Software Operation

SPECTRUM®

DETROIT DIESEL

Remote Communications
Monitoring and Control

Models:

Digital Generator Set Controller
MATS Transfer Switch Controller
MATS+ Transfer Switch Controller
Digital Power Monitor

ISO 9001
INTERNATIONALLY REGISTERED
SPECTRUM®

MP-5823 3/98a

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Appendix A. Glossary of Abbreviations A-1

A generator set and transfer switch, like any other electromechanical device, can pose potential dangers to life and limb if improperly maintained or operated. The best way to prevent accidents is to be aware of potential dangers and act safely. Please read and follow the safety precautions and instructions below to prevent harm to yourself and others. This manual contains several types of safety precautions and instructions which are explained below. SAVE THESE INSTRUCTIONS.

A power monitor, like any other electrical device, can pose potential dangers to life and limb if improperly installed, maintained, or operated. Only trained and qualified personnel should install, maintain, or operate the power monitor or accessories. The best way to prevent accidents is to be aware of potential dangers and act safely. Please read and follow the safety precautions and instructions below to prevent harm to yourself and others. This manual contains several types of safety precautions which are explained below. SAVE THESE INSTRUCTIONS.

DANGER

Danger indicates the presence of a hazard that *will* cause *severe* personal injury, death, or substantial property damage.

WARNING

Warning indicates the presence of a hazard that *can* cause *severe* personal injury, death, or substantial property damage.

CAUTION

Caution indicates the presence of a hazard that *will* or *can* cause *minor* personal injury or property damage.

NOTICE

Notice communicates installation, operation, or maintenance information that is important but not hazard related.

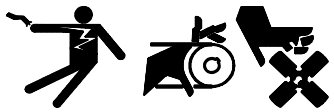
Safety decals affixed to the power monitor in prominent places advise the operator or service technician of potential hazards and how to act safely. The decals are reproduced here to improve operator recognition. Replace missing or damaged decals.

Safety decals affixed to the generator set in prominent places advise the operator or service technician of potential hazards and how to act safely. The decals are reproduced in this publication to improve operator recognition. Replace missing or damaged decals.

Safety decals affixed to the transfer switch in prominent places advise the operator or service technician of potential hazards and how to act safely. The decals are reproduced here to improve operator recognition. Replace missing or damaged decals.

Accidental Starting

WARNING



Accidental starting.
Can cause severe injury or death.

Disconnect battery cables before working on generator set. (Remove negative (–) lead first when disconnecting battery. Reconnect negative (–) lead last when reconnecting battery.)

Disabling generator set. Accidental starting can cause severe injury or death. Before working on the generator set or connected equipment, disable the generator set as follows: 1) Turn the generator set master switch to OFF position. 2) Disconnect power to battery charger. 3) Remove battery cables (remove negative (–) lead first). Reconnect negative (–) lead last when reconnecting battery. Follow these precautions to prevent starting of generator set by an automatic transfer switch or remote start/stop switch.

Hazardous Voltage/ Electrical Shock

⚠ DANGER

Hazardous voltage.
Will cause severe injury or death.

Disconnect all power sources before opening enclosure.

(600 Volt and above)

⚠ DANGER

Hazardous voltage.
Will cause severe injury or death.

Disconnect power sources before servicing. Install barrier after adjustments, maintenance, or servicing.

(600 Volt and above)

⚠ WARNING

Hazardous voltage.
Can cause severe injury or death.

Disconnect all power sources before opening enclosure.

(under 600 Volt)

⚠ WARNING

Hazardous voltage.
Can cause severe injury or death.

Disconnect power sources before servicing. Install barrier after adjustments, maintenance, or service.

(under 600 Volt)

Grounding generator set. Hazardous voltage can cause severe injury or death. Electrocution is possible whenever electricity is present. Open main circuit breakers of all power sources before servicing equipment. Configure the installation to electrically ground the generator set and electrical circuits when in use. Never contact electrical leads or appliances when standing in water or on wet ground, as the chance of electrocution increases under such conditions.

Making line or auxiliary connections. Hazardous voltage can cause severe injury or death. To prevent the possibility of electrical shock, de-energize the normal power source before making any line or auxiliary connections.

Servicing transfer switch. Hazardous voltage can cause severe injury or death. De-energize both normal and emergency power sources before proceeding. Move generator set master switch on controller to OFF position and disconnect battery negative (–) lead before working on transfer switch! Turn the transfer switch selector switch to the OFF position.

Servicing transfer switch inner panel. Hazardous voltage can cause severe injury or death. Disconnect inner panel harness at in-line connector. This will de-energize circuit board and logic circuitry but allow transfer switch to continue to supply utility power to necessary lighting and equipment. Hazardous voltage exists for any accessories mounted to inner panel which are NOT wired through the inner panel harness and de-energized by in-line connector separation. Such accessories are at line voltage.

Short circuits. Hazardous voltage/current can cause severe injury or death. Short circuits can cause bodily injury and/or equipment damage**.** Do not contact electrical connections with tools or jewelry while making adjustments or repairs. Remove wristwatch, rings, and jewelry before servicing equipment.

Opening power monitor enclosure. Hazardous voltage can cause severe injury or death. Only trained and qualified personnel should open power monitor enclosure.

Opening power monitor enclosure. Hazardous voltage can cause severe injury or death. Transfer switch or generator set, when part of the system, can automatically energize power monitor or accessories. Disconnect all power sources before opening enclosure. Move generator set master switch on controller to OFF position and disconnect battery negative (–) lead before proceeding.

Current transformer voltage. Hazardous voltage can cause severe injury or death. Do not disconnect current transformer leads and reenergize the power source or equipment damage and personal injury may occur. If the situation requires reenergizing the power source, reconnect the current transformer leads or short leads together first.

NOTICE

When replacing hardware, do not substitute with inferior grade hardware. Screws and nuts are available in different hardness ratings. American Standard hardware uses a series of markings and metric hardware uses a numeric system to indicate hardness. Check markings on bolt head and nuts for identification.

NOTICE

Electrostatic discharge damage! Electrostatic discharge (ESD) damages electronic circuit boards. Prevent electrostatic discharge damage by wearing an approved grounding wrist strap when handling electronic circuit boards or integrated circuits. An approved grounding wrist strap provides a high resistance (about 1 megohm), *not a direct short*, to ground.

This manual covers the operation of the remote monitoring and control communications software for personal computers to communicate with Digital Controller generator set controllers, MATS and MATS+ automatic transfer switch controllers, and Digital power monitors.

All information found in this publication is based on data available at time of print. The manufacturer reserves the right to make changes to this literature and the products represented at any time without notice and without incurring obligation.

List of Related Materials

The software covered in this manual is part of a total control system. Separate manuals are available for the Digital Controller generator set controller, MATS and MATS+ automatic transfer switch controller, and Digital power monitor. They provide specific information to set up the device to enable remote communications and programming and additional information about device functions.

The related manual numbers are as follows:

Device	Operation/ Installation Manual
MATS Transfer Switch Controller	MP-5604
MATS+ Transfer Switch Controller	MP-5664
Digital Controller	MP-5829
Digital Power Monitor	MP-5875

Service Assistance

For sales and service in the U.S.A. and Canada check the yellow pages of the telephone directory under the heading GENERATORS—ELECTRIC for an authorized Spectrum® service distributor/dealer.

For sales and service outside the U.S.A. and Canada, contact your local distributor.

For further information or questions, contact the company directly at:

Spectrum
N7650 County Trunk LS
Sheboygan, Wisconsin 53083 U.S.A.
Phone: 920-459-1877
Fax: 920-459-1825 (U.S.A. Sales)
920-459-1614 (International)

Section 1. Requirements and Installation

1.1 Introduction

The Monitor software allows the operator to view the status and make changes to settings and programming on Digital Controller generator set controllers, MATS and MATS+ transfer switch controllers, and Digital power monitors using a personal computer (PC). The software allows communication through local direct or remote modem connections. See Section 6—Communication Connections for further information on the different configurations.

1.2 About this Manual

This manual is divided into seven sections:

- **Section 1—Requirements and Installation** Explains the system requirements to run the Monitor software and explains how to install it.
- **Section 2—Main Menu** explains the main menu of the software and how to use it to locally or remotely connect to a Digital Controller generator set controller, MATS and MATS+ transfer switch controller, and Digital power monitor.
- **Section 3—Generator Set Controller Data Menu** explains the Digital Controller generator set controller software operations. Areas covered include viewing the current generator set information, setting default alarms, changing settings, and starting and stopping the generator set.
- **Section 4—ATS Controller Data Menu** explains the MATS and MATS+ transfer switch software operations. Areas covered include viewing the current automatic transfer switch information, setting alarms, changing pick-up and drop-out settings, setting the plant exerciser, and starting and stopping a generator set.
- **Section 5—Power Monitor Data Menu** explains the Digital power monitor software operations. Areas covered include viewing the current metering information, setting time delays, changing settings, and running an ATS test.
- **Section 6—Communication Connections** describes the hardware required to connect a PC to Digital Controller generator set controllers, MATS and MATS+ transfer switch controllers, and the Digital power monitors locally, remotely, and through a network.
- **Section 7—Factory Setup Option** Describes how to enable and perform additional functions with the Monitor software using the factory setup option. These functions are normally performed during installation of additional devices to the system.

1.3 Hardware Requirements

The Monitor software requires the following minimum hardware and software to operate:

- Operating System: MS-DOS® version 4.0, Windows® version 3.1, or Windows® 95.
- Microprocessor: 286
- Conventional Memory: 520K
- Extended memory: 4MB
- Disk Drive: One 3.5 inch high-density floppy drive.
- Hard Drive: 2MB available space
- Video adapter: VGA resolution, compatible with the operating system
- Communication port: 2400, 4800, or 9600 baud connected on COM1-4

1.4 Typographic Conventions

This manual uses the following typographical conventions to distinguish different types of information.

Words in **bold** are command words. Type text in **bold** exactly as shown.

Words in ***bold italic*** are system messages. System messages display information from the system and prompt you to make a choice or provide information to the computer.

Words in <CAPS WITHIN BRACKETS> indicate key names; a plus sign between two key names indicates that the keys must be pressed in combination, i.e., <CTRL> + <F9>.

Words in `Courier font` indicate system information.

The convention –> shows a item or submenu in a menu when using Windows®. For example, File–>New represents selecting New from the File menu.

For simplicity, this manual assumes that your PC has the 3.5 inch floppy drive installed as the A: drive and the hard drive installed as the C: drive.

A pathname inside brackets represents system pathnames. Type the pathname, not the brackets. Example [**c:\Monitor\Help**]. Brackets appear later in

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the manual to expand abbreviated messages displayed on the screen. For example, Coolant Temp is the abbreviation for Coolant Temperature that appears on the screen; the text refers to this message as Coolant Temp[erature].

1.5 Monitor Software

The Monitor software comes on a 3.5 inch floppy diskette. Although the software is an MS-DOS® application, it can also run under Windows® 3.1 and Windows® 95.

The Monitor software diskette contains an executable file called Spectrum.exe which contains the Monitor software. To run the Monitor software you need to execute this file. The following procedures explain how to use both MS-DOS® and Windows® to install the software on the hard drive and to run the software from your hard drive or the floppy drive.

The Monitor software diskette also contains a Help directory. Installation and use of the help files is optional.

Make a backup disk of all the files and directories from the original Monitor software disk before using or installing the software. Store the original disk in a safe place. Use MS-DOS® or Windows® to perform the backup.

Once the program runs it generates other files that the program uses to store system information.

1.6 Installation of Monitor Software

NOTE

To run the Monitor software without installing it, refer to Section 1.7 Running the Monitor Software from a Floppy Drive.

Installation of the software on your hard drive involves the following steps:

1. Creating a directory on the hard drive for the software, optional help files, and program-generated configuration files.
2. Copying the required files to the new directory from a backup copy of the Monitor software disk.
3. Setting up the program for execution (Windows® only).

Note that you can use MS-DOS® to perform all but the last step to install the software, even if you run it under Windows®.

1.6.1 MS-DOS

To install the Monitor software using MS-DOS® or to copy the software to the hard drive using MS-DOS® proceed as follows.

1. Create a Monitor directory on the hard drive.
   a. Change directory to the hard drive by typing **c:** and pressing <ENTER>.
   b. Change the current directory to the root of the C: drive by typing **cd** \ and pressing <ENTER>. The typical MS-DOS® prompt appears ***C:\>***.
   c. Create a directory for the Monitor software by typing **md Monitor** and pressing <ENTER>.
2. Copy the software to the Monitor directory.
   a. Change directory to the Monitor directory by typing **cd Monitor** and pressing <ENTER>. The typical MS-DOS® prompt appears ***C:\Monitor>***.
   b. Insert the backup copy of the Monitor software disk into the 3.5 inch floppy disk drive A:
   c. Type **copy a:Spectrum.exe** and press <ENTER>.
3. Create a subdirectory in c:\Monitor for the help files (optional).
   a. Press <ENTER>. The typical MS-DOS® prompt appears ***C:\Monitor>***.
   b. Create a subdirectory for the help files by typing **md Help** and pressing <ENTER>.
4. Copy the help files to the hard drive (optional).
   a. With the backup copy of the Monitor software disk in the 3.5 inch floppy disk drive A:, type **cd Help** and press <ENTER>. The typical MS-DOS® prompt appears ***C:\Monitor\Help>***.
   b. Type **copy a:\Help*.*** and press <ENTER> to copy the help files to c:\monitor\help.
5. Set the Help File Path to [**c:\Monitor\Help**] using the Program Configuration screen to access the help files on the hard drive from the program. See Section 2.1 (optional).
6. Remove the backup copy of the Monitor software disk from the A: drive.

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The Monitor software is now installed on the hard drive. This completes installation of the software for operation from MS-DOS®.

1.6.2 Windows 3.1

To install the Monitor software in Windows® Version 3.1.

1. Create a directory for the software.
   a. Run File Manager.
   b. Click on the C: drive icon and then click on c:\ in the left pane.
   c. Use File–>Create Directory from the toolbar to create a new directory. In the Name: box type **Monitor** and then click OK.
2. Copy the software.
   a. Insert the backup copy of the Monitor software into the 3.5 inch floppy drive A:.
   b. Copy the contents of A: to C:\Monitor using File Manager. If you copy the Help directory (optional), change the help file path in the Program Configuration screen to [**c:\Monitor\Help**].
3. Create a group item and program item that allows starting the program from your desktop.
   a. Switch to Program Manager and select File–>New.
   b. Select Program Group from the Pop-up box and click OK.
   c. Type **Spectrum Monitor** in the Description box and click OK.
   d. Windows® creates a program group named Spectrum Monitor on your Windows® desktop.
   e. Select File–>New from the Program Manager.
   f. Select Program Item from the Pop-up box and click OK.
   g. Type **Spectrum Monitor** in the Description: box.
   h. Type **c:\Monitor\Spectrum.exe** in the Command Line: box.
   i. Enter **c:\Monitor** in the Working Directory: box and click OK.

1.6.3 Windows 95

To install the Monitor software in Windows® 95.

1. Create a directory for the software.
   a. Run Windows® Explorer.
   b. Click on your C: drive in the left pane.
   c. Choose File–>New–>Folder from the toolbar. Explorer creates and highlights a new directory labeled ***New Folder*** in the right pane. Type **Monitor** and press <ENTER> to rename it.
2. Copy the software.
   a. Insert the backup copy of the Monitor software into the 3.5 inch floppy drive A:.
   b. Copy the contents of A: to C:\Monitor using Explorer. If you copy the Help directory (optional), change the Help File Path in the Program Configuration screen to [**c:\Monitor\Help**].
3. Create a shortcut that allows starting the program from another location.
   a. In Explorer click on C:\Monitor. Explorer shows the contents of the directory in the right pane. One of the files is Spectrum or Spectrum.exe. Right click on Spectrum or Spectrum.exe in the right pane and choose Create Shortcut.
   b. Drag the MS-DOS® shortcut icon file created to the desktop or another directory.

You can also install the program in your Start–>Programs menu instead of making a shortcut. To do so choose Start–>Settings–>Taskbar, choose the Start Menu Programs tab, and click Add. Follow the instructions to create a shortcut for C:\Monitor\Spectrum.exe to place in the desired part of the Start–>Programs menu.

1.7 Running the Monitor Software From a Floppy Drive

This section explains how to run the software from a floppy disk A: without installing it on the hard drive. Use the backup copy of the software, not the original disk, when running off the floppy drive.

If you wish to keep system information on the backup Monitor floppy disk rather than re-entering the information every time the program starts, ensure that the write protect on the backup Monitor diskette is off before proceeding and leave the disk in the A: drive while the program runs so the computer can load and save information.

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When the Monitor program starts for the first time, enter the Monitor type. Type Y if your computer has a color display or N if it has a monochrome display and press <ENTER>. Choose the Program Configuration screen from the Main Menu and provide the required information before using the program.. See Section 2.5.

To access help screens go into the Program Configuration screen and change the Help File Path to [**a:\Help**]. The program retrieves the help files from the floppy disk.

When finished using the software, choose Quit from the Main Menu and remove the Monitor software disk from the drive before turning off the computer.

NOTE

If the Monitor software does not run, refer to Troubleshooting later in this section.

1.7.1 MS-DOS

To start the Monitor software using MS-DOS® from the floppy disk, follow the steps below:

1. Insert the backup copy of the Monitor Software disk into the 3.5 inch floppy disk drive A:.
2. Change directory to the A: drive by typing **a:** and pressing <ENTER>. The typical MS-DOS® prompt appears ***A:\>***.
3. Type **Spectrum.exe** and press <ENTER>. The Monitor program starts.

1.7.2 Windows 3.1

To start the Monitor software in Windows® 3.1 from the floppy disk follow the steps below:

1. Insert the backup copy of the Monitor Software disk into the 3.5 inch floppy disk drive A:.
2. From the Program Manager select File–>Run.
3. Type **a:\Spectrum.exe** in the Command Line: box and click OK. The Monitor program starts.

1.7.3 Windows 95

To start the Monitor software in Windows® 95 from the floppy disk, follow the steps below:

1. Insert the backup copy of the Monitor Software disk into the 3.5 inch floppy disk drive A:.
2. Select Run from the Start menu.
3. Type **a:\Spectrum.exe** in the Open: box.
4. Select the OK button. The Monitor program starts.

1.8 Running the Installed Monitor Software

Follow the procedures below for starting the Monitor software installed on the hard drive using MS-DOS® or Windows® .

When the Monitor program starts for the first time after installation, enter the monitor type. Type Y if you have a color display or N if you have a monochrome display and press <ENTER>. Choose the Program Configuration screen from the Main Menu and provide the required information before using the program. See Section 2.5.

When finished using the software, choose Quit from the Main Menu to end the program.

NOTE

If the Monitor software does not run, refer to Troubleshooting later in this section.

1.8.1 MS-DOS

To start the installed Monitor software in MS-DOS®, follow the steps below:

1. Set the current directory to the hard disk by typing **c:** and pressing <ENTER>.
2. Set the current directory to the Monitor directory by typing **cd \Monitor** and pressing <ENTER>. The typical MS-DOS® prompt appears ***C:\Monitor>***.
3. Type **Spectrum.exe** and press <ENTER> The Monitor program starts.

1.8.2 Windows 3.1

To start the installed Monitor software in Windows® 3.1, double click on your Spectrum Monitor program group and then double click on the Spectrum Monitor icon.

1.8.3 Windows 95

To start the installed Monitor software in Windows® 95, double click on the shortcut you created during installation or select it from your Start–>Programs menu if you placed it there.

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1.9 Uninstalling the Software

Use this section to uninstall the software on the hard drive of your computer.

NOTE

Uninstalling the software permanently deletes all information for your system entered into the Program Configuration, Remote Single Connection, and Remote Area Network screens!

1.9.1 MS-DOS

To remove the Monitor software running under MS-DOS® delete the Monitor directory:

1. Change directory to the hard drive by typing **c:** and pressing <ENTER>.
2. Change the current directory to the root of the C: drive by typing **cd** \ and pressing <ENTER>. The typical MS-DOS® prompt appears ***C:\>***.
3. Delete the Monitor directory and its contents by typing **rmdir /s Monitor** and pressing <ENTER> at the MS-DOS® prompt. Confirm that you want to delete the directory.

1.9.2 Windows 3.1

To remove the Monitor software running under Windows® 3.1:

1. Delete the Monitor directory and its contents:
   a. Run File Manager.
   b. Click on the C: drive icon and then click on c:\ in the left pane.
   c. Click on the **Monitor** directory in the right pane.
   d. In File Manager select File–>Delete from the toolbar to delete the directory.
2. Delete the Windows® setup information:
   a. Go to your desktop and select the **Spectrum Monitor** program group.
   b. Select File–>Delete from the Program Manager.

1.9.3 Windows 95

To remove the Monitor software from the computer running under Windows® 95.

1. Delete the Monitor directory:
   a. Run Windows® Explorer.
   b. Click on your C: drive in the left pane.
   c. Click on the **Monitor** directory in the right pane.
   d. Choose File–>Delete from the toolbar. Confirm to delete.
2. Then delete the Windows® setup information:
   a. If you created a shortcut to Spectrum or Spectrum.exe on the desktop or other location only during installation, delete the shortcut to complete the removal of the software.
   b. If you installed the software in your start menu, choose Start–>Settings–>Taskbar, choose the Start Menu Programs tab and click on Remove. Locate the shortcut to Spectrum.exe and click on Remove to complete the removal of the software.

1.10 Screen and Key Functions

The following function key notes appear at the bottom of various screens within the program.

- The <ESC> key returns to the previous menu or screen.
- The <F1> key displays the help screen for the current menu or screen.
- The <F4> key updates the device settings by transmitting the settings that the operator has entered to the device for storage.
- The <F9> key displays a print menu:
  - ***Print to Printer*** prints a hard-copy report of the current screen to the printer the system designates as LPT1.
  - ***Save Report to a File*** asks to provide a name for a file and saves the current screen report to the file.
  - ***Review Report*** provides a print preview of a screen report.
- The <F10> key restores the Main Menu.

1.11 Monitoring and Programming Setup

This section describes how to set up the remote control and programming modes for monitoring and programming using online PC connections and describes the various online PC connections. See Section 6 for details on communications hardware and connections.

An online PC connection is Local meaning a direct cable connection or it is Remote meaning a connection using a telephone line and modem. PC connections can

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connect to a single device or a local area network (LAN) of devices (a generator set controllers, automatic transfer switch controllers, or power monitors), resulting in four PC connection types: Local, Local Area Network, Remote, and Remote Area Network. See Section 1.12 for more details about these connections.

Each of these four PC connection types work with programming on or off for a total of eight combinations of settings for online PC connections. See the table in Figure 1-1 for the settings for each combination. While programming the Remote Control settings for each device, enter the following additional settings:

- **Baud rate** Enter the same baud rate for all devices. Enter this same baud rate and the COM port 1-4 used for PC communications on the Program Configuration screen for the Monitor software. See Section 2.5.
- **Network Address** Enter a unique network address 1-128 for each device on each Local Area Network or Remote Area Network site. Typically assign addresses from 1 to the number of devices on the network. If a network is not used, leave the network address set to the default value of 1.
- **System ID** Enter the same System ID number into all devices for each Remote Single or Remote Area Network site. Enter this System ID number into the Remote Unit Overview or Remote Network Overview screen for the Monitor software along with the site description, number of units, and phone number at the site. See Section 2.2 and Section 2.3 The System ID number works like a password that only allows Monitor software with the correct System ID number to access the site using a modem.

Enable the Local programming mode first, program the settings for Remote Control, and then change the Programming Mode. See Figure 1-2 for the locations to change these settings for different devices.

Note that you can always perform monitoring at the local display regardless of these online PC connection settings. Also, if you use an online PC connection to perform monitoring, you can also turn the local programming mode on and perform programming locally simultaneously. See the note at the bottom of the table in Figure 1-1.

		Menu 8—Remote Control					Menu 9—Programming Mode		
User Activity	Connection Type	On Line?	Local?	Local Area Net?	Remote?	Remote Area Net?	Local Programming Mode?	Remote Programming Mode?	Programming Mode Off?
Monitor only	Local	Yes	Yes	No	No	No	X	No	X*
	Local Area Network		No	Yes	No	No			
	Remote		No	No	Yes	No			
	Remote Area Network		No	No	No	Yes			
Monitor and Program	Local		Yes	No	No	No	No	Yes	No
	Local Area Network		No	Yes	No	No			
	Remote		No	No	Yes	No			
	Remote Area Network		No	No	No	Yes			

X, X* While monitoring the system using an online connection, choose to enable the Local Programming Mode to perform programming locally or the Programming Mode Off to disable all programming. To perform programming locally choose Yes for the setting represented by X. To disable all programming choose Yes for the setting represented by X*.

Figure 1-1. Settings Required for Monitoring or Programming Using an Online PC Connection

Device	Settings Change Location	
	Remote Control	Programming Mode
Generator Set Controller	Menu 10	Menu 11
ATS Controller	Index 13	Programming Mode Switch
Power Monitor	Menu 8	Menu 9

Figure 1-2. Locations for Changing Remote Control and Programming Mode Settings

1.12 Online PC Connections

A PC can communicate with one or more generator set controllers, automatic transfer switch controllers, and power monitors. These PC connections require the following optional items.

- Remote monitoring and control communications software for the PC.
- A communications module in each device (generator set controller, automatic transfer switch controller, or power monitor).
- Other hardware depending upon the connection type between the devices and the PC.

Contact your authorized distributor/dealer for availability.

Use only Spectrum communications products specified for use with Spectrum products. The manufacturer of Spectrum assumes no responsibility for the use of non-Spectrum communications products.

1.12.1 Local Single Connection

A PC connects directly to an RS-232 port of the communication module installed in a device, such as a generator set controller, with an RS-232 cable when the PC is within 50 ft. (15 m) of the device. See Figure 1-3. For longer connections, the PC connects to an RS-232 to RS-485 port converter within 50 ft. (15 m) of the PC. Then an RS-485 cable can extend up to 4000 ft. (1220 m) from the converter to a device with an installed RS-485 communications module. See Figure 1-4.

1.12.2 Local Area Network (LAN)

A PC connects locally to an RS-485 local area network (LAN) of up to 128 devices with an RS-232 to RS-485 converter. Acceptable devices for the LAN include the Digital Controller, MATS and MATS+ automatic transfer switch controllers, and Digital Power Monitor. See Figure 1-5.

1.12.3 Remote Single Connection

A PC connects to a modem and a single device connects to another modem. The PC communicates to the device using the modems and the telephone network. Locate the PC anywhere a telephone line is available. See Figure 1-6.

1.12.4 Remote Area Network

A PC connects to a modem. Up to 128 devices connect to an RS-485 local area network (LAN) interfaced to another modem using an RS-232 to RS-485 port converter. The PC communicates with the devices using the modems and the telephone network. Locate the PC anywhere a telephone line is available. Acceptable devices for the LAN include the Digital Controller, MATS and MATS+ automatic transfer switch controllers, and Digital Power Monitor. See Figure 1-7.

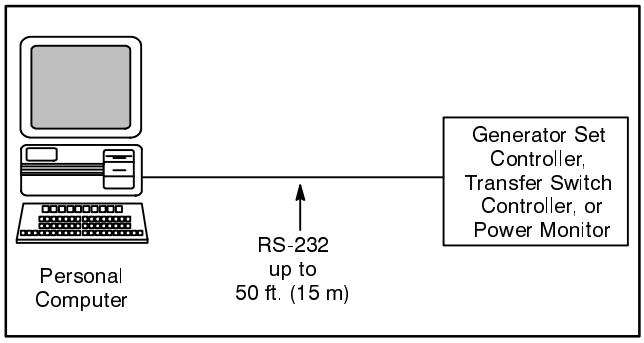


Figure 1-3. Local Single Connection, up to 50 ft. (15 m)

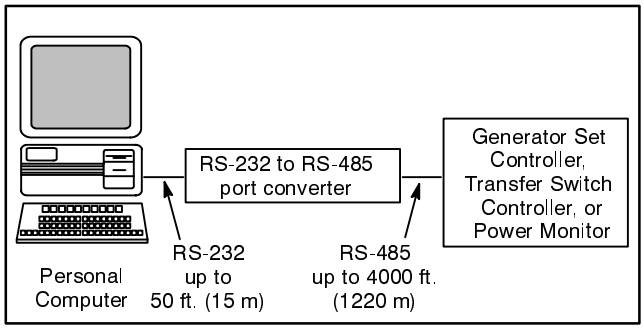


Figure 1-4. Local Single Connection, up to 4000 ft. (1220 m)

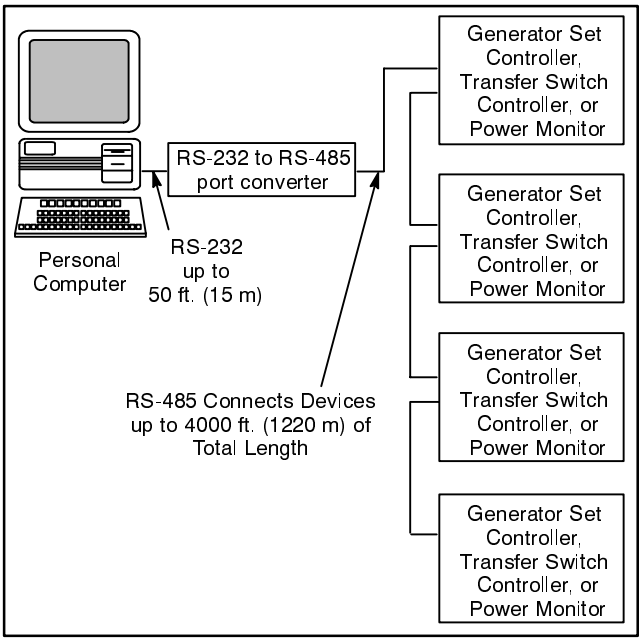


Figure 1-5. Local Area Network

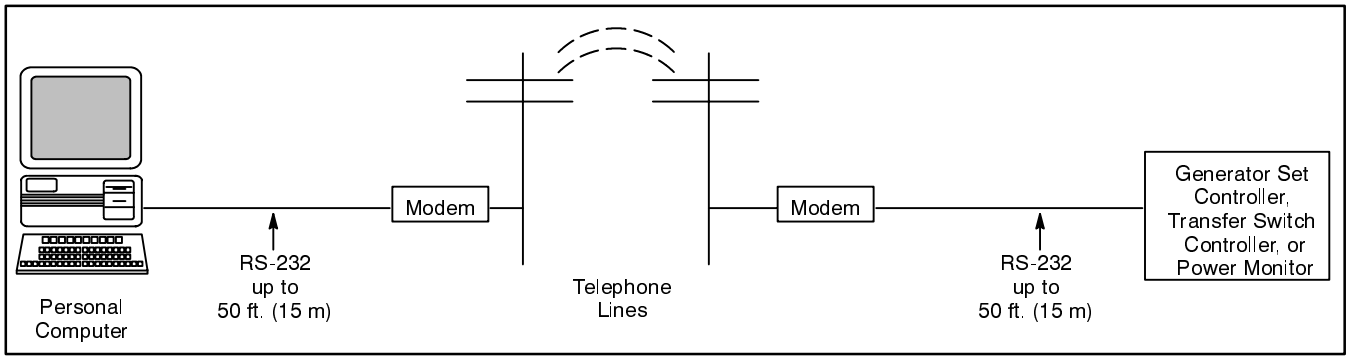


Figure 1-6. Remote Single Connection

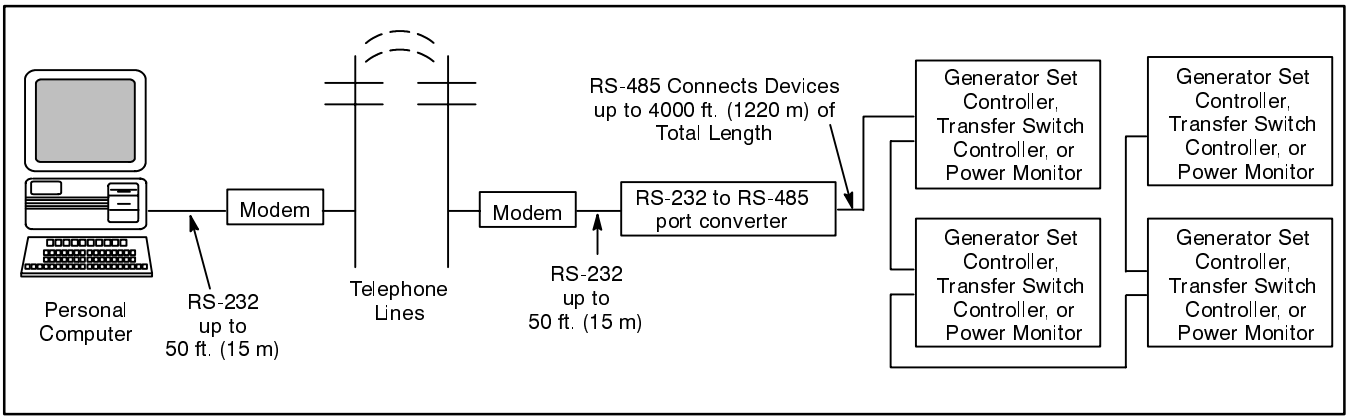


Figure 1-7. Remote Area Network

1.13 Troubleshooting

The computer on which the Monitor software is installed may not run the program because of a memory error. The error looks similar to one of these:

- `Insufficient memory to run application`
- `Not enough memory`

If these errors occur, create a boot disk to use each time you run the Monitor software. Follow the steps below to create a boot floppy disk:

1. Insert a blank disk into the floppy disk drive.
2. Type **format** *drive letter:*/**S**.
   Example format a:/s
   or format b:/s
3. Press <ENTER>.
4. Below are examples of AUTOEXEC.BAT and CONFIG.SYS files that allow the Monitor program to run if they are present on the boot floppy disk. Use a text editor to create these files on the boot floppy disk.

AUTOEXEC.BAT

```
@ECHO OFF
PATH C:\DOS
SET PATH=%PATH%;
PROMPT $P$G
VERIFY OFF
CD MONITOR
SPECTRUM.EXE
```

CONFIG.SYS

```
SHELL=C:\COMMAND.COM C:\ /E:1024 /P
BREAK=OFF
DOS=HIGH,UMB
FILES=60
STACKS=9,256
BUFFERS=40
DEVICEHIGH=C:\DOS\ANSI.SYS
```

5. Use the boot floppy disk to reboot the system each time you run the Monitor software.
6. Remove the disk and label the disk BOOT DISK: MONITOR.

Notes

After starting the Monitor program, the Main Menu appears. See Figure 2-1.

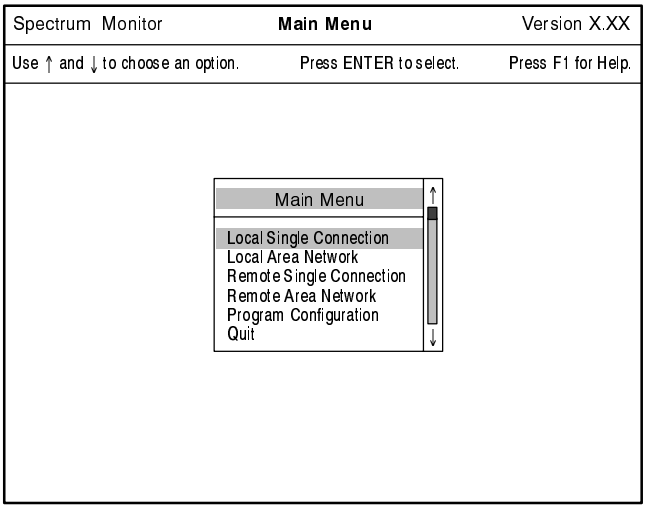


Figure 2-1. Main Menu Screen

The Main Menu allows you to select from the following list of menu options listed in the order shown. Use the up/down arrows to select a menu option. Press <ENTER> to make the selection.

A device or unit means a generator set controller, transfer switch controller, or power monitor compatible with the Monitor software. The options are explained in detail in the following sections.

NOTE

When the software runs for the first time it displays the question, "Are you using a color monitor?" Type Y for yes if the computer has a color display or N for no if the computer has a monochrome display and press <ENTER>. Also, if running the software for the first time, select the Program Configuration option in the Main Menu first and follow the instructions in Section 2.5 for completing the necessary information before accessing other selections.

Main Menu Screen Options

Local Single Connection. Use if the device connects directly to the PC. If the PC cannot establish communications with the device within time periods specified in the Program Configuration screen a communications error results. Press <F10> to clear a communications error and return to the Main Menu. When the software successfully communicates with the device the Data Menu for the device type displays. See Section 3 for a generator set controller Data Menu, Section 4 for a transfer switch controller Data Menu, or Section 5 for the power monitor Data Menu.

Local Area Network. Use if the PC connects directly to an RS-485 communication network of devices. If you select this option the software requests the last address of devices on the network. Type the highest address number used on the network and press <ENTER>. The software then displays the Network Overview screen. See Section 2.1 and Figure 2-2. In this screen you can select the desired device by its network address.

Remote Single Connection. Allows you to use a PC and modem to dial a single device site. This selection displays the Remote Unit Overview screen to edit and enter information into the site database or to dial a single device site. See Figure 2-3.

Remote Area Network. Allows you to use a PC and modem to dial a remote RS-485 network of devices. This choice displays the Remote Network Overview screen to edit and enter information into the remote area network database or to dial into a network site. See Figure 2-4. If you dial into a network site and the software connects successfully to the site, the software displays the Network Overview screen. See Figure 2-2. In this screen you can select the desired device by its network address.

Program Configuration. Allows you to configure the software. If running the software for the first time, enter or change the information here first. See Figure 2-5.

Quit. Ends the program.

2.1 Network Overview Screen

If you selected the Local Area Network option from the Main Menu or the Dial option in the Remote Network Overview screen and the software called the remote site and made a successful connection with the selected network, the software displays the Network Overview screen. This screen displays a set of records that identify and provide status information about the individual devices the operator can monitor and control using the software. See Figure 2-2.

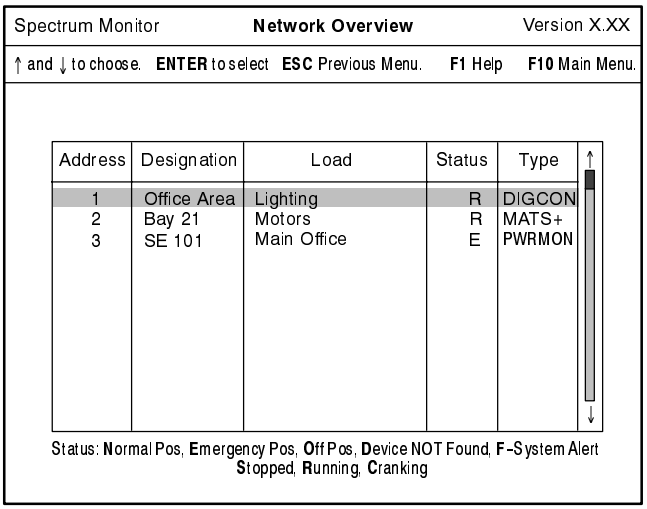


Figure 2-2. Network Overview Screen

Network Overview Screen Key Functions

Key	Screen	Function
↑, ↓, PgUp, PgDn, Home, End	to choose	Moves the cursor up or down to choose a device
ENTER	to select	Displays the Data Menu for the chosen device
ESC	Previous Menu	Returns to the previous menu or screen
F1	Help	Displays the help screen
F10	Main Menu	Returns to the Main Menu

Network Overview Record Fields

Address. Each device must have a unique address, a number from 1-128, for the network to function properly. Enter the address at the device's local display and keypad under Remote Control (Menu 10 on a Digital Controller generator set controller, Index 13 on a MATS or MATS+ transfer switch controller, or Menu 8 on a Digital power monitor).

Designation & Load. Displays the entries made on the Information Setup screen. Go to the device's Data Menu and select the Information Setup Screen to modify these settings.

Status. The following status codes reflect the status of the device or connected system:

N	The transfer switch is in the normal position
E	The transfer switch is in the emergency position
O	The transfer switch is in the off position
D	No device found
F	A system alert exists for the device
S	The generator set is stopped
R	The generator set is running
C	The generator set is cranking

Type. A code for the type of device: DIGCON (Generator Set Controller), MATS or MATS+ (Automatic Transfer Switch Controller), or PWRMON (Power Monitor).

Move the cursor up or down to choose the device to connect to. Press <ENTER> to go to the Data Menu to communicate with that device.

2.2 Remote Single Connection

If you selected the Remote Single Connection option on the Main Menu, the software responds with the Remote Unit Overview screen. This screen displays a list of individual device sites the operator can monitor and control using the software. See Figure 2-3.

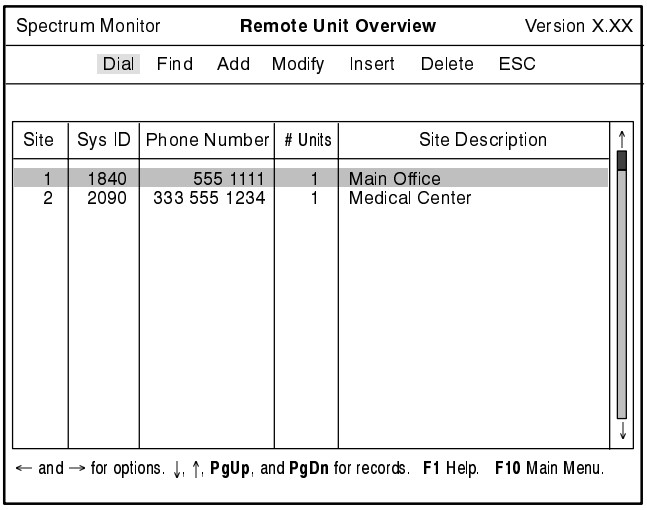


Figure 2-3. Remote Unit Overview

Remote Unit Overview Screen Key Functions

Key	Screen	Function
↑, ↓, PgUp, PgDn, Home, End	for records	Moves the cursor up or down to choose a Remote Unit Overview device site record
← or →	for options	Move to select a menu option or to edit records
ENTER		Performs the menu option selected
ESC	to cancel	Returns to the previous menu or screen
F1	Help	Displays the help screen
F10	Main Menu	Returns to the Main Menu

Remote Unit Overview Record Fields

Site. The number of the device site. The software can list up to 128 separate sites.

Sys ID. The System ID number is a password for remote access. Enter this number at the device's local display and keypad under Remote Control (Menu 10 on a Digital Controller generator set controller, Index 13 on a MATS or MATS+ transfer switch controller, or Menu 8 on a Digital power monitor). The Sys ID of each device and the one entered on the screen must match.

Phone Number. The telephone number for the device site. If the telephone line service includes call waiting, prefix the phone number with **70* for tone dialing or *1170* for pulse dialing when entering telephone numbers into records. The prefix disables call waiting for the duration of the call. If call waiting is not disabled, an incoming call disconnects the modem from the device. Consult the local telephone company to verify that the above dialing prefixes are correct.

 # Units. This field will always be 1 for a Remote Single Connection (Remote Unit Overview screen).

Site Description. A description of the device's location, loads, etc.

Use the arrow keys to move the cursor up or down to highlight a specific record. Use the left and right arrow keys to highlight a menu option and press <ENTER> to perform the highlighted operation:

- ***Dial.*** Call the device site using the phone number in the highlighted record. The software displays the Data Menu for the device if it establishes a connection.
- ***Find.*** Enter a Sys ID number to send the cursor to the device site record with that Sys ID.
- ***Add.*** Sends the cursor to the end of the record list where information about a new device site can be added. Type the information into each field and press <ENTER> to move to the next field.
- ***Modify.*** Edits the highlighted record. Type the changes to the record's fields and press <ENTER> to move to the next field.
- ***Insert.*** Inserts a new record before the highlighted record. Type the information into each field and press <ENTER> to move to the next field. The difference between **Insert** and **Add** is that **Add** always puts the record at the end of the list.
- ***Delete.*** Deletes the highlighted record. The software requests confirmation that you want to delete the record.
- ***Esc*** returns to the Main Menu.

2.3 Remote Area Network

If you selected the Remote Area Network option on the Main Menu, the software responds with the Remote Network Overview screen which displays a list of network sites which may be monitored using the software. See Figure 2-4.

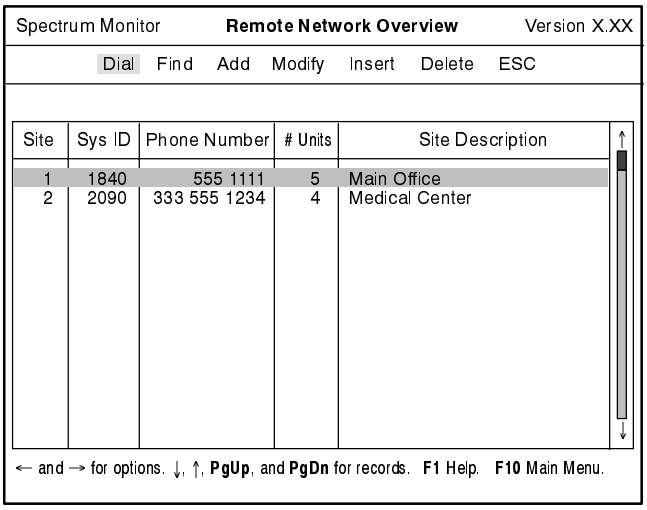


Figure 2-4. Remote Network Overview

Remote Network Overview Screen Key Functions

Key	Screen	Function
↑, ↓, PgUp, PgDn, Home, End	for records	Moves the cursor up or down to choose a Remote Network Overview network site record
← or →	for options	Move to select a menu option or to edit records
ENTER		Performs the menu option selected
ESC	to cancel	Returns to the previous menu or screen
F1	Help	Displays the help screen
F10	Main Menu	Returns to the Main Menu

Remote Network Overview Record Fields

Site. The number of the network site. The software can list up to 128 separate sites.

Sys ID. The System ID number is a password for remote access. Enter this number at the device's local display and keypad under Remote Control (Menu 10 on a Digital Controller generator set controller, Index 13 on a MATS or MATS+ transfer switch controller, or Menu 8 on a Digital power monitor). The Sys ID of each device and the one entered on this screen must match.

Phone Number. The telephone number for the network site. If the telephone line service includes call waiting, prefix the phone number with **70* for tone dialing, or *1170* for pulse dialing when entering telephone numbers into records. The prefix disables call waiting for the duration of the call. If call waiting is not disabled, an incoming call disconnects the modem from the network. Consult the local telephone company to verify that the above dialing prefixes are correct.

 # Units. The number of devices at the network site.

Site Description. A description of the network's location, loads, etc.

Use the arrow keys to move the cursor up and down to highlight a specific record. Use the left and right arrow keys to highlight a menu option and press <ENTER> to perform the highlighted operation:

- ***Dial.*** Calls the network site using the phone number in the highlighted record. A successful call results in the software displaying a Network Overview screen for the network. See Section 2.4 for details.
- ***Find.*** Enter a Sys ID number to send the cursor to the device site record with that Sys ID.
- ***Add.*** Sends the cursor to the end of the record list where information about a new network site can be added. Type new information into each field and press <ENTER> to move to the next field.
- ***Modify.*** Edits the highlighted record. Type the changes to the record's fields and press <ENTER> to move to the next field.
- ***Insert.*** Inserts a new record before the highlighted record. Type the information into each field and press <ENTER> to move to the next field. The difference between **Insert** and **Add** is that **Add** always puts the record at the end of the list.
- ***Delete.*** Deletes the highlighted record. The software requests confirmation that you want to delete the record.
- ***Esc*** returns to the Main Menu

2.5 Program Configuration

Use the Program Configuration screen to configure the Monitor software. If setting up the software for remote communications for the first time, enter information in this menu before proceeding. See Figure 2-5.

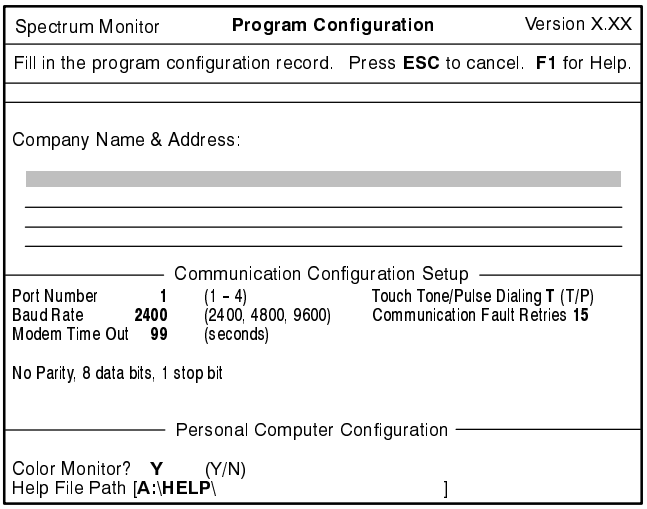


Figure 2-5. Program Configuration Screen

Entering Configuration Changes. You can change all settings or only change specific items.

- **All.** Software automatically starts with Company Name and Address. Fill in the information required and press the <ENTER> key to enter the changes and move to the next item. Repeat the process for all remaining fields. If you have made changes and pressed <ENTER> after the last item, the software displays the options under After Making Changes (below).
- **Specific Items.** Use the up and down arrow keys to select a specific item to change, make your changes, and press <ENTER> to enter the change.

After Making Changes. Press <ESC>. If you have changed the program configuration settings, the screen displays three menu options:

- ***Save*** to store configuration settings and return to the Main Menu
- ***Cancel*** to return to the Main Menu without changing any settings
- ***Modify*** to change settings

Select one and press <ENTER>.

NOTE

To save any changes at the Main Menu select Quit and press <ENTER> to restart the software.

Program Configuration Screen Options

Company Name & Address. Type your company name, operator name and any information required to appear on printed reports (optional).

Port Number. Type the COM port number 1-4 for the PC's RS-232 serial port connected to devices the software is to communicate with.

Touch Tone/Pulse Dialing. Type **T** for Tone dialing or **P** for Pulse dialing.

Baud Rate. Type the baud rate used, 2400, 4800, or 9600 BPS (bits per second). The baud rate must match the baud rate setting for every device you want the software to communicate with. Enter this parameter at the device's local display and keypad under Remote Control (Menu 10 on a Digital Controller generator set controller, Index 13 on a MATS or MATS+ transfer switch controller, or Menu 8 on a Digital power monitor).

Communication Fault Retries. Type in the number of communication fault retries (from 1 to 99, 15 recommended), the number of times the PC attempts to connect with the selected device before displaying a communication error.

Modem Time Out. Type in the maximum number of seconds, from 1 to 99, that the modem takes in attempting to connect before displaying a communication error. A modem time out of 99 seconds is recommended.

Color Monitor. Type **Y** (Yes) if you have a color display or **N** (No) if you have a monochrome display.

Help File Path. Type the drive/path name for the help files. If you have installed the program and help files on the hard disk as shown in this manual, type [C:\MONITOR\HELP\].

Notes

3.1 Data Menu Screen Selections

The software displays the generator set controller Data Menu screen when it establishes communications with the Digital Controller. See Figure 3-1.

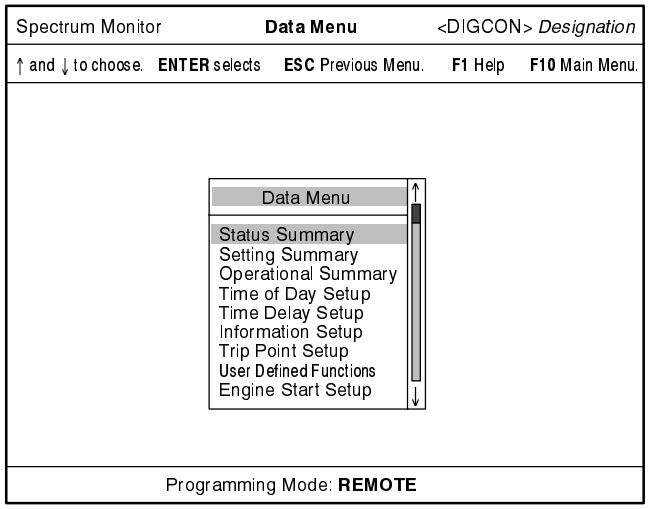


Figure 3-1. Digital Controller Data Menu Screen

The Data Menu screen and other screens described in this section have <DIGCON> *Designation* in the upper right-hand corner. Enter the *designation*, an optional descriptive name for the device, on the Information Setup screen. See Section 3.8. These identifiers allow you to know the type of device and its designation the screen displays.

Figure 3-2 lists the selections that appear on the Data Menu screen. The software also displays the current programming mode at the bottom of the screen. If the generator set is not in the REMOTE programming mode (OFF or LOCAL), the Data Menu screen displays the summary screen and user-defined functions selections only.

Menu Item	Figure	Section
Status Summary	Figure 3-3	3.3
Setting Summary	Figure 3-5	3.4
Operational Summary	Figure 3-6	3.5
Time of Day Setup	Figure 3-7	3.6
Time Delay Setup	Figure 3-8	3.7
Information Setup	Figure 3-9	3.8
Trip Point Setup	Figure 3-10	3.9
User Defined Functions	Figure 3-11	3.10
Engine Start Setup	Figure 3-13	3.11

Figure 3-2. Digital Controller Data Menu Selections

Summary screens display generator set conditions and settings but do not allow programming. Use the setup screens to program the controller's various settings and functions.

Although you enter data in the setup screens, all data is transferred to the controller upon update and stored in its memory. See the generator set controller operation and installation manual for factory default values.

Use the up arrow ↑ or down arrow ↓ key to highlight the desired menu selection and press <ENTER> to procede to that screen. Press the <ESC> key to return to the Data Menu.

Regular updates occur to screen information. The COM port baud rate determines the update frequency.

3.2 Printing Options

Press <F9> in the summary and setting screens to get the print options menu. Use the up and down arrow keys to select from the following options.

- ***Print to Printer*** prints a hard-copy report of the current screen to the printer the system designates as LPT1.
- ***Save Report to a File*** asks to provide a name for a file and saves the current screen report to the file.
- ***Review Report*** provides a print preview of a screen report.

3.3 Status Summary Screen

The Status Summary screen displays a summary of the current status of the generator set. See Figure 3-3.

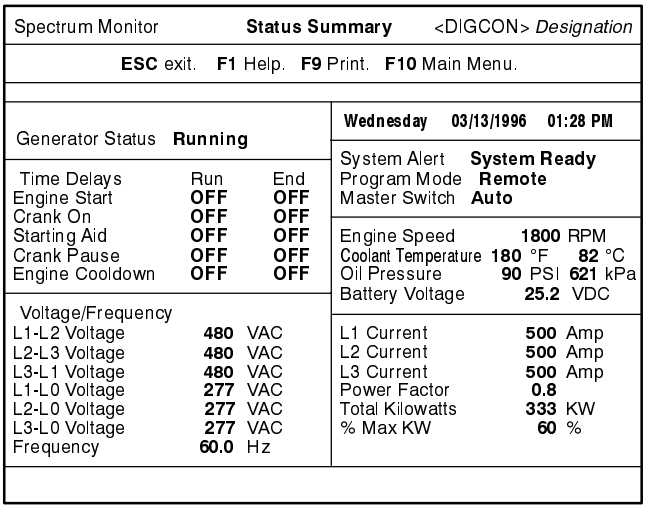


Figure 3-3. Status Summary Screen

Time Delay	Indication
Run ON	Delay is timing
End ON	Delay has completed timing
Run OFF	Delay has not begun timing or run time has completed
End OFF	Delay has not begun timing or time delay is running

Figure 3-4. Time Delays

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Status Summary Screen Information

Generator Status Shows the generator set status: Running, Stopped, or Cranking.

Time Delays Set time delay options on the Time Delay Setup screen. See Figure 3-8.

AC Voltage and Frequency Displays voltage and frequency readings for AC power.

Engine Start The time delay from the remote start contacts closing to the engine start sequence beginning. The engine start time delay is active only when the generator set has been started using automatic remote start.

Crank On The engine cranking on time

AC Voltage and Frequency (continued)

Starting Aid The engine starting aid time delay

Crank Pause The engine cyclic cranking off time

Engine Cooldown The time delay from the remote start contacts opening to the engine stopping

Voltage The voltage on each generator set AC phase L1-L2, L2-L3, L3-L1, L1-L0, L2-L0, and L3-L0

Frequency The generator set running frequency in hertz (Hz.)

Time Displays the current time at the generator set controller's location.

Day of week

Date Month/Day/Year

Time of day Hours:Minutes AM/PM

System Alert Shows the operating mode of the unit. The message displayed can be any of the common faults plus the following messages. See Section 3.10—User Defined Functions for a list of common faults. See the generator set controller operation and installation manual for more information.

Overvoltage L1-L2	**Undervoltage L2-L3**
Overvoltage L2-L3	**Undervoltage L3-L1**
Overvoltage L3-L1	**Undervoltage L1-L0**
Overvoltage L1-L0	**Undervoltage L2-L0**
Overvoltage L2-L0	**Undervoltage L3-L0**
Overvoltage L3-L0	**Master Switch Open**
Undervoltage L1-L2	**Power-Down Error**

Program Mode Shows the current programming mode: Local, Off, or Remote.

Master Switch Shows the master switch position: RUN, OFF/RESET, or AUTO.

Engine Operating Conditions

Engine Speed The engine speed in RPM

Coolant Temperature The engine coolant temperature in degrees Fahrenheit and Celsius

Oil Pressure The engine oil pressure in PSI and kPa

Battery Voltage The voltage of the starting battery(ies)

AC Current and Power Displays current and power readings for AC power.

L1, L2, L3 Current The amperage readings for Line1, Line 2, and Line 3

Power Factor The power factor

Total Kilowatts The total generator load in kilowatts

% of Max KW The current kW loading on the generator divided by the kW rating

3.4 Setting Summary Screen

The Setting Summary screen displays the current settings for the generator set. See Figure 3-5.

Spectrum Monitor **Setting Summary** <DIGCON> *Designation*

ESC exit. **F1** Help. **F9** Print. **F10** Main Menu.

Wednesday 03/13/1996 01:28 PM

Trip Points		
Overvoltage	**112** %	**537** VAC
Undervoltage	**94** %	**451** VAC
Over Frequency	**140** %	**84.0** Hz
Under Frequency	**94** %	**56.4** Hz
Over Speed	**2100** RPM	**70** Hz
Low Battery Voltage		**23.4** VDC
High Battery Voltage		**29.8** VDC

Generator Information		
System Voltage	**480**	VAC
System Frequency	**60**	Hz
Single/Three Phase	**3**	WYE
KW Rating	**1200**	
Battery Voltage	**24**	VDC
Network Address	**3**	
Load	**Test load bank no. 1**	
Location	**No. side of bldg. 32**	

Time Delays	MN:SC
Engine Start	**00:15**
Crank On	**00:01**
Crank Pause	**00:04**
Number of Crank Cycles	**2**
Engine Cooldown	**00:00**
Overvoltage	**00:02**
Undervoltage	**00:05**
Starting Aid	**00:08**

	Inhibit	Delay
Auxiliary 1	**00:00**	**00:00**
Auxiliary 2	**00:00**	**00:00**
Auxiliary 3	**00:00**	**00:00**
Auxiliary 4	**00:00**	**00:00**

Model No.	**000**	Serial Number	**000000**
Spec No.	**000**	Control Serial Number	**C000000**

Figure 3-5. Setting Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setting Summary Screen Information

Trip Points Trip points are the settings at which the unit shuts down or displays a fault condition. See the generator set controller operation and installation manual for details on fault diagnostics.

Overvoltage The percent of system voltage that causes the unit to shut down after the preset time delay. Enter the overvoltage percent on the Trip Point Setup screen. See Figure 3-10. Enter the time delay on the Time Delay Setup screen. See Figure 3-8.

Undervoltage The percent of system voltage that causes the unit to shut down after the preset time delay. Enter the undervoltage percent on the Trip Point Setup screen. See Figure 3-10. Enter the time delay on the Time Delay Setup screen. See Figure 3-8.

Over Frequency The percent of system frequency that causes the unit to shut down after ten seconds. Enter the overfrequency percent on the Trip Point Setup screen. See Figure 3-10.

Under Frequency The percent of system frequency that causes the unit to shut down after ten seconds. Enter the underfrequency percent on the Trip Point Setup screen. See Figure 3-10.

Over Speed The rotational speed in RPM and frequency that shuts the unit down immediately. Enter the overspeed frequency on the Trip Point Setup screen. See Figure 3-10.

Low Battery Voltage The level that battery voltage must be below for more than 10 seconds to cause a low battery voltage warning. Enter the low battery voltage on the Trip Point Setup screen. See Figure 3-10.

High Battery Voltage The level that battery voltage must be above for more than 10 seconds to cause a high battery voltage warning. Enter the high battery voltage on the Trip Point Setup screen. See Figure 3-10.

Setting Summary Screen Information (continued)

Generator Information

System Voltage The generator set voltage shown on the nameplate.

System Frequency The generator set frequency shown on the nameplate.

Single/Three Phase Voltage configuration, single- or three-phase and, if three-phase, the type of connection (delta or wye). Phase and voltage are shown on the nameplate.

KW Rating The generator set standby kilowatt rating shown on the nameplate.

Battery Voltage The battery voltage shown on the nameplate.

Network Address Displays the current address of the unit on an RS-485 network. Set at the local display and keypad.

Load An optional description of the connected load, such as total building, HVAC motors, etc., entered on the Information Setup screen. See Figure 3-9.

Location An optional description of the generator set's physical location entered on the Information Setup screen. See Figure 3-9.

Model No. The generator set model number shown on the nameplate.

Spec No. The generator set specification number shown on the nameplate.

Serial Number The generator set serial number shown on the nameplate.

Control Serial Number The generator set controller serial number.

Time Displays the current time at the generator set controller's location.

Day of week

Date Month/Day/Year

Time of day Hours:Minutes AM/PM

Time Delays Time delays are the time in minutes and seconds that will cause the unit to shut down or display a fault condition.

Engine Start The engine start time delay. The engine start time delay is active only when the generator set has been started from a remote location.

Crank On The engine cranking on time

Crank Pause The engine cyclic cranking rest time

Number of Crank Cycles The number of engine crank cycles before shutdown

Engine Cooldown The engine cooldown time delay

Overvoltage The overvoltage time delay

Undervoltage The undervoltage time delay

Starting Aid The engine starting aid time delay. It allows adjustments to the starting aid RDO on time before engine cranking.

Auxiliary 1, 2, 3, 4

Inhibit The time in minutes:seconds after engine starting before the respective auxiliary 1, 2, 3, 4 inputs is checked.

Delay The time in minutes:seconds after a sensor signal is received before a shutdown or warning occurs for auxiliary 1, 2, 3, 4.

3.5 Operational Summary Screen

The Operational Summary screen displays information about the generator set operation. See Figure 3-6.

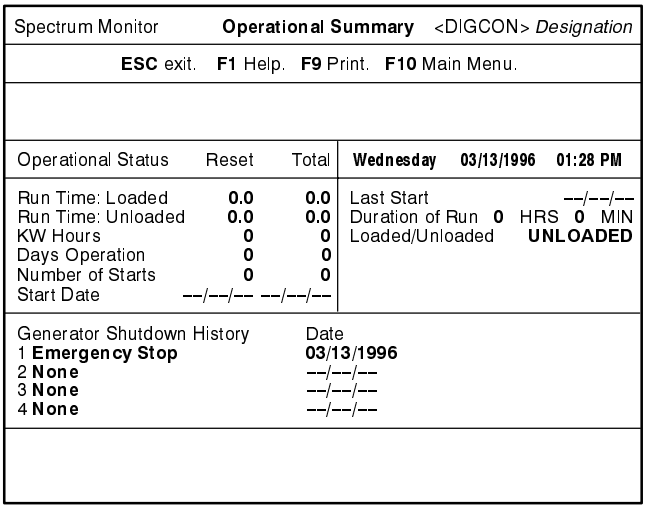


Figure 3-6. Operational Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Operational Summary Screen Information

Operational Status: Reset and Total

The reset column displays information about generator set operation since the last time the record was reset. The reset can only be performed at the controller.

The total column displays generator set operation record totals since the initial installation of the generator set and/or controller.

Run Time: **Loaded** The running time of the generator set with a load

Run Time: Unloaded The running time of the generator set without a load

KW Hours The number of kilowatt hours on the generator set

Days Operation The number of days the generator set has been in operation

Number of Starts The number of successful starts for the generator set

Start Date The last record-reset date and the date that the controller was installed.

Time Displays the current time at the generator set controller location.

Day of week

Date Month/Day/Year

Time of day Hours:Minutes AM/PM

Generator Shutdown History Displays a history of the four most recent generator set shutdowns and the date on which they occurred.

Last Start The time and date the generator set was last successfully started.

Duration of Run The time in hours:minutes that the generator set last ran.

Loaded/**Unloaded** Whether the last run time was with or without a load.

3.6 Time of Day Setup Screen

Use the Time of Day Setup screen to set the current time and date at the generator set controller's location. See Figure 3-7.

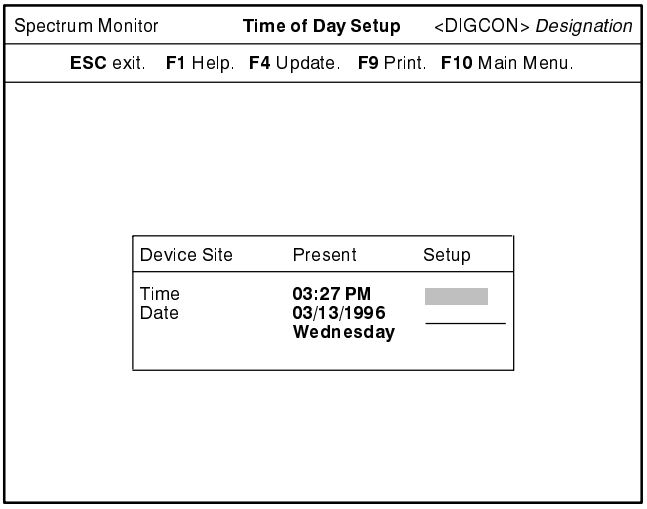


Figure 3-7. Time of Day Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

NOTE

If setting the time for a generator set controller located in a different time zone, enter the time to match the time zone at the generator set controller's location.

Time of Day Setup Screen Information

Time The time at the generator set controller's location, format HR:MN AM or HR:MN PM

Date The date at the generator set controller's location, format MO/DY/YEAR. The software automatically calculates the day of the week from the date upon update and displays it under the date.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes in the setup column; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

3.7 Time Delay Setup Screen

Use the Time Delay Setup screen to set time delays in minutes:seconds for various functions. See Figure 3-8.

Spectrum Monitor **Time Delay Setup** <DIGCON> *Designation*

ESC exit. **F1** Help. **F4** Update. **F9** Print. **F10** Main Menu.

		Present	Setup	Limits
Engine Start		00:15	00:15	00:00-05:00
Crank On		00:15	**00:01**	00:01-00:45
Crank Pause		00:15	**00:04**	00:01-01:00
Number of Crank Cycles		2	**2**	1-6
Engine Cooldown		00:00	**00:00**	00:00-10:00
Overvoltage		00:02	**00:02**	00:02-00:10
Undervoltage		00:05	**00:05**	00:05-00:30
Starting Aid		00:08	**00:08**	00:00-00:10
Auxiliary 1	Inhibit	00:00	**00:00**	00:00-01:00
	Delay	00:00	**00:00**	00:00-01:00
Auxiliary 2	Inhibit	00:00	**00:00**	00:00-01:00
	Delay	00:00	**00:00**	00:00-01:00
Auxiliary 3	Inhibit	00:00	**00:00**	00:00-01:00
	Delay	00:00	**00:00**	00:00-01:00
Auxiliary 4	Inhibit	00:00	**00:00**	00:00-01:00
	Delay	00:00	**00:00**	00:00-01:00

Figure 3-8. Time Delay Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

Time Delay Setup Screen Information

Engine Start The time delay between the remote start contacts closing and the engine start sequence beginning

Crank On The engine cranking-on time

Crank Pause The engine cyclic cranking rest time

Number of Crank Cycles The number of engine crank cycles before overcrank shutdown

Engine Cooldown The time delay between the remote start contacts opening and the engine stop sequence

Overvoltage The time delay before a fault if an overvoltage condition exists

Undervoltage The time delay before a fault if an undervoltage condition exists

Starting Aid The engine starting aid time delay. It allows adjustment to the starting aid RDO on time before engine cranking.

Auxiliary 1, 2, 3, 4

Inhibit The time after engine starting before the respective auxiliary 1, 2, 3, 4 inputs is checked.

Delay The time after a sensor signal is received before shutdown or warning occurs for auxiliary 1, 2, 3, 4.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

3.8 Information Setup Screen

Use the Information Setup screen to enter generator set information. This information is normally entered only at time of system installation and/or initial startup. See Figure 3-9.

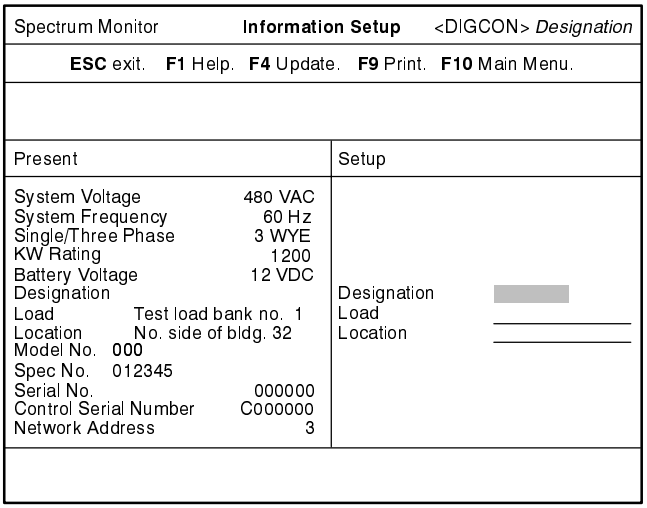


Figure 3-9. Information Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Information Setup Screen Information

System Voltage The generator set voltage shown on the nameplate. This setting is factory set.

System Frequency The generator set frequency shown on the nameplate. This setting is factory set.

Single/Three Phase Voltage configuration, single- or three-phase and, if three-phase, the type of connection (delta or wye). Phase and voltage are shown on the nameplate. This setting is factory set.

KW Rating The generator set kilowatt rating shown on the nameplate. This setting is factory set.

Battery Voltage The battery voltage shown on the nameplate. This setting is factory set.

Designation An optional entry of a unique name describing location, function, etc. You can enter a name of up to 9 characters.

Load An optional description of connected load, such as total building, HVAC, motors, etc. You can enter a description of up to 20 characters.

Location An optional description of the generator set's physical location. You can enter a description of up to 20 characters.

Model No. The generator set model number shown on the nameplate.

Spec No. The generator set specification number shown on the nameplate.

Serial No. The generator set serial number shown on the nameplate.

Control Serial Number The generator set controller serial number.

Network Address The current address of the unit on an RS-485 network. Set at the local display and keypad.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes, press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

3.9 Trip Point Setup Screen

Use the Trip Point Setup screen to enter the settings at which the unit shuts down or displays a fault condition. See Figure 3-10.

Spectrum Monitor **Trip Point Setup** <DIGCON> *Designation*

ESC exit. **F1** Help. **F4** Update. **F9** Print. **F10** Main Menu.

	Present	Setup	Limits
Overvoltage	112 % 537 VAC	**112** % 537 VAC	105–135%
Undervoltage	94 % 451 VAC	**94** % 451 VAC	70–95%
Over Frequency	140 % 84.0 Hz	**140** % 84.0 Hz	102–140%
Under Frequency	94 % 56.4 Hz	**94** % 56.4 Hz	80-98%
Over Speed	70 Hz 2100 RPM	**70** Hz 2100 RPM	65-70 Hz on 60 Hz 55-70 Hz on 50 Hz
Low Battery Voltage	23.4 VDC	23.4 VDC	10.0-12.5 VDC (12V) 20.0-25.0 VDC (24V)
High Battery Voltage	29.8 VDC	29.8 VDC	14.5-16.5 VDC (12V) 29.0-33.0 VDC (24V)

Figure 3-10. Trip Point Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

Information Setup Screen Information

Overvoltage The percent of system voltage that shuts down the unit.

Undervoltage The percent of system voltage that shuts down the unit.

Over Frequency The percent over nominal frequency for more than 10 seconds that causes the unit to shut down.

Under Frequency The percent under nominal frequency for more than 10 seconds that causes the unit to shut down.

Over Speed The speed that shuts the unit down immediately.

Low Battery Voltage The level the battery voltage must drop below for more than 10 seconds to cause a low battery voltage warning.

High Battery Voltage The level the battery voltage must rise above for more than 10 seconds to cause a high battery voltage warning.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes; press <ENTER> or the down arrow key to procede to the next line. Press <F4> to update the record and store the changes.

3.10 User Defined Functions Screen

Use the User Defined Functions screen to change the names and functions of auxiliary 1-4, associate functions with relay driver outputs, and select conditions that trigger a defined common fault. See Figure 3-11.

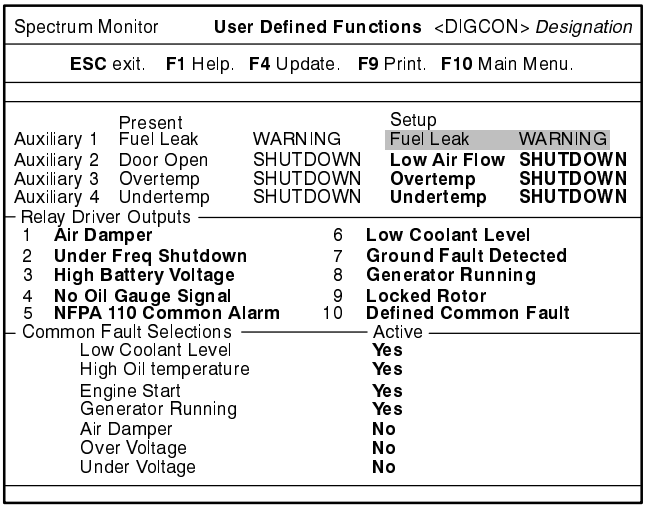


Figure 3-11. User Defined Functions Screen

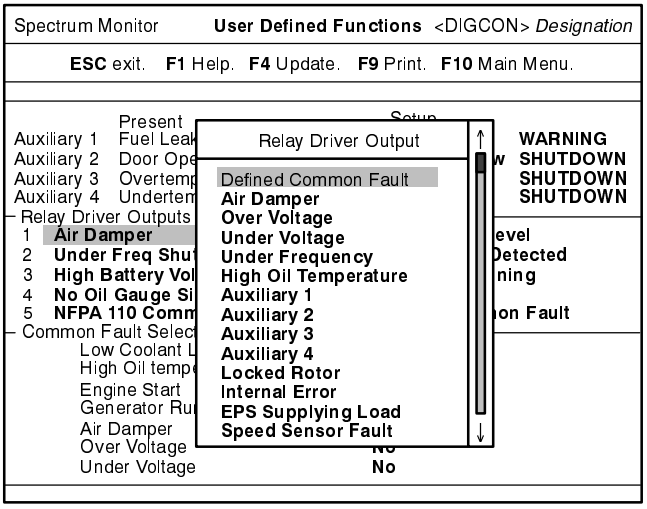


Figure 3-12. Relay Driver Output Popup Menu

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

User Defined Functions Screen Information

Auxiliary 1, 2, 3, 4 Program the identifying name that causes a warning or shutdown on auxiliary 1, 2, 3, or 4. Type the new name and press <ENTER> to move to the next column. Type W to program a WARNING or S to program a SHUTDOWN.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Relay Driver Outputs Relay Driver Outputs identify a signal source for each of the ten relay driver outputs. Highlight one of the relay driver outputs 1-10 on the User Defined Functions screen and press <ENTER> to display the Relay Driver Output popup menu. See Figure 3-12. In the Relay Driver Output popup menu, use the up/down arrow keys to scroll through the following list of signal sources:

Defined Common Fault	Load Shed
Air Damper	KW Overload
Over Voltage	Under Freq[uency] Warning
Under Voltage	High Battery Voltage
Under Freq[uency] Shutdown	No Temp[erature] Gauge Signal
Low Coolant Level	No Oil Gauge Signal
High Oil Temperature	Ground Fault Detected
Auxiliary 1	Over Current
Auxiliary 2	Engine Cooldown
Auxiliary 3	Engine Start
Auxiliary 4	Generator Running
Locked Rotor	NFPA 110 Common Alarm
Internal Error	Starting Aid
EPS Supplying Load	Weak Battery
Speed Sensor Fault	Low AC Output
	Over Frequency Shutdown

Press <ENTER> to assign the highlighted option to the relay driver output. Move to the next Relay Driver Output 1-10 on the User Defined Functions screen and press <ENTER> to display the popup menu again. Repeat the process to designate signal sources for all ten relay driver outputs.

User Defined Functions Screen Information (continued)

Common Fault Selections Select conditions that trigger the defined common fault signal. The choices include those signals available for the relay driver outputs listed above plus the following:

Low Oil Pressure	Battery Charger Fault
High Coolant Temp[erature]	Low Fuel
Over Crank	High [Coolant] Temp Warning
Over Speed	Low Oil Press[ure] Warning
Emergency Stop	Load Shed Under Freq[uency]
Not In Auto	Low Coolant Temp[erature]
System Ready	Load Shed Excess KW
Low Battery Voltage	

Use the up and down arrow keys to move through the list. Type **Y** to change to Active—Yes or **N** to change to Active—No. When any of the Active—Yes selections occur, the Defined Common Fault signal becomes active.

After updating the information, the selections designated as Active-Yes appears before any Active-No selections.

Type the changes; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

Pressing the <ESC> key to exit this screen after making changes to the information without updating the changes causes the program to ask whether you want to exit without making the changes. Reply yes or no.

3.11 Engine Start Setup Screen

Use the Engine Start Setup screen to start the generator set and run it for a specified time period. See Figure 3-13.

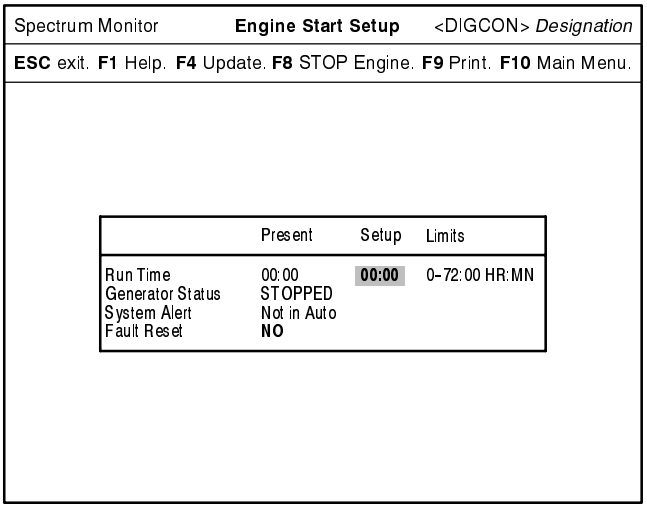


Figure 3-13. Engine Start Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F8	STOP Engine	Stops the exerciser mode
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

NOTE

This screen allows the software operator to start and run a generator set in a location that is not within sight of the operator. Use extreme care when using this feature to prevent accidental starting of the generator set.

Engine Start Setup Screen Information

Run Time Displays the generator set run time.

To set the run time and start the generator set, proceed as follows:

1. Position the cursor in the Run Time row, Setup column.
2. Type the run time in hours:minutes. The generator set stops after the set time expires. Maximum time is 72:00 (72 hours).
3. If a fault exists at the generator set and you want to reset it to run, type **Y** to change the fault reset to Yes.
4. After making the desired choices, press <F4>, confirm with **Y** and press <ENTER> to start the generator set. The time you designate as run time moves from the Setup column to the Present column.

NOTE: Press <F8> to stop the test before the run time completes.

The run time setting returns to 00:00/NO after the exerciser run time is complete.

Generator Status Shows the generator set status: Running, Stopped, or Cranking.

System Alert Shows the current status of the generator set. See Section 3.3 for details.

Fault Reset Displays the fault reset condition. If a fault exists, reset the fault before exercising the generator set.

4.1 Data Menu Screen Selections

The software displays the ATS Data Menu screen when it establishes communications with an automatic transfer switch (ATS) controller. See Figure 4-1.

The screens and menus associated with the MATS and MATS+ transfer switch controls are similar, with the MATS+ having the additional functions associated with programmed transition. For clarity, only the MATS+ is discussed here with the differences noted.

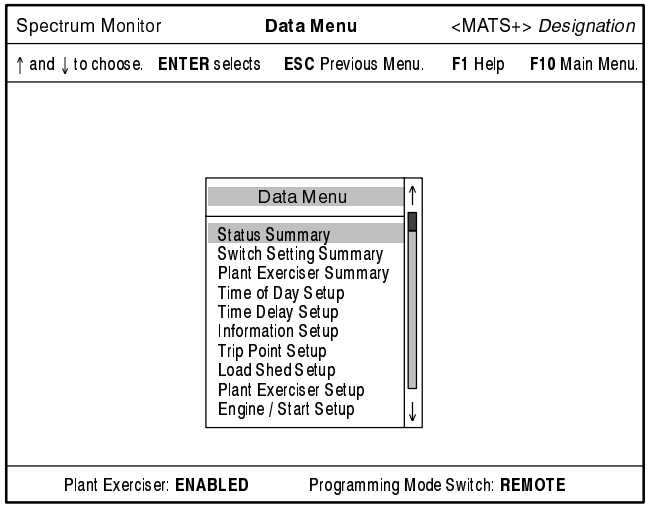


Figure 4-1. ATS Data Menu Screen, MATS+ Shown

The Data Menu screen and other screens described in this section have <MATS+> *Designation* in the upper right-hand corner. Enter the *Designation*, an optional descriptive name for the device, on the Information Setup screen (see Section 4.11). These identifiers allow you to know the type of device and its designation the screen displays. For an MATS transfer switch, the screen actually shows <MATS> *Designation*.

Figure 4-2 lists all the selections that can appear on the Data Menu screen. The software shows the Plant Exerciser mode: ENABLED or DISABLED and the position of the Programming Mode Switch at the bottom of the screen. The position of the Programming Mode Switch determines the current programming mode: REMOTE, OFF, or LOCAL. If the ATS is not in the REMOTE programing mode (OFF or LOCAL), the Data Menu screen displays the summary screen selections only.

The Plant Exerciser mode must be ENABLED in order for the software to show the Plant Exerciser Summary, Plant Exerciser Setup, or Engine Start Setup screens.

Menu Item	Figure	Section
Status Summary	Figure 4-3	4.3
Switch Setting Summary	Figure 4-4	4.4
Plant Exerciser Summary	Figure 4-5	4.5 - 4.8
Time of Day Setup	Figure 4-11	4.9
Time Delay Setup	Figure 4-12	4.10
Information Setup	Figure 4-13	4.11
Trip Point Setup	Figure 4-14	4.12
Load Shed Setup	Figure 4-15	4.13
Plant Exerciser Setup	Figure 4-16	4.14 - 4.17
Engine Start Setup	Figure 4-20	4.18

Figure 4-2. ATS Data Menu Selections

Summary screens display transfer switch conditions and settings but do not allow programming. Use the setup screens to program the controller's various settings and functions.

Although you enter data in the setup screens, all data is transferred to the controller upon update and is stored in its memory. See the ATS controller operation and installation manual for factory default values.

Use the up arrow ↑ or down arrow ↓ key to highlight the desired menu selection and press <ENTER> to proceed to that screen. Press the <ESC> key to return to the Data Menu.

Regular updates occur to screen information. The COM port baud rate determines the update frequency.

4.2 Printing Options

Press <F9> in the summary and setting screens to get the print options menu. Use the up and down arrow keys to select from the following options.

- ***Print to Printer*** prints a hard-copy report of the current screen to the printer the system designates as LPT1.
- ***Save Report to a File*** asks to provide a name for a file and saves the current screen report to the file.
- ***Review Report*** provides a print preview of a screen report.

4.3 Status Summary Screen

See Figure 4-3 for an example of the Status Summary screen.

Spectrum Monitor — **Status Summary** — <MATS+> *Designation*

Switch Position	NORMAL		07/31/1996	Wednesday	08:07 PM
Sources Available	NORMAL	–	System Alert	NONE	
			Program Mode	REMOTE	
			Test Switch	AUTO	

Time Delays	Run	End
Engine Start	OFF	OFF
Normal to Emergency	OFF	OFF
Emergency to Normal	OFF	OFF
Engine Cooldown	OFF	OFF
Off Position	OFF	OFF

Accessories Active	Status
Plant Exerciser	OFF
Load Shed	OFF
In-Phase Monitor	DISABLED
Area Protection	OFF

Operational Status	Reset	Total
Hours-Not In Normal	0	0
Hours-Emer. Source	0	0
Days-Operation	0	0
Switch Transfers	0	0
Start Date	02/08/1996	11/08/1990

Transfer Status	
Exerciser Time Left	0 hrs 0 min
Last Exerciser Date	01/02/1995
Last Outage 11:34 AM	01/15/1995
Duration of Outage	0 hrs 0 min
Auto / Manual Transfer	AUTO

Voltage/Frequency	Normal	Emergency
Phase A-B Voltage	–	–
Phase B-C Voltage	–	–
Phase A-C Voltage	–	–
Phase A-C Frequency	0.0	0.0
Phase Sequence	–	–

Source History	Date
#1 NORMAL UNDER-FREQUENCY	01/15/1996
#2 NORMAL UNDER-FREQUENCY	12/05/1995
#3 NORMAL UNDER-FREQUENCY	09/25/1995
#4 NORMAL UNDER-FREQUENCY	08/12/1995

F1 – Help. **F9** – Print. **F10** – Main Menu. **ESC** – previous menu.

Figure 4-3. Status Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Status Summary Screen Information

Switch Position Position of the transfer switch contactor—NORMAL, EMERGENCY, or OFF. The OFF position applies only to the MATS+ controller.

Source Available Which sources—NORMAL and/or EMERGENCY can accept loads.

Time Delays Time delay indications match the LED indications at the transfer switch. The Off Position delay item displays only for the MATS+ controller.

Run ON Delay is timing.

End ON Delay has completed timing.

Run OFF Delay has not begun timing or run time has completed.

End OFF Delay has not begun timing or time delay is running.

Operational Status The Reset column displays information since the last record reset. The Total column displays information since installation of the transfer switch and/or controller:

Hours—Not in Normal The number of hours that the switch has not been in the Normal position.

Hours—Emer. Source The number of hours that the emergency source has been available.

Days—Operation The number of days that the ATS controller has been in operation.

Switch Transfers The number of times that the switch contactor has operated.

Start Date The date of last record reset and the date of transfer switch or controller installation.

Voltage/Frequency

Voltage(s) Shown for each phase of normal and emergency sources when available. A single-phase source shows voltage on phase A-C.

Frequency Shown for phase A-C of each source, if available.

Phase Sequence Shown for each available source (for 3-phase only).

Status Summary Screen Information (continued)

Time Displays the current time at the ATS controller location. (Time appears across the top of the screen for the MATS controller.)

Date Month/Day/Year

Day of week

Time of day Hours:Minutes AM/PM

Day Occurs # The occurrence number of the day in the current month 1-5 (displays only for the MATS controller.) See Calendar Mode for more explanation.

System Alert

NONE The ATS controller and contactor are working properly.

AUX-SWITCH FAULT A contactor auxiliary switch contact malfunction, wiring, or controller fault.

DBL AUX-SW FAULT A contactor auxiliary switch contact malfunction, showing both normal and emergency contacts closed at the same time or other wiring or controller fault.

TRANSFER HANG The contactor may be binding or not completing a transfer.

POWER DOWN ERROR May indicate a loss of controller settings after a loss of controller power. Recheck settings and reenter as necessary.

RAM ERROR, MEMORY ERROR An ATS controller random access memory fault after controller powerup. The controller may require replacement.

MANUAL TRANSFER Manual transfer is needed when the Auto-Manual selector switch if equipped is in the MANUAL position. Push the MANUAL TRANSFER TO (NORMAL, EMERGENCY, or OFF) push button as necessary.

FAULT #1, FAULT #2 Shows system faults external to the ATS controller. Connection of the two fault-sensing circuits is optional and may be used to annunciate generator set conditions.

Program Mode The programming mode determined by the position of the programming mode switch on the transfer switch front panel—Remote, Off, Or Local.

Test Switch The position of the system test switch and/or the auto-manual switch—AUTO or NOT IN AUTO.

Accessories Active Status The Accessories Active Status matches the Accessory Active LEDs on the ATS controller.

ON The accessory is functioning.

OFF The accessory has completed its function or has not been called upon to function.

DISABLED The enabling shunt on the controller circuit board is not installed. The accessory is not enabled.

Transfer Status.

Exerciser Time Left The generator set running time (hours and minutes) remaining when the generator set is running in plant-exercise or engine start mode.

Last Exerciser Date The date of the most recent plant-exercise run.

Last Outage The time and date of the most recent normal source outage or test using the system test switch.

Duration of Outage The length (hours and minutes) of the most recent normal source outage or test using the system test switch. Outage durations of less than one minute do not show on the screen.

Auto/Manual Transfer The position, AUTO or MANUAL, of the auto-manual transfer mode selector switch.

Source History The source, type, and date of the four most recent source failures. A manual test at the transfer switch records as a source failure.

The following fault messages are displayed for a three-phase electrical system:

PH[ASE] A-B NORMAL OVERVOLTAGE
PH[ASE] B-C NORMAL OVERVOLTAGE
PH[ASE] A-C NORMAL OVERVOLTAGE
PH[ASE] A-B NORMAL UNDERVOLTAGE
PH[ASE] B-C NORMAL UNDERVOLTAGE
PH[ASE] A-C NORMAL UNDERVOLTAGE
NORMAL OVERFREQUENCY
NORMAL UNDERFREQUENCY
NORMAL PHASE LOSS
PH[ASE] A-B EMERGENCY OVERVOLTAGE
PH[ASE] B-C EMERGENCY OVERVOLTAGE
PH[ASE] A-C EMERGENCY OVERVOLTAGE
PH[ASE] A-B EMERGENCY UNDERVOLTAGE
PH[ASE] B-C EMERGENCY UNDERVOLTAGE
PH[ASE] A-C EMERGENCY UNDERVOLTAGE
EMERGENCY OVERFREQUENCY
EMERGENCY UNDERFREQUENCY
EMERGENCY PHASE LOSS

The following fault messages are displayed for a single-phase electrical system:

NORMAL OVERVOLTAGE
NORMAL UNDERVOLTAGE
NORMAL OVERFREQUENCY
NORMAL UNDERFREQUENCY
EMERGENCY OVERVOLTAGE
EMERGENCY UNDERVOLTAGE
EMERGENCY OVERFREQUENCY
EMERGENCY UNDERFREQUENCY

4.4 Switch Setting Summary Screen

See Figure 4-4 for an example of the Switch Setting Summary screen.

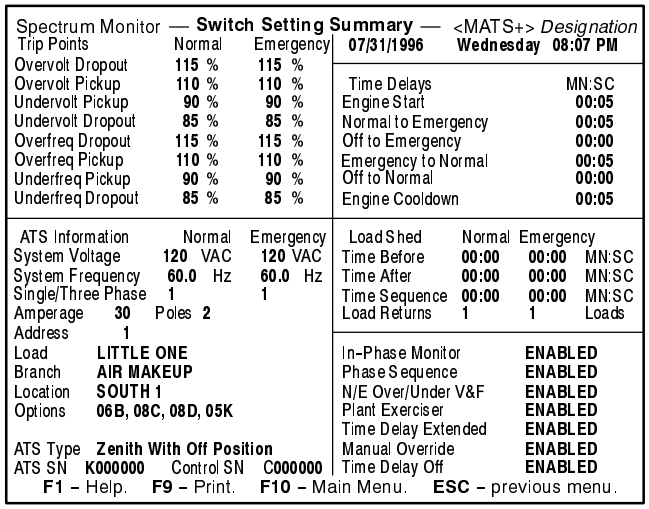


Figure 4-4. Switch Setting Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Switch Setting Summary Screen Information

Trip Points for Normal and Emergency sources:

Overvolt Dropout The percentage of system line-to-line voltage at which source is considered to be unavailable.

Overvolt Pickup The percentage of system line-to-line voltage below which source is available.

Undervolt Pickup The percentage of system line-to-line voltage above which source is available.

Undervolt Dropout The percentage of system line-to-line voltage at which source is unavailable.

Overfreq Dropout The percentage of system frequency above which source is unavailable.

Overfreq Pickup The percentage of system frequency below which source is available.

Underfreq Pickup The percentage of system frequency above which source is available.

Underfreq Dropout The percentage of system frequency below which source is unavailable.

ATS Information for Normal and Emergency sources:

System Voltage The rated line-to-line voltages of both sources. System voltage is factory set.

System Frequency The rated frequencies of both sources. System frequency is factory set.

Single/Three Phase The phase connections of both sources. Single/three phase information is factory set.

Amperage The ampere rating of the transfer switch contactor. Amperage is factory set.

Poles The number of contactor poles (4-pole may also be designated as 3-pole with overlapping neutral). The number of contactor poles is factory set.

Address Displays the current address of the unit if on an RS-485 network. Set at the local display and keypad.

Load An optional general description of the load connected to the transfer switch entered by the installer in Information Setup. See Figure 4-13.

Branch An optional description of the branch circuit connected to the transfer switch entered by the installer in Information Setup. See Figure 4-13.

Location An optional description of the transfer switch's physical location entered by the installer in Information Setup. See Figure 4-13.

Options The catalog numbers of installed options entered at factory. Change entry in Information Setup. See Figure 4-13.

ATS Type The contactor mechanism. Contactor mechanism is factory set and cannot be changed. This item is displayed only for the MATS+ controller.

ATS SN (**ATS Serial Number** is displayed for the MATS controller.) The transfer switch serial number. Number is factory set and cannot be changed.

Control SN (**Control Serial** is displayed for the MATS controller.) The ATS controller serial number. Number is factory set and cannot be changed.

Status Summary Screen Information (continued)

Time Displays the current time at the ATS controller location.

Date Month/Day/Year

Day of week

Time of day Hours:Minutes AM/PM

Day Occurs # The occurrence number of the day in the current month 1-5 (displays only for the MATS controller.) See Calendar Mode for more explanation.

Time Delays The current time delay settings in minutes and seconds (Off to Emergency and Off to Normal time delays are displayed only for the MATS+ controller.)

Load Shed Load shed settings for transfer to the Normal and Emergency sources in minutes and seconds.

Time Before The time delay for the load to be shed before transfer to the new source.

Time After The time delay after transfer to the new source before load return begins.

Time Sequence The elapsed time between load return steps.

Load Returns The number of loads (up to 9) controlled in sequence by relays 1-9.

Optional Functions Displays which features or accessories are ENABLED or DISABLED:

In-Phase Monitor	**Time Delay Extended**
Phase Sequence	**Manual Override**
N/E Over/under V&F	**Time Delay Off (MATS+ Only)**
Plant Exerciser	

4.5 Exerciser Choice Summary Screen

See Figure 4-5 for an example of the Exerciser Choice summary screen. Use this screen to view the plant exerciser schedules.

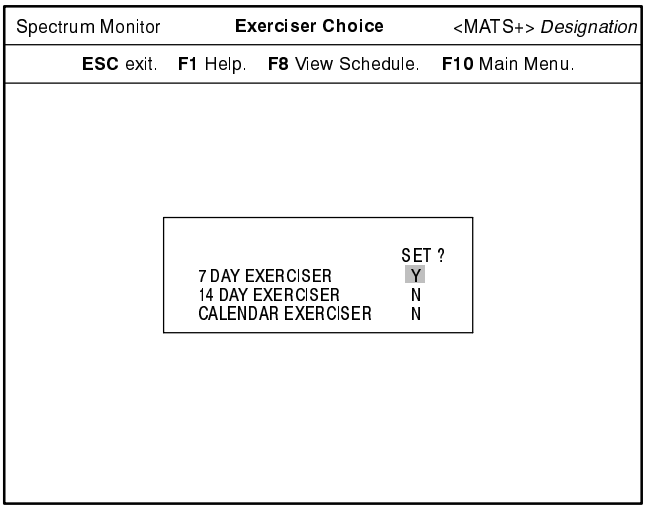


Figure 4-5. Exerciser Choice Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

NOTE

If the Plant Exerciser (program shunt) is not installed in the ATS controller, the exerciser choice screen is not available.

Exerciser Choice Summary Screen Information

7 DAY EXERCISER Type Y (yes) to select the 7-day exerciser schedule for viewing. Press <F8> to view the schedule summary. See Section 4.6 and Figure 4-6 for information about the 7-day exerciser option.

14 DAY EXERCISER Type Y (yes) to select the 14-day exerciser schedule for viewing. Press <F8> to view the schedule summary. See Section 4.6 and Figure 4-7 for information about the 14-day exerciser option.

CALENDAR EXERCISER Type Y (yes) to select the calendar-based exerciser schedule for viewing. Press <F8> to view the schedule summary. See Section 4.6 and Figure 4-10 for information about the calendar exerciser option.

4.6 Seven- and Fourteen-Day Mode Summary Screens

See Figure 4-6 for an example of the 7-Day Mode Summary screen. See Figure 4-7 for an example of the 14-Day Mode Summary screen.

Spectrum Monitor **7 Day Mode Summary** <MATS+> *Designation*

ESC exit. **F1** Help. **F9** Print. **F10** Main Menu.

EXERCISE EVENT	START TIME	DAY OF WEEK 1ST	DAY OF WEEK 2ND	RUN TIME HR:MN	LOAD TRANSFER
#1 ENABLED	07:30 AM	WED	SAT	00:45	NO
#2 ENABLED	09:00 AM	TUE	TUE	00:00	NO
#3 ENABLED	09:00 AM	TUE	TUE	00:00	NO
#4 ENABLED	09:00 AM	TUE	TUE	00:00	NO
#5 ENABLED	09:00 AM	TUE	TUE	00:00	NO

Time **8:00 AM** Day **Sunday** Date **07/14/1996** Day Occurs # **2**

Figure 4-6. 7-Day Mode Summary Screen

Spectrum Monitor **14 Day Mode Summary** <MATS+> *Designation*

ESC exit. **F1** Help. **F9** Print. **F10** Main Menu.

EXERCISE EVENT	START TIME	DAY OF WEEK 1ST	DAY OF WEEK 2ND	WEEK 1 or 2	RUN TIME HR:MN	LOAD TRANSFER
#1 ENABLED	07:30 AM	WED	SAT	2	00:45	NO
#2 ENABLED	09:00 AM	TUE	TUE	1	00:00	NO
#3 ENABLED	09:00 AM	TUE	TUE	1	00:00	NO
#4 ENABLED	09:00 AM	TUE	TUE	1	00:00	NO
#5 ENABLED	09:00 AM	TUE	TUE	1	00:00	NO

Time **8:00 AM** Day **Sunday** Date **07/14/1996** Week **2**

Figure 4-7. 14-Day Mode Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

7-Day and 14-Day Summary Screen Information

EXERCISE EVENT The number of the exercise event and whether the event is ENABLED or DISABLED.

START TIME The scheduled start time for each event's pair of exercise runs.

DAY OF WEEK, 1ST The day for the event's first exercise run.

DAY OF WEEK, 2ND The day for the event's second exercise run. If the days are the same, the event contains only one exercise run.

WEEK 1 OR 2 The week of the 14-day period for the exercise event (14-Day Mode only).

RUN TIME HR:MN The hours and minutes of the event's exercise runs.

LOAD TRANSFER Indicates whether the controller exercises the generator set under a load or not. YES indicates that the Load-No Load selector switch (accessory 23-G if equipped) is in the LOAD position and the controller exercises the plant under a load. NO indicates that the switch is in the NO LOAD position or the accessory is not installed and the controller exercises the plant under no load. The Load-No Load selector switch mounts inside the ATS door when equipped. Also, a hardware jumper installed on the ATS controller indicates the presence of this accessory.

Time and Date Information The software displays the following information at the bottom the screen:

Time Time of day in hours:minutes AM/PM

Day Day of week

Date Month/Day/Year

Day Occurs # The occurrence number of the day in the current month 1-5 (7-day Mode only). See Calendar Mode for more explanation.

Week Week number 1 or 2 of schedule (14-day Mode only)

4.7 Calendar Mode

The Calendar Mode shows up to 5 events with 1 or 2 exercise occurrences each. The software automatically sets the calendar date for each occurrence according to the date setting entered in the Time of Day Setup. See Figure 4-11. This mode uses a true calendar where the software calculates the number of occurrences of a day in any month. Figure 4-8 illustrates relationships of calendar days and dates to occurrence days. The shaded columns show occurrence numbers for days in a typical month.

SUN	MON	TUE	WED	THU	FRI	SAT
		1 **1**	2 **1**	3 **1**	4 **1**	5 **1**
6 **1**	7 **1**	8 **2**	9 **2**	10 **2**	11 **2**	12 **2**
13 **2**	14 **2**	15 **3**	16 **3**	17 **3**	18 **3**	19 **3**
20 **3**	21 **3**	22 **4**	23 **4**	24 **4**	25 **4**	26 **4**
27 **4**	28 **4**	29 **5**	30 **5**	31 **5**		

Figure 4-9. Typical Calendar

NOTE

Because each weekday does not always occur five times in one month, avoid using day occurrence 5. If you enter day occurrence 5 in a month where the weekday does not occur five times, that exercise run will not happen.

4.8 Calendar Mode Summary Screen

The examples in Figure 4-10 and Figure 4-19 show exercise event #1 enabled. Exercise runs start at 7:30 AM. The first exercise run occurs on the second Saturday of the month; the second exercise run occurs on the fourth Saturday. The generator set(s) runs for 45 minutes. Load does not transfer during the exercise runs.

Spectrum Monitor **Calendar Mode Summary** <MATS+> *Designation*

ESC exit. **F1** Help. **F9** Print. **F10** Main Menu.

EXERCISE EVENT	START TIME	DAY OF WEEK	OCCURRENCE # 1ST	OCCURRENCE # 2ND	RUN TIME HR:MN	LOAD TRANSFER
#1 ENABLED	07:30 AM	SAT	2	4	00:45	NO
#2 ENABLED	09:00 AM	TUE	1	1	00:00	NO
#3 ENABLED	09:00 AM	TUE	1	1	00:00	NO
#4 ENABLED	09:00 AM	TUE	1	1	00:00	NO
#5 ENABLED	09:00 AM	TUE	1	1	00:00	NO

Time **8:00 AM** Day **Sunday** Date **07/14/1996** Day Occurs # **2**

Figure 4-10. Calendar Mode Summary Screen

Calendar Mode Summary Screen Information

EXERCISE EVENT The number of the exercise event and whether the event is ENABLED or DISABLED.

START TIME The scheduled start time for each event's pair of exercise runs.

DAY OF WEEK The day selected for each event.

OCCURRENCE #, 1ST The occurrence number 1-5 of the day for the event's first exercise run.

OCCURRENCE #, 2ND The occurence number 1-5 of the day for the event's second exercise run. If the days are the same, the event contains only one exercise run.

RUN TIME HR:MN The hours and minutes of the event's exercise runs.

LOAD TRANSFER Indicates whether the controller exercises the generator set under a load or not. YES indicates that the Load-No Load selector switch (accessory 23-G if equipped) is in the LOAD position and the controller exercises the plant under a load. NO indicates that the switch is in the NO LOAD position or the accessory is not installed and the controller exercises the plant under no load. The Load-No Load selector switch mounts inside the ATS door when equipped. Also, a hardware jumper installed on the ATS controller indicates the presence of this accessory.

Time and Date Information The software displays the following information at the bottom the screen:

Time Time of day in hours:minutes AM/PM

Day Day of week

Date Month/Day/Year

Day Occurs # The occurrence number 1-5 of the day in the current month. See Calendar Mode for more explanation.

4.9 Time of Day Setup Screen

Use the Time of Day Setup screen to set the current time and date at the ATS controller location. See Figure 4-11.

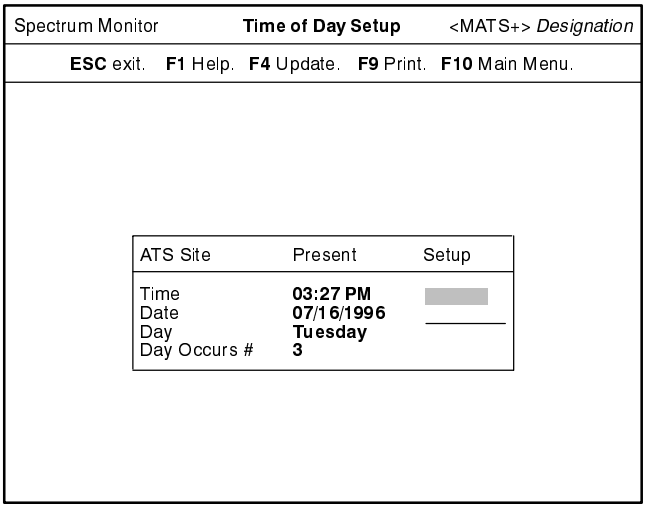


Figure 4-11. Time of Day Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

NOTE

If setting the time for a ATS controller located in a different time zone, enter the time to match the time zone at the ATS controller's location.

Time of Day Setup Screen Information

Time The time at the ATS controller location, format HR:MN AM or HR:MN PM

Date The date at the ATS controller location, format MO/DY/YEAR

Day Day of the week. Automatically calculated from the date.

Day Occurs # The occurrence number of the day of the week. Automatically calculated from the date.

The Present column displays the present settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes in the setup column; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

4.10 Time Delay Setup Screen

Use the Time Delay Setup screen to set time delays in minutes:seconds for various functions. See Figure 4-12.

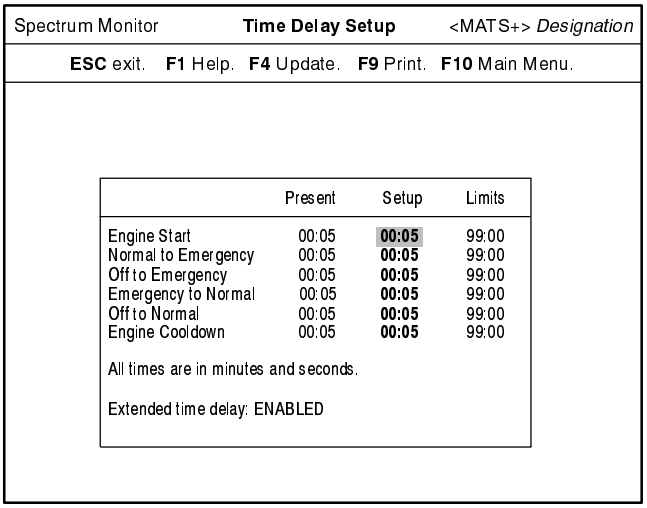


Figure 4-12. Time Delay Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

Time Delay Setup Screen Information

Engine Start The time delay between the remote start contacts closing and the engine start sequence beginning.

Normal to Emergency The time delay before the ATS switches from the Normal to Emergency positions.

Off to Emergency The time delay before the ATS switches from the Off to Emergency position (displayed only for the MATS+ controller; requires option DD-100-B enabled to change).

Emergency to Normal The time delay before the ATS switches from the Emergency to Normal positions.

Off to Normal The time delay before the ATS switches from the Off to Normal position (displayed only for the MATS+ controller; requires option DD-100-B enabled to change).

Engine Cooldown The time delay between the remote start contacts opening and the engine stop sequence.

Extended Time Delay Displayed as ENABLED or DISABLED. Enable extended time delays (option DD-100-B) with a main controller board shunt. This feature cannot be changed by using the software. If enabled, time delays can be extended to 99 minutes.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

4.11 Information Setup Screen

See Figure 4-13 for an example of the Information Setup screen.

ATS information is normally entered only at system installation and/or initial startup.

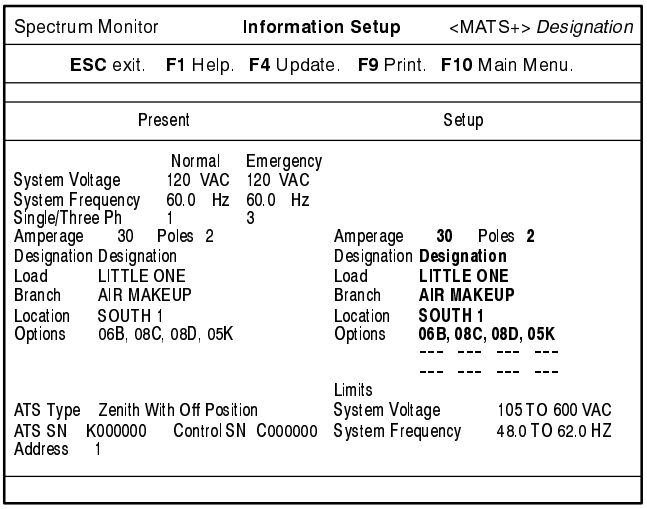


Figure 4-13. Information Setup Summary Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Information Setup Screen Information

System Voltage, System Frequency, and Single/Three Ph[ase] Displays these settings in the Present column as shown on the ATS nameplate. These settings are factory set.

Amperage The ATS contactor current rating in amps.

Poles The number of poles on the ATS contactor.

Designation An optional unique name describing location, function, etc.

Load An optional description of the connected load, such as total building, HVAC motors, etc.

Branch An optional description of the switch location by distribution branch, such as service entrance, branch circuit breaker number, etc.

Location An optional description of the physical location of the transfer switch.

Options The catalog numbers of enabled and installed accessories for reference when servicing the transfer switch. Each entry is limited to three characters. You can enter up to 12 accessories although more than 12 accessories may be installed. Check the transfer switch's nameplate to see a list of all installed accessories.

ATS Type The type of contactor mechanism. The contactor mechanism is factory set and cannot be changed. This item is displayed only for the MATS+ controller.

ATS SN (**ATS Serial Number** is displayed for the MATS controller.) The transfer switch serial number. Number is factory set and cannot be changed.

Control SN (**Control Serial** is displayed for the MATS controller.) The ATS controller serial number. Number is factory set and cannot be changed.

Address Displays the current address of the unit on an RS-485 network. Set at the local display and keypad.

Limits Limits shown for System Voltage and System Frequency are factory set and cannot be changed.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

4.12 Trip Point Setup Screen

The Trip Point Setup screen shows normal and emergency source pickup and dropout points as percentages of system voltage and frequency. See Figure 4-14 for an example of the Trip Point Setup screen.

Spectrum Monitor **Trip Point Setup** <MATS+> *Designation*

ESC exit. **F1** Help. **F4** Update. **F9** Print. **F10** Main Menu.

Trip Points	Present Normal	Present Emergency	Setup Normal	Setup Emergency	Limits
Overvolt Dropout	115 %	115 %	**115** %	**115** %	105 – 135 %
Overvolt Pickup	110 %	110 %	**110** %	**110** %	100 – 130 %
Undervolt Pickup	90 %	90 %	**90** %	**90** %	75 – 100 %
Undervolt Dropout	85 %	85 %	**85** %	**85** %	70 – 95 %
Overfreq Dropout	115 %	115 %	**115** %	**115** %	105 – 135 %
Overfreq Pickup	110 %	110 %	**110** %	**110** %	100 – 130 %
Underfreq Pickup	90 %	90 %	**90** %	**90** %	85 – 100 %
Underfreq Dropout	85 %	85 %	**85** %	**85** %	80 – 95 %

Normal and Emergency Over/Under Voltage and Frequency: ENABLED

NOTE: 2% minimum differential between pickup and dropout must be maintained.

Figure 4-14. Trip Point Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

NOTE

Normal and Emergency Over/Under Voltage and Frequency (option 34-J) at the second-from-bottom line of the screen must show ENABLED in order to enter optional settings.

NOTE

Set *Over* trip points at least 2% higher than *Under* trip points.

Trip Point Setup Screen Information

Setting up trip points:

1. Use the arrow keys to position the cursor in the Normal or Emergency columns and type the settings. Use an arrow key or press <ENTER> to move the cursor to another trip point setting.
2. If you press <F4> and the screen displays the message `Setup Value Out of Limit`, a setting is out of the limit range. The cursor box highlights the out-of-limit setting. Press any key and enter a new setting that is within the limit range. Press <F4> again to store the new settings in the ATS controller. Press <ESC> to return to the ATS Data Menu.

The Present column displays current information. Make changes in the Setup column. The Limits column displays the possible percentage ranges for each setting.

4.13 Load Shed Setup Screen

The Load Shed Setup screen shows load-shed time settings in minutes and seconds. See Figure 4-15 for an example of the Load-Shed Setup screen.

Spectrum Monitor **Load Shed Setup** <MATS+> *Designation*

ESC exit. **F1** Help. **F4** Update. **F9** Print. **F10** Main Menu.

Trip Points	Present Normal	Present Emergency	Setup Normal	Setup Emergency	Limits
Time Before	00:00	00:00	**00:00**	**00:00**	99:00
Time After	00:00	00:00	**00:00**	**00:00**	99:00
Time Sequence	00:00	00:00	**00:00**	**00:00**	99:00
Load Returns	9	9	**9**	**9**	1 -- 9 Loads

All times are in minutes and seconds.

Extended time delay: ENABLED

Figure 4-15. Load Shed Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

NOTE

The number of load returns after transfer to emergency may be smaller than for transfer to normal. In this case, the system has been designed to allow certain nonessential loads shed when the transfer switch is in the emergency position.

Load Shed Setup Screen Information

Time Before The time before transfer to the related source that the load is signaled to shed.

Time After The time after transfer to the related source before load return begins.

Time Sequence The elapsed time between load return steps.

Load Returns The number of steps (blocks) of load that will return after transfer to the related source.

Load-Return signals are provided by up to 9 relays on the transfer switch logic panel. Relays provide signals to separate load control relays and circuit breakers.

The Present column displays current information. Make changes in the Setup column. The Limits column displays the maximum allowable time for each setting.

4.14 Plant Exerciser Choice Setup Screen

See Figure 4-16 for an example of the Plant Exerciser Choice Setup screen.

Plant exerciser schedule choices are 7-day, 14-day, and Calendar (5-week) modes.

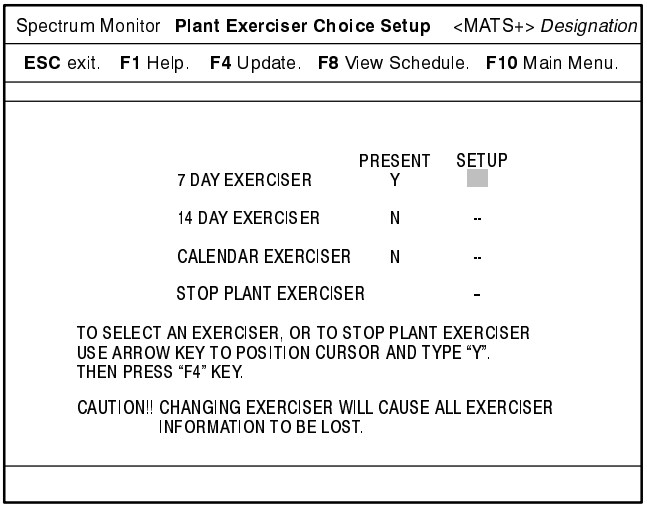


Figure 4-16. Plant Exerciser Choice Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Plant Exerciser Setup Screen Information

To select an exerciser schedule:

Use the up or down arrow key to move the cursor to the selected line in the Setup column. Type **Y** to make a selection. Press <F4> to store your choice. When you change a choice, former settings are lost. Press <F8> to view your choice and make settings.

To stop the exerciser during an exercise run:

Use the down arrow key to move the cursor to STOP PLANT EXERCISER. Type **Y** and press <F4>. This will zero out the exercise timer.

4.15 Seven-Day Mode Setup Screen

See Figure 4-17 for an example of the 7-Day Mode Setup screen. Use the following procedures to enable or disable exercise events for a 1-week period.

Spectrum Monitor **7 Day Mode Setup** <MATS+> *Designation*

ESC exit. **F1** Help. **F4** Update. **F9** Print. **F10** Main Menu.

EXERCISE EVENT	START TIME	DAY OF WEEK 1ST	2ND	RUN TIME HR:MN	LOAD TRANSFER
#1 ENABLED	07:30 AM	WED	SAT	00:45	NO
E	**07:30 AM**	**WED**	**SAT**	**00:45**	
#2 ENABLED	09:00 AM	TUE	TUE	00:00	NO
D	**09:00 AM**	**TUE**	**TUE**	**00:00**	
#3 ENABLED	09:00 AM	TUE	TUE	00:00	NO
D	**09:00 AM**	**TUE**	**TUE**	**00:00**	
#4 ENABLED	09:00 AM	TUE	TUE	00:00	NO
D	**09:00 AM**	**TUE**	**TUE**	**00:00**	
#5 ENABLED	09:00 AM	TUE	TUE	00:00	NO
D	**09:00 AM**	**TUE**	**TUE**	**00:00**	
LIMITS:		TUE - SUN		0-4:00	

USE ARROW KEYS TO POSITION CURSOR UNDER DESIRED EVENT AND ENTER NEW VALUES, F4 WILL UPDATE ATS

Time 8:00 AM Day Wednesday Date 07/17/1996 Day Occurs # 3

Figure 4-17. 7-Day Mode Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

NOTE

If you are setting the start time for a remote transfer switch located in a different time zone, enter the time to match the time zone at the transfer switch's location.

7-Day Mode Setup Screen Information

See Section 4.6 for details on 7-day mode exerciser event fields.

To set up 7-day mode exerciser events:

1. Position the cursor box on the enable/disable exercise event choice. Type **E** and press <ENTER> to enable the event. Type **D** and press <ENTER> to disable the event.
2. Type the desired time of day for a start time and press <ENTER>.
3. Type a day for the first exercise run of the event and press <ENTER>.
4. Type a day for the second exercise run of the event and press <ENTER>.

NOTE: To choose only one exercise run per event, make the DAY entries the same.

5. Type hours:minutes for the event exercise run times and press <ENTER>.

The cursor moves to the enable/disable choice for the next event. Repeat the above steps to set up as many exercise runs as necessary. The maximum number of exercise runs is 10, 5 events of 2 exercise runs each week. Press <F4> to store your new settings in the ATS controller.

LOAD TRANSFER If Yes, the Load/No-Load Exercise switch is in the LOAD position. If No, the switch is in the NO LOAD position. The Load/No-Load selector switch (accessory 23-G, if equipped) is mounted inside the transfer switch cabinet door. Also, a hard-wired jumper installed on the ATS controller indicates load transfer. This setting can be changed only at the transfer switch.

4.16 Fourteen-Day Mode Setup Screen

See Figure 4-18 for an example of the 14-Day Mode Setup screen. Use the following procedures to enable or disable exercise events for a 2-week period.

Spectrum Monitor **14 Day Mode Setup** <MATS+> *Designation*

ESC exit. **F1** Help. **F4** Update. **F9** Print. **F10** Main Menu.

EXERCISE EVENT	START TIME	DAY OF WEEK 1ST	2ND	1 OR 2	RUN TIME HR:MN	LOAD TRANSFER
#1 ENABLED	07:30 AM	WED	SAT	2	00:45	NO
E	**07:30 AM**	**WED**	**SAT**	**2**	**00:45**	
#2 ENABLED	09:00 AM	TUE	TUE	1	00:00	NO
D	**09:00 AM**	**TUE**	**TUE**	**1**	**00:00**	
#3 ENABLED	09:00 AM	TUE	TUE	1	00:00	NO
D	**09:00 AM**	**TUE**	**TUE**	**1**	**00:00**	
#4 ENABLED	09:00 AM	TUE	TUE	1	00:00	NO
D	**09:00 AM**	**TUE**	**TUE**	**1**	**00:00**	
#5 ENABLED	09:00 AM	TUE	TUE	1	00:00	NO
D	**09:00 AM**	**TUE**	**TUE**	**1**	**00:00**	
LIMITS:		TUE - SUN		1-2	0-4:00	

USE ARROW KEYS TO POSITION CURSOR UNDER DESIRED EVENT AND ENTER NEW VALUES, F4 WILL UPDATE ATS

Time 8:00 AM Day Sunday Date 07/17/1996 Week 2

Figure 4-18. 14-Day Mode Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

NOTE

If you are setting the start time for a remote transfer switch located in a different time zone, enter the time to match the time zone at the transfer switch's location.

14-Day Mode Setup Screen Information

See Section 4.6 for details on 14-day mode exerciser event fields.

To change 14-day mode exerciser events:

1. Position the cursor box on the enable/disable exercise event choice. Type **E** and press <ENTER> to enable the event. Type **D** and press <ENTER> to disable the event.
2. Type the desired time of day for a start time and press <ENTER>.
3. Type a day for the first exercise run of the event and press <ENTER>.
4. Type a day for the second exercise run of the event and press <ENTER>.

NOTE: To choose only one exercise run per event, make the DAY entries the same.

5. Type a week (1 or 2) of the 14-day period for the event and press <ENTER>.
6. Type hours:minutes for the event exercise run times and press <ENTER>.

The cursor moves to the enable/disable choice for the next event. Repeat the above steps to set up as many exercise runs as necessary. The maximum number of runs is 10, 5 events of 2 exercise runs per event for each 14-day period. Press <F4> to store your new settings in the ATS controller.

LOAD TRANSFER If Yes, the Load/No-Load Exercise switch is in the LOAD position. If No, the switch is in the NO LOAD position. The Load/No-Load selector switch (accessory 23-G, if equipped) is mounted inside the cabinet door. Also, a hard-wired jumper installed on the ATS controller indicates load transfer. This setting can be changed only at the transfer switch.

4.17 Calendar Mode Setup Screen

See Figure 4-19 for an example of the Calendar Mode Setup screen. Use the following procedures to enable or disable exercise events over a 2-week period.

Spectrum Monitor **Calendar Mode Setup** <MATS+> *Designation*

ESC exit. **F1** Help. **F4** Update. **F9** Print. **F10** Main Menu.

EXERCISE EVENT	START TIME	DAY OF WEEK	OCCURRENCE # 1ST	OCCURRENCE # 2ND	RUN TIME HR:MN	LOAD TRANSFER
#1 ENABLED	07:30 AM	SAT	2	4	00:45	NO
E	**07:30 AM**	**SAT**	**2**	**4**	**00:45**	
#2 ENABLED	09:00 AM	TUE	1	1	00:00	NO
D	**09:00 AM**	**TUE**	**1**	**1**	**00:00**	
#3 ENABLED	09:00 AM	TUE	1	1	00:00	NO
D	**09:00 AM**	**TUE**	**1**	**1**	**00:00**	
#4 ENABLED	09:00 AM	TUE	1	1	00:00	NO
D	**09:00 AM**	**TUE**	**1**	**1**	**00:00**	
#5 ENABLED	09:00 AM	TUE	1	1	00:00	NO
D	**09:00 AM**	**TUE**	**1**	**1**	**00:00**	
LIMITS:		TUE - SUN	1-5	1-5	0-4:00	

USE ARROW KEYS TO POSITION CURSOR UNDER DESIRED EVENT AND ENTER NEW VALUES, F4 WILL UPDATE ATS

Time 8:00 AM Day Wednesday Date 07/17/1996 Day Occurs # 3

Figure 4-19. Calendar Mode Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

NOTE

If you are setting the start time for a remote transfer switch located in a different time zone, enter the time to match the time zone at the transfer switch's location.

Calendar Mode Setup Screen Information

See Section 4.8 for details on calendar mode exerciser event fields.

To change calendar mode exerciser events:

1. Position the cursor box on the enable/disable exercise event choice. Type **E** and press <ENTER> to enable the event. Type **D** and press <ENTER> to disable the event.
2. Type the desired time of day for a start time and press <ENTER>.
3. Type a day for the event's exercise runs and press <ENTER>.
4. Type a number (1-5) for a day occurrence on which the event's first (#1) exercise run is to take place and press <ENTER>.
5. Type a number (1-5) for a day occurrence on which the event's second (#2) exercise run is to take place and press <ENTER>.

NOTE: Enter a zero to prevent the respective exercise run (#1 and/or #2) from taking place.

6. Type hours:minutes for the event exercise run times and press <ENTER>.

The cursor moves to the enable/disable choice for the next event. Repeat the above steps to set up as many exercise runs as necessary. The maximum number of runs is 10, 5 events of 2 exercise runs per event for each month. Press <F4> to store your new settings in the ATS controller.

LOAD TRANSFER If Yes, the Load/No-Load Exercise switch is in the LOAD position. If No, the switch is in the NO LOAD position. The Load/No-Load selector (accessory 23-G, if equipped) switch is mounted inside the cabinet door. Also, a hard-wired jumper installed on the ATS controller indicates load transfer. This setting can be changed only at the transfer switch.

4.18 Engine Start Setup Screen

This screen allows you to start and run the generator set for a specified period of time. To see this screen, the Plant Exerciser option must be enabled. See Figure 4-16. This could be used to verify that the emergency source is running and available for an anticipated outage or to manually start the generator set for an interruptible-rate situation. See Figure 4-20 for an example of the Engine Start Setup screen.

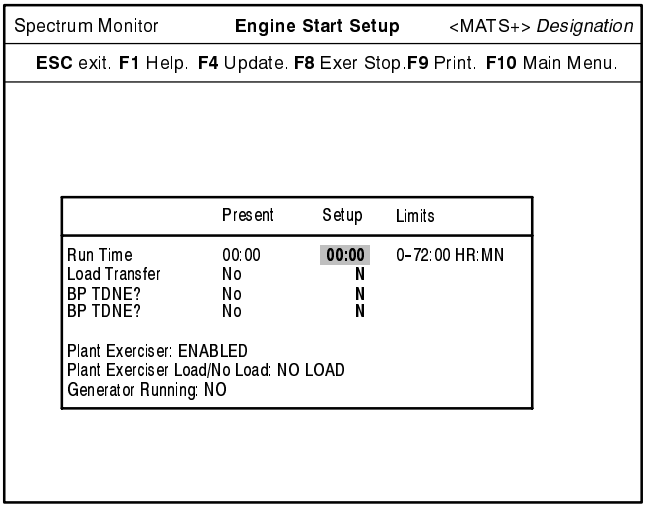


Figure 4-20. Engine Start Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F8	Exer Stop	Stops the exerciser mode
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

NOTE

The screen will not show the source of the engine-start signal, i.e., plant exerciser, a remote-start contact, or engine start signal from the local panel or remote computer.

NOTE

This screen allows the operator of the software to start and run a generator set that is not within sight of the operator. Use extreme care when using this feature to prevent accidental starting of the generator set.

NOTE

The run time returns to 00:00 and Load Transfer, BP TDNE, and BP TDEN return to No after the generator run time completes.

Engine Start Setup Screen Information

To set the run time and start the generator set, proceed as follows:

1. Position the cursor in the Run-Time row, Setup column.
2. Type the time in hours:minutes. The engine-generator set stops after the set time and all other timers have expired. Maximum time is 72:00 (72 hours).
3. Use the Load Transfer option to override any Load/No-Load setting made at the transfer switch. Type **Y** for yes if you want to transfer to emergency. Type **N** (no) only if you want to make the emergency source available or to test run the engine.
4. At the BP TDNE? choice, type **Y** (yes) if you want to bypass the *normal-to-emergency time delay*.
5. At the BP TDEN? choice, type **Y** (yes) if you want to bypass the *emergency-to-normal time delay*.
6. After making your choices, press <F4>; confirm with **Y** and press <ENTER> to start the generator set.

NOTE: If you want to stop the exerciser before the run time completes, press <F8>. The transfer switch retransfers to normal (if in emergency) and the generator set runs through the engine cooldown cycle. The run-time setting return to 00:00. To stop the generator set from the Plant Exerciser Choice Setup menu, use the down arrow key to move to the STOP PLANT EXERCISER choice, type **Y,** and press <F4>.

Engine Start Setup Screen Information (continued)

Plant Exerciser Shows ENABLED if the enabling shunt is installed or Disabled if the enabling shunt is not installed.

Plant Exerciser Load/No Load The position of the load/no-load exerciser switch, LOAD or NO LOAD (accessory 23-G, located on inside of cabinet door if equipped).

Generator Running YES if generator set is running, NO if generator set is not running.

Notes

5.1 Data Menu Screen Selections

The software displays the power monitor Data Menu screen when it establishes communications with the Digital power monitor. See Figure 5-1.

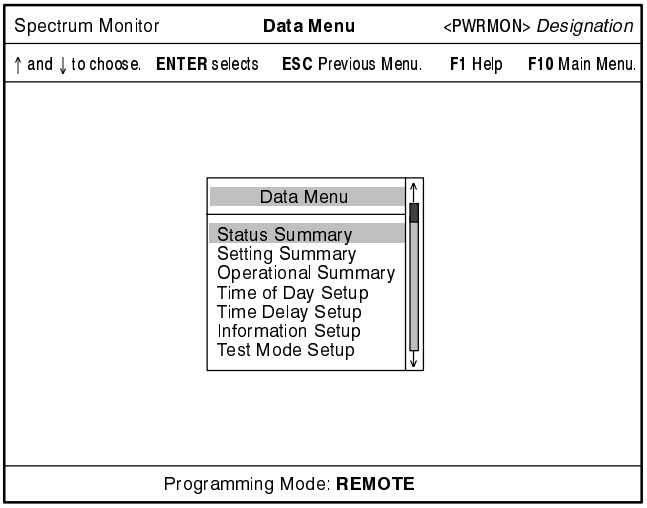


Figure 5-1. Digital Power Monitor Data Menu Screen

The Data Menu screen and other screens described in this section have <PWRMON> *Designation* in the upper right-hand corner. Enter the *designation*, an optional descriptive name for the device, on the Information Setup screen. See Section 5.8. These identifiers allow you to know the type of device and its designation the screen displays.

Figure 5-2 lists the selections that appear on the Data Menu screen. The software also displays the current programming mode at the bottom of the screen. If the power monitor is not in the REMOTE programming mode (OFF or LOCAL), the Data Menu screen displays the summary screen selections only.

Menu Item	Figure	Section
Status Summary	Figure 5-3	5.3
Setting Summary	Figure 5-4	5.4
Operational Summary	Figure 5-5	5.5
Time of Day Setup	Figure 5-6	5.6
Time Delay Setup	Figure 5-7	5.7
Information Setup	Figure 5-8	5.8
Test Mode Setup	Figure 5-9	5.9

Figure 5-2. Digital Power Monitor Data Menu Screen Selections

Summary screens display power monitor conditions and settings but do not allow programming. Use the setup screens to program the power monitor's various settings and functions.

Although you enter data in the setup screens, all data is transferred to the power monitor upon update and stored in its memory. See the power monitor operation and installation manual for the factory default values.

Use the up arrow ↑ or down arrow ↓ key to highlight the desired menu selection and press <ENTER> to proceed to that screen. Press the <ESC> key to return to the Data Menu screen.

Regular updates occur to screen information. The COM port baud rate determines the update frequency.

5.2 Printing Options

Press <F9> in the summary and setting screens to get the print options menu. Use the up and down arrow keys to select from the following options.

- ***Print to Printer*** prints a hard-copy report of the current screen to the printer the system designates as LPT1.
- ***Save Report to a File*** asks to provide a name for a file and saves the current screen report to the file.
- ***Review Report*** provides a print preview of a screen report.

5.3 Status Summary Screen

The Status Summary screen displays a summary of the current status of the power monitor. See Figure 5-3.

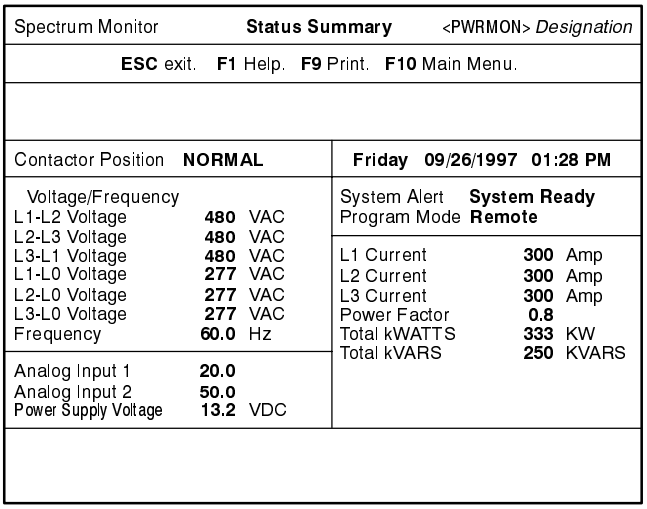


Figure 5-3. Status Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Status Summary Screen Information

Contactor Position Displays the Automatic Transfer Switch (ATS) contactor position as NORMAL, OFF, EMERGENCY, or UNDEFINED.

AC Voltage and Frequency Displays voltage and frequency readings for AC power.

Voltage The voltage on each AC phase L1-L2, L2-L3, L3-L1, L1-L0, L2-L0, and L3-L0

Frequency The system frequency in hertz (Hz.)

Analog DC Inputs Displays readings for analog auxiliary inputs.

Analog Input 1 Analog auxiliary input 1

Analog Input 2 Analog auxiliary input 2

Power Supply Voltage The power monitor's internal DC power supply voltage

Time Displays the current time at the power monitor location.

Day of week

Date Month/Day/Year

Time of day Hours:Minutes AM/PM

System Alert Shows the operating mode of the unit. See the unit operation and installation manual for more information.

Auxiliary 1-6 An system warning condition exists caused by auxiliary warning contact input 1-6.

Test Mode Active The ATS test mode is active.

Internal Error The power monitor has detected an internal memory error.

System Ready No system warning condition is present.

Power Down Error The power monitor has detected a power down error.

Program Mode Shows the current programming mode: Local, Off, or Remote.

AC Current and Power Displays current and power readings for AC power.

L1, L2, L3 Current The amperage readings for Line1, Line 2, and Line 3

Power Factor The power factor

Total kWATTS The total load in kilowatts

Total kVARS The total thousands of volts-amperes-reactive

5.4 Setting Summary Screen

The Setting Summary screen displays a summary of the current settings for the power monitor. See Figure 5-4.

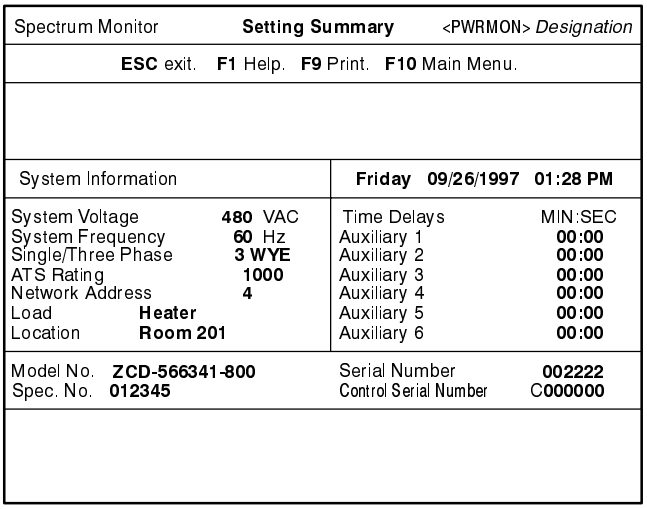


Figure 5-4. Setting Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setting Summary Screen Information

System Information Displays information about the monitored system.

System Voltage Displays the monitored system voltage setting. Normally set at installation.

System Frequency Displays the monitored system frequency setting. Normally set at installation.

Single/Three Phase Displays electrical system type, SINGLE for single-phase, 3 WYE for three-phase wye, or 3 DELTA for three-phase delta. Normally set at installation.

ATS Rating Displays the load or ATS contactor current rating. Normally set at installation.

Network Address Displays the current address of the unit on an RS-485 network. Set at the local display and keypad.

Load The optional description for the connected load, programmable on the Information Setup screen.

Location An optional description for the location of the load or ATS, programmable on the Information Setup screen.

Time Displays the current time at the power monitor location.

Day of week

Date Month/Day/Year

Time of day Hours:Minutes AM/PM

Time Delays

Auxiliary 1, 2, 3, 4, 5, 6 The time delay in minutes:seconds after a customer-provided auxiliary warning contact 1-6 closes before the power monitor indicates a system warning condition and turns on the corresponding relay driver output (RDO). Change the time delays using the Time Delays Setup screen.

ATS Information Displays information intended for use with a connected Automatic Transfer Switch (ATS) (your application may differ).

Model No. Displays the load or ATS model number.

Spec. No. Displays the load or ATS specification number.

Serial Number Displays the load or ATS serial number.

Control Number Displays the load or ATS controller serial number.

5.5 Operational Summary Screen

The Operational Summary screen displays a summary of the system and ATS contactor history. See Figure 5-5.

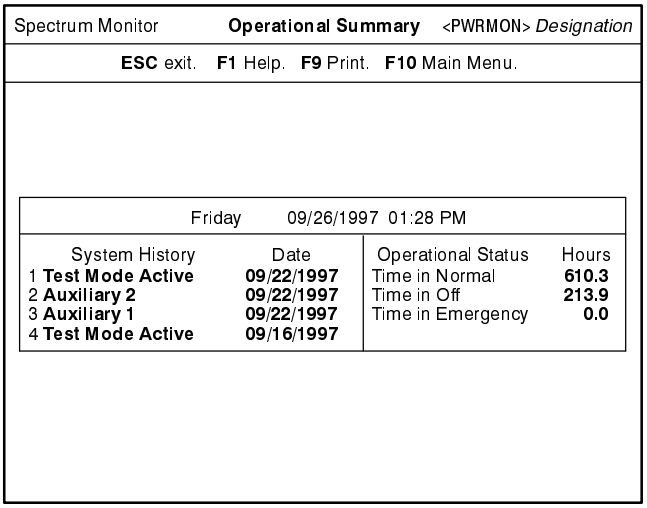


Figure 5-5. Operational Summary Screen

Summary Screen Key Functions

Key	Screen	Function
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Operational Summary Screen Information

Time Displays the current time at the power monitor location.

Day of week

Date Month/Day/Year

Time of day Hours:Minutes AM/PM

System History Displays a history of the four most recent auxiliary warnings or ATS tests and the date on which they occurred.

Operational Status Displays time in hours in each contactor position (Normal, Off, and Emergency) according to contact information from the ATS.

5.6 Time of Day Setup Screen

Use the Time of Day Setup screen to set the current time and date at the power monitor location. See Figure 5-6.

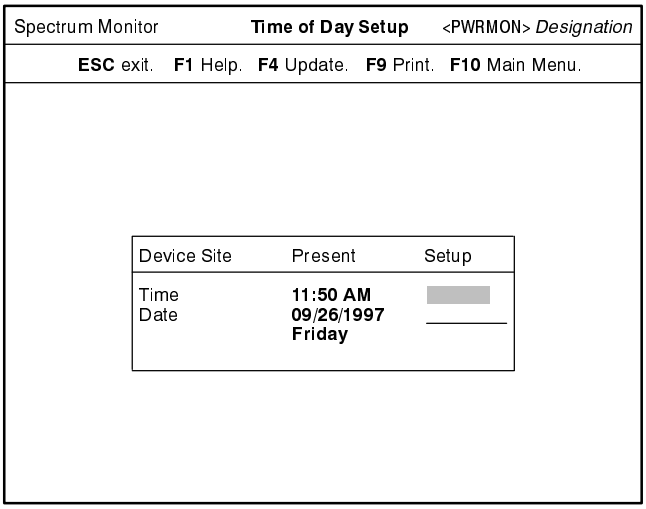


Figure 5-6. Time of Day Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

NOTE

If setting the time for a power monitor located in a different time zone, enter the time to match the time zone at the power monitor's location.

Time of Day Setup Screen Information

Time The time at the power monitor's location, format HR:MN AM or HR:MN PM

Date The date at the power monitor's location, format MO/DY/YEAR. The software automatically calculates the day of the week from the date upon update and displays it under the present date.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

5.7 Time Delay Setup Screen

Use the Time Delay Setup screen to change the names and time delays in minutes:seconds for auxiliary warnings 1-6. See Figure 5-7.

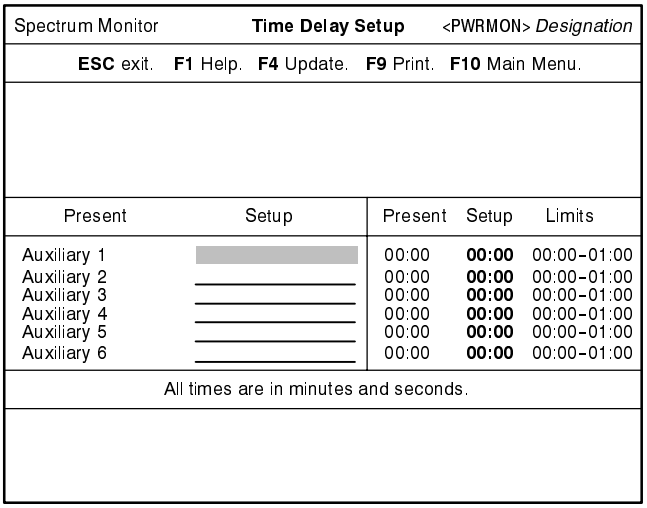


Figure 5-7. Time Delay Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

Time Delay Setup Screen Information

Auxiliary 1-6, Names Displays the names of auxiliary warning contact inputs 1-6 in the left part of the screen under the Present column. Default names shown. Change the names in the Setup column, 20 character limit.

Auxiliary 1-6, Time Delays Displays the time delays in minutes:seconds for auxiliary warning inputs 1-6 on the right part of the screen under the Present column. Change the time delays in the Setup column. The Limit column displays the limits for the time delays.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

5.8 Information Setup Screen

Use the Information Setup screen to enter power monitor information. This information is normally entered only at time of system installation and/or initial startup. See Figure 5-8.

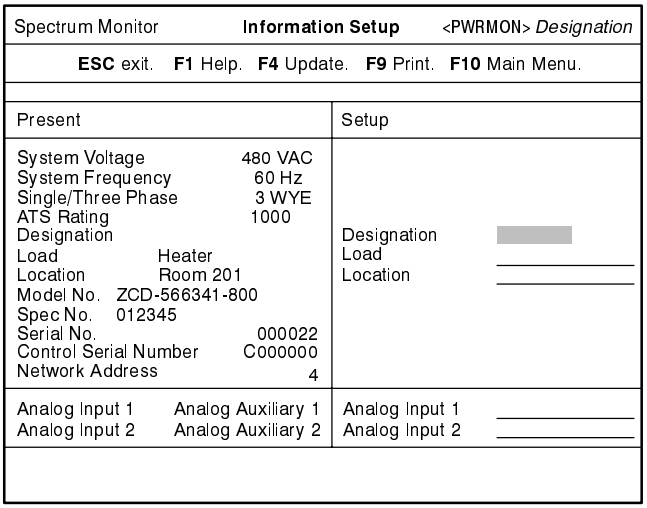


Figure 5-8. Information Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Information Setup Screen Information

System Voltage The monitored system voltage. Normally set at installation.

System Frequency The monitored system frequency. Normally set at installation.

Single/Three Phase Electrical system type, SINGLE for single-phase, 3 WYE for three-phase wye, or 3 DELTA for three-phase delta. Normally set at installation.

ATS Rating The ATS contactor current rating. Normally set at installation.

Designation Describes the location, function, etc. of the load, ATS, or power monitor. Enter up to 9 characters. The *designation* appears on all setup and summary screens for the power monitor in the upper right corner of the screen.

Load A description of the connected load (total building, HVAC, motors, etc), optional. Enter up to 20 characters.

Location A description of the power monitor's location, optional. Enter up to 20 characters.

Model No. The model number of the ATS, 26 characters. Normally set at installation.

Spec No. The specification number for the ATS, 16 characters. Normally set at installation.

Serial No. The serial number for the ATS. Normally set at installation.

Control Serial Number The ATS controller serial number. Normally set at installation.

Network Address Displays the current address of the unit on an RS-485 network. Set at the local display and keypad.

Analog Input 1-2 The current name for the each analog auxiliary input. You can rename each analog auxiliary input with a description of up to 20 characters. The new name appears in menus and screens instead of the default Analog Auxiliary 1 or Analog Auxiliary 2.

The Present column displays the existing settings. Make changes in the Setup column.

Use the arrow keys to move the cursor to the desired location in the setup column.

Type the changes; press <ENTER> or the down arrow key to proceed to the next line. Press <F4> to update the record and store the changes.

5.9 Test Mode Setup Screen

Use the Test Mode Setup screen to perform an ATS test for a specified time period. See Figure 5-9.

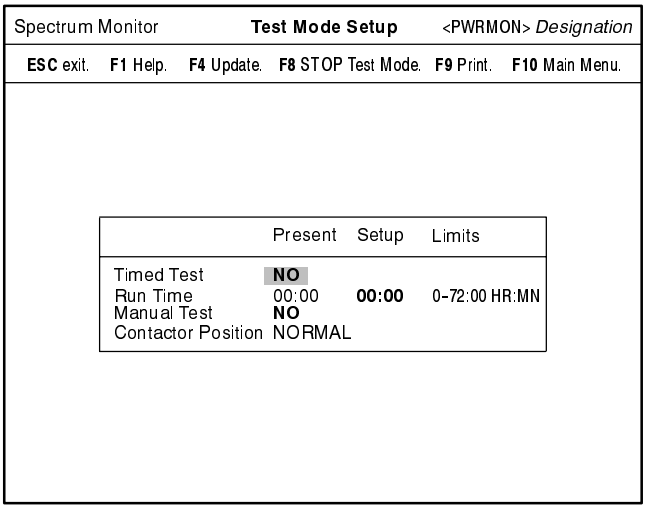


Figure 5-9. Test Mode Setup Screen

Setup Screen Key Functions

Key	Screen	Function
↑		Moves the cursor up to choose
↓		Moves the cursor down to choose
ENTER		Enters a value at the cursor position
ESC	Exit	Returns to the previous menu or screen
F1	Help	Displays the help screen
F4	Update	Updates and stores the new settings
F8	STOP Test Mode	Deactivates the ATS test mode.
F9	Print	Displays the print menu
F10	Main Menu	Returns to the Main Menu

Setup Screen Column Headings

Column	Purpose
Present	Current settings
Setup	Make changes here
Limits	The software accepts inputs only within the range of these limits.

NOTE

This screen allows the operator of the software to operate a transfer switch and possibly start and run a generator set in a remote location that is not within sight of the operator. Use extreme care when using this feature to prevent accidental starting of the generator set or unexpected transfer or power.

Information Setup Screen Information

Timed Test Displays YES under the Present column when running a timed test, NO otherwise.

To set the timed test run time and start the timed test, proceed as follows:

1. Position the cursor in the Run Time row, Setup column.
2. Type the run time for the timed test in hours:minutes. Maximum time is 72:00 (72 hours, 0 minutes).
3. After making the desired choices, press <F4>, confirm with **Y** and press <ENTER> to start the test. The time you designate as run time will move from the Setup column to the Present column.

NOTE: Press <F8> to stop the test before the run time completes.

Run Time Displays timed test run time. See directions under Timed Test above to run a timed test.

Manual Test Displays YES if running a manual test, NO otherwise.

To start a manual test proceed as follows:

1. Position the cursor in the Manual row, Setup column.
2. Type **Y**.
3. Press <F4>, confirm with **Y** and press <ENTER> to start the test. The test continues until stopped.

NOTE: Press <F8> to stop the manual test.

Contactor Position Displays the ATS contactor position NORMAL, OFF, EMERGENCY, or UNDEFINED to allow observation of the transfer switch position during a test.

To use the Monitor software, you must connect the PC to combinations of one or more generator set controllers, automatic transfer switch (ATS) controllers, or power monitors compatible with the software. The desired connection determines the necessary hardware.

- Local single connection—up to 50 feet
- Local single connection—up to 4000 feet
- Local area network
- Remote single connection
- Remote area network

6.1 Communication Modules

In all cases, communication with a device (a generator set controller, ATS controller, or power monitor) requires a communication module installed within the device.

- RS-232—used for direct connection (50 feet maximum) and remote connection using modems
- RS-485—used for direct connection (4000 feet maximum) and local or remote network connections

The power monitor can also have an internal RS-232 to RS-485 converter module installed that works with an installed RS-485 communications module to support the local single connection to 4000 feet and the local and remote area networks.

The following chart lists the figures showing communication module connections:

Device Type	Communications Type		Internal RS-232 to RS-485 Converter
	RS-232	RS-485	
Generator Set Controller	Figure 6-2	Figure 6-3	–
ATS Controller	Figure 6-4	Figure 6-5	–
Power Monitor	Figure 6-6	Figure 6-7	Figure 6-7

Figure 6-1. Communication Module Connections

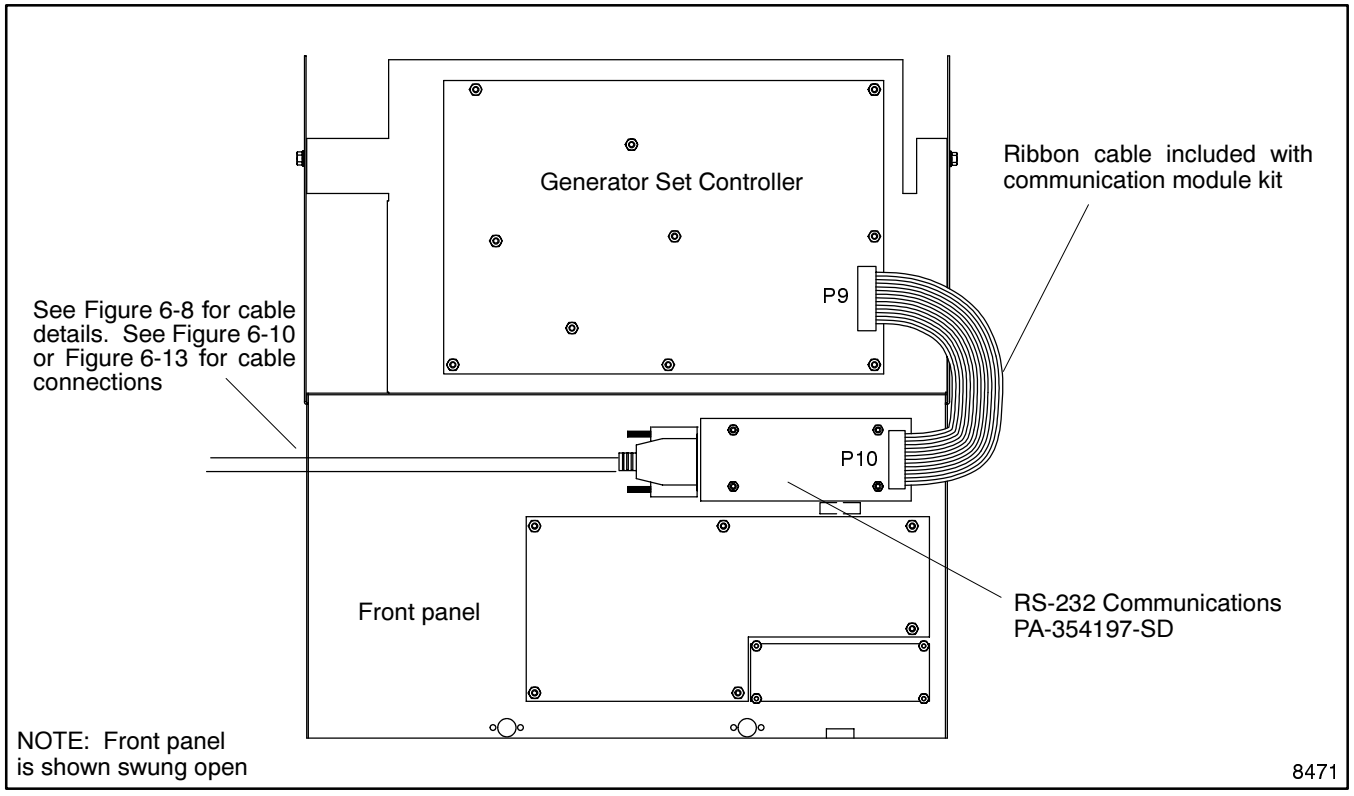


Figure 6-2. RS-232 Communication Module Location and Connection for a Generator Set Controller

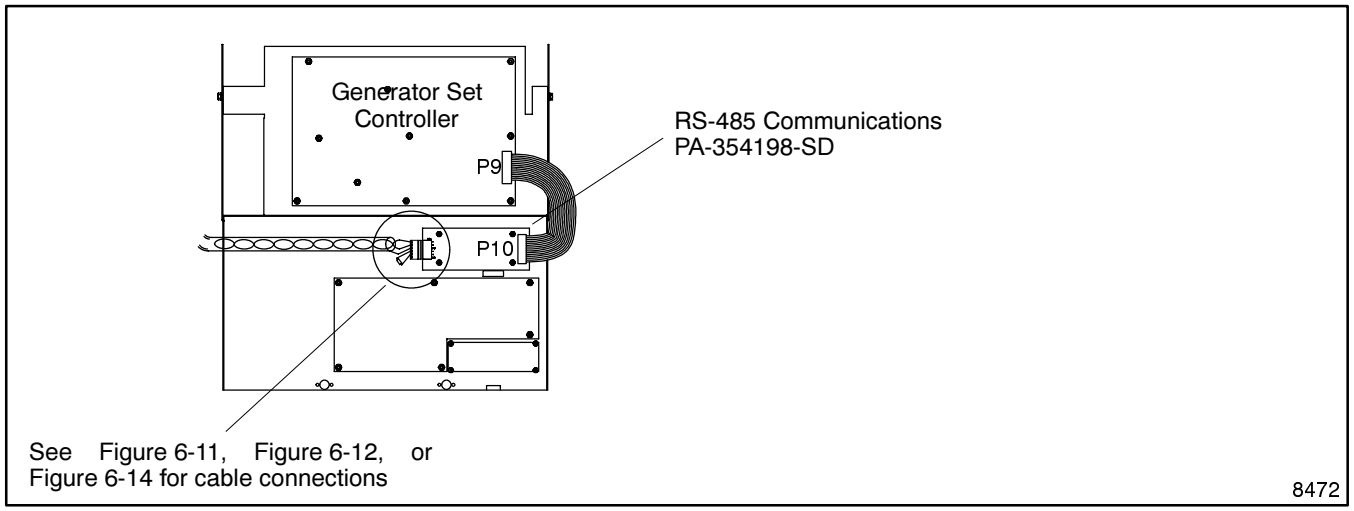


Figure 6-3. RS-485 Communication Module Location and Connection for a Generator Set Controller

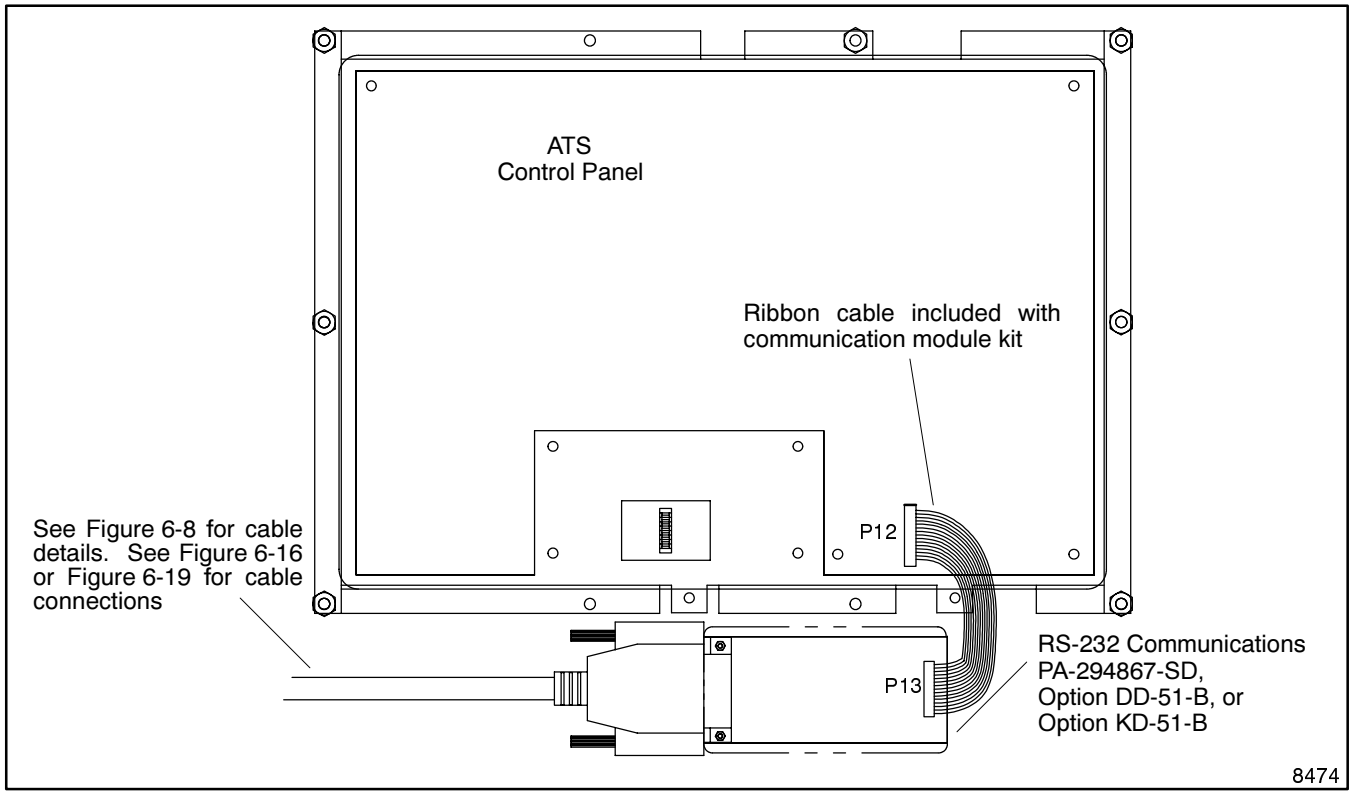


Figure 6-4. RS-232 Communication Module Location and Connection for Automatic Transfer Switch (ATS) Controllers

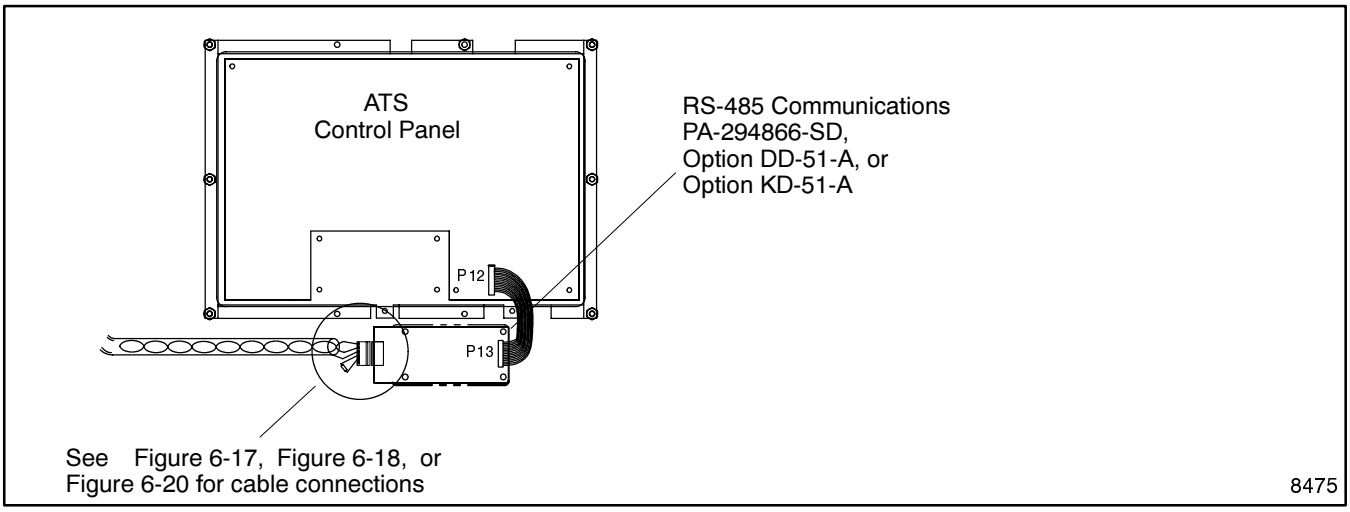


Figure 6-5. RS-485 Communication Module Location and Connection for Automatic Transfer Switch (ATS) Controllers

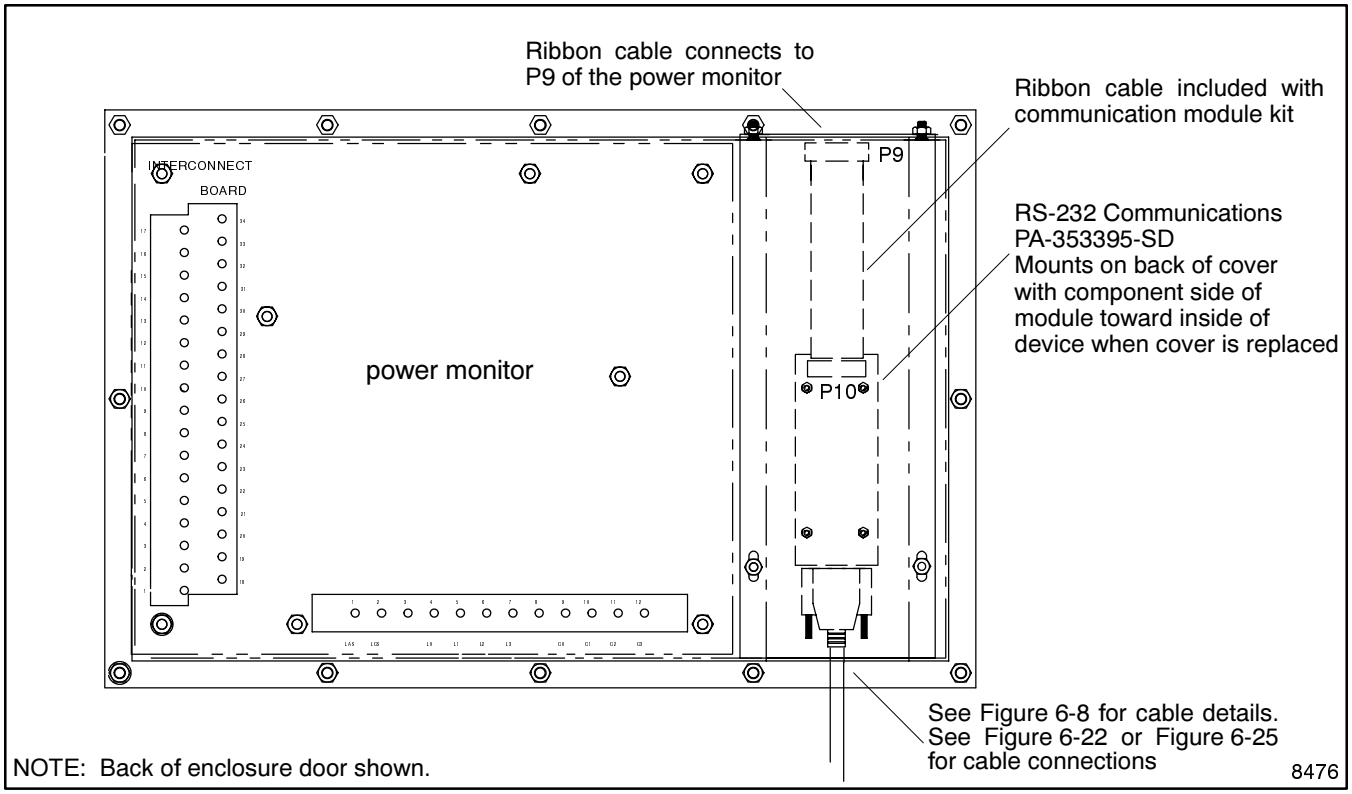


Figure 6-6. RS-232 Communication Module Location and Connection for the Power Monitor

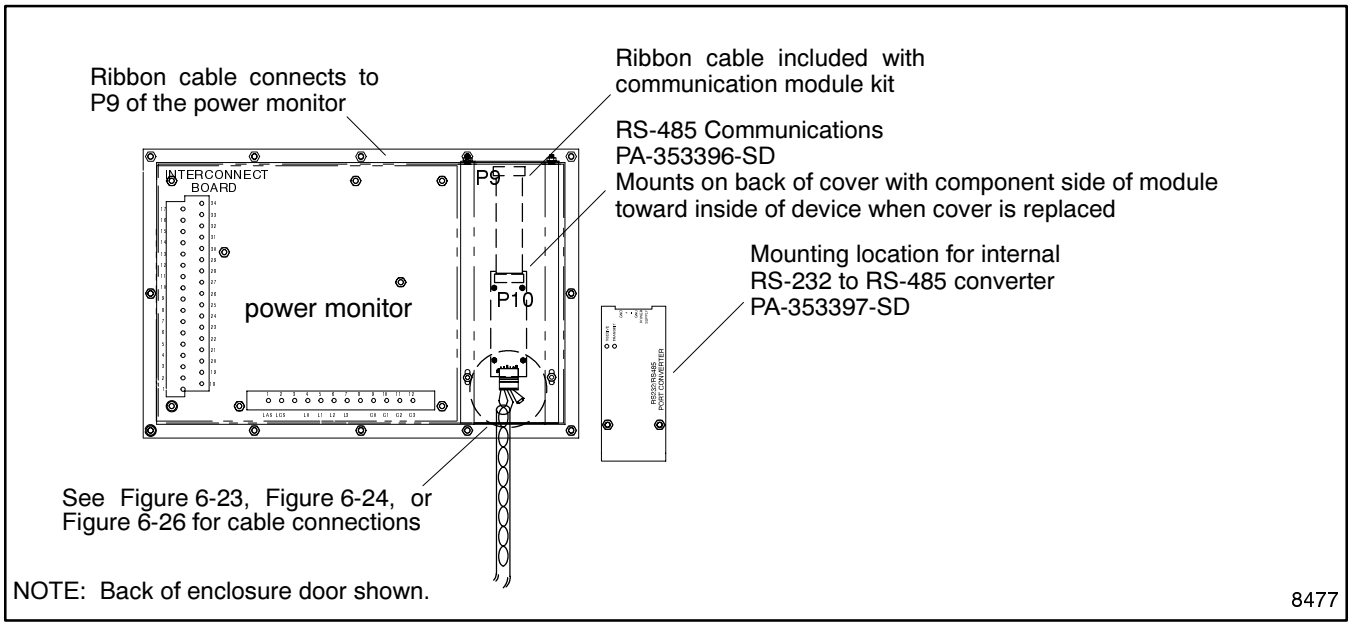


Figure 6-7. RS-485 Communication Module Location and Connection for the Power Monitor

6.2 Communication Hardware

Each connection type and device uses a specific set of communication hardware.

6.2.1 RS-232 Cable Details

See Figure 6-8 for details on RS-232 cables and adapters that connect directly from a PC to a device or from the PC to the modem and from the modem to the device. The 9-pin female to 25-pin male adapter converts certain types of PC serial ports that use 9-pin serial ports to the 25-pin output for use with the cables.

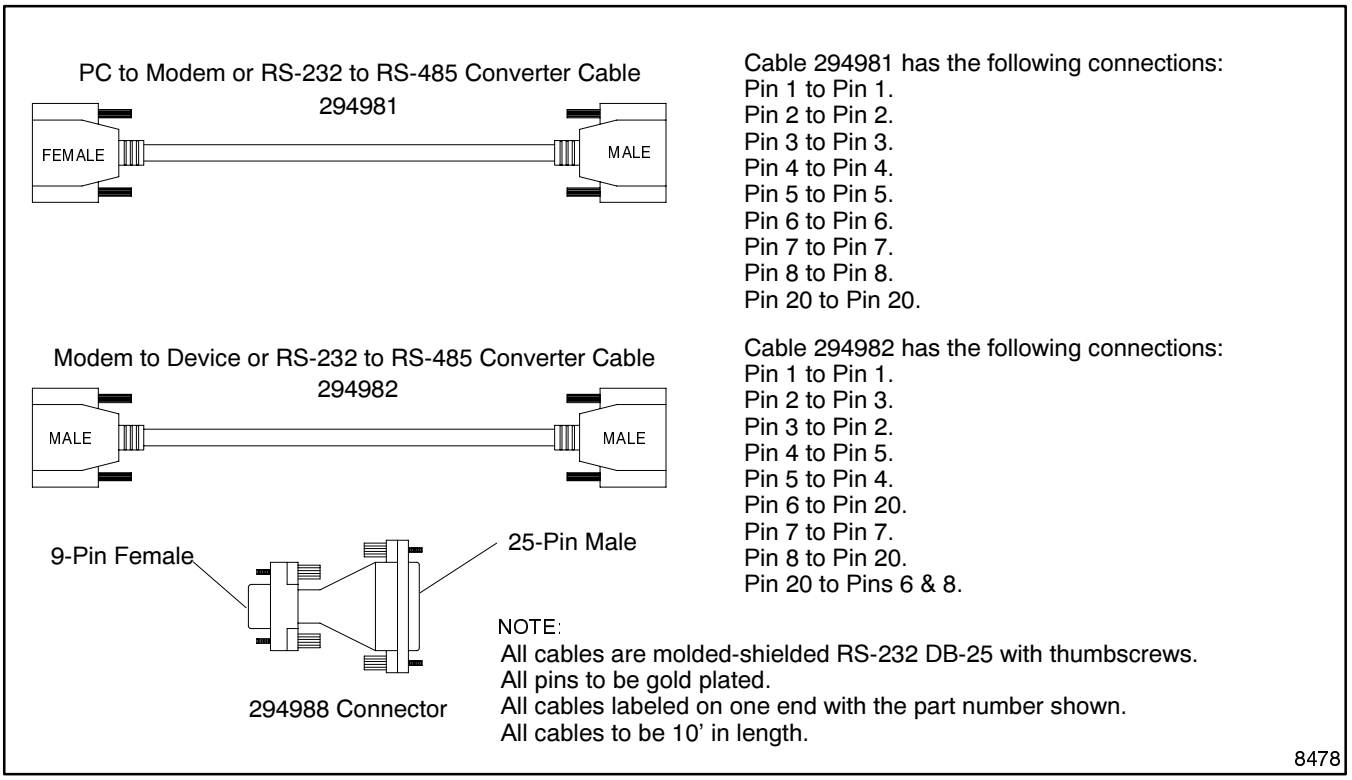


Figure 6-8. RS-232 Cable Details

6.2.2 Generator Set Controller

See Figure 6-9 for generator set controller communication hardware requirements.

Connection Type	Communication Module Accessory		Additional Hardware Required (see references below)
	Mounted	Loose	
Local up to 50 feet See Figure 6-10	354197, RS-232	PA-354197-SD, RS-232	1
Local up to 4000 feet See Figure 6-11	354198, RS-485	PA-354198-SD, RS-485	1, 2, and 3
Local area network See Figure 6-12	354198, RS-485, for each controller	PA-354198-SD, RS-485, for each controller	1, 2, and 3
Remote single connection See Figure 6-13	354197, RS-232	PA-354197-SD, RS-232	4 and 5
Remote area network See Figure 6-14	354198, RS-485, for each controller	PA-354198-SD, RS-485, for each controller	2, 3, 4, and 5

Additional Hardware:
1. PA-294992-SD, PC to RS-232 cable and connector
2. PA-352249-SD, External RS-232 to RS-485 converter
3. Customer-supplied cable, Belden #9841 or equivalent
4. PA-294864-SD, Modem for PC end
5. PA-294865-SD, Modem for controller end

Note: For sites with multiple devices or networks see respective figures to prevent duplication of hardware.

Figure 6-9. Generator Set Controller Communication Hardware

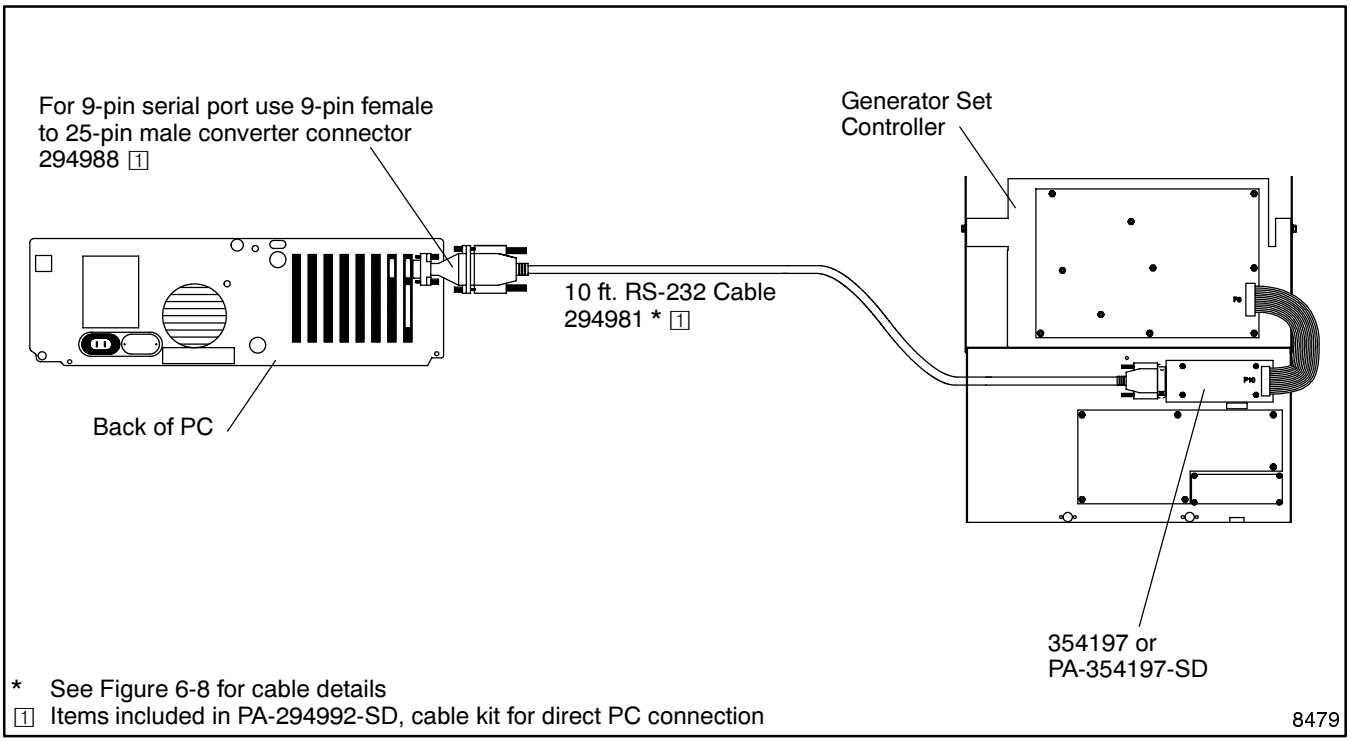


Figure 6-10. Local Single Connection Up to 50 ft. (15.24 m)

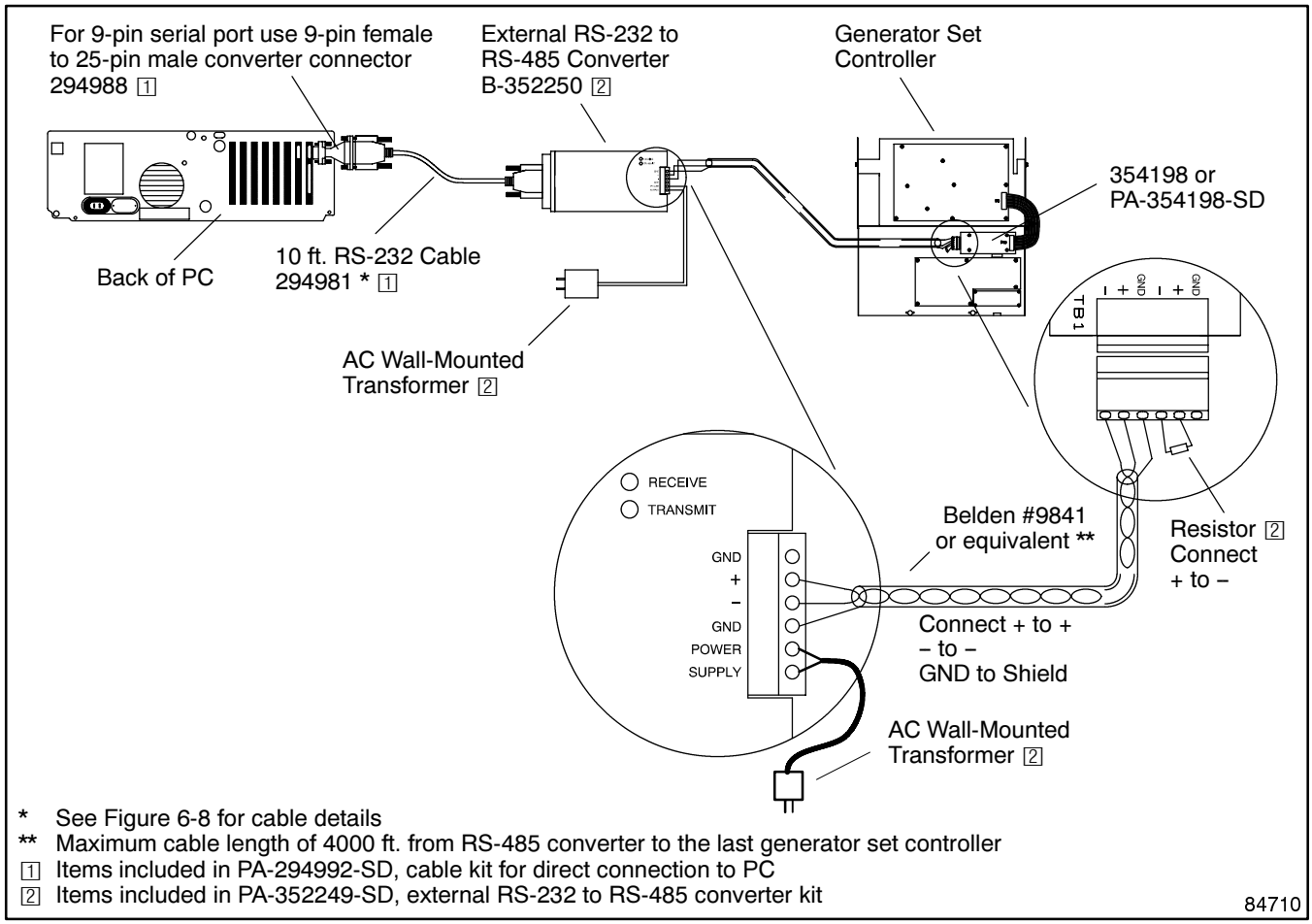


Figure 6-11. Local Single Connection Up to 4000 ft. (1219.2 m)

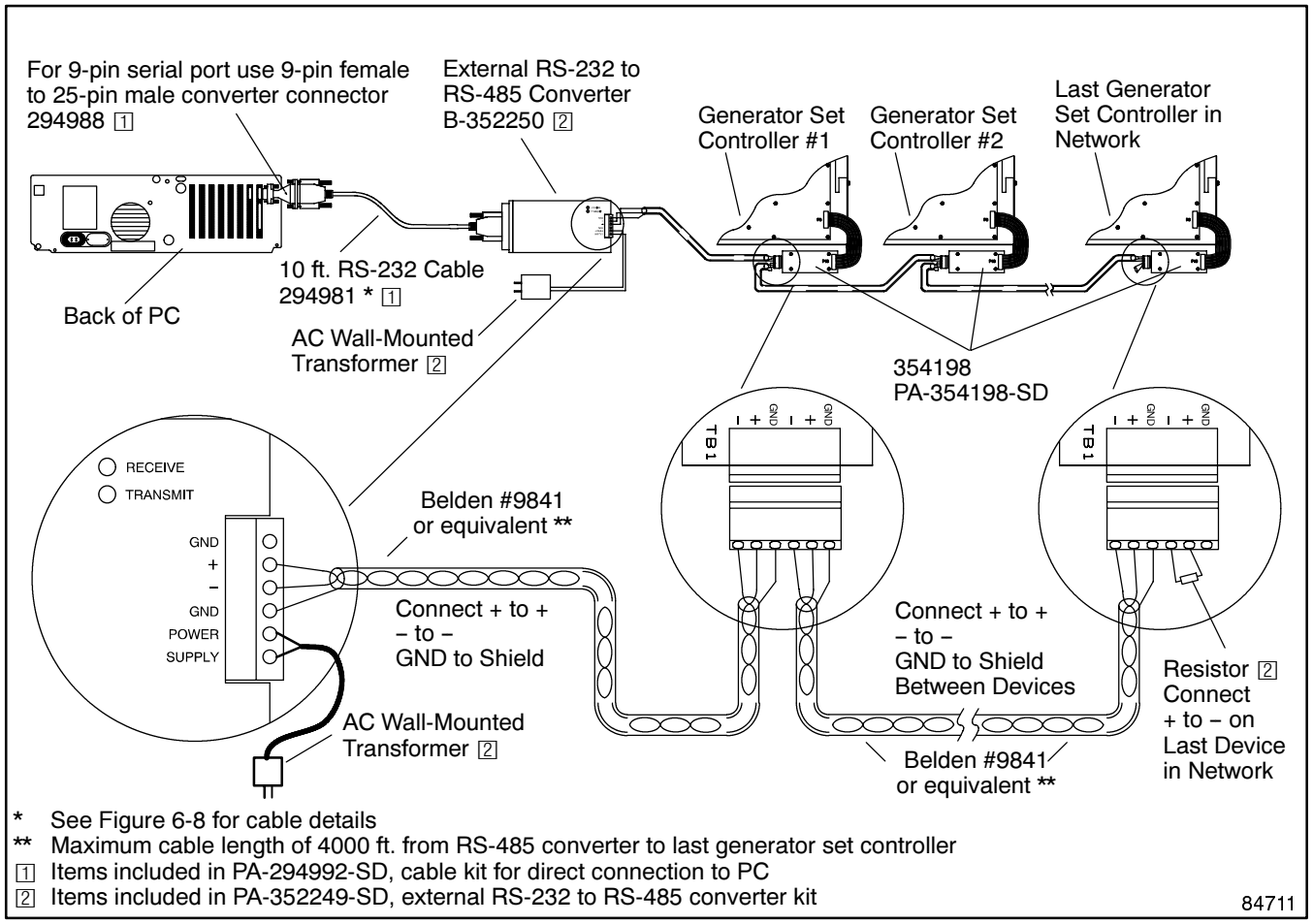


Figure 6-12. Local Area Network

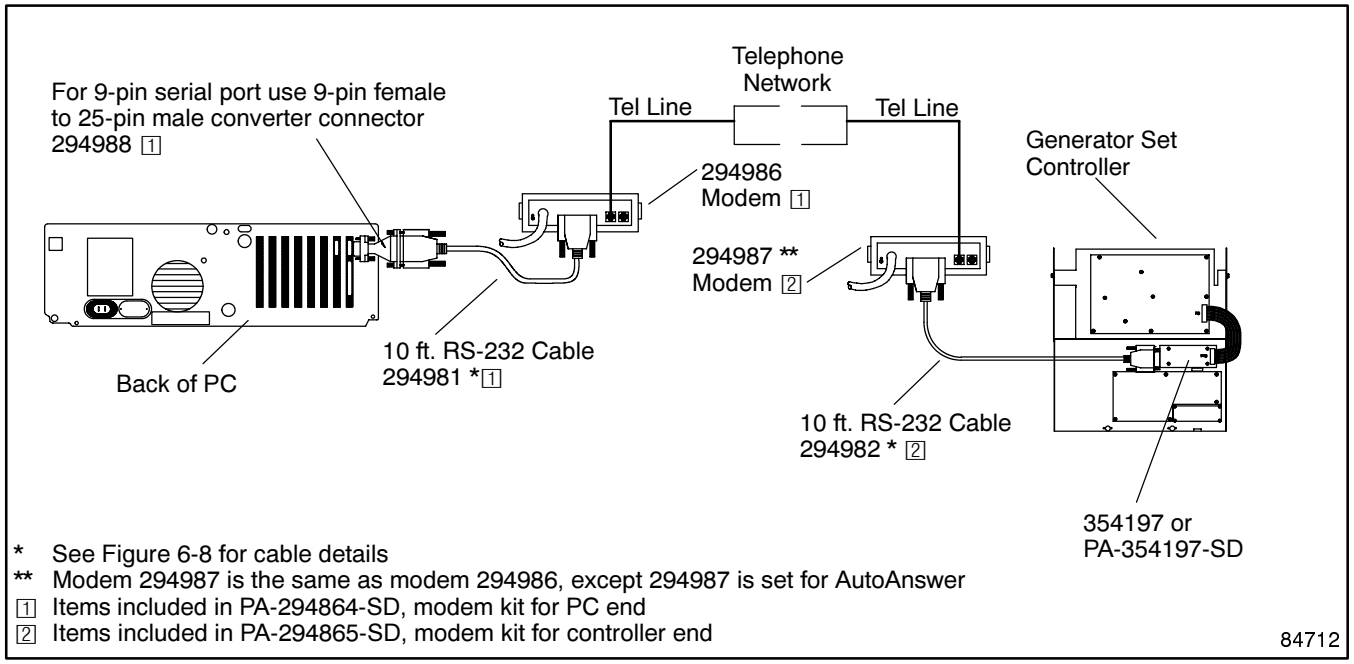
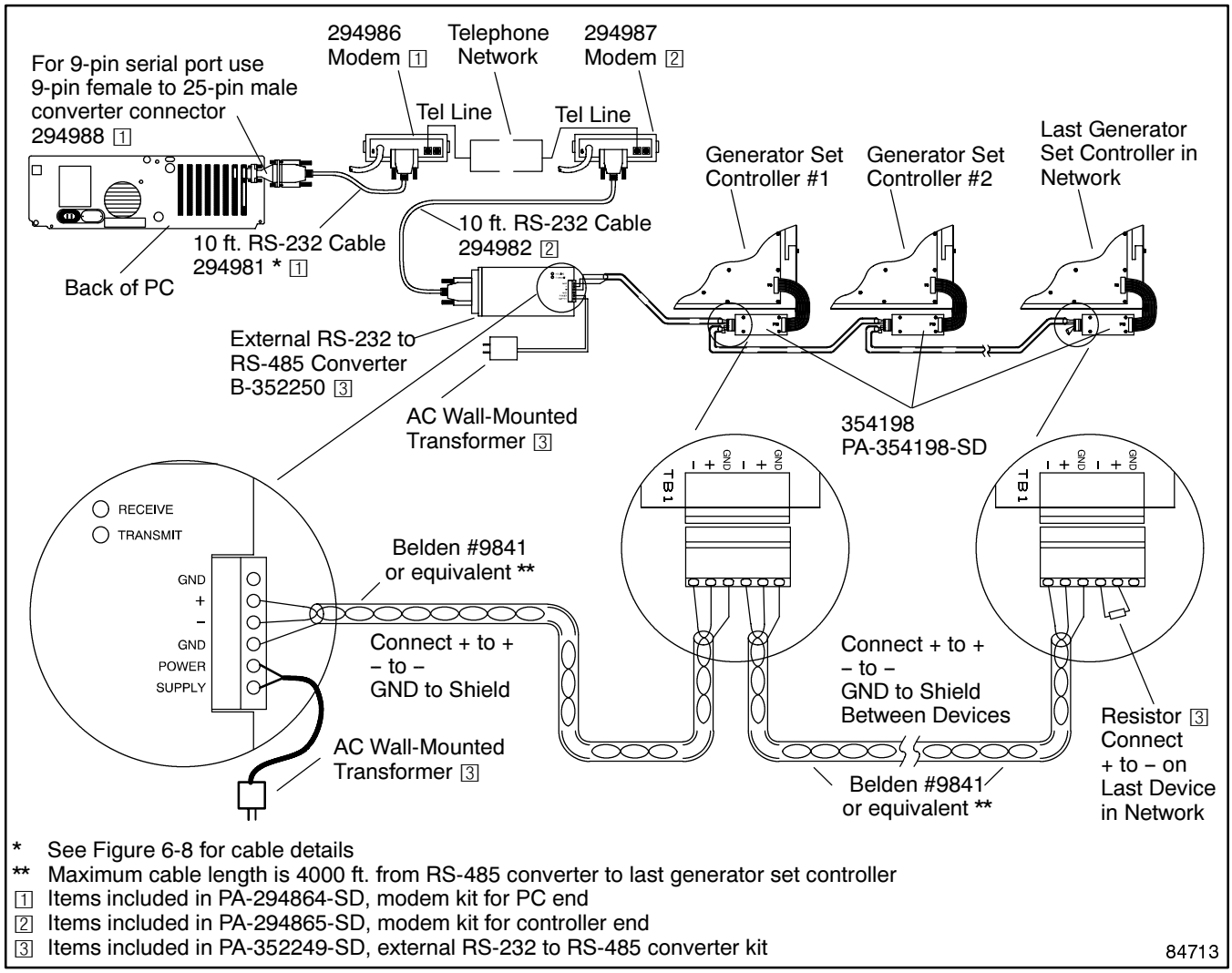


Figure 6-13. Remote Single Connection



* See Figure 6-8 for cable details
** Maximum cable length is 4000 ft. from RS-485 converter to last generator set controller
[1] Items included in PA-294864-SD, modem kit for PC end
[2] Items included in PA-294865-SD, modem kit for controller end
[3] Items included in PA-352249-SD, external RS-232 to RS-485 converter kit

Figure 6-14. Remote Area Network

6.2.3 ATS Controller

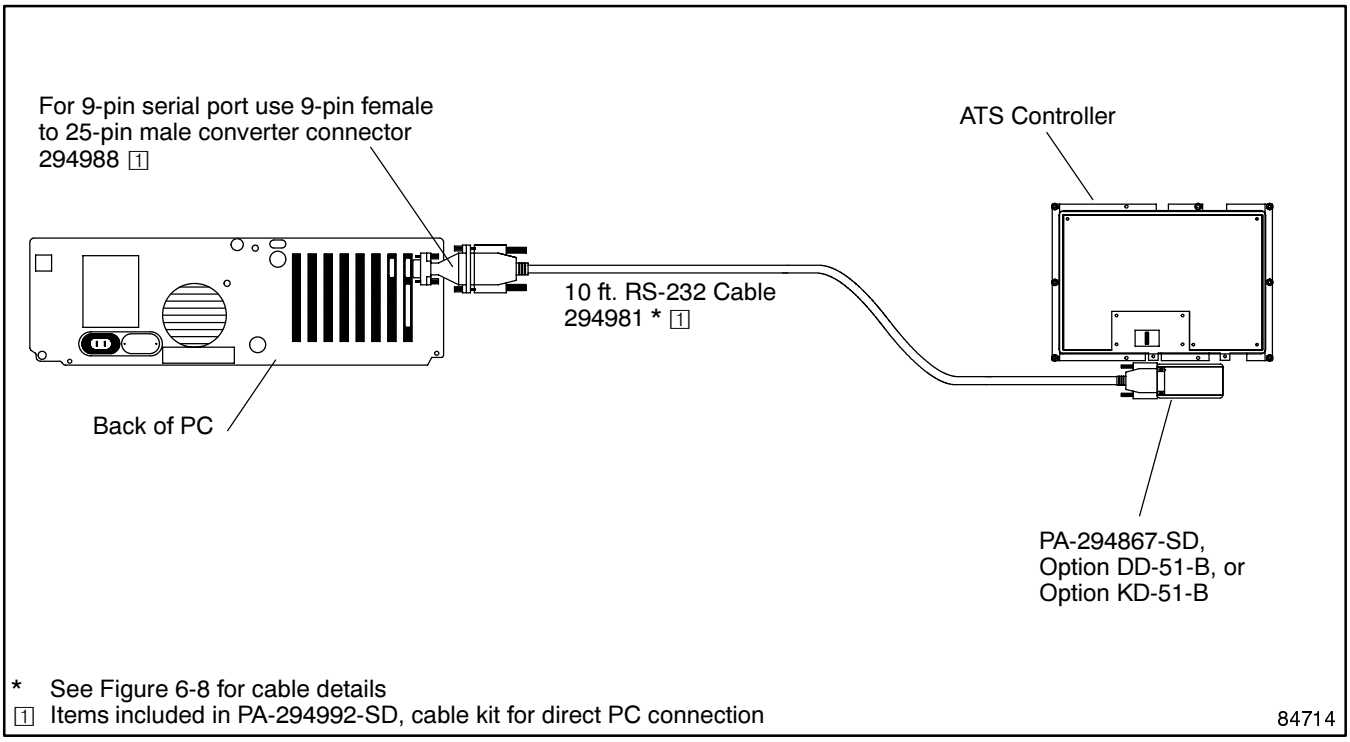
See Figure 6-15 for automatic transfer switch controller communication hardware requirements.

Connection Type	Communication Module Accessory		Additional Hardware Required (see references below)
	Mounted	Loose	
Local up to 50 feet See Figure 6-16	DD-51-B or KD-51-B, RS-232	PA-294867-SD, RS-232	1
Local up to 4000 feet See Figure 6-17	DD-51-A or KD-51-A, RS-485	PA-294866-SD, RS-485	1, 2, and 3
Local area network See Figure 6-18	DD-51-A or KD-51-A, RS-485, for each controller	PA-294866-SD, RS-485, for each controller	1, 2, and 3
Remote single connection See Figure 6-19	DD-51-B or KD-51-B, RS-232	PA-294867-SD, RS-232	4 and 5
Remote area network See Figure 6-20	DD-51-A or KD-51-A, RS-485, for each controller	PA-294866-SD, RS-485, for each controller	2, 3, 4, and 5

Additional Hardware:
1. PA-294992-SD, PC to RS-232 cable and connector
2. PA-352249-SD, External RS-232 to RS-485 converter
3. Customer-supplied cable, Belden #9841 or equivalent
4. PA-294864-SD, Modem for PC end
5. PA-294865-SD, Modem for controller end

Note: For sites with multiple devices or networks see respective figures to prevent duplication of hardware.

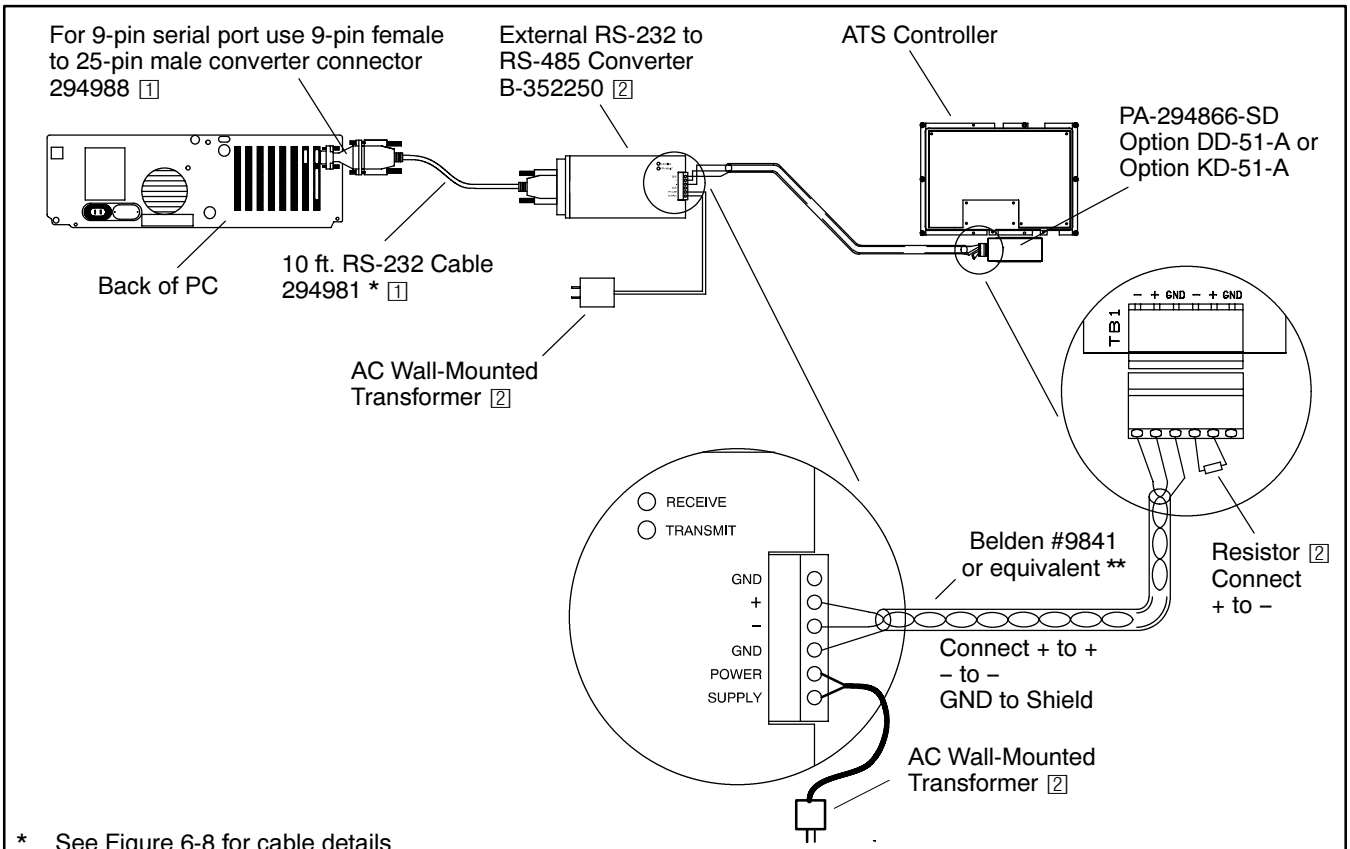
Figure 6-15. Automatic Transfer Switch (ATS) Controller Communication Hardware



* See Figure 6-8 for cable details
[1] Items included in PA-294992-SD, cable kit for direct PC connection

84714

Figure 6-16. Local Single Connection Up to 50 ft. (15.24 m)



* See Figure 6-8 for cable details
** Maximum cable length of 4000 ft. from RS-485 converter to the last ATS
[1] Items included in PA-294992-SD, cable kit for direct connection to PC
[2] Items included in PA-352249-SD, external RS-232 to RS-485 converter kit

84715

Figure 6-17. Local Single Connection Up to 4000 ft. (1219.2 m)

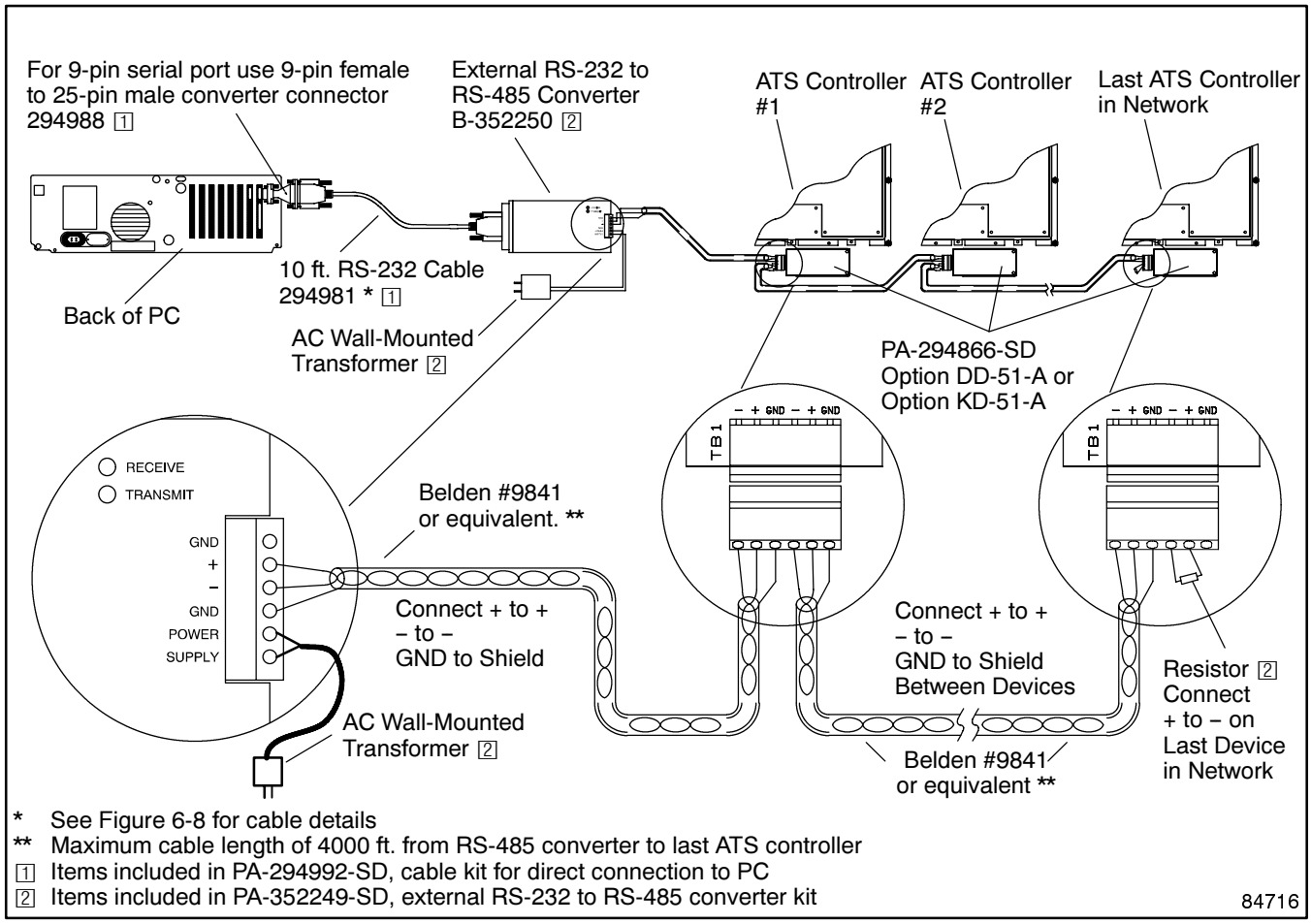


Figure 6-18. Local Area Network

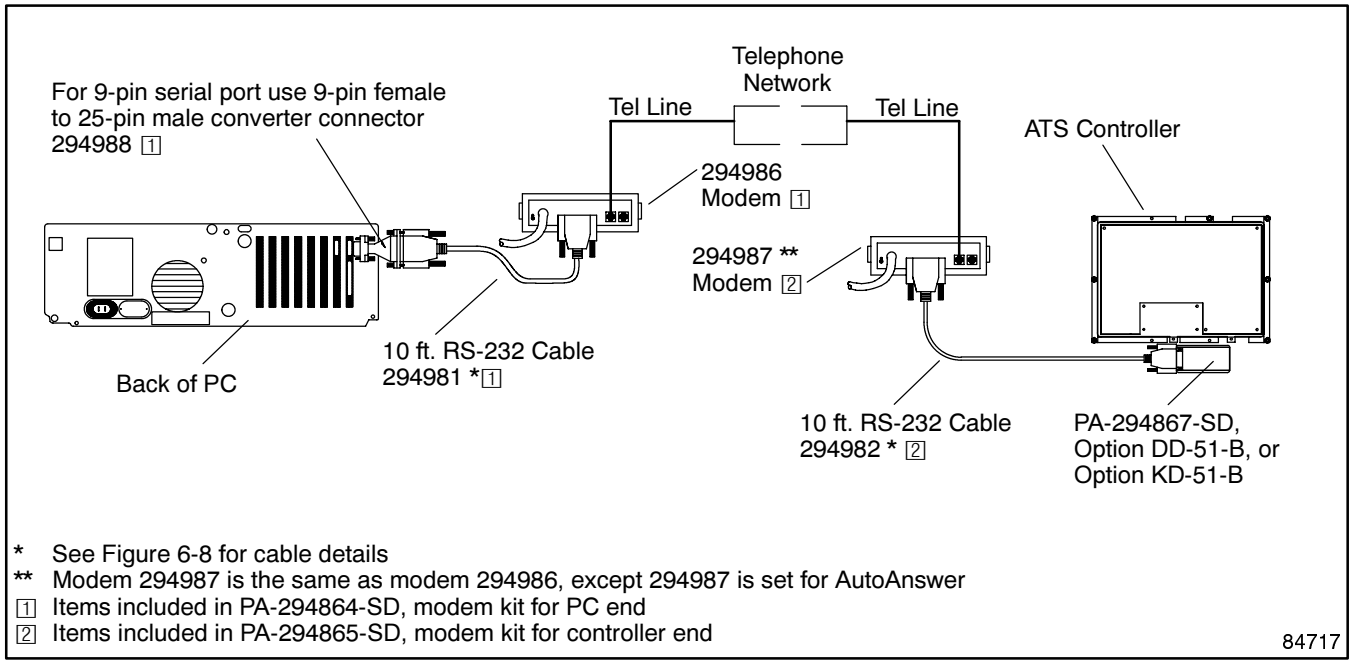
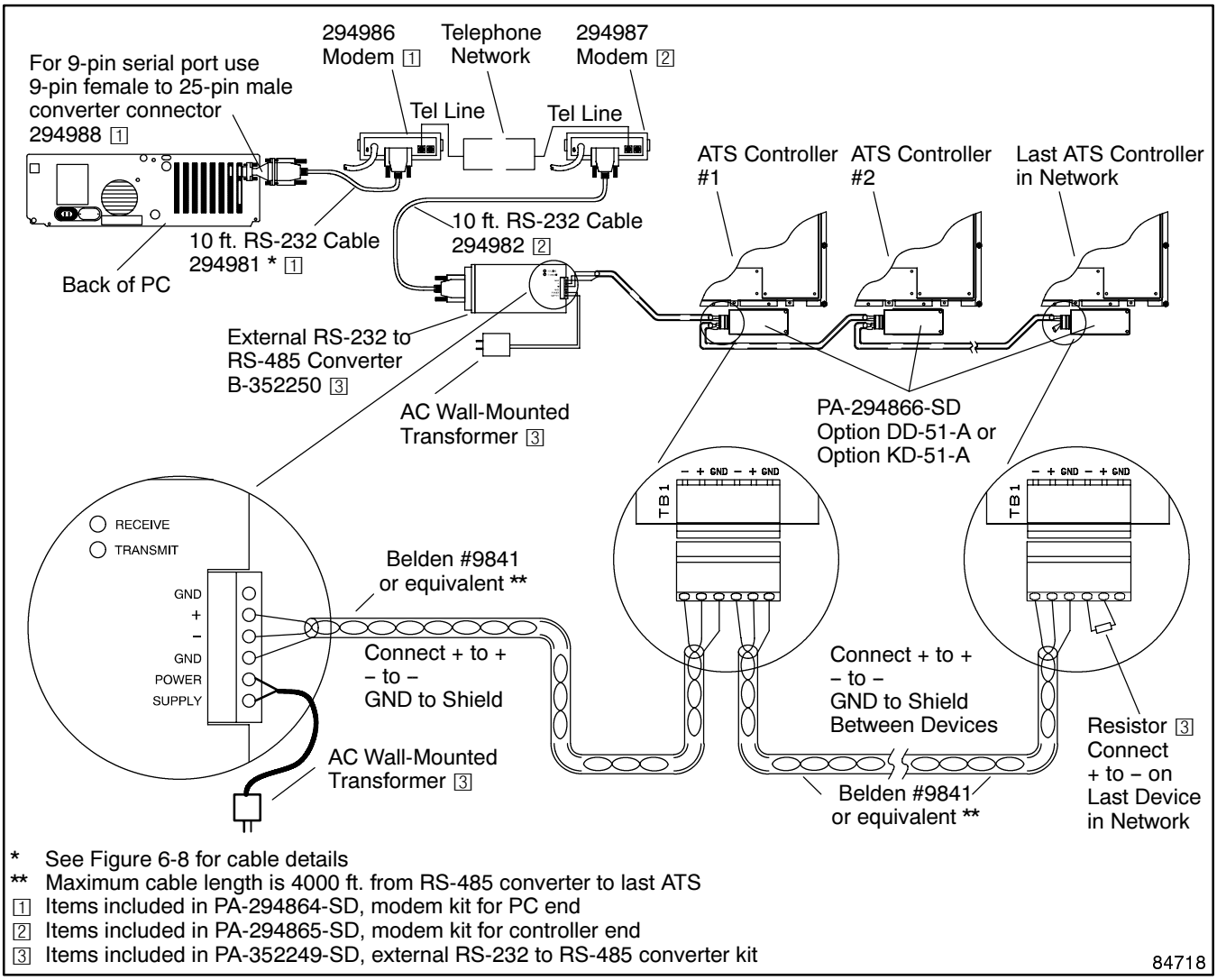


Figure 6-19. Remote Single Connection



* See Figure 6-8 for cable details
** Maximum cable length is 4000 ft. from RS-485 converter to last ATS
[1] Items included in PA-294864-SD, modem kit for PC end
[2] Items included in PA-294865-SD, modem kit for controller end
[3] Items included in PA-352249-SD, external RS-232 to RS-485 converter kit

Figure 6-20. Remote Area Network

6.2.4 Power Monitor

See Figure 6-21 for power monitor communication hardware requirements. Choose between an external or internal RS-232 to RS-485 converter when a power monitor is used in an RS-485 network. The figures show the external converter, but an internal converter installed inside the power monitor connects in the same manner.

Connection Type	Communication Module Accessory		Additional Hardware Required (see references below)
	Mounted	Loose	
Local up to 50 feet See Figure 6-22	353395, RS-232	PA-353395-SD, RS-232	1
Local up to 4000 feet See Figure 6-23	353396, RS-485	PA-353396-SD, RS-485	1, 2 or 3, and 4
Local area network See Figure 6-24	353396, RS-485, for each power monitor	PA-353396-SD, RS-485, for each power monitor	1, 2 or 3, and 4
Remote single connection See Figure 6-25	353395, RS-232	PA-353395-SD, RS-232	5 and 6
Remote area network See Figure 6-26	353396, RS-485, for each power monitor	PA-353396-SD, RS-485, for each power monitor	2 or 3, 4, 5, and 6

Additional Hardware:
1. PA-294992-SD, PC to RS-232 cable and connector
2. PA-352249-SD, External RS-232 to RS-485 converter
3. PA-353397-SD, Internal RS-232 to RS-485 converter
4. Customer-supplied cable, Belden #9841 or equivalent
5. PA-294864-SD, Modem for PC end
6. PA-294865-SD, Modem for power monitor end

Note: For sites with multiple devices or networks see respective figures to prevent duplication of hardware.

Figure 6-21. Power Monitor Communication Hardware

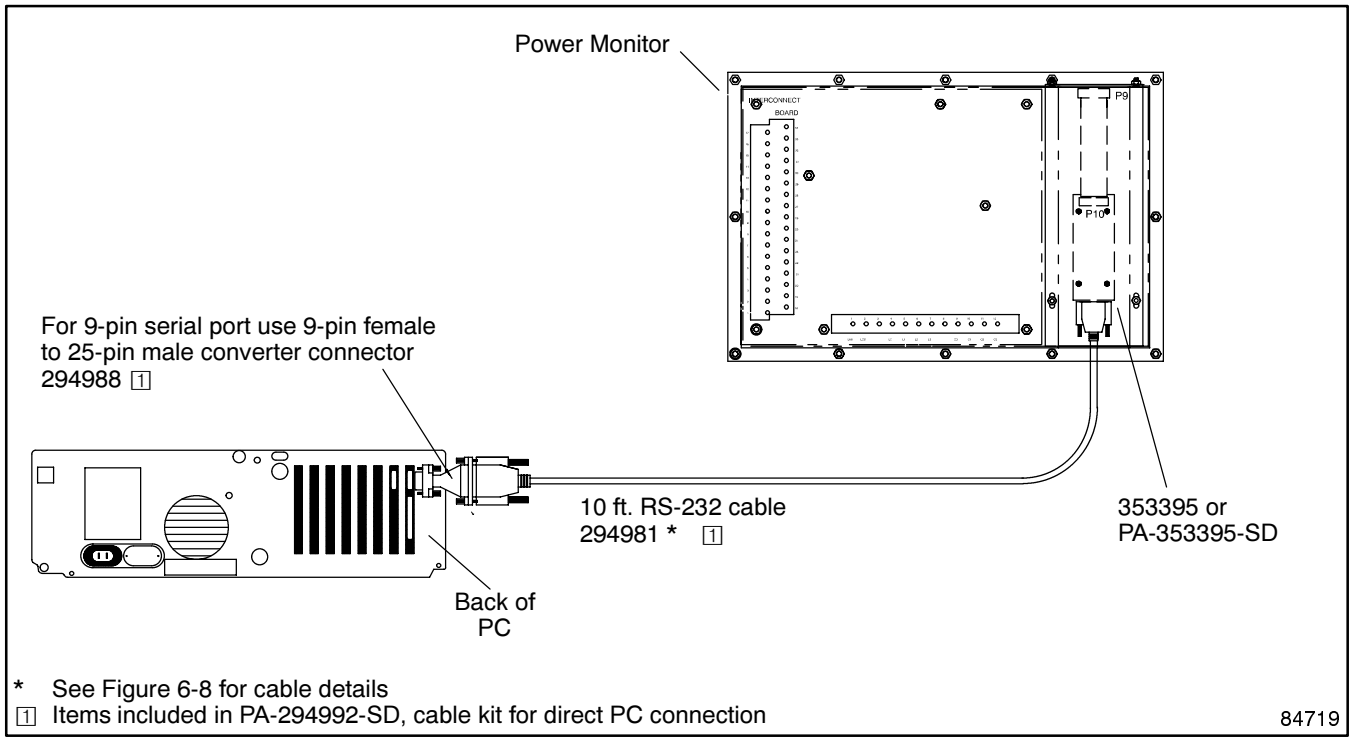


Figure 6-22. Local Single Connection Up to 50 ft. (15.24 m)

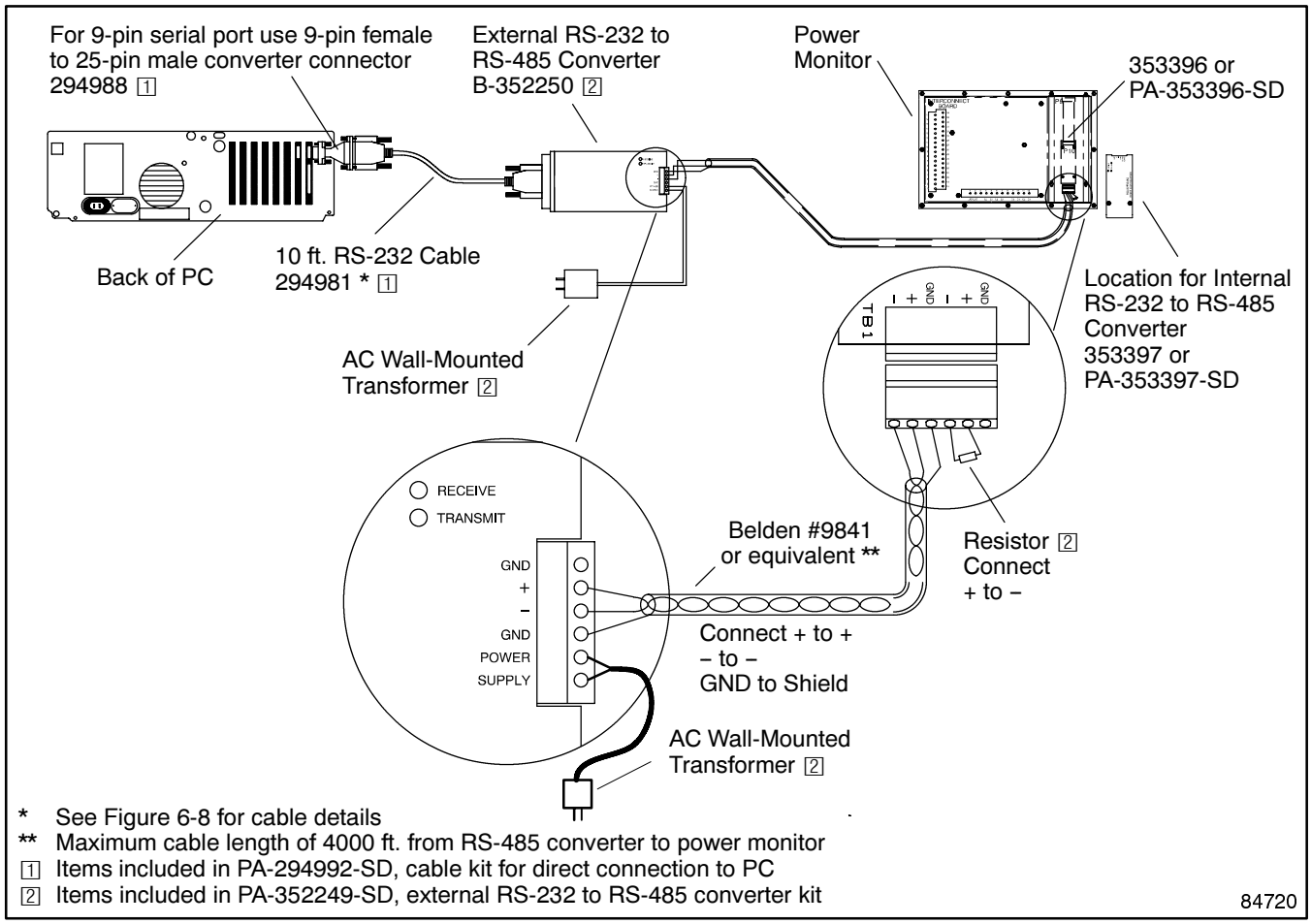


Figure 6-23. Local Single Connection Up to 4000 ft. (1219.2 m)

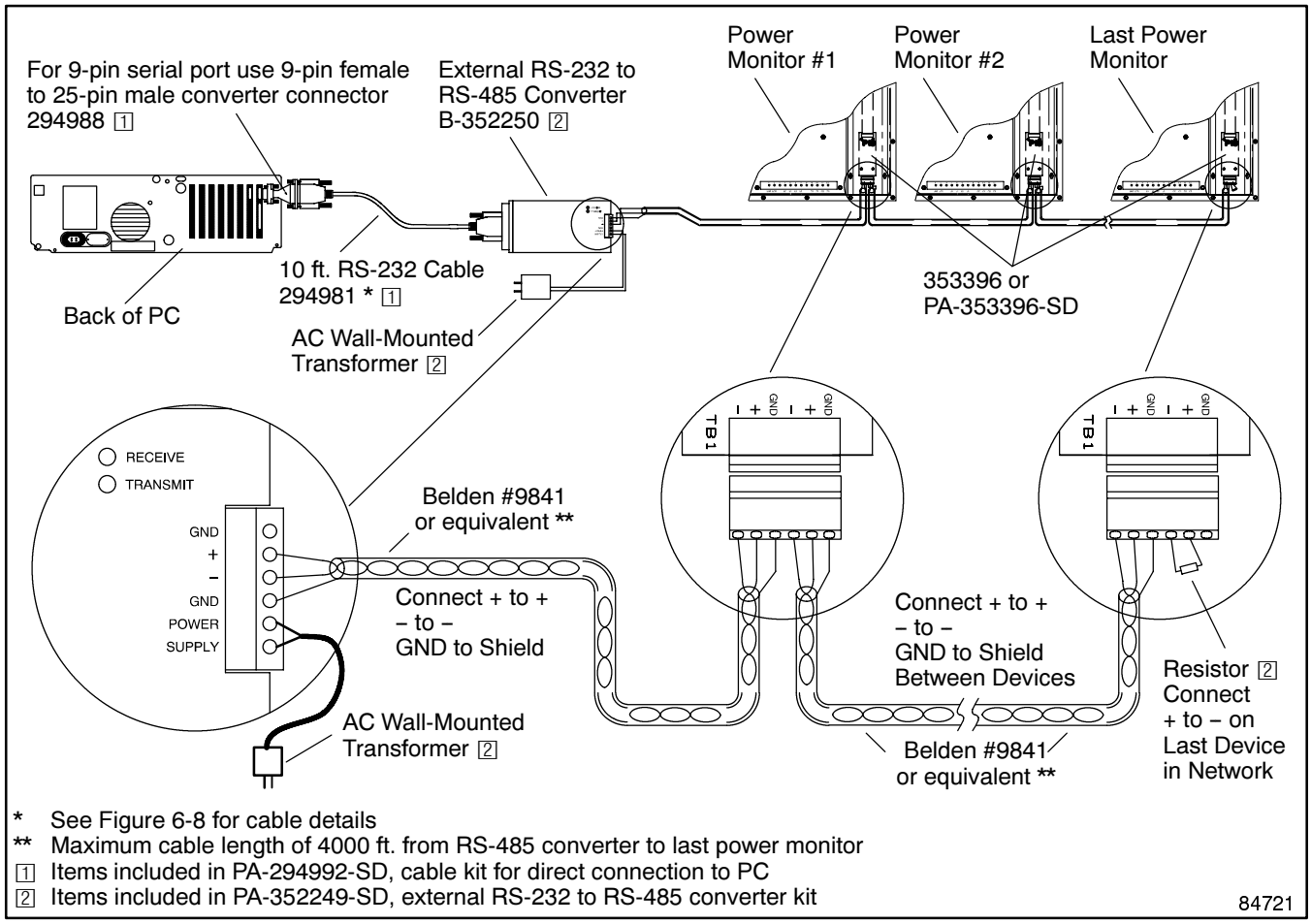


Figure 6-24. Local Area Network

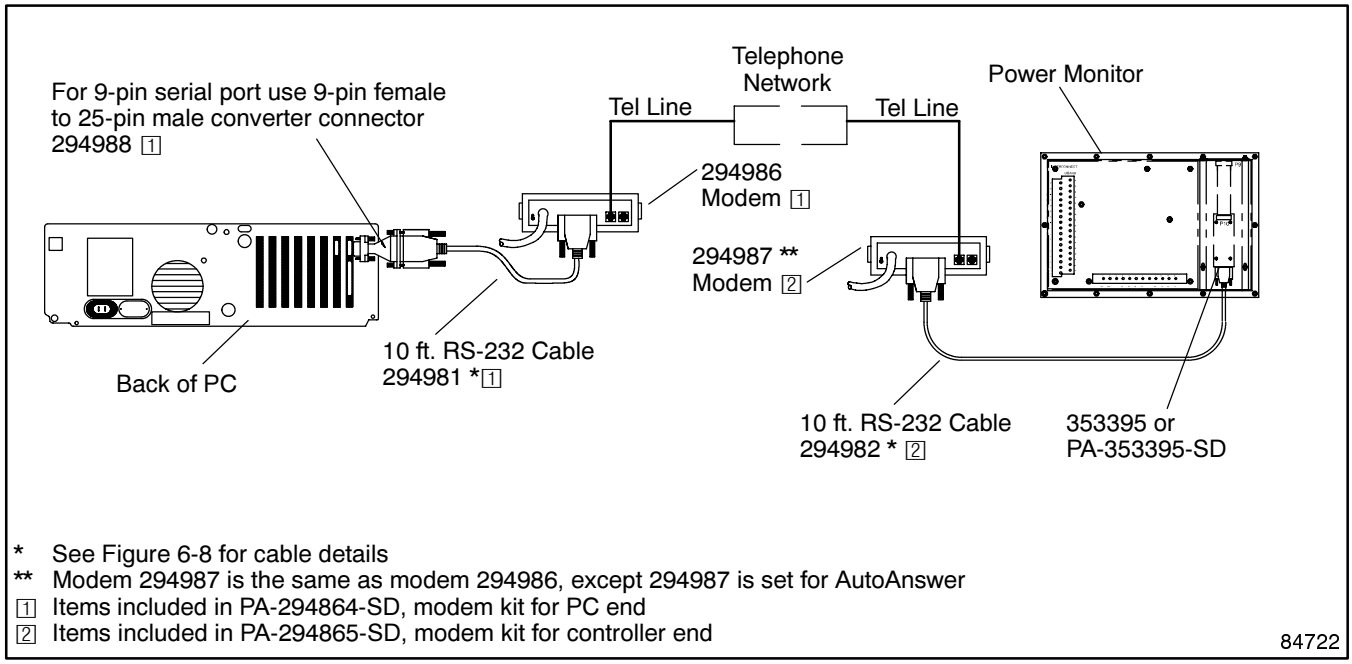


Figure 6-25. Remote Single Connection

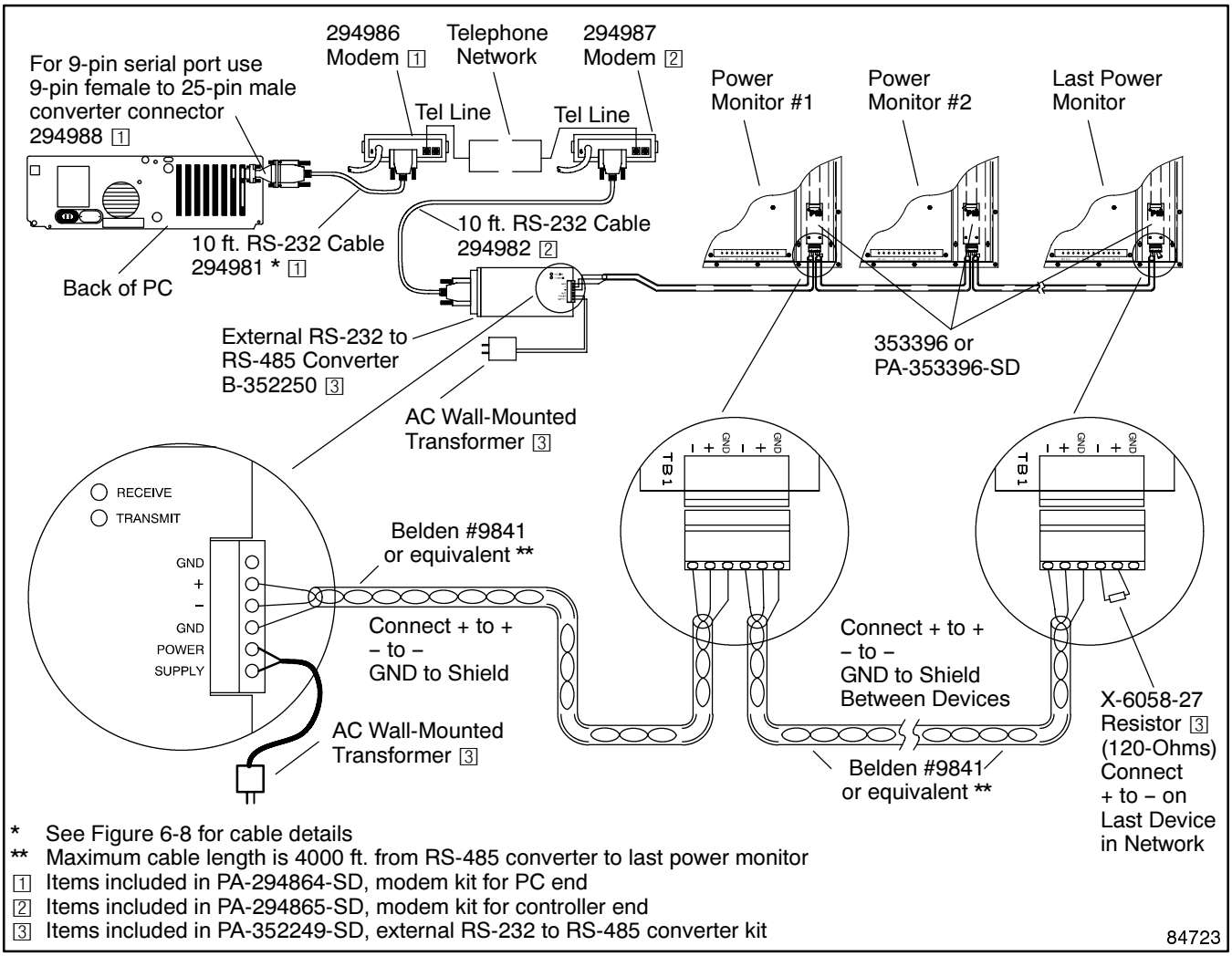


Figure 6-26. Remote Area Network

6.2.5 Different Devices On The Same Remote Area Network

A local area network or a remote area network can also be configured using any combination of power monitors, generator controllers, and automatic transfer switch (ATS) controllers.

Figure 6-27 shows an example of a network with one of each of the devices illustrated. Insert another device at any point in the network. You must connect the termination resistor across the last device on the network on the unused RS-485 communications port. Note that an internal RS-232 to RS-485 converter (part number 353397 or PA-353397-SD) mounted in the power monitor can substitute for the external model (part number PA-352249) shown; the connections are the same.

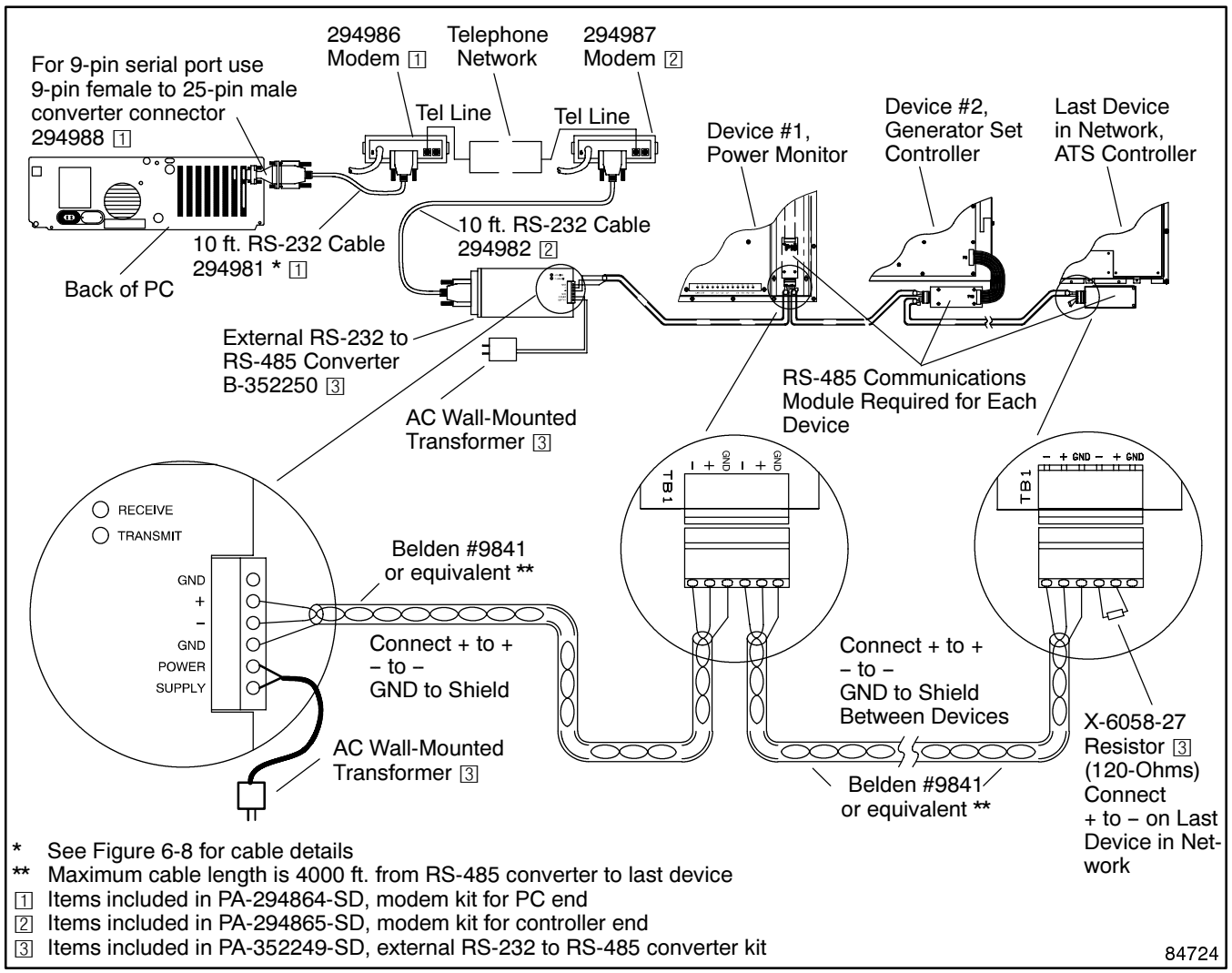


Figure 6-27. Remote Area Network Consisting of one or more Power Monitors, Generator Controllers, and Transfer Switch Controllers.

7.1 Enabling the Factory Setup Option

Use the Monitor software from the command line as follows to enable the factory setup option:

Spectrum.exe –f

If running the software from DOS, type in the command line as shown. If using Windows®, run the command line shown from File–>Run in Windows® 3.1 or Start–>Run in Windows® 95.

To change the normal installation to enable the factory setup option, follow the procedures below to edit the Program Group or shortcut.

Editing your Program Group in Windows® 3.1:

1. Double click on the program group for the monitor software.
2. Select the icon for the monitor software.
3. Choose File–>Properties and add the –f option to the end of the text in the Command Line: box and click OK.

Editing your shortcut in Windows® 95:

1. Find the shortcut you normally use to run the software. If you normally run the program from the Start menu, choose Start–> Settings–> Taskbar–> Start Menu Programs–> Advanced and browse for the shortcut.
2. Right click on the shortcut and choose Properties. In Properties choose the Shortcut or Program tab. Add the –f option to the end of the command line in the Target: or Cmd line: box and click Apply.

The following sections detail what information can be modified when using –f factory setup option. Each of the following sections is for a particular device.

7.2 Generator Set Controller

The following information can also be changed in the Setup column on the Information Setup Screen for a generator set controller using the factory setup option. See Figure 3-9. Use the up and down arrow keys to navigate through the list. Use the <F4> key to update the information when changes are complete.

System Voltage The generator set voltage. Enter the system voltage shown on the generator set nameplate.

System Frequency The generator set frequency. Enter the system frequency shown on the generator set nameplate.

Single/Three Phase The generator set electrical system type: SINGLE for single-phase, 3 WYE for three-phase wye, or 3 DELTA for three-phase delta. Use the + and – keys to select the electrical system type shown on the generator set nameplate.

KW Rating The generator set kilowatt rating. Enter the kilowatt rating shown on the generator set nameplate.

Battery Voltage The battery voltage for the generator set. Enter the battery voltage shown on the generator set nameplate.

Model No. The generator set model number. Enter the model number shown on the generator set nameplate up to 26 characters.

Spec No. The generator set specification number. Enter the specification number shown on the generator set nameplate up to 16 characters.

Serial No. The generator set serial number. Enter the serial number shown on the generator set nameplate up to 6 digits.

Control Serial Number The generator set controller serial number. Type in the generator set controller serial number up to 6 digits.

7.3 ATS Controller

The following information can also be changed in the Setup column on the Information Setup Screen for both the Normal and Emergency sources for an ATS controller using the factory setup option. See Figure 4-13. Use the up and down arrow keys to navigate through the list. Use the left and right arrows to select the Normal or the Emergency source column. Use the <F4> key to update the information when changes are complete.

System Voltage The system voltage. Enter the system voltage for the Normal or Emergency source.

System Frequency The system frequency. Enter the system frequency for the Normal or Emergency source.

Single/Three Phase Electrical system type: 1 for single-phase, 3 for three-phase. Enter 1 or 3 to select the electrical system type for the Normal or Emergency source.

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7.4 Power Monitor

The following information can also be changed in the Setup column on the Information Setup Screen for a power monitor using the factory setup option. See Figure 5-8. Use the up and down arrow keys to navigate through the list. Use the <F4> key to update the information when changes are complete.

System Voltage The monitored system voltage. Enter the system voltage for the monitored system.

System Frequency The monitored system frequency. Enter the system frequency for the monitored system.

Single/Three Phase Electrical system type: SINGLE for single-phase, 3 WYE for three-phase wye, or 3 DELTA for three-phase delta. Use the + and – keys to select the electrical system type for the monitored system.

ATS Rating The ATS contactor current rating. Enter the contactor current rating shown on the ATS nameplate.

Model No. The ATS model number. Enter the model number shown on the ATS nameplate up to 26 characters.

Spec No. The ATS specification number. Enter the specification number shown on the ATS nameplate up to 16 characters.

Serial No. The serial number for the ATS. Enter the serial number shown on the ATS nameplate up to 6 digits.

Control Serial Number The ATS controller serial number. Enter the ATS controller serial number up to 6 digits.

Appendix A. Glossary of Abbreviations

Abbreviations are used throughout this manual. Normally in the text they will appear in complete form with the abbreviation following in parenthesis the first time they are used. After that they will appear in the abbreviated form. The commonly used abbreviations are shown below.

AC	alternating current
AISI	American Iron and Steel Institute
Amp	ampere
Amps	amperes
ANSI	American National Standard Institute
API	American Petroleum Institute
approx.	approximate, approximately
A/R	as required, as requested
A/S	as supplied, as stated, as suggested
ASA	American Standards Association
ASME	American Society of Mechanical Engineers
assy.	assembly
ASTM	American Society for Testing Materials
ATDC	after top dead center
aux.	auxiliary
AWG	American Wire Gauge
AWM	appliance wiring material
BBDC	before bottom dead center
BDC	before dead center
BHP	brake horsepower
bmep	brake mean effective pressure
Btu	British thermal unit
°C	Celsius degree
cc	cubic centimeter
CCA	cold cranking Amps.
CEC	Canadian Electrical Code
cfh	cubic feet per hour
cfm	cubic feet per minute
CID	cubic inch displacement
cm	centimeter, centimeters
cmm	cubic meters per minute
co.	company
cont'd.	continued
CSA	Canadian Standards Association
CT	current transformer
cu. in.	cubic inch, cubic inches
cyl.	cylinder
dB	decibel
dBA	decibels (A weighted)
DC	direct current
DCR	direct current resistance
deg.	degree
dept.	department
dia.	diameter
e.g.	example given
EIA	Electronic Industries Association
EMI	electromagnetic interference
EPA	Environmental Protection Agency
etc.	et cetera (and so forth)
ext.	external
°F	Fahrenheit degree
fl. oz.	fluid ounce, fluid ounces
FM	frequency modulation
ft.	foot, feet
ft. lbs.	foot pound, foot pounds
ga.	gauge
gal./ gals.	gallon, gallons
gph	gallons per hour
gpm	gallons per minute
gr.	grade
grd.	ground
HCHT	high cylinder head temperature
HET	high exhaust (or engine) temperature
Hg	mercury (element)
H_2O	water
HP	horsepower
hr, hrs	hour
Hz	hertz (cycles per second)
ID	inside diameter
IEEE	Institute of Electrical and Electronic Engineers
in.	inch(es)
inc.	incorporated
in. lbs.	inch pounds
int.	internal
int.-ext.	internal-external
ISO	International Standards Organization
J	joule, joules
JIS	Japanese Industry Standard
kg	kilogram, kilograms
kg/cm^2	kilograms per square centimeter
kgm	kilogram meter(s)
kJ	kilojoules (btu cal)
km	kilometer, kilometers
kPa	kiloPascal, kiloPascals
kph	kilometers per hour
kV	kilovolt
kVA	kilovolt amperes
kW	kilowatt, kilowatts
kWH	kilowatt hour
L	liter, liters
LxWxH	length x width x height
LED(s)	light emitting diode
lb., lbs.	pound, pounds
L/hr.	liter per hour, liters per hour
L/min.	liter(s) per minutes
LOP	low oil pressure
LP	liquefied petroleum
m	meter, meters
m^3	cubic meter, cubic meters
max.	maximum
MCM	one thousand circular mils.
megger	megohmmeter
MHz	megahertz
mi.	mile, miles
mil	one one-thousandth of an inch
min.	minimum
mJ	millijoule, millijoules
MJ	mega joule, mega joules
mm	millimeter, millimeters
m^3/min	cubic meters per minute
MPa	megaPascal
mW	milliwatt, milliwatts
MW	megawatt, megawatts
N/A	not available or not applicable
NBS	National Bureau of Standards
N.C.	normally closed
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
Nm	Newton meter, Newton meters
no., nos	number, numbers
NPT	National Standard taper pipe thread per general use
N/R	not required
OC	overcrank
OD	outside diameter
OEM	original equipment manufacturer
OS	overspeed, oversize
O/S	oversize
OSHA	Occupational Safety and Health Act
OV	overvoltage
oz.	ounce, ounces
PF	power factor
PMG	permanent magnet generator
pot.	potentiometer
ppm	parts per million
psi	pounds per square inch
pt., pts.	pint, pints
PVC	polyvinyl chloride
qt., qts.	quart, quarts
qty.	quantity
ref.	reference
RFI	radio frequency interference
r.h.m.	round-head machine (screw)
rms	root mean square
RPM	revolutions per inch
RTV	room temperature vulcanization
SAE	Society of Automotive Engineers
SCR	silicon-controlled rectifier
sec.	second, seconds
spec.	specs, specification
sq.	square
sq. cm	square centimeters
sq. in.	square inch, square inches
tach	tachometer
TDC	top dead center
tech. pub.	technical publications
temp.	temperature
TIF	telephone influence factor
TP, TPs	technical publications
turbo	turbocharger
UHF	ultrahigh frequency
UNC	Unified coarse thread (was NC)
UNF	Unified fine thread (was NF)
UL	Underwriter's Laboratories, Inc.
U/S	undersize
U.S.A.	United States of America
v	volt, volts
vac	volts alternating current
vdc	volts direct current
VHF	very high frequency
W	watt, watts

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