Warning:

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

Maintenance Manual (Field Level)

MODEL 6026 MAGNETIC TAPE SUBSYSTEM

015-000080-01

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Ordering No. 015-000080

Printed in the United States of America
Rev. 00, April, 1979

Maintenance Manual (Field Level)

MODEL 6026 MAGNETIC TAPE SUBSYSTEM

PREFACE

This manual is designed to guide you in performing preventive maintenance procedures, and in troubleshooting the 6026 magnetic tape subsystem to the board or module replacement level. It also covers alignments and replacement procedures. You may wish to supplement your reading with the 6026 tape transport technical manual (DGC No. 015-000079) or the model 6026 magnetic tape subsystem controller (DGC No. 015-000081).

PART 1

Chapter 1, 6026 Subsystem Overview - *Introduces the transport and controller pictorially and briefly describes the transport PC boards and subassemblies.*

Chapter 2, Preventive Maintenance - *Outlines the preventive maintenance schedule and tasks for three different time intervals.*

PART 2

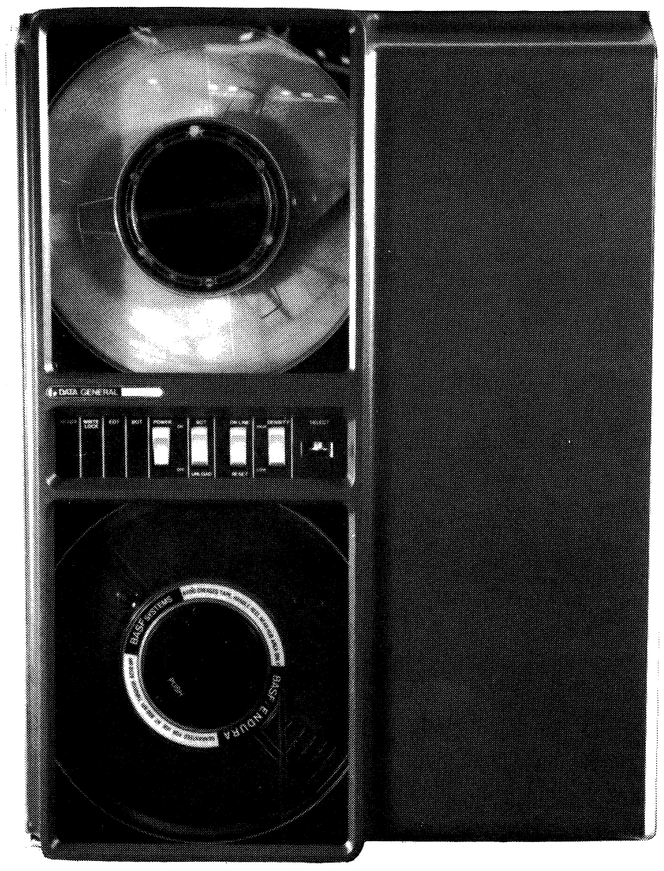
Chapter 3, Diagnostics - *Describes the procedure for loading the diagnostic and reliability, and a sample of the printout to the console.*

Chapter 4, Troubleshooting - *Begins by isolating subsystem problems to either the controller or transport, and then goes on to the power supply and other modules.*

PART 3

Chapter 5, Alignment Procedures & Replacement - *Describes alignment procedures for the transport and gives step by step procedures for removal and replacement of modules, logic boards, and mechanical assemblies.*

CONTENTS



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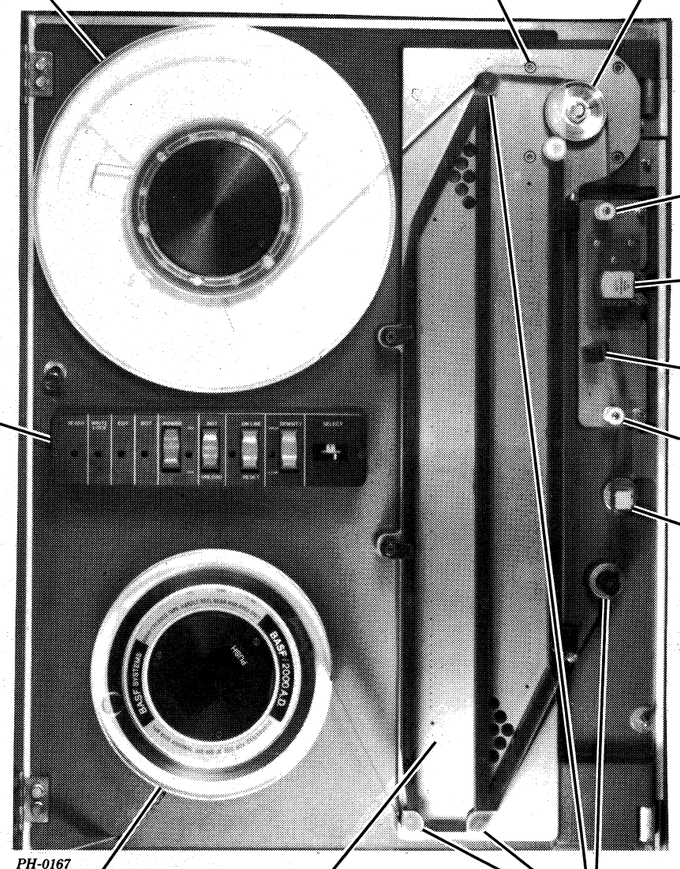
CHAPTER I
TRANSPORT OVERVIEW

INTRODUCTION

The pictorial overview shows the location of the head and vacuum columns to aid in preventive maintenance. You will find it useful in locating various PC boards and subassemblies for troubleshooting, alignment, and replacement procedures. For a detailed description of the subassemblies and various circuitry, refer to *Technical Manual, 6026 Tape Transport* (DGC No. 015-000079-00).



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TAKEUP REEL
Holds tape from the supply reel

TAKEUP VACUUM COLUMN
Holds the tape from the takeup reel.

CAPSTAN
Moves the tape at 75 ips. across the read/write head during a read or write operation and at 200 ips. during a rewind.

CONTROL PANEL
Contains the following switches:

- POWER
- UNLOAD/BOT (the BOT switch loads the tape)
- ON LINE/RESET
- HIGH DENSITY/LOW DENSITY
- UNIT SELECT
  Also contains LEDS for:
- READY
- WRITE LOCK
- EOT
- BOT
- POWER
- ON LINE
- HIGH DENSITY

HEAD TAPE GUIDE
Guides the tape over the read/write head.

READ/WRITE/ERASE HEAD ASSY.
Writes and reads data to and from the tape, and erases the tape before a write.

EOT/BOT SENSOR
Senses the beginning and the end of tape.

HEAD TAPE GUIDE
Guides the tape over the read/write head.

TAPE CLEANER
Cleans tape before contact with the read/write head.

SUPPLY REEL
Holds users tape.

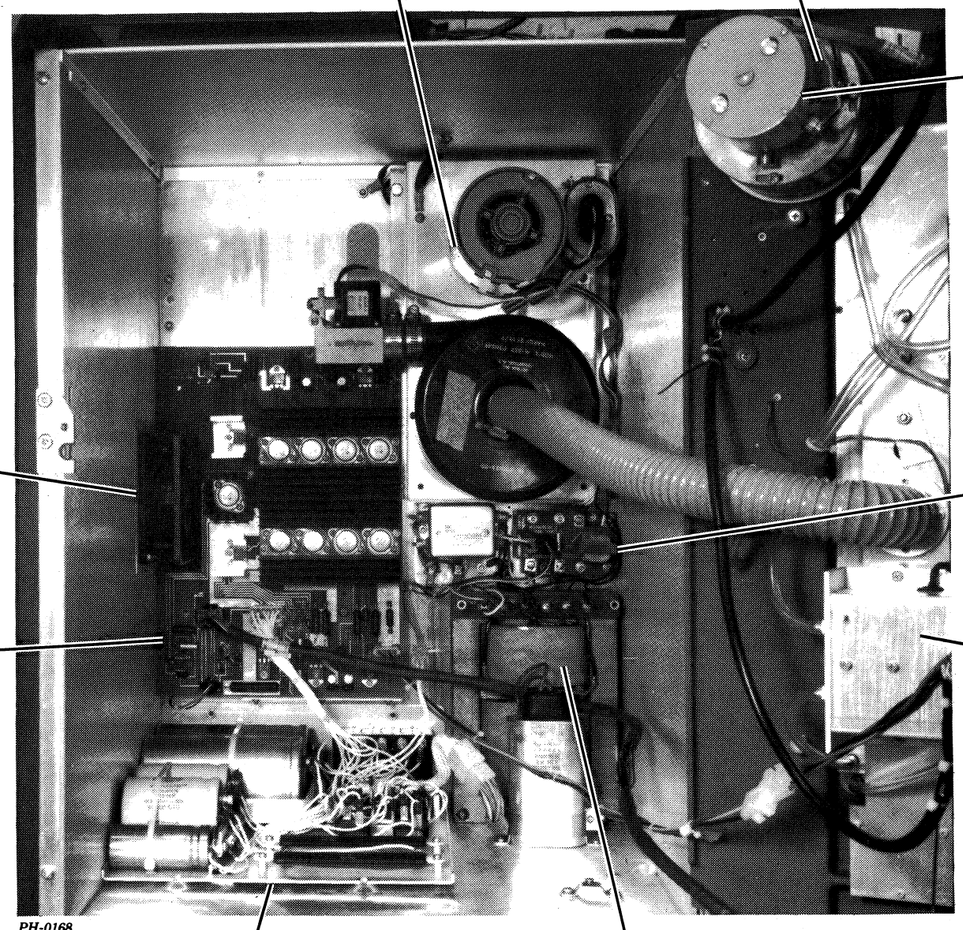
SUPPLY VACUUM COLUMN
Holds the tape from the supply reel.

ROLLER GUIDES
Aligns the tape with the vacuum columns and the capstan.

BLOWER ASSEMBLY
Consists of a blower motor and a vacuum blower that create the vacuum for the takeup and supply columns.

CAPSTAN MOTOR
Moves the tape at 75 ips. across the read/write head during a read or write operation, and at 200 ips. during a rewind.

TACHOMETER
Supplies an error signal to the capstan amplifier that in turn controls the speed of the capstan.



PH-0168

POWER SUPPLY FAN
Draws air across the power supply circuit board, cooling the power amplifiers and exhausting the hot air inside the enclosure to the outside.

POWER SUPPLY BOARD
001-1128, 005-8387, 016-451, 107-716
Contains power amps for takeup and supply reels. The +5 volt regulator is also on this board.

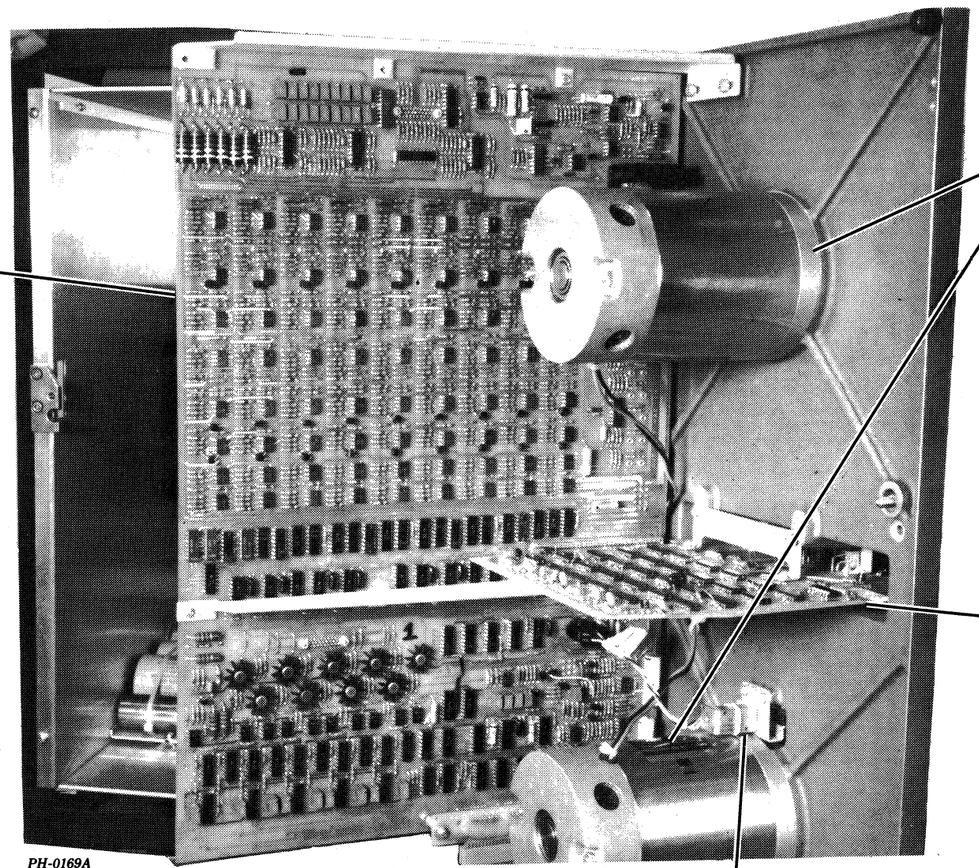
RELAY ASSEMBLY
Consists of two solid state relays and a printed circuit board mounted on top of the relays. The circuit board is an 8-24 volt DC power supply for relay K1.

TRANSDUCER
Senses the position of the tape in the vacuum columns and sends a control voltage to the servo pre-amplifier in the servo circuitry on the R/W board.

POWER PAN ASSEMBLY
Contains bridges, caps, circuit breakers, and preload resistors for the power supply.

TRANSFORMER
Supplys the following voltages:

- -20
- -15
- +20
- +15
- -12
- +8
- +12



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Read/Write Board
001-1158, 005-8417,
016-607, 107-785
The R/W board contains the following circuitry:

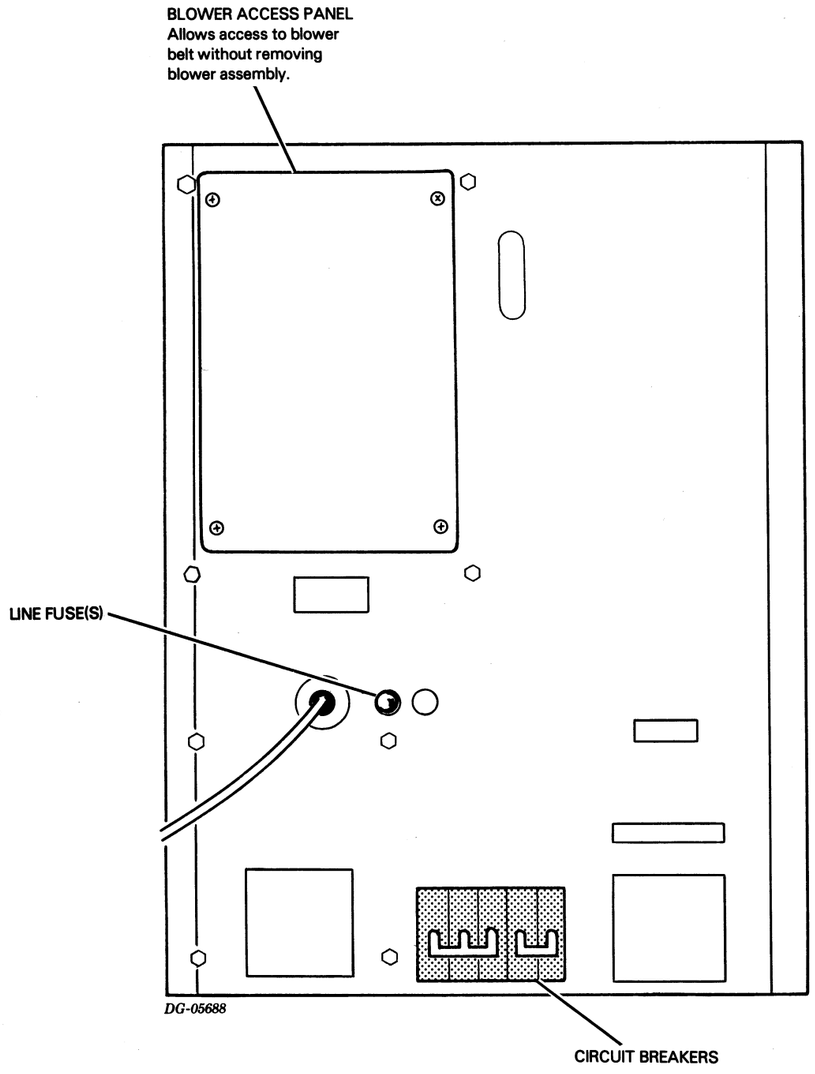
- R/W for high and low density
- Capstan servo
- R/W interface
- Write lock
- Power clear
- Takeup & supply reel servo

REEL SERVO MOTORS
Supply and remove tape to and from the vacuum columns while tape is in motion.

Console Board
001-1157, 005-8456,
016-547, 107-742
The console board contains logic for:

- Loading and unloading
- Vacuum sensing
- Rewinding
- EOT/BOT sensing
- Unit select

WRITE LOCK SWITCH
Enables the write circuitry when write ring is installed on supply reel.



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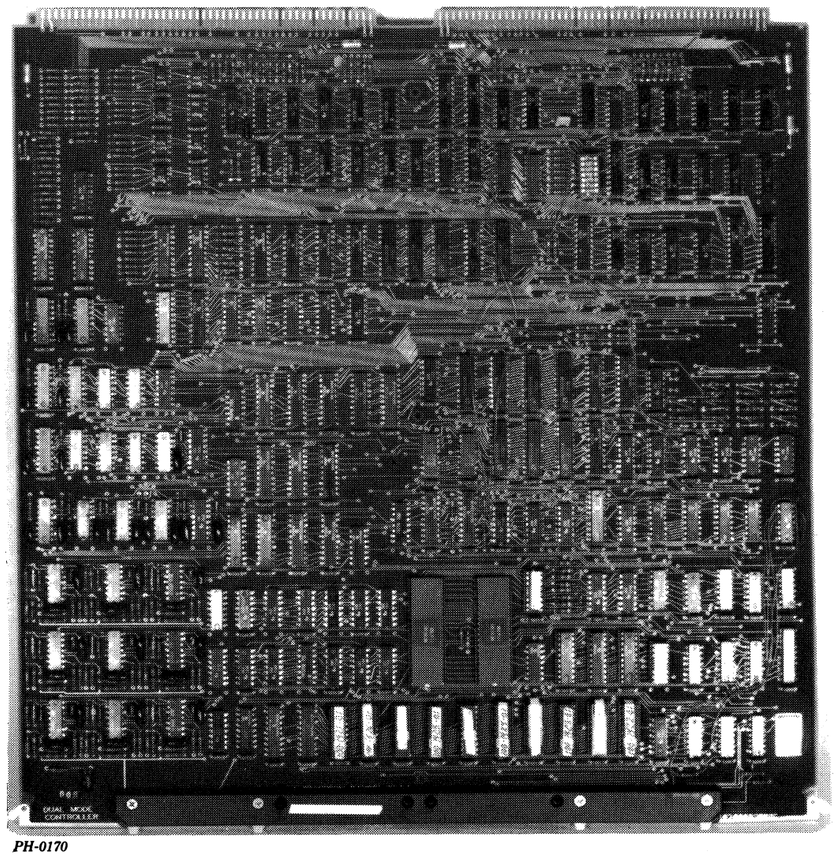
REAR VIEW OF CABINET

Controller and Rear View of Cabinet



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Controller Board
001-1175, 005-8584
016-606, 107-826
Handles:

- Tape motion control
- Data conversion
- Formatting
- Error detection and correction
- Automatic retries
- Hardware diagnostics for controller

May be used in any Data General Nova line or Eclipse series computer.

CHAPTER II
PREVENTIVE MAINTENANCE

INTRODUCTION

Preventive maintenance procedures must be observed to insure reliable operation of the magnetic tape transport. Magnetic tape leaves an oxide residue on the head and vacuum columns that must be removed at least every 8 hours, usually by the operator. The technician, depending on the time interval, checks some, or all, of the following:

- head alignment
- tape path alignment
- capstan speed
- reel servo adjustments
- read gain adjustments
- roller guides for wear

This chapter outlines these routines and gives the time schedule for performing them.

PM SCHEDULE AND ROUTINES

Reliable performance of the 6026 magnetic tape transport depends on the proper preventive maintenance schedule and routines. There are three time intervals in the preventive maintenance schedule:

			Completion Times
†	Daily	every 8 hours (operator maintenance)	5 minutes
†	Monthly	every month (200 hrs.)	20 minutes
†	Every six months	every 6 months	45 minutes

PREVENTIVE MAINTENANCE SCHEDULE

	PM Task	Daily	Monthly	Every Six Months
†	Clean tape path	X	X	X
†	Clean vacuum chamber		X	X
†	Clean deck surfaces		X	X
†	Check head alignment			X
†	Check tape path alignment			X
†	Check capstan speed			X
†	Check reel servo adjustments			X
†	Check read gain adjustments			X
†	Check roller guides for wear			X

DAILY MAINTENANCE

Materials

Cotton swabs	119-64
Lint-free tissue	119-62
Isopropyl alcohol (91%)	

1. Prepare unit
   a) Remove tape from transport
2. Clean tape path
   a) Remove head cover and clean the head assembly with 91% isopropyl alcohol and lint-free tissue. Use a cotton swab to remove debris from the head channels.
   b) Clean the head tape guides with lint-free tissue and 91% isopropyl alcohol.
   c) Wipe the tape cleaner surface with lint-free tissue and 91% isopropyl alcohol.

MONTHLY MAINTENANCE

Tools/Materials

FE standard tool kit	005-7791
Cotton swabs	119-64
Lint-free tissue	119-62
Isopropyl alcohol (91%)	
MT RELIABLILITY program	

1. Prepare unit.
   a) Run magtape reliability program for 5 minutes to verify unit operation.
   b) Remove tape and turn off main power switch.
2. Clean and inspect tape path. See "Daily Maintenance," page II-2.
   a) Clean capstan with dry lint free tissue. Do not use alcohol, as it may damage the capstan surface.
   b) Remove head cover and clean the head assembly with a lint-free tissue and 91% isopropyl alcohol. Use a cotton swab to remove debris from the head channels.
   c) Clean head tape guides with lint-free tissue and isopropyl alcohol. Inspect guide surfaces for wear and scratches. Ensure that ceramic washer moves freely on guide post.
   d) Clean the tape cleaner surface with lint-free tissue and isopropyl alcohol.
   e) Clean roller tape guides with lint-free tissue and isopropyl alcohol. Ensure that guides rotate freely with no end play.
   f) Brush EOT/BOT sensors with dry cotton swab.
   g) Replace head cover.
3. Clean Vacuum chamber
   a) Clean the chamber surface and cover with lint-free tissue and isopropyl alcohol.
   b) Clean out each of the small ports in the vacuum chamber surface. Use a fine wire (resistor lead), or drill bit approximately 0.025 inch in diameter.
4. Clean the deck surface
   a) Wipe down the entire deck plate with lint-free tissue and isopropyl alcohol.
   b) Wash the front door with window cleaner.
5. Run magtape reliability program for 5 minutes to verify unit operation.

SIX MONTH MAINTENANCE

Tools/Materials

FE standard tool kit	005-7791
Cotton swabs	119-64
Lint-free tissue	119-62
Isopropyl alcohol 91%	
Master skew tape	118-298
MT reliability program	
Oscilloscope (Tektronix 453A or equivalent)	

1. Prepare unit
   a) Run magtape reliability program for 5 minutes to verify unit operation.
   b) Remove tape and turn off main power switch.
2. Clean and inspect tape path. See "Monthly Maintenance," pg. II-3.
3. Check capstan speed. See "Adjusting Capstan Velocity," pg. V-11.
4. Check head alignment. See "Head Alignment," pg. V-19.
5. Check tape path alignment. See "Tape Path Alignment," pg. V-9.
   a) Any roller guide that does not rotate freely and quietly must be replaced. See page V-2.
   b) If the tape cleaner is scratched, it must be replaced. See page V-2.
6. Check reel servo adjustments. See "Reel Servo Adjustment," pg. V-27.
7. Check Read Gain. See pg. V-24.
8. Run magtape reliability program for 5 minutes to verify unit operation.

CHAPTER III
DIAGNOSTICS

INTRODUCTION

The 6026 subsystem diagnostic program lets you test the controller either by itself or with the transport. If the controller passes its portion of the diagnostic program, run the diagnostic on the controller and transport together. The controller and transport may be run together from the start if desired, to verify that the 6026 subsystem has a problem. The dual mode reliability program is a maintenance program intended for rigorous testing of a system that has successfully run the diagnostic test. The reliability program also has a command string interpretor. The command string allows the field service engineer to type in test loops for trouble shooting.

- Loading The Diagnostic & Reliability programs
- Starting Addresses

DIAGNOSTICS

When the 6026 subsystem has a problem, power up the transport and load the DTOS tape onto the transport. DTOS stands for diagnostic tape operation system. Program load the tape using device code 22. If you do not know how to load tapes, refer to Appendix C. Load the dual mode tape diagnostic or reliability program by typing in LOAD DMTP DIAG or LOAD DMT RELI respectively on the operators console. If the diagnostics do not load, try to load from another transport, being sure to change the unit number to zero on the transport with the tape on it. If neither transport works, the controller may be bad, making some other means of loading the diagnostic necessary, (i.e.; cassette, disc, or paper tape). If none of these methods for loading the diagnostics work, remove the magnetic tape controller and jumper priority over the empty slot. If the diagnostics still do not load, the problem is not with the tape subsystem, but with the system itself. When the diagnostic program is loaded into the system the following message is sent to the console, your inputs are in brackets,

```
DUAL MODE TAPE DRIVE DIAGNOSTIC
ONLY ONE DRIVE MAY BE ON LINE.
TTO BAUD RATE? = [####]
DEVICE CODE?: [22 OR 62]
IS DRIVE ON LINE? (Y = CR, N = 1 AND CR): [1 CR]
UNIT NUMBER?: [0 THRU 7]
TEST DRIVE ALSO? (N = CR, Y = 1  AND CR): [1 CR]
MOUNT WRITE ENABLED SCRATCH TAPE,
WHEN READY HIT ANY KEY.
DUAL MODE OR NRZI ONLY DRIVE?  (CR OR 1 AND CR): [CR]
HIGH OR LOW DENSITY?  (1 AND CR OR CR): [CR] low density when led is out
CHECK THAT LED IS ON.  (LED is on controller board.)
THEN TO CONTINUE HIT ANY KEY,
CHECK THAT LED TURNS OFF.
VFO LOCK UP TIMES (TRACK 0,1,.....,P) should not be more than 20 bit cells.
7   2   2   2   2   4   4   2   2
RESET, TOGGLE DENSITY SWITCH, PUT ON LINE, THEN HIT ANY KEY.
RESET, TOGGLE DENSITY SWITCH, PUT ON LINE, THEN HIT ANY KEY.
```

LOW	HIGH	(NOTE)
7.5	12.5	DRIVE SETTLE TIME
40	41	ERASE TIME
71.3	78.7	DRIVE FORWARD SPEED
10	11	FORWARD GAP TIME
10	11	REVERSE GAP TIME
6.25	7.75	REVERSE START TIME
.6	1.6	FORWARD WRITE CREEP.

NOTE
VALUES SHOWN ARE
MIN - MAX ALLOWABLE
VALUES.

```
CHECK THAT THE TAPE HAS UNLOADED,
AND THAT THE DRIVE IS OFF LINE.
REMOVE WRITE RING, LOAD AND PUT BACK ON LINE
THEN HIT ANY KEY.
END OF DIAGNOSTIC.
TO LOOP:  RESET, UNLOAD, REPLACE WRITE RING,
LOAD, AND THEN PRESS CONTINUE.
```

STARTING ADDRESS

Diagnostic

200	Start the diagnostic for the first pass. This address is the DTOS default start.
500	Same as above.
374	Restart the program with minimum user input. All drive conditions must be in their original state, except the mode.
376	Loop on the speed test to adjust transport speed. Print the speed to the console after each pass.

After the first pass, the program will halt and print "END OF DIAGNOSTIC" to the console. To loop the diagnostic, replace the write ring and then press continue. The program will loop, displaying an "END" message to the console after each pass.

Reliability

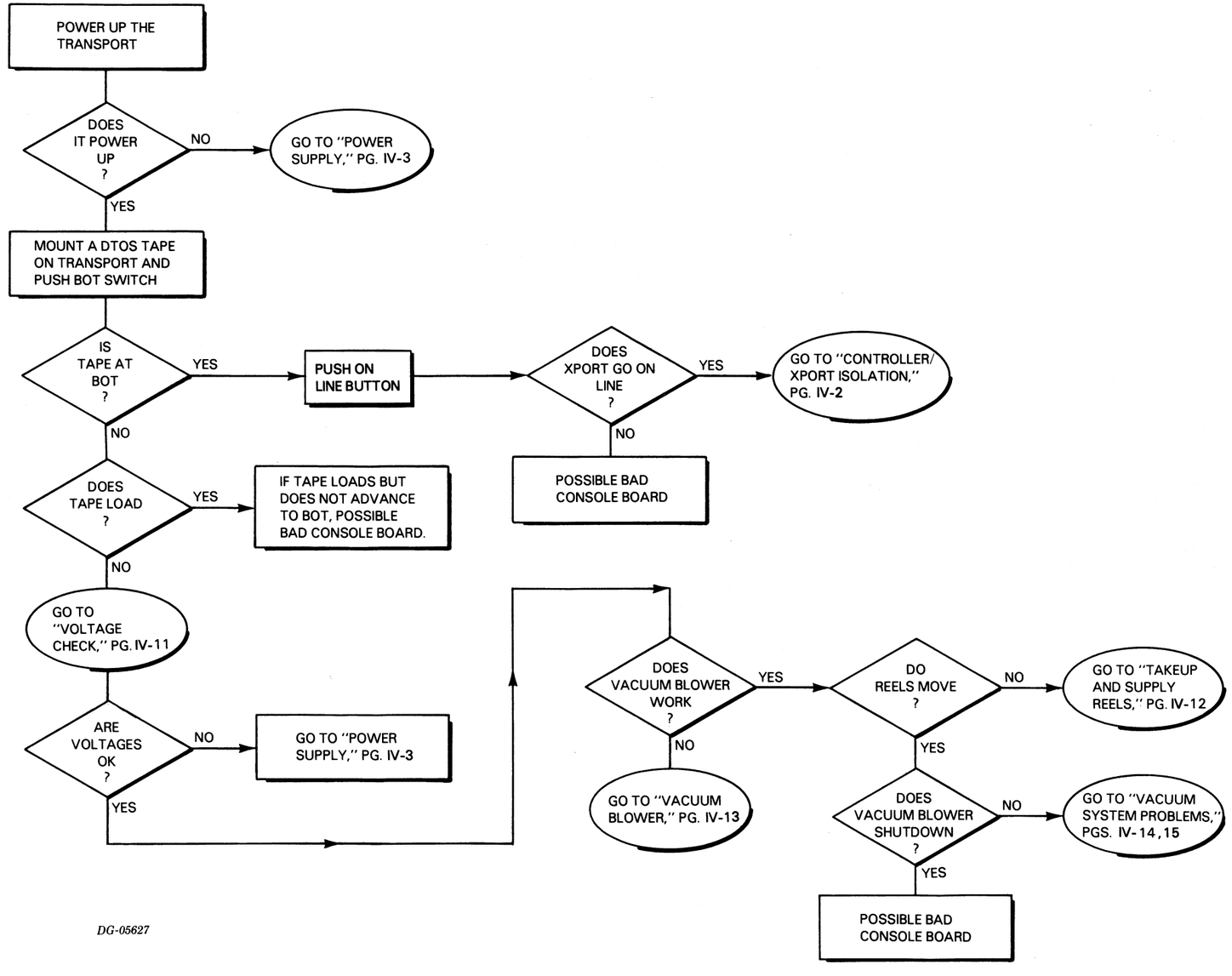
200	RELIABILITY TEST
201	CHANGE DEVICE CODE
500	RELIABILITY TEST
501	INTERCHANGE TEST (RD & WT)
502	INTERCHANGE TEST (RD ONLY)
505	TEST LOOP BUILDER

CHAPTER IV
TROUBLESHOOTING

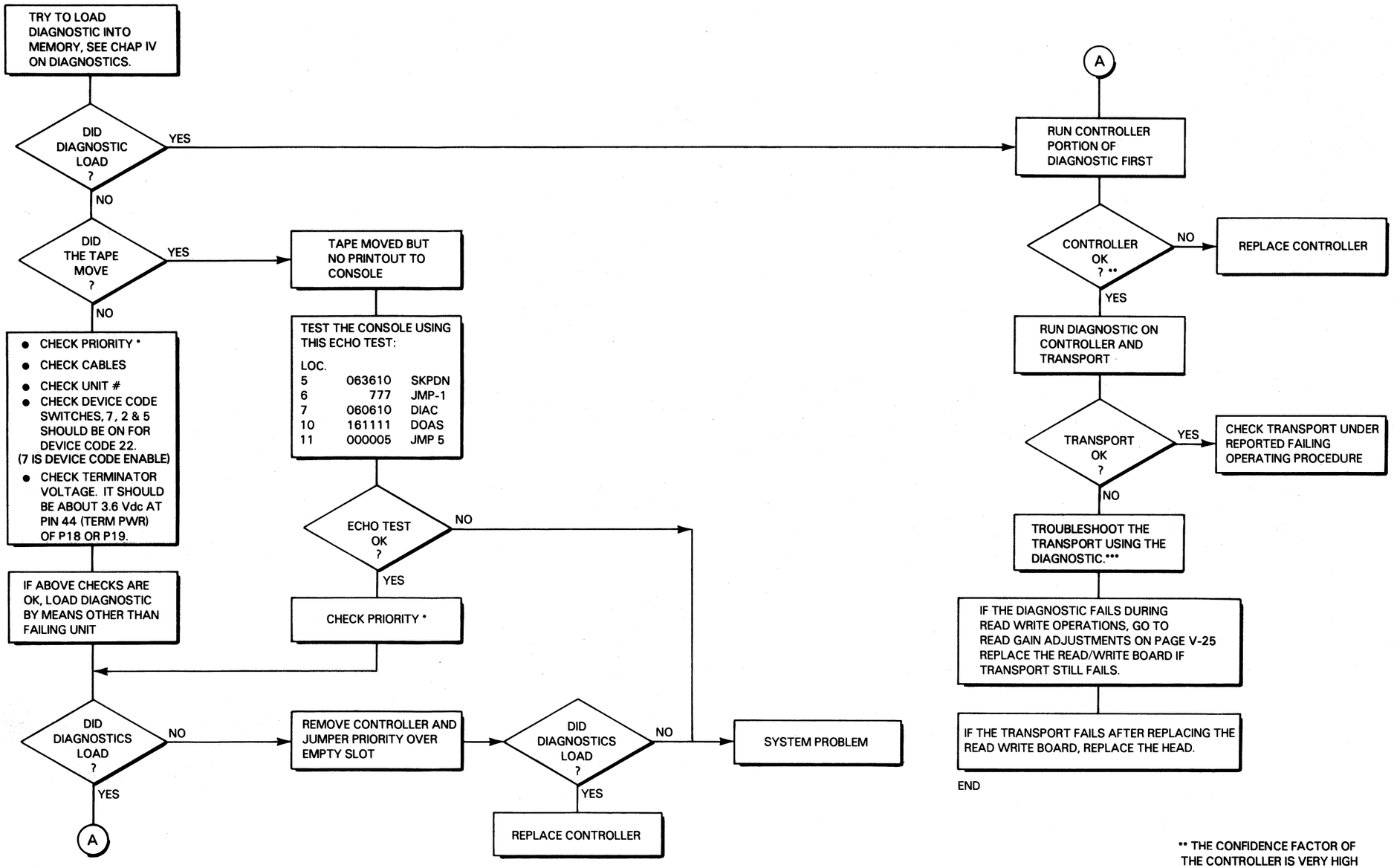
INTRODUCTION

The troubleshooting portion of this manual is intended to aid you in isolating a problem in the 6026 subsystem. This chapter is written for board or module isolation, and does not go into any detailed descriptions of the circuitry. Read the controller manual and the transport manual for a better understanding of the subsystem. Chapter 1, the pictorial overview, is also helpful in locating subassemblies.

Master Flow



Controller/Transport Isolation



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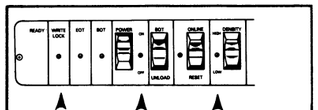
* IF THERE ARE NO EMPTY SLOTS BETWEEN THE CPU AND THE CONTROLLER, THE PRIORITY CHAIN IS COMPLETE. IF THERE ARE ANY SLOTS OPEN, THE PRIORITY CHAIN MUST BE JUMPERED OVER THE OPEN SLOTS. JUMPER FROM (A95 INTP OUT) OF THE LAST SLOT CONTAINING A BOARD, OVER THE OPEN SLOTS TO (A96 INTP IN) OF THE NEXT SLOT CONTAINING A BOARD. FOLLOW THE SAME PROCEDURE FOR (A93 DCHP OUT) TO (A94 DCHP IN). THIS JUMPERING PROCEDURE MUST BE FOLLOWED FOR ALL OPEN SLOTS BETWEEN CONTROLLERS.

** THE CONFIDENCE FACTOR OF THE CONTROLLER IS VERY HIGH AT THIS POINT, HOWEVER INTERACTION BETWEEN THE TRANSPORT AND CONTROLLER MAY STILL CAUSE CONTROLLER FAILURES.

***THE MAJORITY OF THE PROBLEMS WILL BE ON THE READ/WRITE LOGIC BOARD IF THE TIMING PORTION OF THE TEST FAILS THE PROBLEM COULD BE BECAUSE OF A DIRTY CAPSTAN, THE CAPSTAN MOTOR, THE POWER SUPPLY, OR THE READ/WRITE BOARD. IF PROBLEMS ARE INTERMITTENT, CHECK POWER SUPPLY VOLTAGES BEFORE REPLACING ANY BOARDS.



POWER UP THE TRANSPORT AND CHECK TO SEE IF ANY OF THE FOLLOWING LIGHTS COME ON: POWER AND DENSITY SHOULD COME ON WHEN POWERED UP; WRITE LOCK ONLY IF TAPE HAS NO WRITE ENABLE RING

DO CONSOLE LIGHTS WORK ?
- YES → +5Vdc IS OK → A
- NO → CHECK FUSES AND CIRCUIT-BREAKERS AT OUTSIDE REAR OF CABINET. REPLACE OR RESET IF NECESSARY. IF BOTH ARE OK, CHECK AC POWER BEFORE CONTINUING.

DO FUSES CONTINUE TO BLOW ?
- YES → GO TO "FUSES", PG. IV-4
- NO

DO CIRCUIT BREAKERS CONTINUE TO TRIP ?
- YES → GO TO "CIRCUIT BREAKERS", PG. IV-6
- NO

CHECK +5Vdc AT THE POSITIVE SIDE OF C24 AS SHOWN IN DRAWING → B

+5Vdc IS OK ?
- YES → A → CHECK REMAINING VOLTAGES SHOWN IN POWER PAN ASSEMBLY DRAWING, TO ISOLATE BAD VOLTAGE. → GO TO "XFORMER CHECK", PG. IV-10
- NO → CHECK +8 Vdc AT THE POSITIVE SIDE OF C5 IN THE POWER PAN ASSY.

IS 8Vdc OK ?
- NO → GO TO "RELAY ASSEMBLY," PG. IV-9
- YES → THE PROBLEM IS ON POWER SUPPLY BOARD; REPLACE OR REPAIR IT.

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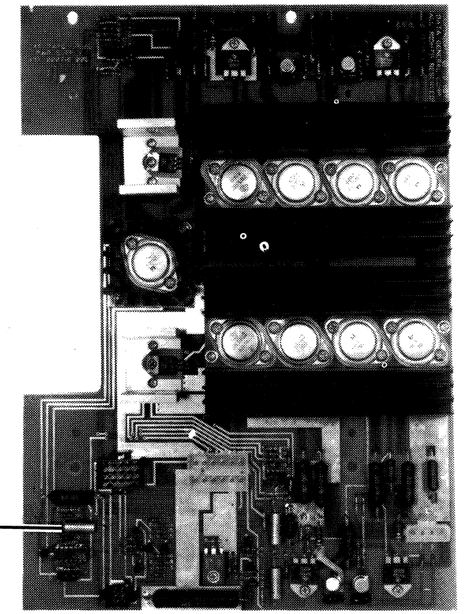
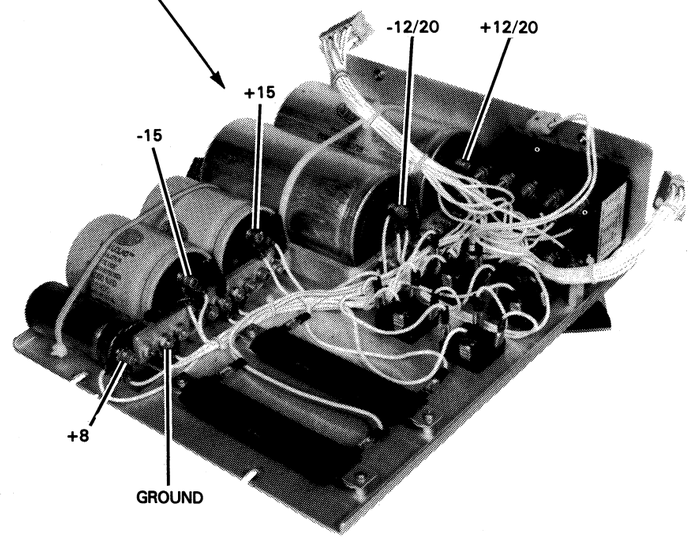
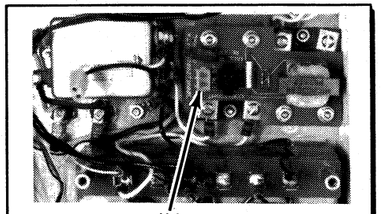






IF FUSE CONTINUES TO BLOW, DISCONNECT J11, PLUG IN LINE CORD, BUT DO NOT POWER UP. CHECK FUSES.

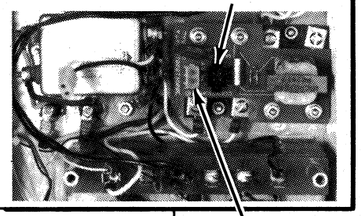
DO FUSES STILL BLOW ?

NO

YES

POSSIBLE DEFECTIVE LINE FILTER, WIRING ERROR, SHORTED POWER SUPPLY FAN, SHORTED TRANSFORMER, OR K1 COULD BE SHORTED TO GROUND IF SET UP FOR 220V. ALSO SEE "TRANSFORMER CHECK," PG. IV-10.

RECONNECT J11 AND DISCONNECT J16. PLUG IN LINE CORD AND CHECK FUSES.

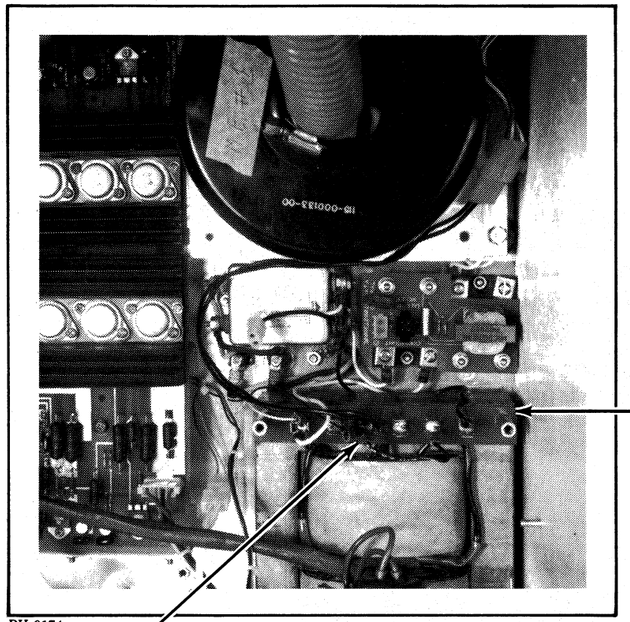


DO FUSES STILL BLOW ?

NO

YES

REPLACE RELAY CIRCUIT BOARD MOUNTED ON TOP OF RELAYS.



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DISCONNECT J13 AND METER RESISTANCE FROM EARTH GROUND TO TERMINALS ON TRANSFORMER AT TB1; THEY SHOULD ALL METER INFINITE

IS RESITANCE OK ?

NO

REPLACE TRANSFORMER, PAGE V-39.

YES

REPLACE RELAY ASSY. PAGE IV-36.

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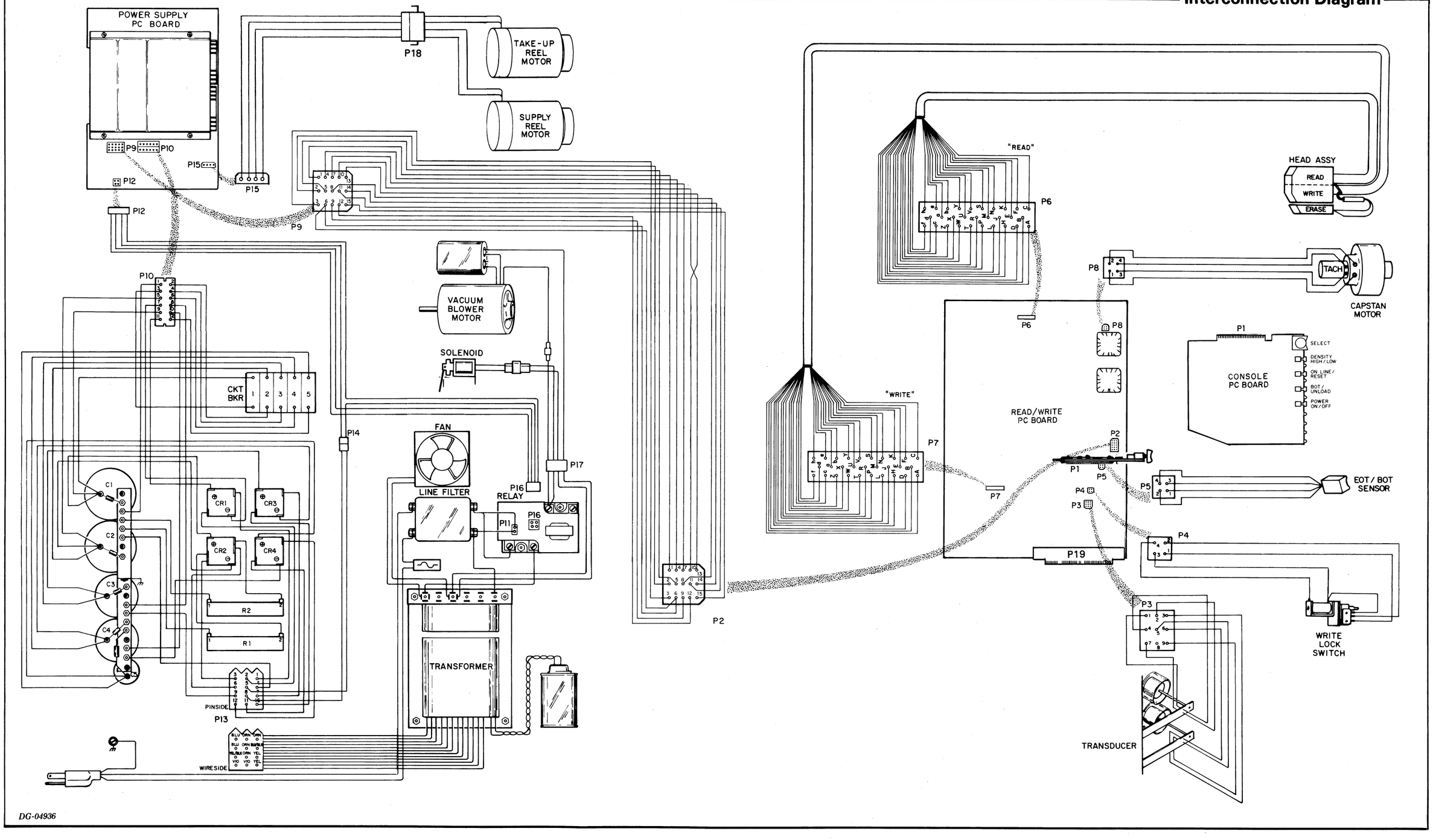
Interconnection Diagram



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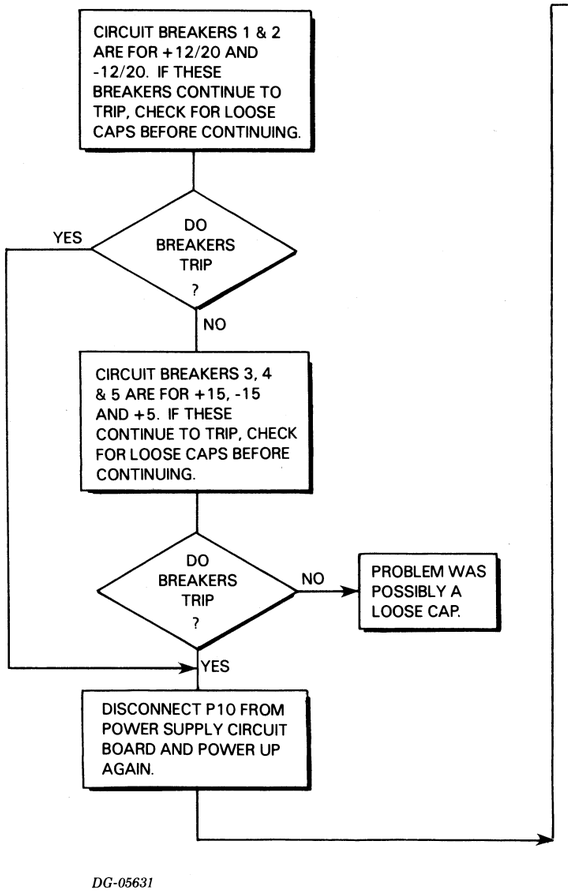
Circuit Breakers



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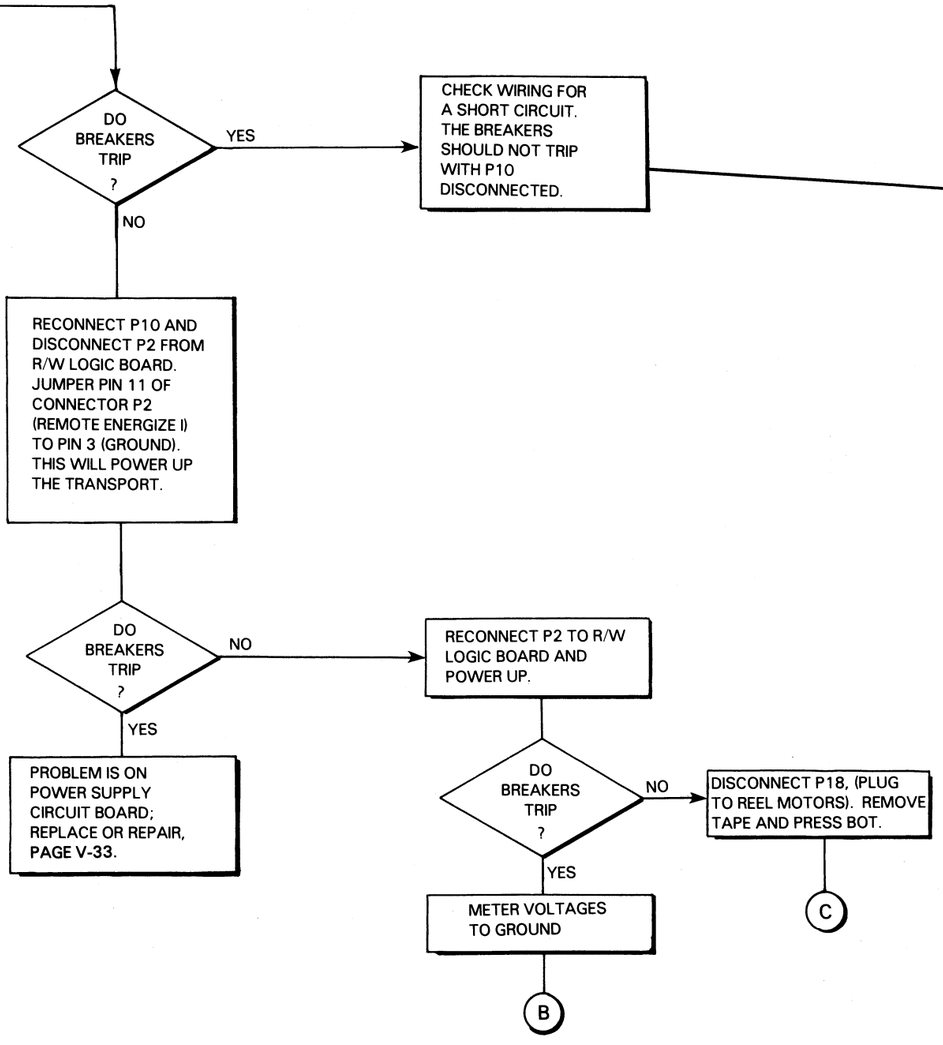
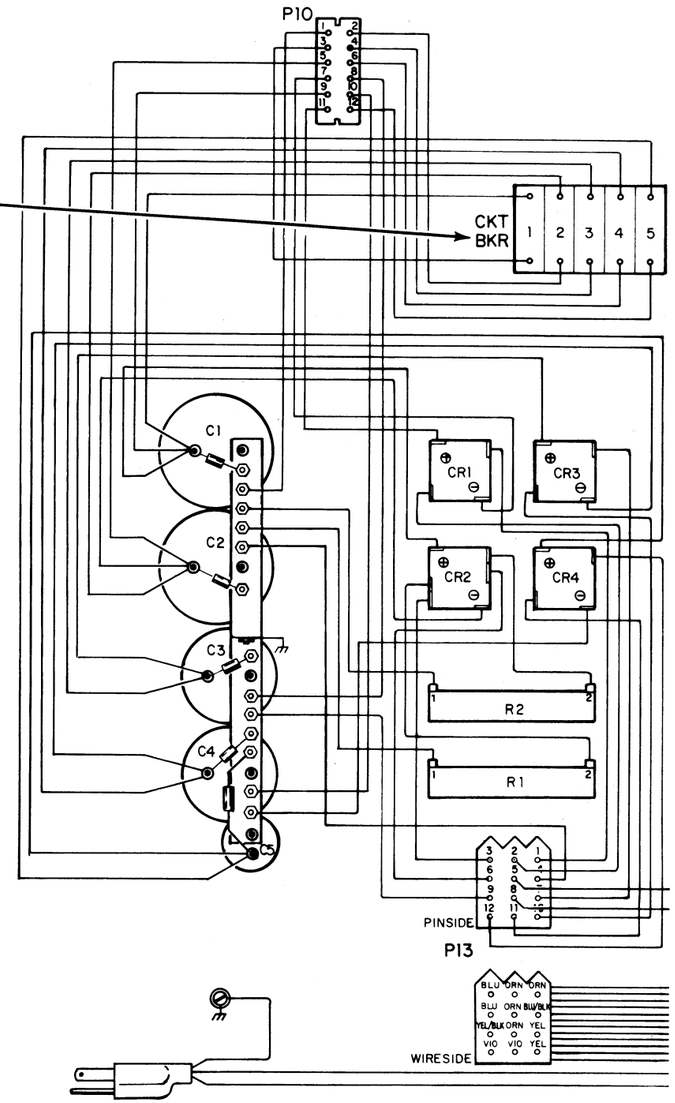
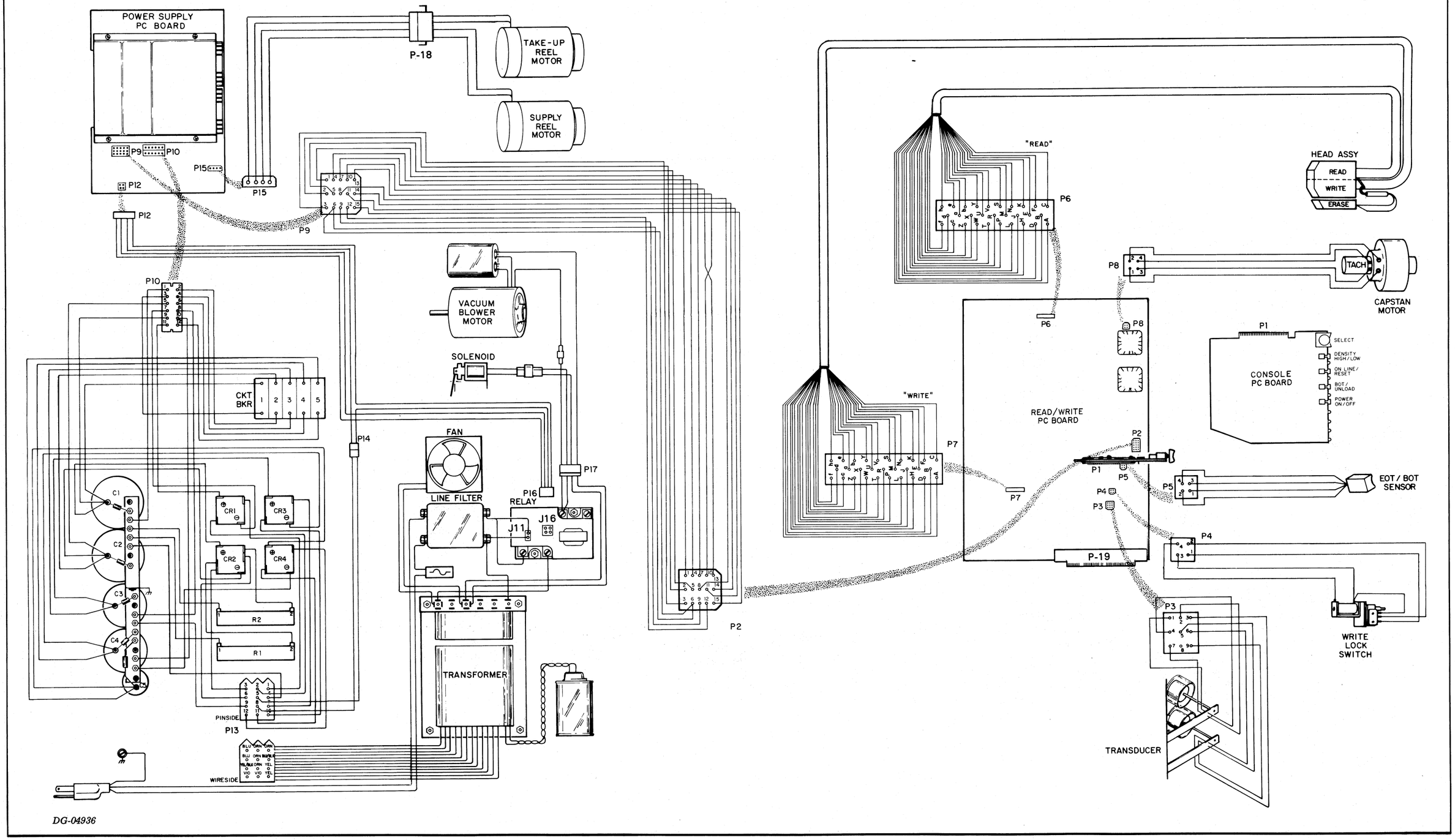




Interconnection Diagram



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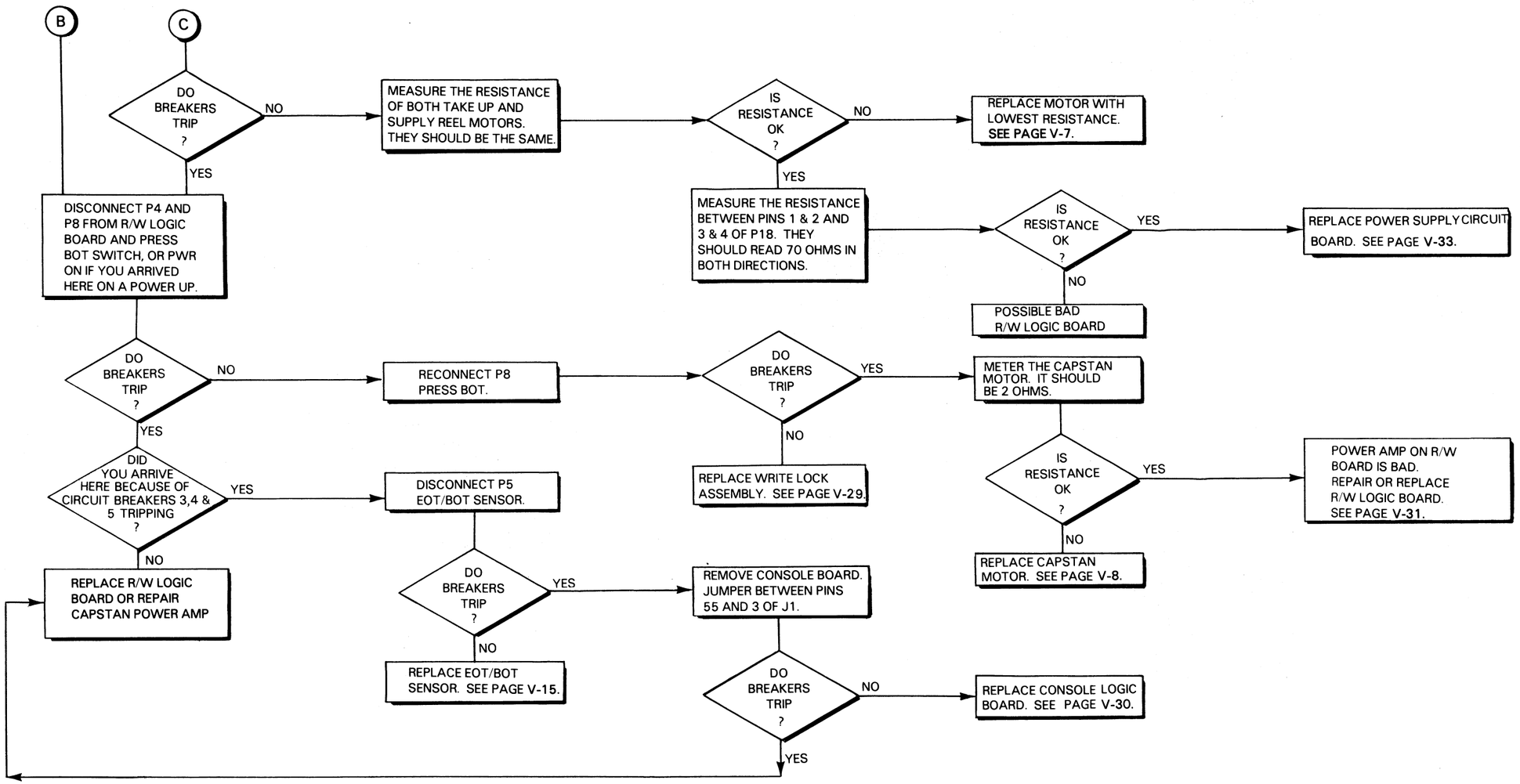

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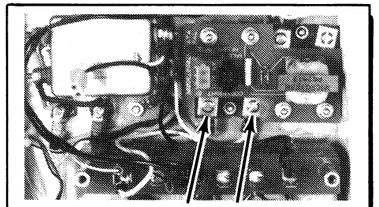
Relay Assembly



WITH POWER SWITCH OFF CHECK FOR 120 VAC BETWEEN TERMINALS 1 & 2 OF RELAY K1.

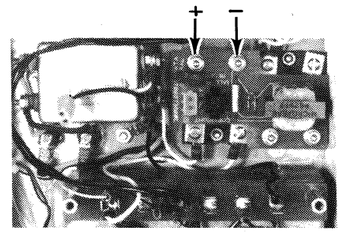
IS VOLTAGE OK ?

YES

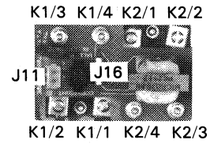
NO

POSSIBLE BAD XFORMER. CHECK LINE CORD, LINE FUSE, LINE FILTER, CONNECTIONS TO THE XFORMER, AND SECONDARY WINDINGS BEFORE REPLACING TRANSFORMER. SEE XFORMER CHECKOUT, PAGE IV-10.

PRESS THE POWER ON SWITCH AND CHECK BETWEEN TERMINALS 3 & 4 OF RELAY K1. IT SHOULD BE BETWEEN 8 & 24 Vdc.



PH-0174

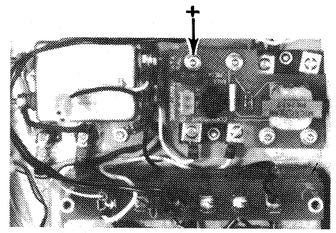


IS VOLTAGE OK ?

YES

NO

METER FROM TERMINAL 3 OF RELAY K1 TO GROUND. IT SHOULD READ 8-24 VDC.

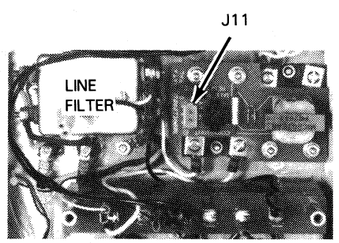


IS VOLTAGE OK ?

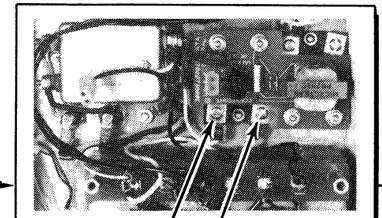
NO

YES

REPLACE CIRCUIT BOARD MOUNTED ON TOP OF RELAYS, PROVIDED THERE IS CONTINUITY BETWEEN J11 1 & 2 AND OUTPUT OF LINE FILTER.



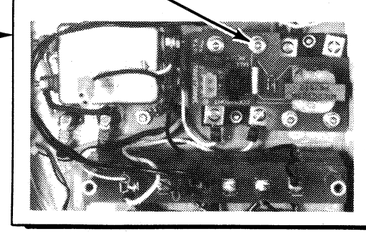
DG-05633



CHECK VOLTAGE BETWEEN TERMINALS 1 & 2 OF RELAY K1; IT SHOULD BE 0 VAC WITH THE POWER SWITCH ON.*

* If the relay is defective, there could be a 120 Vac potential between these terminals.

UNPLUG THE LINE CORD AND, WITH THE POWER SWITCH ON, CHECK CONTINUITY FROM GROUND TO TERMINAL 4 OF RELAY K1.



IS CONTINUITY OK ?

YES

NO

CHECK WIRING FROM SWITCH TO RELAY.

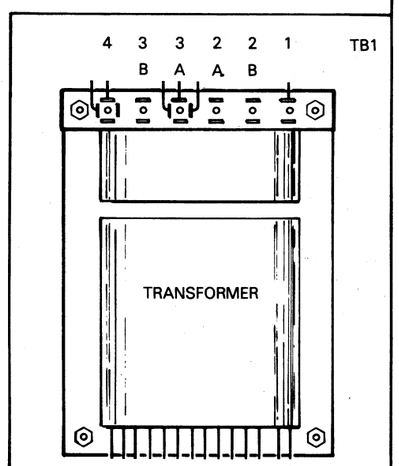
REPLACE RELAY K1. SEE PAGE V-37.

IS VOLTAGE OK ?

YES

NO

PROCEED TO TRANSFORMER CHECKOUT, PAGE IV-10.

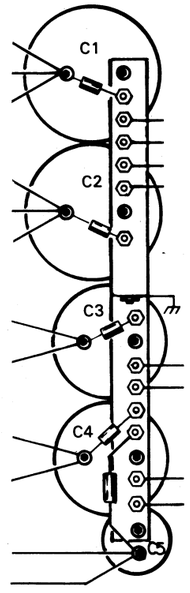


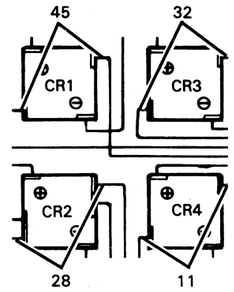
IF INCORRECT OR NO VOLTAGES ARE PRESENT, CHECK JUMPER CONNECTIONS, USING TABLE BELOW.

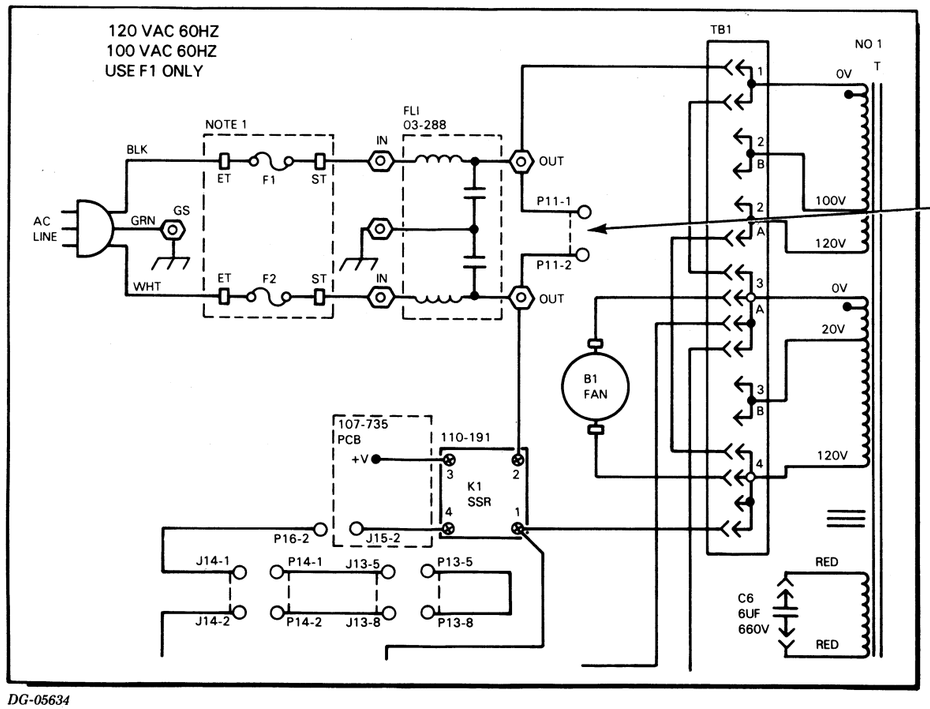
T1 CONNECTIONS

XFORMER P/N	VOLT/FREQ	JUMPER CONNECTIONS	
		FROM	TO
104-188	120VAC/60HZ	TB1-1	TB1-3A
		TB1-2A	TB1-4
	100VAC/60HZ	TB1-1	TB1-3B
		TB1-2B	TB1-4
104-189	100VAC/50HZ	TB1-1	TB1-3B
		TB1-2B	TB1-4
	220VAC/50HZ	TB1-2B	TB1-3A
	240VAC/50HZ	TB1-2A	TB1-3A

AC Voltage Check for the Transformer







JUMPERS OK ? — NO → MAKE CORRECTIONS

YES

MEASURE AC VOLTAGE AT OUTPUT OF LINE FILTER.(P11, PINS 1 AND 2)

AC VOLTAGE OK ? — NO → CHECK LINE CORD AND FUSES; IF THESE ARE OK, LINE FILTER IS BAD.

YES

REFER TO THE DRAWING AND CHECK THE FOLLOWING AC VOLTAGES AT THE INPUT TO THE BRIDGES:

- CR1 = 45 Vac
- CR2 = 28 Vac
- CR3 = 32 Vac
- CR4 = 11 Vac

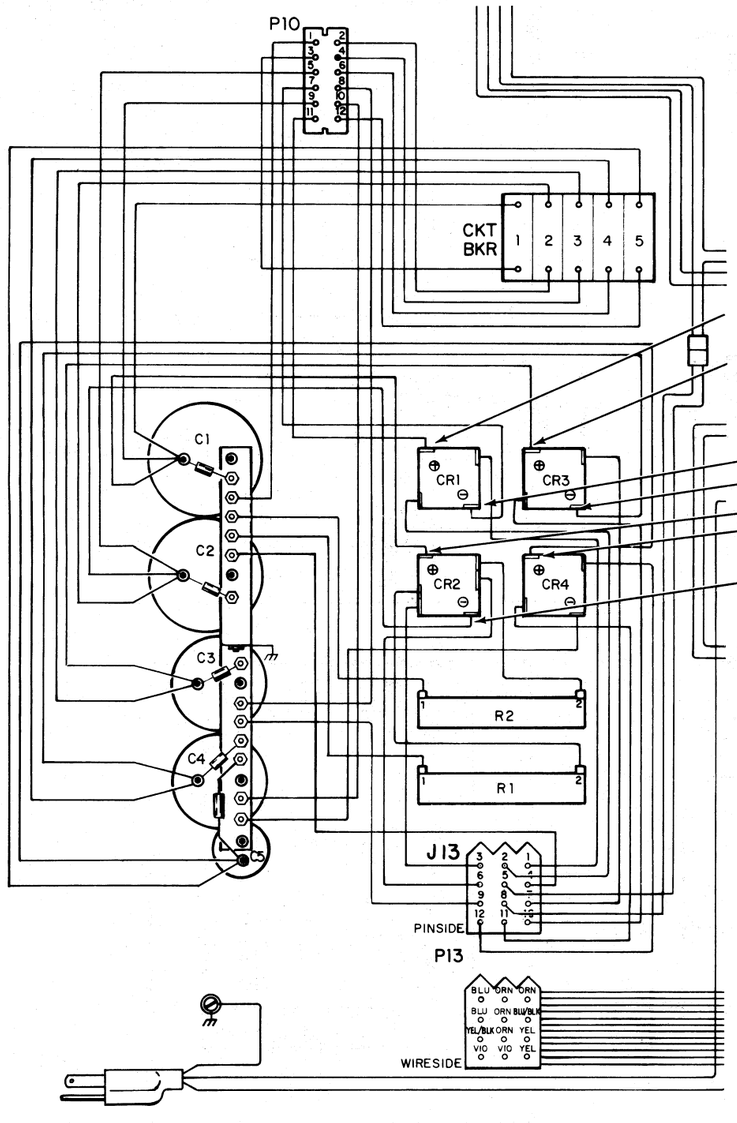
ARE VOLTAGES OK ? — NO →

1. IF ALL VOLTAGES ARE INCORRECT, TRANSFORMER RESONATING CAP MAY BE BAD.
2. IF ONE VOLTAGE IS BAD, DISCONNECT AC LINES TO BRIDGE; IF VOLTAGE IS THEN OK, REPLACE POWER PAN ASSEMBLY.
3. IF NO VOLTAGES ARE PRESENT, REPLACE TRANSFORMER. SEE PAGE V-38.

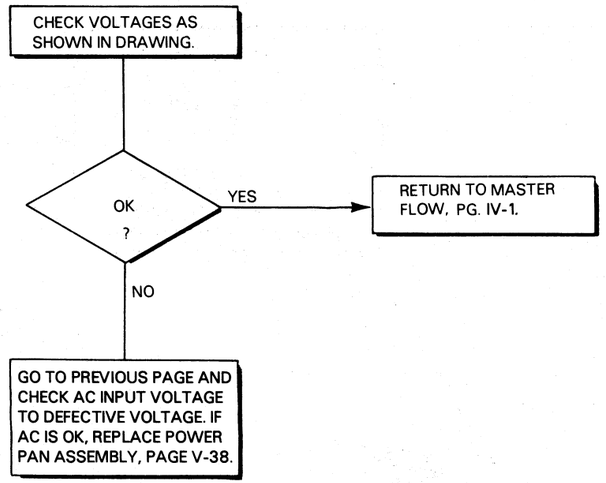
YES

GO TO DC VOLTAGE CHECKOUT ON NEXT PAGE.

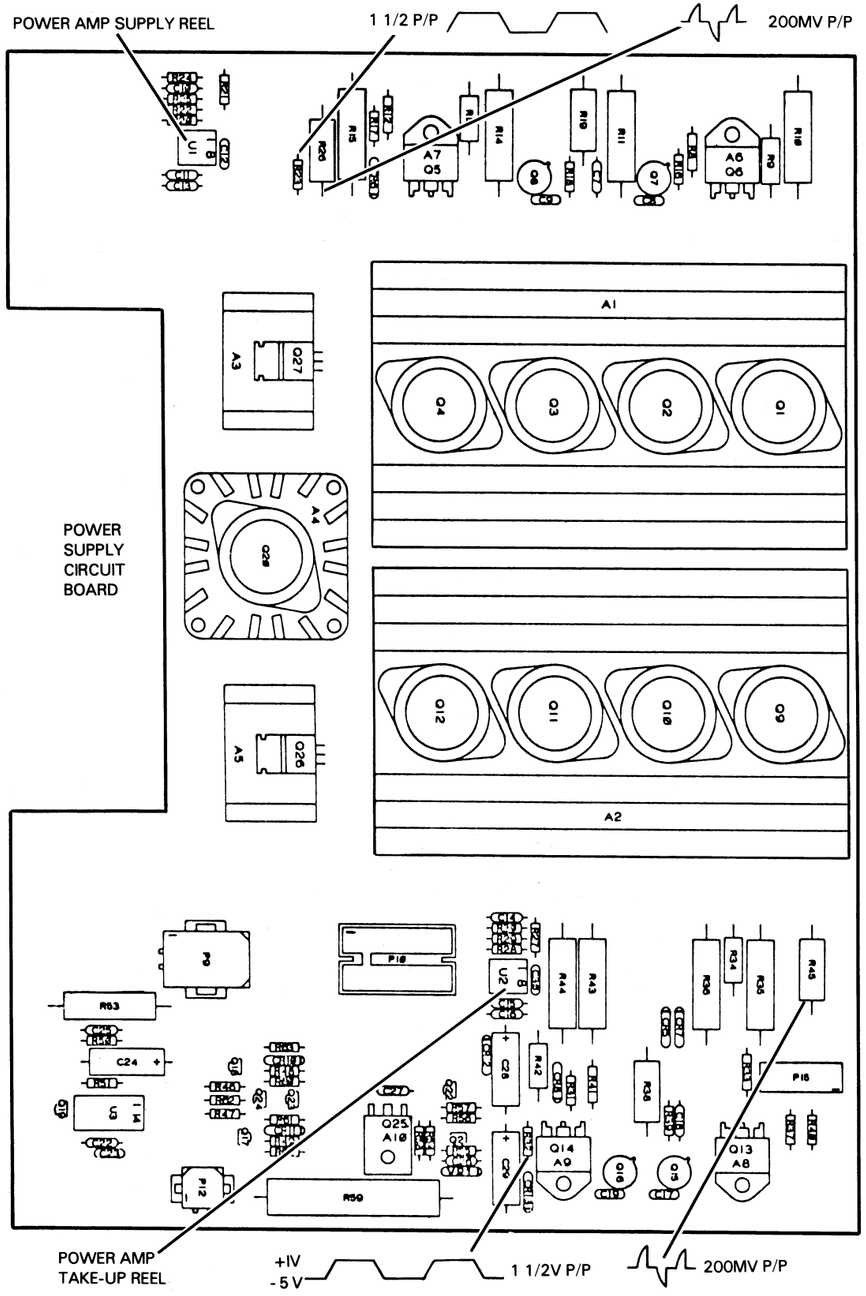
DG-05634



DG-05635



Takeup and Supply Reels



DG-05636

WITH NO TAPE MOUNTED, POWER UP TRANSPORT AND TURN EACH REEL BY HAND IN BOTH DIRECTIONS. YOU SHOULD FEEL A SLIGHT DRAG ON BOTH REELS.

OK ? — NO → ENSURE CABLE FROM REEL MOTORS TO POWER SUPPLY CIRCUIT BOARD IS CONNECTED, AND CHECK CIRCUIT BREAKERS FOR ±12/20 VOLTS.

YES

TURN REEL BY HAND WHILE COMPARING WAVEFORMS WITH THOSE SHOWN AT R45 FOR THE TAKEUP REEL AND R26 FOR THE SUPPLY REEL. WHEN CORRECT WAVEFORMS ARE PRESENT AT R26 & R45, CHECK TO SEE IF THEY REACH THE INPUT TO THE POWER AMPS (PIN2 OF U 1 & 2 OF POWER SUPPLY CIRCUIT BOARD).

OK ? — NO → CHECK POWER SUPPLY VOLTAGES. REPLACE POWER SUPPLY CIRCUIT BOARD IF THE CORRECT WAVEFORMS ARE PRESENT AND THERE IS NO DRAG ON EITHER OF THE REELS.

IF ONE OF THE REELS IS WORKING AND THE OTHER IS NOT, POSSIBLE BAD MOTOR. DISCONNECT P15 FROM POWER SUPPLY BOARD AND METER RESISTANCE OF BOTH MOTORS. IF THEY ARE NOT EQUAL, THE MOTOR THAT IS NOT WORKING MAY METER SHORT OR OPEN. IF BOTH METER THE SAME, REPLACE THE POWER SUPPLY CIRCUIT BOARD.

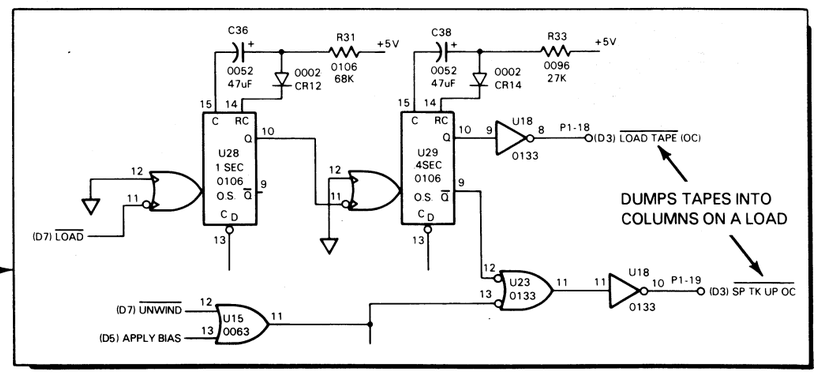
YES

WHEN BOT SWITCH IS PRESSED, REELS SHOULD TURN ABOUT ONE FULL TURN. SUPPLY REEL SHOULD TURN CLOCKWISE, TAKE UP REEL SHOULD TURN COUNTER-CLOCKWISE. THIS IS TO ALLOW TAPE TO DUMP INTO THE COLUMNS WHEN LOADING.

OK ? — YES → GO TO REEL SERVO ADJUSTMENT, PAGES V-27 AND V-28.

NO

CHECK THE LOAD PORTION OF THE CIRCUITRY AT COORDINATES (D 2,3 & 4) SHEET 1 OF SCHEMATIC DGC NO. 001-001157.



OPEN THE TRANSPORT CABINET AND WITH THE POWER ON, PRESS BOT SWITCH ON THE CONTROL PANEL. THE BLOWER MOTOR SHOULD TURN.

OK → IF VACUUM MOTOR TURNS AND BLOWER DOES NOT, THE BLOWER BELT MAY BE OFF, OR MAY NEED REPLACING.

OK → PRESS THE BOT SWITCH AND VISUALLY CHECK THE FLAPPER VALVE AT THE OUTPUT OF THE BLOWER. IT SHOULD BE OPEN.

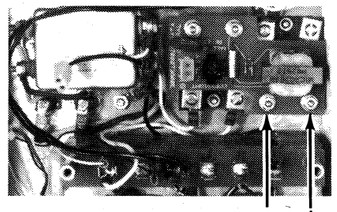
NOT OK → CHECK WIRING. IF WIRING IS OK, REPLACE SOLENOID.

NOT OK → ACCESS TO BLOWER BELT IS FROM REAR OF CABINET. SEE PG. I-5.

NOT OK → IF BLOWER MOTOR DOES NOT TURN, CHECK THE CONTROL PANEL LIGHTS.

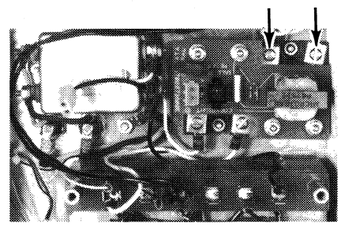
IF ANY OF THE LIGHTS ON THE CONTROL PANEL ARE ON IT IS A GOOD INDICATION THAT THE +5 SUPPLY TO THE RELAY K2 IS OK.

OK →



THE RELAY K2 USES +5 AS A POWER SOURCE. CHECK THE VOLTAGE BETWEEN TERMINALS 3 & 4 OF RELAY K2 IT SHOULD READ +5 Vdc WITH BOT SWITCH PRESSED, TERMINAL 3 BEING POSITIVE.

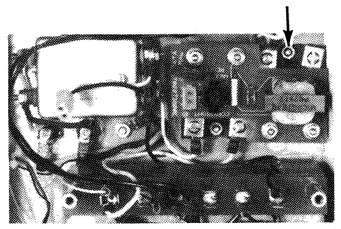
OK → THE VOLTAGES BETWEEN TERMINALS 1 & 2, WITH THE BOT SWITCH PRESSED, SHOULD BE 0 VOLTS.*



*There is a 120 VAC potential between these terminals if the relay is defective.

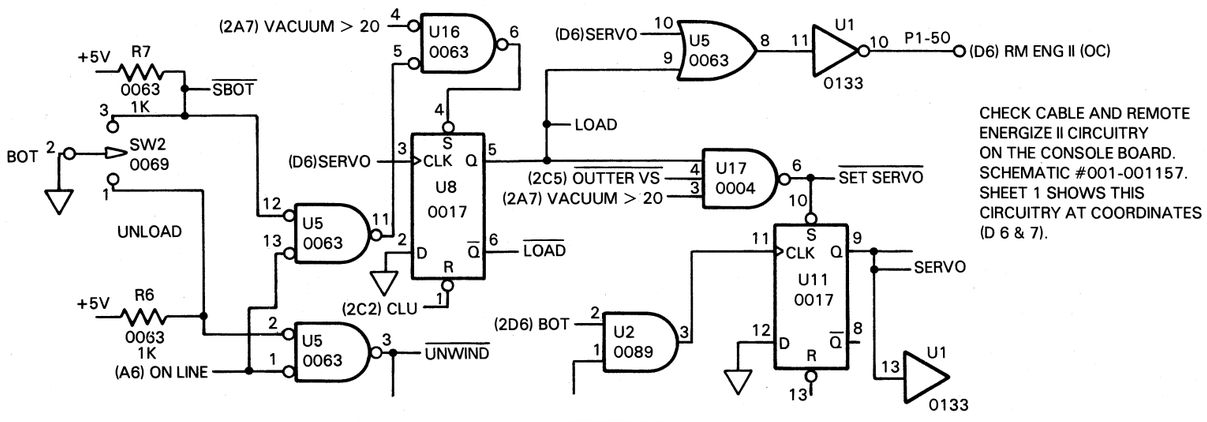
OK → CHECK FOR THE FOLLOWING:
- FAULTY WIRING
- DEFECTIVE MOTOR
- DEFECTIVE CAP

NOT OK → REPLACE RELAY K2, MOUNTED UNDER CIRCUIT BOARD.



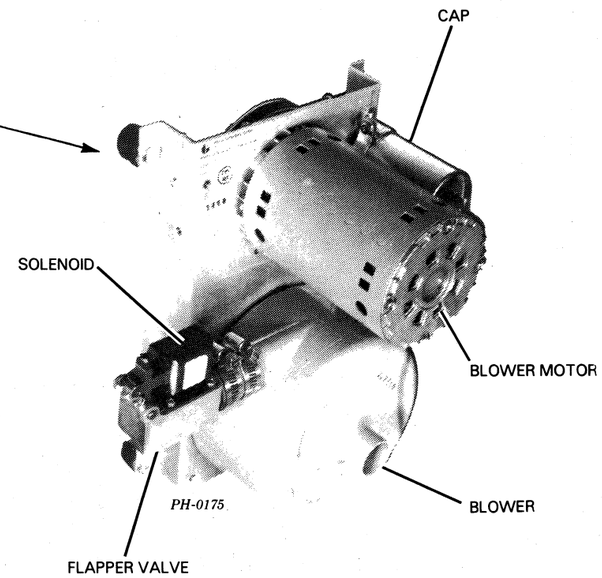
NOT OK

REMOTE ENERGIZE II CIRCUITRY 001-001157



CHECK CABLE AND REMOTE ENERGIZE II CIRCUITRY ON THE CONSOLE BOARD. SCHEMATIC #001-001157. SHEET 1 SHOWS THIS CIRCUITRY AT COORDINATES (D 6 & 7).

Vacuum Blower



DG-05637

Vacuum System Problems

IF THE VACUUM IS SIGNIFICANTLY LOW, IT IS POSSIBLE THAT THE TRANSPORT WILL NOT SUCCESSFULLY LOAD TAPE. FURTHERMORE, A FAILURE AT ONE OF THE FIVE VACUUM-SENSING SWITCHES MAY TRIP THE SERVO DISABLING INTERLOCKS AND PREVENT THE TRANSPORT FROM LOADING.

THE CORRECT LEVEL OF VACUUM IS 30 INCHES WATER, MEASURED AT THE MAIN VACUUM MANIFOLD BEHIND THE VACUUM COLUMNS.

PRESS THE BOT SWITCH AND CHECK THE VACUUM, IT SHOULD REACH 30 INCHES WATER IN 5 SECONDS OR LESS. USE VACUUM GAGE DGC #128-00789 AND CONNECT IT TO THE TAPE CLEANER AS SHOWN IN THE SKETCH AT RIGHT.

OK → IF VACUUM IS OK, GO TO STEP FOR LOADING TAPE LOOP ON THE NEXT PAGE. LOAD LOOP AND RETURN HERE.

NOT OK

LOCATE THE VACUUM-ADJUST FLAP VALVE, LOCATED JUST ABOVE THE CORRUGATED BLOWER HOSE INLET TO THE MAIN VACUUM MANIFOLD.

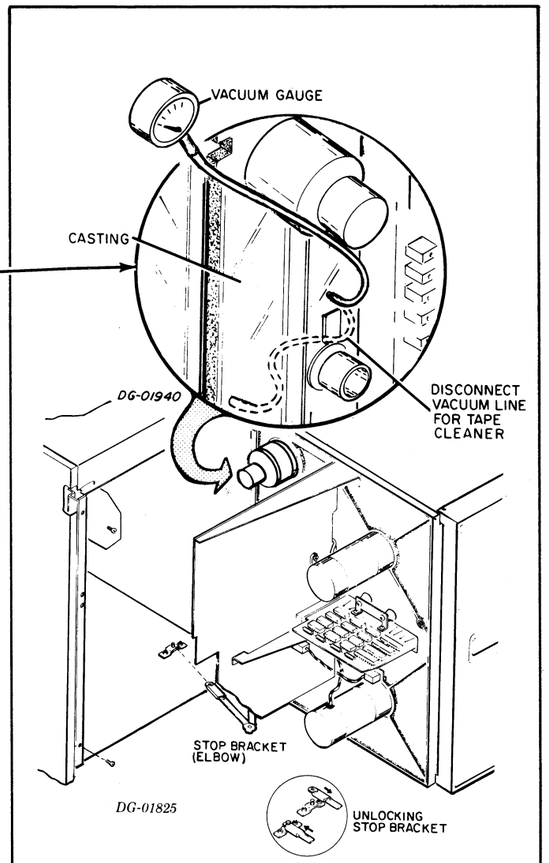
(A)

METER THE VOLTAGES BETWEEN THE CONNECTORS OF THE VACUUM SWITCHES. STARTING WITH THE TOP SWITCH, AND WITH THE TAPE LOOP LOADED, THE VOLTAGES ARE AS FOLLOWS:

SWITCH 1 INNER	0 VOLTS
SWITCH 2 INNER	0 VOLTS
SWITCH 3 VAC > 20	0 VOLTS
SWITCH 4 OUTER	5 VOLTS
SWITCH 5 OUTER	5 VOLTS

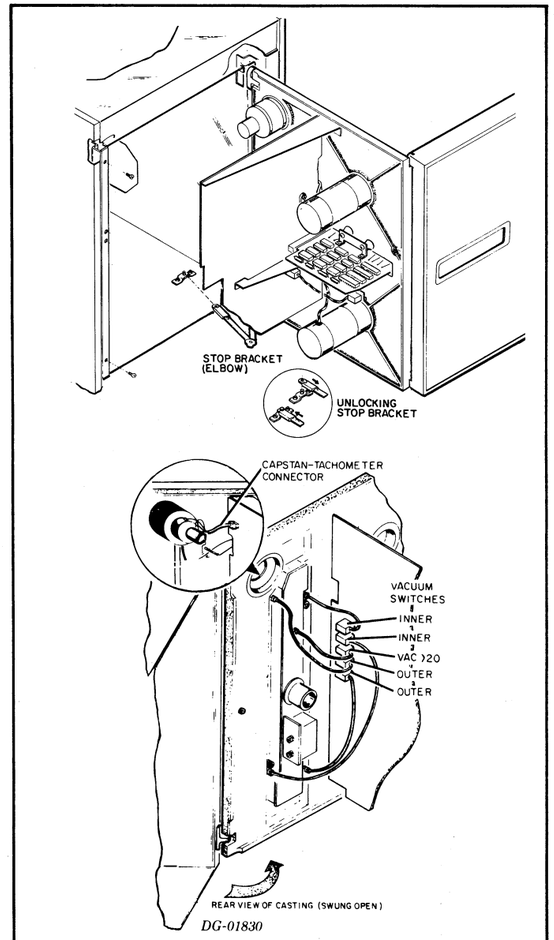
IF ANY OF THE SWITCHES HAVE INCORRECT VOLTAGE READINGS, FIRST CHECK THE LINES LEADING TO THE SWITCH. IF THE LINES ARE ALL RIGHT, REPLACE THE SWITCH.

DG-05638



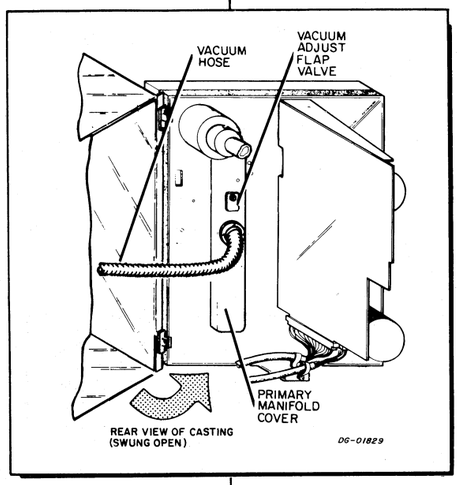
DG-01825

Be aware that a possible cause of the transport load failures is improper tape threading.



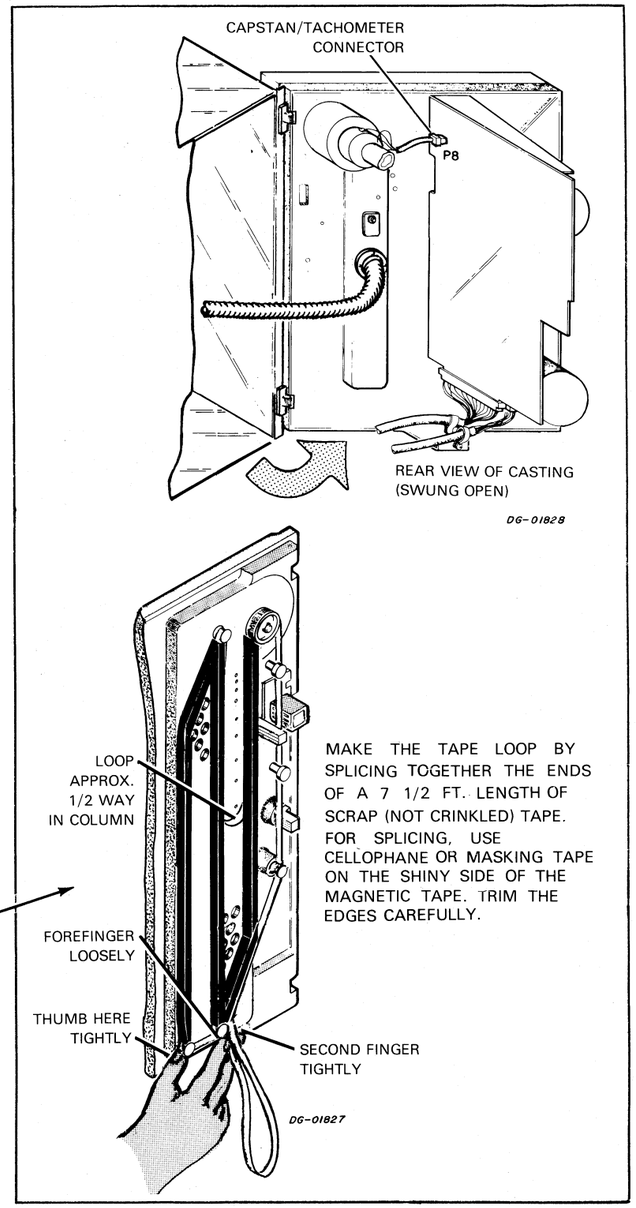
DG-01830

(A)



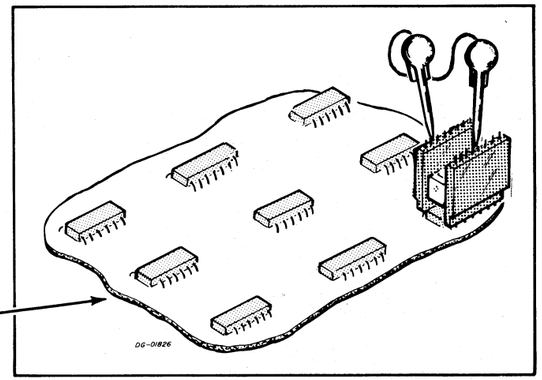
REMOVE REEL OF TAPE FROM TRANSPORT. LOCATE SQUARE BLACK PLUG ON THE CAPSTAN/TACHOMETER CABLE AND DISCONNECT IT FROMTHE CIRCUIT BOARD. LOCATE THE FLAT WHITE, IN-LINE PLUG IN THE DUAL TWISTED-PAIR CABLE TO THE REEL MOTORS AND DISCONNECT IT. THIS DISABLES THE CAPSTAN AND REEL MOTORS.

MOUNT A TAPE LOOP ON THE TRANSPORT AND LOAD IT, USING A GROUNDING JUMPER TO ENERGIZE THE BLOWER. WHILE LOADING THE LOOP, POSITION IT AS SHOWN IN THE SKETCH. HOLD THE TAPE LIGHTLY WITH THE THUMB AND FOREFINGER OF RIGHT HAND, LET IT SLIDE AND FEED INTO THE COLUMNS, AS THE VACUUM RISES. THIS LEAVES THE OTHER HAND FREE TO ENERGIZE THE BLOWER BY INSTALLING THE GROUND JUMPER TO REMOTE ENERGIZE II.



MAKE THE TAPE LOOP BY SPLICING TOGETHER THE ENDS OF A 7 1/2 FT. LENGTH OF SCRAP (NOT CRINKLED) TAPE. FOR SPLICING, USE CELLOPHANE OR MASKING TAPE ON THE SHINY SIDE OF THE MAGNETIC TAPE. TRIM THE EDGES CAREFULLY.

THE SIGNAL REMOTE ENERGIZE II IS AVAILABLE AT U1 PIN 10 OF THE CONSOLE BOARD, OR PIN 2 OF CONNECTOR P-2. THE VACUUM SHOULD REACH ≈ 30 INCHES OF WATER IN 5 SECONDS OR LESS.



OK ?

NO

CHECK THE VACUUM BLOWER DRIVE BELT, IT MAY BE LOOSE OR WORN.

YES

ADJUST FLAP VALVE FOR 30 INCHES OF WATER.

WITH TAPE LOADED IN COLUMNS, CHECK THE LINERS, THE VACUUM COLUMN COVER, THE MANIFOLDS, AND ALL TUBING FOR LEAKS. DO NOT CONTINUE UNLESS THE CAUSE FOR LOW VACUUM IS REPAIRED.

CHAPTER V
REPLACEMENTS, ALIGNMENTS & ADJUSTMENTS

INTRODUCTION

This chapter provides a step-by-step format for the removal, installation, and alignment of all subassemblies in the 6026 Tape Transport. Most procedures include pictures, sketches, graphs, waveforms, and scope setups to aid you. Special tools and/or part numbers are listed in the upper left hand corner of the first page of each procedure. Procedures included in this chapter are:

SPECIAL TOOLS & PARTS

Rolling Tape Guides
(002-00865)
Tape
Cleaner
(123-000282)
Head Tape Guides
[002-00(1067, 1068, 1092, 1210)]
Hex Torque calibrated screwdriver
(128-001092)

ROLLING TAPE GUIDES

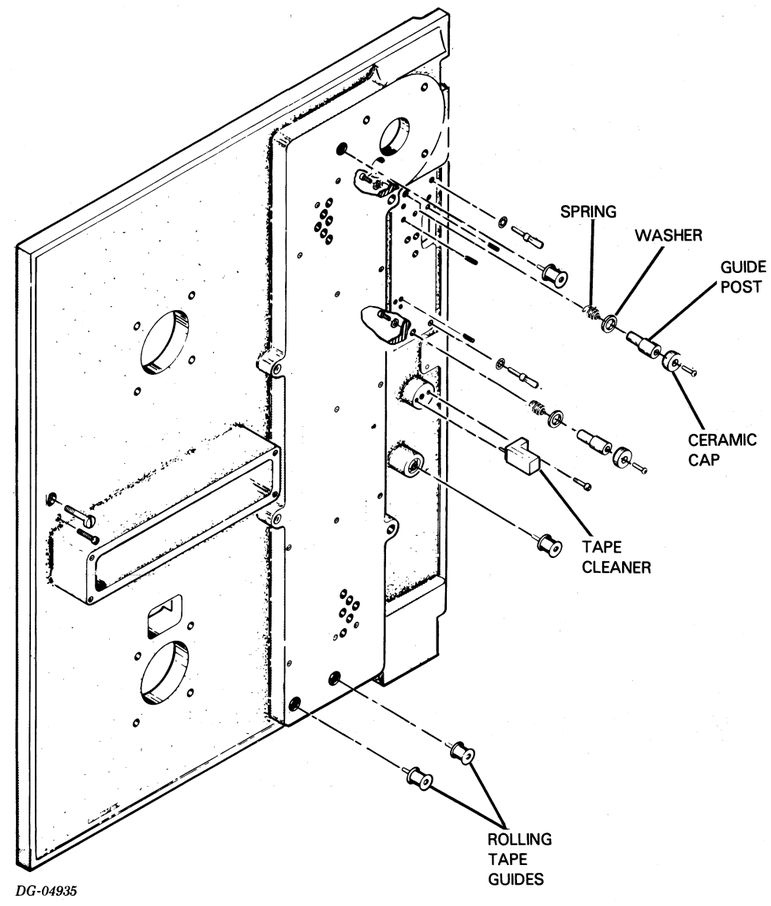
1. Open the front cover of the tape drive. Swing open the vacuum column cover and unscrew the screw holding the defective tape guide.

   The screw is captive within the tape guide.

2. Ensure that the mounting surface of the casting and the roller unit are clean and free of burrs. Place the new tape guide on the casting and torque the screw to 8 in-lbs. Close the vacuum column cover.

TAPE CLEANER

1. Open the front door of the drive. Remove the tape cleaner by unscrewing its retaining screw.
2. Place the new tape cleaner on the casting. Insure that it is seated correctly on its alignment pin. Insert the retaining screw and torque it to 5 in-lbs.



DG-04935

HEAD TAPE GUIDES

1. Open the front cover of the drive. Remove the ceramic cap of the tape guide by unscrewing its retaining screw.
2. Swing open the casting and unscrew the allen screw holding the guide post, washer and spring to the casting.

   Inspect the guide post and its mating surface. Make sure it is clean and free of burrs.

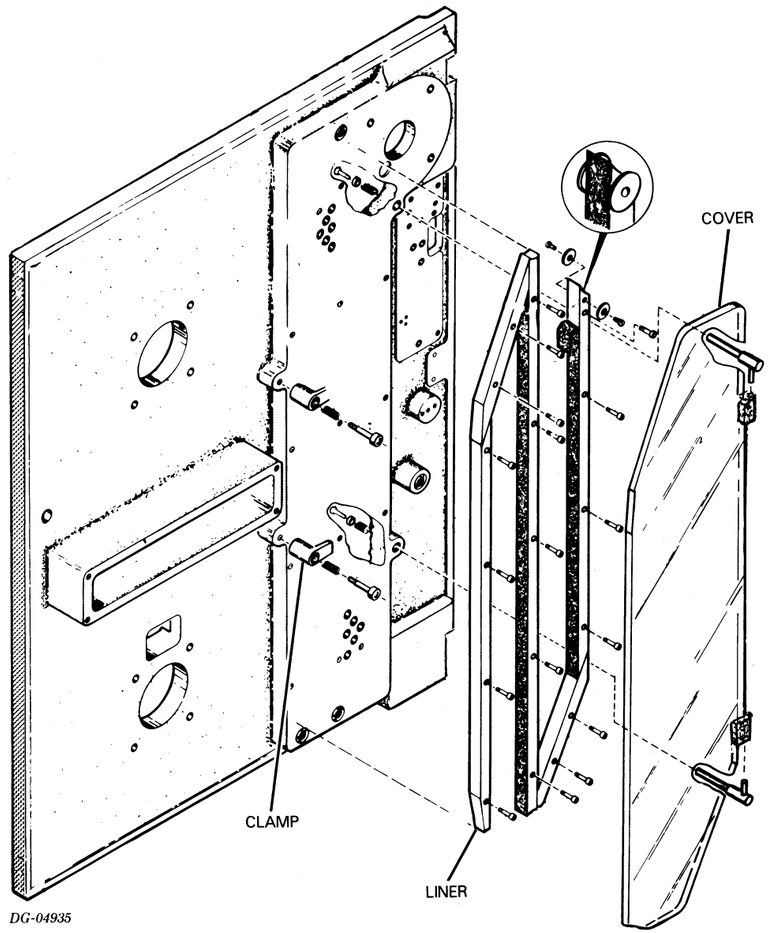
3. Replace the defective part and place the guide post, washer, and spring on the casting. Replace the allen screw and torque it to 8 in-lbs. Close the casting.

   Do not deform the spring.

4. Place the ceramic cap on the guide post; insert its retaining screw and tighten.

SPECIAL TOOLS & PARTS

Vacuum Column Cover
(002-007779)
Cover Clamps
(002-000840)
Liners
(002-000671-675)
Hex, Torque Calibrated Screwdriver
(128-001092)



DG-04935

LINERS

1. Unscrew the screws of the defective liner and remove it from the casting.
2. Place the new liner on the casting.. Insert its screws but do not tighten.
3. Align the liner so that the gap between liners is 0.002 inches or less. (Use a feeler gauge to check.) Then torque the screws to 20 in-lbs.

If the gap is more than 0.002 inches, try adjusting the adjacent liners so that the appropriate gap is attained. If this does not work, discard the liner and try another.

COVER

1. Power down the drive. Swing open the vacuum column cover and unscrew the four screws holding the cover to its hinges.
2. Take the new cover and replace the four screws that hold the cover to its hinges.

CLAMPS

1. Unscrew the allen screw holding the clamp and its spring to the casting.
2. Insert the spring and the screw into the clamp. Place the clamp on the casting and tighten the screw.

Hub Replacement

SPECIAL TOOLS & PARTS

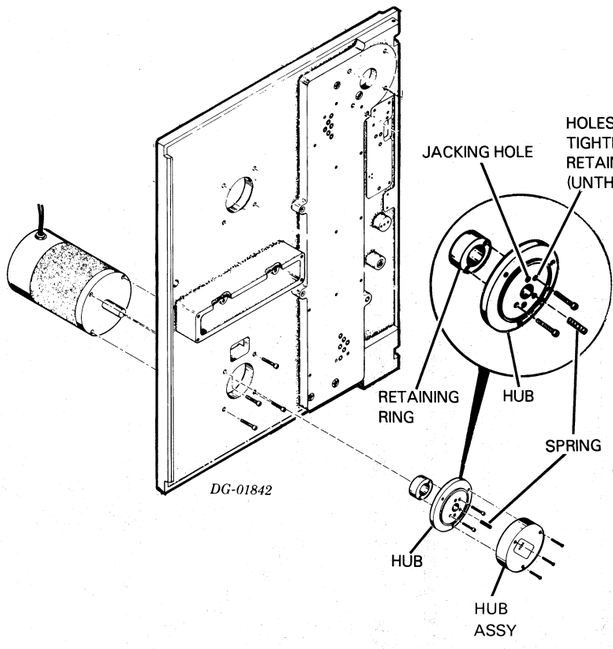
Hex, torqued-calibrated screwdriver (128-001092)
Alignment Go No-Go Gauge (117-000267)
TAKE-UP HUB
(002-00646) hub
(002-000647) reel plate
(123-000259) reel
SUPPLY HUB
(002-000794) hub
(005-001757) hub assy

1. Power down the drive.

Some steps are divided into two parts; part "a" refers to the take up hub, and part "b" refers to the supply hub.

2a. Remove the three Allen screws holding the cover plate and the plastic reel to the take up hub.

2b. Remove the three Allen screws holding the push-lock mechanism to the supply hub. Collect the spring from inside the mechanism.

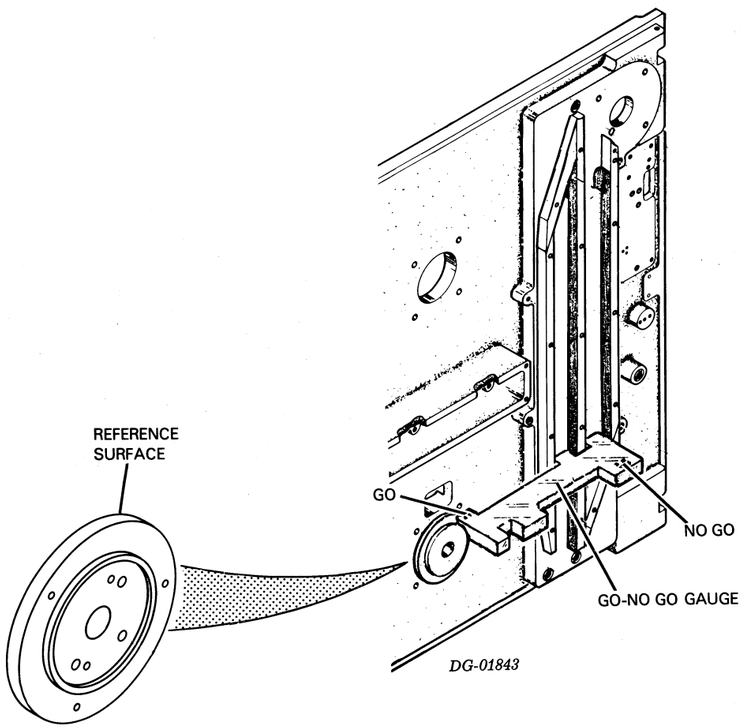


3. Locate the two allen head screws that draw up the retaining ring of the taper lock mechanism. Adjacent to each screw is a threaded jacking hole; remove the two socket head screws and insert them into the threaded holes. Tighten both screws evenly until the retaining ring pops free of the tapered flange.

4. Unscrew the screws from the jacking holes and remove the hub assembly from the motor shaft.
5. Slide the taper lock retaining ring over the split cone on the back of the new hub.
6. Insert socket head screws through the hub's non-threaded holes and engage the threaded holes in the retaining ring. Do not tighten.
7. Slip the hub onto the motor shaft and finger tighten the screws.

The hub should slide along the motor shaft with some light drag.

8. Hold the Go No-Go gauge as shown in the picture. Slide the hub so its reference surface just clears the Go surface of the alignment fixture and contacts the No-Go surface when the fixture is inverted.



DG-01843

9. Rotate the shaft and hub and be certain that surface runout on the hub does not exceed either the Go or the No-Go tolerances.

10. To secure the taper lock, tighten the two screws, alternating between them in 2 in-lb. increments until you reach 30 in-lbs. After tightening, check the alignment and runout again.

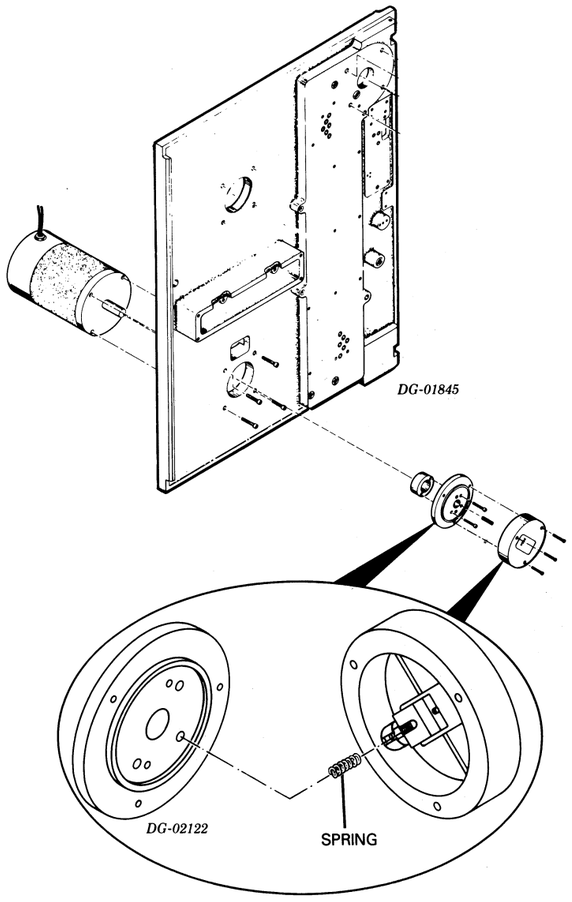
Do not exceed the final torque of 30 in-lbs, or the hub may warp.

11a. Place the take up reel and the hub cover plate on the hub and tighten the mounting screws to 10 in-lbs.

11b. Place the pressure hub (being sure to correctly seat the push-lock spring) on the supply hub and tighten the mounting screws to 10 in-lbs.

One end of the spring seats in a small hole on the face of the hub. The other seats in a recess on the back of the push-lock lever.

Proceed to the Push-Lock Tension Adjustment on the next page.


DG-01845

DG-02122

Push-lock Tension Adjustment

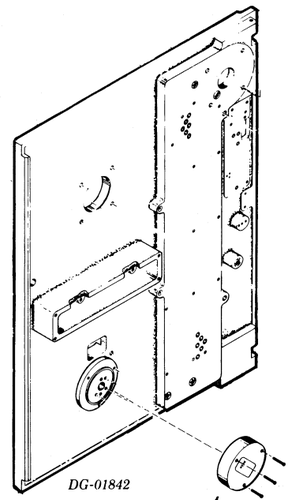
SPECIAL TOOLS & PARTS

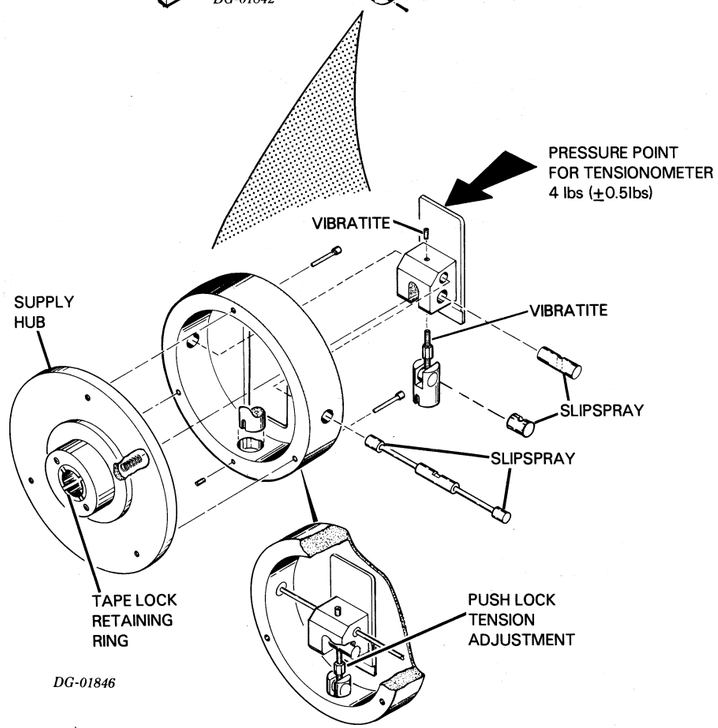
Tension gauge 0-10 lbs.
(117-000202)
Vibratite (120-000102)
Slipspray (120-000152)
Aluminum hub tape reel
Push-Lock Assembly
(005-001757)
Hex, Torque calibrated screwdriver
(128-001092)

1. Power down the drive. Unscrew the three screws holding push-lock mechanism to the supply hub. Coat the appropriate surfaces with slipspray and Vibratite as shown.

   Debris may accumulate on the supply hub, which will give a false tensionmeter reading and cause the reel to slip. Clean the hub with a lint-free cloth dampened with 91% isopropyl alcohol before adjusting the push-lock assembly.

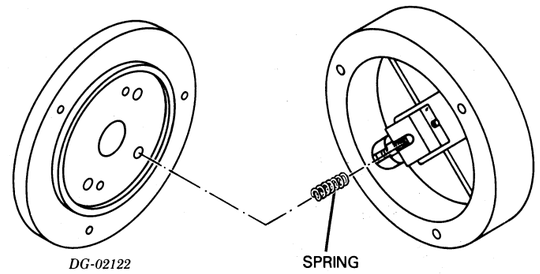
   Vibratite prevents the threaded rod from loosening.


DG-01842



DG-01846

2. Place the push-lock mechanism on the supply hub (being sure to seat the spring correctly). Insert the mounting screws and torque them to 10 in-lbs.



DG-02122

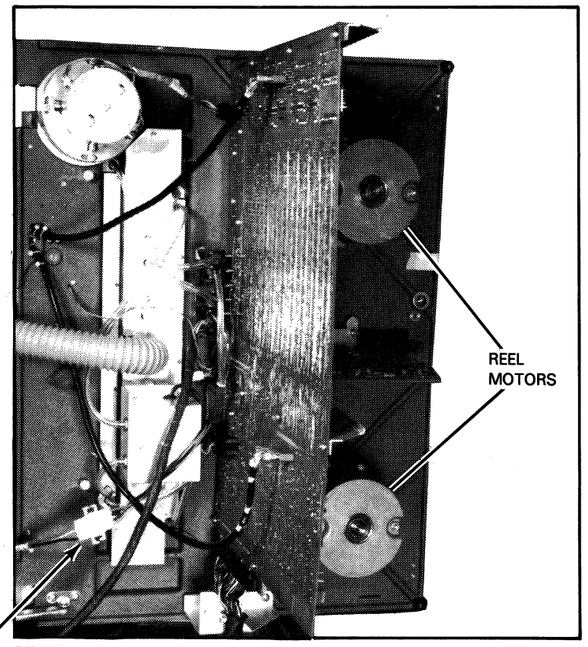
3. Install a metal tape reel on the hub assembly. Use the tension gauge to see howmuch pressure it takes to lock the mechanism> Adjust the double-threaded rod with a wrench so that 6 lbs. (+/- 0.5 lbs.) of pressure will lock it.

   Standard plastic tape reels have a wide tolerance. Therefore, a metal reel is required to obtain the proper pressure.

Reel Motor Replacement

SPECIAL TOOLS & PARTS

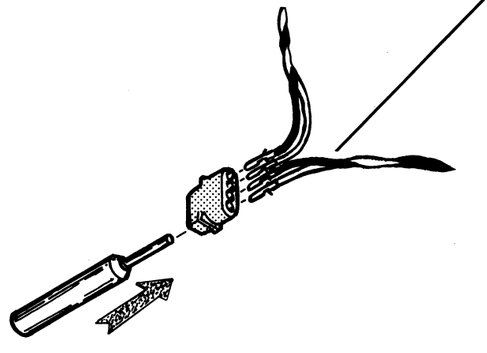
Pin Removal Tool
(128-000086)
Hex, Torque-calibrated
screwdriver
(128-001092)
Reel Motor
(005-002496)



PH-0177

1. Go to the Hub Replacement Procedure, (Pg. V-4) and follow steps 1-4.
2. Swing open the casting and disconnect the cable connector of the motor; Remove the pins (from the connector) of the motor being exchanged.

Take note of the wire locations.

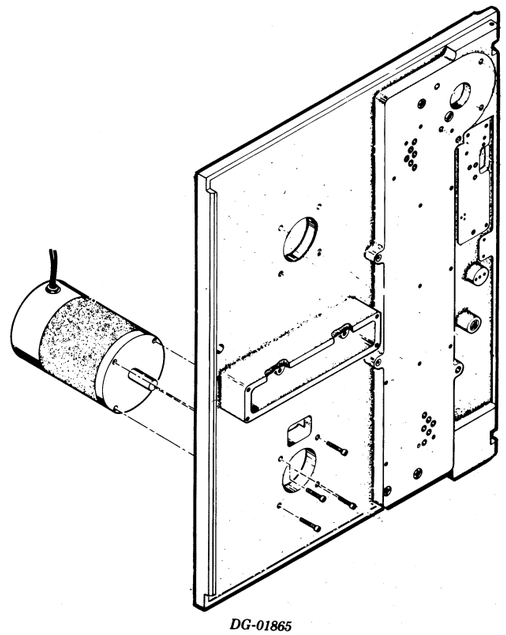


3. Hold the motor with one hand while unscrewing the four mounting screws. Remove the old motor from the casting and put the new motor in its place. Torque the screws to 35 in-lbs.

Tightening order ---------

4 ○ ○ 2

1 ○ ○ 3



DG-01865

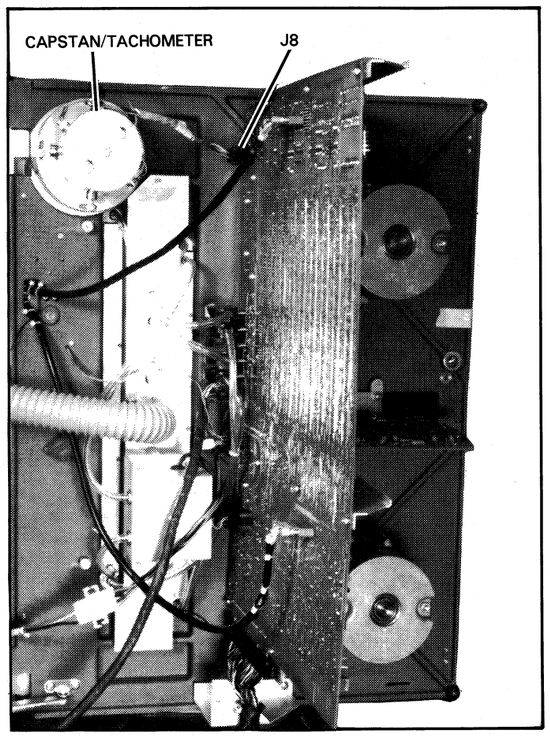
4. Insert the motor wires into tne cable connector and reconnect the cable.
5. Go to the Hub Replacement Procedure, (Pg. V-4) and follow steps 5-11.

Capstan/Tachometer Replacement

SPECIAL TOOLS & PARTS

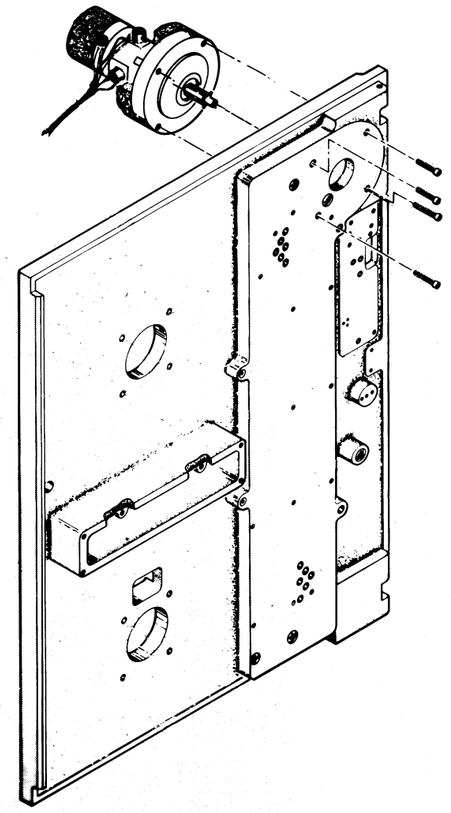
Hex, torque-calibrated screwdriver
(128-001092)
Capstan/Tachometer Assembly
(005-003091)

1. Power down the drive, then swing open the casting and disconnect the capstan/tachometer cable from the read/write board at J8.



PH-0177

2. Swing open the vacuum column cover. Take a firm hold of the capstan/tachometer assembly and remove the four mounting screws that hold it to the casting.



DG-04436

3. Place the new capstan/tachometer assembly against the casting with the positive terminal on top. Replace the four screws and torque them to 35 in-lbs. Plug the cable into the read/write board at J8.

   Data General uses capstan/tachometer assemblies from two different manufacturers; they are completely interchangeable.

   Be sure that the mating surfaces of the motor and the casting are clean and free from mars and burrs.

   Do not put any lateral force on the capstan shaft.

4. The following procedures must be done after the capstan/tachometer assembly has been replaced:

   1) Tape Path Alignment (Page V-9).

   2) Capstan Shimming (only if necessary) (Page V-10).

   3) Adjusting Capstan Velocity (Page V-11).

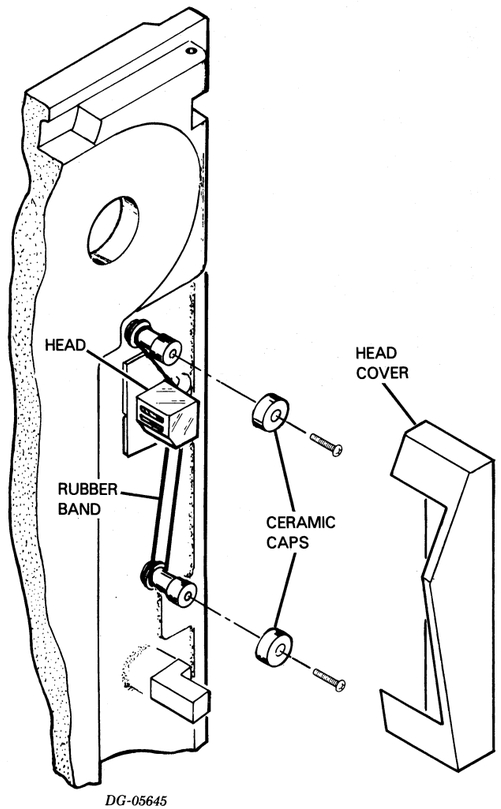
   4) Checking Capstan Quiescent Current (Page V-13).

   5) Verifying "75 IPS" Start/Stop Ramps (Page V-14).

SPECIAL TOOLS & PARTS

Blank Tape (2400 ft)
On Line Exercising Program
(095-001112)

1. Remove the vinyl head cover.



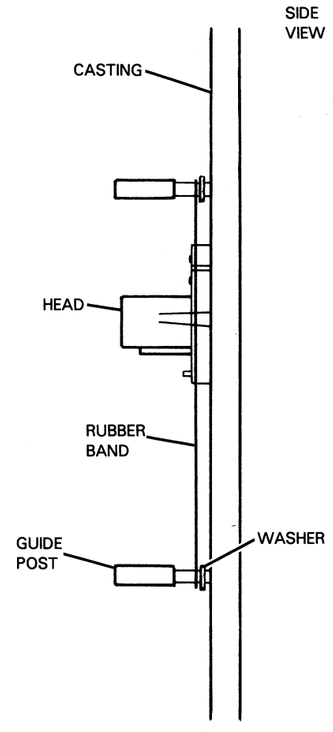
DG-05645

2. Unscrew the two screws holding the ceramic caps on the tape guides and remove them.

3. Push the spring loaded washers on the tape guides towards the casting. Stretch a rubber band between the two guides to keep the springs compressed.

   Stretch the rubber band behind the head and not across the tape contact surface.

   It is important to exert as little lateral force on the tape guides as possible.



DG-05644

4. Mount and load the blank tape. Use the command string (see Appendix C) to move the tape backwards and forwards at 75 IPS.

   Let the time between direction changes be no less than 5 seconds.

5. Observe the tape at the upper tape guide. If the tape shifts laterally 1/32" or more on the guide (i.e. hangs over the edge of the guide), there is a definite problem with tape path alignment.

   If the tape path is true, go to step 7.

6. Possible causes of tape path not being true are:

   1) Bent or non-perpendicular tape guide post.
   2) Non-perpendicularity or bearing play at the roller guide (located near the suction tape cleaner).
   3) Non-perpendicularity at the suction tape cleaner.
   4) Incorrect or non-shimming of the capstan. (See Capstan Shimming procedure on the following page.)

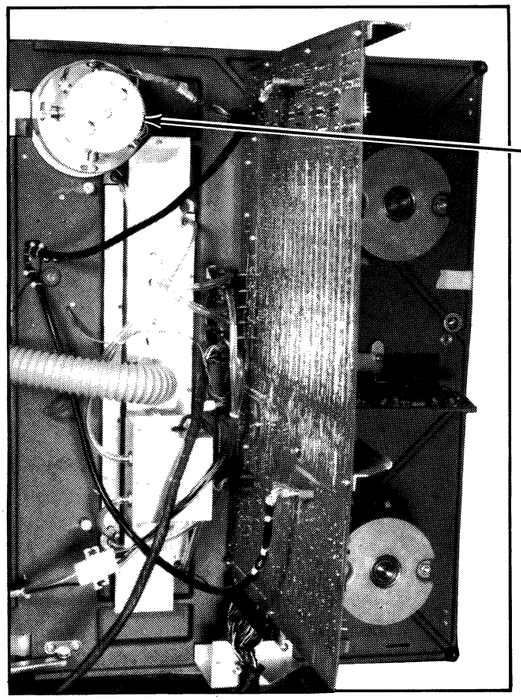
   If condition 1, 2 or 3 is the problem, go to the Tape Guides and Cleaner Replacement procedure, page V-2 , and replace the defective part.

7. Rewind and unload the tape. Remove the rubber band, then replace the ceramic caps on the tape guides. Insert the screws into the tape guides and tighten. Also replace the vinyl head cover.

SPECIAL TOOLS & PARTS

Blank Tape (2400 ft)
On line exercising program
(095-001112)
Hex, torque-calibrated screwdriver
(128-001092)
Shims DGC Part No.
.001" 123-000290
.002" 123-000291
.003" 123-000292

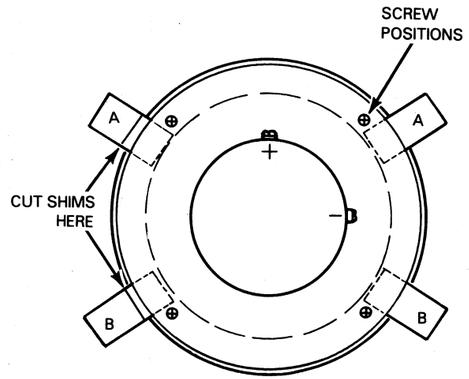
1. Go to the Tape Path Alignment procedure, page V-9 and follow steps 1-5.



PH-0177

2. To correct tape shifting away from the casting, loosen the cap/tach mounting screws and place two equal shims under the top half of the assembly. Then torque the screws to 35 in-lbs. For shifting towards the casting, place the shims under the bottom half of the assembly.

   Refer to the sketch for shim placement.



DG-05646

3. Check the shift and see if it has been corrected. If not, increase the shim thickness by .001" until the shift in tape is no longer visible.

   If more than .006" is needed, replace the capstan/tachometer assembly.

Adjusting Capstan Velocity

SPECIAL TOOLS & PARTS

Master Skew Tape (118-000298)
Blank Tape (2400 ft)
On Line Exercising Program
(095-001112)

The Master Skew Tape is a highly sensitive reel of tape which requires special care. The following guidelines should be adhered to when using the tape.

1) Backspace the tape at 75 IPS. NEVER REWIND the tape at 200 IPS or it may stretch and distort the tape.
2) Use the tape only when it is at room temperature.
3) Minimize the amount of motion reversals. Too many direction changes will put a strain on the tape and may stretch it.

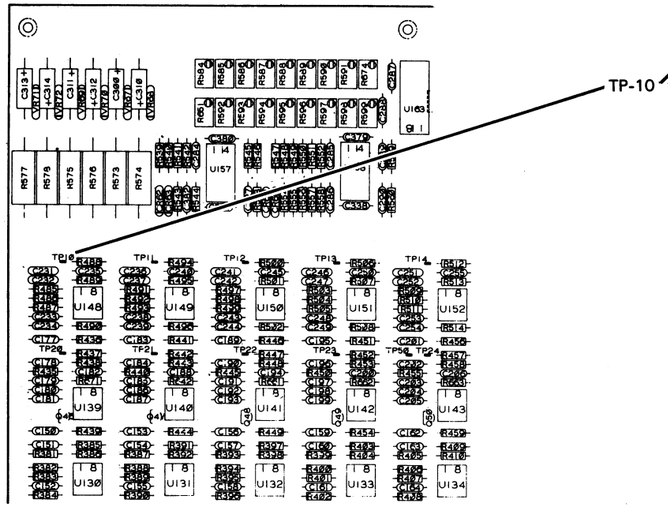
1. Mount and load a blank tape with a write ring installed. Set the density switch to low density.

2.

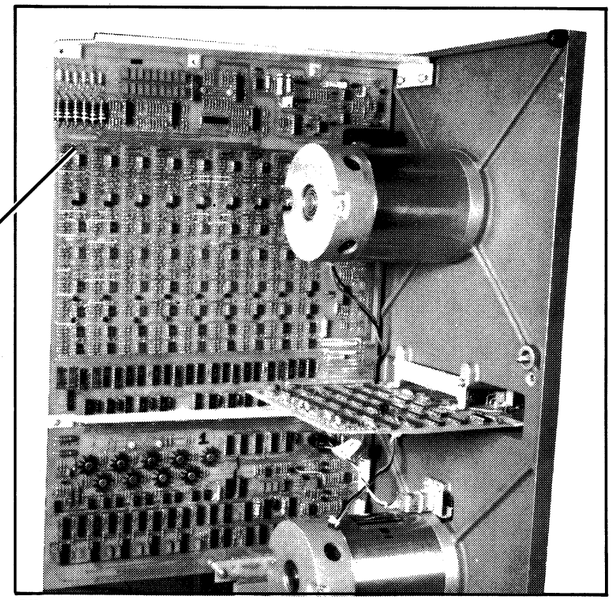
SCOPE SETUP

Channel 1	2.0 volts/div
Channel 2	N/A
Time Base	20 us/div
Vert Mode	Channel 1
Trigger Mode	Norm
Sync	Positive
Coupling	AC
Source	Channel 1

N/A = Not applicable

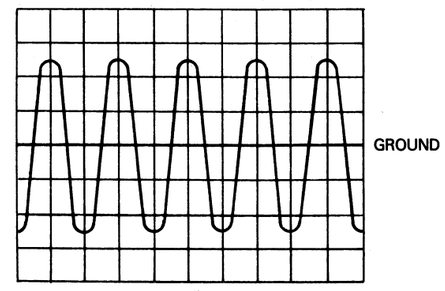


3. Swing open the casting and place a probe on TP-10. Use the command string (see Appendix C) to write all 1's on tape and verify that the signal is present in the data ground reading circuit.



PH-0169A

4. Adjust the scope trigger to obtain a clear signal at the read test point. Rewind the tape and unload it.

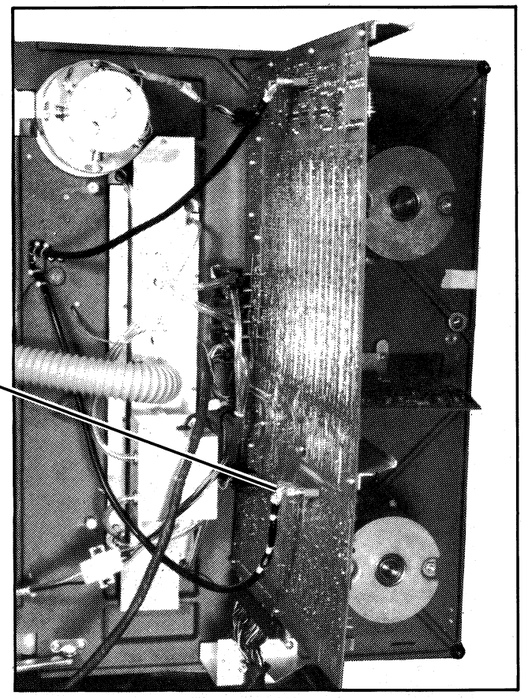


DG-05647

Adjusting Capstan Velocity

5. Power down the drive and disconnect the write connector from the read/write board at J7.

   The connector is fastened to the board by two screws. Back out the screws evenly to prevent damage to the connector pins.

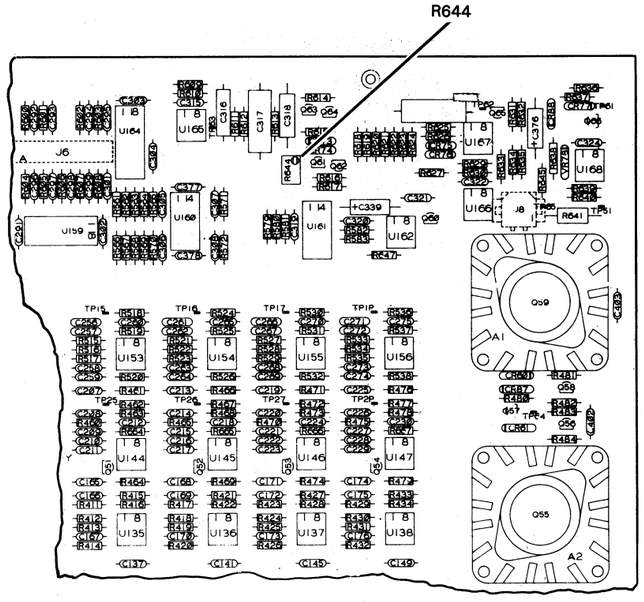


PH-0177

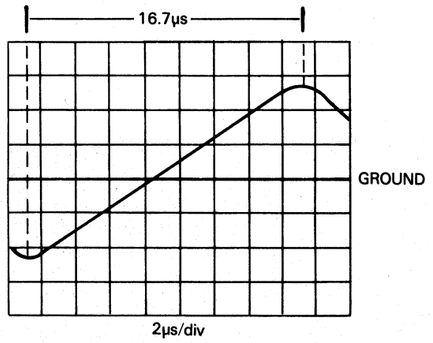
6. Change the Time Base setting to 2 µs/div. Power up the drive. Mount and load the master skew tape. Use the command string to read from the tape.

   The tape must be at room temperature before loading it. Minimize the amount of motion reversals.

   Never rewind the master skew tape. Backspace the tape at 75 IPS to unload it.



7. The interval between flux reversals must be 16.7µs +/- 0.33µs when the tape is going in either a forward or reverse direction. Adjust trimpot R644 so that the interval is within tolerance in both directions.



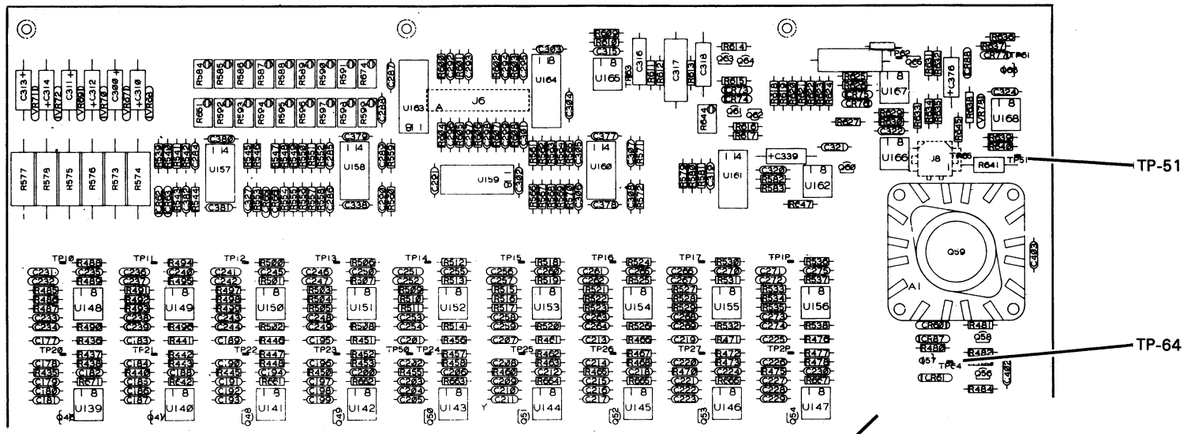
DG-05648

8. Remove the probe, space the tape backwards at 75 IPS and unload it. Power down the drive and reconnect the write connector to the read/write board at J-7.

Checking Capstan Quiescent

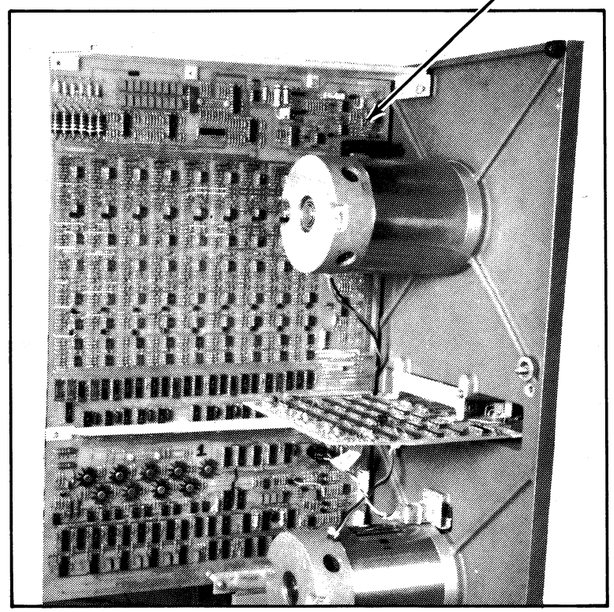
SPECIAL TOOLS & PARTS

Blank Tape (2400 ft)
Digital Multimeter



1. Mount and load a reel of tape on the transport. Swing open the casting and locate test points TP-51 and TP-64 on the read/write board.
2. Use the multimeter to measure the voltage between the two test points. The voltage should be less than 50 millivolts. If it is not, replace the read/write board (see Read/Write Board Replacement pg. V-31).

   It is important that no tape motion command be given while the meter is connected.
3. Unload the tape and remove the meter leads.



PH-0169A

Verifying "75 IPS" Start/Stop Ramps

SPECIAL TOOLS & PARTS

Blank Tape (2400 ft)
On Line Exercising Program
(095-001112)

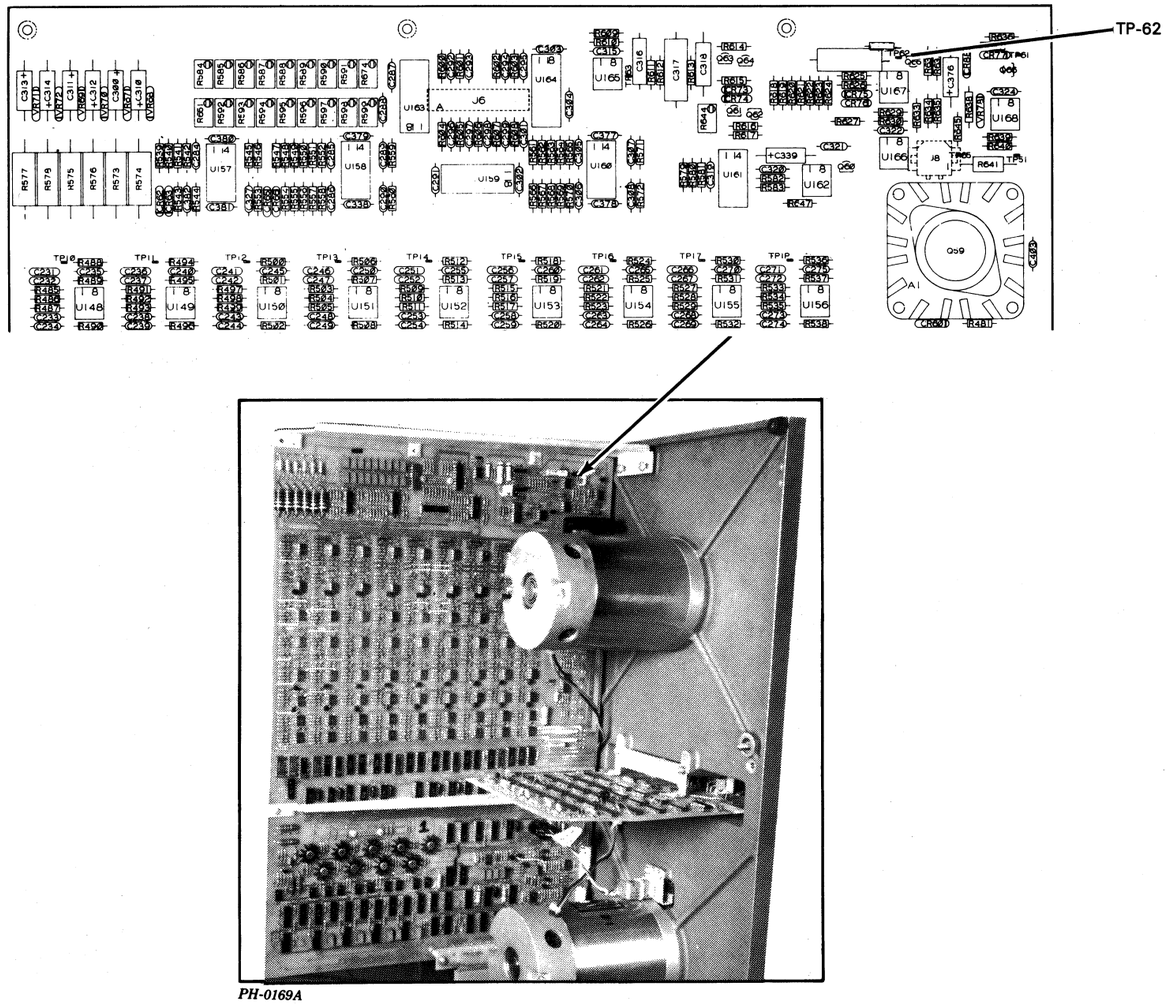
1. Mount and load a blank tape on the transport. Then swing open the casting and connect channel 1 of the scope to TP-62 on the read/write board.

2.

SCOPE SETUP

Channel 1	1.0 volt/div DC
Channel 2	N/A
Time Base	2 ms/div
Vert Mode	Channel 1
Trigger Mode	Norm
Sync	Positive
Coupling	DC
Source	Channel 1

N/A = Not applicable



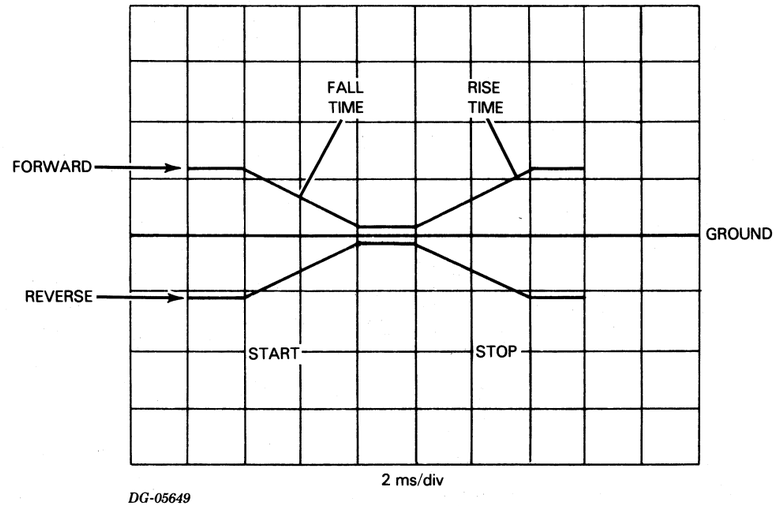
PH-0169A

3. Use the command string (see Appendix C) to write all 1's on tape for approximately 400 feet of tape. Rewind the tape.

4. Use the command string to read from tape in a forward direction and observe the start and stop ramps on the oscilloscope. The fall time for the start ramp and the rise time for the stop ramp must both be between 4.25ms and 4.75ms.

   The oscilloscope may only display the starting ramp waveform. If this happens, then change the triggering slope from positive to negative to observe the stopping ramp waveform.

   If the rise and fall times are not within specifications (4.5ms +/- .25ms), replace the read/write board (See Read/Write Board Replacement ***page V-31****).*



DG-05649

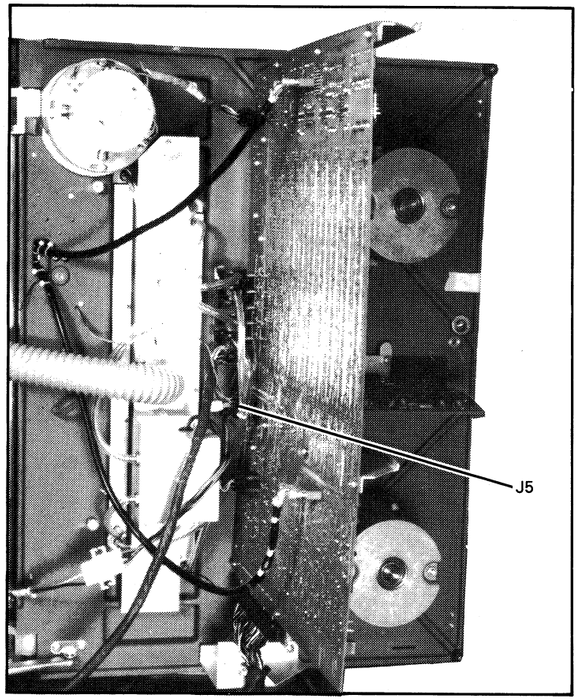
5. Repeat step 4, but move the tape in the reverse direction and check the waveform.

EOT/BOT Sensor Replacement

SPECIAL TOOLS & PARTS

Pin Removal Tool
(128-000205)
EOT/BOT Sensor
(005-002354)

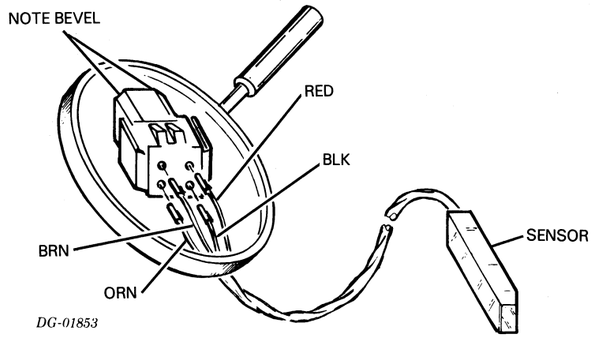
1. Power down the drive. Swing open the casting and unplug the sensor cable from the read/write board at J5.



PH-0177

J5 is located just below, and to the right of the vacuum limit switches.

2. Note the locations of the four wires. Use the pin removal tool to remove the four pins from the connector.



DG-01853

3. While holding the sensor unit, remove its retaining screw and pass its wires through the casting one at a time.

4. Take the new sensor and pass its wires one at a time through the casting. Place the sensor on its alignment pin and make sure it is seated correctly. Replace the retaining screw and tighten.

5. Insert the four wires into their proper sockets and plug the connector into the read/write board.

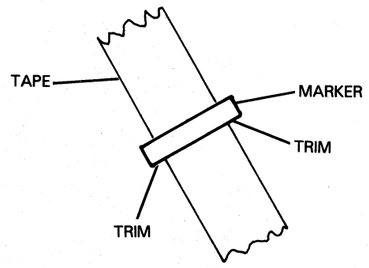
Go to the EOT/BOT Sensor Alignment. (Page V-16).

EOT/BOT Sensor Alignment

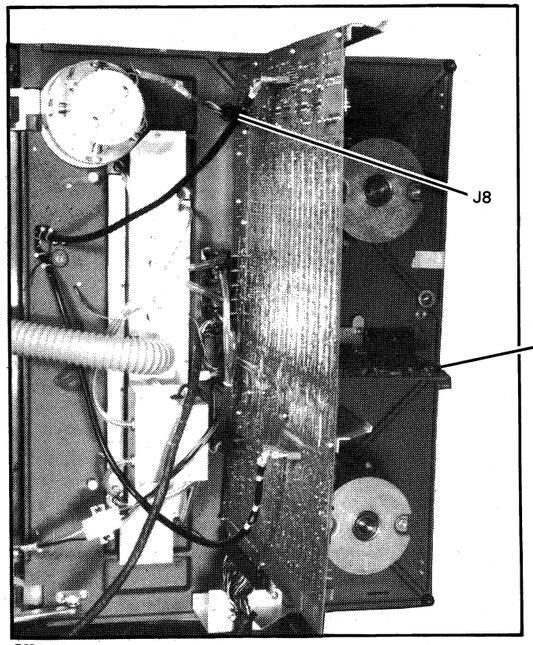
SPECIAL TOOLS & PARTS

7 1/2 feet of tape
Reflective Marker
Digital Multimeter

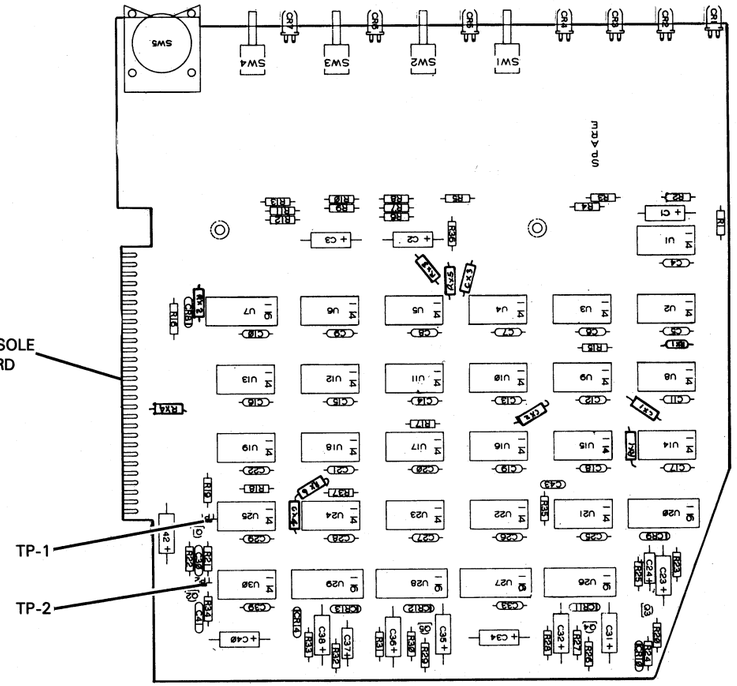
1. Take a 7 1/2 foot piece of tape and splice the ends together. Place a reflective marker across the width of the tape and trim the edges of the marker.



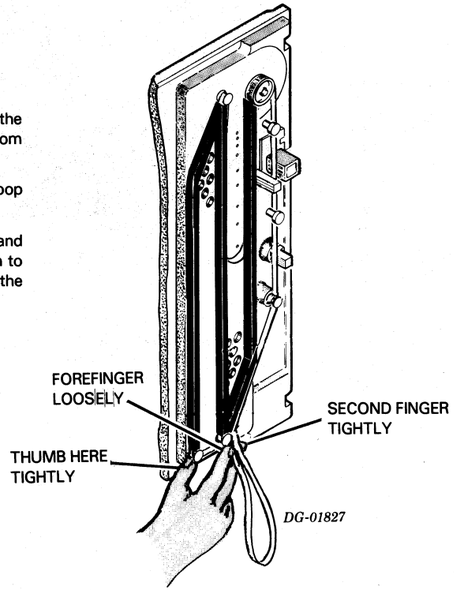
DG-05643



PH-0177



2. Power down the drive. Then swing open the casting and unplug the capstan cable from the read/write board at J8.
3. Power up the drive and mount the tape loop as shown in the sketch.
4. Hold the tape lightly with your thumb and forefinger. Press the UNLOAD/BOT switch to BOT, and let the tape loops feed into the columns as the vacuum rises.



DG-01827

If the tape doesn't enter the columns quickly enough, the servo interlocks may shut down the blower. If this happens, quickly press Reset and Load before the vacuum fails.

The technique is tricky and may take several tries to load the tape.

5. When the tape is loaded, rotate the capstan by hand until the reflective tabs are directly in front of the sensor.

The EOT and BOT indicators should be lit on the console.

6. Use the digital multimeter to observe the voltage levels of TP-1 and TP-2 on the console board. If they are not within 5%, loosen the sensor retaining screw and adjust the sensor to get the two signals as equal as possible. Tighten the retaining screw and recheck the voltages.
7. Unload the loop by turning the power off. Plug the capstan cable into J-8 on the read/write board.

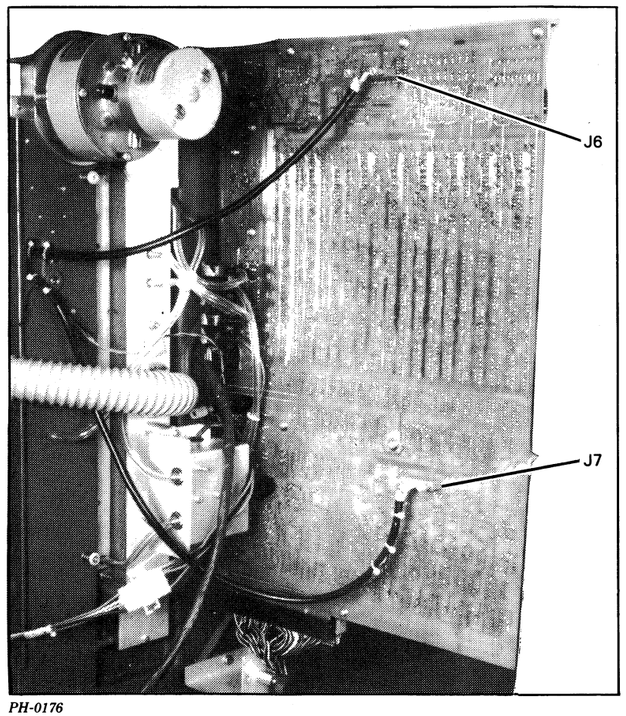
Head Replacement

SPECIAL TOOLS & PARTS

Micrometer (128-000809)
Gylptol (120-000113)
Head & Plate Assembly (118-000692)
Calibrated Screwdriver
Hex Torque (128-001092)

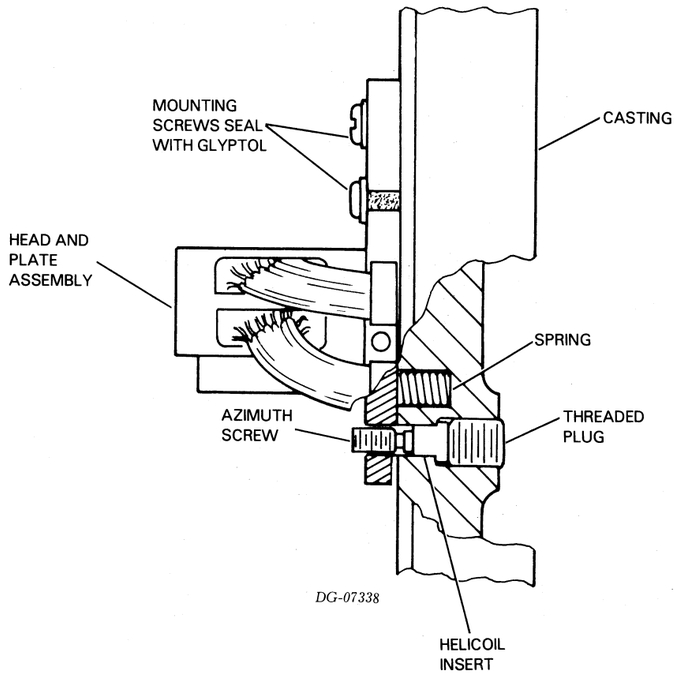
1. Power down the drive. Open the front door and remove the vinyl head cover.
2. Swing the casting open and unscrew the two captive screws holding the read and write connectors to the read/write board at J-6 and J-7 respectively.

   Back out the two connector screws evenly to avoid damaging the pins.



PH-0176

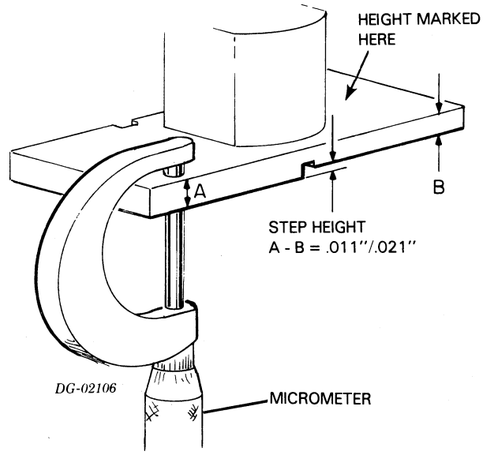
3. Locate the threaded plug on the casting directly behind the head assembly. Unscrew the plug and the slotted azimuth adjust insert underneath the plug. Use an Allen wrench to keep the azimuth adjusting screw from turning with the insert.



DG-07338

4. Remove the three screws holding the head and its mounting plate to the casting. Carefully lift the head away from the casting and recover the spring from behind the head plate. Slip the head cables through the opening in the casting.

5. Use 91% Isopropyl alcohol and lint.free cloth (Kimwipe) to clean the casting, mounting plate, and the head itself before installing. Set the azimuth adjustment screw to extend from the top of the head mounting plate abut 1/8" to 3/16".



DG-02106

6. If a micrometer is not available, do steps A-C. If it is, then go to step D.

   a. Mount the head assembly in position over its alignment pins and secure it to the casting with its three retaining screws.

      The spring azimuth insert must not be in place for this procedure.

   b. Select a feeler guage that fits snugly (not tightly) between the raised portion of the head baseplate and the casting.

   c. Remove the head from the casting.

      The A-B step height is marked on the head assembly plate.

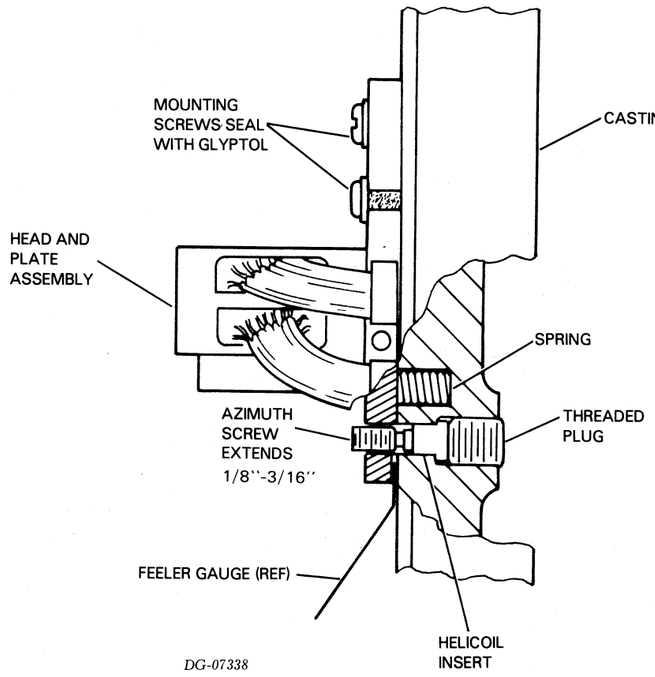
7. Pass the read and write cables through the opening in the casting. Put the spring in place. Press the mounting plate over the alignment pins and secure it with one of the three retaining screws. Make sure the spring is in the correct position, then replace the remaining two screws and torque all of them to 10 in-lbs.

8. Use an allen wrench to keep the azimuth adjustment screw from rotating while you screw the azimuth adjustment insert over it.

   The insert should only be finger tightened at this point.

9. Slide the feeler gauge under the raised portion of the head mounting plate. Keep the azimuth screw from turning and draw the head plate against the feeler gauge by turning the azimuth adjustment insert. The feeler gauge should fit snugly.

   Do not overtighten and jam the feeler gauge.



10. Remove the feeler gauge. Insert the threaded plug over the azimuth adjustment insert and tighten it.

    The pressure of the plug against the insert will keep the insert from turning as the azimuth adjustment screw turns.

11. Apply Glyptol to the three mounting screws holding the head plate, and to the threaded plug on the casting.

12. Connect the read and write cables to the read/write board.

    Tighten the screws evenly to avoid damage to the pins.

13. Align the head. See "Head Alignment" on the following page.

SPECIAL TOOLS & PARTS

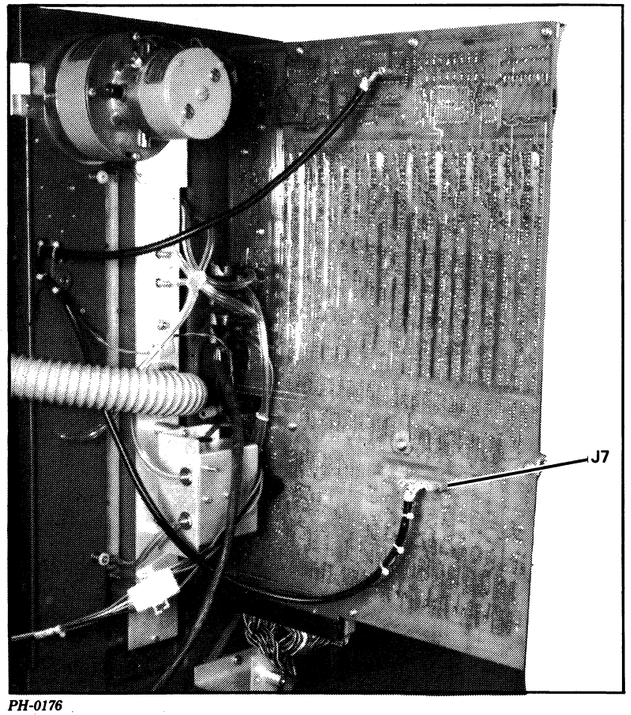
Master Skew Tape (118-000298)
Master Amplitude Tape
On Line Exercising Program
(095-001112)
Glyptol (120-000113)
Blank Tape (2400 ft.)

The Master Skew Tape is a highly sensitive reel of tape which requires special care. The following guidelines should be adhered to when using the tape.

1) Backspace the tape at 75 IPS, and NEVER REWIND it at 200 IPS, or it may stretch and distort the tape.
2) Use the tape only when it is at room temperature.
3) Minimize the amount of motion reversals. Too many direction changes will put a strain on the tape and may stretch it.

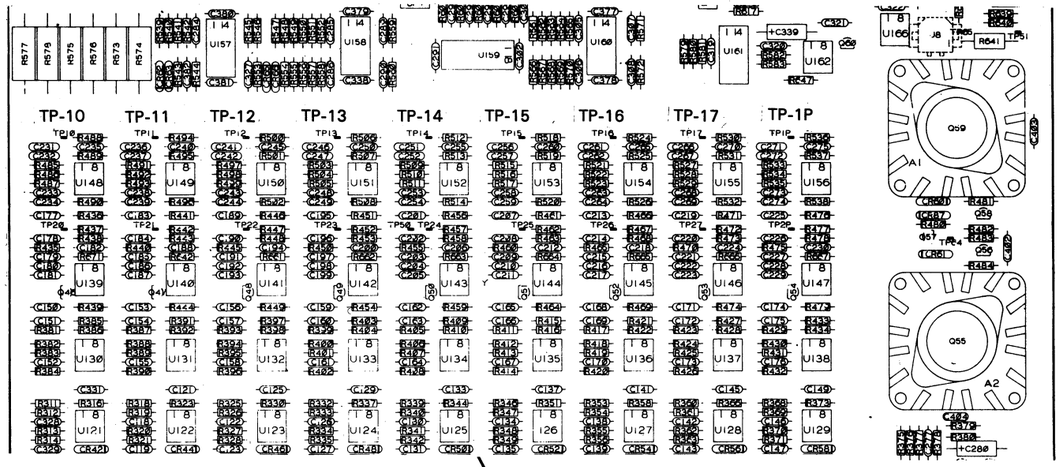
1. Power down the drive and remove the vinyl head cover.
2. Swing the casting open and unscrew the two captive screws holding the write cable connector to the read/write board at J7.

   Back out the connector screws evenly to avoid bending any pins.



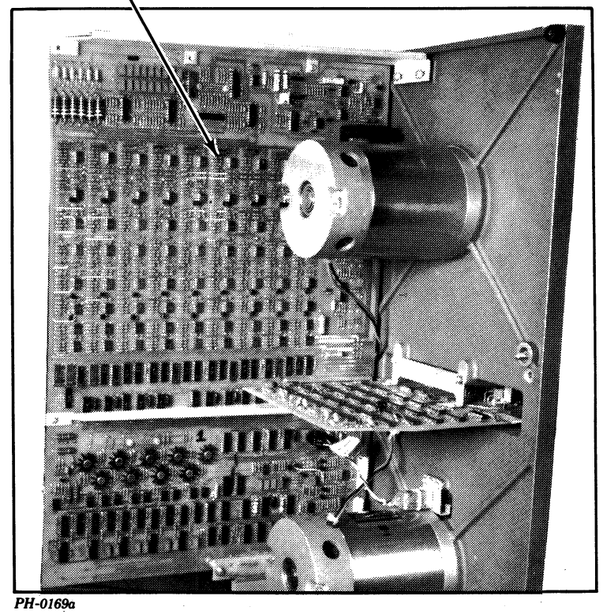
PH-0176

3. Connect Channel 1 of the scope to the data reading path test point for **channel 4 (TP-14). Connect Channel 2 of the scope to channel 5 (TP-15).**



SCOPE SETUP

Channel 1	2.0 volts/div DC
Channel 2	2.0 volts/div DC
Time Base	5 us/div
Vert Mode	Alternate
Trigger Mode	Norm
Sync	Positive
Coupling	AC
Source	Channel 1



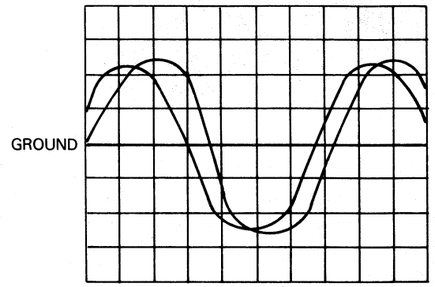
PH-0169a

4. Power up the drive and push the density switch for low density.
5. Mount and load the **Master Skew** Tape. Use the **command string** (see Appendix **C**) to read from the tape. Adjust the scope to obtain a clear trace of the signals from both **channels.**

   The dynamic skew of the tape is seen as peak shift and broadening on the oscilloscope trace. Excessive dynamic skew (1us or more) may indicate tape path is not true.

   Never rewind the master skew; only move the tape in reverse at 75 IPS.

CHANNELS NOT ALIGNED



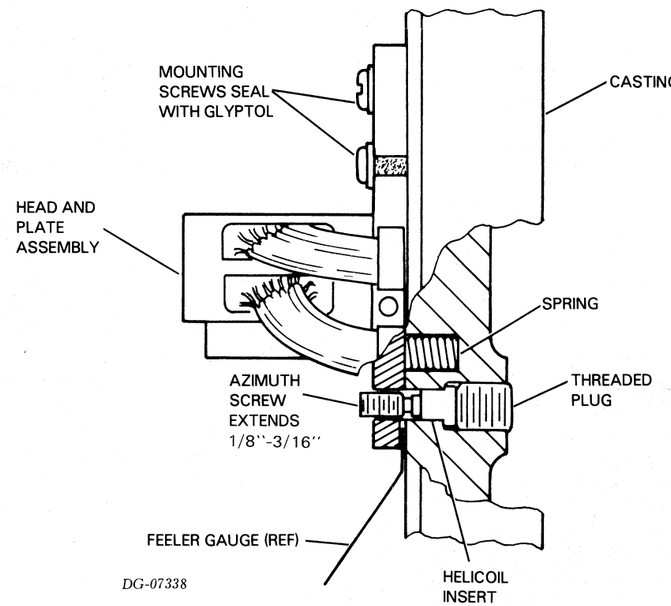
DG-05640

TEST POINTS	CHANNEL NUMBERS
TP-10	CH-0
TP-11	CH-1
TP-12	CH-2
TP-13	CH-3
TP-14	CH-4
TP-15	CH-5
TP-16	CH-6
TP-17	CH-7
TP-1P	CH-P

6. Using an allen wrench, adjust the head azimuth adjustment screw on the head's mounting plate to align the two outside channels.

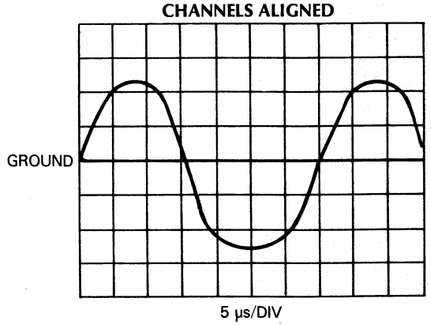
   The peaks displayed on both channels of the scope should occur at precisely the same time.

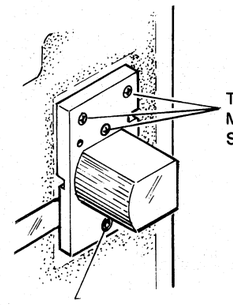
   Do not adjust the three head mounting screws previously torqued in the head replacement procedure.



DG-07338

CHANNELS ALIGNED

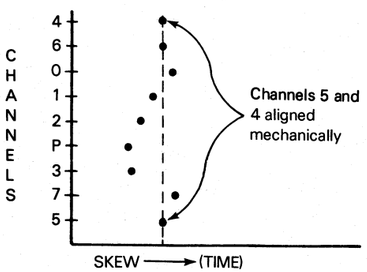




DG-02107

7. Use the probe on Channel 2 to measure the position of the data peak of each **channel** relative to the two outer **channels (5 & 4).** Plot the head skew pattern. (See example below.)

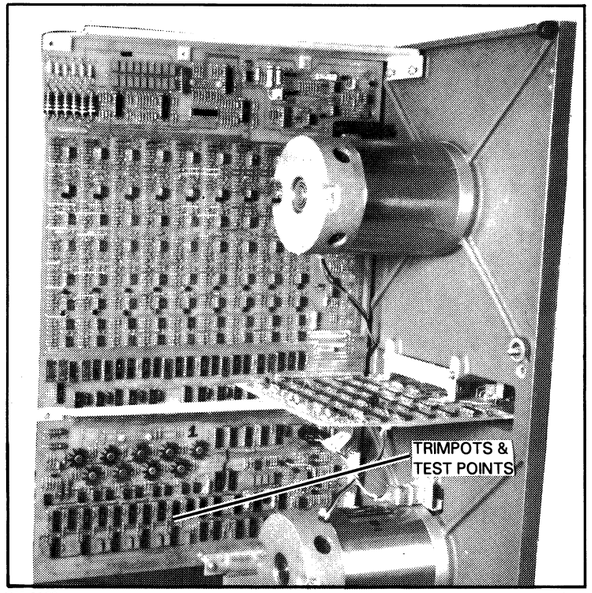
   The signal peaks for all tracks must be within 1 us of the worst two channels. If they are not, this may indicate gross misalignment of the head. If gross misalignment is suspected, see the Head Replacement procedure. (Page V-17).



Possible skew pattern after aligning **outside channels.**

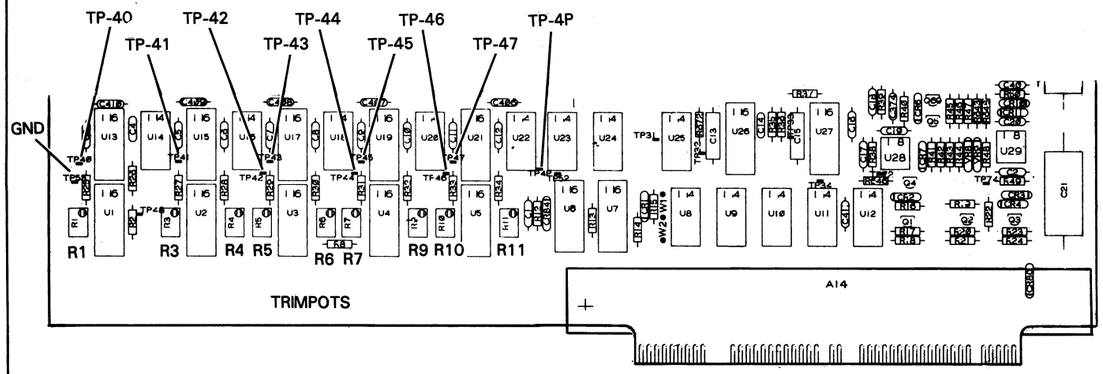
8. Space the Master Skew Tape backwards at 75 IPS, unload it and carefully remove it from the transport. Power down the drive and reconnect the write connector to the read/write board at J-7.

9. Power up the drive, then mount and load a blank tape with a write ring installed. Locate the nine deskew trimpots and their corresponding test points on the read/write board.



PH-0169a

TEST POINTS



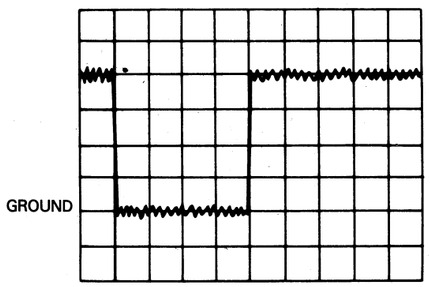
10.

SCOPE SETUP

Channel 1	1.0 volts/div DC
Channel 2	N/A
Time Base	.5 us/div
Vert Mode	Channel 1
Trigger Mode	Norm
Sync	Negative
Coupling	DC
Source	Channel 1

N/A = Not applicable

Connect Channel 1 of the scope to the test point for channel 0 (TP-40). Use the command string to write all 1's (See Appendix A). Adjust the trimpot (R1) so that the negative pulse is approximately 2 µs long. After repeating the procedure for all channels rewind the tape.



DG-05641

TRIMPOT	TEST POINT	CHANNEL NUMBER
R1	TP-40	CH-0
R3	TP-41	CH-1
R4	TP-42	CH-2
R5	TP-43	CH-3
R6	TP-44	CH-4
R7	TP-45	CH-5
R9	TP-46	CH-6
R10	TP-47	CH-7
R11	TP-4P	CH-P

11.

SCOPE SETUP

Channel 1	2.0 volts/div DC
Channel 2	N/A
Time Base	5 µs/div
Vert Mode	Channel 1
Trigger Mode	Norm
Sync	Positive
Coupling	AC
Source	Channel 1

Use the command string to write all 1's on tape. Measure the skew of test points 10 through 1P and adjust their corresponding deskew trimpots until you have duplicated the skew pattern plotted and recorded in step 7.

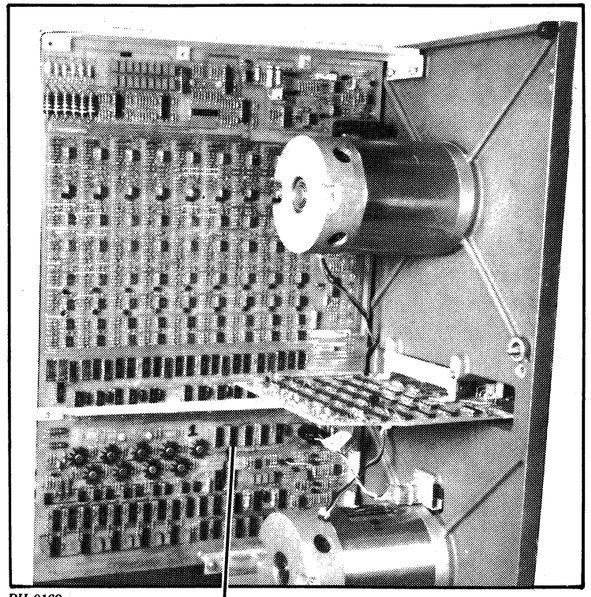
See step 3 for test point locations.

TRIMPOT	TEST POINT	CHANNEL NUMBER
R1	TP-10	CH-0
R3	TP-11	CH-1
R4	TP-12	CH-2
R5	TP-13	CH-3
R6	TP-14	CH-4
R7	TP-15	CH-5
R9	TP-16	CH-6
R10	TP-17	CH-7
R11	TP-1P	CH-P

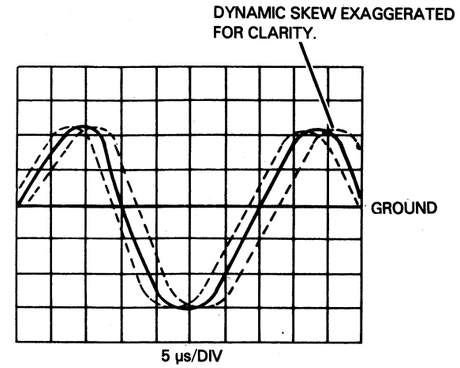
12. Connect Channel 1 of the scope to U44 pin 9.

SCOPE SETUP

Channel 1	2.0 volts/div AC
Channel 2	2.0 volts/div DC
Time Base	5 µs/div
Vert Mode	Channel 2
Trigger Mode	Norm
Sync	Positive
Coupling	AC
Source	Channel 1



PH-0169a



DG-05642

13. Use the probe on Channel 2 to observe the waveform at each read test point (TP 10, 11 etc.) while writing all 1's on tape. Observe the broadening of the waveform and the dynamic skew as the peak shifts. If the center of the peak shifts more than 1 us, the head must be replaced.

Dynamic skew exaggerated for clarity.

If you are not aligning a new head, then proceed to step 17.

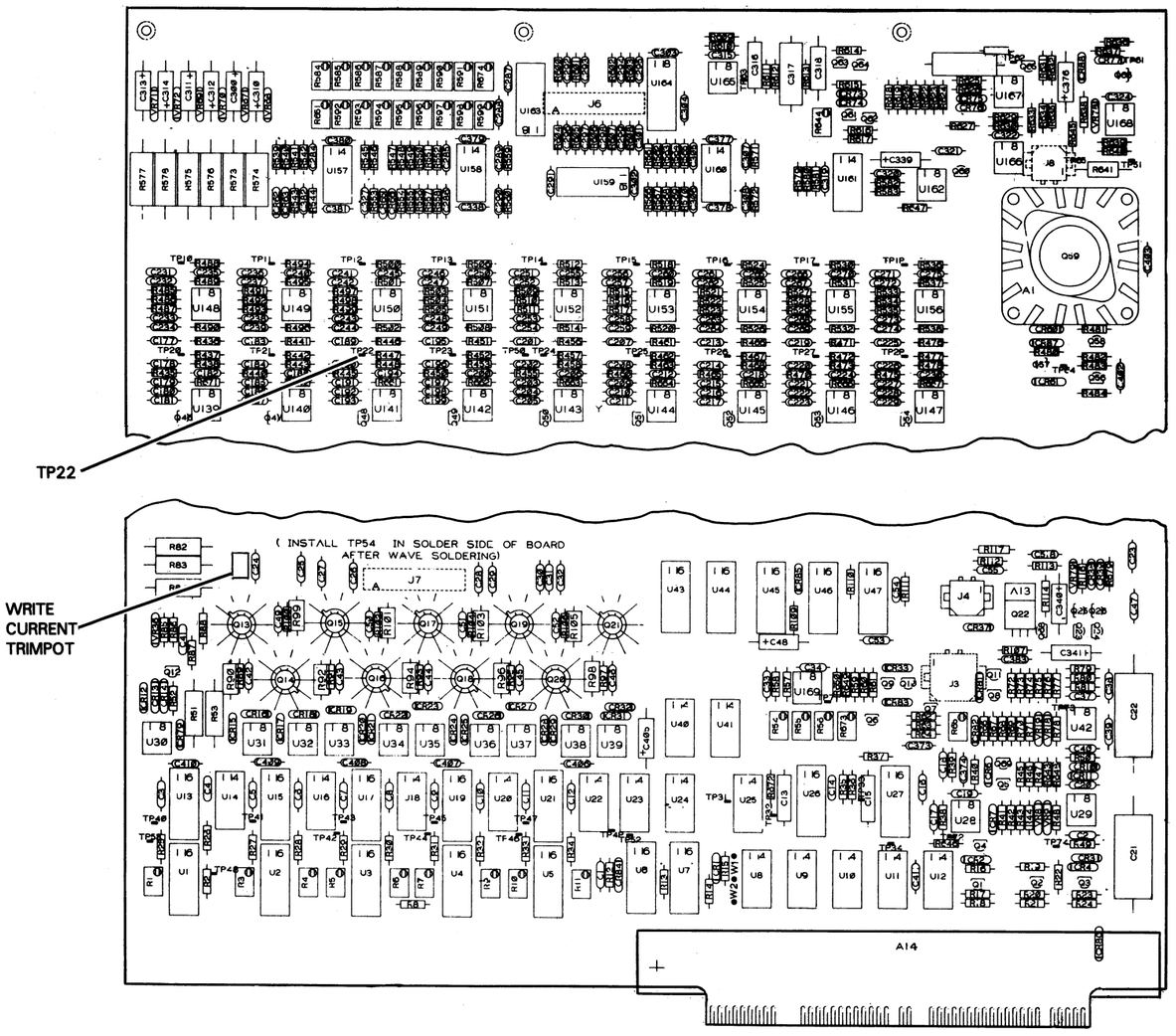
Head Alignment

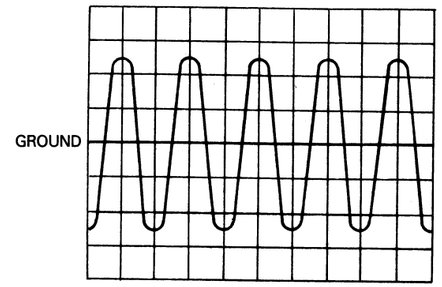
14. Set the density switch to high density and place a probe on TP-22 of the read/write board.

SCOPE SETUP

Channel 1	2.0 volts/div DC
Channel 2	N/A
Time Base	5 µs/div
Vert Mode	Channel 1
Trigger Mode	Norm
Sync	Negative
Coupling	DC
Source	Channel 1

N/A = Not Applicable





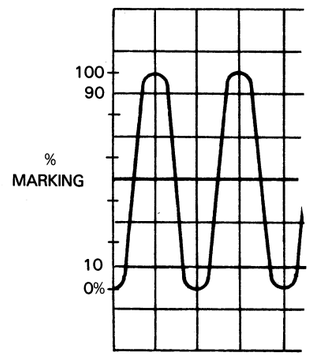
DG-05647

15. Turn the write current trimpot (R???) fully counter-clockwise. Use the command string to write all 1's and adjust the trimpot clockwise until the amplitude of the waveform is maximum.

16. When the output reaches its maximum amplitude, uncalibrate the time base so that the waveform is between the 0 and 100 percent markings on the scope.

Write current should be adjusted with care. If not, tape interchange problems will arise.

17. Turn the trimpot clockwise until the output decreases 10%.



18. Rewind the tape to BOT and unload it. Power down the drive and seal each trimpot with glyptol. Replace the vinyl head cover.

19. The following procedures must be performed after the completion of the head alignment.

1) Setting Read Gain Master Level (V-24)
2) NRZI Read Data Recovery Adjustment (V-26)

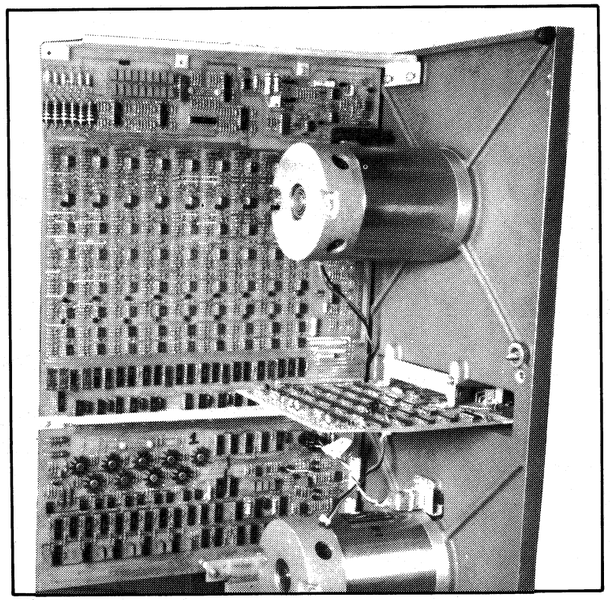
Setting Read Gain Master Level

SPECIAL TOOLS & PARTS

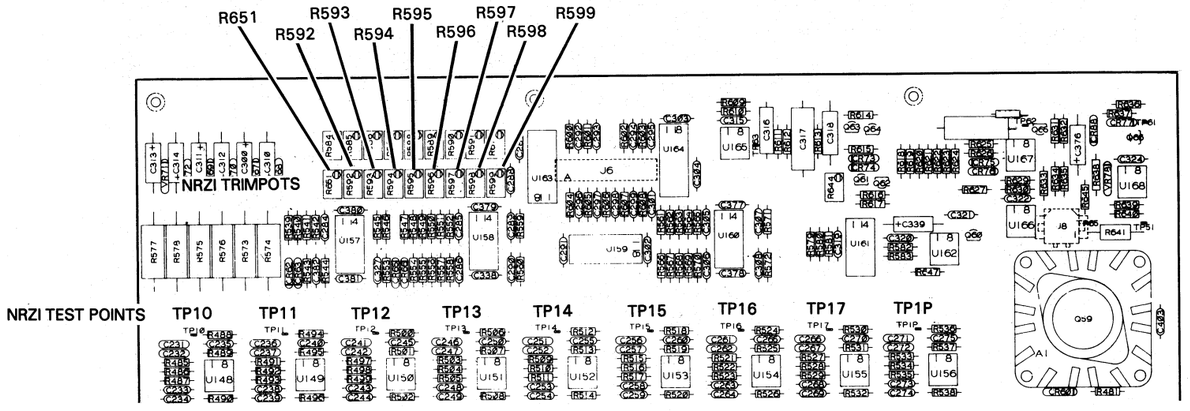
On line exercising program (095-001112)
Glyptol (120-000113)
Blank Tape (2400 ft.)

1. Mount a reel of fresh tape with a write ring on the drive. Load the tape and then swing open the casting.

2. Locate the read amplifier test points on the read/write board. Also locate their trimpots for adjusting the read gain in each channel.



PH-0169a



3.

SCOPE SETUP

Channel 1	2.0 volt/div
Channel 2	N/A
Time Base	20 µs/div
Vert Mode	Channel 1
Trigger Mode	Norm
Sync	Positive
Coupling	AC
Source	Channel 1

N/A = Not applicable

4. Place the probe on TP-10 (channel 0 for NRZI (low density). Use the command string (see Appendix C) to write all 1's. Observe the waveform on the scope.

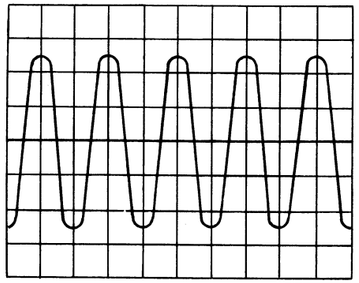
Select NRZI (low density) mode, using program control on the control panel.

TRIMPOT	TEST POINT
R651	TP-10
R592	TP-11
R593	TP-12
R594	TP-13
R595	TP-14
R596	TP-15
R597	TP-16
R598	TP-17
R599	TP-1P

Setting Read Gain Master Level

5. Adjust trimpot R651 so that the amplitude of the wave form is 10.0 volts, peak to peak.

   Repeat steps 4 and 5 for TP-11 through TP-1P and trimpots 592-599.



DG-05647

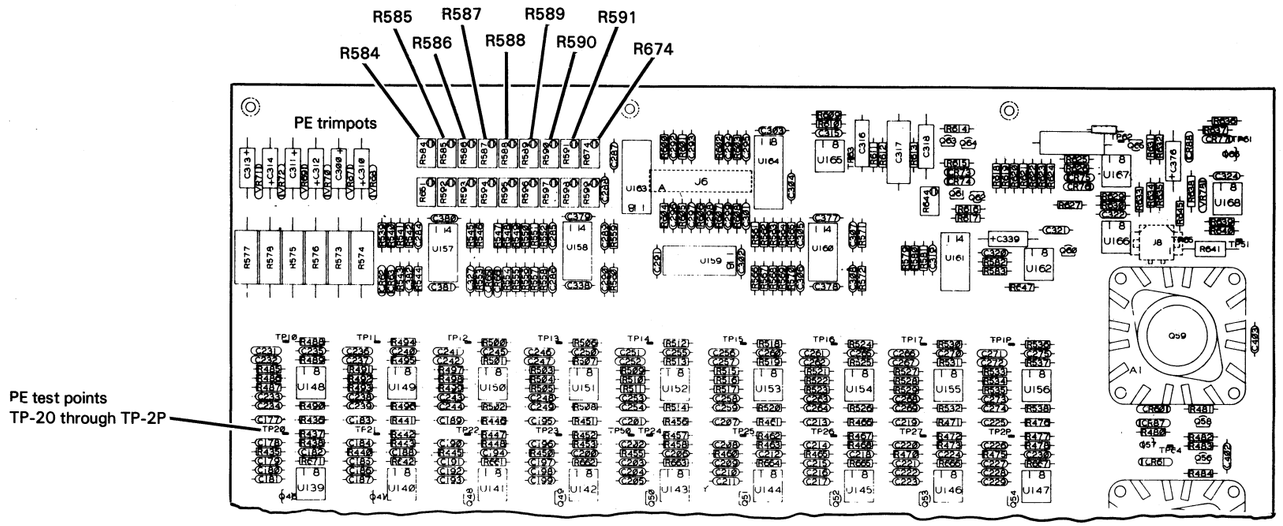
6. Change the Time Base setting to 5 us/div and place the probe on TP-20 channel 0 for PE (high density)]. Use the **command string** to write all 1's. Observe the waveform on the scope.

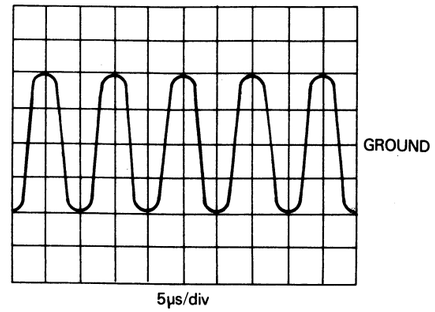
   Select PE (high density) mode, using program control or the density switch on the control panel.

7. Adjust trimpot R584 so that the amplitude of the wavefrom is 8.0 volts, peak to peak.

   Repeat steps 5 and 6 for TP-21 through TP-2P and trimpots 585-591, 674.

TRIMPOT	TEST POINT
R584	TP-20
R585	TP-21
R586	TP-22
R587	TP-23
R588	TP-24
R589	TP-25
R590	TP-26
R591	TP-27
R674	TP-2P





DG-05651

8. Rewind the tape and unload it. Power down the transport and seal each trimpot with glyptol.

NRZI Read Data Recovery Adjustment

SPECIAL TOOLS & PARTS

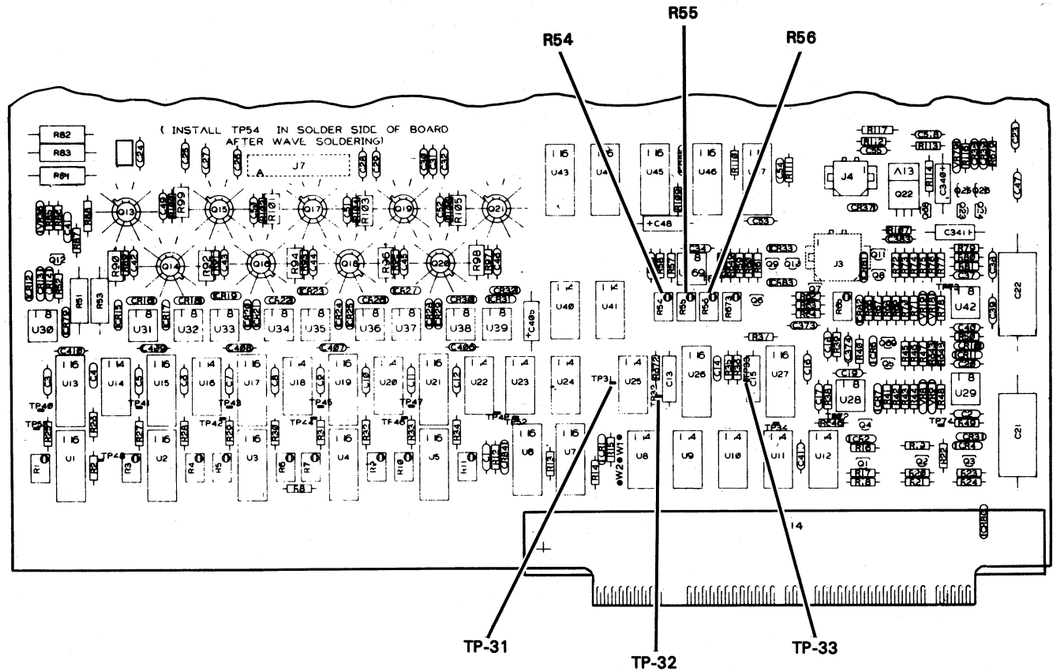
Blank Tape (2400 ft)

1. Mount and load a blank tape on the drive.
2. Swing open the casting and place Channel 1 of the scope on TP-31.

SCOPE SETUP

Channel 1	0.2 volts/div
Channel 2	N/A
Time Base	1µs/div
Vert Mode	Channel 1
Trigger Mode	Norm
Sync	Positive
Coupling	AC
Source	Channel

N/A = Not applicable



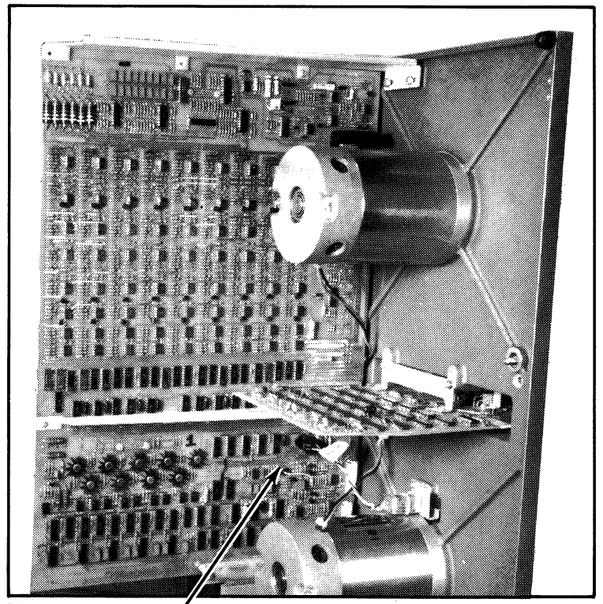
3. Use the command string (see Appendix C) to write all ones on the tape. Adjust R55 for 5.6us +/- 0.8µs.
4. Place the probe on TP-32 and adjust R54 for 11.2µs (MIN 9.0, MAX 11.5)
5. Place the probe on TP-33 and adjust R56 for 8.4µs +/- 1.2µs.
6. Rewind and unload the tape.

Reel Servo Adjustment

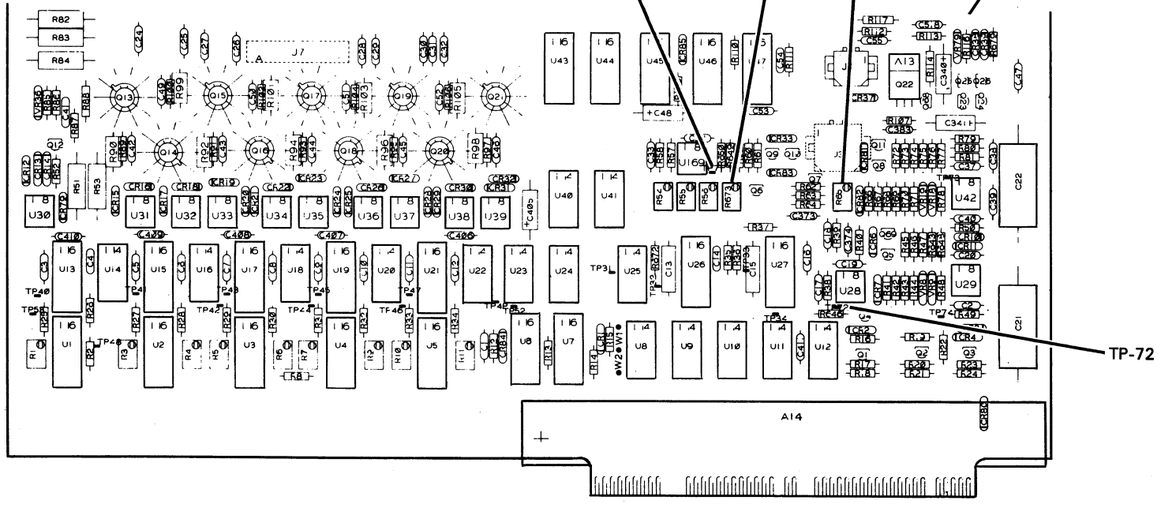
SPECIAL TOOLS & PARTS

Vacuum Gauge
(128-00789)
Blank Tape (2400 ft.)
Glyptol
(120-000113)

1. Swing open the casting and locate the two column adjustment trimpots (R65,R673), and their test points (TP-71, TP-72).



PH-0169a



2.

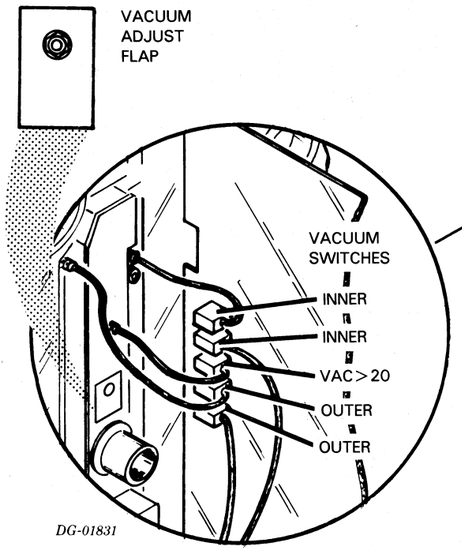
SCOPE SETUP

Channel 1	2.0 volts/div
Channel 2	N/A
Time Base	10 ns/div
Vert Mode	Channel 1
Trigger Mode	Auto
Sync	N/A
Coupling	N/A
Source	N/A

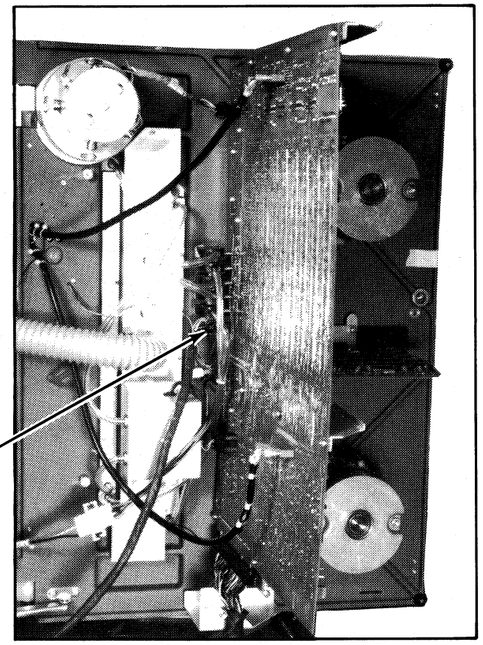
N/A Not applicable

3. Power up the drive and place a probe on TP-72. Adjust trimpot R65 for an output of 7 volts. Do the same for TP-71 and trimpot R673.

4. Mount and load a tape on the drive. Pull the vacuum hose off the VAC > 20 sensing switch after the tape reaches the BOT marker.



DG-01831



PH-0177

5. Connect the vacuum hose to the vacuum gauge. Loosen the vacuum flap retaining nut and adjust the vacuum flap for a reading of 30 inches on the gauge. Tighten the nut and reconnect the hose to the vacuum switch.

   This procedure applies to all transports, including high altitude models when the adjustment is performed on site.

   Adjust the vacuum for 38 inches of water when adjusting a high altitude drive at a low altitude site.

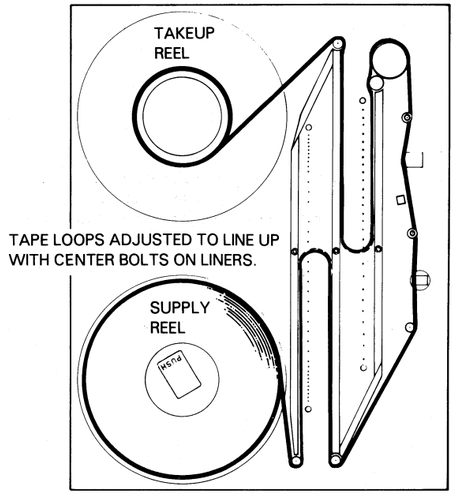
6. Adjust the column position trimpots (R65 R673), so that the two loops line up with the center bolts on the liners.

   When adjusting a high altitude model at a low altitude site, adjust the loops so there are two sensing holes above or below the center bolts on the liners.

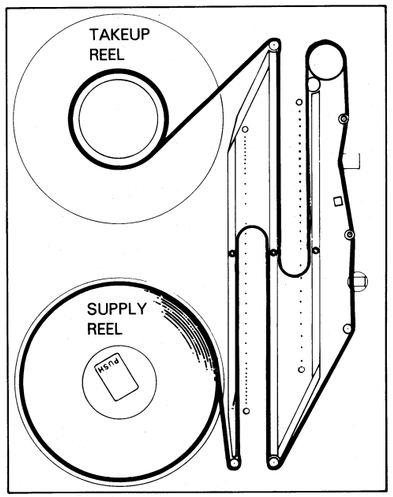
   Clean holes prior to adjustment.

   Refer to monthly Preventive Maintenance (Chapter II, step 3b.).

7. Unload the tape and power down the drive. Seal the trimpots with Glyptol.



DG-01832 Low altitude or High altitude on-site adjustment.



DG-01832 High altitude set-up at low altitude.

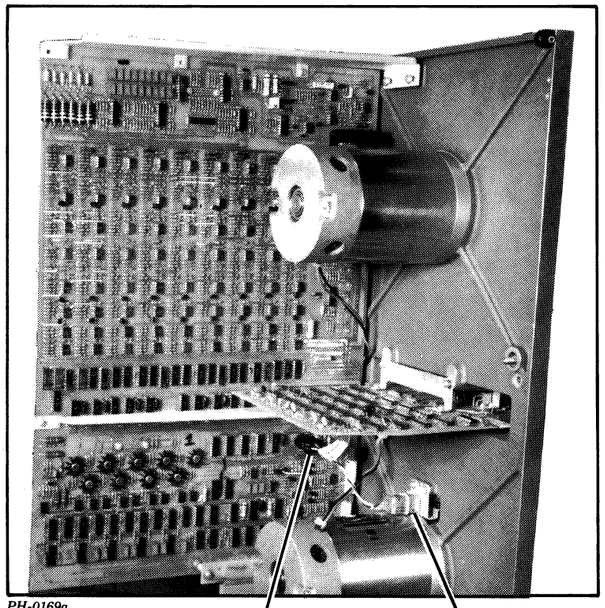
Write Lock Switch Replacement

SPECIAL TOOLS & PARTS

Write Lock Switch
(005-001754)

1. Power down the drive. Swing open the casting and unplug the write lock switch connector on the read/ write board at J-4.

2. Remove the two retaining screws that hold the switch to the casting.



PH-0169a

3. Put the new switch in place and replace the two retaining screws.

4. Plug the connector into J-4 on the read/write board.

5. Power up the drive and push in the plunger of the write lock switch. The write lock indicator on the control panel should go out.

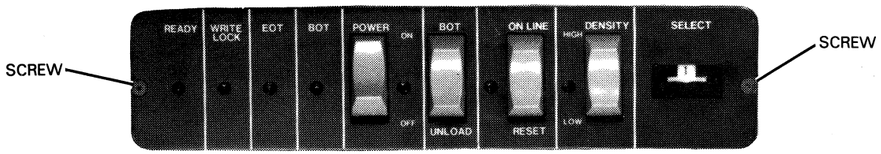
If the light does not go out, recheck the connection at J-4.

Console Board Replacement

SPECIAL TOOLS & PARTS

Console Board (005-008456)

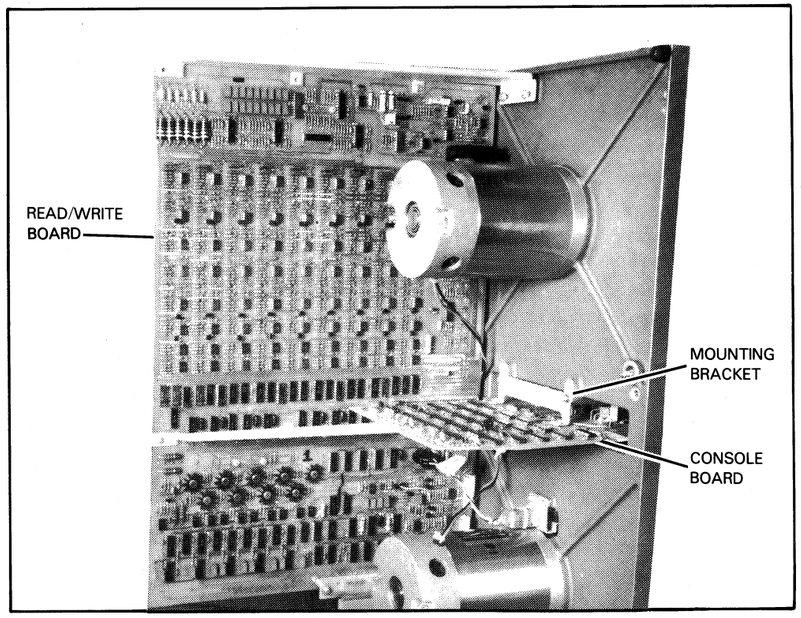
1. Power down the drive. Open the front door of the transport and remove the two console cover retaining screws.



PH-0171

2. With the console cover off, remove the two screws holding the console board to the casting.

3. Swing open the casting and remove the two screws holding the console board to its mounting bracket.



4. Pull the console board away from the read/write board and remove it through the front of the casting.
5. Take the new console board and pass it through the front of the casting. Insert the board in its connector on the read/write board.
6. Replace the two screws that hold the console board to its mounting bracket and secure the mounting bracket with two retaining screws.
7. Close the casting and replace the two screws which hold the board to the casting.
8. Replace the console cover and secure it with its two screws.

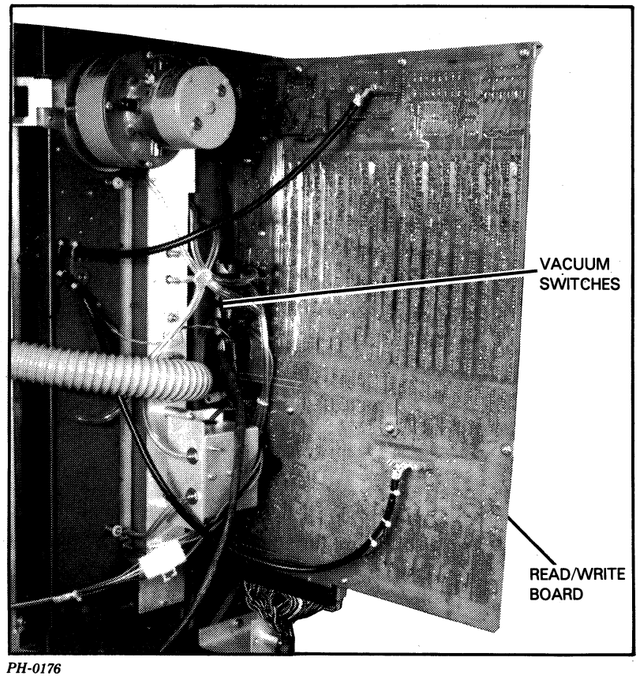
Read/Write Board Replacement

SPECIAL TOOLS & PARTS

Read/Write Board (005-008417)

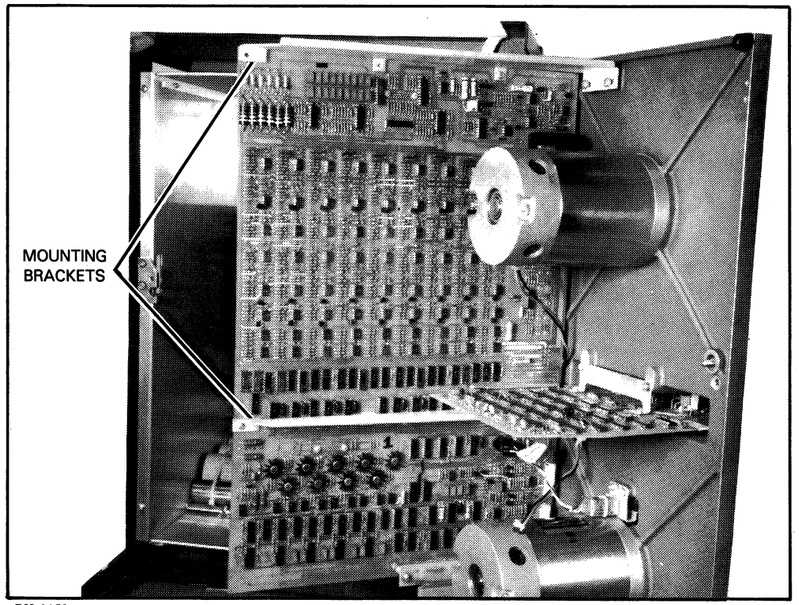
1. Power down the drive and swing open the casting.

2. Unplug (and unscrew) all the connectors attached to the read/write board. Remove the terminator if one is being used. Pull all vacuum limit switches off the board and let them hang by their tubes. Note the position of these switches for reconnecting.



PH-0176

3. Unscrew the six screws holding the read/write board to its mounting brackets and remove it from the drive.



PH-0169

4. Mount the new read/write board on its mounting brackets and secure it with its six screws.

5. Plug all the connectors back onto the read/write board and replace the terminator. Also repace the vacuum limit switches.

6. The following procedures must be performed after a new read/write board has been installed:

   1) Head Alignment (Page V-17)

   2) Eot/Bot Sensor Alignment (Page V-16)

   3) Reel Servo Adjustment (Page V-27)

   4) Adjusting Capstan Velocity (Page V-11)

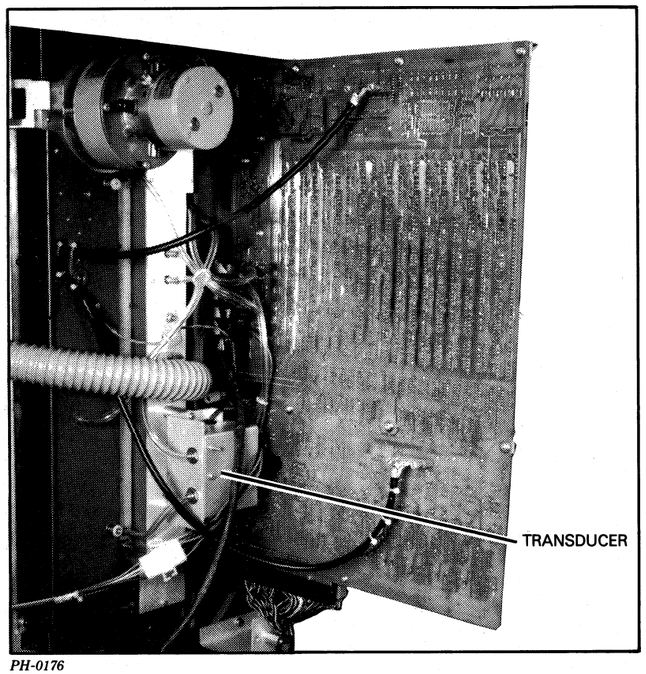
Transducer Replacement

Special Tools & Parts

Transducer (005-001761)

1. Power down the drive and swing open the casting.
2. The transducer assembly is located at the lower left hand corner of the casting. Disconnect the two tubes from the transducer and unplug the cable from the read/write board at J-3.

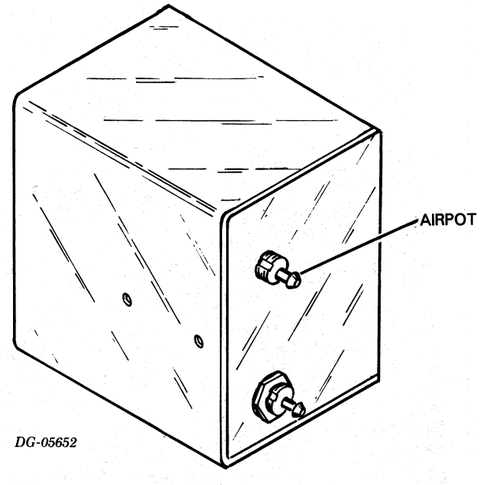
Note which tube goes to each airpot, in order to reconnect them properly.



PH-0176

3. Unscrew the two nuts holding the transducer to the casting and remove it from the drive.

4. Put the new transducer in place and tighten the two nuts.Reconnect the two tubes to their airpots and plug the transducer cable into the read/write board at J-3.



DG-05652

5. Go to the Reel Servo Adjustment (page V-27)

Power Supply Board Replacement

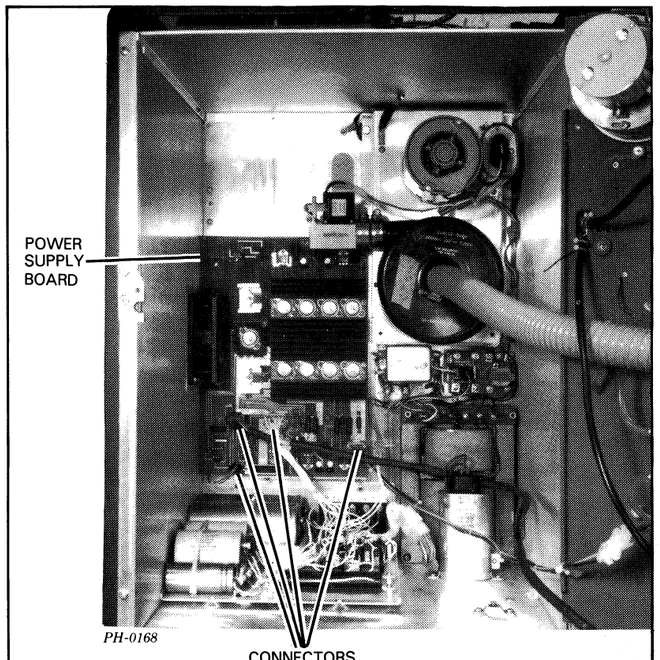
SPECIAL TOOLS & PARTS

Power Supply Board
(005-008387)

1. Power down the drive and unplug the line cord. Swing open the casting.

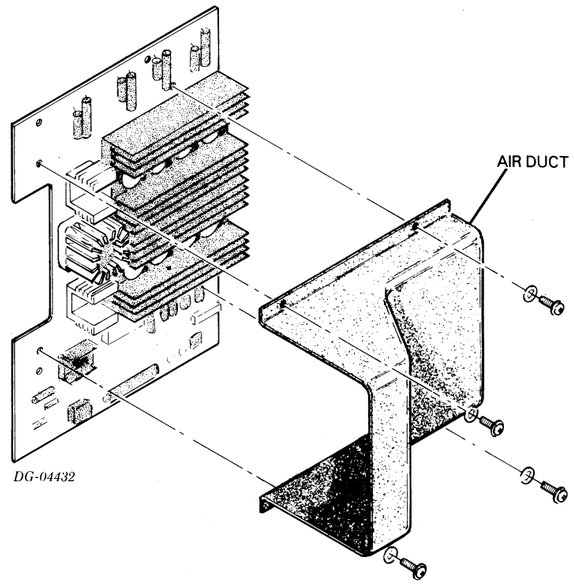
2. Unplug the connectors at P-9, P-10, P-12 and P-15 on the power supply board.

3. Unscrew the four screws holding the power supply board(along with the air duct) to its standoffs and remove the board.



PH-0168

4. Unscrew the four screws holding the heat sink air duct to the power supply board and remove the duct.



DG-04432

5. Place the air duct over the new board. Replace the four screws and tighten.

6. Place the new board in the slot of the lower support bracket against the standoffs. Insert the four retaining screws and tighten.

7. Plug the four connectors into the board.

8. Plug in the line cord.

Fan Replacement

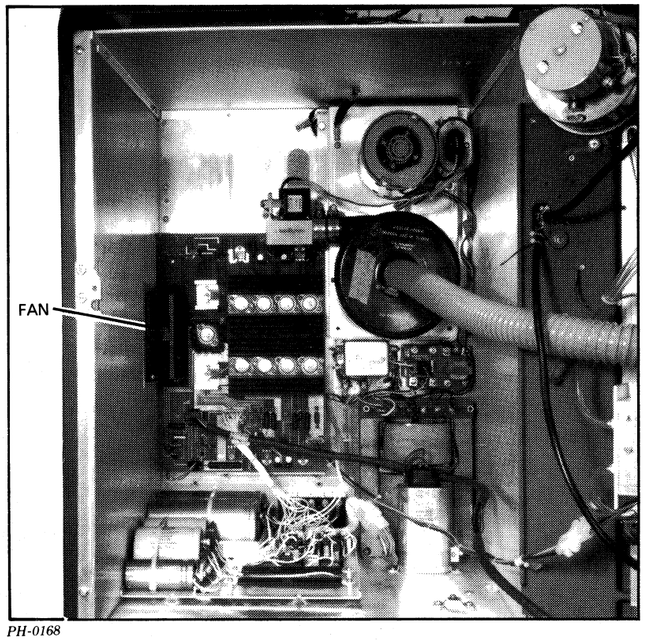
SPECIAL TOOLS & PARTS

Fan
(115-000121)

1. Go to the Power Supply Board Replacement Procedure, page **V-33**, and follow steps 1-3.

2. Disconnect the two wires from the fan.

3. Unscrew the two nuts holding the fan to the side of the enclosure and remove the fan.



PH-0168

4. Mount the new fan on the side of the enclosure and replace the two securing nuts.

5. Connect the two wires to the fan and then go to the Power Supply Board Replacement Procedure and follow steps 6-7.

Blower Assembly Replacement

SPECIAL TOOLS & PARTS

Hex, Torque calibrated screwdriver
(128-001092)

Belt
(123-001106)
(123-001107) 50 Hz High Alt.

Solenoid
(005-002495) 50 hz
(005-002497) 60 hz

Pulley
(002-006101) 50 Hz +60 Hz High Alt.
(002-006102) 60 Hz
(002-006100) 50 Hz High Alt.

Capacitor
(103-000140) 50 Hz
(103-000121) 60 Hz

Flapper Valve
[002-0009(15,16,17,25)]

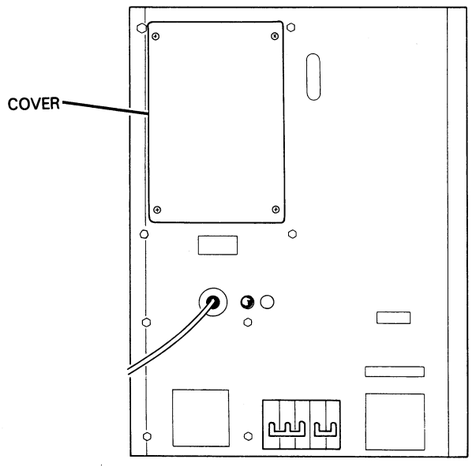
Blower
(115-000133)

Blower Motor
(005-007871) 60 Hz
(005-013877) 50 Hz

1. Power down the drive and unplug the line cord.

2. *Follow this step only if you plan to replace the belt and/or the pulley. If not, go to step 3.*

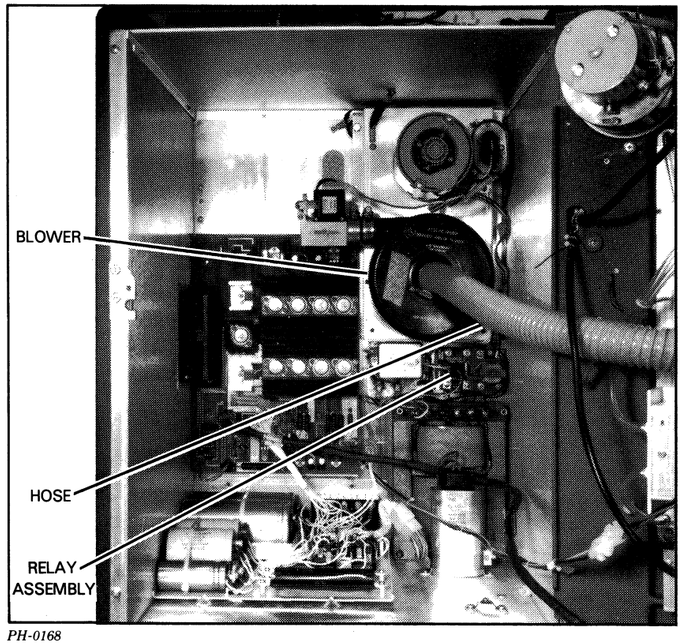
   Unscrew the four screws holding the blower access cover to the rear of the transport. Then go to **step 7** for details on replacing individual components.



DG-05688

3. Swing open the casting and unplug the connector leading to the assembly. Also disconnect the hose from the blower

4. Go to the Power Supply Board Replacement procedure. (pg. V-33), and follow steps 2-3.



PH-0168

5. Unscrew the four screws holding the transparent shield over the relay assembly & remove the shield from the drive.

6. Have an assistant hold the blower assembly and unscrew the four nuts fastening it to the transport. Remove it from the enclosure.

7. Replace necessary components below:

BELT

1) Slip the belt off the pulley and blower.

PULLEY

1) Remove the belt.

2) Unscrew the two allen screws holding the pulley to its support hub and remove the pulley.

3) Place the new pulley on its support hub and torque the screws to 50 in-lbs.

4) Replace the belt.

Do not remove pulley support hub from motor. Factory adjustment necessary.

CAPACITOR

1) Remove the boot cap on the capacitor and disconnect the wires. Note the wire locations for reconnection.

2) Loosen the screw holding the capacitor in its bracket and remove it.

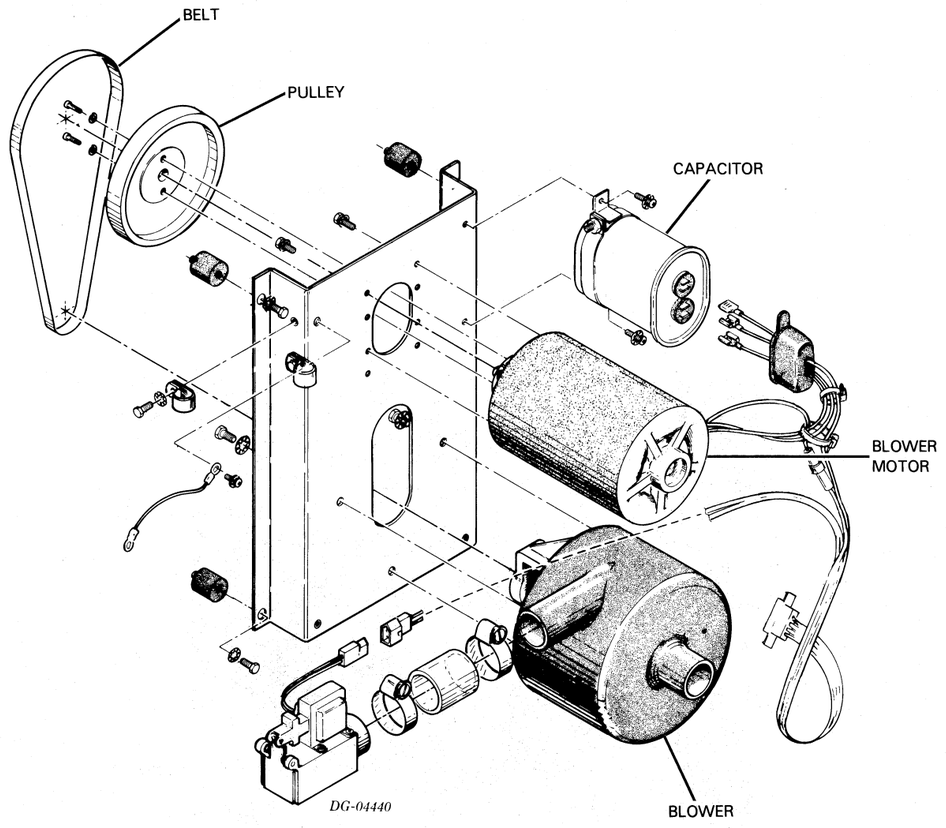
3) Place the new capacitor in the bracket and tighten the screw.

4) Reconnect the wires and slide the boot cap over them.

Blower Assembly Replacement

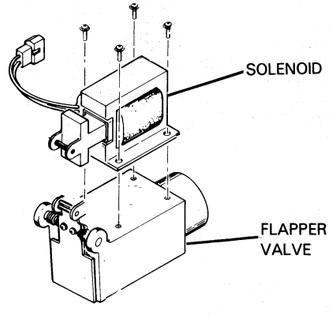
BLOWER MOTOR

1) Remove the belt and pulley.
2) Disconnect the wires to the motor and note their location for reconnection.
3) Remove the four screws holding the motor to the mounting plate.
4) Place the new motor on the mounting plate. Insert its four retaining screws and tighten.
5) Reconnect wires to the motor.
6) Replace the pulley and belt.



SOLENOID & FLAPPER VALVE

1) Unplug the solenoid connector.
2) Loosen the hose clamp fastening the flapper valve to the blower. Remove the flapper valve and solenoid from the enclosure.
3) Unscrew the four screws holding the solenoid to the flapper valve and remove the solenoid.
4) Mount the solenoid on the flapper valve. Insert the four screws and tighten.
5) Insert the flapper valve into the blower hose and tighten the clamp.
6) Plug in the solenoid connector.



BLOWER

1) Remove the belt and pulley.
2) Remove the solenoid and flapper valve.
3) Unscrew the three screws holding the blower to the mounting plate and remove it.
4) Place the new blower on the mounting plate. Insert its three retaining screws and tighten.
5) Replace the solenoid, flapper valve, pulley and belt.
6) When the defective part is replaced, put the blower assembly in the enclosure and secure it with its four nuts.
7) Reconnect all wires to the assembly and replace the access panel if it was removed.
8) Replace the Power Supply Board.
9) Replace the transparent shield over the Relay Assembly.
10) Plug in the line cord.
11) Do the Reel Servo Adjustment (page V-27).

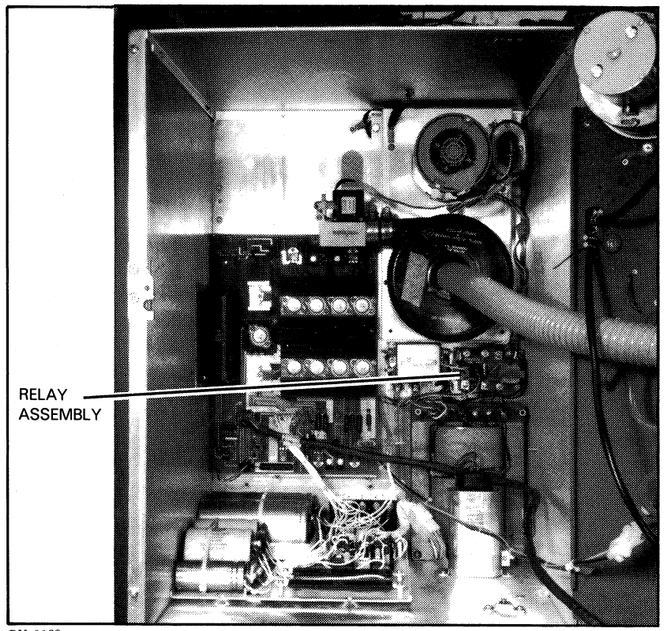
Relay Assembly Replacement

SPECIAL TOOLS & PARTS

Relay Assembly
(005-008422) 50 Hz
(005-008423) 60 Hz
Pin Removal Tool
(128-000086)

1. Power down the drive and unplug the line cord.

2. Swing open the casting and unscrew the four screws holding the transparent shield over the relay assembly and remove the shield from the drive.



PH-0168

3. Disconnect the wires from the transformer.

   Note the placement of the wires for reconnecting.

4. Go to the rear of the enclosure and unscrew the three nuts securing the relay assembly. Remove the relay assembly by rotating the top of the assembly towards the front of the drive, while pulling it towards you.

5. Thread the line cord through the large hole in the rear of the enclosure.

6. Place the new relay assembly in the drive and secure it to the back of the enclosure with its three retaining nuts.

7. Reconnect the wires leading to the transformer and the blower assembly connector. Replace the transparent shield and secure it with its four retaining screws.

8. Plug in the line cord.

Power Pan Replacement

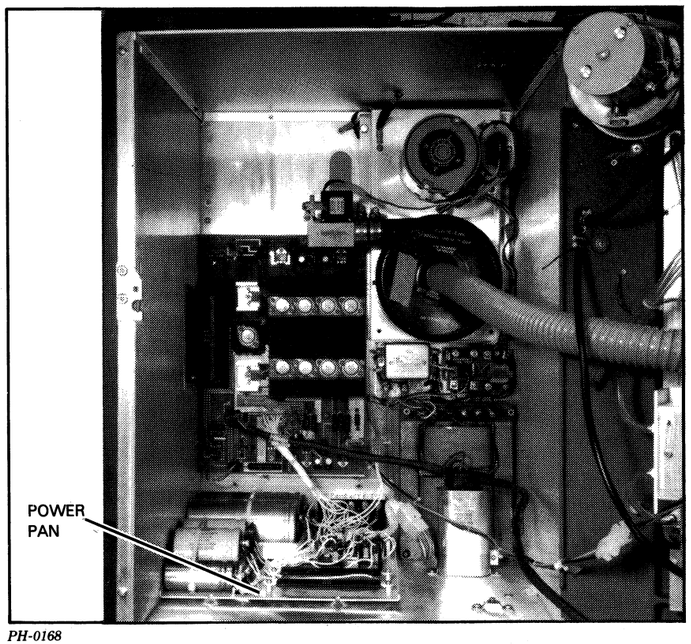
SPECIAL TOOLS & PARTS

Power Pan
(005-008125)

1. Power down the drive and unplug the line cord. Swing open the casting.

2. Unplug the connectors leading to the transformer and the power supply board.

3. Go to the rear of the drive and unscrew the screws holding the pan to the rear of the enclosure.



PH-0168

4. Go back to the inside of the enclosure and unscrew the two screws holding the pan to the bottom of the enclosure. Remove the power pan.

5. Place the new power pan in the drive. Replace the two screws which hold the pan to the bottom of the enclosure and finger tighten only. Plug in the connectors leading to the transformer and the power supply board.

6. Go to the rear of the drive and replace the two screws which fasten the pan to the rear of the enclosure and tighten. Then tighten the two screws inside the enclosure.

7. Plug in the line cord.

Transformer Replacement

SPECIAL TOOLS & PARTS

Transformer (104-000188) 60 Hz
(104-000189) 50 Hz

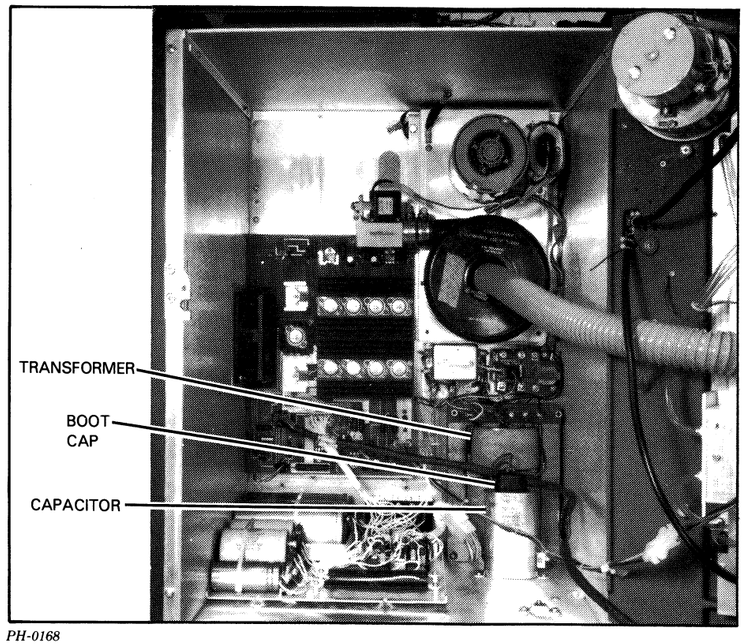
1. Power down the drive and unplug the line cord. Swing open the casting.

2. Remove the boot cap on the 6MF capacitator and disconnect the two leads. Then unscrew the two screws holding the capacitor to the enclosure and remove it.

3. Unscrew the four screws holding the transparent shield over the transformer and remove the shield.

4. Disconnect all wires running to the transformer, From the rear of the of the enclosure, unscrew the the four screws holding the transformer. Remove the transformer from the enclosure.

   It is extremely important to note the location of all the wires that are connected to the the transformer, in order that they may be properly reconnected.



PH-0168

5. Place the new transformer in the enclosure and replace the four screws that secure it. Reconnect all wires to the transformer.

6. Replace and secure the shield over the transformer.

7. Replace the 6MF capacitor and secure it to the enclosure with its two screws. Reconnect the two leads and reseat the boot cap.

8. Plug in the line cord.

APPENDIX A
PROGRAMMING INSTRUCTIONS SET

INSTRUCTIONS

Six instructions program data channel transfers to and from the tape subsystem. Three specify data transfers; the other three examine subsystem status and analyze error conditions.

The device flag commands control the subsystem Busy and Done flags as follows:

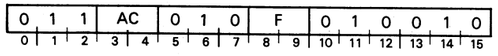
f=s	Sets Busy to 1 (except on a Rewind), sets Done to 0, and starts the current command.
f=c	Terminates any command in progress; sets the command/unit, status, and memory address registers to 0; and initializes the controller logic.
f=p	Diag. Function.
IORST	Same as Clear: and also sets the following two flags to 0: *Auto retry disable - Erase before retry disable* (enabling both features); also disables status check mode.

Instruction Coding Conventions

In the descriptions that follow, we use certain coding conventions to help you to write the instructions properly for Data General's assembler. For details, refer to the Programmer's Reference Manual for Peripherals, 015-000021.

Specify Command and Drive

DOA *[f]* *ac*, **MTA**



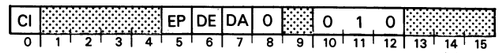
Loads the contents of the specified accumulator into the controller's command register. Accumulator bits 13-15 select the tape drive; the other bits specify a command and other functions as detailed below. The contents of the specified accumulator are unchanged. Some accumulator bits have more than one function, depending on the particular command being specified.

This instruction sends a command to the controller but does not actually start execution of the command. To start execution, issue and I/O *Start* command, typically by appending an s to the instruction mnemonic. No *Start* command is required when using this instruction to clear a status check interrupt (accumulator bit 0).

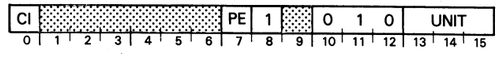
The format of the specified accumulator for various commands are as follows:

NOTE *Issue the Set Drive Mode command* only *when the specified drive is at BOT.*

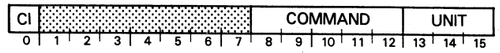
Format 1, Set control mode only



Format 2, Set control (encoding) mode only



Format 3, All other commands



Bits	Name	FUNCTION
0	CLEAR STATUS INTERRUPT	Set status check interrupt flag to 0.
1-4	---	Reserved; must be 0.
5*	ENABLE POLLING	When 1, enables subsystem to request a program interrupt if any drive's status changes.
6*	DISABLE ERASE ON RETRY	When 0, the controller issues an Erase command before it auto-retries a write failure.
7*	DISABLE AUTO-RETRY	When 0, the controller will retry up to 7 times any Read or Write operation that fails.
7**	DRIVE MODE (CODING)	Specifies PE/NRZI encoding: 0 = 800bpi (NRZI) 1 = 1600bpi (PE)
8-12	COMMAND (Bit 9 Must be zero)	0 x 000 Read 0 x 001 Rewind 0 x 010 Set Control Mode 0 x 011 Space Forward 0 x 100 Space Reverse 0 x 101 Write 0 x 110 Write EOF 0 x 111 Erase 1 x 000 Read Non-Stop 1 x 001 Unload 1 x 010 Set Drive Mode (Encoding) 1 x 011 Reserved 1 x 100 Reserved 1 x 101 Reserved 1 x 110 Reserved 1 x 111 Reserved
13-15	UNIT	Selects transport 0-7.

* *Applies only when command field (bits 8-12) is $0x010_8$, specifying a* Set Control Mode *function. See Format 2.*

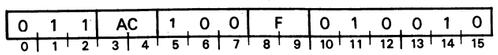
** *Applies only when command field (bits 8-12) is 1 $x010_8$, specifying a* Set Drive Mode (encoding) *function. See format 3.*

NOTE *When you use this instruction to clear a status check interrupt (bit 0 = 1), if any command is in progress you must make sure that all other bits in the accumulator are indentical to those specified for the last command. Otherwise, the controller will attempt to change commands in mid-operation, producing undefined results.*

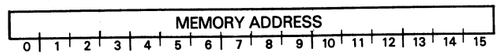
Engineering Data Sheets: MAGNETIC TAPE SUBSYSTEM
MODEL 6026

Load Memory Address Register

DOB *[f]* *ac*, **MTA**



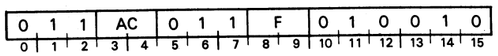
Loads the contents of the specified accumulator into the controller's memory address register. The accumulator should contain the address of the first word to be transferred to/from main memory. The format of the specified accumulator is as follows:



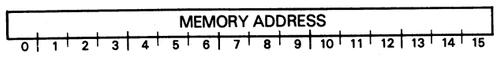
Bits	Name	CONTENTS or FUNCTION
0-15	ADDRESS	Main memory address of first word to transfer.

Read Memory Address Register

DIB *[f]* *ac*, **MTA**



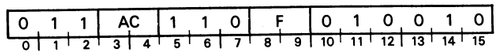
Loads the contents of the controller's memory address register into the specified accumulator. After the subsystem has completed a Read or Write operation, the contents of this register are one greater than the address of the last word transferred. The format of the specified accumulator is as follows:



Bits	Name	CONTENTS or FUNCTION
0-15	ADDRESS	Contents of the memory address register; after a transfer, this is 1 greater than the address of last word moved to/from memory Also used as a block count register for records spaced.

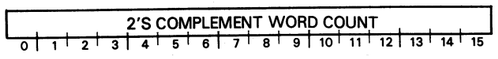
Load Word Count Register

DOC *[f]* *ac*, **MTA**



Loads the contents of the specified accumulator into the controller's word count register. When the controller executes a Read or Write command, this register should contain the two's complement (i.e., the negative) of the number of words to be transferred to or from memory. When the controller executes a Space Forward or Space Reverse command, the register should contain the two's complement of the number of records to be skipped. The format of the specified accumulator is shown below.

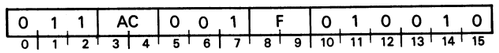
NOTE *Maximum size word count allowed is 16,384 words. It is possible, however, for a large tape to contain more than 16,384 records. Since it is convenient to locate the end of a file by issuing a spacing command with a very large word count, the value in bit 1 of the accumulator is "sign-extended" or copied into bit 0 of the controller's register. This allows for a block count of 65,536 records while spacing.*



Bits	Name	CONTENTS or FUNCTION
0-1	---	See note, above, must be 1 while reading or writing.
2-15	COUNT	The two's complement of either the number of words to transfer or the number of records to skip.

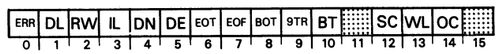
Read Status Register 1

DIA *[f]* *ac*, **MTA**



Loads the contents of the controller's status register 1 into the specified accumulator. The format of the specified accumulator is shown below.

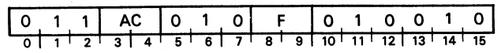
NOTE *When the controller is in Status Check mode, issue this instruction only in response to an interrupt. Otherwise, the data returned are invalid.*



Bits	Name	CONTENTS or FUNCTION
0	ERROR	At least one of these bits is 1: 1,3,5,6,7,8,10,14
1	DATA LATE	Data channel did not respond in time
2	REWINDING	Selected transport is rewinding to BOT
3	ILLEGAL	Command cannot be executed because of drive condition or because command is reserved
4	HIGH DENSITY	Always 1 for 6026 drives; For 6020 drives, density switch is in wrong position if this bit is 0.
5	DATA ERROR	Parity error or other condition not correctable by controller
6	EOT	End of tape marker detected
7	EOF	End of file code detected on Read or successfully written by Write EOF command
8	BOT	Tape is at the load point
9	9 TRACK	Must be 1; if 0, the drive is not compatible with this controller
10	BAD TAPE	Excessive signal loss, noisy gap tape format error, or runaway tape
11	---	Reserved for future use
12	STATUS CHANGED	Status change detected for a drive
13	WRITE LOCK	No write enable ring on tape
14	ODD CHARACTER	Record just read contained an odd number of bytes; Ignore bits 8-15 of the last word read
15	UNIT READY	Transport is on line and is not performing a command

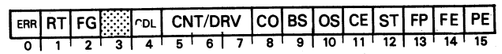
Read Status Register 2

DIC *[f]* *ac*, **MTA**



Loads the contents of the controller's status register 2 into the specified accumulator. The format of the specified accumulator is as follows:

NOTE *When the controller is in status check mode, the status read by this instruction is invalid except after an interrupt.*



Bits	Name	CONTENTS or FUNCTION
0	ERROR	At least one of these bits is 1: 2,4,9,10,11,12, or 13
1	RUNAWAY TAPE	While Reading, Writing, or spacing: no end of record detected for three seconds (18.75 ft)
2	FALSE GAP	Temporary loss of signal on all 4racks during any read or read-after-write, or extraneous signal detected within inter-record gap
3	---	Reserved for future use
4	CORRECTED DATA LATE	Data late encountered and corrected during an auto-retry
5-7	RETRY COUNT/ DRIVE CHANGED	If no status check interrupt occurred, this is the number of retries attempted. If a status check interrupt occurred, this is the unit number of the drive that changed status
8	WORD COUNT OVERFLOW	Record length exceeded word count
9	BAD SIGNAL	If in PE mode, indicates a multiple track failure. If in NRZI mode, signal written below threshold level
10	OVERSKEW	Excessive tape skew during write
11	CHECK ERROR	Vertical parity, LRC, or CRC error
12	SINGLE TRACK ERROR	(PE mode only) correctable single track failure encountered and correction attempted
13	FALSE POSTAMBLE CRC ONLY	In PE mode, the postamble was not properly recognized; In NRZI mode, the CRC checkword did not match the data
14	FORMAT ERROR	Bad ID burst (PE only), or encoding mode of drive different from tape
15	PE Mode	Drive switched to PE mode

APPENDIX B
BOOTSTRAP AND RESTART PROCEDURES

BOOTSTRAP PROCEDURES

Loading DTOS From Magnetic Tape

1. Power up processor and mag tape drive.
2. Set SELECT switch on tape drive to unit 0.
3. Press RESET switch on tape drive.
4. Remove write-enable ring from tape; load and thread tape.
5. Press BOT,then ON LINE switches on tape drive.
6. Perform following steps when system does not have Program-Load option. Otherwise, skip to step 7. (NOTE: DTOS only loads from magnetic-tape drive which has primary device code.)

   a. Toggle following octal values into specified memory locations through console data switches 0-15.

Location	Input
000376	060122
000377	000377

   b. Put 000376 (octal) on console data switches 0-15.

   c. Press RESET, then START switches on console.

   d. Go to step 8.

7. Perform following steps when system has Program-Load option.

   a. Put 100022 (octal) on console data switches 0-15.

   b. Press RESET switch on console.

   c. Press PROGRAM LOAD console switch.

8. Observe following message DTOS displays when loaded correctly.

   TOP OF MEMORY = XXXXX
   DTOS REV XX.XX

9. Input any desired DTOS command when DTOS prompts with asterisk (*).

Loading DTOS From Disk or Diskette (except for microNOVA)

1. Power up processor and disk or diskette drive.
2. Insert disk cartridge, pack, or diskette into drive assigned logical unit 0.
3. Recalibrate the drive as follows.

   for 6060/6061 disk drives:

   Press RESET switch on console.

   for diskette:

   a. Open and close drive door.

   b. Observe that READY and TRACK 0 lights are on.

   for other disk drives:

   a. Toggle following octal values into specified memory locations through console data switches 0-15.

Location	Input
000000	063033 (for primary device) 063073 (for secondary device)
000001	065333 (for primary device) 065373 (for secondary device)
000002	063077
AC0	000000
AC1	001400

   b. Put 000000 (octal) on console data switches 0-15.

   c. Press RESET then START switches on console.

4. Perform following steps when system does not have Program-Load option. Otherwise, skip to step 5.

   a. Toggle following octal values into specified memory locations through console data switches 0-15.

Location	Input	
	For 6060/6061 (in M/600 only)	For Other Disks
000376	060127 (primary) 060167 (secondary)	060133 (primary) 060173 (secondary)
000377	000377	000377
AC0	000056 (primary) 000156 (secondary)	000066 (primary) 000166 (secondary)

   b. Put 000376 (octal) on console data switches 0-15.

   c. Press RESET then START switches on console.

   d. Go to step 6.

5. Perform following steps when system has Program-Load option.

   a. Put following octal value on console data switches 0-15.

   100033 (for primary device)
   100073 (for secondary device)

   b. Press RESET switch on console.

   c. Press PROGRAM LOAD console switch.

6. Observe following message DTOS displays when loaded correctly.

   TOP OF MEMORY = XXXXX
   DDOS REV XX

7. Input any desired DTOS command when DTOS prompts with asterisk (*).

RESTART PROCEDURE

Following is the restart procedure for all systems except microNOVA. Use this procedure when diagnostic program was loaded with any DTOS command except LOAD, DEBUG, or QUIT.

1. Put following octal value on console data switches 0-15.

Input	When maximum memory size is:
007777	4K
017777	8K
027777	12K
037777	16K
047777	20K
057777	24K
067777	28K
077777	32K or greater

2. Press START switch on console.

APPENDIX C
SWITCH OPTIONS, COMMANDS, AND ERROR PRINTOUT

SWITCH OPTIONS, DIAGNOSTICS

SWITCH	OCTAL VALUE	BINARY VALUE	INTERPRETATION
1	40000	0	Loop on error
		1	Do not loop on error
2	20000	0	Print to console
		1	Do not print to console
3	10000	0	Do not print failure rate
		1	Print failure rate
4	04000	0	Print end of pass
		1	Do not print end of pass
5	02000	0	Do not print to the line printer
		1	Print to the line printer
6	01000	0	Do not halt on an error
		1	Halt on an error
7	00400	0	Do not print summary and/or passing of subtests
		1	Print summary and/or passing of subtests
8	00200	0	Print only the first error
		1	Print all errors

Bits 9-15 reserved for future use.

ERROR PRINTOUT

When an error occurs, the program displays the four accumulators and the value of the program counter at the time of the error. The significance of this information is explained in the listing. Generally, the ACs contain the following whenever possible:

AC0 Actual data

AC1 Expected data

AC2 Loop counter

AC3 The address from which the failing subroutine was called.

RELIABILITY SWITCH OPTIONS

SWITCH	OCTAL VALUE	BINARY VALUE	INTERPRETATION
2	20000	0	List all summaries and printouts
		1	Inhibit all summaries and printouts
5	02000	0	Do not output to LPT
		1	Output to LPT
9	00100	0	Erase hard write errors
		1	Do not erase hard write errors
10	00040	0	Do not print hard errors
		1	Print hard errors
11	00020	0	Print summaries at EOT
		1	Do not print summaries at EOT
12	00010	0	Print write parity errors
		1	Do not print write parity errors
13	00004	0	Print read parity errors
		1	Do not print read parity errors
14	00002	0	Print data compare errors
		1	Do not data compare errors
15	00001	0	Enable auto retry mode
		1	Disable auto retry mode

SWITCH COMMANDS

Once the program is running, the state of any bit may be changed by typing keys 1-9, and A-F for bits 10-15. The program will continue running after updating the options. Each key typed complements the bit assigned to it. Typing a 0 locks the program into switch modification mode so more than one bit at a time may be changed. A "CR" must be typed after this command so that control is allowed to return to the main program.

OTHER COMMANDS

"CR"	A carriage return continues the program after it is locked in the switch mode.
Ctrl.D	Resets the switch register to a zero and restarts the program at 200.
Ctrl.R	Restarts the program and retains the present switch settings.
Ctrl.O	Keeps program switch register set to current value and enters Octal Debugger Tool (ODT) program, if diagnostic program currently running uses ODT. The octal number displayed after entering ODT, is the address of instruction which executes upon exit from ODT.
M	Prints the current operating modes selected by the switches.

The user determines several other operating modes at the beginning of the program by answering requests output to the console.

Engineering Data Sheets: MAGNETIC TAPE SUBSYSTEM
MODEL 6026

RELIABILITY TEST LOOP

Mount and load the 6026 reliability tape (095-001112)

Set the CPU control panel switches to 100022.

Press Stop and Reset, then press Program Load.

Reset the switches to 000505 and press the start switch.

The program will respond with

UNIT:??

Type in the unit # with a carriage return (CR). The program will respond with

TAPE MODE:??

Type in either NRZI or PE with a carriage return. Type a CR to preserve the present mode. The program will then respond with

WC:??

Type in the word count (from 2 to 37777_8), depending on available memory size, followed by a CR. The program will then respond with

DATA:??

Type in one of the following data messages listed below with a CR.

DATA MESSAGE	MEANING
ALL 1	All ones
ALL 0	All zeros
ALT 0	Alternating zeros and ones starting with zeros
ALT 1	Alternating ones and zeros starting with ones
RAN	Random data
SEL	Puts in two-word selected pattern of your choice (6 bits per word)

In SEL mode up to 8 words may be typed in with each separated by a space or comma. A minimum of 2 words is required. Type a carriage return to terminate data input.

If the program is restarted, you can execute the previous command string by typing a CR when it asks for UNIT. If you type a CR for DATA, the data will be used from the previous command string.

COMMANDS

COMMAND	MEANING (N = NO. OF RECORDS OR SPACES)
REA	Read N
REW	Rewind
WRI	Write N
ERA	Erase
LOO	Loop
SPA FOR	Space forward N
SPA BAC	Space backward N
WRI EOF	Write EOF
REA EOF	Read EOF
	LOOP BACK TO THIS POINT IN THE COMMAND STRING.

Sample Command String

REW, WRI 10, REW, REA 10, SPA BAC 10, LOO

This routine will rewind, write 8 records, rewind read 8 records, backspace 8 records continually. Type a space character on the TTY to print status.

Spaces or a comma may be used as an argument delimiter. The command string is terminated by typing a carriage return. If a command string requires two lines, type a linefeed to advance to the next line.

The * command allows looping on any section of the command string between the asterisk and the command loop. A sample of the typing format for these commands are as follows:

REW ERA *REW WRI 10 REW REA 10 LOO

The sample command string above will rewind and erase once, and then rewind, write 8 records, rewind, read 8 records and loop continuously.

The asterisk (*) may be set between delimiters anywhere in the command string.

THE ESCAPE CHARACTER IS USED TO TERMINATE A LOOP COMMAND STRING.

THE PROGRAM WILL EXIT TO RESTART IN LOOP BUILDER ROUTINE, IF CURRENT LOOP TEST REACHES EOT MARKER ON TEST TAPE.

PRINT UNIT ERROR LOG

Each online unit's accumulated error log may be printed and/or cleared by teletype request as listed below.

Type a space to print all accumulated errors.

Type an ESC character to abort the present test. The program is restarted at the beginning of the initiated section.

Typing an R character when in command string aborts the existing program operation and initiates program control at the statement requesting the unit number.

STATUS INSTRUCTIONS

DIA Reads basic drive status as described below.

DIB Reads the host memory address for the next data transfer.

DIC Reads extended drive status as described below.

The DIA status bits are as follows.

BIT	STATUS CONDITION
0	Error
1	Data Late
2	Rewinding
3	Illegal
4	High Density
5	Parity Error
6	End of Tape
7	End of File
8	Beginning of Tape
9	9-Track
10	Bad Tape
11	Spare
12	Polling Interrupt
13	Write Lock
14	Odd Character
15	Unit Ready

The DIC status bits are as follows.

BIT	STATUS CONDITION
0	Error
1	Runaway Tape
2	False Gap
3	Spare
4	Corrected Data Late
5,6,7	Number of Retries
8	Record Word Count
9	Bad Signal
10	Overskew
11	Check Error
12	Single Track Error
13	False Postamble
14	Format Error
15	PE Mode

APPENDIX D
RELATED PARTS AND DOCUMENTATION
CRITICAL TORQUES

RELATED PARTS & DOCUMENTATION

The following is a list of Data General publications, tools, parts, and drawings dealing with the 6026 tape transport.

001-001128 SCHEM TP DR CVT P/S
001-001157 SCHEM DUAL MODE CSL BD
001-001158 SCHEM DUAL MODE R/W BD
001-001160 SCHEM RELAY PCB TP DR
001-001175 SCHEM DMMT CTLR
001-001320 SCHEM DMMT TERMINATOR
005-000231 ASSY INT CLB
005-000386 ASSY CA INT MTU
005-000411 ASSY CA INT MTU
005-001754 ASSY WRITE LOCK SW
005-001757 ASSY SUPPLY HUB
005-001761 ASSY TRANSDUCER TAPE DRIVE 75 IPS
005-001792 ASSY CA INT POWER SUPPLY SEC
005-001795 ASSY CA INT TRANSDUCER
005-001802 ASSY CA INT GP PD BD N2
005-002208 ASSY CABLE EXTERNAL ADPT-CONT
005-002354 ASSY EOT-BOT SENSOR 75 IPS TP DR
005-002495 ASSY SOLENOID ASSY 50HZ 75 IPS TD
005-002496 ASSY REEL MOTOR ASSY 75 IPS TD
005-002497 ASSY SOLENOID ASSY 60 HZ 75 IPS TD
005-003091 ASSY CAPSTAN MOTOR & CA 75 IPS TP DR
005-003924 ASSY MTG HDW 75 IPS TP DR 6020-3
005-007871 ASSY MOTOR, BLOWER
005-013877 ASSY PWR PAN CVT P/S
005-008126 ASSY BLOWER (FLAT BELT) 60HZ
005-008132 ASSY BLOWER (FLAT BELT) 50HZ
005-008133 ASSY BLOWER (FLAT BELT) 60HZ HI ALT
005-008134 ASSY BLOWER (FLAT BELT) 50HZ HI ALT
005-008383 ASSY AC LINE CORD CVT TP DR 50HZ
005-008384 ASSY AC LINE CORD CVT TP DR 60HZ
005-008385 ASSY TP DR RELAY PCB TSTD
005-008387 ASSY TP DR CVT P/S PCB TSTD
005-008413 ASSY CSTG TP DR 75 IPS
005-008417 ASSY DUAL MODE R/W PCB TSTD
005-008422 ASSY AC WIRING AND RELAY 50HZ
005-008423 ASSY AC WIRING AND RELAY 60HZ
005-008456 ASSY DUAL MODE CSL BD TSTD
005-008480 ASSY AC WRG CVT TP DR
005-008481 ASSY FAN CA CVT TP DR
005-008483 ASSY PWR PAN/XFMR HARN CVT TP DR
005-008484 ASSY PWR PAN INT CA CVT TP DR
005-008485 ASSY P/S PCB TO RELAY CA CVT TP DR
005-008486 ASSY P/S PCB TO REEL MTR CA CVT TP DR
005-008487 ASSY PWR PAN TO PCB HARN CVT TP DR
005-008492 ASSY TRANSDUCER FLEXURE & CABLE
005-008504 ASSY XFMR JMPR KIT CVT TP DR
005-008573 ASSY MAIN DMTD 50HZ HI ALT
005-008574 ASSY MAIN DMTD 50HZ
005-008575 ASSY MAIN DMTD 60HZ HI ALT
005-008576 ASSY MAIN DMTD 60HZ
005-008580 ASSY FRONT DOOR TAPE DECK
005-008581 ASSY DOC PKG DMT
005-008582 ASSY TAPES AND MANUALS
005-008584 ASSY PCB DUAL MAG TP CONT TSTD
005-008600 ASSY RESISTOR PREP 25 OHM 5W
005-008601 ASSY RESISTOR PREP 150 OHM 5W
005-008672 ASSY DMTD TERMINATOR TSTD
005-009099 ASSY RESISTOR PREP 300 OHM 3W
005-009301 ASSY LINE FILTER TO PCB CABLE
005-009302 ASSY XFMR TO BLOWER CABLE
005-009306 ASSY A/C WIRING JUMPER KIT DMTD 50HZ
005-009845 ASSY ENCL 60HZ DMTD
005-009846 ASSY ENCL 60HZ HI ALT DMTD
005-009847 ASSY ENCL 50HZ DMTD
005-009848 ASSY ENCL 50HZ HI ALT DMTD
005-009879 ASSY COVER, VACUUM COLUMN
005-009964 ASSY PADDLE BOARD (40 WIRE CABLE)

008-000028 WL CA INT MAG TP N/SN 4030
008-000077 WL CA INT MTU 8/12 4030
008-000426 WL CA INT GP PD BD N2
008-000433 WL CA INT VACUUM MOTOR & BLOWER
008-000434 WL CA INT WRITE LOCK SWITCH
008-000435 WL CA INT POWER SPLY SEC
008-000436 WL CA INT EOT-BOT
008-000440 WL CA INT CAPSTAN & TAC
008-000441 WL CA INT TRANSDUCER
008-000533 WL CA EXT VAC COL TAPE UNIT 800/1200
008-000534 WL CA EXT VAC COL TAPE UNIT 820/1220
008-002037 WL P/S PCB TO REEL MOTORS CVT TP DR
008-002038 WL P/S PCB TO RELAY CVT TP DR
008-002039 WL PWR PAN TO PCB HARN CVT TP DR
008-002040 WL PWR PAN/XFMR HARN CVT TP DR
008-002041 WL PWR PAN INT CA CVT TP DR
008-002042 WL AC WIRING CVT TP DR
008-002063 WL CA FAN CVT TP DR

010-000197 CONF 6026 TAPE SS (INSTL DATA SHEET)

015-000021 TM PERIPHERALS PROGRAMMERS
015-000079 TM 6026 TAPE TRANSPORT
015-000081 TM 6026 TAPE CONTROLLER

016-000439 IPL RELAY PCB TAPE DRIVE
016-000451 IPL P/S TAPE DRIVE CVT
016-000477 IPB BREAKDOWN DUAL MODE TAPE DRIVE
016-000547 IPL DUAL MODE CONSOLE BD
016-000606 IPL CONTROLLER BD DMTD
016-000607 IPL READ/WRITE PCB DMTD
016-000608 IPL PADDLE BD DMTD

095-001112 DIAG AB DUAL MODE MAG TAPE DRIVE RELI

096-001112 DIAG LS DUAL MODE MAG TAPE DRIVE RELI

103-000121-CAP 12.5 MFD348-392 VAC 60 Hz
103-000140 CAP 15MFD 200-365 VAC 50 Hz
103-000259 CAP 6.0000MF 660V NOM (GE45F608)

104-000188 XFMR FERRO-RES MMC-5752-1 60 Hz
104-000189 XFMR FERRO-RES MMC-5807-1 50 Hz

107-000716 ARTWORK PCB P/S TP DR CVT
107-000742 ARTWORK DUAL MODE CSL BD
107-000785 ARTWORK DUAL MODE R/W
107-000826 ARTWORK DUAL MODE MAG TAPE CONTROLLER
115-000121 BLOWER, TUBE-AXIAL 4 11/16" (FAN)
115-000133 BLOWER, CONDENSER 230V

*117-000142 SPC TOOL SHEAVE ADJ GAUGE
*117-000202 SPC TOOL SUPPLY HUB ADJUSTMENT GAGE
*117-000267 SPC TOOL GA, TP HUB GO-NO-GO

*118-000298 PUR ASSY PRPHL 600' SKEW TAPE A600
118-000692 PUR ASSY 9 TRACK DUAL MODE HARD COATED

*120-000102 VC-3 VISCOUS COATING 30/CC BOTTLE
*120-000113 GYLPTOL INSULATING PAINT
*120-000152 DUPONT SLIPSPRAY #611N 7 OZ CAN
123-000259 STD PT TAKE UP REEL 10 1/2" #5198-GS
123-000282 STD PT TAPE CLEANER, APPLIED #25083
*123-000290 STD PT SHIM STK, .001THK .5W X 2.0L SST
*123-000291 STD PT SHIM STK, .002THK .5W X 2.0L SST
*123-000292 STD PT SHIM STK, .003THK .5W X 2.0L SST
123-001106 STD PT BELT, ENDLESS SEMI-ELAST 50/60

*128-000086 TOOL MOLEX EXTRACTION
*128-000205 TOOL EXTRACTION MR CONT AMP #453258-1
*128-000255 SPEC TOOL TORQUE WRENCH 99001
*128-000787 TOOL BELT TENSION GAUGE 0755-0101
*128-000789 TOOL 6020 VACUUM TESTER FAB02
*128-000809 TOOL MICROMETER 0" TO 1"
*128-001092 TOOL TORQUE WRENCH 1/4" DRRD1-100

*These tools and parts are required to perform all the field service procedures in this manual.

CRITICAL TORQUES

Capstan/Tachometer Assembly to Casting	35 in-lbs.
Head Assembly to Casting	10 in-lbs.
Head Tape Guide to Casting	8 in-lbs.
Hub Cover Plate to Take Up Hub	10 in-lbs.
Liners to Casting	20 in-lbs.
Pulley to Pulley Support Hub	50 in-lbs.
Push-Lock Mechanism to Supply Hub	10 in-lbs.
Reel Motor to Casting	35 in-lbs.
Rolling Tape Guide to Casting	8 in-lbs.
Take Up/Supply Hub to Taper Lock	30 in-lbs.
Tape Cleaner to Casting	5 in-lbs.

GLOSSARY OF TERMS

Azimuth -the angle of tilt from a vertical line. The recording head must be adjusted to align it perpendicular to the tape.

Bit -a binary unit of information. A bit can assume two values, zero or one.

BOT -begining of tape. A reflective marker denotes the start of the recording area on the tape.

BPI -bits per inch. The density of bits on the recorded tape.

Byte -a character of information containing eight bits.

Capstan -a wheel that moves the tape backward or forward across the recording head.

CVT -constant voltage transformer. A transformer that automatically regulates its secondary voltages over a range of line voltages and loads.

Deskew -an electronic method for eliminating skew.

DTOS -diagnostic tape operating system

EOT -end of tape. A refelective marker denotes the end of recording area on the tape.

High Density -1600 bits per inch. Refers to the density of the bits encoded on the tape.

IPS -inches per second. Refers to the speed of tape movement.

Load -pull tape into vacuum columns and advance the tape to BOT.

Low Density -800 bits per inch. Refers to the density of the bits encoded on the tape.

NRZI -non return to zero inverted. A method of encoding data that records ones as flux reversals.

Online -connected to and controlled by the controller.

PE -phase encoded. A method of encoding data that records "ones" and "zeros" as flux reversals of opposing polarity.

Relay -a device in one circuit, used to control or enable operation of another circuit.

Rewind -return the tape to the BOT position.

R/W head -read/write head. Used to read or write encoded data.

Servo -a unit that positions a mechanical device in response to an electrical signal.

Skew -deviation of recorded information from a straight line perpendicular to the tape.

Threshold -the voltage level a signal must exceed to be considered valid.

Transducer -a device that converts mechanical position to an electric signal.

Unload -return the tape to BOT, shut down the vacuum system and pull the tape out of the vacuum columns.

Unwind -wind the tape onto the supply reel.

Write lock -disable the write circuitry by removing the write ring from a reel of tape.