

**DPS 6 PLUS**  
**MSU9901/9902 & MSU9911/9912**  
**Disk Installation**

Honeywell Bull

**DPS 6 PLUS  
MSU9901/9902 & MSU9911/9912  
DISK INSTALLATION**

**SUBJECT**

Preparation and Installation Procedures

**SPECIAL INSTRUCTIONS**

This manual has been revised to the -200 level. It supersedes all previous issues.

The following notice is provided in accordance with the United States Federal Communications Commission's (FCC) regulations.

**Warning:** This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. The equipment manufactured after October 1, 1983 has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. The equipment manufactured prior to October 1, 1983 has not been tested for compliance. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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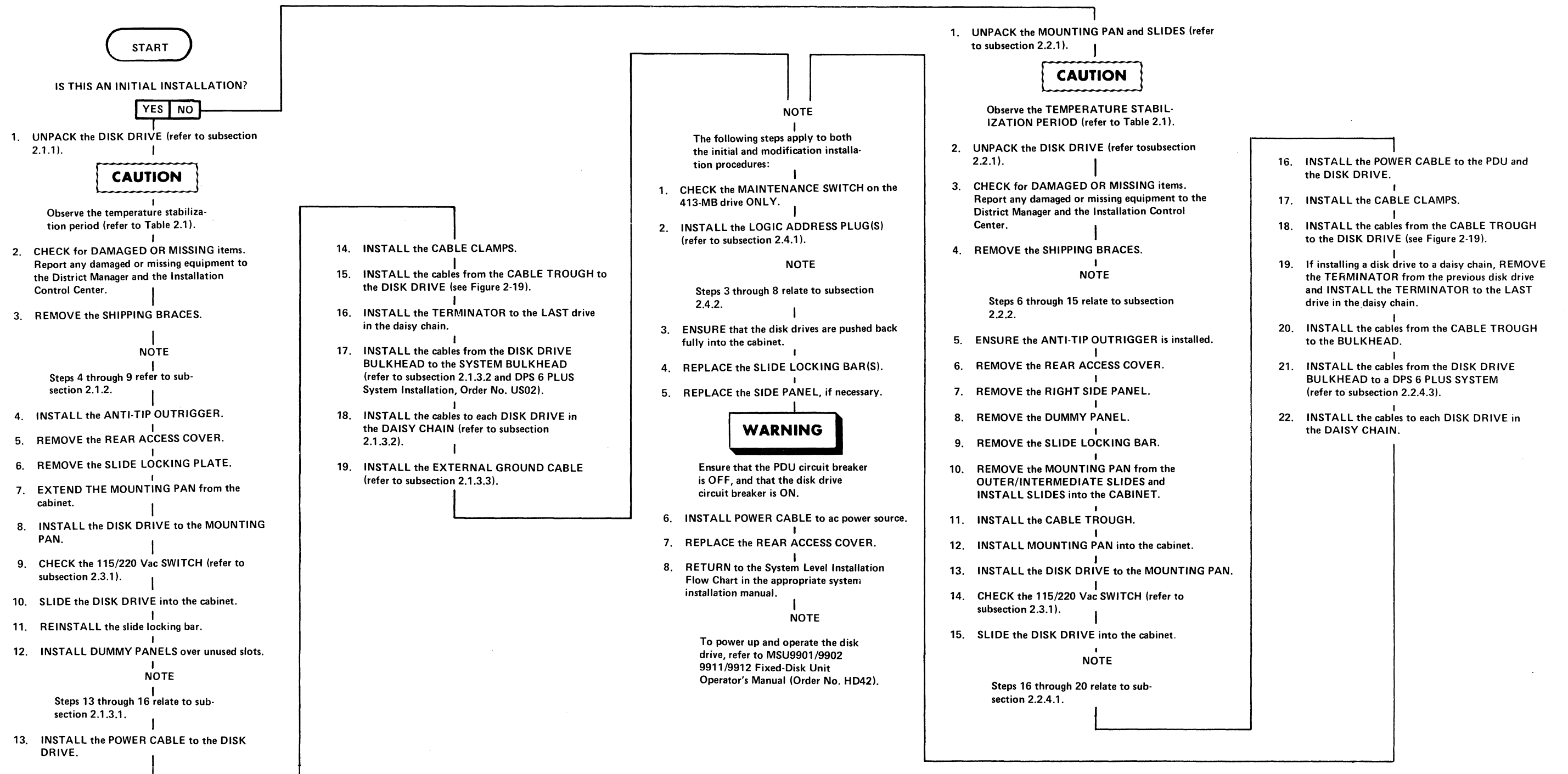
June 1987

**Honeywell Bull**

**USER COMMENTS FORMS** are included at the back of this manual. These forms are to be used to record any corrections, changes, or additions that will make this manual more useful.

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# *Section 1*

## ***INTRODUCTION***

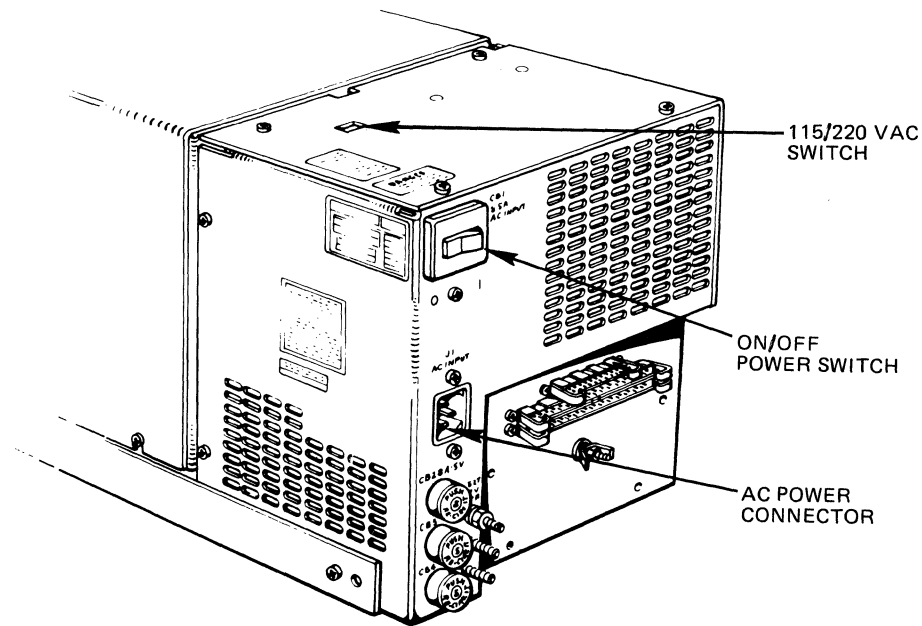
This document provides the procedures for installing the MSU9901/9902 and MSU9911/9912, hereinafter referred to as the disk drive, to a DPS 6 PLUS system at the site. MSU is the abbreviation for Mass Storage Unit.

Section 1 contains a brief description of the disk drive and a list of reference documents including the system installation manuals used in conjunction with this document. Section 2 provides the installation procedures. Section 3 contains the repackaging procedures.

### 1.1 DEVICE OVERVIEW

The disk drive (see Figures 1-1 and 1-2) uses 9-inch fixed disks for storage. The various marketing configurations are described as follows:

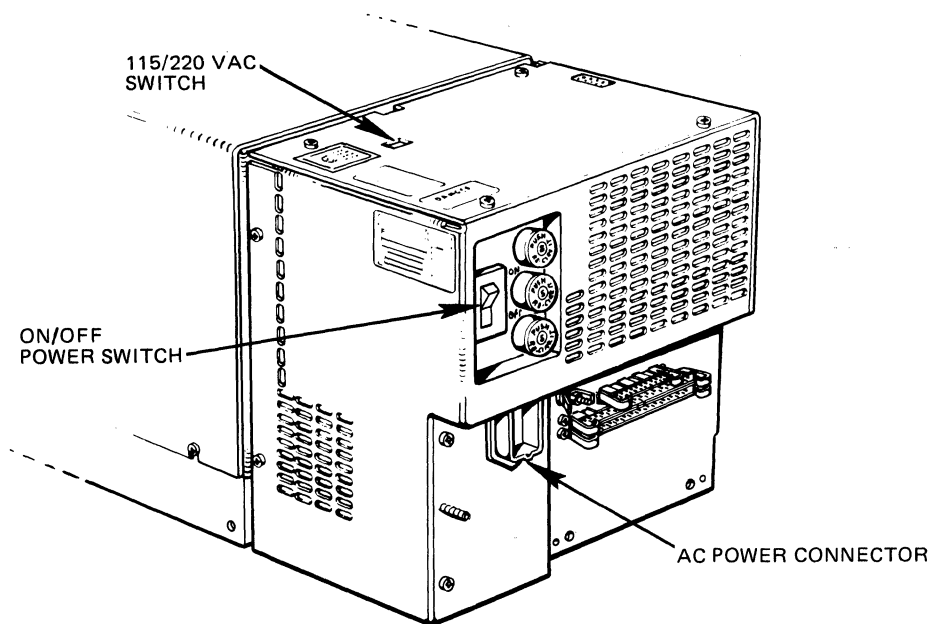
- MSU9901 - (initial drive) has a formatted capacity of 132 megabytes, and is packaged with a 30-inch cabinet, cables, and mounting hardware.
- MSU9902 - (add-on drive) has a formatted capacity of 132 megabytes, and is packaged with cables and mounting hardware.
- MSU9911 - (initial drive) has a formatted capacity of 413 megabytes, and is packaged with a 30-inch cabinet, cables, and mounting hardware.



(A) WITH EARLIER POWER SUPPLY INSTALLED

85-208

(A) With Earlier Power Supply Installed



(B) WITH LATER POWER SUPPLY INSTALLED

85-478

(B) With Later Power Supply Installed

Figure 1-1. Disk Drive (Rear View)

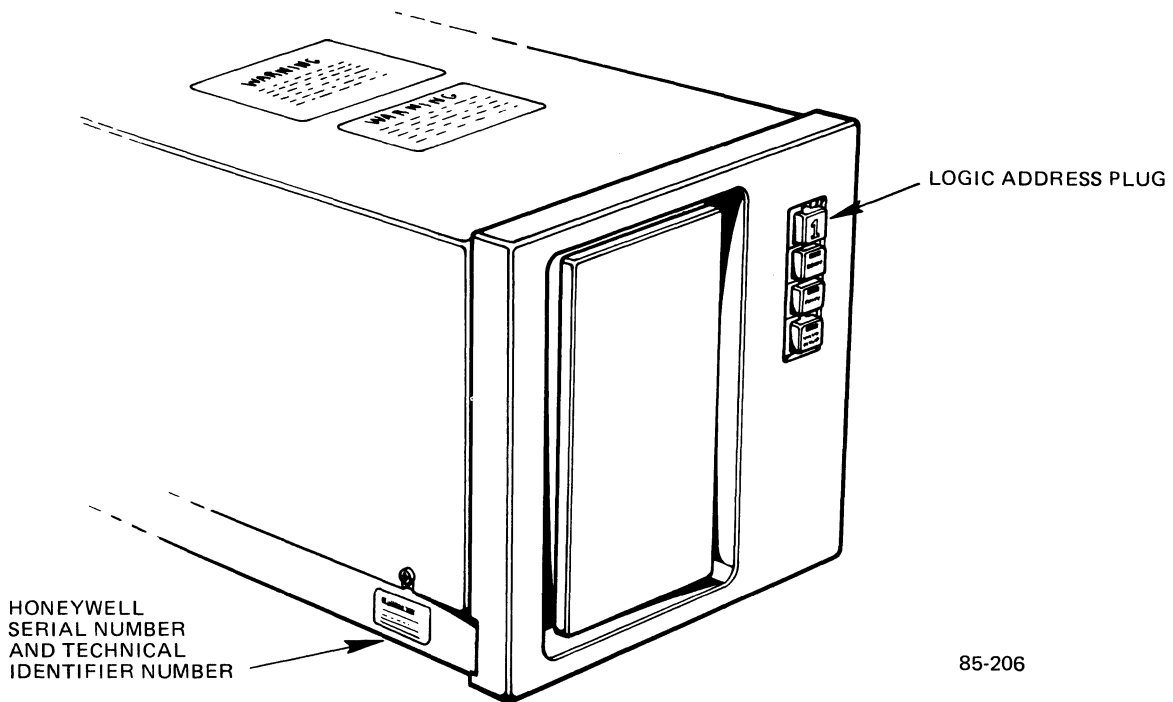


Figure 1-2. Disk Drive (Front View)

- MSU9912 - (add-on drive) has a formatted capacity of 413 megabytes, and is packaged with cables and mounting hardware.

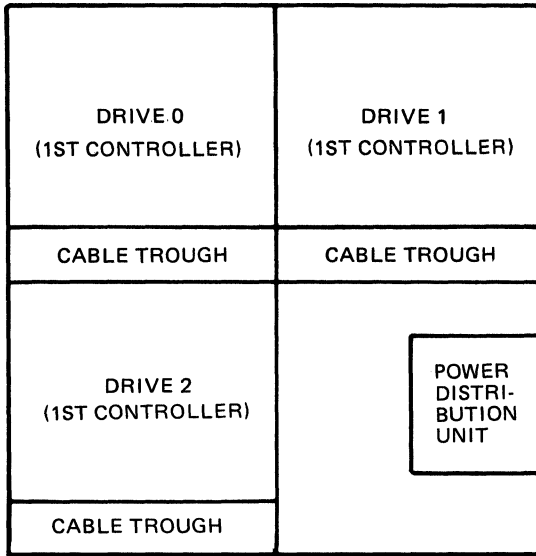
The dimensions of the disk drive are as follows:

- Height: 10.2 inches (25.9 cm)
- Width: 8.5 inches (21.6 cm)
- Length: 29.6 inches (75.2 cm)
- Weight: 82 lbs (37.2 kg) (413-megabyte drive)  
66 lbs (29.9 kg) (132-megabyte drive).

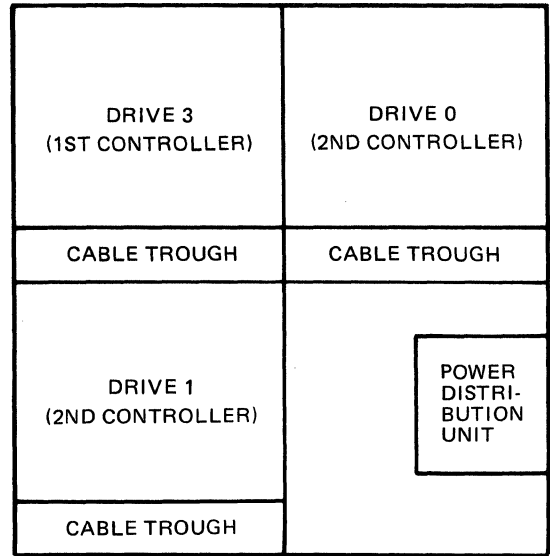
NOTE

The Technical Identifier and the Honeywell Bull Serial Numbers are visible on the front left side of the disk drive.

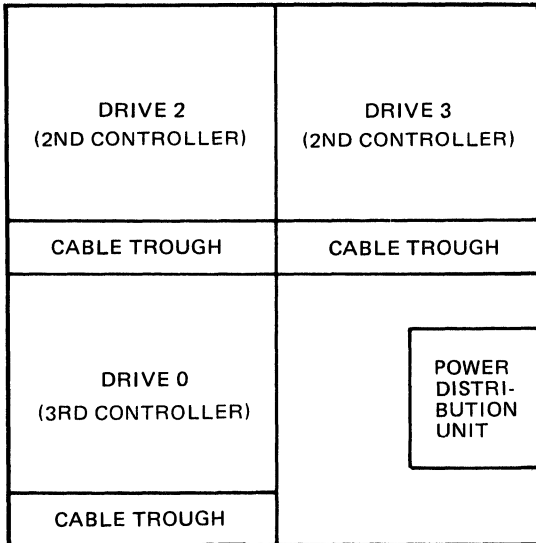
The disk drive is installed in a 30-inch cabinet with a maximum of three disk drives to one cabinet. Up to four disk drives can be daisy-chained together and controlled by one controller board. Figure 1-3 illustrates the cabinet configurations for twelve disk drives with three controller boards in one system.



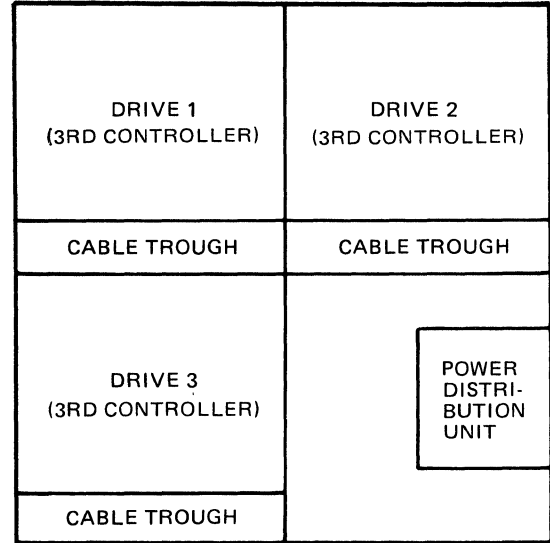
(A) FIRST CABINET



(B) SECOND CABINET



(C) THIRD CABINET



(D) FOURTH CABINET

NOTE

EACH DAISY-CHAIN CAN HAVE A  
MAXIMUM OF FOUR DISK DRIVES  
CABLED TO ONE CONTROLLER  
BOARD.

85-187

Figure 1-3. Disk Cabinet Configurations (Front View)

## 1.2 REFERENCE DOCUMENTS

This subsection provides a list of documents that aid in installing and operating the system.

- MSU9901/9902/9911/9912 Fixed Disk Drive Operation (Order No. HD42)
- DPS 6 PLUS TACPAC II CSE Manual (Order No. US10)
- DPS 6 PLUS Model 410 and Model 420 System Installation (Order No. US02)
- DPS 6 PLUS Controller Boards Installation (Order No. US15).



## *Section 2*

# *DEVICE INSTALLATION*

This section provides the procedures for installing one to three disk drives in a free-standing, 30-inch cabinet. The procedures to cable one to four disk drives to a system are also provided. Subsection 2.1 contains the procedures for installing an initial system (i.e., a system with no previously installed disk drives). Subsection 2.2 contains the procedures for installing additional disk drives to an existing system. Subsection 2.3 contains the device switch settings, and subsection 2.4 completes the installation.

### 2.1 INITIAL INSTALLATION

This subsection provides the following procedures:

- Unpacking the disk drive
- Preparing the device cabinet
- Installing the disk drive into the cabinet
- Cabling the rear of the disk drive
- Cabling the disk drive to the system.

#### 2.1.1 Unpacking

To unpack the disk drive, perform the following steps:

1. Cut the straps that secure the carton to the skid.
2. Without cutting the tape, lift off the top half of the carton (see Figure 2-1).

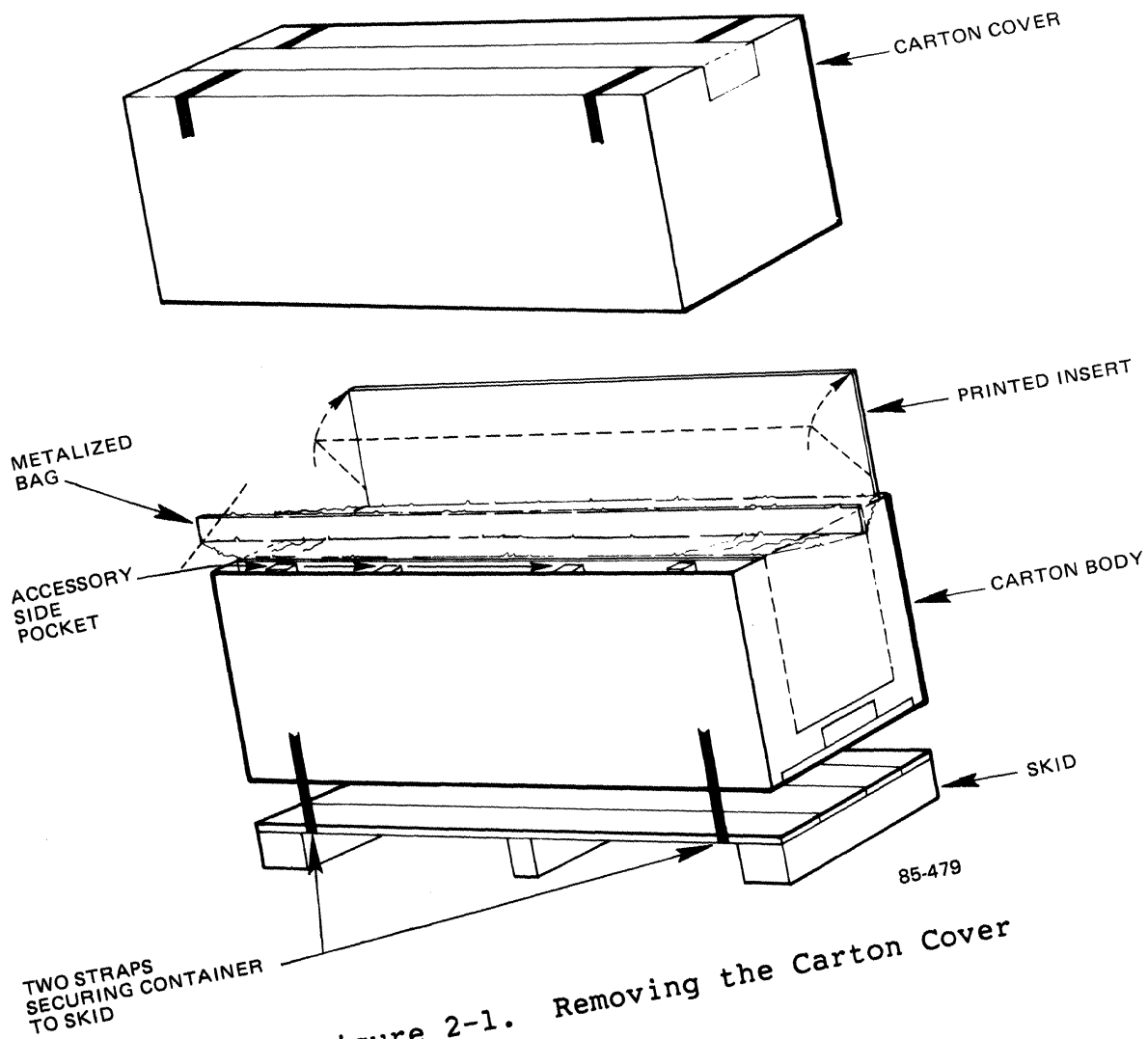


Figure 2-1. Removing the Carton Cover



3. Remove the unpacking/temperature stabilization cardboard insert. Observe the temperature stabilization time period (refer to Table 2-1).

Table 2-1. Temperature Stabilization Time Period

Previous Temperature		Acclimatization Time (Hours)
Degrees F	Degrees C	
+40	+4	1
+30	-1	2
+20	-7	4
+10	-12	5
0	-18	5
-10	-23	6
-20	-29	6
-30	-34	7

**CAUTION**

To prevent condensation from occurring and damaging the equipment, the temperature stabilization period must be observed prior to continuing with the unpacking procedure.

4. From the side pocket of the carton, remove and set aside the accessory packages, which contain the following items:
  - Bag of mounting screws
  - Terminator
  - A set of logic address plugs
  - Cable clamp assembly
  - Connector panel cover (not used)
  - Power cord (not used).

NOTE

The sealed bag that contains the disk drive must be saved for future reshipment of the drive. Therefore, exercise caution while performing the following step.

- Carefully cut open the sealed metalized bag immediately below the top edge seal (see Figure 2-2).

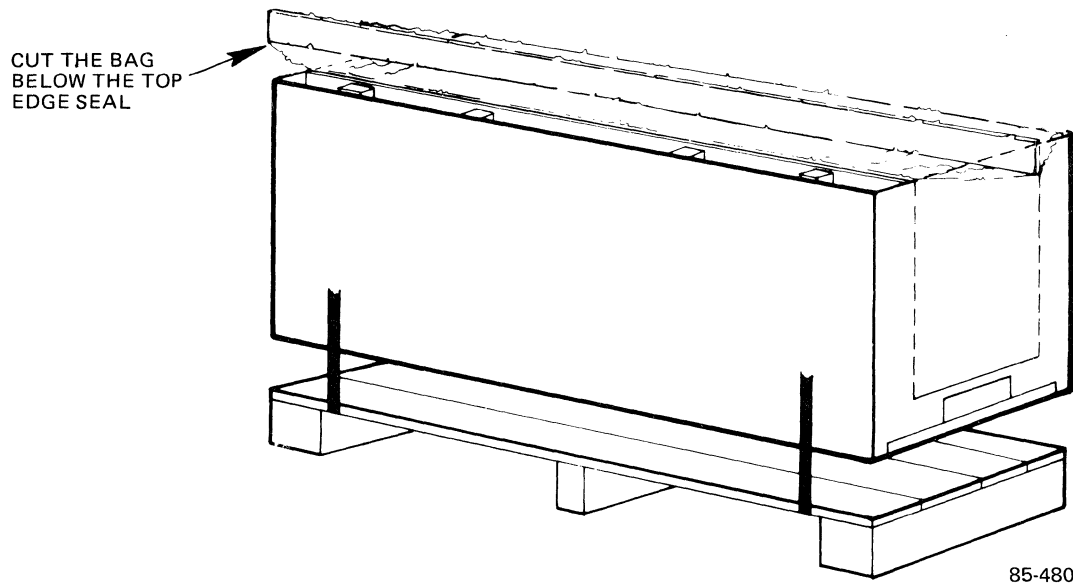


Figure 2-2. Cutting the Metalized Bag

- Remove the two foam end caps by pulling them straight up (see Figure 2-3).

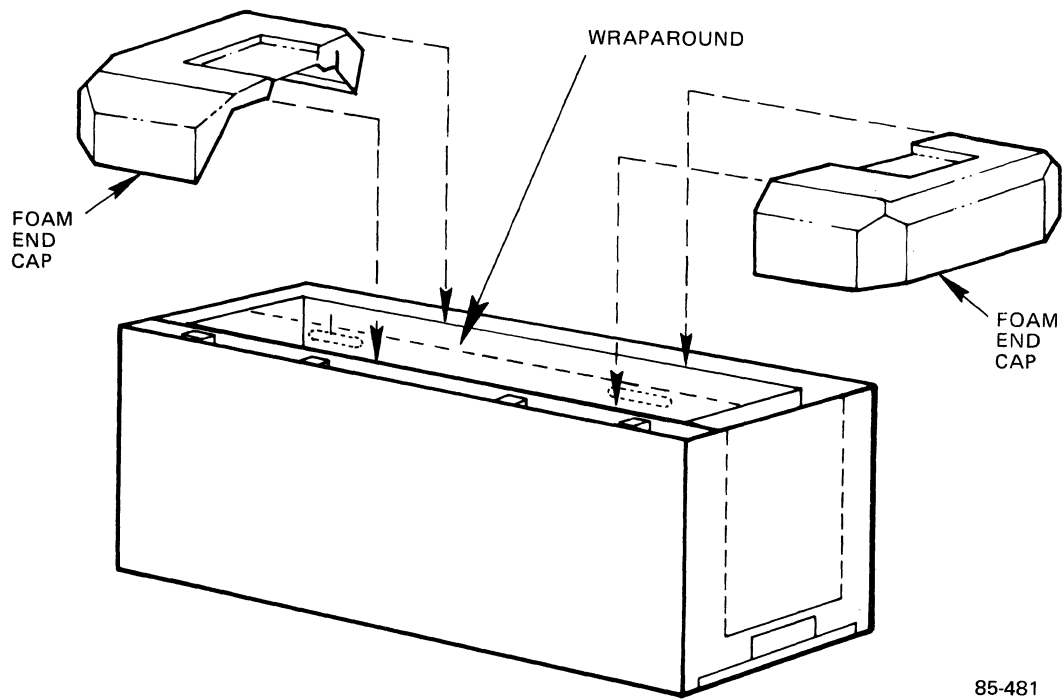


Figure 2-3. Removing the Foam End Caps

7. Open the top flaps of the cardboard wraparound by pulling the two locking tabs from the slots on the top edge of the wraparound (see Figure 2-4).

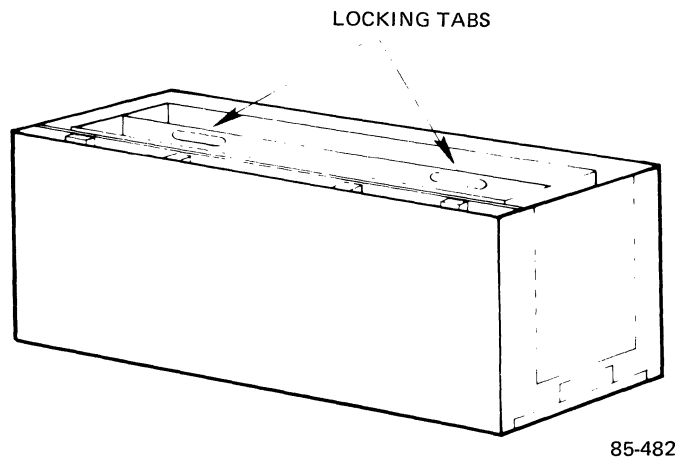


Figure 2-4. Locking Tabs

8. Locate the crease on each of the two flaps that runs adjacent to the hand holes, and bend these creases upward so that when the two flaps are placed together, the hand holes line up forming handles (see Figure 2-5).

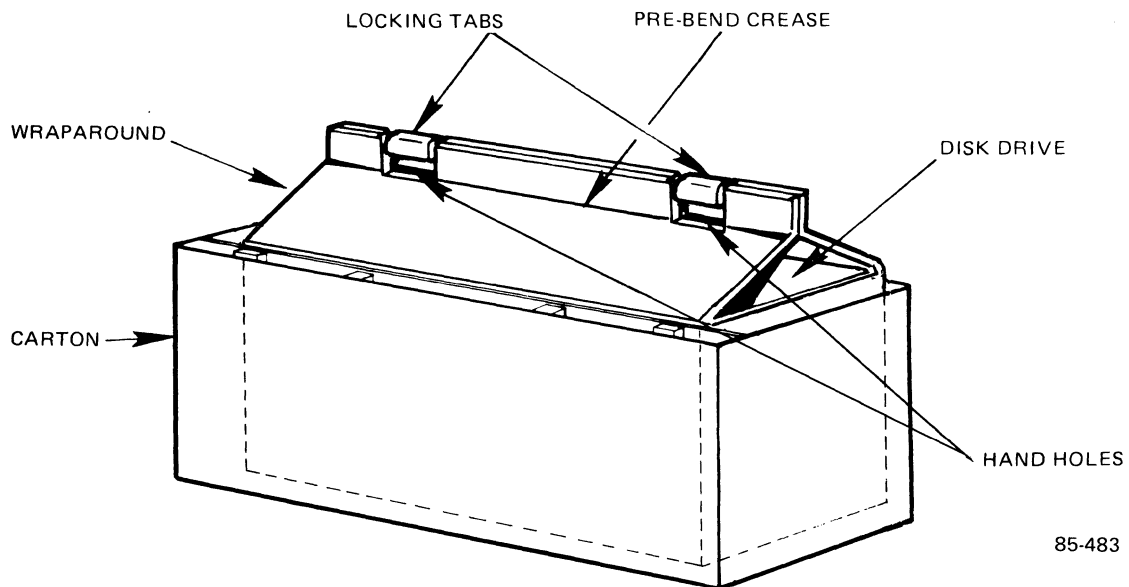


Figure 2-5. Wraparound Shown Inside Carton

9. Place the two locking tabs on the outside of the opposite flap to reinforce the handle.

## WARNING

The 413-megabyte disk drive weighs approximately 82 pounds, and the 132-megabyte disk drive weighs approximately 66 pounds. To avoid bodily injury, two people must lift the disk drive out of the carton.

## CAUTION

When lifting the drive out of the carton, do not twist the handles of the wraparound. This will cause the handles to tear and damage will result.

10. Using the handles, lift the drive out of the carton and set it on the floor.
11. Open the wraparound and remove the internal cardboard sleeve, the front and rear foam inserts, and the plastic dust cover (see Figure 2-6).

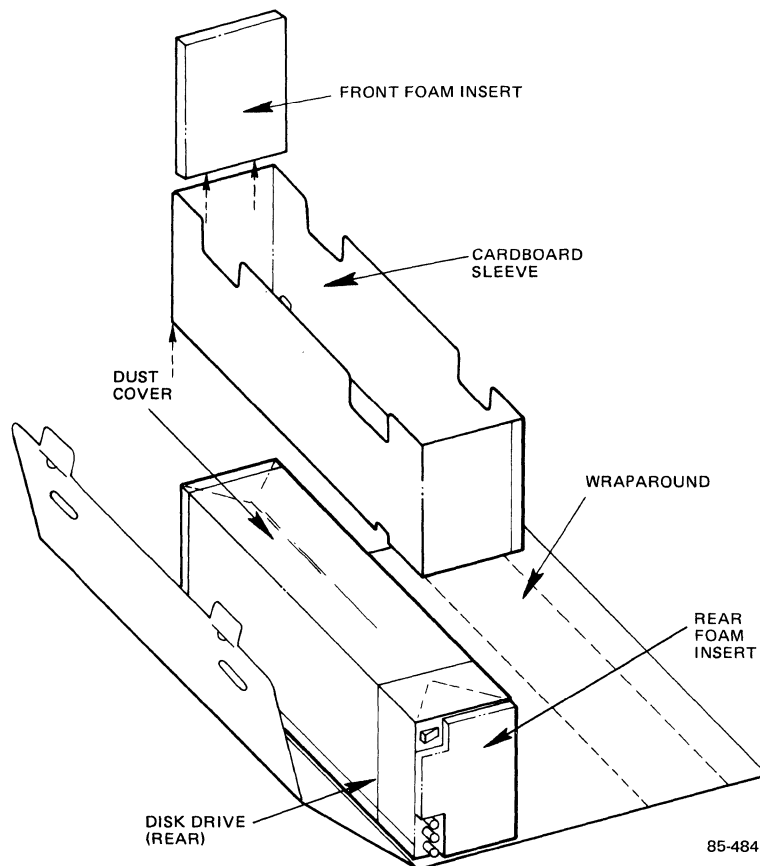


Figure 2-6. Removing the Wraparound

12. Check for damaged or missing items. Report any damaged or missing items to the District Manager and the Installation Control Center.
13. At the disk drive, locate the shipping braces on both sides of the drive. Remove the shipping brace on one side by removing the three screws (see Figure 2-7). Repeat for the other side.

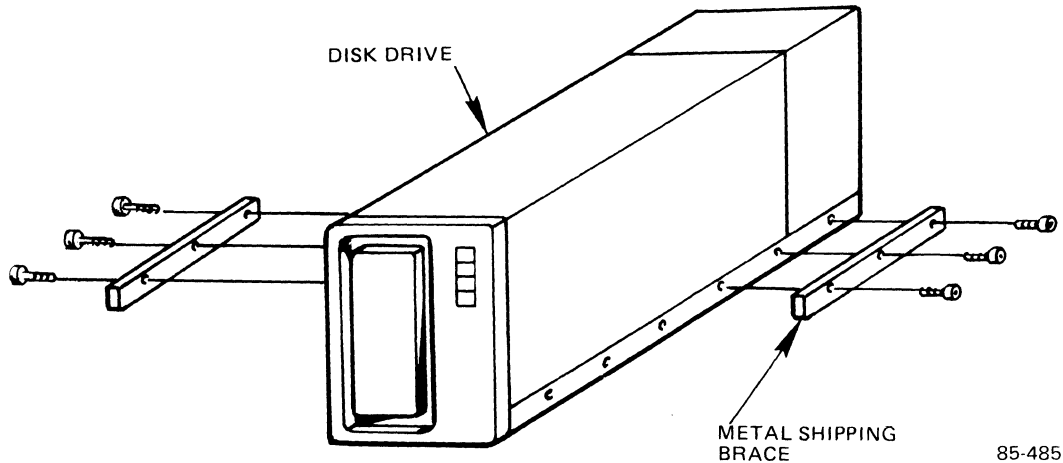


Figure 2-7. Removing the Shipping Braces

NOTE

All packing material, including the shipping braces and screws, must be saved for future reshipment of the drive.

14. Return to the Device Installation Flowchart.

### 2.1.2 Device Installation

This subsection provides the following procedures:

- Installing the anti-tip outrigger
  - Installing the disk drive to the mounting pan
  - Installing the disk drive into the cabinet
  - Installing the dummy panel.
1. Remove the shipping straps, the plastic cover, and the cardboard top from the cabinet.

2. Place the 30-inch cabinet in accordance with the system layout plan. (Cable length dictates that the cabinet must be placed within 20 feet of the cabinet that contains the disk controller.)
3. Locate the anti-tip outrigger kit (60134360-004). Install the two hex screw caps to the anti-tip outrigger; then install the anti-tip outrigger to the cabinet as shown in Figure 2-8. Tighten the screws into the cabinet so that the front of the cabinet rests on the anti-tip outrigger and not on the casters.
4. Lift and remove the cabinet front panel.

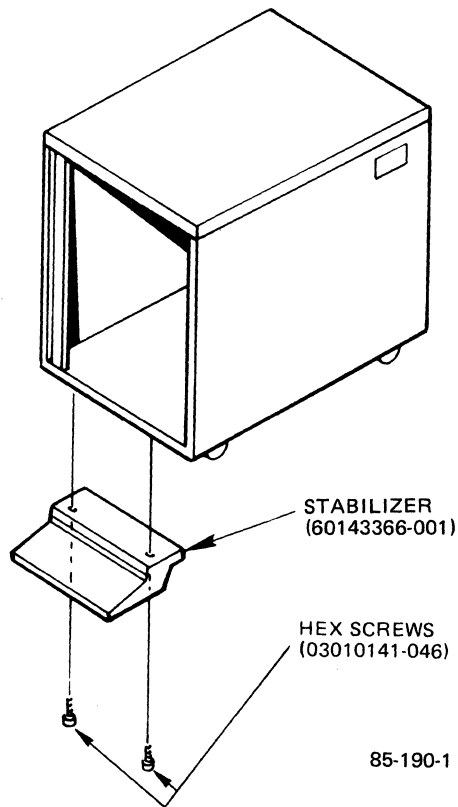


Figure 2-8. Anti-Tip Outrigger

5. At the rear of the cabinet, lift up and remove the rear access cover (see Figure 2-9).

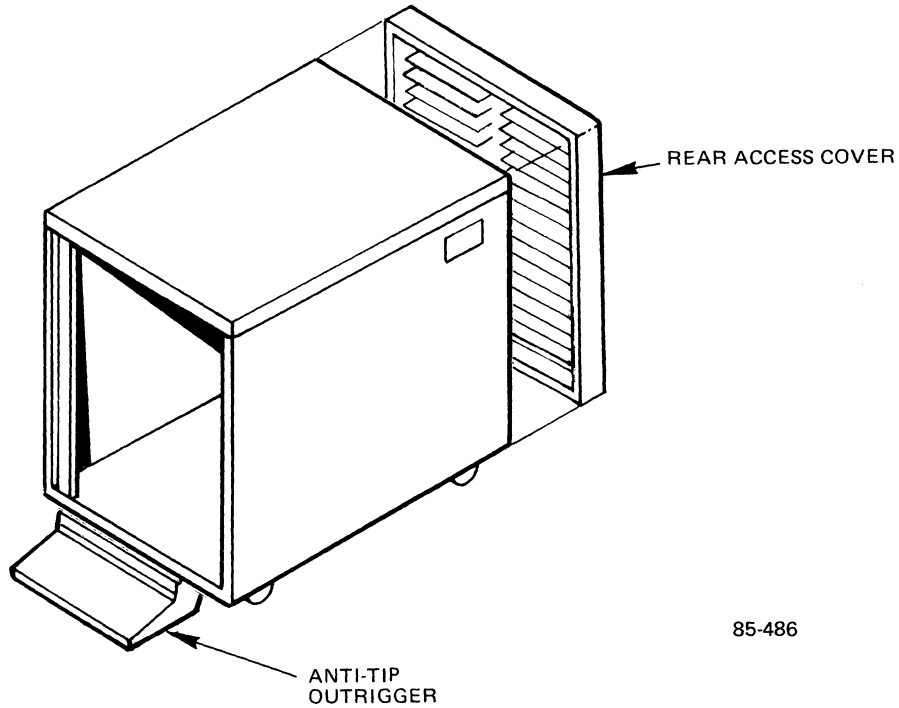


Figure 2-9. Removing the Rear Access Cover

6. Lower the leveling feet at the rear of the cabinet (see Figure 2-10) until the rear of the cabinet rests on the feet and not on the casters. Ensure that the cabinet is level by adjusting the two feet.

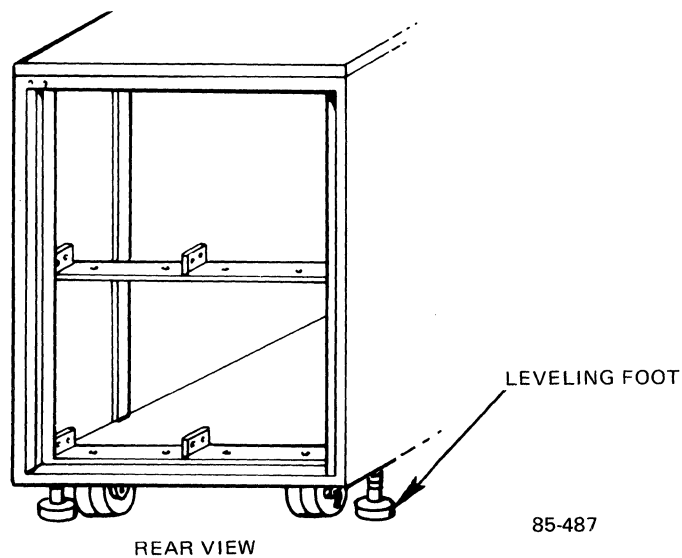
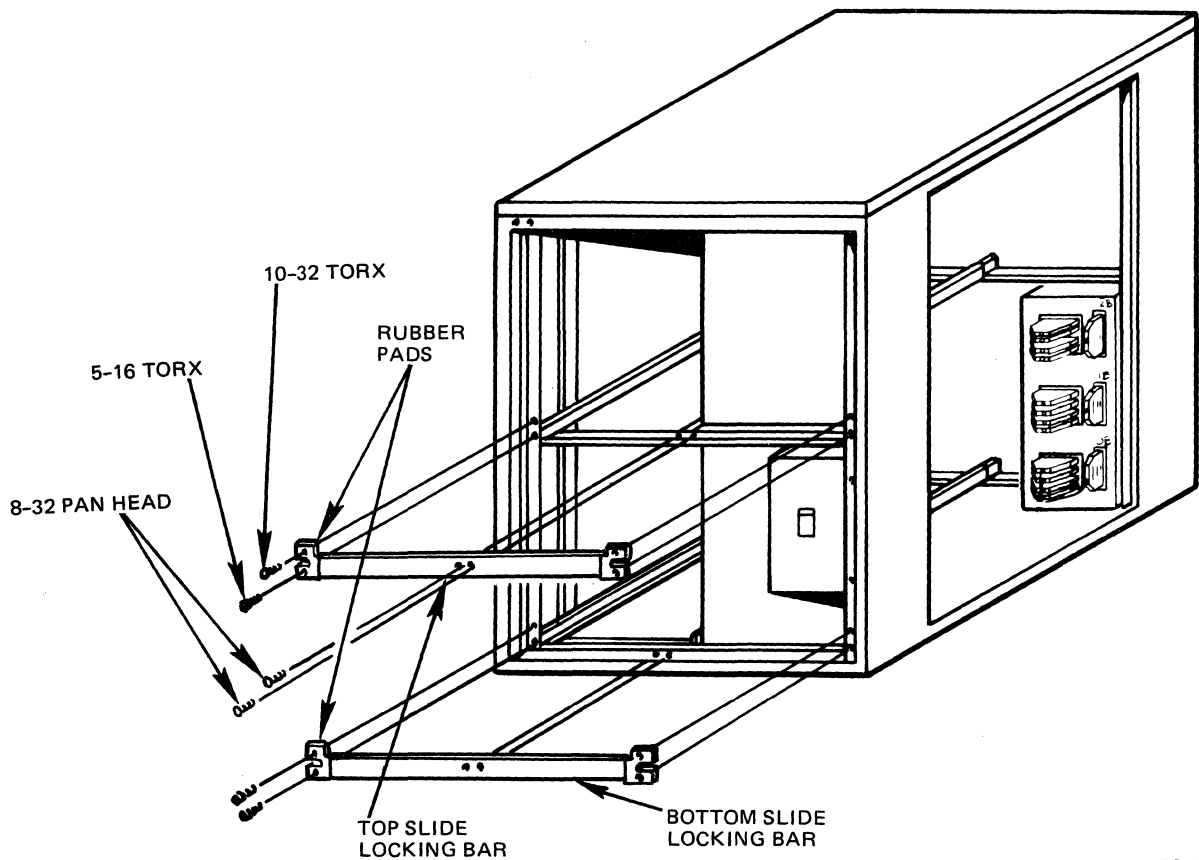


Figure 2-10. Lowering the Leveling Feet

7. At the front of the cabinet, remove the top slide locking bar by removing the six screws (see Figure 2-11). Set them aside for reinstallation in subsection 2.4.2.



85-488-1

Figure 2-11. Slide Locking Bars



8. Inside the cabinet are the mounting pan (see Figure 2-12) and the slide assembly. Extend the mounting pan out of the cabinet until the slides click into the locked position.

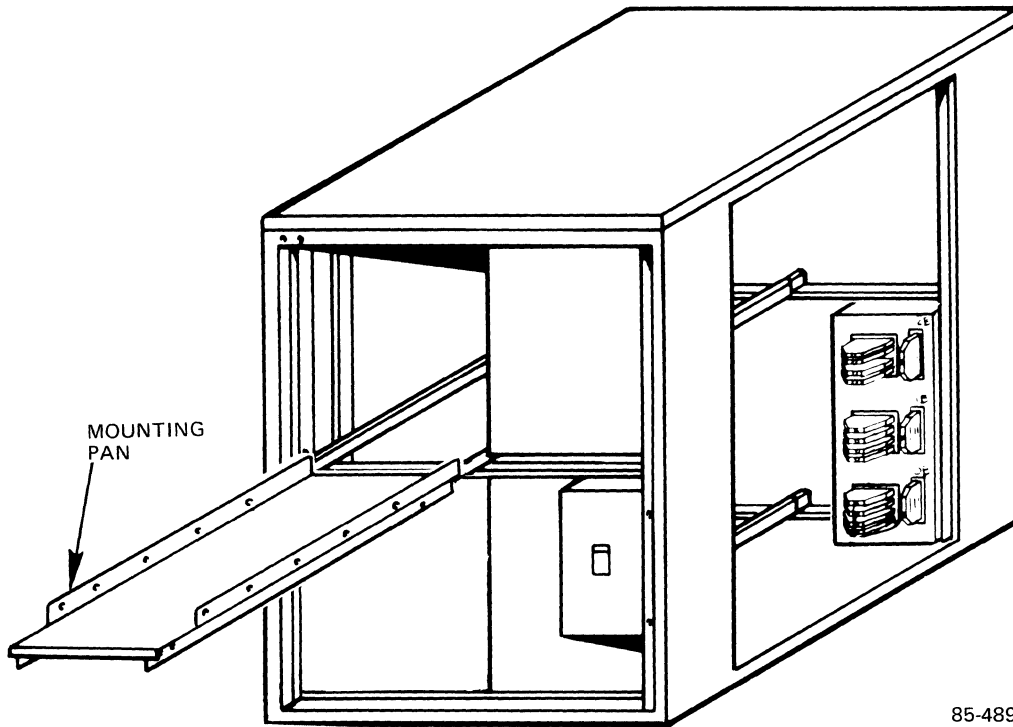


Figure 2-12. Mounting Pan Assembly

9. To avoid damaging the cables, ensure that all the cable connectors at the rear of the cable trough are hanging outside the trough and that the cables are lying flat in the trough.

**WARNING**

To avoid bodily injury and equipment damage, at least two people are required to lift the disk drive.

10. Lift the disk drive and place it in the mounting pan. Ensure the holes are lined up as shown in Figure 2-13.

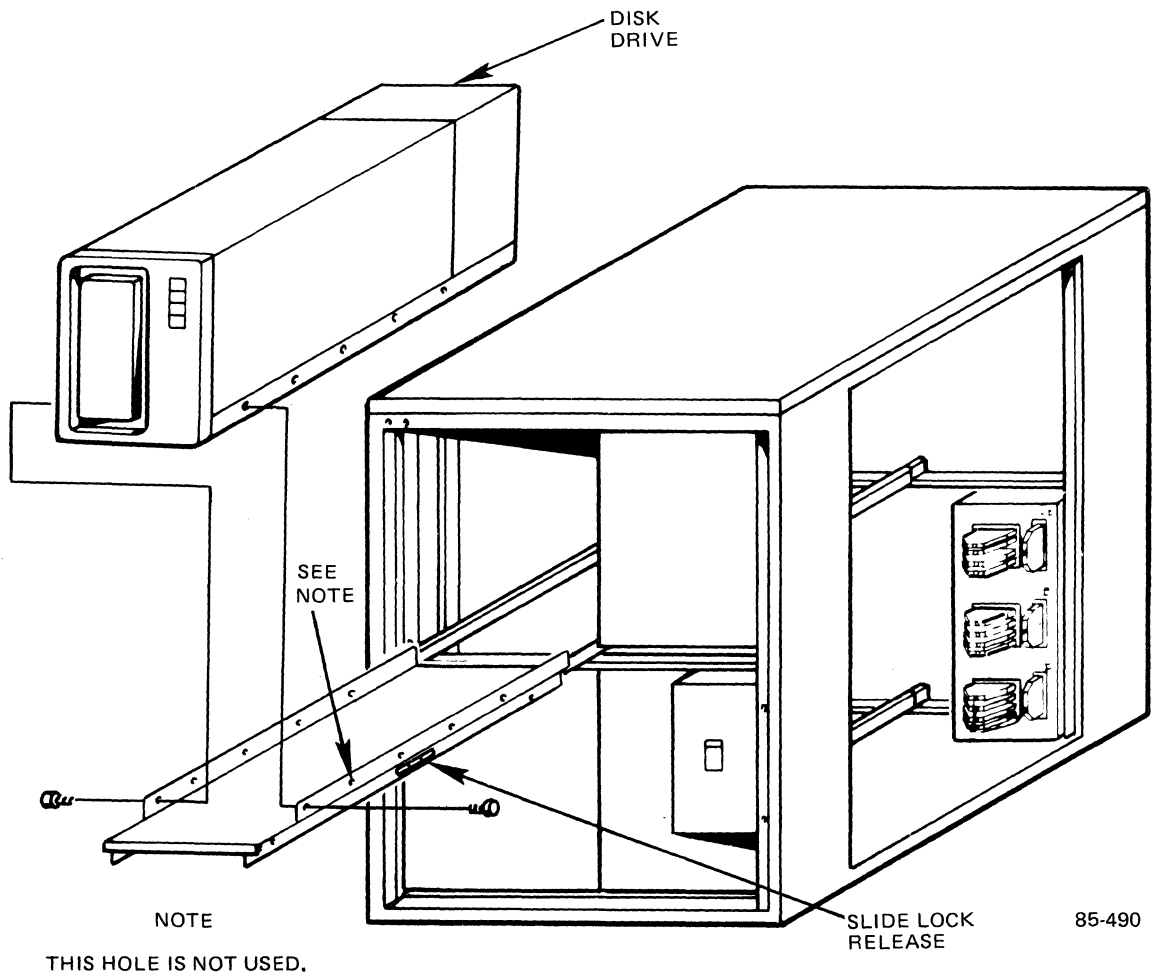


Figure 2-13. Disk Drive Installation

**CAUTION**

Do not substitute the screws in step 11 with longer screws or damage will result to the internal connectors of the disk drive.

11. Secure the disk drive to the mounting pan with the nine special Phillips screws supplied with the drive (extras may be included). Note that five screws are mounted in the left side and four screws are mounted in the right side.

**WARNING**

To avoid bodily injury, the disk drive must be secured to the mounting pan.

12. Check the 115/220 Vac switch for the correct setting (refer to subsection 2.3.1).
13. Slide the disk drive into the cabinet by lifting the slide lock release (see Figure 2-13) on each side and pushing the disk drive fully into the cabinet.

**WARNING**

To avoid the possibility of tipping the cabinet over, extend only one disk drive mounting pan from the cabinet at a time.

14. To install Drive 1 (see Figure 1-3), repeat steps 8 through 13.
15. To install Drive 2 (see Figure 1-3), remove the bottom slide locking bar (see Figure 2-11) and repeat steps 8 through 13.
16. To install Drive 3 (see Figure 1-3), go to the second cabinet and repeat steps 1 through 13.
17. Reinstall the slide locking bar(s) with screws (see Figure 2-11).
18. Install a dummy panel over any unused disk drive positions with the two screws provided as shown in Figure 2-14.
19. Visually check to see that the maintenance switch is in the down (off) position. Refer to subsection 2.3.2.
20. Return to the Device Installation Flowchart.

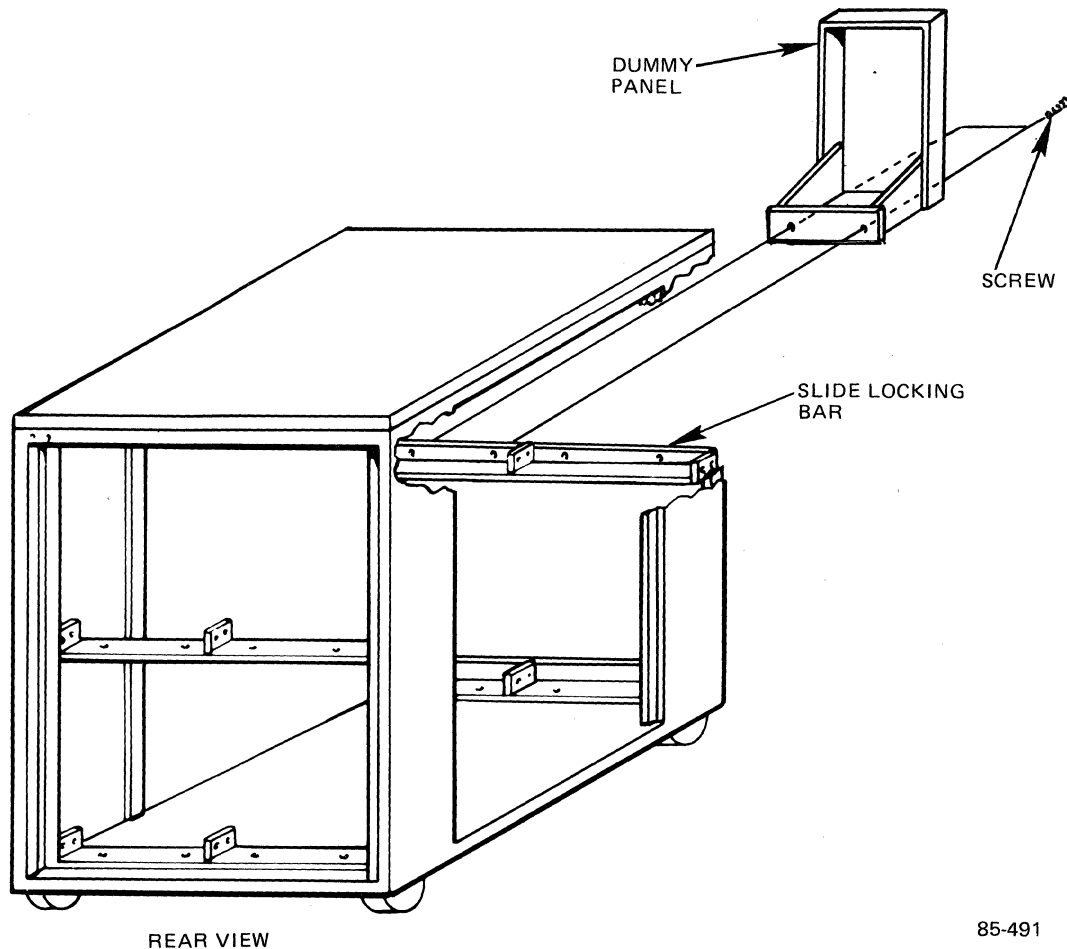


Figure 2-14. Installing the Dummy Panel

### 2.1.3 Device Cabling

This subsection provides the following cabling procedures for the initial installation of the disk drive:

- Cable trough to disk drive
- Device to device
- Device to system.

#### 2.1.3.1 CABLE TROUGH TO DISK DRIVE

To connect the cable trough to the disk drive, perform the following steps:

1. At the rear of the cabinet, locate Drive 0 (see Figure 1-3).
2. Locate the female end of the power cord extended from the rear of the cable trough (see Figure 2-15). Plug it into the ac power connector (see Figure 2-16).

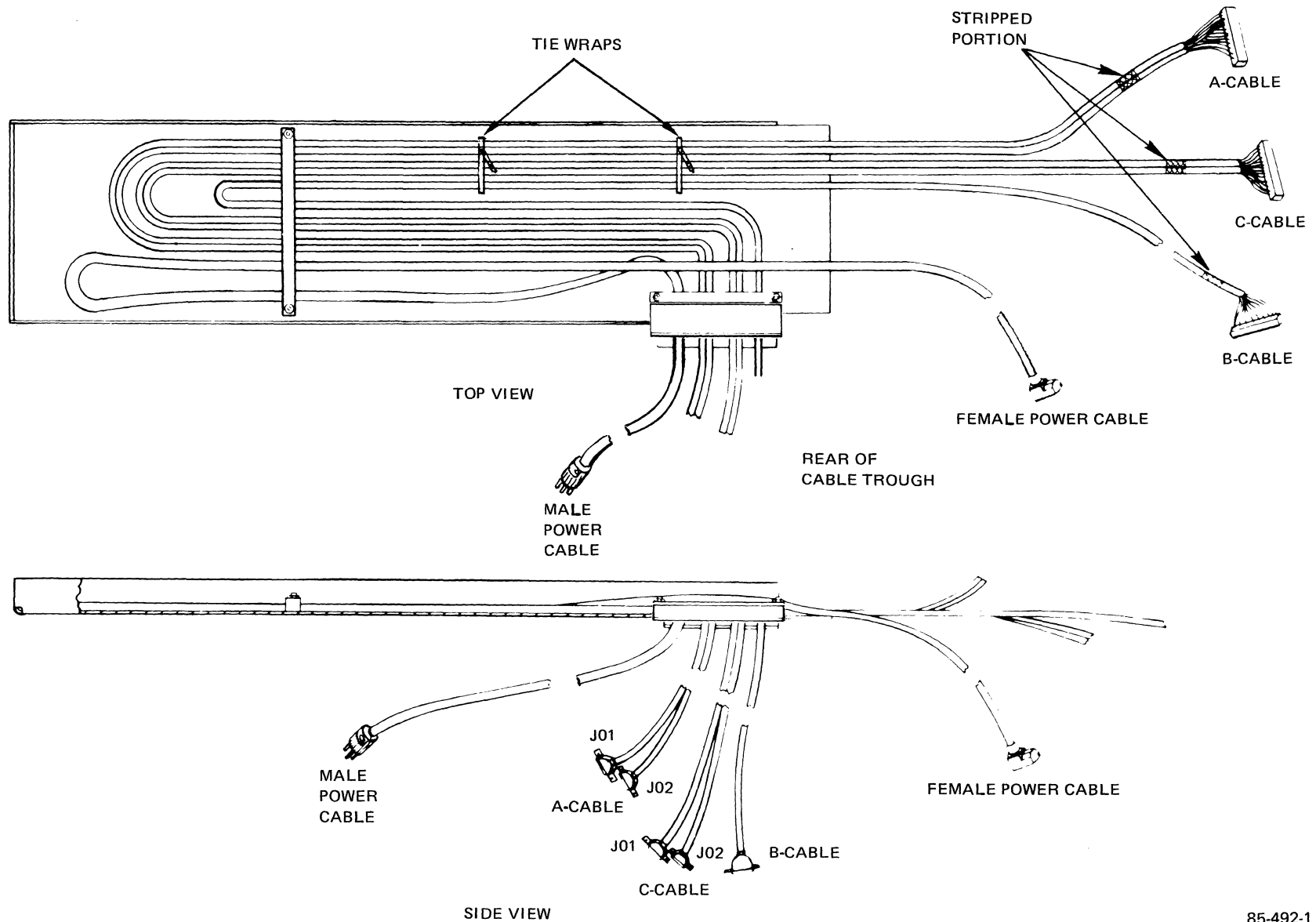
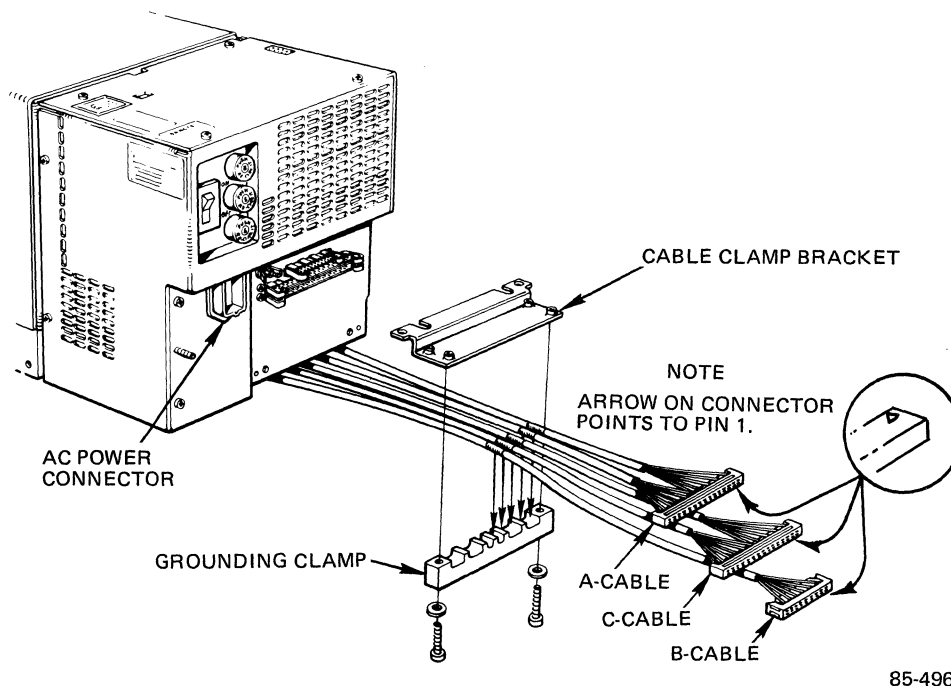


Figure 2-15. Cable Trough Assembly



85-496

Figure 2-16. Grounding Clamp Installation

NOTE

Add two tie-wraps as shown in Figure 2-15 to avoid cable fan-out. See Figure 2-16 for steps 3 through 7.

3. Locate the three cables marked A, B, and C, and arrange them as shown in Figure 2-16. Ensure that the imprinted arrow indicating pin 1 on each connector is on the bottom right side.
4. Locate the two clamps supplied with the drive accessories. Hold the two clamps together. The grounding clamp has smaller slots than the strain relief clamp.
5. Locate the cable clamp bracket and screws supplied with the drive accessories.
6. Align the stripped portions of the A, B, and C cables into the slots of the grounding clamp as shown in Figure 2-16. Ensure that the stripped portions of the three cables are seated correctly in the slots.
7. While holding the cables in place with one hand, place the cable clamp bracket over the grounding clamp, and finger tighten the two screws and washers into place.

## CAUTION

The grounding clamp provides the ground for the cables. To prevent system errors, ensure that the grounding clamp is properly seated.

8. Tighten the screws while ensuring that the cables are not pinched.
9. Loosen the two screws and washers installed in the rear of the disk drive, and insert the cutouts into the cable clamp bracket between the screws and the drive as shown in Figure 2-17. Tighten the screws.

### NOTE

Early shipments of the disk drive shipped the two screws and washers with the cable clamp, which had holes instead of cutouts.

10. Locate the strain relief clamp and install it to the bottom of the cable clamp bracket with the two screws and washers provided as shown in Figure 2-18. Ensure that the cables are seated correctly in the slots.

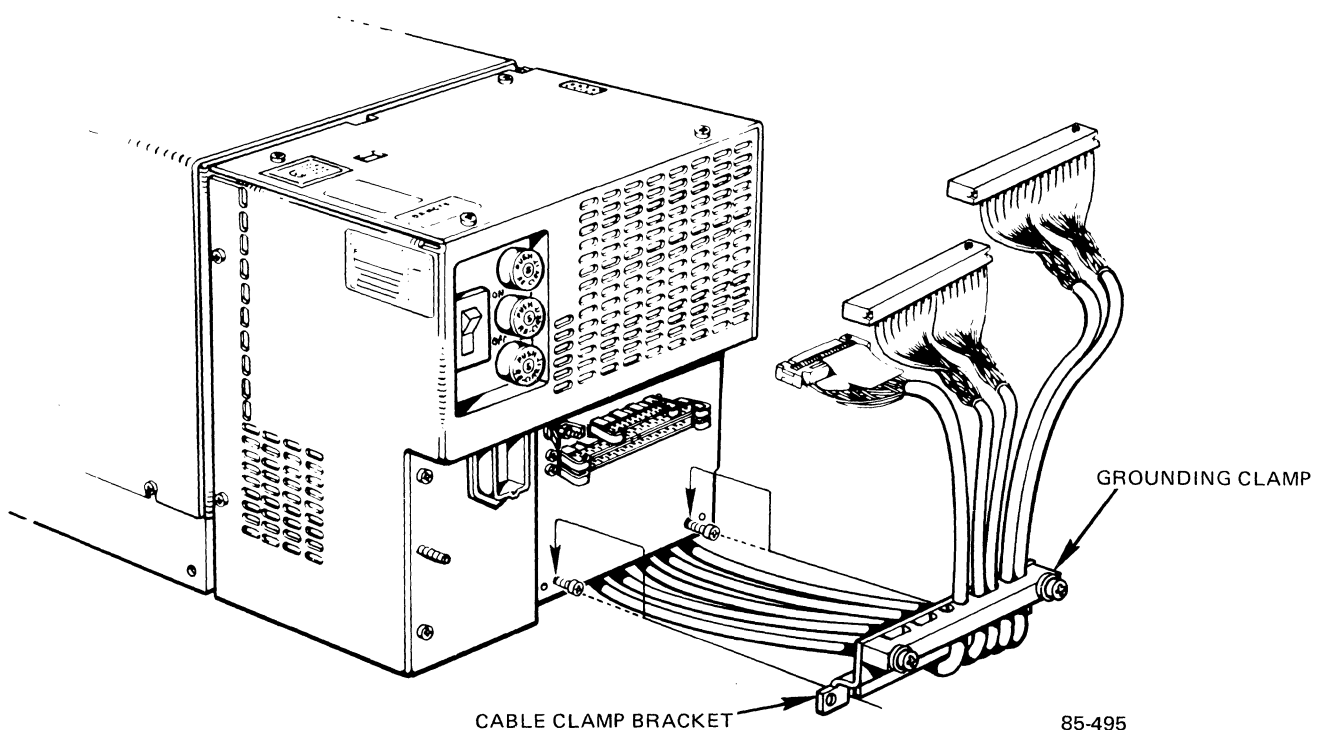


Figure 2-17. Cable Clamp Bracket Installation

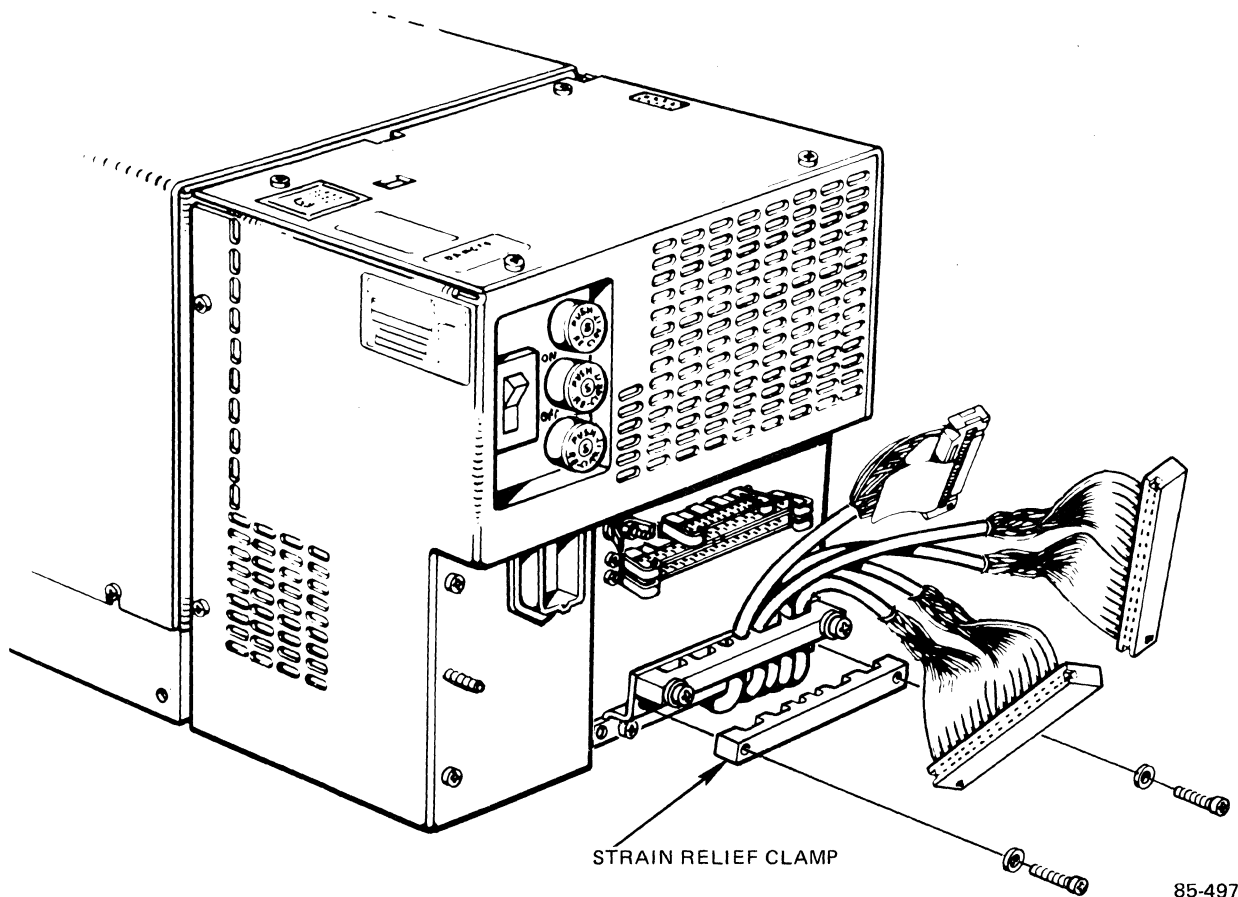


Figure 2-18. Strain Relief Clamp Installation

**CAUTION**

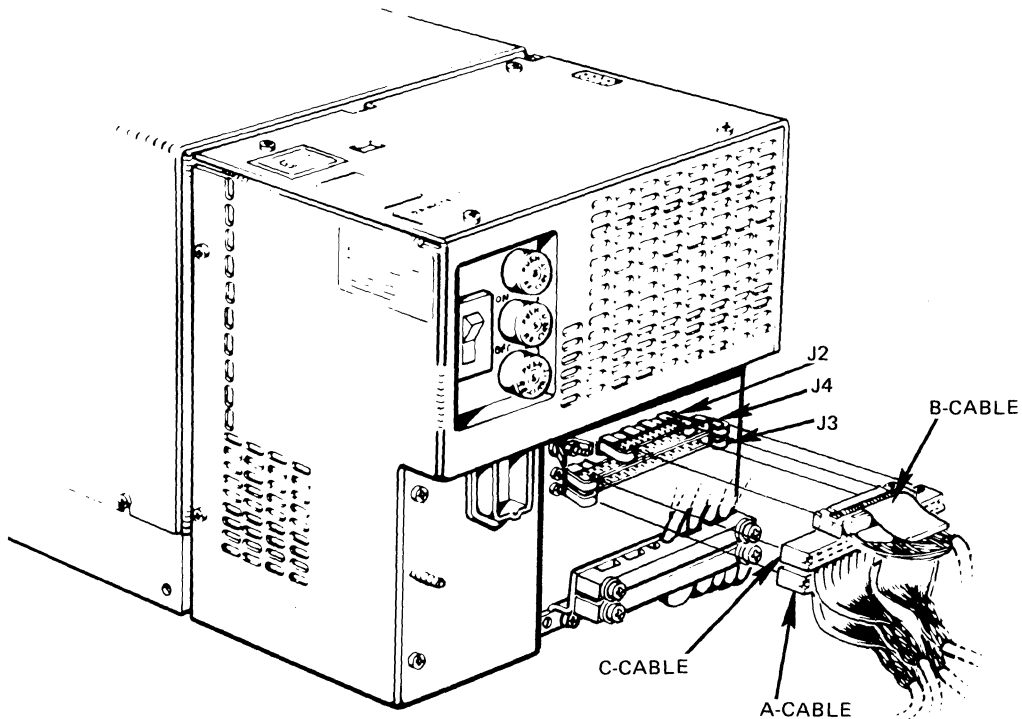
The cables can be plugged in backwards. Ensure that pin 1 (designated by an arrow on the connector) of each cable corresponds to pin 1 of the connector (also designated by an arrow on the connector).

**NOTE**

See Figure 2-19 for steps 11 through 15.

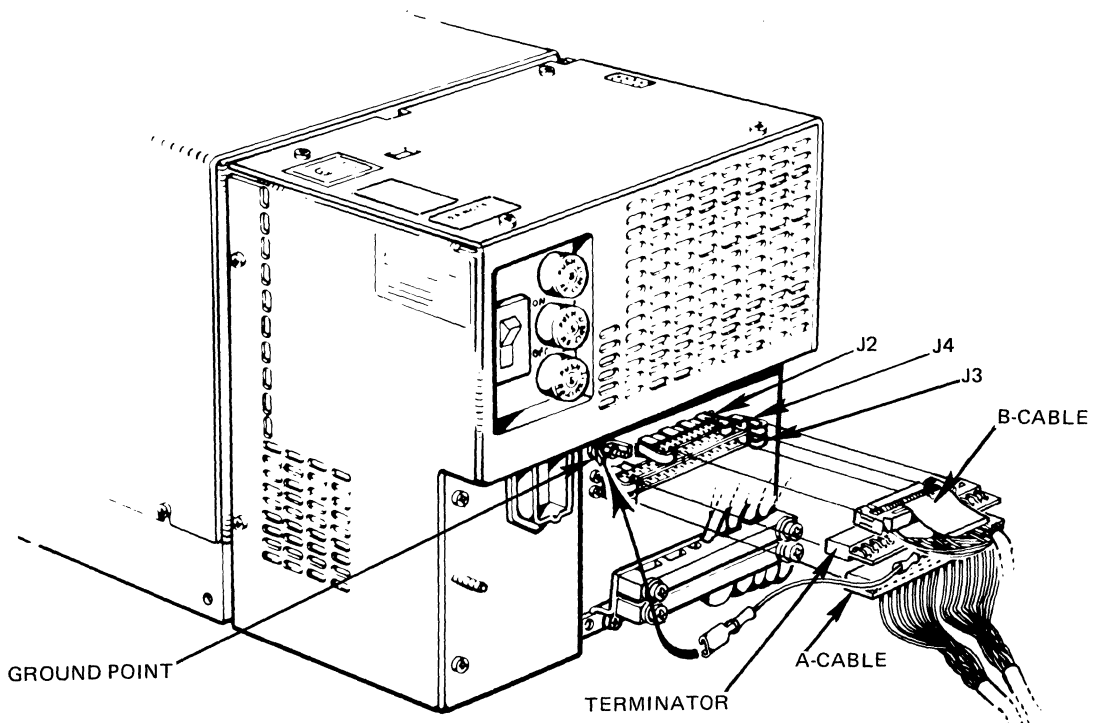
11. Locate the cable labeled A, and connect it to the disk drive at J3 (bottom connector). Ensure that the metal tabs snap into place to hold the cable connector in place.
12. Determine if this disk drive is to be the last drive in the daisy chain (i.e., the last drive in the daisy chain will either be Drive 3 or it will be the last drive to be cabled to the disk controller board).





(A) WITH CABLE C

85-493



(B) WITH TERMINATOR

85-494

Figure 2-19. Cabling the Disk Drive

13. If this drive is not the last drive in a daisy chain, locate the cable labeled C, and connect it to the disk drive at J4. Ensure that the metal tabs snap into place to hold the cable connector in place.
14. For the last drive in a daisy chain, locate the terminator and install it to the disk drive at J4. Connect the terminator ground wire to the ground point.

**CAUTION**

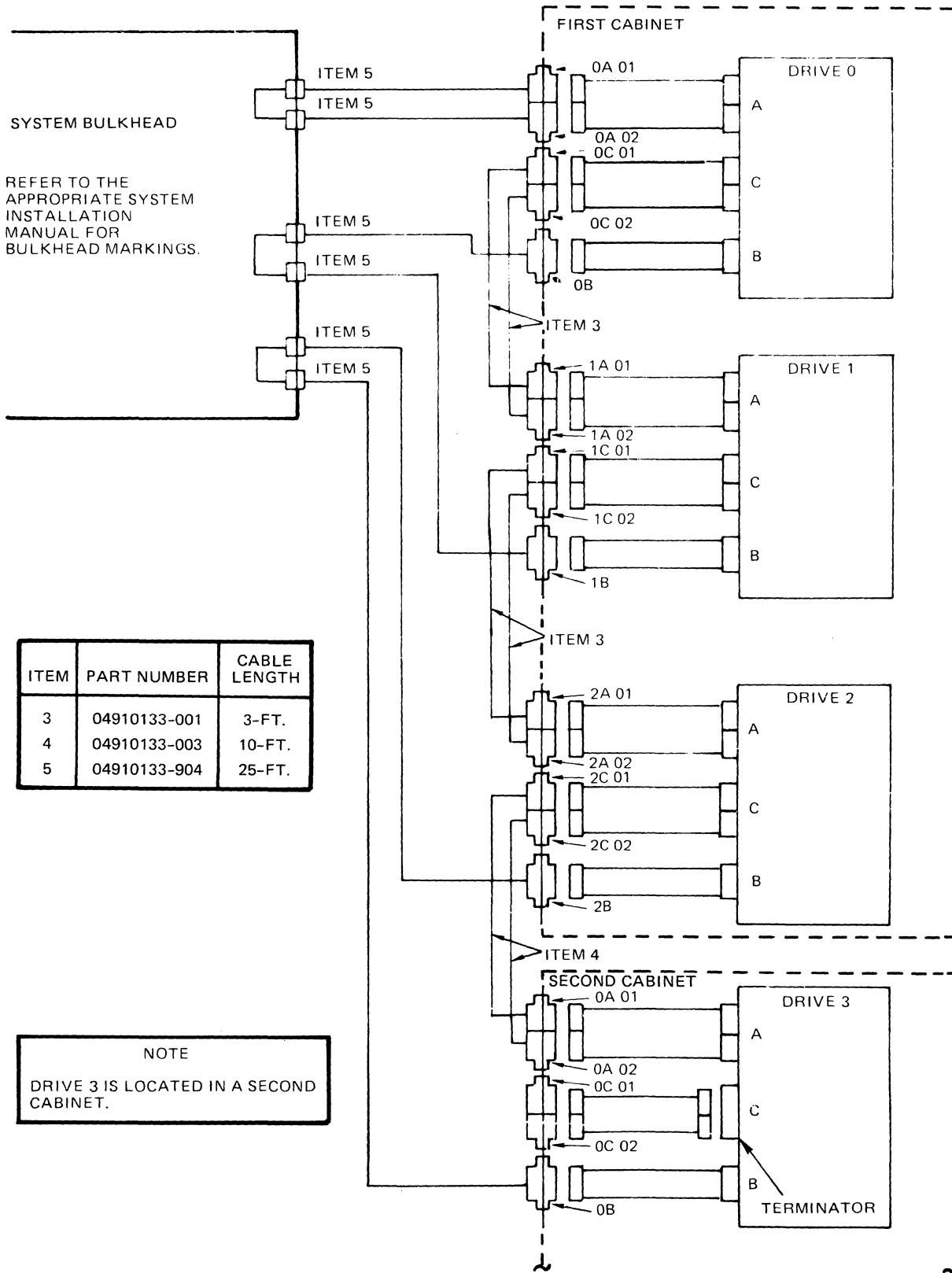
If an unkeyed terminator is used, ensure that pin 1 (designated by an arrow on the connector) of the terminator plugs into pin 1 of J4; otherwise, the terminator can be mispositioned one row of pins and/or installed upside down.

15. Locate the cable labeled B, and connect it to the disk drive at J2. Ensure that the metal tabs snap into place to hold the cable connector in place.
16. Go to the next drive, if present, and repeat steps 2 through 15; otherwise, proceed to subsection 2.1.3.2.

#### 2.1.3.2 DEVICE TO DEVICE AND DEVICE TO SYSTEM

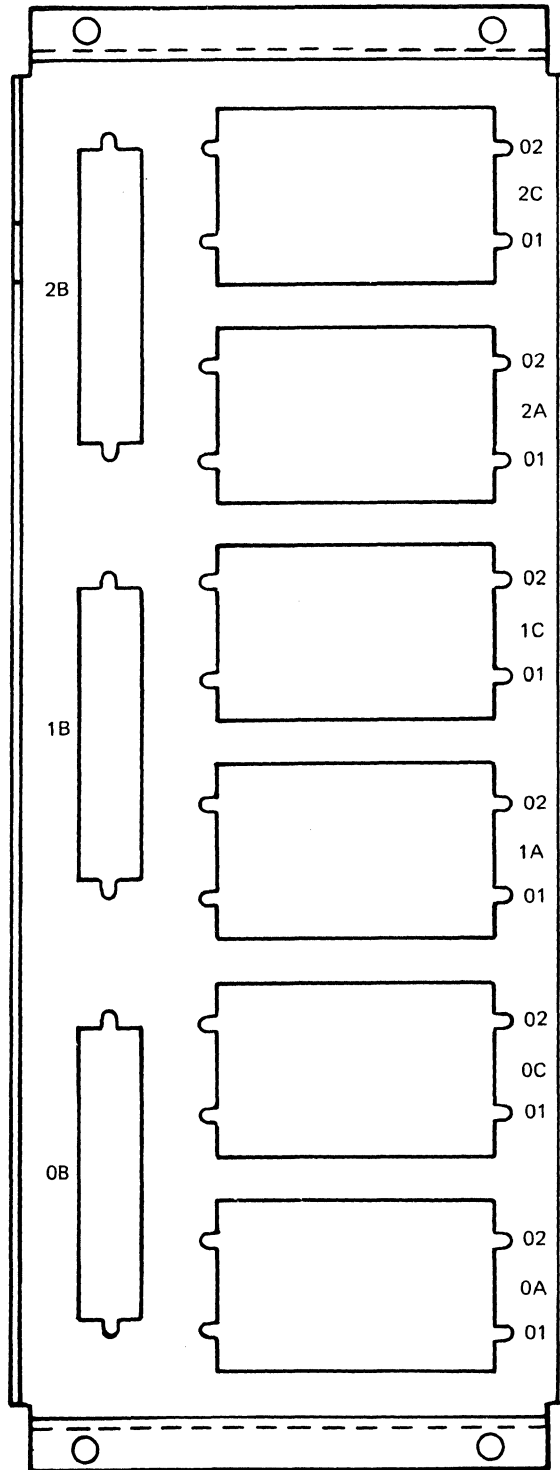
This subsection provides the procedures for cabling up to four disk drives in a daisy chain and for cabling the disk drive bulkhead to the system bulkhead. Figure 2-20 illustrates the basic cabling configuration, and Figure 2-21 illustrates the rear view of the disk drive bulkhead.

Additional device-to-system bulkhead installation information may be found in DPS 6 PLUS Model 410 and Model 420 System Installation (Order No. US02).



85-197-1

Figure 2-20. Cabling Diagram



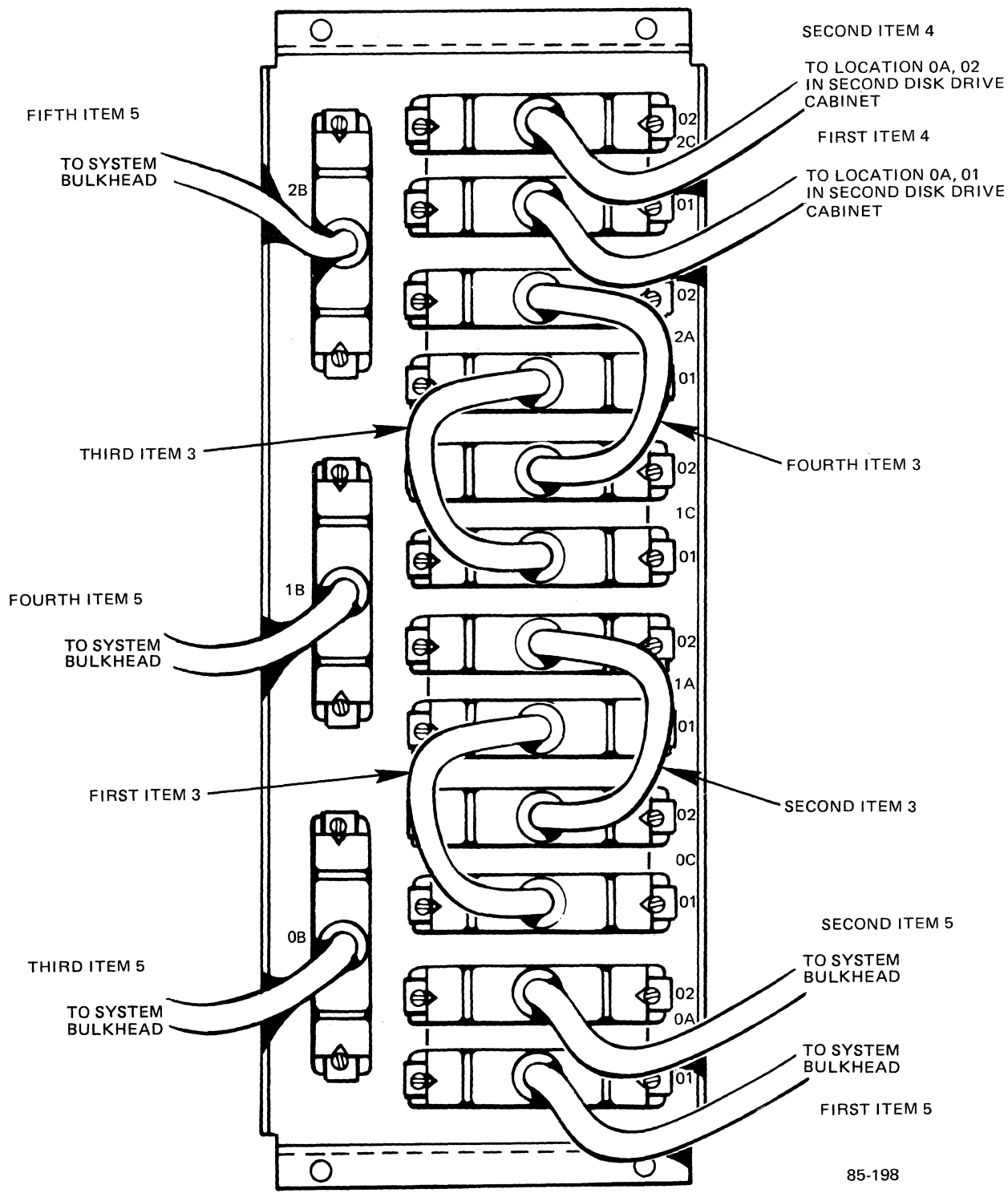
85-498

Figure 2-21. Disk Drive Bulkhead (Rear View)

#### NOTE

For steps 1 through 23, see Figure 2-22 and refer to Table 2-2 for all item numbers.

1. Locate first item 5. Connect one end to the disk drive bulkhead at the 0A, 01 position (Drive 0). Secure the cable to the connector with the captive screws.
2. Connect the other end to the system bulkhead (refer to the Computer Configuration Sheet (CCS) for the correct location). Secure the cable with the captive screws.
3. Locate second item 5. Connect one end to the disk drive bulkhead at the 0A, 02 position. Secure the cable with the captive screws.
4. Connect the other end to the system bulkhead (refer to the CCS for the correct location). Secure the cable with the captive screws.
5. Locate third item 5. Connect one end to the disk drive bulkhead at the 0B position. Secure the cable with the captive screws.
6. Connect the other end to the system bulkhead (refer to the CCS for the correct location). Secure the cable with the captive screws.
7. If there is a Drive 1, continue with the procedure; otherwise, return to the Device Installation Flowchart.
8. Locate first item 3. Connect one end to the 0C, 01 position. Connect the other end to the 1A, 01 position. Secure each end of the cable with the captive screws.
9. Locate second item 3. Connect one end to the 0C, 02 position. Connect the other end to the 1A, 02 position. Secure each end of the cable with the captive screws.
10. Locate fourth item 5. Connect one end to the disk drive bulkhead at the 1B position. Secure the cable with the captive screws.
11. Connect the other end to the system bulkhead (refer to the CCS for the correct location). Secure the cable with the captive screws.
12. If there is a Drive 2, continue with the procedure; otherwise, return to the Device Installation Flowchart.



85-198

Figure 2-22. Disk Drive Bulkhead Cabling Diagram

Table 2-2. Cable Part Numbers

Item	Part Number	Description
1	60157266-001	Internal A- or C-cable from the disk drive to the cabinet bulkhead.
2	60157268-001	Internal B-cable from the disk drive to the cabinet bulkhead.
3	04910133-001	3-foot cable, disk drive bulkhead to disk drive bulkhead (intracabinet).
4	04910133-003	10-foot cable, disk drive bulkhead to disk drive bulkhead (intercabinet).
5	04910133-904	25-foot cable, system bulkhead to disk drive bulkhead.
6	60157266-002	A-cable from the disk drive controller to the system bulkhead.
7	60157268-002	B-cable from the disk drive controller to the system bulkhead.

13. Locate third item 3. Connect one end to the 1C, 01 position. Connect the other end to the 2A, 01 position. Secure each end of the cable with the captive screws.
14. Locate fourth item 3. Connect one end to the 1C, 02 position. Connect the other end to the 2A, 02 position. Secure each end of the cable with the captive screws.
15. Locate fifth item 5. Connect one end to the 2B position. Secure the cable with the captive screws.
16. Connect the other end to the system bulkhead (refer to the CCS for the correct location). Secure the cable with the captive screws.
17. If there is a Drive 3, continue with the procedure; otherwise, return to the Device Installation Flowchart.

NOTE

Drive 3 will be in a second cabinet at the Drive 0 position.

18. Locate first item 4. Connect one end to the 2C, 01 position in the first cabinet. Secure the cable with the captive screws.
19. Connect the other end to the second disk drive cabinet bulkhead 0A, 01 position. Secure the cable with the captive screws.
20. Locate second item 4. Connect one end to the 2C, 02 position in the first cabinet. Secure the cable with the captive screws.
21. Connect the other end to the second disk drive cabinet bulkhead 0A, 02 position. Secure the cable with the captive screws.
22. Locate item 5 in second disk drive cabinet. Connect one end to the second disk drive cabinet bulkhead 0B position. Secure the cable with the captive screws.
23. Connect the other end to the system bulkhead (refer to the CCS for the correct location). Secure the cable with the captive screws.
24. To install any additional drives to the system, refer to the procedure in subsection 2.2.4.3.

#### 2.1.3.3 EXTERNAL GROUND CABLE

To install the external ground cable, perform the following:

1. Locate the 25-foot ground cable (04910131-001) that was shipped in the bottom of the device cabinet.
2. At the bottom of the cabinet, determine which ground stud (E01 or E02) is the closest to the system cabinet.
3. Remove the mounting hardware from the ground stud and install the cable to the ground stud. Reinstall the mounting hardware.
4. Route the cable out the back of the device cabinet and to the system cabinet.
5. Install the cable to a convenient ground stud in the system cabinet.
6. Perform the switch settings in subsection 2.3.

#### 2.1.3.4 SWITCH CONFIGURATIONS

There are two switches to be configured before powering on the system. Refer to subsection 2.3.



## 2.2 SYSTEM MODIFICATION

This subsection provides the procedures for installing one or more additional disk drives to an existing system.

Determine if the add-on disk drive is to be installed into a cabinet that contains previously installed disk drives, or into a new cabinet that was shipped with the disk drive. If the disk drive is to be installed in a new cabinet, perform the procedures in subsection 2.1; otherwise continue with this procedure.

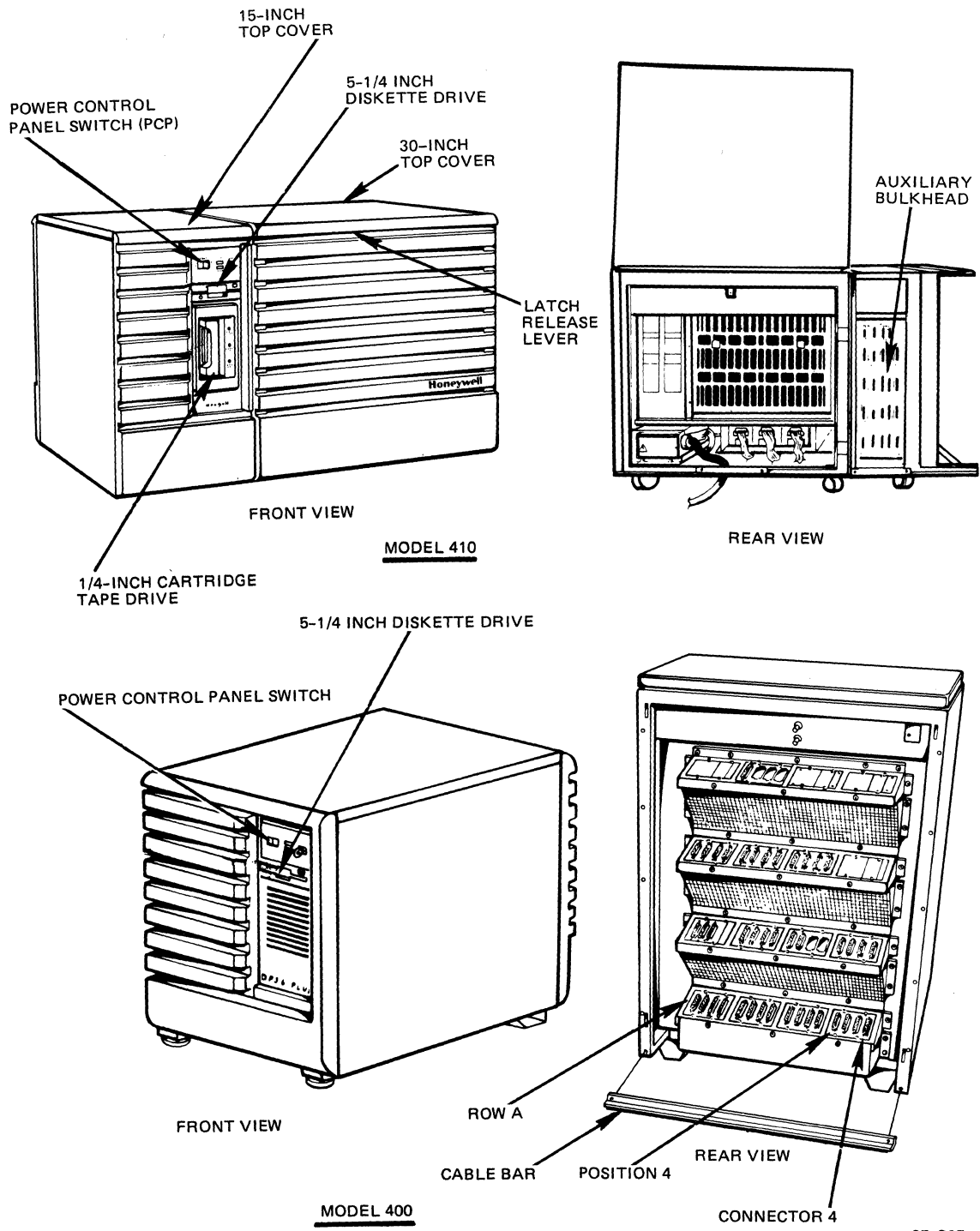
### 2.2.1 System Power Down and Skin Removal

To power down the DPS 6 PLUS system and remove the skins, perform the following steps:

1. Remove the media from the peripherals as necessary.
2. Power off all peripherals attached to the system (refer to the appropriate peripheral manuals).
3. Place the system Power Control Panel POWER switch in the OFF position (see Figure 2-23).

Perform the following procedure to remove the rear skins on the Model 410 and 420. For the Model 400, remove the rear skin by lifting up and away from the system. The Model 400 is now ready for cabling.

4. At the front of the cabinet, locate the latch release lever for the 30-inch top cover (see Figure 2-23). Insert a finger into the latch release hole and push up on the latch. The top cover will pop up.
5. Lift up on the cover.
6. At the left front of the cabinet, locate and push down the latch release lever for the 15-inch top cover.
7. Lift the cover up slightly, move it left to right slightly, and slide it forward and away from the cabinet.
8. At the left front side of the cabinet, locate the knob inside the rear of the cabinet that holds the rear skin in place.
9. Turn the knob. The rear skin will fall back slightly and be held by a retainer chain. Remove the retainer chain from the skin and set the skin aside.
10. At the front of the 45-inch cabinet, locate and turn the knob in the rear cable trough, underneath the 30-inch top cover to release the rear skin. Remove the retainer chain from the skin and set the skin aside. The system is now ready for cabling.



87-265

Figure 2-23. System Power Down and Skin Removal

### 2.2.2 Unpacking

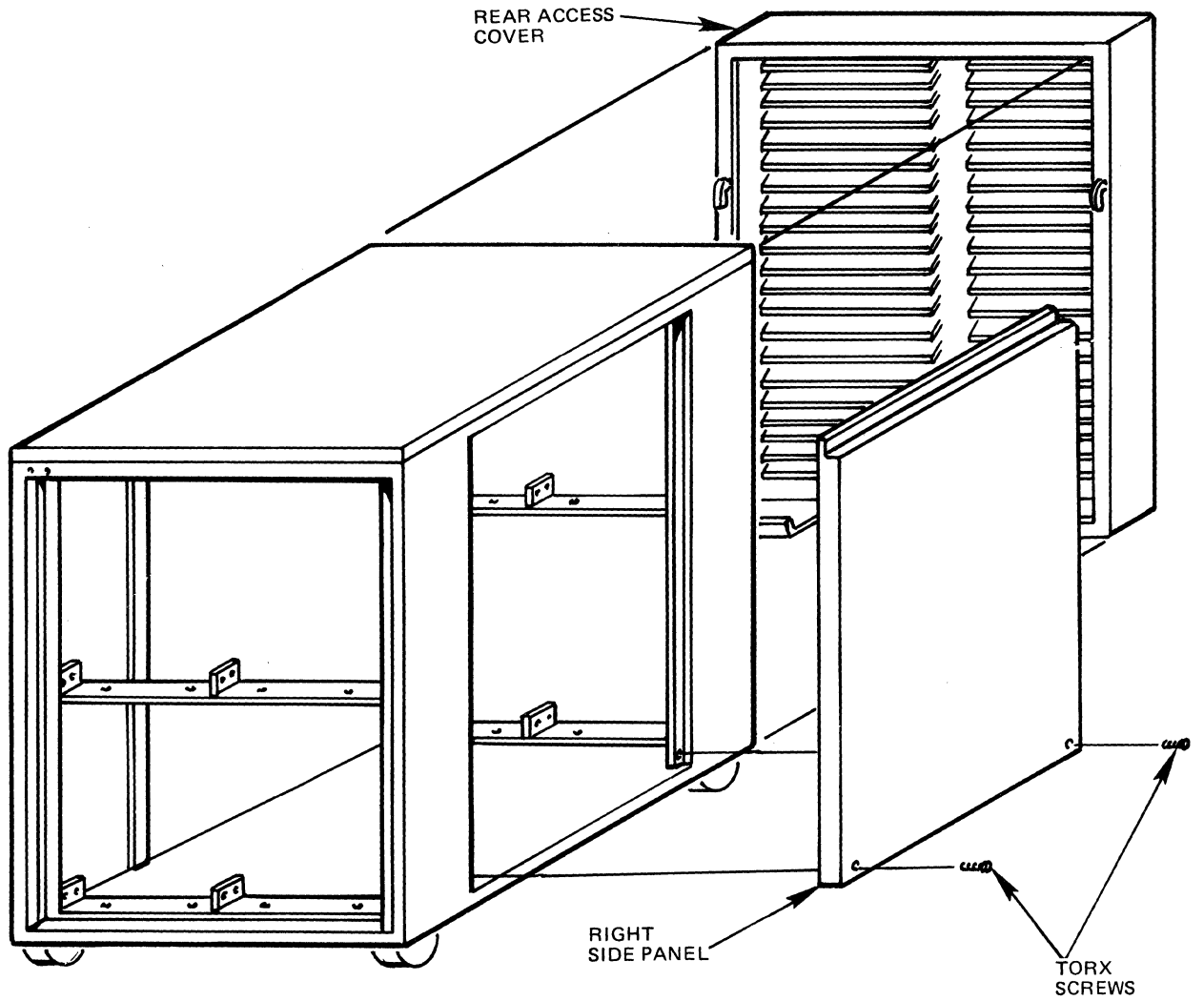
Unpack the mounting pan and slides, the cable trough (see Figure 2-15), and the associated hardware.

To unpack the disk drive, perform the procedure in subsection 2.1.1.

### 2.2.3 Add-On Device Installation

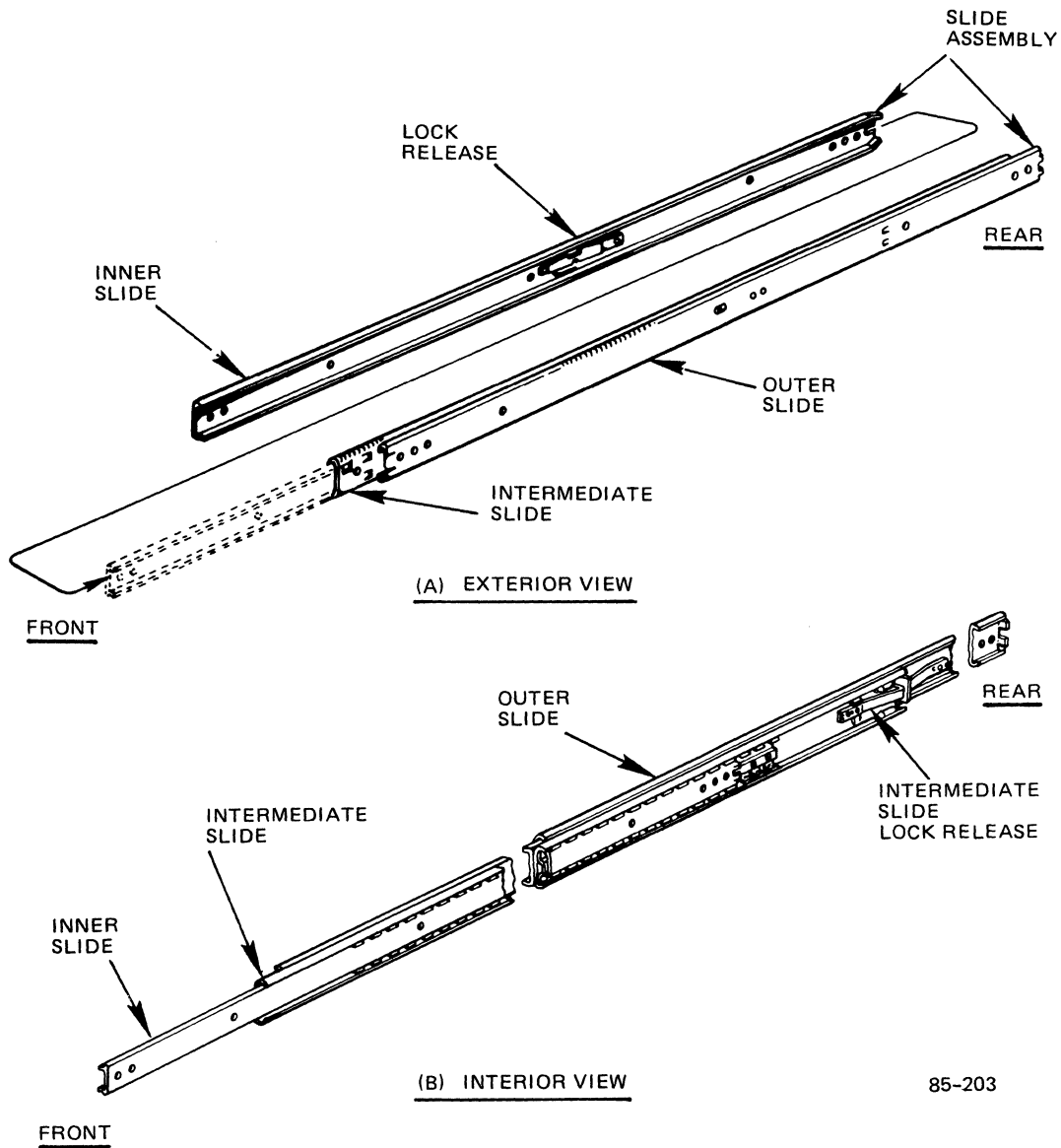
This subsection provides the procedures for removing the cabinet right side panel and the dummy panel. It also provides the procedures for installing the mounting pan and slides into the cabinet and the disk drive to the mounting pan.

1. Open the cabinet front door.
2. Ensure that the anti-tip outrigger (see Figure 2-8) is in place. If the anti-tip outrigger is not in place, install it as described in subsection 2.1.2, step 4.
3. At the rear of the cabinet, lift up and remove the rear access cover (see Figure 2-24).
4. Ensure that the leveling feet are in place (see Figure 2-10).
5. Remove the cabinet right side panel by removing the two bottom screws (see Figure 2-24). Pull the bottom of the panel out from the cabinet, then down.
6. Remove the appropriate dummy panel from the cabinet by removing the two screws (see Figure 2-14).
7. Remove the appropriate slide locking bar (see Figure 2-11).
8. Locate the mounting pan with attached slides. Fully extend the slides with the mounting pan to the locked position.
9. Lift up the lock release on both inner slides (see Figure 2-25) and remove the inner slides and mounting pan from the outer slides.



85-201

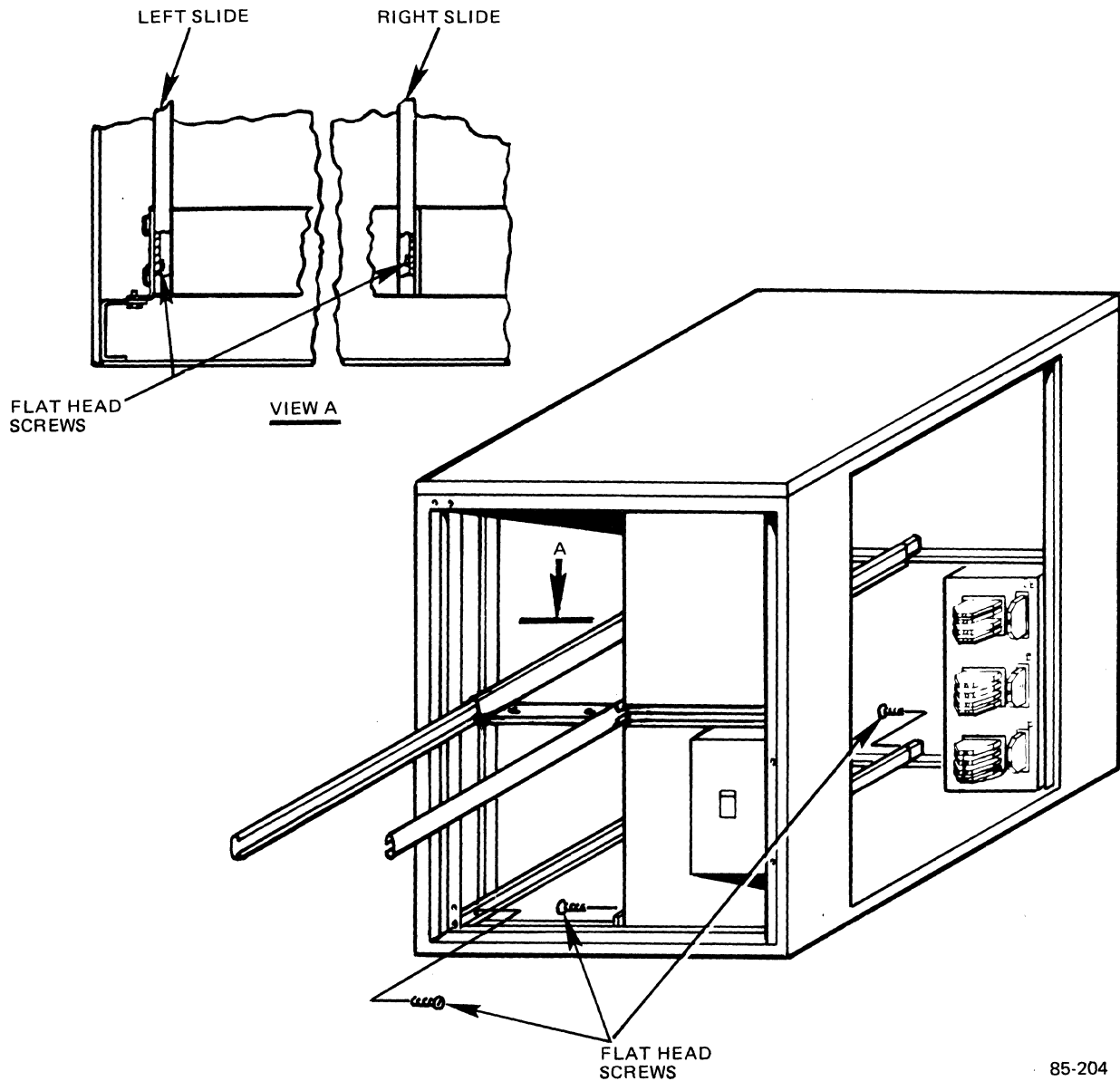
Figure 2-24. Cabinet Side Panel



85-203

Figure 2-25. Cabinet Slides

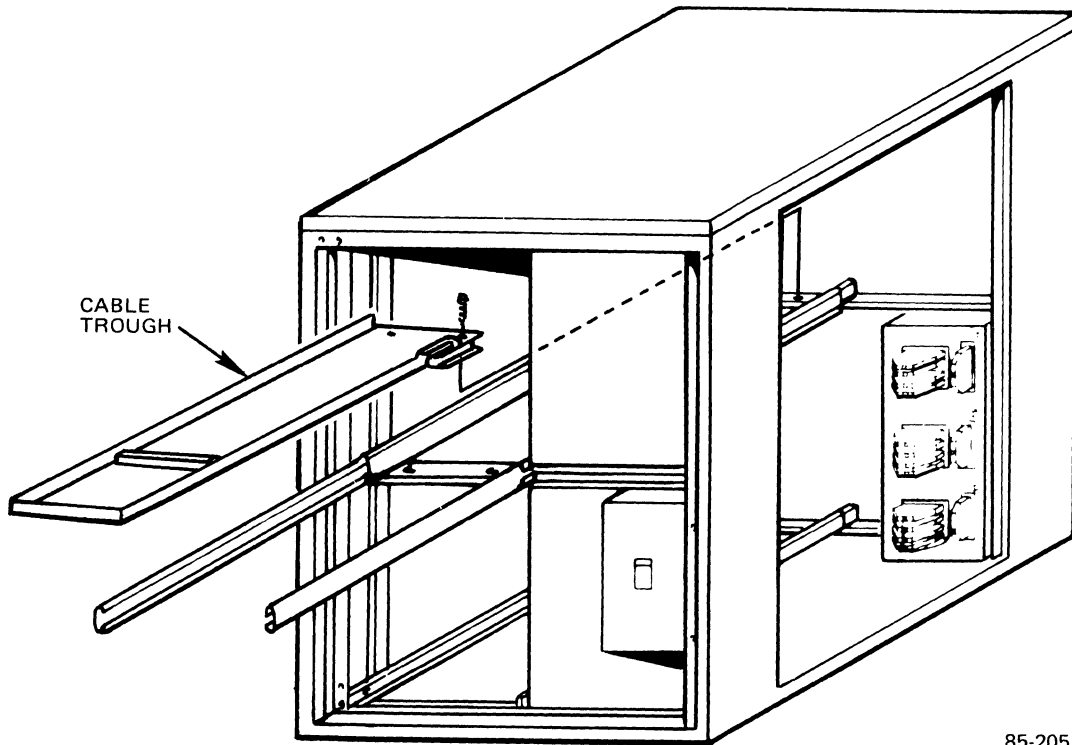
10. Install the left outer/intermediate slide into the left side of the appropriate corner of the cabinet. Ensure that the front of the slide is at the front of the cabinet and that the two holes at the rear of the outer slide line up with the two holes in the cabinet mounting plate.
11. Secure the outer slide to the cabinet with the two flat head screws as shown in Figure 2-26.
12. Repeat steps 10 and 11 for the right slide.



85-204

Figure 2-26. Slide Installation

13. Locate the cable trough assembly (60157493-XXX) (see Figure 2-15) and the four 3/8-inch (8-32) TORX screws (03010218-031).
14. Insert the cable trough into the cabinet between the two slides as shown in Figure 2-27. Ensure that the rear of the cable trough (see Figure 2-15) is located at the rear of the cabinet.
15. Secure the cable trough to the cabinet with the four TORX screws (see Figure 2-27).



85-205

Figure 2-27. Cable Trough Installation

16. If the cable trough was installed in the bottom of the cabinet, perform the following steps:
  - a. Remove the rear screw from the slide closest to the bulkhead.
  - b. Lift the slide and feed the cables from the side of the cable trough under the slide.
  - c. Replace the slide and reinstall the screw.
17. Ensure that all of the cable connectors at the side and the rear are outside of the trough.
18. Lift the mounting pan and install the inner slides into the outer/intermediate slides.
19. Slide the mounting pan into the cabinet until the slides are in the locked position. Lift the lock release on both sides and slide the mounting pan into the cabinet.

NOTE

The intermediate slide lock release (see Figure 2-25B) must be pushed in the first time that the mounting pan is installed into the cabinet.

20. Extend the mounting pan out of the cabinet until both slides click into the locked position.

NOTE

Ensure that the mounting pan slides easily in and out of the cabinet prior to continuing with the next step.

**WARNING**

1. To avoid bodily injury and equipment damage, two people are required to lift the disk drive.
  2. To avoid bodily injury and equipment damage, extend only one drive at a time.
21. Lift the disk drive and place it in the mounting pan. Ensure that the holes are lined up as shown in Figure 2-13.

**CAUTION**

Do not substitute the screws in the next step with longer screws or damage will result to the internal connectors of the disk drive.

22. Secure the disk drive to the mounting pan with the nine special Phillips screws supplied with the drive (extras may be included). Note that five screws are mounted in the left side and four screws are mounted in the right side.

**WARNING**

To avoid bodily injury, secure the disk drive to the mounting pan.

23. Check the 115/220 Vac switch for the correct setting (refer to subsection 2.3.1).



24. Slide the disk drive into the cabinet by lifting the slide lock release on each side and pushing the disk drive fully into the cabinet.
25. Reinstall the slide locking bar (see Figure 2-11).
26. Perform the cabling procedures listed in subsection 2.2.4.

#### 2.2.4 Device Cabling

This subsection provides the following cabling procedures for the installation of the add-on disk drive:

- Cable trough to disk drive
- Cable trough to device bulkhead
- Device to device
- Device bulkhead to DPS 6 PLUS system bulkhead.

##### 2.2.4.1 CABLE TROUGH TO DISK DRIVE

To connect the cable trough to the disk drive, perform the following steps:

1. At the rear of the cabinet, locate the add-on disk drive.
2. Locate the female end of the power cord extended from the rear of the cable trough (see Figure 2-15). Plug it into the ac power connector (see Figure 2-16).

#### NOTE

See Figure 2-16 for steps 3 through 7.

3. Locate the three cables marked A, C, and B, and arrange them as shown in Figure 2-16. Ensure that the imprinted arrow indicating pin 1 on each connector is on the bottom right side.
4. Locate the two clamps supplied with the drive accessories. Hold the two clamps together. The grounding clamp has smaller slots than the strain relief clamp.
5. Locate the cable clamp bracket and screws supplied with the drive accessories.
6. Align the stripped portions of the A, B, and C cables into the slots of the grounding clamp as shown in Figure 2-16. Ensure that the stripped portions of the three cables are seated correctly in the slots.

7. While holding the cables in place with one hand, place the cable clamp bracket over the grounding clamp, and finger tighten the two screws and washers into place.

**CAUTION**

The grounding clamp provides the ground for the cables. To prevent system errors, ensure that the grounding clamp is properly seated.

8. Tighten the screws while ensuring that the cables are not pinched.
9. Loosen the two screws and washers installed in the rear of the disk drive, and insert the cutouts in the cable clamp bracket between the screws and the drive as shown in Figure 2-17. Tighten the screws.

**NOTE**

Early shipments of the disk drive shipped the two screws and washers with the cable clamp, which had holes instead of cutouts.

10. Locate the strain relief clamp, and install it to the bottom of the cable clamp bracket with the two screws and washers provided as shown in Figure 2-18. Ensure that the cables are seated correctly in the slots.

**CAUTION**

The cables can be plugged in backwards. Ensure that pin 1 (designated by an arrow on the connector) of each cable corresponds to pin 1 of the connector (also designated by an arrow on the connector).

**NOTE**

See Figure 2-19 for steps 11 through 15.

11. Locate the cable labeled A, and connect it to the disk drive at J3 (bottom connector). Ensure that the metal tabs snap into place to hold the cable connector in place.
12. Determine if this disk drive is to be the last drive in the daisy chain (i.e., the last drive in the daisy chain will either be Drive 3 or it will be the last drive to be cabled to the disk controller board).

13. If this drive is not the last drive in a daisy chain, locate the cable labeled C, and connect it to the disk drive at J4. Ensure that the metal tabs snap into place to hold the cable connector in place.
14. For the last drive in a daisy chain, locate the terminator and install it to the disk drive at J4. Connect the terminator ground wire to the ground point.

**CAUTION**

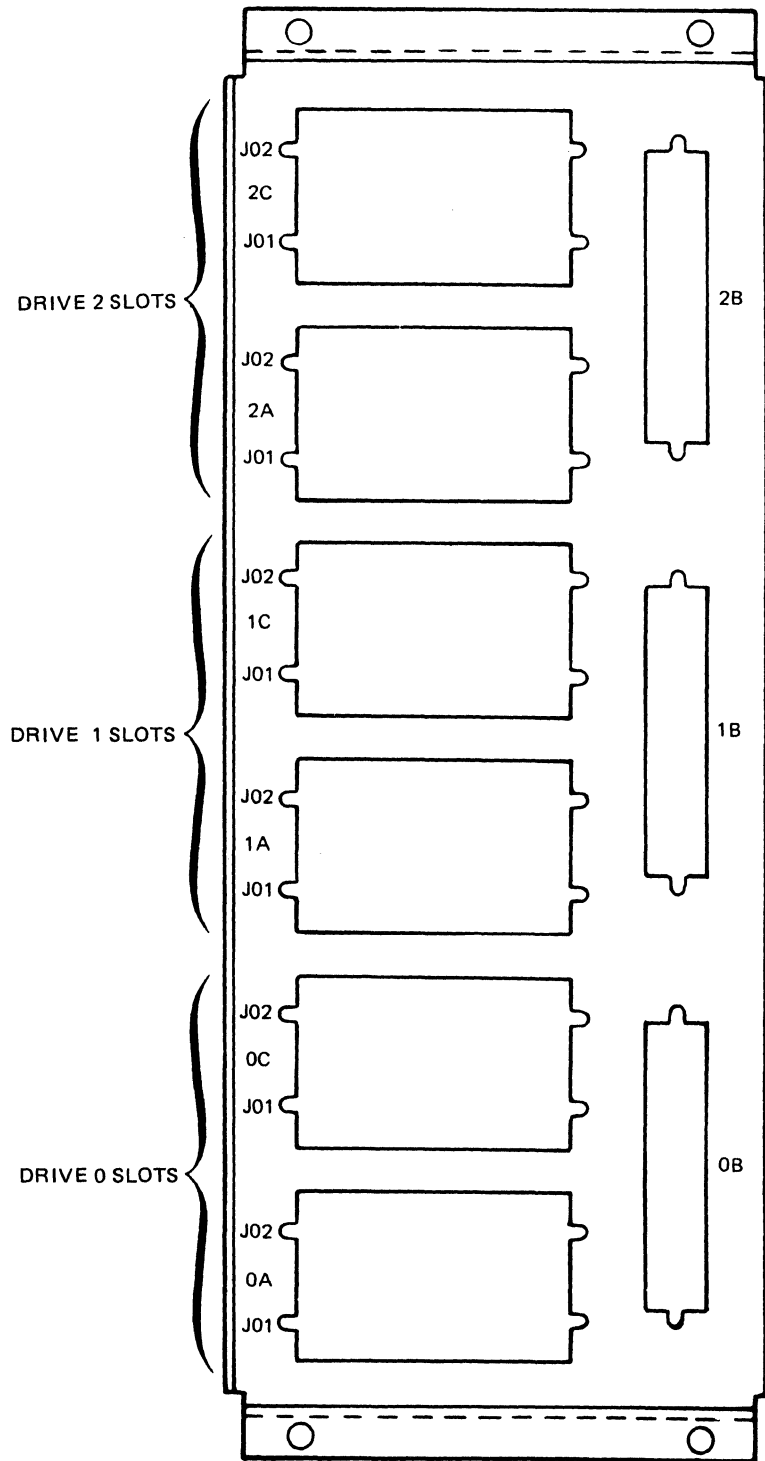
If an unkeyed terminator is used, ensure that pin 1 (designated by an arrow on the connector) of the terminator plugs into pin 1 of J4; otherwise, the terminator can be mispositioned one row of pins and/or installed upside down.

15. Locate the cable labeled B, and connect it to the disk drive at J2. Ensure that the metal tabs snap into place to hold the cable connector in place.
16. If any disk drive is added to an existing daisy chain, the terminator must be removed from the previous disk drive and the C-cable must be installed as follows:
  - a. Remove the terminator ground wire from the ground point, and remove the terminator from J4.
  - b. Locate the C-cable at the rear of the disk drive (see Figure 2-19). Push aside the metal tabs and connect the cable to the disk drive at J4. Ensure that pin 1 of the cable matches with pin 1 of the connector.
17. Go to the next drive, if present, and repeat steps 2 through 14; otherwise, proceed to subsection 2.2.4.2.

#### 2.2.4.2 CABLE TROUGH TO DEVICE BULKHEAD

To connect the cable trough to the device bulkhead, perform the following steps:

1. Determine the slot into which the disk drive is to be cabled as follows (see Figure 2-28):
  - a. The disk drive in the upper left corner of the cabinet is cabled to the Drive 0 slots.
  - b. The disk drive in the upper right corner of the cabinet is cabled to the Drive 1 slots.
  - c. The disk drive in the bottom of the cabinet is cabled to the Drive 2 slots.



85-499-1

Figure 2-28. Disk Drive Bulkhead (Front View)

2. Locate the special slotted standoff screws shipped with the cables (see Figure 2-29), and locate both connectors of the A-cable at the side of the drive's cable trough (see Figure 2-15).

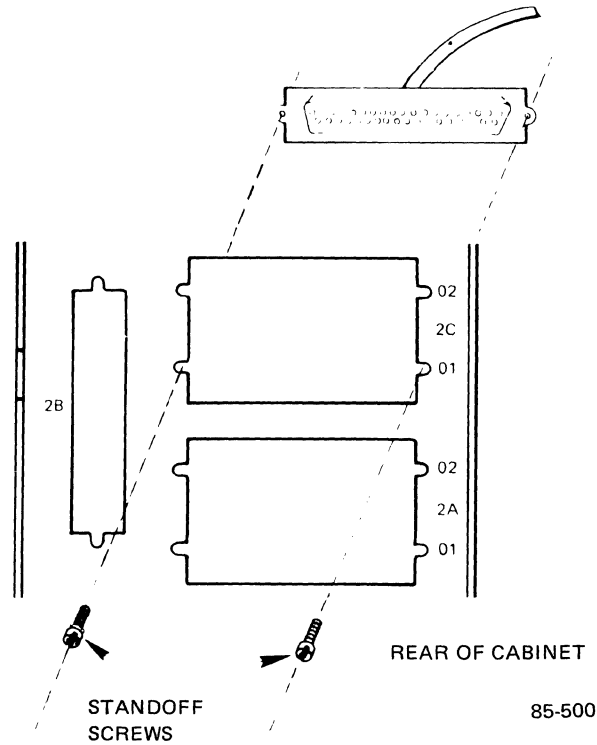


Figure 2-29. Cabling to the Disk Drive Bulkhead

3. Secure the J01 connector to the appropriate A J01 slot on the bulkhead (see Figure 2-28) with the standoff screws as shown in Figure 2-29. Do not overtighten the screws (maximum torque is 4 inch-pounds).
4. Secure the J02 connector to the appropriate A J02 slot with the standoff screws. Do not overtighten the screws (maximum torque is 4 inch-pounds).
5. Locate the B-cable at the side of the cable trough (see Figure 2-15). Secure it to the appropriate B slot on the bulkhead (see Figure 2-29) with the standoff screws as shown in Figure 2-29. Do not overtighten the screws (maximum torque is 4 inch-pounds).
6. Locate both connectors of the C-cable at the side of the drive's cable trough (see Figure 2-15).
7. Secure the J01 connector to the appropriate C J01 slot on the bulkhead (see Figure 2-28) with the standoff screws as shown in Figure 2-29. Do not overtighten the screws (maximum torque is 4 inch-pounds).

8. Secure the J02 connector to the appropriate C J02 slot. Do not overtighten the screws (maximum torque is 4 inch-pounds).
9. Repeat steps 1 through 8 to cable additional disk drives.

#### 2.2.4.3 DEVICE TO DEVICE AND DEVICE TO DPS 6 PLUS SYSTEM

This subsection provides the following procedures:

- Cabling an add-on disk drive to a existing daisy chain
- Cabling up to four new disk drives from the device bulkhead to the DPS 6 PLUS system bulkhead.

Refer back to figures 2-20 and 2-21 for additional cabling information.

To install a second disk controller, refer to DPS 6 PLUS Communications Option Installation (Order No. US15).

#### NOTE

For steps 1 through 4, see Figure 2-22 and refer to Table 2-2 for all item numbers.

1. To cable an add-on disk drive to an existing daisy chain, perform the following steps; otherwise proceed to step 2:
  - a. Determine if the previous drive in the daisy chain is in the same cabinet as the new additional drive. If it is, use item 3 (cable 04910133-001) in steps b and c. If the drive is in a separate cabinet, use item 4 (cable 04910133-003) in steps b and c.
  - b. Connect one cable to the previous drive slot C, 01 position. Connect the other end to the new drive slot A, 01 position. Secure the cable with the captive screws.
  - c. Connect the second cable to the previous drive slot C, 02 position. Connect the other end to the new drive slot A, 02 position. Secure the cable with the captive screws.
  - d. Locate item 5. Connect one end to the disk drive bulkhead at the appropriate B-position. Secure the cable with the captive screws.
  - e. Connect the other end to the system bulkhead as determined by the CCS. Secure the cable with the captive screws.
  - f. To cable additional add-on drives, repeat steps 1a through 1e.

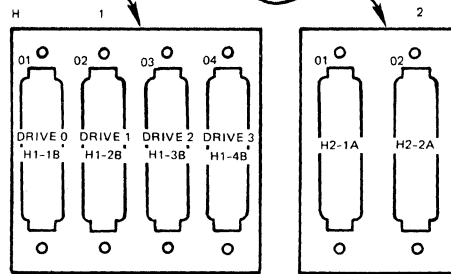
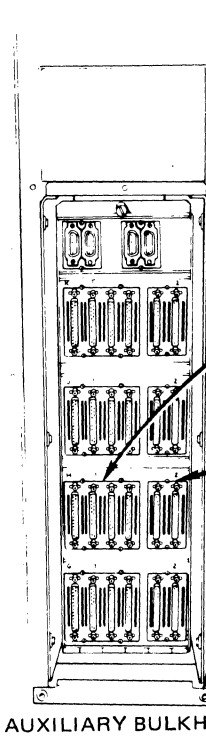
- g. Return to the Device Installation Flowchart.
2. To cable up to four new disk drives from the device bulkhead to the DPS 6 PLUS system bulkhead, perform the following procedures:
    - a. On the Model 410/420 CCS, locate XHFA12 in the column under CONTROL BOARD. On the Model 400 CCS, locate HSD01C in the column under CONTROL BOARD (see Figure 2-30).
    - b. To the right of XHFA12 or HSD01C, locate HFA001. Under HFA001 are the system bulkhead locations.
    - c. Locate two item 5 cables (04910133-904). Connect one end of each cable to the device bulkhead at locations 0A 01, and 0A 02 (see Figure 2-22). Secure the cables with captive screws.
    - d. Route the other ends of the cables to the system bulkhead and under the cable bar. If the cables are not easily routed under the cable bar, then remove the cable bar by removing the two screws.
    - e. Connect the two item 5 cables (0A 01 & 0A 02) to the system bulkhead at locations 01 and 02, respectively. See Figure 2-30 for the appropriate system bulkhead locations. Secure with captive screws.
    - f. Locate the third item 5 cable and connect it to location 0B of the device bulkhead (see Figure 2-22). Connect the other end to the appropriate system bulkhead Drive 0 location (see Figure 2-30).
    - g. Locate the fourth item 5 cable and connect it to location 1B of the device bulkhead (see Figure 2-22). Connect the other end to the appropriate system bulkhead Drive 1 location (see Figure 2-30).
    - h. Locate the fifth item 5 cable and connect it to location 2B of the device bulkhead (see Figure 2-22). Connect the other end to the appropriate system bulkhead Drive 2 location (see Figure 2-30).
    - i. Locate the sixth item 5 cable and connect it to location 0B of the second cabinet device bulkhead (see Figures 1-3 and 2-22). Connect the other end to the appropriate system bulkhead Drive 3 location (see Figure 2-30).
    - j. If the cable bar was removed and there are no other devices that are to be cabled to the system bulkhead, then reinstall the cable bar.

SYSTEM NO XXXXXX-XX LOCATOR CARD 30" CABINET SHEET 3 OF 3 REV. A

SLOT		CONTROL BOARD	ADDR	BULKHEADS			
				4	3	2	1
TERM		TML001					

07	XHFA12 HDX001	28	H1-1B 2800	H1-2B 2880	H1-3B 2900	H1-4B 2980	H2-1A, 2A
----	------------------	----	---------------	---------------	---------------	---------------	-----------



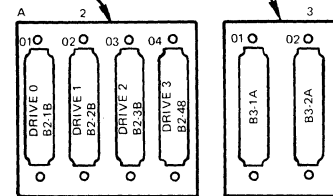
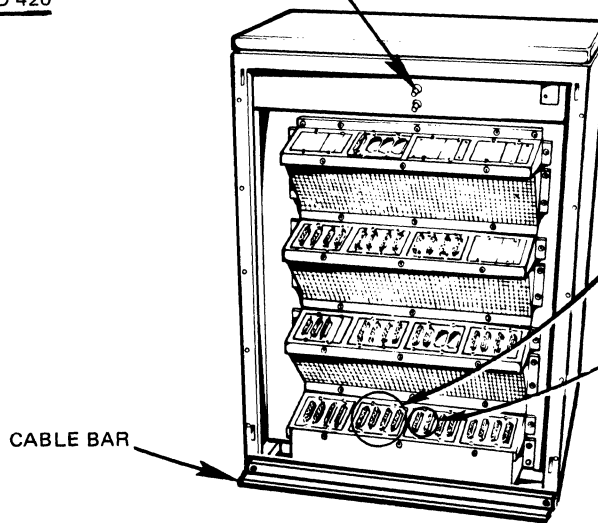
NOTE  
THE B CABLE OF DRIVE 0 CONNECTS TO THE FIRST CONNECTOR (H1 1), THE B CABLE OF DRIVE 1 CONNECTS TO THE SECOND CONNECTOR (H1 2), ETC

SYSTEM NO XXXXXX LOCATOR CARD SHEET 2 OF 2 REV X

SLOT		CONTROL BOARD	ADDR	LEFT SIDE			
				4	3	2	1
TERM		TML001					
08	MIC001	04	WREN DEV 1 0480	DSKT AZ C PNL DSKT-0 0580	STRM01 A4-4 0500	WREN DEV 0 0400	
07	HSD01C	28	A4-1B 2800	A4-2B 2880	A4-3B 2900	A4-4B 2980	A3-1A A3-2A

MODEL 410 AND 420

BNC CONNECTORS



MODEL 400

87-266

Figure 2-30. Example of Cabling the 132M Byte and the 413M Byte Disk Drives



## 2.3 DEVICE CONFIGURATION

This subsection provides the procedures for checking the disk drive switch settings. These switch settings must be checked prior to applying power to the drive.

There are two switches to be checked:

- 115/220 Vac Switch
- Maintenance Switch (only on the 413-megabyte drive).

### 2.3.1 115/220 Vac Switch

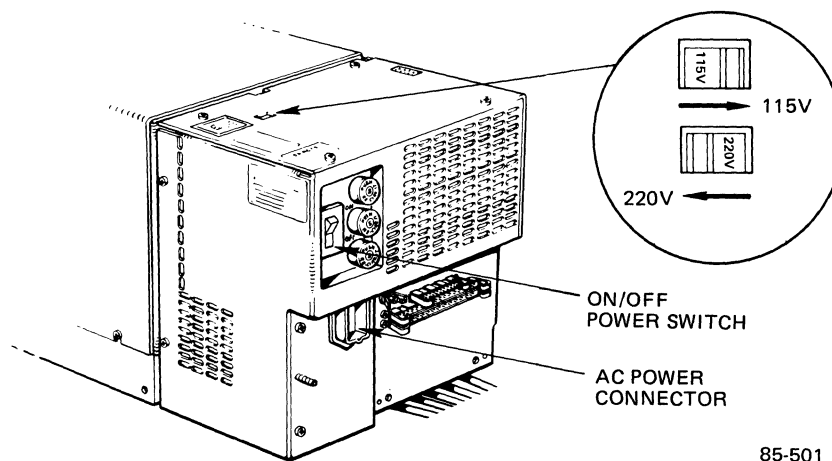
#### **CAUTION**

To prevent equipment damage, ensure that the switch is set at the correct setting.

This switch (S2) is located at the rear of the disk drive on top of the integral power supply (see Figure 2-31) and is only accessible only when the drive is extended out of the cabinet. Setting 115 is for 100 through 120 Vac incoming voltage; setting 220 is for 208 through 240 incoming voltage. This switch, which is preset to 220 by the factory, must be set for the incoming voltage from the ac source. The power supply will operate on either 50 or 60 Hz.

### 2.3.2 Maintenance Switch

This switch is used for self-test purposes and is available only on the 413-megabyte drive. It is located at the front of the disk drive behind the air intake panel (see Figure 2-32). Remove the panel, which easily pops off, remove the filter, and ensure that the toggle switch is in the down position. Replace the filter and then replace the panel.



85-501

Figure 2-31. 115/220 Vac Switch

## 2.4 COMPLETING THE INSTALLATION

This subsection provides the procedures for installing the logic address plug and for completing the disk drive installation.

### 2.4.1 Logic Address Plugs

To install the logic address plug (see Figure 2-32) to the disk drive, perform the following steps:

1. Locate the set of logic address plugs that were unpacked with the disk drive.
2. Determine the appropriate plug as follows:
  - a. The first drive in the daisy chain must have logic address plug 0.
  - b. The second drive in the daisy chain must have logic address plug 1.
  - c. The third drive in the daisy chain must have logic address plug 2.
  - d. The fourth drive in the daisy chain must have logic address plug 3.
3. Install the logic address plug to the front of the disk drive so that the LED window is at the top of the plug (see Figure 2-32). Ensure that the plug is flush with the other buttons on the drive front panel.
4. Ensure that each drive has its appropriate logic address plug installed.

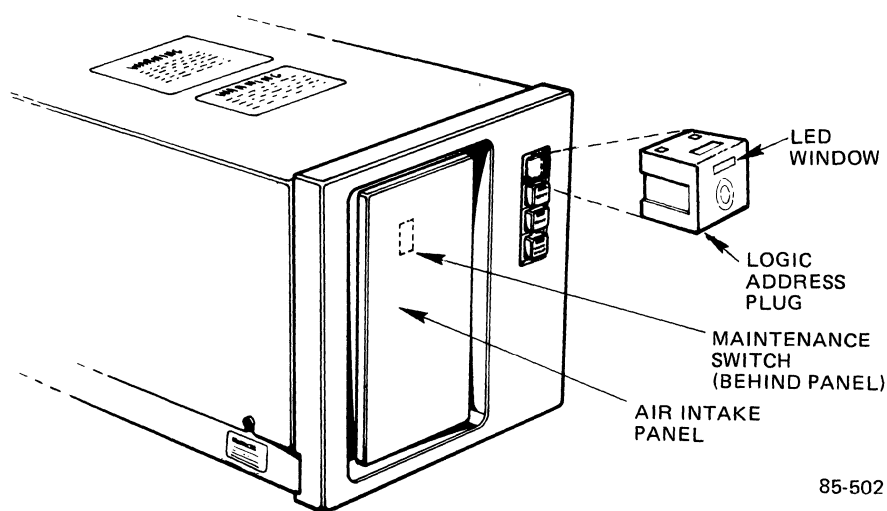


Figure 2-32. Disk Drive Front Panel

## 2.4.2 Finishing the Installation

1. Ensure that all the drives have been pushed back fully into the cabinet.
2. Replace the slide locking bar to each drive (see Figure 2-11).
3. Reinstall the side panel, if necessary.
4. Close the front door.

### **WARNING**

Prior to performing step 5, ensure that the PDU circuit breaker is in the OFF position (see Figure 2-33).

5. At the rear of the cabinet, locate the power cord from the PDU and route it out the rear of the cabinet.
6. Cable the power cord from the PDU to the appropriate ac power source (i.e., customer ac outlet or system PDU).
7. Ensure the disk drive circuit breaker is depressed in the 1 (ON) position for each drive (see Figure 2-31).
8. Reinstall the rear access cover (see Figure 2-24).

### **CAUTION**

Once the disk drive is installed in the cabinet, do not move the cabinet (except for servicing) or damage can result to the disk drive. To relocate the cabinet, remove all disk drives from the cabinet and repackage them in the shipping containers.

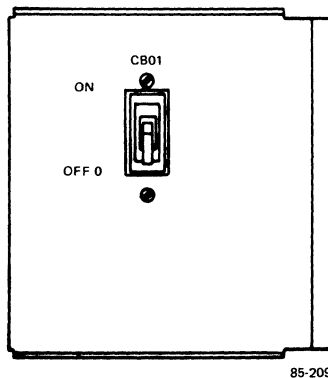


Figure 2-33. Power Distribution Unit (Front View)

9. To power up and operate the disk drive, refer to MSU9901/9902 132 MB Fixed Disk Drive Operation (Order No. HD42), or MSU9911/9912 413 MB Fixed Disk Drive Operation (Order No. HD44).

### 2.4.3 Installing The System Skins

Perform the following procedure to install the rear skins on the Model 410 and 420. For the Model 400, simply line up the tabs on the rear skin with the holes in the cabinet frame and push in and down.

1. At the rear of the cabinet, swing the bar back into position and secure it to the cabinet. If there are a number of cables, remove the bar from the cabinet, place the bar over the cabinet opening, and secure it with the screws while ensuring that the cables are not pinched.
2. At the rear of the cabinet, insert the bottom tabs of the 15-inch rear skin into the two slots on the bottom of the cabinet.
3. Insert both hooks of the retainer chain into one of the holes in the skin's screen. The chain must be hooked into the lowest screen hole possible.
4. Push the skin into position against the cabinet by firmly pressing against the center of the skin. Ensure that the skin is locked into position.
5. Repeat steps 2 through 4 to install the 30-inch rear skin.
6. Slide the 15-inch tip cover back into place with the front of the cover lifted slightly. Ensure that the two rear hooks on the cover catch the metal frame at the rear of the cabinet.
7. Push down on the front of the cover until the cover latch is secured in the up position.

## *Section 3*

# **REPACKAGING**

This section contains the procedures to remove the disk drive from the cabinet and to repackage the disk drive in a shipping carton.

### 3.1 PREPARATION

This procedure assumes that the original disk drive shipping carton or a similar shipping carton is used. To prepare the shipping carton, perform the following steps:

1. Remove everything from inside the shipping carton except the accessory insert (see Figure 3-1).
2. Place the cardboard wraparound flat on the floor with the crease impressions facing up so that the wraparound will fold properly.
3. Place at least three bags of new or reactivated desiccant in the bottom of the shipping carton.

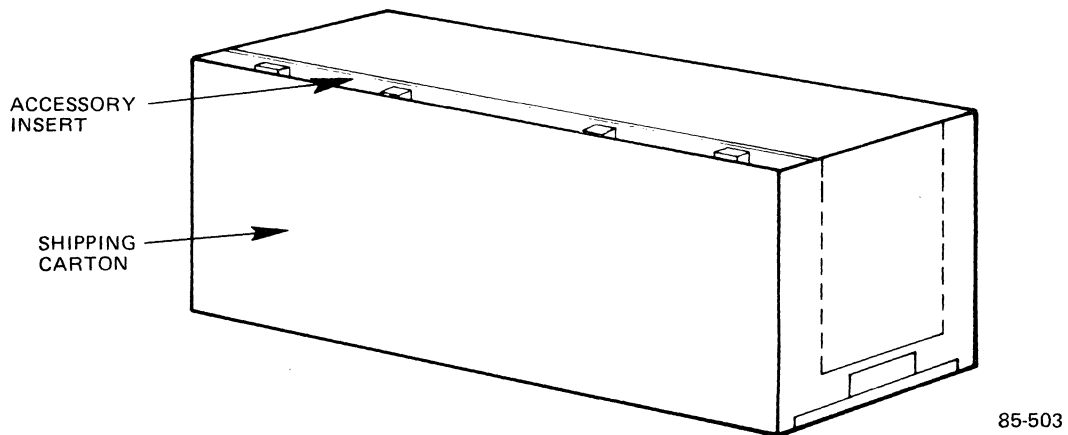


Figure 3-1. Shipping Carton

### 3.2 REMOVING THE DISK DRIVE FROM THE CABINET

To remove the disk drive from the cabinet, perform the following steps:

1. Open the front door of the disk drive cabinet and place the PDU circuit breaker in the OFF position (see Figure 2-33).
2. At the rear of the cabinet, remove the rear access door (see Figure 2-9).
3. At the rear of the disk drive to be removed, disconnect the cables (and terminator, if present) from the J2, J3, and J4 connectors (see Figure 2-19).
4. Loosen the two bottom screws on the cable clamp bracket (see Figure 2-17). With the clamps still attached, lift the bracket up and away from the drive. Allow the bracket to hang down.
5. At the front of the drive, remove the appropriate slide locking bar by removing the six screws (See Figure 2-11).
6. Extend the drive and the mounting pan out of the cabinet until both slides click into the locked position.
7. Remove the nine screws that attach the drive to the mounting pan (see Figure 2-13).

## WARNING

The 413-megabyte disk drive weighs approximately 82 pounds, and the 132-megabyte disk drive weighs approximately 66 pounds. To avoid bodily injury, two people are required to lift the disk drive.

8. Lift the drive out of the mounting pan and place onto the center of the cardboard wraparound.

### NOTE

If a replacement drive is to be installed in the cabinet, do not perform steps 9 through 13.

9. Lift the slide lock release on each slide (see Figure 2-13) and slide the mounting pan back into the cabinet.
10. Reinstall the slide locking bar.
11. Install a dummy panel, or the next drive unit.
12. If the drive was in a daisy chain, then recable the other drives as necessary (refer to subsection 2.2.4). Ensure that the last drive in the daisy chain has a terminator.
13. Reinstall the rear access cover.
14. Place the PDU circuit breaker in the ON position and close the front door.

### 3.3 REPACKAGING THE DISK DRIVE

To repack the disk drive, perform the following steps:

1. Install a shipping brace to each side of the disk drive as shown in Figure 3-2.
2. Remove the logic address plug from the disk drive front panel (see Figure 2-32) and store it in the accessory pocket in the shipping carton (see Figure 3-1).

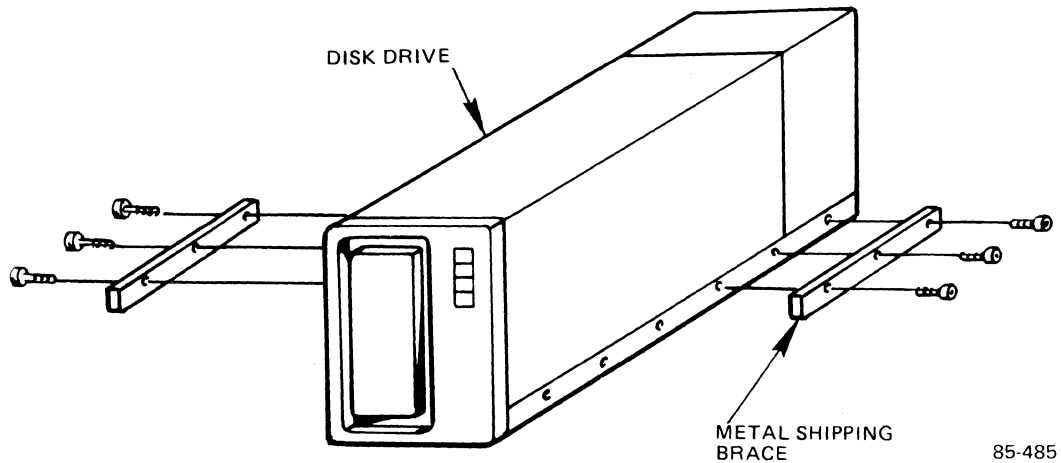


Figure 3-2. Installing the Shipping Braces

NOTE

For steps 3 through 7, see Figure 3-3.

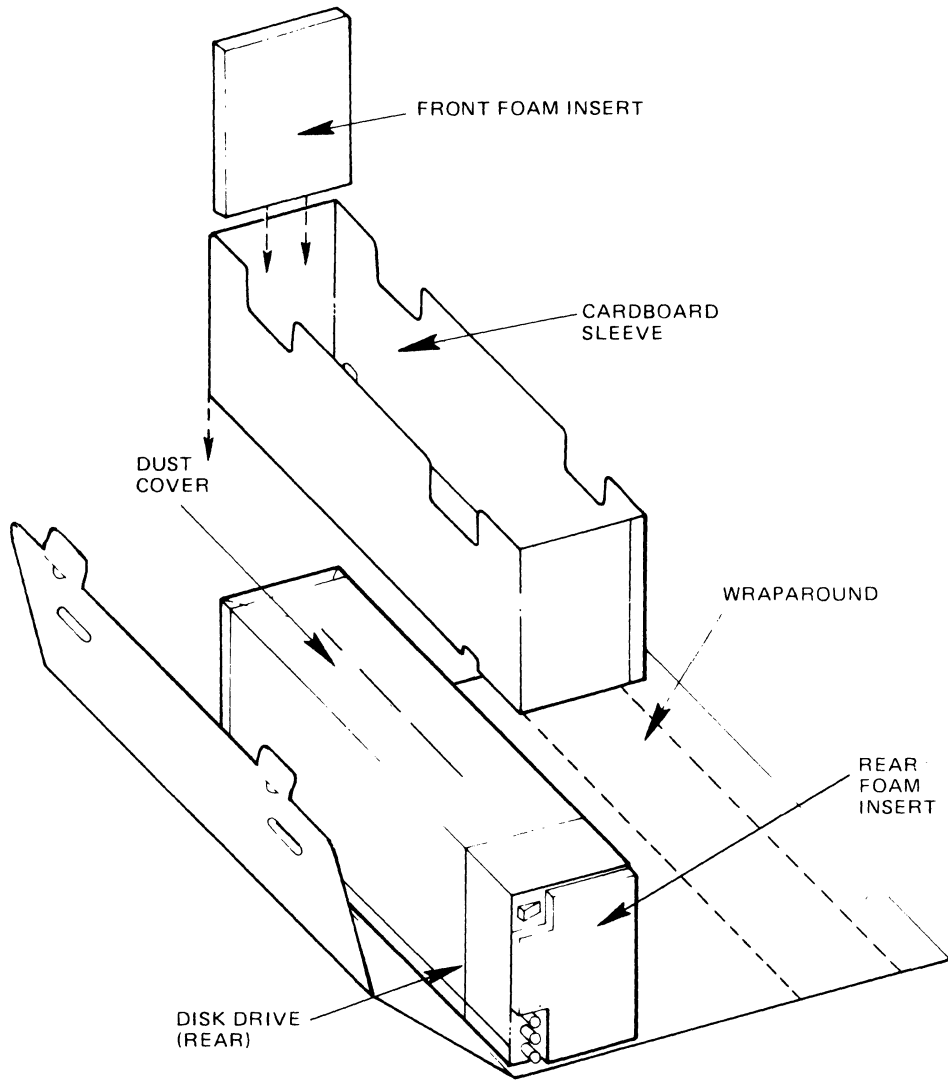
3. Place the plastic dust cover over the disk drive.
4. Place the rear foam insert at the rear of the disk drive. Ensure that the insert is positioned properly so that the notches lie over the power supply circuit breaker knobs.
5. Place the cardboard sleeve over the drive. Ensure the cutouts on the sides are in the up position.

**CAUTION**

Ensure that the logic address plug has been removed or damage will result in the next step.

6. Slide the front foam insert in between the sleeve and the front of the drive.
7. Position the drive and the sleeve so that the front and rear edges of the sleeve are flush with the edges of the wraparound.





85-504

Figure 3-3. Placing the Disk Drive in the Wraparound

8. Fold up the edges of the wraparound and lock the top by inserting the locking tabs into the slots on the edge of the opposite flap (see Figure 3-4).

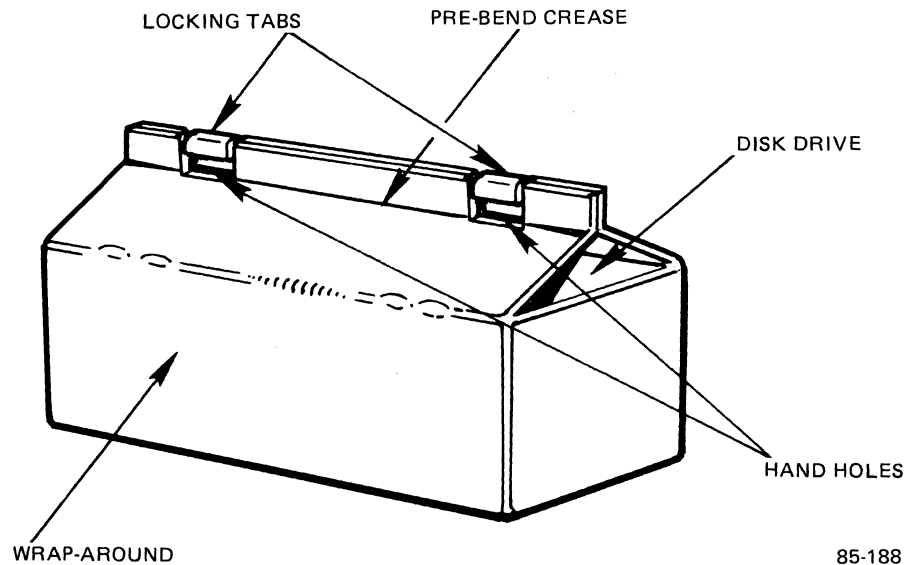


Figure 3-4. Closing the Wraparound

NOTE

For steps 9 through 12, see Figure 3-5.

9. Locate the metalized bag, and place two of the molded foam cushions into it. Push the cushions to the bag ends and square up the bag.
10. Place the bag into the carton, and tuck the flaps under as shown in Figure 3-5. Ensure that the bag and the cushions line up with the perforations in the carton.
11. Place at least three bags of new or reactivated desiccant in the bottom of the shipping carton.
12. Using the handles on the wraparound, lift the drive up and place it in the bag. Ensure that the wraparound is seated correctly on the cushions.
13. While holding the top of the bag up, place the other two molded foam end caps at the ends of the wraparound. Ensure that they are seated correctly.

14. Pull up on the bag to its full height within the carton and fold the excess material over the cut in the bag.
15. Seal the bag with masking tape. Ensure that all openings in the bag are covered with tape.

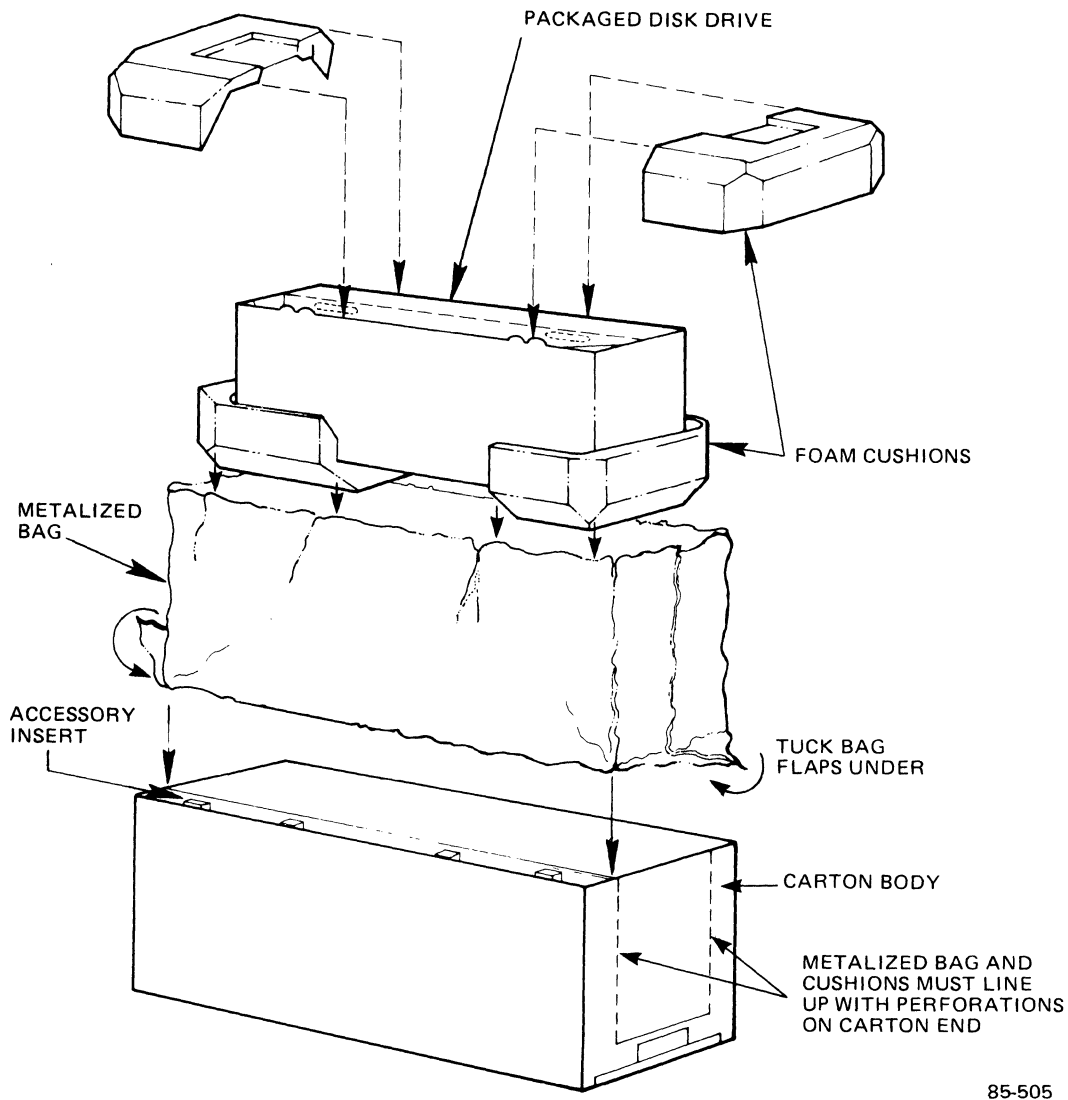


Figure 3-5. Placing the Disk Drive in the Carton

NOTE

With the masking tape, the sealed bag should protect the disk drive from condensation for approximately 6 weeks.

16. If present, slide the printed cardboard insert down between the bag and the carton (see Figure 3-6). Fold it at the crease so that the printed side is lying face up on the bag.
17. Place the top cover on the shipping carton (see Figure 3-6).
18. With two people, lift the carton onto a skid, and tie the carton to the skid with shipping straps.

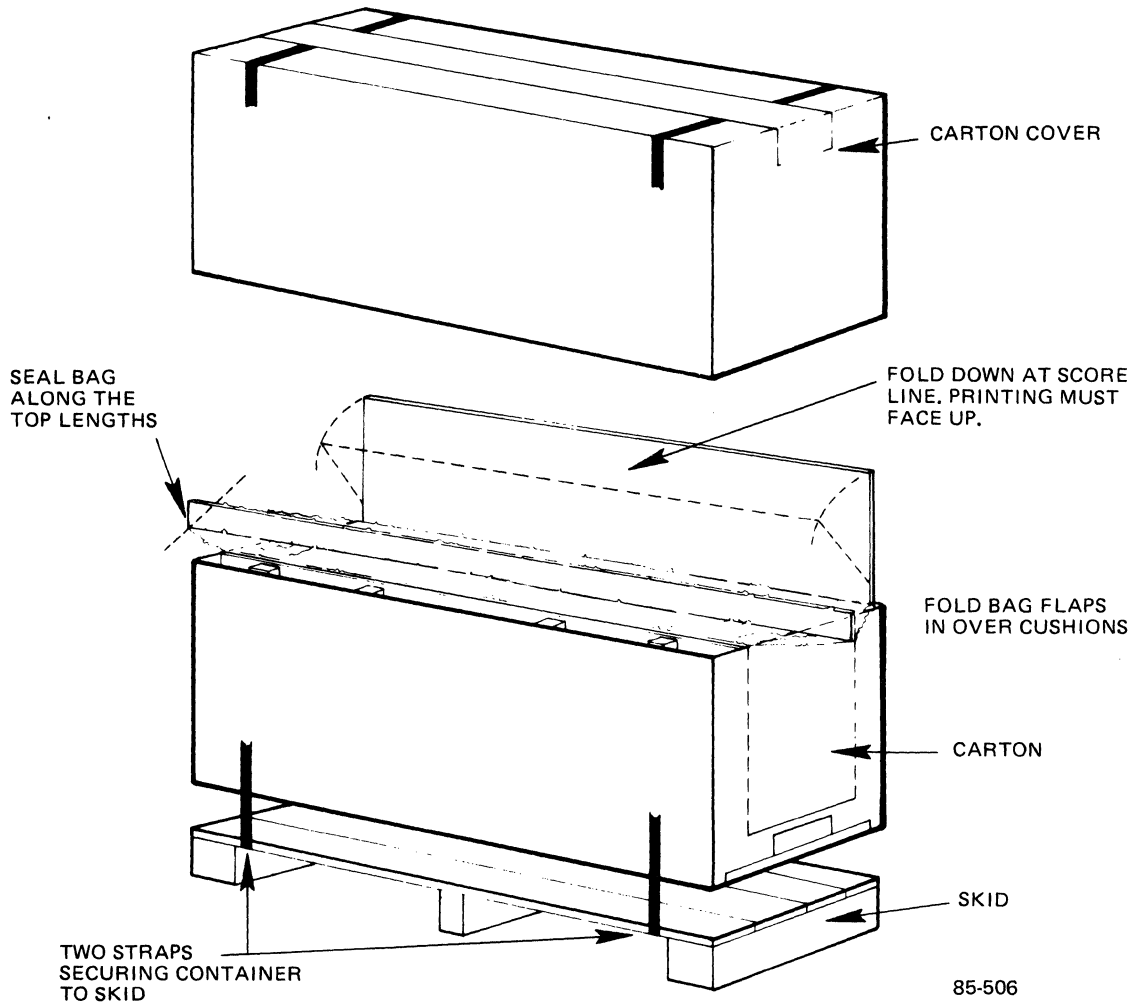


Figure 3-6. Closing the Shipping Carton

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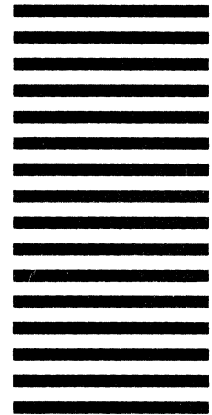
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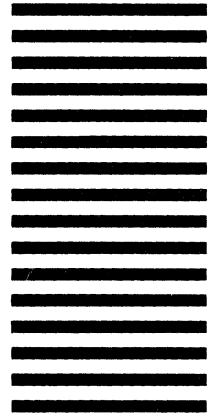
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