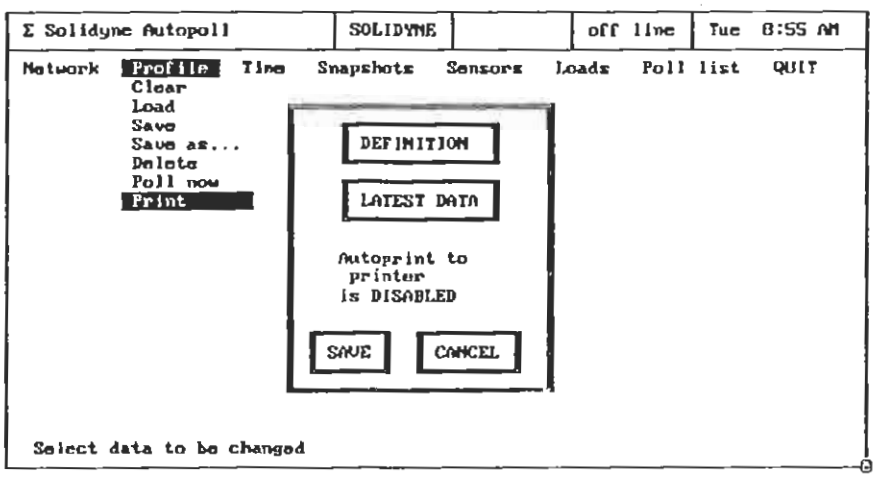

Fig. 9-8: Profile Print

Definition

A printout of the details (time profile is to be polled, snapshots selected, sensors selected for Peaks, Qtr-hour and loads selected for Qtr-hour) for the selected Profile can be obtainded through Definition.

Select Definition

A pop-up window with the message Print profile *filename* to printer will appear, Figure 9-9.

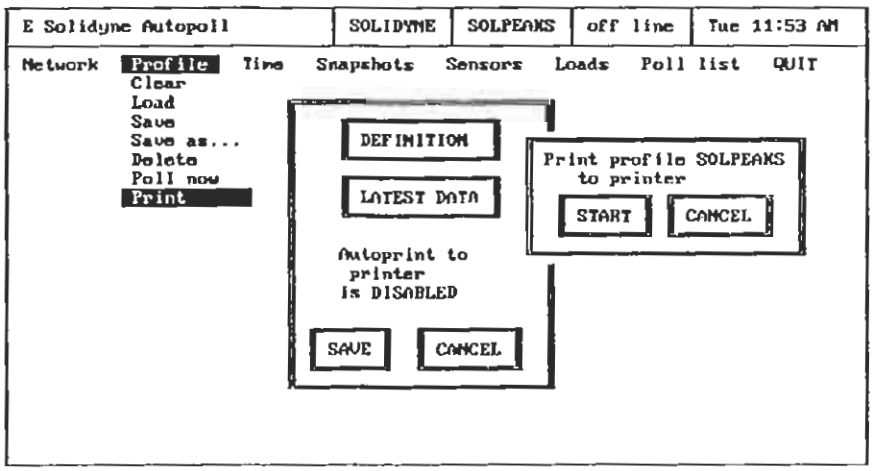

Fig. 9-9: Profile Print Definitions