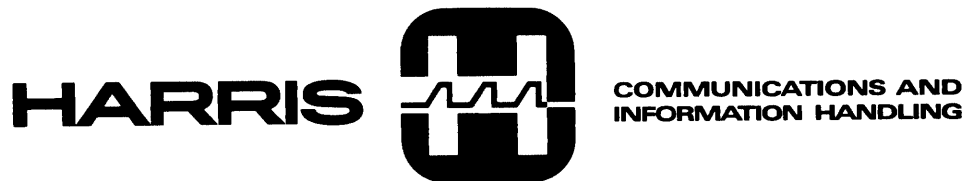


INSTALLATION MANUAL

**SLASH 6
DIGITAL COMPUTER**

**Original Issue
November, 1976**



HARRIS CORPORATION

Computer Systems Division

1200 Gateway Drive, Fort Lauderdale, Florida 33309 305/974-1700

LIST OF EFFECTIVE PAGES

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CAUTIONARY NOTICE

While the Manufacturer has attempted to detail in this manual all areas of possible danger to personnel in connection with the use of this equipment, personnel should use caution when installing, checking out, operating and servicing this equipment, especially when power is on. As with all electronic equipment, care should be taken to avoid electrical shock in all circuits where substantial currents or voltages may be present, either through design or short circuit. Caution should be observed also in lifting and hoisting equipment especially regarding large structures during installation.

The Manufacturer is specifically not liable for any damage or injury arising out of a worker's failure to follow the instructions contained in this manual, or his failure to exercise due care and caution in the installation, operation, checkout and service of this equipment.

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SECTION I INTRODUCTION

1-1 SCOPE

This manual contains descriptions and procedures relative to the installation of the SLASH 6 digital computer system (Figure 1-1) designed and manufactured by Harris Corporation, Computer System Division (HCSD), Fort Lauderdale, Florida. The system configuration has the following comprehensive areas:

- a. Basic Computer
- b. Optional Computer Features
- c. Peripheral I/O Devices

Information in this manual is divided into five sections: Section I, Introduction; Section II, Unpacking, Handling, and Assembly; Section III, Installation; Section IV, Inspection, Adjustment, and Checkout; and Section V, Preparation for Relocation or Reshipment.

1-2 BASIC COMPUTER

The basic computer consists of a 10-position card nest assembly with plug-in PC boards, a programmer's panel, and a power supply assembly, all mounted in a 19-inch HCSD cabinet. The card nest assembly contains the complete Central Processor Unit (CPU), memory, and I/O channel circuitry, each on a separate PC board. Additional memory, I/O, and option cards may be used to expand the capabilities of the basic computer.

1-3 OPTIONAL FEATURES

In addition to the basic computer configuration, a full configuration and an expanded configuration are available. The full configuration uses an 18-position backplane as standard equipment; the expanded configuration uses either an 18-position or a 22-position backplane and an additional card nest assembly with an 18-position backplane. Any of the three configurations may use a full programmer's panel or a turnkey panel. A wide range of options are available for all three configurations. Some options, including block controllers and additional memory and I/O cards, are mounted in the card nest assembly. A special options card, which also plugs into the card nest assembly, contains plug-in facilities for internal timer, program restrict, address trap, and additional priority interrupt option circuits. Other

options, which are not mounted in the card nest assembly, include a real time clock (which can be added to the PIOC Channel), time meter, and battery backup system. A Scientific Arithmetic Unit (SAU) is optional on the full and expanded configurations.

1-4 PERIPHERAL I/O DEVICES

Peripheral units used with the computer are connected by cable assemblies to the I/O cards in the CPU. The number of peripheral units that can be used with the computer depends on the number of available I/O channels. Up to 16 peripheral units may be connected to one I/O channel by connecting them in a "daisy-chain" configuration. When units are daisy-chained, the last unit in the chain must use terminating resistors.

1-5 CABINET SPACE ALLOCATION

Figure 1-2 shows the full configuration SLASH 6 Computer Cabinet layout, which includes the following assemblies:

1. Power Supplies PS1 and PS4 inside PDU; PS2 and PS3 mounted on bracket
2. 18-position Card Nest Assembly
3. SAU Assembly optional

The basic configuration differs as follows:

1. Power Supplies PS1 and PS2 inside PDU
2. 10-position Card Nest Assembly
3. No SAU Assembly

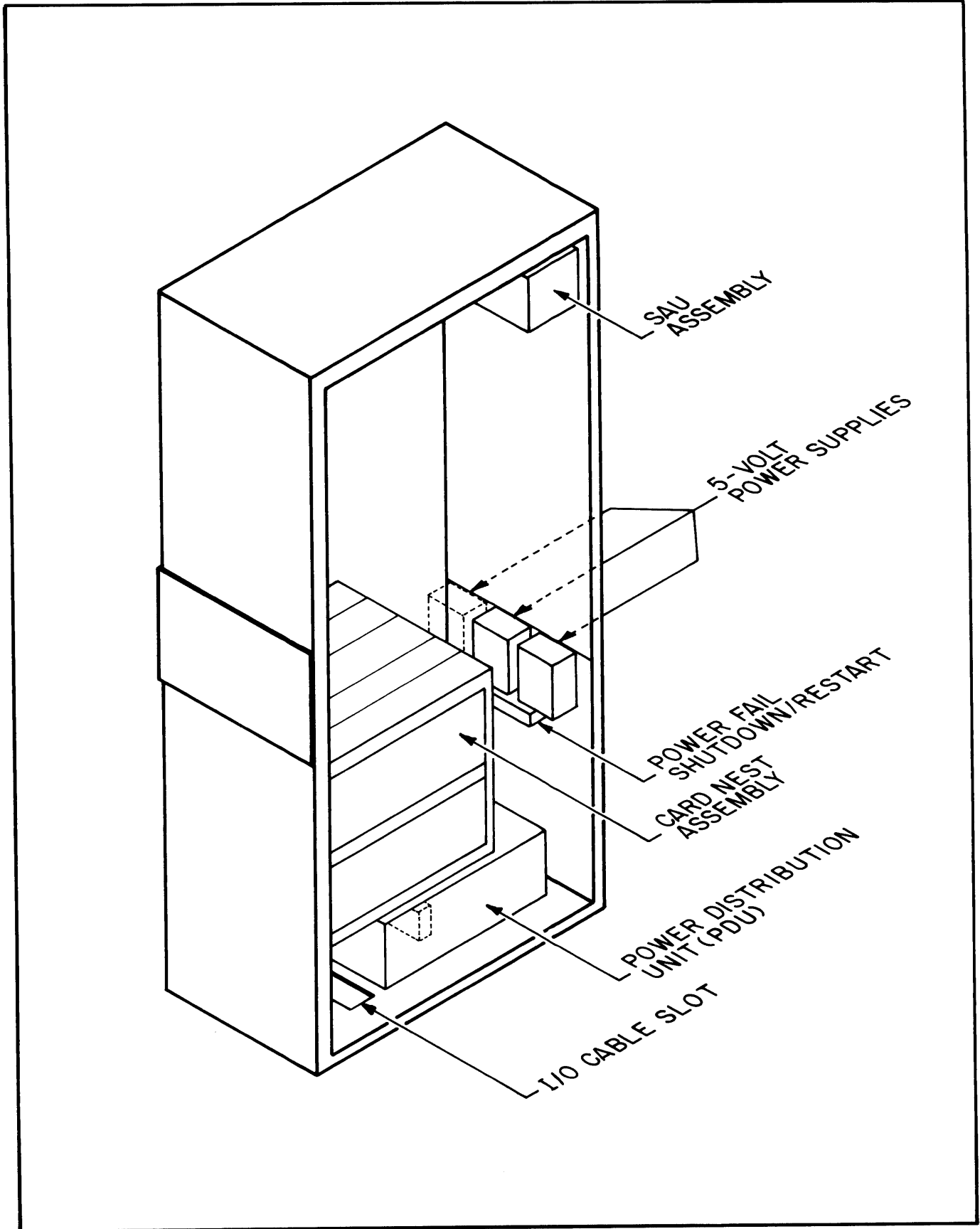
The expanded configuration differs as follows:

1. Power Supplies PS1, PS4, and PS5 inside PDU; PS2, PS3, and PS4 mounted on bracket
2. 22-position Card Nest Assembly
3. SAU Assembly optional

The basic and full configurations may use a Turnkey or a programmer's panel; the expanded configuration uses a programmer's panel. A second Card Nest Assembly may be mounted in the space above the console. The basic and full configurations may use either 115 or 230 VAC; the expanded configuration uses 230 VAC only.



Figure 1-1. SLASH 6 Digital Computer



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Figure 1-2. SLASH 6 Computer Cabinet Space Allocation

SECTION II

UNPACKING, HANDLING, AND ASSEMBLY

2-1 SCOPE

This section contains procedures for unpacking the SLASH 6 Computer System and assembling the separately-packaged components in preparation for installation.

2-2 PACKAGING METHODS

The type of packaging is determined by the mode of transportation and customer specifications. In most cases, the cabinet is wrapped with polyethylene film and secured in a shipping crate made of heavy plywood or tri-wall material. For padded-van shipment, the shipping crate may not be required. In this case, a separate wrapping, or shroud may be placed around the equipment for protection.

The packaging details for crated shipments are shown in Figure 2-1. Cables and accessories, cabinet spacer sets, spare PC cards, and peripheral units are shipped in separate cartons.

2-3 UNPACKING PROCEDURES

2-3.1 Computer Cabinet

Move the cabinet to the installation area and remove packaging materials according to the following procedure. If a shipping crate was not used, begin the procedures at step 4.

1. Cut and remove steel banding straps securing crate cap, and lift off cap.
2. Pull nails securing crate sleeve to shipping platform, and carefully lift off sleeve. Remove the polyfoam pads surrounding the cabinet.
3. Carefully cut and remove two steel banding straps and cabinet wood strips securing wrapped cabinet to floating platform.
4. Remove polyethylene film wrapping from cabinet.
5. Remove four cabinet anti-tip leg equalizers (leveling pads) from hardware packing carton and screw pads into cabinet base so that the cabinet will rest on the pads when it is placed upright.

WARNING

Because of the weight of the cabinet, sufficient help should be obtained for the following step to preclude injury to personnel or damage to equipment.

6. Carefully raise cabinet to upright position, and move shipping platform clear of work area.
7. Remove all protective paper from cabinet.
8. Remove all shipping brackets (conspicuously red-tagged) from inside of cabinet.
9. Visually check for any masking tape or cardboard shipping retainers, and remove.
10. Remove temporary shipping ties securing disconnected wire bundles and cables. Remove wrapping and padding from disconnected electrical plugs.
11. Inspect all packing materials for shipping documents and loose small parts.
12. Visually check cabinet exterior and interior for damage incurred during shipment.

NOTE

All claims for damage incurred during shipment should be filed with the carrier. A full report of the damage should then be forwarded to Harris Computer Systems Division, 1200 N.W. 70th Street, Fort Lauderdale, FL 33309, who will subsequently advise as to the disposition of the equipment.

13. If practical, retain shipping crate, brackets, and packaging materials for reuse in subsequent shipment.

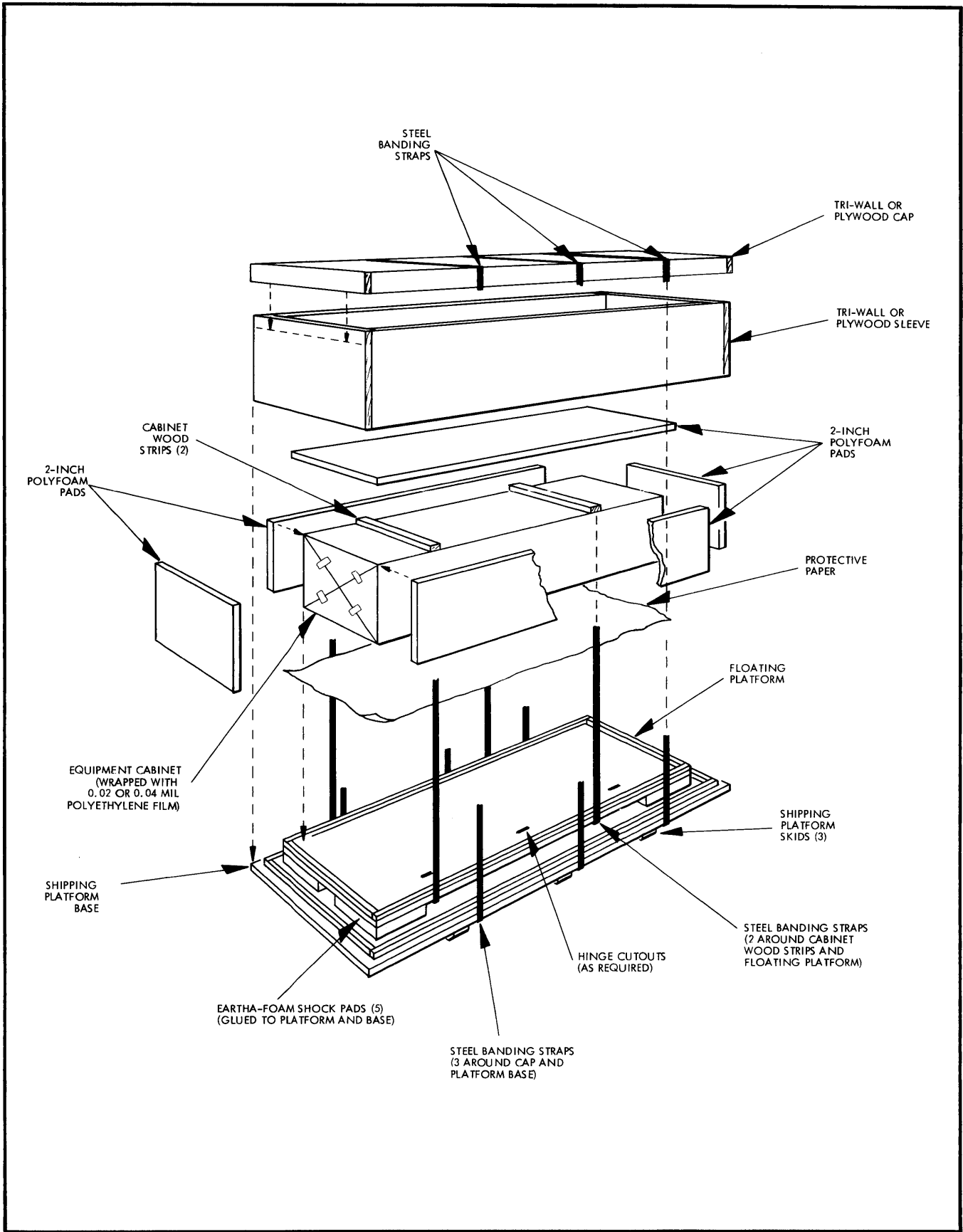
2-3.2 Cables and Accessories

Hardware items, I/O cables, cable terminators, and cabinet connector and spacer components are normally shipped in a separate carton. Unpack these components and visually inspect all cable assemblies and termination plugs for evidence of damage incurred during shipment. Closely check pins of cable and termination connectors. Compare received items inventory with listing on shipping document, and check all packing materials for loose small parts.

2-3.3 Printed Circuit Boards

The SLASH 6 Computer is normally shipped with all PC boards individually wrapped and shipped separately in a heavy-duty carton. Unpack the PC boards as follows:

1. Set carton upright, open top, and remove loose packing material.



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Figure 2-1. Cabinet Packaging Details

2. Remove individually wrapped PC boards from carton and compare received boards inventory with listing on shipping document.



Handle PC boards carefully. Perform the following steps on a felt-covered work bench or similarly padded surface.

3. Remove each polyethylene encased PC board from its padded envelope. Do not unseal or remove PC board from polyethylene envelope until required for installation.
4. Through transparent envelope, visually inspect PC board for evidence of shipping damage to components, printed-circuit pattern, or connector pins.

2-3.4 Peripheral Equipment

Each peripheral unit is unpacked and prepared for installation according to the procedures in its individual installation manual. These manuals are shipped with the peripheral units, and should be followed for specific instructions and precautionary measures applicable to each unit.

2-4 EQUIPMENT CABINET MATING

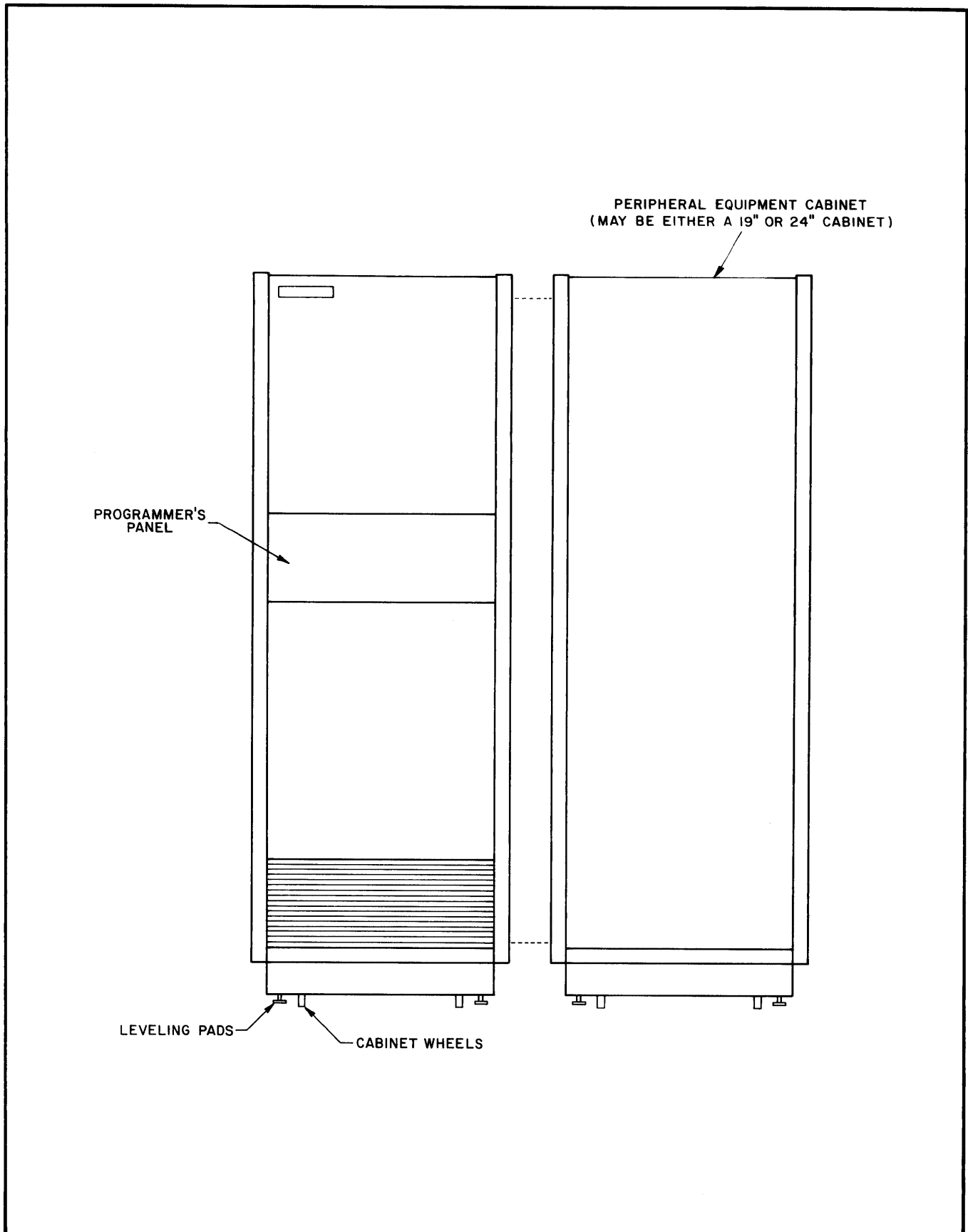
A standard equipment cabinet may be connected to the computer cabinet using standard spacers and attaching hardware. Holes are provided in the corners and edges of the computer cabinet for this purpose. Any peripheral equipment installed in the attached cabinet is electrically connected to the CPU by the standard I/O cables. Each added cabinet must continue ground strap loop.

The following hardware is required for attaching the cabinets:

- 8 hex-head bolts, 1/4-20 x 1.25 inch long
- 8 flat washers, 0.25 inch ID.
- 8 internal-tooth lockwashers, 0.25 inch ID.
- 8 plain hex nuts, 1/4-20

The cabinets are mechanically attached as follows:

1. Unpack the computer cabinet and peripheral equipment cabinet as described previously in this manual.
2. Position the cabinets, with their open sides facing each other, about six inches apart. (See Figure 2-2.)
3. Open cabinet doors and insert eight bolts (with flat washers) through holes in side of computer cabinet. (See detail "A", Figure 2-2.)
4. Install lockwasher and hex nut on each bolt, and tighten securely.



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Figure 2-2. Equipment Cabinet Mating Details

SECTION III INSTALLATION

3-1 SCOPE

This section provides physical specifications for the SLASH 6 Computer, plus power requirements, site selection, layout, and environmental considerations relating to installation.

3-2 SPECIFICATIONS

Physical dimensions for the SLASH 6 Computer are shown in Figure 3-1. The estimated total weight, voltage and current requirements, and heat dissipation characteristics are as follows:

Weights

Basic	350 lb.
Full	390 lb.
Expanded	440 lb.

AC Voltage Requirements ($\pm 10\%$; 47-63 Hz, 1 phase)

Basic 1270139-901 and -903	115 VAC
Basic 1270139-902 and -904	230 VAC
Full 1270140-901, -903, -905, and -907	115 VAC
Full 1270140-902, -904, -906, and -908	230 VAC
Expanded	230 VAC

AC Current Requirements

Basic 115V	13A
Full 115V	22A
Basic 230V	10A
Full 230V	12A
Expanded 230V	19A

Heat Dissipation

Basic	1.4KW
Full	2.5KW
Expanded	4.0KW

3-3 POWER REQUIREMENTS

Either 115 VAC or 230 VAC operation may be specified by the user for the SLASH 6 basic or full configuration; the expanded configuration is designed to operate on 230 VAC only. The correlation between the part number and the power cable requirements is as follows:

BASIC ASSY. 1270139-	FULL ASSY. 1270140-	CABLE NO.
-901, -903 -902, -904	-901, -903, -905, -907 -902, -904, -906, -908	1830022-901 1830023-901

All DC power requirements are provided by DC power supplies within the computer cabinet. Three different types of power supplies are used in different combinations to satisfy the DC power requirements of the basic, full, and expanded configurations as follows:

RATING	BASIC	FULL	EXPANDED
12V, 4A	1 (PS1)	1 (PS1)	1 (PS1)
12V, 12A		1 (PS4)	2 (PS4, PS5)
5V, 120A	1 (PS2)	2 (PS2, PS3)	3 (PS2, PS3, PS6)

AC and DC power requirements for peripheral units can be determined by referring to the applicable manual listed in Table 4-2. Overall system power requirements are determined by combining the power requirements of the computer and the peripheral units.

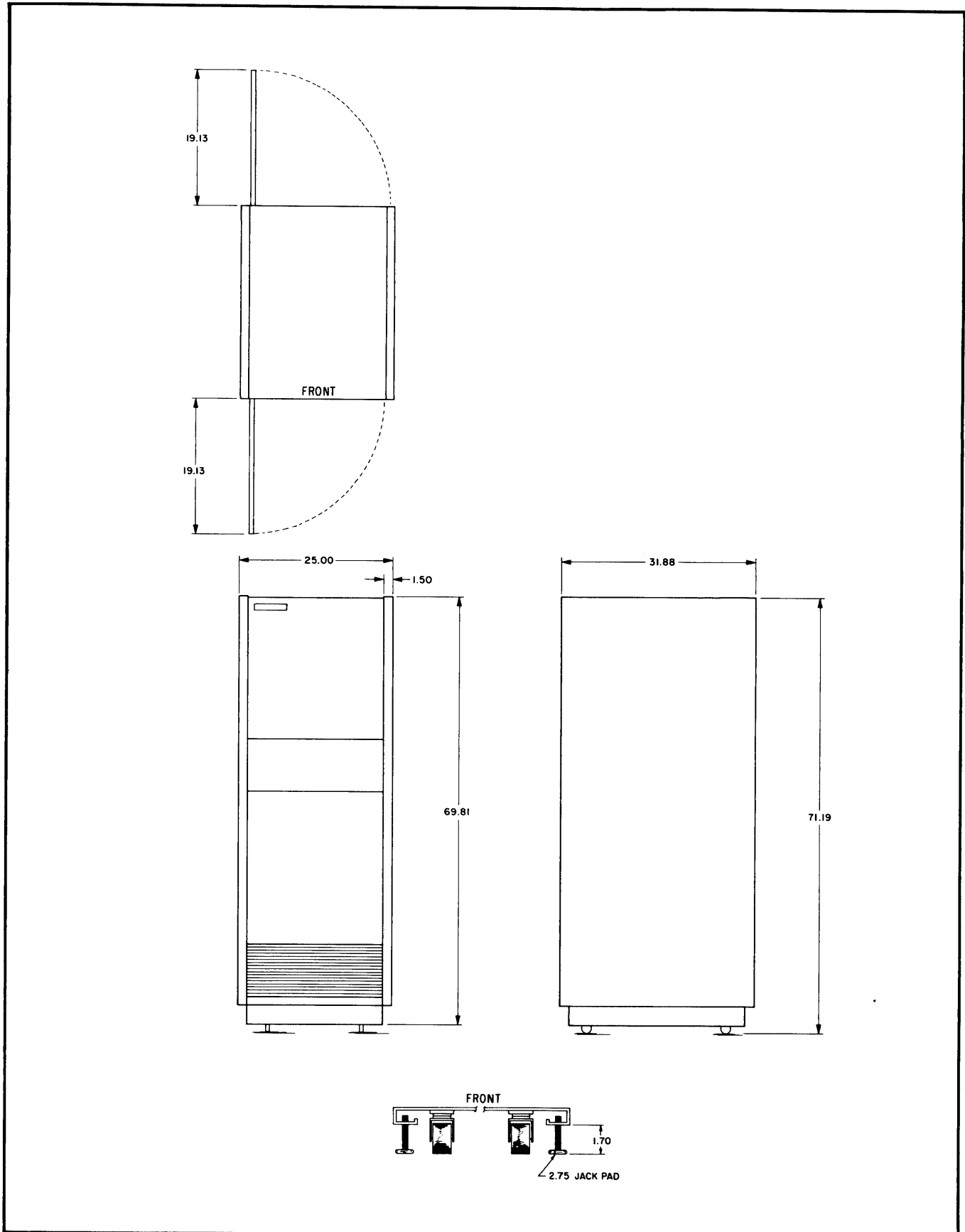
3-4 SITE AND FACILITY CONSIDERATIONS

Placement of the SLASH 6 Computer System and associated peripherals is an important factor in the equipment installation. The selected site must have a controlled environment and proper lighting. Adequate space is required for operating personnel and all items of equipment, including minimum clearances for door operation, air circulation, and maintenance access. An outline drawing is provided in Figure 3-1 to help determine minimum space requirements for the computer cabinet. Consult the respective peripheral manuals for space requirements for all peripheral devices.

3-5 ENVIRONMENTAL CONSIDERATIONS

Computer room cooling provisions should include air conditioning equipment with adequate capacity to safely extract all heat dissipated by a continuously operating computer system, and enough outlet and return air registers to minimize dead air spots around the equipment. Refer to the heat dissipation specifications at the beginning of this section to determine required cooling capacity of the air conditioning system. Temperature and humidity levels should be adjusted for operating personnel comfort, and should never exceed the following limitations:

Operating Temperature	15°C to 45°C (59°F to 115°F)
Relative Humidity	20% to 90% (non-condensing)



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Figure 3-1. Installation Dimensions, Computer Cabinet

3-6 INSTALLATION LAYOUT

The physical layout of the computer system is determined by cable lengths, size of room, and access to equipment. In planning the layout, units used most often such as console and keyboard units should be placed in the foreground for easy access; units that are used or serviced less frequently can be positioned farther back. Avoid placing the computer or any peripheral unit in a recessed or confined area. Cooling for these units is provided by fans which force internally generated heat out through top and rear vents, with air intake through lower vents. In order to ensure proper cooling and operation, these air paths must not be covered or obstructed in any way.

All system equipment should be placed at the planned locations before the required cable runs are finally decided. Each unit with a control panel or keyboard should be placed so the controls face the desired operation or work area. Eliminate any unforeseen problems such as personnel traffic patterns and objectionable glare before connecting cables.

3-7 CABLE CONNECTIONS

All I/O cables are attached to the I/O interface cards in the card nest assembly, and routed down through an opening in the forward portion of the cabinet floor. If the system is installed on a raised floor, an opening in the floor must be provided in line with the slot. If raised flooring is not used, the I/O cables may be routed out through the bottom rear of the cabinet.

The type and quantity of I/O cables required for any given installation will depend on the number and type of peripheral devices used, the priority interrupt configuration, and mainframe options. Applicable engineering drawings can be used as a guide for interconnecting the various units. Refer also to the peripheral equipment cabling and line termination requirements described in the technical manuals covering the peripheral devices in the system.

SECTION IV INSPECTION, ADJUSTMENT, AND CHECKOUT

4-1 SCOPE

This section contains the instructions required for post-installation inspection, adjustment, and checkout of the SLASH 6 Computer System.

4-2 INSPECTION

4-2.1 Computer Cabinet

1. Ensure that all external power, control, and data cables are properly connected, and circuit breakers are set to OFF.
2. Check assembly intercabling inside computer cabinet (Figure 4-1).
3. Check AC power distribution connections and retighten if necessary (Figure 4-2).
4. Check DC power wiring to backplane assembly (Figure 4-3 or 4-4).
5. Check backplane pin areas for bent pins or other damage.
6. Verify proper cards are installed in appropriate slots in backplane assembly (Table 4-1).

4-2.2 Peripheral Equipment

Refer to applicable peripheral equipment manuals for special post-installation checks for individual I/O devices.

4-3 ADJUSTMENT

The computer has no variable controls or functional moving mechanisms requiring alignment or adjustment following installation. All voltage levels are set by the manufacturer, and should not require subsequent readjustment unless repairs are made.

Refer to appropriate peripheral equipment manuals for electrical and mechanical adjustments of power supplies and peripheral devices.

4-4 CHECKOUT

4-4.1 Computer Diagnostic Programs

Equipment checkout is accomplished using diagnostic programs supplied with the computer. Each diagnostic program contains specific instructions for its execution. The diagnostic facilitates rapid checkout of the CPU mainframe and memory, and any peripheral units. The mainframe diagnostic is 61768-00; the memory diagnostic is 61845-00. Peripheral equipment diagnostics are listed in Table 4-2, together with the associated technical manual for the peripheral unit.

Table 4-1. SLASH 6 PC Cards

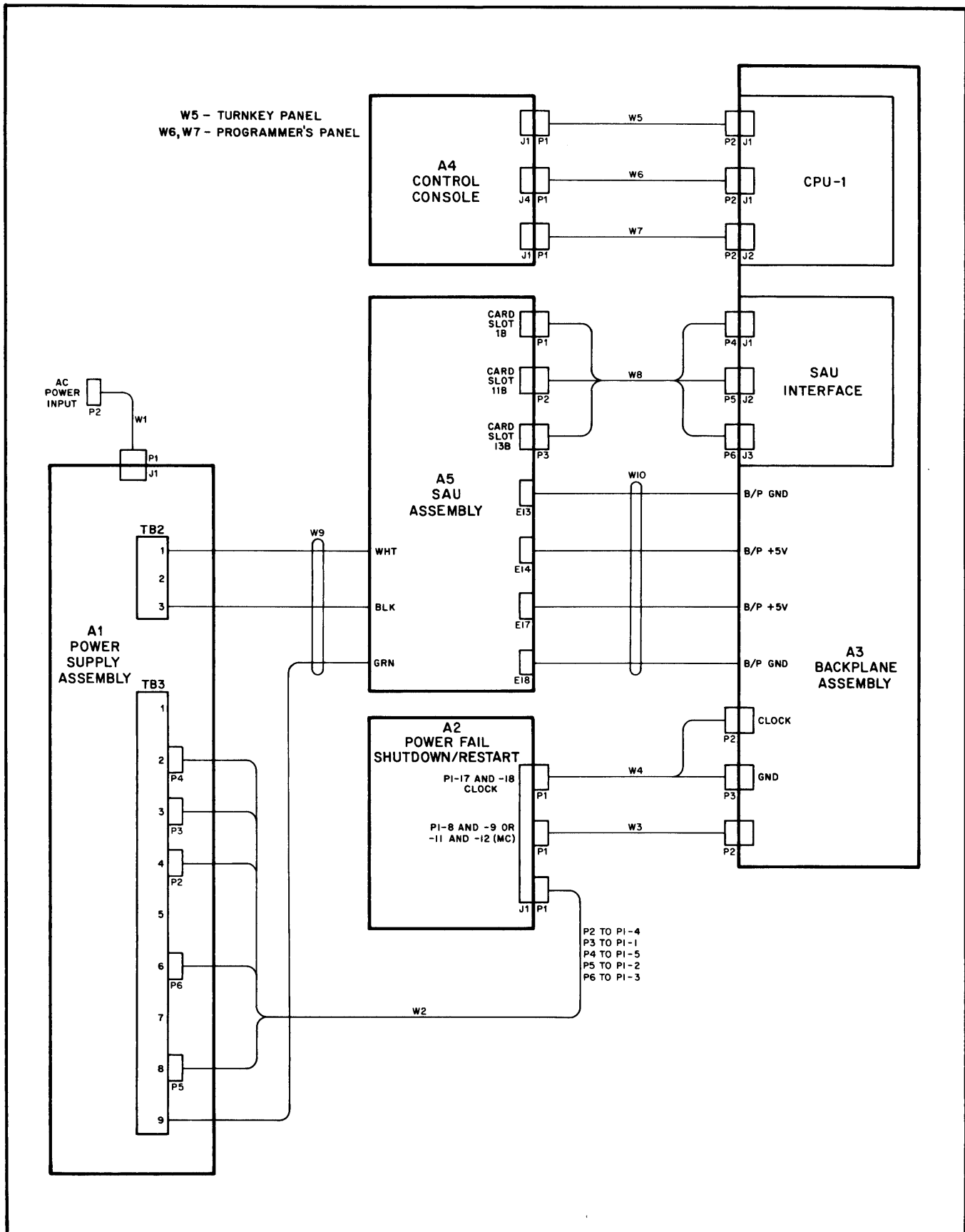
CARD NO.	CARD DESCRIPTION	FITS CARD SLOTS		
		10-POS	18-POS	22-POS
1510115	Option Board (Note 1)	10	18	22
1510121	PIOC, 8-Level (Note 2)	1-7	1-15	1-19
1510122	UBC I/O Channel (Note 3)	1-7	1-15	1-19
1510124	SAU Interface	1-8	1-16	1-20
1510126	MOS Memory with Error Correction	1-8	1-16	20
1510223	Virtual Memory	8	16	20
1510236	CPU-1	9	17	21
1510252	IBC	1-7	1-15	1-19
1510256	XBC	1-7	1-15	1-19

Note 1 The following cards plug into Option Board 1510115:

- 1510113 Interval Timer
- 1510117 Program Restrict
- 1510119 Priority Interrupt, 8-Level
- 1510120 Address Trap

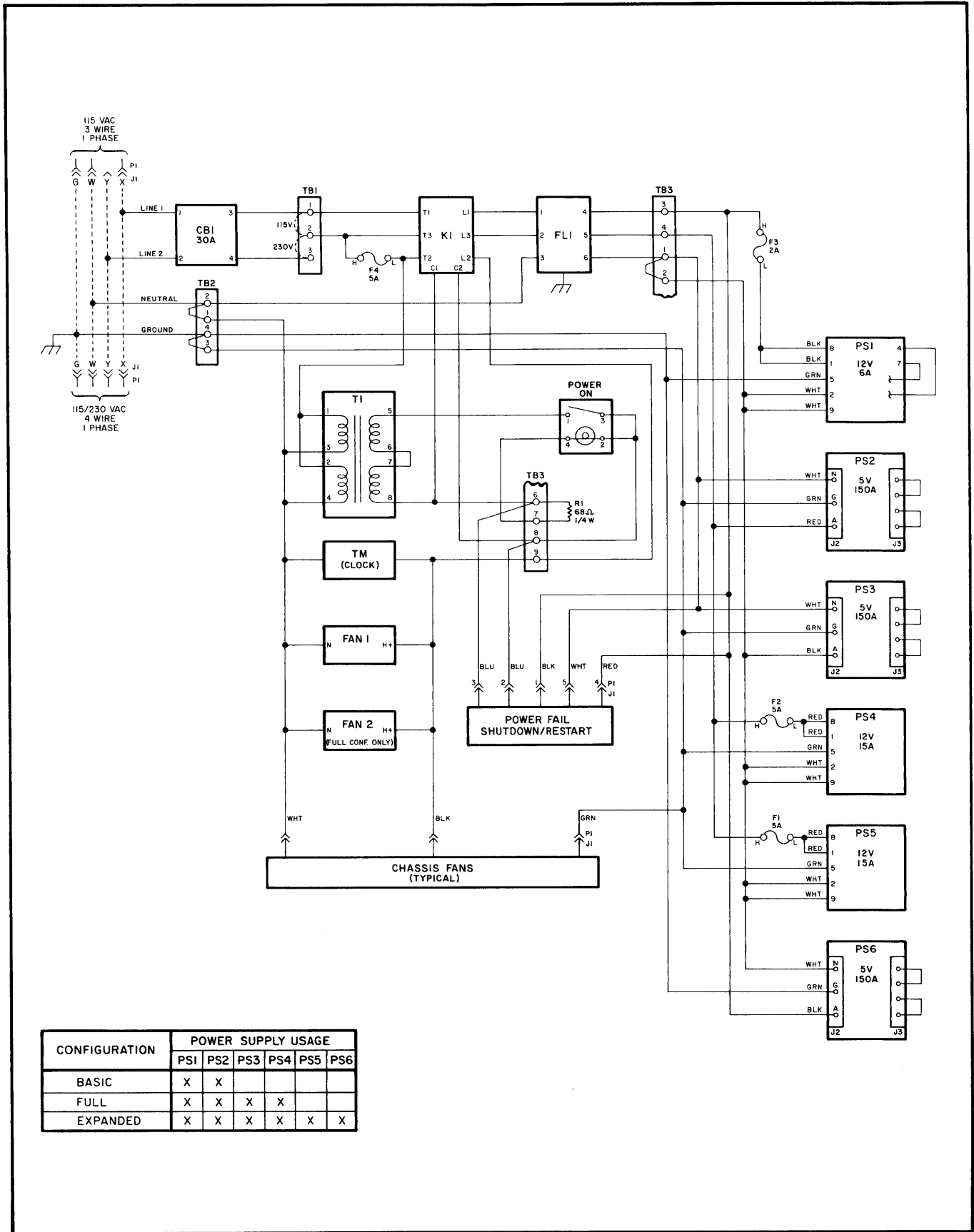
Note 2 Later serial numbers use 1510272 PIOC.

Note 3 Later serial numbers use 1510292 UBC



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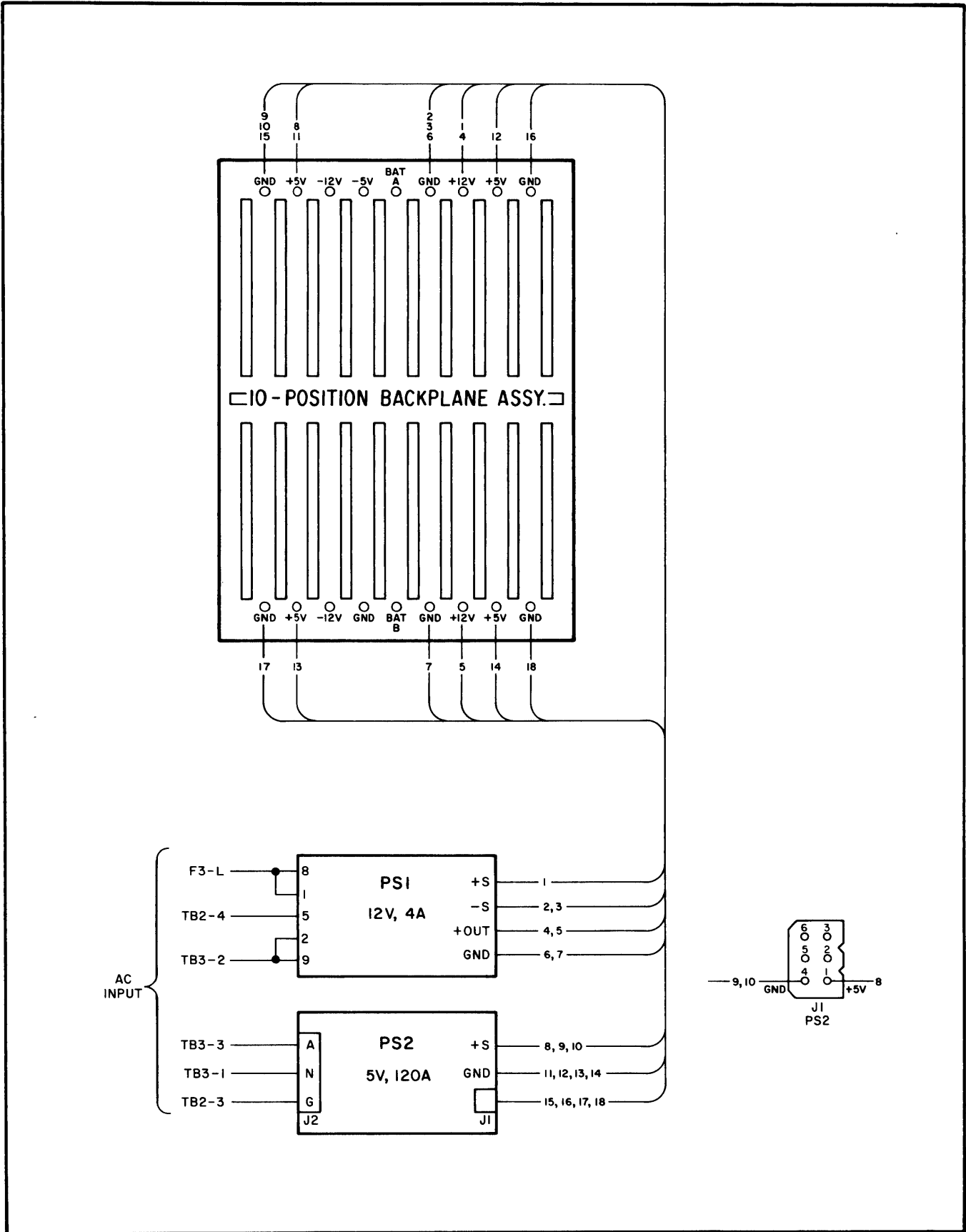
Figure 4-1. Interconnecting Diagram



CONFIGURATION	POWER SUPPLY USAGE					
	PS1	PS2	PS3	PS4	PS5	PS6
BASIC	X	X				
FULL	X	X	X	X		
EXPANDED	X	X	X	X	X	X

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Figure 4-2. AC Power Distribution



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Figure 4-3. Backplane DC Wiring, Basic Configuration

Table 4-2. Peripheral Diagnostics and Technical Manuals

Peripheral Equipment Nomenclature	Diagnostic No.	Manual
Keyboard/Printer Model 6001-1	AA61521-00	TM61310-00
Keyboard/Printer 6001-2, 6001-3	AA61521-00	TM61392-00
Keyboard/Printer Model 6001-4 and 6001-5	AA61521-00A	TM61371-00
Paper Tape Reader Model 6002-10 & 6002-20	AA61522-00	TM61313-00
Paper Tape Spooler Model 6002-21	AA61522-00	TM61313-00
Paper Tape Punch Model 6003	AA61523-00	TM61314-00
Card Reader Model 6005-2	AA61524-00	TM61317-00
Card Reader Models 6005-1 and 6005-3	AA61524-00	TM61357-00
Card Reader Models 3010, 3020 and 3030	AA61524-00	TM61357-00
Line Printer Model 6004-2	AA61561-00	TM61356-00B
Line Printer Model 6004-3	AA61525-00	TM61315-00
Line Printer Models 4005 and 4006	AA61579-00	TM61386-00
Disc Storage System (630)	AA61526-00	TM61318-00
Disc Controller (701/714)	AA61569-00	TM61340-00
Fixed-Head Disc (5300 Series)	AA61577-00	TM61373-00
Magnetic Tape Controller Model 6008-1	AA61556-00A	TM61359-00A
Magnetic Tape Controller Model 6009-1	AA61556-00A	TM61341-00
High Speed Paper Tape Reader Model 6002	AA61522-00B	TM61391-00
REMAX Paper Tape Reader/Punch Model 6003-10	AA61647-00	TM61108-00
Card Punch/Reader Model 307X	AA61704-00	
CDC Line Printer (24 Bit) Model 404X	AA61664-00	TM61127-00
TALLY Line Printer Model 444X	AA61679-00	TM61131-00
Synchronous Controller Model 9010	AA61686-00	TM61113-00
Asynchronous Controller Model 9000	AA61687-00	TM61111-00

4-4.2 Bootstrap Loader Programs

All programs are initially loaded by means of a bootstrap loader program. The bootstrap, once entered in the appropriate area in memory, will automatically load a minimum of one record from a selected peripheral device. A record loaded in this manner normally contains a more sophisticated loader that, in turn, will permit other programs, operating systems, etc. to be loaded into any desired area of memory. For bootstrap programs for the SLASH 6 Computer, refer to Operator's Manual 0840003.

Several versions of the bootstrap program are available. The actual bootstrap used will be determined by the peripheral device from which loading is to be accomplished. Bootstrap programs may be manually loaded into memory, instruction-by-instruction, by means of the operator's console. The PROM Bootstrap option provides automatic loading of the appropriate bootstrap program through the use of switches on the console. These switches initialize the Paper Tape, Card Reader, Disc, and Magnetic Tape peripheral units according to a BCD format. The BCD format can be altered so that any BCD code can control any I/O device bootstrap. The suggested standard is as follows:

BCD CODE	DEVICE	DEVICE NO.	CHANNEL
000	Disc	0	5
001	Mag. Tape (9-track, 800 BPI)	0	7
010	Mag. Tape (9-track, 1600 BPI)	0	7
011	Mag. Tape (7-track, 800 BPI)	0	7
100	Card Reader	1	3
101	Flexible Disc	0	3
110	Disc	0	6
111	Paper Tape Reader/Punch	1	0

SECTION V PREPARATION FOR RELOCATION OR RESHIPMENT

5-1 SHIPPING REQUIREMENTS

The circumstances involved in shipping the computer system will vary; therefore, no specific or all-inclusive procedures can be prescribed. Recommended methods, with precautionary considerations, are detailed for crated and wrapped shipments. These procedures can be modified, as necessary, to meet specific requirements.

5-2 PREPARATION FOR SHIPMENT

No special preparations are needed for room-to-room movement of equipment. The cabinet may be moved on its built-in wheels after all cables are disconnected and stowed, and all doors, lids, panels, etc. are closed and secured.

For padded van shipment, the cabinet must be wrapped according to the procedures in this section, and shipping brackets and retainers must be installed. For commercial truck or cargo aircraft shipment, additional protection is necessary, including a padded crate and shock mounting.

5-3 PACKING PROCEDURES

The equipment should be repackaged using the original packaging materials, if available. If these items are not available, new containers must be fabricated using instructions in this section for the computer cabinet, or in peripheral equipment manuals for peripheral units.

5-3.1 Equipment Cabinet

A. Wrapped Shipment

1. Ensure that all circuit breakers and power switches are set to OFF position, unless specified otherwise in detailed procedures.
2. Unplug all AC power cables, termination plugs, and I/O cables.
3. Cover AC power cable connectors and I/O cable connectors with foam pads and wrapping paper or padded envelope; coil each cable and tie or tape it securely. Pack coiled cables in a separate tri-wall carton.
4. Remove CPU memory PC boards and package them individually in sealed transparent envelopes, then in padded envelopes. Pack all wrapped memory boards carefully in a tri-wall carton.
5. Ensure that all PC boards to be shipped in equipment are securely mated with electrical connectors.

6. Install suitable metal shipping brackets using existing holes in cabinet and internal assemblies. Attach a "SHIPPING BRACKET ONLY" or similar red tag to each shipping bracket installed.
7. Transfer cabinet rear door handle to inside surface of door.
8. Close and latch or lock all cabinet doors. Ensure that all front panel screws are tightened securely.
9. Wrap a 12-inch-wide strip of plastic aircap (or equivalent material) completely around center area of cabinet; secure strip ends with nylon tape. Do not apply tape directly to equipment painted surfaces.
10. Completely cover equipment cabinet with 0.02- or 0.04-mil polyethylene film wrapping. Tape securely with nylon tape.
11. Move wrapped equipment cabinet into padded van. Position cabinet near corner, or with its back facing a wall. Surround cabinet with padding blankets, and strap securely to padded van wall and floor tiedown fittings.

B. Crated Shipment

1. Separate joined equipment cabinets.
2. Perform steps 1 through 9 of Paragraph 5-3.1A.
3. Obtain or fabricate a shipping crate. Refer to Paragraph 5-4 for shipping crate fabrication guidelines.



Orient shipping platform with its hinge cutouts on same side as cabinet door hinges to prevent warping cabinet door during shipment.

4. Position end of shipping platform parallel to, and within two inches of cabinet rear frame. Cut and lay a sheet of heavy protective paper onto platform.

5. Temporarily place a 2- by 3-foot piece of polyfoam or blanket padding over end of shipping platform adjacent to cabinet base. Screw cabinet levelling pads fully in, then roll cabinet against padding on platform.



A fully equipped cabinet may weight several hundred pounds. Use enough handling personnel in the following step to preclude injury to personnel or damage to equipment.

6. Block rear wheels and carefully tilt cabinet backwards, gently lowering its top end onto platform. Unscrew the four levelling pads from cabinet base.
7. Remove temporary padding placed in step 5. Be sure cabinet rests within the wood retaining strips on platform.
8. Completely cover cabinet with 0.02- or 0.04-mil polyethylene film wrapping secured to platform with nylon tape.
9. Cut two wood strips and fit onto wrapped cabinet as shown in Figure 2-1.
10. Install two 0.5 inch steel banding straps around cabinet wood strips and floating platform.
11. Cut polyfoam pads to fit wrapped cabinet sides and ends. Fit pads to cabinet, and attach with nylon tape.
12. Slip tri-wall or plywood crate sleeve down over cabinet and pads. Nail or staple lower edge of sleeve to wood nailing strips on shipping platform base.
13. Fit polyfoam pad over wrapped cabinet within crate sleeve.
14. Fit tri-wall or plywood crate cap onto top of crate sleeve. Secure cap with three 0.5-inch steel banding straps around shipping platform base and crate cap.

5-3.2 Accessories

1. Gather all removed accessories such as termination plugs, cabinet spacers, levelling pads, etc. removed from equipment.

2. Wrapped the three cabinet spacers (and their bagged attaching hardware) in a single package.
3. Individually wrap or place termination plugs into padded envelopes.
4. When practical, pack accessories into a single tri-wall carton. Fill voids with dunnage, and seal carton with nylon or glass tape.

5-3.3 Spare Components

Pad and wrap spare components in the same manner as that used for accessories. Individually seal PC boards in plastic envelopes, then place into padded bags. Bulk pack these items in as few tri-wall cartons as practical.

5-3.4 Peripheral Equipment

Package all peripheral units according to the instructions provided in the individual unit's manuals.

5-3.5 Postpackaging Requirements

1. Clearly mark each shipping container with a suitable notice such as: "FRAGILE, DELICATE ELECTRONICS EQUIPMENT; DO NOT DROP, JAR, OR ALLOW TO GET WET."
2. Denote top of each container with conspicuous markings on sides as well as top.
3. For multiple-container shipments, mark containers: BOX 1 of ---, BOX 2 of ---, etc.
4. Verify that all shipping documents have the correct address and an accurate listing of items being shipped.
5. Unless otherwise specified in local standards, enclose shipping documents in a moisture-proof envelope, and attach envelope to exterior surface of shipping container.

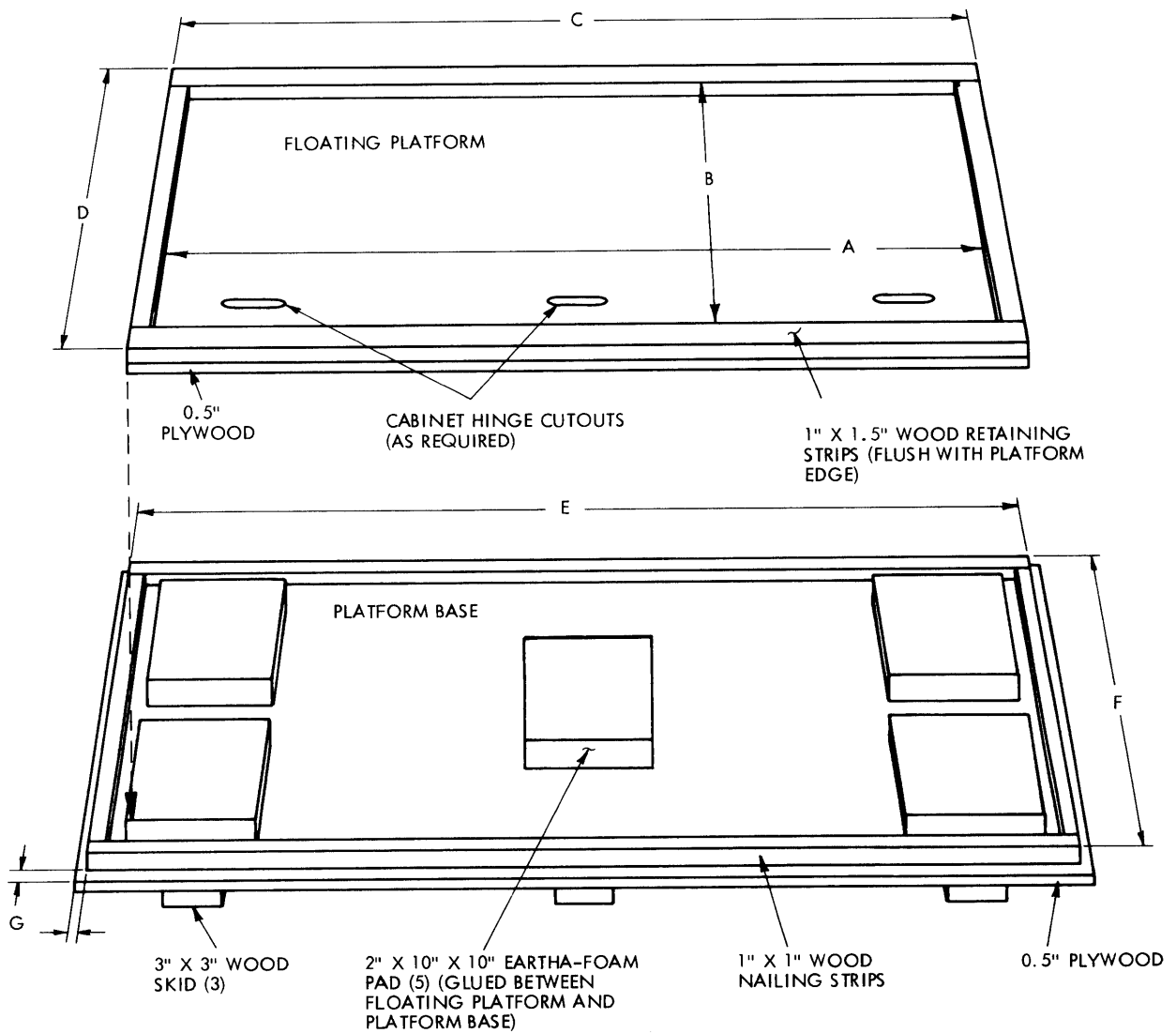
5-4 SHIPPING CRATE FABRICATION

Shipping crate dimensions may vary significantly because of differences in available material thicknesses. Therefore, recommended material thicknesses only are specified, and enough other information is provided to determine optimum dimensions of the shipping crate.

5-4.1 Floating Platform and Base (See Figure 5-1)

1. Measure extreme height and width spans of cabinet back side and add 0.25 inch to determine dimensions A and B, then determine dimensions C and D as indicated in the table in Figure 5-1.
2. Cut plywood sheet (0.5-inch minimum) to dimensions C and D.

SPAN	DIMENSIONS
A	0.25" GREATER THAN CABINET REAR FRAME HEIGHT.
B	0.25" GREATER THAN CABINET REAR FRAME WIDTH.
C	A PLUS WIDTH OF TWO WOOD RETAINING STRIPS.
D	B PLUS WIDTH OF TWO WOOD RETAINING STRIPS.
E	C PLUS THICKNESS OF TWO POLYFOAM PADS TO BE USED IN CRATE.
F	D PLUS THICKNESS OF TWO POLYFOAM PADS TO BE USED IN CRATE.
G	THICKNESS OF TRI-WALL OR PLYWOOD SLEEVE MATERIAL.



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Figure 5-1. Floating Platform and Base Fabrication Details

3. Cut and nail/staple 1 by 1.5 inch wood retaining strips flush with edges of plywood platform.
4. Carefully fit floating platform to back of cabinet and mark locations of hinges. Make appropriate hinge cutouts in floating platform.
5. Determine dimensions E, F, and G (Figure 5-1). Cut a plywood sheet (0.5-inch minimum) to dimensions F plus 2G wide by E plus 2G long.
6. Cut and nail/staple 1 by 1-inch wood nailing strips one G dimension inside platform base edges.
7. Cut three lengths of 3 by 3-inch wood skids as long as the platform base is wide, and bevel the skid ends. Nail platform base to skids.

8. Cut five 10 by 10-inch shock pads from 2-inch-thick Eartha-foam stock. Glue shock pads to platform base at locations shown in Figure 5-1.

5-4.2 Sleeve and Cap

1. Measure spans E and F on prepared platform base (Figure 5-1) to obtain inside length and width for crate sleeve (Figure 2-1). Obtain height of crate sleeve by measuring depth of cabinet to be crated, then adding 2 inches for padding and 2.5 inches for floating platform.
2. Make a 4-sided crate sleeve from tri-wall or 0.5-inch plywood to the dimensions determined in step 1.
3. Make a snug-fitting crate cap using 0.5-inch plywood (Figure 2-1).