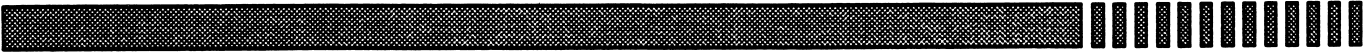


August, 1989
Order Number: 280742-002



iPSC[®]/2
SITE PREPARATION GUIDE



intel[®] Corporation

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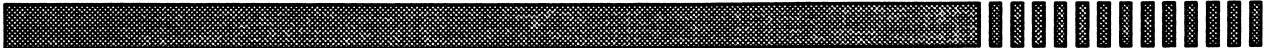
NOTE

This equipment is a Class A digital apparatus which complies with the Canadian Radio Interference Regulations CRC c.1374.

CAUTION

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause interference with radio communications. It has been tested and found to comply with the limits for a Class A Computing Device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

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This document shows you how to plan for the installation of your iPSC®/2 Parallel Supercomputer. Proper planning will ensure that your system is installed and made operational as quickly and efficiently as possible.

This guide explains the various items that must be considered when planning your installation, such as space considerations, electrical requirements, ventilation requirements, and system cables.

WHAT YOU HAVE

The major physical components of the iPSC/2 system are the standard cabinet, the System Resource Manager (SRM), the optional compact cabinet, and the optional nine-track tape drive. Depending on how a specific iPSC/2 system is configured, it may include some or all of these major components. The minimum configuration consists of a standard cabinet (or optional compact cabinet) and an SRM. (Most older systems use compact cabinets.)

Figure 1-1 shows an iPSC/2 system that includes one standard cabinet and one optional compact cabinet.

The Standard Cabinet

A standard cabinet contains one or more card cages and/or peripheral modules. The actual configuration you have ordered determines how many of these will be in each standard cabinet. Each card cage can contain up to 16 boards of various types and configurations. Each peripheral module can contain disk and/or cartridge tape drives, to a maximum of four units.

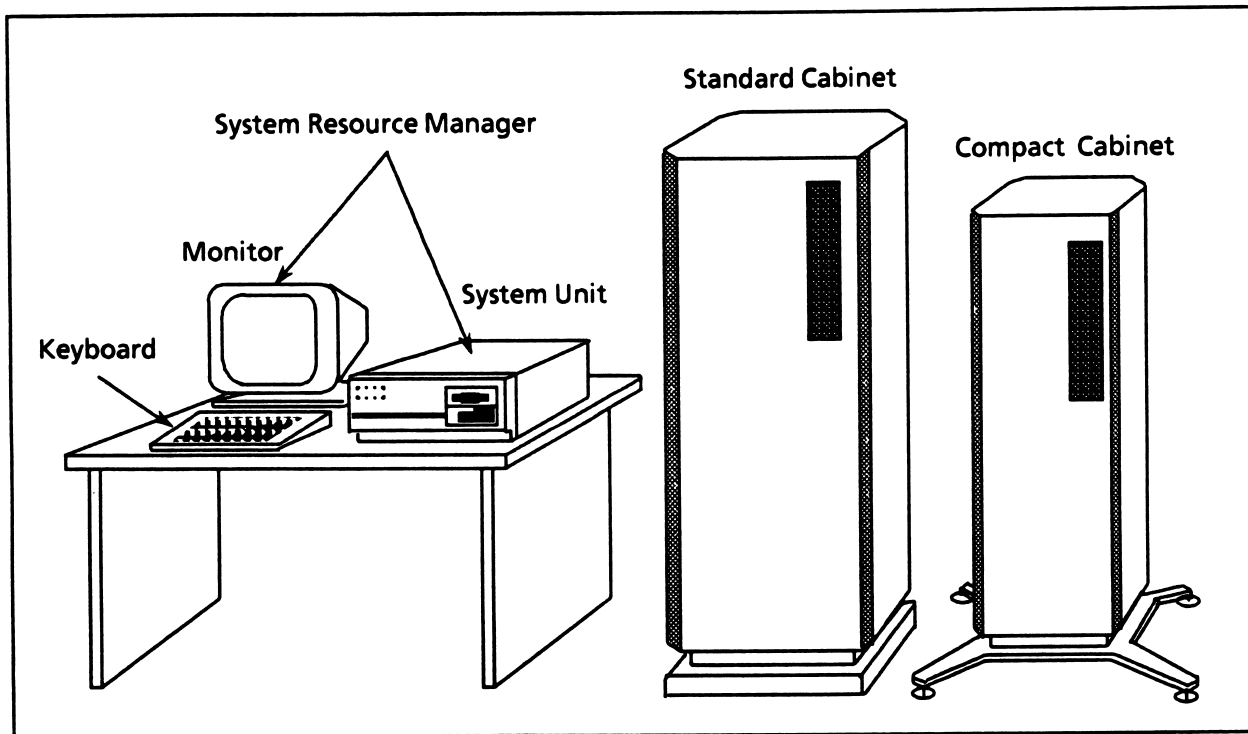


Figure 1-1. iPSC®/2 Configuration with Standard and Compact Cabinets

The System Resource Manager

The System Resource Manager is a 386™-based workstation that includes a system unit, monitor and keyboard. It serves as a gateway to other computers and workstations, as well as a system administration console for the iPSC/2 system.

The Optional Compact Cabinet

An optional compact cabinet consists of one card cage that can contain up to 32 boards of various types and configurations. The actual configuration you have ordered determines how the card cage in each compact cabinet is populated.

The Optional Nine-Track Tape Drive

The optional nine-track tape drive is an integrated tape formatter/controller and half-inch (12.7 cm) tape drive packaged as a single floor-standing unit. It is a dual-density device capable of recording and reading ANSI-compatible tapes at 1600 BPI or 6250 BPI.

System Configurations

The iPSC/2 family of supercomputers includes a variety of configurations, too extensive to list here. Contact your Intel sales representative for a description of the specific configuration you will be receiving.

WHAT YOU NEED

To have your installation go as smoothly and efficiently as possible, you should do the following:

Plan layout and prepare site

There are a number of items that are required for proper preparation of your site. You must have appropriate electrical service installed, verify that the air-conditioning system is adequate, and have the location of the system planned and sketched.

These items are described in detail in Chapter 2.

Schedule installation

Find out from your iSC sales representative when your system will be delivered and when the customer support engineer will arrive to install it.

Be prepared

Be sure that potentially long lead-time items, such as electrical service and additional air-conditioning, are installed prior to system delivery. Based on the installation date, notify pertinent personnel and have them available, in case Customer Support needs help or information. Specifically, the system administrator should be present during installation to answer site-specific questions about the TCP/IP network, ask questions about the iPSC/2 system, and receive instruction on the use of the Cube Diagnostic Program (**cdp** in software Release 3.1, **cdp** and **cdpo** in prior releases).

INTRODUCTION

This chapter gives you equipment specifications that will help you set up your site to accommodate your iPSC/2 system. These include system component sizes for planning the system's location, electrical and air-conditioning requirements, and cabling information.

A checklist of the site preparation items, in abbreviated form, is at the end of this chapter.

LAYING OUT YOUR SITE

The layout of your iPSC/2 system installation will be unique. It depends on the equipment that you have ordered and where your system is to be located. This section provides the information about the components of your system that is necessary for you to prepare a detailed site layout.

Plan the location of your iPSC/2 system so that when it arrives, your system can be installed quickly and efficiently. For best results, follow these recommendations:

- Sketch the proposed location of each component on grid paper. Use a scaling factor to give you the correct proportions.

Use the physical dimensions shown in Figures 2-1 through 2-4 plus the access area dimensions shown in Figures 2-5 through 2-9. Tables 2-1 and 2-2 summarize the component and access area dimensions shown in the illustrations. The last column in Table 2-1 lists each component's weight.

- Cable lengths also impact the placement of your system. The "System Cabling" section, in this chapter, provides information on system cabling.

There are constraints on where the cabinets can be located. Check with your iSC sales representative for more information.

Component Space Requirements

Figures 2-1 through 2-4 and Table 2-1 describe the space requirements of each of the system components.

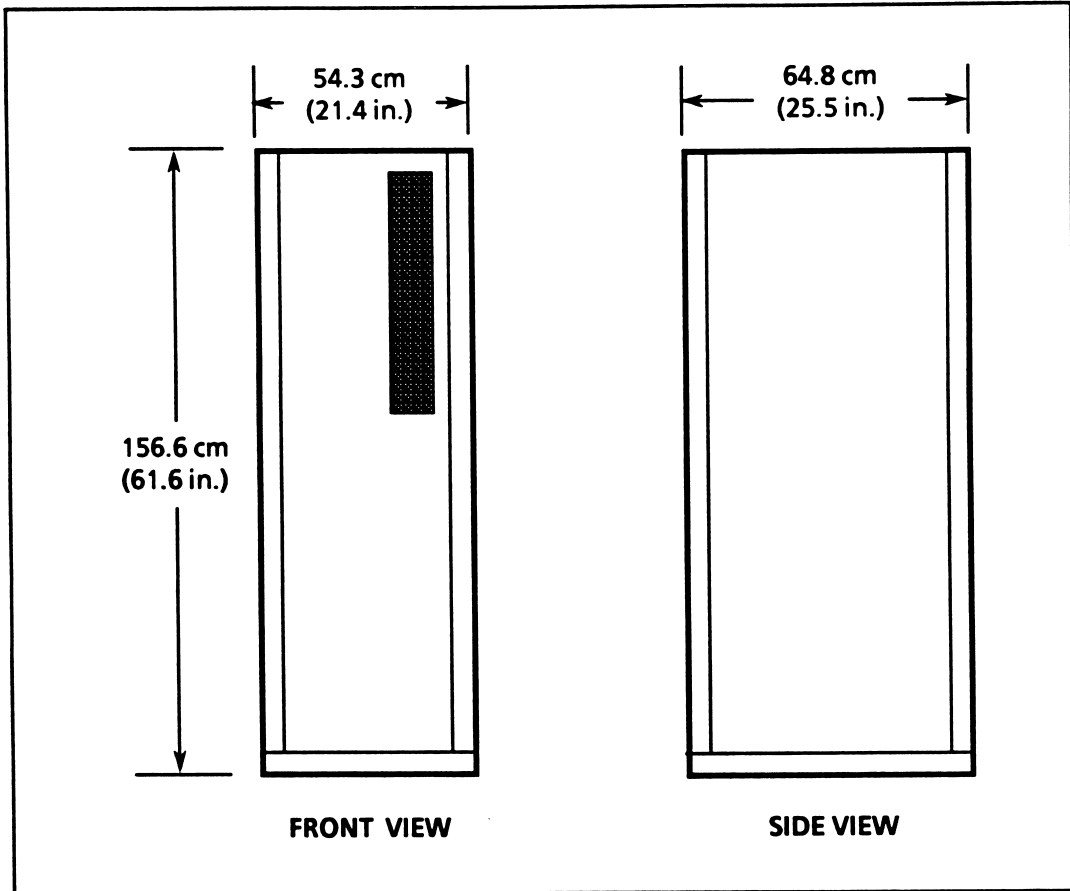


Figure 2-1. Standard Cabinet Dimensions

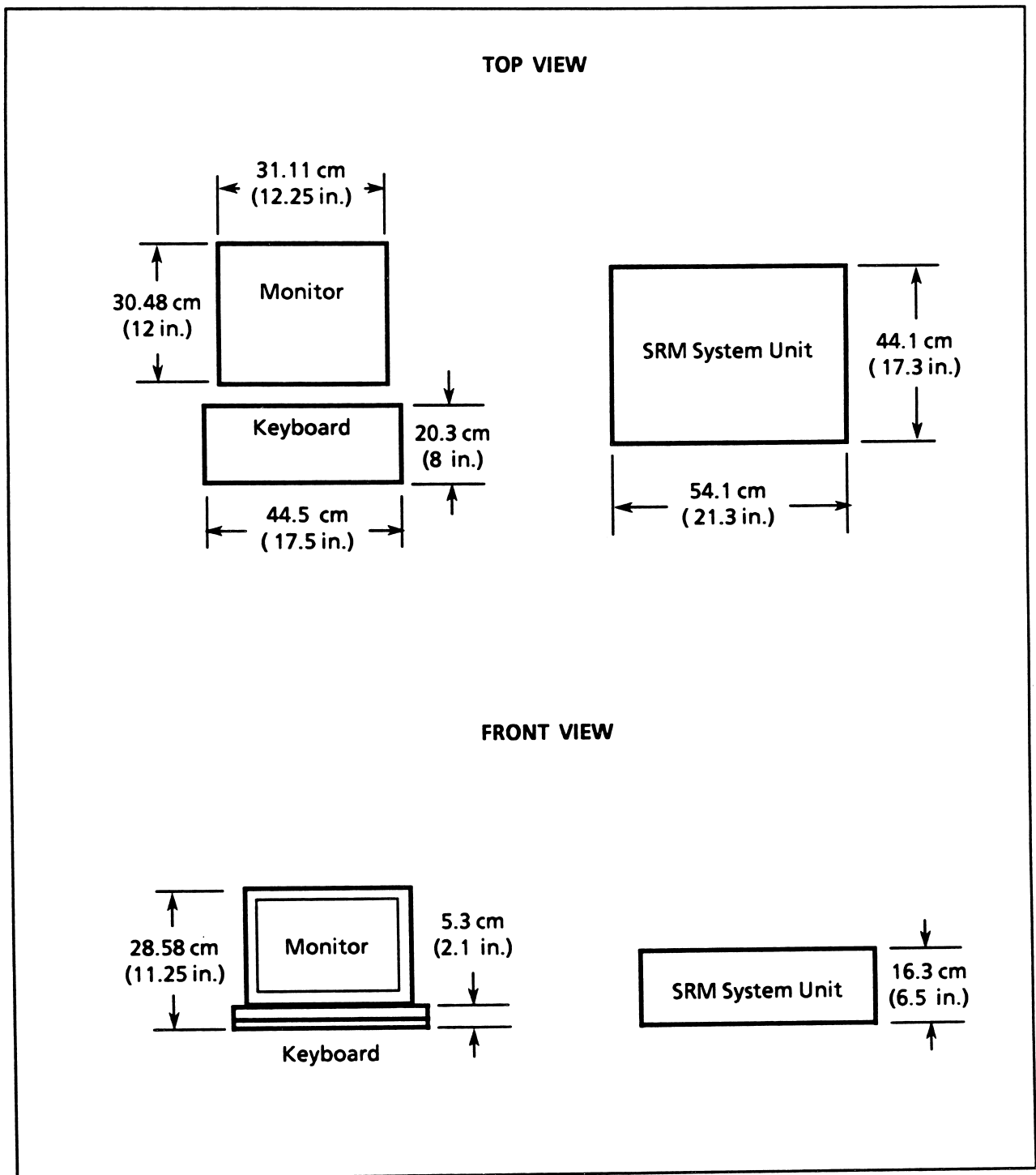


Figure 2-2. SRM Dimensions

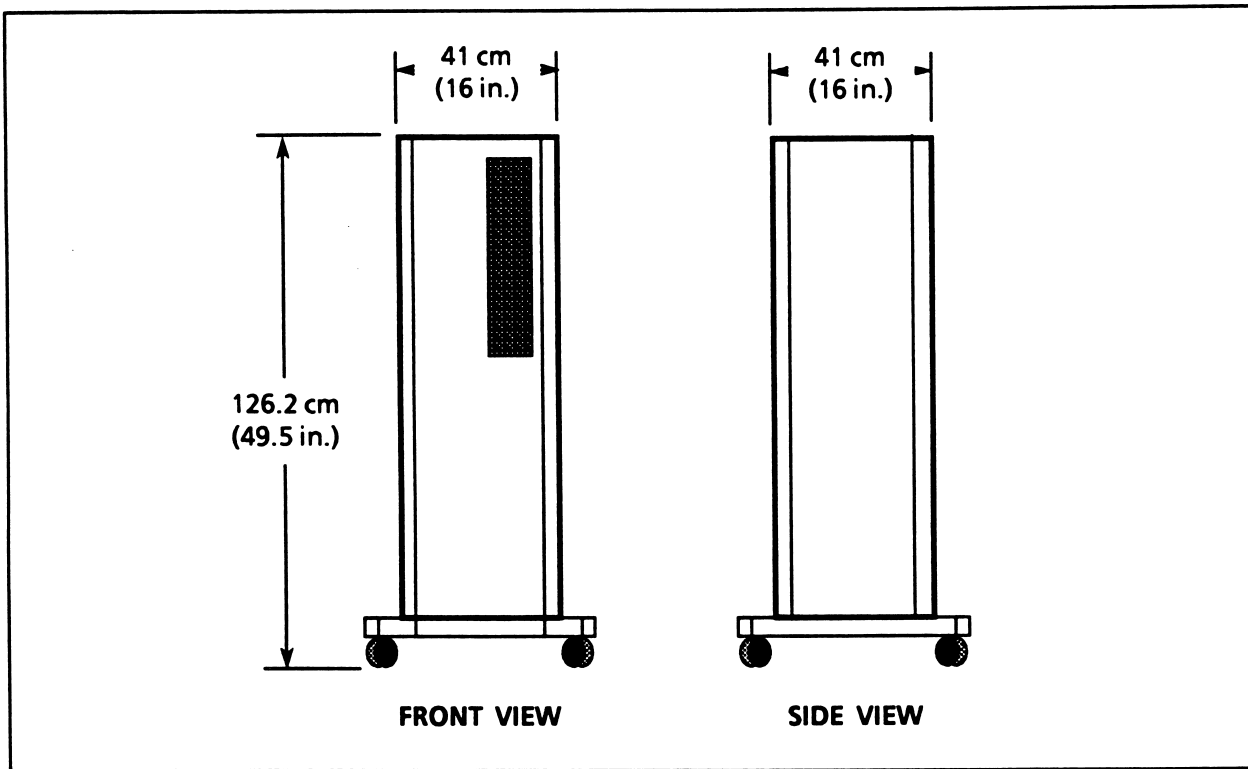


Figure 2-3. Optional Compact Cabinet Dimensions

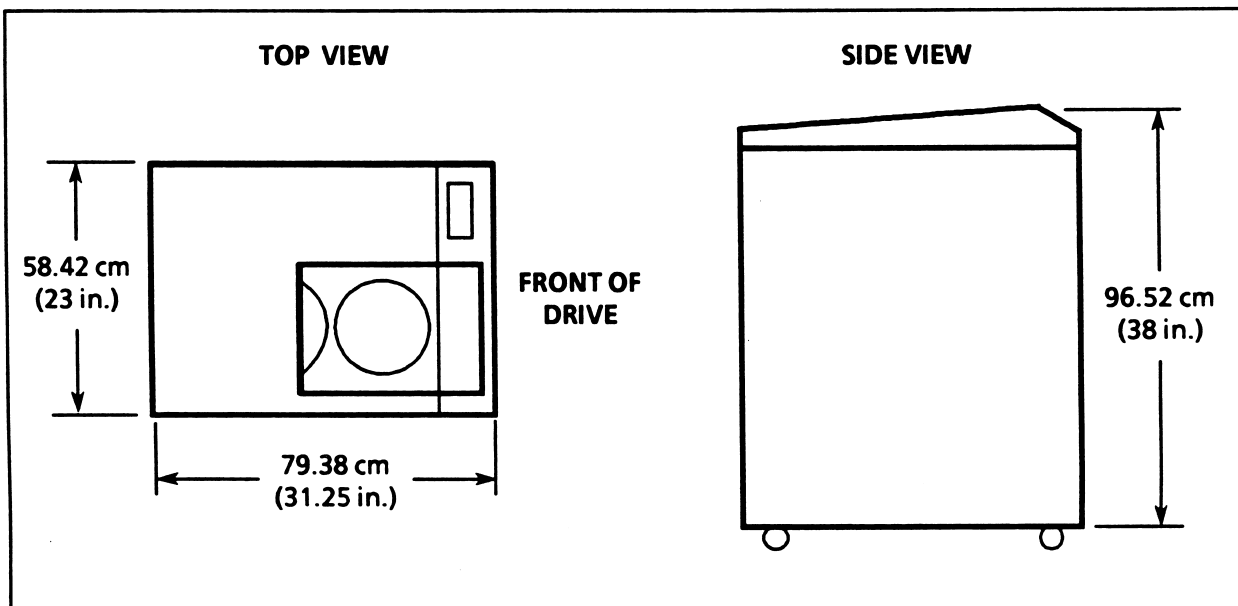


Figure 2-4. Optional Nine-Track Tape Drive Dimensions

Table 2-1. Component Sizes and Weights

Component	Height	Width	Depth	Weight ¹
Standard cabinet	156.6 cm (61.625 in.)	54.3 cm (21.375 in.)	64.8 cm (25.5 in.)	215.9 kg (475 lbs.)
SRM System Unit	16.3 cm (6.5 in.)	54.1 cm (21.3 in.)	44.1 cm (17.3 in.)	20 kg (44 lbs.)
Monitor (with stand)	28.58 cm (11.25 in.)	31.11 cm (12.25 in.)	30.48 cm (12 in.)	9.6 kg (21.1 lbs.)
Keyboard	5.3 cm (2.1 in.)	44.5 cm (17.5 in.)	20.3 cm (8 in.)	1.8 kg (4 lbs.)
Compact cabinet (optional)	126.2 cm (49.5 in.)	41 cm (16 in.)	41 cm (16 in.)	97.7 kg (215 lbs.)
Nine-track tape drive (optional)	96.52 cm (38 in.)	58.42 cm (23 in.)	79.38 cm (31.25 in.)	57 kg (125 lbs.)
¹ The weight given includes a full complement of boards and peripheral devices.				

Access Areas

Access area around each component is necessary for operation, maintenance, and proper air flow. Figures 2-5 through 2-9 show these access areas. Table 2-2 summarizes them.

Figure 2-5 shows the front and rear access spaces for a single standard cabinet. Air inlets are located at the bottom of the cabinet (front and back). The air is exhausted through the rear door and the top of the cabinet. Adequate access space is required for air flow and makes cable routing and equipment servicing easier.

Figure 2-6 shows the access spaces needed for the SRM System Unit. Access space is needed in the back for cables and air flow, and in the front for air flow. Looking at the front of the SRM, the air inlet is located on the left side. The air outlet is on the right rear side. Access space in the front allows room for tape and diskette insertion and removal. Access space is needed on the right side to operate the power switch.

The only access space needed for the monitor is for cables, as shown in Figure 2-7. The monitor and keyboard are quite compact and easily fit on a 30-inch deep table or desk.

Figure 2-8 shows the front and rear access spaces for a single compact cabinet. Each cabinet is 16 inches square. Air inlets are located at the bottom (front and back). The air outlet is in the back, at the top of the cabinet. Adequate access space is required for air flow and makes cable routing and servicing easier.

Figure 2-9 shows the access spaces needed for the 9-track tape drive. Access space is needed in the back for cables. Space in the front and on top of the drive allows room for tape loading and unloading, operator control of the unit, and access to the tape drive mechanism for maintenance.

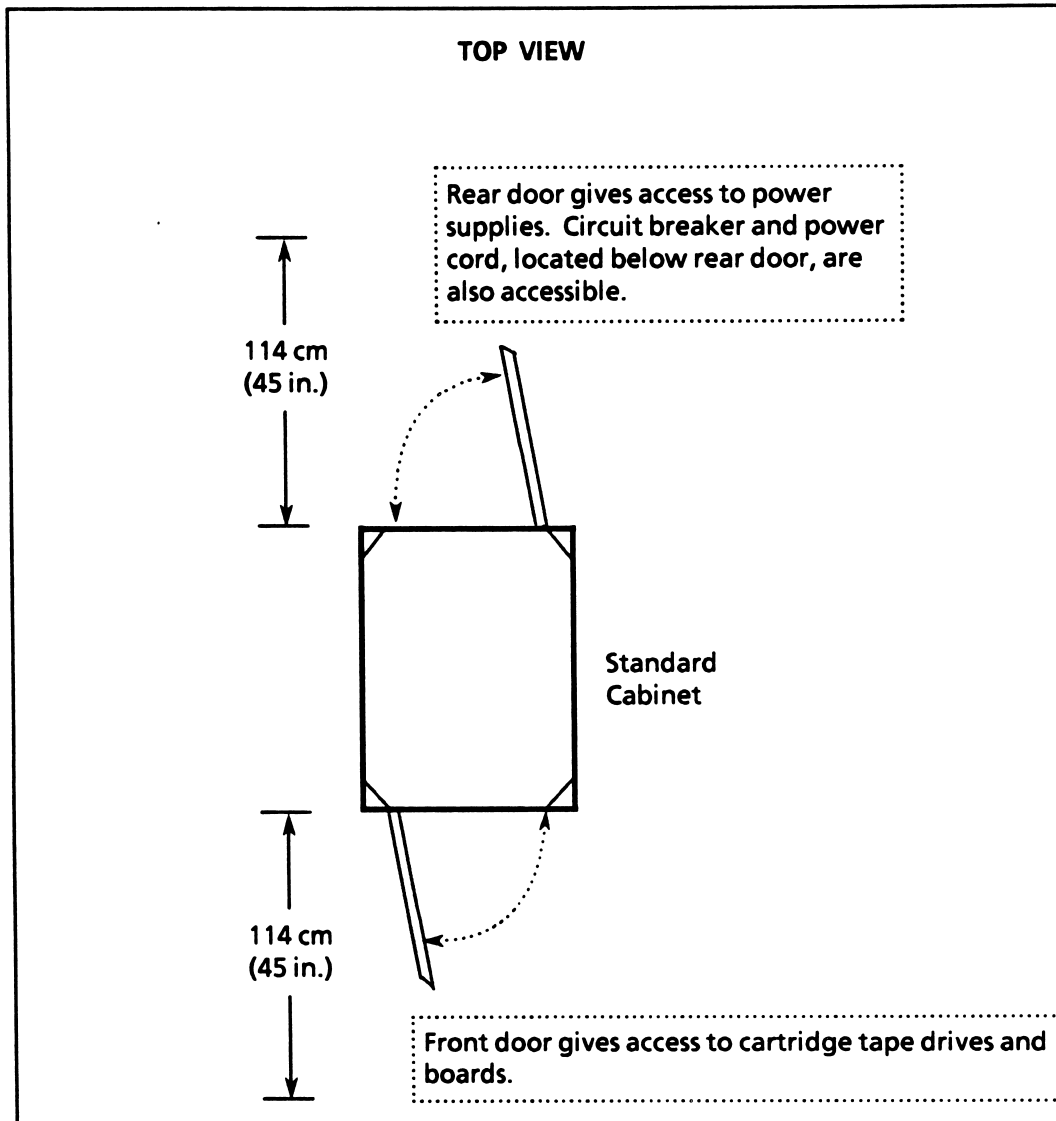


Figure 2-5. Access Areas for a Standard Cabinet

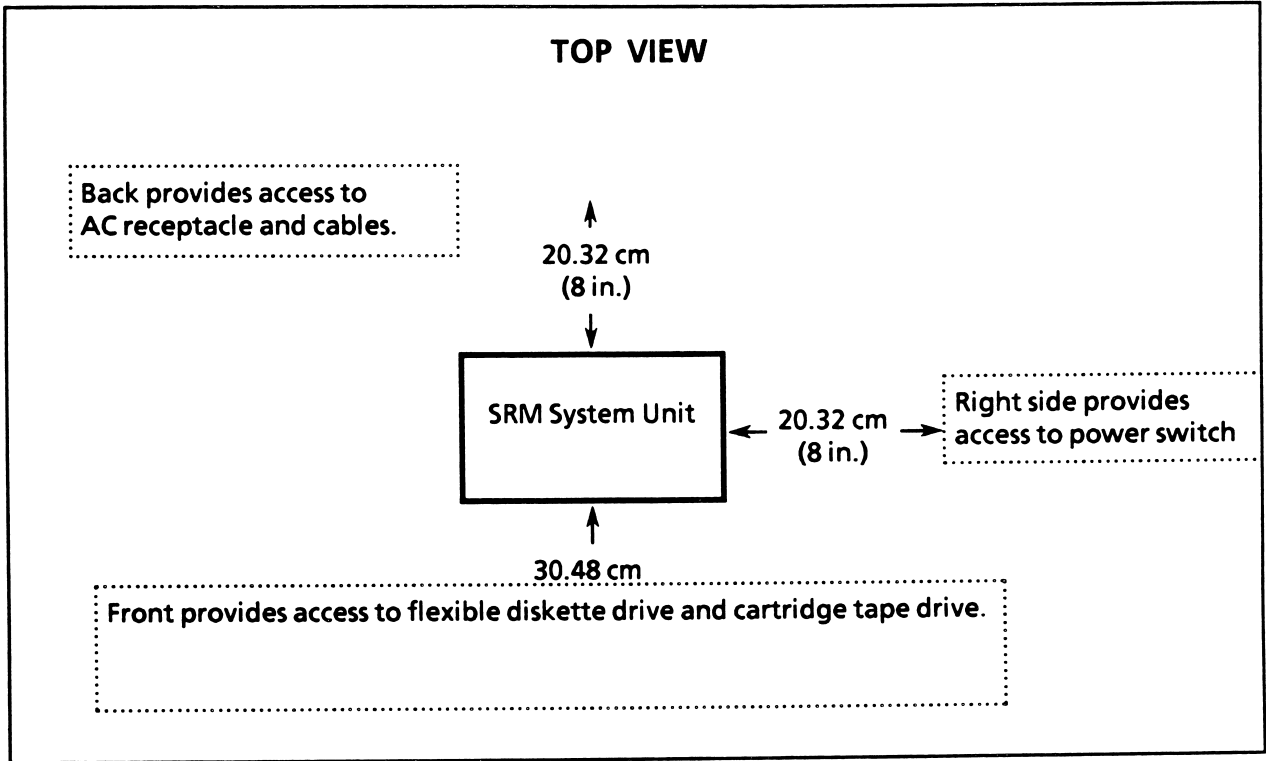


Figure 2-6. Access Areas for the SRM System Unit

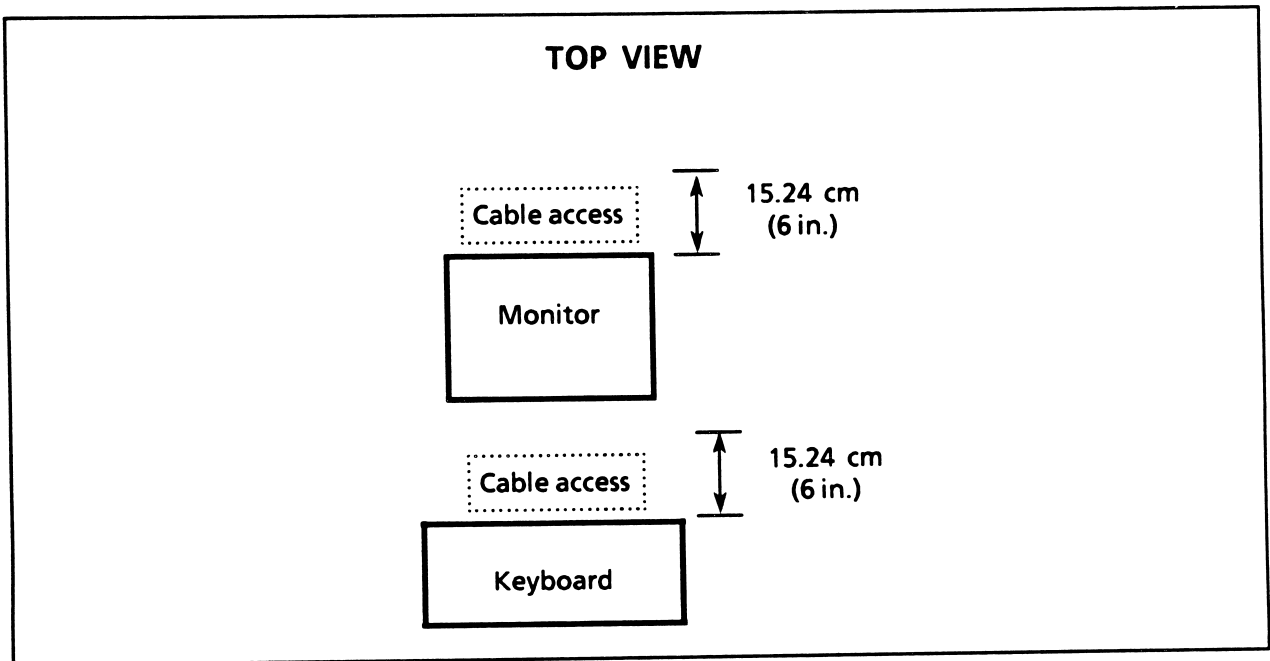


Figure 2-7. Access Area for the SRM Monitor and Keyboard

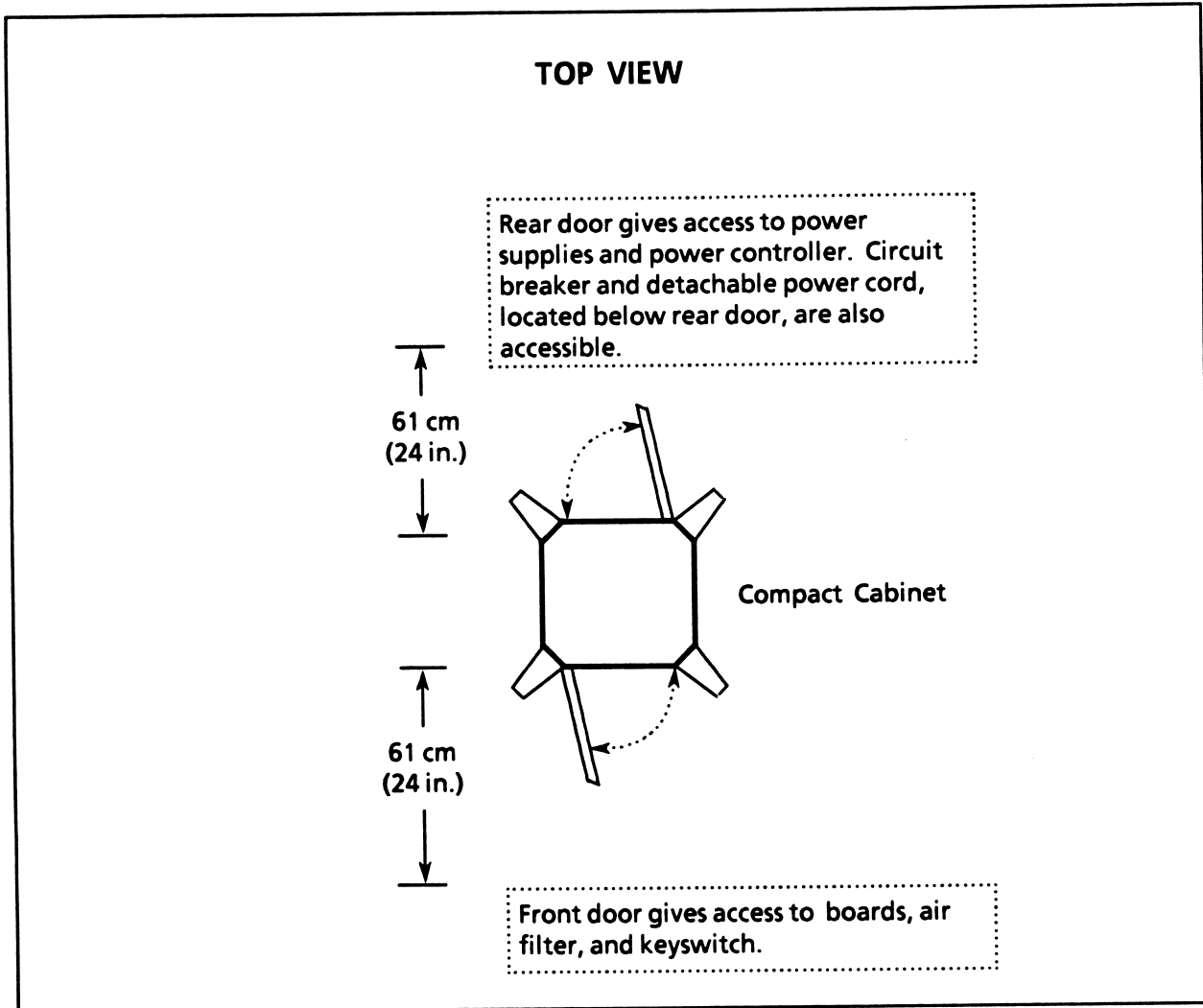


Figure 2-8. Access Areas for an Optional Compact Cabinet

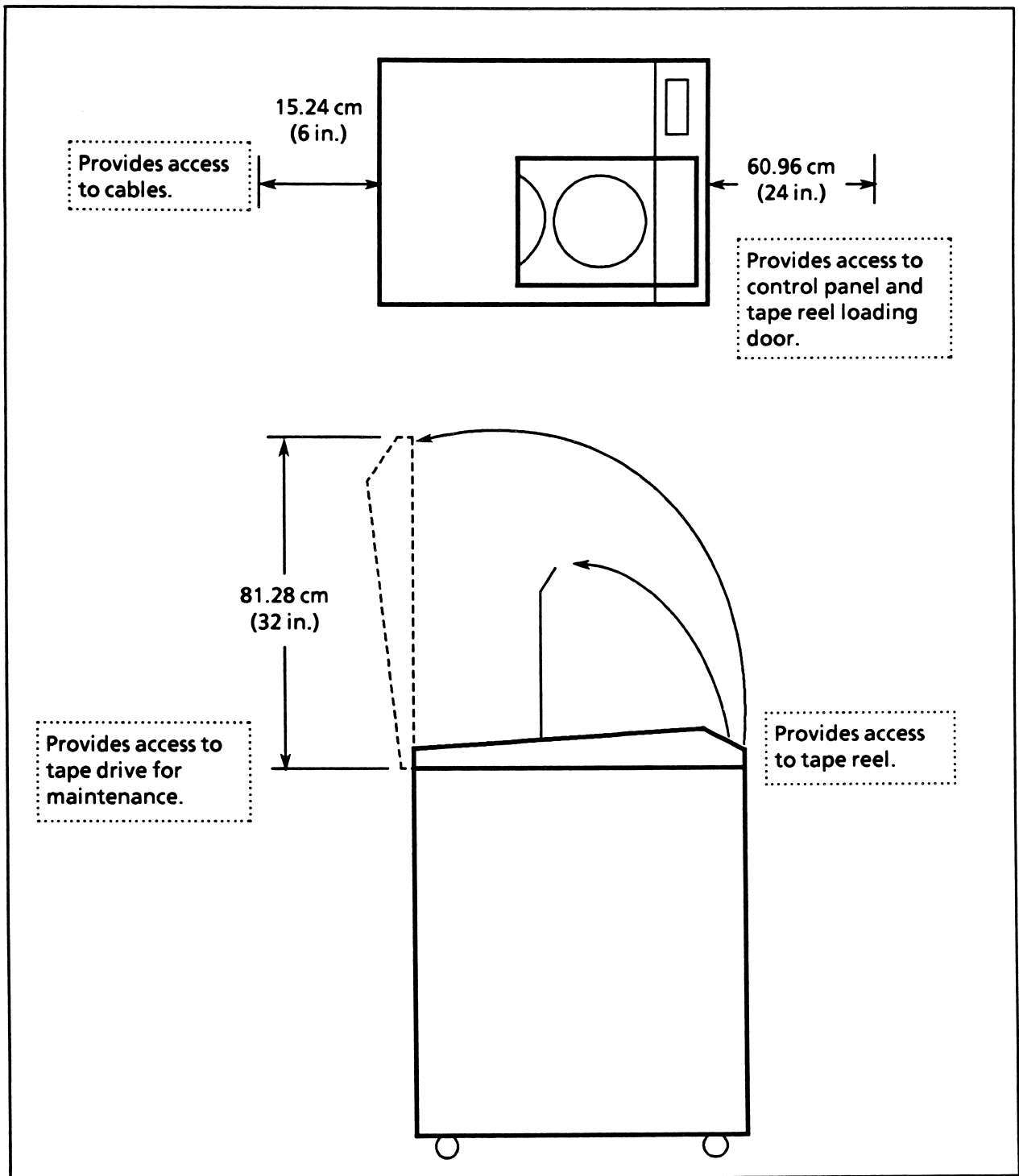


Figure 2-9. Access Areas for the Optional Nine-Track Tape Drive

Table 2-2. Access Areas

Component	Additional Space for Access
Standard cabinet	114.3 cm (45 in.) in back and in front
SRM System Unit	20.32 cm (8 in.) in back 30.48 cm (12 in.) in front 20.32 cm (8 in.) on right sides
Monitor	15.24 cm (6 in.) in back
Keyboard	15.24 cm (6 in.) in back
Compact cabinet (optional)	60.96 cm (24 in.) in back and in front
Nine-track tape drive (optional)	15.24 cm (6 in.) in back 60.96 cm (24 in.) in front 81.28 cm (32 in.) on top

System Cabling

Table 2-3 describes the cables that come with a single standard cabinet system.

Table 2-3. Cables for a Standard Cabinet System

Cable Type	Standard Cable Length
AC power cord for SRM System Unit	2.4 m (7 ft)
AC power cable for the standard cabinet (not detachable)	3 m (10 ft)
Monitor-to-SRM System Unit AC power cord	1.85 m (6 ft)
SRM System Unit-to-monitor cable	1 m (3 ft)
SRM-to-first cabinet cable	10 m ¹ (38.2 ft)
Nine-track tape drive interface cable (optional)	6 m ² (19.8 ft)
Nine-track tape drive interface termination module (optional) ³	Not Applicable
Nine-track tape drive AC cable (optional)	2 m (6 ft)

¹ The maximum distance from the SRM to the first standard cabinet is 10 m (33ft.).
² This length is the maximum cable length from a standard cabinet to the last tape drive in a string of two tape drives.
³ The interface termination module is installed on connector J7 of the last nine-track tape drive in a string of two tape drives.

NOTE

When a multiple cabinet configuration includes both standard and compact cabinets, external interconnecting cables are required. Otherwise, the standard and compact cabinets are connected internally, and no additional cables are required.

Figure 2-10 shows SRM cabling. Figure 2-11 shows the cabling between the SRM and either a standard cabinet or an optional compact cabinet (not shown). Figure 2-12 shows the cabling required for two standard cabinets that are bolted together.

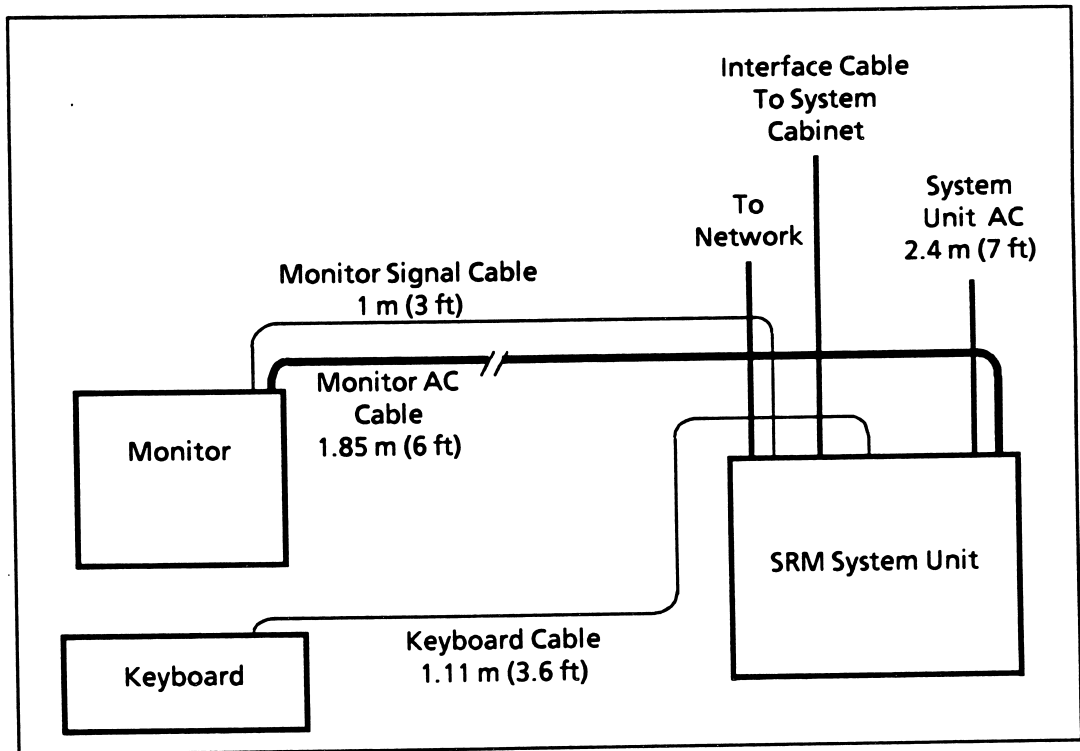


Figure 2-10. SRM Cabling

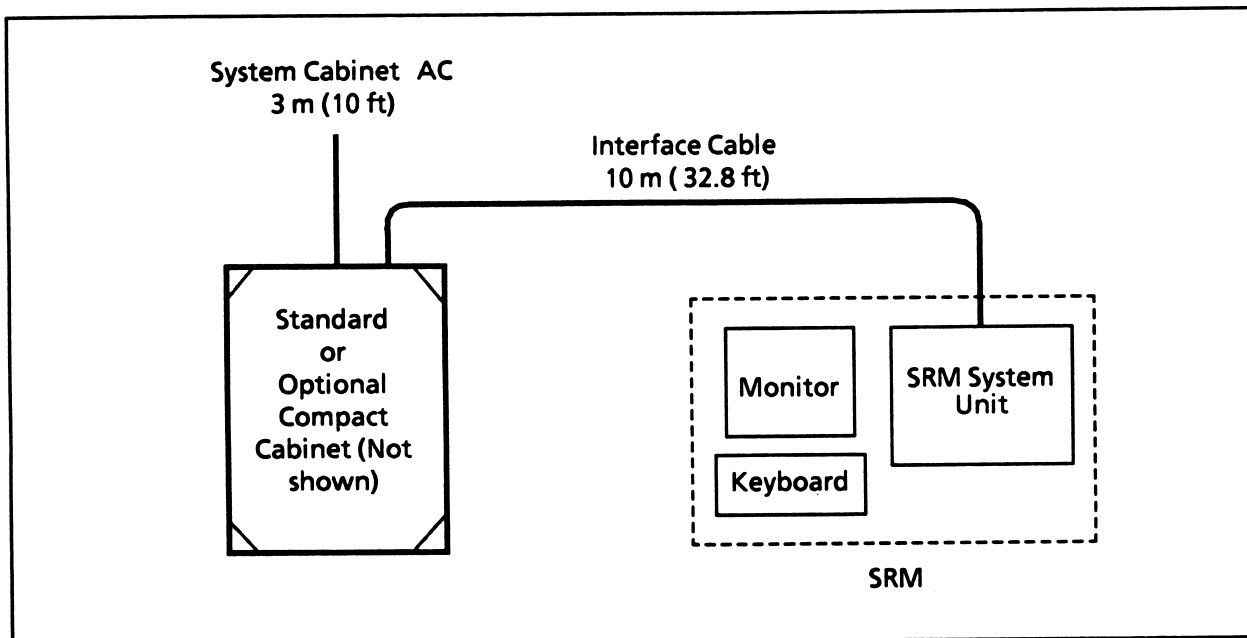


Figure 2-11. SRM-to-Cabinet Cabling

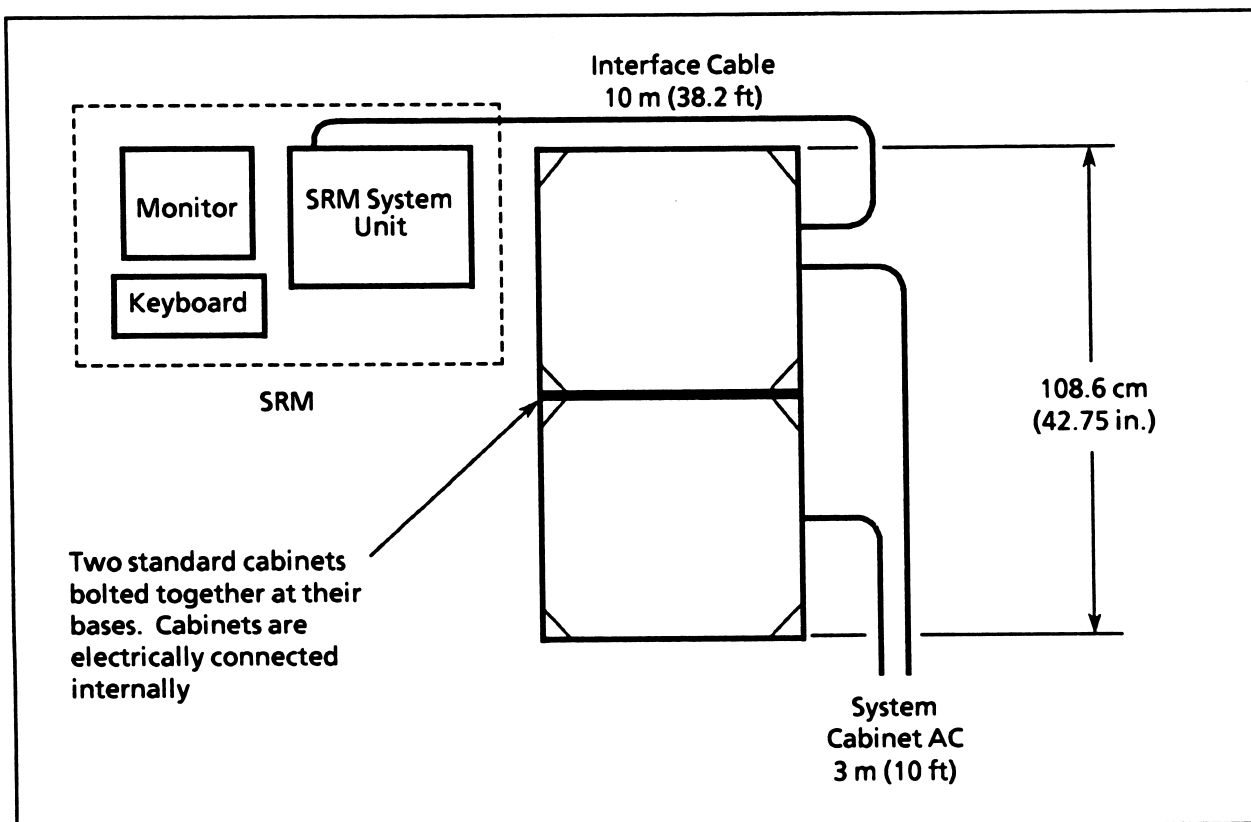


Figure 2-12. Cabling Between the SRM and Two Standard Cabinets

Table 2-4 describes the cables that come with an optional compact cabinet system. Figure 2-13 shows the cabling required for two compact cabinets that are bolted together. Figure 2-14 shows the cabling required for a system configuration that includes both standard and compact cabinets. Figure 2-15 shows the cabling required to connect a 9-track tape drive to a standard cabinet that includes Concurrent I/O (CIO).

Table 2-4. Cables for an Optional Compact Cabinet System

Cable Type	Standard Cable Length
AC power cord for each compact cabinet	3 m (10 ft)
AC power cord for SRM System Unit	2.4 m (7 ft)
Monitor-to-SRM System Unit AC power cord	1.85 m (6 ft)
SRM System Unit-to-monitor cable	1 m (3 ft)
SRM-to-first compact cabinet cable	10m ¹ (38.2 ft)
Compact cabinet-to-standard cabinet RS-422 cable. (Used only when standard cabinet includes CIO system.)	10m (38.2 ft)
Compact cabinet-to-standard cabinet DCM-7 cable. (Used only when standard cabinet includes CIO system.) One cable is used per I/O node.	10m (38.2 ft)

¹ The maximum distance from the SRM to the first compact cabinet is 10 m (33 ft.).

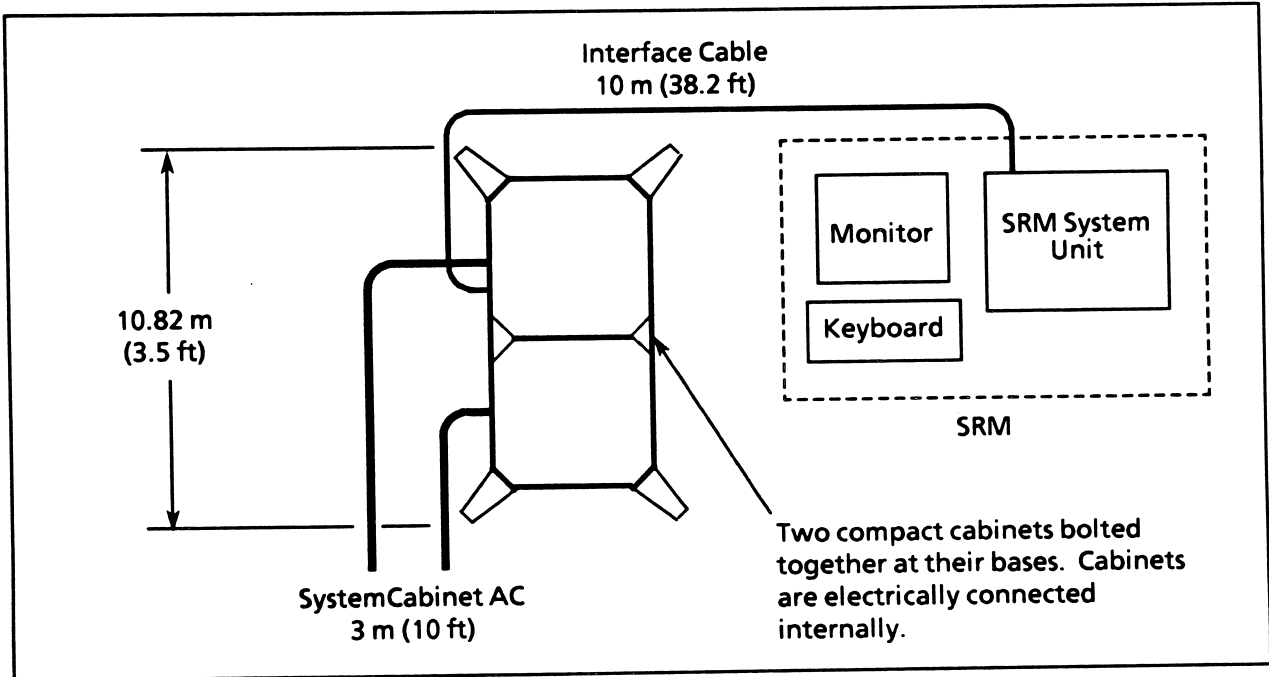


Figure 2-13. Cabling Between the SRM and Two Compact Cabinets

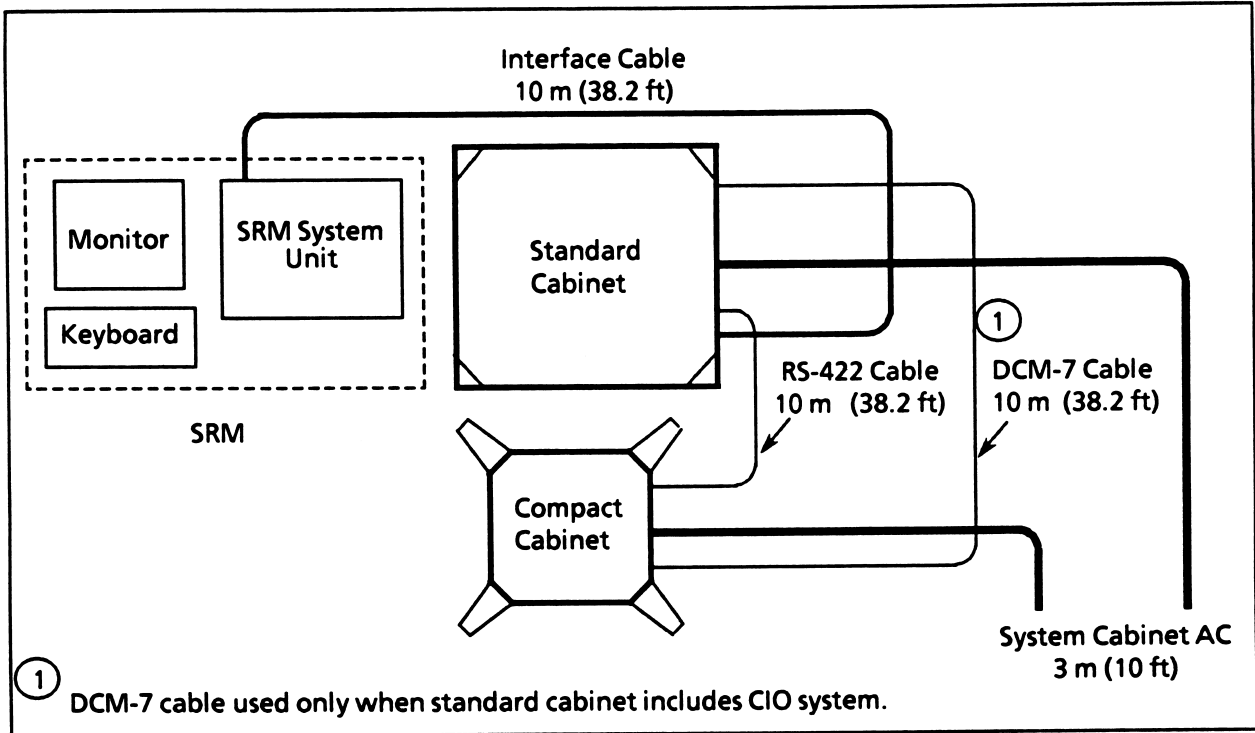


Figure 2-14. Cabling Between the SRM, a Standard Cabinet, and a Compact Cabinet

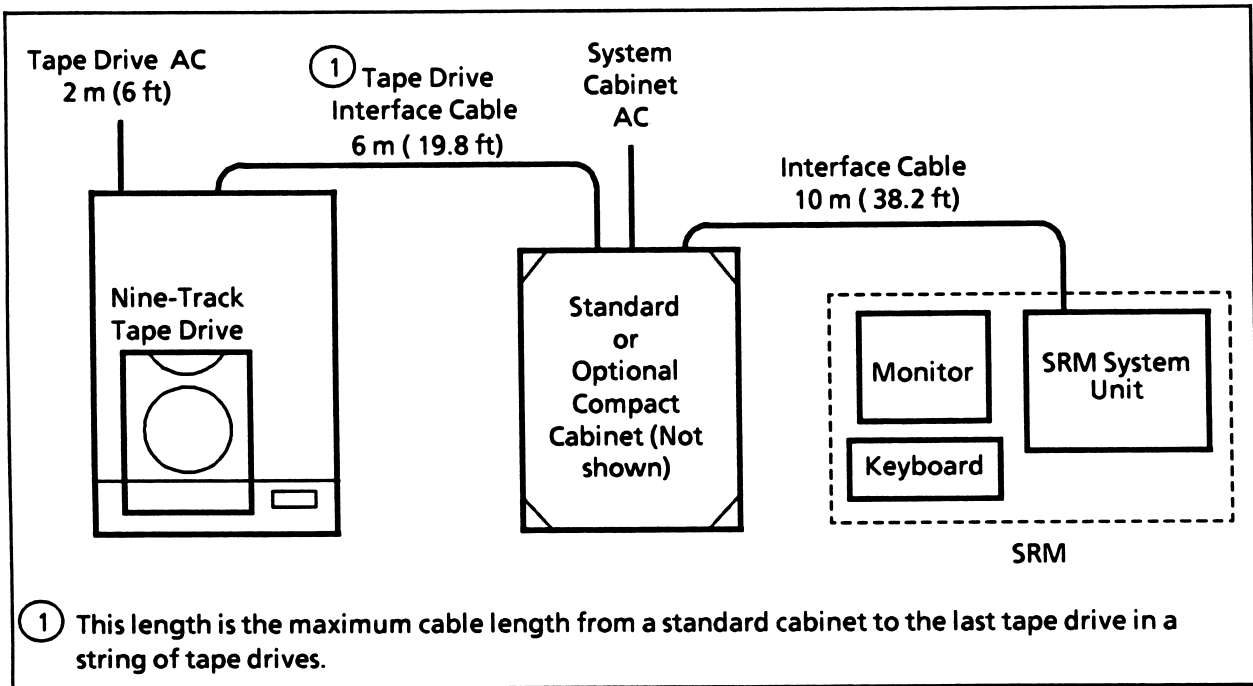


Figure 2-15. Cabling Between the Nine-Track Tape Drive and a Standard Cabinet

When you lay out your cabling, follow these recommendations:

- Keep cables off the floor as much as possible. Plastic cable trays can be purchased and mounted on the wall near the floor.
- Where a cable must be run across the floor, use cable ramps to protect the cable and reduce the hazard to personnel.
- If your room does not have a large number of cables, use cable ties or clamps to suspend cables from existing structures.
- Avoid flexing or bending the cables.
- Do not route cables in elevator shafts. Unless specially installed, do not route cables outside buildings.
- If you are installing your system in an area with raised floors, provide cutouts in the floor for the system cables before installation.

ELECTRICAL REQUIREMENTS - INSIDE THE UNITED STATES

The system requires one electrical receptacle for each standard cabinet and one for the SRM. Each standard cabinet requires a 30-amp, 250-volt receptacle (see Figure 2-16 for receptacle specifications). For example, if you intend to install two standard cabinets, you must have two 30-amp, 250-volt receptacles. Each compact cabinet requires a 20-amp, 250-volt receptacle (see Figure 2-17 for receptacle specifications).

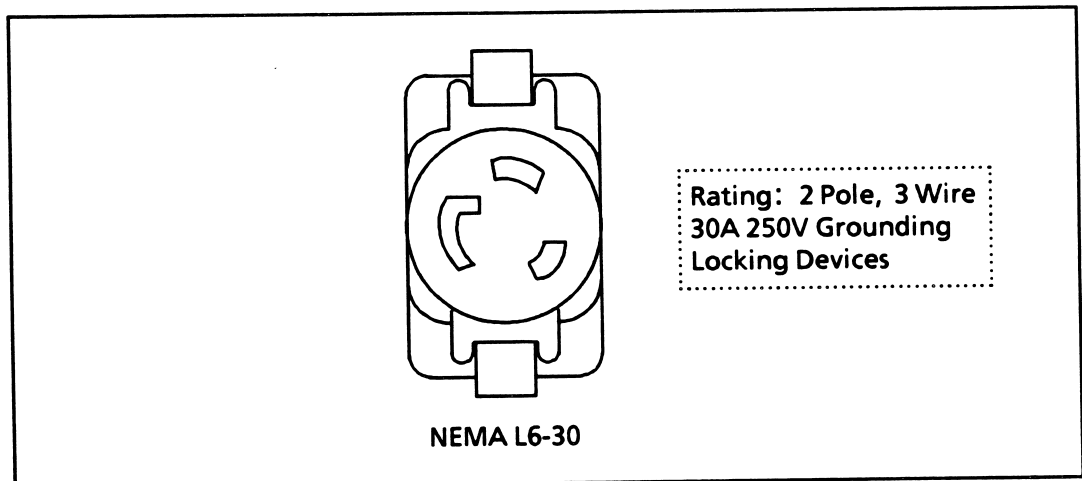


Figure 2-16. Standard Cabinet Receptacle

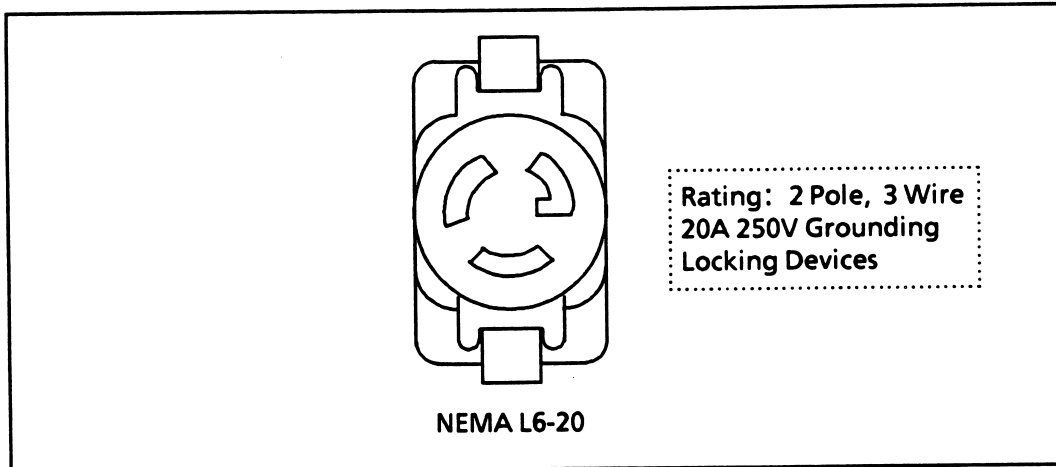


Figure 2-17. Optional Compact Cabinet Receptacle

You will also need one 120-volt, three-prong, isolated ground receptacle for the SRM. The monitor and keyboard connect to the SRM System Unit for power. For installations outside the United States, refer to the section on “Installations Outside the United States”, later in this chapter.

Follow these recommendations as well:

CAUTION

The cabinet and SRM grounds must be connected to the same ground potential.

- Be sure that all electrical wiring is installed in compliance with national and local electrical codes.
- Use isolated ground receptacles to reduce power line disturbances. This means that each receptacle is connected to the ground for the primary power service of the facility by a single uninterrupted wire.
- Use dedicated lines for all receptacles.
- Do not use extension cords.
- Plan for future expansion. For example, provide space for additional circuit breakers in your circuit breaker panel.
- To detect noise and other problems in the power circuits, monitor the power for one week prior to the installation of the system. Many subtle problems affecting system maintenance, reliability, and performance can be attributed to noisy power.

Table 2-5 shows the AC power requirements for the components of an iPSC/2 system.

Table 2-5. Power Requirements

Component	Max. Input Current (Amps)	Input Voltage (VAC)	AC Frequency (Hz)	Max. Power Consumption (Watts)
Standard cabinet	24	200 - 250	50/60 ± 5%	4992
SRM System Unit	5	115 ± 10%	50/60 ± 5%	314
	3	230 ± 10%		
Monitor	0.5	115 ± 10 ¹	60	50
	0.25	230 ± 10% ¹	50	
Compact cabinet (optional)	16	200 - 250	50/60 ± 5%	3366
Nine-track drive (optional)	4	120	60 ± 1%	480
¹ The monitor voltage is set at the factory and is not field configurable.				

ELECTRICAL REQUIREMENTS - OUTSIDE THE UNITED STATES

WARNING

To prevent possible electrical shock or damage to the system, only qualified technical personnel should change the power cord plug. Also, check local electrical standards before selecting a power cord plug.

For installations outside the United States, each standard cabinet is shipped with an IEC 309, 32-amp, 3-pole, single-phase plug. However, each power plug may have to be replaced to conform with local electrical standards. If you replace the plug on the power cord or change the cord itself, note the following warning and the wire color coding.

When changing the power cord plug, make sure you connect all the wires properly. For installations outside the United States, the power cord has the following color wire convention:

- The green wire with yellow stripes connects to earth ground.
- The light blue wire connects to the neutral or grounded side of the power line.
- The brown wire connects to the hot or ungrounded side of the power line.

AIR-CONDITIONING REQUIREMENTS

It is essential that you verify that the added heat dissipation from your iPSC/2 system can be handled by the air-conditioning system in your selected site. Air circulation and exchange rate in the room must also be sufficient. If it isn't, the ambient temperature in the room will become excessive, regardless of the cooling capability. This can adversely affect the operation of the system.

When calculating cooling requirements, consider the heat-loading due to personnel, lighting, windows, and other equipment in the room.

Suggestions:

- Locate the system the proper distance from heating/cooling vents (refer to Table 2-6). You must provide 60.96 cm (24 in.) of clearance above the standard cabinet for proper air circulation.
- The rate of temperature change in the room should never be more than 1.1° C (2° F) per hour.
- In the room housing the system, avoid having large windows that permit sunlight to overload the air-conditioning system.
- If you are installing the system on a raised-floor structure with subfloor air-conditioned plenum, mount the system on perforated floor tiles.

Table 2-6 lists the environmental specifications that will ensure reliable system performance.

Table 2-6. Environmental Specifications

Component	Operating Temperature Range	Relative Humidity (non-condensing)	Altitude Range	Maximum Noise Level
Standard cabinet	10° to 25°C ¹ (50° to 77° F)	85%, max. noncondensing	sea level to 3000 m (10,000 ft)	55dBA
SRM System Unit	With diskette in drive: 17° to 32° C (60° to 90° F)	5 to 85%	sea level to 2135 m (7,000 ft)	Not Applicable
Monitor	5° to 40° C (41° to 104° F)	10 to 90%	sea level to 2440 m (8,000 ft)	Not Applicable
Compact cabinet (optional)	10° to 35° C (50° to 95° F)	85%, max. noncondensing	sea level to 3000 m (10,000 ft)	55dBA
Nine-track tape drive (optional)	16° to 31° C (60° to 90° F)	20% to 80% noncondensing	sea level to 1830 m (6,000 ft)	55dBA
¹ iSC strongly recommends that you operate the standard cabinet in an environment where its operating temperature does not exceed 25°C.				

Table 2-7 gives the number of International British Thermal Units (BTUs) per hour that are generated by each component.

Table 2-7. Component Heat Dissipation Rates

Component	Heat Dissipation (BTU/hr)
Standard cabinet	16,973
SRM System Unit	1,072
Monitor	171
Compact cabinet (optional)	11,488
Total for a single standard cabinet system	18,216
Total for a single compact cabinet system (optional)	12,731
Nine-track tape drive (optional)	1,632

SOFTWARE INSTALLATION REQUIREMENTS

The iSC customer support engineer needs the following information about your specific software environment to be able to install your iPSC/2 system software.

TCP/IP Software Information

When you load the TCP/IP software, you need the product serial number and product validation key (shipped with the TCP/IP software diskettes) to complete the installation.

Network Configuration Information

When you load the TCP/IP software, the following network configuration information is required by the TCP/IP software:

- **Internet Address of the Host** - The unique address of your host on the network. It consists of a 32-bit quantity comprised of an address class identifier, network number and a local host address number (for example, 128.3.3.3).
- **Network Name** - The name your System Administrator has established for your network (for example, *eng*).
- **Broadcast Address** - Address that enables your host to receive all "broadcast" transmissions.
- **UNQUALIFIED Host Name** - Shortened name of your host machine (for example, *dragon*). In large networks, this name is used instead of your host's full ethernet address.
- **Domain of the Host** - Routing address to what is effectively the distributed data base for objects in your computer network (for example, *isc.intel.com*). It is analogous to a postal address consisting of a city, state, and country.

CFS Configuration Information

CFS is installed using the `mkcfs` command. Refer to the *iPSC®/2 Programmer's Reference Manual*, *iPSC®/2 User's Guide*, and *iPSC®/2 System Administrator's Guide* for detailed information.

OTHER CONSIDERATIONS

Here are a few other items to consider:

Static electricity

Although there is little static electricity buildup when the relative humidity is maintained at 50%, your site should have appropriate floor covering. Tile, sealed concrete, and wood are acceptable. Either treat carpeting with static suppression spray or use antistatic mats.

Be sure that you use proper antistatic protection (grounded wrist strap) any time you handle a printed circuit board.

Ordering Supplies

Estimate floppy diskette and tape usage and check available supply. If necessary, order more.

Floppy diskettes are 5-1/4 inches, double-sided, quad-density. Storage capacity is 1.2M bytes.

Tapes are:

- **SRM:** standard 1/4-inch tape cartridge (3M DC or equivalent). Storage capacity is approximately 60M bytes for a 600 ft. tape.
- **Cartridge Tape Subsystem:** 8mm data cartridge (Exabyte EXB-8200 certified or equivalent). Storage capacity is from 291 to 2332M bytes.
- **Nine-Track Tape Drive:** standard 1/2-inch 1600/6250 BPI 9-track tape, on 7-, 8.5-, or 10.5-inch reels.

SITE PREPARATION CHECKLIST

As you prepare for your installation, check off each item when completed.

Space Requirements

- 1. Sketch components' locations on a layout sheet, allowing for necessary access space.
- 2. Verify that desired furniture and fixtures (table, chair, lighting) are available.

Electrical Requirements

- 1. Install (or use existing) one 250-volt, 30-amp isolated ground outlet for each standard cabinet. Install (or use existing) one 220-volt, 20-amp isolated ground outlet for each compact cabinet.
- 2. Install (or use existing) one 120-volt outlet for SRM. (The monitor and keyboard connect to SRM System Unit for power.) This may vary for installations outside the United States. Check local electrical standards.
- 3. (Optional) Install (or use existing) one 120-volt outlet for 9-track tape drive. This may vary for installations outside the United States. Check local electrical standards.

Air-Conditioning Requirements

- 1. Verify that present air-conditioning system is adequate or increase its capacity.
- 2. Check air circulation and exchange rate in the room.
- 3. Ensure that equipment can be located the proper distance from heating/cooling vents.
- 4. If installing system on a raised-floor structure, verify that perforated floor tiles are installed where system will be placed.

Cabling Requirements

- 1. Check cable lengths against proposed floor plan to be sure the cables are long enough. If they are not, obtain longer cables or change the floor plan.
- 2. Obtain plastic cable trays to keep cables off the floor or ensure that existing structures are available to tie, clamp, or tape cables to.

- 3. If cables will be crossing the floor, obtain cable ramps or provide some other solution.
- 4. If system is to be installed in a raised-floor area, provide cable cutouts in the floor in advance.

Software Installation Requirements

Have the following information ready for software installation:

- 1. TCP/IP product serial number
- 2. TCP/IP product validation key
- 3. Internet address of the host
- 4. Network name
- 5. Broadcast address
- 6. UNQUALIFIED host name
- 7. Domain of the host.
- 8. CFS installation information.

Miscellaneous

- 1. Verify that the flooring is the proper material (sealed concrete, tile, or wood) or is treated with antistatic spray to reduce static electricity.
- 2. Check diskette and tape supply and order if necessary.