

MODEL TC-151 TAPE CONTROLLER
HARDWARE MANUAL



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western peripherals

14321 MYFORD ROAD
TUSTIN, CALIFORNIA 92680

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SECTION II INSTALLATION

2.1 INTRODUCTION

2.2 This section provides the necessary information to successfully set up and install the TC-151 Tape Controller into the DEC LSI-11 computer system. This information is essential for the initial installation and will also be valuable when the controller is reinstalled after repair. The controller consists of two printed circuit boards which plug into the slots in a standard ^{Q-}SPC-wired system unit (backplane) which may be in the computer mainframe or expansion chassis. Cable Adapter Paddleboards are provided to adapt the universal controller interface cables to the specific connector requirements of each drive (to be specified by the customer at the time of purchase). All DC power required for the operation of the controller is received from the power supply of the host computer or chassis via the backplane.

2.3 PREPARATION

2.4 Locate the position in the computer where the controller will be installed. Remember that the position of the system unit determines priority for DMA and interrupt activity. The tape controller usually works well if placed anywhere in the system. Check the cabling distance to the first drive and to each daisy-chained drive, verifying that all cable lengths will be adequate. Refer to the tape drive manual to install the

WARNING: INCORRECT INSTALLATION WILL CAUSE DAMAGE
TO THE SYSTEM WHEN POWER IS APPLIED

2.5 SYSTEM COMPONENTS. Do not discard any shipping materials until all parts have been checked off on the packing list and any concealed damage has been reported to the carrier. Check the equipment supplied to ensure that all necessary items are included:

1. Controller Boards (two) with ;
2. ^{Optional} Standard ^{-type} backplane system unit and associated power cable. (Molex plug must match the power supply connector.)
3. Drive Cables (3), one set per drive:
 - Control cable
 - Write cable
 - Read cable
4. Adapter Paddleboards (3), one set per drive:
 - Control Paddleboard
 - Write Paddleboard
 - Read Paddleboard
 Including:
 - Terminators (on the Write and Control Paddleboards)
 - Drive Select Jumpers (on the Control Paddleboard)
 See Figure 2-6 for part identification.
5. Program tapes:
 - a. Diagnostic program tape
 - b. Reliability program tape

6. Documentation:
 - a. Hardware manual
 - b. Logic manual
 - c. Diagnostic manual
7. Other items which must be available:
 - a. Tape drives
 - b. Computer
 - c. Standard ^{Q-}SPC backplane system unit and associated power cable. (Molex plug must match the power supply connector.)
 - d. Q-bus terminator, cables/jumpers
 - f. Loading device for diagnostics

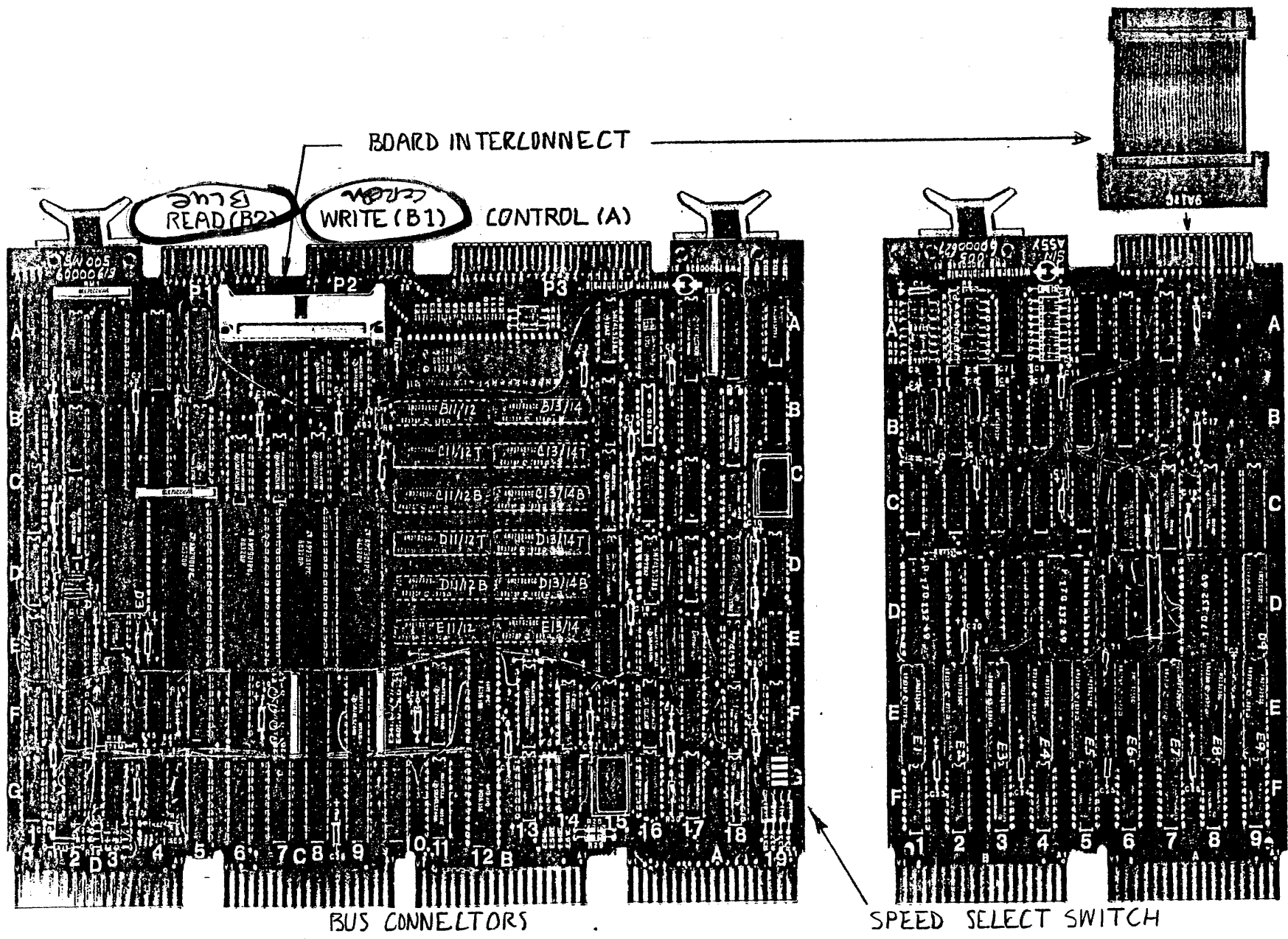
2.6 SYSTEM SET-UP

2.7 The tape system must be set up properly either when installing the system or after servicing. Proper set-up includes:

Setting the speed switches for the speed of the drives

and

checking backplane jumpers for the priority signals. Each Tape Drive Adapter Paddleboard must have the proper termination (on the last drive) and Configuration Switch setup. Installation is complete when the system components are plugged in and interconnected. A recheck and inspection of the installation ensures that no item is overlooked. The procedures for setup and installation are in the paragraphs that follow. Locations of setup items on the



BOARD INTERCONNECT

READ (B2)

WRITE (B1)

CONTROL (A)

BUS CONNECTORS

SPEED SELECT SWITCH

S11V6

controller boards are shown in Figure 2-1.

2.8 TAPE SPEED SELECTION. Tape drive speed is selected on the controller by the setting of four switches located by the setting of four switches located in a switch pack at location 19G. Speed selection provides two tape speeds for both the NRZI and PE modes. Table 2-1 provides the required speed settings for various combinations, (If only one speed is used, it may be selected on either speed A or speed B.)

TABLE 2-1 SPEED SELECTION SWITCHES

TAPE SPEEDS (ips)		SWITCHES			
A	B	1	2	3	4
25	37.5			ON	ON
25	45		ON		ON
25	75	ON			
25	125	ON	ON		
37.5	45		ON	ON	
37.5	75	ON			ON
37.5	125	ON	ON		ON
45	75	ON		ON	
45	125	ON	ON	ON	
45	125	ON	ON	ON	ON

2.15 CONTROLLER BOARD INSTALLATION. Referring to Figure 2-3, place the controller boards into any convenient location of the system unit. Ensure the boards are oriented correctly (notches on the board connectors must fit the ridges of the system unit), and are seated fully.

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(Paragraph 2.16 is intentionally missing from this manual.)

2.17 CONTROLLER CABLE CONNECTIONS. Locate the following cables:

Description	Conductors	Controller-End Marking	Connects To
Tape Read Cable .	26	Top B2	Board 4
Tape Write Cable	26	Top B1	Board 3
Tape Control Cable	50	Top A	Board 2

The ribbon cables are keyed to prevent incorrect connections. Check the ribbon cable connectors to assure that all keys are in place.

2.18 Install the Read, Write, and Control cables (in that order) onto the controller connectors as shown in Figure 2-4. The cables will exit toward the solder side of the boards.

2.19 TAPE DRIVE INSTALLATION

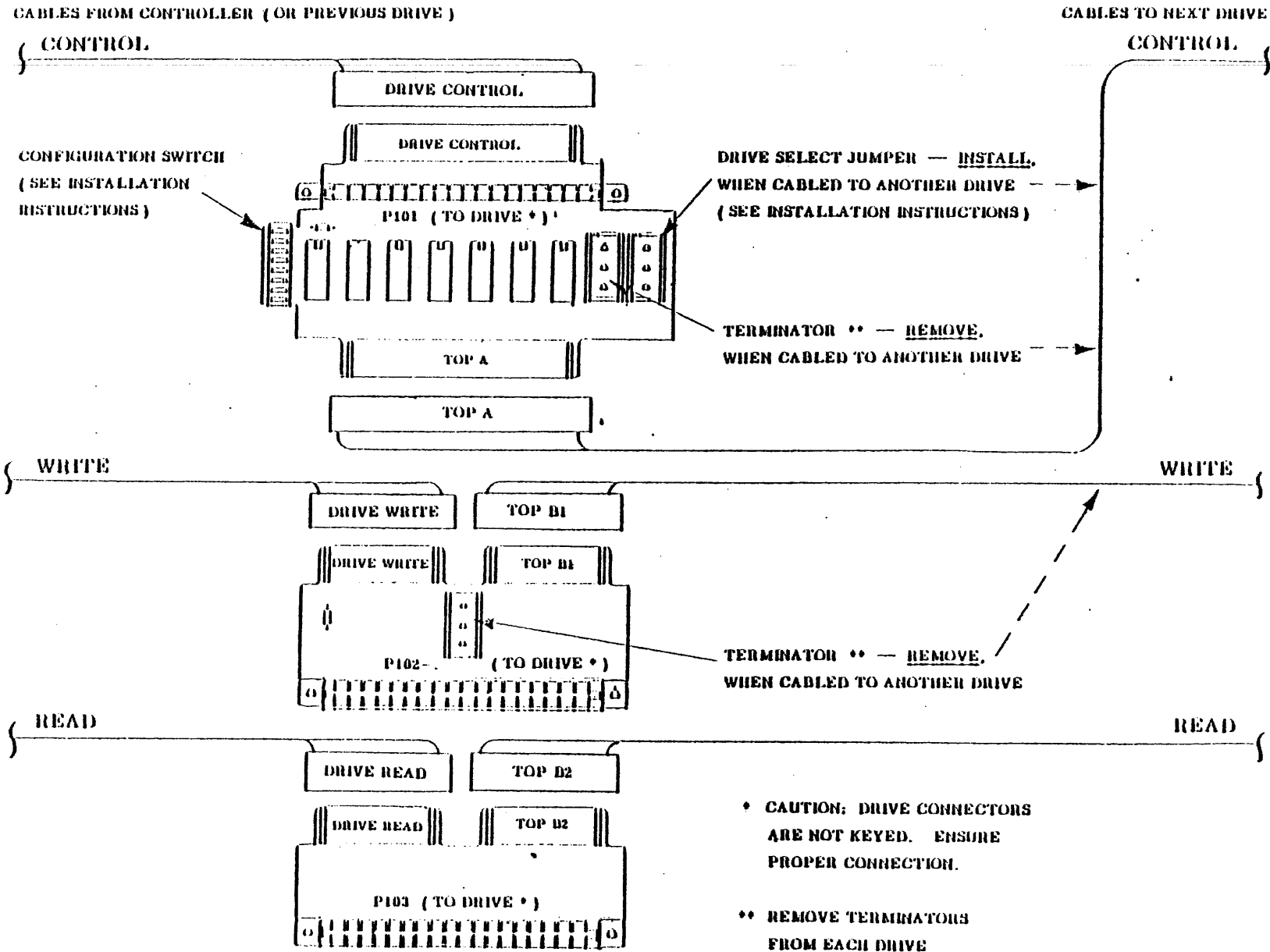
2.20 ADAPTER PADDLEBOARD SETUP. Locate a set of three Adapter Paddleboards for each tape drive. The Adapter Paddleboards for each drive require proper setup before installation. Setup includes proper termination, switch settings, and installation of drive selection jumper plugs.

2.21 TERMINATORS. Consulting the tape manuals for details, remove all termination devices from each drive. Remove the terminators from the Write and Control Adapter Paddleboards, except the Adapter Paddleboards on the drive located farthest from the controller. See Figure 2-5. Ensure that the last Adapter Paddleboards have the terminators installed as shown.

2.22 CONFIGURATION SWITCHES. Set the switch module on each Control Paddleboard according to the configuration requirements of the tape drive. Switch settings are given in Table 2-3.

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- * CAUTION: DRIVE CONNECTORS ARE NOT KEYPED. ENSURE PROPER CONNECTION.
- ** REMOVE TERMINATORS FROM EACH DRIVE

Figure 2-5. Details of Adapter Installation

INSTALLATION

SWITCH NO.	FUNCTION
1	"ON" for Qantex "OFF" for all other drives
2	"ON" for Kennedy, CDC, or Tandberg drives "OFF" for all other drives
3	"OFF"
4	9-TRACK DRIVE: "ON" for Speed B "OFF" for Speed A
5	Set opposite of Switch 2 (see above)
6	"ON" for 9-track NRZI-only drives "OFF" for all other drives
7	"ON" for dual density or PE drives made by Kennedy, Digidata, or Qantex "OFF" for all other drives
8	"OFF"

(for assembly numbers 122037, 122038, 122039, and 122044)

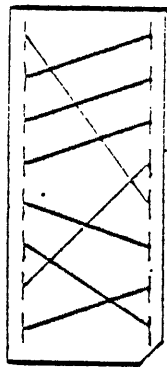
Table 2-3. Configuration Switches

2.23 DRIVE SELECT JUMPERS. Ensure that the correct Drive Select Jumper is installed in the Control Paddleboards. The last drive does not require a Drive Select Jumper (leaving one installed will have no effect).

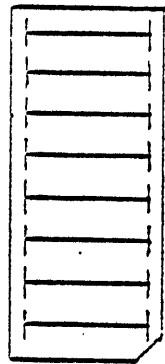
1. For tape drives without front panel unit select switches, use jumper part number 122012 as shown in Figure 2-6.
2. For tape drives with front panel unit select switches:
 - a. Use jumper part number 122010 as shown in Figure 2-6.
 - b. On drives with Unit Select Switches that receive the select lines from J101, ensure Control Paddleboard Jumpers are installed from P to R (factory etch), N to M, E to F, and G to H. See Table 2-4.
 - c. On drives with externally connected Unit Select Switches, connect as shown in Table 2-4

2.24 TAPE DRIVE INTERCONNECTIONS. Locate a set of three ribbon cables for each drive (one set is connected to the controller). Check that each connector has its key in place and connect the cables as shown in Table 2-5 and Figures 2-7 and 2-8.

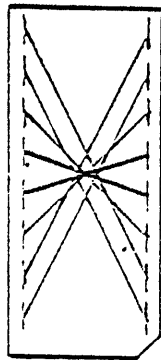
INSTALLATION



NON-SELECT JUMPER (PN 122012)
For daisy-chained drives
Without front panel Unit Select switches.



UNIT SELECT JUMPER (PN 122010)
For daisy-chained drives
with Unit Select switch
(Except fourth tape unit)



UNIT SELECT JUMPER (PN 122011)
For daisy-chained drives
with unit select switches
(Install in fourth tape unit)

NOTE: No jumper plug is required on the last tape unit or for single drive installations.
However, it should remain in the board for future expansion of the system.

Figure 2-6 Drive Select Jumpers

NOTE: APPLIES TO DRIVE SELECT THUMBWHEEL OPTION ONLY.

Drive Select Line:	Add Jumper:	To Activate J101 Pin:	Connect External Switch To:
Select 0	P-R (Etch)	J	A
Select 1	N-M	A	B
Select 2	E-F	18	D
Select 3	G-H	V	C
		L	(return line from switch)

Table 2-4 Control Adapter Select Options

	(Sequence is repeated for each drive)					
	Cables		Paddleboards		Cables	
Controller Board	Controller End	Drive End	Controller End	Daisy Chain End	Controller End	Drive End
Board 2	Top A	Drive Control	Drive Control	Top A	Top A	Drive Control
Board 3	Top B1	Drive Write	Drive Write	Top B1	Top B1	Drive Write
Board 4	Top B2	Drive Read	Drive	Top B2	Top B2	Drive Read

Table 2-5 Connector Legends and Cable Connections

2.25 Connect the Control, Write and Read Adapter Paddleboard connectors to J101, J102, and J013, respectively, on the tape transport. (Reference the tape drive manual for details.) Connect the paddleboards to the drive with care. The green connectors are not keyed to the drive connectors. Therefore, it is possible to (1) install the connector backwards or (2) to place the Adapter Paddleboard on the wrong drive connector (e.g., Read and Write Connectors reversed.) Avoid incorrect connection by (1) verifying the function of each drive connector and (2) physically checking the pin orientation of the mating connectors. If possible, secure the paddleboard connectors to the drive connectors with screws. Neatly dress and tie all cables so the installation appears neat and professional.

2.26 INSTALLATION INSPECTION

2.27 **WARNING.** Severe damage may result from incorrect installation of the system. Avoid these typical problems:

Possible Problem Description	Paragraph
2. System unit installed backwards or pins bent	2.14
3. Power paddleboard reversed; power cable incorrectly connected.	2.14
4. Boards and cables reversed or placed in the wrong position.	2.14

Other less serious problems can be remedied by reviewing the installation procedures.

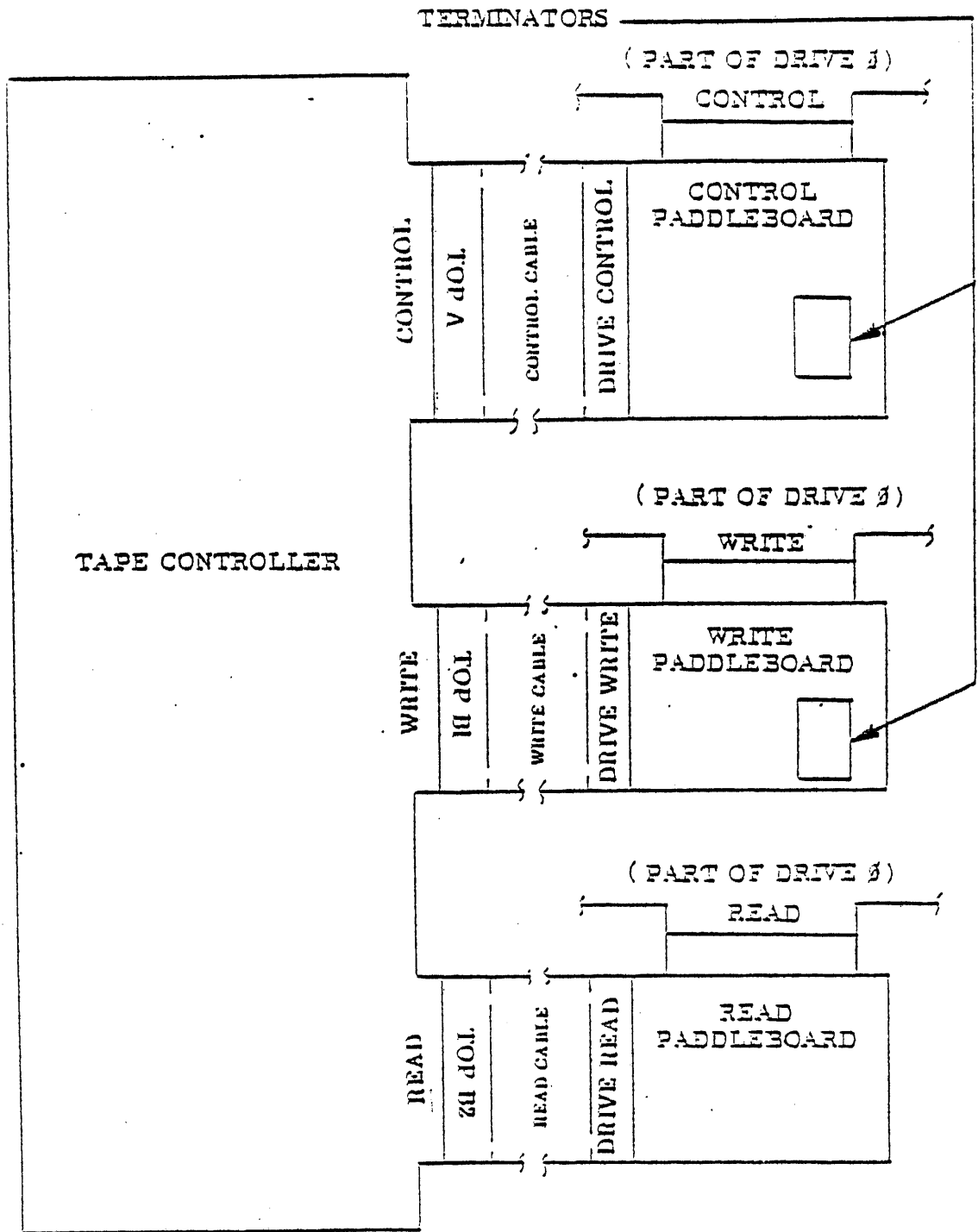
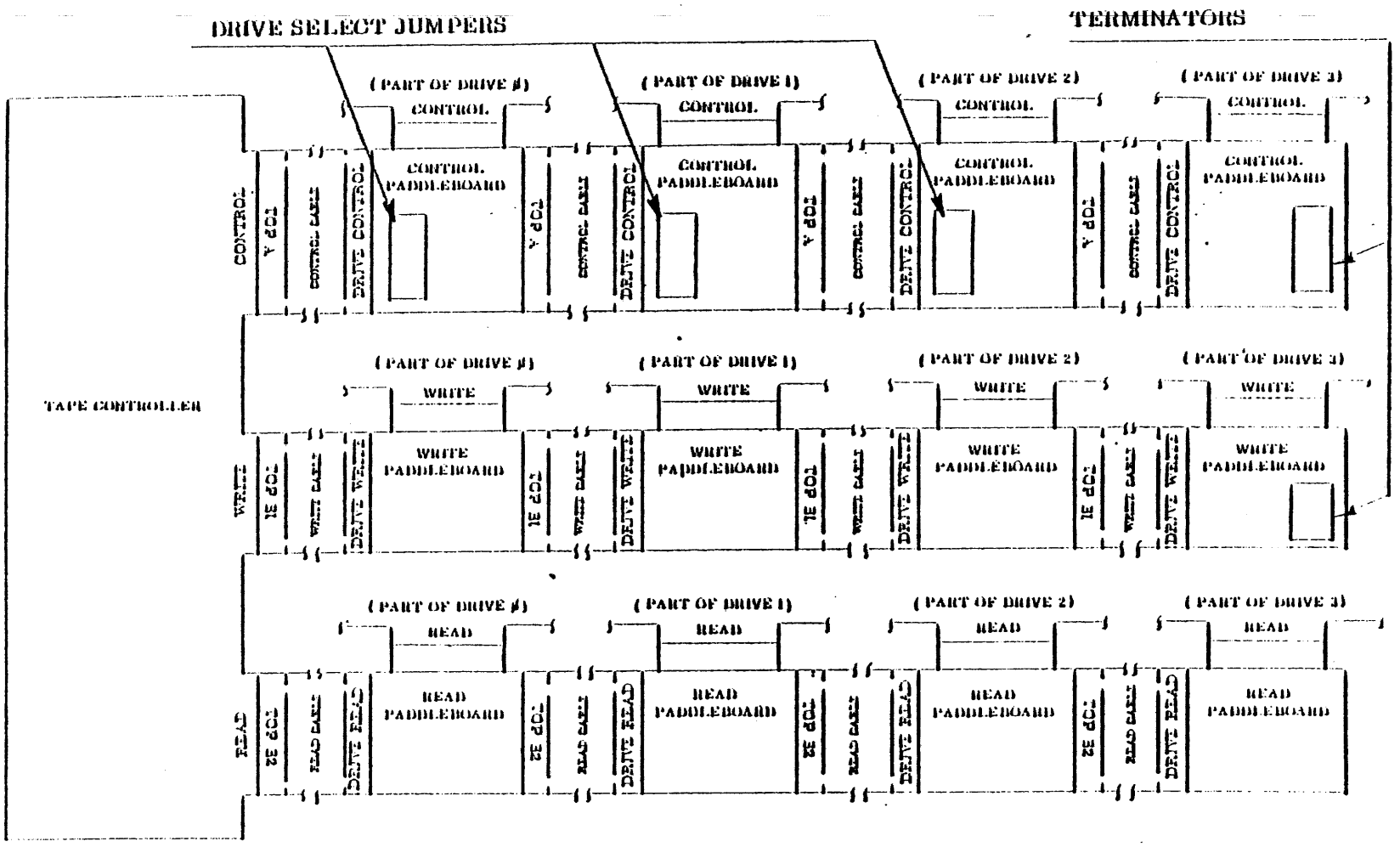


Figure 2-7. Single Tape Drive Connections

Figure 2-3. Tape Drive Daisy-Chain Connections



INSTALLATION