SIEMENS

SIMATIC PCS 7 OSx

Hardware Manual

(SIMATIC Rack PC 840)

⚠ DANGER

DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

DANGER is limited to the most extreme situations.

⚠ WARNING

WARNING indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and/or property damage.

⚠ CAUTION

CAUTION used with a safety alert symbol indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation that, if not avoided, could result in property damage.

NOTICE

NOTICE indicates a potential situation that, if not avoided, could result in an undesirable result or state.

MANUAL PUBLICATION HISTORY

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Preface

Purpose of This Manual

The *SIMATIC PCS 7 OSx Hardware Manual (SIMATIC Rack PC 840)* includes installation procedures, hardware descriptions, and maintenance information about the SIMATIC Rack PC 840 OSx computer.

- Chapter 1 describes the Rack PC 840 hardware components and how they connect to the system.

- Chapter 2 describes how to use the CMOS setup utility to restore system configuration for OSx 4.x.x.

- Chapter 3 describes the system unit printed circuit boards and how to use system diagnostics.

What's in the Other Manuals?

The SIMATIC PCS 7 OSx manual set consists of several manuals. If you cannot find the information that you need in the *SIMATIC PCS 7 OSx Hardware Manual (SIMATIC Rack PC 840)*, check these other books:

- *SIMATIC PCS 7 OSx System Administration Manual*   This manual offers help in configuring network stations, and for procedures that describe how to configure printers, archive and backup data.

- *SIMATIC PCS 7 OSx Process Configuration Manual*   This manual describes the primary tasks required to configure your OSx system for controlling your process.

- *SIMATIC PCS 7 OSx Graphical Editor Manual*   This manual describes how to create the graphical displays used with OSx.

- *SIMATIC PCS 7 OSx Reports Manual*   This manual describes how to create reports on your process and your OSx configuration.

- *SIMATIC PCS 7 OSx Recipe Manual*   This manual explains more advanced configuration tasks involving the creation and use of recipes.

- *SIMATIC PCS 7 OSx Batch Programming Manual*   This manual describes more advanced configuration tasks involving the use of BCL, the Batch Control Language, and the creation of batch programs.

- *SIMATIC PCS 7 OSx Operator Manual*   This manual is written for the configuration engineer, but it describes how to carry out the various tasks that the process operator must do when the system is in the Operate state.

- *SIMATIC PCS 7 OSx Interface to S5 Controllers Manual*   This manual describes the OSx interface with SIMATIC S5 controllers.

- *SIMATIC PCS 7 OSx Interface to S7 Controllers Manual*   This manual describes the OSx interface with SIMATIC S7 controllers.

- *SIMATIC PCS 7 OSx Library Manual*   This manual describes the function blocks used to program the S7-400 controllers to interface with OSx.

Be sure to check the Readme File for information that did not become available until after the publication deadlines for the OSx manuals. The Readme File also points to important copyright, licensing, and warranty information. Select **Help**->**About OSx** from the main menu bar, and then click the **Show Readme** button at the bottom of the About OSx dialog box.

Optional SIMATIC PCS 7 OSx Features

The following manuals are available for optional SIMATIC PCS 7 OSx features.

- *SIMATIC PCS X Terminal User Manual*   This manual describes how to connect and operate an X terminal as an extension of an OSx station.

- *SIMATIC PCS 7 OSx Remote Data Transfer Manual*   This manual describes the remote data transfer feature, which allows you to transmit data collected from the process by an OSx station to an Oracle database on the remote computer for historical records and other purposes.

- *SIMATIC PCS 7 OSx @aGlance User Manual*   This manual describes how to import OSx data into a Windows application, such as Excel or Lotus 1-2-3, or into another UNIX or VMS application.

If You Need Help

If you have difficulty with your system, contact the Siemens Energy & Automation, Inc., Technical Services Group in the U.S.A. at 800–333–7421. Outside the U.S.A., call 49–911–895–7000.

1.1 Overview of System Components

Features

Figure 1-1 shows the locations for the hardware connections to a SIMATIC PCS 7 OSx station. The following sections describe the component connections.

- Connecting the Monitor, Section 1.9

- Connecting Input Devices, Section 1.10

- Connecting the System to the Industrial Ethernet Network, Section 1.11

- Connecting Options: Printer, Section 1.12

- Connecting Options: Alarm Card, Section 1.13

CAUTION

This is an FCC Class A product intended for use in industrial environments.

Use of this product in a domestic environment may cause radio frequency interference, which may disrupt other electronic equipment.

If you are using this product in a non-industrial, non-scientific environment, take proper installation precautions.
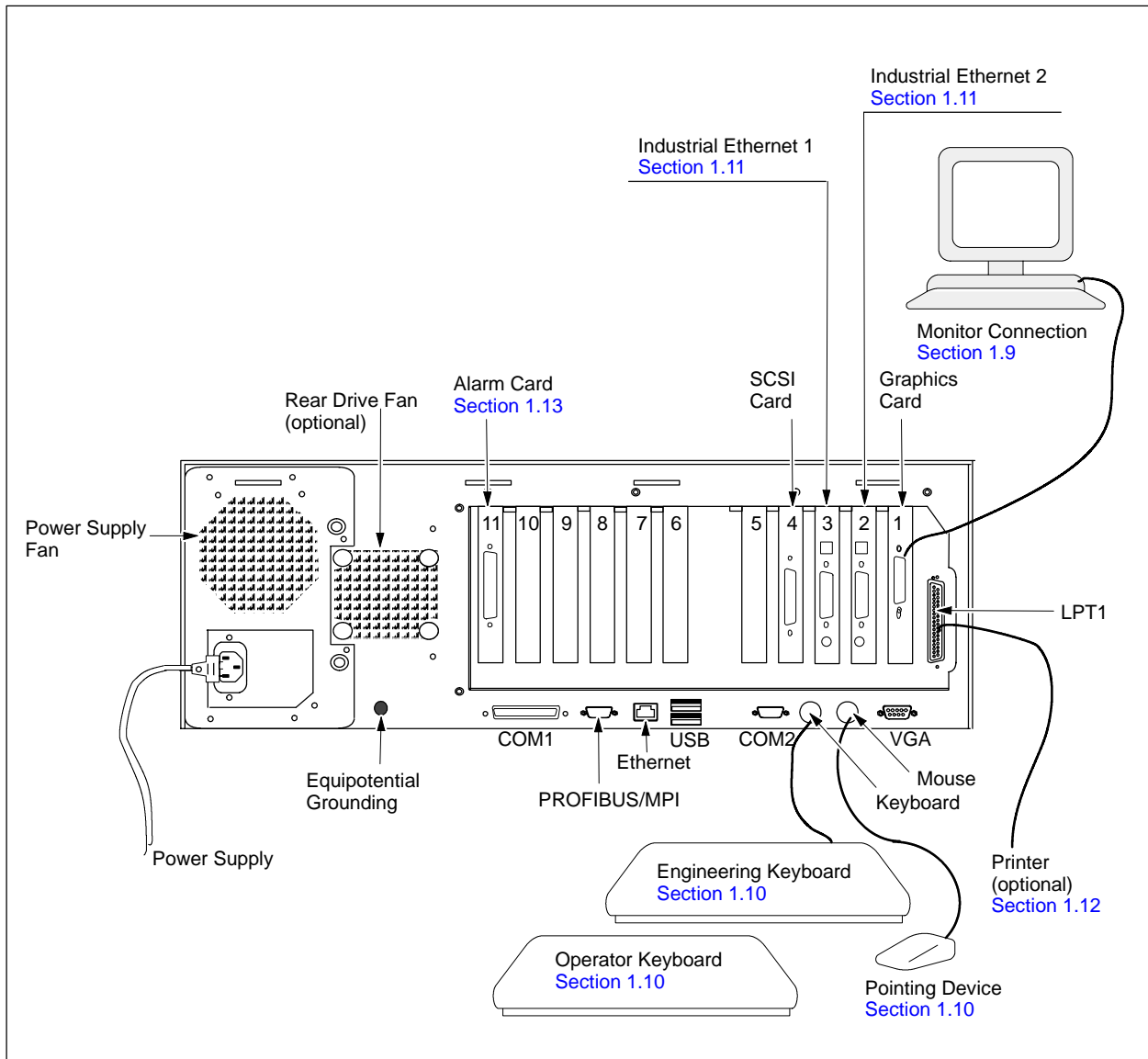
Figure 1-1   System Component Connections

1.2　Hardware Assemblies

SIMATIC PCS 7 OSx System

The SIMATIC PCS 7 OSx system consists of the following major subassemblies.

The **System Unit** controls the gathering of data from the Industrial Ethernet network. The system unit makes decisions on what to do with the gathered data based upon the database configuration. It contains the real time relational database, system software packages, system RAM memory, and network interface.

The **22-Inch Monitor** provides 256 colors and 640 x 480 through 1280 x 1024 pixel resolution.

The **Engineering Keyboard** allows you to configure the system, to design reports, and to program. The engineering keyboard is of standard construction, but is configured to function the same way as an operator keyboard and can be used in the Operate state.

The **Operator Keyboard** allows you to access process graphics and displays, to enter new values, and to print reports. The operator keyboard is constructed of a factory-hardened, tactile membrane, with ports that can be used to attach a mouse or trackball, and a standard engineering keyboard.

The **Pointing Device**, a trackball or mouse, is used for moving quickly among the menu and screen-selections, and for drawing shapes in the graphics editor.

The **Magneto-Optical Drive** is used for data archiving.

The **Hard Disk Drive** serves as the mass storage device for the system unit. It consists of one 20 Gbyte drive.

The **Ethernet Communications Board** allows OSx to connect to an Ethernet network.

The **Alarm Board** provides external annunciation of alarms and failover communications.

The **CD-ROM** is used for loading operating system software and for accessing the SIMATIC PCS 7 OSx manual set on CD.

Optional Printers   OSx supports several optional printers. Printers can be set up to provide hard copies of reports, alarm messages, operator change messages, tag lists, system messages, screen prints, etc. See the *SIMATIC PCS 7 OSx System Administration Manual* for additional information.

System Cabling   Figure 1-1 shows cable connections for the OSx computer.

Power Requirements   Additional information about fuse requirements, input voltage selection, and servicing data is listed in this manual along with general subassembly descriptions.

NOTE: It is recommended that you provide an Uninterruptible Power Supply (UPS) for your system to ensure continuous operation during AC power failures. Refer to Appendix C for UPS cabling information.

1.3   Equipment Storage Requirements

Before taking delivery of your system, prepare a storage area for the equipment boxes so you can use them later, if required. Your equipment must be stored in a clean environment to prevent system component damage. Table 1-1 lists storage environment specifications.

Table 1-1   Storage Environment Specifications

Parameter	Range or Description
Storage temperature	–20°C to 60°C
Relative humidity	5% to 95% (no condensation)
Contaminants to be avoided	Dust Smoke Corrosive chemicals Toxic gases

CAUTION
Motors, copy machines, and similar devices used near equipment can destroy stored data and distort monitor color purity. **Keep equipment away from transformers and other sources of electromagnetic fields.**

Equipment Carton Weights and Dimensions

Table 1-2 lists equipment carton weights and dimensions.

Table 1-2   Equipment Carton Weights and Dimensions

Subassembly	Height	Length	Width	Weight
System Unit	16.5 in. 41.9 cm	25.0 in. 63.5 cm	25.0 in. 63.5 cm	50.6 lb. 23.0 kg
Color Monitor, 22-inch	25.0 in. 63.5 cm	24.5 in. 62.2 cm	24.5 in. 62.2 cm	67.7 lb. 30.8 kg
Color Monitor, 17-inch	20.5 in. 52.1 cm	22.0 in. 55.9 cm	21.0 in. 53.3 cm	46.3 lbs. 21.0 kg
Engineering Keyboard	4.0 in. 10.2 cm	25.5 in. 64.7 cm	10.25 in. 26.0 cm	5.0 lb. 2.3 kg
Operator Keyboard	5.0 in. 12.7 cm	9.5 in. 24.1 cm	6.5 in. 16.5 cm	8.0 lb. 3.6 kg
Mouse/Trackball	5.0 in. 12.7 cm	9.5 in. 24.1 cm	6.5 in. 16.5 cm	2.0 lb. 0.9 kg

Equipment Storage Requirements (continued)

Media Storage

When determining your overall space requirements, include space for storing diskettes and tapes. Choose a storage area that protects diskettes and tapes from the following hazards.

- Magnetic fields

- Dust

- Smoke

- Humidity

- Process by-products (e.g., corrosive chemicals, toxic gases)

- Temperature extremes (ensure that the –20°C to 60°C range is maintained)

Select a cabinet that is approved for storage by an applicable agency, such as Underwriters Laboratories (UL).

Spare Parts Storage

Overall space requirements should also include provisions for storing spare parts. Choose a storage area that meets equipment storage specifications. Refer to Table 1-1 and Table 1-2 for environmental considerations and space requirements.

1.4   Equipment Physical Dimensions

Subassembly Dimensions

Table 1-3 lists external physical dimensions for individual OSx station subassemblies. Allow sufficient space so that power and signal cables can be attached to the rear of the system unit and monitor. Figure 1-2 shows the front view of the Rack PC 840 system unit.

Table 1-3   Rack PC 840 Physical Dimensions

Subassembly	Height	Depth	Width
System Unit	7.25 in. 18.4 cm	19.0 in. 48.3 cm	19.0 in. 48.3 cm
Color Monitor, 22-inch (includes base assembly)	19.7 in. 49.4 cm	18.9 in. 47.3 cm	19.8 in. 49.5 cm
Color Monitor, 17-inch (includes base assembly)	16.9 in. 42.9 cm	17.7 in. 45.0 cm	15.9 in. 40.4 cm
Operator Keyboard	2.5 in. 6.3 cm	10.25 in. 26.0 cm	17.12 in. 43.5 cm
Engineering Keyboard	2.0 in. 5.1 cm	6.75 in. 17.1 cm	21.0 in. 53.3 cm
Mouse/Trackball	3.0 in. 7.6 cm	7.75 in. 19.7 cm	4.38 in. 11.1 cm

Equipment Physical Dimensions (continued)

Additional Space Requirements

When figuring the total space that is required for individual subassemblies, consider the following.

- The physical dimensions for individual subassemblies do not account for cabling. Allow sufficient space so that power and signal cables can be attached to the rear of the system unit and monitor.

- The system unit has fans mounted inside the box to provide adequate air circulation. Be sure to provide a minimum of two inches free air space adjacent to all system unit fan openings.

- There are several openings at the top and at the rear of the monitor cabinet for cooling purposes. Plan for enough space around the monitor cabinet (two inches minimum) to provide adequate cooling.
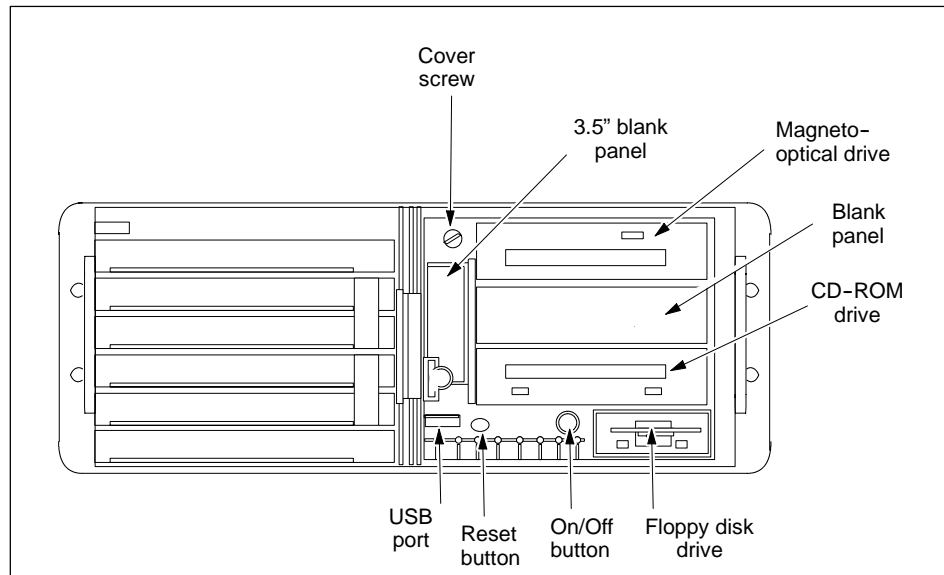
Figure 1-2   Rack PC 840 System Unit (Front View)

1.5   Power Requirements

Power Supply Specifications

Table 1-4 lists specific power requirements for your OSx station.

Table 1-4   Power Specifications

Subassembly	Voltage	Frequency	Power Consumption	Current
System Unit	120–240 VAC (85...264 VAC)	50–60 Hertz	71 W	0.9 Amperes
Monitor (22-inch)	100–120 VAC / 220–240 VAC	50/60 Hertz	75 W	1.0 Amperes
Monitor (17-inch)	100–120 VAC	50–60 Hertz	62 W	3.1 Amperes

Power Requirements (continued)

**AC Power
Requirements**

The OSx station requires an isolated AC power source. For the personal safety of the operator, as well as for proper operation, you must ground the system by plugging the power cord into a mating three-prong grounded receptacle. The receptacle must be grounded in accordance with the National Electric Code, as well as local codes and ordinances.

> ### ⚠ WARNING
>
> **Attempting to use a receptacle or extension cord that does not accommodate a three-conductor plug could cause electrical shock and could result in death or serious injury to personnel, and/or damage to equipment.**
>
> **Do not cut the grounding prong from the plug. You must ground the system by plugging the power cord into a mating three-prong grounded receptacle.**
>
> **The receptacle must be grounded in accordance with the National Electric Code, as well as local codes and ordinances.**

If your site does not have a properly-wired wall receptacle, you must have one installed by a qualified electrician. Any of the following conditions can cause a safety hazard or result in a system malfunction.

- Open safety ground

- Safety ground connected to neutral conductor in the receptacle—connect at service entrance only

- Safety ground connected to conduit only

- Hot and neutral connections reversed in the receptacle

NOTE: Install an Uninterruptible Power Supply (UPS) to maintain operational capability during abnormal power loss. Refer to Appendix C for a description of a typical UPS application that includes cabling instructions.

NOTE: OSx requires a dedicated power source (free of use by other equipment). This is particularly important if the other equipment uses large amounts of power, resulting in AC waveform distortion.

Earth Ground   Ensure that the AC power receptacle is properly grounded to earth. In some installations, a metal conduit that connects to the neutral phase at the circuit-breaker box supplies the earth ground of the power receptacle. Depending on site conditions, this metal conduit may conduct current from other sources that can interfere with the operation of a computer or printer plugged into the socket.

To minimize this possibility, isolate earth ground and neutral from the conduit (except at the service entrance housing); see Figure 1-3. Use a receptacle wired in accordance with National Electrical Manufacturers Association specification, NEMA 5-15R. Also, follow these guidelines.

•   Ensure that the protective ground wire resistance is less than 1 ohm.

•   Ensure that the resistance to earth ground does not exceed 1 ohm; ideally it should be 0.1 ohm or less.
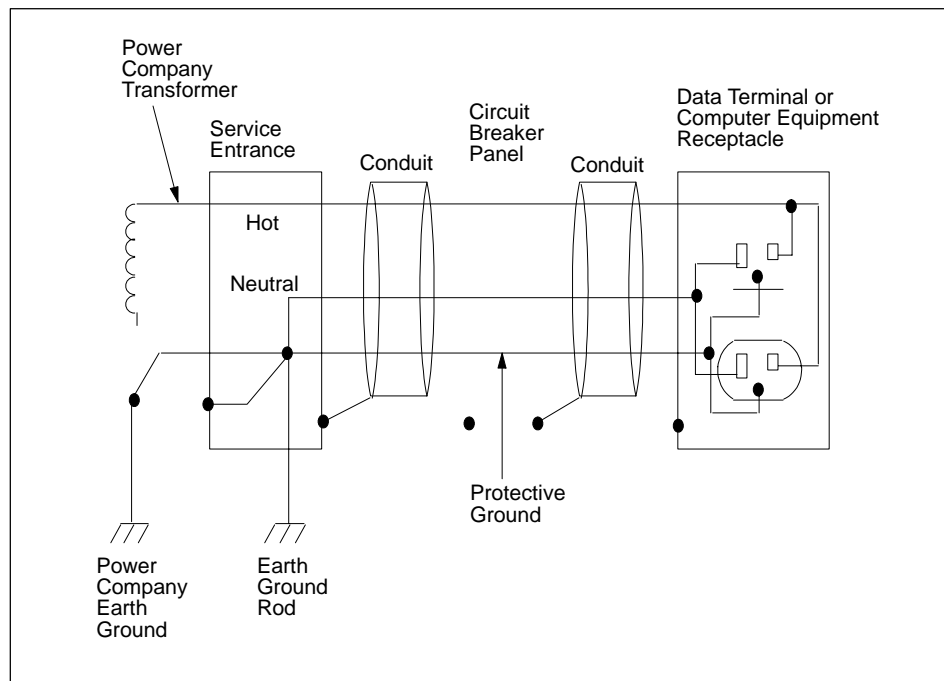
Figure 1-3   Isolating Ground and Neutral from Conduit

Power Requirements (continued)

Minimizing Effects of Electrical Noise

Avoid sources of electrical noise when installing your system. The main sources of electrical noise are those devices (and their wiring) that produce and switch high voltages/currents. Typical examples include:

- Power lines carrying 480 volts or higher

- Generators

- Electric motors

- Transformers

- Electric welders

- Induction furnaces and heaters

- Power inverters

- Radio transmitters

- Walkie-talkies that generate a signal greater than 50 mV

- Teletypes

Consider the following guidelines when installing your system.

- Avoid parallel runs of AC cables and signal cables.

- Avoid running unshielded cables together for long distances.

Static Electricity and Lightning

An electrostatic discharge to magnetic media (for example: hard disk, diskette, or tape) erases data. The following factors contribute to static electricity problems.

- Carpeting without anti-static properties or treatment

- Extremely low humidity

- Plastic or vinyl upholstery

- Specific clothing/shoe/carpeting or upholstery combinations

Areas subject to lightning storms may require installation of a lightning protector, particularly if the building is serviced by aerial power lines or if the power utility has installed lightning protectors on the primary source.

1.6　Control Room Environment Specifications

```
┌────────────────────────────────────────────────────────────────┐
│                         CAUTION                                │
├────────────────────────────────────────────────────────────────┤
│ The hard disk drive is very sensitive to physical shock. Even  │
│ slight movements of the unit can cause loss of data or damage  │
│ to the hard disk.                                              │
│ For this reason, the system support platforms must be very     │
│ stable and capable of absorbing shocks without allowing damage │
│ to the system.                                                 │
└────────────────────────────────────────────────────────────────┘
```

Table 1-5 lists the environmental specifications for an OSx station.

Table 1-5　Environmental Specifications

Parameter	Requirements
Operating temperature* (inside cabinet)	5–55°C
Relative humidity	5–80% (no condensation)
Contaminants to avoid	Dust, smoke, corrosive chemicals, toxic gases
*　Ambient with a maximum temperature change of 10°C per hour (condensation not permitted)	

Control Room Environment Specifications (continued)

Environment Preparation Guidelines

Consider the following guidelines when preparing your control room.

- Provide adequate ventilation in the control room to prevent overheating the equipment.

- Install air-conditioning equipment in areas where the control room temperature exceeds 55°C.

- Install humidity control equipment in areas where the control room humidity level may fall outside of the specified operating range.

- Locate your control room in an area where vibration and noise interference are minimal.

- Minimize exposure to contaminants.

Lighting

Incandescent lighting (500 Lux) is recommended for the overall illumination of your control room. Carefully locate and select light sources to avoid glare on the monitor screens. Consider using polarized screens and glare filters to reduce glare and improve contrast.

Floor Coverings

The following types of floor coverings are recommended for your control area.

- Anti-static carpeting designed for computer rooms

- Carpeting treated with static suppression spray or covered with anti-static mats

- Anti-static linoleum

If you are installing your system on a concrete floor or on a raised floor above concrete, you must seal the concrete before you install the system. Concrete dust is extremely harmful to disk drives.

1.7   Fire Protection Considerations

Planning a fire protection system is an important part of your site preparation. When planning your fire protection system, always follow local codes, standards and other regulations published by the National Fire Protection Agency (NFPA) and the National Electrical Manufacturers Association (NEMA). Also, follow the National Electric Code (NEC).

Consider the following fire precautions.

Smoke Detectors Install smoke detectors in the ceiling and under the sub-floors in your control room. Consider a combination of thermal, ionization, and optical detectors. Consult local fire code regulations when installing the smoke detectors.

Fire Extinguishing Systems A halon gas fire-extinguishing system is recommended for your control room. Halon gas extinguishes fire while minimizing damage to disks, tapes, or electronic circuitry.

Emergency Exits Remember to include emergency exits in your control room in case of fire or other emergencies.

1.8   Site Planning Checklist

☐   Prepare a storage area for the equipment cartons.

☐   Plan a route for moving the equipment cartons to the storage or
      operator area.

☐   Determine the space requirements for storing media and spare parts.

☐   Determine the space requirements for installing your command center
      or individual subassemblies.

☐   Determine the power requirements for your system.

☐   Plan and implement a grounding system.

☐   Prepare the control room environment according to OSx specifications.

☐   Determine the lighting requirements for the control room.

☐   Determine the flooring requirements for the control room.

☐   Plan a fire protection system for the control room.

1.9   Connecting the Monitor

Connect the video cable from the system unit to the back of the monitor as shown in Figure 1-4. If you need an extension cable for the monitor, use a 15-pin female to 15-pin male cable.

NOTE: For the 22-inch monitor, use only the socket on the left (as you face the back of the monitor). For the 17-inch monitor, use only the upper socket.
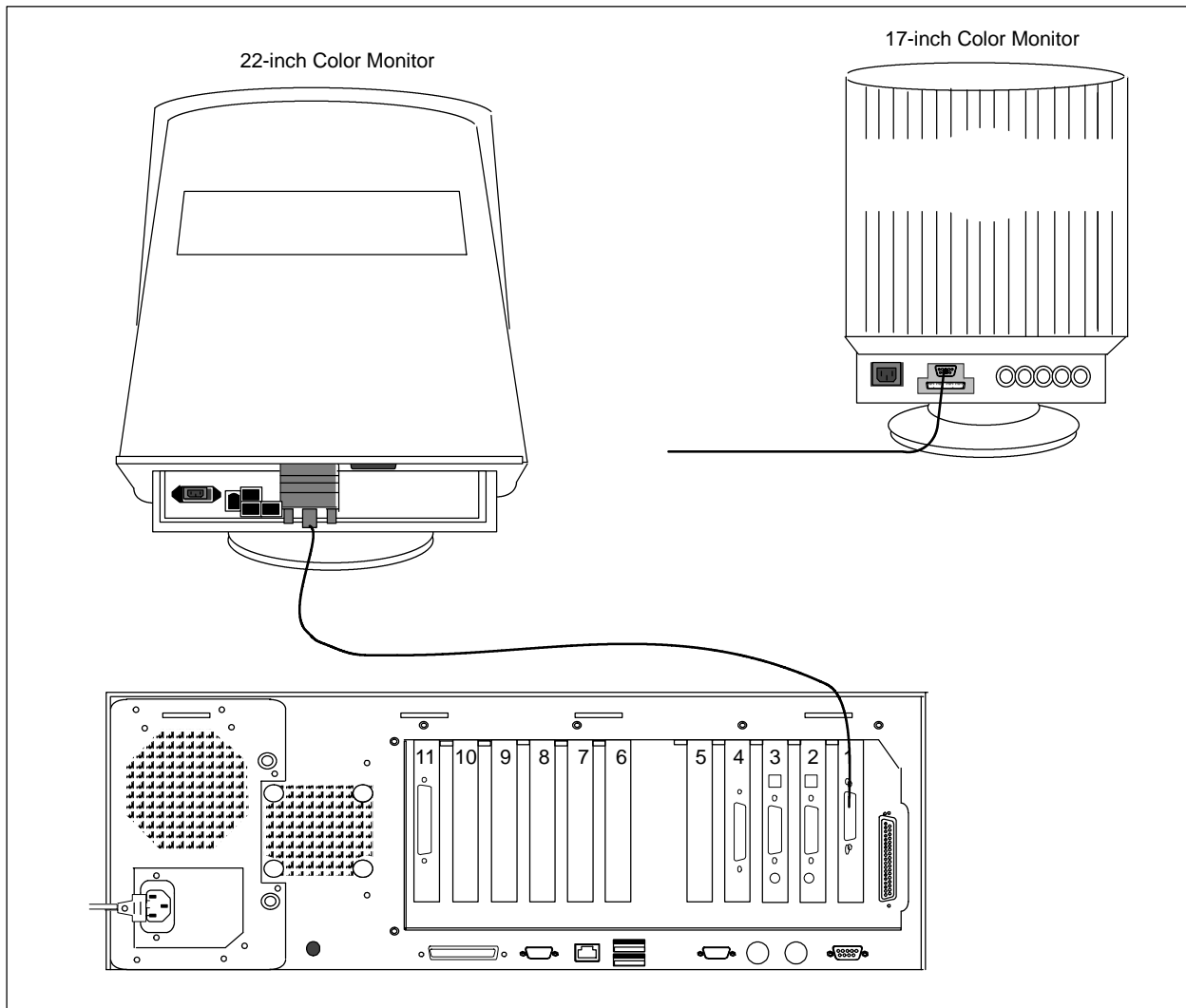
Figure 1-4   Connecting the Monitor

1.10   Connecting Input Devices

**Installing the
Keyboards and
Pointing Device**

Be sure that power to the system unit is turned off before you connect the
mouse/trackball and keyboards.

CAUTION

**Plugging or unplugging the pointing device with system power on results in the
pointing device being inoperable until you power cycle the computer.**

Turn off all power to the system before you plug or unplug the pointing device.

CAUTION

**Plugging and unplugging a keyboard into the system unit with power on can
result in damage to the system unit and/or keyboard.**

Turn off all power to the system before you plug in the keyboard or unplug it.

A rocker switch on the back of the operator keyboard allows you to select the
current operational keyboard. The standard pointing devices supplied with
the system are PS/2-compatible.

Figure 1-5 shows how to install the cables to connect the pointing device and the operator and engineering keyboards to the system unit. If you do not have an operator keyboard, you can connect the engineering keyboard and a pointing device directly to the system unit. Figure 1-6 shows you how to make these connections.
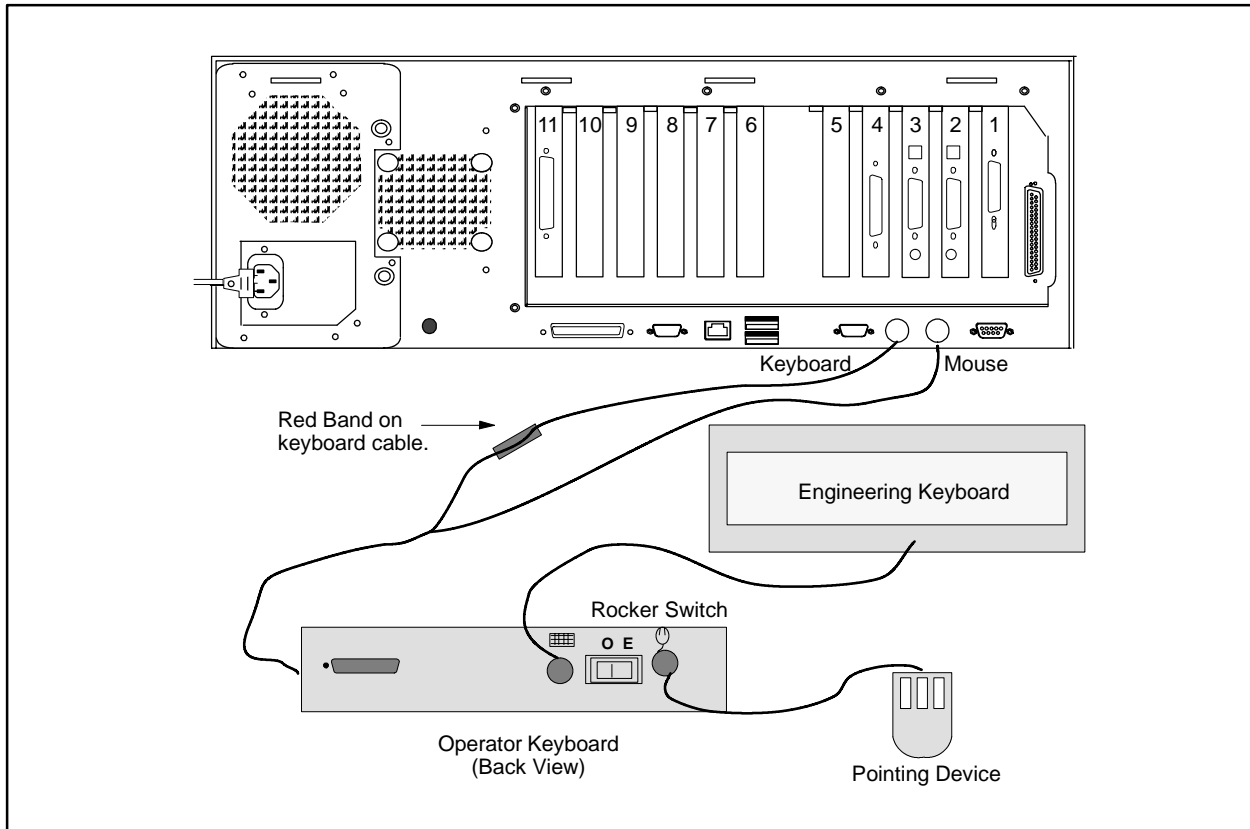
Figure 1-5   Connecting Input Devices to the System Unit

Connecting Input Devices (continued)
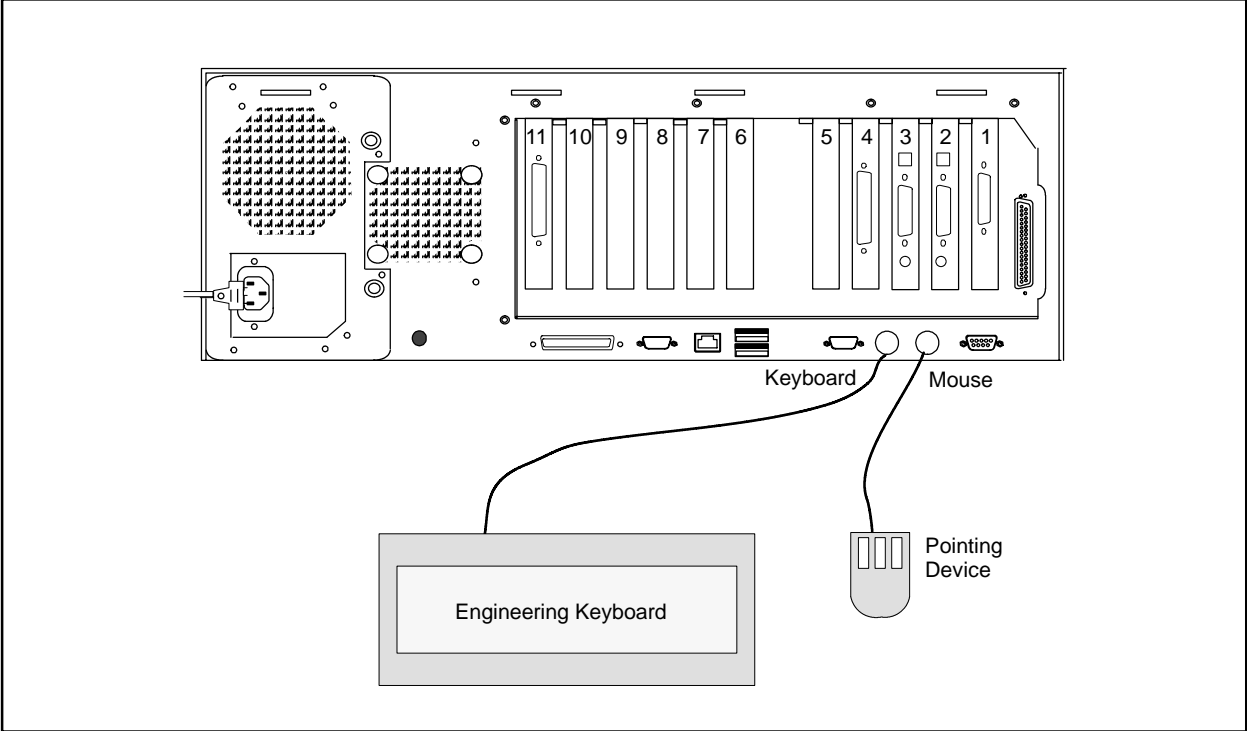
Figure 1-6   Installing the Engineering Keyboard

1.11   Connecting the System to the Industrial Ethernet

The system unit has slots available for two network communications cards. If you select a single network system, your system has one card. If you choose to add a second network, you must install another card. Chapter 3 gives guidelines for installing the second ethernet communications card.

Figure 1-7 shows how to install the cables to connect the system unit to the Industrial Ethernet networks. If you need assistance, contact the Siemens Energy & Automation, Inc., Technical Services Group in the U.S.A. at 800–333–7421. Outside the U.S.A., call 49–911–895–7000.
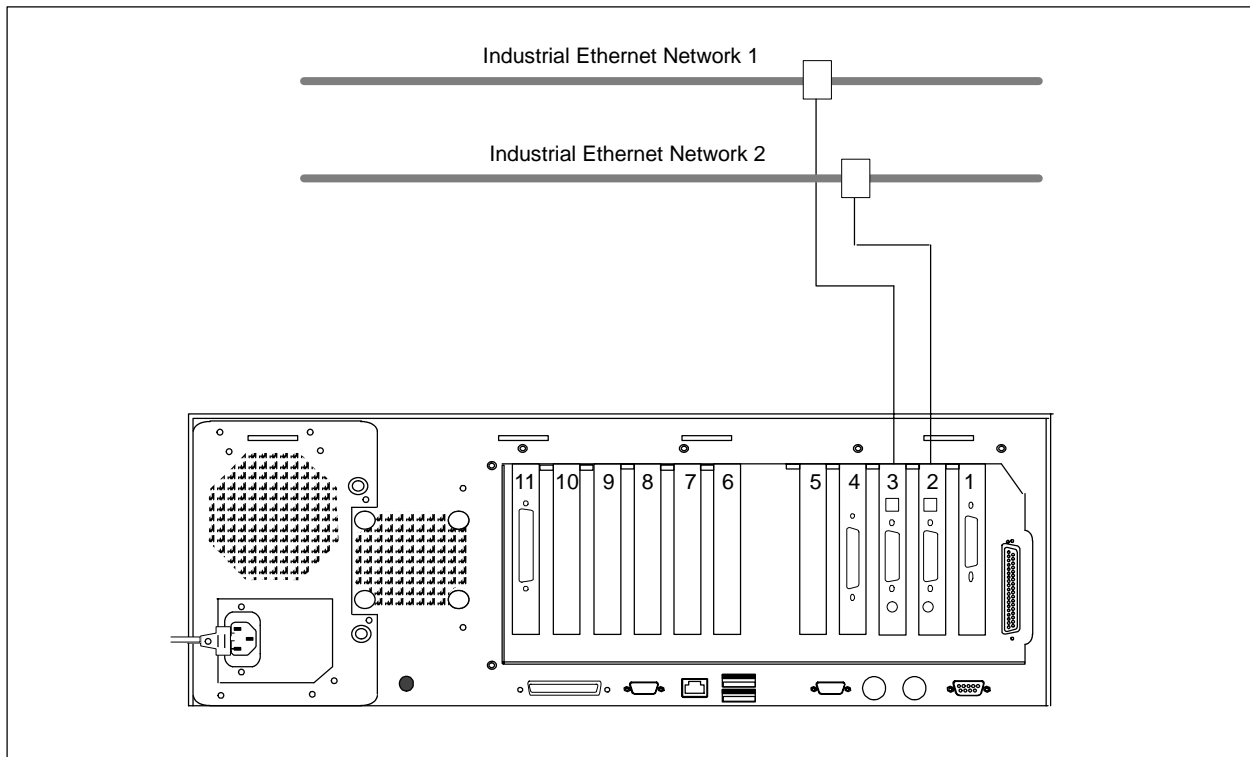
Figure 1-7   Connecting the Ethernet Cable(s) to the System Unit

1.12 Connecting Options: Printer

You have the option of connecting parallel printers to the system unit. Figure 1-8 shows how to install the cable to connect your printer to the system unit.
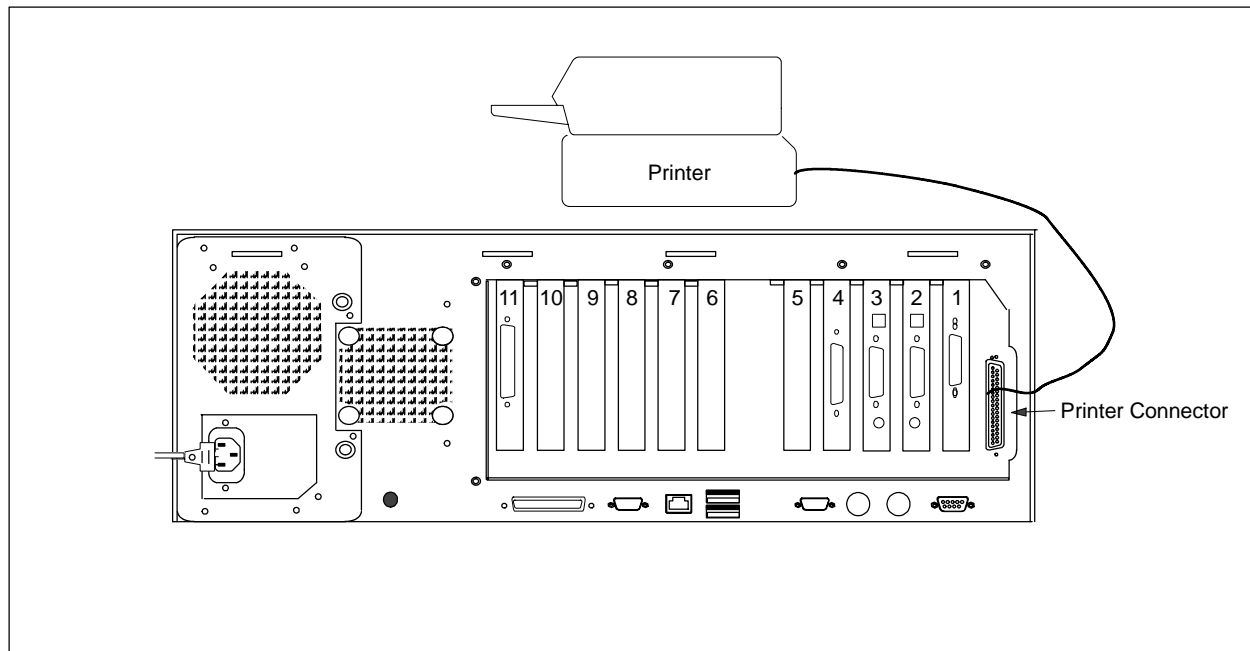
Figure 1-8   Connecting the Printer

1.13 Connecting Options: Alarm Card

Figure 1-9 shows the position of the system unit alarm card on the OSx system unit.

You can access the input and output channels through the external connector of the alarm card. These channels allow you to connect external sirens and warning lights to your process. Refer to Appendix A for alarm card specifications and configuration details.
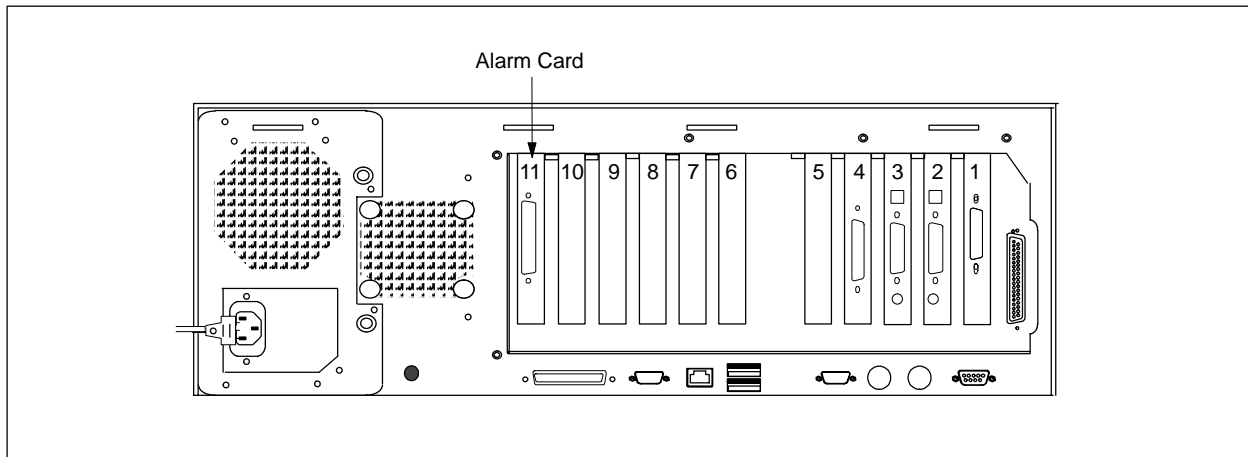
Figure 1-9   Connecting to the Alarm Card

Setting Up System CMOS

2.1   Using the CMOS Setup Utility for the SIMATIC Rack PC 840

The Complementary Metallic Oxide Semiconductor (CMOS) memory contains configuration data that is critical for the functioning of the system unit. You can lose system unit configuration if the system unit power is turned off while the back-up battery is disconnected (or defective). You must restore configuration before continuing.

To reset system unit configuration, turn the station power off and then on again. At the **Press F2 to enter SETUP** message, press **F2** to enter CMOS setup. The CMOS settings are the same for all OSx 4.x.x systems.

The menu bar allows you to access the main setup screens. Use the arrow keys to move around the screen and **Enter** to access the setup screens and submenus. Copy the information as shown in Figure 2-1 through Figure 2-17. Use **Esc** to return from a submenu back to the main menu. Always exit the setup program from the exit submenu.

NOTE: The screens shown in the following pages are representative of a typical system. Because there are several versions of the BIOS, there may be minor differences in the appearance of some screens. These differences should not be critical to the proper functioning of your system.

**Main Menu
Changes**

On the Main Menu, arrow down to Primary Master and press **Enter**.

| Main | Advanced | Security | Power | Boot Sequence | Version | Exit |

Item Specific Help

System Time: 09 : 35 : 54
System Date   [01/07/2002]

Legacy Diskette A: [1.44 MB, 3.5"]

▶Primary Master   [20496 MB]
▶Primary Slave   [None]
▶Secondary Master   [CD-ROM]
▶Secondary Slave   [None]

Memory Cache   [Write Back]
▶Boot Options
▶Keyboard Features
▶Hardware Options

System Memory: 640 KB
Extended Memory: 129536 KB

<Tab>, <Shift-Tab> , or
<Enter> selects field
Example:
Hour/Minute/Second
Month/Day/Year

| F1 | Help | ↓↑ | Select Item | | –/+ | Change Values | | F9 | Setup Defaults |
| ESC | Exit | ←→ | Select Menu | | Enter | Select ▶ Sub-Menu | | F10 | Save and Exit |

Figure 2-1   System Configuration: Main Menu

Using CMOS Setup Utility for the SIMATIC Rack PC 840 (continued)

On the Primary Master submenu (Figure 2-2), Type should be set to **Auto**, LBA Mode Control should read **Enabled**, and Ultra DMA Mode should read **Mode 5**.

Main	Advanced	Security	Power	Boot Sequence	Version	Exit

Primary Master [40992 MB]

Item Specific Help

```
Type:                     [Auto]

              LBA Format

Total Sectors:            40031712*
Maximum Capacity:         20496 MB*

Multi-Sector Transfers:   [16 Sectors]
LBA Mode Control:         [Enabled]
32 Bit I/O:               [Enabled]
Transfer Mode:            [FPIO 4 / DMA 2]
Ultra DMA Mode:           [Mode 5]
```

[AUTO] (recommended)
Autotypes installed
IDE devices.

[User]
Enter parameters of
IDE-devices installed
at this connection.

*Parameters vary depending on the hard drive that is installed.

F1	Help	↓↑	Select Item	–/+	Change Values	F9	Setup Defaults
ESC	Exit	←→	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Figure 2-2   Primary Master Submenu

```
┌─────────────────────────────────────────────────────────────────────────────────┐
│                                                                                   │
│  ┌──────────────────────────────────────────────────────────────────────────┐    │
│   Main    Advanced    Security    Power    Boot Sequence    Version    Exit       │
│  └──────────────────────────────────────────────────────────────────────────┘    │
│                                            │                                       │
│              Secondary Master (CD-ROM)     │           Item Specific Help          │
│                                            │                                       │
│  ──────────────────────────────────────── │ ───────────────────────────────────── │
│                                            │                                       │
│                                            │                                       │
│                                            │                                       │
│        Type:                  [CD-ROM]     │      [AUTO] (recommended)             │
│                                            │      Autotypes installed              │
│                                            │      IDE devices.                     │
│        Multi-Sector Transfers: [Disabled]  │                                       │
│        LBA Mode Control:       [Disabled]  │                                       │
│        32 Bit I/O:             [Enabled]   │      [User]                           │
│        Transfer Mode:     [FPIO 4 / DMA 2] │      Enter parameters of              │
│        Ultra DMA Mode:         [Mode 2]    │      IDE-devices installed            │
│                                            │      at this connection.              │
│                                            │                                       │
│                                            │                                       │
│                                            │                                       │
│                                            │                                       │
│                                            │                                       │
│                                            │                                       │
│  ───────────────────────────────────────────────────────────────────────────     │
│   F1    Help      ↓↑    Select Item    –/+     Change Values       F9   Setup Defaults   │
│   ESC   Exit      ←→    Select Menu    Enter   Select ▶ Sub-Menu   F10  Save and Exit    │
│                                                                                   │
└─────────────────────────────────────────────────────────────────────────────────┘
```

Figure 2-3   Secondary Master Submenu

Using CMOS Setup Utility for the SIMATIC Rack PC 840 (continued)

Main	Advanced	Security	Power	Boot Sequence	Version	Exit

Primary Slave [None]   Item Specific Help

```
         Type:                    [Auto]                          [AUTO] (recommended)
                                                                  Autotypes installed
                                                                  IDE devices.

         Multi-Sector Transfers:  [Disabled]
         LBA Mode Control:        [Disabled]                      [User]
         32 Bit I/O:              [Enabled]                       Enter parameters of
         Transfer Mode:           [Standard]                      IDE-devices installed
         Ultra DMA Mode:          [DIsabled]                      at this connection.
```

F1	Help	↓↑	Select Item	–/+	Change Values	F9	Setup Defaults
ESC	Exit	←→	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Figure 2-4   Primary Slave Submenu

NOTE: The Secondary Slave submenu is the same as the Primary Slave submenu, Figure 2-4.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                                                                           │
│  Main   Advanced    Security    Power    Boot Sequence    Version    Exit │
│ ┌───────────────────────────────────────┬─────────────────────────────── │
│ │            Boot Options                │         Item Specific Help      │
│ │                                        │                                 │
│ ├────────────────────────────────────────┤                                │
│ │                                        │                                 │
│ │   Quickboot Mode:        [Enabled]     │    Allows the system to         │
│ │   SETUP prompt:          [Enabled]     │    skip certain tests           │
│ │   POST Errors:           [Enabled]     │    while booting. This          │
│ │   Floppy check:          [Enabled]     │    will decrease the            │
│ │   Summary screen:        [Enabled]     │    time needed to boot          │
│ │                                        │    the system.                  │
│ │                                        │                                 │
│ │                                        │                                 │
│ │                                        │                                 │
│ ├────────────────────────────────────────┴─────────────────────────────── │
│   F1   Help      ↓↑    Select Item        –/+    Change Values      F9    Setup Defaults │
│   ESC  Exit      ←→    Select Menu         Enter  Select ▶ Sub-Menu  F10   Save and Exit  │
└─────────────────────────────────────────────────────────────────────────┘
```

Figure 2-5   Boot Options Submenu

Using CMOS Setup Utility for the SIMATIC Rack PC 840 (continued)

Main	Advanced	Security	Power	Boot Sequence	Version	Exit

Keyboard Features   Item Specific Help

Numlock: [Off]   Selects Power-on state
Key click: [Disabled]   for Numlock on next
Keyboard auto-repeat rate: [30/sec]   boot.
Keyboard auto-repeat delay: [1/2 sec]

| F1 | Help | ↓↑ | Select Item | –/+ | Change Values | F9 | Setup Defaults |
| ESC | Exit | ←→ | Select Menu | Enter | Select ▶ Sub-Menu | F10 | Save and Exit |

Figure 2-6   Keyboard Features Submenu

Main	Advanced	Security	Power	Boot Sequence	Version	Exit

Hardware Options   Item Specific Help

Onboard Ethernet: [Disabled]

Legacy USB Support   [Disabled]   Enable or disable the
                                                PCI – Multi Point
SafeCard Functions: [Disabled]   Interface (MPI / DP).

Fan Control: [Enabled]

PS/2 Mouse: [Enabled]

| F1 | Help | ↓↑ | Select Item | –/+ | Change Values | F9 | Setup Defaults |
| ESC | Exit | ←→ | Select Menu | Enter | Select ▶ Sub-Menu | F10 | Save and Exit |

Figure 2-7   Hardware Options Submenu

Advanced Menu Changes

Select **Advanced** on the menu bar. On the Advanced Configuration menu, set Memory Gap at 15 Mbyte to **Disabled**. Set the Default Primary Video Adapter to **PCI** (Figure 2-8).

Select COM / LPT Configuration. On the COM/LPT Configuration submenu (Figure 2-9), be sure the Parallel Port Mode is **Output only.**
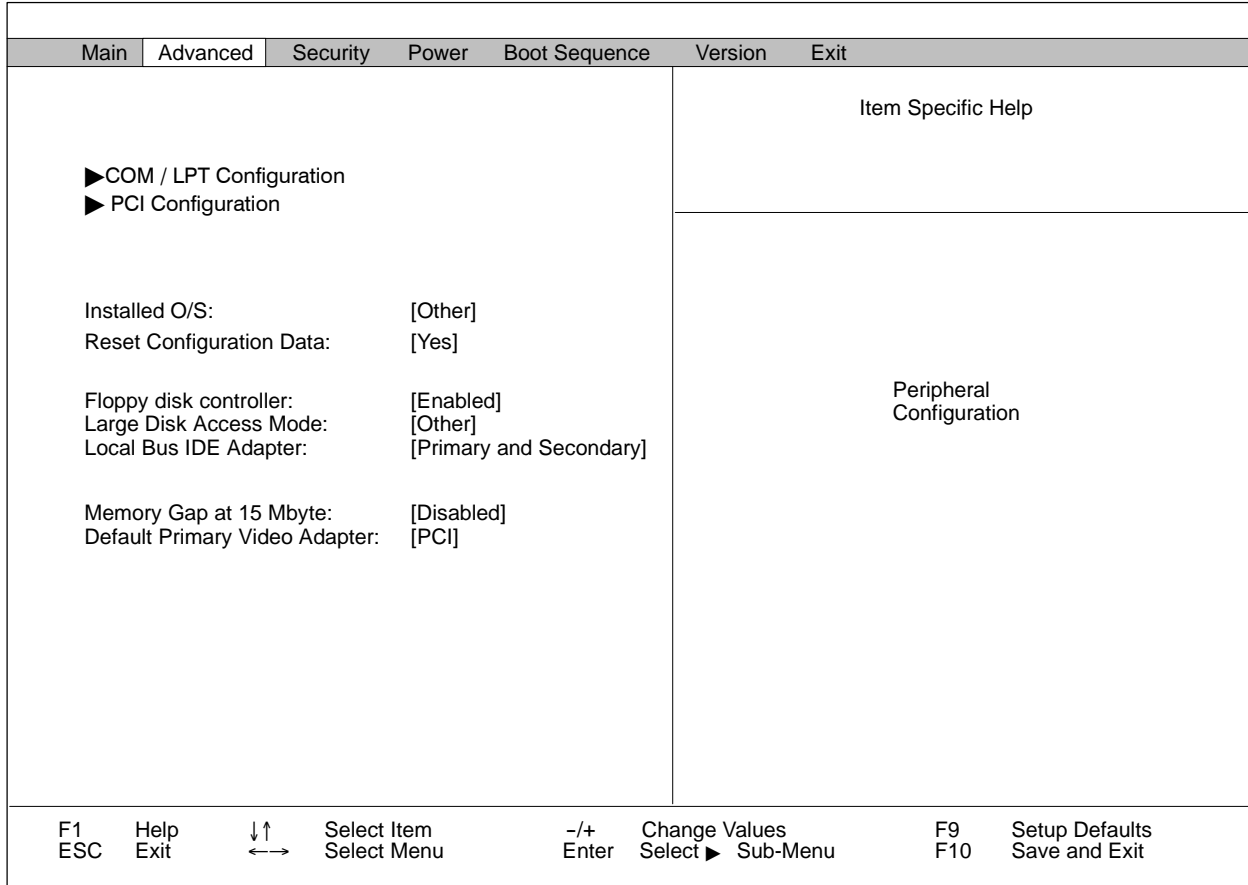
Main	Advanced	Security	Power	Boot Sequence	Version	Exit

Item Specific Help

▶COM / LPT Configuration
▶ PCI Configuration

Installed O/S:	[Other]
Reset Configuration Data:	[Yes]
Floppy disk controller:	[Enabled]
Large Disk Access Mode:	[Other]
Local Bus IDE Adapter:	[Primary and Secondary]
Memory Gap at 15 Mbyte:	[Disabled]
Default Primary Video Adapter:	[PCI]

Peripheral Configuration

F1	Help	↓↑	Select Item	–/+	Change Values	F9	Setup Defaults
ESC	Exit	←→	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Figure 2-8   Advanced Configuration Menu

| Main | Advanced | Security | Power | Boot Sequence | Version | Exit |

COM/LPT Configuration

Item Specific Help

Internal COM1:   [Enabled]
   Base I/O address: [3F8]
   Interrupt: [IRQ 4]

Internal COM2:   [Enabled]
   Base I/O address: [2F8]
   Interrupt: [IRQ 3]

Parallel Port: [Enabled]
   Mode: [Output only]
   Base I/O address: [378]
   Interrupt: [IRQ 7]

Set the mode for the
internal LPT1 port
using options:

Output only
Bi–directional
EPP
ECP

| F1 | Help | ↓↑ | Select Item | –/+ | Change Values | F9 | Setup Defaults |
| ESC | Exit | ←→ | Select Menu | Enter | Select ▶ Sub-Menu | F10 | Save and Exit |

Figure 2-9   COM/LPT Configuration Submenu

| Main | Advanced | Security | Power | Boot Sequence | Version | Exit |

PCI Configuration

Item Specific Help

▶PCI Device, Slot # 1
▶PCI Device, Slot # 2
▶PCI Device, Slot # 3
▶PCI Device, Slot # 4
▶PCI Device, Slot # 5
▶PCI Device, Slot # 6
▶PCI Device, Slot # 7

▶PCI/PNP ISA IRQ Resource Exclusion

PCI IRQ line 1:   [Auto Select]
PCI IRQ line 2:   [Auto Select]
PCI IRQ line 3:   [Auto Select]
PCI IRQ line 4:   [Auto Select]

Setup items for
configuring the
specific PCI device.

| F1 | Help | ↓↑ | Select Item | –/+ | Change Values | F9 | Setup Defaults |
| ESC | Exit | ←→ | Select Menu | Enter | Select ▶ Sub-Menu | F10 | Save and Exit |

Figure 2-10   PCI Configuration Submenu

```
  Main    Advanced    Security    Power    Boot Sequence    Version    Exit

            PCI Device, Slot #1                               Item Specific Help


        Option ROM Scan:  [Enabled]                              Initialize device
        Enable Master:      [Enabled]                            expansion ROM
        Latency Timer:      [0040h]




  F1     Help      ↓↑   Select Item          –/+    Change Values        F9     Setup Defaults
  ESC    Exit      ←→   Select Menu          Enter  Select ▶ Sub-Menu    F10    Save and Exit
```

Figure 2-11   PCI Configuration: PCI Device Slot 1 Submenu

NOTE: PCI Configuration: PCI Device Slots 1 through 7 submenus are the same as , above.

```
  Main    Advanced    Security    Power    Boot Sequence    Version    Exit

      PCI/PNP ISA IRQ Resource Exclusion                      Item Specific Help


              IRQ  3:    [Available]
              IRQ  4:    [Available]
              IRQ  5:    [Available]
              IRQ  7:    [Available]                         Reserves the specified
              IRQ  9:    [Available]                         IRQ for use by legacy
              IRQ 10:    [Available]                         ISA devices.
              IRQ 11:    [Available]
              IRQ 12:    [Available]



  F1     Help      ↓↑   Select Item          –/+    Change Values        F9     Setup Defaults
  ESC    Exit      ←→   Select Menu          Enter  Select ▶ Sub-Menu    F10    Save and Exit
```

Figure 2-12   PCI Configuration: PCI/PNP Resource Exclusion Submenu

Using CMOS Setup Utility for the SIMATIC Rack PC 840 (continued)

Security and Power Menu Changes

The Security and Power menus are shown in Figure 2-13 and Figure 2-14.

Main	Advanced	Security	Power	Boot Sequence	Version	Exit

Item Specific Help

Supervisor Password Is:	Disabled
User Password Is:	Disabled
Set User Password	[Enter]
Set Supervisor Password	[Enter]
Password on boot:	[Disabled]
Fixed disk boot sector:	[Normal]
Diskette Access:	[Supervisor]

Supervisor password controls access to the setup utility.

F1	Help	↓↑	Select Item	–/+	Change Values	F9	Setup Defaults
ESC	Exit	←→	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Figure 2-13   Security Configuration Menu

Main	Advanced	Security	Power	Boot Sequence	Version	Exit

Item Specific Help

APM:	[Disabled]
Power Savings:	[Disabled]
Hard Disk Timeout:	Disabled
Resume On Time:	[On]
Resume Time:	[00:00:00]
After Power Failure:	[Last State]

Maximum power savings conserves the greatest amount of system power. Maximum Performance conserves power but allows greatest system performance. To alter these settings, choose Customized. To turn off power management, choose Disabled.

F1	Help	↓↑	Select Item	–/+	Change Values	F9	Setup Defaults
ESC	Exit	←→	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Figure 2-14   Power Configuration Menu

Boot Sequence and Version Menus

Figure 2-15 and Figure 2-16 show the Boot Sequence and Version Menus.

| Main | Advanced | Security | Power | Boot Sequence | Version | Exit |

Item Specific Help

+Removable Devices
+Hard Drive
CD–ROM Drive

Keys used to view or
configure devices:
<Enter> expands or collapses
devices with a + or –
<Ctrl +Enter> expands   all
<Shift + 1> enables or
disables a device.
<+> and <–> moves the device
up or down.
<n> may move removable device
between Hard Disk or
Removable Disk
<d> removes a device that is not
installed.

F1	Help	↓↑	Select Item	–/+	Change Values	F9	Setup Defaults
ESC	Exit	←→	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Figure 2-15   Boot Sequence Menu

| Main | Advanced | Security | Power | Boot Sequence | Version | Exit |

Item Specific Help

SIMATIC   Rack PC 840

Bios Version   V10.05.03
Bios Number   A5E00077977–ES03

MPI/DP Firmware   V01

CPU Type   Pentium III
CPU Speed   866 MHz
CPU ID   068A
Code Revision   0001

Note: Information on this page may vary.

All items on this menu
cannot be modified in
user mode. If any
items require changes,
please consult your
system supervisor.

| F1 | Help | ↓↑ | Select Item | –/+ | Change Values | F9 | Setup Defaults |
| ESC | Exit | ←→ | Select Menu | Enter | Select ▶ Sub-Menu | F10 | Save and Exit |

Figure 2-16   Version Menu

Using CMOS Setup Utility for the SIMATIC Rack PC 840 (continued)

Exit CMOS   When you are finished, select **Exit** on the menu bar (Figure 2-17), then select **Save Changes & Exit.**
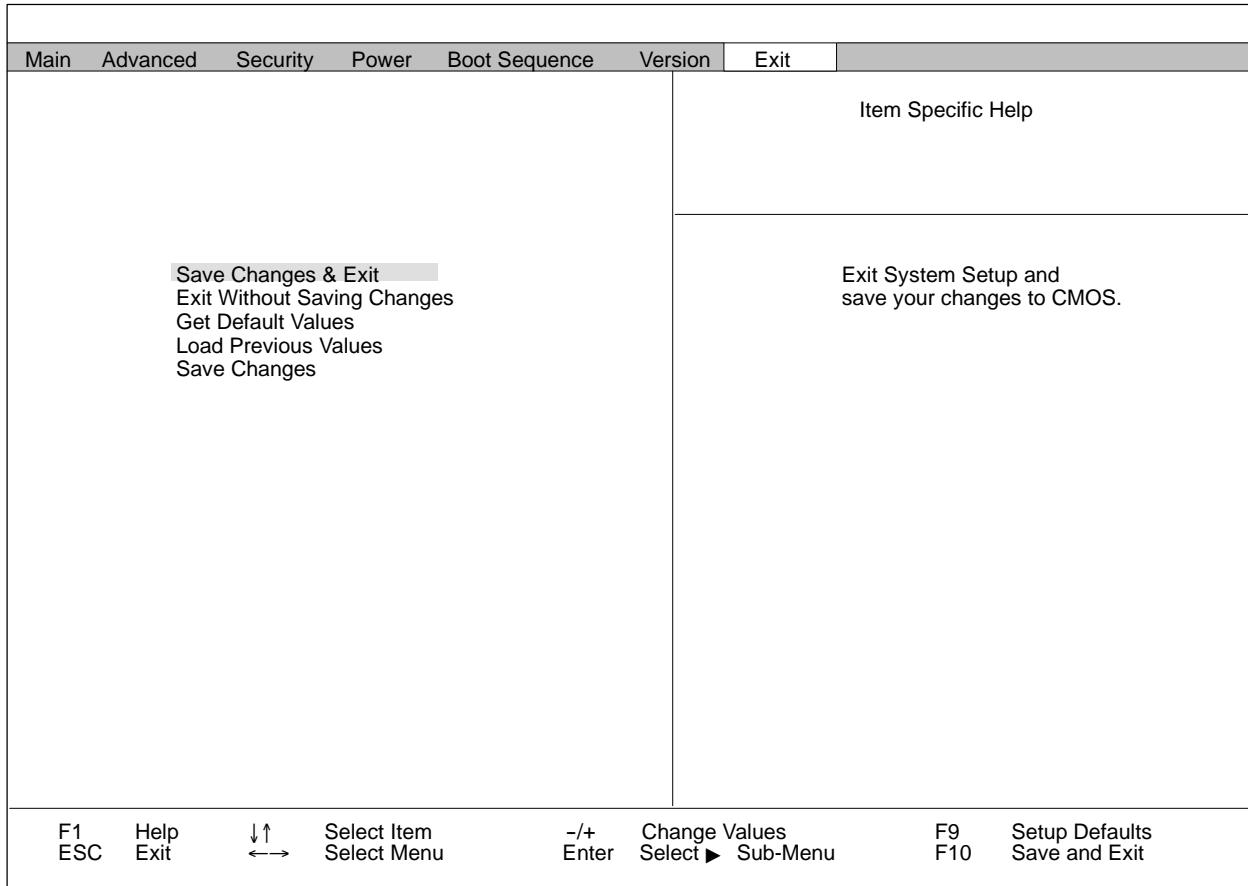
Main	Advanced	Security	Power	Boot Sequence	Version	Exit	

Item Specific Help

Save Changes & Exit
Exit Without Saving Changes
Get Default Values
Load Previous Values
Save Changes

Exit System Setup and
save your changes to CMOS.

F1	Help	↓↑	Select Item	–/+	Change Values	F9	Setup Defaults
ESC	Exit	←→	Select Menu	Enter	Select ▶ Sub-Menu	F10	Save and Exit

Figure 2-17   Exit Menu

System Unit Cards

3.1   Card Locations

┌───┐
│   ⚠ **WARNING**   │
├───┤
│ **Changing the printed circuit boards while the system unit is connected to AC power could cause electrical shock and could result in death or serious injury to personnel, and/or damage to equipment.** │
│ **Ensure that the system unit is unplugged—that it is NOT connected to AC power—before attempting to install or change cards. Do not attempt these procedures unless you are thoroughly familiar with precautions required when working around high voltage equipment. Follow appropriate safety precautions.** │
└───┘

┌───┐
│   **CAUTION**   │
├───┤
│ **Components on the communications card can be damaged by the discharge of static electricity.** │
│ **Before handling the card, be sure that you are grounded by using a grounded wrist strap. For an alternative, but less effective, precautionary measure, you can discharge static electricity by touching a grounded piece of metal.** │
└───┘

Table 3-1 shows the bezel positions for the system unit.

Table 3-1   Bezel Positions for System Unit Cards

Bezel Position	Bus Type	Installed Card Description
1	PCI Slot	Graphics Card (Section 3.4)
2	PCI Slot	Ethernet Communications Card #2 (3C900B–Combo) (Section 3.3)
3	PCI Slot	Ethernet Communications Card #1 (3C900B–Combo) (Section 3.3)
4	PCI Slot	SCSI Controller Card
5	PCI Slot	Empty
6	PCI Slot	Empty
7	ISA/PCI Slot	Empty
8	ISA Slot	Empty
9	ISA Slot	Empty
10	ISA Slot	Empty
11	ISA Slot	Alarm Card (Section 3.2)

Figure 3-1 shows the card locations on the system unit.
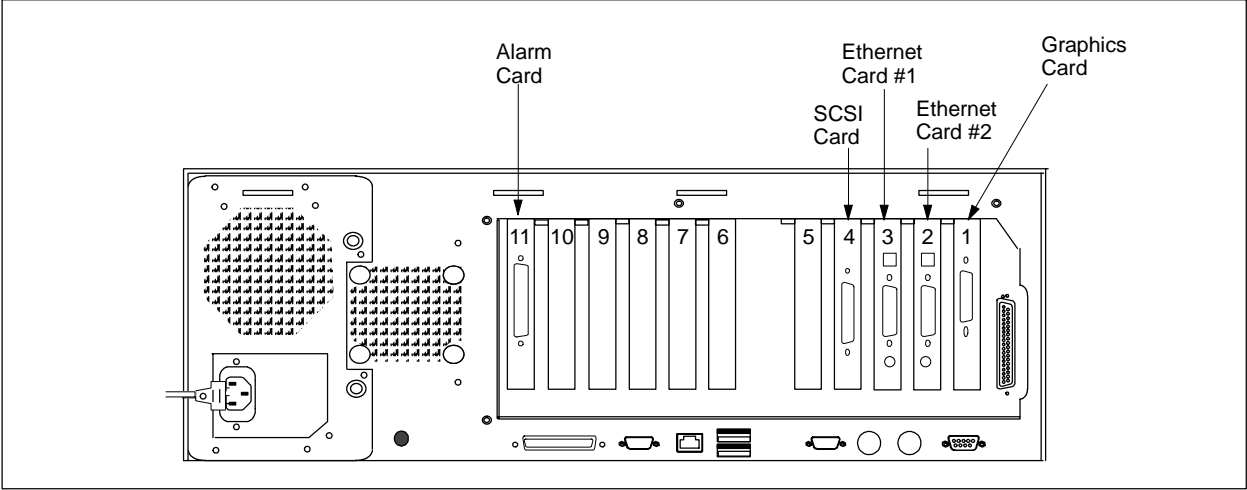
Figure 3-1   System Unit Card Locations

3.2   Alarm Card

The alarm card provides external warning and critical alarms for the SIMATIC PCS 7 OSx system. Figure 3-2 shows the alarm card.

An eight-segment dipswitch called SW1 sets the watchdog timer and assigns the alarm card address. If you service or replace the card, be sure that you reset SW1 correctly. Refer to Appendix A for additional information on alarm card dipswitch settings.
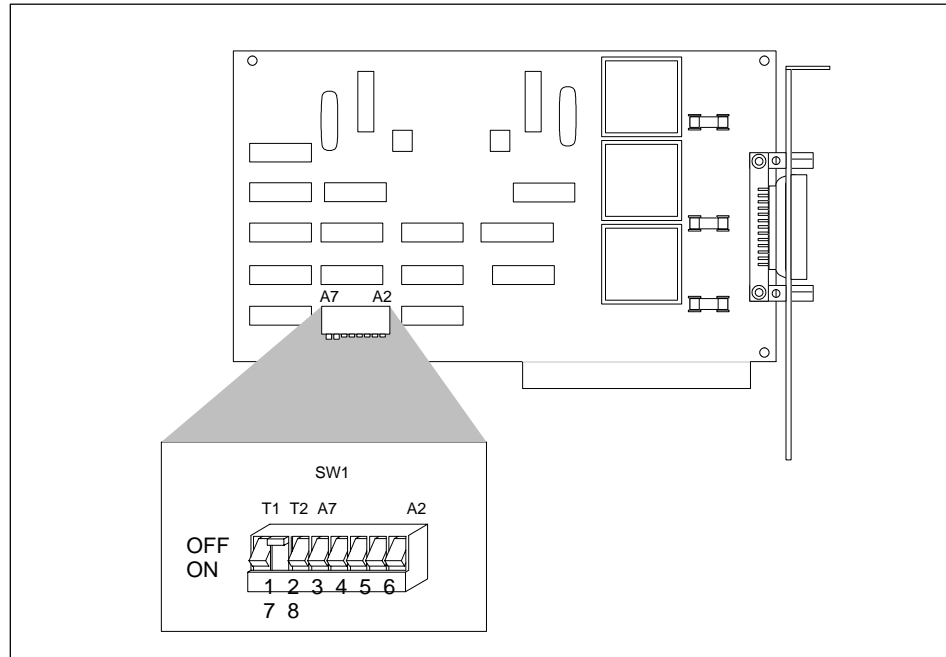

Figure 3-2   Alarm Card

3.3 Ethernet Communications Card

Figure 3-3 shows the 3C900B Combo ethernet card that is used in OSx stations. This card provides the communications link between the OSx station and the Industrial Ethernet. You do not need to set jumpers or switches on this card.

You can install a second ethernet communications card in an OSx station to provide an additional network. For information on enabling a second card, refer to the *SIMATIC PCS 7 OSx Installation Instructions*.
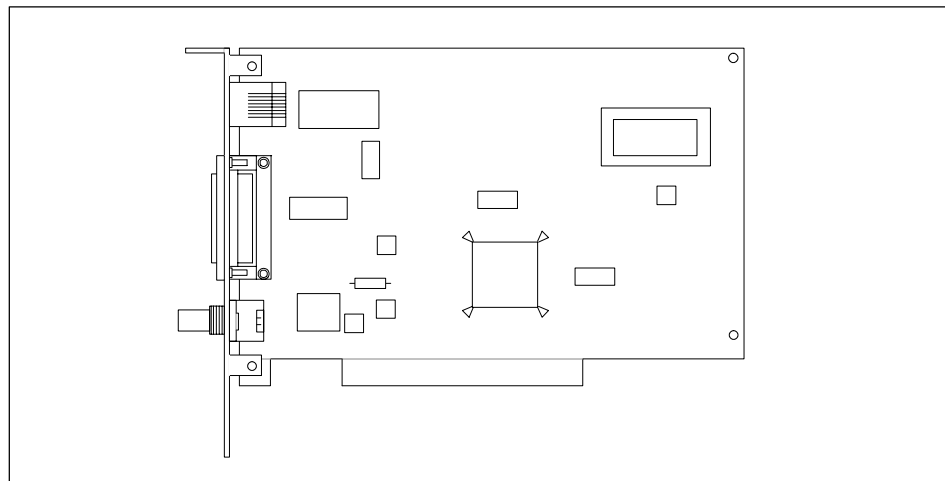
Figure 3-3   Communications Card

3.4   Graphics Card

Figure 3-4 shows the high-resolution graphics card. Dipswitch and jumper settings are not required.
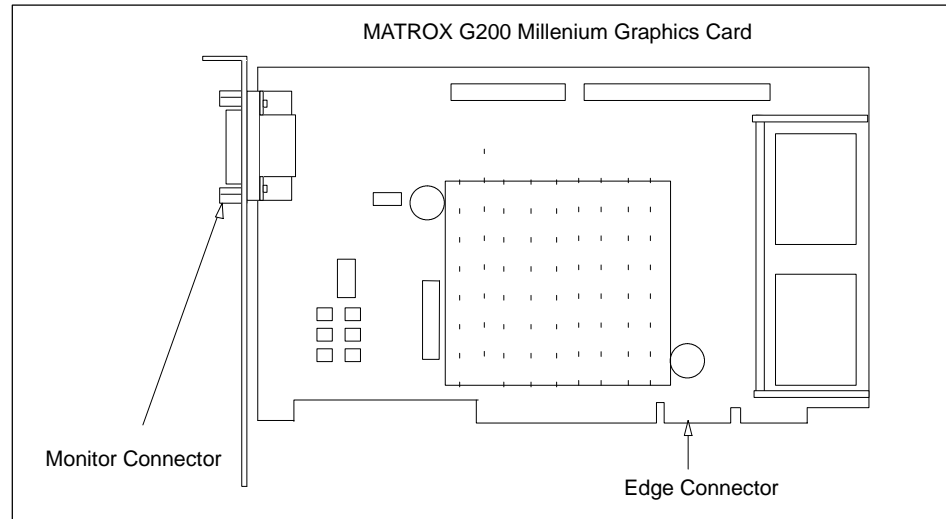
Figure 3-4   Graphics Card

3.5 System Diagnostics

OSx provides you with a series of diagnostic tests for your system unit. These diagnostic tests help you to pinpoint a specific area of difficulty and to determine what part of the hardware assembly needs to be repaired or replaced.

To test your system, select **Diagnostics** from **Help** on the menu bar. The System Diagnostics Screen appears (Figure 3-5). Enter the number of the test that you want to run.

- The **Alarm Card Test** diagnoses problems with the warning alarm, the critical alarm, and the failover circuit of a multiple-station system. When you select the **Alarm Card Test** option, the warning that appears applies only to a multiple-station system. The settings for the internal and external alarm annunciators and alarm output mode in the Event Preferences Configuration dialog box determine how the alarm card test is run.
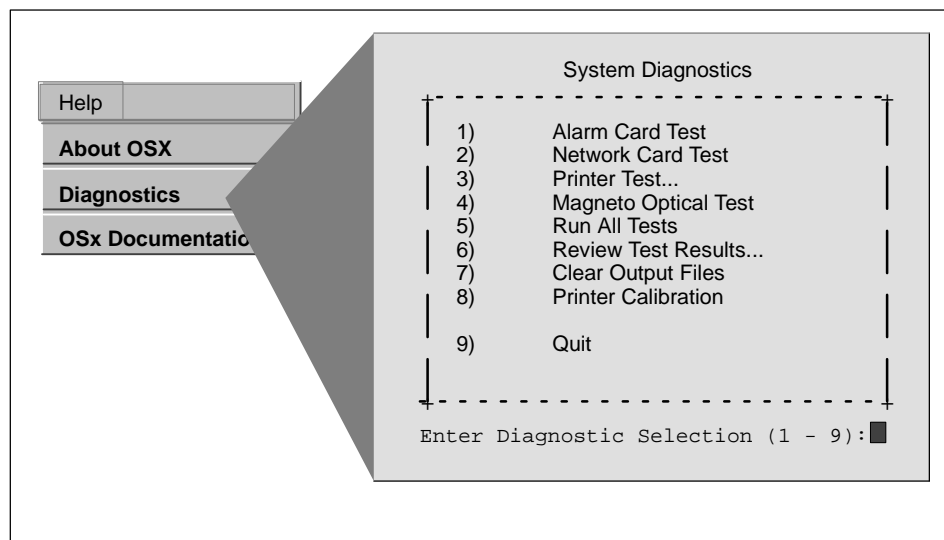
Figure 3-5   System Diagnostics Screen

- The **Network Card Test** checks for the presence of two network cards and whether or not they are communicating. You must take the system to the Operate state at least once before running the Network Card Test.

  If the Network Card Test seems to take an unusual amount of time, the network cable may not be connected to the OSx station. Press the **Delete** key several times to stop the test, connect the cable, and then retry the test.

- The **Printer Test** displays a menu of all valid printers, from which you can select one or more for testing. If you have not configured your printer correctly, the test malfunctions. Press **Delete** to exit diagnostics, correct the problem, and repeat the test.

- The **Magneto Optical Test** checks for the presence of the magneto-optical drive and the ability to read from and write to the drive.

- **Run All Tests** runs all the above tests in the above order.

- **Review Test Results** creates two files when you run a test. The Results File displays a simple Pass or Fail for the test run. The Detail File offers additional information about the test run. You can view these files on the screen or print them to a selected printer.

- **Clear Output Files** clears both of the files that were created by the Review Test Results.

- **Printer Calibration** allows you to calibrate a video printer (Tektronics RGB II) against all-white and all-black screens. To run this calibration, you must be in the Offline state with no editor running.

- **Quit** dismisses the diagnostics screen.

To cancel a diagnostic test while it is running, press the **Delete** key. Note that this not only stops the current test from running, but also dismisses the diagnostics process.

Alarm Applications/Failover Option

A.1 Alarm Card Specifications and Pin-out Data

Table A-1 lists specific power requirements for the alarm card.

Table A-1   Alarm Card Power Specifications

Parameters	Range or Values (UL Class 2 or PELV)
Input Voltage (Input Specifications)	20–30 VAC (AC Input) 20–42 VDC (DC Input)
Input Current (Input Specifications)	5-20mA (AC Input) 5-20mA (DC Input) (Typical input current at 24 V is 10 mA)
Voltage Range (Output Specifications, Voltage)	5–30 VAC (AC Output) 5–42 VDC (DC Output)
Resistive Load (Output Specifications, Current)	10mA to 1 Amp, full voltage range (AC Output) 10mA to 1 Amp, full voltage range (DC Output)
Pilot Rating (Output Specifications, Current)	10mA to 1 Amp at 24 VAC (AC Output) 10mA to 1 Amp at 24 VDC (DC Output)

Input Channels   The alarm card uses two input channels for failover detection purposes.

Output Channels   The alarm card has three output channels. To provide failover detection capabilities, connect the watchdog output (channel 3) to the input channel of another OSx station.

External Connector   You can access the input and output channels through the external connector of the alarm card. These channels allow you to connect external sirens and warning lights to your process. Table A-2 shows the pin numbers and functions for the alarm card connector.

Table A-2   Alarm Card Connector Pin-out Data

Pin	Function
1	Channel 1—normally open contact
2	Channel 1—normally closed contact
4	Channel 2—normally open contact
6	Channel 3—watchdog normally open contact
7	Channel 3—watchdog normally closed contact
10	Channel 2—input A
13	Channel 1—input A
14	Channel 1—common contact
16	Channel 2—common contact
17	Channel 2—normally closed contact
19	Channel 3—watchdog common contact
21	Channel 2—input B
24	Channel 1—input B
Any pin numbers not listed have no connections.	

Alarm Card Specifications and Pin-out Data (continued)

An eight-segment dipswitch called SW1 sets the watchdog timer and assigns the alarm card address (Figure A-1). If you service or replace the card, be sure that you reset SW1 correctly, as in Table A-3.
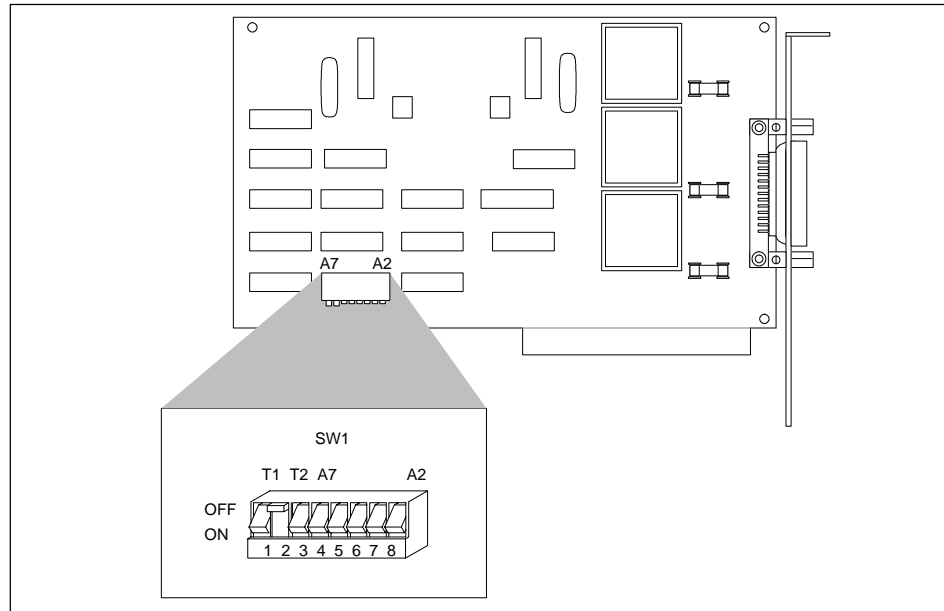
Figure A-1   Alarm Card

Table A-3   Alarm Card Dipswitch Settings

Switch #	Setting
1	ON
2	OFF
3	ON
4	ON
5	ON
6	ON
7	ON
8	ON

Alarm Card Switch Configuration

Use switch SW1 to configure the I/O address of the alarm card and to configure the time-out period of the watchdog timer. Switch positions 1 and 2 are used to set the time period (Table A-4). The default time-delay value for PCS is 4.6 seconds. Figure A-1 shows the default switch selection.

Table A-4   Time Delay Configuration (SW1–1 and SW1–2)

Switch Position		Time Delay
1	2	
O	O	Invalid
C	O	4.6 s
O	C	9.3 s
C	C	14 s
O = Open Switch, Off C = Closed Switch, On		

Use switch positions 3 through 8 to set the I/O address (see Table A-5). PCS requires an address setting at 300 H.

Table A-5   Address Configuration (SW1–3 through SW1–8)

Switch Position						I/O Address
3	4	5	6	7	8	
C	C	C	C	C	C	300–301H
C	C	C	C	C	O	304–305H
C	C	C	C	O	C	308–309H
C	C	C	C	O	O	30C–30DH
. . .	. . .	. . .	. . .	. . .	. . .	. . .
O	O	O	O	O	C	3F8–3F9H
O	O	O	O	O	O	3FC–3FDH
O = Open Switch, Off C = Closed Switch, On						

Switch positions 3 through 8 are imbedded in the binary decode settings as shown below:

A9	A8	A7	A6	A5	A4	A3	A2	A1	A0
1	1	SW1–3	SW1–4	SW1–5	SW1–6	SW1–7	SW1–8	0	X

A9 and A8 are always decoded as logic 1, A1 is always a 0, A0 can either be 0 or 1, depending on the function performed by the alarm card. A0 is controlled by OSx software.

A.2 Application 1: Single Alarm

General Description

Figure A-2 shows a typical single-alarm application using one alarm annunicator. Use this application in a multiple-station configuration to provide a separate alarm from each OSx station. This configuration provides one critical alarm level.
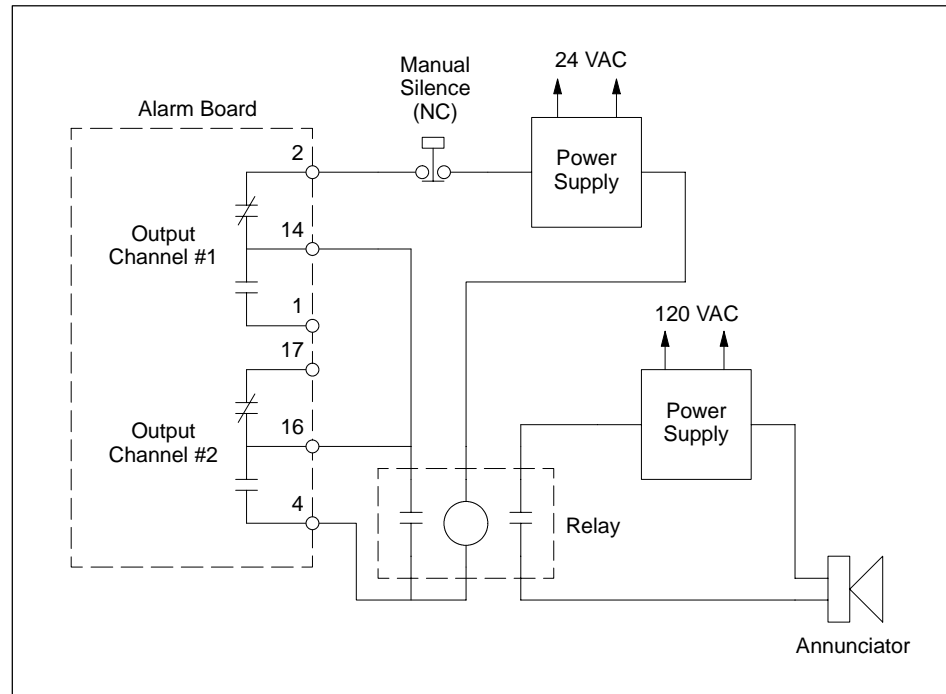
Figure A-2 Single Alarm

Use the output channel #1 for the alarm annunciator silence switch and output channel #2 for the critical alarm annunciator. The numbers for each of the outputs are the pin numbers of the external connector.

You need two external power supplies (a 24 VAC and a 120 VAC) for this application. Use a 120 VAC power supply to drive the alarm annunciator and a 24 VAC power supply for the alarm acknowledge circuit.

To run this application, you need to make the following configuration changes in the Event Preferences Configuration dialog box. Set the External Alarm Annunciator to **Enabled**, and ensure that the alarm output mode is set to **Pulsed Critical**, which is the default configuration. For instructions on configuring the alarm output mode, refer to the section called Event Preferences Configuration in the chapter on OSx station configuration in the *SIMATIC PCS 7 OSx System Administration Manual*.

Theory

In the normal non-alarm condition, a 24 VAC supplies power to channel #2 common, pin 16, through the normally-closed contacts of the manual silence switch and output channel #1. When output channel #2 experiences a pulsed alarm condition, the normally-open contact is momentarily closed, supplying power to the relay. With the relay energized, both of the relay's normally-open contacts close. These contacts allow the annunciator both to sound and to latch on the circuit that provides power to the relay. This occurs even when the contact on output channel #2 returns to the normally-open condition.

To silence the annunciator, either press the manual silence switch or silence the alarm from the operator keyboard or screen. This opens the normally-closed contact on output channel #1.

NOTE: If you have difficulty with your system, contact the Siemens Energy & Automation, Inc., Technical Services Group in the U.S.A. at 800–333–7421. Outside the U.S.A., call 49–911–895–7000.

A.3 Application 2: Dual Alarms

General Description

Figure A-3 shows a typical dual-alarm application using two alarm annunciators. This configuration provides both warning and critical alarm levels. Use this application in a multiple-station configuration to provide separate warning and critical alarms from each OSx station. Since there is no manual silence circuit for these alarms, you must silence the alarm from the operator keyboard or screen.

Use the output channel #1 for the warning alarm annunciator switch and output channel #2 for the critical alarm annunciator. The numbers for each of the outputs are the pin numbers of the external connector.

You need two external power supplies (a 24 VAC and a 120 VAC) for this application. Use a 120 VAC power supply to drive both alarm annunciators and a 24 VAC power supply for both alarm latching circuits.

To run this application, you need to make the following configuration changes in the Event Preferences Configuration dialog box. Set the External Alarm Annunciator field to **Enabled** and set the alarm output mode to **Continuous**. Refer to the section called Event Preferences Configuration in the chapter on OSx station configuration in the *SIMATIC PCS 7 OSx System Administration Manual* for instructions on configuring the alarm output mode.

This configuration change allows the output contact to latch on when the system is in alarm. The output contact does not unlatch until you clear the alarm condition.

NOTE: If you have difficulty with your system, contact the Siemens Energy & Automation, Inc., Technical Services Group in the U.S.A. at 800–333–7421. Outside the U.S.A., call 49–911–895–7000.

Theory   In the normal non-alarm condition, a 24 VAC supplies power to channel #1 common, pin 14, and channel #2 common, pin 16. When output channel #1 experiences a warning alarm condition, the normally-open contact closes, supplying power to relay #1. Energizing this relay closes the normally-open contact, causing annunciator #1 to sound.
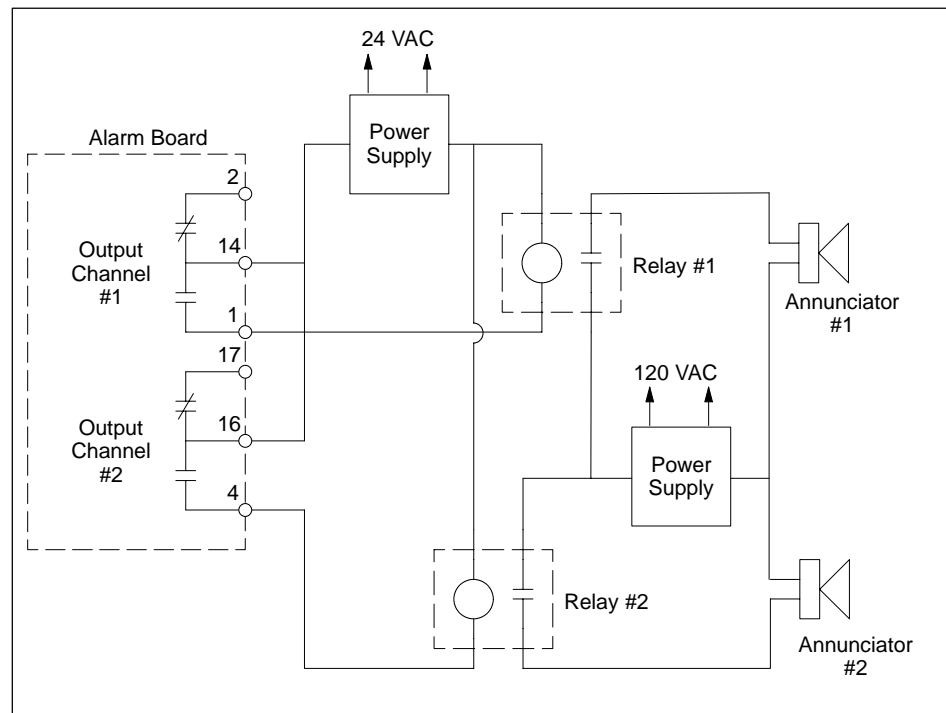
When output channel #2 experiences a critical alarm condition, the normally-open contact closes, supplying power to relay #2. Energizing this relay closes the normally-open contact, causing annunciator #2 to sound.

Figure A-3   Dual Alarms

A.4 Failover Circuit

If you are installing more than one supervisory station, you can connect these stations so that one station serves as a backup. The station with the backup role assumes the primary role if the designated primary fails.

The alarm card on the backup station detects the loss of a watchdog timer signal when the primary station fails. You must connect the alarm card in the primary to the alarm card in the backup to provide failover capability. Figure A-4 shows how to connect the failover ribbon cable to the alarm card.
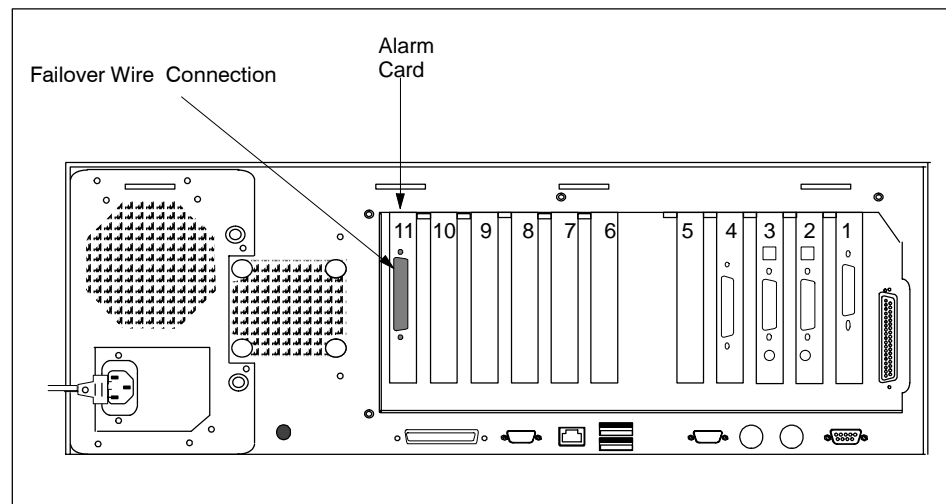
Figure A-4   Connecting the Failover Wire to the Alarm Card

Although operator stations cannot have the backup role, you can connect the failover circuit to them. When connected to the failover circuit, the operator station detects the failure of the primary as quickly as possible. This allows the operator station to resynchronize with the new primary more quickly.

Figure A-5 shows multiple station connections. Refer to the *SIMATIC PCS 7 OSx System Administration Manual* and the *SIMATIC PCS 7 OSx Process Configuration Manual* for additional information on multiple-station installations.
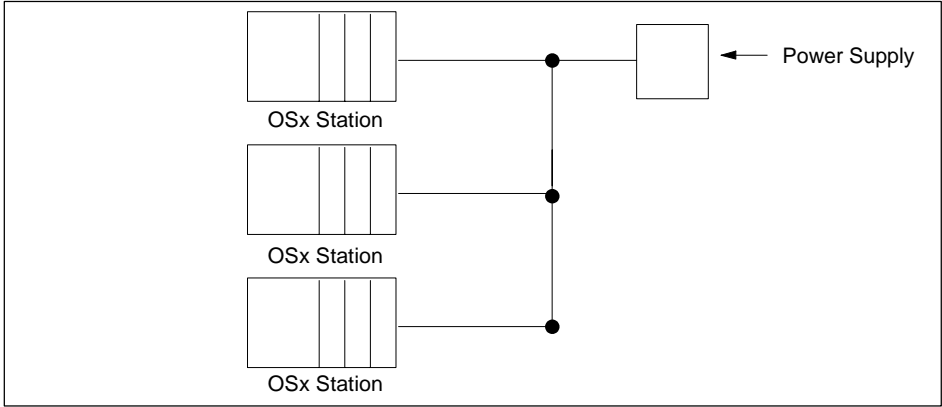
Figure A-5   Multiple OSx Station Connections

Use 28 AWG wire with a maximum of 16 receiver connections for the failover ribbon cable. Use either a 24 VDC or a 24 VAC power supply for the failover circuit. Figure A-6 shows the wiring diagram for the failover circuit.
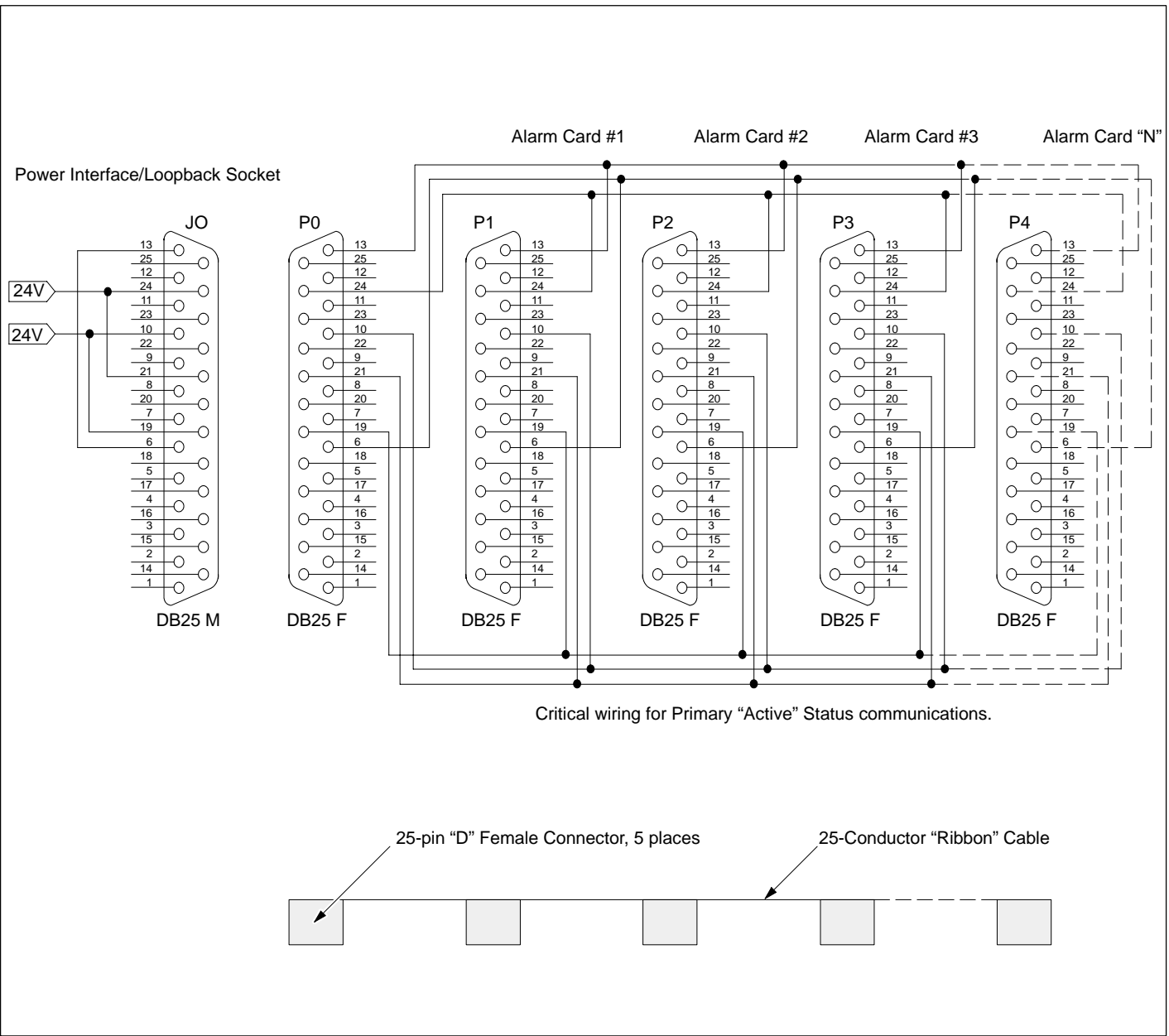
Figure A-6   Failover Cable Wiring Diagram

Failover Circuit Length Calculation

To calculate the maximum length of the wiring used for failover cable wiring, you must know the resistance of the wire used. For example, use 28 AWG ribbon cable and a specified resistance of 74 ohms/1000 ft., and calculate as follows.

1. Calculate the total current required for all OSx stations.

   The worst case is 16 nodes in a system, with the first node as primary. The remaining 15 nodes require 10 mA at 24 volts of current for each node. The total current moving through the cable to the remote nodes is 150 mA.

2. Calculate the resistance allowed for voltage drop:

   With a nominal voltage of 24 volts, and a minimum input of 18 volts, the allowable drop is

   24 volts –18 volts = 6 volts

3. Calculate the allowable resistance:

   6 volts / 150 mA = 40 ohms

4. Calculate the length of cable allowed:

   Distance (D) at 74 ohms per thousand feet:
   (D / 40) = (1000 / 74)
    D = (1000 / 74) * 40
    D = 540 ft.

Since there are two wires involved in the closed-loop circuit, you divide the resulting distance by two in order to get the length of the cable you need to use:

D = 540 ft. / 2 = 270 ft.

If you need more cable length, use larger wire.

NOTE: Avoid routing the failover wiring near high voltage cables (480 volts or higher), as well as other sources of noise that could adversely affect the signals.

Routine Maintenance

B.1   General Operating Procedures

Overview

Routine maintenance on the system consists mainly of developing and using good housekeeping habits. Keep the area clear of debris and clutter that can hinder operations. Periodically check wires, cables, and other parts of the system for obvious damage. Perform repairs or replace damaged parts as required. Refer to the appropriate removal and replacement procedures, if you need parts replacement guidance.

Avoiding External Interference

Follow the installation guidelines to avoid problems, such as stray magnetic fields coming from nearby motors, copy machines, and similar devices. Your AC power lines should also be installed with sufficient filtering to prevent transients or other line fluctuations capable of damaging the system.

Problems can occur, however, with infrequent situations. Welding or other maintenance functions can be performed near your system. If this occurs, take every precaution to ensure proper protection for critical areas of the system. Areas subject to damage from this type of interference include the hard disks, floppy diskettes, magneto-optical diskettes, and color monitors.

**Handling OSx
Software Media**

Take good care of your software media. To ensure satisfactory performance, follow these guidelines.

- Do not touch exposed areas.

- Avoid extreme temperatures.

- Do not bend or mishandle in any way.

- Keep away from magnetic fields.

- Do not try to remove from the drive when in-use light is on.

- Use only a very soft felt-type pen for writing on the jacket.

- Return CDs, disks, and diskettes to the protective jacket as soon as your work is done.

- Store copies of your system software in a clean, safe, dry place away from extreme heat, direct sunlight, or magnetic fields.

CAUTION
Failure to remove important diskettes from the drive can result in loss of data.
Do not leave diskettes containing important configuration, backup, or operating system software in the drive for extended periods of time.

B.2 Scheduled Maintenance

Recommended Cleaning Procedures

On a schedule appropriate for your site, wipe off the chassis exterior, keyboards, color monitor, trackball, and other accessible areas. Dampen a lint-free cloth in a mild cleaning solution. Do not allow moisture to flow into the electronic circuits.

If the environment is dusty and you must use a vacuum cleaner, follow these special guidelines.

```
┌─────────────────────────────────────────────────────────────────────┐
│                            CAUTION                                    │
├─────────────────────────────────────────────────────────────────────┤
│ Moving a vacuum cleaner near a disk or diskette can destroy stored    │
│ data. Using a vacuum cleaner near a monitor can distort color purity. │
│                                                                       │
│ Be extremely careful when using vacuum cleaners around PCS 7 OSx      │
│ hardware. Motors are inductive devices that create stray magnetic     │
│ fields.                                                               │
└─────────────────────────────────────────────────────────────────────┘
```

- Use a vacuum cleaner with a long hose and nozzle so you can keep the motor assembly well away from critical areas.

- Do not turn a vacuum cleaner off in front of the monitor.

Maintaining Disk Drives

Disk drives are precision pieces of equipment that require careful handling. To keep them functioning properly and to eliminate downtime, perform periodic cleaning, using a good quality, commercially available, disk head-cleaning kit. Dust particles on the read/write heads can cause a variety of problems, including premature wearing out of diskettes.

Front Panel

The front panel has openings for device ventilation. A filter mat and the fans are located behind this front panel. The panel can only be removed when the front door is open. Please check the filter mat regularly for dirt and replace it if necessary.

Front Door

The front ports and the screw to unlock the housing cover are protected against dirt and unauthorized access by means of a door. Please keep the front door closed during normal operation.

Only qualified personnel should be authorized to open the Rack PC or carry out repairs or maintenance work. The front door can be locked to prevent unauthorized access.

Checking Picture Quality

Observe the overall monitor picture quality periodically. Perform the following procedures as often as necessary.

- If necessary, rotate the monitor controls through their full range to see if a satisfactory setting can be achieved.

- Observe picture purity. Does the screen show "spots" or other evidence of poor color adjustment?

If you discover a problem, determine its severity. Relatively minor problems, such as a purity problem, can be repaired by using the degaussing switch located on the front of the unit. Other minor repair may be delayed for action at a time appropriate to the user.

If you discover a more serious problem that requires immediate action, contact your supplier.

NOTE: If you have difficulty with your system, contact the Siemens Energy & Automation, Inc., Technical Services Group in the U.S.A. at 800–333–7421. Outside the U.S.A., call 49–911–895–7000.

Uninterruptible Power Supply

C.1   Overview

General Description

An Uninterruptible Power Supply (UPS) is used to protect data integrity during abnormal power loss. If you lose AC power, the UPS provides power to the OSx system unit for a minimum of 20 minutes.

Figure C-1 shows cabling arrangements for a typical UPS system. To properly maintain a single-station system, install a 1 KVA system.

If you need additional help in selecting or installing a UPS, contact your supplier.

Power Cabling

A 1 KVA (minimum) UPS provides sufficient emergency power for a single OSx station (monitor, system unit, and printer). Install a second power strip in back of the system to provide this emergency power. Figure C-1 shows cabling connections for both primary and UPS power using a 1 KVA system.
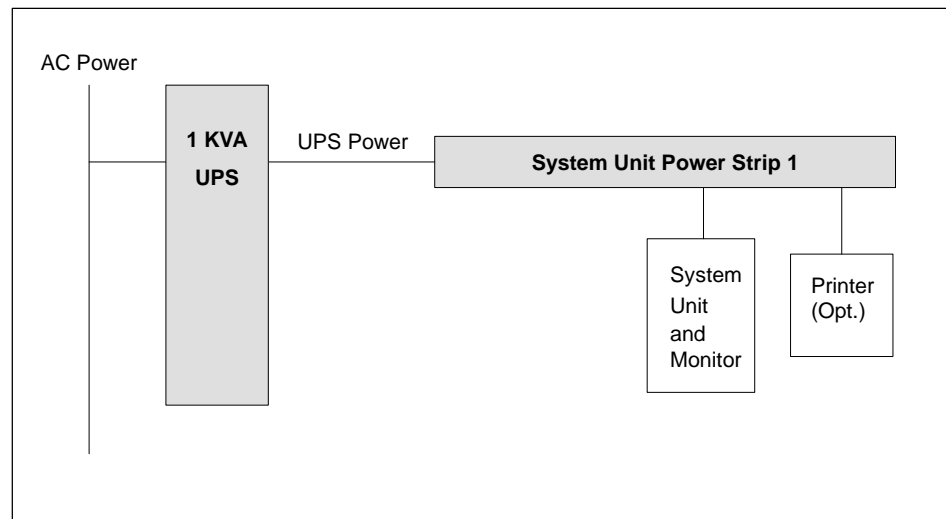
Figure C-1   Cabling Diagram (1 KVA UPS)

To determine the size of the Uninterruptible Power Supply (UPS) use the Average Volt Amperes Consumed as a guide for sizing to allow for your back-up time. For example, when you use the Rack PC 840 with the 22-inch color monitor and a required hold-up time of one hour, the minimum rating requirement is (120 V * (0.894 A + 0.935 A)) * 1 Hr = 219 VA Hr. If you need to turn the system on using the UPS with the Mains AC not available, pay particular attention to the Peak Power-on (or Inrush) Current. On some systems, this value can be up to ten times as great as steady state current. Size your UPS accordingly. Table C-1 shows system current and voltage values for the Rack PC 840, and the 17-inch and 22-inch color monitors.

If you install a printer and want it powered through the UPS, ensure that you use appropriate values. Use a 1 KVA UPS for a complete single-station system. Use a larger power supply if your printer requires it.

Table C-1   System Current and Voltage Values

Sub-System	Test Voltage (60HZ)	Current, Average RMS	Peak Power-on Current[1]	Typical Peak Current	Average Power Consumed, Watts
System Unit	120 V RMS	0.572 A RMS	61.8 Amperes	0.894 Amperes	71 Watts
Monitor (22–inch)	120 V RMS	0.628 A RMS	27.9 Amperes	0.935 Amperes	75 Watts
Monitor (17–inch)	120 V RMS	0.940 A RMS	12.0 Amperes	3.10 Amperes	62 Watts
1 Peak Power-on Current: exponentially decreases from the listed Peak Power-on Current to the average Peak Current in approximately five cycles of line power.					

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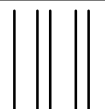**Manual Assembly Number:** 2810908–0001   **Date:** 3/02
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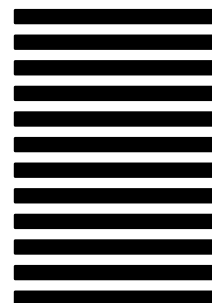
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