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Remove	Insert	Page Numbers	# of Sheets	General contents of manual described and changes (if any) listed
★	★	All	19	<p>This manual contains the information included in a traditional site planning manual including the information necessary for planning and preparing a site. It includes information on power and cooling requirements, wiring requirements, and preparation checklists.</p> <p>This revision incorporates the latest list of peripherals, controllers, and interfaces available for a CRAY Y-MP EL or CRAY EL98 system.</p>



**Preparing Your Site for a
CRAY Y-MPEL™ or CRAY EL98™
Installation**

HR-04026-0B

Cray Research, Inc.

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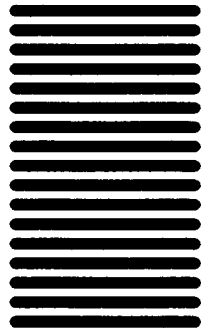


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Each time this manual is fully revised and reprinted, all change packets to the previous version are incorporated into the new version, and the new version is assigned an alphabetical revision level, which is indicated in the publication number on each page of the manual. A revised manual does not usually contain change bars.

REVISION	DESCRIPTION
	February 1992. Original printing. This manual contains the information included in a traditional site planning manual.
A	March 1993. Revision. This revision incorporates the addition of the CRAY EL98 system to the CRAY Y-MP EL product line. Additional Remote Support site planning information has also been added.
B	July 1994. Revision. This revision adds information on network connectivity and updates Table 3-7 with power and cooling requirements of additional peripheral equipment.



PREFACE

Preparing Your Site for a CRAY Y-MP EL or CRAY EL98 Installation contains the technical information necessary to plan and prepare a site for the installation of a CRAY Y-MP EL or CRAY EL98 system. The CRAY EL98 and the CRAY Y-MP EL systems have identical cabinet specifications; therefore, all site planning considerations will be identical for both systems. This manual is intended for management and personnel responsible for the site preparation process.

This manual provides information about the site planning and preparation process and the operational requirements for the system. It also includes configuration information, electrical requirements, power consumption information, environmental requirements, and remote support information.

Cray Research site planning representatives are available for consultation regarding site planning and preparation. Site planning representatives can be reached at 1-800-284-2729 extension 62820.



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1 SYSTEM DESCRIPTION

The CRAY Y-MP EL minisupercomputer system offers potential supercomputer users an opportunity to enter the Cray Research supercomputer environment with a low-cost, reliable, and easily installed computer system. The CRAY EL98 system is an enhanced version of the CRAY Y-MP EL system and offers 2, 4, 6, or 8 enhanced CPUs. The CRAY Y-MP EL and CRAY EL98 systems have identical cabinet specifications; therefore, CRAY EL98 site planning considerations are the same as those for the CRAY Y-MP EL system. Refer to Figure 1-1 for an illustration of the CRAY Y-MP EL and CRAY EL98 mainframe cabinets and their various cabinet options.

The CRAY Y-MP EL and EL98 systems are designed to meet the needs of a diverse group of minisupercomputer users. The systems are air cooled, have low power and cooling requirements, and are compact enough to fit where previous Cray Research supercomputers could not be installed.

Both systems are fully code-compatible with the CRAY Y-MP computer system; therefore, most software applications available for Cray Research supercomputers can run on the CRAY Y-MP EL and EL98 systems.

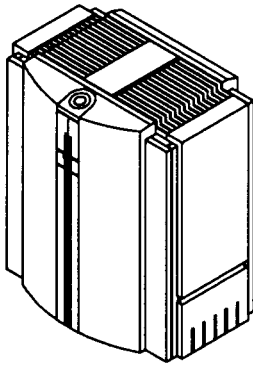
A system console, a NetBlazer dial-up router, a modem, and an optional maintenance workstation model EL (MWS-EL) need to be considered when planning your site location. Refer to Section 3, "System Requirements," for a discussion of this equipment. Refer to Section 2, "Site Requirements," for remote support information.

System Cabinets

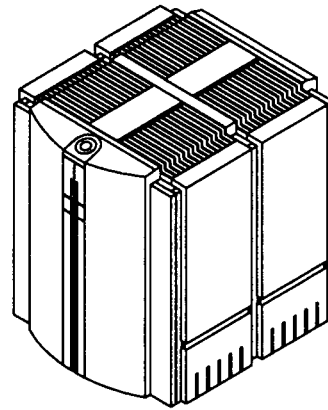
The CRAY Y-MP EL or EL98 mainframe cabinet is a stand-alone system that can be upgraded by attaching one, two, or three peripheral cabinets as shown in Figure 1-1. Additional central processing units (CPUs) and memory can also be added in the mainframe cabinet.

A peripheral cabinet contains additional input/output subsystems (IOSs) and optional peripheral devices. Refer to Table 3-7 for a list of optional peripheral devices.

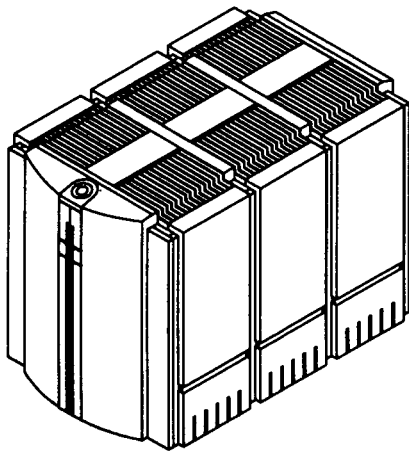
Additional floor space should be provided in front of the mainframe cabinet if additional cabinets for an upgrade are requested.



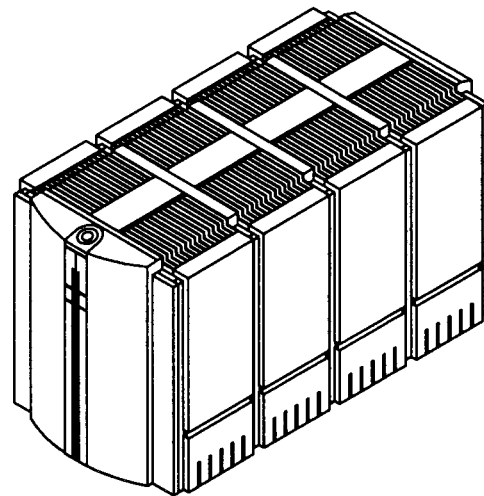
CRAY Y-MP EL or CRAY EL98
Mainframe Cabinet



CRAY Y-MP EL or CRAY EL98 Mainframe
Cabinet with One Peripheral Cabinet



CRAY Y-MP EL or CRAY EL98 Mainframe
Cabinet with Two Peripheral Cabinets



CRAY Y-MP EL or CRAY EL98 Mainframe
Cabinet with Three Peripheral Cabinets

A-10589

Figure 1-1. CRAY Y-MP EL and CRAY EL98 Mainframe and Peripheral Cabinets

2 SITE REQUIREMENTS

Cray Research recommends that the customer follow suggested site planning and preparation guidelines to ensure the successful installation of the CRAY Y-MP EL and EL98 systems. This section provides the guidelines for preparing a typical site for a system installation.

Effective Site Planning

The Cray Research account manager and the customer discuss site planning, preparation, and installation suggestions. The information provided in this section will help the customer determine where the system can be installed. Floor layouts can also be very useful in determining the amount of space needed for the computer system. This section also contains the facility requirements such as operating environment specifications, building requirements, electrical requirements, and Remote Support requirements.

The following list contains guidelines for planning a system installation:

- Identify the space, power, and environmental conditions required for the system.
- Select a location for the system and identify modifications that need to be made, if any.
- Prepare the site according to guidelines provided in this publication.

Site Access

Proper site preparation helps ensure successful delivery and installation of your computer system. Section 3, "System Requirements," contains information on the weight and dimensions of the CRAY Y-MP EL and CRAY EL98 systems. Refer to Section 3 if you have dimension and weight-related questions regarding the following site access requirements. Ensure that your building meets Cray Research requirements for the following areas:

- Loading dock. If your existing loading dock meets height or ramp requirements for a standard freight carrier truck, you may use a pallet jack for system unloading; if not, you need to provide a forklift or other means to unload the computer system equipment. The forklift must be able to accommodate the weight of the CRAY Y-MP EL system in its shipping crate. *A pallet jack is required to move the shipping crate to the system location.*
- Computer room equipment access route (including the elevator). Refer to Figure 3-2 for shipping crate dimensions. Cray Research recommends that you leave the system in its shipping crate until it reaches its final destination. If the crate does not fit through the planned access route, partial disassembly may be required. The entire access route to your computer room should meet the following specific requirements:
 - Minimum elevator capacity: 1,600 lbs (726 kg)
 - Minimum door height: 74.00 in. (188 cm)
 - Minimum hallway and door width: 36.00 in. (91 cm)
 - Maximum incline: One unit of height for every six units of length (10 degrees)

The following list provides the system width specifications that you should consider when planning your door access requirements.

- System in shipping crate: 35.00 in. (89 cm)
- System unpackaged with panels: 32.75 in. (83 cm)
- System without panels and control panel: 28.00 in. (71 cm)

The front and back panels can be lifted off by releasing a bottom latch located on the lower left- and right-hand corners.

Environment

You must provide a suitable environment for your CRAY Y-MP EL or CRAY EL98 system. Cray Research designs environmental resilience into system hardware; however, your facility must be properly planned and prepared to facilitate uninterrupted operation of your system.

The design of your environmental control system (such as computer room air-conditioning units) must ensure that inlet air to the system meets the requirements specified in this section. The CRAY Y-MP EL system requires an environment controlled within the ranges shown in Table 2-1. The amount of air conditioning required depends on your configuration. Refer to Section 3, Table 3-7, for information used in calculating the air-conditioning requirements.

If, on arrival at your site, the CRAY Y-MP EL system is significantly colder [more than 40 °F (22 °C) colder] than the environment in which it is to be installed, leave the system in its shipping crate for 24 hours to prevent thermal shock and condensation from occurring.

Table 2-1. Environmental Requirements for CRAY Y-MP EL and EL98 Systems

Environmental Factor	Temperature Range Requirements	Relative Humidity Range Requirements
Operating	55 °F to 85 °F (13 °C to 29 °C) 70 °F (21 °C) preferred	20% to 80% 35% to 65% preferred
Nonoperating	34 °F to 120 °F (1 °C to 49 °C) (temperature changes must not result in condensation)	20% to 80%
Shipping	-40 °F to 140 °F (-40 °C to 60 °C)	5% to 95%
Storage†	34 °F to 120 °F (1 °C to 49 °C)	10% to 80%

† Cray Research assumes that the system is stored in its crate.

Facility Electricity

Cray Research makes every effort to minimize the effects of power failures and interruptions to the hardware. However, if the computer equipment is subjected to repeated power interruptions and fluctuations, it is susceptible to a higher component failure rate than it would be with a stable power source. Cray Research encourages you to provide a stable power source, such as an uninterruptable power system, to reduce the possibility of component failures.

Table 2-2 lists the electrical specifications for a single CRAY Y-MP EL or CRAY EL98 cabinet. Table 2-3 through Table 2-6 list the electrical specifications for the maintenance workstation model EL (MWS-EL), system console, modem, and NetBlazer dial-up router, respectively.

NOTE: Each mainframe cabinet and peripheral cabinet requires its own customer-supplied circuit breaker and receptacles.

An International Electrotechnical Commission 309 (IEC 309) plug, supplied by Cray Research, connects power to the system. The MWS-EL requires two customer-supplied receptacles. The system console, NetBlazer router, and modem each require a customer-supplied receptacle.

If you have difficulty supplying these receptacles, contact your Cray Research account manager. All wiring should conform to local and national codes.

Table 2-2. CRAY Y-MP EL and EL98 Electrical Specifications (Single Cabinet)

Electrical Service	Specification
Voltage	200 to 240 Vac, single-phase
Frequency	50 or 60 Hz
Circuit	30-amp circuit breaker
Power consumption	Refer to Table 3-7
Receptacle: North America/Japan	IEC 309, single-phase, 30-amp Hubbell #330C6W or equivalent
International	IEC 309, single-phase, 32-amp Hubbell #332C6W or equivalent

Table 2-3. MWS-EL Electrical Specifications

Electrical Service	Specification
Voltage	100 to 120 or 200 to 240 Vac
Frequency	50 or 60 Hz
Circuit	15-amp circuit
Power consumption	Refer to Table 3-7
Receptacle: North America/Japan	NEMA #5-15R or equivalent (two required)
International	IEC 309, single phase, 16 amp (two required)

Table 2-4. System Console Electrical Specifications

Electrical Service	Specification
Voltage	100 to 120 or 200 to 240 Vac
Frequency	50 or 60 Hz
Circuit	15-amp circuit
Power consumption	Refer to Table 3-7
Receptacle: North America/Japan International	NEMA #5-15R or equivalent IEC 309, single phase, 16 amp

Table 2-5. Modem Electrical Specifications

Electrical Service	Specification
Voltage: North American International	90 to 110 Vac 198 to 254 Vac
Frequency	50 or 60 Hz
Circuit	15-amp circuit
Power consumption	Refer to Table 3-7
Receptacle: North America/Japan International	NEMA #5-15R or equivalent IEC 309, single phase, 16 amp

Table 2-6. NetBlazer Electrical Specifications

Electrical Service	Specification
Voltage	100 to 120 or 200 to 240 Vac
Frequency	50 or 60 Hz
Circuit	15-amp circuit
Power consumption	Refer to Table 3-7
Receptacle: North America/Japan International	NEMA #5-15R or equivalent IEC 309, single phase, 16 amp

Remote Maintenance

Cray Research systems support personnel use a modem data communication link to administrate, troubleshoot, and maintain Cray Research computer systems.

If site security regulations permit the use of a modem, contact the local telephone company well in advance of system delivery to arrange for installation of the appropriate telephone line. You must install a public-switched communication line: telephone, X.25 pad, or ISDN terminal adapter. Data telephone lines should be separate, outside telephone lines. Cray Research recommends that you also install a voice telephone for general use.

Cray Research supplies the Microcom QX Series of Protocol modems, model QX/4232*bis*, for systems located in the United States and Canada. For system installations outside of the United States and Canada, contact your account manager for the modem type and telephone line requirements.

Cray Research also supplies the Telebit NetBlazer dial-up router, which is used in conjunction with the Microcom modem to provide Transmission Control Protocol/Internet Protocol (TCP/IP) dial-up access to the Cray Research Area Service Centers. Position the NetBlazer dial-up router next to the MWS-EL.

Prior to shipment, a network request form must be filled out by your local service representative. A registered Internet address will then be assigned by a remote support network administrator. Remote support administrators and Cray Research service personnel install and configure the appropriate software on the MWS-EL.

Raised-floor Installations

CRAY Y-MP EL and EL98 systems are often installed on a raised-floor system. A raised-floor system provides a convenient way to duct cooling air and to route power and communication cabling. If you have any questions concerning structural capabilities of any floor, contact a qualified structural engineer.

If you plan to install your system on a raised floor, ensure that proper cooling is available to the system. Refer to Table 3-7. A minimum raised-floor height of 12 in. (30 cm) is recommended for proper airflow. Perforated floor panels or floor grills should be located near the base of the system but not directly under it. Figure 2-1 shows the floor cutout for cables and the recommended locations for perforated floor panels or floor grills. Although a 5-in. (13-cm) square hole is shown, you may substitute a 6-in. (15-cm) diameter cutout.

When installing a CRAY Y-MP EL or EL98 system, ensure that heated air discharged from other equipment does not discharge toward the base of the system. The air intake is located on the bottom of the system and overheating could occur. Heated air from the CRAY Y-MP EL or EL98 system is discharged from the top of the system.

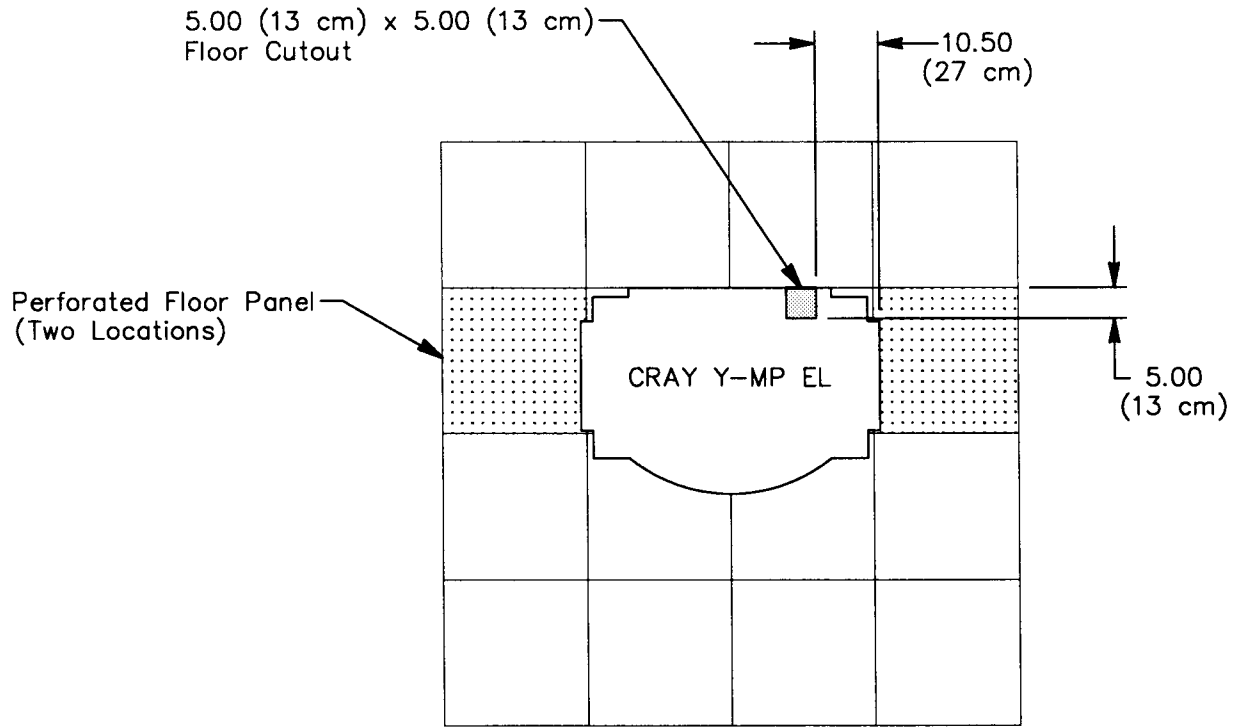
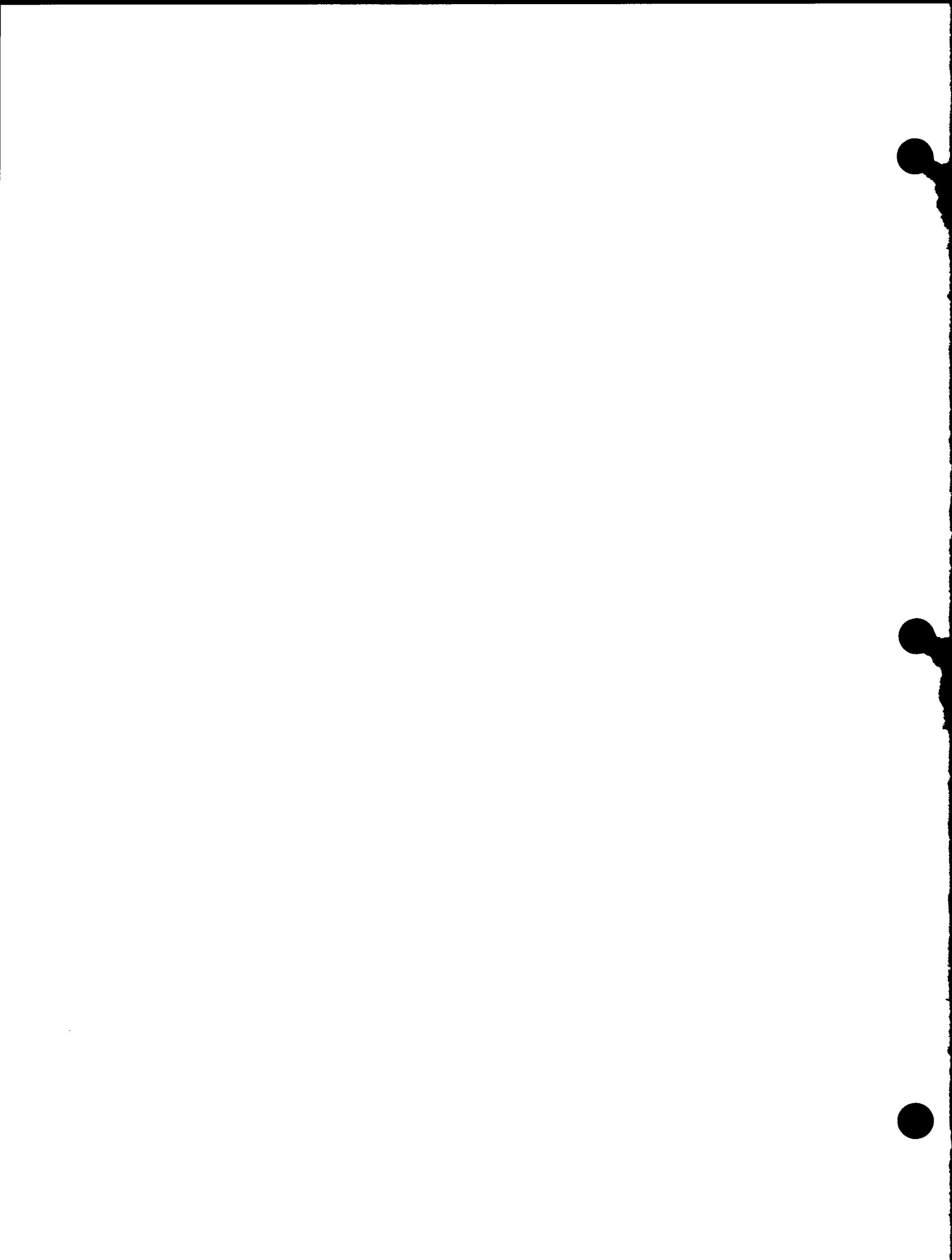


Figure 2-1. CRAY Y-MP EL or EL98 Floor Cutout Diagram



3 SYSTEM REQUIREMENTS

Cray Research recommends that you follow suggested site planning and preparation guidelines to prepare for the successful installation of your CRAY Y-MP EL or CRAY EL98 system. This section provides system requirements for planning the floor layout and preparing for the installation.

Mainframe and Peripheral Cabinet Specifications

Use a floor layout of the proposed system location to determine the exact area required for the mainframe cabinet, possible peripheral cabinets, MWS-EL, and system console, as well as for service access. Table 3-1 contains specific access requirements. Unless otherwise indicated, the specifications are for each cabinet. The maintenance access requirements are for single- or multiple-cabinet systems.

The computer room floor must be able to support the weight of the system cabinets. Each cabinet rests on four casters that concentrate the weight of the cabinet on a small surface area. Refer to Table 3-1 for cabinet specifications. Figure 3-1 is an orthographic drawing of the CRAY Y-MP EL or CRAY EL98 mainframe. Figure 3-2 is an orthographic drawing of the shipping crate. Each cabinet requires its own shipping crate.

Table 3-1. CRAY Y-MP EL and CRAY EL98 System Chassis Specifications

Characteristics	Mainframe and Peripheral Cabinet Specifications
Height	57.50 in. (146 cm)
Width	50.00 in. (127 cm)
Depth:	
Mainframe cabinet	32.75 in. (83 cm)
Peripheral cabinet	22.50 in. (57 cm)
Weight (maximum)	1,400 lbs (635 kg)
Maintenance access requirements:	
Rear	12.00 in. (30 cm)
Sides	32.00 in. (81 cm)
Front	36.00 in. (91 cm)
Shipping size:	
Height	65.00 in. (165 cm)
Width	35.00 in. (89 cm)
Depth	54.00 in. (137 cm)
Shipping weight (maximum)	1,600 lbs (726 kg)
Power cable	8-ft (2.4-m) plug-compatible drop cord

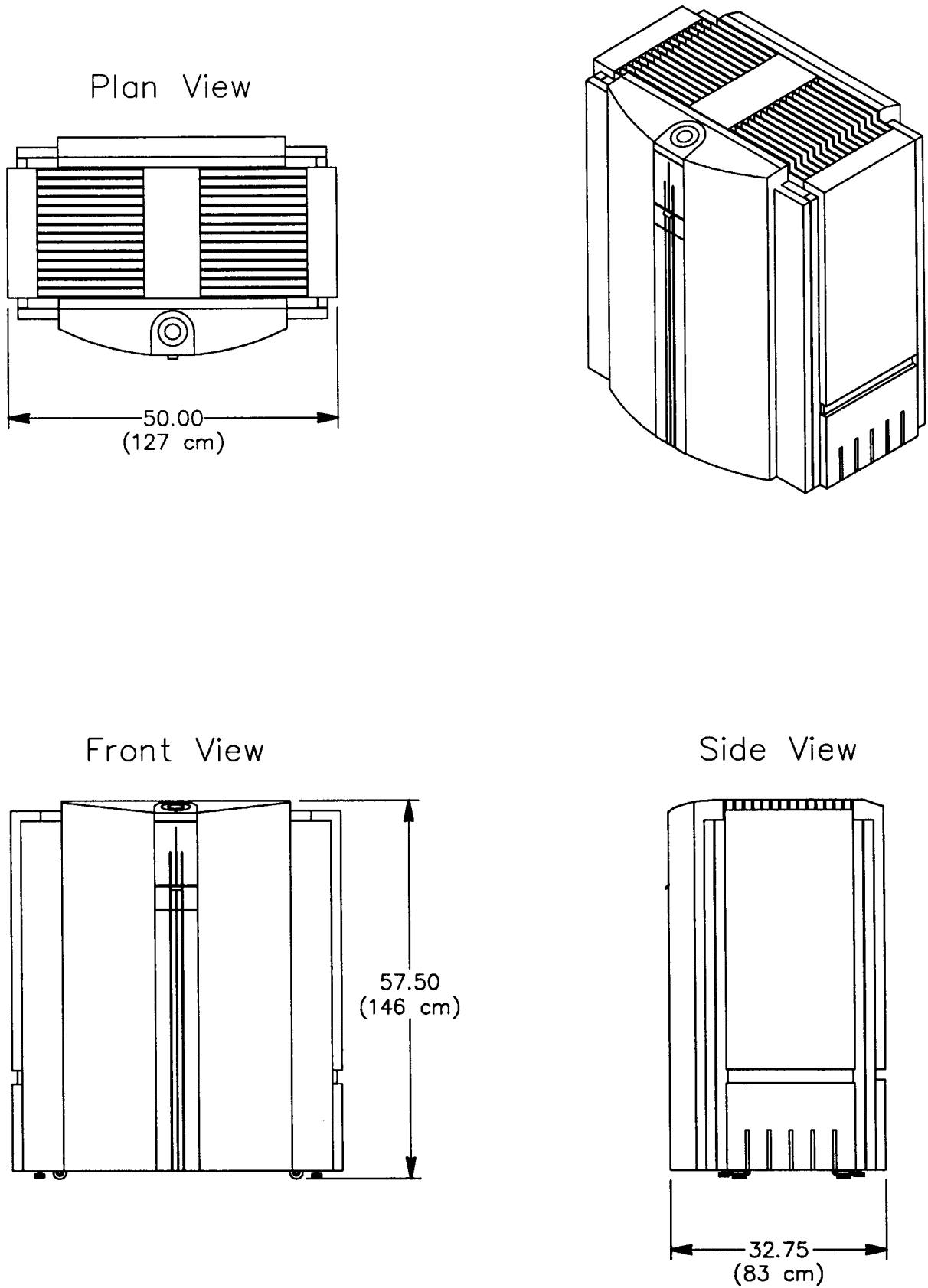


Figure 3-1. CRAY Y-MP EL or CRAY EL98 Mainframe

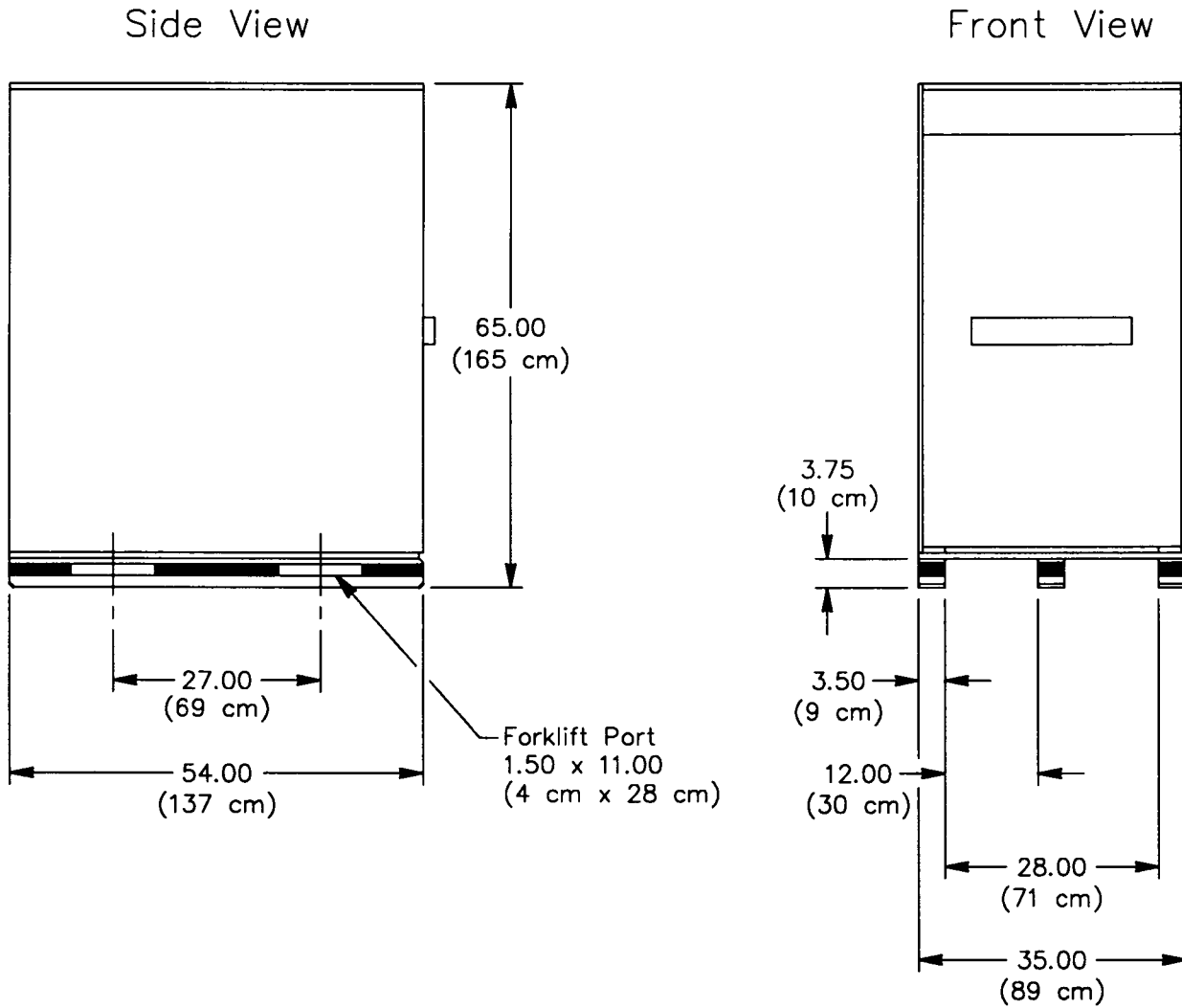


Figure 3-2. CRAY Y-MP EL or CRAY EL98 Shipping Crate

System Console

The system console is used by system operators. Refer to Table 2-4 for system console electrical specifications and receptacle model numbers.

The system console must be located within 45 ft (13.7 m) of the CRAY Y-MP EL system to connect with the 50-ft (15.2-m) RS-232 data cable supplied by Cray Research.

The customer must supply a chair and table (or equivalent) for the system console and system operator.

Table 3-2 provides additional specifications for the system console. Refer to Figure 3-3 for an illustration of the system console.

Table 3-2. System Console Specifications

Characteristic	Specification
Height	13.50 in. (34 cm)
Width	17.25 in. (44 cm)
Depth	22.00 in. (56 cm)
Weight	20 lbs (9.1 kg)
Power cable	8-ft (2.4-m) plug-compatible drop cord
Power receptacle: North America/Japan International	NEMA #5-15R or equivalent IEC 309, single phase, 16 amp

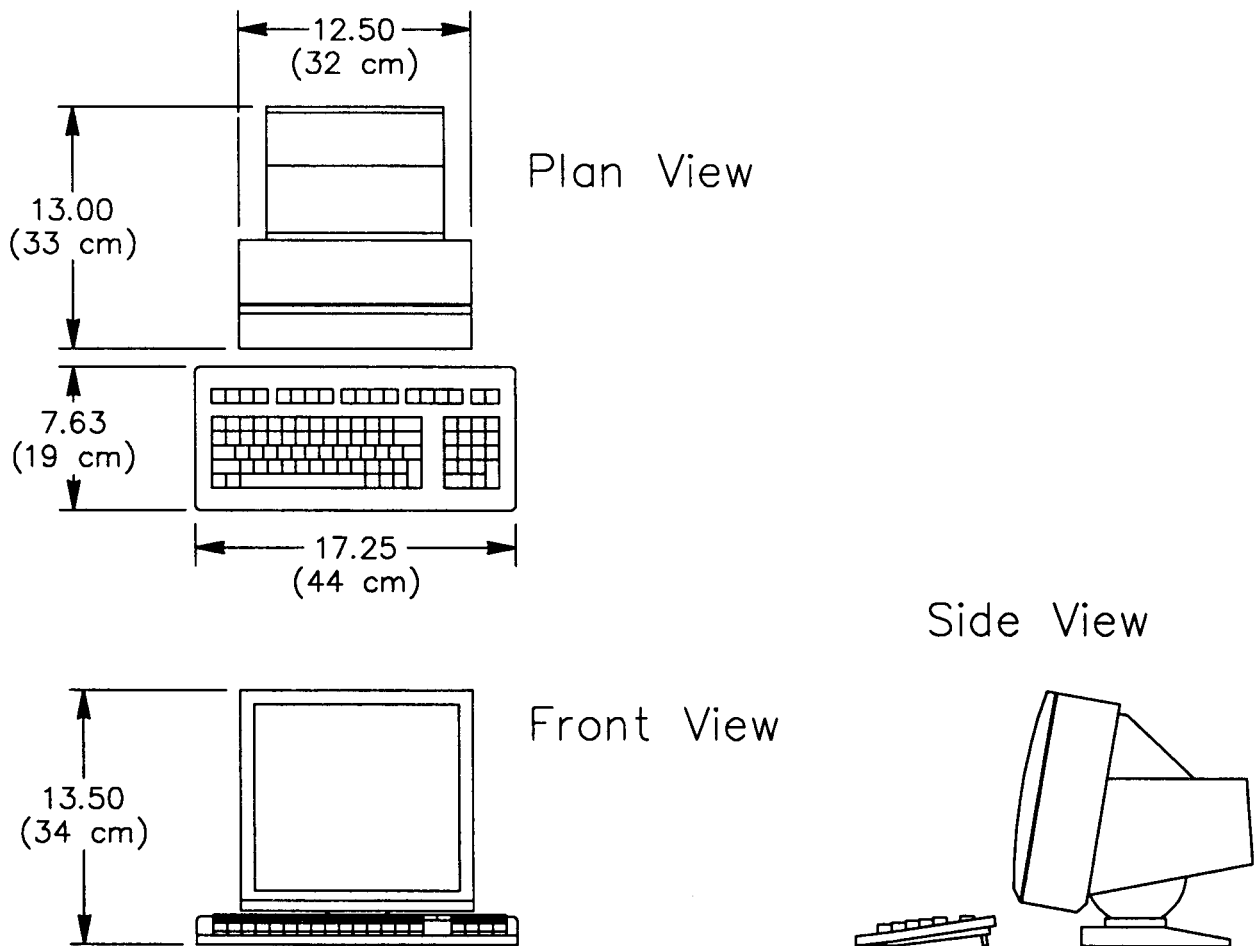


Figure 3-3. System Console

Maintenance Platform

Cray Research uses a NetBlazer dial-up router and modem for remote hardware maintenance, remote system operation, and remote system monitoring. The maintenance platform options consist of either the NetBlazer dial-up router (refer to Figure 3-4) and modem, or the MWS-EL assembly which includes a NetBlazer router and modem. The MWS-EL (refer to Figure 3-5) is not shipped as part of the CRAY EL98 or CRAY Y-MP EL unless specifically ordered. The voltage selection is automatically set by the power supply for the MWS-EL.

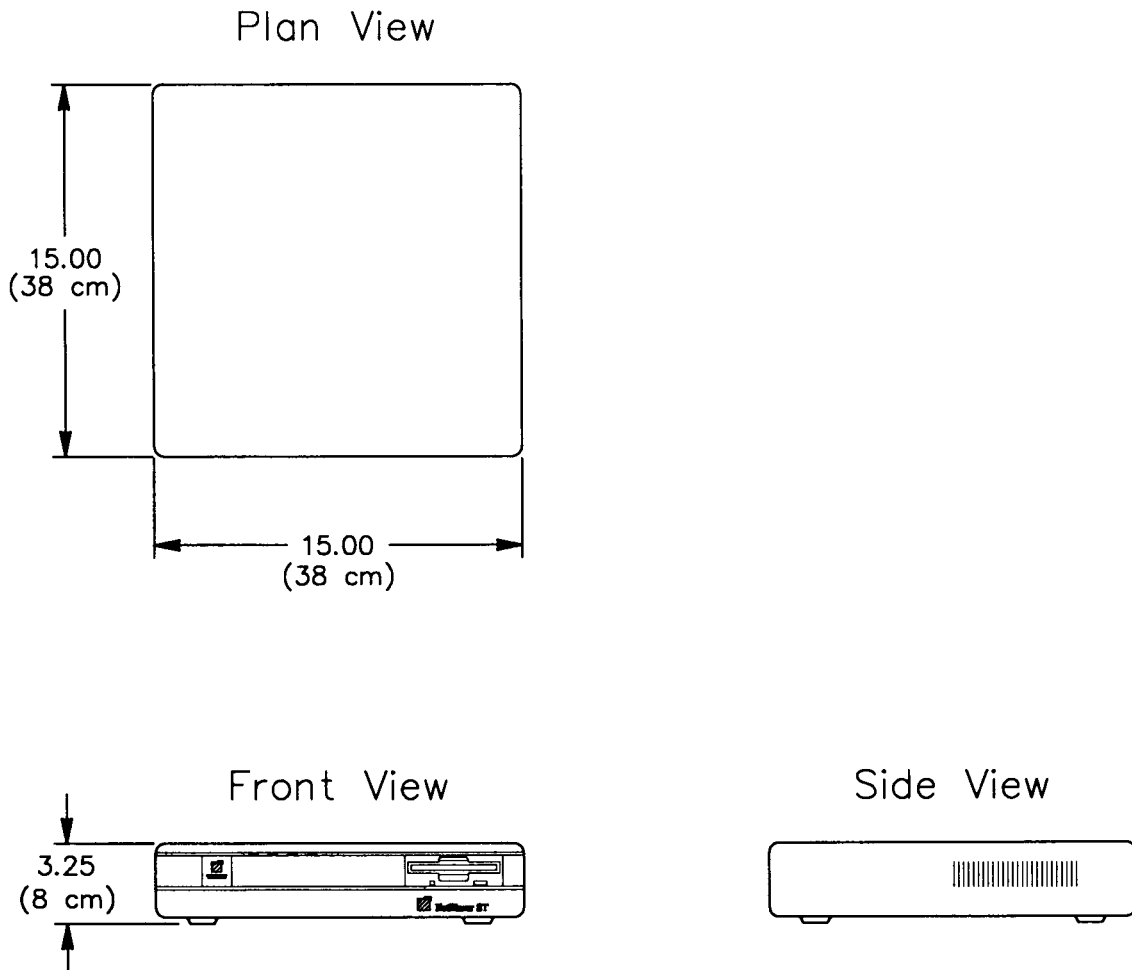


Figure 3-4. NetBlazer Dial-up Router

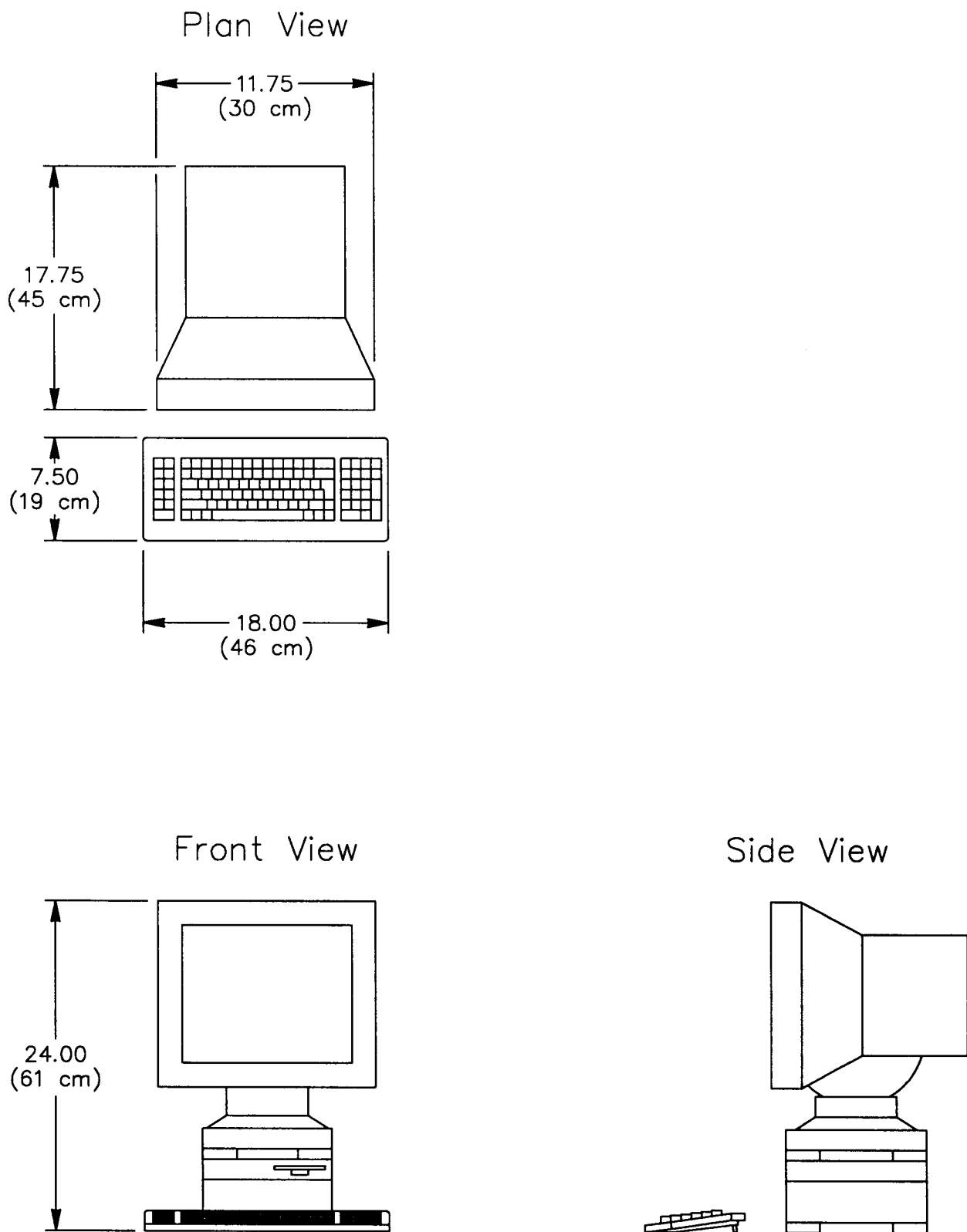


Figure 3-5. MWS-EL

The MWS-EL must be located within 45 ft (13.7 m) of the CRAY Y-MP EL system to connect with the 50-ft (15.2-m) RS-422 shielded data cable supplied by Cray Research.

Cray Research also supplies the Ethernet and HYPERchannel cables. The NetBlazer option contains two Ethernet cards that Cray Research supplies. The customer must supply a table and chair (or equivalent) for the MWS-EL.

Refer to Table 3-3 for MWS-EL electrical specifications and manufacturers' model numbers for the receptacles. Table 3-4 contains the NetBlazer specifications.

Table 3-3. MWS-EL Specifications

Characteristic	Specification
Height	24.00 in. (61 cm)
Width	18.00 in. (46 cm)
Depth	26.00 in. (66 cm)
Weight	50 lbs (22.5 kg)
Power cable	8-ft (2.4-m) plug-compatible drop cord
Power receptacle: North America/Japan International	NEMA #5-15R or equivalent - two required IEC 309, single phase, 16 amp - two required

Table 3-4. NetBlazer Specifications

Characteristic	Specification
Height	3.25 in. (8 cm)
Width	15.00 in. (38 cm)
Depth	15.00 in. (38 cm)
Weight	14 lbs. (6 kg)
Power cable	8-ft (2.4-m) plug-compatible drop cord
Power receptacle: North America/Japan International	NEMA #5-15R or equivalent IEC 309, single phase, 16 amp

Telephone company representatives might request information about modem requirements. Table 3-5 provides the modem requirements, and Table 3-6 provides the modem specifications.

Table 3-5. Modem Requirements

Option	Specification
FCC registration number	CLB772-10785-MD-E
Transmission rate	V.32/V.42bis (9,600 bps)
Telephone	Standard, with a voice grade line
Telephone jack type	RJ11C
Touch tone/rotary dial	Touch tone preferred
Ringer equivalence	1.6 Bd
External/internal clock	Internal
Grounding	Chassis ground to signal ground
Transmit level	Up to 38.4 Kbps
Private/dial-up line	Dial-up line
Receive long space disconnect	Disabled
Transmit long space disconnect	Disabled
Data terminal ready disconnect	Enabled
Carrier fail disconnect	Enabled
Auto-answer/manual-answer	Auto-answer
Make busy in analog loopback	Disabled
Permanent/DTR controlled auto-answer	DTR controlled auto-answer
Synchronous/asynchronous	Asynchronous
9-bit/10-bit/11-bit character	10-bit character

Table 3-6. Modem Specifications

Characteristic	Specification
Height	1.80 in. (5 cm)
Width	6.50 in. (17 cm)
Depth	10.70 in. (27 cm)
Weight	2 lbs. (907 g)
Power cable	6-ft (1.8-m) plug-compatible drop cord
Power receptacle: North America/Japan International	NEMA #5-15R or equivalent IEC 309, single phase, 16 amp

Network Connectivity

Each CRAY Y-MP EL and CRAY EL98 system has a standard Ethernet attachment unit interface (AUI) bulkhead connector and an AUI extension cable, which is shipped with each system. You must provide an Ethernet transceiver to match your network hardware protocol to the computer system. The transceiver must support IEEE 802.3 and Ethernet version 2.0 specifications and use the signal quality error (SQE) heartbeat feature.

Equipment Power Consumption and Air Conditioning

Table 3-7 lists power requirements for CRAY Y-MP EL and CRAY EL98 equipment. Once your configuration is determined, use this table to calculate your total system power consumption in kilovolt-amperes (kVA) and the total air conditioning required (kBtu/hr) for the system.

Table 3-7. System Equipment Power Consumption and Air-conditioning Requirements

Device	Quantity	Electrical Requirements		Air-conditioning Requirements	
		kVA per unit	kVA Total	kBtu/hr per unit	kBtu/hr Total
Mainframe cabinet	1	0.42	0.42	0.85	0.85
Peripheral cabinet (PC-2, PC-3, PC-4)		0.42		0.85	
CPU: CRAY Y-MP EL system		0.15		0.50	
CRAY EL98 system		0.16		0.54	
Memory (regardless of configuration)	4	0.39	1.55	1.31	5.23
IOS		0.17		0.56	
Ethernet interface (EI-1)		0.06		0.18	
HYPERchannel interface (HC-1)		0.06		0.18	
Fiber-optic distributed data interface (FI-2)		0.06		0.18	
Disk controller-4 (DC-4)		0.06		0.18	
Disk controller-5 (DC-5)		0.06		0.18	
Disk drive-4 (DD-4)		0.15		0.50	
Small computer system interface-2 (SI-2)		0.06		0.18	
Small computer system interface-3 (SI-3)		0.06		0.18	
Small computer system interface-2X (SI-2X)		0.06		0.18	
Small computer system interface-3X (SI-3X)		0.06		0.18	
Disk subsystem-IPI (DDI-10)		0.31		1.06	
Disk subsystem-SCSI (DDS-10)		0.28		0.96	
Removable disk-1 (RD-1)		0.17		0.56	
Removable disk-2 (RD-2)		0.04		0.12	
EXABYTE tape drive (EX-2)		0.03		0.07	
Tape controller (TC-2)		0.06		0.18	
Tape drive-2 (TD-2)		0.27		0.92	
Tape drive-3 (TD-3)		0.40		1.36	
Tape drive-DAT 4-mm (DS-3)		0.01		0.03	
Peripheral expansion trays (PE-3, 4, 5)	no power consumed - power rating included with disk drives				
Maintenance workstation (MWS-EL)		0.55		1.23	
NetBlazer ST		0.10		0.34	
Modem		0.02		0.03	
System console		0.08		0.26	
		System Total (kVA)		System Total (kBtu/hr)	
		<input type="text"/>		<input type="text"/>	



4 CHECKLISTS

Refer to Table 4-1 and Table 4-2 for site planning and site preparation checklists. These checklists are intended to be used as guidelines; your site might have additional preparation issues that are not included in these checklists. Refer to these checklists 6 to 8 weeks before the shipment of your system.

Table 4-1. Site Planning Checklist

Yes	No	Site Planning Checklist	Comments
		Has the system location been established?	
		Has an access route to the system location been identified for system installation?	
		Has the floor layout been completed?	
		Does the proposed location meet the guidelines for maintenance access?	
		At what voltage will the mainframe and peripheral cabinets be operated? _____	
		At what voltage will the system console and the MWS-EL be operated? _____	
		Have the power receptacles been ordered?	
		Has an installation date been determined? Installation date: _____	
		Have administrators and operators been enrolled in the necessary Cray Research training courses?	
		Have cable length requirements been met?	
		Are elevator and elevator door dimensions adequate (if applicable)?	
		Is elevator weight capacity adequate (if applicable)?	
		Are ramp dimensions adequate (if applicable)?	
		Is additional fire suppression equipment required?	
		Has the method of unloading the system been determined (equipment and/or personnel)?	

Table 4-2. Site Preparation Checklist

Yes	No	Site Preparation Checklist	Comments
		Is the path from the unloading area to the system location clear?	
		Does the path satisfy the access requirements as outlined in Section 2?	
		Are the receptacles for the system, system console, and MWS installed and positioned to satisfy the power circuit requirements?	
		Are circuit breaker panels and receptacles properly installed? Are they labeled?	
		Does the computer environment meet the Cray Research specifications for temperature and humidity listed in Section 2?	
		Can the computer environment specifications be maintained satisfactorily?	
		Have air handlers been tested?	
		Are the air handlers and air filters clean?	
		Are dedicated telephone lines for remote maintenance installed at the correct location?	
		Have system administrators received the necessary administration training?	
		Have system operators received the necessary operations training?	







