



**INSTALLATION AND SERVICE
MANUAL**

HP 1000 COMPUTER SYSTEM

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MODELS COVERED

This manual covers models 20, 21, 30, 31, 80, and 81 of the
HP 1000 Computer System.

LIST OF EFFECTIVE PAGES

Changed pages are identified by a change number adjacent to the page number. Changed information is indicated by a vertical line in the outer margin of the page. Original pages do not include a change number and are indicated as change number 0 on this page. Insert latest changed pages and destroy superseded pages.

Change 0 (Original) MAR 1977

All pages in this edition are original.

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SAFETY CONSIDERATIONS

KEEP WITH MANUAL

GENERAL - This product and related documentation must be reviewed for familiarization with safety markings and instructions before operation.

SAFETY SYMBOLS



Instruction manual symbol: the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual in order to protect the product against damage.



Indicates hazardous voltages.



Indicates earth (ground) terminal (sometimes used in manual to indicate circuit common connected to grounded chassis).

WARNING

The **WARNING** sign denotes a hazard. It calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in injury. Do not proceed beyond a **WARNING** sign until the indicated conditions are fully understood and met.

CAUTION

The **CAUTION** sign denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product. Do not proceed beyond a **CAUTION** sign until the indicated conditions are fully understood and met.

SAFETY EARTH GROUND - This is a safety class I product and is provided with a protective earthing terminal. An uninterruptible safety earth ground must be provided from the main power source to the product input wiring terminals, power cord, or supplied power cord set. Whenever it is likely that the protection has been impaired, the product must be made inoperative and be secured against any unintended operation.

BEFORE APPLYING POWER - Verify that the product is configured to match the available main power source per the input power configuration instructions provided in this manual.

If this product is to be energized via an auto-transformer (for voltage reduction) make sure the common terminal is connected to the earth terminal of the main power source.

SERVICING

WARNING

Any servicing, adjustment, maintenance, or repair of this product must be performed only by qualified personnel.

Adjustments described in this manual may be performed with power supplied to the product while protective covers are removed. Energy available at many points may, if contacted, result in personal injury.

Capacitors inside this product may still be charged even when disconnected from its power source.

To avoid a fire hazard, only fuses with the required current rating and of the specified type (normal blow, time delay, etc.) are to be used for replacement.

1-1. INTRODUCTION

This manual describes the installation activities and provides service information for the HP 1000 Computer System. The system models covered in this manual are shown in figure 1-1.

This section provides the unpacking, installation, and checkout instructions required for the HP 1000 Computer System. Installation of the system must be performed by Hewlett-Packard Customer Engineers who have been trained in the handling and operation of Hewlett-Packard systems.

On-site installation and checkout of the HP 1000 Computer System (together with the accessories that comprise the complete system) are performed by a Hewlett-Packard Customer Engineer. This service includes supervision of equipment unpacking, inventory, equipment set-up, turn-on, running diagnostics, and operator training. Software installation and assistance, including system boot-up are also provided. The installation and checkout service does not include uncrating of equipment, equipment positioning, routing of cabling in customer's ducts, adding-on non-HP equipment, or programmer training.

The customer received instructions in the Site Planning and Preparation Guide (part of *Configuration Guide*, part no. 5953-0810) for inspecting the shipment, verifying the packing list, filing claims, and moving the system to the installation site. You can begin by inspecting the site to ensure that the physical and electrical site preparation has been completed. Have the customer correct any deficiencies.

1-2. POWER CABLING

An electrician will be required to install the customer fabricated power cable for all cabinets in 50 Hertz installations and for multi-phase 60 Hertz installations. Make sure that an electrician is available.

1-3. FINDING DOCUMENTS

Before the customer unpacks any hardware items, ask him to open the cartons marked "MANUALS AND ACCESSORIES" and unpack the manuals. Several of the manuals will be required for the installation.

1-4. UNPACKING THE SHIPMENT

The customer may begin unpacking at the installation site, using the Installation Record in the SYSTEM SUPPORT LOG for a detailed inventory of the equipment. Refer to paragraph 1-5 for uncrating cabinets and to paragraph 1-6 unpacking the desk top instructions. The system console and accessories do not have to be removed completely from their cartons until instructed to install them. Some interface PCA's are installed in the computer. These can be inventoried during system cabling. Unpack an item and inspect it for external or internal damage. Look for broken controls, dents, cracks, scratches, breaks, etc. Open all doors or panels to look for damaged or missing parts.

Check all device serial numbers and inspect all software items (magnetic tapes, paper tapes, disc packs, tape cartridges, etc.) for damage. If the visual inspection and inventory reveals damaged or missing items follow the filing claims instructions described in paragraph 1-7.

1-5. UNCRATING CABINETS

Cabinets are shipped in reuseable containers. The uncrating and unpacking instructions are contained in an envelope on the crate. **Do not attempt to lift the cartridge disc assembly by its desk top.**

1-6. UNPACKING THE DESK TOP (Models 20, 30, and 80 only)

The 72-inch desk top for the computer cabinet is shipped in a carton (figure 1-2) that supports the end of the desk top opposite the Leg assembly.

CAUTION

The table top weighs 85 pounds (38.6 kilograms). Installation may be performed by one person if the unpacking procedure described here and in paragraph 1-9 is followed; if not, it is recommended that two persons perform the operation.

- a. Cut open the top of the carton and carefully cut away the sides (figure 1-2 item 1)

Installation

- b. Remove the styrofoam packaging material. Do not unpack further until the remainder of the system components are ready for installation. At that time the desk top may be attached to the HP 29421A computer cabinet, following the instructions given in paragraph 1-9.

1-7. FILING CLAIMS

The customer should report any flaw in the shipment immediately, to the carrier or the carrier's agent and you. Make sure that he saves all crates, cartons, boxes, and packing material for inspection. Don't make any verbal reports of damage or missing items without making a written report also. You, the customer engineer, should report any problem with the shipment or packing list to the responsible product support engineer at the factory. Missing or damaged items will be replaced without waiting for the settlement of claims.

1-8. INSTALLATION PROCEDURES

These instructions pertain to the installation of the HP 1000 Computer System Models shown in figure 1-1. In addition to these instructions, you will need to refer to the appropriate *Installation and Service Manuals* for data regarding installation of accessories supplied in the system.

1-9. HP 29421A DESK-COMPUTER CABINET ASSEMBLY

- a. Remove the packaging support (figure 1-2 item 2) located under the front clamps of the desk top assembly. Raise the top of the desk slightly and slide the packaging support out from under the desk.
- b. Roll the computer cabinet under the desk top with the front of the cabinet under the clamps.
- c. Carefully cut and remove the remainder of the support packaging (3) and lower the desk top onto the cabinet. Exercise care while cutting to avoid scratching the paint on the desk key or cable tray.
- d. Engage the two clamps on the bottom surface of the desk top with the top front crossmember of the cabinet frame as shown in figure 1-3 (detail A.)
- e. Using a 3/8-inch nutdriver, attach the bottom surface of the desk top to the mounting brackets (4) at the top rear of the cabinet with the two 1/4-20 x 5/16-inch screws supplied. The mounting hardware is located in a package taped to the bottom of the desk top assembly.

- f. Using a 5/16-inch nut driver attach the cable trough (5) to the side panel (6) of the computer cabinet with the two 10-32 x 1-inch screws supplied. Ensure that the cable trough is firmly bolted to the side panel before attempting to move the cabinet with the desk top attached.
- g. Using a screwdriver attach the two adjustable cable clamps to the bottom rear of the desk top with the #8 tap screws supplied. After cabling of the desk mounted equipment is complete, dress the cables through the cable clamps and tighten the clamps.

CAUTION

Ensure that the levellers on the cabinet and desk leg assembly are fully raised before moving the equipment.

Do not attempt to move the cabinet when the desk top assembly is not properly secured to the cabinet.

Keep the desk top leg clear of any obstruction when moving the cabinet.

Do not raise the desk top assembly more than 2 inches (4.88 mm) above floor level when moving the cabinet.

- h. Level the cabinet and desk top by means of the levellers on the cabinet and the desk leg assembly.

1-10. HP 2645A SYSTEM CONSOLE

Place the system console and keyboard assembly on the desk top for desk models, or any convenient surface for other models.

CAUTION

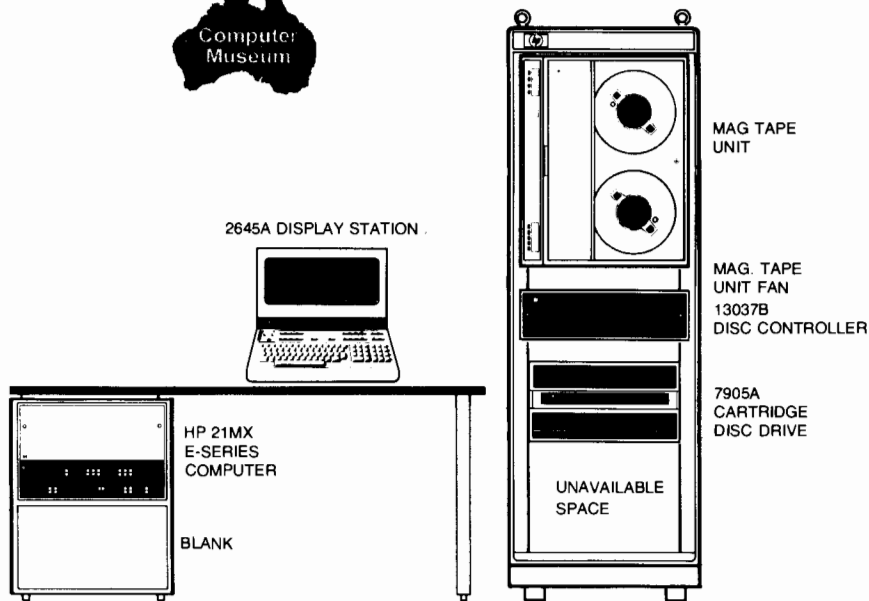
Do not use typewriter pads or any spongy surface that might restrict the air flow through the bottom vents.

1-11. HP 29425A 28-INCH CARTRIDGE DISC CABINET

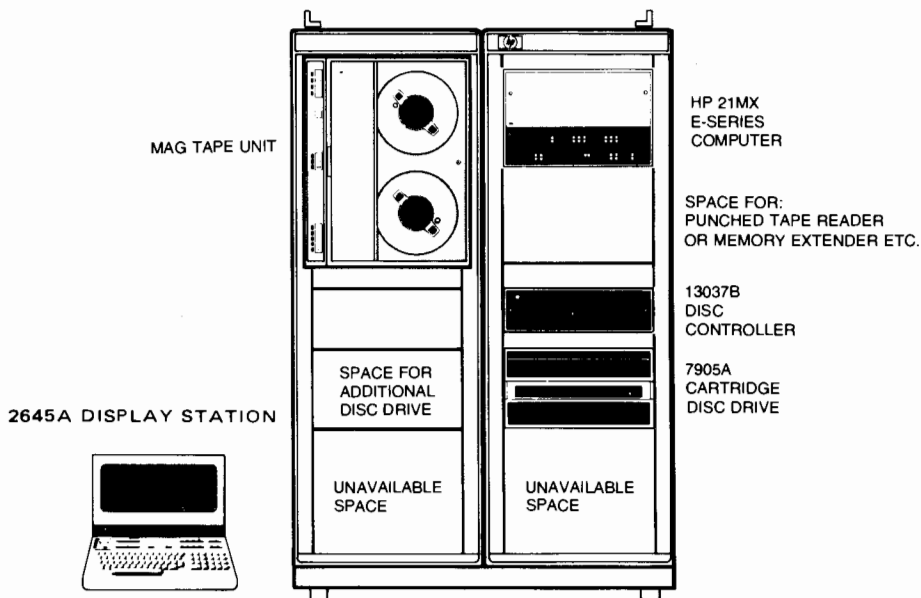
Carefully move the disc cabinet into position as shown in figure 1-3. Adjust the levellers so that the cabinet is level with respect to the desk.



OR MAG TAPE
E
LER
3E
/E

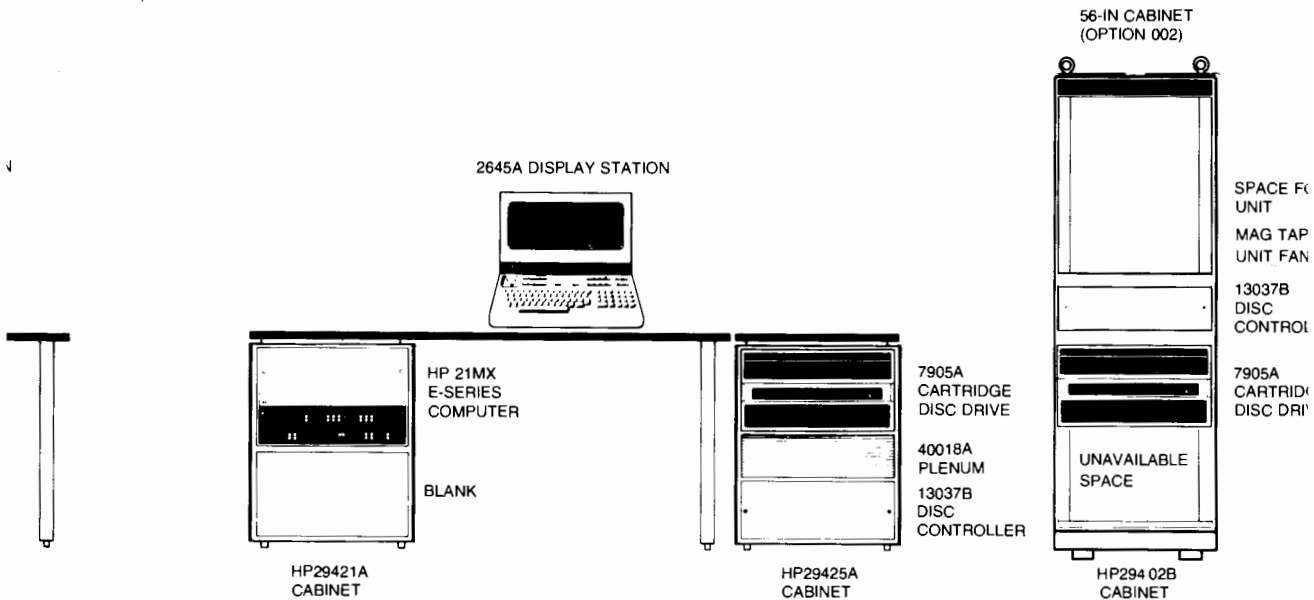


**MODEL 80 (HP2172A-002)
LINE PRINTER NOT SHOWN**

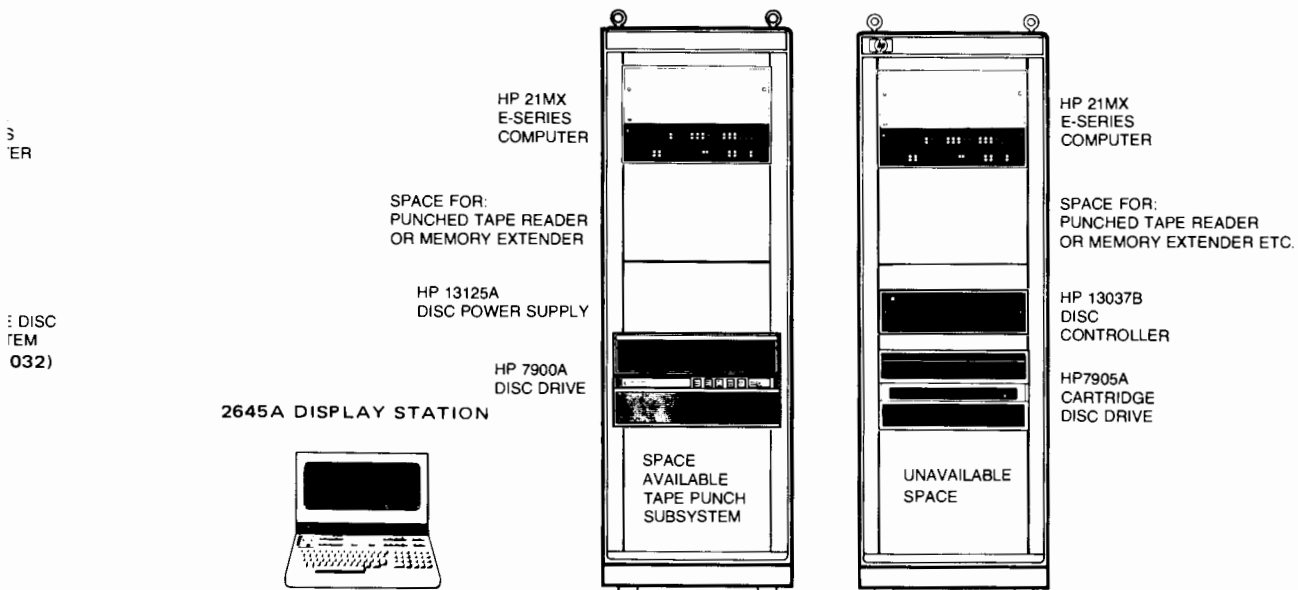


**MODEL 81 (HP2171A-002)
LINE PRINTER NOT SHOWN**

Figure 1-1. HP 1000 Computer System Racking Diagram



MODEL 30 (HP2172A)

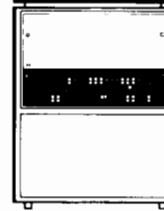


(HP2170A) OR (HP2171A)

MODEL 31

12732A-001
FLEXIBLE DISC
SUBSYSTEM
(option 032)

2645A DISPLAY STATION



HP 21MX
E-SERIES
COMPUTER

BLANK

MODEL 20 (HP2173A)



HP 21MX
E-SERIE
COMPU1

12732A
FLEXIBL
SUBSYS
(option

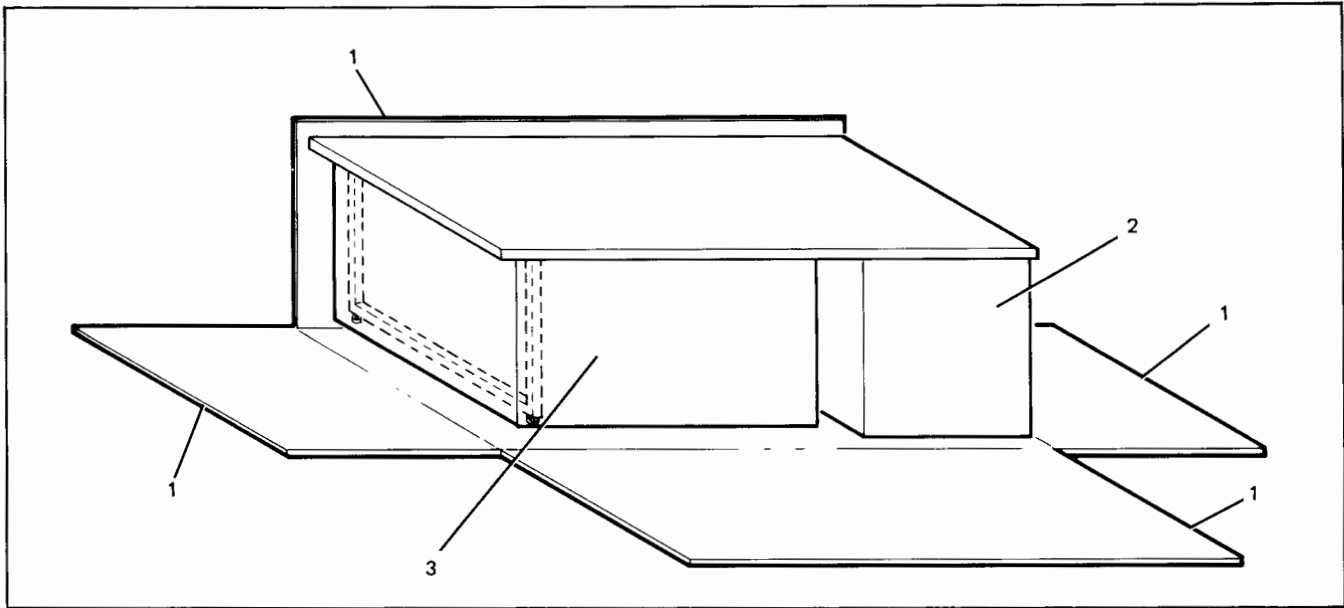
2645A DISPLAY STATION



NOTES:

1. Detailed racking diagrams and stabilizer requirements for all 56-inch cabinet configurations are located in the **System Support Log**.
2. Cabinets are shown with doors removed to illustrate racking arrangement.

MODEL 21 (HP2174A)



7700-4

Figure 1-2. Desk Top Carton Disassembly

1-12. HP 29402B 56-INCH CABINET

WARNING

Once the 56-inch cabinet is in place, the anti-tip legs must be fully extended with the pads down and locked, and on single bay cabinets the rear anti-tip stabilizer (40017A, 40017A-001, or 40022A) must be installed prior to pulling out any equipment on rack slides or any hinged equipment. Failure to comply may result in the cabinet tipping over.

- a. Carefully move the cabinet(s) to the desired position. Pull out the front anti-tip extension legs until they latch. On model 21 (HP 2174A) insert the bent legs (right and left bends outward) in the front of the cabinet. Latch pins inside the cabinet must be raised to insert and latch the legs fully. On single bay cabinets insert the rear anti-tip stabilizer per the *Installation Instructions for HP 40017A Cabinet Stabilizer Assembly*, part no. 40017-90002 or the *Installation Instructions for HP 40022A Cabinet Stabilizer Leg Assembly*, part no. 40022-90002. The stabilizer that is shipped with each single bay model is:

MODEL	STABILIZER
30 or 80 (HP 2172A-002)	40017A
21 (HP 2174A)	40017A-001
31 (HP 2170A & HP 2171A)	40022A (rear legs)

- b. lower the levelling feet until they firmly touch the floor.
- c. Install the magnetic tape unit or other rack mounted accessories at this time. Refer to the SYSTEM MANUAL INDEX in binder 1 to locate the appropriate *Installation and Service manuals*. The recommended location for rack mounted accessories is shown in figure 1-1.
- d. Remove eyebolts or lifting fixtures (they block ventilation holes in the cabinet top).

NOTE

Set aside any interface PCA's supplied with the accessories. These PCA's will be installed later.

1-13. HP 12732A (9885M) FLEXIBLE DISC

Place the disc on the desk as shown in figures 1-1 and 1-3.

1-14. LINE PRINTER

Move the line printer to the desired position, within 25 feet of the computer cabinet I/O card cage if the standard length signal cable is to be used.

1-15. ACCESSORIES AND INTERFACE PCA'S

Position free standing accessories in any convenient location within the range of the signal cable supplied.

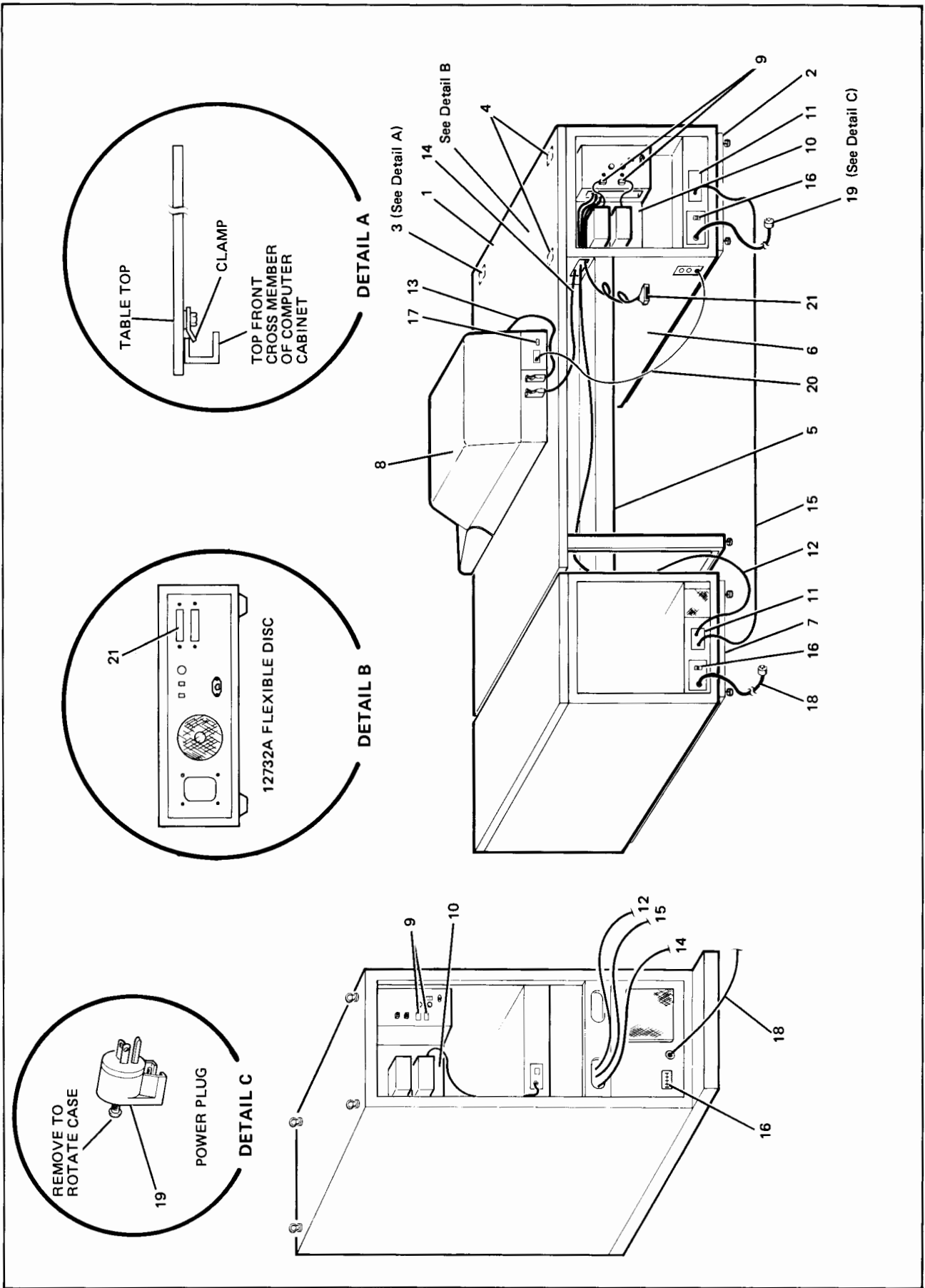


Figure 1-3. System Installation Details (Rear View)



NOTE

A decal, showing the PCA slot assignments for the computer I/O card cage and extender, is located on the inside of the computer cabinet front door. A copy of the decal is contained in the SYSTEM SUPPORT LOG. This copy may be more convenient to use at this time.

To check the installed interface PCA's and to install the accessory interface PCA's proceed as follows:

- a. Unlock and open the rear door of the computer cabinet.
- b. Remove the I/O card cage cover (10) by loosening the four captive screws on the cover. Ensure that the battery pack cables are disconnected from the "BAT INPUT" connectors (9).
- c. Using the decal copy, check that the installed PCA's are in the proper slots. Locate the interface PCA's to be installed and install them in the slots specified on the decal.

1-16. SYSTEM SIGNAL AND POWER CABLING

Models 20, 30, and 80 will require installation of signal cables and power cords for all system components and accessories. Models 21, 31, and 81 will have most of the system components in place and completely cabled. Check the cables on these components and their interface PCA's to ensure that the connectors are firmly seated. Install the system cable by performing the procedures in the following paragraphs that pertain to the components in your system.

CAUTION

The cabinet ac receptacles are dedicated for system products. Do not connect external equipment to the cabinet power strips.

1-17. HP 2645A SYSTEM CONSOLE

- a. The interface cable, part no. 12966-60008 (14) is in the computer cabinet with one hooded connector connected to the 12966-60004 PCA. This card is identified by "BACI 12966" marked on the extractor. Uncoil the cable and pass the end through the cabinet access hole into the cable trough (for desk models) and up to the console.

- b. Raise the rear access cover of the system console and connect the hood connector to the console PCA connector that has been notched to match the cable connector key.
- c. Connect the hood connector on keyboard cable 02640-60081 (13) to the console PCA that has been notched to match the cable connector.
- d. Connect one end of the system console power cord (20) to the ~LINE connector on the system console and the other end to a convenience outlet on the side panel (6) of the computer cabinet.

1-18. HP 12732A FLEXIBLE DISC SUBSYSTEM

- a. The interface cable, part no. 12735-60003 (21) is in the computer cabinet with the dual-hood connector on the PCA's labeled "FLEX DISC I/F 1" AND "FLEX DISC I/F 2". Flex disc I/F 1 is in the lower numbered (higher priority) slot and flex disc I/F 2 is in the next higher numbered (lower priority) slot. Ensure that the connector is seated firmly on the two PCA's.
- b. Uncoil the cable and pass the single hood connector through the cable access hole, through the rear of the cable trough and up to the flexible disc. Connect to the top connector on the rear of the flexible disc drive.
- c. Connect one end of the flexible disc drive power cord to the ~LINE connector and the other end to a convenience outlet on the side panel of the computer cabinet.

1-19. HP 12962C/D (7905A) CARTRIDGE DISC SUBSYSTEM

- a. Unlock and open the rear door of the cartridge disc subsystem cabinet.
- b. Loosen the screws securing the sliding shutter (11) that covers the cable entry opening on the HP 29425A cartridge disc subsystem cabinet and the HP 29421A computer cabinet. Pull out power cable and ac plug (60 Hertz installations) stored in each cabinet. (Do not connect to ac power mains at this time.)
- c. Locate interface cable, part no. 13037-60015 and the copper-braid grounding cable stored in the bottom of the cartridge disc subsystem cabinet. Pass these cables (12 & 15) through the cabinet cable entry opening, along the cable trough (5), and into the interior of the computer cabinet (2), as shown in figure 1-2. If more convenient, the cables may be laid on the floor between the cabinets and routed into the computer cabinet via the cable entry opening. Dress these cables (and any others laid on the floor) close to the equipment to prevent personnel from stepping or tripping on them.

NOTE

If the desk system includes the 56-inch cabinet option (HP 2172A-002), locate cable 13037-60015 and the copper-braid grounding cable in the bottom of the 56-inch cabinet and pass them through the opening in the rear of the cabinet. Route the cables to the computer cabinet as described in step 3. above.

- d. Connect the hooded connector on the interface cable 13037-60015 to the 13037-60023 PCA in the computer I/O card cage. This card has "13037 INTF" marked on its extractor. Connect the copper-braid grounding cable to the grounding stud in the computer cabinet, adjacent to the grounding stud used for the power cable grounding wire.
- e. Close the shutter on both cabinets as tight as possible and secure in place with locking screws.

1-20. ACCESSORIES

Install the signal cables and power cords for the magnetic tape unit, lineprinter, and other system accessories at this time. Refer to the appropriate *Installation and Service Manuals* for cable installation data of each accessory.

1-21. HP 29402B CABINET DOOR PANELS

The integration of some accessories such as magnetic tape units, additional disc drive, etc. require the reconfiguration of the door panels. Locate and install the new door panels (packed with the accessories).

1-22. CONNECTION TO MAINS POWER SOURCE

To connect the system to the ac mains power source proceed as follows:

- a. Replace the I/O card cage cover on the rear panel of the computer.
- b. Remove the insulators from the BAT. INPUT connectors and connect the battery pack cables to the BAT. INPUT connectors (9).
- c. Set the power switches listed in table 1-1 off. Set the power switches on all accessories off.
- d. Set the circuit breakers at the rear of each cabinet to OFF.

NOTE

50 HERTZ INSTALLATIONS — Have the electrician install the customer furnished power wiring at this time. Refer to figures 1-3, 1-4, and 1-5 for wiring diagrams of the cabinets.

MULTI-PHASE 60 HERTZ INSTALLATIONS — Have the electrician install the customer furnished power wiring at this time. Refer to figures 1-3, 1-4, and 1-5 for cabinet wiring diagram. More detailed cabinet wiring information may be obtained from the *HP 29400B Series Cabinets Installation and Service Manual*, part no. 02940-90256.

- e. Connect the 60 Hertz power cables furnished with the single bay cabinets to the NEMA 5-20R receptacles. The case of the 5-20P power plug may be moved to a more convenient position by removing the screw in the top of the case and the strain relief hood screws. Lift the case free of the plug. Redress (rewire) the cable to the desired position observing polarity of the wires. (White wire to silver screw terminal, black wire to brass screw terminal, and green wire to green screw terminal.) Lower the case onto the plug, replace and tighten the screws.

1-23. TURN ON PROCEDURE

To energize the system following the completion of the installation instructions described in the preceding paragraphs, proceed as follows:

CAUTION

Before the initial start of a system containing an HP 7900A Disc Drive Subsystem, the carriage clip on the disc drive must be removed. Failure to remove the carriage clip will result in damage to the disc drive.

- a. Ensure that the following switches for the components in your system are in the off position. Refer to table 1-1 for the location of these switches.

COMPONENT	SWITCH
Computer	~LINE ON/OFF
9885M/S Flexible Disc	AC LINE 0/1
7905A Disc Drive	POWER/OFF
13037B Disc Controller	POWER ON/OFF
7900A Disc Drive	LOAD/UNLOAD
13215A Disc Power Supply	POWER ON/OFF
2645A System Console	~LINE ON/OFF

- b. Ensure that the power switches of the system accessories are off.
- c. Apply power to the desk top cabinets by setting the circuit breaker on the rear of each cabinet to the ON position.

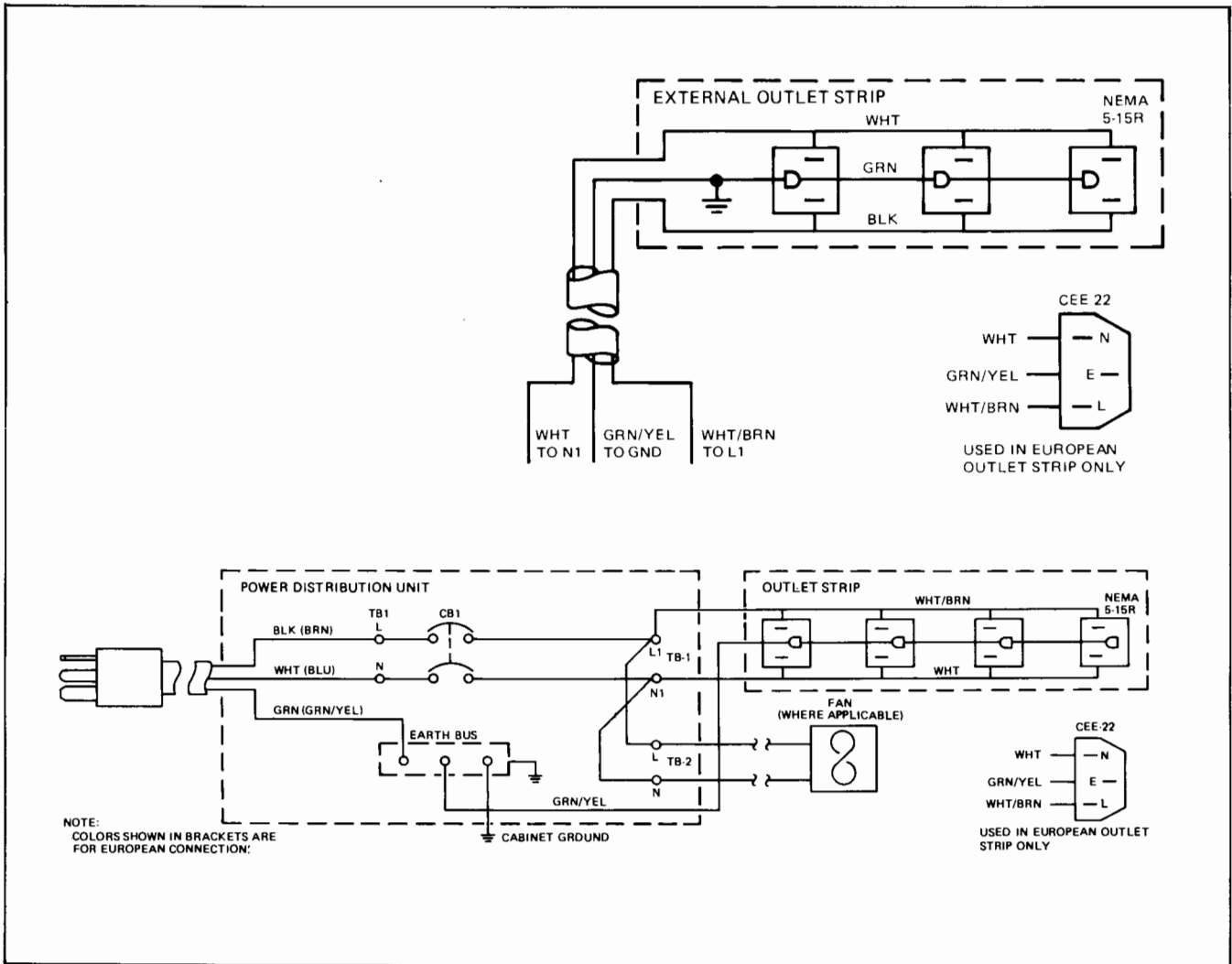


Figure 1-4. HP 29421A Computer Cabinet Wiring Diagram

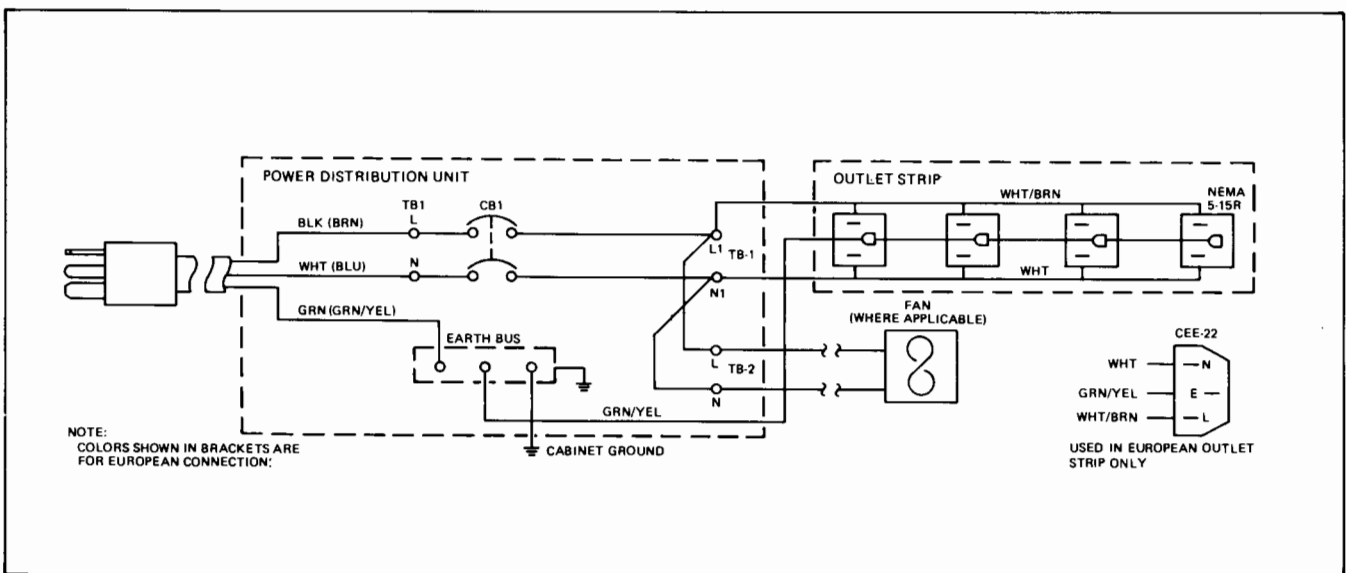


Figure 1-5. HP 29425A Cartridge Disc Cabinet Wiring Diagram

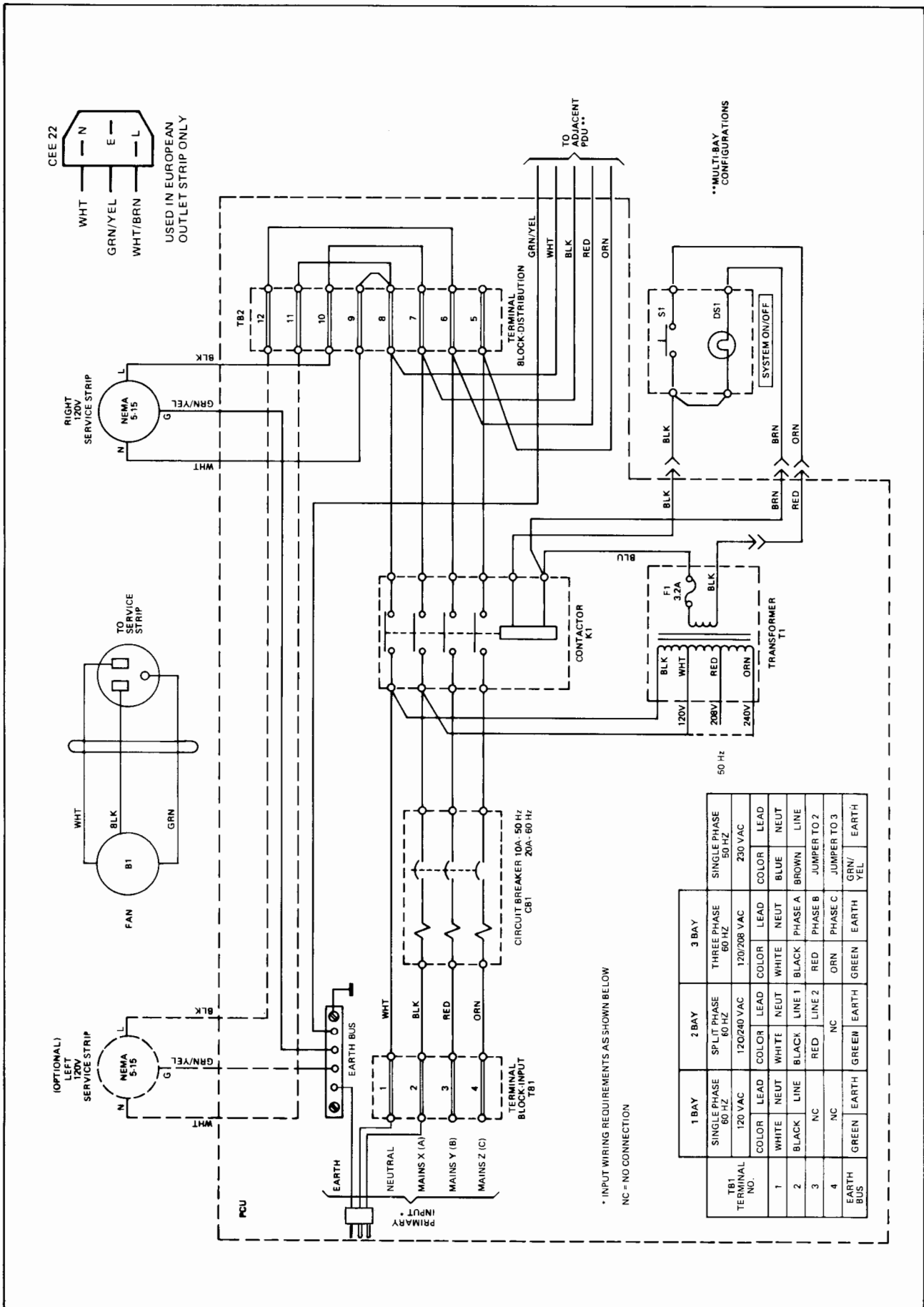


Figure 1-6. HP 29402B 56-Inch Cabinet Wiring Diagram

Table 1-1. Initial Control Settings

COMPONENT/ SUBSYSTEM	CONTROL	SETTING	REMARKS
Computer	~LINE ON/OFF switch	ON	Located on rear panel
	BATTERY ON/OFF switch	ON	Located on rear panel
	R/STANDBY/OPERATE/LOCK key-operated switch	OPERATE	
9885M Flexible Disc	AC LINE O/I switch	1	Located on front panel
7905A Cartridge Disc Subsystem			
a. Disc Controller	POWER ON/OFF switch	ON	Located on rear panel
b. Disc Drive	POWER/OFF switch	POWER	Located below cover on front panel
(Removable disc cartridge must be installed and cover closed)	RUN/STOP switch	RUN	DRIVE READY sign lights after temperature stabilization (approx- imately 5 minutes)
7900A Cartridge Disc Subsystem			
a. Disc Drive	LOAD/UNLOAD/POWER	LOAD ON	DRIVE READY indicator lights after after 30 seconds
b. Disc Power Supply	POWER ON/OFF switch	ON	DRIVE POWER lamp on disc panel will light
(Removable disc cartridge must be installed and cover closed)	RUN/STOP switch	RUN	
System Console	~LINE ON/OFF switch	ON	Located on rear panel.
	DUPLEX switch	FULL	Located on keyboard assembly
	PARITY switch	NONE	
	BAUD RATE switch	9600	
	REMOTE key	DOWN	
	CAPS LOCK key	DOWN	
	AUTO LF key	UP	
	DISPLAY FUNCTIONS key	UP	

- d. Apply power to the 29402B 56-inch cabinet by setting the circuit breaker on the rear of the cabinet to the ON position and then, by pressing the SYSTEM ON-OFF switch at the top front of the cabinet. The switch pushbutton will light.
- e. Check that the fans in the cartridge subsystem cabinet and the fans in the 56-inch cabinets are operating.
- f. Set the system controls as detailed in table 1-1. Energize the system accessories.

1-24. INSTALLATION CHECKOUT

Following application of power to the system, carry out the disc drive installation checkout procedure described in *Section II* of the *HP 7905A Disc Drive Installation and Service Manual*, part no. 07905-90007. If marginal or intermittent computer operations are encountered during verification, perform the Processor Power Supply Check, detailed in *Section I* of the *21MX E-Series Installation and Service Manual*, part no. 02109-90002. Also, consult the Installation and Service manuals for the system accessories, and perform all the required installation checks. At the conclusion of these checks close and lock the doors of the system cabinets and accessories.

1-25. VERIFICATION OF OPERATION

After completing the checkout procedures, operation of the system components may be verified by running the system console self-check test followed by the diagnostic test routines provided with the system. These routines apply to the individual components and subsystems of the system. The diagnostic test routines are absolute programs on tape cartridges that are loaded into the processor using the cartridge tape loader ROM. The test and diagnostic routines are the same as those used for maintenance and troubleshooting. Locate the diagnostic tape cartridges and refer to the *Diagnostic Configurator Reference Manual*, part no. 02100-90157 for detailed information regarding the use of the diagnostics and the contents of each tape.

1-26. OPERATOR TRAINING

If the system operator has not been responsible for an HP 1000 Computer System before you must show him how to operate the system. With the system operator, review the contents and perform the procedures contained in the *Getting Started With Your HP 1000 Computer System Manual* part no. 02172-90005 for an RTE II/III system or *Managing Your HP 1000 System Model 20 Series Manual*, part no. 02173-90006 for an RTE-M system. Demonstrate the system start up procedures and the physical operation of peripheral devices (loading discs, paper, ribbon, magnetic tape, etc.). Finally, show him how to shut the system down.

This section contains preventive maintenance, general maintenance, troubleshooting, and cabling information for the HP 1000 Computer System. The system is designed to operate over a wide range of conditions (see the Technical Data Book). However, to reduce costly down time, and the possibility of failure, a maintenance agreement is advisable. (HP Maintenance Agreements are available for those who desire to contract for this service.) Personnel in charge of the system should become familiar with the hardware and software to be able to quickly place it back in operation.

2-1. ELECTRICAL SAFETY

Before proceeding with any maintenance or service on the system which requires physical contact with electrical or electronic components, be sure that either power is removed or that safety precautions are followed to protect personnel against shock. Heed all "WARNING" signs on equipment. Rubber mats should be used for standing on while working on equipment inside a cabinet with power on. All maintenance work must be done by qualified personnel.

2-2. PREVENTIVE MAINTENANCE

WARNING

High voltages are present on the equipment. Always disconnect power before performing any maintenance. Failure to do this could result in serious injury.

Preventive maintenance schedules should be set up according to the quality of the environment in which the system is operating. A system in a clean and air-conditioned atmosphere requires much less care than one which is located in an atmosphere with an unusual amount of dust, smoke, moisture, or other foreign matter.

The user should consult the *Installation and Service Manual* for each component in his system for the procedures required for a preventive maintenance schedule. The manuals for system components are listed in the System Manual Index.

2-3. GENERAL MAINTENANCE

The cabinets and all interconnecting cabling should be inspected by a qualified person once a month for signs of mechanical and electrical defects. Electrical components

that show signs of deterioration should be checked and a thorough investigation made to verify proper operation. Mechanical parts should be inspected for excessive wear, looseness, misalignment, and corrosion. Be sure that all ventilating fans are in good working order.

The cabinets and equipment should be kept free of dust, moisture, grease, and foreign matter to ensure trouble-free operation. A dry clean cloth, a soft bristle brush, or a cloth saturated with isopropyl alcohol or similar cleaning compounds may be used to clean the metal portions of the cabinets and the table tops. Instrument front panels, (metal portions, knobs, etc.) may be cleaned with Chemisol, an industrial cleaner and degreaser, or Formula 409 (purchased from "A" Division of Harrell Corp., So. Norwalk, Connecticut). These cleaners are usually used in half-and-half mixture with water for the initial panel cleaning. If a slight residue remains, a half-and-half mixture of alcohol and water will remove it.

Filters for the ventilating fans in the cabinets, disc drive, and plenum should be cleaned weekly to ensure that the equipment remains free of dust. To clean the filters vacuum the outer sides (only). The ventilating fans used in the system have sealed bearings and require no lubrication.

CAUTION

Do not connect a vacuum cleaner or other equipment that generates line noise to a system ac receptacle. Failure to comply may result in erratic system operation.

2-4. REMOVAL OF SYSTEM COMPONENTS

Rail and column mounted system components may be removed using the following instructions:

WARNING

To prevent possible injury to personnel and accidental damage to equipment, two or more persons are required to remove, lift, or carry the rail-mounted processor and disc drive. These units weigh 75 pounds (34 kilograms) and 162 pounds (73.6 kilograms), respectively.

Maintenance

- a. Ensure that all power is off. Disconnect cabinet power cable from wall receptacle or set circuit breaker to OFF in System Power Panel for hardwired cabinets.

Disconnect all cables from rear of unit.

NOTE

The doors and side panels of the cabinets are removable. If it is necessary to remove these items to gain access to the cables, refer to the appropriate cabinet *Installation and Service Manual* for instructions. These manuals are listed in the System Manual Index.

- c. Remove front channel mounting screws from behind both sides of unit. (On the processor, these screws are located behind the drop front panel.)
- d. Slide unit out holding it firmly so that it does not drop out of the front. Remove unit. Heavy units should be moved on to a firm platform which can be adjusted to the operating height of the equipment being removed.

2-5. TROUBLESHOOTING PROCEDURE

If a malfunction occurs or is suspected in the system, it is suggested that an attempt be made first to isolate the problem to a particular system component or subsystem. This can be accomplished by an analysis of the symptoms, followed by a running of the system's diagnostic programs. It is recommended that the system console self-check test be performed before running the diagnostics. Consult the *HP 2645A User's Manual*, part no. 02645-90001 for information on how to perform the test. System diagnostic tape cartridges, together with associated *Reference Manuals* are listed in *Diagnostic Configurator Reference Manual*, part no. 02100-900157, provides detailed information regarding use of the diagnostics.

When the problem has been isolated, the *Installation and Service Manual* for the suspected component should then be consulted for troubleshooting suggestions. These manuals are listed in the System Manual Index.

2-6. CABLING INFORMATION

For signal tracing between the Computer and the HP 12962C/D (7905A) cartridge disc subsystem, refer to table 3-2 in the *HP 12962A/B/C/D Cartridge Disc Subsystem Installation and Service Manual*, part no. 12962-90003. This provides a description of the signal flow between the interface card in the processor and the device controller card in the HP 13037A/B Disc Controller. Internal cabling between the components of the subsystem is also described

in this publication. For signal tracing between the computer and the HP 12960A (7900A) cartridge disc subsystem, refer to the *HP 13210A Disc Drive Interface Kit Operating and Service Manual*, part no. 13210-90003. For signal tracing between the computer and the 12732A Flexible disc subsystem refer to the *HP 12732A/12733A Flexible Disc Drive Subsystem Operating and Service Manual*, part no. 12732-90005. For signal tracing between the processor, the system console, and the system accessories, refer to the applicable *Installation and Service Manuals* for the equipment.

Wiring for the computer cabinet and the cartridge disc subsystem cabinet is illustrated in figures 1-3, 1-4, and 1-5.

2-7. REPACKING FOR SHIPMENT

Repacking of the Cartridge Disc Subsystem or the Computer contained in an HP 29425A or an HP 29421A Cabinet, requires the use of the original container and packing material. If the container is not available, consult your local Hewlett-Packard Sales and Service Office to obtain a container or instructions for fabricating an acceptable alternate. Before shipment the container (or equipment) should have a tag identifying the owner and the service or repair to be accomplished. Include the equipment model number and full serial number.

To package the unit, proceed as follows:

- a. Place the ramp on the rear of the container base.
- b. Position the unit at the ramp with the front of the enclosure facing the container base.
- c. Thread the levelling feet fully into the enclosure to allow freedom of movement of the unit.
- d. On the front of the container base, thread the two levelling feet retainer bolts into the threaded sleeves until the retainers are firmly secured but not tight.
- e. Align the retainer slots approximately parallel with the side member of the container to receive the unit levelling feet.

CAUTION

Ensure that the retainer slots are wrapped with a protective tape to avoid damage to the levelling feet threads.

- f. Roll the unit onto the container base via the ramp and seat the levelling feet in the retainer slots.

- g. Install the rear retaining member, seating the retainers on the levelling feet.
- h. Tighten the retainer bolts and the rear retaining member screws.
- i. Replace and secure the ramp with tie wrap material of at least 300 lb. strength.
- j. Replace the packing material.
- k. Replace the top and secure with climp fasteners.

Mark the container "FRAGILE". On the container housing a cartridge disc subsystem, add a caution sticker that states "MAGNETIC EQUIPMENT SUITABLE FOR AIR SHIPMENT IF MAINTAINED AT A DISTANCE OF 25 FEET (7.62 METRES) FROM COMPASS SENSING DEVICES.

Repacking instructions for the HP 2645A Data Station (system console) are contained in the *HP 2645A Data Station Reference Manual*, part no. 02645-90005.

Repacking instructions for the system accessories are contained in the installation and service manual for the accessories. Refer to the manual index to locate the appropriate manual.



REPLACEABLE PARTS

SECTION

III

3-1. ORDERING INFORMATION

When ordering replacement parts, each part must be identified by a Hewlett-Packard part number as well as description. Include the system model number, serial number, and subsystem or component number. For system

level parts lists refer to the System Summary Report in the System Support Log. For parts lists of individual units — computer, subsystem, component, interface, or cabinet — refer to the applicable *Installation and Service Manuals*. These publications are listed in the System Manual Index. Address order or inquiry to your local HP Sales and Service Office (listed at the rear of this manual).



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