DIGI-DATA CORPORATION
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MAGNETIC TAPE TRANSPORT

OPERATION AND MAINTENANCE MANUAL

MODEL 1140, 1640, 1740

RECORD OF REVISIONS

REVISION LETTER	DESCRIPTION	DATE
X1	Class "C" Release, 0551711-0000	10-26-78
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1 - GENERAL INFORMATION

1.1 SCOPE OF MANUAL. This publication, in Sections 1 through 4, describes the operation, installation, and interfacing of Digi-Data Corporation's 1140, 1640, and 1740 series synchronous magnetic tape transports. Sections 5 through 10 describe circuit operation, troubleshooting techniques, component replacement instructions, and adjustment procedures.

1.2 DESCRIPTION OF EQUIPMENT. The tape transport series described herein is designed to record and read NRZI or phase encoded data on seven or nine track magnetic tape at synchronous tape speeds from 12.5 to 45 inches per second (IPS) with full ANSI/IBM COMPATIBILITY. Refer to ANSI Interchangeability Specifications X3.39-1973, X3.22-1973, and X3.14-1973.

1.2.1 TAPE MOVEMENT. Tape movement is controlled by a single capstan mounted on the shaft of a DC permanent magnet motor. The tape is in contact with 180 degrees of the capstan surface. Constant tape velocity and linear acceleration are achieved through feedback from the capstan motor's integral tachometer. Tape buffering is accomplished by two tension arms whose movements control the take-up and supply reel motors via differential photocell servomechanisms. Beginning-of-tape detection, end-of-tape detection, high speed rewind, and low speed unload are incorporated in all three models. Available tape speeds are indicated in Figure 1-1.

Tape Speed	Model 1140 7" dia. reels (600')	Model 1640 8 1/2" dia. reels (1200')	Model 1740 10 1/2" dia. reels (2400')
12.5 IPS	OPTIONAL	OPTIONAL	OPTIONAL
18.75 IPS	OPTIONAL	OPTIONAL	OPTIONAL
25 IPS	STANDARD	STANDARD	OPTIONAL
37.5 IPS	---	OPTIONAL	OPTIONAL
45 IPS	---	---	STANDARD

Figure 1-1, Available Tape Speeds

1.2.2 DATA TRANSFER. Data to be recorded must be provided with an external clock. NRZI data is encoded by the transport, phase-encoded data must be already encoded when presented to the transport.

NRZI data recovered from tape is amplified, decoded, and deskewed, and provided at the I/O with a clock developed from the data. Phase encoded data is squared up and threshold discriminated but is not decoded nor deskewed. These last two functions are performed in the phase encoded formatter.

Each unit has three read thresholds: high for read-after-write error checking, normal, and low for the recovery of severely degraded data. Each unit also incorporates file protection to prevent inadvertant erasure, and edit capability which allows the user to rewrite a single record/block in the midst of other records/blocks. All units are equipped with a dual gap read-after-write head.

1.2.3 TAPE PROTECTION. Since customer tapes often contain data of significant value the Digi-Data transport incorporates several unique tape protection circuits. In the event of power loss the reel motors are brought to rest in a controlled fashion employing energy stored in an oversized filter capacitor, and the tape buffering arms are gently relaxed to their mechanical stops. Tape remains neatly threaded with no apparent slackness. A mechanical relay protects the tape from catastrophic failure in the motor amplifier circuits.

1.2.4 PHYSICAL DESCRIPTION. The 1140, 1640, and 1740 transports are each built on a single machined aluminum plate; all tape handling components are mounted directly on this precision surface to assure the flattest possible tape path. The tension arms are light and short to provide low inertia, and are mounted in double ball-bearings to maintain perpendicularity.

The electronics are distributed across three printed circuit cards, which are mounted so that the component side of each card is readily accessible to the maintenance engineer. Over fifty labelled test stakes are provided. The last card provides the I/O to the formatter, with two fifty-pin ribbon cable plug connectors. All major components are connected via plugs and sockets to speed replacement.

1.3 OPTIONS.

1.3.1 IMBEDDED FORMATTER WITH SUPPLEMENTARY POWER SUPPLY. A microprocessor-controlled formatter which mounts on the rear of the transport card chassis is provided in either a NRZI, phase encoded, or dual NRZI/PE configuration. Up to three additional transports may be daisy-chained to a formatted transport.

1.3.2 UNATTENDED RESTART. This option allows a transport to load and come on line automatically without operator assistance following a power outage. This feature is of value only when used in conjunction with a computer/controller incorporating the same feature.

1.3.3 UNIT SELECT SWITCH. This thumbwheel switch allows the operator to easily change a transport's address. Normally a transport's address is programmed on the write/control card.

1.3.4 DIRECT CURRENT OPERATION. The transport operates from an external 48±8VDC supply rather than from an AC line.

1.3.5 TWO TAPE SPEEDS. A second tape speed is selected via an I/O signal so that ANSI compatible tapes may be written at two different speeds.

1.3.6 I/O ADAPTOR. An adaptor which mounts on the rear of the card cage provides an alternate industry standard I/O on three 36-pin card edges.

1.3.7 MISCELLANEOUS. Tape transports may also be provided without a front door and with various line cords.

1.4 MODEL NUMBERING SCHEME. The Digi-Data transport model number completely describes the series, number of tracks, data packing density, tape speed, line voltage, and options of a transport. Figure 1-2 explains the model numbering scheme.

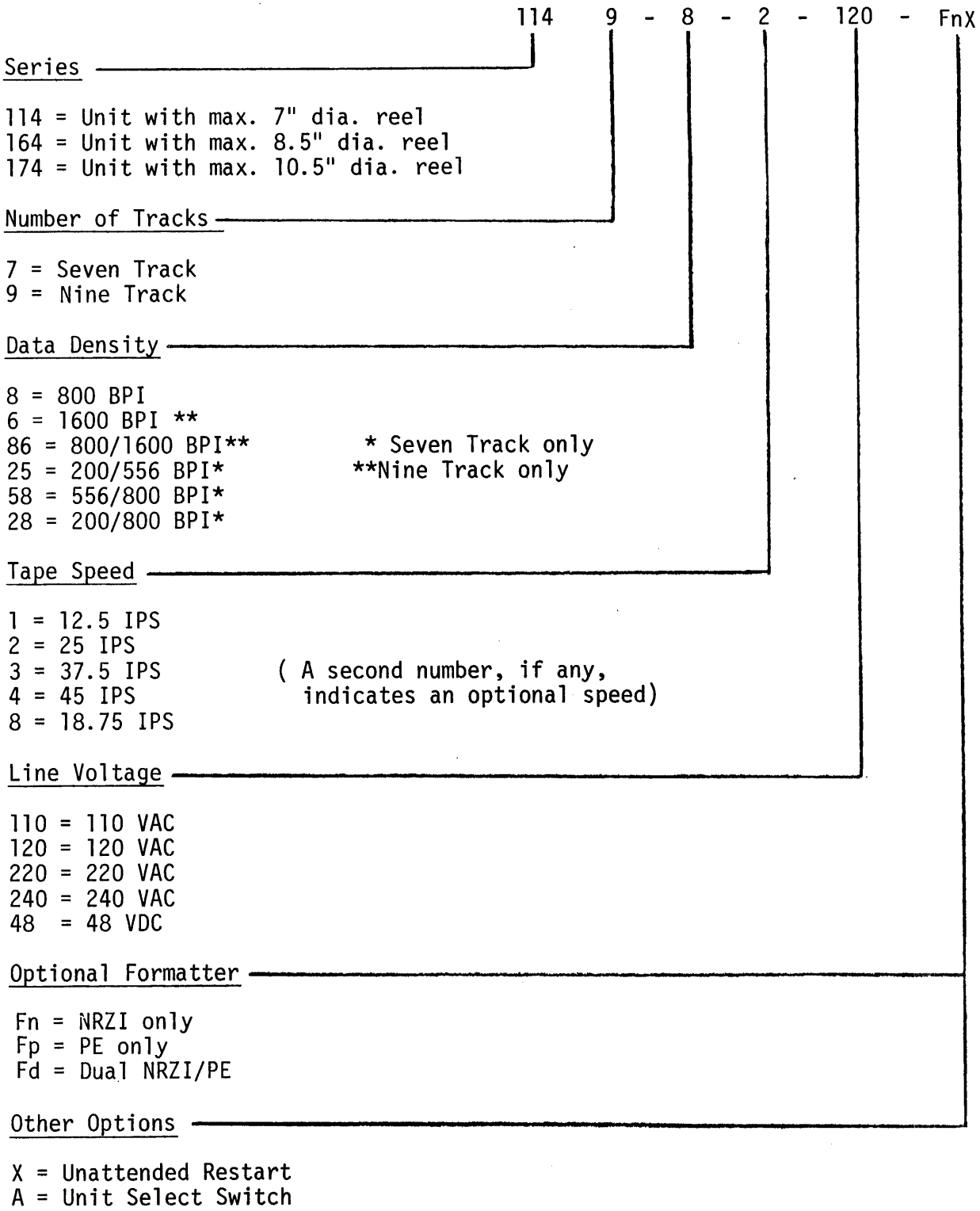


Figure 1-2, Model Numbering Scheme

1.5 SPECIFICATIONS.

CHARACTERISTICS	VALUE		
Recording Mode	NRZI, Phase Encoded, or both		
Number of Tracks	7 or 9, IBM compatible		
Data Packing Density	200, 556, 800, or 1600 BPI		
Head	Dual gap (read-after-write)		
Start/Stop Distance	0.19 inch ± 0.02		
Start/Stop Time	8.4 msec ± 0.9 @ 45 ips 10.1 msec ± 1.1 @ 37.5 ips 15.2 msec ± 1.6 @ 25 ips 30.4 msec ± 3.2 @ 12.5 ips		
Instantaneous Speed Variation	± 3% Maximum		
Long Term Speed Variation	± 1% Maximum		
Interchannel Displacement	150 microinches max.		
Tape Specifications	0.5 inch width, 1.5 mil, computer grade		
Tape Tension	7 oz. ± 1		
Tape Buffering	Tension arm, 30 to 60 degree arc		
BOT/EOT Sensing	Photoelectric		
Head and Tape Guide Spacing	IBM compatible		
Power Fail Protection	Dynamic electrical braking, control maintained to rest.		
Read Thresholds	NRZI: Normal 20%, High 50%, Low 10% PE: Normal 10%, High 30%, Low 5%		
	1140	1640	1740
Maximum Reel Size	7" dia. (600')	8.5" dia. (1200')	10.5" dia. (2400')
Synchronous Tape Speed	Up to 25 IPS	Up to 37.5 IPS	Up to 45 IPS
Rewind Velocity	75 IPS	100 IPS	150 IPS

CHARACTERISTIC	VALUE		
Electronics	Solid State Silicon		
Electrical Interface	Line Drivers: 7406/7407 buffers, open collector Line Receivers: 7414 or equivalent with 220Ω to V_{CC}, 330Ω to ground		
Line Voltage	110 VAC ±10% 120 VAC ±10% 220 VAC ±10% 240 VAC ±10% 48 VDC ± 8 VDC		
Line Frequency (AC)	49 to 62 Hz		
Power	200 Watts maximum		
Operating Environment	0 to 20,000 feet (6,000m.) 35 to 122 degrees F (2 to 50 degrees C)* to 95% RH without condensation.		
Non-operating Environment	0 to 50,000 feet (15,000m.) -40 to 160 degrees F (-40 to 70 degrees C)		
	1140	1640	1740
Weight	39 lbs. (17.7 kg.)	46 lbs (20.9 kg.)	70 lbs (31.8kg.)
Height	8.75 inches (22.22cm)	12.25 inches (31.11 cm)	24.0 inches (60.96cm)
Depth, Overall	12.85 inches (32.64cm)	12.85 inches (32.64cm)	12.85 inches (32.64 cm)
Depth, Overall with formatter	13.65 inches (34.67 cm)	13.65 inches (34.67 cm)	13.65 inches (34.67 cm)
Depth, Behind front plate	10.5 inches (26.67 cm)	10.5 inches (26.67cm)	10.5 inches (26.67cm)
Depth, Behind with formatter	11.3 inches (28.70 cm)	11.3 inches (28.70 cm)	11.3 inches (28.70 cm)
Width	19.0 inches (48.26 cm)	19.0 inches (48.26 cm)	19.0 inches (48.26 cm)
Mounting in EIA Cabinet	On Slides	On Slides	On Hinges

*Operating temperature behind the front plate. Due to the temperature characteristics of magnetic tape the operating temperature in the tape area is restricted to 60 to 90°F (15 to 22°C), 20 to 80% RH.

2 - OPERATOR'S INFORMATION

2.1 INTRODUCTION. This section contains a description of each manual control and indicator lamp, and explanations of tape loading and unloading.

2.2 CONTROLS AND INDICATORS. The standard operator control panel on all three models is identical.

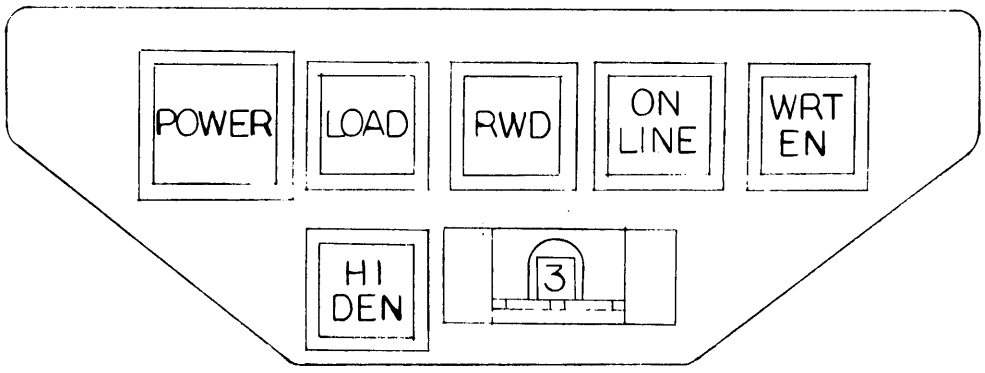


Figure 2-1, OPERATOR CONTROL PANEL

2.2.1 POWER. This alternate action pushbutton switch applies power to the transport; the indicator lamp is illuminated when power is on.

2.2.2 LOAD. This momentary pushbutton switch activates the load sequence which results in the positioning of the tape at the BOT marker. When BOT is being sensed the LOAD indicator lamp is illuminated.

2.2.3 REWIND (RWD). This momentary pushbutton switch initiates the rewind sequence or the unload operation. While rewinding or unloading the RWD indicator lamp is illuminated. Normally pressing this switch starts a rewind sequence and takes the transport off line. If, however, the LOAD lamp is illuminated when the RWD pushbutton is pressed an unload operation occurs. If the RWD lamp is already illuminated when the RWD pushbutton is pressed an unload operation will occur automatically after the rewind is completed.

2.2.4 ON LINE. This momentary pushbutton switch alternately places the transport "on line" enabling remote control, and "off line", disabling remote control. The indicator lamp is illuminated only when the transport is on line.

2.2.5 WRITE ENABLE (WRTEN). This indicator lamp is illuminated when a reel of tape containing a write enable ring is loaded on the transport. It warns that the tape is not "file protected" and writing/erasing are therefore permitted.

2.2.6 HIGH DENSITY (HIDEN). This alternate action pushbutton switch selects the low or high available data density. The indicator lamp is illuminated only when the high density is selected.

2.2.7 UNIT SELECT. This thumbwheel switch is optional. The address of the transport may be set at 0, 1, 2, or 3.

2.3 LOADING TAPE. The procedure for loading tape on the 1140, 1640 and 1740 transports is discussed in three separate paragraphs since the tape path of each series is unique to that series.

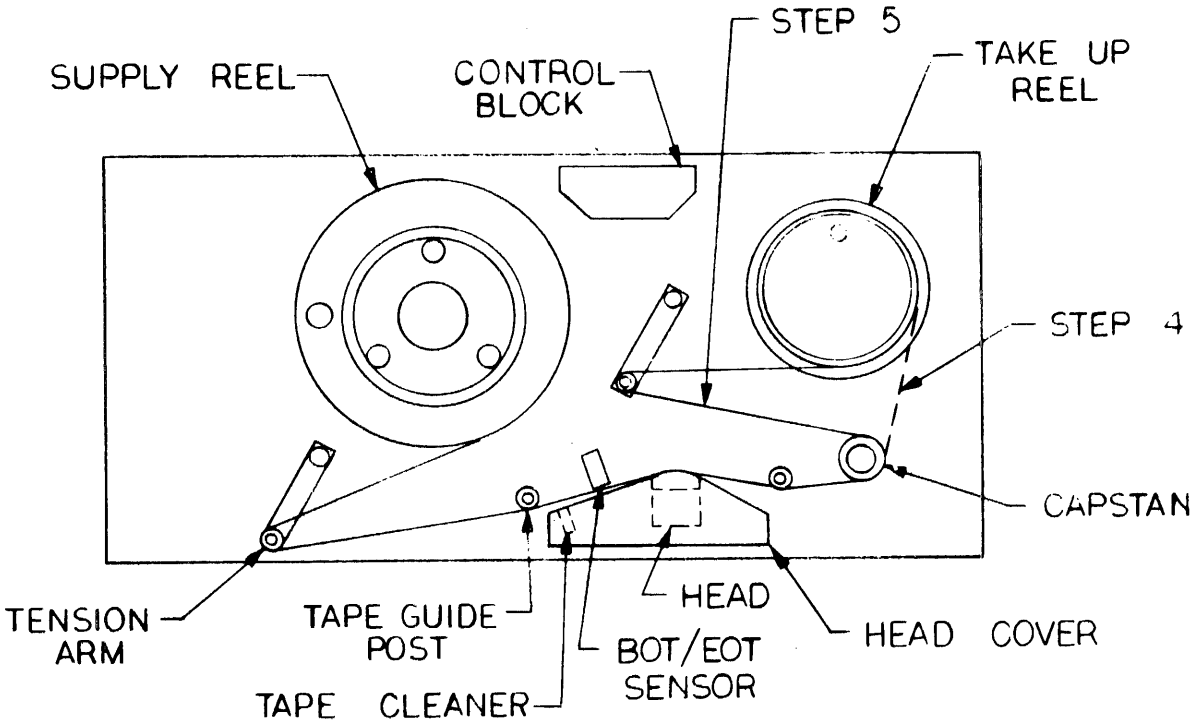


FIGURE 2-2 TAPE LOADING DIAGRAM
MODEL 1140

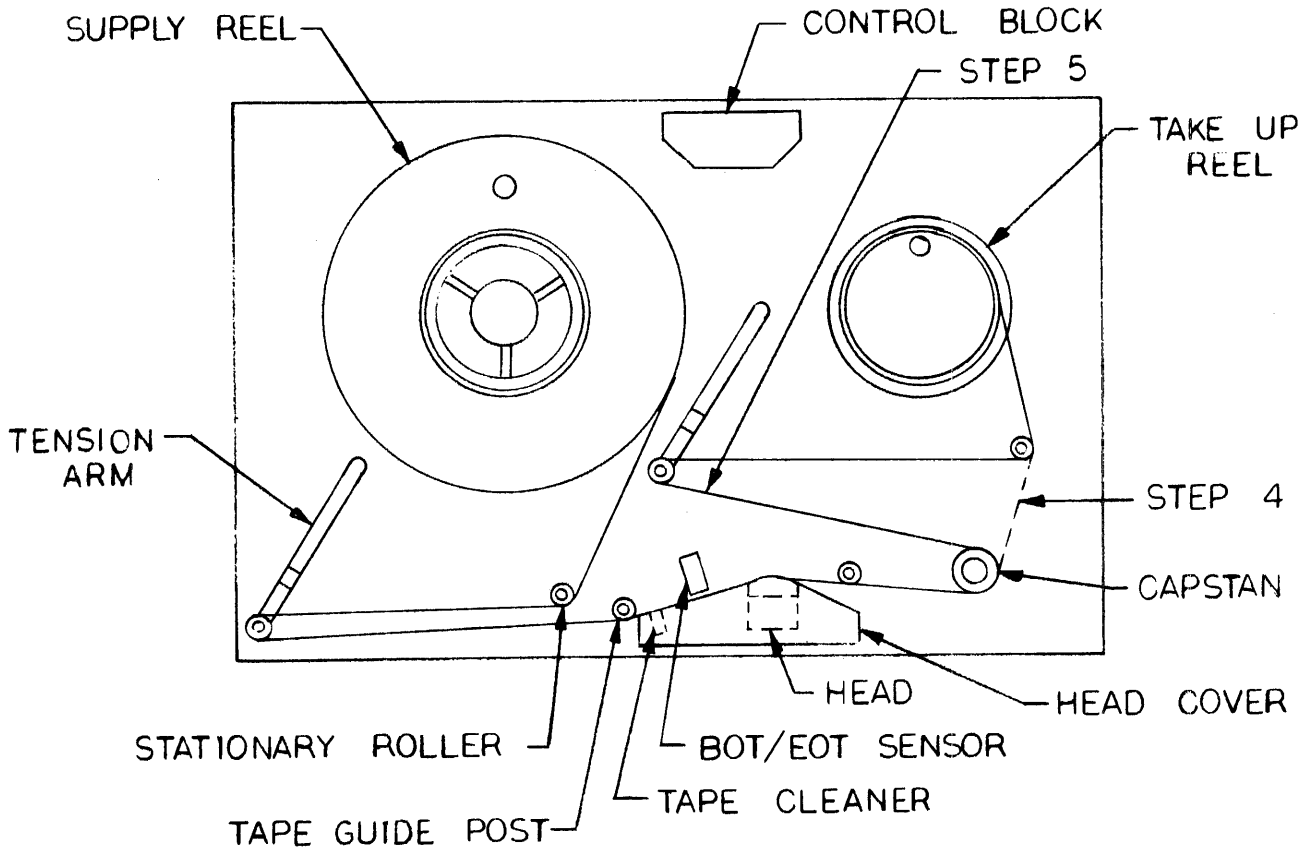


FIGURE 2-3 , TAPE LOADING DIAGRAM
MODEL 1640

When mounting a reel of tape on a transport care should be taken that pressure is applied by the fingertips only in the center of the tape reel; pressing on the flanges will damage the tape edges resulting in unreliable performance.

Before loading a reel of tape on any transport look at the back of the reel to determine whether the "write ring" is present or has been removed. The "write ring" is a simple, but effective, safety feature. When a reel of tape with the ring removed is mounted on the transport, writing and erasing are impossible; the transport's condition is known as "file protected", and only reading is permitted. When a reel of tape with the write ring inserted is mounted on the transport the WRTEN indicator light on the operator's control panel will be illuminated cautioning that writing and erasing are allowed.

2.3.1 LOADING TAPE ON THE 1140 TRANSPORT. To load tape on the 1140 series transport follow these step-by-step instructions while referring to Figure 2-2. The maximum size reel which may be mounted on the 1140 has a 7 inch diameter.

1) Open the transport dust cover.

2) Press the POWER pushbutton switch applying power to the transport. The POWER indicator light should be illuminated.

3) Press the reel of tape onto the supply hub which is located on the left. Insure that the reel is firmly seated behind all three catches.

4) Thread the tape from the reel around the left of the supply tension arm. Continue under the left tape guide post, over the tape cleaner, between the two elements of the BOT/EOT sensor assembly, over the head (but under the flux gate), under the right tape guide post, under the capstan and up onto the take-up hub in the counter-clockwise direction.

5) After winding four or five feet of tape onto the take-up hub, place your right index finger against the tape between the capstan and the take-up hub and pull the tape to the left, looping it over the take-up tension arm.

6) Remove any slackness in the tape by turning either hub. Verify that the tape is threaded as shown on the decal affixed to the transport front plate, or as shown in Figure 2-2.

7) Close the transport dust cover.

8) Press the LOAD pushbutton switch. The reel motors will apply tension to the tape, and the tape will move forward. When the BOT (beginning of tape) reflective marker reaches the BOT/EOT sensor tape motion will stop and the LOAD indicator will be illuminated. This location is referred to as the "load point".

9) Press the ON-LINE pushbutton switch. The associated indicator light illuminates only when the transport is ON LINE, i.e. under remote control. The unit may now be operated by the computer or other controller.

2.3.2 LOADING TAPE ON THE 1640 TRANSPORT. To load tape on a 1640 series transport, follow these step-by-step instructions while referring to Figure 2-3. The maximum size reel which may be mounted on the 1640 has an 8.5 inch diameter.

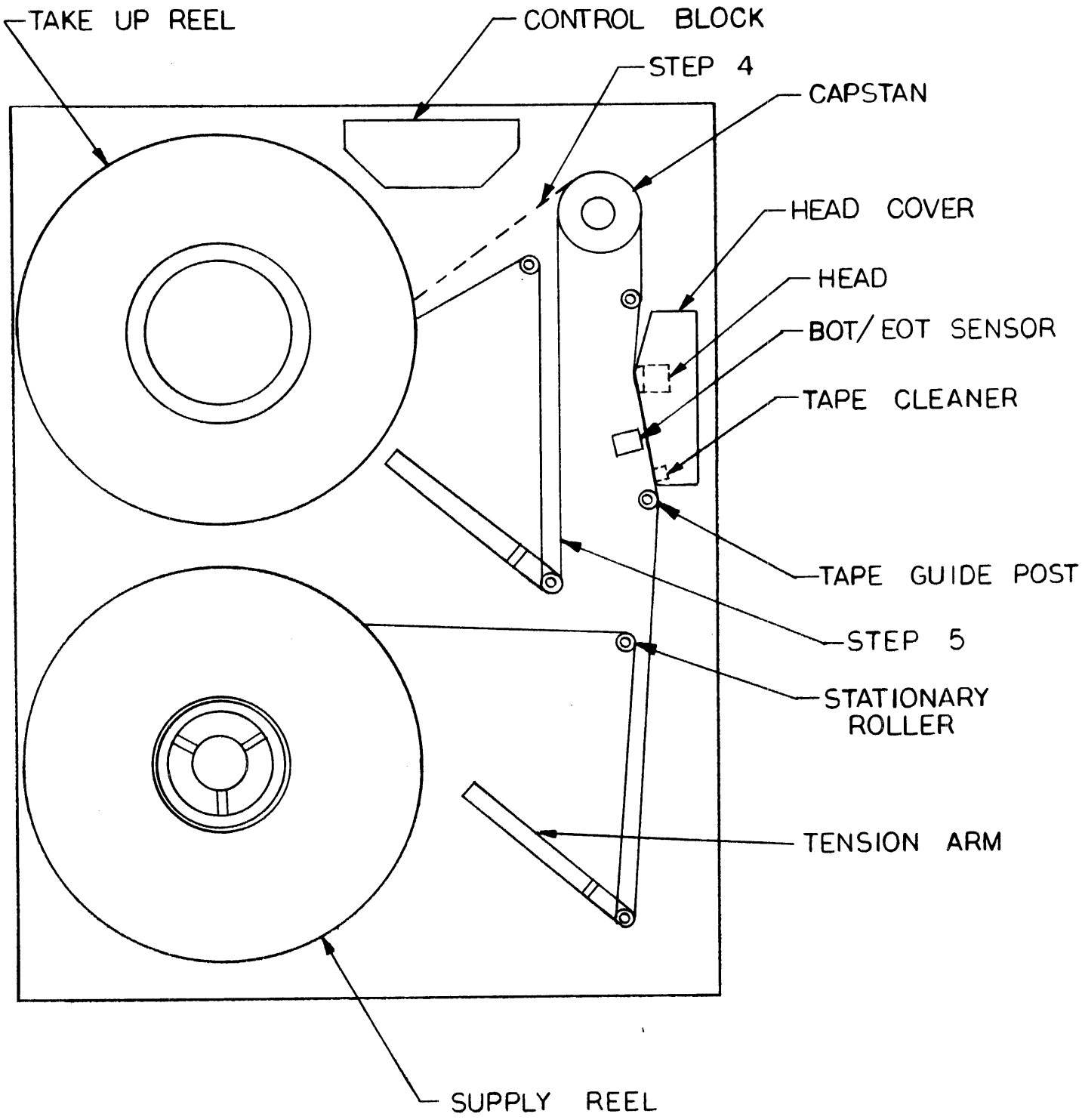


FIGURE 2-4, TAPE LOADING DIAGRAM
MODEL 1740

1) Open the transport dust cover.

2) Press the POWER pushbutton switch applying power to the transport. The POWER indicator light should be illuminated.

3) Pull outward on the reel-locking knob located in the center of the supply hub which is on the left. Place the reel of tape on the supply hub, then press inward on the reel-locking knob to lock the reel in place.

4) Thread the tape from the reel around the right of the stationary roller located below the supply reel, then around the left of the supply tension arm. Return under the left tape guide post, above the tape cleaner, between the two elements of the BOT/EOT sensor assembly, over the tape head (but under the flux gate), under the right tape guide post, under the capstan, to the right of the stationary roller, and up onto the hub so that the tape will wind onto the hub in the counter-clockwise direction. A reel is not required on the take-up hub of the 1640 transport.

5) After winding four or five feet of tape onto the take-up hub place your right index finger against the tape between the capstan and the stationary roller and pull the tape to the left, looping it over the take-up tension arm.

6) Remove any slackness in the tape by turning either hub. Verify that the tape is threaded as shown on the decal affixed to the transport front plate, or as shown in Figure 2-3.

7) Close the transport dust cover and perform steps 8) and 9) as indicated in paragraph 2.3.1.

2.3.3 LOADING TAPE ON THE 1740 TRANSPORT. To load tape on the 1740 transport, follow these step-by-step instructions while referring to figure 2-4. The maximum size reel which may be mounted on the 1740 transport has a 10.5 inch diameter.

1) Open the transport dust cover.

2) Press the POWER pushbutton switch applying power to the transport. The POWER indicator light should be illuminated.

3) Pull outward on the reel-locking knob located in the center of the supply hub. The supply hub is at the bottom. Place the reel of tape on the supply hub, then press inward on the reel-locking knob to lock the reel in place.

4) Thread the tape from the bottom (supply) reel over the stationary roller to the right of the reel, then down around the bottom tension arm roller. Return upward to the right of the bottom tape guide post, left of the tape cleaner, between the two elements of the BOT/EOT sensor assembly, between the tape head and its attached flux gate and to the right of the top guide post. Continue over the top of the capstan directly onto the top (take-up) reel. The tape should be wound onto the take-up reel in the clockwise direction.

5) After winding five or six feet of tape onto the take-up reel, pull the tape down between the capstan and the top stationary roller onto the top tension arm roller.

6) Remove any slackness in the tape by turning either reel. Verify that the tape is now threaded as shown in the decal affixed to the transport front plate, or as shown in figure 2-4.

7) Close the transport dust cover and perform steps 8) and 9) as indicated in paragraph 2.3.1.

2.4 UNLOADING TAPE. To unload tape from any 1140, 1640, or 1740 transport follow this procedure. If power has been off refer to paragraph 2.5.1 first.

1) Press the RWD pushbutton twice. Tape will rewind to load point at high speed and then unload at low speed.

2) After tape tension is lost open the transport door/dust cover and by hand wind the tape completely onto the supply reel.

3) On the 1740 and 1640 pull up on the reel-locking knob at the center of the supply hub. Remove the reel. Press down on the reel-locking knob and close the door/dust cover.

2.5 RECOVERING FROM PROBLEM CONDITIONS.

2.5.1 RECOVERING FROM A POWER OUTAGE. In the event of power failure the 1140, 1640, and 1740 transports will employ energy stored in a filter capacitor to stop the reel motors completely under servo control, even when rewinding, and then relax the tension arms to their stops. Tape will never spill or be damaged in any way. To rewind the tape after restoration of power,

1) Press the LOAD pushbutton. Tape will tension and move forward.

2) Press the LOAD and ON LINE pushbuttons simultaneously. Tape motion will cease. Steps 1 and 2 are not necessary if the unit is equipped with the unattended restart option.

3) Press the RWD pushbutton. Tape will rewind to the load point.

2.5.2 RECOVERING AFTER RUNNING TAPE ENTIRELY OFF THE SUPPLY REEL. Should the tape be accidently wound entirely from the supply reel the transport will halt when tape tension is lost. To reload the tape follow these instructions.

1) Thread the tape from the take-up hub to the supply reel as shown on the tape threading decal affixed to the front plate.

2) Turn the supply reel counter-clockwise until the EOT (end of tape) reflective marker is encountered - approximately ten feet. If no EOT marker is present apply one along the edge of the tape which is nearest the plate on the non-oxide surface.

3) Remove slackness from the tape and verify that the tape is threaded properly. Close the dust cover.

4) Press the LOAD and ON LINE pushbuttons simultaneously to load and stop forward tape motion before the tape runs entirely off the supply reel.

5) Press RWD and the tape will rewind to the load point.

2.6 CLEANING. Careful attention should be given to the performance of the daily cleaning instructions provided below. Small particles of dust and oxide from the tape will cause data errors and possibly permanent damage to the magnetic tape.

Perform the following procedure after every eight hours of system use, or after every reel of tape if system use is infrequent.

1) Remove tape from the transport as described in paragraph 2.4.

2) Moisten a cotton swab, or any lint-free clean cloth, with isopropyl alcohol or commercial head cleaning solvent. Do not use carbon tetrachloride, and do not use an abrasive cloth.

3) Lifting the flux gate, clean the head and the two tape guides.

4) Clean the tape cleaner, the tension arm rollers, and the stationary rollers. Rotate the rollers as you clean them to insure the complete removal of all contaminants. Once cleaned, a surface should not be touched with the fingers. Excessive liquid is not required! Allow a few seconds for the alcohol to evaporate before loading tape on the transport.

5) Rotate the capstan with one hand on the center shaft (not the outer surface, as it may be accidently deformed), while holding the cleaning implement with the other hand against the outer surface. If the capstan outer surface shows signs of cracking or polish advise the maintenance engineer.

3 - INSTALLATION AND INITIAL CHECKOUT

3.1 INTRODUCTION. This section describes the unpacking, inspection, initial check-out and rack-mounting of series 1140, 1640, and 1740 synchronous magnetic tape transports.

3.2 UNPACKING THE TRANSPORT. Digi-Data transports are shipped in two fiberboard cartons with three inches of free space between the inner and outer cartons on all sides. These cartons, and all spacers, sleeves, and corner blocks should be retained if the transport is to be reshipped. Refer to drawings 4550000-0000, 4550001-0000 and 4550002-0000 included at the end of this section.

3.2.1 UNPACKING PROCEDURE.

1) Slit the top of the outer carton and raise the flaps. Remove the four top corner blocks.

WARNING!

DO NOT CUT TOO DEEPLY OR THE PLEXIGLAS OF THE TRANSPORT DOOR WILL BE MARRED.

2) Carefully slit the top of the inner carton.

3) Raise the inner flaps. Two hand holes should appear along the longer sides of the carton.

4) Grasp the transport behind the front plate and lift the transport straight up and out of the carton.

5) Locate and remove the accessories from the packing materials. They are packed between the inner and outer cartons.

6) Remove the adhesive tape from the transport dust cover and power cord.

3.2.2 IN CASE OF DAMAGE. If at any point during the unpacking procedure it becomes obvious that the transport has been damaged, unpack no further. Advise Digi-Data Corporation of the loss, and file a claim with the carrier. Since the carrier's claim agent may wish to inspect the packing materials these should be retained.

3.2.3 VERIFY THE SHIPMENT AGAINST THE PACKING LIST. A packing list is contained in the plastic envelope attached to the top of the outer carton. Check the transport model number and serial number against that indicated on the packing list. Check that all accessories (connector, manual, mounting hardware, etc.) indicated on the packing list are present. Advise Digi-Data of any discrepancies.

3.2.4 RESHIPMENT. It is suggested that the original packing material be used for reshipment. Refer to the packing drawings at the end of this manual for the proper placement of all corner blocks, sleeves, and spacers. Note: It is easier to place the inner carton into the outer carton before placing the transport in the inner carton rather than vice-versa. Seal all flaps well with paper tape or vinyl tape.

3.3 INITIAL CHECKOUT. To check for proper operation of the transport before placing it in the system perform the following procedure. Additional operation information is contained in Section 2 of this manual.

1) Check that the input voltage noted on the transport's model number tag and the actual line voltage at the intended installation agree. If not remove the two screws holding the card cage in place and swing it away; then remove the two screws holding the motor control card in place and unplug it from its connectors. Two slide switches will now be visible. Use the screwdriver's blade to slide the switches to the proper settings indicated in Figure 3-1.

VOLTAGE RANGE	SWITCH SETTINGS		AC FUSE
110 VAC ± 10%	115	LO	3A SB
120 VAC ± 10%	115	NOR	3A SB
220 VAC ± 10%	230	LO	1.5A SB
240 VAC ± 10%	230	NOR	1.5A SB

2) Check the AC fuse visually.

3) Load tape on the transport as described in Paragraph 2.3.

4) When the LOAD indicator is illuminated press the ON LINE pushbutton several times and verify that the ON LINE indicator alternately is illuminated and is extinguished.

5) Locate the three-position service switch on the write/control card. With the transport ON LINE verify that the service switch is inoperable.

6) With the transport OFF LINE, move the service switch to the FORWARD position. After several feet of tape have run onto the take-up reel return the service switch to the NORMAL position; tape motion should cease.

7) Move the service switch to the REVERSE position. After several feet of tape have run onto the supply reel, return the switch to the NORMAL position; tape motion will again cease. NOTE: The service switch ignores the BOT and EOT markers.

8) Use the service switch to run the tape forward again. Visually check all the tape path components for smooth operation.

9) After stopping the tape, place the transport ON LINE, then press the RWD push-button switch. The transport will go OFF LINE and the tape will rewind until the BOT reflective marker is sensed. When rewinding, the tape will overshoot the load point by several inches, and then return forward to the exact load point location. While rewinding the RWD indicator will be illuminated. After the tape has returned to the load point the LOAD indicator will be illuminated.

10) Use the service switch to again run fifty to a hundred feet of tape onto the take-up reel. Return the service switch to the NORMAL position. Press the RWD switch. After the tape has reached the full rewind speed, press the POWER switch off. The transport should stop smoothly without spilling tape.

11) Press the POWER switch on again. Press LOAD and the tape will begin to advance. Press LOAD and ON LINE simultaneously (this creates a "fake" BOT indication) and the tape will halt.

12) Press RWD twice. The tape will rewind at full speed and then automatically unload at low speed.

13) Remove the tape from the transport.

14) Important!! The service switch must be in the NORMAL position for "normal" on line operation. Make sure that you have left it in NORMAL.

Additional checks may be performed with the use of the Digi-Data transport exerciser card if available. Refer to the manual supplied with this card for a discussion of its proper utilization.

3.4 RACK-MOUNTING THE TRANSPORT. Digi-Data synchronous magnetic tape transports may be mounted in any standard 19-inch EIA rack or cabinet. Models 1140 and 1640 mount on slides supplied with the transport to accomodate rack depths between 22 and 28 inches. Model 1740 is mounted on hinges, also supplied with the transport.

3.4.1 RACK-MOUNTING THE 1140 AND 1640. The 1140 transport requires 8.75 inches of panel height in a standard 19 inch EIA rack or cabinet; the 1640 transport requires 12.5 inches of panel height. The top and bottom edge of the transport front plate should be centered on the 0.5 inch hole spacing. The slides are centered on the 0.5 inch spaced holes 3.5 inches above the transport bottom edge.

Refer to installation drawings 0550020-0000 and 0550021-0000 with regard to the following rack-mounting procedure.

1) Remove the inner rail of the left slide from the outer rail and mount it on the left side panel of the transport chassis with the #8-32 bolts provided.

2) Attach a shorter slide holder behind the rack's left front mounting rail using two #10-32 bolts and a bar nut.

3) Attach a longer slide holder in front of the rack's left rear mounting rail using two #10-32 bolts and a bar nut.

4) Place the outer slide rail into the front and rear slide holders and attach it to them with three #8-32 bolts and nuts.

5) Repeat steps 1) through 4) for the right side.

6) Place the transport into the rack, carefully guiding the inner slide rail into the outer slide rail on each side.

3.4.2 RACK-MOUNTING THE 1740. The 1740 transport requires 24 inches of panel height in a standard 19-inch EIA rack or cabinet. Refer to installation drawing

1) Fasten the two hinge blocks to the left mounting rail of the rack with the six #10-32 bolts and two bar-nuts provided. Notice that the pins in the mounting blocks are of differing heights; the tallest should be used as the top hinge block. The top bolt of the top hinge block should be located 2.5 inches or more below the desired location of the top edge of the transport front plate. The top bolt of the bottom hinge block should be located 17.5 inches below the top bolt of the top hinge block.

2) Locate the holes in the transport which are to receive the hinge pins, and mark their location with a pencil on the side of the dust cover. Lift the transport and holding it perpendicular to the mounting surface approach the hinge blocks with the left side of the dust cover. Maneuver the longer top pin into its hole first, then the shorter bottom pin. NOTE: Handling the transport in this step normally requires two persons.

3) Swing the transport inside the rack and turn the twist-lock fastener clockwise to secure the right side of the transport.

4) Insert a keeper below each hinge and attach with hardware provided. The keepers prevent the transport from inadvertantly being lifted up and off the hinge pins.

5) Unlock the transport and swing it out of the rack. Attach the retaining chain assembly to the transport and to the rack. Adjust length as necessary. Close and lock the transport again.

4 - INTERFACING AND CONTROL

4.1 INTRODUCTION. This section describes the electrical interface, defines each I/O signal, sets forth the tape format requirements, and explains how to control the transport in order to perform the various write/read operations.

4.2 ELECTRICAL AND PHYSICAL INTERFACE REQUIREMENTS. All line drivers in the transport are 7406/7407 open-collector buffers or equivalent. All inputs are terminated in a 220-Ohm resistor to V_{CC} and a 330-Ohm resistor to ground. The formatter/controller should drive all transport inputs with open-collector circuits capable of sinking at least 25 milliamps. The recommended interface circuit is depicted in figure 4-1.

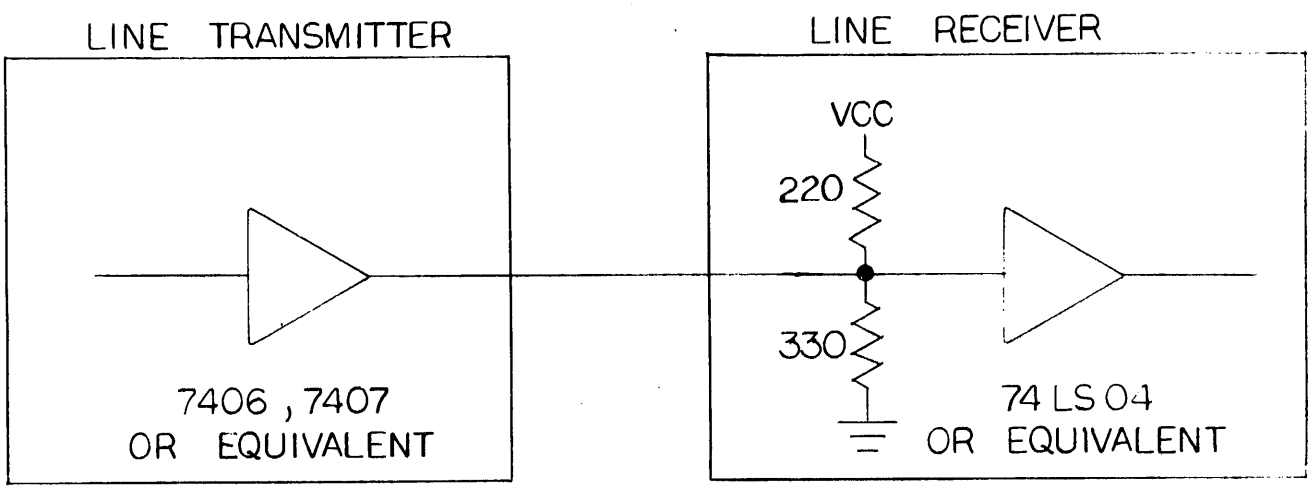


FIGURE 4-1, RECOMMENDED INTERFACE CIRCUIT

The minimum recommended pulse width on the interface lines is one microsecond. Inputs which elicit immediate confirming responses from the transport may be narrower if they go false upon detecting the transport's response. All signals to and from the transport are low true.

TRUE = LOW = 0 to 0.6 VDC

FALSE = HIGH = Greater than 2.0 VDC

The transport I/O connectors, located at the top edge of the write/control p.c. card are fifty-pin ribbon cable plug connectors. Figure 4-2 indicates transport interface connector pin assignments and signal mnemonics. These signals are described in paragraph 4.3 which follows.

4.3 TRANSPORT INTERFACE SIGNALS.

4.3.1 TRANSPORT COMMAND INPUT SIGNALS.

Select (SLT, SLTØ, SLT 1, SLT2, SLT3). True low level on the appropriate line gates all transport inputs and outputs. A false high level immediately terminates any tape motion except rewinding.

Synchronous Forward Command (SFC). True low level causes forward tape motion. This command is blocked if the transport is not in READY status.

J1

1	FMT2	SP1	2
3		GND	4
5	SPØ	SP2	6
7	RDY	GND	8
9	ONL	GND	10
11	RWD	GND	12
13	FPT	GND	14
15	LDP	GND	16
17	EOT	GND	18
19	FMT3	SPS	20
21	SLT	GND	22
23	SWS	GND	24
25	WARS	GND	26
27	WDS	GND	28
29	RTH2	GND	30
31	RTH1	GND	32
33	OVW	GND	34
35	SLT2	GND	36
37	SLT3	GND	38
39	SLTØ	GND	40
41	SLT1	GND	42
43	SFC	GND	44
45	SRC	GND	46
47	+5V	GND	48
49	+5V	GND	50

J2

1	RWC	GND	2
3	OFFC	GND	4
5	WD7.1	GND	6
7	WD6.2	GND	8
9	WD5.4	GND	10
11	WD4.8	GND	12
13	WD3.A	GND	14
15	WD2.B	GND	16
17	WD1	GND	18
19	WDØ	GND	20
21	WDP.C	GND	22
23	DDS	GND	24
25	RDS	GND	26
27	RD7.1	GND	28
29	RD6.2	GND	30
31	RD5.4	GND	32
33	RD4.8	GND	34
35	RD3.A	GND	36
37	RD2.B	GND	38
39	RD1	GND	40
41	RDØ	GND	42
43	ROL	GND	44
45	RDIS	GND	46
47	RDP.C	GND	48
49	FMT 1	GND	50

Figure 4-2, Transport I/O

Synchronous Reverse Command (SRC). True low level causes reverse tape motion. This command is blocked if the transport is not in READY status. If the BOT marker is sensed while in reverse, the transport will stop with the marker .52" to .92" closer to the head than the normal load point.

Rewind Command (RWC). A true low pulse causes the transport to rewind the tape onto the supply reel until the BOT marker is sensed. Write current is inhibited. RWC is ignored if the transport is already at BOT.

Off-Line Command (OFFC). A true low pulse places the transport off line, disabling remote control and extinguishing the front panel ON LINE indicator. The transport remains off line until the operator presses the ON LINE pushbutton or until the ROL input is pulsed low. This input is gated only by SLT, permitting the transport to accept an OFFC while rewinding.

Remote On Line (ROL). A true low pulse causes the selected transport to apply tension to the tape and to go ON LINE. If the transport is already on line it will go off line.

Set Write Status (SWS). Level or pulse, must go true low concurrent with the motion command and remain true for at least 20 microseconds after initiation of SFC or SRC to energize write and erase circuitry. After being set the write circuitry will remain energized, except in the overwrite mode, until initiation of another SFC or SRC with SWS held false or until receipt of RWC or OFFC.

NOTE: The transport will not write unless a write ring is installed on the tape reel.

Overwrite (OVW). A true low level or pulse places the transport in the overwrite mode if it and SWS are true for at least 20 microseconds after initiation of SFC or SRC. In the overwrite mode the write and erase heads are turned off immediately after the WARS pulse input while the tape is still at speed to avoid the creation of a turn-off glitch in the interrecord gap.

Data Density Select (DDS). A true low level selects the lowest available density on a dual density transport. False high level selects the highest available density. This input must be held at the desired level for the duration of the reading/recording operation.

Read Disable (RDIS). A true low level disables the read circuits so that only recording is possible.

Read Threshold 1 (RTH1). Not connected since dual gap transports automatically switch to high read threshold when performing read-after-write.

Read Threshold 2 (RTH2). True low level lowers the read amplifier threshold thereby increasing sensitivity to aid in the recovery of severely degraded data. Normal threshold is selected when RTH2 is false high.

Speed Select (SPS). A low true level on this line selects the optional tape speed on transports equipped with this feature. The optional speed may be either faster or slower than the standard speed.

4.3.2 TRANSPORT STATUS OUTPUT SIGNALS.

On Line (ONL). True low level indicates that the operator has placed the transport under remote control.

Ready (RDY). True low level indicates the transport is on line, selected, loaded with tape, and not rewinding. Motion commands will be ignored if READY is false.

Load Point (LDP). True level indicates that the tape is positioned at the BOT marker.

End of Tape (EOT). This level is true low anytime the EOT marker is encountered by or has passed the BOT/EOT sensor in the forward direction.

File Protect (FPT). True low level indicates that the write ring is removed from the tape reel. The transport will not write or erase when this level is true, even though SWS is asserted.

Rewinding (RWD). True low level indicates that the transport is in the rewind mode or in the advance to load point after rewind mode.

Single Gap (SGL). This line will always be false high indicating that the selected transport is equipped with a dual gap head.

Format 1, 2, 3 (FMT1,2,3,). These three signals taken together reveal the format of the selected transport. See figure 4-3 below.

FORMAT	FMT1	FMT2	FMT3
7 Tk, 200 BPI, NRZI	LO	LO	LO
7 Tk, 556 BPI, NRZI	LO	LO	HI
7 Tk, 800 BPI, NRZI	HI	LO	LO
9 Tk, 200 BPI, NRZI	LO	HI	LO
9 Tk, 800 BPI, NRZI	HI	HI	LO
9 Tk, 1600 BPI, PE	LO	HI	HI
9 Tk, 6250 BPI, GCR	HI	HI	HI
Unassigned	HI	LO	HI

Figure 4-3, FORMAT SIGNAL DECODING

Speed Status Ø,1,2 (SPØ,1,2). These three signals taken together reveal the tape speed of the transport. See figure 4-4 on next page.

TAPE SPEED	SP2	SP1	SPØ
Unassigned	HI	HI	HI
12.5 IPS	HI	HI	LO
18.75 IPS	HI	LO	HI
25 IPS	HI	LO	LO
37.5 IPS	LO	HI	HI
45 IPS	LO	HI	LO
75 IPS	LO	LO	HI
125 IPS	LO	LO	LO

Fig. 4-4, Speed Status Decoding

4.3.3 DATA INPUT SIGNALS.

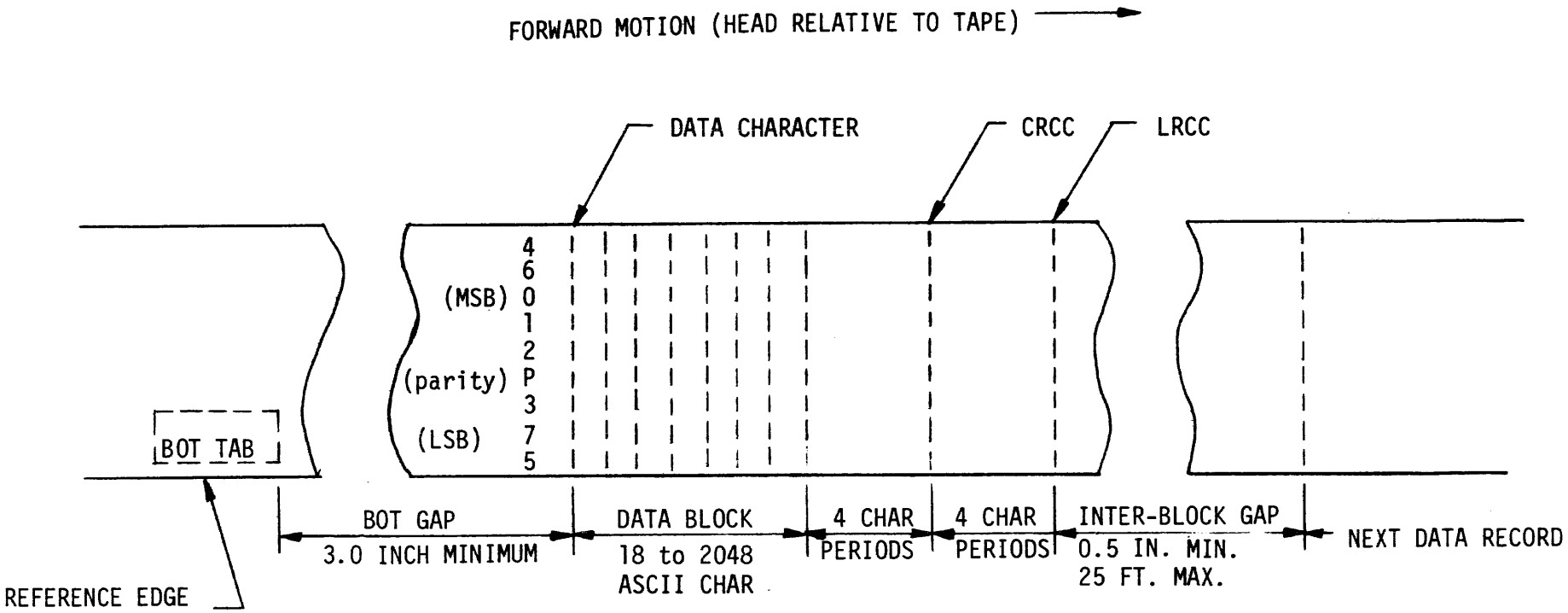
Write Data Strobe (WDS). True pulse strobes information on the WRITE DATA lines into the transport write circuitry. In the NRZI mode, one WDS should be supplied for each data character, and, in the case of 9 track tape, also for the CRCC. In the PE mode, two WDS pulses are required per character, one for the "phase bit" and one for the "data bit". The frequency at which the formatter/controller must supply WDS's is a function of transport tape speed and desired data packing density.

Write Amplifier Reset (WARS). True pulse resets the transport's write amplifiers to the direction of tape erasure, which is the normal state at the beginning and end of every write operation. During an overwrite (edit) operation, in both the NRZI and PE modes, WARS is utilized to initiate a gradual turn-off of the write and erase head currents. In the NRZI mode only, WARS writes the longitudinal redundancy check character (LRCC) on tape, and must be supplied in the eighth character position (9 track units) or fourth character position (7 track units) after the last data character of a record. No WDS should be supplied when writing the LRCC.

Write Data Inputs (WDP, WD0-WD7). Levels which must be present 200 nanoseconds before the leading edge of WDS and remain stable until the trailing edge. In NRZI mode a true level causes the direction of tape magnetization to be reversed in the associated track, resulting in a logical "one" on tape. A false level causes no change in the direction of tape magnetization, resulting in a logical "zero" on tape. In PE mode, a false high level causes the direction of the tape magnetization to be opposite to the direction of erasure. A true low level aligns the magnetization with that of erased tape. The formatter/controller is responsible for generating these lines as a function of data to accomplish phase encoding.

4.3.4 DATA OUTPUT SIGNALS

Read Data Strobe (RDS). A true low pulse of two microseconds duration which occurs in NRZI mode only when a data character or check character has been



NOTES:

1. TAPE SHOWN WITH OXIDE SIDE UP .
2. CHANNELS 0 THROUGH 7 CONTAIN DATA BITS IN DESCENDING ORDER OF SIGNIFICANCE.
3. DATA PACKING DENSITY IS FIXED AT 800 CHARACTERS PER INCH.

FIGURE 4-5, 9 TRACK NRZI FORMAT

assembled in the read register. RDS should be used to clock data from the READ DATA outputs. RDS remains false during a phase-encoded operation. The READ DATA strobe leading edge occurs after data has been set up on RDP-RD7 lines. The READ DATA remains on the lines after the trailing edge of RDS.

Read Data Outputs (RDP,RDO-RD7). In the NRZI mode a true low level during the READ DATA STROBE indicates that a logical "one" was read in the associated track. The READ DATA outputs appear prior to the leading edge of the RDS pulse, and remain present until after its trailing edge. In the PE mode, phase-encoded data is presented at these outputs; PE data is not deskewed, so that transitions reflect each track in real time.

4.4 NRZI TAPE FORMAT. The formatter/controller must control the transport in such a manner so as to produce tapes formatted in accordance with IBM and ANSI specifications. These specifications for nine track and seven track NRZI tape are illustrated in figures 4-5 and 4-6. Refer also to ANSI Interchangeability Standard X3.22-1973.

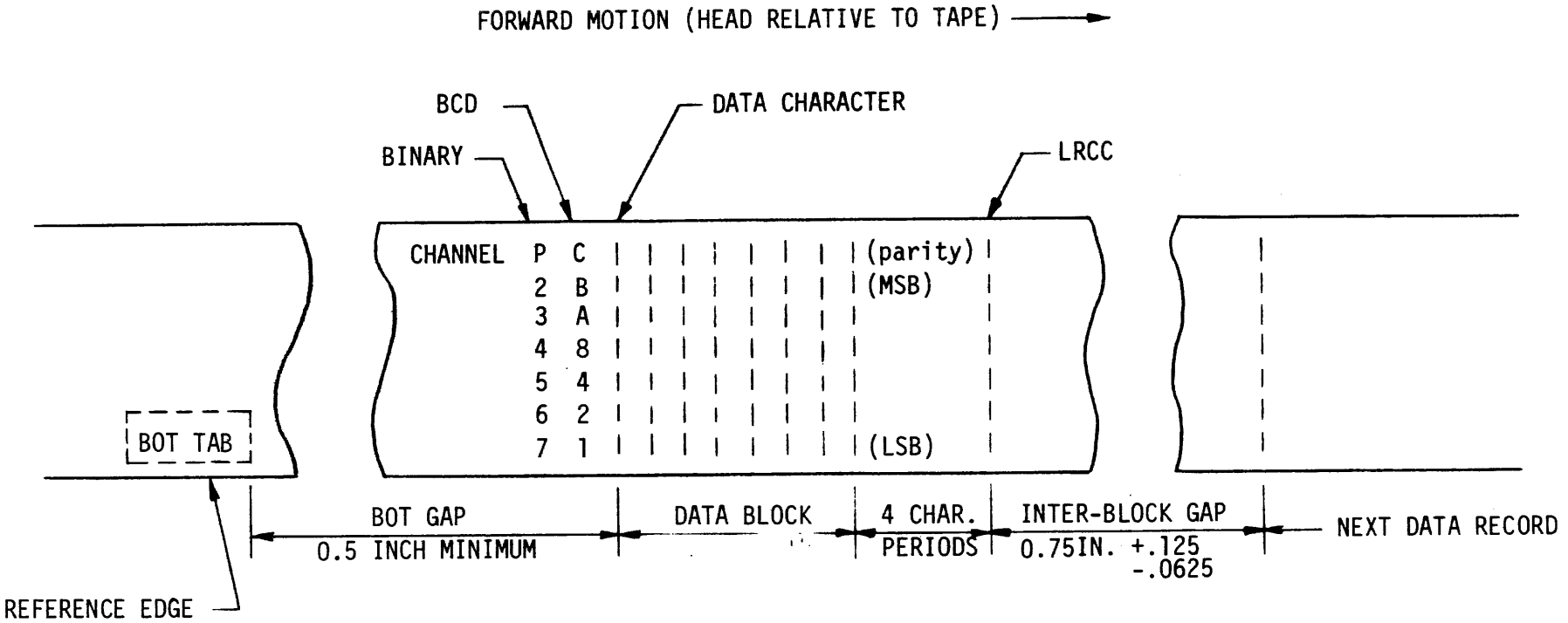
Two reflective markers affixed to the non-oxide side of the tape and detectable by the transport determine the usable bounds of the tape. The "beginning of tape" marker is located along the edge of the tape farthest away from the transport front plate (reference edge), at least fourteen feet from the physical beginning of the tape. All tape before the BOT marker is considered leader. The "end of tape" marker is located at least ten feet before the physical end of the tape, along the edge of the tape nearest the front plate. The logical functions of the transport make it impossible to record or read before the BOT marker; however, data may be written and read beyond the EOT marker. The formatter/controller or computer is responsible for terminating forward tape motion after the receipt of the EOT status indication before the physical limit of the tape is reached.

Data is recorded on magnetic tape in blocks or records separated by inter-record gaps (IRG). These erased gaps in the data provide space for the transport to stop and start tape motion. The IRG on seven track tape is 0.75 inches; the IRG on nine tape of 0.6 inches.

Each data block or record may contain an unspecified number of data characters; the number is normally determined only by the customer's application. Data is recorded in seven or nine tracks (also called channels) which run parallel the length of the tape. A data character consists of one bit in each of the seven or nine tracks perpendicular across the tape. Characters are written either 200, 556, or 800 to the inch on seven track tape. The data packing density on nine track NRZI tapes is generally 800 characters per inch. A data character on seven-track tape is comprised of six data bits and one vertical parity bit. When seven track tapes employ odd parity they are referred to as binary tapes, when they use even parity they are BCD tapes. A nine track data character consists of eight data bits, together commonly called a byte, and one parity bit. Nine track parity is usually odd.

In addition to the vertical parity bit associated with each character other means of data verification are employed. At the end of each block of data one check character, in the case of seven track tape, and two check characters, in the case of nine-track tape, are recorded. The longitudinal redundancy check character (LRCC) is formed by calculating the even parity of each track. It is written either four (7 track) or eight (9track) character positions beyond the last data character in order to be distinguished from it by the read circuitry.

The LRCC is generated in the transport during record operations, but must be verified in the formatter/controller during read operations.



NOTES:

1. TAPE SHOWN WITH OXIDE SIDE UP.
2. CHANNELS 2 THROUGH 7 CONTAIN DATA BITS IN DESCENDING ORDER OF SIGNIFICANCE.
3. DATA PACKING DENSITY MAY BE 200, 556 or 800 CHARACTERS PER INCH.

FIGURE 4-6, 7 TRACK NRZI FORMAT

Nine track NRZI tapes also use the cyclic redundancy check character (CRCC) which may be developed in the formatter/controller during write operations and checked during read operations. The CRCC is written four character periods after the last data character of a record.

The abbreviation NRZI stands for non-return-to-zero, change on "ones". In the NRZI recording mode, a "one" in a particular track is recorded as a magnetic flux change on tape; the direction of the change carries no significance, only the existence of the change itself. A "zero" is indicated by no magnetic flux change in that bit position.

Each character must contain at least one "one" to permit detection of the character's existence during read. Odd parity tapes automatically fulfill this requirement since an all "zeros" data character would result in a "one" parity bit. Even parity 7 track tape conventions dictate that an all "zeros" data character be converted and recorded as a binary ten (001010). This "zero to ten conversion" for 7 track even parity BCD tapes must be performed in the formatter/controller.

Several records or blocks of data on tape are usually grouped together as a "file" and are separated from other files by a "file mark", or "tape mark", which is a record consisting of a special file character and its associated LRCC. The special file character is 001111 for 7 track or 00010011 for 9 track, and is always written with a false parity bit. (No CRCC is present in a 9 track file mark.)

4.5 PHASE ENCODED TAPE FORMAT. The format specifications for nine-track phase encoded tape are illustrated in Figure 4-7. The data packing density is always 1600 CPI. Characters consisting of eight data bits and one odd parity bit are recorded across the tape, with each of the nine bits in a defined track. The tracks are numbered 0 through 7 and P and are arranged in the same sequence as nine-track 800 CPI standards, and with the same physical locations and dimensions. (ANSI Interchangeability Standard X3.39-1973)

In the PE recording mode "ones" and "zeros" are signified by the direction of the change of magnetic flux in the bit position on tape. At the transport I/O a "one" is defined as a change from true to false, and a "zero" is a transition from false to true. In between two data transitions in a track there may or may not be a phase transition. The phase transition is utilized to establish the proper flux polarity so that the upcoming data transition may occur in the desired direction. By referring to Figure 4-8 it may be seen that a stream of all "ones" or all "zeros" in a track would require 3200 flux reversals per inch, i.e. a phase transition preceding every data transition; whereas a stream of alternating "one" and "zero" characters would require no phase transitions.

Whenever a phase encoded tape is written it must be identified as such with an ID Burst. The ID Burst is a stream of alternating "ones" and "zeros" written alongside the BOT marker in track P only with all other tracks DC erased. The ID Burst enables dual density transports with automatic mode selection to condition themselves to read PE data.

Each data block on tape is comprised of three elements; a preamble, the actual data, and a postamble. The preamble consists of 40 characters of all "zeros" followed by an all "ones" character. The preamble is utilized by the formatter/controller when reading to achieve synchronization upon the data transitions. The all "ones" character signals the end of the preamble and the beginning of the actual data. The postamble consists of one all "ones" character followed by 40 characters of all "zeros". The postamble signals the end of data and also permits synchronization when reading reverse.

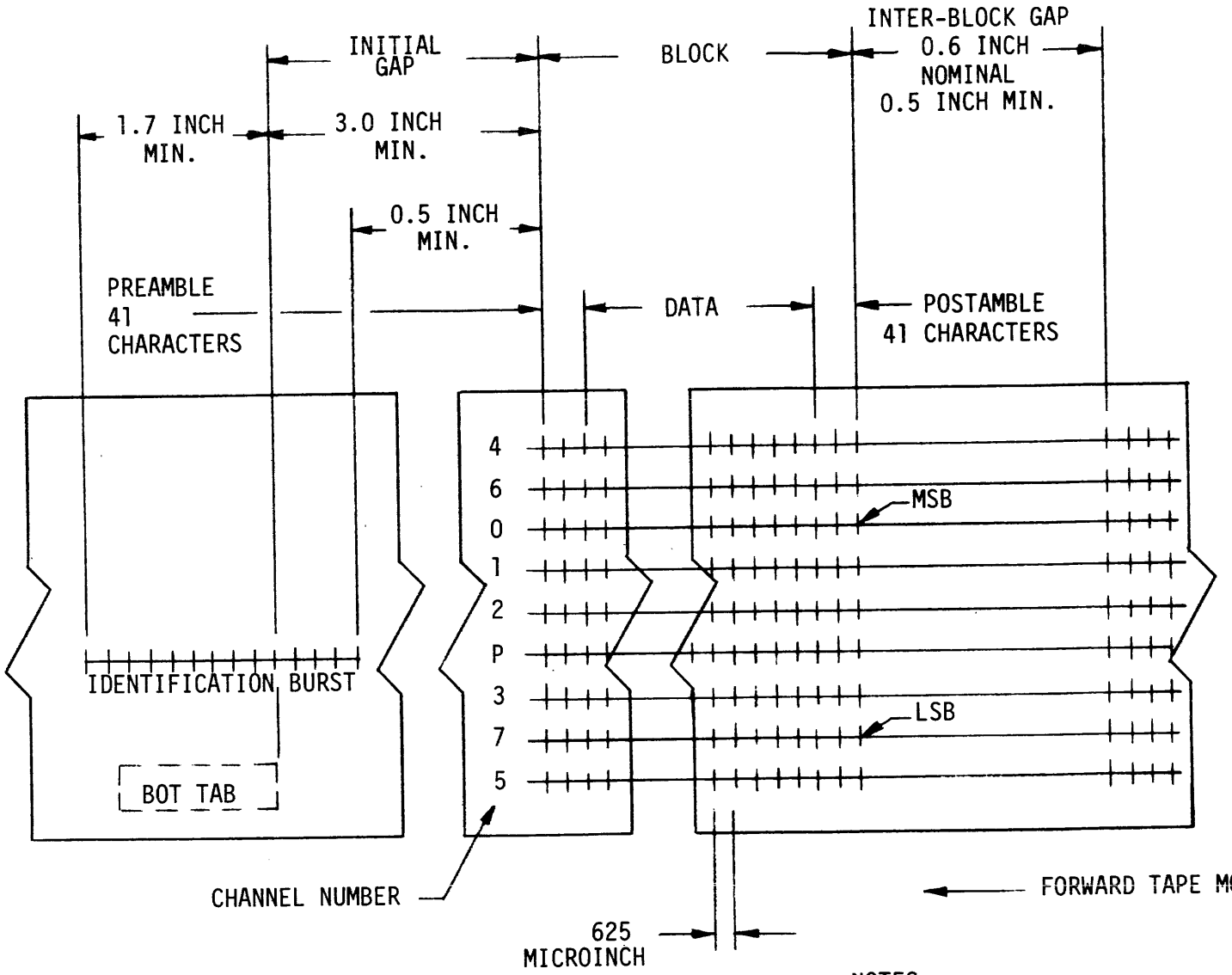
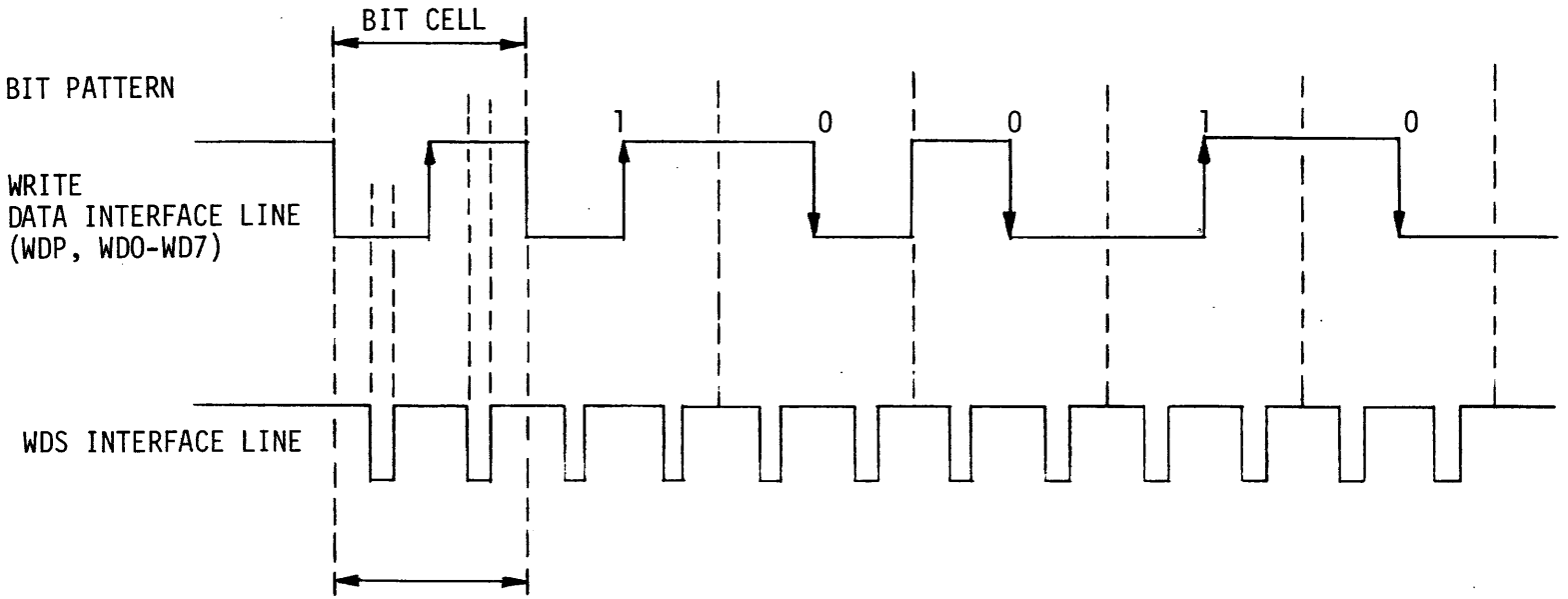


FIGURE 4-7, 9 TRACK PHASE ENCODED TAPE FORMAT

NOTES:

1. TAPE IS SHOWN WITH OXIDE SIDE UP.
2. TAPE IS TO BE FULLY SATURATED IN THE ERASED DIRECTION IN THE INTER-BLOCK GAP AND THE INITIAL GAP.
3. THE IDENTIFICATION BURST MUST EXTEND PAST THE END OF THE BOT MARKER.



12.5	IPS	50	USEC
18.75	IPS	33.3	USEC
25	IPS	25	USEC
37.5	IPS	16.6	USEC
45	IPS	13.9	USEC

FIGURE 4-8 PHASE ENCODED INTERFACE SIGNALS

WRITE DATA

The phase encoded file mark (EOF) consists of 40 "zeros" in tracks 2, 6, and 7 with tracks 1, 3, and 4 DC erased. Tracks P, 0, and 5 may be either erased or contain "zeros". The file mark must be preceded by at least 3 inches of erased tape.

4.6 NRZI TRANSPORT CONTROL. Functions which are to be performed by the transport's formatter/controller are:

1) The generation of various timing delays, which allow for transport acceleration and deceleration, and which dictate the IRG length and the head position during specific operations.

2) The generation of WRITE DATA STROBES at the frequency required by tape speed and desired data packing density.

3) The generation of vertical parity for each character; and the detection of parity errors during read.

4) The generation of a WRITE AMPLIFIER RESET(WARS) pulse to record the LRCC at the proper location; and the verification of the LRCC during read.

5) The generation of the CRCC and the appropriate timing to record it on tape, and the verification of the CRCC during read (9track only).

6) The detection of the end of block and the detection and segregation of the check characters from the data.

7) The generation of file marks, and their detection as such during read.

4.6.1 MOTION CONTROL AND TIMING. The signals employed to control tape motion are,

SYNCHRONOUS FORWARD COMMAND (SFC)	J1-43
SYNCHRONOUS REVERSE COMMAND (SRC)	J1-45
REWIND COMMAND (RWC)	J2-1
SELECT (SLT,SLTØ,SLT1,SLT2,SLT3)	J1-21,39,41,35,37

The transport READY (RDY) status output must be true or else motion commands will be ignored. READY indicates that the transport is selected, ON LINE (pushbutton switch and associated indicator light), not REWINDING(J1-11 false), and loaded with tape (determined within the transport by means of photo-electric sensors).

Should SELECT go false all tape motion except rewinding is terminated.

When either SFC or SRC is set true the transport's capstan will accelerate the tape to the specified synchronous speed of the transport. The tape distance traversed during acceleration from rest to full velocity is always .19 inch $\pm$ 0.02 regardless of the transport's specified tape speed. Acceleration is linear so that the time required to reach synchronous tape speed is always .19 inches divided by one-half the specified synchronous tape speed.

Deceleration occurs whenever the SFC or SRC command is removed. Deceleration from full speed to rest requires the same distance and time as acceleration. Acceleration and deceleration ramp times for the more common synchronous tape

speeds are,

SYNCH. SPEED	DISTANCE TRAVERSED	TIME TO ACCELERATE
12.5 inch/sec	0.19 inches ± 0.02	30.4 msec.
18.75 inch/sec	0.19 inches ± 0.02	20.3 msec.
25 inch/sec	0.19 inches ± 0.02	15.2 msec.
37.5 inch/sec	0.19 inches ± 0.02	10.1 msec.
45 inch/sec	0.19 inches ± 0.02	8.4 msec.

The tape formatter must be aware of the time required to accelerate and decelerate and must not attempt to write during these times.

4.6.2 WRITE OPERATIONS. The choice of a read or write operation is made via the SET WRITE STATUS (SWS) line. To perform a write operation SWS must go true concurrent with the motion command (SFC or SRC) and remain true for at least 20 microseconds. Assertion of this input energizes the write and erase circuitry in the transport; this circuitry will remain energized until a subsequent motion command with SWS held false is received, or until REWIND command or OFF LINE command is received, or until WARS is received in OVERWRITE mode. An electromechanical interlock in the transport prevents the energizing of the write and erase circuitry when a write ring is not installed in the supply tape reel.

The formatter must be able to control essentially five types of write operations,

WRITE DATA
WRITE DATA WITH EXTENDED GAP
WRITE FILE MARKS
EDIT
ERASE

4.6.2.1 WRITE DATA OPERATIONS. To write a data record on tape the formatter/controller must perform the following sequence,

1) Select a transport, and set DDS as necessary.

2) Receive, and utilize as necessary, the various status information revealed by the transport.

3) Issue the SYNCHRONOUS FORWARD (SFC) motion command with SET WRITE STATUS (SWS) set true for at least 20 microseconds.

4) Wait an appropriate, calculated delay to allow the tape to accelerate to synchronous speed before attempting to write data.

5) Issue WRITE DATA STROBES (WDS) at the appropriate frequency (the product of synch. speed and desired packing density). Place a data character on the WRITE DATA lines (WD0 - WD7) for the duration of each WDS. Also place the correct parity bit for each data character on the WRITE DATA PARITY line (WDP) coincident with that data character. WD0-WD7,WDP must be stable 200 nanoseconds before the leading edge of WDS and remain stable until its trailing edge.

6) Calculate and write the CRCC (cyclic redundancy check character) in the fourth character position following the last data character of the record. Writing the CRCC is accomplished by setting the character on the WRITE DATA lines and pulsing WDS.

7) Write the LRCC (longitudinal redundancy check character) in the eight character position following the last data character of the record. The formatter/controller need not calculate the LRCC: the LRCC may be obtained by resetting the write flip-flops in the transport. A special input, WRITE AMPLIFIER RESET (WARS) is used to accomplish this. No WDS or write data should be supplied when writing the LRCC.

8) Wait an appropriate, calculated delay to allow a portion of the interrecord gap to be traversed at full speed and the read head to pass all the data before decelerating the tape. The distance between the read and write gaps of a dual gap head is 0.15 inches for 9 track units, and 0.3 inches for 7 track units.

9) Remove the SYNCHRONOUS FORWARD (SFC) motion command, thereby initiating deceleration.

10) A motion command of the same direction may be applied at anytime, before, during, or after deceleration. A motion command of the opposite direction should not be applied until tape motion has ceased; an appropriate delay should be calculated by the formatter/controller to determine when tape motion has ceased. When a new motion command of the same direction is applied either before or during deceleration the same acceleration (prerecord) delay as normally required when accelerating from the rest must be maintained to ensure that an interrecord gap of sufficient length is created.

4.6.2.2 WRITE WITH EXTENDED GAP OPERATIONS. To write a data record with an extended interrecord gap preceding, i.e. a skip-write operation, the controller/formatter should perform the sequence indicated in paragraph 4.6.2.1 except that the delay between the issuance of the motion command and the commencement of data recording must be extended to traverse the desired distance on tape. An extended interrecord gap is required preceding the first data record when starting from load point; this extended gap is sometimes referred to as the "BOT jump". An extended gap is also useful in skipping over defective error-prone portions of tape.

4.6.2.3 WRITE FILE MARK OPERATIONS. A file mark, or tape mark, is a one character record with LRCC which is utilized to separate the tape into logical divisions. To write a file mark on tape the formatter/controller must perform the following operations in contradistinction to the writing of a data record.

1) The prerecord delay, following the assertion of the motion command, must be extended to provide for a preceding gap of at least 3 inches.

2) Place the file mark character on the WRITE DATA lines and issue a single WRITE DATA STROBE (WDS). The nine track file mark character is "ones" in tracks 3, 6, and 7; the seven track file mark character is "ones" in tracks 1, 2, 4, and 8.

3) No CRCC is written.

4) The LRCC is written eight character spaces (four character spaces on 7 track tapes) after the file mark character, and is identical to it since longitudinal parity is even. The LRCC may be generated and recorded by pulsing the WARS line, as previously described in the case of data records.

5) Wait a calculated delay before decelerating the tape, as in the case of data records.

4.6.2.4 EDIT OPERATIONS. The edit operation consists of replacing an existing record on tape with a new record of equal length in the same physical position so as not to disturb data previously written before and after the to-be-editted record. The edit operation is identical to the normal write data operation described in paragraph 4.6.2.1 except in the following points,

1) When the SYNCHRONOUS FORWARD (SFC) motion command is set true, the OVERWRITE (OVW) command, as well as the SET WRITE STATUS (SWS) must be set true for least 20 microseconds. When OVW is asserted at the start of a record the write current slowly decays following the issuance of the WARS pulse at the end of the record so that extraneous recording does not occur in the gap, as is the case when the write current is turned off abruptly.

2) The formatter/controller must devise a scheme for positioning the write head in almost exactly the same location on tape as formerly when the record to be editted was originally written. This is normally accomplished by performing a read reverse operation over the to-be-editted record with a longer than normal postrecord delay.

4.6.2.5 ERASE OPERATIONS. To erase an unusable portion of tape of variable length perform the following sequence,

1) Issue the SYNCHRONOUS FORWARD (SFC) motion command with SET WRITE STATUS (SWS) set true for at least 20 microseconds.

2) Supress WRITE DATA STROBES (WDS).

3) After an appropriate dealy, representing a desired amount of tape travel, remove the motion command. The tape motion will cease in 0.19 inches $\pm$ 0.02. NOTE: The controller/formatter may employ the prerecord delays required for the "BOT jump", "skip-write", or "write EOF" operations (described in paragraph 4.6.2.2and 4.6.2.3) to create fixed length erasures. The edit operation with no WDS supplied to the transport could be employed to erase a record in the midst of other records.

4.6.3 READ OPERATIONS. The formatter/controller should provide the capability to receive read data at a synchronous rate, detect parity errors, isolate check characters from the data, and also recognize the special file mark record as such. Inasmuch as the formatter/controller initiates and terminates tape motion it must be able to determine the absence of data, that is, the interrecord gap.

4.6.3.1 READ DATA OPERATIONS. To recover a normal data record from tape the formatter/controller must perform the following functions,

1) Select a tape transport and set DDS as necessary.

2) Utilize, as necessary, the various status indications.

3) Issue the SYNCHRONOUS FORWARD (SFC) or SYNCHRONOUS REVERSE (SRC) motion command with SET WRITE STATUS (SWS) held false.

4) Generate a delay during which the tape is accelerating to synchronous speed, and during this delay suppress the invalid read data resulting from possible gap noise.

5) Receive and utilize each READ DATA STROBE (RDS) supplied by the transport to sample the READ DATA lines (RD0-RD7,RDP).

6) Verify that the vertical parity of each character is correct.

7) Monitor the RDS with a missing pulse detector or similar scheme, in order to distinguish the CRCC and LRCC (each preceded by three empty character spaces) from the data.

8) Verify the correctness of the CRCC and LRCC as deemed necessary.

9) Recognize the presence of the interrecord gap by the continued absence of data.

10) After an appropriate postrecord delay, remove the motion command, thereby initiating deceleration. A new command to read in the same direction may be issued at any time before, during, or after deceleration. A new motion command in the opposite direction should not be issued until the tape is at rest.

4.6.3.2 READ THRESHOLDS. Two input levels, READ THRESHOLD 1 and READ THRESHOLD 2, are provided to select three different read threshold levels. These commands are not latched by the transport and should therefore be held true for the entire operation during which they are desired.

RTH 1 is terminated in the transport but is not used; instead the transport automatically selects high threshold (50%) whenever the write status flip-flop is set.

READ THRESHOLD 2 may be employed to recover severely degraded data from tape. The discrimination level is decreased to only about 10% nominal signal amplitude with RTH2 held true.

When RTH2 is false a normal threshold level of 20% of nominal signal amplitude is employed to discriminate between "ones" and "zeros".

4.6.3.3 FILE MARK RECOGNITION. The procedure for reading the special file mark record is no different than that for reading a data record. Since the file mark character and its LRCC are identical, the file mark record appears the same in both the forward and reverse directions. The formatter/controller should incorporate some sort of decoding circuit to recognize file marks as such.

4.7 PHASE ENCODED TRANSPORT CONTROL. Functions to be performed by the phase encoded transport's controller are,

1) The generation of various timing delays which allow for transport acceleration and deceleration, and which dictate IRG length and the head position during specific operations.

2) The encoding of data to be written,and the generation of two WRITE DATA STROBES per character period.

3) The generation of preamble, postamble, vertical odd parity, the ID Burst, and EOF records, and their proper placement on tape.

4) During read operations, the discrimination of preamble and postamble from data.

5) The deskewing and decoding of read data and the development of a read strobe.

6) The detection of format errors, dropouts, and data parity errors. The correction of single channel dropouts.

7) The detection of ID Burst and EOF records as such.

4.7.1 MOTION CONTROL AND TIMING. Motion control of the phase encoded transport is identical to that of the NRZI transport so that reference should be made to paragraph 4.6.1.

4.7.2 WRITE OPERATIONS. The assertion of SWS (SET WRITE STATUS) concurrent with the motion command (SFC or SRC) energizes the write and erase circuitry in the transport. The SWS line is sampled within 20 microseconds of SFC or SRC going true so that SWS may go false any time thereafter if so desired. The "file protect" circuitry in the transport which senses the presence of a write ring in the supply reel disables the write current when the ring is absent.

4.7.2.1 WRITE DATA OPERATIONS. To write a data record on tape the formatter/controller must perform the following sequence,

1) Select a transport and set DDS as necessary.

2) Receive and utilize, as necessary, the status information, e.g. tape speed, revealed by the selected transport.

3) Issue the SYNCHRONOUS FORWARD COMMAND (SFC) with SET WRITE STATUS (SWS) true for at least 20 microseconds.

4) Wait an appropriate delay before presenting data to allow the transport to reach synchronous speed.

5) Issue WRITE DATA STROBES to record forty phase encoded "zeros". Two WDS pulses are required for each character. The WRITE DATA lines must be stable 200 nanoseconds before the leading edge of WDS and remain stable until its trailing edge.

6) Issue the preamble all "ones" character and associated WDS's.

7) Issue phase encoded data with accompanying odd parity and WDS's.

8) Issue postamble all "ones" character followed by forty all "zero" characters, with associated strobes.

9) After an appropriate delay which allows a portion of the subsequent interrecord gap to be traversed at full speed remove the SFC thereby initiating deceleration. The read stack must pass the block before removing the motion command. The distance between read and write gaps is 0.15 inches.

10) A new motion command of the same direction may be applied at any time, before, during, or after deceleration. The formatter should calculate a delay to determine when tape motion has ceased before applying a motion command of the opposite direction.

4.7.2.2 WRITE FROM LOAD POINT. When writing from load point the ID Burst must be recorded alongside the BOT marker, and an extended gap must appear before the first record. The following sequence is required.

1) Assert SFC and SWS.

2) Wait a calculated delay to allow the transport to reach synchronous speed.

3) Begin writing the ID Burst while the trailing edge of the BOT marker is still at least 1.7 inches to the supply reel side of the head. (The distance from the trailing edge of BOT to the write gap, with the machine at load point, is 2.45 inches ± 0.3 inches.) The ID Burst consists of alternating phase-encoded "one" and "zero" bits on WDP only, with the associated WDS's and all other WRITE DATA INPUTS false. The ID Burst must continue past the trailing edge of the BOT marker.

4) Wait an appropriate delay before issuing the first data record, so that the following two conditions are met,

a) The first record is at least 0.5 inches beyond the ID Burst,
b) The first record is at least 3 inches, and at most 25 feet, beyond the BOT marker.

5) Write the first record as described in paragraph 4.7.2.1.

4.7.2.3 WRITE FILE MARK OPERATION. The phase-encoded EOF (end-of-file) record consists of 40 "zeros" in tracks 2, 6, and 7 with tracks 1, 3, and 4 erased. (Tracks P, 0, and 5 may be erased or may contain transitions.) The following sequence is required,

1) Assert SFC and SWS.

2) Wait a sufficiently long delay to traverse at least three inches of tape before presenting the EOF record on the WRITE DATA lines.

3) The formatter/controller may utilize its preamble generating circuit to provide 40 "zeros" at WD2, WD6 and WD7 while holding WD1, WD3, and WD4 false.

4) After an appropriate delay remove the motion command, as in a write data operation.

4.7.3 READ OPERATIONS. The formatter/controller must provide the capability of detecting transitions at each READ DATA input independent of the other READ DATA inputs. It must decode and deskew the data, detect parity and format errors, and recognize the special EOF record as such. And it must initiate and terminate tape motion in the inter-record gaps. When reading from load point the controller may wish to test for the presence of the ID Burst.

4.7.3.1 READ DATA OPERATIONS. To recover a normal data record from tape perform the following sequence.

1) Select a transport and set DDS as necessary.

2) Utilize, as necessary, the various status indications (e.g. tape speed) revealed by the selected transport.

3) Issue the SYNCHRONOUS FORWARD COMMAND (SFC) or SYNCHRONOUS REVERSE COMMAND (SRC) with SET WRITE STATUS (SWS) held false.

4) Generate a delay during which the transport is accelerating to synchronous speed.

5) Detect the preamble in each track and achieve synchronization upon the data transition. Detect any drop-outs.

6) Upon receipt of the all "one" character, read, decode, and deskew the data, and verify that vertical parity is correct.

7) Detect the initiation of the postamble as distinct from data.

8) Detect the end of the record.

9) Generate a delay to allow a portion of the inter-record gap to be traversed at synchronous speed.

10) Remove the motion command and generate another delay to determine when the transport is at rest.

11) When reading the controller may wish to maintain the transport at synchronous speed rather than stop in each gap.

4.7.3.2 READ THRESHOLDS. As in the NRZI transport a total of three read clipping levels is provided. High threshold (30%) is forced whenever the write current is energized. Low threshold of 5% nominal signal amplitude is available with the assertion of RTH2. The normal PE read threshold is 10%.

5 - PREVENTIVE MAINTENANCE

5.1 INTRODUCTION. The Digi-Data synchronous transports, models 1140, 1640, and 1740, are manufactured to well-conceived and proven designs in an environment of strict quality-control. With regular preventive maintenance, primarily cleaning, each transport should provide years of trouble-free service in your system.

Figure 5-1 lists recommended preventive maintenance tasks with a schedule for their performance. The head and other surfaces in contact with the magnetic tape should be cleaned daily by the system operator as described in paragraph 2.6. Tasks scheduled quarterly may be performed by either operator or maintenance engineer. All tasks scheduled annually must be performed by a qualified maintenance engineer.

5.2 CLEANING. Periodic cleaning of the tape head, tape guides, tape cleaner, arm rollers, stationary rollers, and capstan outer surface is absolutely necessary. Dust and/or accumulated oxide particles will cause 'drop-outs' resulting in tape recording and reading errors. Refer to paragraph 2.6.

Quarterly the entire transport front plate and dust cover should be cleaned with glass cleaner and a soft, lint-free cloth.

5.3 INSPECTING FOR WEAR.

5.3.1 TAPE GUIDES. The bottom flange of the tape guides is spring-loaded and is normally inadvertantly rotated in the daily cleaning process so that it should last indefinitely. The upper flange is fixed and should be loosened with an allen wrench and rotated to present a new wear surface yearly. Loosening or removing the top flange also provides an opportunity for a more thorough cleaning of the tape guides.

5.3.2 CAPSTAN. Inspect the capstan outer surface for cracking or polish quarterly. Since the 1740 capstan is manufactured from a soft metal, it should be inspected for possible deformity resulting from abuse. See paragraph 9.3 to replace if required.

5.3.3 HEAD. Inspect the magnetic tape head for wear quarterly. The head has a flat gutter on either side of the tape contact area. When the crown wears down to the depth of the gutters the head should be replaced. Worn heads have a trade-in value; contact the factory for details.

PREVENTIVE MAINTENANCE SCHEDULE		DAILY	QUARTERLY	YEARLY
Refer to	Task			
2.6	Clean head, other tape surfaces	X	X	X
5.2	Clean entire transport		X	X
5.3.2,3	Inspect head wear and capstan		X	X
5.3.1	Rotate tape guides			X
10.3.3	Check Start/Stop ramps			X
10.4.3	Check tension arm positions			X
10.5	Check BOT/EOT adjustment			X
10.8	Check read amplifier gain			X
10.10.1	Check read skew			X
10.7	Check write current waveform			X
10.12	Check skew gate			X

Figure 5-1, PREVENTIVE MAINTENANCE SCHEDULE

6 - REMEDIAL MAINTENANCE OVERVIEW

6.1 INTRODUCTION. This section provides general information required to service Digi-Data synchronous transports, models 1140, 1640, and 1740. Included are explanations of p.c. card variables, plug jumper and DIP switch options, electrical subassembly and component designations, a recommended tool list, and recommended spare parts inventory.

In order to isolate a transport malfunction to a faulty component or improper adjustment refer to the troubleshooting procedure outlined in section 8. Detailed component removal and replacement instructions are provided in section 9. When a component has been replaced several adjustments are usually required; section 10 indicates how to perform these requisite adjustments.

6.2 REPLACEMENT GUIDELINES. All 40-series transports employ generally the same electronics. There are currently fifteen versions of the read card, eight versions of the motor control card, and a single version of the write/control card. Remember, however, that the write/control card contains several plug jumpers and DIP switches which must be in the appropriate positions when exchanging cards. Refer to paragraphs 6.3, 9.2, and 10.7

The variables which affect read card versions are indicated in figure 6-1. When replacing a defective card be sure that the new card is of the same version. Refer to paragraphs 9.2, 10.8, and 10.12 for detailed replacement and adjustment procedures.

The motor control card is supplied with either a short heat sink (required in the 1140) or a tall heat sink (required in the 1640 and 1740). Other variables, as indicated in figure 6-2 are the unattended restart option (designated in the transport model number with an "X"), and the optional second tape speed. When a motor control card is replaced several potentiometer adjustments are also mandatory. Refer to paragraphs 9.2, 10.2, 10.3, and 10.4.3.

The location of each card in the transport is shown in figure 6-3. Figures 6-4, 6-5, and 6-6 explain the system of designations employed in the transport. Refer also to transport schematic diagram 0251442-0000.

6.3 PLUG JUMPER AND SWITCH OPTIONS. The positioning of several plug jumpers and DIP switches on the write/control card define the various features described below.

6.3.1 SELECTION OF THE TAPE UNIT. The plug jumpers which affect unit selection are W5, W6, W7, W8, W9, W10, and W26. The following eight combinations are valid.

a) To label the transport as unit Ø so that it may be selected via a low true on the SLTØ line J1-39 install W6 and W10.

b) To label the transport as unit 1 so that it may be selected via a low true on the SLT1 line J1-41 install W7 and W10.

c) To label the transport as unit 2 so that it may be selected via a low true on the SLT2 line J1-35 install W8 and W10.

d) To label the transport as unit 3 so that it may be selected via a low true on the SLT3 line J1-37 install W9 and W10.

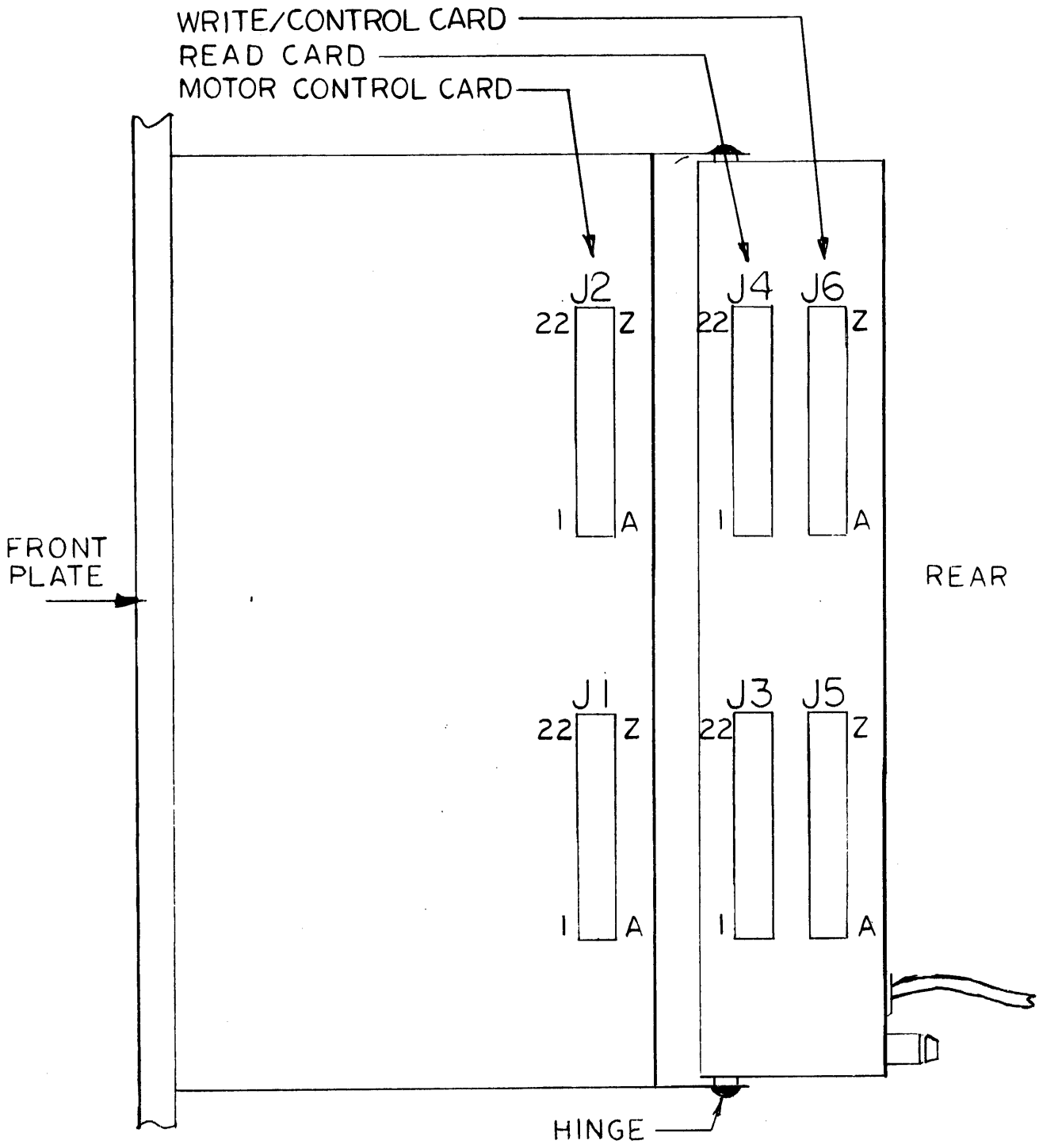
KIT ASSY PART NO. AND VERSION	RECORDING FORMAT(S)	STANDARD TAPE SPEED	INCORPORATES PCBA PART NO. AND VERSION
0051548-0001	NRZI	12.5 IPS	0051740-0002
-0002	NRZI	18.75 IPS	-0003
-0003	NRZI	25 IPS	-0004
-0004	NRZI	37.5 IPS	-0005
-0005	NRZI	45 IPS	-0006
-0006	PE	12.5 IPS	0051739-0002
-0007	PE	18.75 IPS	-0003
-0008	PE	25 IPS	-0004
-0009	PE	37.5 IPS	-0005
-0010	PE	45 IPS	-0006
-0011	PE/NRZI	12.5 IPS	0051726-0002
-0012	PE/NRZI	18.75 IPS	-0003
-0013	PE/NRZI	25 IPS	-0004
-0014	PE/NRZI	37.5 IPS	-0005
-0015	PE/NRZI	45 IPS	-0006

Figure 6-1, Read Card Versions

KIT ASSY PART NO. AND VERSION	HEAT SINK	UNATTENDED RESTART	OPTIONAL SPEED	INCORPORATES PCBA PART NO. AND VERSION
0051550-0001	SHORT	NO	NO	0050109-0002
-0002	SHORT	YES	NO	-0004
-0003	SHORT	NO	YES	-0006
-0004	SHORT	YES	YES	-0008
-0005	TALL	NO	NO	-0003
-0006	TALL	YES	NO	-0005
-0007	TALL	NO	YES	-0007
-0008	TALL	YES	YES	-0009

Figure 6-2, Motor Control Card Versions

NOTE: When ordering spares always order by the Kit Assembly Part Number rather than by the Printed Circuit Board Assembly Part Number. This will assure your receiving the most current revision level replacement.



Model 1740, Right Side View
Models 1640 and 1140, Bottom View

Figure 6-3, Transport Card Connector Locations.

Figure 6-4, Electrical Sub-Assembly Designations.

A01	CONTROL PANEL ASSEMBLY A01S1/DS1 Power Switch/Indicator A01S2/DS2 Load Switch/LDPT Indicator A01S3/DS3 Rewind Switch/Indicator A01S4/DS4 On Line Switch/Indicator A01DS5 Write Enable Indicator A01S6/DS6 High Density Switch/Indicator A01S7 Unit Select Switch A01P1 Connector
A02	TAKE-UP ARM SERVO ASSEMBLY
A03	SUPPLY ARM SERVO ASSEMBLY
A04	BOT/EOT SENSOR ASSEMBLY
A05	POWER CORD ASSEMBLY A05P1 Power, Input A05P2 Power, Switched A05F1 Fuse
A06	POWER CONTROL UNIT A.C. 120/240V A06S1 115/230 Switch A06S2 LO/NOR Switch A06P1 Power, Switched A06CR1 Bridge Rectifier, S.P.S. A06CR2 Bridge Rectifier, Logic Supply A06CR3 Bridge Rectifier, S.N.S. D.C. 48V see assembly parts list for details.
A07	MOTOR CONTROL CARD
A08	READ CARD
A09	WRITE/CONTROL CARD
A10	FORMATTER POWER SUPPLY
A11	IMBEDDED MICROFORMATTER ASSEMBLY

Figure 6-5, ELECTRICAL COMPONENT DESIGNATIONS ON THE CHASSIS.

C1 C2 C3	Filter Capacitor, S.P.S. (+20V nom.) Filter Capacitor, Logic Supply (+8V nom) Filter Capacitor, S.N.S. (-20V nom)
CR4 CR5	Bridge Rectifier, Take-Up Motor Suppression Bridge Rectifier, Supply Motor Suppression
CG1 CG2 CG3 CG4 CG5 CG6 CG7	Chassis Ground, Motors Chassis Ground, Analog Chassis Ground, Digital Chassis Ground, Capacitors Chassis Ground, Power Control Unit Chassis Ground, Safety Chassis Ground, Front Plate
J1,J2 J3,J4 J5,J6	Motor Control Card Connectors Read Card Connectors Write/Control Card Connectors
K1/XK1 K2/XK2	Servo Relay and Socket Rewind Relay and Socket
L1	File Protect (WRT EN) Solenoid
P8, P8 P9, P9 P10, P10 P11	Supply Motor Connection Capstan Motor Connection Take-Up Motor Connection Control Panel Connector
S5 S8	File Protect (WRT EN) Switch Arm Limit Switch
R1 R2 R3	Bleeder Resistor S.P.S. Bleeder Resistor, Logic Supply Bleeder Resistor, S.N.S.
R4 R5	Current Limiter, Rewind Supply Current Limiter, Rewind Take-up
G1 M1 M2 M3	Capstan Tachometer Capstan Motor Supply Reel Motor Take-Up Reel Motor

CONNECTOR	MATING	
A07P1	Mates With	J1
A07P2	Mates With	J2
A08PA	Mates With	J3
A08PB	Mates With	J4
A09PA	Mates With	J5
A09PB	Mates With	J6
A05P2	Mates With	A06P1
A01P1	Mates With	P11
P8	Mates With	P8
P9	Mates With	P9
P10	Mates With	P10

Figure 6-6, Transport Connector Mating

ITEM	QUANTITY	ITEM	QUANTITY
Oscilloscope w/dual trace	1	Solder-wick	1
Probe, 1:1	1	Solder, Rosin core	1
Probe, 10:1	2	Cotton swabs	1
Screwdriver set, blade	1	Isopropyl alcohol	1
Nutdriver set	1	Multimeter	1
Allen driver set	1	Chip-clip	3
Diagonal cutter	1	Scrub Mag Tape, 600'	1
Long-nose pliers	1	Master skew tape	1
Scale, 6-inch	1	Wire Stripper	1
Soldering iron and tips	1	Transport test card	1

Figure 6-7, List of Tools and Equipment

e) In order that the transport may be selected via the general SLT line J1-21 install W5 and W10.

f) In order to have the transport selected all the time install none of the applicable plug jumpers.

g) In order to have the transport selected whenever it is ON LINE install W26 only.

h) If the transport has a Unit Select Switch on the control panel install only W10. (The Unit Select Switch takes the place of jumpers W6-W9.)

6.3.2 GATING OF TRANSPORT STATUS. Either W11 or W12, but not both, must be installed in the transport; usually W12 is installed. With W11 installed the status lines LDP, EOT, and FPT are revealed whenever SLTD is true. With W12 installed LDP, EOT, and FPT are instead gated by the signal ARM I/O (equivalent to RDY).

6.3.3 USE OF THE SWS INPUT. Either W13 or W14, but not both, must be installed in the transport; usually W13, is installed. The condition of the SWS line at the beginning of each operation is latched in the WRITE MODE flip-flop. With W14 installed WRITE MODE is cleared when SWS goes false. With W13 installed WRITE MODE remains true until a subsequent operation not requiring SWS is begun.

6.3.4 DEFINITION OF EOT STATUS. Either W17 or W18, but not both, must be installed in the transport; usually W18 is installed. With W17 installed the EOT status line is true only when the EOT reflective marker is within the photo-electric sensor. With W18 installed EOT status is held in a latch so that it remains true after the marker is passed in the forward direction. The EOT latch is not cleared until a rewind is initiated or until the EOT marker is passed in the reverse direction.

6.3.5 SELECTION OF DENSITY. The plug jumpers which provide density selection are W15, W16, W19, W20, and W21. There are six valid combinations.

a) A single density NRZI only unit must have only W19 installed.

b) A single density phase encoded unit must have only W21 installed.

c) A seven-track dual density unit with density selection via the DDS input must have W19 and W15 installed.

d) A seven-track dual density unit with density selection via the front panel HIDEN switch must have W19 and W16 installed.

e) A nine-track dual density unit with density selection via the DDS input must have W20 and W15 installed.

f) A nine-track dual density unit with density selection via the front panel HIDEN switch must have W20 and W16 installed.

6.3.6 ON LINE STATUS. Either W29 or W30, but not both, must be installed in the transport; usually W30 is installed. With W29 installed ON LINE is always true. With W30 installed ON LINE is true only when the ON LINE flip-flop is set.

6.3.7 SPEED STATUS. The speed status lines are controlled by the settings of DIP switch SW3 and the level of the SPS input. These three outputs (SP2,SP1, SPØ) reveal to the formatter the transport's tape speed.

a) Standard speeds - SPS false.

12.5 IPS	ON - 2, 6	OFF - 4
18.75 IPS	ON - 4, 6	OFF - 2
25 IPS	ON - 6	OFF - 2, 4
37.5 IPS	ON - 2, 4	OFF - 6
45 IPS	ON - 2	OFF - 4, 6

b) Optional speeds - SPS true.

12.5 IPS	ON - 1, 5	OFF - 3
18.75 IPS	ON - 3, 5	OFF - 1
25 IPS	ON - 5	OFF - 1, 3
37.5 IPS	ON - 1, 3	OFF - 5
45 IPS	ON - 1	OFF - 3, 5
none	ON - 1, 3, 5	

6.3.8 FORMAT STATUS. The plug jumpers W2 and W3 and the DIP switch SW1 are used with the density selection to generate the format status lines FMT1, FMT2, and FMT3 as follows,

FORMAT	FMT1	FMT2	FMT3
9 track 1600 BPI	LO	HI	HI
9 track 800 BPI	HI	HI	LO
9 track 200 BPI	LO	HI	LO
7 track 800 BPI	HI	LO	LO
7 track 556 BPI	LO	LO	HI
7 track 200 BPI	LO	LO	LO

Proper setting of the switches and jumpers for each configuration is,

CONFIGURATION	S1 or S2	S3 or S4	S5,6, or 7	W2 or W3
9 track 800/1600 BPI	S1	S4	S7	W3
9 track 800 only	S2	S3	S6	W3
9 track 1600 only	S1	S4	S5	W2
7 track 800 only	S2	S4	S6	W2
7 track 556 only	S2	S4	S6	W3
7 track 200 only	S2	S4	S5	W2
7 track 200/556	S2	S4	S7	W3
7 track 556/800	S2	S3	S7	W2
7 track 200/800	S2	S4	S7	W2

6.3.9 INDICATOR LAMP CHANGES. The plug jumper W22 is usually installed so that the HIDEN indicator lamp indicates high density status. This lamp can be changed to an EOT status indicator by removing W22 and installing W23 instead. The plug jumper W27 is usually installed so that the ON LINE indicator lamp indicates ON LINE status. This lamp can be changed to a READY status indicator by removing W27 and installing W28 instead.

6.3.10 TEST CARD POWER. In order to supply +5 VDC to the Digi-Data test card, plug jumper W4 must be installed. This jumper must not be installed when the transport is connected in a system.

6.3.11 PE WRITE CURRENT ONE-SHOT. Plug jumper W1 is installed to decrease the length of the PE write current one-shot in the higher speed transports. Refer to paragraph 10.7. This jumper is not required in NRZI only units.

6.3.12 BACKWARDS COMPATIBILITY WITH 30-SERIES. If a 40-series dual density seven-track transport is to be operated on a 30-series bus W25 is installed. All other cases require the installation of W24. (Note: If W25 is installed the information is paragraph 6.3.8 is invalid.)

6.4 RECOMMENDED SPARE PARTS INVENTORY. Each of the components and assemblies appearing on the parts list at the end of this section is field-replaceable. Complete instructions are found in section 9 of this manual.

ITEM	QTY/DASH				PART NUMBER	DESCRIPTION	REFERENCE
1					2060002-0002	FUSE, 1.5A SB	
2					2060002-0001	FUSE, 3.0A SB	
3					2060007-0001	RELAY, 12VDC	
4					2550001-0001	RECTIFIER, CR4, CR5	
5					2550000-0001	RECTIFIER, CR1, CR2, CR3	
6					2251088-6353	CAPACITOR, 35VDC 35K UF	
7					2251088-6114	CAPACITOR, 35VDC 110K UF	
8					2250101-6753	CAPACITOR, 15VDC, 75K UF	
9					2051469-1112	SWITCH, POWER	
10					2051155-2113	SWITCH, MOMENTARY, LOAD	
11					2051155-2133	SWITCH, MOMENTARY, ON LINE	
12					2051155-2123	SWITCH, MOMENTARY, REWIND	
13					2051155-1153	SWITCH, ALT. ACTION, HIDEN	
14					2051155-3143	INDICATOR, WRTEN	
15					2951715-0001	LAMP	
16					0051545	CONTROL PANEL ASSEMBLY	
17					0051547-0001	48 VDC POWER UNIT	
18					0051404-0001	TRANSFORMER ASSEMBLY	
19					1050010-	CAPSTAN (3 Types)	
20					2050027-0001	MOTOR/TACHOMETER	
21					2051067-0002	REEL MOTOR	
22					2050035-0002	REEL MOTOR	
23					0050098-0001	STATIONARY ROLLER ASSEMBLY	
BASIC VERSION					NOTES:		

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: SPARE PARTS LIST, 40-SERIES TRANSPORT

P.L. NO.	SH. 1 OF 2	REV.

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH				PART NUMBER	DESCRIPTION	REFERENCE
24					0050008-0001	TENSION ARM ROLLER ASSEMBLY	
25					1910345-0001	SPRING, TAPE GUIDE	
26					1550000-0001	CERAMIC DISC, TAPE GUIDE	
27					1210717-0001	RETAINER CAP, TAPE GUIDE	
28					5910749-0001	SHIM, .0005	
29					0050045-0001	TAPE CLEANER	
30					0051038-0001	HEAD COVER	
31					2051345-0001	TAPE HEAD ASSEMBLY, 9TK	
32					2051531-0001	TAPE HEAD ASSEMBLY, 7TK	
33					0051553-0001	BOT/EOT SENSOR ASSEMBLY	
34					0050043-0001	FLUX SHIELD ASSEMBLY	
35					0010249-0001	FILE PROTECT ASSEMBLY	
36					0010242-0001	ARM SERVO ASSEMBLY	
37					0051477-0001	EXTENSION SPRING ASSEMBLY	
38					0051550-	MOTOR CONTROL CARD KIT	
39					0051549-0001	WRITE/CONTROL CARD KIT	
40					0051548-	READ CARD KIT	
BASIC VERSION					NOTES:		

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: SPARE PARTS LIST, 40-SERIES TRANSPORT

P.L. NO.	SH.	OF	REV.
	2	2	

D.D. FORM 04-1-50001-0000

7 - CIRCUIT DESCRIPTIONS

7.1 TRANSPORT BLOCK DIAGRAM. A familiarity with the general principles of operation of the transport's major circuits will significantly aid the maintenance engineer in his isolation and correction of transport malfunctions. This paragraph briefly discusses each major circuit's function with reference to the transport block diagram, figure 7-1. Subsequent paragraphs in this section provide more detailed descriptions. All signals between major blocks are shown in schematic 0251442-0000 and in the first sheets of schematics 0251322-0000, 0251419-0000, and 0250028-0000.

SELECT: All I/O signals are directly or indirectly gated by the select line so that several transports may be daisy-chained on a formatter.

CONTROL LOGIC: Formatter command signals, operator pushbuttons, and certain information derived within the transport are inputs to the control logic which is located primarily on the write/control card. This control logic directs the motor circuits, enables the write and the read circuits as appropriate, generates the read threshold signals, and provides numerous status indications to the formatter.

WRITE AMPLIFIERS: A command to write is latched within the control logic, and the write power is routed through the file protect switch which determines the presence of a write enable ring in the supply reel. Write data is provided by the formatter on nine parallel inputs along with a write strobe. The write register and amplifiers control the direction and amount of current through the write head windings. The erase head is energized any time write power is available.

READ AMPLIFIERS: Read data is amplified, validated, and provided on nine parallel outputs. In the NRZI mode the read data is also decoded, deskewed, and provided to the formatter with a read strobe. The selection of the phase encoded and various NRZI densities is via three signals from the control logic.

POWER SUPPLIES: The power supplies provide three unregulated voltages, S.P.S. (+20V), Logic Supply (+8V) and S.N.S. (-20V), and four regulated voltages, (+5, +5L, +12, -12). If the transport contains an embedded formatter a third +5 volt regulator is installed; this formatter logic supply is described separately in the formatter manual.

RELAY CONTROL: All three motors are connected to their respective servo amplifiers through a relay. This relay is de-energized in certain failure modes and therefore serves to protect the magnetic tape. The relay control circuit also generates the power fail sequencing which stops all three motors under servo control and keeps the tape neatly threaded.

CAPSTAN SERVO AMPLIFIER: The capstan servo circuit controls tape velocity. Linear acceleration and deceleration ramps are added to the motion command signal so that exact tape position can be calculated by the formatter. The capstan motor is controlled by feedback from an integral DC tachometer.

REEL SERVO AMPLIFIERS: The motion controlling signals generated in the capstan circuit are fed to the reel servo circuits for the purpose of optimally positioning the tape-buffering arms during each particular operation. The movement of the reel motors is controlled by comparison of the actual position of the arm with the arm's desired position. The actual arm position is supplied to the reel servo amplifier as a varying photocell output voltage.

7.2 RAW POWER SUPPLIES. The 40-series transport is supplied with either a 120/240 VAC power control unit or a 48 VDC power control unit. In either case three raw D.C.

voltages are produced:

a nominal +20V designated SPS,
a nominal -20V designated SNS,
and a nominal +8V designated Logic Supply

These voltages are filtered by C1, C2, and C3 which are located on the chassis.

7.2.1 AC POWER CONTROL UNIT. The line side of the AC line is fused by A05F1, then switched by A01S1 in the front panel. The primary windings of transformer A06A01T1 may be arranged by means of switches A06A01S1 (115/230) and A06A01S2 (LO/NOR) to suit four different line voltages. Refer to figure 3-1. The transformer secondaries are connected to three bridge rectifiers A06CR1, A06CR2, and A06CR3 which provide +20V, +8V, and -20V respectively.

7.2.2 DC POWER CONTROL UNIT. When operation from a 48VDC source is desired the transport is supplied with a high-frequency transformer-coupled DC-to-DC converter in place of the components described in the preceding paragraph. Refer to schematic 0251295-0000. The heart of this converter is U1, a switching regulator control and drive unit. U1's output buffers (pins 4,5,6, and 7) drive the power transistor pairs Q7/Q9 and Q6/Q8 which draw the line current through the coupling transformer's primary winding (2-3-4). The windings on the collectors of Q6 and Q7 are in anti-phase with the primary to ensure the saturation of Q8 and Q9.

Primary current is sensed at the emitters of Q8/Q9 and is input (U1-17) to the current control amplifier in U1 which limits output current by adjusting the output pulse width modulator. The line voltage is sensed via a center-tapped full-wave rectified secondary (12-13-14) with a potentiometer (R22) pick-off. This voltage feedback signal is input (U1-21) to the voltage control amplifier in U1, whose output also controls output pulse duty cycle. The converter operates with line voltages from 40 to 56 volts. With low line voltage the duty cycle approaches 100%; at the high end the duty cycle is reduced to less than 70%.

U1 contains a free-running 20 KHz oscillator and a ramp generator. The ramp is compared to the control voltage (outputs of the current control amplifier, U1-18, and the voltage control amplifier, U1-20) to determine pulse width. Alternate pulses are steered to each set of dual push-pull outputs (U1-4,5, and 6,7). Inhibit lines (U1-1,2) from the feedback secondary prevent pulse overlap.

The circuit incorporates a soft start-up and also prevents an initial current surge. When line power is first switched on the line filter C14 charges through the current limiting resistor R32. After the switching regulator is operating, current in the primary winding 15 fires the SCR which now by-passes the resistor to provide normal primary current. Also, when the unit is first turned on power is provided to U1's 5 volt shunt regulator through the conduction of Q2. After U1 is operating power is derived from the feedback secondary (12-13-14) through the rectifiers (CR7,8) and Q1. Q3 turns off Q2. The duty cycle of the switching regulator gradually increases from zero to the required percentage due to an initial exponential waveform at the control input (U1-13) which is derived from the charging of C6 and C7. These capacitors cannot charge until the charge on the filter capacitor (C14) reaches about 35 volts.

The power output secondaries (9-10-11 and 6-7-8) are center-tapped to ground and full-wave rectified. CR11 provides -22 volts at 2A and +22V at 4A; CR12 provides +7V at 10A. All three outputs are LC filtered.

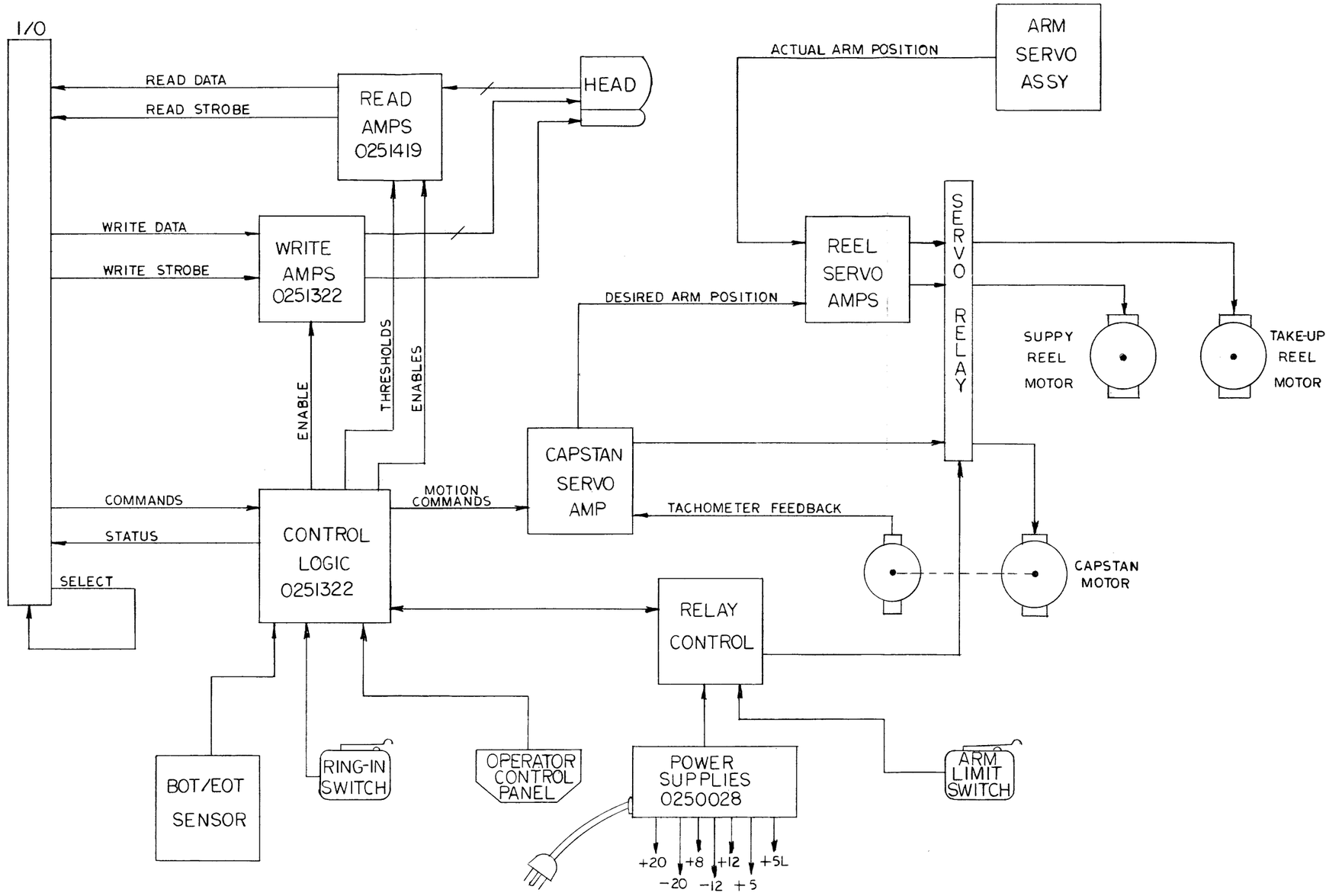


FIGURE 7-1
TRANSPORT BLOCK DIAGRAM

7.3 REGULATED POWER SUPPLIES. Four regulated d.c. voltages are produced in the power supply circuits on the motor control card. Refer to schematic diagram 0250028-0000 sheet 2.

Two of these voltages are derived from the raw +20 volt supply. Regulator chip U11 provides +5 volts which is adjustable with the 5LADJ potentiometer R62. This regulated voltage is designated +5L to distinguish it from a separate +5 volt supply derived from raw +8 volts. In the event of line power failure the +5L supply will regulate longer than the +5 supply. For this reason +5L is used throughout the capstan and reel servo circuits.
Regulated +12 volts is provided by the series pass transistor Q6 which is controlled by U10. This voltage is adjustable with the potentiometer R52 (+12ADJ). Current limit protection is provided by Q26 which diverts base drive current away from Q6 when the drop across R59 provides sufficient bias.

A -12 volts is derived from the raw -20 volt supply. Regulator U14 supplies base current to the series pass transistor Q7. Current limit protection is provided by Q28. This voltage is not adjustable.

Another +5 volts is derived from the raw +8 volt supply. This +5 regulator is referenced to the +5L output via differential amplifier U6. U6 controls Q24 which drives Q5. Current limit protection is provided by Q25 which diverts current away from Q24's base when the drop across R43 is sufficient to bias Q25 on. Generally speaking +5 volts is employed on the read and write/control cards whereas +5L is employed on the motor control card.

VOLTAGE	ADJUSTMENT	USE
+20	none	Motors, +12 reg., +5L reg.
-20	none	Motors, -12 reg.
+8	none	+5 reg.
+5L	R62	Logic on Motor Control card
+5	follows +5L	Logic on read, write cards, Control Block Lamps
+12	R52	Op amps, arm sensor lamps
-12	none	Op amps

Figure 7-2, USAGE OF DC VOLTAGES.

7.4 CAPSTAN RAMP GENERATOR AND SERVO AMPLIFIER. These circuits located on the motor control card control the movement of the magnetic tape across the recording head. The capstan motor is accelerated and decelerated linearly so that a specified length of tape is always traversed in a specific length of time. Refer to schematic drawing 0250028-0000, sheets 4 and 5, with regard to the following discussion.

The control logic (sheet 3) produces the signal FORWARD (TP13) whenever forward tape motion is required; it produces the signal RVS RAMP (TP11) whenever reverse motion, including rewinding, is required. Op amp U13-4 converts these TTL signals into a bi-polar signal, RSC. RSC is limited to ± 6 volts by precision clamps U13-3/CR15 and U13-12/CR16. At TP12 RSC is -6 volts for a forward motion command, +6 volts for a reverse motion command, and 0 volts with neither command true.

The circuit centered upon the various U12 op amps and integrator U6-10 adds the linear acceleration and deceleration ramps to the bi-polar RSC signal. The signal at U6-10 not only has ramps added, but is of opposite polarity to RSC (TP12). U12-4 is a non-inverting amplifier whose output is precision clamped by CR12 and CR13. When ramping the voltage at the input U12-5 is non-zero; when not ramping (i.e., either at rest or at full speed) the input is 0 volts.

The clamp reference voltage is nominally +6 volts and is provided by the adjustment of RAMP potentiometer R45 through voltage follower U12-3. Normally no current is flowing through R64 since U8-2/13 is open. The positive clamp therefore operates at +6 volts and the negative clamp at -6 volts. The resistor U8-2/13 is not installed.

The various parts of U12 function so that the junction of CR12/CR13 is approximately -6 volts when accelerating in the forward direction, +6 volts when decelerating in the forward direction, +6 volts when accelerating in the reverse direction, -6 volts when decelerating in the reverse direction, 0 volts when at rest, and 0 volts when at synchronous speed.

The voltage at the CR12/13 junction produces a current through resistor U8-1/14 to the virtual ground at U6-8, the inverting input of U6-10. Constant current is assured due to the precision clamps. Therefore C19 will charge at a constant rate producing a linearly increasing voltage. When U6-10 is equal and opposite to RSC U12-5 will be at 0 volts and consequently no more current will be supplied through U8-1/14.

When a SHORT RAMP is desired (dual speed units) the input resistor U8-1/14 is paralleled with resistor U7-2/15 so that C19 will charge at a faster rate producing a steeper ramp.

Next the motion command is split according to polarity so that the reverse speed and forward speed may be separately adjusted. The motion command with ramps at U6-10 produces a small current through the resistor U8-8/7 to the virtual ground at U6-6. The feedback current flows through either CR8 and R42 or CR7 and R40 depending on polarity.

The next stage U6-3 is a summing amplifier whose output is proportional to the sum of the currents through R38 (zero offset), R39 and R48 (forward command), R41 and R49 (reverse command), and U8-3/12 (rewind add-on). The forward motion current, and hence the forward speed, is adjustable with the FWD potentiometer R48. Likewise the reverse motion current, and hence reverse speed, is adjustable with the REV potentiometer R49. The current through U8-3/12 is always proportional to the current through R41 so that the rewind speed is also adjusted with R49. When REWIND is false the R54/R55 junction is low holding Q27 off. When REWIND goes true the rewind ramp is produced by the charging of C23 through R54 and R55 which gradually increases the conduction of Q27. At the completion of the rewind operation REWIND goes false and C23 discharges through R55 gradually decreasing the conduction of Q27 and thereby the current to the summing point of the CSC amplifier. Note that RVS RAMP is also true when REWIND is true so that the output of the rewind ramp generator is added to that of the reverse ramp generator.

During an unload operation REWIND is false, REVERSE is true, and REELS ON is false. This combination of signals forward biases CR17 so that current flows through the voltage divider comprised of R57, CR17, and R55 thereby charging C23

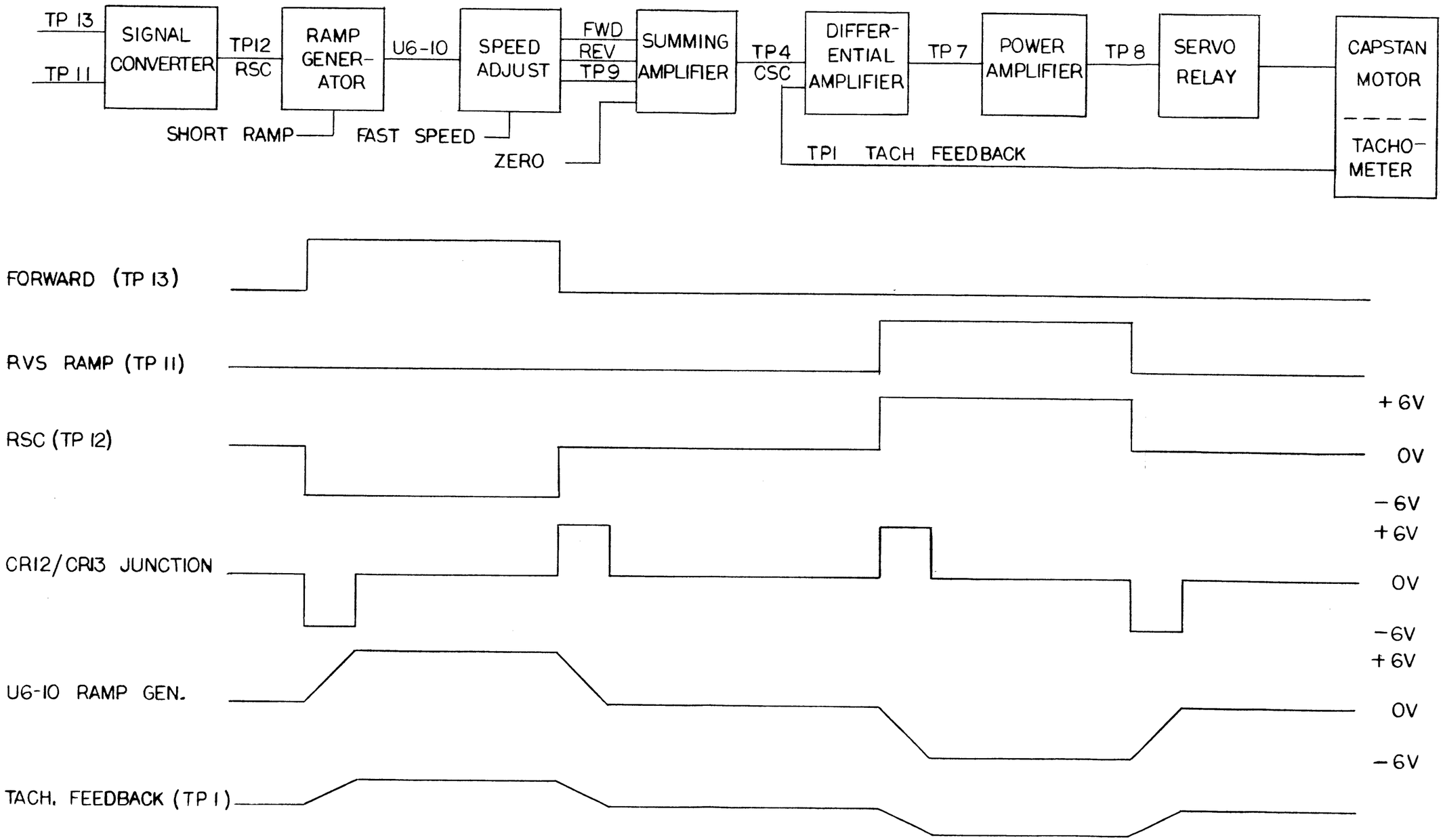


FIGURE 7-3 CAPSTAN BLOCK DIAGRAM AND WAVEFORMS

and turning Q27 on to provide a current to the summing amplifier through U8-3/12.

When FAST SPEED is selected in a dual speed transport the input resistor (U8-8/7) to the polarity splitter is paralleled by resistor U7-7/10 and the FAST potentiometer R47. This proportionally increases the current through R39 or R41 to the summing point U6-1. The FAST potentiometer permits fine adjustment of the alternate tape speed.

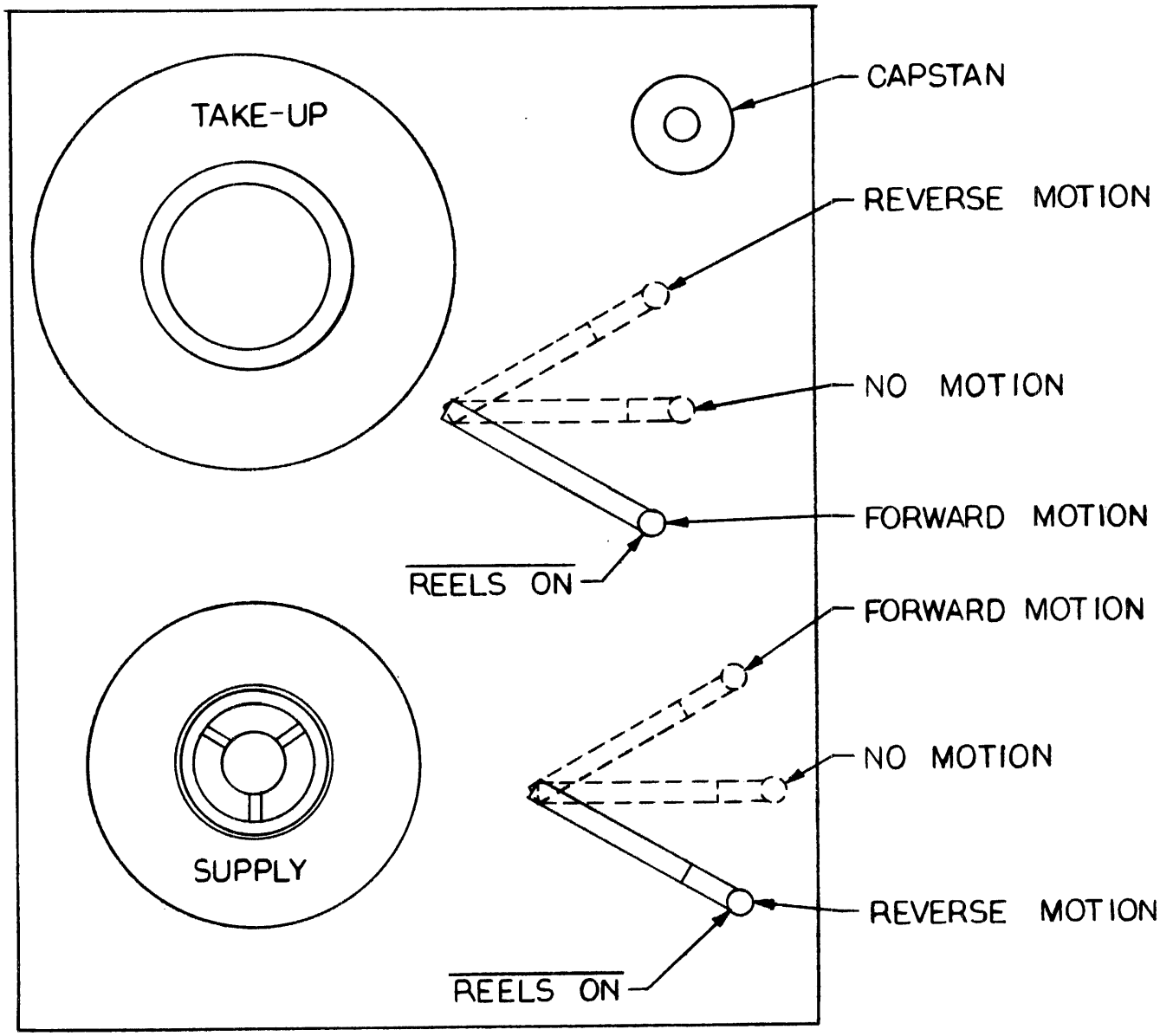
The "capstan servo control" signal CSC (TP4) is input to the capstan servo amplifier (sheet 5). The output voltage of this power amplifier is proportional to the difference between the CSC and the tachometer feedback voltage (which represents actual tape speed), consequently the first stage is a differential amplifier, U1-10. The difference between the filtered tach voltage (TP1) and the CSC is amplified in subsequent gain stages. A positive signal at CPSN MOTOR (TP8) results in forward tape motion; a negative signal in reverse tape motion.

Q23 and Q21 act to current limit the output stages by diverting their base drive when the output current through R29 or R10 produces an IR drop of .65 volts. CR2 and CR4 protect the output transistors Q3 and Q1 against inductive voltage transients.

The CPSN MOTOR signal (TP8) is connected to the capstan motor winding through the servo relay K1. Refer to schematics 0251640-0000, 0251641-0000, 0251642-0000.

7.5 REEL SERVO CIRCUITS. The reel servo circuits (schematic 0250028-0000, sheet 6) control the motion of the supply reel and the take-up reel in response to the movements of their associated tape-buffering arms. Tape buffering is required because actual capstan acceleration far exceeds the acceleration capabilities of the reel motors. During each particular motion the arms are positioned in a specific location suited to that motion so that the largest possible degree of buffering is always available. For example, during forward motion the supply arm is positioned at the full extent of its arc (up on the 1740, right on the 1640 and 1140). When the forward motion of the capstan ceases the supply arm absorbs the tape still being unwound from the supply reel. By contrast, during forward motion the take-up arm is positioned just off the mechanical stop (bottom of arc on 1740, left on 1640 and 1140). When the forward motion of the capstan ceases the tape-up arm provides tape to the still winding take-up reel. Desired arm positions for the various operations are shown in figure 7-4. Attached to the shaft of each buffering arm is a round black-anodized disk containing an eccentric slit. Mounted on one side of this disk is a lamp; on the other side is a photocell. The movement of the arm through its operating arc rotates the photodisk thereby varying the amount of light upon the photocell. This produces a voltage analogous to actual arm position which is input to the reel servo circuit on the motor control card as TAKE-UP P.C. (TP 15) and SUPPLY P.C. (TP16).

When no tape motion is commanded each arm's desired position is the center of its operating arc. The center positions are adjustable with the TUCEN and SUPCEN potentiometers R134 and R135. With the arm at the center of its operating arc the voltage at TP15 and TP16 is nominally 2.7 volts. The following paragraphs discuss the operation of the take-up reel servo circuit; the supply side is basically identical.



DESIRED ARM POSITIONS
MODEL 1740
FIGURE 7-4

It will be noted that the take-up photocell signal and the TUCEN adjustment (from -8 to -12 volts) form a voltage divider. When U27-5 is non-zero a current is supplied through resistor U24-6/9 and through the lead-lag network R133, C59, C60 to the d.c. servo amplifier summing point U27-8. This current is amplified in subsequent gain stages and applied to the take-up reel motor through relay K1. Both the take-up and the supply power amplifiers are identical to the capstan power amplifier previously discussed. The only difference is the larger values of R89, R81, R147, and R120 which cause the reel amplifiers to current limit at lower currents than the capstan amplifier.

With no capstan motion, the take-up reel motor turns, winding or unwinding the tape, until the TAKE-UP P.C. signal is such that it results in 0 volts at U27-5. A positive voltage at the power amplifier output TP14 causes the take-up reel motor to wind tape; a negative voltage causes it to unwind tape. The winding (tensioning) of tape tends to move the arm upward/rightward which increases the photocell voltage. The unwinding (slackening) of tape tends to move the arm downward/leftward which decreases the photocell voltage.

When forward or reverse tape motion is commanded an offset is added to the "center arm" current. This steady-state offset current is supplied to the summing point U27-8 through resistor U24-4/11. When forward motion is commanded the RSC signal is clamped at -6 volts, and the APC signal (sheet 3) is false, so that U27-3 (TP18) goes to +2 volts. This positive offset requires through the servo loop that U27-4's contribution to the summing point (U27-8) be negative. When the motor unwinds tape and allows the take-up arm to drop (1740), or move left (1640 and 1140), this will be achieved since TAKE-UP P.C. will become less positive and consequently U27-5 will be negative.

The distance which the arm swings away from the center position is dictated by the proportional relationship between the U24-6/9 (center)current and the U24-4/11 (offset) current. Increasing the U24-6/9 current would have the same effect as decreasing the U24-4/11 current, that is, of lessening the operating arc of the arm by decreasing the width of the swing away from the center position. The U24-6/9 current may be increased by increasing the gain of U27-4 by means of the TUARC potentiomenter R124. In order to widen the operating arc the gain of U27-4 would, of course, be decreased with TUARC.

It is desirable that the arm move smoothly to its new desired position when forward or reverse motion is first commanded. In order to achieve this an exponential component is added to the TP18 signal by the RC network containing op amp U27-12. The result is roughly constant motor current over the full transit time of the arm.

It has been noted that the signal at TP18 is +2 volts in the case of forward tape motion. This signal is inverted in U28-3 (U28-2 is 0 volts since REELS ON is true). This -2 volts at TP19 produces a current through resistor U26-4/11. Op amp U28-12 adds the transient component. When summed with the current supplied through U26-6/9 and amplified it results in the turning of the supply motor until the supply arm is in a new position such that the photocell output nulls out the arm offset voltage. This new supply arm position is opposite to that of the take-up arm.

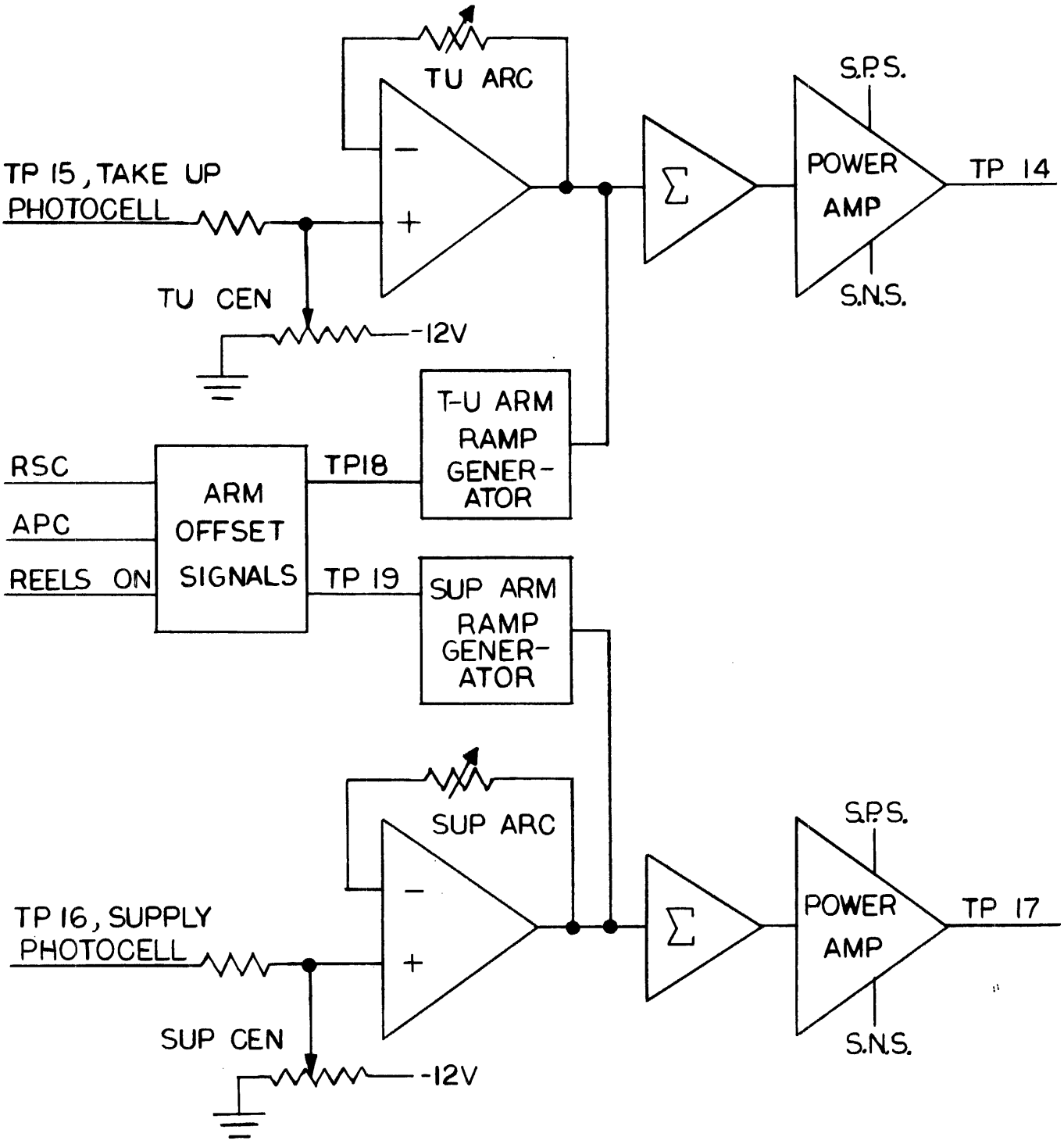


FIGURE 7-5, REEL SERVO BLOCK DIAGRAM

A reverse command has the exactly opposite effect. RSC would be +6V, TP18 would be -2 volts, and hence TP19 would be +2 volts; the take-up arm would shift up/right and the supply arm would shift down/left.

During a rewind on the 1740 the same control voltages are produced in the reel servos as in normal reverse motion. During a rewind on the 1640 or 1140 the signal APC goes true which has the effect of cancelling out the RSC signal so that almost no offset current is supplied and both arms are therefore positioned near the center of their operating arcs.

During a SET BT condition, such as a power failure or exceeding the arm limits, the motion commands are clamped low so that RSC will be 0 volts. The "arm position control" signal, APC, is true so that +1.5 volts is present at U27-2, and therefore approximately +2 volts at TP18. The signal REELS ON is also clamped false so that U28-2 is at about +2 volts, and there is therefore approximately +2 volts at TP19. Both arms are offset down/left near their mechanical stops. This same set of conditions exists during an unload operation. During unloading note that RSC is at 0 volts even though REV is true because RVS RAMP is false (sheet 3).

MOTION	RSC	APC	REELS ON	TP18	TP19
Forward	-6	0	TRUE	+2	-2
Reverse	+6	0	TRUE	-2	+2
Rewind (1740)	+6	0	TRUE	-2	+2
Rewind (1640, 1140)	+6	TRUE	TRUE	0	0
"SET BT"	0	TRUE	0	+2	+2
Unload	0	TRUE	0	+2	+2

Figure 7-6, Reel Servo Signal Levels.

7.6 RELAY CONTROL CIRCUITS. All three motors are connected to their respective amplifiers by the SERVO RELAY, K1. This relay is actuated by either REELS ON true (normal operation), or REVERSE true (unload), or CPF true(beginning of the power fail sequence). When the reel motors are not connected to their amplifiers they are connected to the arm relaxer circuit which is discussed below.

A second relay, the REWIND RELAY, is installed in the 1740 series and in the 37.5 ips 1640 series. The rewind relay K2 connects the supply reel motor return to -20 volts and the take-up reel motor return to +20 volts instead of to ground so that adequate voltage is provided for a full-speed rewind. Refer to schematic 0251640-0000 and 0251641-0000. When the K2 relay is not installed, as in the 1140 series and in the 25 ips or less 1640, the jumper U8-9/6 must be present so that APC is true during a rewind. APC causes each arm to move to the center of its arc since RVS RAMP is also true. This jumper should not be installed when the K2 relay is present.

A most important signal in the transport control logic is SET BT (schematic 0250028-0000, sheet 3) which sets the BROKEN TAPE flip-flop on the write/control card. This flip-flop in turn resets every control flip-flop in the transport. SET BT

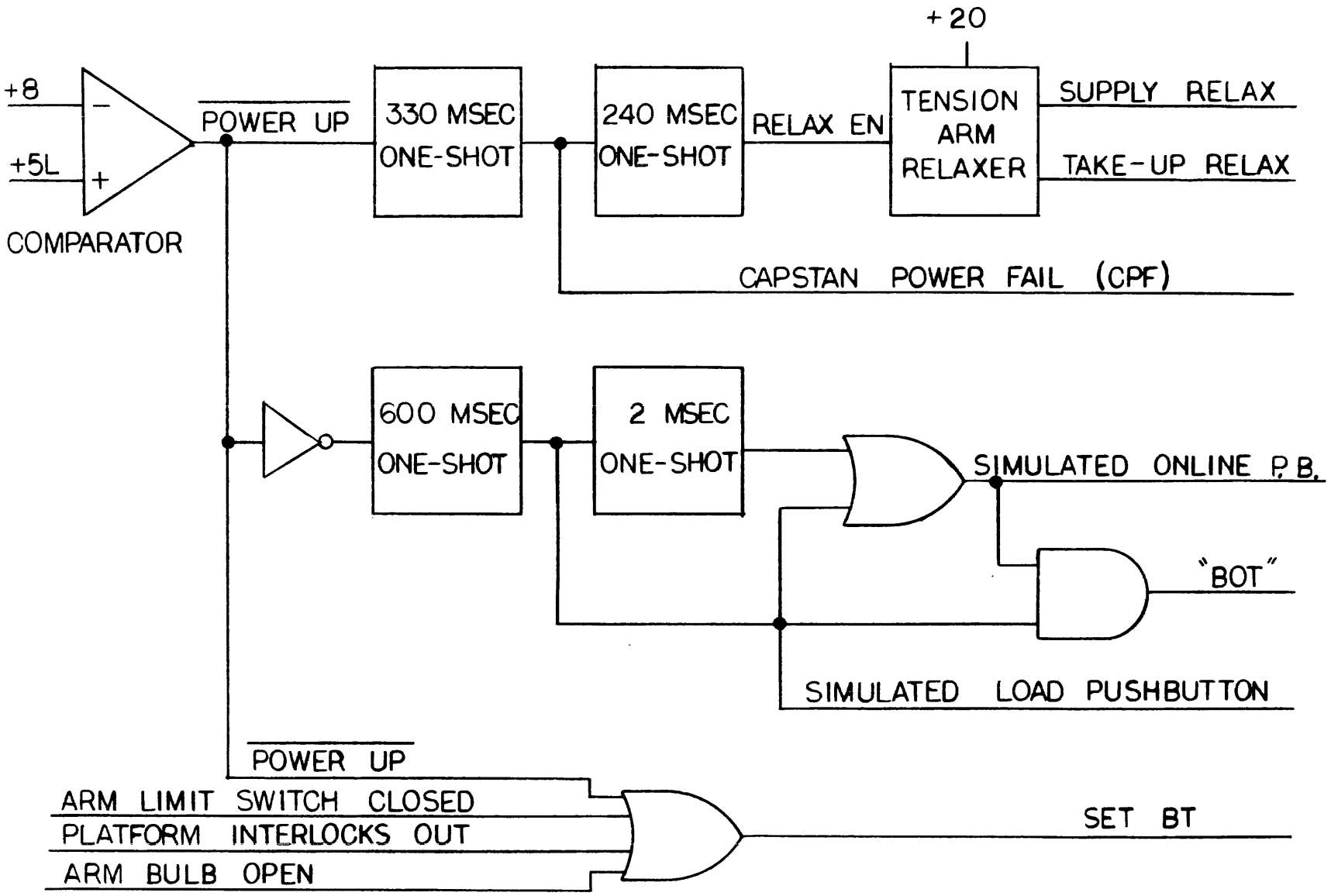


FIGURE 7-7 , BLOCK DIAGRAM , POWER FAIL AND UNATTENDED RESTART

clamps all motion commands and REELS ON low thereby making APC true so that the capstan stops the tape and the reel servos position the arms near their mechanical stops. Four different circumstances may cause the signal SET BT to go true (U20-3).

SET BT will go true if either of the bulbs in the arm photocell servo assembly burns open. These two lamps are connected in series on the +12 volt supply. When no current is drawn by them the comparator U23-14 switches low. SET BT will also go true if the arm limit switch is closed. This happens when the supply arm swings beyond its normal operating limits due to excessive or inadequate tape tension. In this way the tape is protected from electrical failure in the reel servo circuits. SET BT is true also if the platforms U26,U24, and U8 are not installed.

SET BT is also generated by POWER UP false. The POWER UP signal is the output of voltage comparator U23-1 (schematic 0250028-0000, sheet 7) which monitors the +8 volt raw dc supply using the +5L regulated supply as a reference. In the event of power loss the raw +8 volts decays rapidly, however, the +5L stays within regulation for at least one second longer. When the raw +8 volts goes below the +5L U23-1 switches high making POWER UP false and consequently making SET BT true.

When SET BT goes high the signal REVERSE+REELS ON (U17-6) goes low triggering the one-shot U22-5 whose 330 millisecond output pulse is called CPF. The trailing edge of CPF triggers a second one-shot U22-9 whose output is called RELAX EN. Note that these U22 one-shots operate only when the SET BT is due to a power loss; both are held clear by the other SET BT conditions.

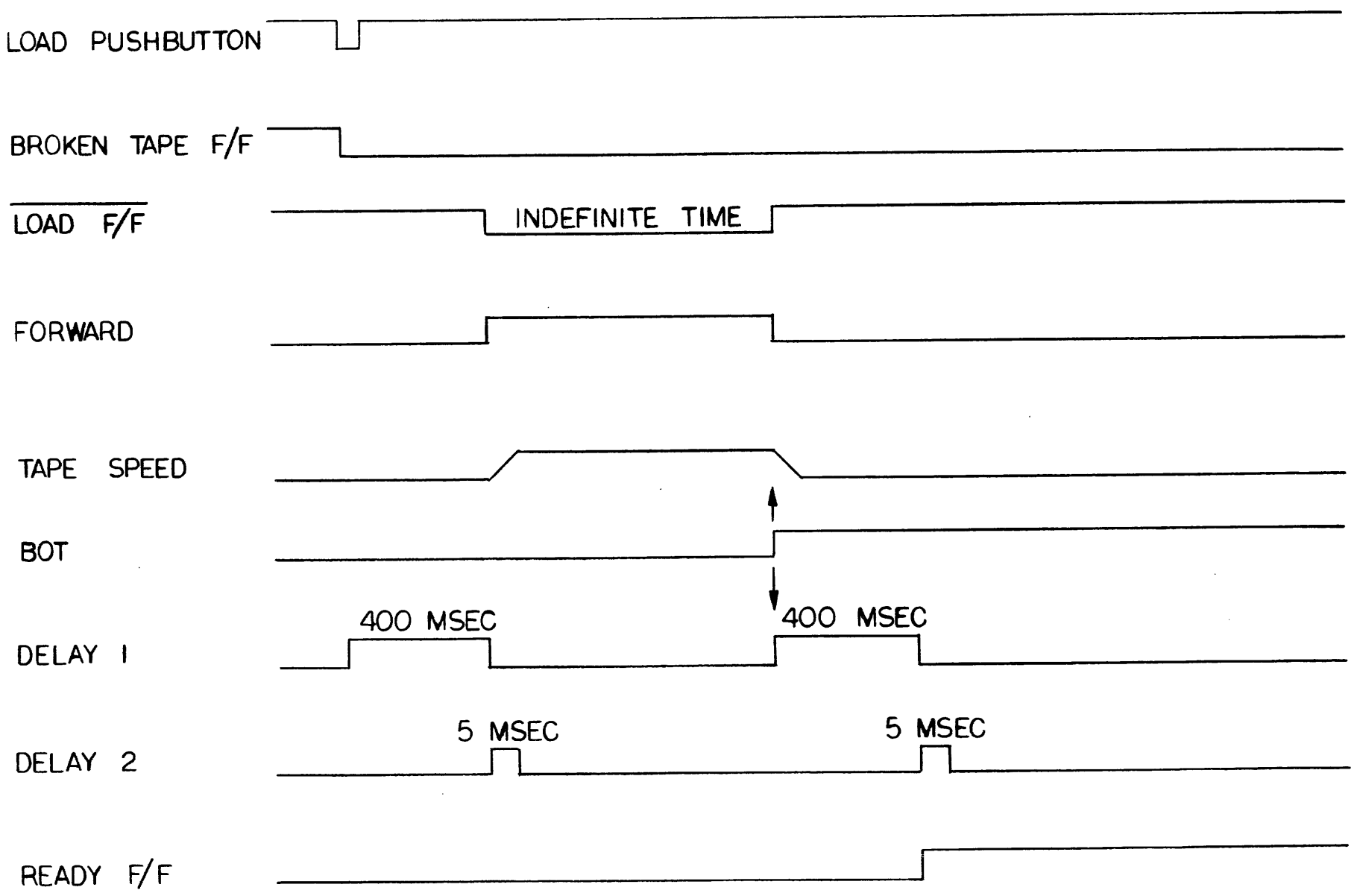
The CPF pulse serves two purposes: it keeps the servo relay K1 actuated so that all three motors remain connected to their respective amplifiers, and it produces forward capstan motion (sheet 3) by applying a small voltage to the capstan ramp generator. At the trailing edge of CPF the servo relay is released and the reel motors are connected to the arm relaxer circuit instead (sheet 7). With no motor current the arms accelerate toward their mechanical stops due to spring tension. Meanwhile the RELAX EN pulse charges C36 (sheet 7) to the voltage permitted by the zener diode CR29. Transistor Q34 acts as an emitter follower to bias on the two Darlington pairs Q33/Q12 and Q35/Q13 whose collectors are now connected to the reel motor windings since K1 is no longer energized. The current supplied to the motors as a result of the conduction of the Darlingtons opposes the action of the tension spring so that the arms only gently strike their stops. Following the trailing edge of RELAX EN C36 discharges through R101 providing enough motor current so that tape tension smoothly decreases to zero and no slackness appears.

7.7 RESTART OPTION. Many installations suffer frequent or infrequent power outages. The restart option provides a means of bringing the transport back on line without operator intervention following the restoration of power. It will be remembered from paragraph 7.6 that due to the power fail sequence the tape on a Digi-Data transport remains properly threaded with no slackness. The restart sequence simulates a load operation with the tape already supposedly located at BOT.

This option may be configured in one of two ways (schematic 0250028-0000, sheet 3). With jumpers U7-3/14 and U7-4/13 installed the restart sequence occurs when power is restored to the transport. With jumpers U7-1/16 and U7-8/9 installed the re-

LOAD SEQUENCE TIMING DIAGRAM

FIGURE 7-8



start sequence is initiated by selecting the transport and then pulsing low the I/O line ROL.

In either case the sequence begins with the triggering of the 600 millisecond one-shot U4-13 which simulates the simultaneous pressing of the LOAD and ON LINE pushbutton switches. This creates a false BOT indication (schematic 0251322-0000, sheet 3A) so that tension is applied to the tape but the forward searching motion is not begun. The trailing edge of this first one-shot triggers a two millisecond one-shot U4-5 which simulates the make-break switch action required to toggle the ON LINE flip-flop. At the end of this pulse the ON LINE and READY indications are true at the I/O.

NOTE

When a transport is equipped with the restart option configured to operate upon power restoration normal loading of the tape should be done after the POWER switch is turned on in order to avoid false indications to the controller.

7.8 MOTION CONTROL LOGIC. The circuit descriptions which follow refer to schematic 0251322-0000, sheets 2 and 3.

7.8.1 BOT/EOT DETECTION. Light from an infrared LED is reflected toward either the "beginning of tape" or "end of tape" photoelectric sensor by the respective marker on tape. When BOT is sensed $\overline{\text{BOT SENSE}}$ (TP15) goes low and comparator U75-13 (sheet 3A) indicates BOT true. Note that U78-10 allows the operator or the restart circuitry to generate BOT by pressing the LOAD and ON LINE pushbuttons simultaneously.

When no tape is loaded, light is reflected to both photocells by the reflective surface on the head cover; BOT and EOT are AND'd (U80-1, sheet 2) to set the broken tape (BT) flip-flop.

Note that EOT is normally latched (U73-9) so that the I/O status line will remain true after the marker has been passed. LEOT is cleared only by rewinding or by reverse tape motion past the marker.

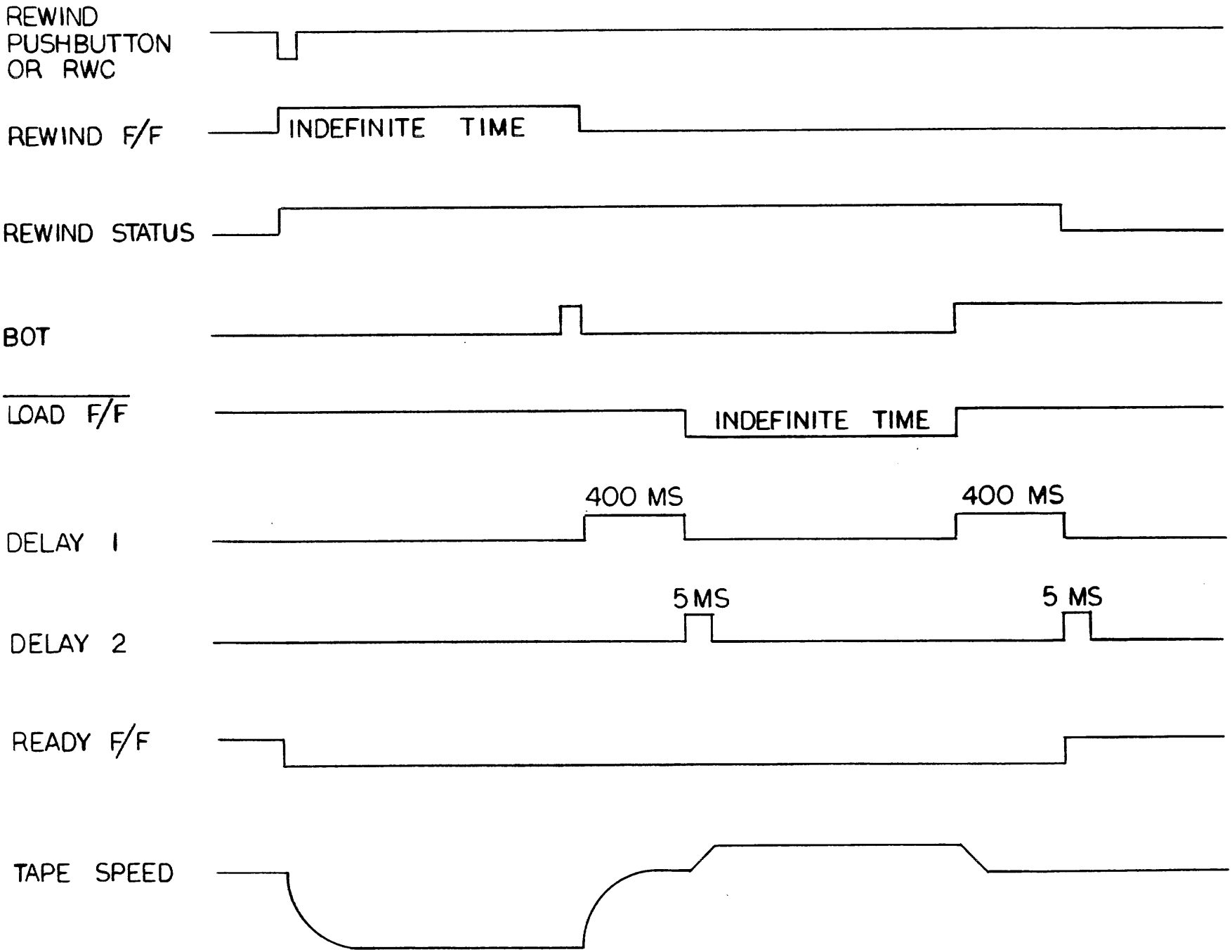
7.8.2 LOAD SEQUENCE. When the transport is powered up the BT flip-flop is set. BT in turn clears all the other control flip-flops (sheet 2) and makes REELS ON false. The BT flip-flop can be cleared only by pressing the LOAD pushbutton, either physically or electrically. When BT goes false REELS ON comes true energizing the SERVO RELAY which connects all three motors to their servo amplifiers. The arms move to their center positions as tension is applied to the tape. The arm limit switch cannot create SET BT while the LOAD pushbutton is depressed (and shortly thereafter); this allows the supply arm time to travel into its normal operating arc.

When BT is cleared DELAY 1 is triggered (sheet 3A). The trailing edge of this 400 millisecond pulse (TP13) triggers DELAY 2. This 5 millisecond pulse (TP14) resets the $\overline{\text{LOAD}}$ flip-flop (U55-13, sheet 2) which makes FWD true so that the capstan now moves the tape forward. When the BOT marker is eventually sensed the $\overline{\text{LOAD}}$ flip-flop is set and tape motion ceases.

The setting of $\overline{\text{LOAD}}$ triggers DELAY 1 which subsequently triggers DELAY 2 which sets the READY flip-flop (U57-7) since BOT is now true.

REWIND SEQUENCE TIMING DIAGRAM

FIGURE 7-9



7.8.3 ON LINE OPERATION. In order to operate the transport under remote control the I/O signal RDY must be true; internally this status indication is called ARM I/O (U65-6). In order for ARM I/O to be true the transport must be a) selected,b) ON LINE, c) loaded with tape, i.e., the READY flip-flop set, and d) not rewinding.

The transport is selected (sheet 3B) by holding the proper SLT line low. Which SLT line is appropriate for a given transport is a function of which plug jumper is installed, or optionally, what the setting of the UNIT SELECT thumbwheel switch is. Refer to paragraph 6.3.1.

Each time the ON LINE pushbutton is pressed the ON LINE flip-flop (sheet 3B) is clocked, alternately placing the transport on line or off line. The ON LINE pushbutton may be "pressed" electrically by means of the I/O signal ROL. The ON LINE flip-flop may be directly cleared by pressing the REWIND pushbutton or by pulsing low the I/O signal OFFC, i.e., off line command. The ON LINE indicator lamp is illuminated only when the transport is on line.

The load sequence which ends in the setting of the READY flip-flop has already been discussed. The last requirement for ARM I/O, that of not rewinding, is discussed below. ARM I/O gates all the motion commands (SFC, SRC, and RWC) as well as the tape status indicators (LDP, EOT, and FPT). It also gates the read data outputs (RDO-7, P) and the write data strobe input (WDS).

When the transport is off line the three-position service switch, located on the write/control card, may be used to command forward or reverse tape motion to the capstan servo circuit. The center NORM position is off.

7.8.4 REWIND SEQUENCE. A rewind operation may be initiated either by pressing the RWD pushbutton or by pulsing low the I/O line RWC. Either action results in the setting of the RWD flip-flop (U55-4, sheet 2). RWD also sets the rewind status flip-flop (U57-9) thereby making ARM I/O and RDY false.

Eventually the BOT marker is sensed. The trailing edge of BOT triggers DELAY 1 (TP13, sheet 3A) which resets the RWD flip-flop so that the tape decelerates. The trailing edge of DELAY 1 triggers DELAY 2 (TP14) which starts the load sequence by resetting the $\overline{\text{LOAD}}$ flip-flop. When the load sequence is completed the READY flip-flop is set and the rewind status (RWD ST) flip-flop is reset.

Note that the I/O signal RWD (based upon RWD ST) is true until the entire load-after-rewind sequence is complete. The RWD indicator lamp, on the other hand, is true only while RWD (U55-4) is set. If the rewind operation was initiated by means of the RWC signal, rather than with the pushbutton switch, the transport will still be ON LINE and RDY will come true again.

7.8.5 UNLOAD SEQUENCE. Unloading of the tape may be initiated by the operator in either of two ways: a) pressing the RWD pushbutton switch while the tape is located at BOT, or b) pressing the RWD pushbutton switch while a rewind operation is in progress.

In the first instance BOT and LOC RWD are AND'd (U64-11) to set the UNLOAD flip-flop (U57-4). Note that when UNLOAD is set the RWD flip-flop is reset. In the second instance the "automatic unload" flip-flop (U73-5) is set and when the rewind sequence is complete UNLOAD will be set via U49-12 to automatically initiate unloading. Typical operator practice is to press RWD once for rewinding alone and twice for rewinding and automatic unloading.

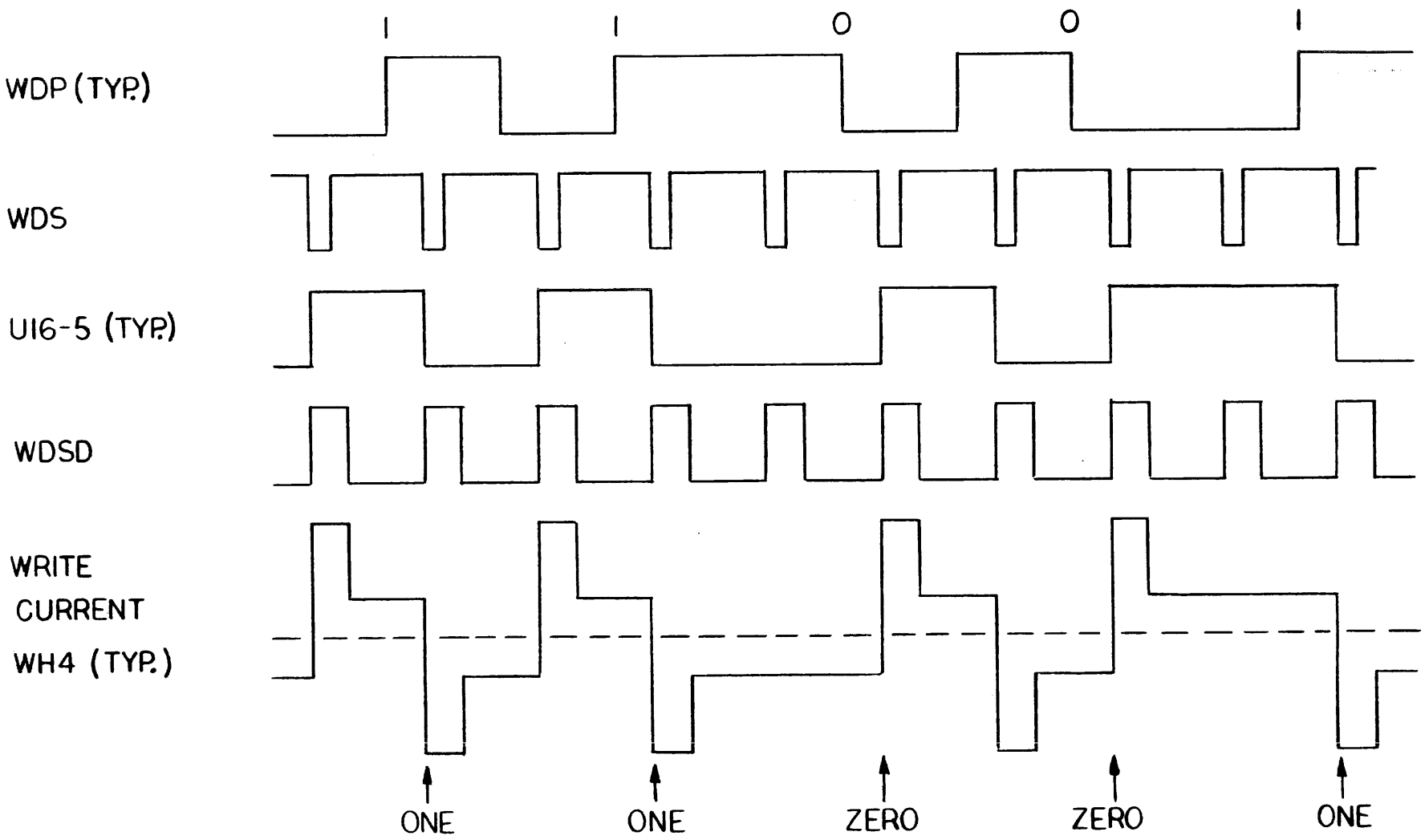


FIGURE 7-10 , PHASE ENCODED WRITE WAVEFORMS

UNLOAD makes REELS ON false and REV true. REV keeps the SERVO RELAY energized. REELS ON false makes APC true (schematic 0250028-0000, sheet 3) so that the tape-buffering arms both move to a position near their stops. Although REV is true, RVS RAMP is not, so the capstan servo produces only the low speed reverse motion previously described in paragraph 7.4. Tape motion terminates when tape tension is lost since the arm limit switch produces SET BT which drops out K1.

7.9 WRITE CIRCUITS. The first requirement for a write operation is that the reel of tape mounted on the supply hub contain a write enable ring. The presence of this ring is detected by a microswitch which rides on a plunger which protrudes through the transport front plate near the supply hub. The +12 volts required for the write head windings is routed through this microswitch. When the switch is closed due to the plunger being pushed back by the ring the signal SWITCHED +12 biases on Q1 (schematic 0251322-0000, sheet 5A) creating $\overline{\text{RING IN}}$, and, when the load operation begins, $\overline{\text{SOL ON}}$. The leading edge of $\overline{\text{SOL ON}}$ triggers one-shot U2-3 on the motor control card (schematic 0250028-0000, sheet 7) which turns on "pull-in" transistor Q19 to retract the file protect plunger so that it does not scrape against the ring during subsequent tape motions. The "hold-in" transistor Q18, biased on by $\overline{\text{SOL ON}}$, keeps the plunger retracted after Q19 turns off.

0251744-0000 WRITE CTRL SHT 5A

SWITCHED +12 goes to the write head commons through the "write power switch" (Darlington Q3/Q4) which is controlled by the signal $\overline{\text{WRITE MODE}}$ Note that any time that write power is available the erase head is active. The $\overline{\text{WRITE MODE}}$ flip-flop holds the level of the "set write status" input at the time the last tape motion was begun. The formatter initiates a write operation by making SWS a true level for at least 20 microseconds after the false-to-true transition of either the forward (SFC) or reverse (SRC) motion command. SFC and SRC are gated with ARM I/O and then OR'd to trigger the U51-5 delay (schematic 0251322-0000, sheet 5A). The trailing edge of this one-shot triggers a second one-shot U51-13 which clocks the $\overline{\text{WRITE MODE}}$ flip-flop. WRITE MODE will be true if SWS was true, provided none of the direct clears is present. The $\overline{\text{WRITE MODE}}$ flip-flop cannot be reset if the transport is off line, is rewinding, or is loaded with a tape reel containing no write enable ring.

The nine write channels are diagrammed on schematic 0251322-0000, sheets 5B and 6. The following discussion refers to only channel P; the remaining eight channels are identical in their operation.

It will be remembered that NRZI tapes are encoded so that a "one" is signified by a flux reversal in a bit position, and a "zero" by no flux reversal in a bit position. The direction of any reversal carries no meaning, only its presence or absence is significant.

The direction of current through each write head winding is controlled by the complementary outputs of the write register. When a write operation first begins the entire write register (U16-5, etc.) is in the reset state so that a ground is provided opposite the write power through each WH- winding. When writing NRZI tapes the signal PE is false and U15-8 is always high. This provides a parallel current path increasing the current through the head winding. When writing PE tapes U15-8 is low, so that less current is drawn through the winding, except that when a transition occurs, the parallel paths to ground are switched in for the duration of WDSD.

If the first bit to be written is a NRZI "one" the input signal WDP would go low and the J and K inputs of U16 would both go high. When clocked by WCLK, a gated

version of WDS, the flip-flop will toggle so that U41-3 and U32-3 go high and U41-5 and U32-5 go low. Write current will now be drawn through the WH4+ winding, and the direction of tape magnetization will be reversed. A second "one" would toggle the flip-flop back to the reset state, a third "one" to set, and so forth.

When writing a NRZI "zero", WDP is high and the J and K inputs are both low so that the flip-flop will not change states at WCLK time.

When phase encoded tapes are written these circuits are operated in a slightly different fashion. In phase encoding the direction of each flux reversal carries significance: a change into the direction of gap erasure is a "one", a change out of the direction of gap erasure is a "zero". These definitions demand that a non-data transition occur in between any two data transitions of the same meaning, e.g., to write two "ones" in a row an intervening non-data "zero" transition is required. For this reason two WDS's are provided by the formatter per each tape character to be written.

The X-OR U7-6 now functions so that the J and K inputs of the write register are always at opposite levels; the register is operated in a set/reset fashion rather than in the NRZI's toggle/no toggle fashion. Since the signal PE is true the D-latches which serve as transition detectors now come into play. The X-OR U7-3 compares the new level of WDP with the level that was present before the last WDS(WCLK). When U14-15 is set the WDSD pulse is gated through U15-11 and U15-8 so that current is added through the head winding for the duration of WDSD.

WDSD (sheet 5A) is the output of a one-shot U9-6 triggered from the leading edge of each WCLK. The purpose of this signal is to add extra current to the write head winding at the time of each transition. At the trailing edge of WDSD the write current is reduced to its PE reference level. Writing PE tapes in this manner prevents peak shifting in the PE read circuits since each transition is clearly defined. In the case of no phase transition (e.g., a data "one" following a data "zero") the reset state of U14-15 prevents WDSD from adding current through the winding. Typical write waveforms are shown in figure 7-10.

At the end of each data block the formatter issues the "write amplifier reset" pulse (WARS). WARS via $\overline{\text{WR RES}}$ direct clears the entire write register. When operating in the NRZI mode those channels which had recorded an odd number of "ones" in that block would change states once more creating another "one" on tape. Resetting the write register therefore automatically generates an even longitudinal parity check by writing the LRCC on tape.

7.10 READ CIRCUITS. The read circuits are located primarily on the second p.c. card in the transport; however a small portion of these circuits is located on the write/control card.

7.10.1 READ THRESHOLDS. Since the 40-series transport is equipped with a dual gap (read-after-write) head the high read threshold command RTH1 is not required. Instead high threshold ($\overline{\text{HT}}$) is selected whenever WRITE MODE is true. WRITE MODE forces normal threshold ($\overline{\text{NT}}$) false. The low threshold command RTH2 also makes $\overline{\text{NT}}$ false. Refer to schematic 0251322-0000, sheet 4. The $\overline{\text{NT}}$ and $\overline{\text{HT}}$ signals are used on the read card (schematic 0251741-0000, sheet 2) to develop six separate threshold voltages, three for NRZI and three for phase encoding. See figure 7-11.

Also derived on the write/control card are two read enable signals: $\overline{\text{PE READ EN}}$ and NRZI READ EN which are derived from ARM I/O as a function of the density selected. When $\overline{\text{PE READ EN}}$ is true the NRZI TV is raised to almost +6V so that

the NRZI read circuit activity cannot feed noise into the PE read circuits.

THRESHOLD	WRITE MODE	RTH2	$\overline{NT}$	$\overline{HT}$	P.E. TV (TP4)	NRZI TV (TP3)
High	HI	X	HI	LO	+4.9V	+2.3V
Normal	LO	HI	LO	HI	+1.5V	+0.87V
Low	LO	LO	HI	HI	+1.1V	+0.38V

Figure 7-11, Read Threshold Levels

7.10.2 READ PREAMPLIFIER. As the magnetic tape moves across the read stack, small currents are induced in each head winding. These currents, and the voltage waveforms associated with them, correspond to the magnetic flux direction and changes in each track on tape. The signal across each winding is applied to the inputs of a differential amplifier (U101, etc., schematic 0251741-0000, sheet 3). These amplifiers have individual gain adjustments (R108, etc.) to compensate for track-to-track variations in the head windings; associated passive filters control bandwidth for maximum noise immunity.

Inasmuch as the recovery of NRZI data from this amplified head signal requires different techniques than the recovery of phase encoded data the balance of the read circuits are discussed in two separate paragraphs which follow.

7.10.3 NRZI READ CIRCUITS. The amplified head signal is full-wave rectified (TP103, etc.) and clipped below the NRZI threshold voltage. Positive peaks, which correspond to changes in the direction of magnetic flux on tape, are detected. The peak detector output (Q102, etc.) is a pulse of fixed duration and is independent of input signal amplitude.

When a peak is detected in a channel the appropriate read deskewing flip-flop is set (sheet 4) to indicate the reading of a "one". As soon as the first "one" in a character is read the $\overline{\text{SKEW GATE ENABLE}}$ bus is pulled down through an isolating diode (CR109, etc.).

$\overline{\text{SKEW GATE ENABLE}}$ (sheet 3) triggers one of the two SKEW GATE one-shots. U4-5 (TP6) operates for high density, U3-6 (TP5) for low density. The width of each output pulse is adjustable with a 50K potentiometer; the desired pulse width is about one-third character period. The SKEW GATE allows time for all the channels to arrive. Its trailing edge triggers the read data strobe one-shot U3-13 whose output is gated with NRZI READ EN and then buffered on the write/control card to form the I/O signal RDS which the mag tape formatter uses to sample the read data outputs (RDØ-7, P). The read data outputs are simply the states of the read deskewing register (sheet 4) gated by the NRZI READ EN and buffered on the write/control card (U67, U59). Those channels which have not detected "ones" are assumed to be "zeroes". Generally all bits in a character arrive within 15% of the character period.

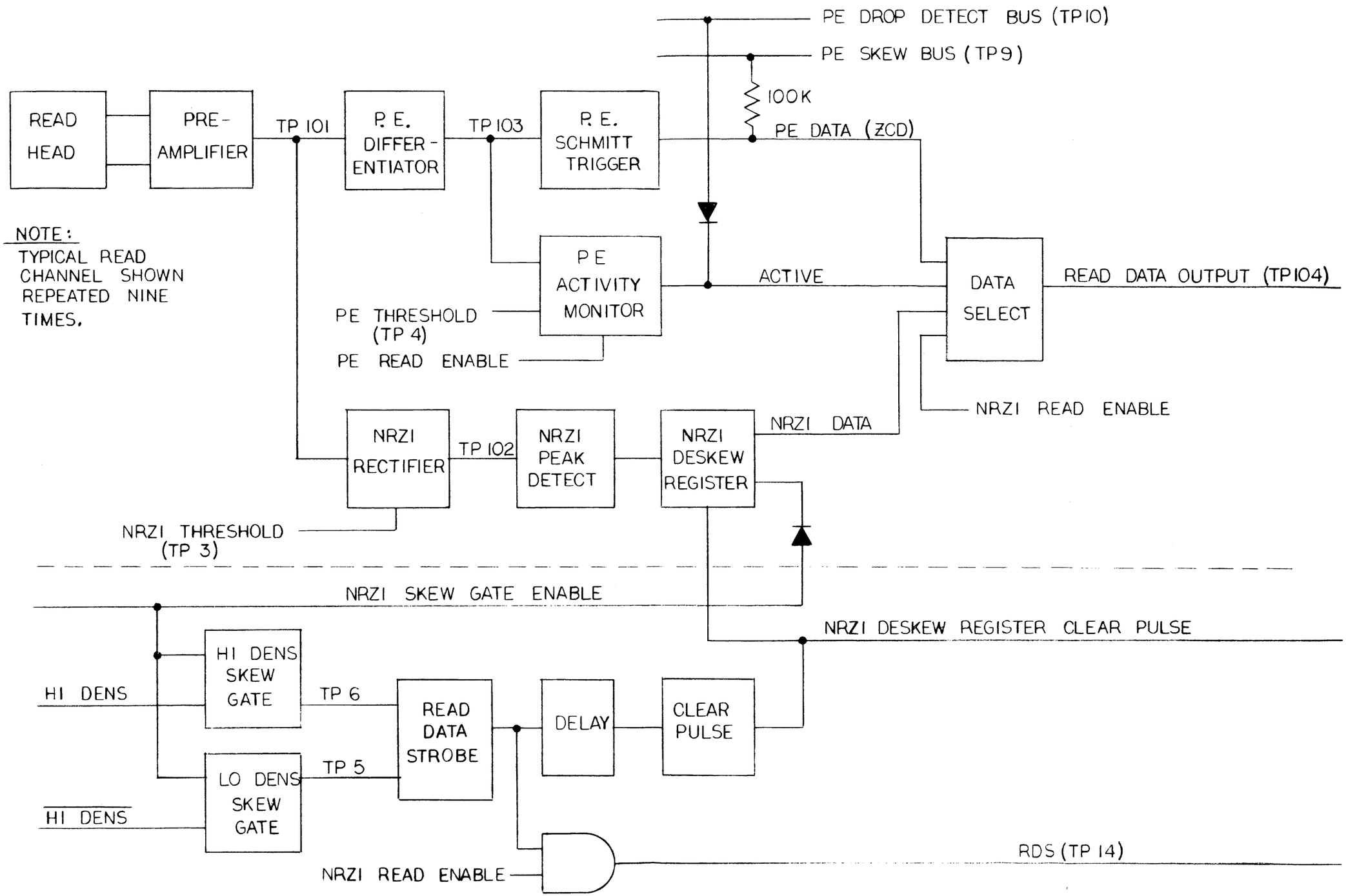
On the trailing edge of RDS the delay U2-5 is triggered after which a $\overline{\text{CLEAR}}$ pulse (TP13) is generated to clear the read register in anticipation of the next character's arrival.

7.10.4 PHASE ENCODED READ CIRCUITS. In the PE mode the read head signal is amplified by the same differential amplifier as is utilized in the NRZI mode. Because the flux reversals on phase encoded tape vary between 312 and 625 micro-inches apart as a function of the data pattern the induced head signal has varying amplitude. Equalization of the amplified head signal is achieved in a differentiating circuit (U102 and TP102, etc.). A ninety degree phase lead is also effected. Next a Schmitt trigger circuit (U105, etc) used as a zero crossing detector squares up the read signal which is now identical in time to the actual bit pattern on tape.

Each PE channel output (ZCD) is gated with an activity monitor ACTIVE to insure its validity, and is then buffered on the write/control card and presented as RDØ-7, P on the I/O connector. The Schmitt trigger outputs of all nine channels are also tied together through 100K resistors to provide a PE SKEW test point (TP9, sheet 4). This signal is also present when reading NRZI tapes with a PE/NRZI unit.

The ACTIVE signal in each channel is derived from the PE threshold discrimination circuit; this circuit incorporates a time lag of 3 1/2 character periods for turn on and two character periods for turn off, so that not only signal amplitude but also signal duration is verified. The first stage is a Schmitt trigger (U104,etc.) whose threshold voltage may be varied with the signal PE TV previously discussed in paragraph 7.10.1. Positive peaks from the differentiator (U102, etc.) which exceed threshold cause U104-6 to pulse negative placing a -3.5 volt charge on C123 through CR107. This turns Q103 off enabling C124 to charge toward +12 volts through R140. Approximately 3 1/2 consecutive valid bits are required before Q104 has sufficient bias to make ACTIVE high.

When the differentiator output falls below the threshold C123 charges toward +12 volts through R139. If this situation persists for two character periods Q103 will forward bias and turn on discharging C124 and turning off Q104 making ACTIVE false. Note that Q103 and Q104 cannot operate unless PE RE (a +12 volt signal) is true. The ACTIVE signals in all nine channels are tied together through isolating diodes so that when ACTIVE is false in any channel the DROP DET bus (TP10) is low.



NRZI READ TIMING CHAIN

FIGURE 7-12
READ BLOCK DIAGRAM

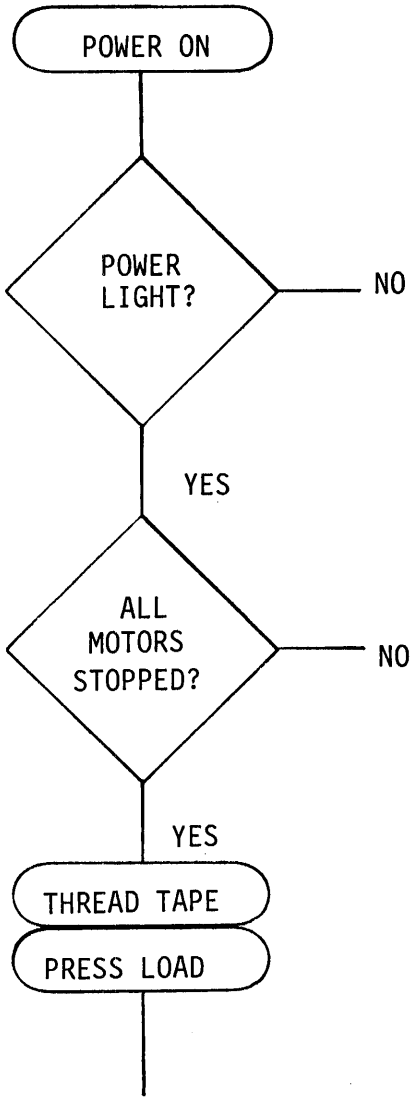
8 - TROUBLESHOOTING

8.1 INTRODUCTION. This section aids the field maintenance engineer in isolating transport malfunctions to a particular component or circuit; it includes a problem isolation flow chart, a description of the service switch, and an explanation of one particularly useful technique for troubleshooting the motor control circuits.

The problems identified in the flow chart are not in strict sequential order, but generally one must correct tape movement problems before tackling write or read errors as is shown. Many seemingly sophisticated problems may be solved by performing the adjustments and alignments described in section 10 of this manual.

Upon isolating a difficulty refer to sections 9 and/or 10 to correct the problem. Refer to section 7, as required, for a description of the operation of any particular circuit in view.

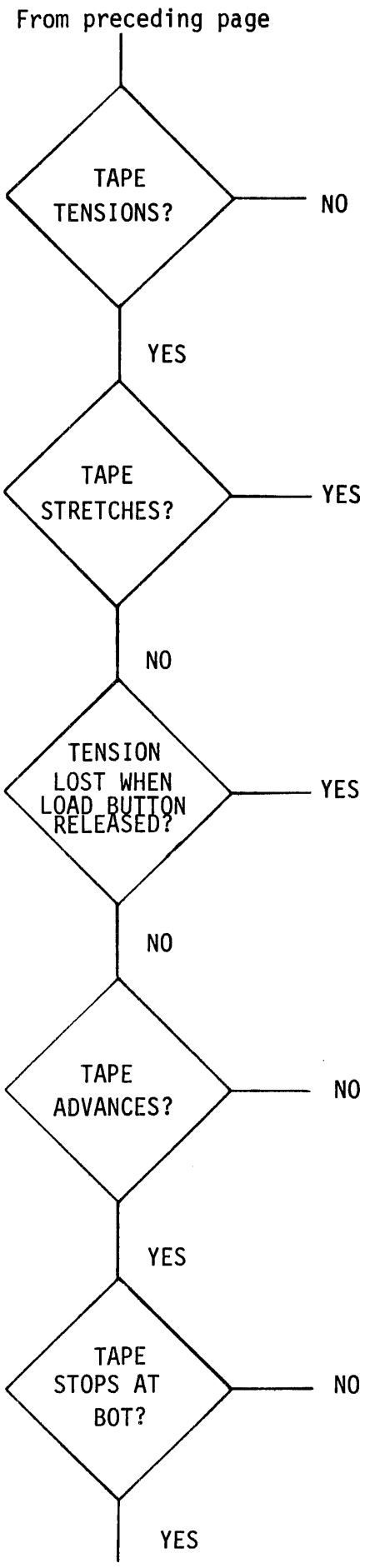
8.2 PROBLEM ISOLATION FLOW CHART.



Check line fuse, +5V output, +8V output, Lamp.

Rewind true (i.e. K2 energized, J1-17)? Tension arm relaxer (J1-16,M)? K1 energized (J1-18)?

To next page



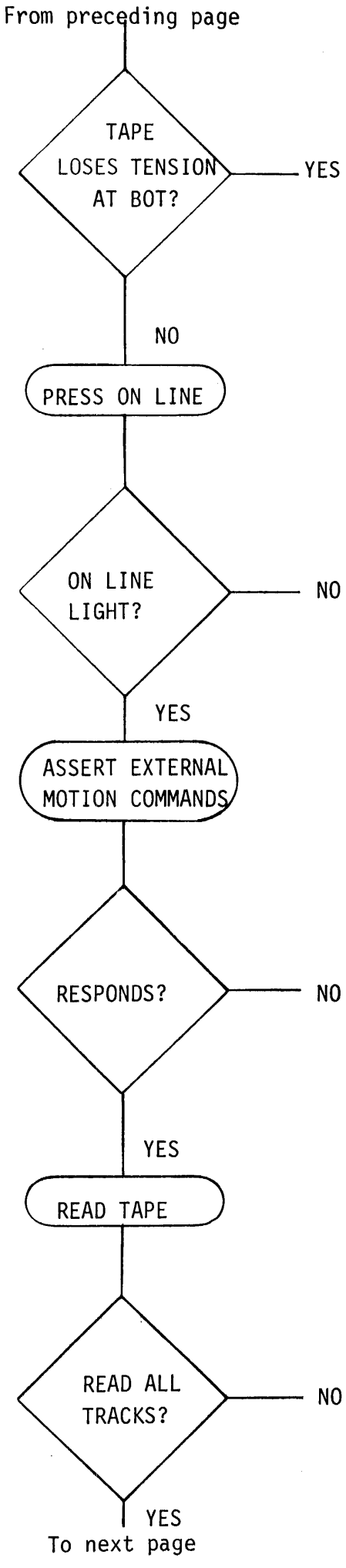
See discussion #1.
Possibilities include:
- BOT/EOT Adjustment
- LOAD button, BT F/F
- K1 Relay, Arm Servo Lamp open
- Platform out of Motor Control Card

See discussion #2.
Possibilities include:
- Negative power supply
- Arm photocells (TP15, TP16)
- +5L supply
- K2 relay, rewind
- Reel servo amplifiers

Is BT being set again?
BOT/EOT warm-up.
Arm limit switch
Incorrect arm adjustments

See discussion #3.
Possibilities include:
- LOAD F/F
- Forward command
- BOT always sensed
- Capstan servo circuits
- Service switch

Sensing BOT should reset the LOAD F/F.
Service switch



Is BT set because EOT is always true?

Check lamp drivers,
ONL F/F toggling action.
Is last unit on daisy-chain powered up?

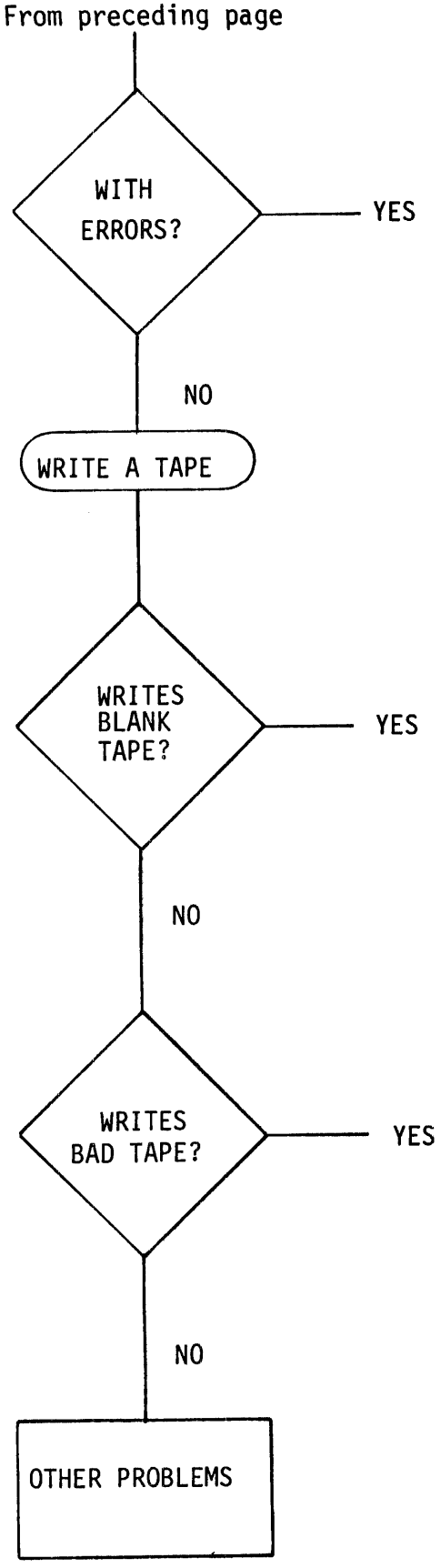
Cables installed properly?
READY true?
Unit SELECTED?

Review interface requirements.
Go OFF LINE, use service switch.

NOTE: When read data is absent most controllers will search for 25 feet or so then stop tape motion.

Discussion #4
Possibilities include:

- Tape path wrong
- Read channels
- Threshold
- Head continuity.
- RDS chain (NRZI only)
- Density selection and read enables



Discussion #5
Possibilities include:
- Thresholds
- Capstan speed and ramps
- Excessive skew
- Crossfeed from the write head
- Read gain adjustments
- Motor brush noise
- Dirt

Write enable ring
RING IN switch and solenoid.
Write power present?
WDS input.
Trace signal paths.

Discussion #6
Possibilities include:
- Erase head
- Capstan speed and ramps
- WARS input
- Skew excessive
- WDS frequency wrong

Other problems:

1) Loss of tape tension during normal operations or during rewind indicates probable mal-adjustment of arm positions.

Discussion #1. The LOAD pushbutton should reset the BT F/F causing the signal REELS ON (P1-W) to go high. REELS ON should activate the K1 relay (P1-18 low) to connect all three motors to their servo amplifiers. Work your way through this sequence. Remember that (BOT·EOT) will prevent the resetting of BT, so check their adjustment. Also an open arm servo lamp or missing motor control card platform will hold BT true. Hold the LOAD pushbutton down when troubleshooting or hold the take-up arm within its operating arc, otherwise SET BT will be generated by the arm limit switch.

Discussion #2. The reel motors in all three models are connected to their servo amplifiers in such a way that a positive amplifier output causes the motor to wind tape onto its reel and a negative voltage causes it to unwind tape from its reel. Therefore, when an unrestrained positive voltage is output from an amplifier, tape will attempt to stretch until the supply arm trips the arm limit switch. If the field engineer holds the LOAD pushbutton down, thereby overriding the arm limit switch, the tape will eventually separate. Refer to paragraph 8.4 to operate the transport without tape loaded.

Possible causes of a continual positive voltage being applied to a motor are,

1) No photocell input to the reel servo at TP15 or TP16 because the photocell is defective, or the +5L supply is defective.

2) No negative supply voltages.

3) One or the other amplifier is defective. Compare TP17 with U28-10, and TP14 with U27-10. Check the power transistors on the heat sink for emitter-collector shorts. After replacing a defective transistor check all associated transistors with an ohmmeter before applying power again.

Possibilities 1 and 2 affect both reel motors; the third possibility would usually affect only one.

A problem in the rewind circuit can also give the appearance of stretching tape, particularly on the transports which employ the K2 relay to switch a greater potential across the motor windings.

	SERVO AMP OUTPUT	REEL/TAPE ACTION	1140, 1640 REEL TURNS	1740 REEL TURNS
SUPPLY	Positive	Winding	CCW	CCW
SUPPLY	Negative	Unwinding	CW	CW
TAKE-UP	Positive	Winding	CCW	CW
TAKE-UP	Negative	Unwinding	CW	CCW

Figure 8-1, EXPECTED REEL ACTION

Discussion #3. The resetting of BT starts a 400 msec one-shot which triggers a 5 msec one-shot on its trailing edge, which sets the LOAD F/F, which makes FORWARD true at P1-2. Look for -6 volts at TP12, a positive signal at TP4, a positive signal at TP8, and a positive signal at K1-6, to quickly isolate the problem within the capstan servo circuit.

Discussion #4. If the transport fails to read in all tracks check the tape path particularly at the tape guide after the head. In dual density units check the signals NRZI READ ENABLE, PE READ ENABLE, and the DENSITY selection. In NRZI units check the timing chain which generates the RDS; check the threshold against the voltages in figure 7-11.

In individual tracks, check the numerous test points for read data moving back toward the head. With power off, check continuity from ground to each of the eighteen (fourteen) read amplifier inputs.

Disucssion #5. Before attempting any other corrective measures ensure that the head and guides are clean and that the tape is of good quality. Check tape speed and start/stop ramps per paragraph 10.3.3. Check skew per paragraph 10.10.1 Adjust the read amplifier gain potentiometers per paragraph 10.8. Verify that threshold level is correct. If the problem occurs only during read-after-write perform the cross-feed minimization procedure in paragraph 10.9. To determine if the problem is a noisy motor brush read a bulk-erased tape while monitoring the RDS or any channel.

Discussion #6. Check the write signal at the head in all tracks while writing "all ones". If the unit writes tapes which it can read but other systems cannot, the problem is most likely excessive skew (paragraph 10.10) or improper tape speed (paragraph 10.3). Other items to check are,

1. WDS input is being provided at proper frequency.
2. Data is stable for duration of each WDS.
3. The WARS is being provided.
4. The erase head is energized. Voltage drop should be 0.5 volts.

8.3 SERVICE SWITCH. Located on the write/control card is a three-position slide switch for use by the maintenance engineer. With this service switch in the FORWARD position, and the transport OFF LINE, a continual forward motion command is asserted to the capstan servo circuitry. In the REVERSE position a reverse motion command is asserted. This reverse command is not disabled by the detection of BOT, so attention is required to avoid running tape entirely from either reel. When not in use the switch should always be returned to the normal position. This switch is inoperable with the transport ON LINE.

8.4 TROUBLESHOOTING WITHOUT TAPE LOADED. The troubleshooting technique described below allows the field maintenance engineer to rapidly isolate a malfunction using only the operator's control panel and the service switch.

a) Disable the "set BT" conditions. Place a small piece of magnetic tape between the two elements of the BOT/EOT sensor assembly, so that the BROKEN TAPE F/F is not held set. Use a rubber band or write enable ring between the arm roller and stationary roller to hold the take-up arm off its stop, so that the arm limit switch does not produce the SET BT signal.

b) Initiate the load sequence. Press and release the LOAD pushbutton. Observe that both reel motors begin to spin and that about half a second later the capstan starts to turn CCW. This indicates that the LOAD pushbutton has reset BT thereby generating the REELS ON signal which activated the K1 relay to connect all three

motors to their amplifiers. The movement of the capstan suggests that the one-shot delays, the LOAD F/F, and the capstan servo are all functioning.

c) Check the reel servo's. The LOAD F/F is producing a forward motion command. With your hand move the take-up arm off its stop. As you pass over the first dimple (on the front plate) the take-up reel motor should stop and reverse direction. The null point for the supply arm will be near the second dimple at the opposite end of the arc. These are the desired arm positions for a forward motion command. The successful performance of this check indicates that both reel servo circuits are functioning properly. If one motor spins continually or not at all and fails to vary velocity or direction with arm position its servo amplifier is suspect. If both motors spin a power supply problem is generally indicated.

d) Fake a BOT marker. Press the LOAD and ON LINE pushbuttons simultaneously and release. This action generates an apparent BOT which resets the LOAD F/F so that the capstan halts. The desired arm positions will now be center. You may verify this as in the previous step.

e) Move tape with the service switch. Place the transport OFF LINE and place the service switch in the REVERSE and FORWARD positions. Check capstan direction and desired arm positions. Desired arm positions for reverse motion are take-up arm at second dimple, supply arm at first dimple.

f) Rewind. Press the REWIND pushbutton. The capstan will turn CW at high speed. Desired arm positions cannot be checked in this mode with the technique discussed. Press ON LINE and LOAD simultaneously. The capstan should halt after the buttons are released and then move forward as in the load sequence. Press the ON LINE and LOAD again simultaneously and the capstan will halt.

g) Unload. Press LOAD, ON LINE, and REWIND simultaneously. The capstan will turn reverse at slow speed. The desired take-up and supply arm positions will both be at the first dimple.

9 - COMPONENT REMOVAL AND REPLACEMENT

9.1 INTRODUCTION. This section provides removal and replacement procedures for all field replaceable components, including all items appearing on the recommended spare parts lists in Section 6. When a part is replaced some adjustment or alignment is generally required. The last step of each replacement procedure below refers the maintenance engineer to the appropriate paragraphs in Section 10, Adjustment and Alignment.

9.2 PRINTED CIRCUIT CARDS. To remove and replace the motor control card, read card, or write/control card perform the following steps,

1) Turn off power and wait a minute for the capacitors to discharge.

2) Remove the two 6-32 screws holding the card in place, and remove the card by pulling firmly out. (Access to the motor control card may be improved by removing the two 6-32 screws holding the card cage in place and swinging it away.)

3) Inspect the replacement card. Refer to section 6 for details.
   a) If a motor control card, are the proper versions of the platforms U8, U24 and U26 installed? Is the card itself the proper version?
   b) If a read card, is it the proper version?
   c) If a write/control card, are <u>all</u> plug jumpers installed in the desired positions?

4) Insert the replacement card in the appropriate card slot; press firmly to assure a good seat in the connectors, and replace the hold-down screws. The component side of the motor control card and the write/control card should be to the rear; the component side of the read card must be to the front.

5) Refer to the appropriate adjustment procedures in Section 10 of this manual,
   Motor control card: paragraphs 10.2, 10.3, and 10.4.3.
   Read card: paragraphs 10.8 and 10.12.
   Write/control card: paragraphs 10.5 and 10.7.

9.3 CAPSTAN MOTOR. To remove and replace the capstan motor follow the procedure below.

1) Turn off power and disconnect the motor electrically by separating connector P9/P9 between the motor and the chassis.

2) Measure and record for future use the distance between the capstan and the front plate. Refer to figure 9-1.

3) Loosen set screw in the capstan with a 1/16 inch Allen wrench and remove the capstan from the motor shaft. The 1740 capstan is machined from a soft metal and therefore excessive force may cause deformation.

4) Remove the four 6-32 screws holding the motor to the plate, while supporting the motor with your hand. Remove motor.

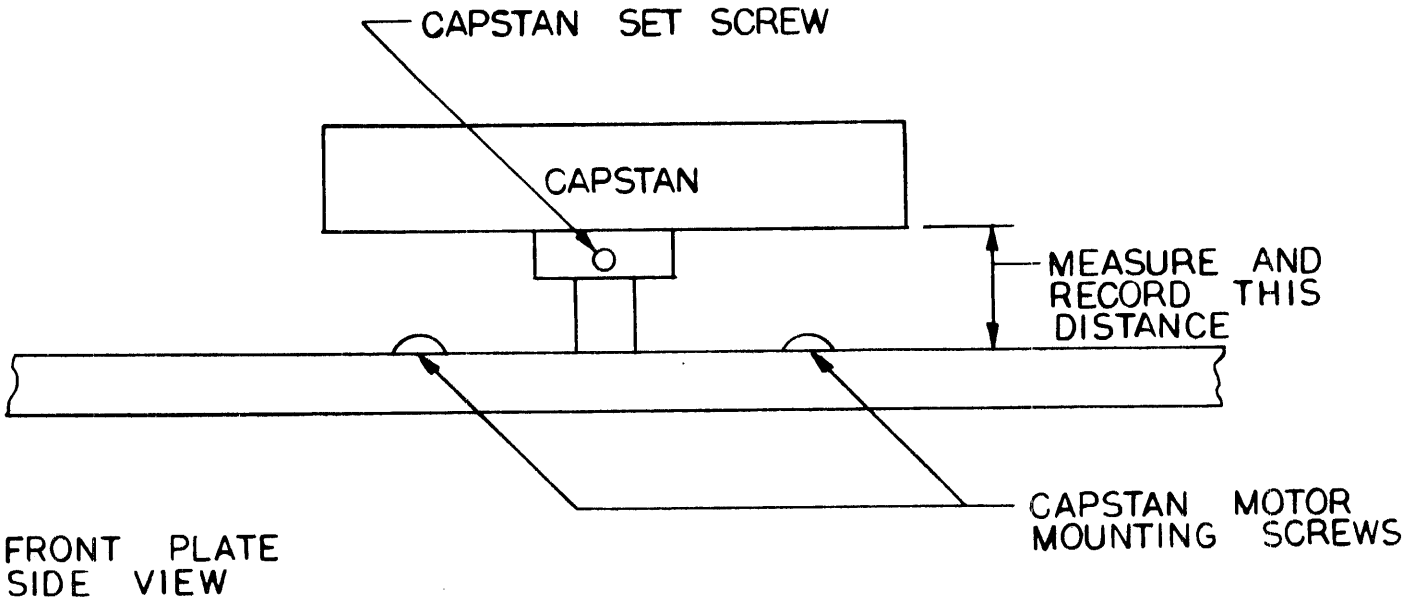


FIGURE 9-1 , CAPSTAN HEIGHT MEASUREMENT

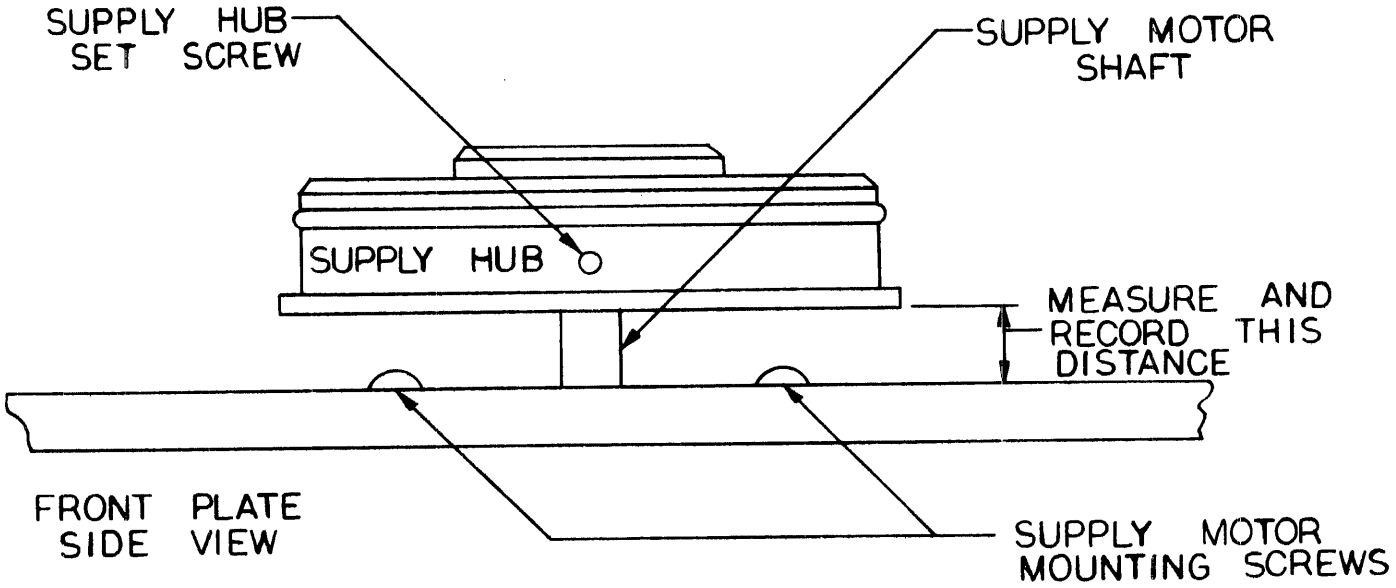


FIGURE 9-2 , REEL HUB HEIGHT MEASUREMENT

5) Ensure that the mounting surface of plate and replacement motor are clean to avoid perpendicularity problems.

6) Install new motor with the four 6-32 screws.

7) Mount capstan on the motor shaft at the previously recorded height. Align the set screw with the flat of the motor shaft and tighten the set screw.

8) Plug together the electrical connection, P9/P9.

9) Use the service switch to run tape forward and reverse, and visually verify that tape tracking across the capstan is proper.

10) Perform capstan servo adjustments per paragraph 10.3. Note that the short-cut method of duplicating voltage readings at TP1 cannot be used since these readings correspond to the old motor. Also check the read skew as explained in paragraph 10.10.1.

9.4 REEL MOTORS. To remove and replace either reel motor follow the procedure below.

1) Turn off power and disconnect the motor electrically; supply motor connector is P8/P8, take-up motor connector is P10/P10.

2) In order to improve access to the reel motors swing the card cage away and remove the motor control card entirely.

3) Measure and record for future use the distance between the hub and the plate. Refer to figure 9-2.

4) If a supply motor is being removed skip to step 5. On the 1640 or 1140 remove the rubber ring from the take-up hub by pulling it up with your fingers. On the 1740 remove the three screws from the reel retaining plate, and remove the reel retaining plate and take-up reel.

5) Loosen the set screw in the hub with a 3/32 Allen wrench and remove the hub from the reel motor shaft.

6) Remove the four 8-32 screws holding the motor to the plate and remove motor. Support the motor with one hand during this step.

7) Insure that the mounting surfaces of the plate and new motor are clean and mount the new motor with the four 8-32 screws.

8) Mount the hub on the motor shaft at the previously recorded height. Line up the set screw with the flat of the motor shaft and tighten the set screw with a 3/32 inch Allen wrench.

9) If a supply motor is being installed skip to Step 10. On the 1640 or 1140 reinstall the rubber ring on the take-up hub. On the 1740 reinstall the plastic reel and metal reel retaining plate with three screws.

10) Plug the new motor's electical connector together.

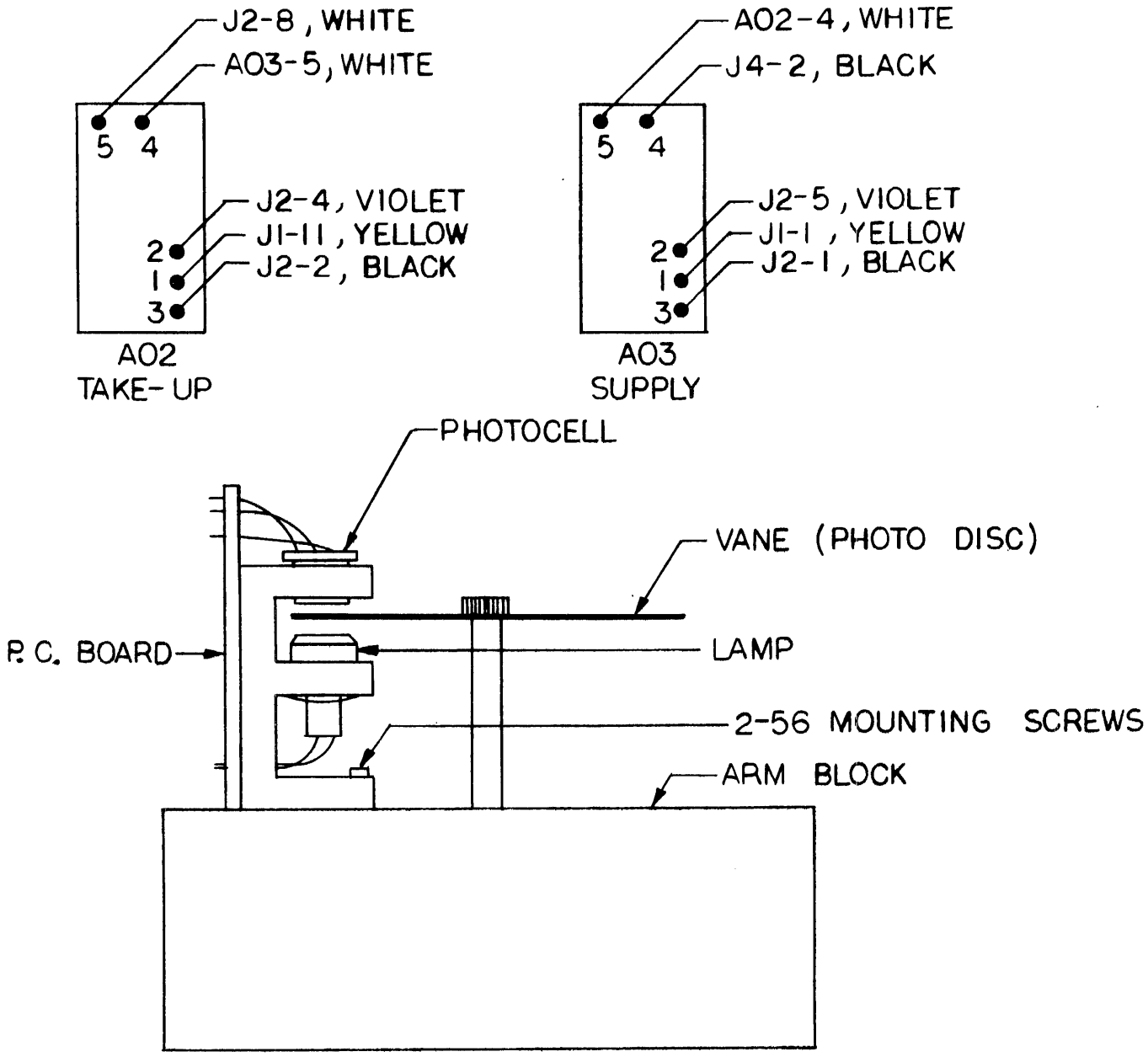


FIGURE 9-3, ARM SERVO ASSEMBLY

11) Reinstall the motor control card. Apply power, load tape, and use the service switch (located center of write/control card) to run tape forward and reverse. Verify that the tape edge does not ride against the edge of either reel. Readjust the hub height if necessary. Perform the adjustments in paragraph 10.4.3.

9.5 BOT/EOT SENSOR ASSEMBLY. To replace the BOT/EOT sensor (BES) perform the sequential steps listed below.

1) Unsolder the following wires from J5.

J5-1	black	BES GND
J5-D	violet	BES LED POWER
J5-R	white	BOT SENSE
J5-S	yellow	EOT SENSE

2) Remove the single 6-32 screw holding the BOT/EOT sensor assembly in place, and remove the assembly by pulling the attached wires through the hole in the plate.

3) Thread the wires of the replacement sensor assembly back through the same hole, and mount the sensor assembly on the plate with the 6-32 screw and washers previously removed.

4) Mount a reel of magnetic tape on the transport (power off), and align the sensor assembly so that it is parallel to the tape.

5) Run the four wires into the center cable harness and back to J5. Attach cable ties as necessary. Solder the four wires onto the pins indicated in step 1 above.

6) Perform the BOT/EOT adjustment procedure per paragraph 10.5.

9.6 ARM SERVO ASSEMBLY. To remove and replace either arm servo assembly perform the following steps while referring the figure 9-3. Note that the supply arm lamp and take-up arm lamp are connected in series so that if either fails the other will also be extinquished. With power off, use an ohmmeter to determine which lamp has opened.

1) Remove the black vane (photo disk) using a 3/32 inch Allen wrench.

2) Unsolder and label each of the five wires connected to the small p.c. card.

3) Remove the two 2-56 screws which hold the assembly to the arm block, and remove the assembly.

4) Install new arm servo assembly to the arm block with the two 2-56 screws.

5) Strip and reconnect the five wires to the p.c. card in their proper locations.

6) Mount the vane using the 6-32 socket head screw. Move the tension arm with your hand; the slot in the vane should move inward as the arm is moved off the stop. If not, the vane is mounted upside down.

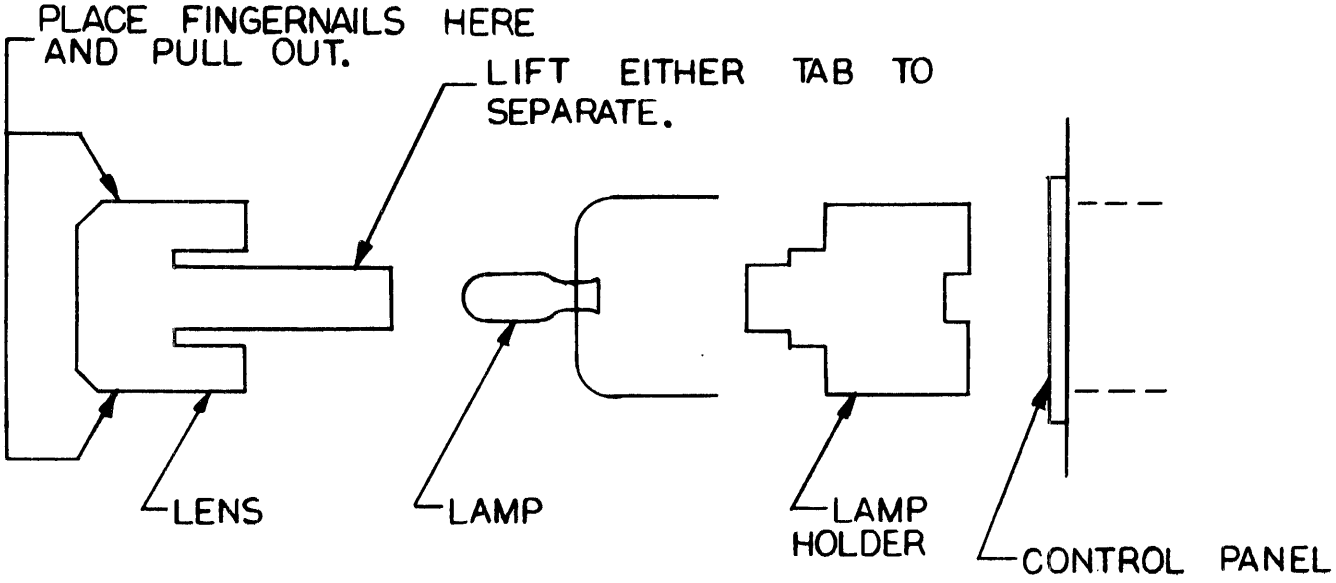


FIGURE 9-4 , INDICATOR LAMP REPLACEMENT

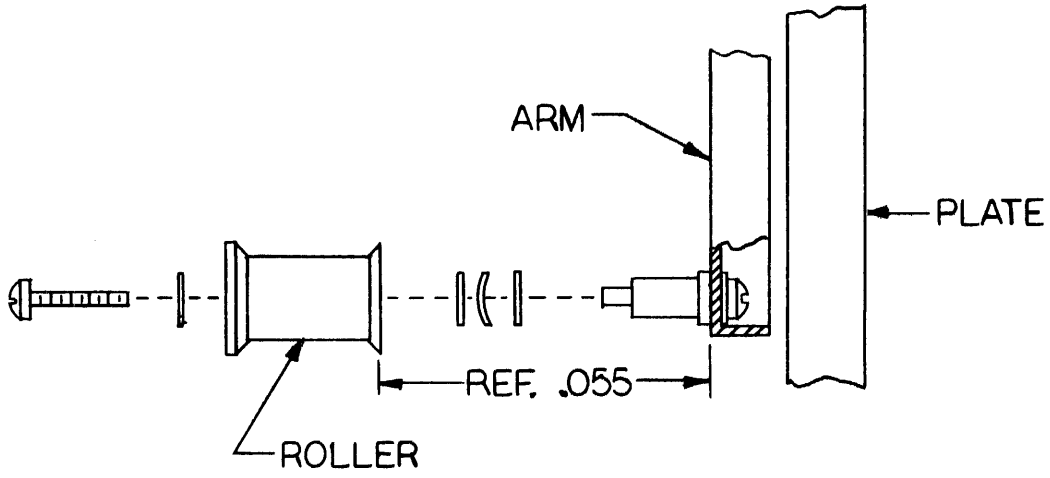


FIGURE 9-5 , ARM ROLLER

7) Perform the arm servo alignment procedure in paragraph 10.4.1.

8) If the take-up arm servo assembly was replaced perform the arm limit switch adjustment procedure in paragraph 10.4.2.

9) Adjust the arm positioning potentiometers as indicated in paragraph 10.4.3.

9.7 CONTROL PANEL LAMPS AND ASSEMBLY. In order to replace a defective control panel lamp perform the following sequence. Refer to figure 9-4.

1) Firmly grasp the square lens with your fingernails behind the grooves at top and bottom and pull out. Some force is required.

2) Separate the lens from the lampholder by lifting up slightly on either retaining tab and pulling the two pieces apart.

3) Lift the defective lamp out of the lampholder.

4) Place new lamp in the lampholder. Form leads and clip at approximately 1/4 inch.

5) Press lens and lampholder together, and press entire assembly into the control panel.

In order to replace the entire control panel assembly perform the following sequence.

1) Remove the two 6-32 screws which hold the assembly to the plate.

2) Unplug connector P11/A01P1.

3) Label and pull off the quick-disconnect power connections from the POWER switch of the defective assembly.

4) Push the power connections onto the POWER switch in the new control panel assembly.

5) Mount the new assembly on the front plate with two 6-32 screws and washers.

6) Connect P11/A01P1.

7) No electical adjustments are required.

9.8 RELAYS. All -40 series transports contain at least one relay. The 1740 and the 1640 at 37.5 ips tape speed contain two relays. To replace either perform the following sequence.

1) Turn off power.

2) Snap off the relay retaining spring by prying it slightly up and pushing it off to the side.

3) Unplug the relay from its socket.

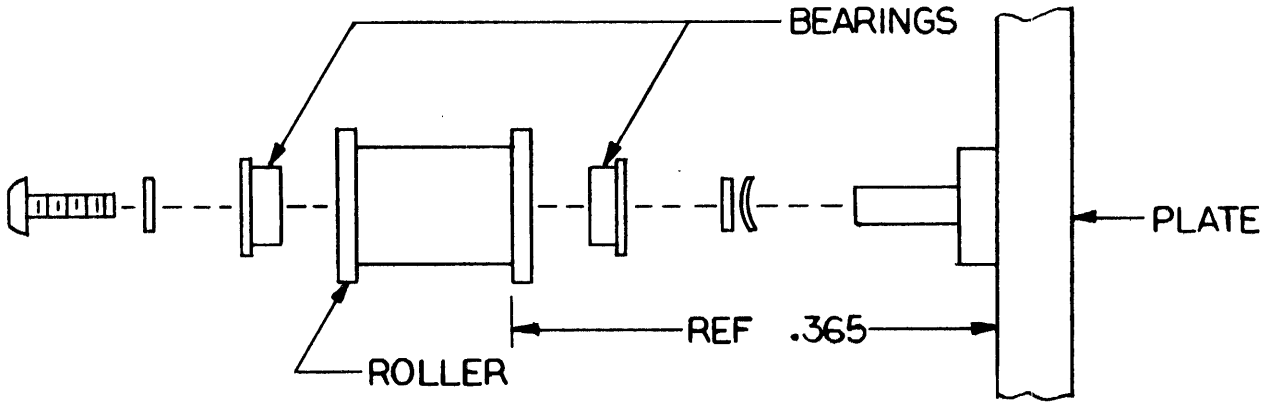


FIGURE 9-6 , STATIONARY ROLLER

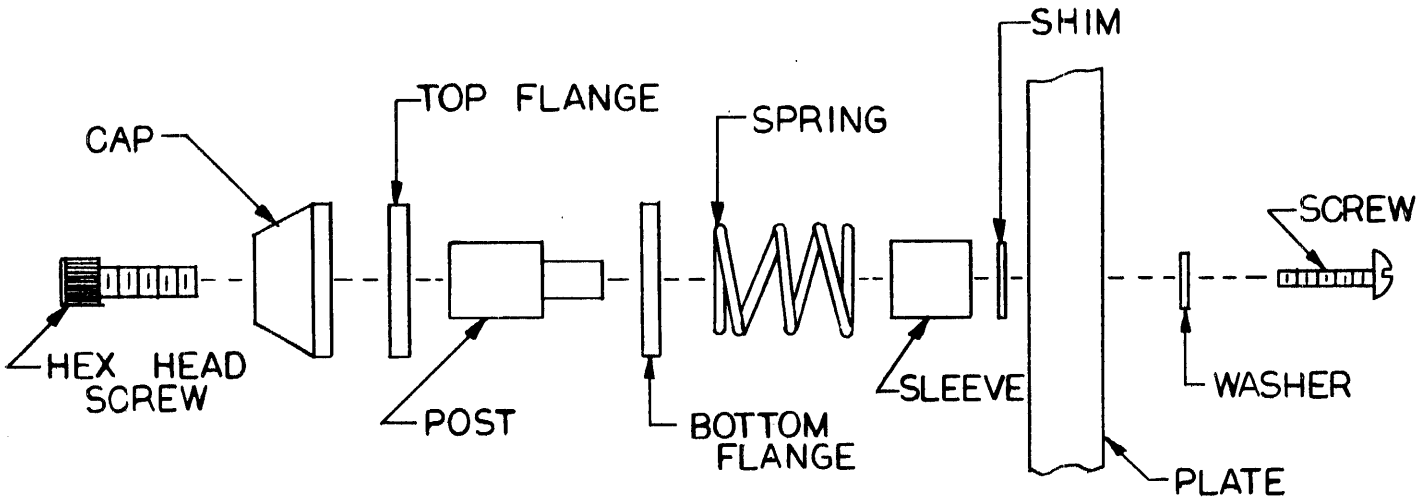


FIGURE 9-7 , TAPE GUIDE

4) Line up the pins of the replacement relay with the socket and plug the relay in.

5) Push the retaining spring up into the catch on the top of the relay.

6) No adjustments are required.

9.9 FILE PROTECT ASSEMBLY. To replace the file protect assembly, which senses the presence or absence of the write enable ring, perform the following sequence.

1) Label and remove the four wires connected to the RING IN switch and solenoid.

L1(+)	J2-K	yellow
L1(-)	CG-3	black
S5-COM	J1-V	white
S5-N.O.	J6-E	white

2) Remove the two 6-32 screws which hold the file protect assembly to the front plate and remove.

3) Mount replacement assembly with two 6-32 screws and washers.

4) Reconnect the four wires disconnected in step 1.

5) Perform the solenoid plunger/microswitch adjustment per paragraph 10.6.

9.10 ROLLERS AND TAPE GUIDES.

9.10.1 ARM ROLLERS. To remove or replace a binding or noisy arm roller perform these steps while referring to figure 9-5.

1) Remove the 2-56 screw from the center of the arm roller.

2) Pull off the arm roller; watch for any shims.

3) Slip on the replacement roller. Insert and tighten the screw, but do not over-torque. Check height with reference to figure 9-5.

4) Load the tape and use the service switch to verify proper operation.

9.10.2 STATIONARY ROLLERS. If a stationary roller fails to rotate freely or generates excessive noise one of the two bearing assemblies in the roller should be replaced. Refer to figure 9-6 with regard to these directions.

1) Remove the 6-32 screw from the center of the roller.

2) Pull the roller off its post.

3) Remove and replace either the top or bottom bearing assembly as required. If the bottom bearing assembly is not found in the roller it has remained on the post and may be found there.

4) After replacing the bearing(s) place the roller on its post, and insert and tighten the 6-32 screw. Do not over-torque. Check height.

5) Load tape and use the service switch to verify proper operation.

9.10.3. TAPE GUIDES. To replace or simply rotate the top ceramic flange, remove the center screw with an Allen wrench. The cap and top flange can now be lifted off.

To replace the entire tape guide assembly follow these step-by-step directions, referring to figure 9-7.

1) Loosen the 6-32 screw on the rear of the plate until the tape guide can be lifted off. Shims, if any, should rest on the screw.

2) Replace components in the proper sequence shown in figure 9-7. Tighten screw.

3) Perform skew measurement as indicated in paragraph 10.10.1 to determine if the new guide must be shimmed.

9.11 TAPE HEAD ASSEMBLY. Replacement magnetic tape heads are supplied by Digi-Data Corporation with connectors J3 and J6 attached. To remove a defective head and to install a replacement head follow these step-by-step instructions.

1) Remove the read card and the write/control card from their slots.

2) Label and unsolder the wires connected to J3 and J6 which are not part of the head assembly. These are,

J3-A	black	(shield ground)
J3-B	black	(head ground)
J3-X	white	(-12V)
J3-Y	white	(+12V)
J6-A	white	(+12V)
J6-2	black	(shield ground)
J6-E	white	(+12 SWITCHED)
J6-21,Y	black	(logic ground)
J6-22,Z	white	(+5V)

3) Remove the 4-40 screws, nuts, and washers holding J3 and J6 to the card cage. Save all this hardware for the eventual installation of the replacement connectors.

4) Cut all the cable-ties between J3, J6, and the tape head. Pull the connectors and cable loose.

5) Pull the head cover straight out and off - it is held by two banana plugs.

6) Remove the two 4-40 screws which hold the head to the front plate.

7) Thread the cable and J3 and J6 connectors which are attached to the head out through the hole in the front plate, thereby removing the entire head assembly.

8) Thread the new connectors and cable in through the front plate hole.

9) Clean the head mounting area of the plate, and mount the tape head on the plate with two 4-40 screws.

10) Reinstall the head cover.

11) Mount the J3 and J6 connectors with the hardware saved from step 3.

12) Connect the nine wires to J3 and J6 which were previously removed in step 2.

13) Use cable-ties to dress and secure the cable.

14) Reinstall the read card and the write/control card in their slots.

15) Perform the following adjustment and alignment procedures.

Write Current Adjustment	Para. 10.7
Read Gain Adjustment	Para. 10.8
Cross-feed Minimization	Para. 10.9
Skew Measurement	Para. 10.10.1

9.12 POWER COMPONENTS

9.12.1 TRANSFORMER ASSEMBLY. The transformer for field replacement has attached plug A06A01P1, switches A06A01S1 and S2, and lugs for connections to the bridge rectifiers A06CR1, CR2, and CR3, and to earth ground. To replace the transformer assembly follow the procedure below.

1) Unplug A06A01P1 (transformer primary) from A05P2 (line cord assembly).

2) Remove the transformer shield earth connection -- a ring lug located on the chassis near card connector J1.

3) Remove the two 6-32 screws which retain the card cage and swing it open. Remove the motor control card.

4) With the motor control card removed switches A06A01S1 and S2 will be visible. Remove the four 4-40 screws holding them in place.

5) Pull the six transformer secondary leads off the AC terminals of the bridge rectifiers CR1, CR2, and CR3.

6) Remove the 6-32 screws which hold the transformer to the chassis and remove the transformer assembly.

7) Install the replacement transformer on the chassis with four 6-32 screws.

8) Push the six transformer secondary leads onto the AC terminals of CR1, CR2, and CR3.

   red/white to CR1.
   violet/white to CR2.
   blue/white to CR3.

9) Install switches S1 and S2 with the 4-40 hardware.

10) Fasten the transformer shield wire to the earth connection (CG6) on the chassis near connector J1.

11) Plug together plug A06P1 (transformer primary) and plug A05P2 (line cord assembly).

12) Set switches A06A01S1 and S2 to the required positions. See figure 3-1.

13) Re-install the motor control card with 6-32 hardware.

14) Turn power on, wait a few minutes for warm-up, and verify the proper adjustment of the regulator outputs per paragraph 10.2

15) Turn power off and secure card cage in its closed position with 6-32 hardware.

9.12.2 BRIDGE RECTIFIERS. To replace any one of the three bridge rectifiers CR1, CR2, or CR3 follow the procedure below.

1) Pull off the four connections from the rectifier to be replaced.

2) Remove the 6-32 screw, and the split-lock and flat washers from the center of the rectifier and remove the rectifier from the chassis.

3) Apply heat sink compound to the bottom surface of the replacement rectifier and to the mounting surface of the chassis. Mount the rectifier with the 6-32 hardware previously removed.

4) Push onto the proper rectifier terminals the four wires previously removed.
CR1: (+) to C1(+), (-) to chassis ground CG5, (AC) to T1 red/write.
CR2: (+) to C2(+), (-) to chassis ground CG5, (AC) to T1 violet/white.
CR3: (+) to chassis ground CG5, (-) to C3(-), (AC) to T1 blue/white.

5) Verify the proper adjustment of the regulator outputs per paragraph 10.2.

9.12.3 FILTER CAPACITORS. To replace any one of the three filter capacitors C1, C2, or C3 located on the chassis perform the following sequence.

1) Swing open the card cage and remove the motor control card.

2) Label and remove the connecting wires and bleeder resistor from the terminals of the capacitor to be replaced.

3) Measure and record the height of the capacitor above the chassis. Loosen the capacitor clamp and slide the capacitor out of the chassis.

4) Insert the replacement capacitor into the clamp, and tighten the clamp with the capacitor located at the height previously noted.

5) Connect all wires and the bleeder resistor previously removed to the capacitor terminals.

6) Re-install the motor control card and verify the voltage regulator outputs per paragraph 10.2. Secure the card cage in its closed position with 6-32 hardware.

9.12.4 48VDC POWER CONTROL UNIT. To replace the 48VDC power control unit which is mounted on the rear of the front plate perform the following sequence.

1) Remove the four 4-40 screws which hold the unit's cover in place and lift off the cover.

2) Unplug connector A05P2 from A06P1.

3) Label and remove the four ring lug connections from terminal block TB1.

4) Remove the three 6-32 screws, washers, and spacers which secure the power unit to the front plate, and remove the unit.

5) Remove the cover from the replacement unit and mount the unit to the rear of the front plate with the three 6-32 screws, washers, and spacers previously removed.

6) Reconnect the four wires to TB1.

TB1-1	from	C3(-)
TB1-2	from	C1(+)
TB1-3	from	chassis ground
TB1-4	from	C2(+)

Terminal 1 is nearest the edge.

7) Plug together connector A05P2 and A06P1.

8) Re-install the cover on the power unit with 4-40 hardware.

9) Verify the proper adjustment of the voltage regulator outputs per paragraph 10.2.

10 - ADJUSTMENT AND ALIGNMENT

10.1 INTRODUCTION. This section provides step-by-step procedures for the alignment of various mechanical assemblies and the adjustment of the transport's twenty-five potentiometers.

10.2 REGULATED VOLTAGES. The transport has four regulated voltages, two of which are adjustable. Maximum AC ripple is 50 mV p-p.

1) With an accurate voltmeter connected between TP10 (GND) and TP5 (+5L) adjust potentiometer R62 to obtain +5V $\pm$ 0.05.

2) Adjust potentiometer R52 to obtain +12V $\pm$ 0.05 between TP10 (GND) and TP2 (+12).

3) Verify that the voltage at TP3 is +5V $\pm$ 0.1.

4) Verify that the voltage at TP6 is -12V $\pm$ 0.6.

10.3 CAPSTAN SERVO ADJUSTMENT. These adjustments determine the transport's tape speed and tape acceleration. The procedures given below assume the use of a Digi-Data test card.

10.3.1 ZERO ADJUSTMENT. Load a reel of magnetic tape to BOT. With no tape motion commanded adjust the voltage at TP7 to 0.00V $\pm$ 0.01 with the ZERO potentiometer R46. This adjustment removes from the servo amplifier any d.c. offset due to tolerance build-up.

10.3.2 SPEED ADJUSTMENTS. The transport's forward and reverse speeds are each adjustable with a potentiometer. The rewind speed, since it is directly proportional to the reverse speed, requires no adjustment. The optional dual speed transport contains a FAST potentiometer with which to adjust the faster of the two speeds after the forward and reverse speed adjustments have been made at the slower speed.

Two different procedures are provided below for performing the speed adjustments. Either procedure may be used when the motor control card is replaced. Only the longer procedure B may be used when the capstan motor is replaced.

Procedure A.

1) Locate the round label affixed to the capstan tachometer, see figure 10-1. This label indicates the voltage readings at TP1 (tachometer feedback) when the factory technician properly adjusted the forward and reverse speeds at the time of manufacture using a method similar to Procedure B.

2) Connect an accurate voltmeter between TP10 (GND) and TP1 (tachometer feedback).

3) Move tape forward using either the service switch or the test card. Adjust R48 to duplicate the voltage preceded by an "F" on the capstan label.

4) Switch tape motion to reverse, and adjust R49 to duplicate the voltage preceded by an "R" on the capstan label.

Note: The service switch ignores the BOT marker.

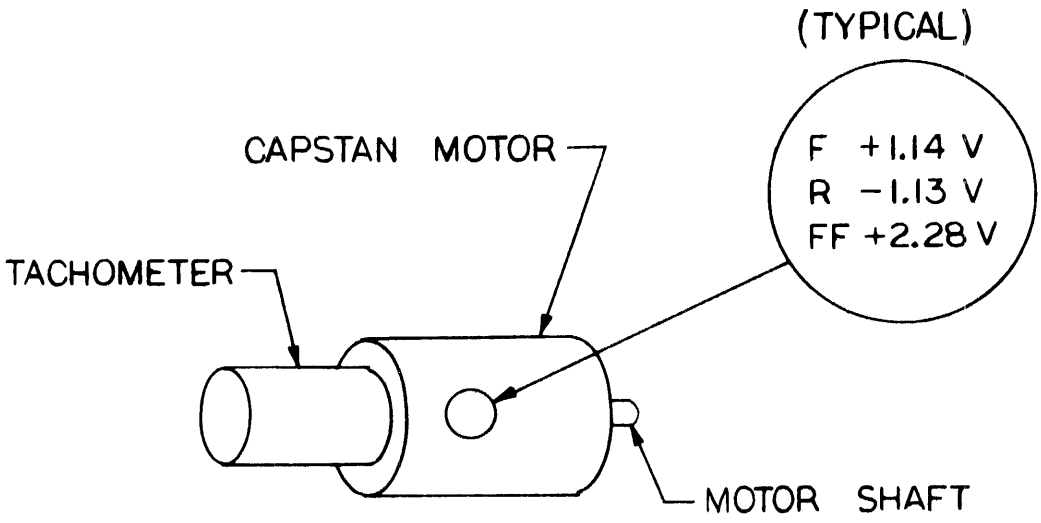


FIGURE 10-1 , LOCATION OF CAPSTAN TACHOMETER FEEDBACK VOLTAGE READINGS

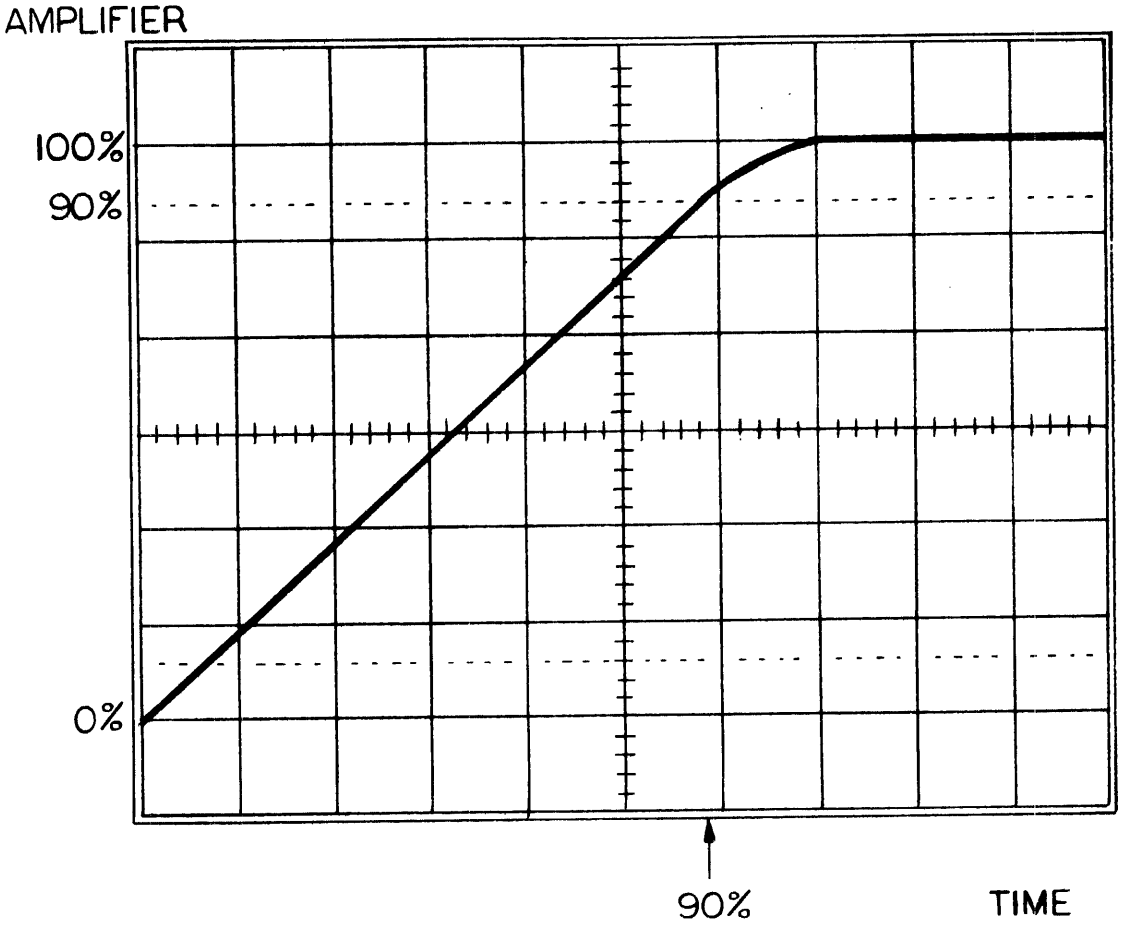


FIGURE 10-2, RAMP ADJUST SCOPE DISPLAY

5) If the transport has an optional second tape speed the FAST potentiometer must be adjusted. The input line SPS may be used to select either a faster or a slower speed. The four steps above must be performed at the slower of the two available tape speeds (whether normal or optional). To adjust the FAST potentiometer R47 stop tape motion, switch to the higher speed and then generate a forward motion command. Duplicate the voltage at TP1 which appears on the tachometer label preceded by "FF". Be sure to stop tape motion before switching back to the slower speed.

Procedure B. This procedure for adjusting tape speed requires the use of an 800 BPI master alignment tape and a frequency counter.

1) Load an 800 BPI master alignment tape to BOT. This tape reel should not contain a write enable ring.

2) Monitor the output at TP101 on the read card with a frequency counter (or oscilloscope).

3) Generate continuous forward motion with the service switch or the test card and adjust the potentiometer R48 (FWD) to the appropriate frequency indicated in the chart below which is one-half character rate.

TAPE SPEED	FREQUENCY	PERIOD
12.5 IPS	5 KHz	200 usec
18.75 IPS	7.5 KHz	133 usec
25 IPS	10 KHz	100 usec
37.5 IPS	15 KHz	66.7 usec
45 IPS	18 KHz	55.5 usec
75 IPS	30 KHz	33.3 usec

4) Generate continuous reverse motion, by means of either the service switch or test card, and adjust R49 (REV) to obtain the desired frequency as in step 3 above.

5) On a dual speed transport stop the tape and switch to the higher speed. Then move tape forward and adjust the FAST potentiometer R47 to obtain the frequency appropriate to that speed. Be sure to stop tape motion before switching back to the lower speed.

6) Unload and remove the master alignment tape.

10.3.3 RAMP ADJUSTMENT. This procedure requires the use of an oscilloscope with a calibrated time base. A Digi-Data test card is also mandatory.

1) Set the test card switches to FWD and to PULSE.

2) Load a reel of scrub tape to BOT, and place the transport on line.

3) Trigger the scope negative on TP12 of the motor control card and view TP1. Adjust the test card STOP and GO times to achieve an adequate scope presentation; generally twice the desired ramp time serves well.

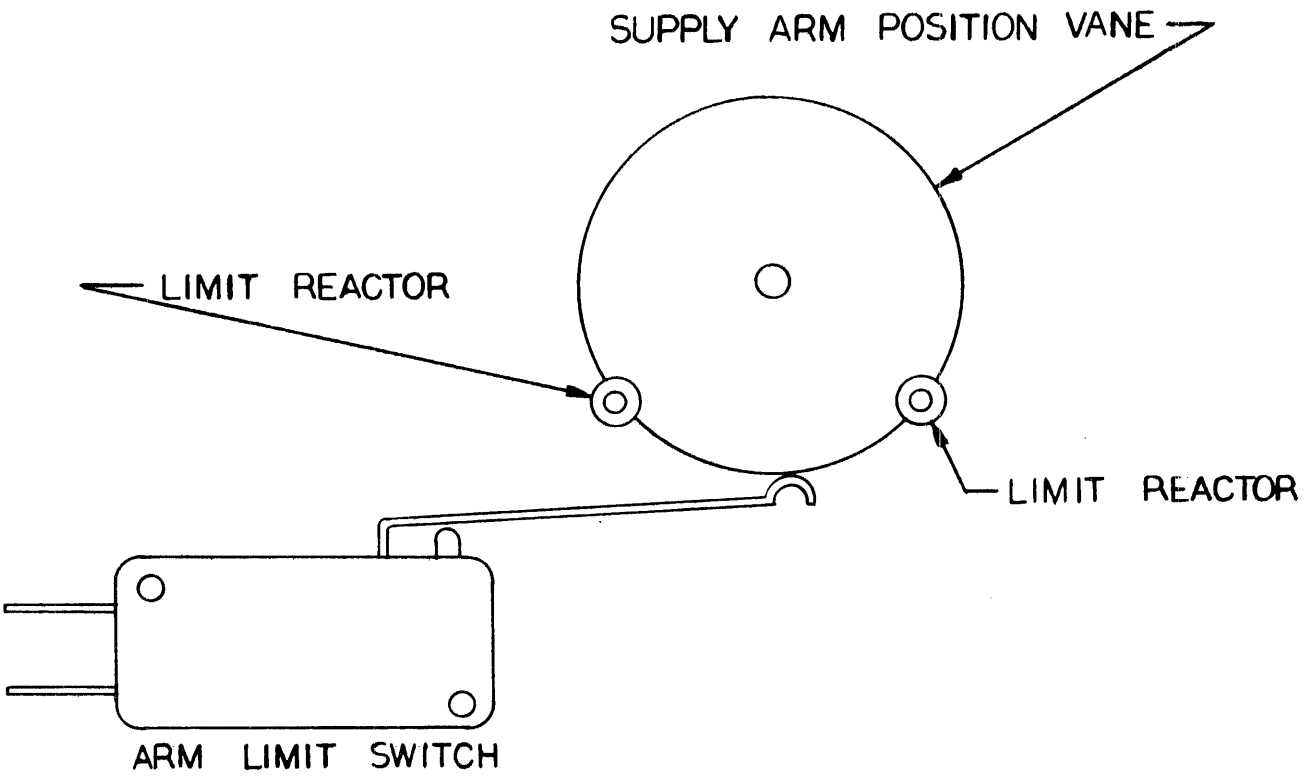


FIGURE 10-3, ARM LIMIT SWITCH ACTUATION

FIGURE 10-4, EFFECT OF ARM ADJUSTMENTS

4) Uncalibrate the scope amplitude and position the trace such that the 90% amplitude point of the start ramp may be easily ascertained. See figure 10-2.

5) Adjust the RAMP potentiometer R45 to achieve the correct ramp time as indicated below.

TAPE SPEED	TIME TO REACH 90% AMPLITUDE
12.5 IPS	27 milliseconds
18.75 IPS	18 milliseconds
25 IPS	13.5 milliseconds
37.5 IPS	9 milliseconds
45 IPS	7.5 milliseconds

6) Trigger positive and view the stop ramp. Verify that it is approximately equal in time to the start ramp.

7) Move the motion switch on the test card to REV and verify that the reverse start and stop ramps are generally equal to each other and to the forward ramps.

10.4 REEL SERVO ADJUSTMENTS. These adjustments are all related to the operation of the tape-buffering arms.

10.4.1 PHOTODISK ALIGNMENT. This alignment is required only when the photodisk has been moved, e.g., during the replacement of the arm servo assembly.

1) Power up, but do not load tape.

2) Connect a voltmeter between ground and TP16 (supply photocell) or TP15 (take-up photocell) on the motor control card.

3) With your hand hold the appropriate arm in the approximate center of its operating arc, equidistant between the two dimples.

4) The voltmeter should read 2.7V $\pm$ 0.1. If not loosen the 6-32 set screw holding the photodisk and rotate the photodisk until the voltmeter reads 2.7V.

5) Tighten the set screw and ensure that the voltmeter still reads 2.7V with the arm held center.

10.4.2 ARM LIMIT SWITCH ALIGNMENT. Refer to figure 10-3 with regard to this alignment.

1) Insure that the 6-32 screws holding the microswitch in place are tight. Power <u>off</u>.

2) Connect an ohmmeter between the two connected lugs of the switch (COM and N.O.).

3) Lift the take-up arm off its stop. The meter should go from "short" to "open"before the first dimple is reached. Release the arm to the stop; the meter should return to "short".

FRONT PLATE SIDE VIEW

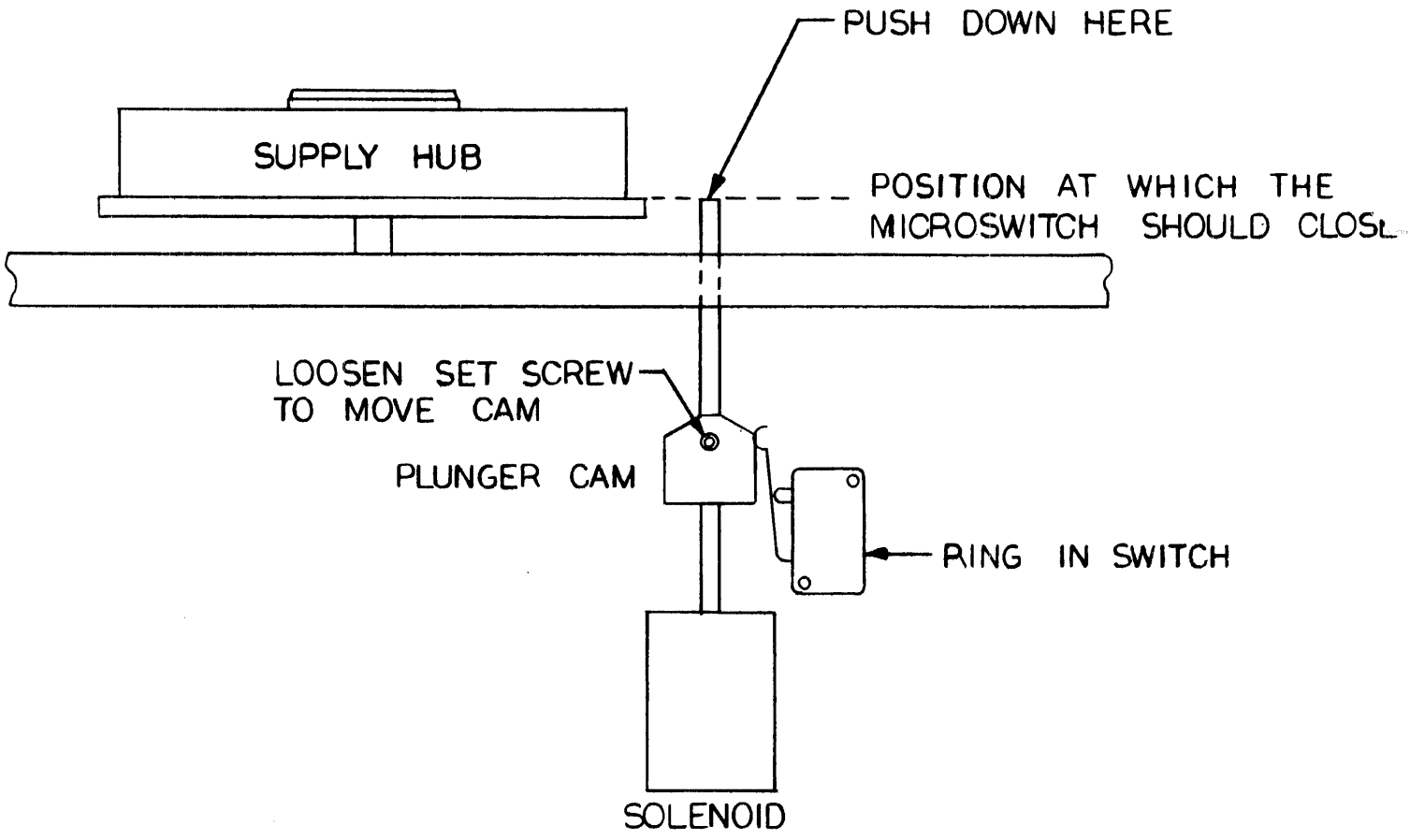


FIGURE 10-5, FILE PROTECT ASSEMBLY ALIGNMENT

4) Move the take-up arm to the opposite end of its arc. The meter should go from "open" to "short" after the second simple is passed. Bring the arm back again and the meter should indicate "open" before the dimple is reached.

5) If the conditions indicated in steps 3 and 4 do not exist, loosen and move the appropriate arm limit reactor(s) on the take-up photodisk to achieve those conditions.

10.4.3 ARM POSITION ADJUSTMENTS. The adjustments of the TUCEN, SUPCEN, TUARC, and SUPARC potentiometers on the motor control card determine the position of the tape-buffering arms during various operations. Anytime the motor control card, a reel motor, or an arm servo assembly is replaced the following adjustment procedure must be performed.

1) Set the TUARC and/or SUPARC potentiometer(s) fully counter-clockwise. Set the TUCEN and/or SUPCEN potentiometer(s) to mid-range.

2) Load a reel of scrub tape to BOT. If tape will not load adjust the TUCEN potentiometer slightly clockwise and try again.

3) Move tape forward several feet off BOT then place the test card motion switch in the SHUTTLE mode. Increase the GO time on the test card to at least one second to permit a full swing of the tape-buffering arms. If a test card is not available the maintenance engineer may simulate the shuttling mode by manually switching the service switch from FWD to REV repeatedly.

4) The arm achieves its widest swing when its associated reel is nearly empty. Turn the TUARC potentiometer R124 clockwise gradually increasing the take-up arm's arc until it reaches the dimples on the front plate which delineate its operating arc. As this adjustment is made the arm will probably reach one dimple before the other. Adjust the TUCEN potentiometer R134 to shift the entire arc. Continue to make repeated small adjustments to the TUARC and TUCEN potentiometers until the take-up arm is swinging exactly to each dimple. Figure 10-4 indicates the effect of the arm adjustments upon the arm's operating arc.

5) Switch the test card to forward motion and run most of the tape onto the take-up reel. Near EOT switch to the SHUTTLE mode again. Turn the SUPARC potentiometer R125 gradually clockwise widening the supply arm's arc. Adjust the SUPCEN potentiometer R135 as necessary to achieve an arm swing from dimple to dimple.

6) Rewind and unload the tape.

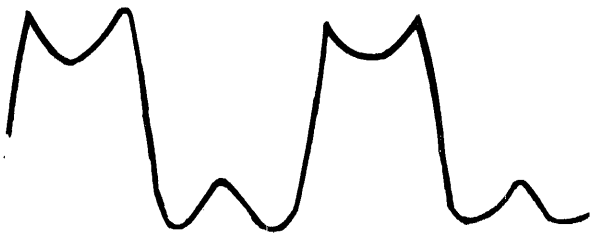
10.5 BOT/EOT SENSOR ADJUSTMENTS. These adjustments are required whenever either the write/control card or the BOT/EOT sensor assembly is replaced. Only a voltmeter is needed.

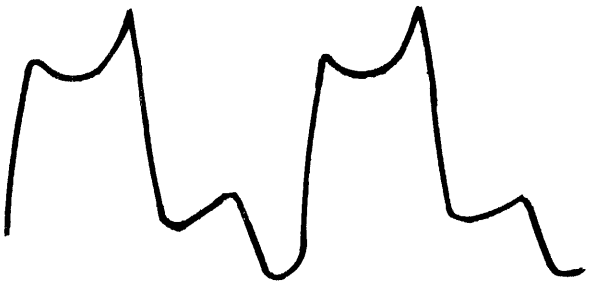
1) Power up and wait at least one minute for warm-up before performing the voltage measurements indicated in the following steps.

2) Thread magnetic tape on the unit and turn the reels so that the tape is taut through the BOT/EOT sensor. Insure that neither the BOT nor the EOT reflective tab is located within the sensor assembly.

A) 1600 FRPI, OVER-SATURATED

B) 1600 FRPI, PROPERLY SATURATED





C) 1600 FRPI, UNDER-SATURATED

FIGURE 10-6, DIFFERENTIATOR OUTPUTS AT 1600 FRPI

3) Connect the voltmeter between ground and TP15 on the write/control card (J5-R) and adjust R81, the BOT potentiometer, so that the meter reads at least +9 volts.

4) Connect the voltmeter between ground and TP16 on the write/control card (J5-S) and adjust R82, the EOT potentiometer, so that the meter reads at least +9 volts.

5) Remove the magnetic tape from within the sensor assembly. The voltages at TP15 and TP16 must drop below +1 volt.

10.6 FILE PROTECT ALIGNMENT. The point of depression at which the ring-detecting plunger actuates the RING IN microswitch must be set when the file-protect assembly is replaced. Refer to figure 10-5.

1) Power off and no tape loaded.

2) Connect an ohmmeter between the two connected lugs of the RING IN (WRT EN) microswitch. The meter should indicate an "open".

3) Depress the plunger which protrudes through the front plate. The meter should indicate a "short" at the inner lip of the supply hub. Refer to figure 10-5.

4) Loosen the set screw in the plunger cam and move the cam on the plunger so that the condition described in step 3 is obtained.

5) Disconnect the meter. Power up, load a reel of tape with a write enable ring installed and verify that the solenoid retracts the plunger fully when the LOAD pushbutton is pressed, and that the WRT EN indicator lamp is illuminated. The write power check described in paragraph 10.11 may be performed at this point, however, this is not a requirement.

10.7 PE WRITE CURRENT ADJUSTMENT. This adjustment is not required on an NRZI only transport.

1) Load a master output tape (SRM 3200 or equivalent) on the transport.

2) Set up the test card to write phase encoded tape at 1600 flux reversals per inch. (Refer to the test card manual)

3) With oscilloscope view TP102 on the read card.

4) Adjust the potentiometer R1 on the write/control card to obtain the "cowboy hat" waveform indicated in figure 10-6 (b).

5) If unable to obtain the proper waveform, remove plug jumper W1 on the write/control card and adjust R1 again.

6) View also TP202 through TP902 to insure that all nine tracks exhibit similar waveforms. If necessary, readjust R1 for the best signal in the average track.

7) Uncalibrate the scope and insure that the "dip" in the top of the "cowboy hat" is below 90% of the peak and above 50% of the peak. See figure 10-7.

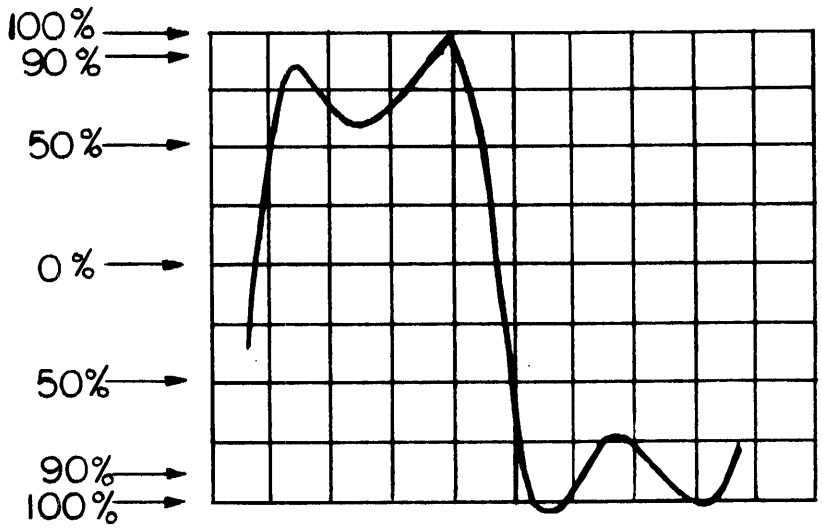


FIGURE 10-7 , PROPER DIFFERENTIATOR OUTPUT AT 1600 FRPI

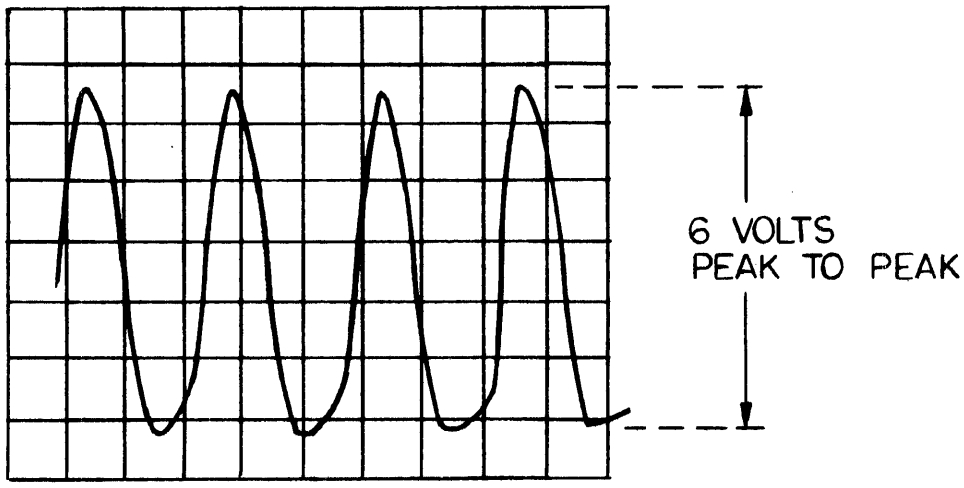


FIGURE 10-8 , READ GAIN ADJUSTMENT AT 3200 FRPI

10.8 READ GAIN ADJUSTMENTS. The gain of the read pre-amplifiers must be adjusted when the read card or the magnetic tape head is replaced. In making these adjustments a standard reference level tape (i.e., master output tape SRM 3200 or equivalent) recently recorded with "all one's" data should be used. Do not use a master alignment tape for these adjustments.

10.8.1 PE AND PE/NRZI READ GAIN. Any transport capable of reading phase encoded tapes should be adjusted by means of the following procedure.

1) Read a phase encoded tape recorded at 3200 flux reversals per inch. (To write a 3200 frpi tape with the test card refer to the test card operation manual.)

2) View TP102 with an oscilloscope and adjust potentiometer R108 to obtain a 6 volt peak-to-peak signal. See figure 10-8.

3) Repeat step 2 for each of the remaining eight channels (TP202 and R208, etc.).

10.8.2 NRZI ONLY READ GAIN. To adjust the read amplifier gains on a transport capable of reading only NRZI tapes, perform the following procedure.

1) Read an 800 BPI NRZI tape containing "all one's" at synchronous speed.

2) View TP101 with an oscilloscope and adjust potentiometer R108 to obtain a 10 volt peak-to-peak signal.

3) Repeat step 2 for each of the remaining channels (TP201 and R208, etc.). Seven-track units do not employ channels 0 and 1, i.e., TP701 and TP801.

10.9 CROSS-FEED MINIMIZATION. If errors are occurring in the read-after-write mode, or if a dual gap head is replaced, some adjustment of the "flux gate" may be necessary to minimize the cross-feed between the write and read stacks.

1) Verify that the gain of each read pre-amplifier is properly adjusted; refer to paragraph 10.8.

2) Note the position of the density select plug jumper located next to the service switch on the write/control card. If this jumper is not in W19 then move it from W20 or W21 to W19 for the duration of this adjustment.

3) Turn power on, and thread a scrub tape on the transport, but omit the capstan from the tape path, i.e., go directly from the tape guide (take-up side) to the tension arm roller.

4) Set up the Digi-Data test card to write all "ones" at 800 BPI with continuous forward tape motion. Press the LOAD pushbutton switch; the reel motors will apply tension to the tape and the capstan will rotate CCW. Press LOAD and ON LINE simultaneously to simulate BOT detection; the capstan will stop and then start forward again as the pushbuttons are released. The write circuits are now active. However, since the tape is not moving the read circuits cannot really read-after-write, and therefore, any activity in the read channels is cross-feed from the write circuits.

5) With an oscilloscope view the pre-amplifier output TP101; the peak-to-peak signal must not exceed the maximum value indicated below.

TAPE SPEED	MAXIMUM CROSSFEED SIGNAL
12.5 IPS	0.75 volts p-p
18.75 IPS	0.50 volts p-p
25 IPS	0.38 volts p-p
37.5 IPS	0.25 volts p-p
45 IPS	0.21 volts p-p

6) If signal amplitude exceeds the specification in step 5 loosen the two screws which hold the "flux gate" assembly to the plate. Move the assembly slowly from side to side noting the position which results in the smallest peak-to-peak cross-feed signal. The assembly should be parallel to the head and as close as possible to it without touching the tape.

7) When the optimum position for minimum cross-feed has been determined, tighten the two mounting screws; then verify that the assembly has not shifted while tightening the screws. View also TP201 through TP901 and verify that these signals are within the maximum values indicated in step 5.

8) Turn off power, remove the tape, and return the density select plug jumper to W20 or W21 if previously moved in step 2.

10.10 TAPE SKEW. That time, and therefore distance, by which the first-to-arrive channel precedes the last-to-arrive channel is called interchannel displacement or skew. Skew may be considered in two causal categories. Static skew is unchanging from character to character and is the result of tolerance build-up. For example, the head windings may not be perfectly in line with each other and the head windings may not be perfectly perpendicular to the tape due to head mounting, plate flatness, and guide height variations. The purpose of the tape guides is to ensure that the tape moves across the head perpendicular to the windings, however, too great reliance upon the tape guides to accomplish this task of static skew removal will result in more dynamic skew.

Dynamic skew is that varying component of total skew which changes with tape direction, tape speed, and arm positions. Reel hub height, capstan height, and the variation of an arm's height throughout its arc all contribute to dynamic skew.

10.10.1 SKEW MEASUREMENT. In order to measure skew on the 40-series transport a Digi-Data test card is generally required. Refer to the skew measurement procedure in the test card operation manual. Maximum allowable skew (static plus dynamic) is 150% of the figure indicated below.

STATIC SKEW	TIME IN MICROSECONDS AT AVAILABLE SPEEDS				
	12.5 IPS	18.75 IPS	25 IPS	37.5 IPS	45 IPS
150 microinches	12.0	8.0	6.0	4.0	3.33

10.10.2 SKEW CORRECTION. Before concluding that one of the tape guides needs to be shimmed make the following checks.

1) Verify that the tape has been properly threaded.

2) Clean all tape-handling components.

3) Check each tension arm roller for axial play. The roller should not move up and down. Horizontal tilt is normal. If either roller exhibits vertical play, remove and replace it. Arm roller height is adjustable with the center screw. See figure 9-5.

4) Check the stationary rollers (1640 and 1740 only) for the absence of vertical play, and replace either if necessary. Stationary roller height is also adjustable with the center screw. See figure 9-6.

5) Check the tape guide springs for freedom of movement. When depressed and then released the bottom flange should snap up to its original position. If the flange's movement feels spongy or sticks, remove, disassemble, and clean the tape guide. See figure 9-7. Recommended solvents are heptane and alcohol.

6) If none of the above is the cause of the skew problem then tape guide shims must be added or removed. A small label on the rear of the front plate near the head indicates which guide, if either, was shimmed at the time of manufacture and how much it was shimmed. To determine which guide to shim perform the skew measurement procedure per the test card operation manual. Press lightly on the outside edge of the tape near each tape guide in turn. The guide where the skew is worsened by this pressing is the one which must be raised.

10.11 WRITE POWER CHECKS. This procedure provides a means of verifying that the transport is capable of writing only when specific conditions are met.

1) Load a scrub tape <u>without</u> a write enable ring to BOT. Place the transport on line.

2) Connect a voltmeter to J6-C.

3) Generate <u>pulsing</u> forward tape motion with the test card set up to WRITE. The meter must indicate 0 volts.

4) With your finger, press the file protect plunger rearward. The solenoid should take over and fully retract the plunger and hold it back. The meter should now indicate approximately +10 volts.

5) Switch the test card to READ; the meter should indicate 0 volts. Switch back to WRITE.

6) Place the transport off line; the write power should again go to 0 volts. Place the transport back on line.

7) Initiate a rewind operation; the write power should go to 0 volts, and return to +10 volts at the end of the rewind if the transport is still on line.

8) With your finger, lift the actuator of the arm limit switch slightly (this is the microswitch which rides on the take-up arm's photodisk). This should cause a "broken tape" indication; the meter will indicate 0 volts and will <u>not</u> return to +10 volts.

9) Press the LOAD pushbutton, then the LOAD and ON LINE buttons simultaneously. Rewind and unload the tape.

10.12 NRZI SKEW GATE ADJUSTMENT. This adjustment is required whenever the read card is replaced on any transport capable of reading NRZI tapes. The SKEW GATE is a one-shot which defines the time during which all the data bits in a character must arrive; it is triggered by the first bit to arrive. Nine-track ANSI standards require that all bits arrive within 34% of the character period.

1) Read any tape. View TP6 on the read card with an oscilloscope.

2) Adjust the width of the high (or single) density skew gate (TP6) with potentiometer R27 to the appropriate time indicated below.

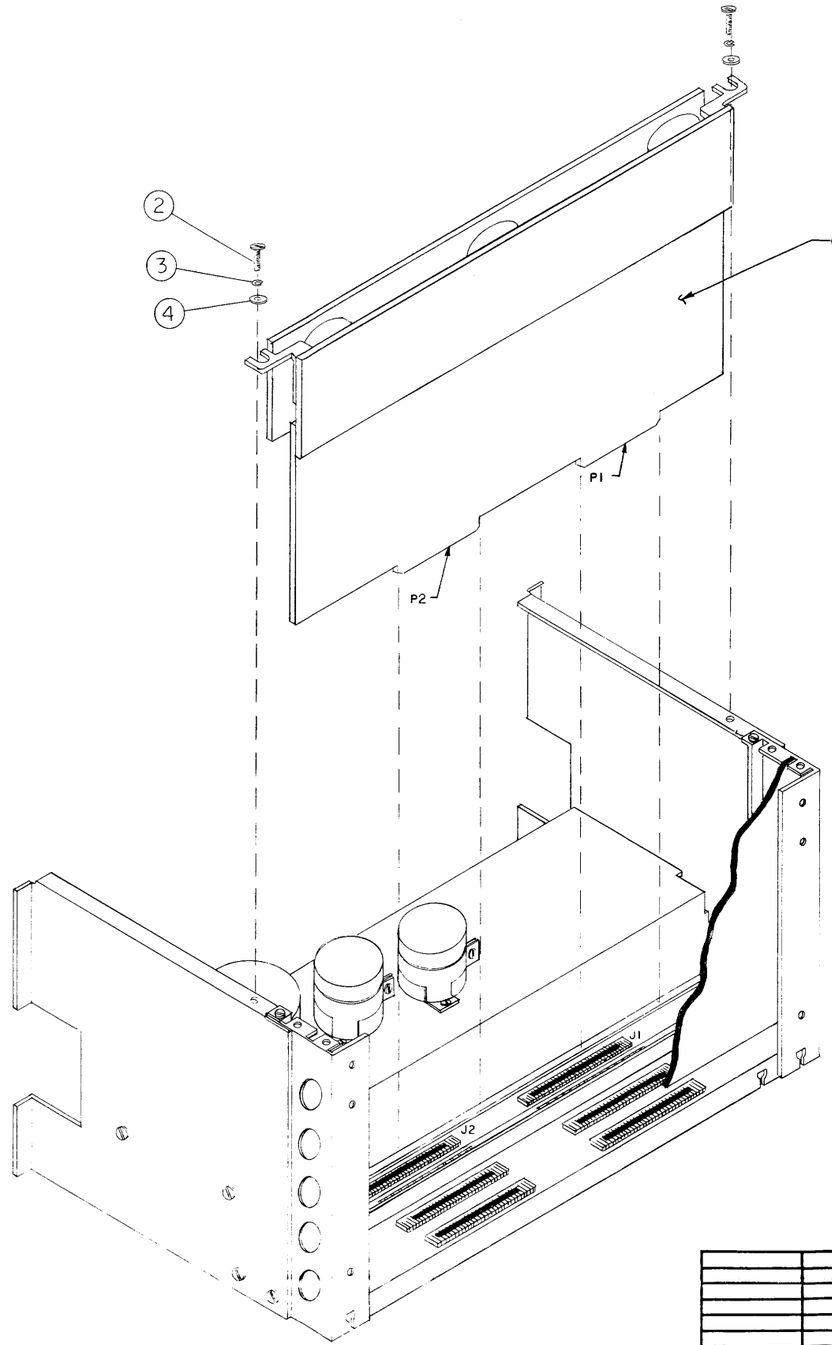
TAPE SPEED	NOMINAL WIDTH OF SKEW GATE (TP6, TP5)
12.5 IPS	35 usec
18.75 IPS	25 usec
25 IPS	18 usec
37.5 IPS	12 usec
45 IPS	10 usec

3) In the case of a seven-track dual density unit switch to the lesser density via the DDS input line or the optional front panel density select switch. View TP5, the low density skew gate, and adjust R24 to obtain the appropriate time indicated above.

11 - ENGINEERING DOCUMENTATION

KIT, MOTOR CONTROL CARD	0051550-0000
ASSEMBLY, MOTOR CONTROL CARD	0050109-0000
PARTS LIST, MOTOR CONTROL CARD	0050109-0001 thru -0009
SCHEMATIC, MOTOR CONTROL CARD	0250028-0000
KIT, WRITE/CONTROL CARD	0051706-0000
ASSEMBLY, WRITE/CONTROL CARD	0051705-0000
PARTS LIST, WRITE/CONTROL CARD	0051705-0001
SCHEMATIC, WRITE/CONTROL CARD	0251704-0000
KIT, READ CARD	0051548-0000
ASSEMBLY, READ CARD, NRZI	0051740-0000
PARTS LIST, READ CARD, NRZI	0051740-0001 thru -0006
ASSEMBLY, READ CARD, PE	0051739-0000
PARTS LIST, READ CARD, PE	0051739-0001 thru -0006
ASSEMBLY, READ CARD, PE/NRZI	0051726-0000
PARTS LIST, READ CARD, PE/NRZI	0051726-0001 thru -0006
SCHEMATIC, READ CARD	0251741-0000
SCHEMATIC, TRANSPORT	0251442-0000
SCHEMATIC, MOTOR CONNECTION	0251640-0000
SCHEMATIC, MOTOR CONNECTION	0251641-0000
SCHEMATIC, MOTOR CONNECTION	0251642-0000
INSTALLATION, AC POWER UNIT	0051546-0000
ASSEMBLY, AC POWER UNIT	0051404-0000
INSTALLATION, CONTROL BLOCK	0051545-0000
SCHEMATIC, CONTROL BLOCK	0251648-0000
ASSEMBLY, BOT/EOT SENSOR	0051553-0000
SCHEMATIC, BOT/EOT SENSOR	0251137-0000
KIT, AC LINE CORD	0051551-0000
ASSEMBLY, AC LINE CORD	0051460-0000
SERVO ASSEMBLY	4110045-0000
PARTS LIST, SERVO ASSEMBLY	0010242-0001

	REVISIONS		
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-19-78	JPK



NOTES:

1. Some parts omitted for the sake of clarity.

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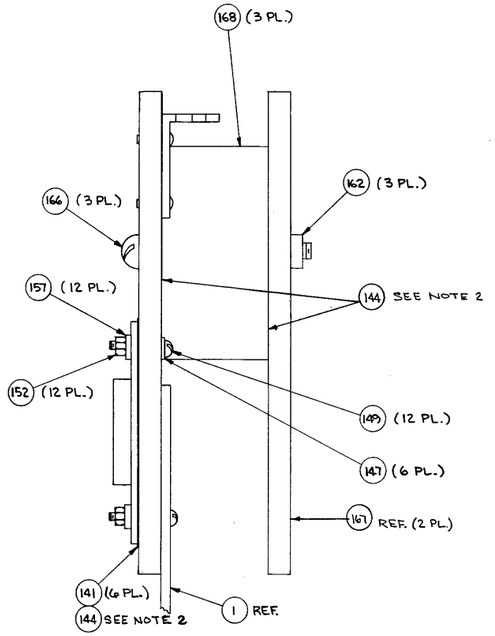
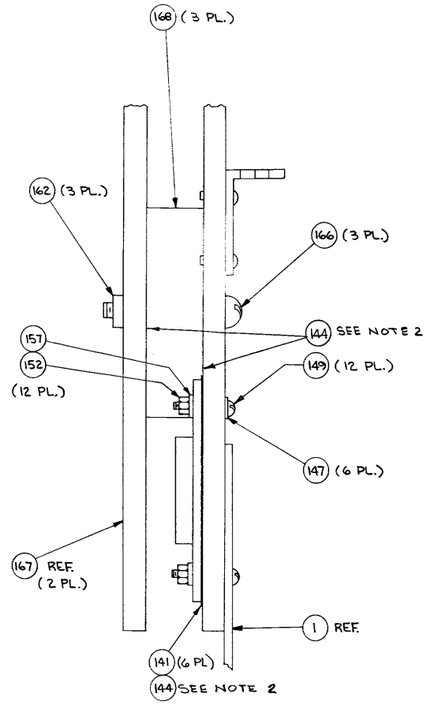
		FINISH-	DR- [illegible]	9-18-78	
		TOLERANCE-UNLESS	CHK- W.E. REYNESS	9-16-78	
		OTHERWISE SPECIFIED	ENG- JPKING	9-19-78	SCALE: NONE / SHEET 1 OF 1
		3 PLACE ±.005	CUST-		
		2 PLACE ±.010			INSTALLATION DRAWING MOTOR CONTROL CARD KIT
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			
1051550-0001/0008		DO NOT SCALE THIS			size D / dwg no CC1551550-0CCC / rev 01
NEXT ASS'Y	USED ON	PRINT			

	REVISIONS		
LTR	DESCRIPTION	DATE	APPROVED
01	CL. B. PRE-RELEASE	11-10-77	JPK
02	ECO-251	2-14-79	JPK

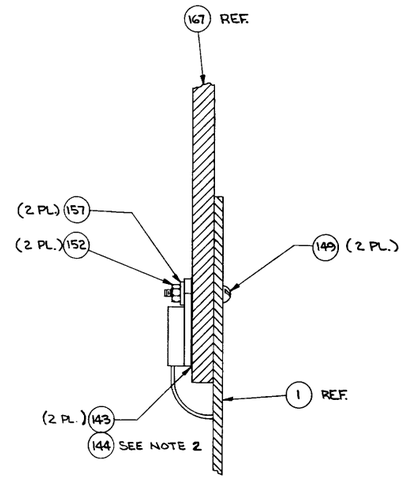


APPLIES TO -0002,-0004,-0006,-0008 ASSEMBLIES ONLY

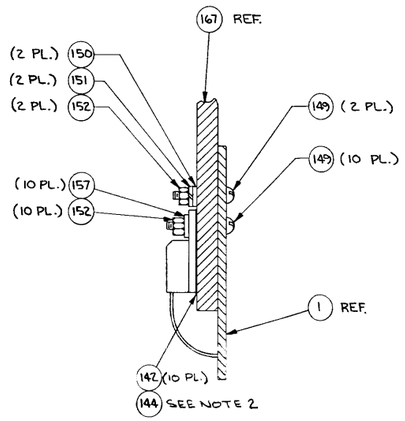
VIEW "A-A"



APPLIES TO -0003,-0005,-0007,-0009 ASSEMBLIES ONLY



SECTION "C-C"



SECTION "B-B"

NOTES:
1. BOARD TO BE INDELIBLY STAMPED WITH ASSEMBLY VERSION NUMBER AND REV. LEVEL IN THE APPROPRIATE AREA.
2. APPLY ITEM 144 TO BOTH SIDES OF ITEMS 141, 142, 143 AND 168.
3. W1 TO BE INSTALLED FROM PIN 8 TO PIN 11 OF U3, WHEN APPLICABLE.

		MATERIAL- ———	SIGNATURE	DATE
		FINISH- ———	DR- Tom Lott	5-25-77
		TOLERANCE-UNLESS	CHK- B. JOHNSON	11-10-77
		OTHERWISE SPECIFIED	ENG- J.P.KING	11-10-77
		3 PLACE ±.005	CUST-	
		2 PLACE ±.010		
		FRACTIONS ± 1/64		
		ANGLES ± 1/2°		
0050109-0001		DO NOT SCALE THIS		
NEXT ASS'Y	USED ON	PRINT		

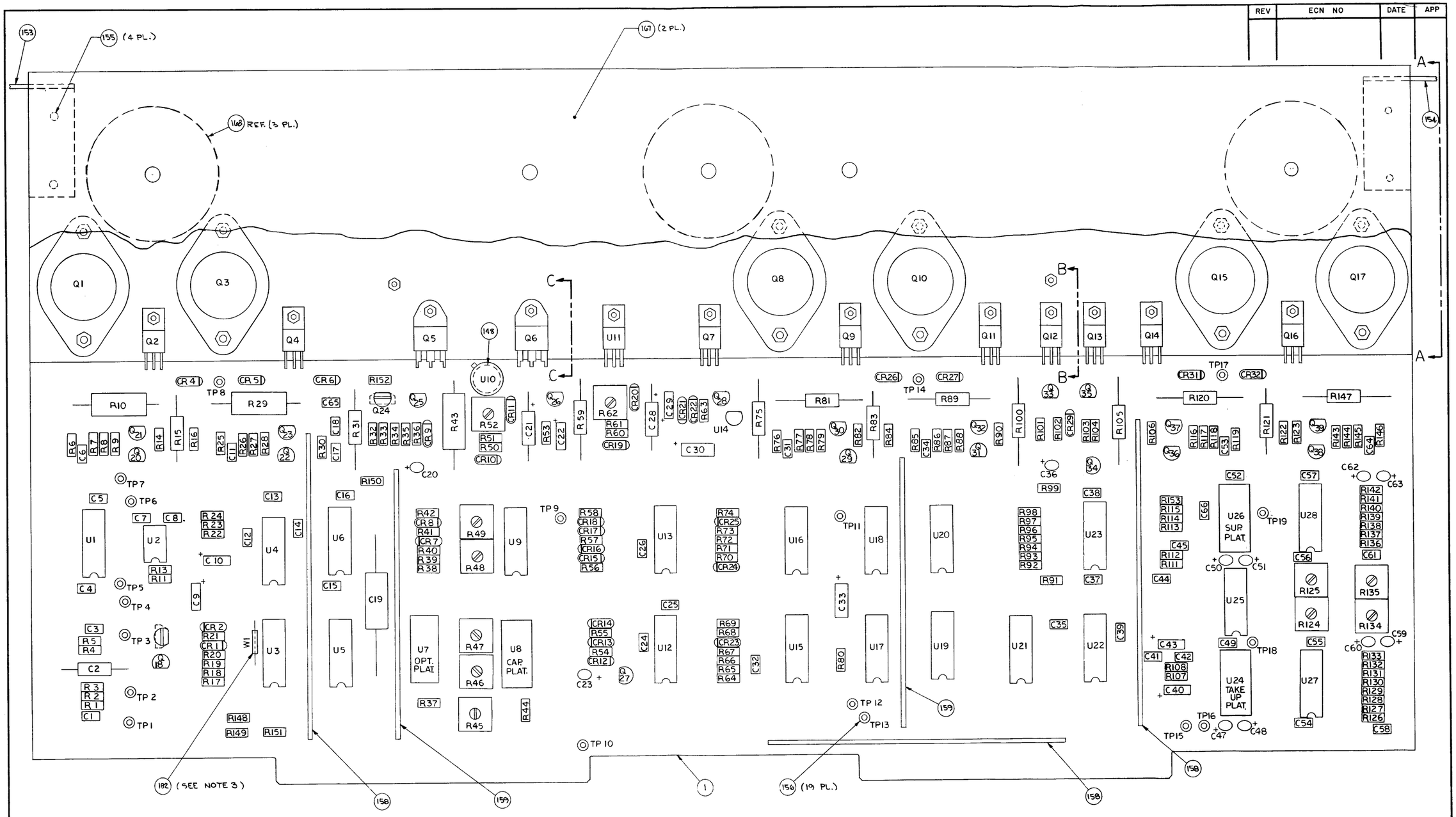
DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

SCALE: 2:1 | SHEET 1 OF 2

ASSEMBLY, MOTOR CONTROL

size	dwg no	rev
D	0050109-0000	02

REV	ECN NO	DATE	APP



REF - THIS ASSEMBLY		
DESIG.	LAST USED	NOT USED
R	R153	R12, R109, R110
C	C66	C27, C46
Q	Q39	
CR	CR32	CR3, CR28, CR30

		MATERIAL- ———	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH- ———	DR- Tom Lee	5-20-7	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ± 1/64 ANGLES ± 1/2°	CHK-		SCALE: 2:1 — SHEET 2 OF 2
			ENG-		ASSEMBLY, MOTOR CONTROL
			CUST-		
		DO NOT SCALE THIS PRINT			size D — dwg no 0050109-0000 — rev 02
NEXT ASS'Y	USED ON				

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
1					1350008-0001	Drill Detail, MC-18	
						INTREGRATED CIRCUITS	
2	1				2450049-3173	Reg. Adj. 3 Term. (317, TO-220)	U11
3	1				2450049-3172	Reg. Adj. 3 Term (317, TO-5)	U10
4	1				2450048-1210	Reg. 3 Term. L.P. Neg. (79L12A)	U14
5	6				2450050-3611	Quad Operational Amp (4136)	U1, U6, U12
							U13, U27, U28
6	1				2450045-3391	Quad Comparator (339)	U23
7	1				2450052-9300	54/74 LS Series TTL Gate (74LS00)	U20
8	1				2450052-9002	54/74 LS Series TTL Gate (74LS02)	U21
9	2				2450053-9006	54/74 Series TTL Gate (7406)	U15, U17
10	1				2450053-9007	54/74 Series TTL Gate (7407)	U16
11	1				2450051-0031	Darlington Tran. Array (2003A)	U19
12	1				2450047-1001	I.C. Timer (555)	U2
13	1				2450047-9002	I.C. Timer (556)	U22
14							
15							
16							
						TRANSISTORS	
17	9				2350016-0001	Transistor, Silicon (NPN)	Q21, Q22, Q25
							Q27, Q28, Q30
							Q31, Q37, Q38

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
E	ECO-251	2-19-79	JPK		
D	ECO-216	10-11-78	JPK		
C	ECO-153	1-24-78	JLK		
B	ECO-132	11-18-77	WPJ		
A	ORIG. ISSUE		JLK	0050105, 0050106, 0050107	

DIGI-DATA CORPORATION

DR 6-30-77 ENG JPK 6-30-77
CHK WPJ 6-30-77
TITLE: ASSEMBLY, MOTOR CONTROL BASIC
P.L. NO. 0050109-0001 SH 1 OF 11 REV E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
18	11				2350017-0001	Transistor, Silicon (PNP)	Q18, Q20, Q23
							Q26, Q29, Q32
							Q33, Q34, Q35
							Q36, Q39
19	1				2350023-0011	Transistor, 1W, (NPN)	Q24
20	1				2350023-0511	Transistor, 1W, (PNP)	Q19
21	4				2350026-6290	Trans.Silicon Med PWR Comp (2N6290)	Q2, Q7, Q9, Q14
22	5				2350026-6109	Trans.Silicon Med PWR Comp (2N6109)	Q4, Q11, Q12
							Q13, Q16
23	3				2350024-5878	Trans. Silicon 150W, Comp (2N5878)	Q3, Q10, Q17
24	3				2350024-5876	Trans. Silicon, 150W, Comp (2N5876)	Q1, Q8, Q15
25	1				2350025-3055	Trans. Silicon 90W, Comp (NPN)	Q5
26	1				2350025-2955	Trans. Silicon 90W, Comp. (PNP)	Q6
27							
28							
29							
						DIODES	
30	13				2550002-9140	Silicon Fast Switching (1N914)	CR6, CR7, CR8
							CR12, CR13
							CR14, CR15
							CR16, CR17
							CR18, CR23

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR ENG
CHK
TITLE: ASSEMBLY, MOTOR CONTROL BASIC
P.L. NO. 0050109-0001 SH 2 OF 11 REV E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
							CR24, CR25
31	9				2550010-4001	Silicon, 1 Amp, (1N4001)	CR1, CR2,
							CR9, CR10,
							CR11, CR19
							CR20, CR21, CR22
32	6				2550010-4002	Silicon, 1 Amp (1N4002)	CR4, CR5, CR26
							CR27, CR31
							CR32
33	1				2550009-2829	8.2V, 1W, 5% Zener	CR29
34							
35							
						CAPACITORS (CERAMIC)	
36	3				2250163-4331	330 pF, 200V, ±10%	C3, C52, C49
37	6				2250160-4102	1000 pF, 100V, ±10%	C6, C11, C31
							C34, C53, C64
38	3				2250161-4822	8200 pF, 100V, ±10%	C58, C61, C45
39	22				2250162-7103	.01 uF, 100V, -20% +80%	C35, C41, C39
							C42, C8, C7
							C13, C32, C37
							C44, C4, C15
							C24, C26, C54
							C56, C5, C16

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR ENG
CHK
TITLE: ASSEMBLY, MOTOR CONTROL BASIC
P.L. NO. 0050109-0001 SH 3 OF 11 REV E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
							C25, C55, C57
							C66
40	2				2250161-4153	.015 uF, 100V, ±10%	C1, C18
41	3				2250162-7104	.1 uF, 100V, -20% +80%	C17, C65, C38
42							
43							
44							
						CAPACITORS (TANTALUM)	
45	4				2250116-4105	1.0 uF, 35V, ±10%	C9, C22, C40
							C43
46							
47	1				2250116-5475	4.7 uF, 35V, ±20%	C29
48							
49							
						CAPACITORS (DIPPED TANTALUM)	
50	4				2250166-4106	10 uF, 15V, ±10%	C60, C59, C62
							C63
51	7				2250166-4226	22 uF, 15V, ±10%	C20, C23, C36
							C47, C48, C50
							C51

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR ENG
CHK
TITLE: ASSEMBLY, MOTOR CONTROL, BASIC
P.L. NO. 0050109-0001 SH 4 OF 11 REV E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
52							
53							
54							
						CAPACITORS (MYLAR)	
55	1				2250121-3105	1.0 uF, 50V, ±5%	C19
56	1				2250121-3333	.033 uF, 50V, ±5%	C2
57							
						CAPACITORS (ALUMINUM)	
58	4				2250119-7226	22 uF, 16V, -20% +80%	C21, C28, C30
							C33
59							
60							
61							
62							
63							
						RESISTORS 1/4W 5%	
64	12				2150004-0100	10	R7,R8,R26,R27,
							R77,R78,R86,R87,
						R117,R118,R144,R145	
65	1				2150004-0470	47	R53

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

DIGI-DATA CORPORATION

DR | ENG
CHK
TITLE: ASSEMBLY, MOTOR CONTROL BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0050109-0001	SH. 5	OF 11	REV. E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
66							
67	4				2150004-0151	150 1/4W, 5%	R19, R63, R35
							R80
68	6				2150004-0201	200	R9,R28,R79,
							R88,R116,R143,
69	3				2150004-0271	270	R50, R133,R142
70	1				2150004-0301	300	R61
71	2				2150004-0471	470	R20, R72
72	2				2150004-0751	750	R21, R92
73	11				2150004-0102	1K	R6,R25,R36,R95,
							R98,R85,R119,
74						R146,R60,R33,R76	
75	2				2150004-0152	1.5K	R66, R67
76	4				2150004-0202	2K	R102, R104
							R126, R136
77	4				2150004-0222	2.2K R103	R93, R132,R141
78	1				2150004-0272	2.7K	R51
79	1				2150004-0302	3K	R70
80	2				2150004-0392	3.9K	R69, R73
81	6				2150004-0472	4.7K	R13, R23, R71
							R96, R151,R149

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

DIGI-DATA CORPORATION

DR | ENG
CHK
TITLE: ASSEMBLY MOTOR CONTROL BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0050109-0001	SH. 6	OF 11	REV. E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
82	1				2150004-0512	5.1K 1/4W, 5%	R17
83	1				2150004-0622	6.2K	R74
84	6				2150004-0103	10K	R18, R37, R44
							R97, R152, R11
85	2				2150004-0153	15K	R130, R139
86	2				2150004-0203	20K	R94, R113
87	4				2150004-0243	24K	R131, R140
							R112, R115
88							
89	3				2150004-0393	39K	R64, R65,R153
90	4				2150004-0563	56K	R68,R129,R138,R57
91	4				2150004-0104	100K	R32, R34, R101
							R111
92	2				2150004-0224	220K	R108, R54
93	1				2150004-0304	300K	R107
94	1				2150004-0564	560K	R58
95	1				2150004-0106	10 Meg.	R38
96	2				2150004-0123	12K	R114, R55
97							
98							

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

DIGI-DATA CORPORATION

DR | ENG
CHK
TITLE: ASSEMBLY, MOTOR CONTROL BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0050109-0001	SH. 7	OF 11	REV. E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
						RESISTORS 1/2W 5%	
99	1				2150006-0620	62	R91
100	3				2150006-0201	200	R16, R84, R122
101	1				2150006-0471	470	R99
102	6				2150006-0821	820	R14, R30, R82
							R90, R106,R123
103							
104							
105							
						RESISTORS 1W 5%	
106	3				2150008-0821	820	R15, R83, R121
107							
108							
						RESISTORS 2W WW 5%	
109	4				2150038-0228	.22	R81, R89, R120
							R147
110	1				2150038-0568	.56	R59
111	1				2150038-0688	.68	R75
112	2				2150038-0519	5.1	R100, R105
113	1				2150038-0180	18	R31

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

DIGI-DATA CORPORATION

DR | ENG
CHK
TITLE: ASSEMBLY, MOTOR CONTROL BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0050109-0001	SH. 8	OF 11	REV. E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
						RESISTORS 5W WW 5%	
114	2				2150039-0188	.18	R10, R29
115	1				2150039-0158	.15	R43
116							
						RESISTORS 1/8W 1% M.F.	
117	1				2150020-2261	2.26K	R3
118	1				2150020-1002	10.0K	R1
119	3				2150020-1332	13.3K	R40, R42,R137
120	2				2150020-3482	34.8K	R39, R41
121	1				2150020-4022	40.2K	R56
122	1				2150020-4322	43.2K	R4
123	1				2150020-4642	46.4K	R128
124	1				2150020-6042	60.4K	R127
125	1				2150020-8662	86.6K	R5
126	1				2150020-2003	200K	R2
127							
128							
129							
						POTENTIOMETERS	
130	2				2150046-1101	Single Turn (100)	R52, R62
131	2				2150046-1102	Single Turn (1K)	R134, R135

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASSEMBLY, MOTOR CONTROL BASIC

P.L. NO.	SH.	OF	REV.
0050109-0001	9	11	E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
132	2				2150046-1502	Single Turn (5K)	R124, R125
133	3				2150046-1103	Single Turn (10K)	R45, R48, R49
134	1				2150046-1503	Single Turn (50K)	R46
135							
136							
						DIP RESISTOR NETWORKS	
137	2				2150049-2002	Resistor Network Dip 14 Pin 1%	U9, U25
138	1				2150048-2472	Resistor Network Dip 14 Pin Pullup	U18
139							
140							
						MISCELLANEOUS	
141	6				2950009-0001	Mica Insulator TO-3	
142	10				2950010-0001	Mica Insulator TO-220	
143	2				2950011-0001	Mica Insulator TIP	
144	AR				9050001-0001	Silicone H.S. Compound	
145	AR				3950000-0001	Solder	
146	3				2950006-0001	Dip Socket, Solder Tail	XU8,XU24,XU26
147	6				5950034-0002	Insulator, Shoulder	
148	1				2950022-0001	Mounting Pad Insulator	
149	26				5050021-0207	Screw #4-40 x 7/16" Bdr. Hd. S.S.	
150	2				5250008-1203	Washer #4 Flat	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASSEMBLY, MOTOR CONTROL BASIC

P.L. NO.	SH.	OF	REV.
0050109-0001	10	11	E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
151	2				5250004-1203	Washer #4 Split Lock	
152	26				5150001-1203	Nut #4-40 Hex	
153	1				1150013-0001	Hold Down, Angle MC	
154	1				1150013-0002	Hold Down, Angle MC	
155	4				5950020-0412	Rivit, Snap Head, .093 x .312	
156	19				2070017-0001	Terminal, Turret, Thru-Hole	TP1,TP2,TP3,
							TP4,TP5,TP6,
						TP7,TP8,TP9,TP10,TP11,TP12,TP13,TP14,TP15,TP16,	
						TP17,TP18,TP19	
157	24				5250005-1202	Washer #4 Int. Tooth	
158	3				2950029-0001	Buss Bar	
159	2				2950029-0002	Buss Bar	
160							
161							
162	3				5950015-1220	Insert Screw Thd. Self Clinch 8-32	
163							
164	REF				0250028-0000	Schematic Diagram, Motor Control Assy.	
165	REF				0050109-0000	ASSY., MOTOR CONTROL	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0001

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASSEMBLY, MOTOR CONTROL BASIC

P.L. NO.	SH.	OF	REV.
0050109-0001	11	11	E

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
166		3			5050005-0416	Scr. Mach. Bdr. Hd. Slt. 8-32x1	
167		2			1150011-0001	Heat Sink	
168		3			1010488-0002	Heat Sink Spacer	
181		AR			2050023-0009	Wire, Buss #24 GA.	W1
182		AR			2950007-0201	Tubing, Teflon, #24	
200		1			0050109-0001	Assy., Motor Control, Basic	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0002

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	ECO-251	7-19-79	JPK		
B	ECO-133	11-18-77	WPJ		

DIGI-DATA CORPORATION

DR yem		ENG	
CHK			

TITLE: ASSY, MOTOR CONTROL SHORT H.S.

P.L. NO.	SH.	OF	REV.
0050109-0002	1	1	C

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
166			3		5050005-0412	Scr. Mach. Bdr. Hd. Slt. 8-32 x 3/4	
167			2		1150011-0002	Heat Sink	
168			3		1010488-0001	Heat Sink Spacer	
181			AR		2050023-0009	Wire, Buss #24 GA.	W1
182			AR		2950007-0201	Tubing, Teflon, #24	
200			1		0050109-0001	Assy., Motor Control, Basic	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0003

DIGI-DATA CORPORATION

DR vem | ENG
CHK
TITLE: ASSY, MOTOR CONTROL TALL H.S.

P.L. NO. 0050109-0003 | SH. 1 OF 1 | REV C

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	ECO-251	2-14-79	JPK		
B	ECO-133	11-18-77	WPJ		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	2	3	4	PART NUMBER	DESCRIPTION	REFERENCE
166				3	5050005-0416	Scr. Mach.Bdr.Hd.Slt. 8-32 x 1	
167				2	1150011-0001	Heat Sink	
168				3	1010488-0002	Heat Sink Spacer	
169				1	2450054-0022	Dual Monostable TTL LS (74LS123)	
170				1	2450053-2006	54/74 Series TTL Gate (7406)	U3
171				2	2250154-7104	Cap. .1uF, 25V, -20% +80% Cer.	C14,C12
172				1	2250116-5475	Cap. 4.7uF, 35V ±20% Tant.	C10
173				1	2150004-0151	Resistor 150 1/4W 5%	R150
174				1	2150004-0472	Resistor 4.7K 1/4W 5%	R148
175				1	2150004-0473	Resistor 47K 1/4W 5%	R24
176				1	2150004-0334	Resistor 330K 1/4W 5%	R22
177				1	2950006-0003	Dip Socket - Solder Tail	U7
200				1	0050109-0001	Assy., Motor Control, Basic	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0004

DIGI-DATA CORPORATION

DR vem | ENG
CHK
TITLE: ASSY, MOTOR CONTROL SHORT H.S. UNATT. REST.

P.L. NO. 0050109-0004 | SH. 1 OF 1 | REV C

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	ECO-251	2-14-79	JPK		
B	ECO-133	11-18-77	WPJ		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	6	7	8	PART NUMBER	DESCRIPTION	REFERENCE
166	3				5050005-0412	Scr.Mach.Bdr.Hd.Slt. 8-32 x 3/4	
167	2				1150011-0002	Heat Sink	
168	3				1010488-0001	Heat Sink Spacer	
169	1				2450054-0022	Dual Monostable TTL LS (74LS123)	U4
170	1				2450053-1006	54/74 Series TTL Gate (7406)	U3
171	2				2250154-7104	Cap. .1uF, 25V, -20% +80% Cer.	C12, C14
172	1				2250116-5475	Cap. 4.7uF, 35V ±20% Tant.	C10
173	1				2150004-0151	Resistor 150 1/4W 5%	R150
174	1				2150004-0472	Resistor 4.7K 1/4W 5%	R148
175	1				2150004-0473	Resistor 47K 1/4W 5%	R24
176	1				2150004-0334	Resistor 330K 1/4W 5%	R22
177	1				2950006-0003	Dip Socket-Solder Tail	U7
200	1				0050109-0001	Assy., Motor Control, Basic	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0005

DIGI-DATA CORPORATION

DR | ENG
CHK
TITLE: Assy, Motor Control Tall H.S., Unatt. Rest.

P.L. NO. 0050109-0005 | SH. 1 OF 1 | REV C

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	ECO-251	2-14-79	JPK		
B	ECO-133	11-18-77	WPJ		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	6	7	8	PART NUMBER	DESCRIPTION	REFERENCE
166		3			5050005-0416	Scr.Mach.Bdr.Hd.Slt. 8-32 x 1	
167		3			1150011-0001	Heat Sink	
168		3			1010488-0002	Heat Sink Spacer	
177		1			2950006-0003	Dip Socket-Solder Tail	U7
178		1			2450046-0001	Analog Switch (AH0134)	U5
179		1			2150046-1103	Potentiometer 10K	R47
181		AR			2050023-0009	Wire, Buss #24 Ga.	W1
182		AR			2950007-0201	Tubing, Teflon #24	
200		1			0050109-0001	Assy. Motor Control, Basic	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0006

DIGI-DATA CORPORATION

DR | ENG
CHK
TITLE: Assy, Motor, Control Short H.S., Dual Speed

P.L. NO. 0050109-0006 | SH. 1 OF 1 | REV C

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	ECO-251	2-14-79	JPK		
B	ECO-133	11-18-77	WPJ		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	6	7	8	PART NUMBER	DESCRIPTION	REFERENCE
166			3		5050005-0412	Scr.Mach.Bdr.Hd.Slt 8-32 x 3/4	
167			2		1150011-0002	Heat Sink	
168			3		1010488-0001	Heat Sink Spacer	
177			1		2950006-0003	Dip Socket-Solder Tail	U7
178			1		2450046-0001	Analog Switch (AH0134)	U5
179			1		2150046-1103	Potentiometer 10K	R47
181			AR		2050023-0009	Wire, Buss #24 Ga.	W1
182			AR		2950007-0201	Tubing, Teflon #24	
200			1		0050109-0001	Assy., Motor Control, Basic	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0007

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: Assy., Motor Control Tall H.S., Dual Speed

P.L. NO. 0050109-0007 | SH. 1 | OF 1 | REV. C

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	ECO-251	2-14-79	JPK		
B	ECO-133	11-18-77	WPJ		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	6	7	8	PART NUMBER	DESCRIPTION	REFERENCE
166			3		5050005-0416	Scr.Mach.Bdr.Hd.Slt. 8-32 x 1	
167			2		1150011-0001	Heat Sink	
168			3		1010488-0002	Heat Sink Spacer	
169			1		2450054-0022	Dual Monostable TTL LS (74LS123)	U4
170			1		2450053-2006	54/74 Series TTL Gate (7406)	U3
171			2		2250154-7104	Cap. .1uF, 25V, $^{-20\%}_{+80\%}$ Cer.	C12,C14
172			1		2250116-5475	Cap. 4.7uF, 35V, ±20% Tant.	C10
173			1		2150004-0151	Resistor 150 1/4W 5%	R150
174			1		2150004-0472	Resistor 4.7K 1/4W 5%	R148
175			1		2150004-0473	Resistor 47K 1/4W 5%	R24
176			1		2150004-0334	Resistor 330K 1/4W 5%	R22
177			1		2950006-0003	Dip Socket-Solder Tail	U7
178			1		2450046-0001	Analog Switch (AH0134)	U5
179			1		2150046-1103	Potentiometer 10K	R47
200			1		0050109-0001	Assy., Motor Control, Basic	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0008

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: Assy., Motor Control Short H.S., U.R. and D.S.

P.L. NO. 0050109-0008 | SH. 1 | OF 1 | REV. C

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	ECO-251	2-14-79	JPK		
B	ECO-133	11-18-77	WPJ		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 9	10	11	12	PART NUMBER	DESCRIPTION	REFERENCE
166	3				5050005-0412	Scr.Mach.Bdr.Hd.Slt. 8-32 x 3/4	
167	2				1150011-0002	Heat Sink	
168	3				1010488-0001	Heat Sink Spacer	
169	1				2450054-0022	Dual Monostable TTL LS (74LS123)	U4
170	1				2450053-2006	54/74 Series TTL Gate (7406)	U3
171	2				2250154-7104	Cap. .1uF, 25V $^{-20\%}_{+80\%}$ Cer.	C12,C14
172	1				2250116-5475	Cap. 4.7uF, 35V, ±20% Tant.	C10
173	1				2150004-0151	Resistor 150 1/4W 5%	R150
174	1				2150004-0472	Resistor 4.7K 1/4W 5%	R148
175	1				2150004-0473	Resistor 47K 1/4W 5%	R24
176	1				2150004-0334	Resistor 330K 1/4W 5%	R22
177	1				2950006-0003	Dip Socket-Solder Tail	U7
178	1				2450046-0001	Analog Switch (AH0134)	U5
179	1				2150046-1103	Potentiometer 10K	R47
200	1				0050109-0001	Assy., Motor Control, Basic	

BASIC VERSION

NOTES:

P.L. NO. 0050109-0009

DIGI-DATA CORPORATION

DR		ENG	
CHK			

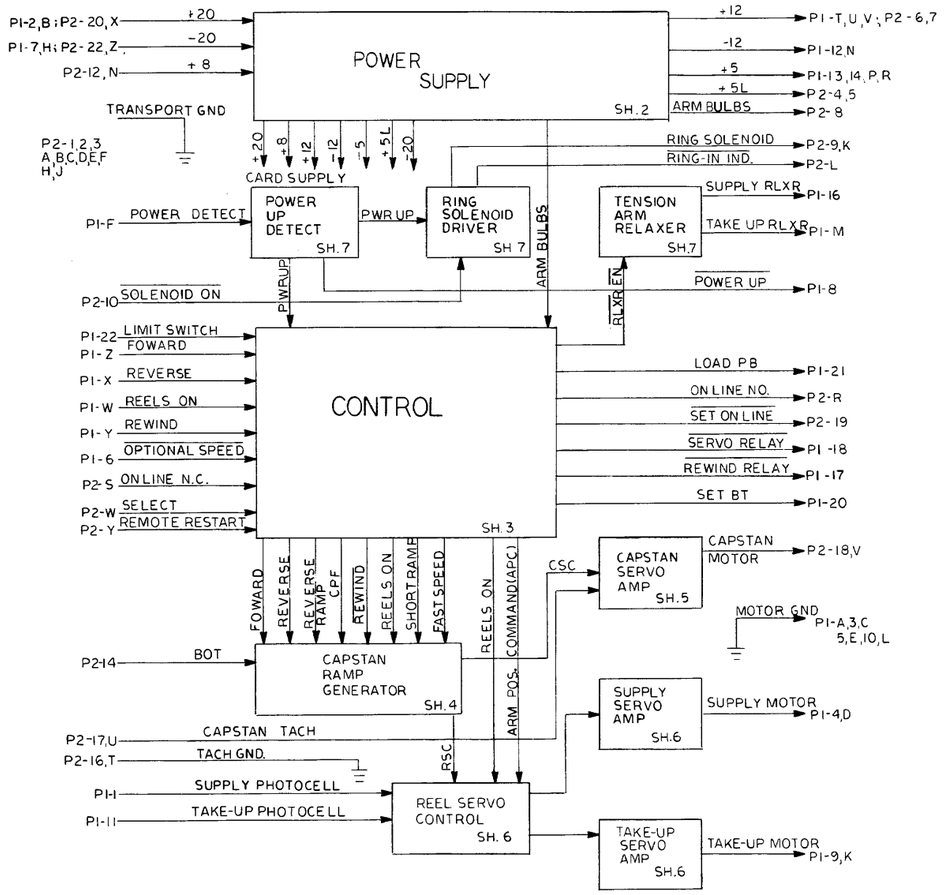
TITLE: Assy., Motor Control Tall H.S., U.R. and D.S.

P.L. NO. 0050109-0009 | SH. 1 | OF 1 | REV. C

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	ECO-251	2-14-79	JPK		
B	ECO-133	11-18-77	WPJ		

D.D. FORM 04-1-50001-0000

REV	ECN NO	DATE	APP
01	CL. B - PRE-RELEASE	8-30-77	JPK
02	ECO - 133	11-18-77	WPJ
03	ECO - 158	1-24-78	JPK
04	ECO - 216	10-11-78	JPK
05	ECO - 251	2-14-79	JPK



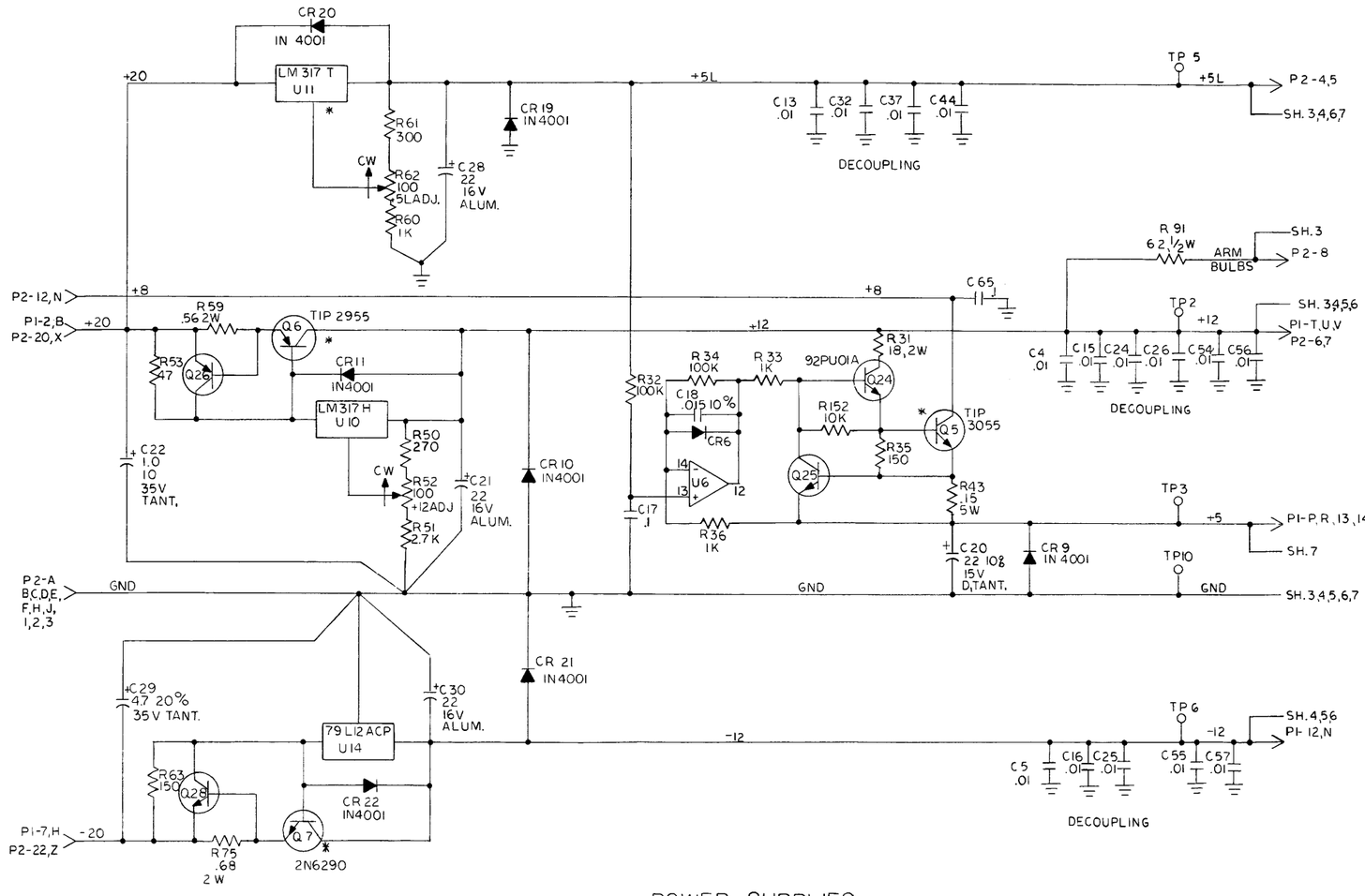
BLOCK DIAGRAM

NOTES:

1. UNLESS OTHERWISE SPECIFIED:
   - A. ALL DISCRETE RESISTORS ARE 1/4 W, 5 % CARBON FILM TYPES EXCEPT 1 % RESISTORS ARE 1/8 W METAL FILM TYPES.
   - B. ALL CAPACITORS ARE 25V -20 % +80 % CERAMIC TYPES.
   - C. ALL DIODES ARE IN 914 OR EQUIVALENT.
   - D. ALL OPERATIONAL AMPLIFIERS ARE RC 4136 OR EQUIVALENT.
   - E. ALL LOGIC IS SN74LSXXX SERIES EXCEPT U3, U15, U16, U17 ARE SN74XXX SERIES.
2. ALL RESISTANCES ARE IN OHMS.
3. ALL CAPACITANCES ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
4. * = HEATSINK.

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- Adrian P. Baker	9/8/77	
		TOLERANCE-UNLESS	CHK- B. JOHNSON	8-30-77	
		OTHERWISE SPECIFIED	ENG- J.P. KING	8-30-77	SCALE: NONE / SHEET 1 OF 7
		3 PLACE ±.005	CUST-		
		2 PLACE ±.010			SCHEMATIC DIAGRAM MOTOR CONTROL ASSY.
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			
0050109-0001		DO NOT SCALE THIS			size D / dwg no 0250028-0000 / rev 05
NEXT ASS'Y	USED ON	PRINT			

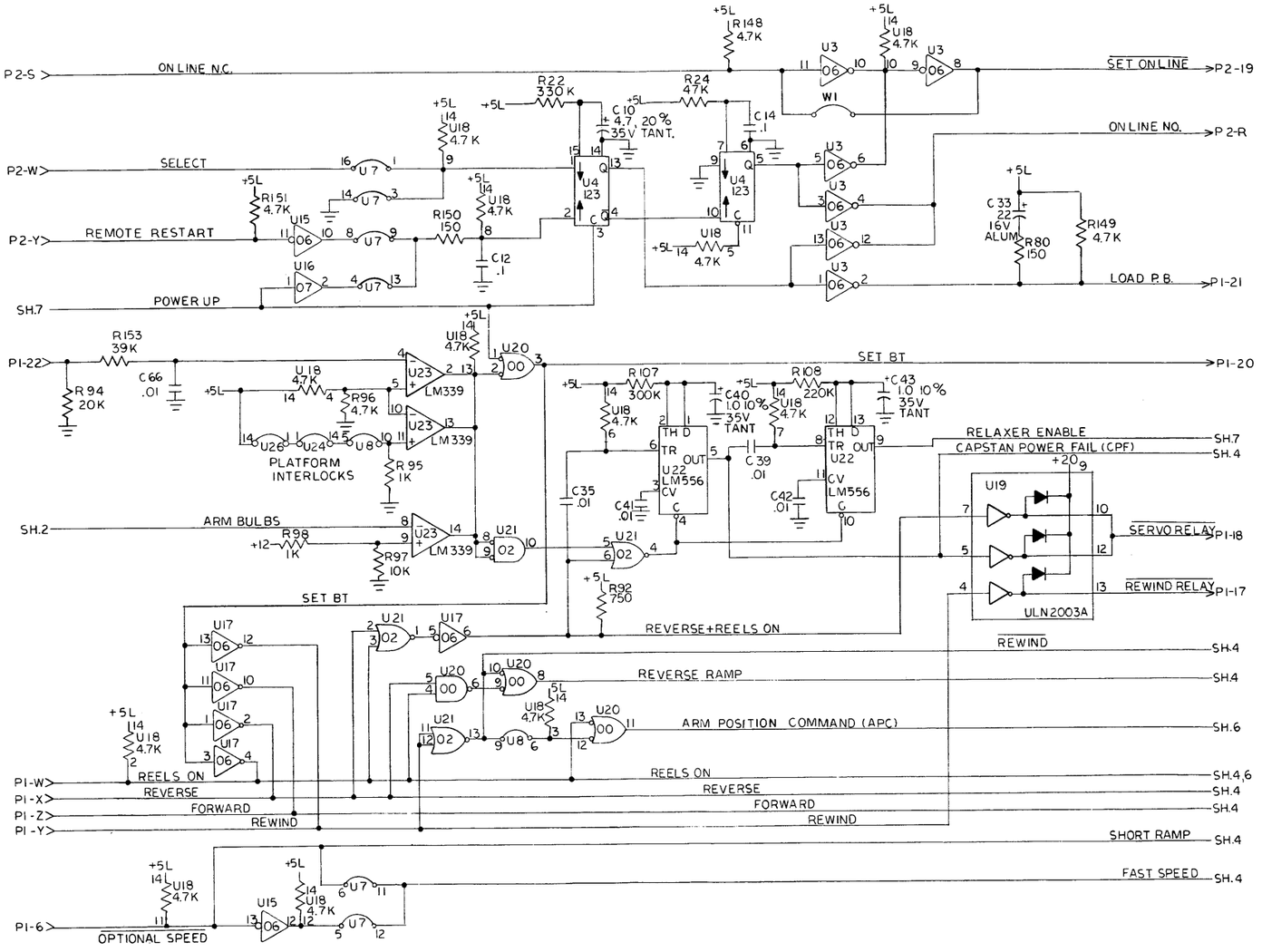
REV	ECN NO	DATE	APP



POWER SUPPLIES

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- Graham R. Frahe	6/9/77	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ± 1/64 ANGLES ± 1/2°	CHK-		SCALE: NONE — SHEET 2 OF 7
			ENG-		
			CUST-		SCHEMATIC DIAGRAM MOTOR CONTROL ASSY.
NEXT ASS'Y	USED ON	DO NOT SCALE THIS PRINT			size D — dwg no 0250028-0000 — rev 05

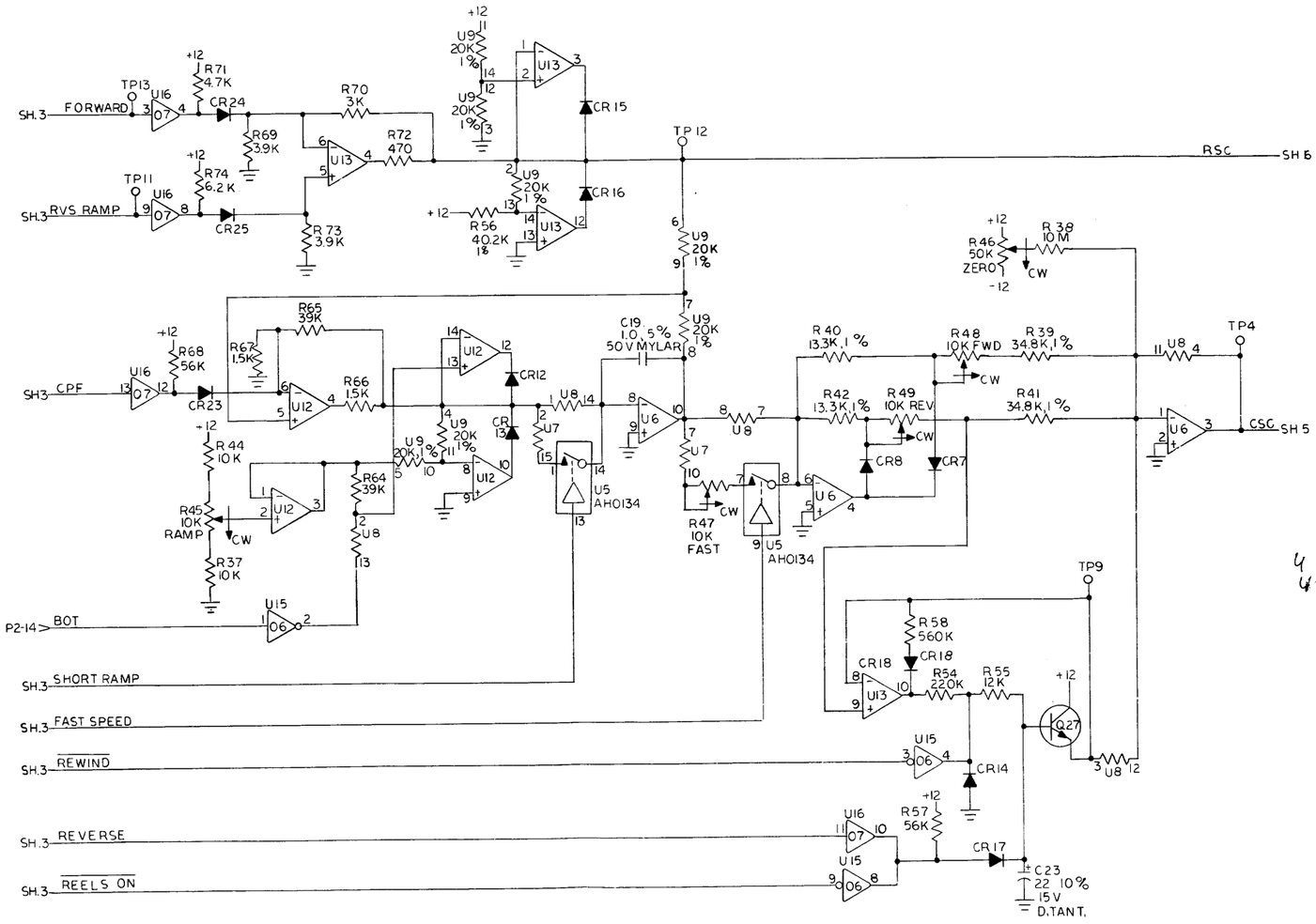
REV	ECN NO	DATE	APP



CONTROL

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		~~FINISH~~-	DR- William R. Rueke	4/4/77	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-		SCALE: NONE SHEET 3 OF 7
		3 PLACE ±.005	ENG-		
		2 PLACE ±.010	CUST-		SCHEMATIC DIAGRAM MOTOR CONTROL ASSY.
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			
		DO NOT SCALE THIS PRINT			size D dwg no 0250028-0000 rev 05
NEXT ASS'Y	USED ON				

REV	ECN NO	DATE	APP

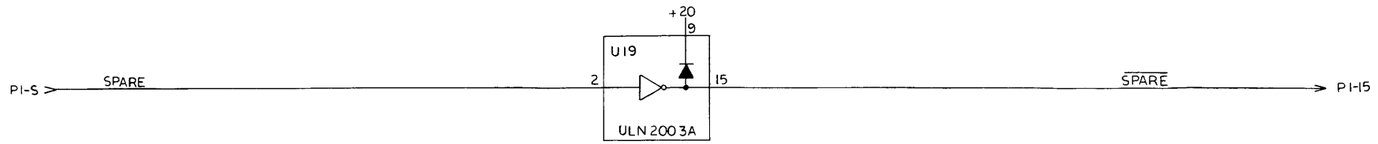


4 6, 4 12 - 4136
4 13

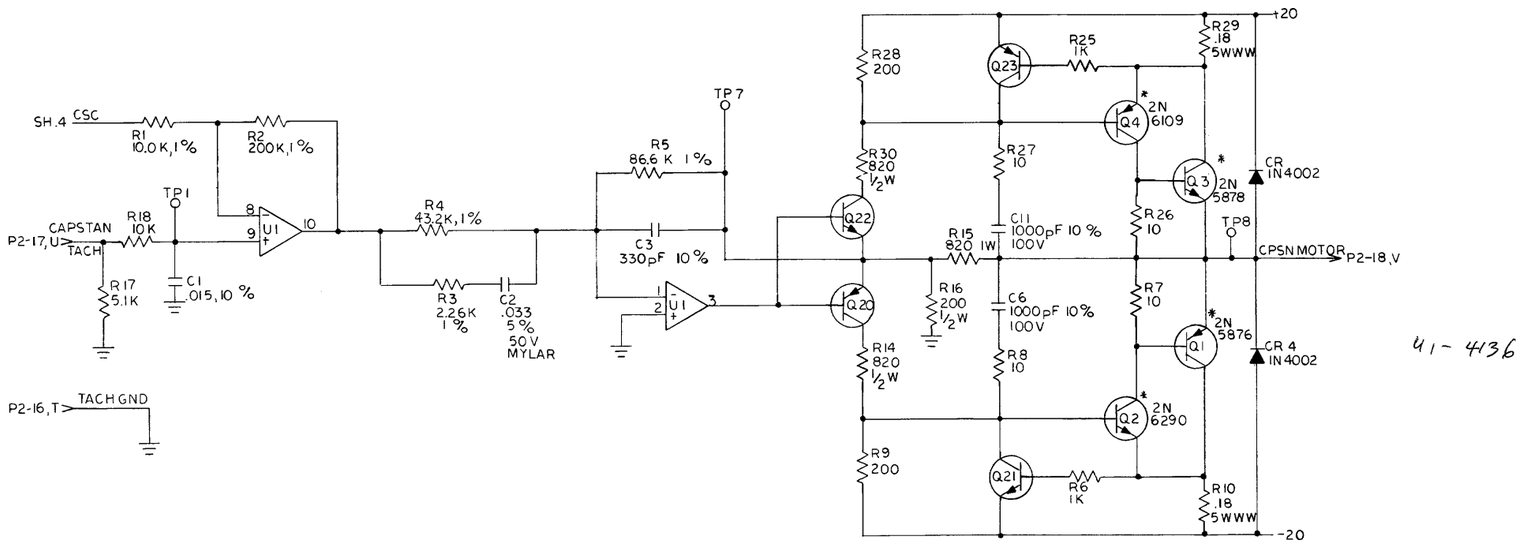
CAPSTAN RAMP GENERATOR

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- William R. Hanke	6/19/77	
		TOLERANCE-UNLESS	CHK-		SCALE: NONE SHEET 4 OF 7
		OTHERWISE SPECIFIED	ENG-		
		3 PLACE ±.005	CUST-		SCHEMATIC DIAGRAM MOTOR CONTROL ASSY.
		2 PLACE ±.010			
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			size D dwg no 0250028-0000 rev 05
		DO NOT SCALE THIS			
NEXT ASS'Y	USED ON	PRINT			

REV	ECN NO	DATE	APP

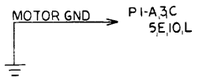


LAMP DRIVER (SPARE)



41-4136

CAPSTAN SERVO AMP



		MATERIAL-	SIGNATURE	DATE
		FINISH-	DR- William F. Burke	6/15/77
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-	
		3 PLACE ±.005	ENG-	
		2 PLACE ±.010	CUST-	
		FRACTIONS ±1/64		
		ANGLES ±½°		
		DO NOT SCALE THIS PRINT		
NEXT ASS'Y	USED ON			

DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

SCALE: NONE | SHEET 5 OF 7

SCHEMATIC DIAGRAM
MOTOR CONTROL ASSY.

size D | dwg no 0250028-0000 | rev 05

CAPSTAN SERVO

REV	ECN NO	DATE	APP

TP1 –
2 – +12V
3 – +5V
4 –
5 – +5L
6 – –12
7 –
8 –
9 –
10 – GND

TAKE UP POSITION PHOTOCELL

PH1 TAKE UP P.C.

TP15

R132 2.2K
R124 5K TUARC
R131 24K
CW
R130 15K
R134 1K TUCEN
R129 56K
C58 8200pF 10%
R126 2K

REEL SPEED CONTROL (& DIRECTION)

SH.4 RSC

R130 60.4K, 1%
U25 20K 1%
TP18

R133 270
C59 10, 10% 15V TANT
C60 10, 10% 15V TANT
U24
C49 330pF 10%
4136

ARM POSITION COMMAND

SH.3 APC

U16
R128 46.6K 1%
U25 20K, 1%
U25 20K 1%
C47 22, 10% 15V D. TANT
C48 22, 10% 15V D. TANT

+5L
U17
REELS ON
R137 13.3K, 1%
U25 20K, 1%
U25 20K 1%
U25 20K 1%

SUPPLY POSITION PHOTOCELL

PI-1 SUPPLY PC.

TP16
R139 15K
R135 1K SUPCEN
R138 56K
C61 8200pF 10%
R136 2K
R125 5K SUPARC
R141 2.2K
R140 24K
TP19
C50 22, 10% 15V D. TANT
C51 22, 10% 15V D. TANT
C52 330pF 10%
R142 270
C63 10, 10% 15V DTANT
C62 10, 10% 15V D. TANT
U26

ILIM+

R88 200
R90 820 ½W
R82 820 ½W
R79 200
Q32
R85 1K
Q11 2N 6109
R89 .22 2W
Q10 2N 5878
R87 10
C34 1000pF, 10% 100V
R86 10
R83 820, 1W
TP14
T.U. MOTOR
PI-K9
Q31
Q29
R84 200 ½W
C31 1000pF, 10% 100V
R78 10
R77 10
Q8 2N 5876
Q9 2N 6290
Q30
R76 1K
R81 .22 2W
+20
CR27 IN4002
CR26 IN4002
-20
ILIM-

R143 200
R123 820 ½W
R106 820 ½W
R116 200
Q39
R146 1K
Q16 2N 6109
R147 .22 2W
Q17 2N 5878
R144 10
C64 1000pF, 10% 100V
R145 10
R121 820, 1W
TP17
SPLY MOTOR
PI-D, 4
Q38
Q36
R122 200 ½W
C53 1000pF 10% 100V
R118 10
R117 10
Q15 2N 5876
Q14 2N 6290
Q37
R119 1K
R120 .22 2W
+20
CR 32 IN4002
CR 31 IN4002
-20

REEL SERVOS

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- William R. Cooke	6/23/77	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ± 1/64 ANGLES ± 1/2°	CHK-		SCALE: NONE — SHEET 6 OF 7
			ENG-		SCHEMATIC DIAGRAM MOTOR CONTROL ASSY.
			CUST-		
NEXT ASS'Y	USED ON	DO NOT SCALE THIS PRINT			size D — dwg no 0250028-0000 — rev 05

REV	ECN NO	DATE	APP

P1-F > POWER DETECT

+8 — R113 20K — C45 8200pF — R114 12K

+5L — R112 24K

+20 — C38 .01

U23 LM339 (pins 6, 7, 3, 1, 12)

+5L — R93 2.2K

R111 100K

R115 24K

POWER UP > P1-8

+5L — 14 U18 4.7K 1

5 — 06 — 6 U15

POWER UP SH.3

POWER UP DETECT

+5L — R11 10K — R13 4.7K — C9 1.0 10% 35V TANT.

+5L — R23 4.7K

P2-10 > SOL.ON — C8 .01

FROM WRITE CTRL SHT 5A PA-L

SOURCE: RING ON SOLENOID MICROSWITCH VIA WRITE CTRL PB-E "SWITCHED +12" PRESENT ONLY IF RING IS IN.

LM555 U2 (6 TH, 7 D, 2 TR, 3 OUT, 5 CV, 4 C)

C7 .01

POWER UP

+20 — 9 U19 — 3 — ULN2003A — 14

92PU51A Q19 — +20

R21 750

+5 — Q18 — R19 150

CR1 IN4001

CR2 IN4001

RING SOLENOID > P2-K,9

R20 470

+20 — 9 U19 — 1 — ULN 2003A — 16

RING-IN IND > P2-L

RING SOLENOID DRIVER

+20

U24 (12, 3) — R100 5.1 3W — Q12 2N6109 — Q33

U26 (12, 3) — R105 5.1 3W — Q13 2N6109 — Q35 — R104 2K

R102 2K

SUPPLY RELAXER > P1-16

TAKE-UP RELAXER > P1-M

+20 — 9 U19 — 6 — ULN2003A — 11

SH.3 RELAX EN,

R99 470 1/2W — CR29 8.2V 5% 1W — R103 2.2K

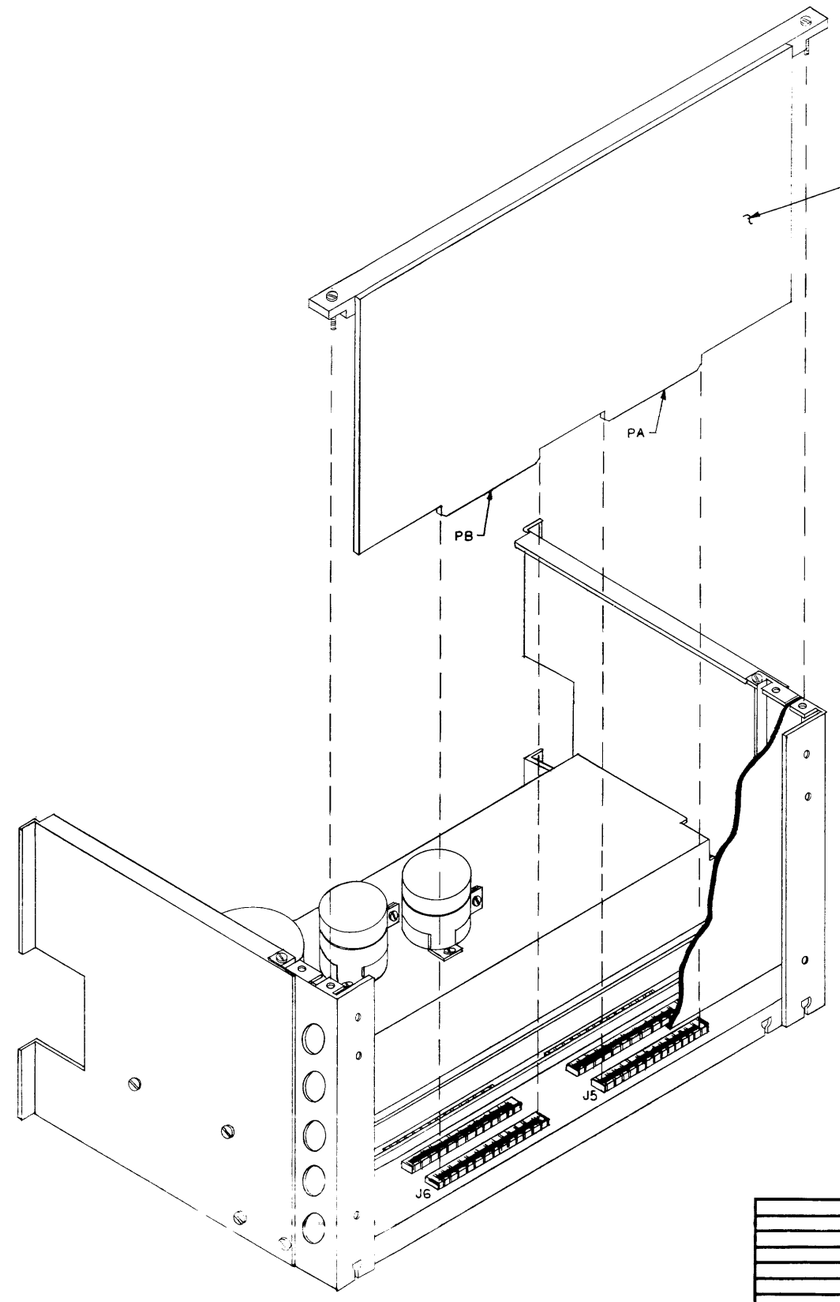
C36 22,10% 15V D TANT — R101 100K

Q34

TENSION ARM RELAXER

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794	
		FINISH-	DR- Walter F. Bahr	6/14/77		
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-		SCALE: NONE	SHEET 7 OF 7
		3 PLACE ±.005	ENG-			
		2 PLACE ±.010	CUST-		SCHEMATIC DIAGRAM MOTOR CONTROL ASSY.	
		FRACTIONS ± 1/64				
		ANGLES ± 1/2°				
		DO NOT SCALE THIS PRINT			size D	dwg no 0250028-0000
NEXT ASS'Y	USED ON					rev 05

	REVISIONS		
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	2-14-79	MJD

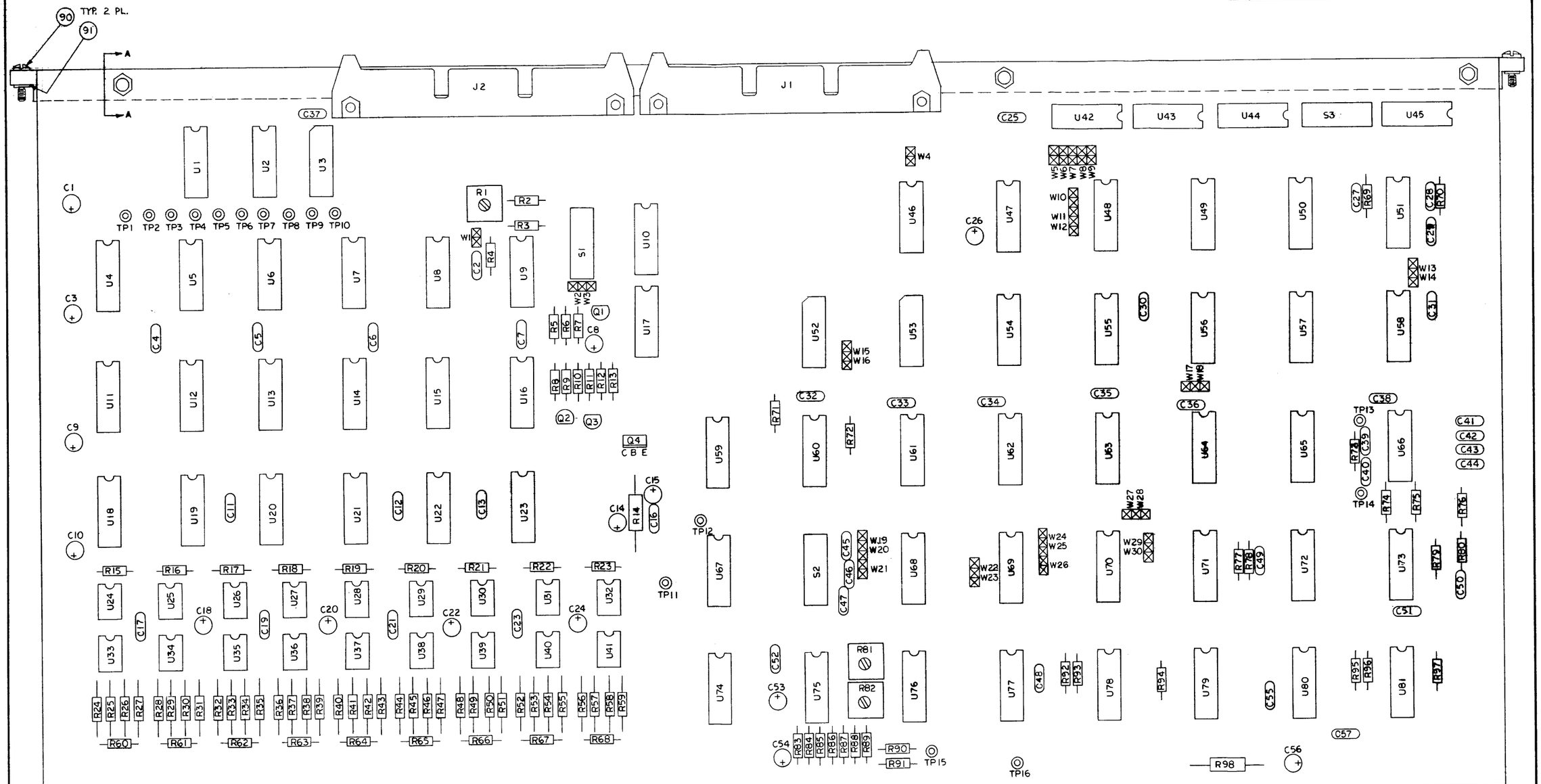


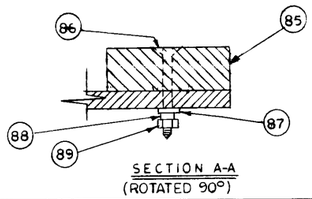
NOTES:

1. Some parts omitted for the sake of clarity.
2. Item 3, Jumper Terminals to be shipped with each unit.

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR-		
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ± 1/64 ANGLES ± 1/2°	CHK-W. FRENESS	2-14-79	SCALE: NONE SHEET 1 OF 1
			ENG- M. LINDSAY	2-21-79	
			CUST-		INSTALLATION DRAWING DUAL WRITE CONTROL CARD KIT
0051706-0001		DO NOT SCALE THIS PRINT			size D dwg no 0051706-0000 rev 01
NEXT ASS'Y	USED ON				

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	2-13-79	[illegible]

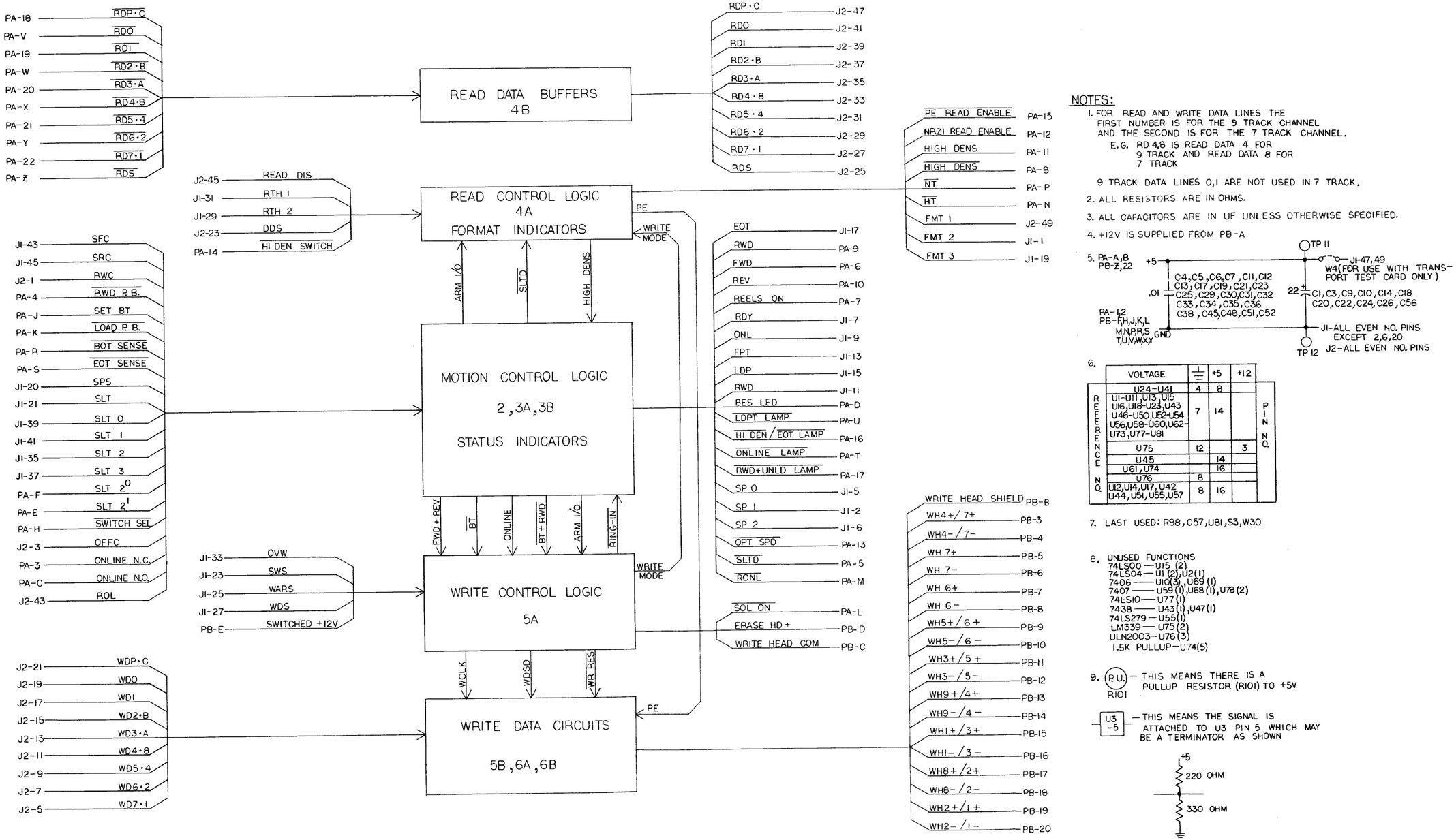




SECTION A-A
(ROTATED 90°)

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION
		FINISH-	DR-B. BRYANT	5-18-78	8580 DORSEY RUN ROAD
		TOLERANCE-UNLESS	CHK-S. [illegible]	7-25-78	JESSUP, MD. 20794
		OTHERWISE SPECIFIED	ENG-M. [illegible]	2-13-79	SCALE: 2:1 SHEET 1 OF 1
		3 PLACE ±.005	CUST-		
		2 PLACE ±.010			ASSEMBLY DUAL WRITE CONTROL CARD
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			SIZE D dwg no 0051705-0000 REV 01
0051704-0001		DO NOT SCALE THIS PRINT			
NEXT ASS'Y	USED ON				

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS 'B' RELEASE	2-13-79	[illegible]



NOTES:

1. FOR READ AND WRITE DATA LINES THE FIRST NUMBER IS FOR THE 9 TRACK CHANNEL AND THE SECOND IS FOR THE 7 TRACK CHANNEL.
   E.G. RD 4,8 IS READ DATA 4 FOR 9 TRACK AND READ DATA 8 FOR 7 TRACK

   9 TRACK DATA LINES 0,1 ARE NOT USED IN 7 TRACK.
2. ALL RESISTORS ARE IN OHMS.
3. ALL CAPACITORS ARE IN UF UNLESS OTHERWISE SPECIFIED.
4. +12V IS SUPPLIED FROM PB-A
5. PA-A,B PB-Z,22 +5 — C4,C5,C6,C7,C11,C12 C13,C17,C19,C21,C23 C25,C29,C30,C31,C32 C33,C34,C35,C36 C38,C45,C48,C51,C52 (.01) — TP 11 — JI-47,49 W4(FOR USE WITH TRANSPORT TEST CARD ONLY) — 22 uF C1,C3,C9,C10,C14,C18 C20,C22,C24,C26,C56 — JI-ALL EVEN NO. PINS EXCEPT 2,6,20 J2-ALL EVEN NO. PINS — TP 12
   PA-1,2 PB-F,H,J,K,L M,N,P,R,S T,U,V,W,X,Y GND
6.

REFERENCE NO.	VOLTAGE	⏚	+5	+12	PIN NO.
	U24-U41	4	8		
	U1-U11,U13,U15 U16,U18-U23,U43 U46-U50,U52-U54 U56,U58-U60,U62-U73,U77-U81	7	14		
	U75	12		3	
	U45		14		
	U61,U74		16		
	U76	8			
	U12,U14,U17,U42 U44,U51,U55,U57	8	16		

7. LAST USED: R98,C57,U81,S3,W30
8. UNUSED FUNCTIONS
   74LS00 — U15 (2)
   74LS04 — U1 (2),U2(1)
   7406 — U10(3),U69(1)
   7407 — U59(1),U68(1),U78(2)
   74LS10 — U77(1)
   7438 — U43(1),U47(1)
   74LS279 — U55(1)
   LM339 — U75(2)
   ULN2003 — U76(3)
   1.5K PULLUP — U74(5)
9. (P.U.) R101 — THIS MEANS THERE IS A PULLUP RESISTOR (R101) TO +5V

   U3 -5 — THIS MEANS THE SIGNAL IS ATTACHED TO U3 PIN 5 WHICH MAY BE A TERMINATOR AS SHOWN

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- S. HEISHMAN	6/15/78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ± 1/64 ANGLES ± 1/2°	CHK- W. FURNESS	2-13-79	SCALE: NONE SHEET 1 OF 6
			ENG- [illegible]	9-13-79	
			CUST-		SCHEMATIC, DUAL WRITE CONTROL CARD
0051705-0001		DO NOT SCALE THIS PRINT			size D dwg no 0251704-0000 rev 01
NEXT ASS'Y	USED ON				

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
1	1	1351702-0001	DRILL DETAIL, 78 DCW	
2				
3				
			INTEGRATED CIRCUITS	
4	1	2450053-9000	54/74 SERIES TTL GATE	U72
5	7	2450052-9000	54/74 LS SERIES TTL GATE	U11,U13,U15,U20,
				U22,U63,U64
6	1	2450052-9002	54/74 LS SERIES TTL GATE	U80
7	5	2450053-9014	54/74 SERIES TTL GATE	U1,U2,U54,U58,
				U71
8	4	2450053-9006	54/74 SERIES TTL GATE	U10,U48,U60,U69
9	4	2450053-9007	54/74 SERIES TTL GATE	U59,U67,U68,U78
10	2	2450053-9010	54/74 SERIES TTL GATE	U62,U77
11	1	2450053-9011	54/74 SERIES TTL GATE	U79
12	1	2450052-9012	54/74 LS SERIES TTL GATE	U70
13	1	2450053-9021	54/74 SERIES TTL GATE	U65
14	1	2450052-9027	54/74 LS SERIES TTL GATE	U49
15	1	2450052-9032	54/74 LS SERIES TTL GATE	U56
16	3	2450053-9038	54/78 SERIES TTL GATE	U43,U46,U47
17	3	2451171-1074	54/74 SERIES TTL D FLIP-FLOP	U50,U73,U81
18	5	2450052-9086	54/74 LS SERIES TTL GATE	U4,U5,U6,U7,U8
19	5	2451344-9114	54/74 LS SERIES TTL EDGE TRIGGERED FLIP-FLOP	U16,U18,U19,U21,

BASIC / VERSION

NOTES:

P.L. NO. 0051705-0001

DIGI-DATA CORPORATION

DR	2-13-79	ENG	
CHK	2-13-79		

TITLE: ASSEMBLY; DUAL WRITE CONTROL CARD BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CCB 8661			0051706-0001	

P.L. NO. 0051705-0001 | SH. 1 OF 6 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
				U23
20	1	2450056-9121	54/74 SERIES TTL MONOSTABLE MULTIVIBRATOR	U9
21	1	2450054-0022	54/74 LS SERIES TTL MONOSTABLE MULTIVIBRATOR	U51
22	1	2451288-9157	54/74 SERIES DATA SELECTORS/ MULTIPLEXERS	U44
23	2	2451306-9174	54/74 LS SERIES D-TYPE FLIP-FLOP WITH CLEAR	U12,U14
24	1	2451310-9253	54/74 LS SERIES DATA SELECT/ MULTIPLEXER	U42
25	2	2451508-9279	54/74 LS SERIES QUAD $\overline{S}$-$\overline{R}$ LATCHES	U55,U57
26	1	2451386-0002	32 x 8 TRI-STATE PROM	U17
27	18	2451194-2152	DUAL PERIPHERAL DRIVER	U24,U25,U26,U27,
				U28,U29,U30,U31,
				U32,U33,U34,U35,U36,U37,U38,U39,U40,U41
28	1	2450051-0031	DARLINGTON TRANSISTOR ARRAY	U76
29	1	2450047-2002	I.C. TIMER	U66
30	1	2450045-3391	QUAD COMPARITOR	U75
31	2	2151498-3152	RESISTOR NETWORK, DIP, 16 PIN PULLUP	U61,U74
32	1	2150048-3472	RESISTOR NETWORK, DIP, 14 PIN PULLUP	U45
33				
34				
35				
36				
37				

BASIC / VERSION

NOTES:

P.L. NO. 0051705-0001

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASSEMBLY; DUAL WRITE CONTROL CARD BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051705-0001 | SH. 2 OF 6 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			RESISTORS, 1/4 W, 5%	
38	2	2150004-0470	47 OHM	R12,R86
39	1	2150004-0221	220 OHM	R79
40	2	2150004-0331	330 OHM	R11,R13
41	2	2150004-0471	470 OHM	R95,R96
42				
43	6	2150004-0152	1.5K OHM	R2,R8,R71,R77,
				R93,R97
44	9	2150004-0472	4.7K OHM	R3,R7,R10,R72,
				R75,R83,R89,R92,R94
45				
46	5	2150004-0103	10K OHM	R9,R76,R80,R90,
				R91
47	2	2150004-0123	12K OHM	R4,R5
48	2	2150004-0273	27K OHM	R85,R87
49	2	2150004-0393	39K OHM	R70,R73
50				
51	1	2150004-0164	160K OHM	R69
52	2	2150004-0474	470K OHM	R84,R88
53	1	2150004-0365	3.6M OHM	R74
54	1	2150004-0106	10M OHM	R78
55				

BASIC / VERSION

NOTES:

P.L. NO. 0051705-0001

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASSEMBLY; DUAL WRITE CONTROL CARD BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051705-0001 | SH. 3 OF 6 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			RESISTORS, 1/2W, 5%	
56	18	2150006-0331	330 OHM	R24,R26,R28,R30
				R32,R34,R36,R38
			R40,R42,R44,R46,R48,R50,R52,R54,R56,R58	
57	18	2150006-0511	510 OHM	R25,R27,R29,R31
				R33,R35,R37,R39
			R41,R43,R45,R47,R49,R51,R53,R55,R57,R59	
58				
			RESISTORS, 1W, 5%	
59	1	2150016-0360	36 OHM	R98
60	1	2150016-0201	200 OHM	R14
61				
			POTENTIOMETER, SINGLE TURN	
62	1	2150046-1203	20K OHM	R1
63	2	2150046-1503	50K OHM	R81,R82
64				
			CAPACITORS, MONOLITHIC CERAMIC	
65	1	2250160-4560	56pF, 10%, 100V	C28
66	2	2250160-4271	270pF,10%,100V	C2,C27
67	3	2250161-4102	.001uF,10%,100V	C46,C47,C49

BASIC / VERSION

NOTES:

P.L. NO. 0051705-0001

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASSEMBLY; DUAL WRITE CONTROL CARD BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051705-0001 | SH. 4 OF 6 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1				PART NUMBER	DESCRIPTION	REFERENCE
68	27				2250162-7103	.01uF, -20, +80%, 100V	C4,C6,C7,C12,C17
							C19,C21,C23,C25,
						C29,C30,C31,C33,C34,C36,C38,C39,C40,C42,C43,C44,	
						C45,C48,C52,C55,C32,C37	
69	2				2250161-4104	.1uF, 100V, 10%	C41,C50
70							
71							
						CAPACITORS, DIPPPED SOLID TANTALUM	
72	3				2250166-4225	2.2uF, 15V, 10%	C8,C15,C54
73	4				2250166-4226	22uF, 15V, 10%	C14,C18,C53,C56
74							
75	1				2350017-0001	TRANSISTOR, SILICON (PNP)	Q2
76	2				2350016-0001	TRANSISTOR, SILICON (NPN)	Q1,Q3
77	1				2350023-0011	TRANSISTOR, 1W, (NPN)	Q4
78							
						MISCELLANEOUS	
79	50				2951271-0001	STRAIGHT HEADER	W1,W2,W3,W4,W5,
							W6,W7,W8,W9,W10,
						W11,W12,W13,W14,W15,W16,W17,W18,W19,W20,W21,W22,	
						W23,W24,W25,W26,W27,W28,W29,W30	
80	3				2950006-0001	DIP SOCKET, 14 PIN	U3,U52,U53

BASIC VERSION

NOTES:

P.L. NO. 0051705-0000

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASSEMBLY; DUAL WRITE CONTROL CARD BASIC

P.L. NO.	SH.	OF	REV.
0051705-0001	5	6	D

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1				PART NUMBER	DESCRIPTION	REFERENCE
81	2				2060016-0001	DIP SWITCH	S1,S3
82	1				2060005-0009	SLIDE SWITCH	S2
83	16				2070017-0001	TERMINAL, TURRET	TP1,TP2,TP3,TP4,
							TP5,TP6,TP7,TP8,
						TP9,TP10,TP11,TP12,TP13,TP14,TP15,	TP16
84	2				2051246-0005	I/O CONNECTOR, 50 PIN	J1,J2
85	1				1051458-0001	CARD HOLD-DOWN RAIL	
86	3				5050014-0210	SCREW FLAT HD 4-40 x 5/8 LG	
87	3				5250008-1203	WASHER, #4, FLAT	
88	3				5250004-1203	WASHER, #4, SPL. LOCK	
89	3				5150001-1203	NUT, HEX, 4-40	
90	2				5051537-0307	SCREW, CAPTIVE	
91	2				5051538-1102	WASHER, RETAINING	
92	AR				3950000-0001	SOLDER	
93							
94							
95							
96							
97							
98							
99	REF				0051705-0000	ASSEMBLY;DUAL WRITE/CONTROL CARD	
100	REF				0251704-0000	SCHEMATIC;DUAL WRITE/CONTROL CARD	

BASIC VERSION

NOTES:

P.L. NO. 0051705-0001

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASSEMBLY;DUAL WRITE CONTROL CARD BASIC

P.L. NO.	SH.	OF	REV.
0051705-0001	6	6	C

D.D. FORM 04-1-50001-0000

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

CONN	SOURCE PAGE	NAME
	3B	ONLINE
JI-43		SFC
	2	ARM 1/0
JI-45		SRC
	3A	BOT
J2-1		RWC
PA-4		RWD P. B.
	3A	DLY 1
	3A	EOT
PA-J		SET BT
PA-K		LOAD P B
	3A	BOT
	2	AUNLD
	3A	DLY 2
	3B	SLTD
	5A	RING-IN
	3A	EOT
	2	FWD
	2	REV

NAME	DESTINATION PAGE	CONN
FWD	2	PA-6
FWD+REV	5A	
REV	2	PA-10
RWD		PA-9
RWD 1	3A	
RWD+UNLD	3A	
LOC RWD	3B	
AUNLD	2	
REELS ON		PA-7
BT	3A,3B,5A	
LOAD P.B.	3A	
UNLD	3B	
LD	3A	
RDY		JI-7
ARM 1/0	2,3A,4A,5A	
ONL		JI-9
RWD		JI-11
BT+RWD	5A	
LDP		JI-15
FPT		JI-13
EOT		JI-17
LEOT	3A	

MOTION CONTROL AND STATUS INDICATORS

MATERIAL-	SIGNATURE	DATE
FINISH-	DR- S. HEISHMAN	6/15/78
TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-	
3 PLACE ± .005	ENG-	
2 PLACE ± .010	CUST-	
FRACTIONS ± 1/64		
ANGLES ± 1/2°		
DO NOT SCALE THIS PRINT		

NEXT ASS'Y | USED ON

DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

SCALE: NONE | SHEET 2 OF 6

SCHEMATIC, DUAL WRITE CONTROL CARD

size D | dwg no 0251704-0000 | rev 01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

CONN	SOURCE PAGE	NAME
PA-R		BOT SENSE
PA-S		EOT SENSE
	2	LOAD P.B.
	3B	ON LINE PRESSED

NAME	DESTINATION PAGE	CONN
BES LEC		PA-D
BOT	2	
BOT	2,3A	
EOT	2	
EOT	2	

BOT AND EOT DETECTORS

2	LD
2	RWD I
3A	BOT
2	BT

NAME	DESTINATION PAGE	CONN
DLY2	2	
DLY1	2	

DELAY 1 AND DELAY 2

4A	HIGH DENS	W22	
2	LEOT	W23	
3B	ONLINE	W27	
2	ARM 1/0	W28	
2	RWD + UNLD		

NAME	DESTINATION PAGE	CONN
LDPT LAMP		PA-U
HI DEN/ EOT LAMP		PA-16
ONLINE LAMP		PA-T
RWD + UNLD LAMP		PA-17

LAMP DRIVERS

3A

CONN	SOURCE PAGE	NAME
JI-20		SPS
JI-21		SLT
JI-39		SLT Ø
JI-41		SLT 1
JI-35		SLT 2
JI-37		SLT 3
PA-F		SLT 2^0
PA-E		SLT 2^1
PA-H		SWITCH SEL

NAME	DESTINATION PAGE	CONN
SP1		JI-2
SPO		JI-5
SP2		JI-6
OPT SPD		PA-13

SPEED INDICATORS

		SLTD	2
	4A	SLTD	PA-5

TRANSPORT SELECTION

J2-3		OFFC	
2		UNLD	
2		LOC RWD	
2		BT	
PA-3		ONLINE NC.	
PA-C		ONLINE N.O.	
J2-43		ROL	

NAME	DESTINATION PAGE	CONN
ONLINE	2,3A,5A	
ONLINE PRESSED	3A	
RONL		PA-M

ONLINE FLIP-FLOP 3B

		MATERIAL-	SIGNATURE	DATE
		FINISH-	DR- S. HEITSMAN	6/16/78
		TOLERANCE-UNLESS	CHK-	
		OTHERWISE SPECIFIED	ENG-	
		3 PLACE ±.005	CUST-	
		2 PLACE ±.010		
		FRACTIONS ± 1/64		
		ANGLES ± 1/2°		
		DO NOT SCALE THIS		
NEXT ASS'Y	USED ON	PRINT		

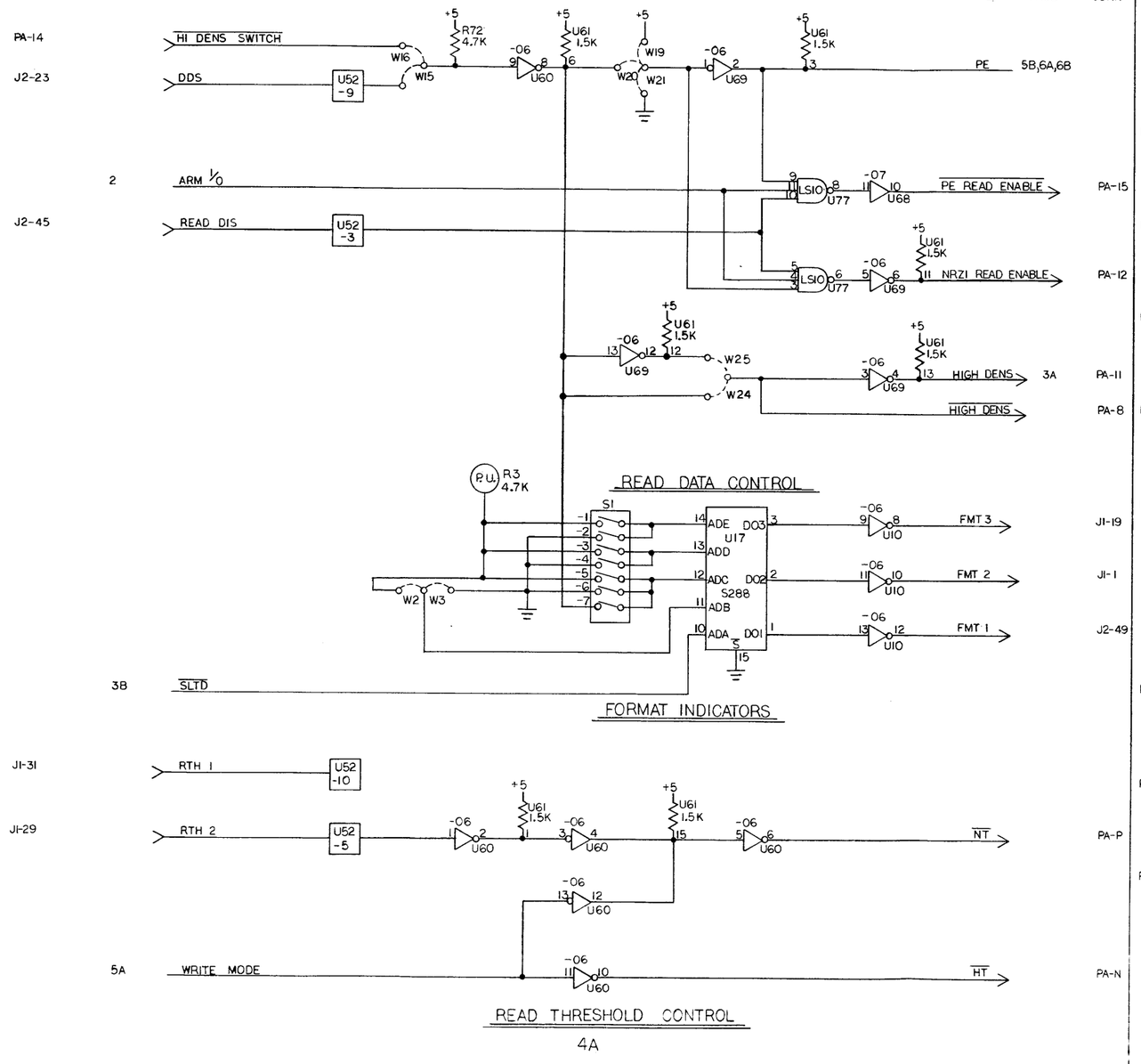
DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

SCALE: NONE | SHEET 3 OF 6

SCHEMATIC, DUAL WRITE CONTROL CARD

size D | dwg no 0251704-0000 | rev 01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- S. HEISHMAN	6/19/78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ±1/64 ANGLES ±½°	CHK-		SCALE: NONE — SHEET 4 OF 6
			ENG-		SCHEMATIC, DUAL WRITE CONTROL CARD
			CUST-		
		DO NOT SCALE THIS PRINT			size D — dwg no 025170-4-0000 — rev 01
NEXT ASS'Y	USED ON				

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

CONN	SOURCE PAGE	NAME
	2	FWD+REV
	2	$\overline{BT}$
J1-33		OVW
J1-23		SWS
	3B	ONLINE
J1-25		WARS
	2	$\overline{BT+RWD}$
PB-E		FROM MICROSWITCH ON RING DETECTER — SWITCHED +12
	2	ARM I/O
	5A	WRITE MODE
J1-27		WDS
	5A	WRITE MODE

NAME	DESTINATION PAGE	CONN
WRITE MODE	5A	
WRITE MODE	4A,5A	
To MOTOR CTRL SHT 7	P2-7C	
$\overline{SOL\ ON}$		PA-L
RING IN	2	
ONLY PRESENT IF RING IS IN (GENERATES FPT ON SHT 2)		
$\overline{WR\ RES}$	5B,6A,6B	
WCLK	5B,6A,6B	
WDSD	5B,6A,6B	
WRITE HEAD COM		PB-C
ERASE HD +		PB-D

WRITE CONTROL

WRITE POWER

5A

CONN	SOURCE PAGE	NAME
	5A	WCLK
J2-21		WDP•C
	4A	PE
	5A	$\overline{WR\ RES}$
	5A	WDSD
J2-19		WDO
J2-17		WDI

NAME	CONN
WH4+/7+	PB-3
WH4-/7-	PB-4
WH7+	PB-5
WH7-	PB-6
WH6+	PB-7
WH6-	PB-8

WRITE CIRCUITS

5B

		MATERIAL-	SIGNATURE	DATE
		FINISH-	DR-S. HEISHMAN	6/20/78
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-	
		3 PLACE ±.005	ENG-	
		2 PLACE ±.010	CUST-	
		FRACTIONS ±1/64		
		ANGLES ±½°		
		DO NOT SCALE THIS PRINT		
NEXT ASS'Y	USED ON			

DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

SCALE: NONE — SHEET 5 OF 6

SCHEMATIC, DUAL WRITE CONTROL CARD

size D — dwg no 0251704-0000 — rev C1

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

CONN	SOURCE PAGE	NAME	NAME	CONN
J2-15	5A	WCLK	WH5+/6+	PB-9
		WD2-B	WH5-/6-	PB-10
	4A	PE		
	5A	WR RES		
	5A	WDSD		
J2-13		WD3-A	WH3+/5+	PB-11
			WH3-/5	PB-12
J2-11		WD4-8	WH9+/4+	PB-13
			WH9-/4-	PB-14

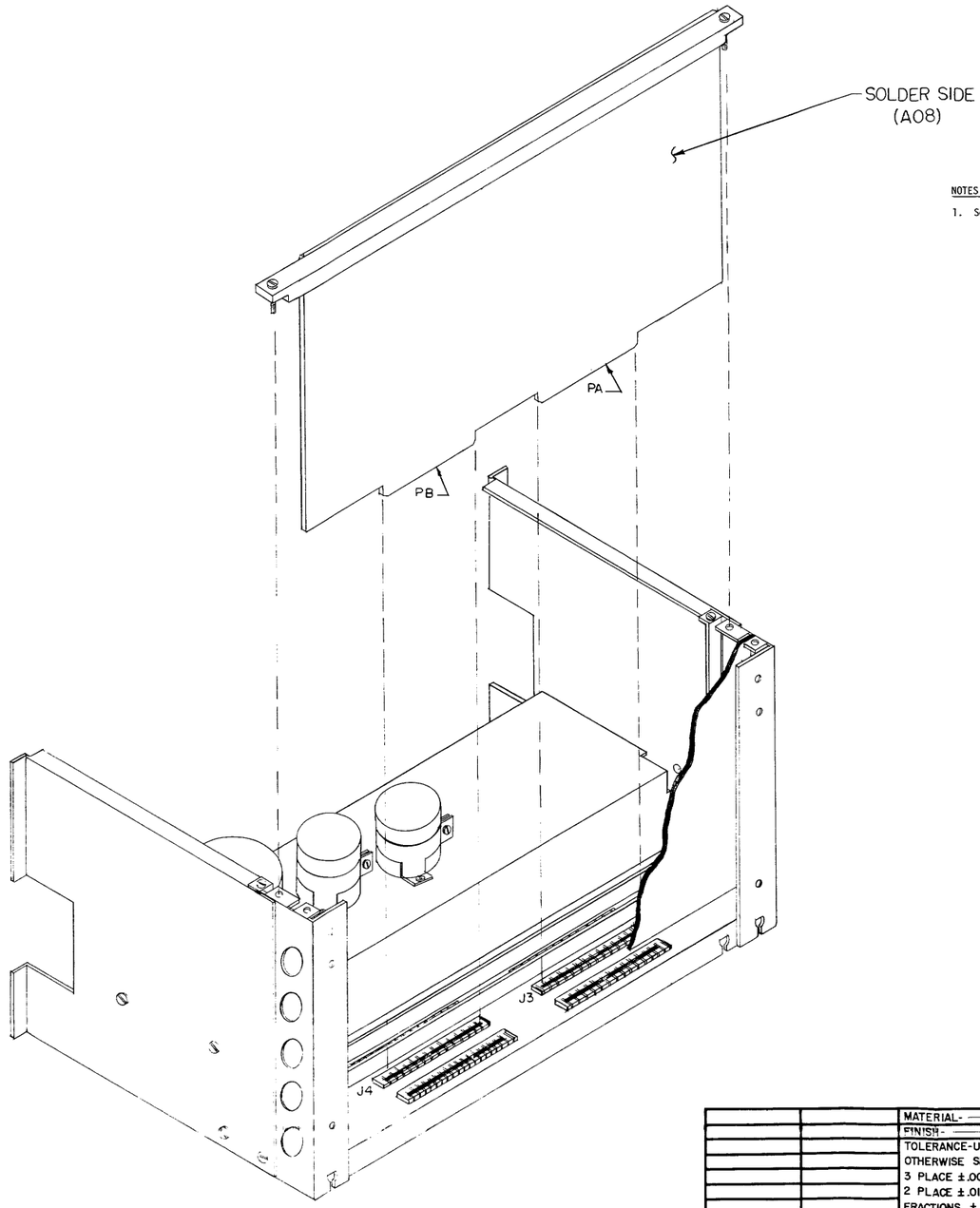
WRITE CIRCUITS
6A

CONN	SOURCE PAGE	NAME	NAME	CONN
J2-9	5A	WCLK	WH1+/3+	PB-15
		WD5-4	WH1-/3	PB-16
	4A	PE		
	5A	WR RES		
	5A	WDSD		
J2-7		WD6-2	WH 8+/2+	PB-17
			WH 8-/2-	PB-18
J2-5		WD7-1	WH 2+/1+	PB-19
			WH 2-/1-	PB-20

WRITE CIRCUITS
6B

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- S. REISHMAN	6/21/78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-		SCALE: NONE — SHEET 6 OF 6
		3 PLACE ±.005	ENG-		
		2 PLACE ±.010	CUST-		SCHEMATIC, DUAL WRITE CONTROL CARD
		FRACTIONS ±1/64			
		ANGLES ±½°			size D — dwg no 0251704-0000 — rev 01
NEXT ASS'Y	USED ON	DO NOT SCALE THIS PRINT			

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-19-78	JPK

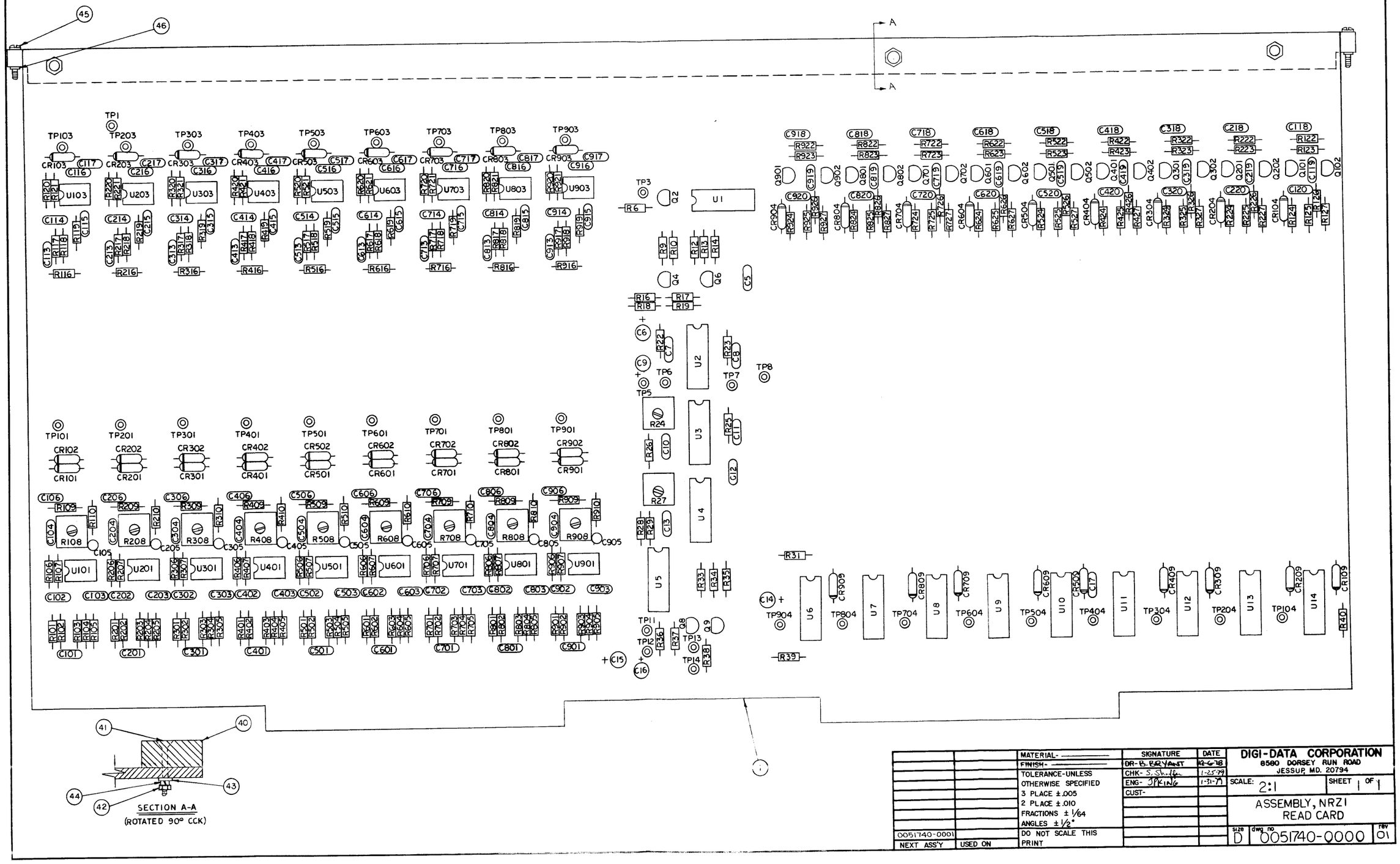


NOTES:

1. Some parts omitted for the sake of clarity.

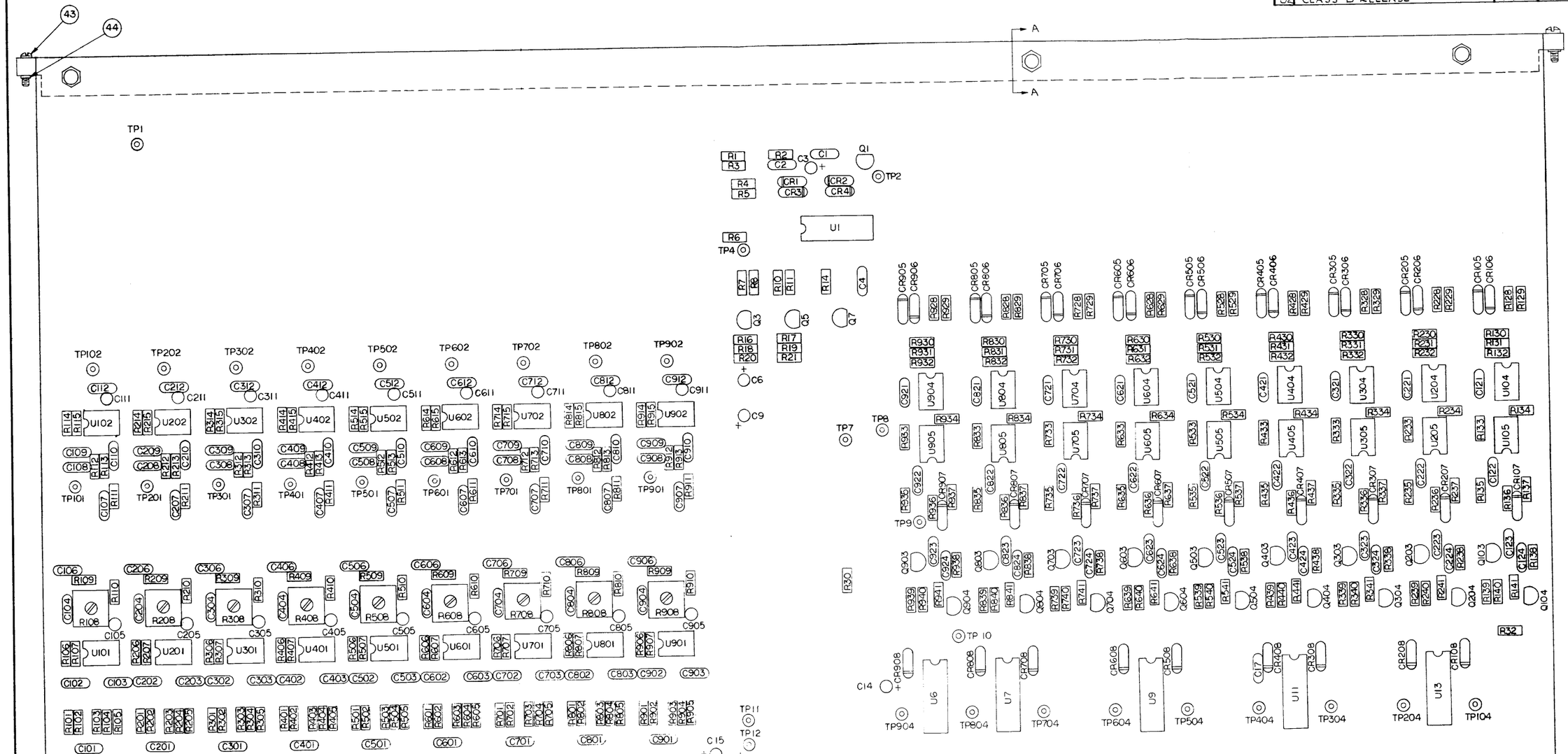
		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR-		
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ± 1/64 ANGLES ± 1/2°	CHK- W. C. FORNESS	9-15-78	SCALE: NONE / SHEET 1 OF 1
			ENG- J.P. KING	9-11-76	
			CUST-		INSTALLATION DRAWING READ CARD KIT
0051548-0001/02		DO NOT SCALE THIS PRINT			size D / dwg no 0051548-0000 / rev 01
NEXT ASS'Y	USED ON				

LTR	REVISIONS DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	1-31-79	JPK



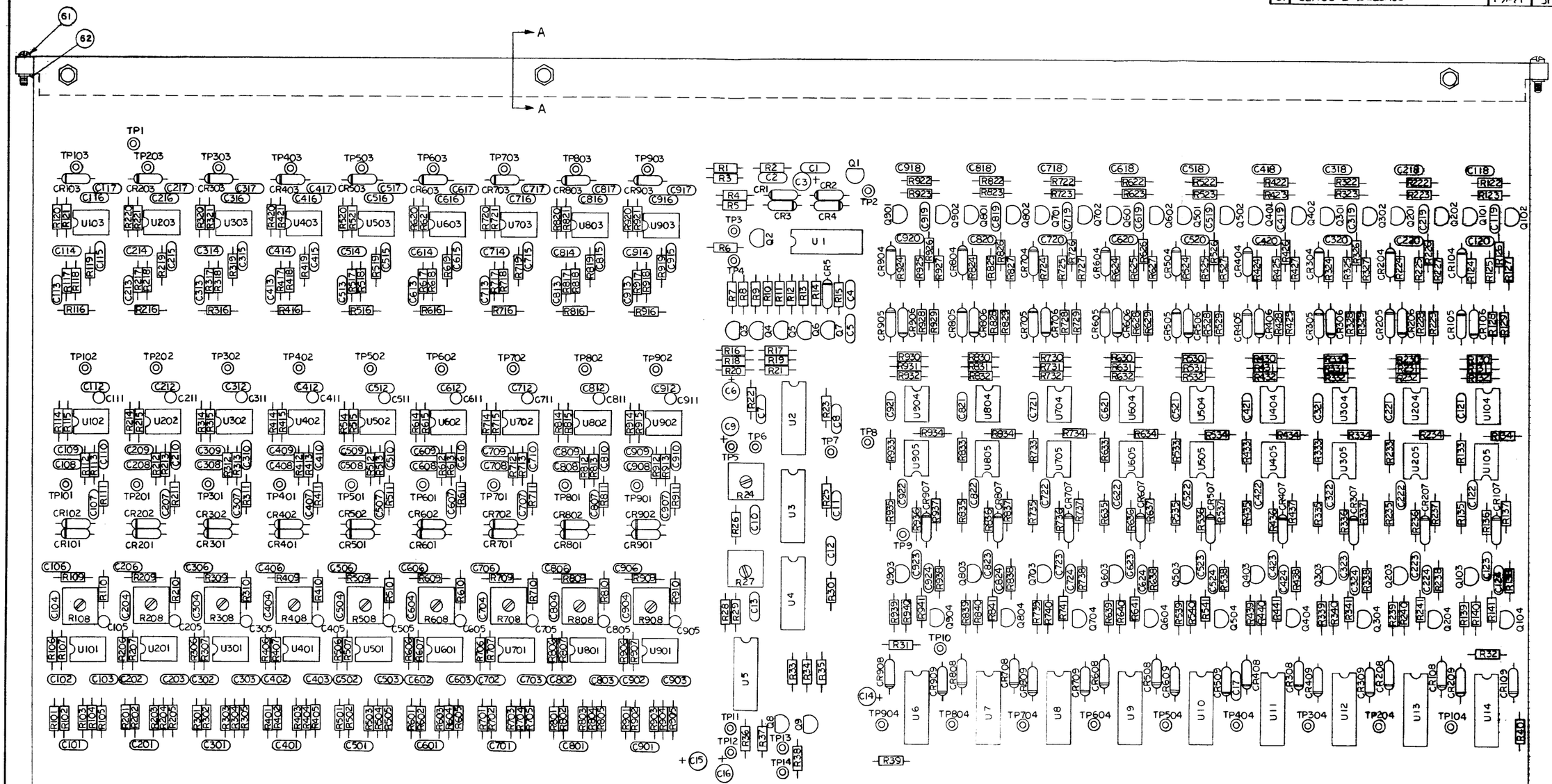
		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- B. BRYANT	12-6-78	
		TOLERANCE-UNLESS	CHK- S. Shuttle	1-25-79	
		OTHERWISE SPECIFIED	ENG- JPKING	1-31-79	SCALE: 2:1 SHEET 1 OF 1
		3 PLACE ±.005	CUST-		
		2 PLACE ±.010			ASSEMBLY, NRZI READ CARD
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			
0051740-0001		DO NOT SCALE THIS PRINT			SIZE D DWG NO 0051740-0000 REV 01
NEXT ASS'Y	USED ON				

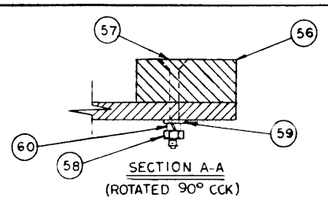
LTR	REVISIONS DESCRIPTION	DATE	APPROVED
02	CLASS "B" RELEASE	1-31-79	JAK



		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- S. HEISHMAN	12/6/78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK- S. Shaffer	1-12-79	
		3 PLACE ±.005	ENG- JTKING	1-31-79	SCALE: 2:1 SHEET 1 OF 1
		2 PLACE ±.010	CUST-		ASSEMBLY PE READ CARD
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			
0051739-0001		DO NOT SCALE THIS PRINT			size D dwg no 0051739-0000 rev 02
NEXT ASS'Y	USED ON				

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	1-31-79	JPK





REF - THIS ASSEMBLY		
DESIGNATOR	LAST USED	NOT USED
R	RX41, R40	
C	CX24, C17	
Q	QX04, Q9	
CR	CRX09, CR5	
TP	TPX04, TP14	
U	UX05, U14	

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR-B. BRYANT	11-14-78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ±1/64 ANGLES ±1/2°	CHK- S.S. Fee	1-12-79	
			ENG- JPKING	1-31-79	SCALE: NONE SHEET 1 OF 1
			CUST-		ASSEMBLY PE/NRZI READ CARD
0051726-0001		DO NOT SCALE THIS PRINT			SIZE D DWG NO 0051726-0000 REV 01
NEXT ASS'Y	USED ON				

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
1	1	1351724-0001	DRILL DETAIL - 78 DMR	
			INTEGRATED CIRCUITS	
2	18	2451167-7011	OPERATIONAL AMPLIFIER	U101,U201,U301,
				U401,U501,U601,
			U701,U801,U901,U102,U202,U302,U402	U502,U602,U702,
			U802,U902	
3	1	2450050-3611	QUAD OPERATIONAL AMPLIFIER	U1
4	1	2450063-1844	DTL GATES	U5
5	4	2450052-9000	54/74 LS SERIES GATE	U8,U10,U12,U14
6	5	2450052-9003	54/74 LS SERIES GATE	U6,U7,U9,U11,
				U13
7	3	2450054-0022	DUAL MONOSTABLE TTL LS	U2,U3,U4
			SEMICONDUCTORS	
8	21	2350016-0001	TRANSISTOR, NPN, SILICON	Q101,Q201,Q301
				Q401,Q501,Q601,
			Q701,Q801,Q901,Q102,Q202,Q302,Q402,Q502,Q602,Q702	
			Q802,Q902,Q2,Q8,Q9	
9	2	2350017-0001	TRANSISTOR, PNP, SILICON	Q4,Q6
10	45	2550002-9140	DIODE, SILICON, F.S.	CR101,CR201,
				CR301,CR401,
			CR501,CR601,CR701,CR801,CR901,CR102,CR202,CR302,	

BASIC VERSION

NOTES:

P.L. NO. 0051740-0001

DIGI-DATA CORPORATION

DR [illegible] 12-20-78 ENG JPL 12-20-78

CHK S.S. 12-19-78

TITLE: ASS'Y; READ CARD- NRZI BASIC

P.L. NO. 0051740-0001 SH. 1 OF 6 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	[illegible]	12-20-78	JPL		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			CR402,CR502,CR602,CR702,CR802,CR902,CR103,CR203,	
			CR303,CR403,CR503,CR603,CR703,CR803,CR903,CR104,	
			CR204,CR304,CR404,CR504,CR604,CR704,CR804,CR904,	
			CR109,CR209,CR309,CR409,CR509,CR609,CR709,CR809,	
			CR909	
			CAPACITORS, MONOLITHIC CERAMIC	
11	9	2251566-3339	±5%, COG, 100V, 3.3pF	C105,C205,C305,
				C405,C505,C605,
			C705,C805,C905	
12	9	2250163-4220	±10%, COG, 200V, 22pF	C116,C216,C316,
				C416,C516,C616,
			C716,C816,C916	
13	1	2250163-4121	±10%, COG, 200V, 120pF	C8
14	1	2250163-4331	±10%, COG, 200V, 330pF	C7
15	9	2250163-4471	±10%, COG, 200V, 470pF	C114,C214,C314,
				C414,C514,C614,
			C714,C814,C914	
16	1	2250161-4561	±10%, X7R, 100V 560pF	C11
17	47	2250162-7103	-20 + 80%, Z5U, 100V, .01uF	C103,C203,C303,
				C403,C503,C603,
			C703,C803,C903,C104,C204,C304,C404,	C504,C604,C704,
			C804,C904,C113,C2113,C313,C413,C513,C613,C713,C813,	

BASIC VERSION

NOTES:

P.L. NO. 0051740-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y READ CARD - NRZI BASIC

P.L. NO. 0051740-0001 SH. 2 OF 6 REV.

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			C913,C112,C212,C312,C412,C512,C612,	C712,C812,C912,
			C110,C210,C310,C410,C510,C610,C710,	C810,C910,C12,
			C17	
18	10	2250158-7105	-20 + 80%,Z5U, 50V, 1uF	C106,C206,C306,
				C406,C506,C606,
			C706,C806,C906,C5	
			DIPPED TANTALUM	
19	5	2250166-4226	±10%, 15V, 22uF	C6,C9,C14,C15,
				C16
			RESISTORS, D.C. 1/4W, 5%	
20	9	215004-0101	100 OHM	R109,R209,R309,
				R409,R509,R609,
			R709,R809,R909	
21	9	215004-0331	330 OHM	R138,R238,R338,
				R438,R538,R638,
			R738,R838,R938	
22	9	2150004-0471	470 OHM	R122,R222,R322,
				R422,R522,R622,
			R722,R822,R922	
23	15	2150004-0152	1.5K OHM	R120,R220,R320,
				R420,R520,R620,
			R720,R820,R920,R28,R33,R35,R38,R40,R14	

BASIC VERSION

NOTES:

P.L. NO. 0051740-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE:ASS'Y; READ CARD - NRZI BASIC

P.L. NO. 0051740-0001 SH. 3 OF 6 REV.

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
24	48	2150004-0472	4.7K OHM	R117,R217,R317,
				R417,R517,R617,
			R717,R817,R917,R116,R216,R316,R416,R516,R616,R716,	
			R816,R916,R125,R225,R325,R425,R525,R625,R725,R825,	
			R925,R126,R226,R326,R426,R526,R626,R726,R826,R926,	
			R127,R227,R327,R427,R527,R627,R727,R827,R927,R6,	
			R31,R39	
25	2	2150004-0512	5.1K OHM	R22,R23
26	2	2150004-0682	6.8K OHM	R26,R29
27	1	2150004-0752	7.5K OHM	R25
28	16	2150004-0153	15K OHM	R123,R223,R323,
				R423,R523,R623,
			R723,R823,R923,R16,R17,R18,R19,R34,R36,R37	
29	9	2150004-0243	24K OHM	R119,R219,R319,
				R419,R519,R619,
			R719,R819,R919	
30	9	2150004-0154	150K OHM	R124,R224,R324,
				R424,R524,R624,
			R724,R824,R924	
			RESISTORS, METAL FILM, 1/8W, 1%	
31	1	2150020-8250	825 OHM	R10
32	1	2150020-4021	4.02K OHM	R13

BASIC VERSION

NOTES:

P.L. NO. 0051740-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD - NRZI BASIC

P.L. NO. 0051740-0001 SH. 4 OF 6 REV.

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
33	1	2150020-1822	18.2K OHM	R9
34	1	2150020-2552	25.5K OHM	R12
35	18	2150020-4752	47.5K OHM	R118,R218,R318,
			R418,R518,R618,R718,R818,R918,R121,	R221,R321,R421,
			R521,R621,R721,R821,R921	
36	18	2150020-5112	51.1K OHM	R105,R205,R305,
				R405,R505,R605,
			R705,R805,R905,R107,R207,R307,R407,	R507,R607,R707,
			R807,R907	
			POTENTIOMETERS	
37	9	2150046-1102	1K OHM	R108,R208,R308,
				R408,R508,R608,
			R708,R808,R908	
38	2	2150046-1503	50K OHM	R24,R27
			MISCELLANEOUS	
39	37	2070017-0001	TERMINAL TURRET, THRU-HOLE	TP101,TP201,
				TP301,TP401,
			TP501,TP601,TP701,TP801,TP901,TP102,TP202,TP302,	
			TP402,TP502,TP602,TP702,TP802,TP902,TP104,TP204,	
			TP304,TP404,TP504,TP604,TP704,TP804,TP904,TP1,TP5,	
			TP6,TP7,RP8,TP11,TP12,TP13,TP14	

BASIC VERSION

NOTES:

P.L. NO. 0051740-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD - NRZI BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051740-0001 | SH. 5 OF 6 | REV.

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
40	1	1051458-0001	CARD HOLD DOWN RAIL	
41	3	5050014-0210	SCR,FLT HD PHILLIPS #4-40x5/8 LG	
42	3	515001-1203	NUT, HEX, 4-40	
43	3	5250008-1203	WAHSER, FLAT, #4	
44	3	5250004-1203	LOCKWASHER, #4	
45	2	5051537-0307	SCREW, CAPTIVE	
46	2	5251538-1102	WASHER, RETAINING	
47	R_{EF}	0051740-0000	ASS'Y; READ CARD - NRZI	
48	R_{EF}	0251741-0000	SCHEMATIC, READ CARD	
49	A_R	3950000-0001	SOLDER	

BASIC VERSION

NOTES:

P.L. NO. 0051740-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD - NRZI BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051740-0001 | SH. 6 OF 6 | REV.

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 2	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051740-0001	ASSY; READ CARD-NRZI BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4100	±10%, COG, 200V, 10pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
54	9	2250163-4680	±10%, COG, 200V, 68pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920	
55	9	2250163-4221	±10%, COG, 200V, 220pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
56	9	2250161-4102	±10%, X7R, 100V, 1000pF	C101,C201, 01,
				C401,C501 01,
			C701,C801,C901	
57	2	2250161-4682	±10% X7R, 100V, .0680pF	C10,C13
58	9	2250161-4103	±10%, X7R, 100V, .01uF	C118,C218,C318,
				C418,C518,C618,
			C718,C818,C918	
			RESISTORS, D.C., 1/4W, 5%	
59	9	2150004-0100	10 OHMS	R106,R206,R306,
				R406,R506,R606,

BASIC VERSION

NOTES:

P.L. NO. 0051740-0002

DIGI-DATA CORPORATION

DR | ENG 12-21-78

CHK 12-21-78

TITLE: ASS'Y; READ CARD- NRZI 12.5IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLB REL	12-21-78	JPK		

P.L. NO. 0051740-0002 | SH. 1 OF 2 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 2	PART NUMBER	DESCRIPTION	REFERENCE
			R706,R806,R906	
			RESISTORS, METAL FILM, 1/8W, 1%	
60	36	2150020-9310	931 OHMS	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3482	34.8K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	

BASIC VERSION

NOTES:

P.L. NO. 0051740-0002

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD-NRZI 12.5 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051740-0002 | SH. 2 OF 2 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 3	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051740-0001	ASS'Y; READ CARD-NRZI BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4120	±10%, C0G, 200V, 12pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
54	9	2250163-4470	±10%, C0G, 200V, 47pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920	
55	9	2250163-4151	±10%, C0G, 200V, 150pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
56	9	2250163-4471	±10%, C0G, 200V, 470pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
57	2	2250161-4472	±10%, X7R, 100V, 4700pF	C10,C13
58	9	2250161-4682	±10%, X7R,100V, 6800pF	C118,C218,C318,
				C418,C518,C618,
			C718,C818,C918	
			RESISTORS, D.C., 1/4W, 5%	
59	9	2150004-0330	33 OHMS	R106,R206,R306,
				R406,R506,R606,

BASIC / VERSION

NOTES:

P.L. NO. 0051740-0003

DIGI-DATA CORPORATION

DR [illegible] 12-20-78 ENG JPKING 12-21-78
CHK [illegible] 12-20-78
TITLE: ASS'Y; READ CARD NRZI 18.75IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CL B REL	12-21-78	JPK		

P.L. NO. 0051740-0003 SH. 1 OF 2 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 3	PART NUMBER	DESCRIPTION	REFERENCE
			R706,R806,R906	
			RESISTORS, METAL FILM, 1/8W 1%	
60	36	2150020-1371	1.37K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3482	34.8K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	

BASIC / VERSION

NOTES:

P.L. NO. 0051740-0003

DIGI-DATA CORPORATION

DR ENG
CHK
TITLE: ASS'Y; READ CARD NRZI 18.75IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051740-0003 SH. 2 OF 2 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 4	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051740-0001	ASSY; READ CARD - NRZI BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4180	±10%, C0G, 200V, 18pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
54	9	2250163-4330	±10%, C0G, 200V, 33pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920	
55	9	2250163-4101	±10%, C0G, 200V, 100pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
56	9	2250163-4271	±10%, C0G, 200V, 270pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
57	2	2250161-4392	±10%, X7R, 100V, 3900pF	C10,C13
58	9	2250161-4562	±10%, X7R, 100V, 5600pF	C118,C218,C318,
				C418,C518,C618,
			C718,C818,C918	
			RESISTORS, D.C., 1/4, 5%	
59	9	2150004-0101	100 OHM	R106,R206,R306,
				R406,R506,R606,

BASIC / VERSION

NOTES:

P.L. NO. 0051740-0004

DIGI-DATA CORPORATION

DR [illegible] ENG JPKING 12-21-78
CHK [illegible] 12-20-78
TITLE: ASSY; READ CARD - NRZI 25IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CL B REL	12-21-78	JPK		

P.L. NO. 0051740-0004 SH. 1 OF 2 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 4	PART NUMBER	DESCRIPTION	REFERENCE
			R706,R806,R906	
			RESISTORS, METAL FILM, 1/8W, 1%	
60	36	2150020-1781	1.78K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3322	33.2K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	

BASIC / VERSION

NOTES:

P.L. NO. 0051740-0004

DIGI-DATA CORPORATION

DR ENG
CHK
TITLE: ASSY; READ CARD NRZI 25 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051740-0004 SH. 2 OF 2 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051740-0001	ASSY; READ CARD - NRZI BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4220	±10%, COG 200V, 22pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920	
54	9	2250163-4270	±10%, COG, 200V, 27pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
55	9	2250163-4680	±10%, COG, 200V, 68pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
56	9	2250163-4121	±10%, COG, 200V, 120pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
57	2	2250161-4272	±10%, X7R, 100V, 2700pF	C10,C13
58	9	2250161-4332	±10%, X7R, 100V, 3300pF	C118,C218,C318,
				C418,C518,C618,
			C718,C818,C918	
			RESISTORS, D.C., 1/4W, 5%	
59	9	2150004-0241	240 OHM	R106,R206,R306,
				R406,R506,R606,

BASIC VERSION

NOTES:

P.L. NO. 0051740-0005

DIGI-DATA CORPORATION

DR 12-20-78 | ENG JPK ING 12-21-78
CHK 12-20-78
TITLE: ASSY; READ CARD - NRZI 37.5IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLB REL	12-21-78	JPK		

P.L. NO. 0051740-0005 | SH. 1 OF 2 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	PART NUMBER	DESCRIPTION	REFERENCE
			R706,R806,R906	
			RESISTORS, METAL FILM, 1/8W, 1%	
60	36	2150020-2671	2.67K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3402	34.0K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	

BASIC VERSION

NOTES:

P.L. NO. 0051740-0005

DIGI-DATA CORPORATION

DR | ENG
CHK
TITLE: ASSY; READ CARD - NRZI 37.5 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051740-0005 | SH. 2 OF 2 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 6	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051740-0001	ASSY; READ CARD - NRZI BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4180	±10%, COG, 200V, 18pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920	
54	9	2250163-4330	±10%, COG, 200V, 33pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
55	9	2250163-4560	±10%, COG, 200V, 56pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
56	9	2250163-4820	±10%, COG, 200V 82pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
57	2	2250161-4222	±10%, X7R, 100V, 2200pF	C10,C13
58	9	2250161-4272	±10%, X7R, 100V, 2700pF	C118,C218,C318,
				C418,C518,C618,
			C718,C818,C918	
			RESISTORS, D.C., 1/4W, 5%	
59	9	2150004-0331	330 OHM	R106,R206,R306,
				R406,R506,R606,

BASIC VERSION

NOTES:

P.L. NO. 0051740-0006

DIGI-DATA CORPORATION

DR 12-20-78 | ENG JPK ING 12-21-78
CHK 12-20-78
TITLE: ASSY; READ CARD - NRZI 45 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLB REL	12-21-78	JPK		

P.L. NO. 0051740-0006 | SH. 1 OF 2 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 6	PART NUMBER	DESCRIPTION	REFERENCE
			R706,R806,R906	
			RESISTORS, METAL FILM 1/8W, 1%	
60	36	2150020-3241	3.24K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3402	34.0K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	

BASIC VERSION

NOTES:

P.L. NO. 0051740-0006

DIGI-DATA CORPORATION

DR | ENG
CHK
TITLE: ASSY; READ CARD - NRZI 45 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051740-0006 | SH. 2 OF 2 | REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
1	1	1351724-0001	DRILL DETAIL 78 DMR	
			INTEGRATED CIRCUITS	
2	27	2451167-7011	OPERATIONAL AMPLIFIER	U101,U201,U301,
				U401,R501,U601,
			U701,U801,U901,U103,U203,U303,U403,	U503,U603,U703,
			U803,U903,U104,U204,U304,U404,U504,	U604,U704,U804
			U904	
3	9	2451168-7112	VOLTAGE COMPARATOR	U105,U205,U305,
				U405,U505,U605,
			U705,U805,U905	
4	1	2450050-3611	QUAD OPERATIONAL AMPLIFIER	U1
5	5	2450052-9003	54/74 LS SERIES GATE	U6,U7,U9,U11,
				U13
			SEMICONDUCTORS	
6	18	2350016-0001	TRANSISTOR, NPN, SILICON	Q103,Q203,Q303,
				Q403,Q503,Q603,
			Q703,Q803,Q903,Q104,Q204,Q304,Q404,	Q504,Q604,Q704,
			Q804,Q904	
7	4	2350017-0001	TRANSISTOR, PNP, SILICON	Q1,Q3,Q5,Q7
8	40	2550002-9140	DIODE, SILICON, F.S.	CR105,CR205,
				CR305,CR405,

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0001

DIGI-DATA CORPORATION

DR [illegible] 12-20-78 ENG JPR 12-20-78

CHK [illegible] 12-19-78

TITLE: ASS'Y READ CARD - PE BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	[illegible]	[illegible]	JPR		

P.L. NO. 0051739-0001 SH. 1 OF 6 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			CR505,CR605,CR705,CR805,CR905,CR106,	CR206,CR306,
			CR406,CR506,CR606,CR706,CR806,CR906,	CR107,CR207,
			CR307,CR407,CR507,CR607,CR707,CR807,	CR907,CR108,
			CR208,CR308,CR408,CR508,CR608,CR708,	CR808,CR908,
			CR1,CR2,CR3,CR4	
			CAPACITORS	
			MONOLITHIC CERAMIC	
9	18	2251566-3339	±5%, COG 100V, 3.3pF	C105,C205,C305,
				C405,C505,C605,
			C705,C805,C905,C111,C211,C311,C411,	C511,C611,C711,
			C811,C911	
10	9	2250163-4101	±10%, COG, 200V, 100pF	C109,C209,C309,
				C409,C509,C609,
			C709,C809,C909	
11	56	2250162-7103	-20 +80%, Z5U, 100V, .01uF	C103,C203,C303,
				C403,C503,C603,
			C703,C803,C903,C104,C204,C304,C404,	C504,C604,C704,
			C804,C904,C115,C215,C315,C415,C515,	C615,C715,C815,
			C915,C117,C217,C317,C417,C517,C617,	C717,C817,C917,
			C121,C221,C321,C421,C521,C621,C721,	C821,C921,C122,
			C222,C322,C422,C522,C622,C722,C822,	C922,C2,C17
12	20	2250158-7105	-20 +80%, Z5U, 50V, 1uF	C106,C206,C306,

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD - PE BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051739-0001 SH. 2 OF 6 REV.

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			C406,C506,C606,C706,C806,C906, C108,	C208,C308,C408,
			C508,C608,C708,C808,C908, C1,C4	
			DIPPED TANTALUM	
13	1	2250166-4106	±10%, 15V, 10uF	C3
14	5	2250166-4226	±10%, 15V, 22uF	C6,C9,C14,C15,
				C16
			RESISTORS, D.C. 1/4W, 5%	
15	10	215004-0101	100 OHM	R109,R209,R309,
				R409,R509,R609,
			R709,R809,R909,R3	
16	1	215004-0271	270 OHM	R2
17	1	215004-0301	300 OHM	R1
18	27	2150004-0331	330 OHM	R129,R229,R329,
				R429,R529,R629,
			R729,R829,R929,R134,R234,R334,R434,	R534,R634,R734,
			R834,R934,R138,R238,R338,R438,R538,	R638,R738,R838,
			R938	
19	9	215004-0471	470 OHM	R141,R241,R341,
				R441,R541,R641
			R741,R841,R941	
20	9	2150004-0152	1.5K OHM	R114,R214,R314,

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD - PE BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051739-0001 SH. 3 OF 6 REV.

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			R414,R514,R614,R714,R814,R914	
21	9	2150004-0222	2.2K OHM	R131,R231,R331,
				R431,R531,R631,
			R731,R831,R931	
22	9	2150004-0272	2.7K OHM	R135,R235,R335,
				R435,R535,R635,
			R735,R835,R935	
23	14	2150004-0472	4.7K OHM	R137,R237,R337,
				R437,R537,R637,
			R737,R837,R937,R4,R5,R6,R10,R30	
24	18	2150004-0103	10K OHM	R128,R228,R328,
				R428,R528,R628,
			R728,R828,R928,R133,R233,R333,R433,	R533,R633,R733,
			R833,R933	
25	15	2150004-0153	15K OHM	R130,R230,R330,
				R430,R530,R630,
			R730,R830,R930,R16,R17,R18,R19,R20,	R21
26	10	2150004-0473	47K OHM	R140,R240,R340,
				R440,R540,R640,
			R740,R840,R940,R32	
27	9	2150004-0104	100K OHM	R136,R236,R336,
				R436,R536,R636,
			R736,R836,R936	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD PE BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051739-0001 SH. 4 OF 6 REV

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
28	9	2150004-0154	150K OHM	R132,R232,R332,
				R432,R532,R632,
			R732,R832,R932	
			RESISTORS, METAL FILM, 1/8W,1%	
29	9	2150020-4020	402 OHM	R112,R212,R312,
				R412,R512,R612,
			R712,R812,R912	
30	1	2150020-1501	1.50K OHM	R14
31	1	2150020-2491	2.49K OHM	R11
32	1	2150020-1472	14.7K OHM	R8
33	1	2150020-3012	30.1K OHM	R7
34	9	2150020-4122	40.2K OHM	R115,R215,R315,
				R415,R515,R615,
			R715,R815,R915	
35	18	2150020-5112	51.1K OHM	R105,R205,R305,
				R405,R505,R605,
			R705,R805,R905, R107,R207,R307,R407,	R507,R607,R707,
			R807,R907	
			POTENTIOMETERS, SINGLE TURN	
36	9	2150046-1102	1K OHM	R108,R208,R308,
			R408,R508,R608,R708,R808,R908	

BASIC VERSION

NOTES:

P.L. NO. 0051739-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD PE BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0051739-0001	SH. 5 OF 6	REV.

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
37	36	2070017-0001	TERMINAL TURRET, THRU HOLE	TP101, TP201,
				TP301, TP401,
			TP501,TP601,TP701,TP801,TP901,TP103,	TP203,TP303,
			TP403,TP503,PT603,TP703,TP803,TP903,	TP104,TP204,
			TP304,TP404,TP504,TP604,TP704,TP804,	TP904,TP1,TP2,
			TP4,TP7,TP8,TP9,TP10,TP11,TP12	
38	1	1051458-0001	CARD HOLD DOWN RAIL	
39	3	5050014-0210	SCR, FLT. HD., PHILLIPS #4-40x5/8LG	
40	3	5150001-1203	NUT, HEX #4-40	
41	3	5250008-1203	WASHER, FLAT #4	
42	3	5250004-1203	LOCKWASHER, #4	
43	2	5051537-0307	SCREW, CAPTIVE	
44	2	5251538-1102	WASHER, RETAINING	
45	REF	0051739-0000	ASSEMBLY; READ CARD-PE	
46	REF	0251741-0000	SCHEMATIC; READ CARD	
47	AR	3950000-0001	SOLDER	

BASIC VERSION

NOTES:

P.L. NO. 0051739-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD PE BASIC

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0051739-0001	SH. 6 OF 6	REV.

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 2	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051739-0001	ASS'Y READ CARD-PE BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4100	±10%, COG, 200V, 10pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
54	9	2250163-3471	±5%, COG, 200V, 470pF	C107,C207,C307
				C407,C507,C607,
			C707,C807,C907	
55	9	2250161-4102	±10%, X7R, 100V, 1000pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
56	9	2250161-4122	±10%, X7R, 100V, 1200pF	C123,C223,C323,
				C423,C523,C623,
			C723,C823,C923	
57	9	2250161-4183	±10%, X7R, 100V, .018uF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS, D.C., 1/4W, 5%	
58	9	2150004-0100	10 OHM	R106,R206,R306,
				R406,R506,R606,
			R706,R806,R906	

BASIC VERSION

NOTES:

P.L. NO. 0051739-0002

DIGI-DATA CORPORATION

DR 12-21-78 | ENG JPKING 12-21-78

CHK 12-21-78

TITLE: ASS'Y; READ CARD - PE 12.5 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0051739-0002	SH. 1 OF 2	REV.
01	CLB REL	12-21-78	JPK					

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 2	PART NUMBER	DESCRIPTION	REFERENCE
			RESISTORS, METAL FILM, 1/8W, 1%	
59	9	2150020-2100	210 OHM	R111,R211,R311,
				R411,R511,R611,
			R711,R811,R911	
60	36	2150020-9310	931 OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-4021	4.02K OHM	R113,R213,R313,
				R413,R513,R613,
			R713,R813,R913	
62	9	21500020-3482	34.8K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	
63	9	2150020-2673	267K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC VERSION

NOTES:

P.L. NO. 0051739-0002

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y; READ CARD-PE 12.5 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0051739-0002	SH. 2 OF 2	REV.
								01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 3	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051739-0001	ASS'Y; READ CARD - PE BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4120	±10%, COG, 200V, 12pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
54	9	2250163-3331	±5%, COG, 200V, 330pF	C107,C207,C307,
				C407,C507,C607,
			C707,C807,C907	
55	9	2250163-4471	±10%, COG,200V, 470pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
56	9	2250161-4821	±10%, X7R, 100V, 820pF	C123,C223,C323,
				C423,C523,C623,
			C723,C823,C923	
57	9	2250161-4123	±10%, X7R, 100V, .012uF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS	
58	9	2150004-0330	33 OHM, D.C., 1/4W, 5%	R106,R206,R306,
				R406,R506,R606,
			R706,R806,R906	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0003

DIGI-DATA CORPORATION

DR [illegible] 12-21-78 ENG JPKING 12-21-78
CHK [illegible] 12-21-78
TITLE: ASS'Y; READ CARD PE 18.75 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLB REL	12-21-78	JPK		

P.L. NO. 0051739-0003 SH. 1 OF 2 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 3	PART NUMBER	DESCRIPTION	REFERENCE
59	9	2150020-2000	200 OHM, M.F. 1/8W, 1%	R111,R211,R311,
				R411,R511,R611,
			R711,R811,R911	
60	36	2150020-1371	1.37K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3831	3.83K OHM	R113,R213,R313,
				R413,R513,R613,
			R713,R813,R913	
62	9	2150020-3482	34.8K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	
63	9	2150020-2553	255K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0003

DIGI-DATA CORPORATION

DR [illegible] ENG
CHK
TITLE: ASSEMBLY; READ CARD - PE 18.75 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051739-0003 SH. 2 OF 2 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 4	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051739-0001	ASSY; READ CARD - PE BASIC	
			CAPACITROS, MONOLITHIC CERAMIC	
53	9	2250163-4180	±10%, COG, 200V, 18pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
54	9	2250163-4271	±10%, COG, 200V, 270pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
55	9	2250163-3271	±5%, COG, 200V, 270pF	C107,C207,C307,
				C407,C507,C607,
			C707,C807,C907	
56	9	2250161-4561	±10%, X7R, 100V, 560pF	R123,R223,R323,
				R423,R523,R623,
			R723,R823,R923	
57	9	2250161-4822	±10%, X7R, 100V, 8200pF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS, D.C., 1/4W, 5%	
58	9	2150004-0101	100 OHM	R106,R206,R306,
				R406,R506,R606,
			R706,R806,R906	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0004

DIGI-DATA CORPORATION

DR [illegible] ENG JPKING 12-21-78
CHK [illegible] 12-21-78
TITLE: ASSY; READ CARD - PE 25 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY	USED ON
01	CLB REL	12-21-78	JPK		

P.L. NO. 0051739-0004 SH. 1 OF 2 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 4	PART NUMBER	DESCRIPTION	REFERENCE
			RESISTORS, METAL FILM, 1/8W, 1%	
59	9	215-020-1820	182 OHM	R111,R211,R311,
				R411,R511,R611,
			R711,R811,R911	
60	36	2150020-1781	1.78K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3481	3.48K OHM	R113,R213,R313,
				R413,R513,R613,
			R713,R813,R913	
62	9	2150020-3322	33.2K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	
63	9	2150020-2803	280K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0004

DIGI-DATA CORPORATION

DR ENG
CHK
TITLE: ASSY; READ CARD - PE 25 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY	USED ON

P.L. NO. 0051739-0004 SH. 2 OF 2 REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051739-0001	ASSY; READ CARD - PE BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4270	±10%, COG, 200V, 27pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
54	9	2250163-4121	±10%, COG, 200V, 120pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
55	9	2250163-3181	±5%, COG, 200V, 180pF	C107,C207,C307,
				C407,C507,C607,
			C707,C807,C907	
56	9	2250163-4391	±10%, COG, 200V, 390pF	C123,C223,C323,
				C423,C523,C623,
			C723,C823,C923	
57	9	2250161-4562	±10%, X7R 100V, 5600pF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS, D.C.,1/4W,5%	
58	9	2150004-0241	240 OHM	R106,R206,R306,
				R406,R506,R606,
			R706,R806,R906	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0005

DIGI-DATA CORPORATION

DR ENG JPK 12-21-78

CHK 12-20-78

TITLE: ASSY; READ CARD - PE 37.5 IPS

P.L. NO. 0051739-0005 SH. 1 OF 2 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY	USED ON
01	CLB REL	12-21-78	JPK		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	PART NUMBER	DESCRIPTION	REFERENCE
			RESISTORS, METAL FILM, 1/8, 1%	
59	9	2150020-1820	182 OHM	R111,R211,R311,
				R411,R511,R611,
			R711,R811,R911	
60	36	2150020-2671	2.67K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3481	3.48K OHM	R113,R213,R313,
				R413,R513,R613,
			R713,R813,R913	
62	9	2150020-3402	34.0K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	
63	9	2150020-2673	267K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0005

DIGI-DATA CORPORATION

DR ENG

CHK

TITLE: ASSY; READ CARD - PE 37.5 IPS

P.L. NO. 0051739-0005 SH. 2 OF 2 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 6	PART NUMBER	DESCRIPTION	REFERENCE
52	1	0051739-0001	ASSY; READ CARD - PE BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
53	9	2250163-4330	±10%, COG, 200V, 33pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
54	9	2250163-4820	±10%, COG, 200V, 82pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
55	9	2250163-3151	±5%, COG, 200V, 150pF	C107,C207,C307,
				C407,C507,C607,
			C707,C807,C907	
56	9	2250163-4331	±10%, COG, 200V, 330pF	C123,C223,C323,
				C423,C523,C623,
			C723,C823,C923	
57	9	2250161-4472	±10%, X7R, 100V, 4700pF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS, D.C., 1/4W, 5%	
58	9	2150004-0331	330 OHM	R106,R206,R306,
				R406,R506,R606,
			R706,R806,R906	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0006

DIGI-DATA CORPORATION

DR ENG JPK 12-21-78

CHK 12-21-78

TITLE: ASSY; READ CARD - PE 45 IPS

P.L. NO. 0051739-0006 SH. 1 OF 2 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY	USED ON
01	CLB REL	12-21-78	JPK		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 6	PART NUMBER	DESCRIPTION	REFERENCE
			RESISTORS, METAL FILM, 1/8W, 1%	
59	9	2150020-1820	182 OHM	R111,R211,R311,
				R411,R511,R611,
			R711,R811,R911	
60	36	2150020-3241	3.24K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
61	9	2150020-3481	3.48K OHM	R113,R213,R313,
				R413,R513,R613,
			R713,R813,R913	
62	9	2150020-3402	34.0K OHM	R110,R210,R310,
				R410,R510,R610,
			R710,R810,R910	
63	9	2150020-2673	267K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC / VERSION

NOTES:

P.L. NO. 0051739-0006

DIGI-DATA CORPORATION

DR ENG

CHK

TITLE: ASSY; READ CARD - PE 45 IPS

P.L. NO. 0051739-0006 SH. 2 OF 2 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
1	1	1351724-0001	DRILL DETAIL, 78 DMR	
			INTEGRATED CIRCUITS	
2	36	2451167-7011	OPERATIONAL AMPLIFIER	U101,U201,U301
				U401,U501,U601
			U701,U801,U901,U103,U203,U303,U403,	U503,U603,U703,
			U803,U903,U104,U204,U304,U404,U504,	U604,U704,U804,
			U904,U102,U202,U302,U402,U502,U602,	U702,U802,U902
3	9	2451168-7112	VOLTAGE COMPARATOR	U105,U205,U305,
				U405,U505,U605,
			U705,U805,U905	
4	1	2450050-3611	QUAD OPERATIONAL AMPLIFIER	U1
5	1	2450063-1844	DTL GATES	U5
6	4	2540052-9000	54/74 LS SERIES GATE	U8,U10,U12,U14,
7	5	2450052-9003	54/74 LS SERIES GATE	U6,U7,U9,U11,
				U13
8	3	2450054-0022	DUAL MONOSTABLE TTL LS	U2,U3,U4
			SEMICONDUCTORS	
9	39	2350016-0001	TRANSISTOR, NPN SILICON	Q101,Q201,Q301,
			Q401,Q501,Q601,Q701,Q801,Q901,Q102,	Q202,Q302,Q402,
			Q502,Q602,Q702,Q802,Q902,Q103,Q203,	Q303,Q403,Q503,
			Q603,Q703,Q803,Q903,Q104,Q204,Q304,Q404,Q504,Q604,	

BASIC VERSION

NOTES:

P.L. NO. 0051726-0001

DIGI-DATA CORPORATION

DR [illegible] 12-21-78 ENG JPK 12-21-78

CHK [illegible] 12-21-78

TITLE: ASSEMBLY; READ CARD-PE/NRZI BASIC

P.L. NO. 0051726-0001 SH. 1 OF 8 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLEREL	12-21-78	JPK		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			Q704,Q804,Q904,Q2,Q8,Q9,	
10	6	2350017-0001	TRANSISTOR, PNP SILICON	Q1,Q3,Q4,Q5,Q6
				Q7
11	86	2550002-9140	DIODE, SILICON, F.S.	CR101,CR201,
				CR301,CR401,
			CR501,CR601,CR701,CR801,CR901,	CR102,CR202,CR302,
			CR402,CR502,CR602,CR702,CR802,CR902,CR103,CR203,	
			CR303,CR403,CR503,CR603,CR703,CR803,CR903,CR104,	
			CR204,CR304,CR404,CR504,CR604,CR704,CR804,CR904,	
			CR105,CR205,CR305,CR405,CR505,CR605,CR705,CR805,	
			CR905,CR106,CR206,CR306,CR406,CR506,CR606,CR706,	
			CR806,CR906,CR107,CR207,CR307,CR407,CR507,CR607,	
			CR707,CR807,CR907,CR108,CR208,CR308,CR408,CR508,	
			CR608,CR708,CR808,CR908,CR109,CR209,CR309,CR409,	
			CR509,CR609,CR709,CR809,CR909,CR1,CR2,CR3,CR4,CR5	
			CAPCITORS, MONOLITHIC CERAMIC	
12	18	2251566-3339	C0G, 100V, 3.3pF	C105,C205,C305
				C405,C505,C605,
			C705,C805,C905,C111,C211,C311,C411,	C511,C611,C711,
			C811,C911	
13	9	2250163-4220	±10, C0G, 200V, 22pF	C116,C216,C316,
				C416,C516,C616

BASIC VERSION

NOTES:

P.L. NO. 0051726-0001

DIGI-DATA CORPORATION

DR ENG

CHK

TITLE: ASSEMBLY; READ CARD-PE/NRZI BASIC

P.L. NO. 0051726-0001 SH. 2 OF 8 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			C716,C816,C916	
14	9	2250163-4101	±10, C0G, 200V, 100pF	C109,C209,C309,
				C409,C509,C609,
			C709,C809,C909,	
15	1	2250163-4121	±10 C0G, 200V, 120pF	C8
16	1	2250163-4331	±10, C0G, 200V, 330pF	C7
17	9	2250163-4471	±10, C0G, 200V, 470pF	C114,C214,C314,
				C414,C514,C614,
			C714,C814,C914	
18	1	2250161-4561	±10, X7R, 100V, 560pF	C11
19	84	2250162-7103	-20 +80, Z5U, 100V, .01uF	C103,C203,C303,
				C403,C503,C603,
			C703,C803,C903,C104,C204,C304,C404,	C504,C604,C704,
			C804,C904,C110,C210,C310,C410,C510,	C610,C710,C810,
			C910,C112,C212,C312,C412,C512,C612,	C712,C812,C912,
			C115,C215,C315,C415,C515,C615,C715,	C815,C915,C117,
			C217,C317,C417,C517,C617,C717,C817,	C917,C113,C213,
			C313,C413,C513,C613,C713,C813,C913,	C121,C221,C321,
			C421,C521,C621,C721,C812,C921,C122,	C222,C322,C422,
			C522,C622,C722,C822,C922,C2,C12,C17	
20	21	2250158-7105	-20 +80, Z5U, 50V, 1uF	C106,C206,C306,
				C406,C506,C606,
			C706,C806,C906,C108,C208,C308,C408,	C508,C608,C708,

BASIC VERSION

NOTES:

P.L. NO. 0051726-0001

DIGI-DATA CORPORATION

DR ENG

CHK

TITLE: ASSEMBLY; READ CARD-PE/NRZI BASIC

P.L. NO. 0051726-0001 SH. 3 OF 8 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			C808,C908,C1,C4,C5	
21	1	2250166-4106	DIPPED TANTALUM, ±10, 15V, 10uF	C3
22	5	2250166-4226	DIPPED TANTALUM, ±10, 15V, 22uF	C14,C16,C15,C6,
				C9
			RESISTORS, D.C., 1/4 W, 5%	
23	10	2150004-0101	100 Ohm	R109,R209,R309,
				R409,R509,R609,
			R709,R809,R909,R3	
24	1	2150004-0271	270 Ohm	R2
25	1	2150004-0301	300 Ohm	R1
26	27	2150004-0331	330 Ohm	R129,R229,R329,
				R429,R529,R629,
			R729,R829,R929,R134,R234,R334,R434,	R534,R634,R734,
			R834,R934,R138,R238,R338,R438,R538,	R638,R738,R838,
			R938	
27	18	2150004-0471	470Ohm	R122,R222,R322,
				R422,R522,R622,
			R722,R822,R922,R141,R241,R341,R441,	R541,R641,R741,
			R841,R941,	
28	23	2150004-0152	1.5K Ohm	R120,R220,R320,
				R420,R520,R620,
			R720,R820,R920,R114,R214,R314,R414,	R514,R614,R714,
			R814,R914R28,R33,R35,R38,R40	

BASIC VERSION

NOTES:

P.L. NO. 0051726-0001

DIGI-DATA CORPORATION

DR ENG

CHK

TITLE: ASSEMBLY; READ CARD-PE/NRZI BASIC

P.L. NO. 0051726-0001 SH. 4 OF 8 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
29	9	2150004-0222	2.2K Ohm	R131,R231,R331,
				R431,R531,R631,
			R731,R831,R931	
30	9	2150004-0272	2.7K Ohm	R135,R235,R335,
				R435,R535,R635,
			R735,R835,R935,	
31	60	2150004-0472	4.7K Ohm	R117,R217,R317,
				R417,R517,R617,
			R717,R817,R917,R116,R216,R316,R416,	R516,R616,R716,
			R816,R916,R125,R225,R325,R425,R525,	R625,R725,R825,
			R925,R126,R226,R326,R426,R526,R626,	R726,R826,R926,
			R127,R227,R327,R427,R527,R627,R727,	R827,R927,R137,
			R237,R337,R437,R537,R637,R737,R837,	R937,R4,R5,R6,
			R30,R31,R39	
32	2	2150004-0512	5.1K Ohm	R22,R23
33	2	2150004-0682	6.8K Ohm	R26,R29
34	1	2150004-0752	7.5K Ohm	R25
35	18	2150004-0103	10K Ohm	R128,R228,R328,
				R428,R528,R628,
			R728,R828,R928,R133,R233,R333,R433,	R533,R633,R733,
			R833,R933	
36	27	2150004-0153	15K Ohm	R123,R223,R323,
				R423,R523,R623,

BASIC VERSION

NOTES:

P.L. NO. 0051726-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASSEMBLY; READ CARD-PE/NRZI BASIC

P.L. NO. 0051726-0001 | SH. 5 OF 8 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			R723,R823,R923,R130,R230,R330,R430,	R530,R630,R730,
			R830,R930,R16,R17,R18,R19,R20,R21,	R34,R36,R37
37	9	2150004-0243	24K Ohm	R119,R219,R319,
				R419,R519,R619,
			R719,R819,R919	
38	10	2150004-0473	47K Ohm	R140,R240,R340,
				R440,R540,R640,
			R740,R840,R940,R32	
39	9	2150004-0104	100K Ohm	R136,R236,R336,
				R436,R536,R636,
			R736,R836,R936	
40	18	2150004-0154	150K Ohm	R124,R224,R324,
				R424,R524,R624,
			R724,R824,R924,R132,R232,R332,R432,	R532,R632,R732,
			R832,R932	
			RESISTORS, METAL FILM, 1/8W 1%	
41	9	2150020-4020	402 Ohm	R112,R212,R312,
				R412,R512,R612,
			R712,R812,R912	
42	2	2150020-8250	825 Ohm	R10,R15
43	1	2150020-1501	1.50K Ohm	R14
44	1	2150020-2491	2.49K Ohm	R11
45	1	2150020-4021	4.02K Ohm	R13

BASIC VERSION

NOTES:

P.L. NO. 0051726-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASSEMBLY; READ CARD-PE/NRZI BASIC

P.L. NO. 0051726-0001 | SH. 6 OF 8 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
46	1	2150020-1472	14.7K Ohm	R8
47	1	2150020-1822	18.2K Ohm	R9
48	1	2150020-2552	25.5K Ohm	R12
49	1	2150020-3012	30.1K Ohm	R7
50	9	2150020-4022	40.2K Ohm	R115,R215,R315,
				R415,R515,R615,
			R715,R815,R915	
51	18	2150020-4752	47.5K Ohm	R118,R218,R318,
				R418,R518,R618,
			R718,R818,R918,R121,R221,R321,R421,	R521,R621,R721,
			R821,R921	
52	18	2150020-5112	51.1K Ohm	R105,R205,R305,
				R405,R505,R605,
			R705,R805,R905,R107,R207,R307,R407,	R507,R607,R707,
			R807,R907	
			POTENTIOMETERS, SINGLE TURN	
53	9	2150046-1102	1K Ohm	R108,R208,R308,
				R408,R508,R608,
			R708,R808,R908	
54	2	2150046-1503	50K Ohm	R24,R27
			MISCELLANEOUS	
55	50	2070017-0001	TERMINAL TURRET, THRU HOLE	TP101, TP201,
				TP301,TP401,

BASIC VERSION

NOTES:

P.L. NO. 0051726-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASSEMBLY; READ CARD-PE/NRZI BASIC

P.L. NO. 0051726-0001 | SH. 7 OF 8 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 1	PART NUMBER	DESCRIPTION	REFERENCE
			TP501,TP601,TP701,TP801,TP901,TP102,TP202,TP302,	
			TP402,TP502,TP602,TP702,TP802,TP902,TP103,TP203,	
			TP303,TP403,TP503,TP603,TP703,TP803,TP903,TP104,	
			TP204,TP304,TP404,TP504,TP604,TP704,TP804,TP904,	
			TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8,TP9,TP10,TP11,TP12,	
			TP13,TP14	
56	1	1051458-0001	CARD HOLD DOWN RAIL	
57	3	5050014-0210	SCR., FLT.HD., PHILLIPS 4-40x5/8 LG	
58	3	5150001-1203	NUT, HEX, 4-40	
59	3	5250008-1203	WASHER, FLAT, #4	
60	3	5250004-1203	LOCKWASHER, #4	
61	2	5051537-0307	SCREW, CAPTIVE	
62	2	5251538-1102	WASHER, RETAINING	
63	REF	0051726-0000	ASSEMBLY; READ CARD-PE/NRZI	
64	REF	0251741-0000	SCHEMATIC, READ CARD	
65	AR	3950000-0001	SOLDER	

BASIC VERSION

NOTES:

P.L. NO. 0051726-0001

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASSEMBLY; READ CARD-PE/NRZI BASIC

P.L. NO. 0051726-0001 | SH. 8 OF 8 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 2	PART NUMBER	DESCRIPTION	REFERENCE
67	1	0051726-0001	ASSEMBLY; READ CARD - PE/NRZI BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
68	9	2250163-4100	± 10%, COG, 200V, 10pF	C102,C202,C302
				C402,C502,C602
			C702,C802,C902	
69	9	2250163-4680	± 10%, COG, 200V, 68pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920	
70	9	2250163-4221	±10%, COG, 200V, 220pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
71	9	2250163-3471	±5%, COG, 200V, 470pF	C107,C207,C307,
				C407,C507,C607,
			C707,C807,C907	
72	9	2250161-4102	±10%, X7R, 100V, 1000pF	C101,C201,C301
				C401,C501,C601,
			C701,C801,C901	
73	9	2250161-4122	±10%, X7R, 100V, 1200pF	C123,C223,C323,
				C423,C523,C623,
			C723,C823,C923	
74	2	2250161-4682	±10%, X7R, 100V, 6800pF	C10, C13
75	9	2250161-4103	±10%, X7R, 100V, .01uF	C118,C218,C318,

BASIC / VERSION

NOTES:

P.L. NO. 0051726-0002

DIGI-DATA CORPORATION

DR		12-21-78	ENG	JPK	12-21-78
CHK		12-21-78			

TITLE: ASSEMBLY; READ CARD PE/NRZI
12.5 IPS

P.L. NO. 0051726-0002 | SH. 1 | OF 3 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLB REL	12-21-78	JPK		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 2	PART NUMBER	DESCRIPTION	REFERENCE
			C418,C518,C618,C718,C818,C918	
76	9	2250161-4183	±10%, X7R, 100V, .018uF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS, D.C., 1/4W, 5%	
77	9	2150004-0100	10 OHM	R106,R206,R306,
				R406,R506,R606,
			R706,R806,R906	
			RESISTORS, METAL FILM, 1/8W, 1%	
78	9	2150020-2100	210 OHM	R111,R211,R311,
				R411,R511,R611,
			R711,R811,R911	
79	36	2150020-9310	931 OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R505,R604,	R704,R804,R904,
80	9	2050020-4021	4.02K OHM	R113,R213,R313,
				R413,R513,R613,
			R713,R813,R913	
81	9	2150020-3482	34.8K OHM	R110,R210,R310,

BASIC / VERSION

NOTES:

P.L. NO. 0051726-0002

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASS'Y; READ CARD PE/NRZI
12.5 IPS

P.L. NO. 0051726-0002 | SH. 2 | OF 3 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 2	PART NUMBER	DESCRIPTION	REFERENCE
			R410,R510,R610,R710,R810,R910	
81	9	2050020-2673	267K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC / VERSION

NOTES:

P.L. NO. 0051726-0002

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASS'Y READ CARD PE/NRZI
12.5 IPS

P.L. NO. 0051726-0002 | SH. 3 | OF 3 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 3	PART NUMBER	DESCRIPTION	REFERENCE
67	1	0051726-0001	ASS'Y; READ CARD-PE/NRZI, BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
68	9	2250163-4120	±10%, COG, 200V, 12pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
69	9	2250163-4470	±10%, COG,200V, 47pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920	
70	9	2250163-4151	±10%, COG, 200V, 150pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
71	9	2250163-3331	±5%, COG, 200V, 330pF	C107,C207,C307,
				C407,C507,C607,
			C707,C807,C907	
72	9	2250163-4471	±10%, COG, 200V, 470pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
73	9	2250161-4821	±10%, X7R, 100V, 820pF	C123,C223,C323,
				C423,C523,C623,
			C723,C823,C923	
74	2	2250161-4472	±10%, X7R, 100V, 4700pF	C10,C13
75	9	2250161-4682	±10%, X7R, 100V, 6800pF	C118,C218,C318,

BASIC / VERSION

NOTES:

P.L. NO. 0051726-0003

DIGI-DATA CORPORATION

DR		12-21-78	ENG	JPK	12-21-78
CHK		12-21-78			

TITLE: ASSEMBLY; READ CARD PE/NRZI
18.75IPS

P.L. NO. 0051726-0003 | SH. 1 | OF 3 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLB REL	12-21-78	JPK		

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 3	PART NUMBER	DESCRIPTION	REFERENCE
			C418,C518,C618,C718,C818,C918	
76	9	2250161-4123	±10%, X7R, 100V, .012uF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS, D.C. 1/4W, 5%	
77	9	2150004-0330	33 OHM	R106,R206,R306,
				R406,R506,R606,
			R706,R806,R906	
			RESISTORS, METAL FILM, 1/8W, 1%	
78	9	2150020-2000	200 OHM	R111, R211,R311,
				R411,R511,R611,
			R711,R811,R911	
79	36	2150020-1371	1.37K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
80	9	2050020-3831	3.83K OHM	R113,R213,R313,
				R413,R513,R613,
			R713,R813,R913	
81	9	2150020-3482	34.8K OHM	R110,R210,R310

BASIC VERSION

NOTES:

P.L. NO. 0051726-0003

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASS'Y; READ CARD PE/NRZI 18.75 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 1151726-0003	SH. 2	OF 3	REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 3	PART NUMBER	DESCRIPTION	REFERENCE
			R410,R510,R610,R710,R810,R910	
82	9	2150020-2553	255K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC VERSION

NOTES:

P.L. NO. 0051726-0003

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASS'Y READ CARD PE/NRZI 18.75 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0051726-0003	SH. 3	OF 3	REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 4	PART NUMBER	DESCRIPTION	REFERENCE
67	1	0051726-0001	ASS'Y; READ CARD PE/NRZI BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
68	9	2250163-4180	±10%, C0G, 200V, 18pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
69	9	2250163-4330	±10%, C0G, 200V, 33pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920	
70	9	2250163-4101	±10%, C0G, 200V, 100pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
71	9	2250163-4271	±10%, C0G, 200V, 270pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
72	9	2250163-3271	±5%, C0G, 200V, 270pF	C107,C207,C307,
				C407,C507,C607,
			C707,C807,C907	
73	9	2250161-4561	±10%, X7R, 100V, 560pF	C123,C223,C323,
				C423,C523,C623,
			C723,C823,C923	
74	2	2250161-4392	±10%, X7R, 100V, 3900pF	C10, C13
75	9	2250161-4562	±10%, X7R, 100V, 5600pF	C118,C218,C318,

BASIC VERSION

NOTES:

P.L. NO. 0051726-0004

DIGI-DATA CORPORATION

DR		12-21-78	ENG	JPK	12-21-78
CHK		12-21-78			

TITLE: ASS'Y; READ CARD PE/NRZI 25 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0051726-0004	SH. 1	OF 3	REV. 01
01	CLEREL	12-21-78	JPK						

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 4	PART NUMBER	DESCRIPTION	REFERENCE
			C418,C518,C618,C718,C818,C918	
76	9	2250161-4822	±10%, X7R, 100V, 8200pF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS, D.C. 1/4W, 5%	
77	9	2150004-0101	100 OHM	R106, R206,R306
				R406,R506,R606,
			R706,R806,R906	
			RESISTORS, METAL FILM, 1/8W, 1%	
78	9	2150020-1820	182 OHM	R111,R211,R311,
				R411,R511,R611,
			R711,R811,R911	
79	36	2150020-1781	1.78K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
80	9	2150020-3481	3.48K OHM	R113,R213,R313,
				R413,R513,R613,
			R713,R813,R913	
81	9	2150020-3322	33.2K OHM	R110,R210,R310,

BASIC VERSION

NOTES:

P.L. NO. 0051726-0004

DIGI-DATA CORPORATION

DR		ENG	
CHK			

TITLE: ASS'Y; READ CARD PE/NRZI 25 IPS

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON	P.L. NO. 0051726-0004	SH. 2	OF 3	REV. 01

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 4	PART NUMBER	DESCRIPTION	REFERENCE
			R410,R510,R610,R710,R810,R910	
82	9	2150020-2803	280K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC VERSION

NOTES:

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y READ CARD PE/NRZI 25 IPS

P.L. NO. 0051726-0004 | SH. 3 OF 3 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051726-0004

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	PART NUMBER	DESCRIPTION	REFERENCE
67	1	0051726-0001	ASS'Y; READ CARD - PE/NRZI BASIC	
			CAPACITORS, MONOLITHIC CERAMIC	
68	9	2250163-4220	±10%, C0G, 200V, 22pF	C120,C220,C320,
				C420,C520,C620,
			C720,C820,C920,	
69	9	2250163-4270	±10%, C0G, 200V, 27pF	C102,C202,C302,
				C402,C502,C602,
			C702,C802,C902	
70	9	2250163-4680	±10%, C0G, 200V, 68pF	C119,C219,C319,
				C419,C519,C619,
			C719,C819,C919	
71	9	2250163-4121	±10%, C0G, 200V, 120pF	C101,C201,C301,
				C401,C501,C601,
			C701,C801,C901	
72	9	2250163-3181	±5%, C0G, 200V, 180pF	C107,C207,C307,
				C407,C507,C607,
			C707,C807,C907	
73	9	2250163-4391	±10%, C0G, 200V, 390pF	C123,C223,C323,
				C423,C523,C623,
			C723,C823,C923	
74	2	2250161-4272	±10%, X7R, 100V, 2700pF	C10,C13
75	9	2250161-4332	±10%, X7R, 100V, 3300pF	C118,C218,C318,

BASIC VERSION

NOTES:

DIGI-DATA CORPORATION

DR 12-21-78 ENG JPK 12-21-78

CHK 12-21-78

TITLE: ASS'Y; READ CARD-PE/NRZI 37.5 IPS

P.L. NO. 0051726-0005 | SH. 1 OF 3 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLS REL	12-21-78	JPK		

P.L. NO. 0051726-0005

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	PART NUMBER	DESCRIPTION	REFERENCE
			C418,C518,C618,C718,C818,C918	
76	9	2250161-4562	±10%, X7R, 100V, 5600pF	C124,C224,C324,
				C424,C524,C624,
			C724,C824,C924	
			RESISTORS, D.C., 1/4W, 5%	
77	9	215004-0241	240 OHM	R106,R206,R306,
				R406,R506,R606,
			R706,R806,R906	
			RESISTORS, METAL FILM, 1/8W,1%	
78	9	2150020-1820	182 OHM	R111,R211,R311,
				R411,R511,R611,
			R711,R811,R911	
79	36	2150020-2671	2.67K OHM	R101,R201,R301,
				R401,R501,R601,
			R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
			R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
			R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
80	9	2050020-3481	3.48K OHM	R113,R213,R313,
				R413,R513,R613
			R713,R813,R913	
81	9	2150020-3402	34.0K OHM	R110,R210,R310,

BASIC VERSION

NOTES:

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y READ CARD-PE/NRZI 37.5 IPS

P.L. NO. 0051726-0005 | SH. 2 OF 3 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051726-0005

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 5	PART NUMBER	DESCRIPTION	REFERENCE
			R410,R510,R610,R710,R810,R910	
82	9	2150020-2673	267K OHM	R139,R239,R339,
				R439,R539,R639,
			R739,R839,R939	

BASIC VERSION

NOTES:

DIGI-DATA CORPORATION

DR | ENG

CHK

TITLE: ASS'Y READ CARD-PE/NRZI 37.5 IPS

P.L. NO. 0051726-0005 | SH. 3 OF 3 | REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051726-0005

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 6				PART NUMBER	DESCRIPTION	REFERENCE
67	1				0051726-0001	ASSEMBLY; READ CARD-PE/NRZI BASIC	
						CAPACITORS, MONOLITHIC CERAMIC	
68	9				2250163-4180	C0G, 200V, 18pF, ±10%	C120,C220,C320,
							C420,C520,C620
						C720,C820,C920,	
69	9				2250163-4330	C0G, 200V, 33pF, ±10%	C102,C202,C302,
							C402,C502,C602,
						C702,C802,C902	
70	9				2250163-4560	C0G, 200V, 56pF, ±10%	C119,C219,C319,
							C419,C519,C619,
						C719,C819,C919	
71	9				2250163-4820	C0G, 200V, 83pF, ±10%	C101,C201,C301,
							C401,C501,C601,
						C701,C801,C901	
72	9				2250163-3151	C0G, 200V, 150pF, ±5%	C107,C207,C307,
							C407,C507,C607,
						C707,C807,C907	
73	9				2250163-4331	C0G, 200V, 330pF, ±10%	C123,C223,C323,
							C423,C523,C623,
						C723,C823,C923	
74	2				2250161-4222	X7R,100V, 2200pF, ±10%	C10,C13
75	9				2250161-4272	X7R, 100V, 2700pF, ±10%	C118,C218,C318,
							C418,C518,C618,

BASIC / VERSION

NOTES:

DIGI-DATA CORPORATION

DR 12-21-78 ENG JPK 12-21-78
CHK 12-21-78
TITLE: ASSEMBLY; READ CARD-PE/NRZI 45 IPS
P.L. NO. 0051726-0006 SH. 1 OF 3 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON
01	CLB8EL	12-21-78	JPK		

P.L. NO. 0051726-0006

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 6				PART NUMBER	DESCRIPTION	REFERENCE
						C718,C818,C918	
76	9				2250161-4472	X7R, 100V, 4700pF, ±10%	C124,C224,C324,
							C424,C524,C624,
						C724,C824,C924	
						RESISTORS, D.C., 1/4W, 5%	
77	9				2150004-0331	330 Ohm	R106,R206,R306,
							R406,R506,R606,
						R706,R806,R906	
						RESISTORS, METAL FILM, 1/8W, 1%	
78	9				2150020-1820	182 Ohm	R111,R211,R311,
							R411,R511,R611,
						R711,R811,R911	
79	36				2150020-3241	3.24K Ohm	R101,R201,R301,
							R401,R501,R601,
						R701,R801,R901,R102,R202,R302,R402,	R502,R602,R702,
						R802,R902,R103,R203,R303,R403,R503,	R603,R703,R803,
						R903,R104,R204,R304,R404,R504,R604,	R704,R804,R904
80	9				2150020-3481	3.48K Ohm	R113,R213,R313,
							R413,R513,R613,
						R713,R813,R913	
81	9				2150020-3402	34.0K Ohm	R110,R210,R310,
							R410,R510,R610,
						R710,R810,R910	

BASIC / VERSION

NOTES:

DIGI-DATA CORPORATION

DR ENG
CHK
TITLE: ASSEMBLY; READ CARD-PE/NRZI 45 IPS
P.L. NO. 0051726-0006 SH. 2 OF 3 REV. 01

REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051726-0006

D.D. FORM 04-1-50001-0000

ITEM	QTY/DASH 6				PART NUMBER	DESCRIPTION	REFERENCE
82	9				2150020-2673	267K Ohm	R139,R239,R339,
							R439,R539,R639,
						R739,R839,R939	

BASIC / VERSION

NOTES:

DIGI-DATA CORPORATION

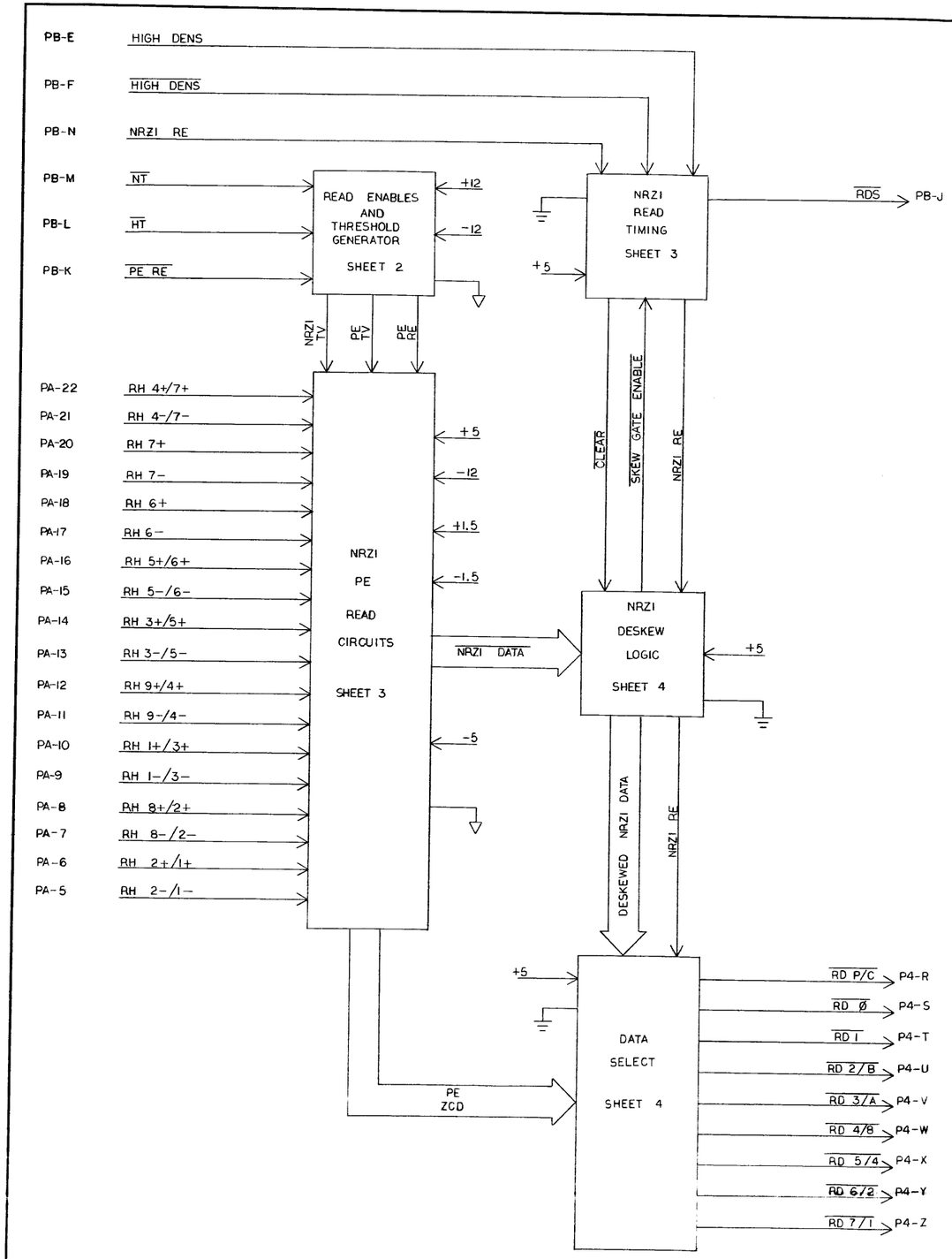
DR ENG
CHK
TITLE: ASSEMBLY; READ CARD-PE/NRZI 45 IPS
P.L. NO. 0051726-0006 SH. 3 OF 3 REV. 01

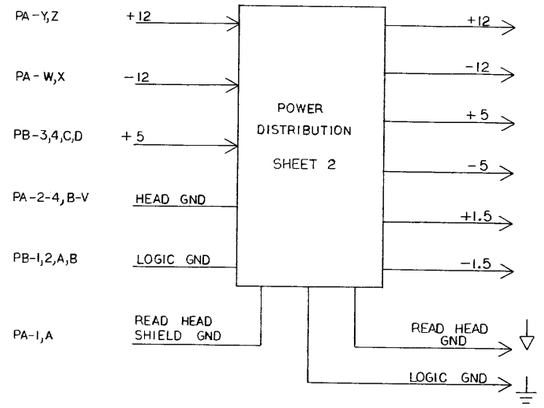
REV.	CHG. NO.	DATE	APPR.	NEXT ASSY.	USED ON

P.L. NO. 0051726-0006

D.D. FORM 04-1-50001-0000

	REVISIONS		
LTR	DESCRIPTION	DATE	APPROVED
X2	CLASS "C" RELEASE	2-9-79	JPK
01	CLASS "B" RELEASE	2-9-79	JPK





NOTES:

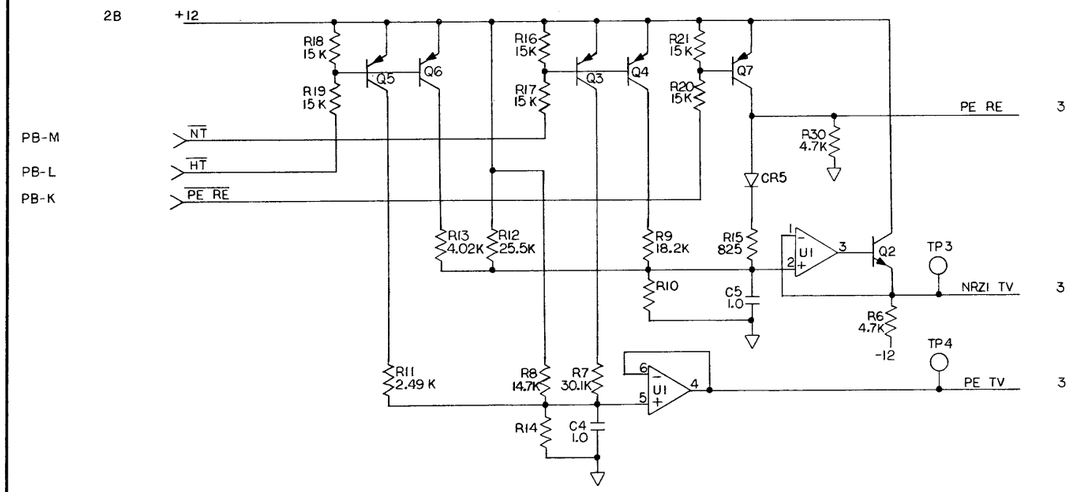
1. ALL CAPACITANCES ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTANCES ARE IN OHMS.
3. ⊥ = LOGIC GROUND ⏚ = HEAD GROUND

IC SUPPLY VOLTAGE AND PIN USED								
VOLTAGE		⏚	⊥	+5	-5	+12	-12	
REFERENCE	U1					11	7	PIN NO.
	U2,U3,U4			8	16			
	U5			7	14			
	U101-U901					7	4	
	U102-U902					7	4	
	U103-U903					7	4	
	U104-U904			7	4			
	U105-U905	1			4	8		

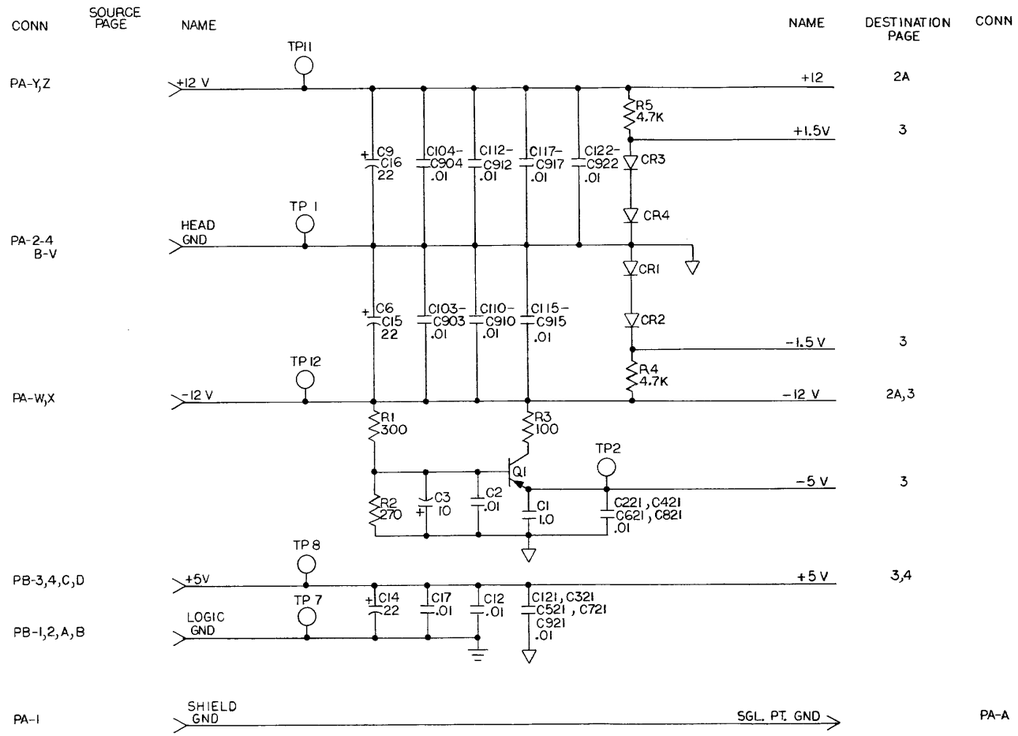
		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- S. HEISHMAN	12/7/78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ±1/64 ANGLES ±1/2°	CHK- S. Sleffer	12/12/78	
			ENG- JPK	1-9-79	SCALE: NONE SHEET 1 OF 4
			CUST-		SCHEMATIC, READ CARD
		DO NOT SCALE THIS PRINT			size D dwg no 0251741-0000 REV 01
NEXT ASS'Y	USED ON				

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

THRESHOLD GENERATOR AND READ ENABLES



POWER DISTRIBUTION



		MATERIAL-	SIGNATURE	DATE
		FINISH-	DR-S. HEISHMAN	12/7/79
		TOLERANCE-UNLESS	CHK-	
		OTHERWISE SPECIFIED	ENG-	
		3 PLACE ±.005	CUST-	
		2 PLACE ±.010		
		FRACTIONS ± 1/64		
		ANGLES ± 1/2°		
		DO NOT SCALE THIS		
NEXT ASS'Y	USED ON	PRINT		

DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

SCALE: NONE | SHEET 2 OF 4

SCHEMATIC, READ CARD

size D | dwg no 0251741-0000 | rev 01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TYPICAL READ AMPLIFIER, 9 TIMES

CONN	SOURCE PAGE	NAME
	2A	PE RE
	2A	PE TV
PA 5		RH 2-/1-
PA 6		RH 2+/1+
	2A	NRZI TV
	2B	+5
4B		SKEW GATE ENABLE
PB-E		HIGH DENS
PB-F		HIGH DENS
PB-N		NRZI RE

NAME	DESTINATION PAGE	CONN
ACTIVE 2	4	
ZCD 2	4	
NRZI 2/B	4	
CLEAR	4A,4B	
RDS		PB-J
NRZI RE	4A,4B	

R107 51.1K, R108 1K, CW, R109 100, C106 1.0, R110, C105 3.3PF, TP101, R101, R102, C101, R104, R103, R105 51.1K, R106, C102, U101, C107, R113, R111, R112 402, R114 1.5K, C108 1.0, TP102, R115 40.2K, C111 3.3 PF, C109 100 PF, U102, R128 10 K, +1.5, -1.5, CR105, CR106, R130 15 K, R132 150 K, R131 2.2K, U104, CR107, R139, R140 47K, R141 470, Q104, Q103, C123, C124, +5, R134 330, U105, R135 2.7K, R129 330, R137 4.7K, R133 10 K, -5

R118 47.5K, R121 47.5K, C116 22 PF, CR102, CR103, CR101, TP103, R117 4.7K, C113 .01, U103, R119 24K, R120 1.5K, C114 470 PF, R116 4.7K, -12

+5, R124 150K, R125 4.7K, R127 4.7K, C120, R126 4.7K, C119, Q102, R122 470, C118, Q101, R123 15K, CR7

NRZI READ TIMING

R29 6.8K, R28 1.5K, R27 50K, C13, TP6, R25 7.5K, C11 560 PF, R22 5.1K, C7 330 PF, R23 5.1K, C8 120 PF, R38 1.5K, R40 1.5K, TP13, U4 LS123, U3 LS123, U2 LS123, R33 1.5K, R35 1.5K, R34 15K, Q9, U5 844, TP14, R26 6.8K, R24 50K, C10, TP5, R36 15K, R37 15K, Q8

		MATERIAL-	SIGNATURE	DATE
		FINISH-	DR-S. HEISHMAN	12/6/78
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-	
		3 PLACE ±.005	ENG-	
		2 PLACE ±.010	CUST-	
		FRACTIONS ± 1/64		
		ANGLES ± 1/2°		
		DO NOT SCALE THIS PRINT		
NEXT ASS'Y	USED ON			

DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

SCALE: NONE | SHEET 3 OF 4

SCHEMATIC, READ CARD

size D | dwg no 0251741-0000 | rev 01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

DATA SELECT

SOURCE PAGE	NAME
3	ZCD P
3	ACTIVE P
3	ZCD Ø
3	ACTIVE Ø
3	ZCD 1
3	ACTIVE 1
3	ZCD 2
3	ACTIVE 2
3	ZCD 3
3	ACTIVE 3
3	NRZI RE

R136 100 K, R236 100 K, R336 100 K, R436 100 K, R536 100 K

CR108 330, R238 CR208 330, R338 CR308 330, R438 CR408 330, R538 CR508 330

LS03 U6, U7, U9

NAME	DESTINATION PAGE	CONN
TP 104 RD P/C		PB-R
TP 204 RD Ø		PB-S
TP 304 RD 1		PB-T
TP 404 RD 2/B		PB-U
TP 504 RD 3/A		PB-V
DROP DETECT BUS	4B	
PE SKEW BUS	4B	
SKEW GATE ENABLE	4B	

NRZI DESKEW LOGIC

2B +5

R39 4.7K, R31 4.7K

3	NRZI P/C
3	CLEAR
3	NRZI Ø
3	NRZI 1
3	NRZI 2/B
3	NRZI 3/A

LS03 U6; LS00 U8, U10

CR109, CR209, CR309, CR409, CR509

(A)

DATA SELECT

SOURCE PAGE	NAME
3	ZCD 4
3	ACTIVE 4
3	ZCD 5
3	ACTIVE 5
3	ZCD 6
3	ACTIVE 6
3	ZCD 7
3	ACTIVE 7
3	NRZI RE
4A	DROP DETECT BUS
4A	PE SKEW BUS

R636 100 K, R736 100 K, R836 100 K, R936 100 K

CR608 330, R738 CR708 330, R838 CR808 330, R938 CR908 330

R32 47K +5

LS03 U11, U13

NAME	DESTINATION PAGE	CONN
TP 604 RD 4/8		PB-W
TP 704 RD 5/4		PB-X
TP 804 RD 6/2		PB-Y
TP 904 RD 7/1		PB-Z
DROP DETECT TP 10		
PE SKEW TP 9		

NRZI DESKEW LOGIC

3	NRZI 4/B
3	CLEAR
3	NRZI 5/4
3	NRZI 6/2
3	NRZI 7/1
4A	SKEW GATE ENABLE

LS00 U12, U14

CR609, CR709, CR809, CR909

SKEW GATE ENABLE 3

(B)

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- S. HEITSHMAN	12/8/78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ± 1/64 ANGLES ± 1/2°	CHK-		SCALE: NONE / SHEET 4 OF 4
			ENG-		
			CUST-		SCHEMATIC, READ CARD
NEXT ASS'Y	USED ON	DO NOT SCALE THIS PRINT			size D / dwg no 0251741-0000 / rev 01

LTR	REVISIONS DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-20-78	JJE

POWER CORD ASSY A05

POWER CONTROL ASSY A06

CONTROL PANEL ASSY A01

BOT EOT SENSOR A04

EMBEDDED FORMATTER ASSY A11

FORMATTER POWER SUPPLY ASSY A10

READ ASSY A08

TAKE-UP PHOTOCELL A02

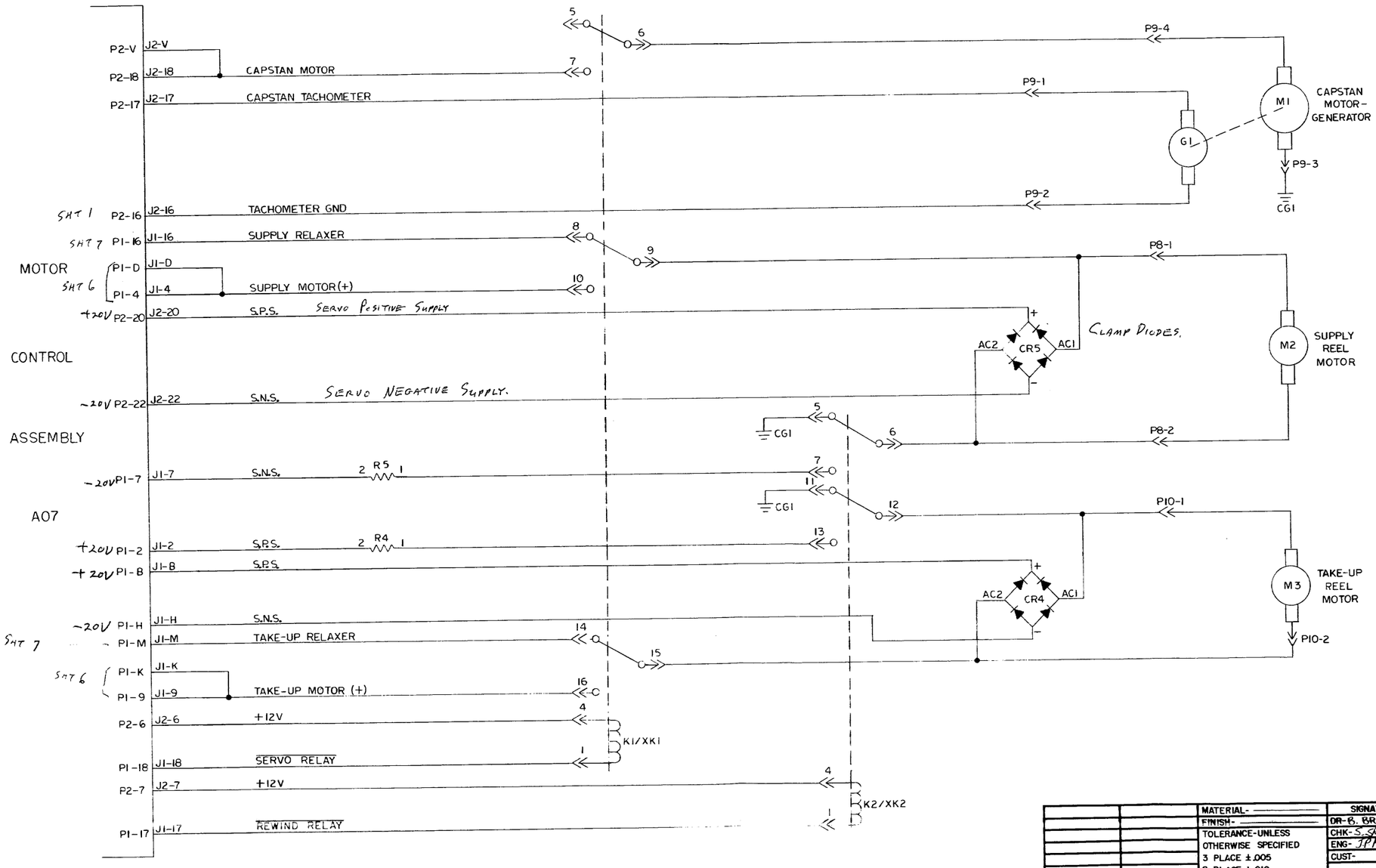
SUPPLY PHOTOCELL A03

MOTOR CONTROL ASSY A07

WRITE / CONTROL ASSY A09

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- S. HEISHMAN	8/8/78	
		TOLERANCE-UNLESS	CHK- S. Heishman	9-20-78	
		OTHERWISE SPECIFIED	ENG- JJ Eng	9-20-78	SCALE: NONE SHEET 1 OF
		3 PLACE ± .005	CUST-		SCHEMATIC, TRANSPORT
		2 PLACE ± .010			
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			
NEXT ASSY	USED ON	DO NOT SCALE THIS PRINT			SIZE E DWG NO 3251442 0000 REV 01

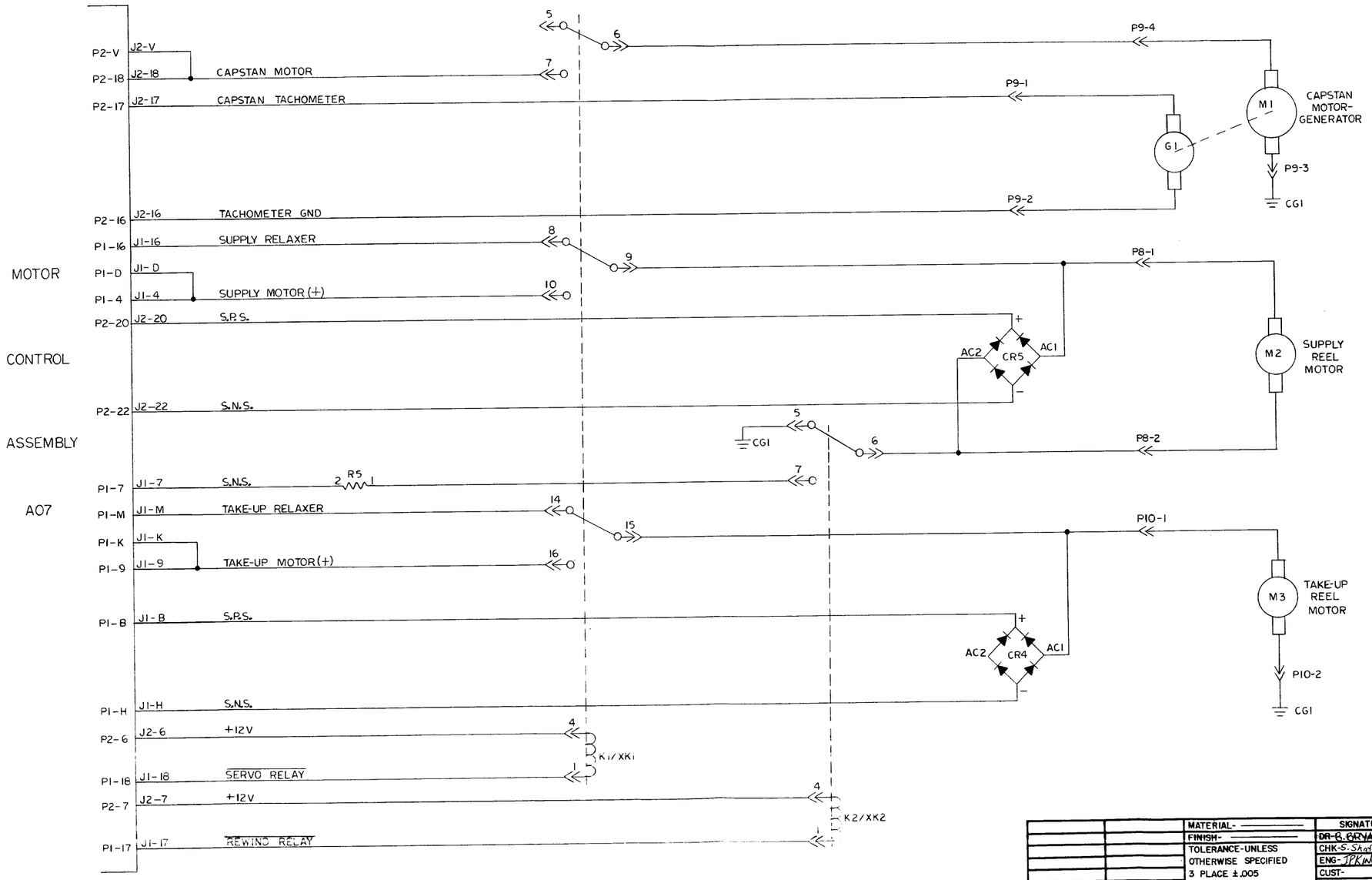
REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-20-78	JPK



RELAYERS: CURRENT SOURCES FROM +20V VIA PNP TRANSISTORS

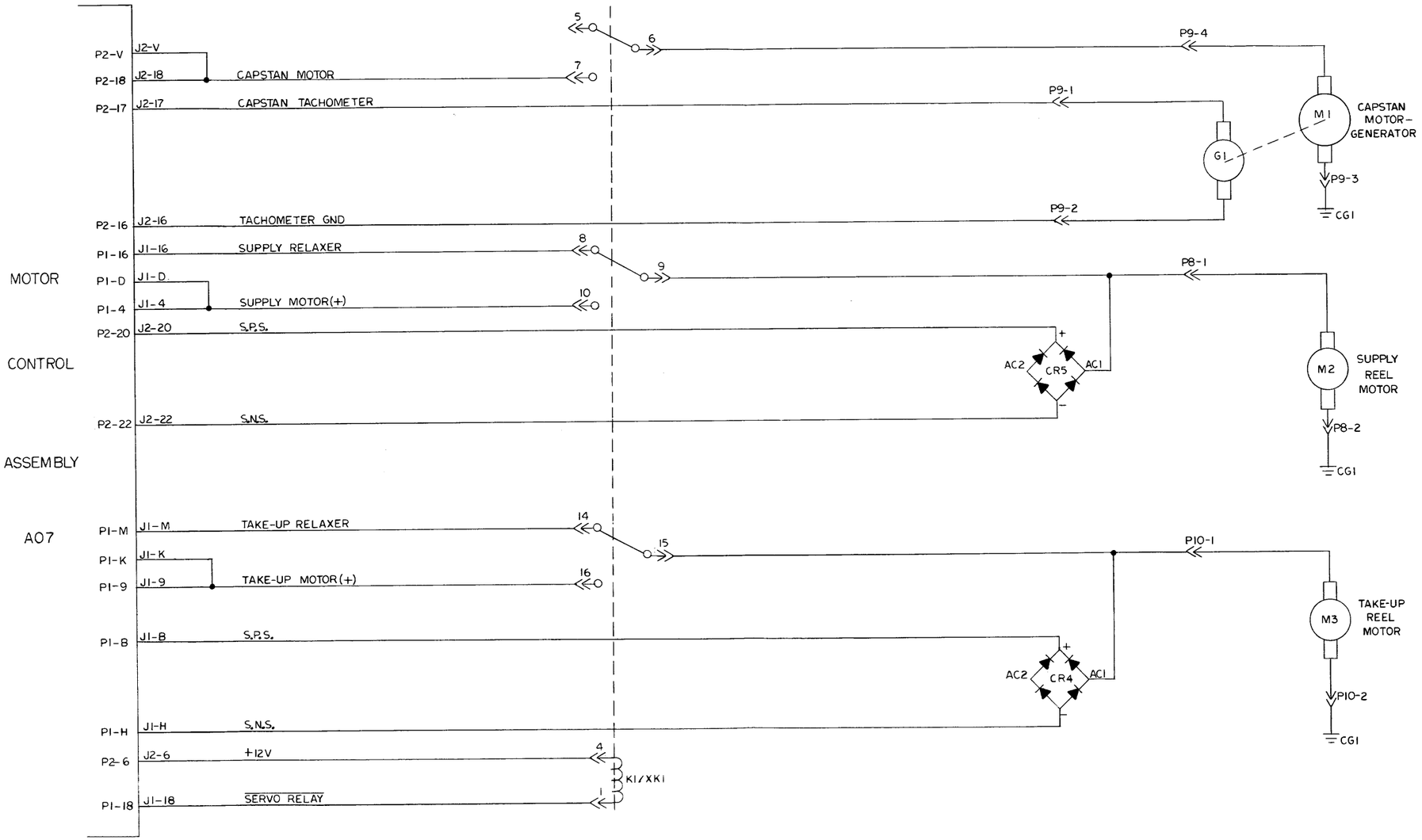
		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR-B. BRYANT	9-9-78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK- S. Slotter	9-20-78	
		3 PLACE ±.005	ENG- JP KING	9-20-78	SCALE: NONE SHEET 1 OF 1
		2 PLACE ±.010	CUST-		SCHEMATIC, MOTOR CONN., 10 1/2" TRANSPORT
		FRACTIONS ±1/64			
		ANGLES ±1/2°			SIZE D dwg no 0251640-0000 REV 01
NEXT ASS'Y	USED ON	DO NOT SCALE THIS PRINT			

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-20-78	JPK



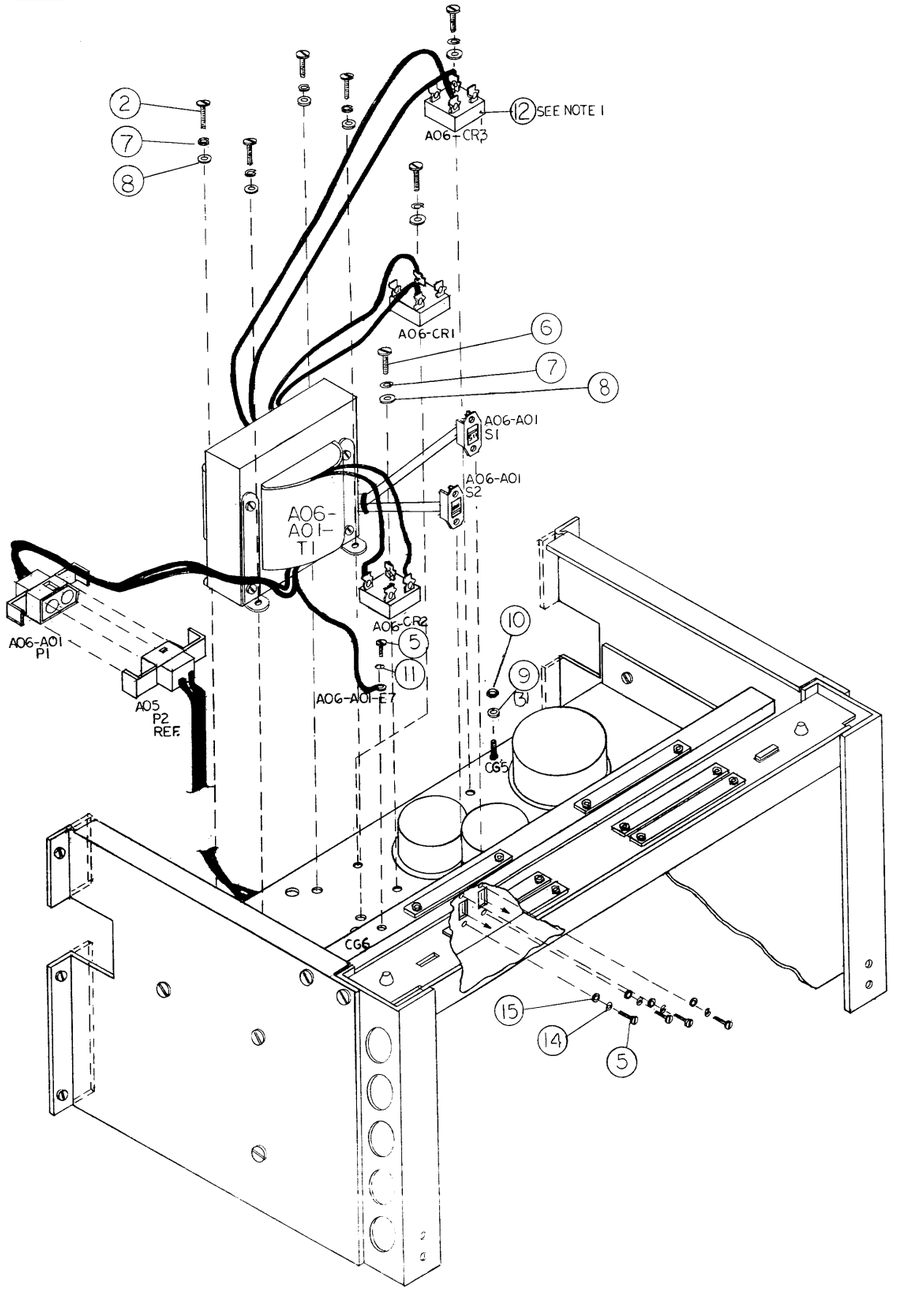
		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794	
		FINISH-	DR-B.BRYANT	9-8-78		
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-S.Shaffer	9-20-78		
		3 PLACE ±.005	ENG-JPKING	9-20-78	SCALE: NONE	SHEET 1 OF 1
		2 PLACE ±.010	CUST-		SCHEMATIC, MOTOR CONN., 8 1/2" TRANSPORT, 37.5 IPS	
		FRACTIONS ±1/64				
		ANGLES ±1/2°				
		DO NOT SCALE THIS PRINT			size D dwg no 0251641-0000	rev 01
NEXT ASS'Y	USED ON					

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-20-78	JPK



		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- B. BRYANT	8-9-78	
		TOLERANCE-UNLESS	CHK- S. Shaffer	9-20-78	
		OTHERWISE SPECIFIED	ENG- JPKING	9-20-78	SCALE: NONE / SHEET 1 OF 1
		3 PLACE ±.005	CUST-		
		2 PLACE ±.010			SCHEMATIC, MOTOR CONN., 7,8 1/2" TRANSPORT, 25 IPS
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			
		DO NOT SCALE THIS			size D / dwg no 0251642-0000 / rev 01
NEXT ASS'Y	USED ON	PRINT			

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-20-78	JPK



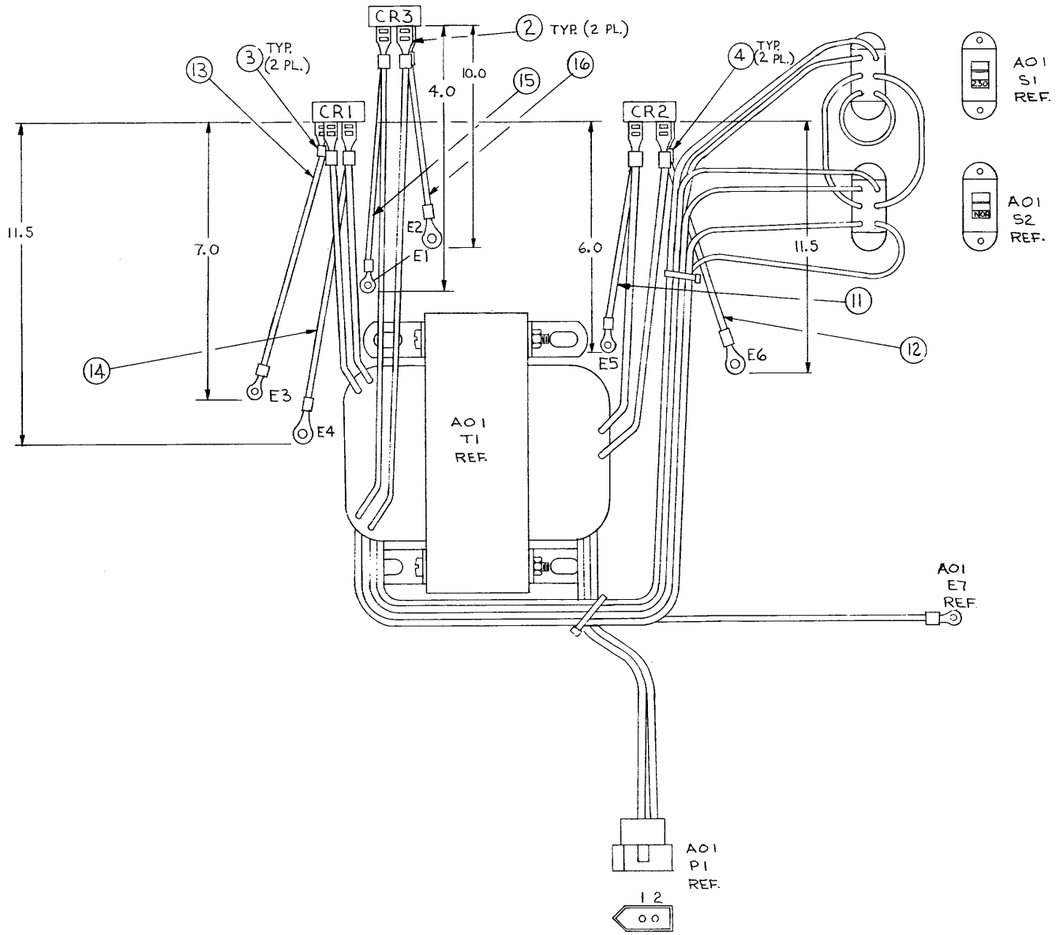
NOTES:

1. Accomplish physical installation: Install A06 components as shown, using specified hardware. Apply item 12 to mating surfaces of A06, CR1, CR2, and CR3.
2. Accomplish electrical installation:
   A. Connect A06A01P1 to A05P2.
   B. Connect A06 wire terminations E1, E3, and E5 to transport CG5, using specified hardware in accordance with standard assembly procedures.
   C. Connect A06A01T1 shield wire termination A06A01E7 to transport CG6 using specified hardware.
   D. Make the following connections, using existing hardware in accordance with standard assembly procedures:

      A06E2 to transport C3 (-)
      A06E4 to transport C1 (+)
      A06E6 to transport C2 (+)

		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- Manfred Arndt	8-21-78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK- S. Shaffer	9-20-78	
		3 PLACE ±.005	ENG- JPKING	9-20-78	SCALE: NONE / SHEET 1 OF 1
		2 PLACE ±.010	CUST-		
		FRACTIONS ±1/64			INSTALLATION DRAWING POWER CONTROL UNIT A.C.
		ANGLES ±½°			
0051546-0001		DO NOT SCALE THIS PRINT			size D / dwg no 0051546-0000 / REV 01
NEXT ASS'Y	USED ON				

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-20-78	JPK



NOTES:

1. WIRE LENGTH SPECIFICATIONS HAVE TOLERANCE OF ±.25 INCHES.
2. ELECTRICAL ASSEMBLY:
   A. ATTACH TERMINALS FROM A01 TO CR1, CR2, AND CR3 AS FOLLOWS:
      A01-E1 TO CR1-AC1
      A01-E2 TO CR1-AC2
      A01-E3 TO CR2-AC1
      A01-E4 TO CR2-AC2
      A01-E5 TO CR3-AC1
      A01-E6 TO CR3-AC2
   B. ATTACH WIRES TERMINATING IN E1 THROUGH E6 TO CR1, CR2, AND CR3 AS FOLLOWS:
      E1 TO CR3(+)
      E2 TO CR3(-)
      E3 TO CR1(-)
      E4 TO CR1(+)
      E5 TO CR2(-)
      E6 TO CR2(+)

		MATERIAL-	SIGNATURE	DATE
		FINISH-	DR- S. HEISHMAN	6/2/78
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-	9-20-78
		3 PLACE ±.005	ENG- JP KING	9-20-78
		2 PLACE ±.010	CUST-	
		FRACTIONS ±1/64		
		ANGLES ±1/2°		
0051404-0001		DO NOT SCALE THIS PRINT		
NEXT ASS'Y	USED ON			

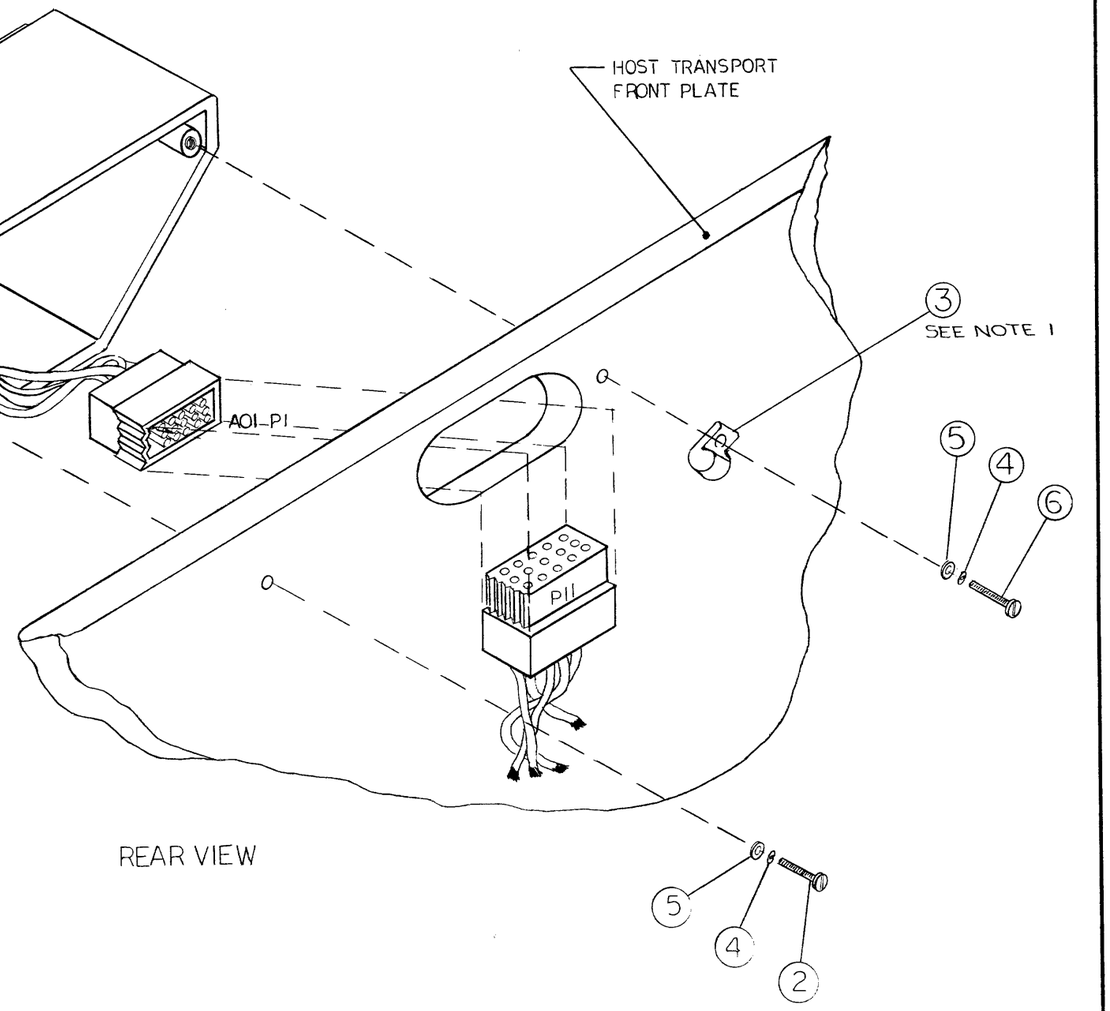
DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

SCALE: NONE | SHEET 1 OF 1

ASSEMBLY, POWER CONTROL UNIT, AC

SIZE D | DWG NO 0051404-0000 | REV 01

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-25-78	JPL



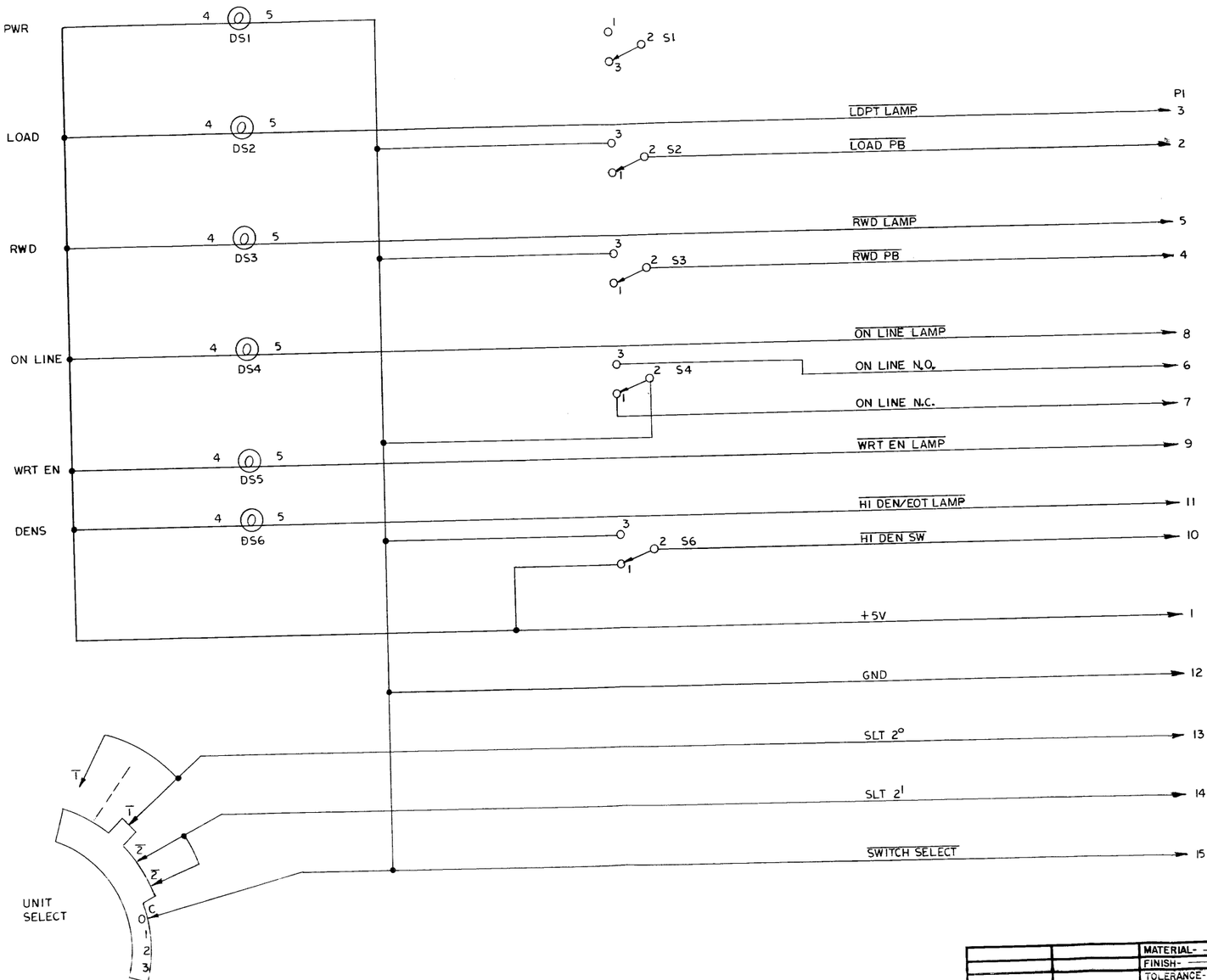
REAR VIEW

NOTES:

1. Cable clamp to be used for support of power cord assembly upon installation.

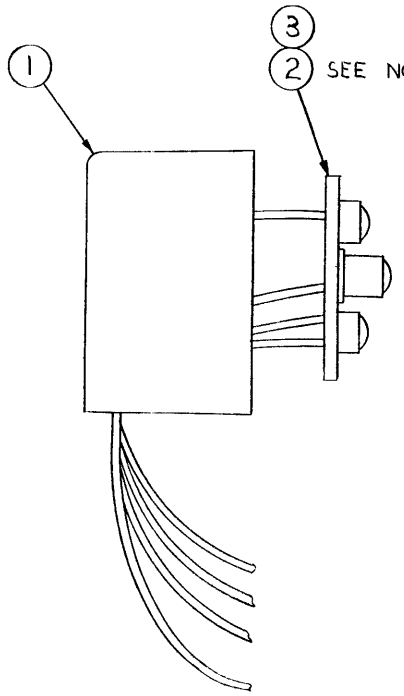
		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794	
		FINISH-	DR-Doug H. Koch	5-15-78		
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-S.F. Shaffer	9-25-78	SCALE: NONE	SHEET 1 OF 1
		3 PLACE ±.005	ENG- JPKING	9-25-78		
		2 PLACE ±.010	CUST-		INSTALLATION DRAWING CONTROL BLOCK KIT	
		FRACTIONS ± 1/64				
0051545-0002		ANGLES ± 1/2°			size C dwg no 0051545-0000	rev 01
0051545-0001		DO NOT SCALE THIS PRINT				
NEXT ASS'Y	USED ON					

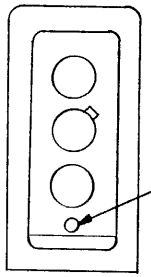
	REVISIONS		
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-22-78	JPK
02	ECO-232	12-5-78	JPK



		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- B. BRYANT	9-21-78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED 3 PLACE ±.005 2 PLACE ±.010 FRACTIONS ± 1/64 ANGLES ± 1/2°	CHK- S. SL. ??-	9-22-78	SCALE: NONE SHEET 1 OF 1
			ENG- JPKING	9-22-78	SCHEMATIC, LIGHTED SWITCH BLOCK
			CUST-		
NEXT ASS'Y	USED ON 005569-0001	DO NOT SCALE THIS PRINT			SIZE D dwg no 0251648-0000 rev 02

	REVISIONS		
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	8-3-78	JPK



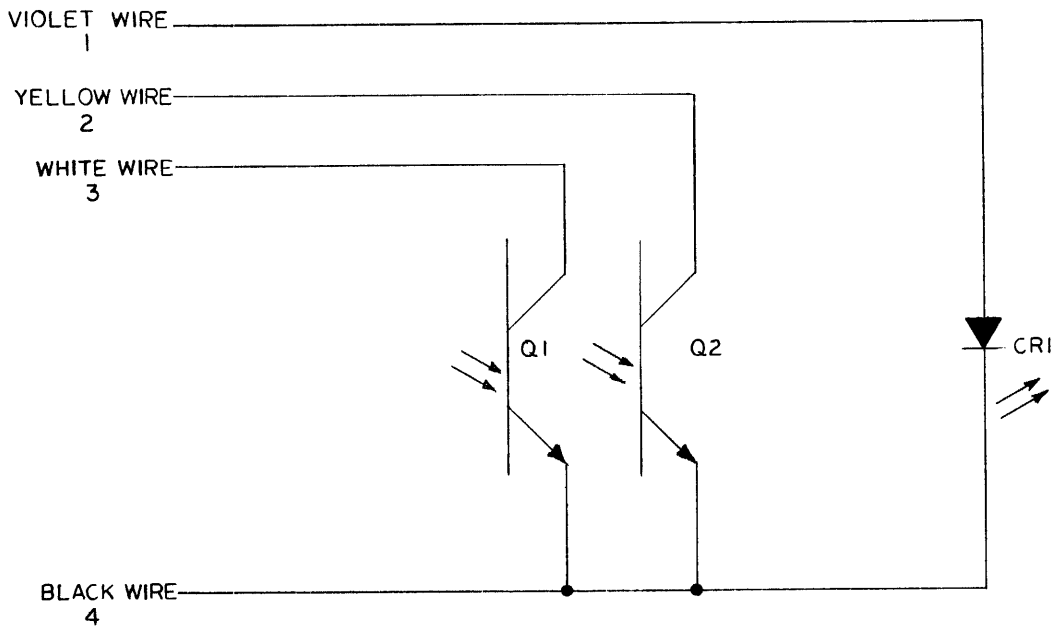


NOTES:

1. INSTALL ITEM 2 USING ITEM 3 ON TOP, BOTTOM & SIDES.

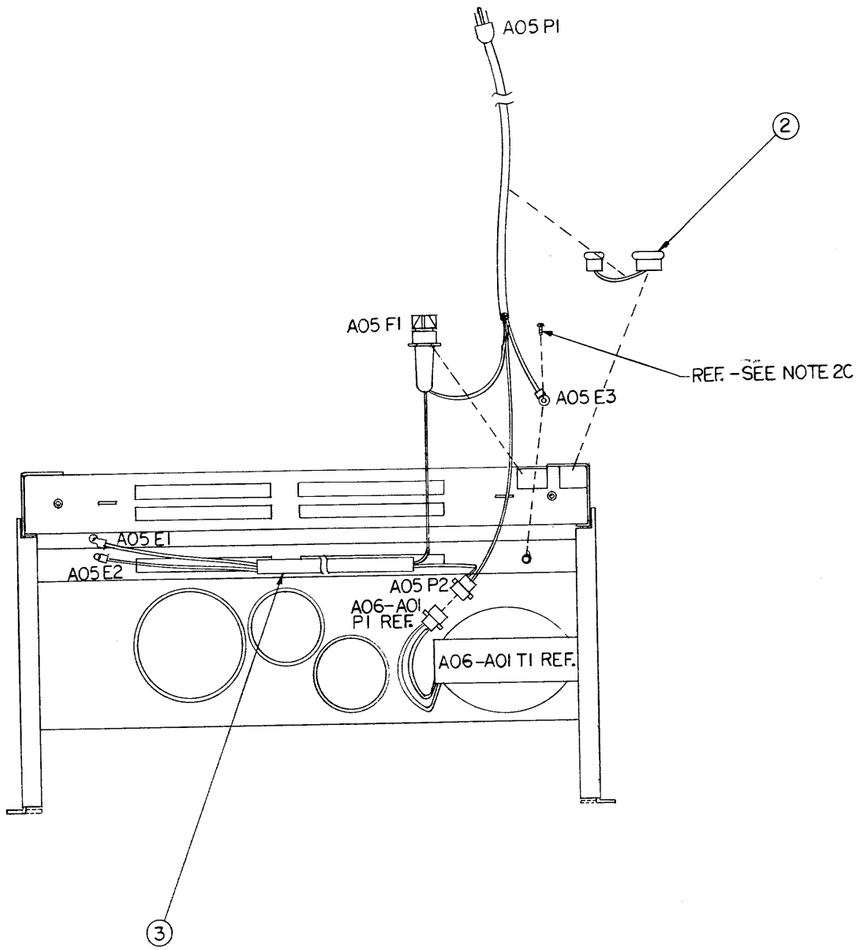
		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR- S. HEISHMAN	7/27/78	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK- W.E. FORNESS	8-1-78	
		3 PLACE ± .005	ENG- JPKING	8-3-78	SCALE: NONE — SHEET 1 OF 1
		2 PLACE ± .010	CUST-		
		FRACTIONS ± 1/64			ASSEMBLY, BOT-EOT SENSOR
		ANGLES ± 1/2°			
0051553-0001		DO NOT SCALE THIS PRINT			size B — dwg no 0051553-0000 — rev 01
NEXT ASS'Y	USED ON				

REV	ECN NO	DATE	APP
A	CL. "A" REL. ECO-117	3-15-78	[illegible] D
B	ECO -207	8-22-78	JPK



		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH-	DR-B. Bryant	10-14-77	
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK-W.E. Forness	3-13-78	
		3 PLACE ±.005	ENG-M. Devaney	3-15-78	SCALE: NONE SHEET 1 OF 1
		2 PLACE ±.010	CUST-		
		FRACTIONS ± 1/64			SCHEMATIC BE PCB
0051090-0002	INFOREX	ANGLES ± 1/2°			
0051090-0001	1130,1630,1730	DO NOT SCALE THIS PRINT			size B dwg no 0251137-0000 REV B
NEXT ASS'Y	USED ON				

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	2-13-79	JPK



1. ACCOMPLISH PHYSICAL INSTALLATION:

   A. Sleeve wires terminated by A05E1 and A05E2, using item 3.
   B. Install A05F1 as shown using mounting nut and tubing supplied.
   C. Install A05P1 as shown, compressing item 2 enough to fit through cage mounting hole.
   D. Dress leads as required, using item 4.

2. ACCOMPLISH ELECTRICAL INSTALLATION:

   A. Connect A05E1 to A01S1 Pin 3.
   B. Connect A05E2 to A01S1 Pin 2.
   C. Connect A05E3 to CG6, using hardware specified by Power Control unit (A06) Installation Drawing.
   D. Connect A05P2 to A06 A01 P1.

		MATERIAL-	SIGNATURE	DATE
		FINISH:	DR-B. BEYANT	1-8-79
		TOLERANCE-UNLESS OTHERWISE SPECIFIED	CHK:	
		3 PLACE ±.005	ENG- JPKING	2-13-79
		2 PLACE ±.010	CUST-	
		FRACTIONS ± 1/64		
		ANGLES ± 1/2°		
		DO NOT SCALE THIS PRINT		
NEXT ASS'Y	USED ON			

DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

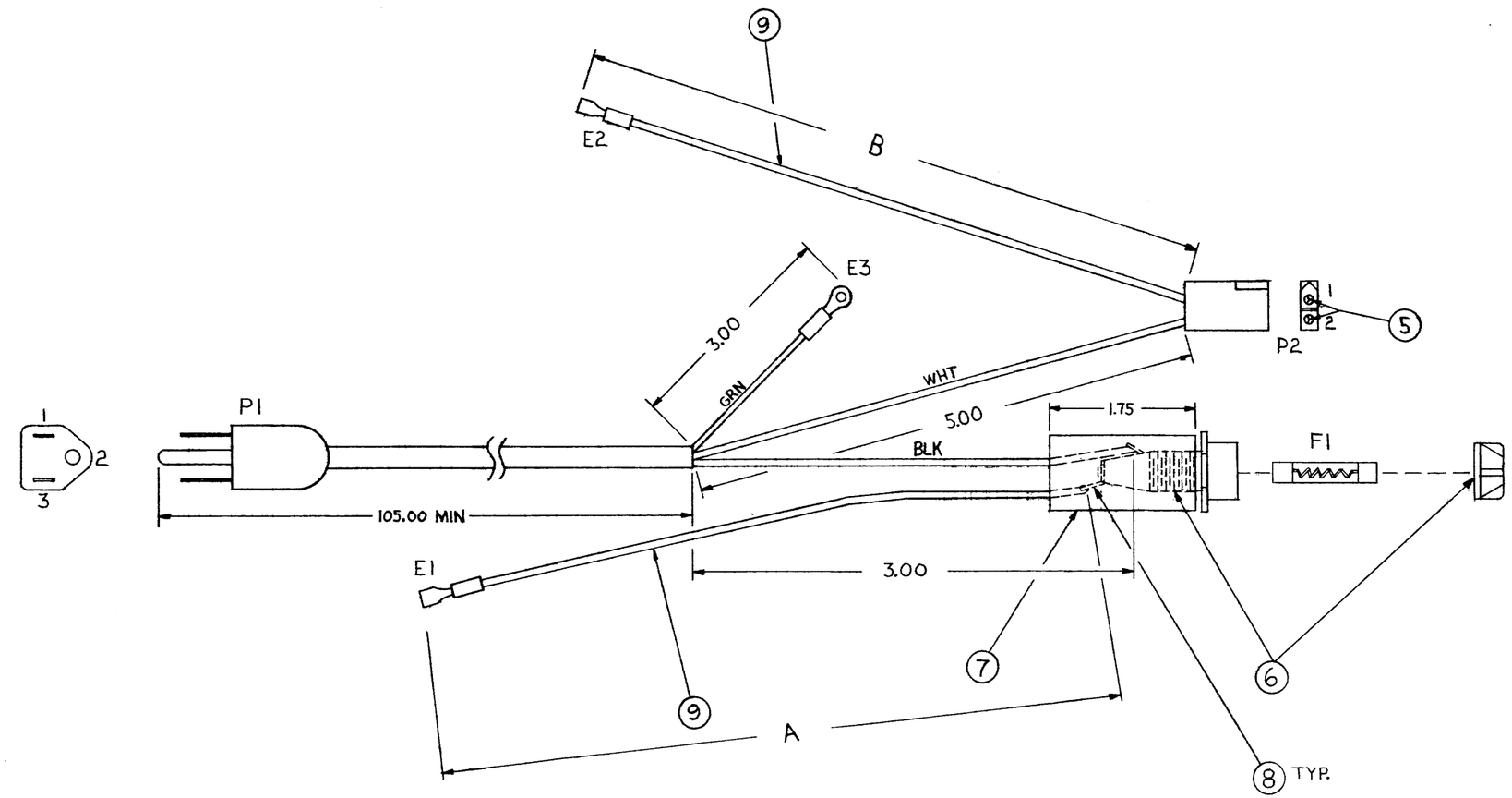
SCALE: NONE | SHEET 1 OF 1

INSTALLATION DRAWING, AC LINE CORD

SIZE	DWG NO	REV
D	0051551-0000	01

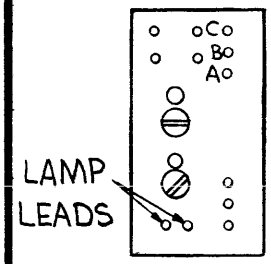
D.D.C. PART NO.	A LENGTH	B LENGTH
0051460-0001	21.00	23.50
0051460-0002	24.00	26.50
0051460-0003	35.50	38.00

	REVISIONS		
LTR	DESCRIPTION	DATE	APPROVED
01	CLASS "B" RELEASE	9-20-78	JPK

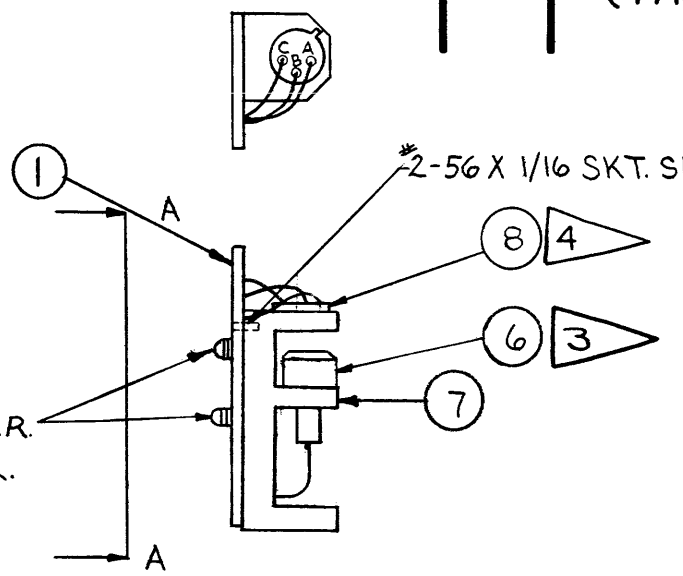


		MATERIAL-	SIGNATURE	DATE	DIGI-DATA CORPORATION
		FINISH-	DR- S. HEISHMAN	5/22/78	8580 DORSEY RUN ROAD
		TOLERANCE-UNLESS	CHK- S. Shaffer	9-20-78	JESSUP, MD. 20794
		OTHERWISE SPECIFIED	ENG- JPKING	9-20-78	SCALE: NONE / SHEET 1 OF 1
		3 PLACE ±.005	CUST-		
		2 PLACE ±.010			ASSEMBLY, AC LINE CORD, 110/120 VAC
		FRACTIONS ± 1/64			
		ANGLES ± 1/2°			
0051460-0001/0003		DO NOT SCALE THIS			size C / dwg no 0051460-0000 / rev 01
NEXT ASS'Y	USED ON	PRINT			

REV	ECN NO	DATE	APP
A	ORIG. ISSUE (0506)	12-22-75	
B	P/N WAS 41-1-10045- (P/N CHG. ONLY		



VIEW AT "A-A"



NOTES:

1. SEE PARTS LIST PA-0242 (0010242-0001)
2. ASSY. NO. -1 (AS SHOWN
3. LAMP (ITEM 6) TO BE INSTALLED WITH MANUFACTURER SUPPLIED RETAINER RING.
4. PHOTOCELL LEADS MUST BE SLEEVED WITH TEFLON TUBING. (ITEM 9).

		MATERIAL- —	SIGNATURE	DATE	DIGI-DATA CORPORATION 8580 DORSEY RUN ROAD JESSUP, MD. 20794
		FINISH- —	DR- M. J. Quinn	10/20/75	
		TOLERANCE-UNLESS	CHK- E	12/22/75	
	1500	OTHERWISE SPECIFIED	ENG- J. S.	12-22-75	SCALE: N.T.S. SHEET 1 OF 1
	1300	3 PLACE ± .005	CUST-		
41500007-0000	1130	2 PLACE ± .010			SERVO ASSY.
41500006-0000	1630	FRACTIONS ± 1/64			
41500000 0000	INFOREX	ANGLES ± 1/2°			
41400U-0000	1730	DO NOT SCALE THIS			size A dwg no MA-0045 rev B
NEXT ASS'Y	USED ON	PRINT			

4110045-

ITEM	QTY 1	2	3	4	PART NUMBER	PART DESCRIPTION	VENDOR NUMBER	REFERENCE
1	1				1300562-0001	PRINTED CIRCUIT BOARD		
2	2				5050000-0003	#2-56 x 3/16 BDR. HD. SCR.		
3	1				5050001-0001	#2-56 X 1/16 SKT. SET SCR.		
4								
5	2				5250001-0001	#2 INT. TH. LK. WSHR.		
6	1				2950002-0001	ALCO LAMP		
7	1				1250003-0001	PHOTO SENSOR BLOCK		
8	1				2950003-0001	PHOTO CELL, VACTEC		
9	AR				2950004-0001	#24 TEFLON TUBING		
10								
11	REF				4110045-0001	SERVO ASSY		
					NOTES:			

REV.	ECN NO.	DATE	APPR.	NEXT ASSY.	USED ON
C	PIL CHANGE ONLY	2-15-79	W.F.F.	41-4-50007-0000	1500
B	0689	5-3-78		41-4-50006-0000	1300
A	ORIG. ISSUE	12-22-75		41-4-500 00-0000	1130
				41-4-4800 11-8008	1630
					INFOREX
					1730

DIGI-DATA CORPORATION
8580 DORSEY RUN ROAD
JESSUP, MD. 20794

DR M.J.Z.	10-27-75	ENG	
CHK [illegible]	12/22/75	CUST	

TITLE: PARTS LIST
SERVO ASSY

SIZE	DWG NO.	SH. OF	REV.
PA	PA-0242	1 1	C

0010242-0000

0010242-0000 PA-0242

ADDENDUM AND ERRATA FOR MANUAL 0551711-0000

2.2 Controls and Indicators.

2.2.3 REWIND/RWD is now labeled REWIND/UNLOAD.

2.2.5 WRTEN is now labeled WRITE ENABLE.

2.2.6 HIDEN is now labeled HIGH DENSITY.

2.2.7 UNIT SELECT Thumbwheel is now replaced by four pushbutton switches labeled 0, 1, 2 and 3.

6.3 Plug Jumper and Switch Options

6.3.1 Corrections:

To label a transport as Unit Ø, Install W8 and W10.

To label a transport as Unit 1, Install W9 and W10.

To label a transport as Unit 2, Install W7 and W10.

To label a transport as Unit 3, Install W6 and W10.

For other selection options there is no change from the manual.

6.3.5 Selection of Density

Addition:

g) A Nine-Track Pertec Compatible PE/NRZ Unit with density selection via the DDS input must have W15 and W31 installed; format lines should be conditioned for 30 Series compatibility.

Corrections:

c) Should read:
Seven- or Nine-track Dual Density NRZ Unit. . .

d) Should read:
A Seven- or Nine-Track Dual Density NRZ Unit. . .

e) Should read:
A Nine-Track PE/NRZ Unit. . .

f) Should read:
A Nine-Track PE/NRZ Unit. . .

6.3.7 and 6.3.8 are replaced by the following:

6.3.7 SPEED STATUS. The speed status lines are controlled by the settings of DIP switch S3 and the level of the SPS input. These three outputs (SP2, SP1, SP0) reveal to the formatter the transport's tape speed.

6.3.7.1 40 SERIES COMPATIBILITY

a) Standard speeds - SPS False

12.5 IPS	ON - 2, 6	OFF - 4
18.75 IPS	ON - 4. 6	OFF - 2
25 IPS	ON - 6	OFF - 2, 4
37.5 IPS	ON - 2, 4	OFF - 6
45 IPS	ON - 2	OFF - 4, 6

b) Optional speeds - SPS True

12.5 IPS	ON - 1, 5	OFF - 3
18.75 IPS	ON - 3, 5	OFF - 1
25 IPS	ON - 5	OFF - 1, 3
37.5 IPS	ON - 1, 3	OFF - 5
45 IPS	ON - 1	OFF - 3, 5
none	ON - 1, 3, 5	

6.3.7.2 30 SERIES COMPATIBILITY

a) Standard Speed - SPS False

Lo Speed	ON	OFF - 2, 4, 6
Hi Speed	ON - 4	OFF - 2, 6

b) Optional Speed - SPS True

Lo Speed	ON	OFF - 1, 3, 5
Hi Speed	ON - 3	OFF - 1, 5

6.3.8 FORMAT STATUS. The plug jumpers W2, W3, W24 and W25 and the DIP switch S1 are used with the density selection to generate the format status lines FMT1, FMT2 and FMT3 as follows,

FORMAT	40 Series Compatibility FMT1	FMT2	FMT3	30 Series Compatibility FMT1 (DDI)	FMT2 (7 TK)	FMT3 (NRZ)
7 Tk, 200 BPI, NRZ	LO	LO	LO	LO	LO	LO
7 Tk, 556 BPI, NRZ	LO	LO	HI	HI	LO	LO
7 Tk, 800 BPI, NRZ	HI	LO	LO	HI	LO	LO
9 Tk, 200 BPI, NRZ	LO	HI	LO	LO	HI	LO
9 Tk, 800 BPI, NRZ	HI	HI	LO	LO	HI	LO
9 Tk, 1600 BPI, PE	LO	HI	HI	HI	HI	HI
9 Tk, 6250 BPI, GCR	HI	HI	HI	NA	NA	NA
Unassigned	HI	LO	HI	NA	NA	NA

FORMAT SIGNAL DECODING

6.3.8.1 40 SERIES COMPATIBILITY

Proper setting of the switches and jumpers for each configuration is:

CONFIGURATION	S1 -1 or -2	-3 or -4	-5,-6 or -7	W2 or W3	W24 or W25
9 Tk 800/1600 BPI	-1	-4	-7	W3	W24
9 Tk 200/800	-2	-3	-7	W3	W24
9 Tk 800 only	-2	-3	-6	W3	W24
9 Tk 200 only	-2	-3	-5	W3	W24
9 Tk 1600 only	-1	-4	-5	W2	W24
7 Tk 800 only	-2	-4	-6	W2	W24
7 Tk 556 only	-2	-4	-6	W3	W24
7 Tk 200 only	-2	-4	-5	W2	W24
7 Tk 200/556	-2	-4	-7	W3	W24
7 Tk 556/800	-2	-3	-7	W2	W24
7 Tk 200/800	-2	-4	-7	W2	W24

6.3.8.2 30 SERIES COMPATIBILITY

Proper settings of the switches and jumpers for each configuration in 30 Series Model is:

	-1 or -2	-3 or -4	-5,-6 or -7	W2 or W3	W24 or W25
9 Tk 800/1600 BPI	-1	-3	-7	W3	W24
9 Tk 800 only	-1	-3	-5	W3	W24
9 Tk 1600 only	-1	-3	-6	W3	W24
7 Tk 800 only	-2	-4	-6	W2	W25
7 Tk 556 only (High Density)	-2	-4	-6	W2	W25
7 Tk 556 only (Low Density)	-2	-4	-5	W2	W25
7 Tk 200 only	-2	-4	-5	W2	W25
7 Tk 200/556	-2	-4	-7	W2	W25
7 Tk 556/800	-2	-4	-7	W2	W25
7 Tk 200/800	-2	-4	-7	W2	W25

ADDENDUM ON 40-SERIES

11 - Engineering Documentation

Assembly, Write/Control Card 0051705-0000	Replaced by 0052198-0000
Parts List, Write/Control Card 0051705-0001	Replaced by 0052198-0001 thru -0003
Schematic, Write/Control Card 0251704-0000	Replaced by 0252195-0000
Schematic, Transport 0251442-0000	Replaced by 0252337-0000
Schematic, Motor Connection 0251640-0000	Replaced by 0252338-0000
Schematic, Motor Connection 0251641-0000	Replaced by 0252348-0000
Schematic, Motor Connection 0251642-0000	Replaced by 0252349-0000
Assembly, AC Power Unit 0051404-0000	Replaced by 0052323-0000*
Assembly, AC Line Cord 0051460-0000	Replaced by Schematic 0251588-0000
Servo Assembly 4110045-0000	Replaced by Schematic 0250029-0000

Additions:

Schematic, Power Control Unit AC	0252429-0000
Schematic, Operator Control Panel	0252048-0000
Kit Instllation, 1140 and 1640 Transport	0051911-0000*
Parts List, Kit Installation, 1140 and 1640 Transport	0051911-0001*
Kit Installation, 1740 and 1840 Transport	0051552-0000*
Parts List, Kit Installation, 1740 and 1840 Transport	0051552-0001*
Kit Installation, 1740 and 1840 Transports, W/O Door	0051896-0000*
Parts List, Kit, Without Door Installation, 1740 and 1840 Transport	0051896-0001*

* Drawings Available on Request.

Errata

In the Text (Section7)

0251322-0000 should have referred to the Write/Control Card. The corrected number is now 0252195-0000.