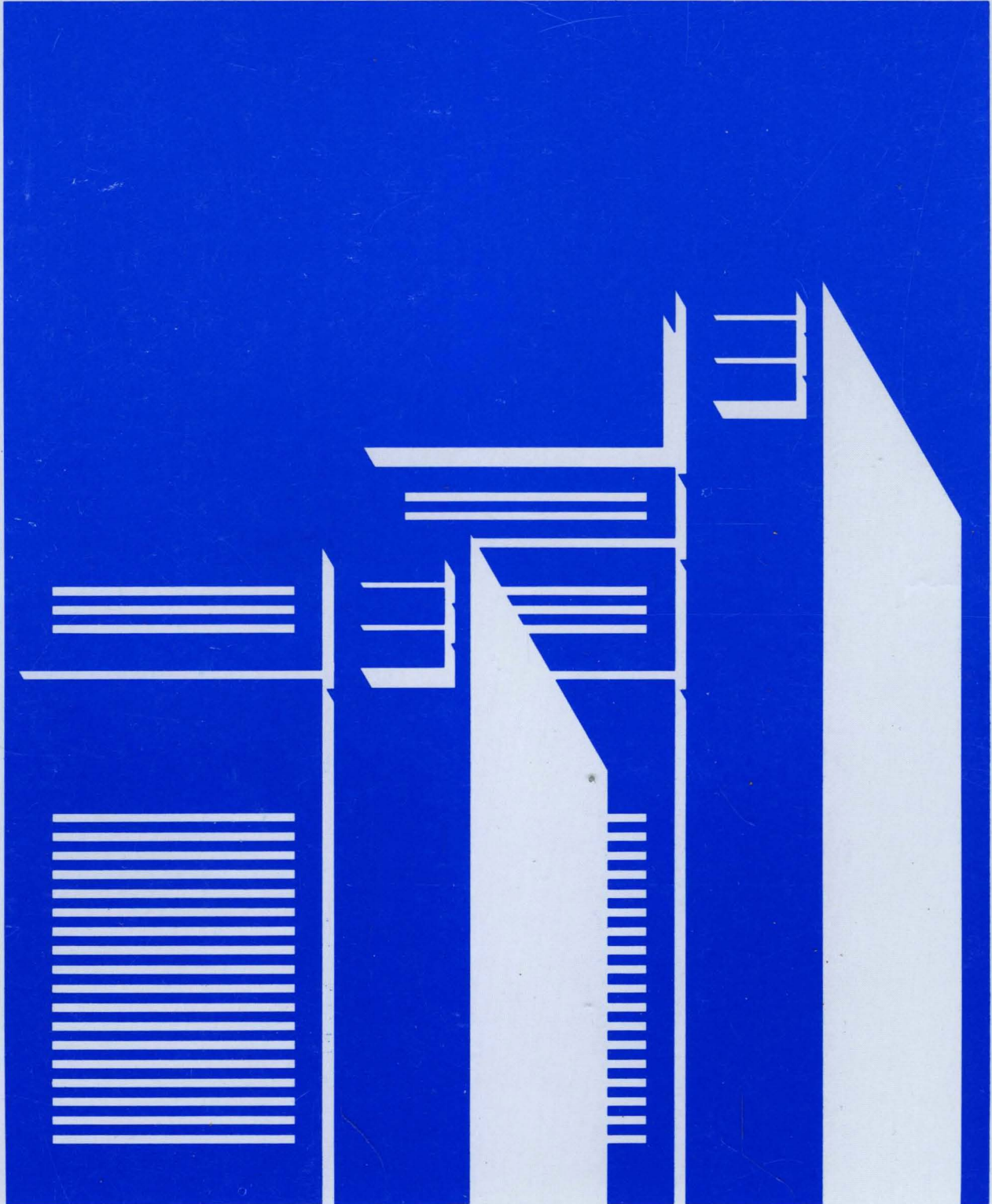


9370 Information System

Installation Manual –
Physical Planning



GA24-4031-0
File No. 9370-15

**IBM 9370 Information System
Installation Manual —
Physical Planning**

IBM

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First Edition (October 1986)

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Who Should Read This Book

This book contains information necessary for you to prepare the physical site and plan for installing the 9370 system. Become familiar with the contents of this manual before beginning any installation planning.

How to Use This Book

This book has six chapters and four appendixes:

Chapter 1, "Introduction," provides general information on site preparation and customer responsibility.

Chapter 2, "System Specifications," provides system specifications, such as primary power and environmental specifications.

Chapter 3, "Rack," explains the requirements for the rack enclosure, including environmental and power specifications, and limitations.

Chapter 4, "Unit Specifications," provides three-dimensional views and specifications for system units.

Chapter 5, "Cable Requirements," provides the requirements for ordering system cables.

Chapter 6, "Remote Facility," provides a general description of Remote Service and system requirements for Remote Service.

Appendix A, "Specification Summary," provides a specification and noise-emission level chart for the units integrated in the system.

Appendix B, "Plugs and Receptacles," provides illustrations of the required plugs and receptacles.

Appendix C, "Planning Checklist," provides a planning checklist to prepare for installing the system.

Appendix D, "Physical Planning Templates," provides plan views of the 9309 Rack Enclosure you can use to plan the floor layout of the system.

What You Should Know

The system hardware consists of:

- The 9309 Rack Enclosure.
- The following IBM 9370 rack-mounted System/370 processors:
 - 9373 Model 20
 - 9375 Models 40 and 60
 - 9377 Model 90.
- Integrated input/output (I/O) controllers for:
 - Disk/Tape
 - Work stations
 - Telecommunications
 - Local area network.
- Direct access storage devices (DASD).
- Magnetic tape drive units.
- System/370 block multiplexer channels.

If You Need More Information

Depending on your system equipment, you may find the following books helpful.

- *IBM System/360, System/370, 4300 Processors, Input/Output Equipment Installation Manual – Physical Planning*, GC22-7064
- *IBM Input/Output Equipment Reference Installation Manual – Physical Planning: System/360, System/370, and 4300 Processors*, GC22-7069
- *IBM General Information Manual Installation Manual – Physical Planning*, GC22-7072
- *IBM Communications Terminals Installation Manual-Physical Planning*, GA27-3006
- *IBM 3270 Information Display Station Installation Manual-Physical Planning*, GA27-2787
- *IBM Multiuse Communications Loop Planning and Installation Guide*, GA27-3341
- *Installation and Assembly of Coaxial Cable and Accessories for Attachment to IBM Products*, GA27-2805

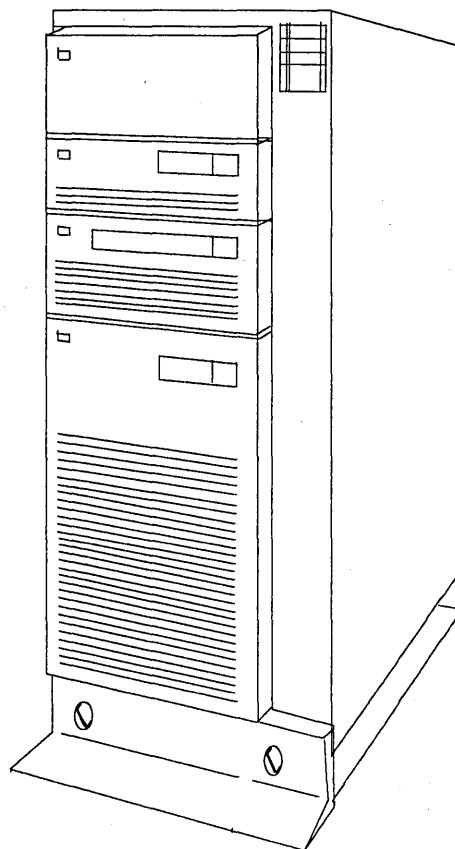
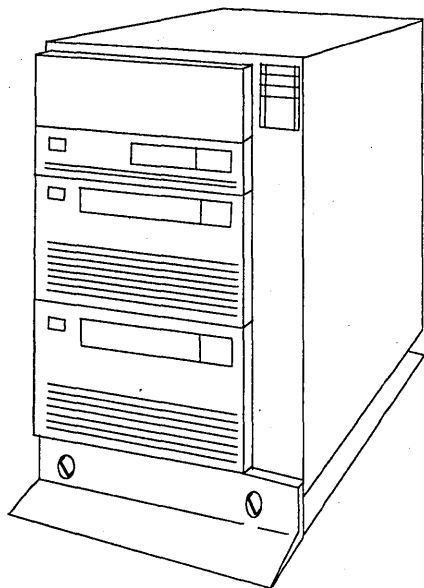
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The 9370 system includes the 9370 Processors, which are air-cooled, compatible with System/370, and reside in the IBM 9309 Rack Enclosure (for clarity, *rack* will be used in the rest of this book). There are four versions of the 9370 Processor.

- 9373 Model 20
- 9375 Models 40 and 60
- 9377 Model 90.

These processors use microcode-driven input/output (I/O) controllers (residing on logic cards) to attach I/O units. Some of the highlights of the 9370 system include:

- Rack-mounted I/O units
 - Direct access storage units
 - Tape units
- An integrated DASD/Tape Controller
- A System/370 Block Multiplexer Channel, which allows you to use System/370 channel-attached devices
- A Work Station Subsystem Controller (uses 3270-type terminals)
- Four communication subsystems, which allow you to communicate over synchronous and asynchronous lines
- Local Area Network subsystem.

Your Responsibilities

Site preparation for the system is your responsibility. This book can help you prepare for installing and expanding your system. Although you are responsible for this activity, you may need help from IBM, consultants, contractors, or vendors to complete the tasks.

The primary task of the site planner is to identify the physical space and system layout requirements for the equipment. Appendix D, "Physical Planning Templates," supplies paper cutouts of the rack to help plan the layout. [Plastic templates in English (GX24-4046) and metric (GX24-4047) units are available.]

Site preparation includes:

- Adhering to the planning schedules.
- Preparing the physical location of the units (floor planning).
- Obtaining, installing, and maintaining coaxial cables for work stations or the IBM cabling system.
- Inspecting the site to insure that each unit will fit through doorways and passageways.
- Arranging for installation of any communication facilities (common carrier, postal telephone and telegraph, or private) and connecting the system to these facilities.
- Performing similar planning functions for IBM input/output (I/O) devices that you plan to attach to the processor.

Planning the Layout

Operational requirements determine where you place system components. Some considerations include:

- Flow of work and personnel within the area
- Location of planned safety equipment
- Necessity for maintaining service clearances for all system units

Planning the Layout (Continued)

- Priority of channel-attached devices
- Space limitations, such as floor-loading capacity, location of columns, and provisions for growth
- The length of the cables connecting the units in the system
- Visual access required between a control unit and at least one of its associated I/O devices
- Work space and aisles.

You may need to prepare and analyze several layouts before choosing the final layout. If you plan to install the equipment in two or more stages, prepare a separate layout for each stage. Consider channel priority assignments and cable lengths for each stage.

To make a layout, you need an accurate drawing of the proposed area. For a precise layout, use the paper templates in Appendix D or order clear plastic templates (English GA24-4046, metric GA24-4047). The templates show the required space for weight distribution and clearances for the operator, service personnel, and test equipment. Templates also show the radii of swinging gates and covers, and the location of casters and frame entry/exit cutouts for cables.

Note: You may overlap clearances shown on the templates if you maintain the larger clearance. The gate swing of an auxiliary unit must not interfere with the gate swing of its corresponding control unit.

Place the equipment so that the lengths of the connecting cables do not exceed the maximum limits; these limits may vary. Refer to the device specification pages and cable schematics for the appropriate limits.

Planning Checklist

The planning checklist (Appendix C, "Planning Checklist") provides a suggested schedule. Your site preparation may not require all of the suggested steps, or you may require some additional steps. Be sure you allow enough time to complete the necessary steps before your system arrives.

Making the Layout

The prepared layout must be accurate and drawn to scale. If necessary, IBM uses the layout to determine the appropriate cable lengths [EMEA (IBM Europe/Middle East/Africa) has fixed length cables.] Be sure to include the following items, and any other unique considerations, on the layout:

- Service clearances required for each unit.
- Location of:
 - Power receptacles
 - Air conditioning equipment and controls
 - File cabinets, desks, and other office equipment
 - Room emergency power-off controls
 - All entrances, exits, windows, and columns or pillars.
- The number of:
 - Control units assigned to each channel
 - The number of input/output units attached to each control unit.

Special tasks that you must do for a **raised-floor environment** include:

- Showing the location of any obstruction that may affect cable routing.

Making the Layout (Continued)

- Showing the height of the raised-floor above the base floor.

Note: The raised-floor height should be between 155 millimeters (6 inches) and 460 millimeters (18 inches). This height should accommodate piping and power distribution. The minimum raised-floor height for the 9370 system, with the System|370 channel feature, is 155 millimeters (6 inches). However, the height should also have a minimum of an additional 115 millimeters (4.5 inches) to ensure you can run cables and connectors over and under obstacles.

When a raised-floor panel is cut for cable entry or air register, additional panel support may be required to restore structural integrity. See Figure 3-6 on page 3-6 for the recommended floor cutout dimensions and placement.

Tasks that you must do for a **non-raised-floor environment** include:

- Showing the planned placement of cables for minimum obstruction.
- Showing the amount of additional cable required, if the cable route is indirectly between units (such as along walls or suspended).
- Deciding if you need cable guards or ramps to ensure personnel and equipment safety.

Always review the final layout to ensure that cable lengths do not exceed limitations and that all devices have proper clearances. Notify IBM immediately of any layout changes that affect cable lengths.

Storage and Shipping Environment

IBM designs its units to operate in a controlled temperature and relative humidity range, and (even when stored or in shipment) they require some environmental control. If you store the unit outside the specified limits, permanent damage can result.

Warning: Do not store a unit in a room that has chemicals that can cause corrosion damage. See "System Environmental Specifications" on page 2-7, and individual specifications in Chapter 4.

When removing a unit for shipment or storage, use the blocks, braces, and preparation procedures found in the *Packaging Bill of Material*. This is a protective package designed uniquely for each unit, and is available from any IBM Branch Office.

Ship the units through a household goods carrier (padded van), with appropriate strapping and padding to avoid transit damage.

Electrical Power

Primary Computer Power Service

For maximum reliability, the computer power panel should connect to feeders *that do not serve other loads*.

Connect electrical noise-producing devices, such as accounting equipment, card punches, typewriters, and calculators to panels separate from those feeding the computer units.

Electrical Power (Continued)

Branch Circuits

The branch circuit panel for the computer should be in a convenient, well-lighted area of the computer room.

Protect the individual branch circuits on the panel with circuit breakers properly rated according to the manufacturer's specifications and applicable codes. Label each circuit breaker to identify the branch circuit it controls. The power requirements for I/O equipment are on the unit specification pages in:

- *IBM Input/Output Equipment Installation Manual—Physical Planning for System/360, System/370, and 4300 Processors, GC22-7064.*
- *IBM Input/Output Equipment Reference Installation Manual—Physical Planning for System/360, System/370, and 4300 Processors, GC22-7069.*

The grounding wire of the branch circuit must have insulation and be equal in size to the neutral and phase conductors.

Terminate branch circuits as close as possible to the unit they supply—within 3 meters (10 feet). Run branch circuits in either rigid or nonrigid metallic conduit (or in compliance with local or national standards). The conduit system should be continuous, uninterrupted, and connected to the building or transformer ground; see Figure 1-1 on page 1-9.

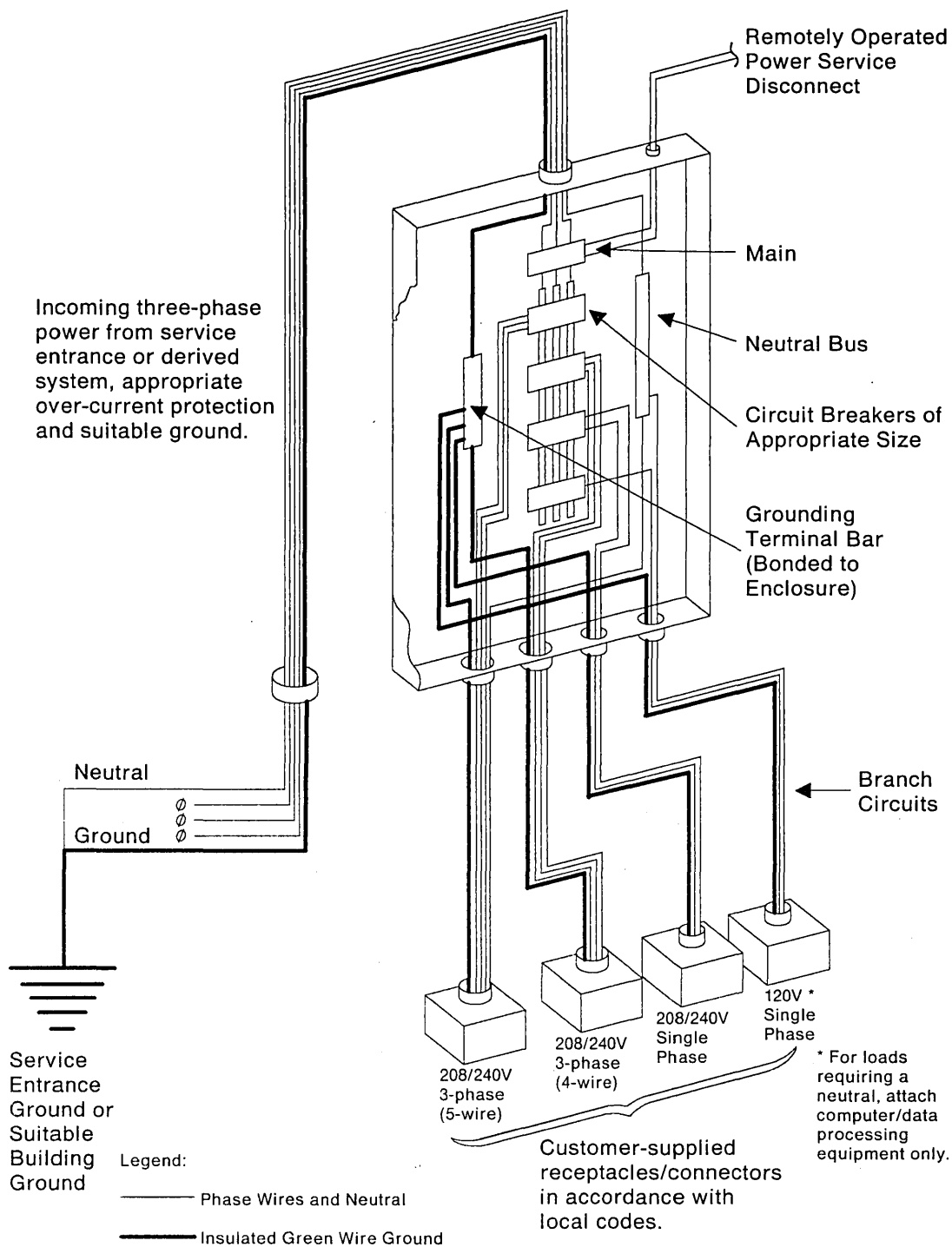


Figure 1-1. Power Distribution Systems

Electrical Power (Continued)

Grounding

A machine must be properly grounded. It is recommended that an insulated green wire ground, the same size as the phase wire, be installed between the branch circuit panel and the receptacle. For some small machines such as terminals, a continuous metallic conduit is adequate for grounding.

To ensure proper grounding, a licensed electrician should check the grounding and receptacles for conformance with the country electrical codes.

For personnel safety, the ground must have sufficiently low impedance to limit the voltage to ground and to operate the circuit protective devices if a phase-to-frame short occurs. For example, the ground path shall not exceed 1 ohm for 120-volt, 20-ampere branch circuit devices.

Computer Room Emergency Power-Off Controls

As a safety precaution, provide room emergency power-off controls for disconnecting the *main service wiring* that supplies the computer equipment. Install these controls at a convenient place for the operator and next to the main exit doors of the room.

Follow national and local electrical codes.

Lightning Protection

You should install lightning protection devices when:

- An overhead power service supplies the primary power
- The utility company installs lightning protectors on the primary power source
- The area is subject to electrical storms or equivalent-type power surges.

Convenience Outlets

You are responsible for selecting and installing lightning protection devices.

Install a suitable number of convenience outlets in the computer room and the service representative area for use by building maintenance personnel and service representatives. Convenience outlets should be on the lighting or other building circuits, not on the computer power panel or feeder. *Do not use the service convenience outlets on IBM units for any purpose other than normal servicing.*

Power Plugs and Receptacles

All power attachment cable plugs have approval for use with the 9370 system and meet the relevant testing laboratory or country/test-house standards. All power cords have the appropriate plugs according to the ship destination of the system.

Note: See Appendix B, "Plugs and Receptacles," for types of power cord plugs and receptacles.

Additional Reference Material

For more information about domestic standards on site preparation refer to:

- National Fire Protection Association (NFPA) Standard No. 75, *Protection of Electronic Computer|Data Processing Equipment* (or applicable local or national equivalent)
- *IBM General Information Manual, Installation Manual-Physical Planning, GC22-7072.*

Some of the topics in the *IBM General Installation Manual – Physical Planning* that you may consider reviewing for proper site preparation include:

- Environmental Considerations
- Acoustics
- Electromagnetic Compatibility
- Lighting

Additional Reference Material (Continued)

- Air Conditioning
- Temperature and Humidity Design Criteria
- Safety and Fire Precautions.

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The system includes rack-mounted units and peripheral devices. Refer to the rack and unit specification pages for power and environmental information.

The system can operate as a stand-alone computer system or as an information network, connecting to similar systems and/or host computer complexes. The system can support many display terminals and printers, including personal computers.

Primary Rack Power

You must provide primary AC power for the 9309 Rack. Each rack has a self-contained AC power control compartment, which distributes AC power to the units in the rack. Each rack of a multiple-rack system contains power for the units in its rack.

Each rack has a power cord and plug. A separate outlet must supply the selected voltage for each rack. The 9309 Rack requires one of the following voltages:

Frequency	Voltage		
	Nominal	Minimum	Maximum
50 Hz	200	180	220
Single Phase	220	193	238
	230	202	249
	240	210	259
60 Hz	120	104	127 *
Single Phase	200	180	220
	208	180	220
	220	193	238
	240	208	254
50 Hz	380	333	410
Three Phase	415	363	448

* Available with the 9309-1 rack for the USA.

Note: The tolerance for 50 and 60 Hz is plus or minus 0.5.

Power Control Compartment (PCC)

The rack has a power control compartment, which serves as a power source for the system units. This unit distributes 120-volt (Model 1) and 220-volt (both models) single-phase power to the AC power outlets.

There are five versions of the power control compartments. Each version is designed for a specific input power.

The requirements for power and control define the various versions of the rack. Figure 2-1 on page 2-4 shows the power and control associated with each type of compartment. You will receive the default version of the power control compartment that is listed for your country under *Country* in Figure 2-1. You can use the specify codes to override this default.

Primary Rack Power (Continued)

Rack Model	EIA Units	Max. kVA	PCC Phase	Main Line CB	Country	Specify Code
1	19	4.4	2 *	10 Amps	Switzerland	9114
		3	1	15 Amps	EMEA (See Note 2)	9112
		5	2 *	15 Amps	EMEA (See Note 2)	9113
		5	1	25 Amps	USA, AG, A/PG, EMEA (See Notes.)	9111
		2.4	1	20 Amps	USA only	9115
2	32	4.4	2 *	10 Amps	Switzerland	9114
		5	2 *	15 Amps	EMEA (See Note 2)	9113
		5	1	25 Amps	USA, AG, A/PG, EMEA (See Notes)	9111

Figure 2-1. Power Control Compartment Versions

Notes:

1. *AG represents IBM Americas Group; A/PG represents IBM Asian/Pacific Group.*
2. *EMEA represents IBM Europe/Middle East/Africas Corporation. The default PCC varies for some EMEA countries. Refer to Figure 2-2 on page 2-5 for more information.*

For example, using Figure 2-2 you see that in France the default PCC is Specify Code 9111, but 9113 is also available.

3. ** Indicates that input power is 3-phase, but only 2-phases are used.*

Country	Specify Code 9111 1 Phase 5 kVA	Specify Code 9112 1 Phase 3 kVA	Specify Code 9113 3 Phase 5 kVA	Specify Code 9114 3 Phase 4.4 kVA
Austria		0	X	
Belgium	X		0	
Denmark			X	
Finland	X	0	0	
France	X		0	
Germany	X	0	0	
Ireland	X		0	
Israel		0	X	
Italy	X	0	0	
Kuwait and Gulf States	X	0		
Netherlands		0	X	
Norway	X	0		
Pakistan		0	X	
Portugal		0	X	
Saudia Arabia	X	0		
South Africa		0	X	
Spain	X	0	0	
Sweden			X	
Switzerland			0	X
Turkey		0	X	
UK	X		0	
AREAS/South (AFRICA)		0	X	
ROECE (IBM Regional Office for Europe, Central and East)		0	X	

Figure 2-2. Power Control Compartments for EMEA

X = Default

0 = Optional

Primary Rack Power (Continued)

Power Phase Imbalance

If you have a single-phase power control compartment, you will supply single-phase AC power. However, if you have a two-phase power control compartment, you will have to supply three-phase power. The two-phase power control compartment only uses phases 1 and 2 and the neutral of incoming three-phase power. This may result in a power imbalance for the three-phase power system. This imbalance of power increases as the number of installed racks in your system increases.

Note: If you have a two-phase power control compartment, you should consult an electrician to properly balance the incoming three-phase power.

Plugs and Receptacles:

USA, Americas Group (AG), and Asian/Pacific Group (A/PG)

See Appendix B, "Plugs and Receptacles."

Europe/Middle East/Africa (EMEA)

See "Plugs and Receptacles for EMEA" on page B-3.

CAUTION

The plug on the power cord is approved for use with this machine and meets the relevant testing laboratory or country/test-house standards. For the user's safety, the plug must be connected to a properly wired and grounded receptacle. An improperly wired receptacle could place a hazardous voltage on accessible metal parts of the machine and on the metal housing of the plug and receptacle. The customer is responsible for receptacle wiring.

Cooling

Directly forced-air cools the unit. The air intake is through the front panel and air exhaust is out the bottom and top of the rack rear door.

For maximum system heat output for the rack and each unit, see Figure A-1 on page A-2. To determine the total heat output of your system, identify the units you are ordering and add the heat outputs specified for those units.

System Environmental Specifications

Unless otherwise noted on individual specification pages, the following environmental specifications apply:

Environment	Temperature	Relative Humidity	Maximum Wet Bulb
Operating	10 to 40.6°C (50 to 105°F)	8 to 80%	26.7°C (80°F)
Non-Operating	10 to 51.7°C (50 to 125°F)	8 to 80%	26.7°C (80°F)
Storage	0.6 to 60°C (33 to 140°F)	5 to 80%	29.4°C (85°F)
Shipping	-40 to 60°C (-40 to 140°F)	5 to 100%	29.4°C (85°F)

Figure 2-3. System Environment Specifications

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 Stability 3-11

The IBM 9309 Rack holds standard-sized electronic equipment and distributes power for this equipment. All models conform to the EIA (Electronic Industries Association) RS-310-C standard for racks, panels, and associated equipment.

Refer to the following symbols and to Figure 3-2 on page 3-3 for the plan view of a one-rack system. Refer to Figure 3-3 on page 3-4 for the plan view of a multiple-rack system.

Warning: Be sure to read "Limitations" on page 3-8. This contains important information on the requirements for the rack.

The symbols used in the plan views are in Fig. 3-1.

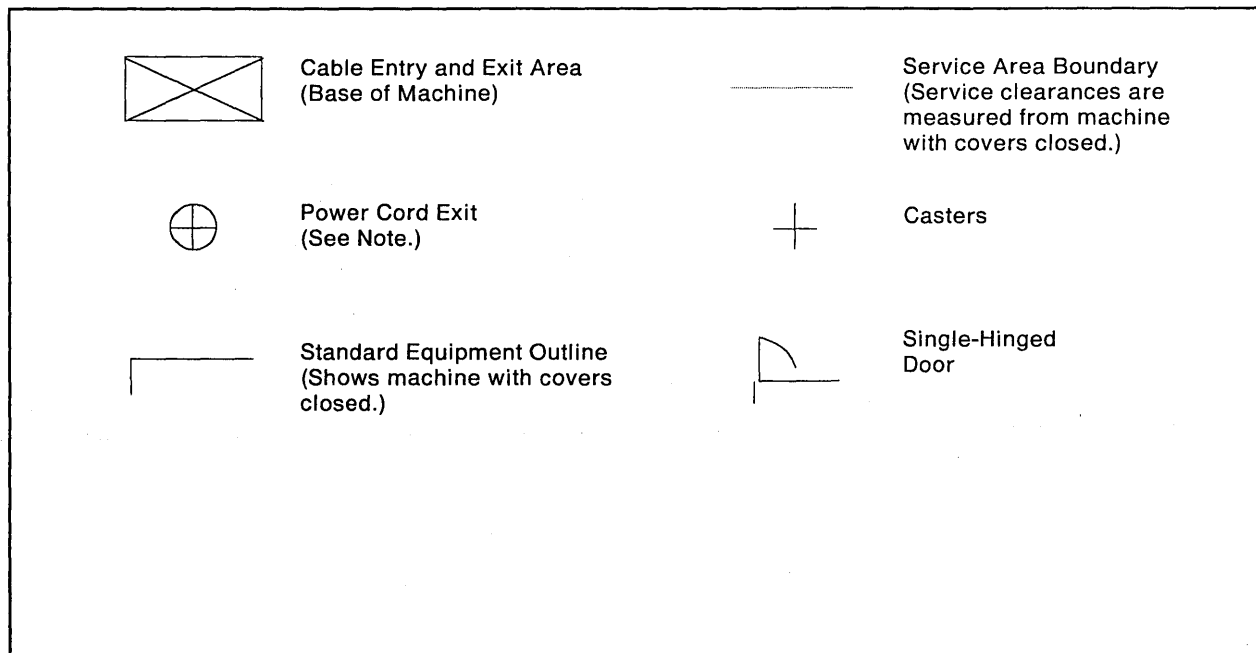


Figure 3-1. Plan View Symbol Legend

Notes:

- 1. Power cords are supplied in 4.3 m (14 feet) lengths, unless otherwise noted in the specification pages.*
- 2. Dimensions are shown in millimeters, with inches in parentheses.*

Plan View (Not to Scale)

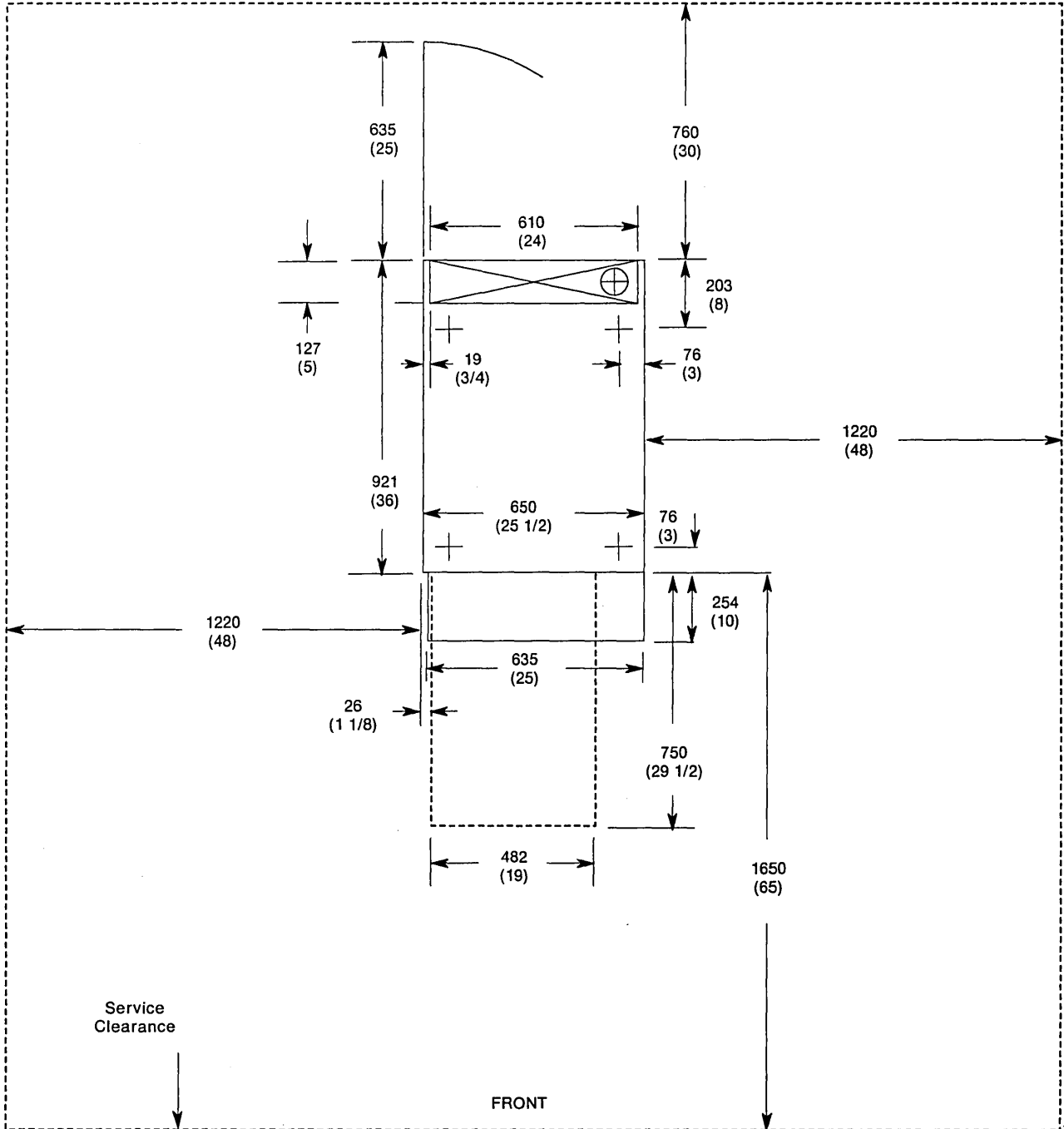


Figure 3-2. 9309 Rack Enclosure Models 1 and 2

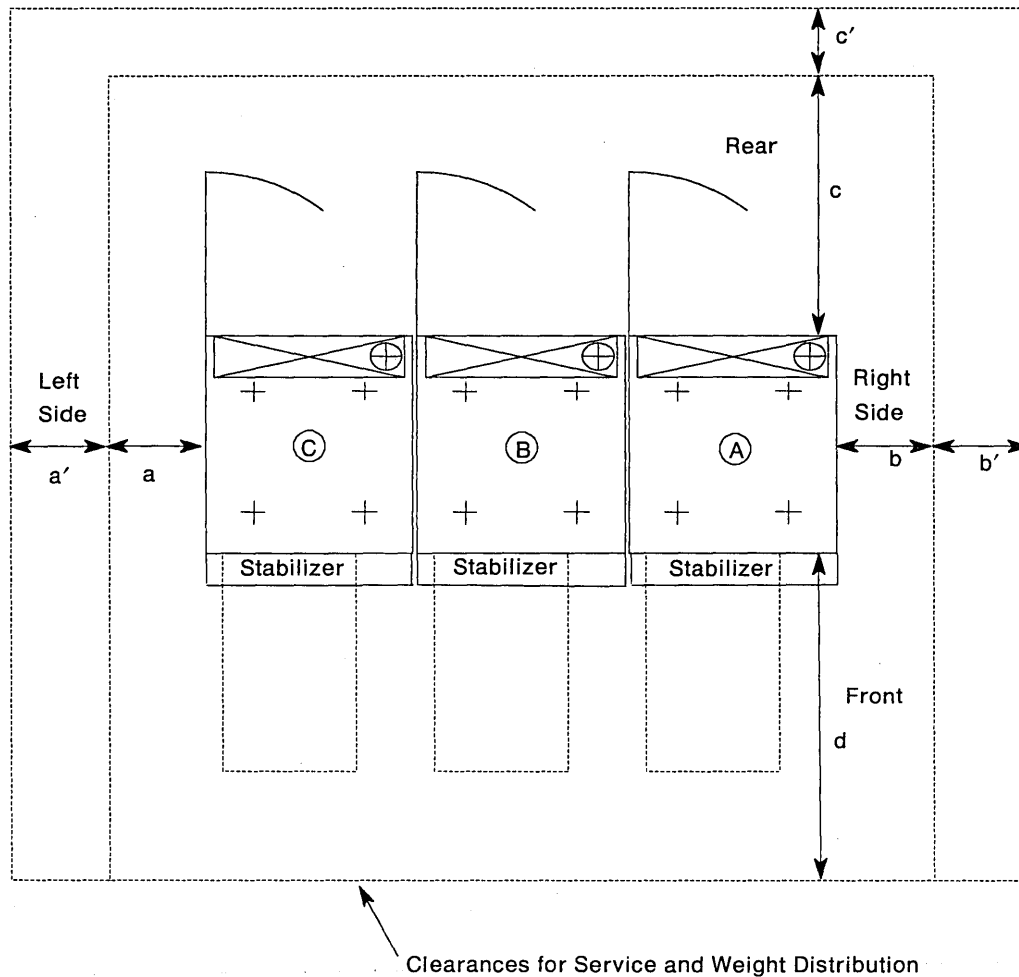


Figure 3-3. Plan View for Multiple Racks

During installation of a multiple-rack system, when looking from the front of the racks, identify the racks in a right-to-left manner beginning with the letter A (see Figure 3-3). The rack letter has no significance other than to identify the racks. Identifying the racks will help you when you run cables from rack to rack.

Allow enough clearance to the right of rack A for another rack if you have plans to upgrade your 9375 Processor to a 9377 Processor. The space is also required when upgrading the 9377 Processor with additional I/O Bus Units.

Figure 3-3 and Figure 3-4 identify the required service/weight distribution clearance required for a

floor-load rating of 345 kg/m² (70 lb/ft²). The clearance assumes each rack has a maximum weight of 478 kg (1,055 lbs). The dimensions for a', b', and c' vary according to the weight configuration and the floor-load rating of your facility.

Number of Racks	Left a + a'	Right b + b'	Rear c + c'	Front d
1-4	1220 mm (48 in.)	1220 mm (48 in.)	760 mm (30 in.)	1650 mm (65 in.)
5	1525 mm (60 in.)	1525 mm (60 in.)	760 mm (30 in.)	1650 mm (65 in.)
6	1525 mm (60 in.)	1525 mm (60 in.)	915 mm (36 in.)	1650 mm (65 in.)

Figure 3-4. Weight Distribution/Service Clearance for Multiple Racks

IBM recommends that no more than six racks be adjacent to one another. This ensures that the maximum one-way walking distance for a service representative will be 5 meters (16 ft) when he/she works on any one unit.

If you alter the dimensions, you should obtain the services of a qualified consultant or structural engineer to determine floor loading. If the review of the floor-loading does not require the weight distribution area shown in Figure 3-3, the service clearances shown in Figure 3-5 are required.

Left (a)	Right (b)	Rear (c)	Front (d)
1220 mm (48 in.)	1220 mm (48 in.)	760 mm (30 in.)	1650 mm (65 in.)

Figure 3-5. Required Service Clearance

These service clearances also meet the office environment floor-loading requirement of 244 kg/m² (50 lb/ft²) for a single rack.

Raised Floor Cutout

Figure 3-6 identifies the recommended positioning of the rack on a raised floor with 610-mm (24-in) raised-floor panels. This drawing shows the *relative* position of the floor cutout; it is not a machine template and is not drawn to scale.

The plan view (Figure 3-2 on page 3-3) and templates (Appendix D, "Physical Planning Templates") of the rack identify the actual machine opening. The floor panel cutout is for the primary rack with a maximum configuration. Secondary racks may not require as large a floor cutout.

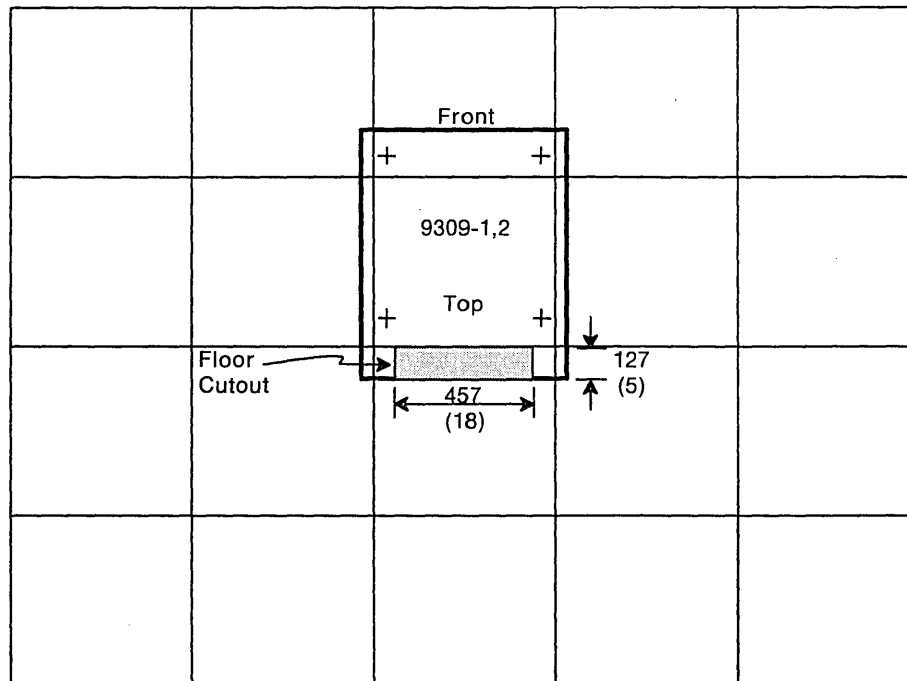


Figure 3-6. Positioning and Dimensions for the Floor Cutout

Rack Specifications

Dimensions (Model 1)

	Front	Side	Height
mm	650	921	1 000
inches	(25 1/2)	(36)	(40)

Note: Height is measured from the floor.
Floor clearance is 75 mm (2.95 in).

Dimensions (Model 2)

	Front	Side	Height
mm	650	921	1 578
inches	(25 1/2)	(36)	(62)

Service Clearances

	Front	Rear	Right	Left
mm	1 650	760	1 220	1 220
inches	(65)	(30)	(48)	(48)

Weight

Model	kg.	lbs.
1	107	(235)
2	139	(306)

Heat Output

Model	Watts	BTU/HR
1	57	(194)
2	57	(194)

Airflow: The rack does not have a fan; each system unit has its own fan. Air flows from the front to the rear of the system units, with the air exiting out of the top and bottom of the rear of the frame.

Power

Model	50Hz	60Hz
1	.093kVA	.093kVA
2	.093kVA	.093kVA
phase	1, 3	1

Note: A 3-phase input power control compartment is available for EMEA.

Power Cord

	Meters	Feet
USA, AG, and APG standard	4.3	(14)
optional (specify code 9986)	1.8	(6)
EMEA two phase	4.3	(14)
single phase (3 kVA)	3	(10)
single phase (5 kVA)	4.3	(14)

Power Cord Style

See "50-Hz Power Cord Style" on page B-7.

Plug Type

See Appendix B, "Plugs and Receptacles."

Noise Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

Limitations

These requirements reflect some of the conditions under which the rack and its units were tested for stability and safety.

It is the responsibility of the customer or unit manufacturer to assure the rack and its units meet these requirements. Failure to meet these requirements could result in an unsafe condition.

Requirements

Appliance Coupler Outlets

The maximum load of the rack outlets for the Power Control Compartment is:

<i>Countries</i>	<i>Amps</i>
EMEA	10 (IEC ³ 320)
USA and AG, A/PG	15 (UL/CSA)

Center-of-Gravity for A Slide-Mounted Unit

- The center-of-gravity for an extended unit cannot exceed 362 mm (14.25 in.) from the face of the rack.

If an extended system unit exceeds this distance, the configured rack may be unstable.

If you have a rack configuration that exceeds this center-of-gravity limit, you should test the configuration for stability to make sure it meets UL¹ /CSA² requirements, or the requirements stipulated by the national test-house for your country.

¹ Underwriters Laboratory

² Canadian Standards Association

³ International Electrotechnical Commission

Center-of-Gravity for the 9309 Model 1

The center-of-gravity for the Model 1, without any system units, is as follows.

- The depth of the center-of-gravity is 495 mm (19.5 in.) from the front of the rack (measurement does not include stabilizer).
- The height from the bottom of the rack (measurement does not include casters) to the center-of-gravity is 410 mm (16.1 in.)
- The distance from the right edge of the rack to the center-of-gravity is 292 mm (11.5 in.).

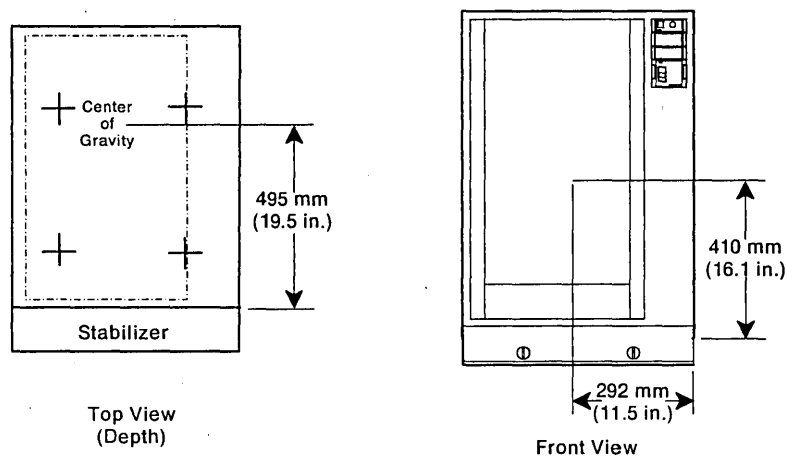


Figure 3-7. Center-of-Gravity for the Model 1

Limitations (Continued)

Center-of-Gravity for the 9309 Model 2

The center-of-gravity for the Model 2, without any system units, is as follows.

- The depth of the center-of-gravity is 495 mm (19.5 in.) from the front of the rack (measurement does not include stabilizer).
- The height from the bottom of the rack (measurement does not include casters) to the center-of-gravity is 657 mm (25.8 in.).
- The displacement from the right edge of the rack to the center-of-gravity is 292 mm (11.5 in.).

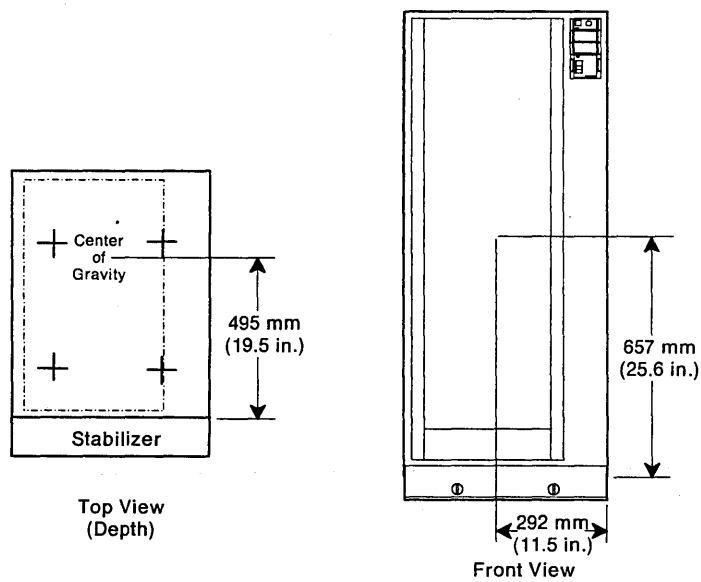


Figure 3-8. Center-of-Gravity for the Model 2

Loading the Rack

Warning: Always install the system units in a bottom-to-top sequence. If you do not install the system units in this sequence, the rack may become top heavy – depending on the types and location of the installed system units.

Power

Besides the single-phase power control compartment, a three-phase power control compartment is available for EMEA (Europe/Middle East/Africa) countries.

The maximum input current to the rack with all installed units must not exceed its power rating (amps, kVA, frequency, voltage).

Stability

The rack stabilizer requires a minimum force of 25 newton meters (18.5 pound-force-foot) on each screw. The limitations described under the following headings must be followed at all times:

- **Support Rails**

Some system units mount in the rack by residing on support rails. Rail-mounted system units do not slide out.

<i>Type</i>	<i>Length</i>	<i>Part No.</i>
Left	725 mm (28.5 in.)	375816
Right	725 mm (28.5 in.)	375714

Warning: Each pair of rails is designed to hold a maximum of 68 kg (150 lbs). All system units mounted on the rails must be UL listed/recognized or certified by the CSA (or by the national test house for your country).

Limitations (Continued)

- **Support Slides**

Some system units mount in the rack by residing on slides. You can extend slide-mounted units.

Warning: System units mounted on slides must:

- Be UL listed/recognized or certified by the CSA
- Include an attached label that warns the user that the rack may tip if more than one slide-mounted unit is extended in the service position at the same time. This label must be visible to the user when the unit is pulled forward.
- Meet weight restrictions:
 - The maximum weight for a unit on a pair of slides is 60 kg (132 lbs).
 - The maximum weight for all units mounted on slides is 275 kg (606 lbs).

- **Weight Restrictions**

The maximum weight of the rack with installed I/O units is 478 kg (1055 lbs).

The maximum weight for all units in the rack is:

Model 1	190 kg (418 lbs)
Model 2	320 kg (704 lbs).

For information on weight distribution for the rack, refer back to Figure 3-3 on page 3-4.

- **Weight Distribution for System Units**

The weight distribution for installed system units cannot exceed 10 kg (22 lbs) per EIA unit.

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IBM 9373, 9375, and 9377 Processors

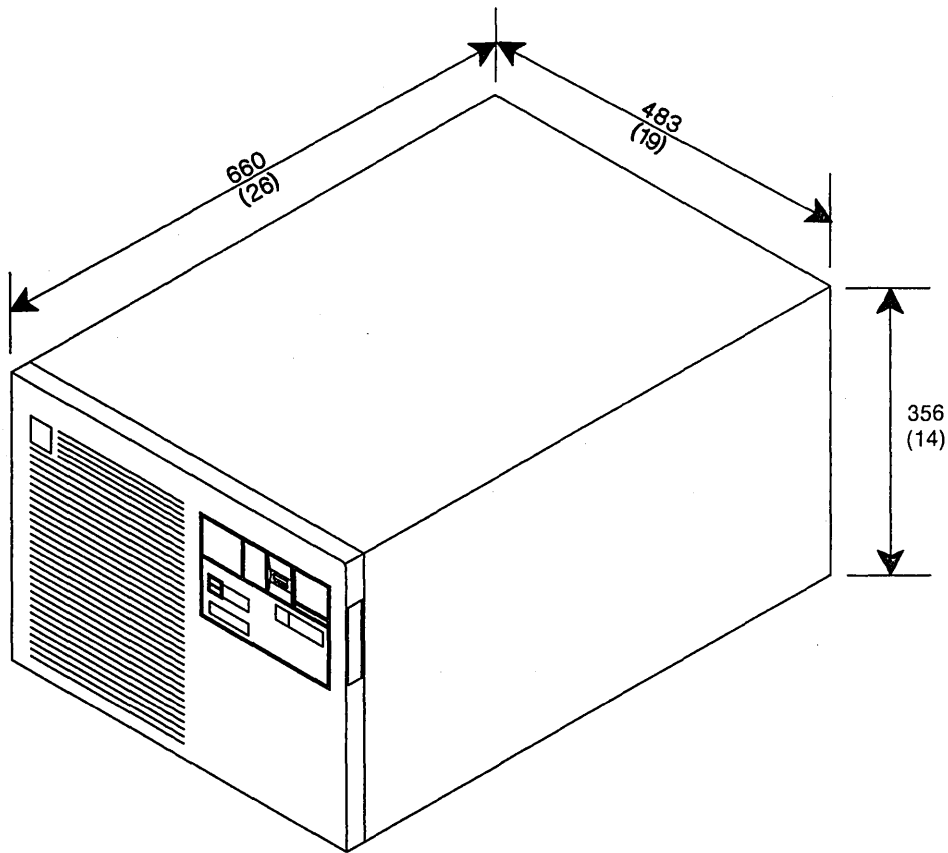
9373 Processor

Figure 4-1. 9373 Processor

9373 Processor Specifications

Dimensions:

Height: 356 mm (14 in.)

Width: 483 mm (19 in.)

Depth: 660 mm (26 in.)

Weight:

60 kg (132 lb)

Heat Output:

588 W (2,000 BTU/HR)

Airflow:

7.9 m³/min [280 cubic foot meters (cfm)]

Power:

0.70 kVA

AC Voltage:

120 and 220 volts

Noise-Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

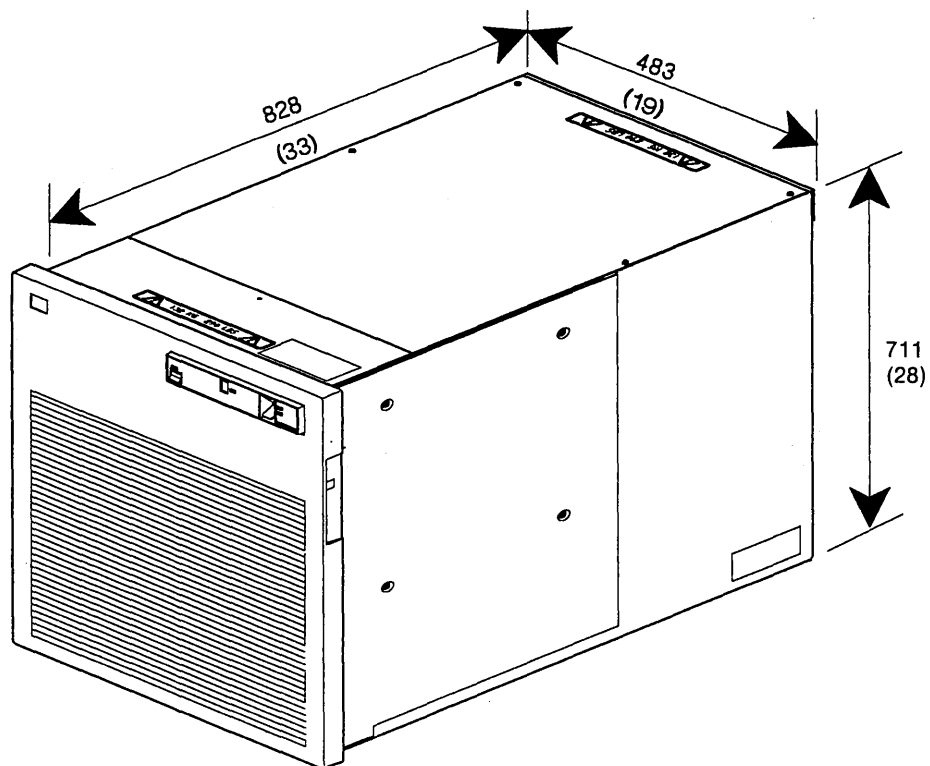
IBM 9373, 9375, and 9377 Processors (Continued)**9375 Processor**

Figure 4-2. 9375 Processor

9375 Processor Specifications

Dimensions:

Height: 711 mm (28 in.)

Width: 483 mm (19 in.)

Depth: 828 mm (33 in.)

Weight:

132 kg (290 lb)

Heat Output:

1 800 W (6,145 BTU/HR)

Airflow:

17 m³/min (600 cfm)

Power:

2.00 kVA

Noise-Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

IBM 9373, 9375, and 9377 Processors (Continued)

9377 Processor

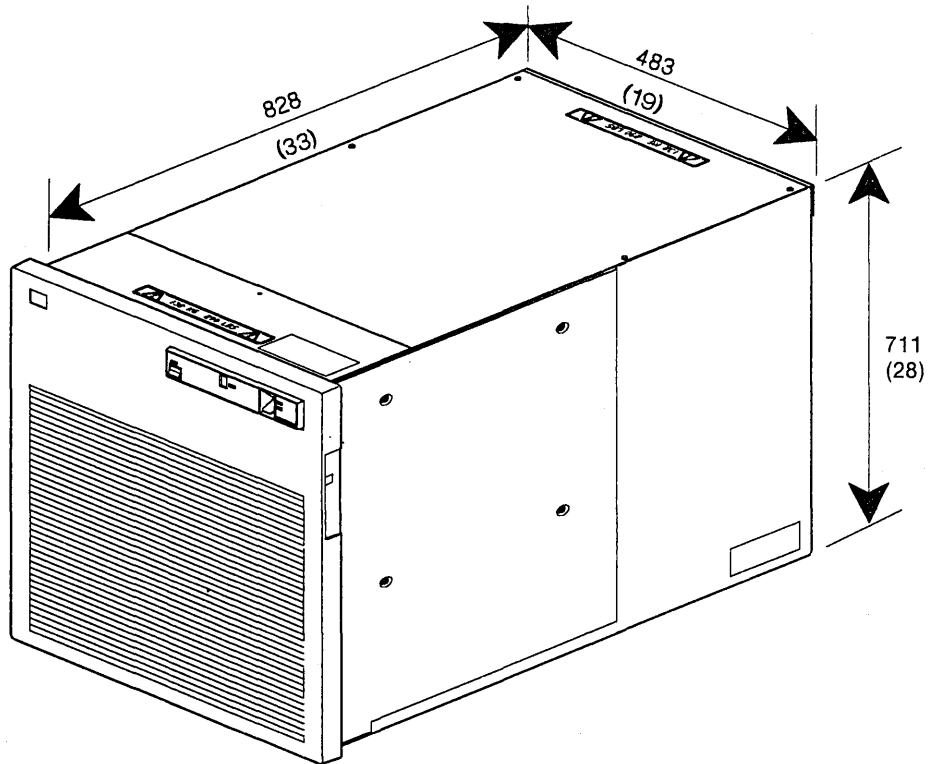


Figure 4-3. 9377 Processor

9377 Processor Specifications

Dimensions:

Height: 711 mm (28 in.)

Width: 483 mm (19 in.)

Depth: 828 mm (33 in.)

Weight:

122 kg (268 lb)

Heat Output:

1 200 W (4,100 BTU/HR)

Airflow:

11 m³/min (380 cfm)

Power:

1.70 kVA

Noise-Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

Operating Environment:

Temperature	15.6 to 32.2°C	(60 to 90°F)
Rel Humidity	20 to 80%	
Max Wet Bulb	22.8°C	(73°F)

Nonoperating Environment:

Temperature	10 to 43.3°C	(50 to 110°F)
Rel Humidity	8 to 80%	
Max Wet Bulb	26.7°C	(80°F)

I/O Card Unit

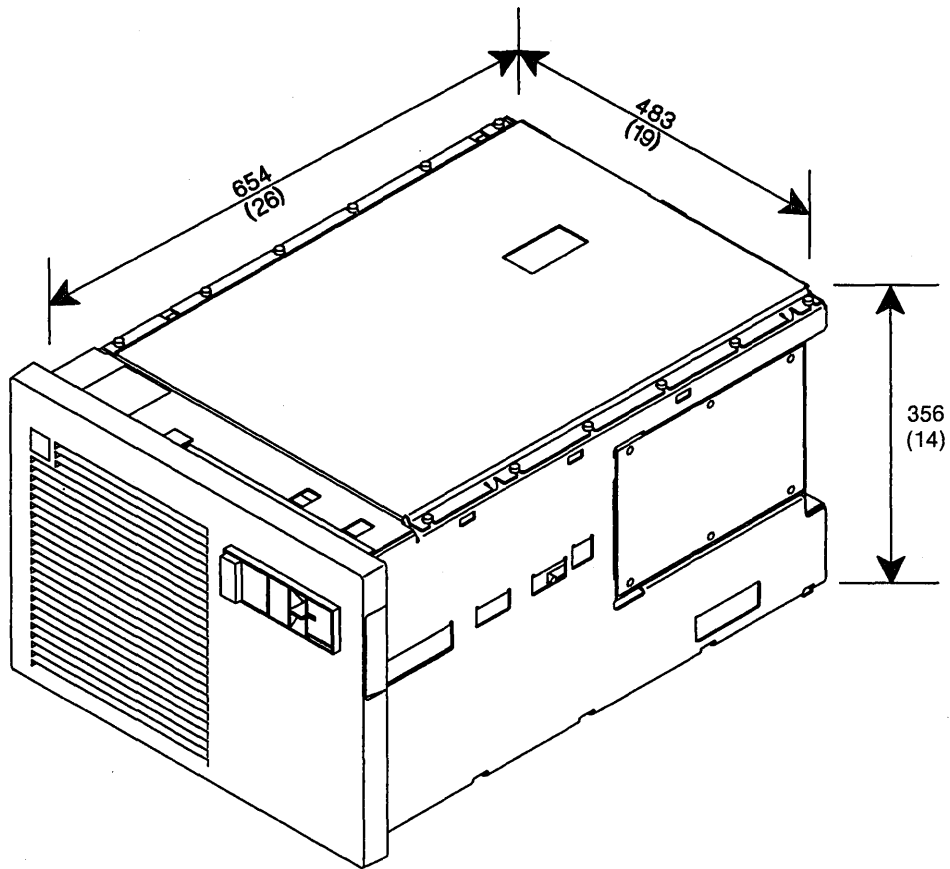


Figure 4-4. I/O Card Unit (Features 5010 and 5020)

I/O Card Unit Specifications

Dimensions:

Height: 356 mm (14 in.)

Width: 483 mm (19 in.)

Depth: 654 mm (26 in.)

Weight:

55 kg (120 lb)

Heat Output:

211 W (720 BTU/HR)

Airflow:

0.43 m³/min (15.0 cfm)

Power:

0.90 kVA

Noise-Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

Operating Environment:

Same as the 9377 processor.

Nonoperating Environment:

Same as the 9377 processor.

Note: Feature 5010 is a one-bus I/O Card Unit and Feature 5020 is a two-bus I/O Card Unit. These features are only available with the 9377 processor. One I/O Card Unit (Feature 5020) is standard with a 9377 processor.

9332-400 DASD

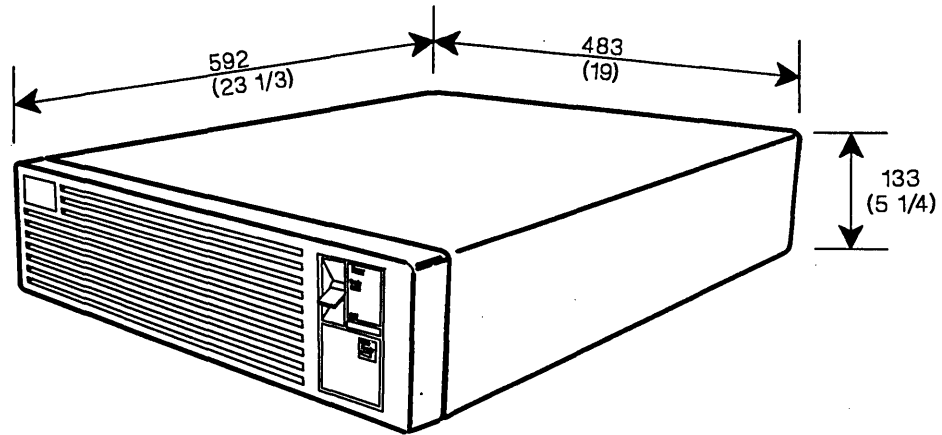


Figure 4-5. 9332 Model 400 DASD

9332-400 DASD Specifications

Dimensions:

Height: 133 mm (5 1/4 in.)

Width: 483 mm (19 in.)

Depth: 592 mm (23 1/3 in.)

Weight:

30 kg (65 lb)

Heat Output:

262 W (895 BTU/HR)

Airflow:

1.4 m³/min (50 cfm)

Power:

0.50 to 0.70 kVA

AC Voltage:

115 or 230 volts

Noise-Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

9335-A01 DASD Controller

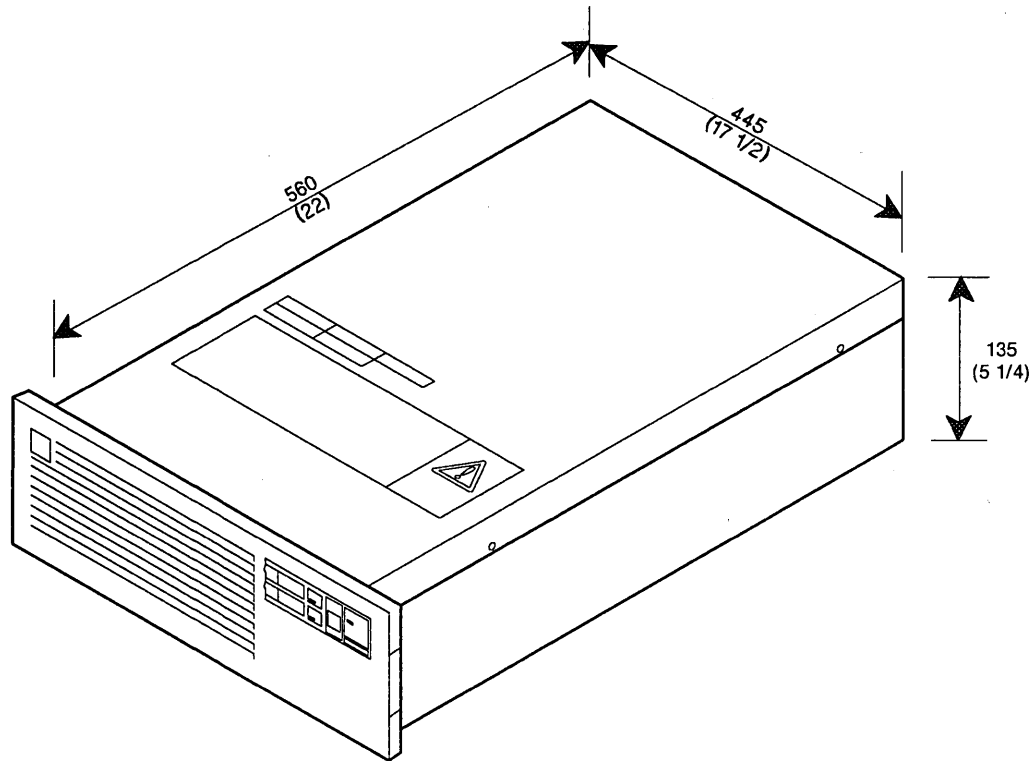


Figure 4-6. 9335-A01 DASD Controller

9335-A01 DASD Controller Specifications

Dimensions:

Height: 135 mm (5 1/4 in.)

Width: 445 mm (17 1/2 in.)

Depth: 560 mm (22 in.)

Weight:

17 kg (38 lb)

Heat Output:

175 W (597 BTU/HR)

Airflow:

1.8 m³/min (64 cfm)

Power:

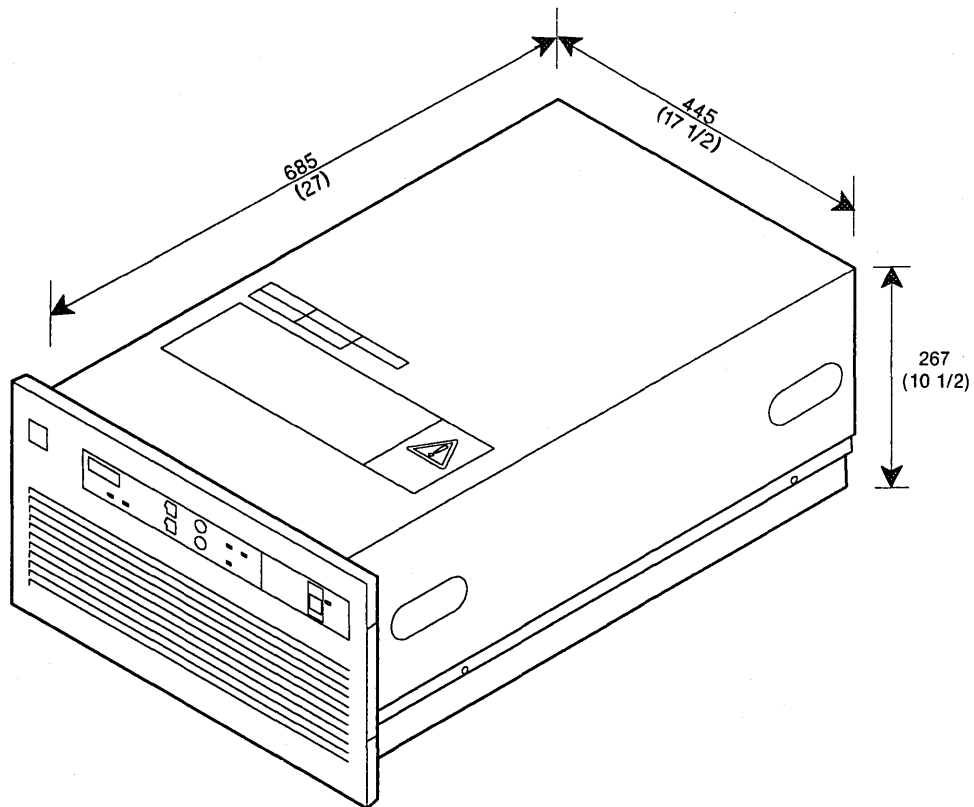
0.24 kVA

AC Voltage:

180 to 259 volts

Noise-Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

9335-B01 DASD**9335-B01 DASD****Figure 4-7. 9335-B01 DASD**

9335-B01 DASD Specifications

Dimensions:

Height: 267 mm (10 1/2 in.)

Width: 445 mm (17 1/2 in.)

Depth: 685 mm (27 in.)

Weight:

60 kg (132 lb)

Heat Output:

430 W (1,467 BTU/HR)

Airflow:

2.4 m³/min (85 cfm)

Power:

0.72 kVA

AC Voltage:

Switch setting for:

208, 220, 230, and 240 volts

Noise-Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

9347 Tape Unit

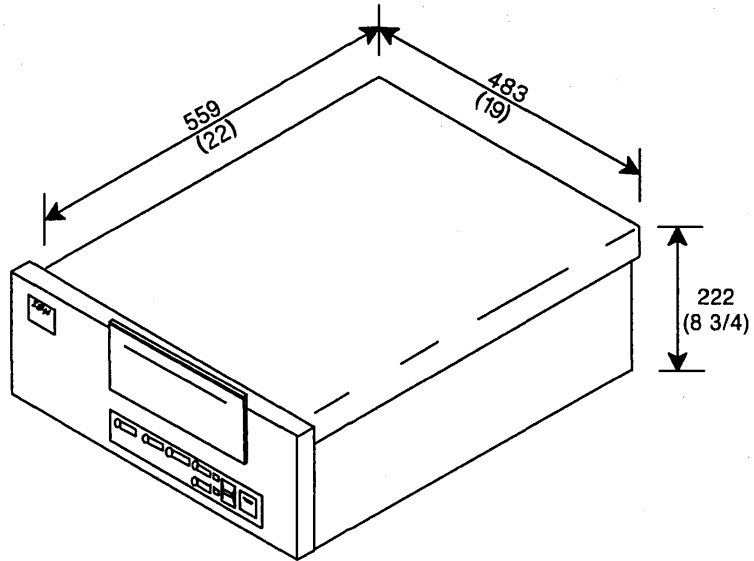


Figure 4-8. 9347 Tape Unit

9347 Tape Unit Specifications

Dimensions:

Height: 222 mm (8 3/4 in.)
Width: 483 mm (19 in.)
Depth: 559 mm (22 in.)

Weight:

37 kg (82 lb)

Heat Output:

270 W (925 BTU/HR)

Airflow:

1.4 m³/min (50 cfm)

Power:

0.30 kVA

AC Voltage:

115 or 230 volts

Noise-Emission Levels

Refer to "Acoustics (Noise-Emission Levels)" on page A-3.

Operating Environment:

Temperature	15.6 to 32.2°C	(60 to 90°F)
Rel Humidity	20 to 80%	
Max Wet Bulb	22.8°C	(73°F)

Nonoperating Environment:

Temperature	10 to 43.3°C	(50 to 110°F)
Rel Humidity	8 to 80%	
Max Wet Bulb	26.7°C	(80°F)

Power Sequence and Control

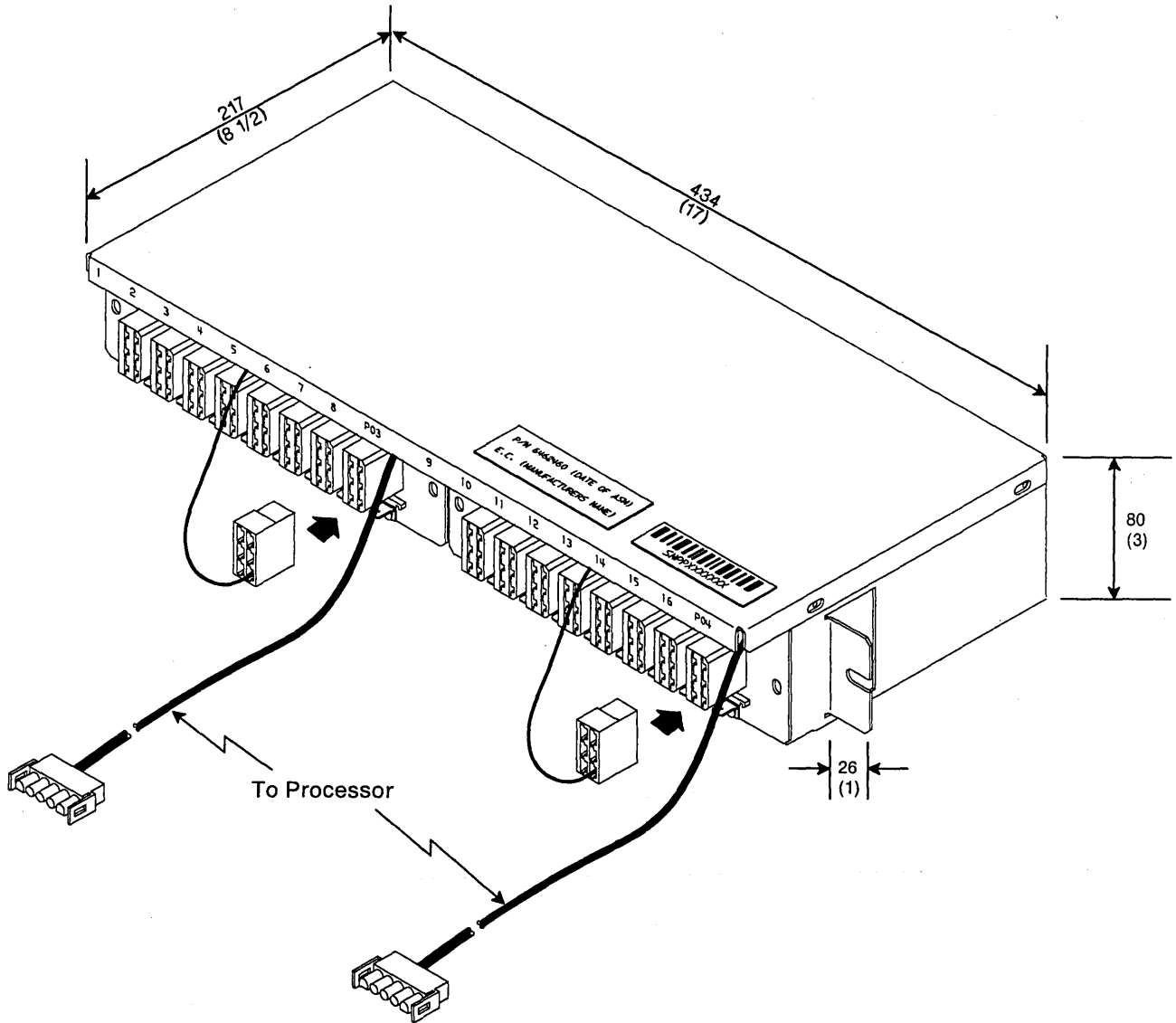


Figure 4-9. Power Sequence and Control Unit (Feature 6001)

Unit Specifications

Dimensions:

Height: 80 mm (3 in.)
Width: 434 mm (17 in.)
Depth: 217 mm (8 1/2 in.)

Weight:

7 kg (15 lb)

Note: The power sequence and control unit (Feature 6001) is only available on the 9375 and 9377 Processors. For more information see Chapter 5, "Cable Requirements," and *Planning For Your System*, GA24-4030.

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Cable Information

When you draw the floor plan of the data processing area, know the location of the external devices so that you can determine the maximum cable lengths. For World Trade, the devices have to be placed according to the standard cable length available.

Channel Cable Length

Determine the cable length by measuring the cable path from the cable entry/exit cutout of the device/control unit to the entry/exit of the rack. When you measure this length, remember:

- Include the distance from the edge of the unit to the center of the cable entry/exit hole in the unit.
- Never include any *under the cover cable* measurements; IBM allows for these when building external channel cables.
- In a raised-floor environment, add twice the height of the raised floor to the cable length between the attached units.

Coaxial Cable Length

Measure work station cables from the connector on the work station to the connector on the system; be sure to consider the intended cable route, including diagonal and vertical cable runs. Also, remember:

- The cable connectors on the system depend on the location of the feature card.
- The rack has a cable clamp at the bottom of the frame near the cable entry. Route cables through this clamp, then to the connectors.
- Add 0.6 meter (2 ft) to the length of each work station cable to allow for slack in the cable.

Communication Cable Length

To find the length of the communication attachment, measure from the cable entry/exit hole of the system to one of the following:

- The external modem or auto-call unit
- The digital-network channel service unit
- The teleprocessing line connector
- The protective device, where such a device communicates with a switched teleprocessing line.

Cable Information (Continued)

Cable Schematic

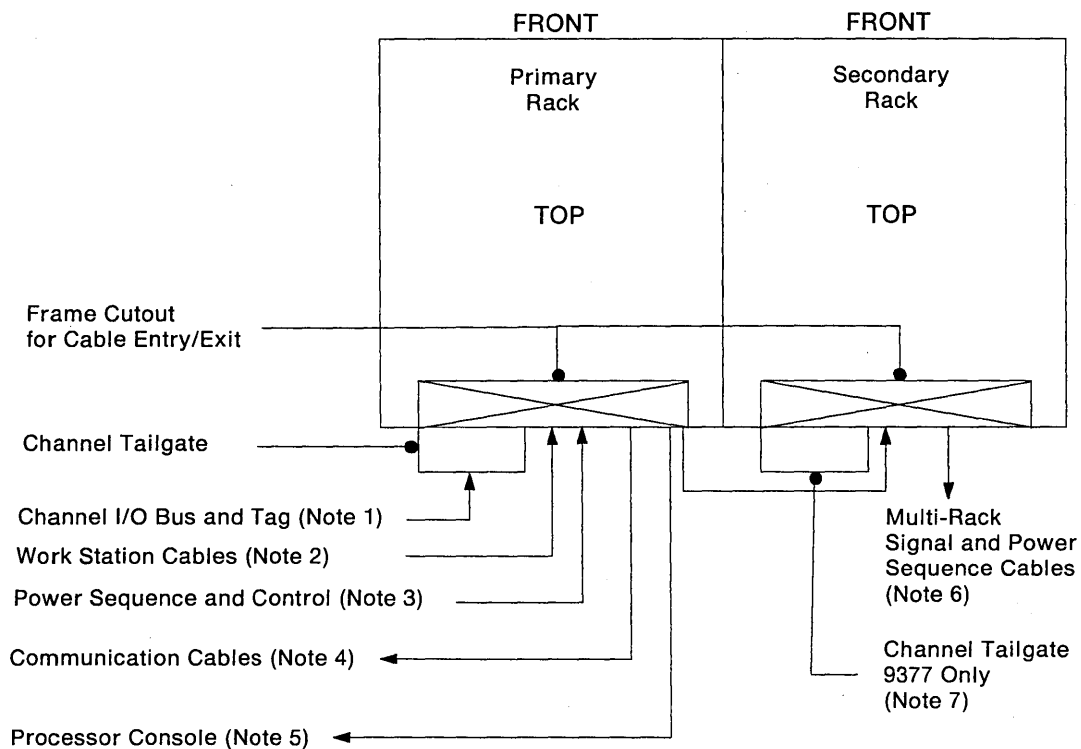


Figure 5-1. Cable Schematic

Notes:

1. *Channel-attached devices. If you have to order cables, refer to:*
 - *The device specification pages of IBM Sys/360, Sys/370, 4300 Processors I/O Equipment Installation Manual – Physical Planning, GC22-7064, and*
 - *Chapter 5 of Planning Your System, GA24-4032.*
2. *See “Work Station Cables” on page 5-12 for cable information.*
3. *A 16-position power sequence and control unit is available as an optional feature. If you want System/370 control unit sequencing, order Feature 6001.*

4. See "Communication Cables" on page 5-10 for required cables.
5. A signal cable for the processor console is shipped with the processor [fixed length: 7.6 meter (25 ft)]. Two additional signal cables for the processor console (and the RSF modem) are shipped with the processor [fixed length: 7.6 meter (25 ft)]. These cables are for the remote support and auto start operations. Auto start operations only become active when the rack has the security key lock installed.
6. This cable controls power on/off and emergency power-off from rack-to-rack in a multiple-rack system. A 3-meter (10-ft.) power sequence cable is shipped with each secondary rack. An optional 6-meter (20-ft.) cable is also available.

Note: The Hands On Network Environment (HONE) configurator will prompt you for the required specify codes to order the appropriate cables for all connections within and between units mounted in the rack(s).
7. The 9377 Processor requires an I/O Card Unit (Feature 5020) in a primary and/or secondary rack to attach System/370 channel devices.

System Cabling

Channel Cables

Figure 5-2 and "Cables To The 9370 Processors" on page 5-7 relate the cable group numbers and feature code numbers to connector IDs. If you know the features on order, the cabling schematic shows most of the information needed for ordering external cables from the channel I/O device.

The feature code (Features 6003 and 6001) and connector IDs of the cables "To" the 9370 Processors are shown on the right (connector ID = even number). For more information on the channel cabling charts, see Chapter 6 of the *IBM General Information Manual, Installation Manual - Physical Planning*, GC22-7072.

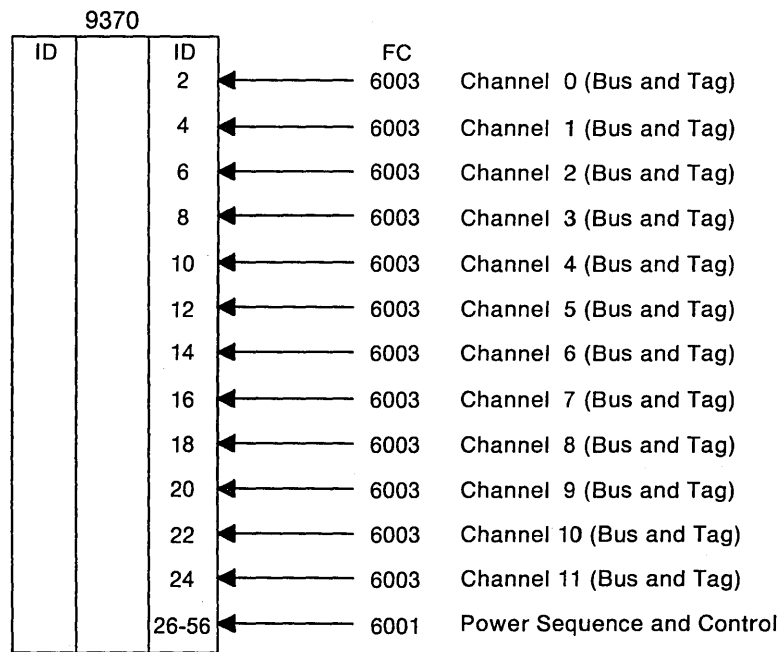


Figure 5-2. Channel Cabling Chart

Cables To The 9370 Processors

The following cables are ordered with "Group Numbers" identified on the specification pages of the System/370 channel-attached device.

Feature	Conn. ID	Comments	Notes
6003	2	Channel 0, Bus & Tag	1,2,3,4
6003	4	Channel 1, Bus & Tag	1,2,3,4,5
6003	6	Channel 2, Bus & Tag	1,2,4,5
6003	8	Channel 3, Bus & Tag	1,2,5
6003	10	Channel 4, Bus & Tag	1,2,5
6003	12	Channel 5, Bus & Tag	1,2,5
6003	14	Channel 6, Bus & Tag	1,2,5
6003	16	Channel 7, Bus & Tag	1,2,5
6003	18	Channel 8, Bus & Tag	1,2,5
6003	20	Channel 9, Bus & Tag	1,2,5
6003	22	Channel 10, Bus & Tag	1,2,5
6003	24	Channel 11, Bus & Tag	1,2,5
6001	26-56	Power Sequence and Control	6,7

Figure 5-3. Cables to the 9370 Processor

Notes:

1. *The maximum cumulative cable length available to attach up to eight control units is 122 meters (400 ft), unless modified by the general control unit-to-channel cabling schematic.*
2. *The block multiplexer channel (Feature 6003) contains a single card and a cable set. The cable set connects to the channel card on one end and to the channel box (System/370) connector on the other end.*
3. *Channel 0 is optional on the 9373 Processor. The channel on the 9373 Processor is restricted to two controllers: a tape controller and/or a printer.*
4. *Channels 0 and 1 are optional on the 9375 Processor. Channel cards are installed only in two of the five slots of the top card enclosure in the processor unit.*

System Cabling (Continued)

5. *Channels 0 through 11 are optional on the 9377 Processor. Channel cards can be installed only in the two-bus I/O Card Unit (Feature 5020). The I/O Card Unit can be installed in a secondary rack. Your physical layout will depend on the number of system racks you have.*
6. *Power sequence and control is an optional feature with the System/370 channel feature. It enables I/O control units to power on/off sequentially when the system powers on/off. Power sequence and control is available for a maximum of sixteen control units. Order Feature 6001 for the power sequence and control positions. The connector IDs for the sixteen positions are even numbers; 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, and 56.*
7. *For more information on power sequencing, refer to System/360, System/370 Power Control Interface OEMI, GA22-6906.*

Control Unit-to-Channel Cabling

Generally, the maximum cumulative cable length to attach to a channel is 122 meters (400 feet). Exceptions to this are noted on the cabling schematics for the individual control units.

All control units are serially connected to the channels.

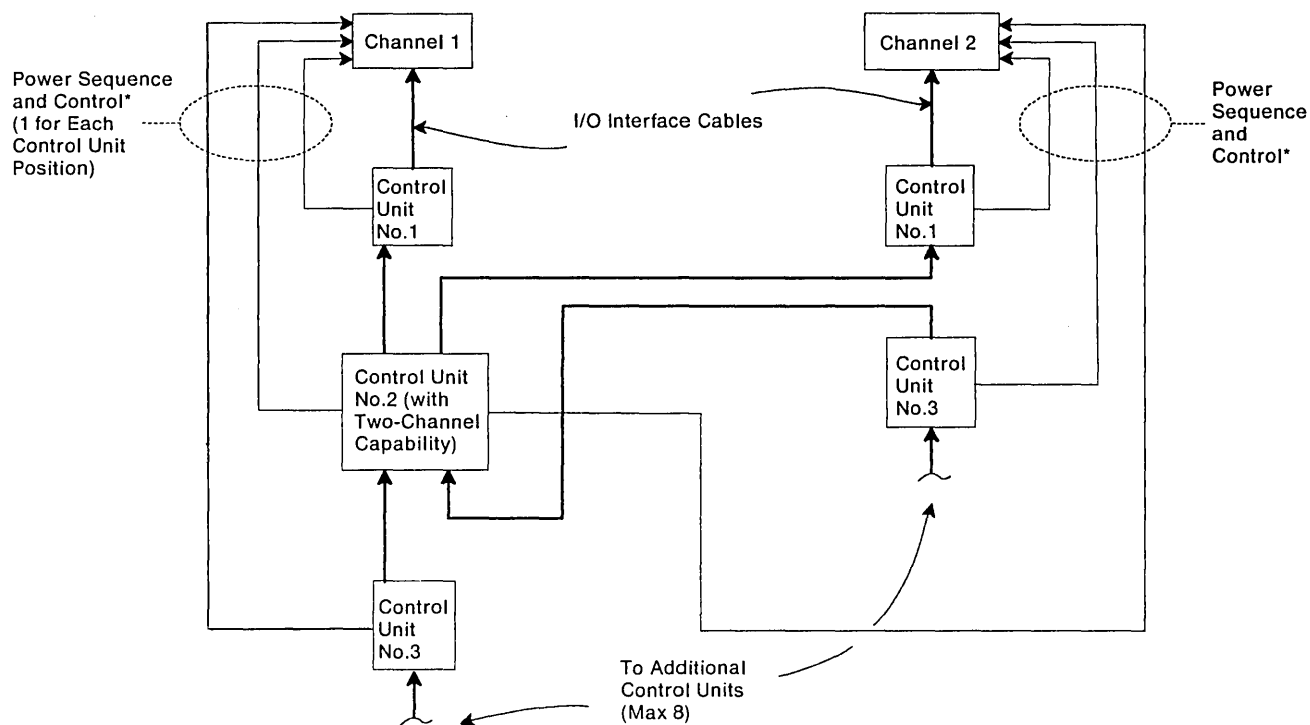


Figure 5-4. Control Unit-to-Channel Cabling

* Power sequencing is an option on most IBM equipment. Power sequence and control cables need not be ordered unless you want to power the equipment on or off from a single location, or the individual machine requires it for other reasons. See the specification pages for the specific control unit requirement.

System Cabling (Continued)

Communication Cables

Figure 5-5 and Figure 5-6 identify the interface and cable length of the Communications Processor (Feature 6030) for the Asynchronous Adapter (Feature 6032) and Multi-Protocol Adapter (Feature 6031). Two other adapters supported by the Communications Processor are the IBM Token-Ring Adapter (Feature 6034) and the IEEE 802.3 Local Area Network (LAN) Adapter (Feature 6035).

For more information on communication features, see *Planning For Your System*, GA24-4032, and *Introducing The IBM 9370 Information System*, GA24-4030.

Note: All communication cables [except IEEE 802.3 Local Area Network (Feature 6035)] will be shipped with the feature. For more information on local area network and connectors, see the communications cable guide (ask your sales representative for the availability date).

Feature	Qty.	Maximum Length	Type	Notes
6032	1	6.0 meters (20 feet)	Asynchronous RS-232	1,2,4
6032	1	15.2 meters (50 feet)	Asynchronous RS-422	1,2,4
6032	1	6.0 meters (20 feet)	Asynchronous Modem (V.24/RS-232)	1,2,4
6032	1	6.0 meters (20 feet)	Asynchronous System-to-System (RS-232)	1,2,4
6032	1	6.0 meters (20 feet)	Extension Cable (25 pin)	1,2,5

Figure 5-5. Cables for Asynchronous Protocol Adapter

Feature	Qty.	Maximum Length	Type	Notes
6031	1	6.0 meters (20 feet)	RS-232	1,3,4
6031	1	15.2 meters (50 feet)	RS-422	1,3,4
6031	1	6.0 meters (20 feet)	Network X.21	1,3,4
6031	1	6.0 meters (20 feet)	X.21 BIS	1,3,4
6031	1	6.0 meters (20 feet)	DDS V.35 (DSU/MOD)	1,3,4
6031	1	6.0 meters (20 feet)	Modem (RS-232)	1,3,4
6031	1	6.0 meters (20 feet)	Auto-call	1,3,4
6031	1	6.0 meters (20 feet)	System-to-System (RS-422)	1,3,4
6031	1	6.0 meters (20 feet)	IBM Wiring 422/ECL	1,3,4
6031	1	6.0 meters (20 feet)	Modem (V.24)	1,3,4
6031	1	6.0 meters (20 feet)	422 LC-1	1,3,4
6031	1	6.0 meters (20 feet)	Extension Cable (25 pin)	1,3,4

Figure 5-6. Cables for Multi-Protocol Adapter

Notes:

1. *The feature code, device type, and line speed determines what cable will be shipped with the feature.*
2. *To support ASCII devices, you must have the Communications Processor (Feature 6030) and the Asynchronous Adapter (Feature 6032) installed.*
3. *To support the standard synchronous and asynchronous communication line protocols (SDLC, HDLC, BSC, and TTC2), you must have the Communications Processor (Feature 6030) and the Multi-Protocol Adapter (Feature 6031) installed.*

System Cabling (Continued)

4. *Each Multi-Protocol Adapter supports two lines and each Asynchronous Adapter supports four lines.*
5. *The maximum configuration for the Communications Processor is:*
 - *Any combination, maximum of three, of the Multi-Protocol Adapter and Asynchronous Adapter, or*
 - *Four Asynchronous Adapters using the ASCII Subsystem (16 lines), or*
 - *One IEEE 802.3 Local Area Network (LAN), or*
 - *One IBM Token-Ring Adapter.*

Work Station Cables

To attach the selected devices to the processor, you must have the Work Station Controller (Feature 6020).

A multiplexer, such as the 3299, can attach ports 1, 4, 5, and 6 of the work station adapter. This allows you to attach up to 32 devices. For more information, refer to Chapter 3 in *Planning For Your System*, GA24-4032.

You are responsible for ordering, installing, maintaining and testing all cabling between work stations and the system. Work station cabling is available from IBM, either assembled or unassembled. Test and install your work station cables before the scheduled arrival of the system.

For cable specifications and ordering information, refer to the specification pages of the appropriate *Installation Manual—Physical Planning* for the peripheral device.

For cable installation information, refer to *Installation and Assembly of Coaxial Cable and Accessories for Attachment to IBM Products*, GA27-2805.

When planning for the required cables, identify each cable end (work station and processor connector number) with the cable lengths and addresses. Document this information on your floor plan and *Form D* in the *Planning Forms*, GA24-4093.

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 Requirements 6-4
Remote Facility 6-6
 External Interface Adapter (USA only) 6-6
 Customer-Ordering Information For Remote Facility 6-8

The Remote Facility is a standard feature on all 9370 Processors. In the event the system malfunctions, the Remote Facility allows fast maintenance response. It also allows you to control the processor at a remote location.

The Remote Facility provides the following functions:

- **Remote Service** transfers system error data to the IBM support system. This also allows service representatives to control and analyze the system from a remote location.
- The **Remote Operation** allows you to control multiple systems from a central site.

The connection to the 9370 is through the processor console with a synchronous communication data link. In the USA and Canada, IBM will provide a 2400 bit-per-second (bps) modem with auto-answer capability. World trade customers have to provide a modem according to country regulations and specifications identified in this chapter.

General Information

To establish a switched network data connection in manual operation, you need a telephone:

- To call or answer a call and
- To switch the circuit to the modem to transfer the data.

The following applies for the USA and Canada:

- You must provide a telephone that uses a modular jack. You should also have the switched network line terminated at your site.
- The Federal Communications Commission (FCC), Part 68, Rules and Regulations (July 1979) also affect customer premises equipment (CPE), such as telephones and modems. Part 68 requires FCC registration of all CPE attached to the public switched telephone network. (It also requires protective circuits to protect the switched telephone network.)
- Protective circuits can be provided in two forms. Some configurations use a data protective coupler, which goes between an unprotected modem and the switched telephone network. More recently designed modems, such as the IBM 5842, include the protective circuit within the modem so that it does not require an external coupler.

World Trade countries must follow equivalent regulations.

Communication Facilities

In the USA and Canada, IBM will provide a 2400 bps, manual dial, auto-answer modem that includes protective coupler circuits as part of the 9370 processor console. You will need to:

- Obtain a dedicated switched network line that terminates at an RJ11 data jack (four-position modular jack). This should terminate within 4.5-meters (15-feet) of the processor console and modem.

Note: IBM provides a 4.5 meter (15 foot) cable for use between the modem and the switched line data jack (see Figure 6-1 on page 6-6).

- Provide a normal telephone with a modular plug that is compatible with the type of phone line service (pulse or tone dialing).
- Register the modem and telephone, after installation, with the local phone company by using the FCC registration number and ringer equivalency number (REN) provided on the equipment.

In World Trade Countries, IBM will supply a compatible modem, if local communications regulations do not restrict the IBM support structure. Each country with restrictions will be handled on an individual basis.

Requirements

In the USA and Canada each telephone, modem, and protective coupler used on the public switched telephone network must be registered with the FCC. When you order communication facilities, you must specify, by Universal Service Order Code (USOC) code, the jacks required to terminate the line. You must also provide the telephone company with specific registration information for each device to be directly attached to the the switched telephone network. The manufacturer or supplier of the device will supply this information.

The information the FCC requires is:

- Device name and model number
- FCC registration number
- Ringer equivalence number (REN).

A fixed-length cable is shipped with the processor (see Figure 6-1 on page 6-6). For convenience, install the remote facility telephone handset next to the processor console.

Outside the United States and Canada, you need the following to connect the Remote Facility:

- Switched network termination for line plate interface.

Remote Facility (RF)

External Interface Adapter (USA only)

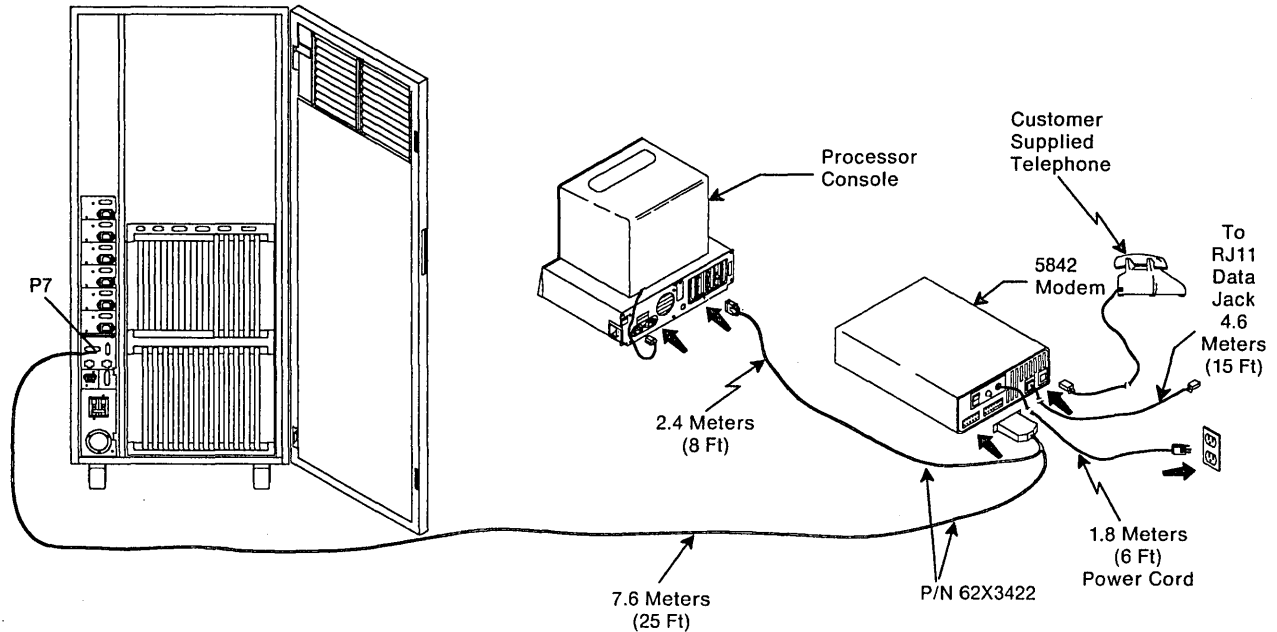


Figure 6-1. Remote Facility Configuration

Notes:

1. A RS232C/CCITT V.24, Y-shaped cable (PN 62x3422) is shipped with the processor to all countries.
2. All customers must provide a switched network communication line with a compatible telephone.
3. For convenience, install the customer-provided telephone handset next to the display console.
4. The common carrier must provide the connection or data jack, as described by the modem instructions.

CDT-Type Protective Coupler	External Modem	Line Connection	Line Type
Modem dependent	IBM 5842 Modem or equivalent (see Note 2) OEM equivalent to V.22 or V.22 bis interface and operation (see Note 1)	Common-Carrier provided before Jan. 1, 1983 Common-Carrier provided USOC as specified by OEM instructions	Switched Network Line for data up to 2400 BPS

Notes:

1. *Additional site planning and preparation may be required before installing the modem or coupler units. The modem must provide for synchronous operation clocking provided by the data communication equipment (DCE). See the instructions for the device you plan to use. For FCC regulations, see Original Equipment Manufacturer (OEM) literature.*
2. *The 5842 Modem will be shipped to the USA and Canada. World Trade countries will have to furnish an equivalent 1200 or 2400 bps, V.22, V.22 bis, or V.23 interface modem with internal clocking.*

Remote Facility (Continued)

Customer-Ordering Information For Remote Facility

1. Communication Facility Requirements
 - Line Type – Dial-Up Business Line
 May be Touch-Tone¹ or rotary dial
 - Line Speed – 2400 bps
 - Line Termination – IBM 5842 Modem (or equivalent)
 - FCC Registration information – determined by customer-supplied modem
2. Modem Requirements
 - IBM 5842 or equivalent V.22 bis for the USA and Canada.
 - CCITT V.22, CCITT V.22bis, or CCITT V.23 modem for World Trade countries.
3. Telephone Requirement
 - C5 Touch-Tone or C6 rotary dial (must be the same as line type).
 - Modular jack telephone (or equivalent for World Trade countries).

¹ Trademark of American Telephone and Telegraph Co.

Specification Summary Chart	A-2
Acoustics (Noise-Emission Levels)	A-3
Unit Noise-Emission Levels	A-4

Specification Summary Chart

Type	Model	Unit Description	Max. kVA	Heat Output		Weight		EIA. Units	Notes
				W	BTU/hr	kg	lb		
9309	1	1.0 Meter Rack	0.093	57	194	107	235	19	1,6,7
	2	1.6 Meter Rack	0.093	57	194	138	303	32	
9373	20	Processor	0.70	588	2,000	60	132	8	2
9375	40, 60	Processor	2.00	1 800	6,145	132	290	16	2
9377	90	Processor	1.70	1 200	4,100	122	268	16	2
9332	400	DASD	0.50	262	895	30	65	3	4
9335	A01	DASD Controller	0.24	175	597	17	38	3	3
	B01	DASD	0.72	430	1,467	60	132	6	3
9347		Magnetic Tape Drive	0.30	270	925	37	82	5	5
		I/O Card Unit	0.90	211	720	55	120	8	8

Figure A-1. Unit Specification Summary

Notes:

1. Specifications include the power control compartment (PCC).
2. Maximum kVA with maximum storage.
3. Maximum of one 9335 A01 per DASD/Tape Controller (Feature 6010). Maximum of four 9335 B01s per 9335 A01.
4. Maximum of four 9332s and one 9347 per DASD/Tape Controller (Feature 6010).
5. Maximum of two 9347s per DASD/Tape Controller (Feature 6010).
6. A total of 5 kVA is the maximum for a Model 2 PCC and 3 kVA for a Model 1 PCC. Do not include the System/370 I/O in the kVA total for the rack.
7. Maximum number of EIA (Electronic Industries Association) units for the Model 1 is 19 and 32 for the Model 2.
8. The I/O Card Unit is a feature for the 9377 Processor. Feature 5010 is a one-bus I/O Card Unit and feature 5020 is a two-bus I/O Card Unit.

Acoustics (Noise-Emission Levels)

Acoustical data is intended to answer requests for information and is for consultants and planners requiring the data to help predict the levels of acoustical noise. The format in which the data are provided conforms to the standard used by the computer industry. The measurement procedures used to acquire the data conform to American National Standard S12.10-1985 and International Standard 7779. The following terms are used to present acoustical data in this manual.

Term	Definition
LwAd	The declared sound power-emission level.
< LpA > m	The mean value of the space-averaged sound pressure emission levels at the one-meter positions.
T	Prominent discrete tones

Unit Noise-Emission Levels

The following table shows the noise-emission levels for units of the system. The levels for these units were measured in the 9309 Rack Enclosure, Model 2. The information is preliminary and subject to change.

Type	Model	Hz	LwAd		< LpA > m		T
			Operating (bels)	Idling (bels)	Operating (dB)	Idling (dB)	
9309	1, 2	60	*	*	*	*	N
		50	*	*	*	*	
9373	20	60	6.8	6.8	50	50	N
		50	6.8	6.8	50	50	
9375	40	60	6.6	6.6	50	50	N
		60	6.8	6.8	51	51	
9377	90	60	6.4	6.4	47	47	N
		50	6.6	6.6	49	49	
9332	400	60	6.1	6.1	46	46	Y
		50	6.1	6.1	46	46	
9335	A01	60	5.8	5.8	43	43	N
		50	5.9	5.9	44	44	
9335	B01	60	7.1	7.1	54	54	N
		50	7.2	7.2	55	55	
9347		60	6.5	6.5	51	51	N
		50	6.5	6.5	51	51	
I/O Card Unit		60	6.7	6.7	50	50	N
		50	6.7	6.7	50	50	

Figure A-2. Noise Emission Levels

Notes:

1. * Does not radiate any measurable noise.
2. Refer to "Acoustics (Noise-Emission Levels)" on page A-3 for definitions used in the table.

Noise levels are not additive. Use the following logarithmic formula for the emission level of your system configuration.

The formula for the sound power-emission level of a sample configuration consisting of a 9375, 9335-A01, and two 9335-B01s is as follows:

$$\begin{aligned}
 L_{\text{sum}} &= \log [\text{sum } 10^{L_{wAd}}] \\
 &= \log [10^{6.6} + 10^{5.8} + 10^{7.1} + 10^{7.1}] \\
 &= \log [3981071.7 + 630957.3 + 12589254 \\
 &\quad + 12589254] \\
 &= \log [29790537] \\
 &= 7.47 \text{ bels}
 \end{aligned}$$

The following table lists five sample configurations and the power-emission levels (L_{wAd}) of each. For example, configuration **A** includes one 9373, one 9332, and one 9347, with a power-emission level (L_{wAd}) of 7.0 bels.

Sample	Processor Model	Number of Devices				LwAd
		9332	9335-A	9335-B	9347	
A	9373	1	0	0	1	7.0 bels
B	9373	2	0	0	1	7.1 bels
C	9375	0	1	2	0	7.4 bels
D	9375	0	1	3	0	7.7 bels
E	9377	0	1	3	0	7.7 bels

Figure A-3. Power-Emission Level for Sample Configurations

A

Appendix B. Plugs and Receptacles

B

Plugs/Receptacles for USA, AG, APG	B-2
Plugs and Receptacles for EMEA	B-3
Three-Phase Power Plug	B-6
50-Hz Power Cord Style	B-7

Appendix B. Plugs and Receptacles

Plugs/Receptacles for USA, AG, APG

IBM supplies power cords with attached plugs. You, the customer, must supply the corresponding power outlet receptacles. The reference (Ref) letter in Figure B-1 corresponds to the letter in Figure B-2 on page B-3.

Ref	Plug Type	Service Rating				Connector/Receptacle		Notes
		Volts	Amps	Phase	Wires			
A	3750	220/250	30	1	3	3933	3753	1,2,8
B	L6-30P	220/250	30	1	3		L6-30R	3,8
C	WIP130	250	30	1	3		WIBM130	4,8
D	56PA330	250	30	1	3		56S0330	5,8
E	3720U-1	125	20	1	3	3913U-1	3743U-1	1,2,6,8
F	5-20P	125	20	1	3		5-20R	6,7,8

Figure B-1. Plugs and Receptacles for USA and AG, APG

Notes:

1. *Raised-floor installations require an R&S (Russell and Stoll) watertight plug/connector/receptacle (specify code 9080).*
2. *An R&S inline connector used with flexible metal conduit or liquid-tight flexible metal conduit requires an R&S FSA adapter.*
3. *A NEMA-style (National Electrical Manufacturers' Association) twist-lock plug/receptacle (specify code 9081).*
4. *Only for Australia.*
5. *Only for New Zealand.*
6. *Only available for the U.S.A. on a 9309-1.*
7. *NEMA non-twist-lock plug/receptacle. Specify code 9081 with the 9309-1, 120 Vac PCC.*
8. *Refer to Figure B-2 on page B-3 for power plug illustrations.*

The chart on the following page illustrates the plugs, receptacles, and connectors used by the rack for AG and A/PG countries and the USA.

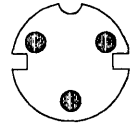
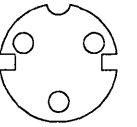


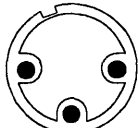
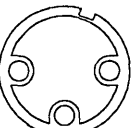
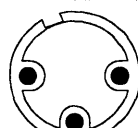
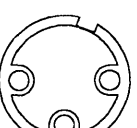


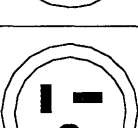
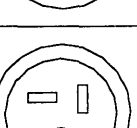
	Plug	Receptacle/ Connector	Type
A			Russell and Stoll Waterproof Plug, Receptacle/Connector 220/250V 30A
B			NEMA Twistlock Plug/Receptacle 220/250V 30A
C			PDL Insulated Plug/Receptacle 250V/30A (New Zealand)
D			Wilco Weatherproof Plug/Receptacle 250V/30A (Australia)
E			Russell and Stoll Waterproof Plug, Receptacle/Connector 125V/20A
F			NEMA Plug/Receptacle 125V/20A

Figure B-2. Plug and Connector/Receptacle for USA, AG, and A/PG

Plugs and Receptacles for EMEA

For EMEA countries, IBM supplies the power cord with an attached plug that corresponds to the power-outlet receptacle most used in that country. Figure B-3 on page B-5 shows illustrations of the power plugs for 3 kVA, single-phase power (specify code 9112). Match the letter of the illustrations in Figure B-3 with the appropriate listing of countries on the next page.

Plugs and Receptacles for EMEA (Continued)

Note: * = The power cord for the 3 kVA single-phase PCC in the United Kingdom does not have a plug.

Country	Plug ID	Country	Plug ID
Algeria	A	Mauritania	A
Andorra	A	Mauritius	A
Angola	A	Monaco	A
Austria	A	Morocco	A
Bahrain	B	Mozambique	A
Belgium	A	Netherlands	A
Benin Republic	A	New Caledonia	A
Bulgaria	A	Niger	A
Cameroon	A	Norway	A
Central Africa Rep.	A	Oman	B
Chad	A	Pakistan	C
Channel Islands	B	Poland	A
Congo	A	Portugal	A
Cyprus	B	Qatar	B
Czechoslovakia	A	Romania	A
Egypt	A	Senegal	A
Ethiopia	F	Saudi Arabia	B
Finland	A	Sierra Leone	B
France	A	Somalia	B
Germany	A	South Africa	C
Ghana	B	Spain	A
Guinea	A	Sudan	A
Greece	A	S.A.R. (Southeast Asia Region)	A
Hungary	A	Tanzania	B
Iceland	A	Togo	A
Iran	A	Tunesia	A
Ireland	B	Turkey	A
Israel	D	Uganda	B
Italy	F	U.A.E.	B
Ivory Coast	A	United Kingdom	*
Jordan	B	Upper Volta	A
Kenya	B	U.S.S.R.	A
Kuwait	B	Yemen	B
Lebanon	A	Yugoslavia	A
Libya	B	Zaire	A
Liechtenstein	E	Zambia	B
Luxembourg	A		
Malagasy	A		
Malawi	B		
Maliuras	A		
Malta	B		

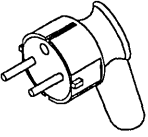
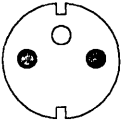
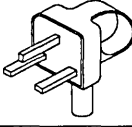
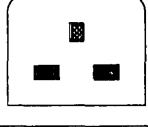
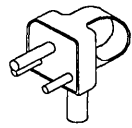
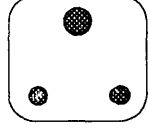
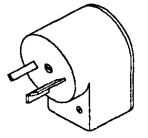
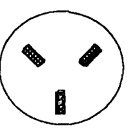
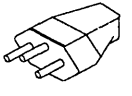
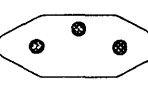
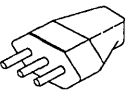
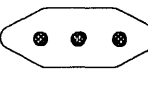
Plug Three-Dimensional View	Plug Pin-Side View	Service Rating and Standard
[A] 		250V 10/16A International rules for the approval of Electrical Equipment CEE: VII
[B] 		250V 13A British Standards Institution BS1363: (U.K.)
[C] 		250V 10/16A South African Bureau of Standards
[D] 		250V 10/16A Standards Institution of Israel SI-32-1971
[E] 		250V 10A Schweizerischer Elektrotechnischer Verein SEV 24507
[F] 		250V 10/16A Comitato Elettrotecnico Italiano CEI 23-16

Figure B-3. EMEA Plugs for Single-Phase Power (3 kVA)

Besides the plugs listed in Figure B-3, there is also a 5 kVA single-phase power plug; refer to Figure B-4.

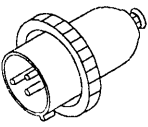
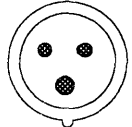
Plug Three-Dimensional View	Plug Pin-Side View	Service Rating and Standard
		220/380V 25A International Electrotechnical Commission IEC 309

Figure B-4. EMEA 200-240 Single-Phase Power Plug (5 kVA)

Plugs and Receptacles for EMEA (Continued)

Three-Phase Power Plug

The following three-phase power plug is for the two-phase power control compartment for EMEA countries.

Note: Power is not balanced using this plug. This plug only uses phases 1 and 2 of the incoming three-phases. For more information, refer to “Power Phase Imbalance” on page 2-6.

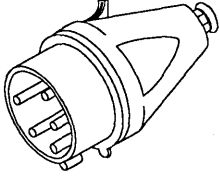
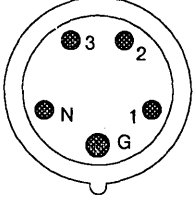
Plug Three-Dimensional View	Plug Pin-Side View	Service Rating and Standard
		<p>220/380V 10/16A</p> <p>International Electrotechnical Commission</p> <p>IEC 309</p>

Figure B-5. Three-Phase Power Plug (for 15 Amps)

Legend:

- 1 = Phase 1
- 2 = Phase 2
- 3 = Phase 3
- N = Neutral
- G = Ground

50-Hz Power Cord Style

The following chart provides power cord specifications needed to terminate the power cord in accordance with local practice, if necessary.

Phase	CABLE		Number of Shields	CONDUCTORS		
	Nominal OD mm (inches)			Quantity	Nominal OD* mm (inches)	
1	8.9	(0.350)	0	3	2.8 (0.110)	1.5
3	9.0	(0.354)	0	5	2.8 (0.110)	1.5

* This diameter refers to solid, bare wire.

Figure B-6. Power Cord Style (50-Hz Reference)

This checklist identifies installation tasks and responsibilities sequentially. If you have to renovate your site, you will probably need more time and a longer planning cycle. Use the following schedule and list of tasks as a guide.

Time Frame and Task/Consideration	Scheduled Completion Date	Actual Completion Date
16 Weeks Before Delivery		
Designate a person in your organization with the responsibility for all phases of site preparation.	_____	_____
Review this site planning guide with the designated person.	_____	_____
Plan for the installation of the device cables between the devices and the processor. See Chapter 5, "Cable Requirements."	_____	_____
Determine the schedule with your IBM representative. Fill in the dates on this form.	_____	_____
Identify communication needs and the source for the communication lines. Order modems as required. See "Communication Cables" on page 5-10 and Chapter 6, "Remote Facility."	_____	_____
14 Weeks Before Delivery		
Lay out the floor plan. Show the locations of the processor, control units, terminals, modems, power outlets, and accessories.	_____	_____
Review the overall site preparation plan with your IBM representative.	_____	_____
Place orders for device cables. See Chapter 5, "Cable Requirements." Order material to assemble your coaxial cables. Refer to <i>Installation and Assembly of Coaxial Cable and Accessories</i> , GA27-2805.	_____	_____

Time Frame and Task/Consideration	Scheduled Completion Date	Actual Completion Date
12 Weeks Before Delivery		
Determine if the existing programs need changes. Schedule changes as required.	_____	_____
Determine if any existing devices and control units need changes. Schedule changes as required.	_____	_____
Arrange for installing the device cables between the work stations, terminals, and modems.	_____	_____
Arrange for installing the power receptacle and wiring. See "Electrical Power" on page 1-7 and Appendix B, "Plugs and Receptacles."	_____	_____
Define a training program for employees.	_____	_____
Order required manuals. See your IBM representative.	_____	_____
10 Weeks Before Delivery		
Review the progress of the data communication plan. Identify and resolve any schedule conflicts.	_____	_____
Review the system configuration to ensure the configuration meets your requirements. Make necessary changes.	_____	_____
8 Weeks Before Delivery		
Review the installation plan and define any points in the schedule that may cause a problem.	_____	_____
Confirm the arrival of the package containing the cables.	_____	_____

Time Frame and Task/Consideration	Scheduled Completion Date	Actual Completion Date
Start installing and labeling cables and power receptacles.	_____	_____
Start employee training.	_____	_____
Have an IBM representative review progress of your site preparation.	_____	_____
2 Weeks Before Delivery		
Complete the checkout of the cables and power: continuity and polarity test of cables, power receptacles and safety considerations.	_____	_____
Complete the required changes to the existing programs and data processing units.	_____	_____
Complete the site preparation.	_____	_____
Install communication facilities, such as telephone lines and modems.	_____	_____
Review setup instructions with setup personnel.	_____	_____
Arrival of Unit(s)		
Move unit(s) to installation location. Unpack unit(s) according to instructions.	_____	_____
Read the setup instructions and set up your system.	_____	_____

English Units

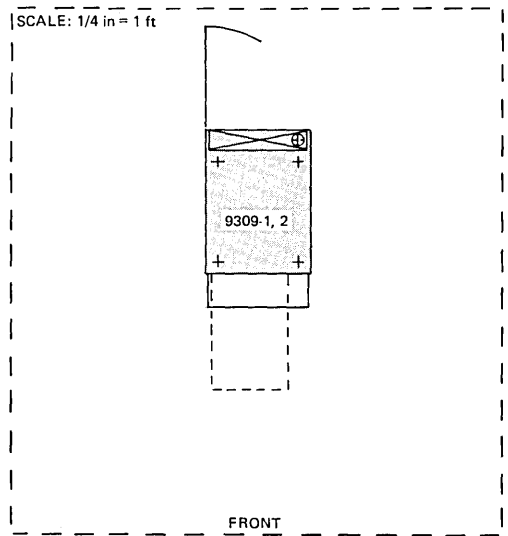
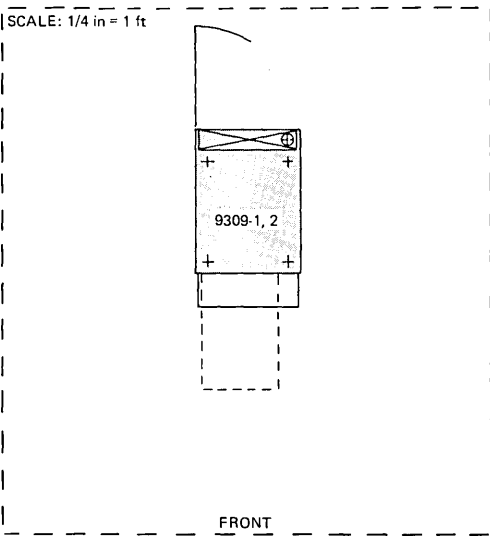
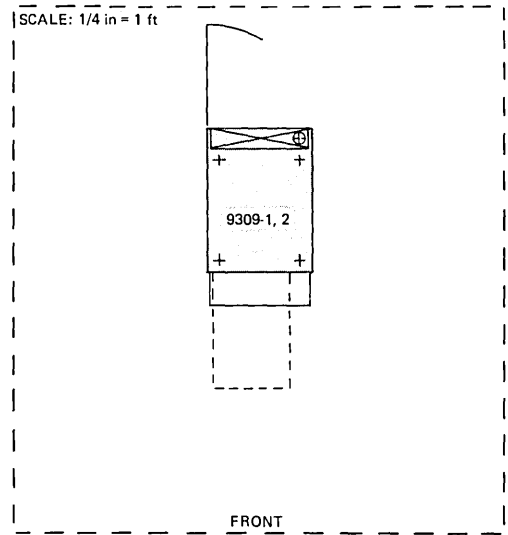
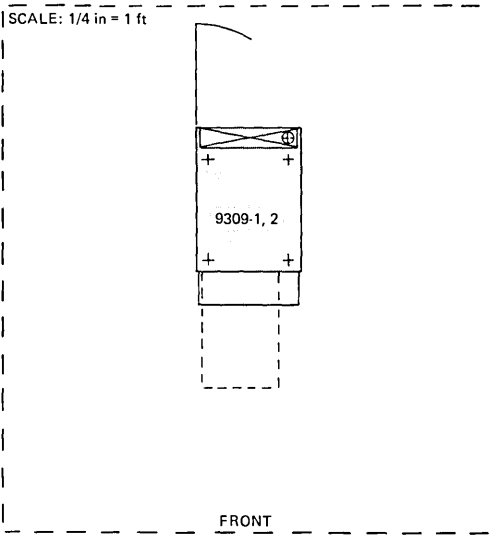


Figure D-1. Physical Planning Template (English)

Metric Units

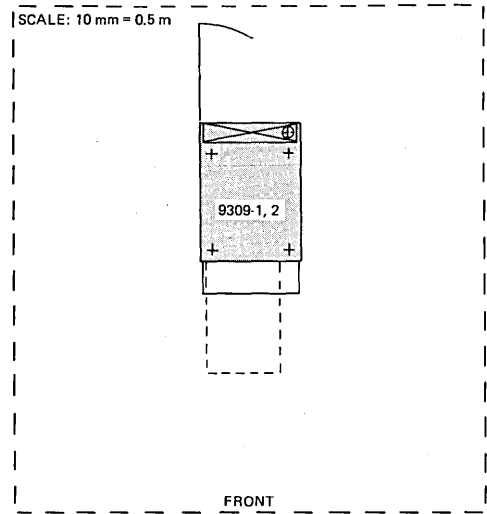
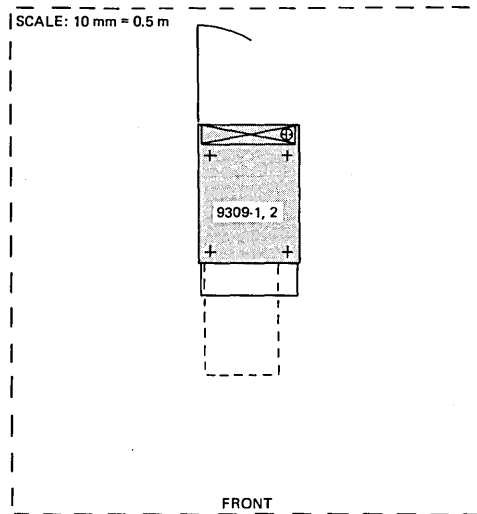
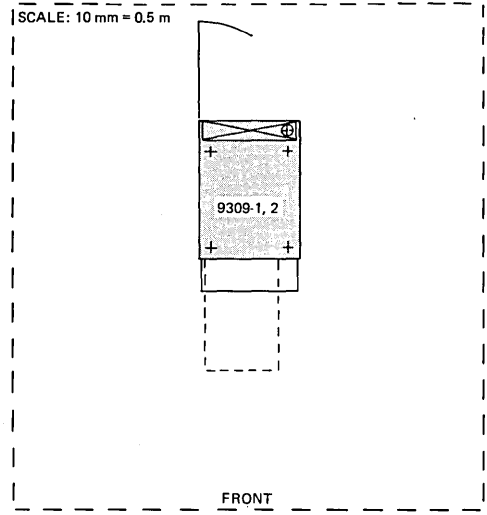
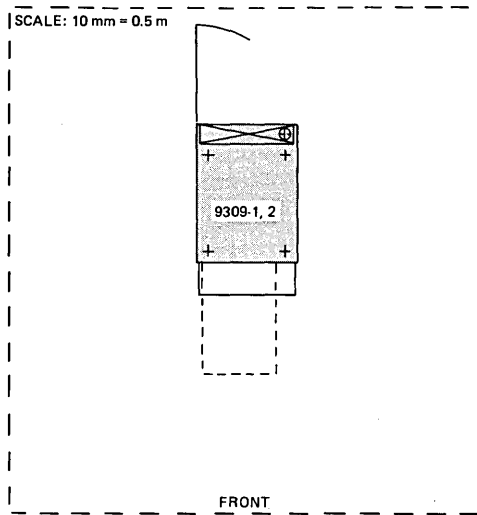


Figure D-2. Physical Planning Template (Metric)

Template List

Unit	Order Number
Rack 9309	GX24-4047 (Metric units) GX24-4046 (English units)

For the order number of *channel-attached I/O* equipment templates, refer to:

- *IBM Input/Output Equipment Installation Manual—Physical Planning for System/360, System/370, and 4300 Processors, GC22-7064, or*
- *IBM Input/Output Equipment Reference Installation Manual—Physical planning: System/360, System/370, and 4300 Processors, GC22-7069.*

For planning the layout of the service area, use *IBM Physical Planning Template: Field Engineering Furniture and Test Equipment, GX22-6925.*

The following terms are defined as they are used in this publication. If you do not find the term you are looking for, see the *IBM Data Processing Glossary*.

A

A. Ampere.

AG. Americas Group

A/PG. Asian/Pacific Group

ASHRAE. American Society of Heating, Refrigeration and Air Conditioning Engineers.

AT&T. American Telephone & Telegraph Co..

AWG. American wire gauge.

B

BNC. Burndy connector.

bpi. Bits per inch.

bps. Bits per second.

BSC. Binary synchronous control.

BTU. British thermal unit. The amount of heat required to raise the temperature of one pound of water one degree Fahrenheit.

C

C. Degree Celsius.

CBS. Automatic operation coupler.

CCITT. Consultant Committee of International Telephone & Telegraph (World Trade).

CDT. Manual operation coupler.

cfm. Cubic feet per minute.

CSA. Canadian Standards Association

D

DAA. Data access arrangement.

DASD. Direct access storage device.

DRC. Data recording control.

DTE. Data terminal equipment.

E

E/ME/A. Europe/Middle East/Africa.

EBCDIC. Extended binary-coded decimal interchange code.

EIA. Electronic Industries Association (or applicable local or national equivalent).

EMC. Electromagnetic compatibility.

EMEA. Europe/Middle East/Africa.

ESD. Electrostatic discharge.

F

°F. Degree Fahrenheit.

FC. Feature code.

FCC. Federal Communications Commission.

ft. Feet.

Footcandle. Unit used to measure the intensity of light. (see lux)

H

HDLC. High-level data link control.

Hz. Hertz.

I

ICA. Integrated communications adapter.

ID. Identification.

IM-PP. Installation Manual-Physical Planning.

in. Inch.

I/O. Input/output.

IOA. Input/output adapter.

IOE. Input/output extension.

K

k. Kilo- (1000).

K. 1024 (2^{10}).

kb. Kilobyte.

kbps. Kilobytes per second.

kg. Kilogram.

kg/m². Kilograms per square meter.

kVA. Kilovolt ampere.

kW. Kilowatt.

L

LA. Line adapter.

lb. Pound.

lumen. The unit of quantity of light.

lux. Lumens per square meter. One lumen falling on an area of one square foot produces an illumination of one footcandle.

M

max. Maximum.

m³/min. Cubic meter per minute.

mm. Millimeter.

modem. Modulator/demodulator (a device that modulates and demodulates signals transmitted over communication facilities).

ms. Millisecond.

N

NEC. National Electrical Code.

NEMA. National Electrical Manufacturers' Association (or applicable local or national equivalent).

newton meter (N-m). The amount of force applied at right angles to a moment arm.

NFPA. National Fire Protection Association (or applicable local or national equivalent).

NTT. Nippon Telephone and Telegraph.

O

OD. Outside diameter.

OEM. Original equipment manufacturer.

oersted. Centimeter-gram-second electromagnetic unit of magnetizing force (A.c.m 1.256 oersteds).

P

PC. Personal computer.

PCC. Power Control Compartment.

psi. pounds per square inch

PTT. Postal Telephone and Telegraph.

R

R & S. Russell & Stoll.

RF. Radio frequency.

Rel. Relative (relative humidity).

REN. Ringer equivalency number.

rfi. Radio-frequency interference.

S

SDA. Synchronous data adapter.

SDLC. Synchronous data link control.

service clearance. Minimum space required to allow working room for the operator and the service representative.

T

TTY. Teletype.

TP. Teleprocessing.

U

UK. United Kingdom.

UL. Underwriters Laboratory.

USOC. Universal Service Order Code.

V

V. Volt.

W

W. Watt.

WT. IBM World Trade.

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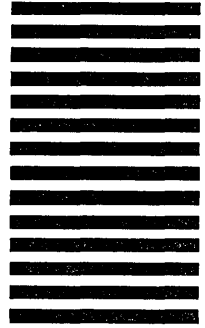
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