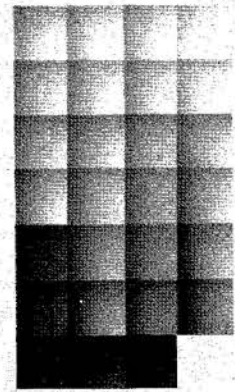


DOUBLE-SIDED DOUBLE DENSITY FLEXIBLE DISK DRIVE M2894-63 MAINTENANCE MANUAL

Maintenance Manual	TJ2-G4124B
Technical Manual	TJ2-G4135B
Illustrated Parts List	TJ2-G4138B
Schematics and Logic Manual	TJ2-G4131-F
Packing Procedure	TJ2-G4149B





MAINTENANCE MANUAL

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1. INTRODUCTION

This manual describes the operation, maintenance, and adjustment of the M2894-63 Double-Sided, Double-Density 8 inch Flexible Disk Drive.

2. RELATED DOCUMENTS AND DATA

SJ2-G3332	M2894-63 Standard Specification
TJ2-G4131	Logic Manual
TJ2-G4135	Technical Manual
TJ2-G4138	Illustrated Parts List
TJ2-G4149	Packing Procedure
TJ2-G4141	M2894-63 Maintenance Parts List

3. MAJOR COMPONENTS

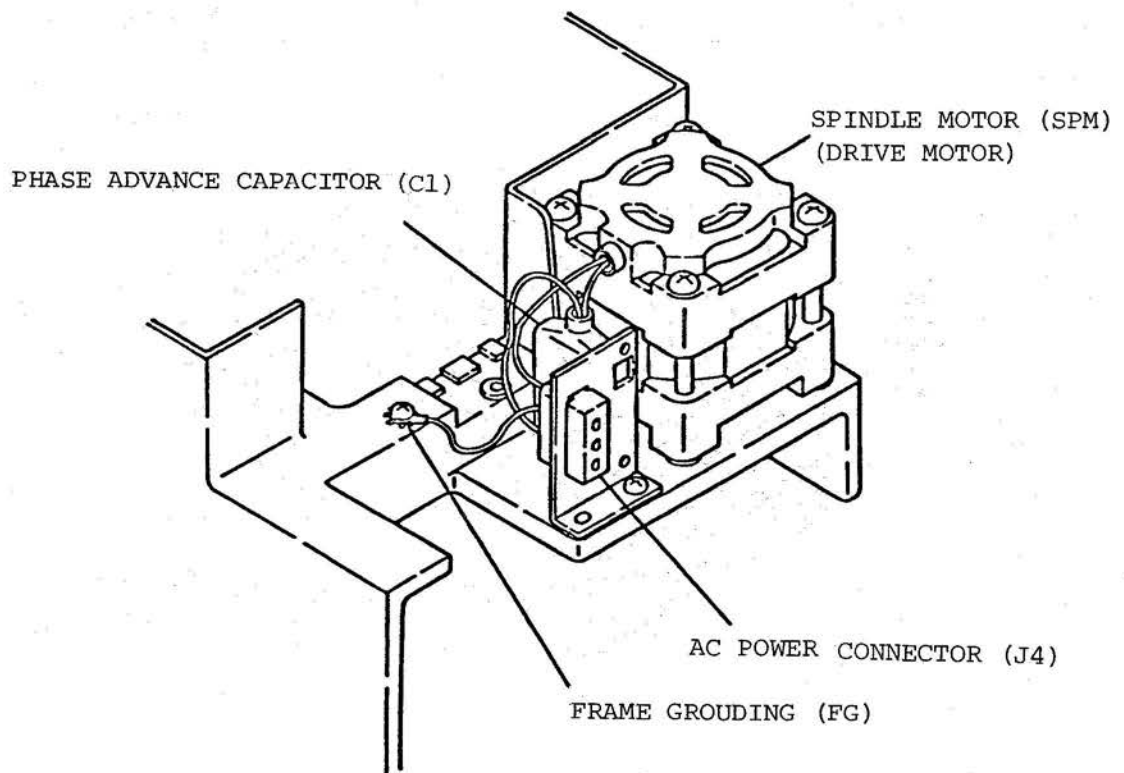


Figure 1 View "A"

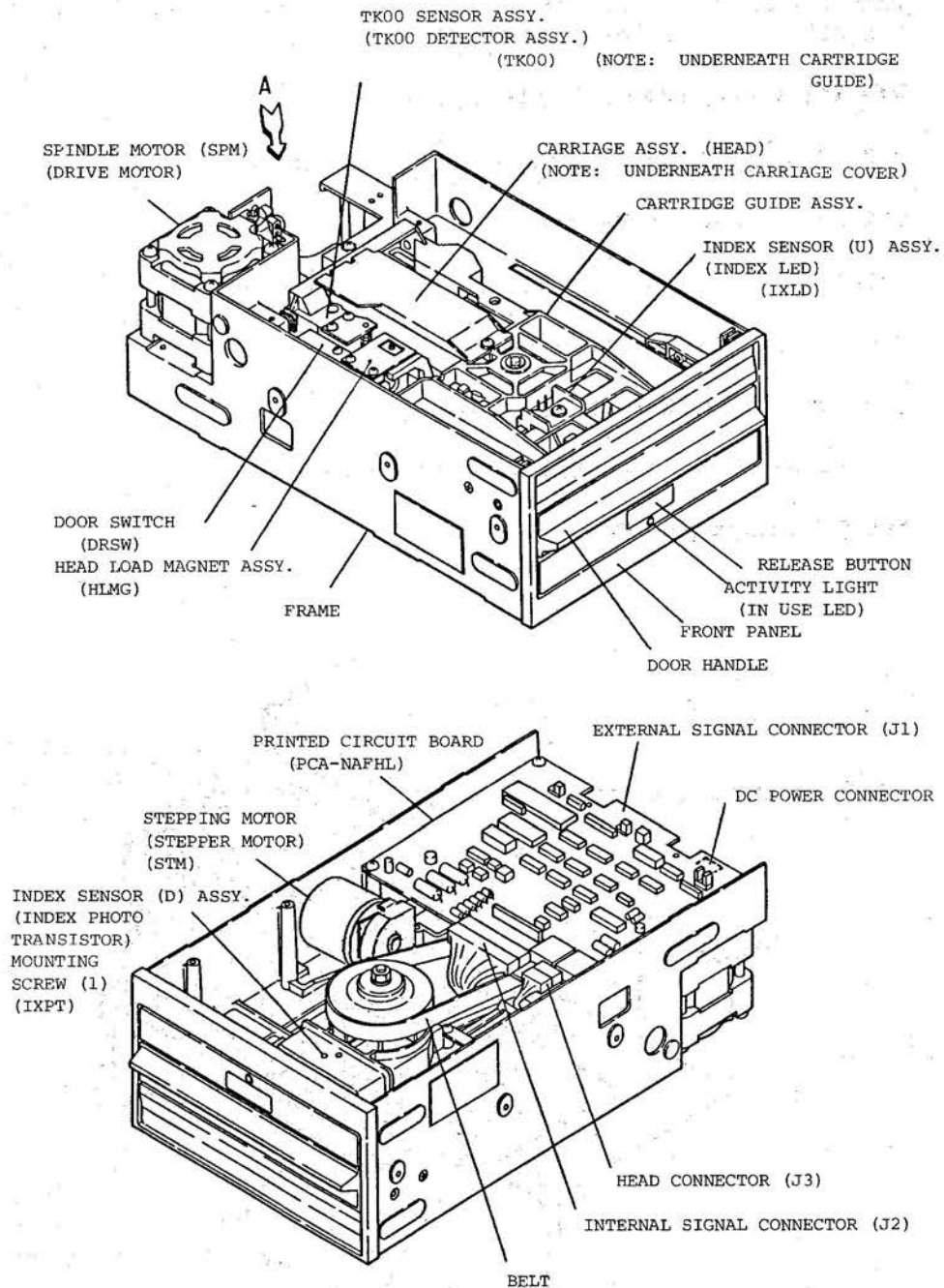


Figure 2

4. OPERATION

4.1 Operating Environment

This disk drive operates properly in a normal office environment. The disk drive and disks may be damaged or operate poorly, however, if operated under conditions other than the following:
(The values are general specifications.)

① Temperature and humidity

	Operating	Non-Operating
Temperature	5 to 43°C (41 to 109°F)	-10 to 50°C (-14 to 122°F)
Relative humidity	20 to 80% (Non-condensing) (Wet bulb 29.4°C maximum) (85°F)	20 to 80% (Non-condensing)

② Shock and vibration

Less than 0.25 g (10 to 100 Hz)	Less than 3 g Continuous vibration (10 to 100 Hz)
------------------------------------	---

③ Dust

Be sure dust of hard materials cannot enter the equipment; it damages the magnetic heads and recording surfaces of disks.

④ Temperature change rate

Less than 20°C per hour (when not packed)

4.2 Handling of Disks

Be especially careful about the following items (see figure 3):

- ① Do not place near equipment that generates a magnetic field (Radios, TV sets, motors, generators, and other electrical apparatus).
- ② Do not move magnetic materials near the drive (Rubber magnets, round magnets for blackboard, screwdrivers, etc.).
- ③ Do not under any circumstances fold or bend a disk.
- ④ Be sure to place the diskette in an envelope and dedicated box when carrying or storing it.
- ⑤ Absolutely never touch a diskette in the data area. Do not use alcohol, etc. for cleaning diskettes.
- ⑥ Do not place in direct sunshine, where the temperature is high, or where it is dusty.
- ⑦ Do not write on the jacket except in the label area. Use only soft-tipped markers, such as felt-tip pens.

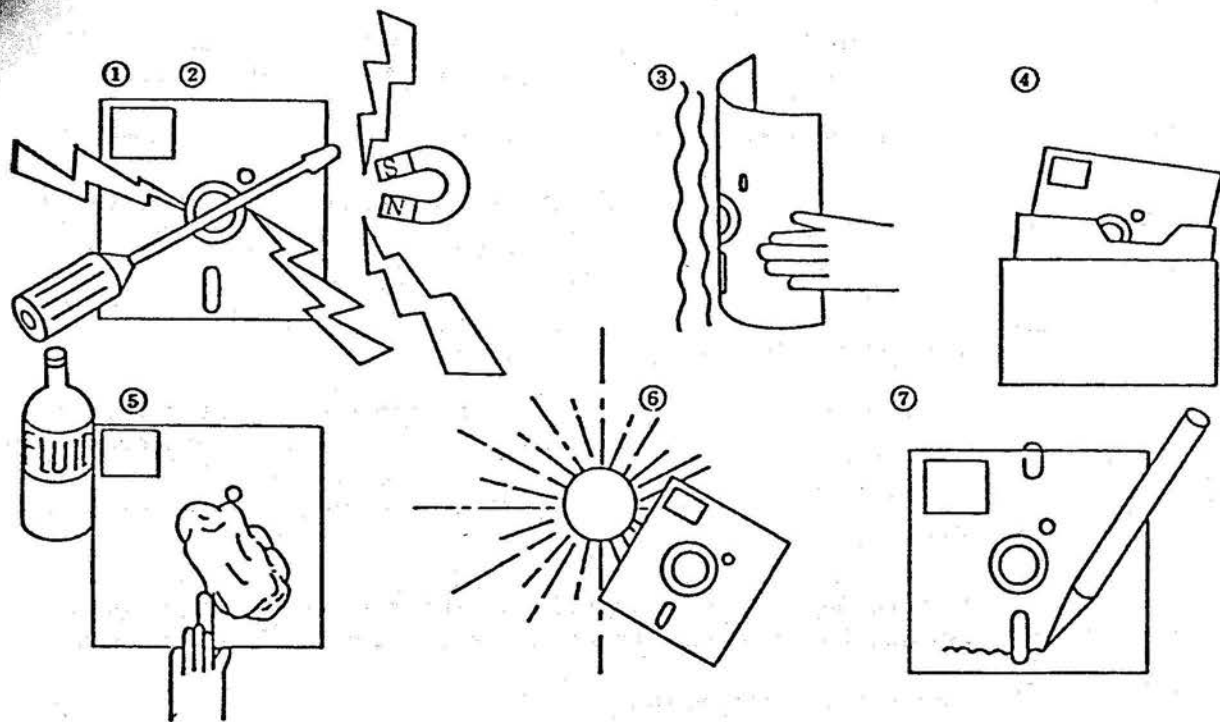


Figure 3

4.3 Mounting and Dismounting Disks

- ① Open the insertion door by pushing the release button on the front panel.
- ② Insert the disk until spring pressure stops and a click is heard. (See figure 4 for the disk label surface, etc.)
- ③ Close the insertion door by moving the door handle, preferably holding the handle at its center. Mounting of the disk is now complete.
- ④ To dismount the disk,
 - a Release the head load and door lock, then
 - b Push the release button.

The disk springs out of the insertion opening.

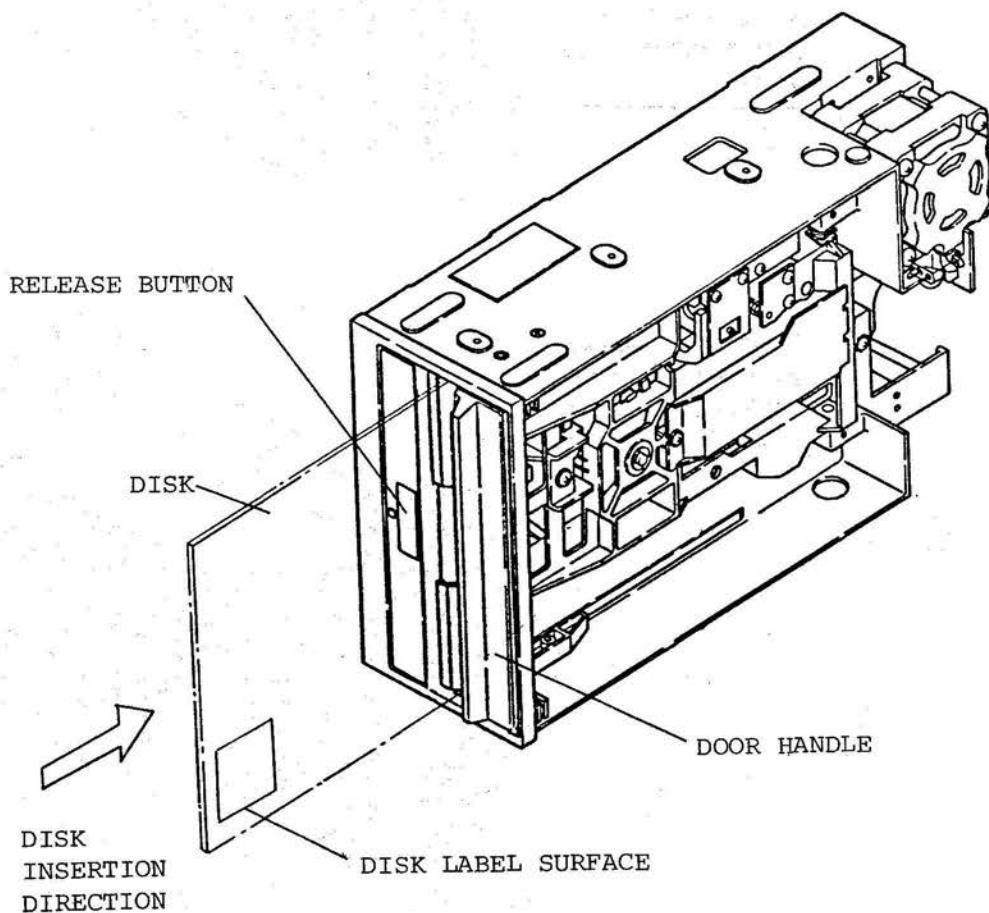
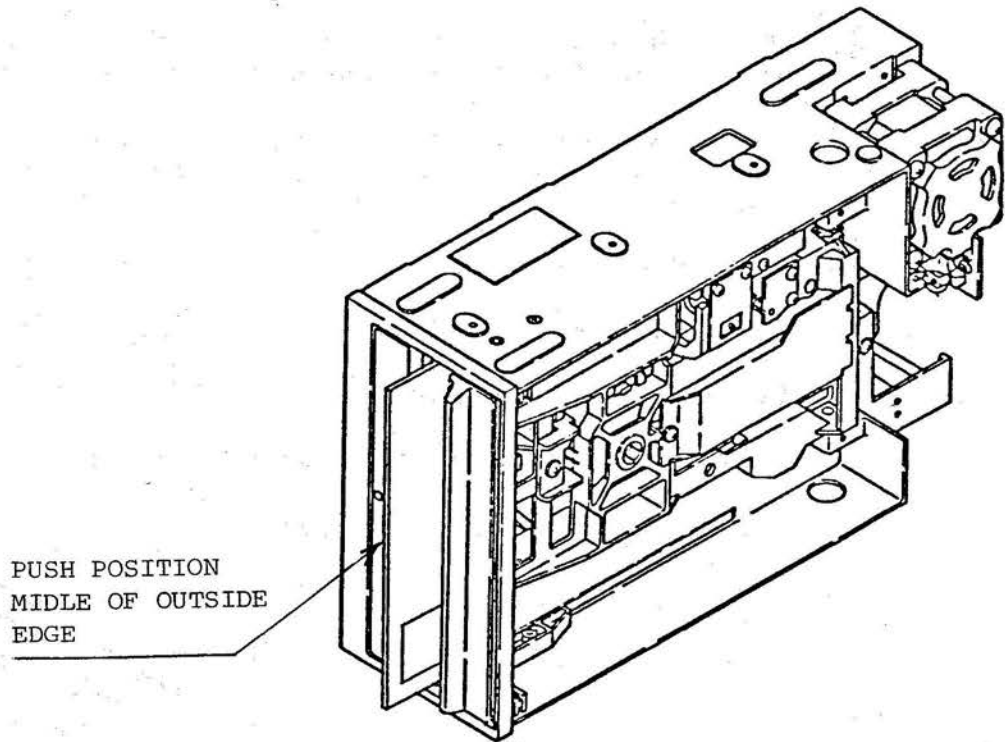


Figure 4



⑤ Cautions for insertion

- ① When inserting a disk, do it slowly and hold the disk as shown in figure 5.



Insert by slowly
pushing near the
center of the disk
with fingers as shown.

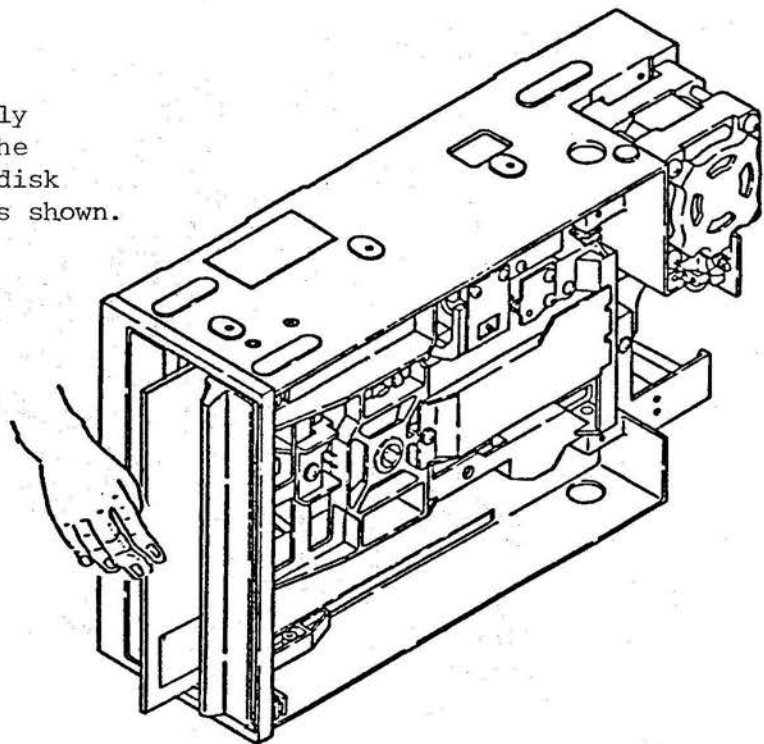


Figure 5

4.4 Cable Connections

- ① Connect the AC power cable connector, J4.
- ② Connect the AC power cable connector, J5.
- ③ Connect the signal cable connector, J1.

CAUTION

Turn off the power supply before connecting or disconnecting a connector, or moving the disk drive.

4.5 Grounding

The signal and frame grounds are connected but may be separated by the user. Figure 6 shows the separation procedure.

- ① Types of grounds
 - ③ Printed-circuit board (signal) ground (SG)
 - ④ Frame grounding (FG) (See figure 1 "VIEW - A".)
- ② When separating the signal ground (SG) from the frame, cut the grounding pattern on the printed-circuit board as shown in figure 6.

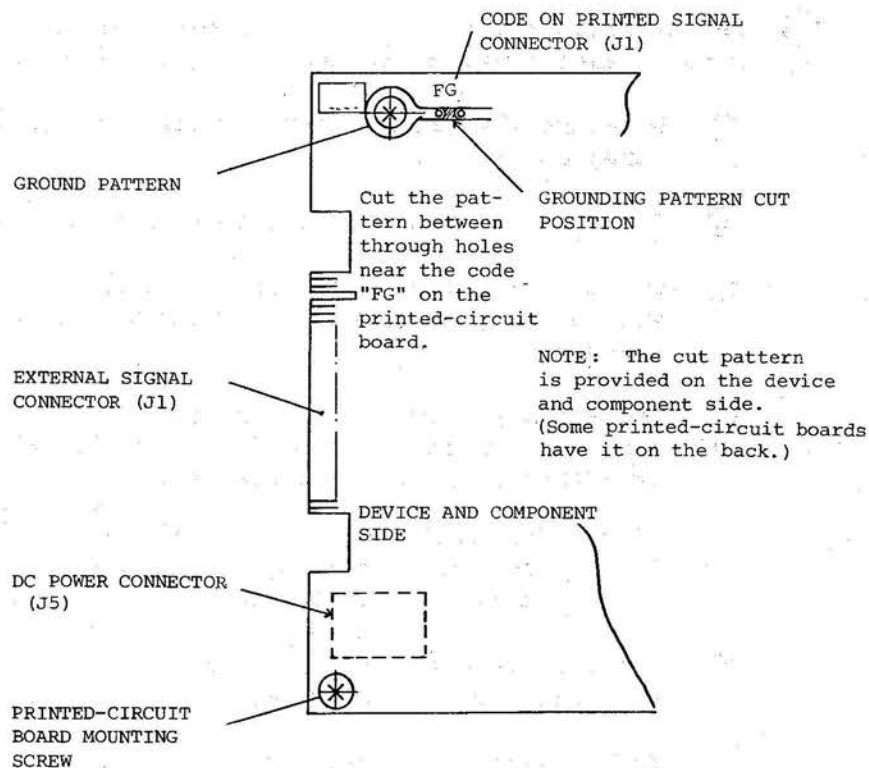


Figure 6



4.6 Motor Pulley Check

- ① Confirm that a pulley is mounted as shown in figure 7 and that the pulley is correct for the AC power frequency. (A motor pulley for 60 Hz is set for 115 volts and that for 50 Hz is set for 230 volts.)

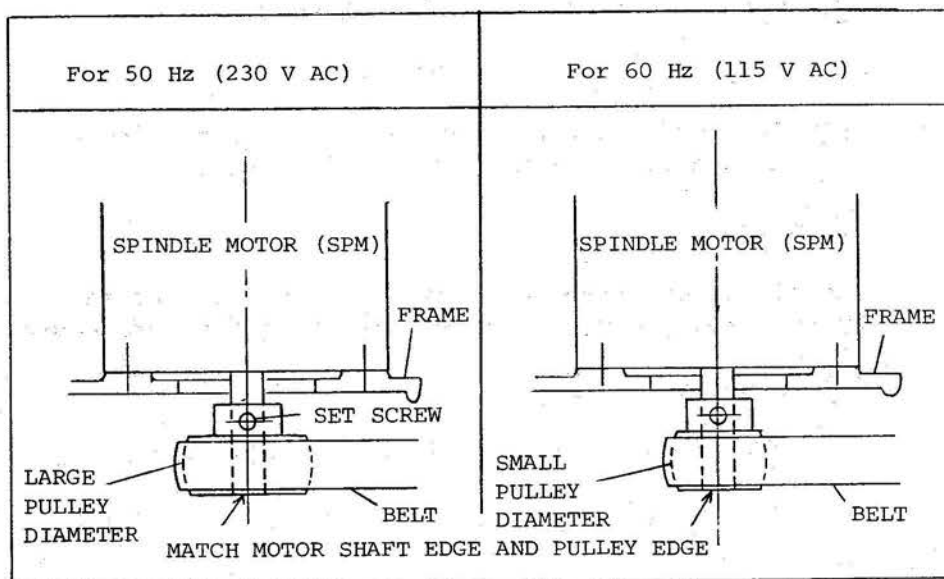


Figure 7

- ② If the frequency of the power supply changes, change to the motor pulley suiting the new frequency as follows:
- (a) Dismount the printed-circuit board in accordance with paragraph 6.2.1.
 - (b) Dismount the belt in accordance with paragraph 6.2.3.
 - (c) Loosen the pulley set screw, turning it counterclockwise with a hexagonal wrench, and slide the pulley off the motor shaft.
 - (d) Install a pulley (motor pulley) for the **new** frequency on the motor shaft. The pulley direction and position at this time shall be as shown in figure 7.

NOTE: The pulley frequency can easily be confirmed, as shown in figure 8, by using the **frame match marks** (printed-circuit board side).

- (e) Tighten the set screw by turning it clockwise with a hexagonal wrench and fasten it in the motor shaft.

NOTE: Match the position of the pulley set screw by rotating the shaft (or the pulley) so that the screw is fixed in a notch of the motor shaft.

- ⑥ Mount the belt and printed-circuit board by reversing the sequence used for dismounting.

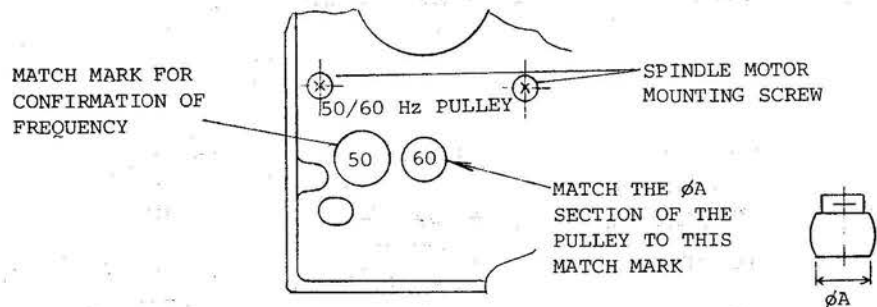


Figure 8

4.7 Setting of Termination Resistor

4.7.1 Daisy chain connection configuration

A termination resistor (TERMINATOR RT in figure 9) is inserted into the printed-circuit board IC socket of only the disk drive to be connected to the farthest terminal of the signal cable. An M16A-150 OHMJ (Iwaki Musen) or 898-3-R150 (Beckman) shall be used as the terminal resistor.

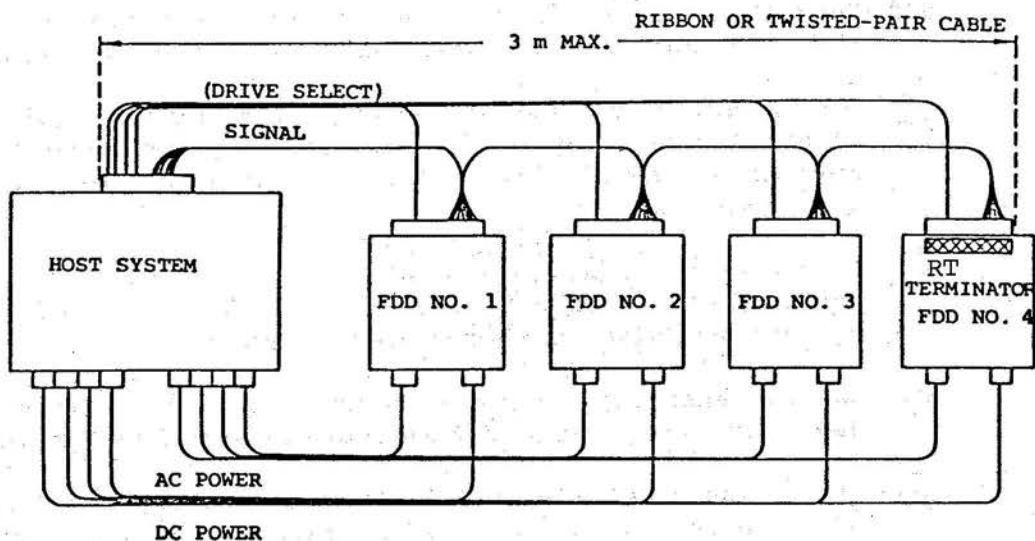


Figure 9



4.8 Setting of Select Plugs

4.8.1 Daisy chain connection configuration

Insert select plugs into printed-circuit boards according to the drive numbers as shown in figure 10.

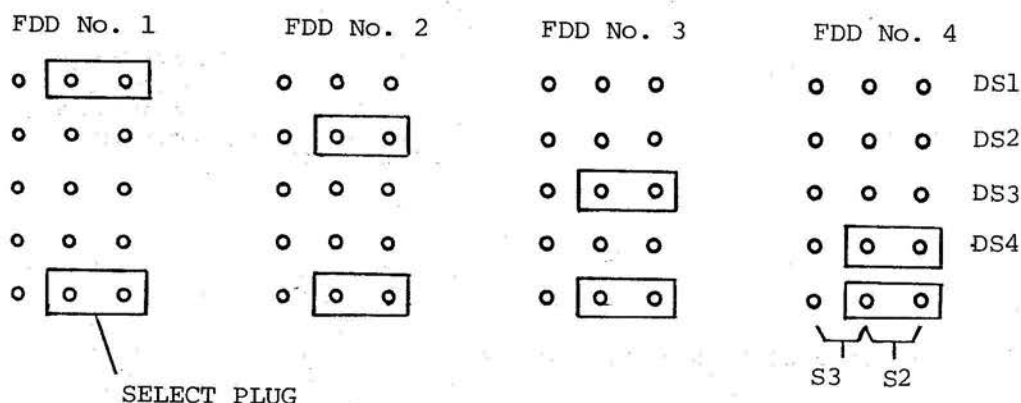


Figure 10

5. MAINTENANCE PRECAUTIONS AND TOOLS

5.1 Maintenance Precautions

- ① Be careful during maintenance work that dust does not get into the disk drive and that the heads, etc., are not damaged.
- ② The spindle motor rotates whenever AC power is supplied, even if the DC power supply is turned off. Do not proceed with maintenance work before confirming that both power supplies are turned off.
- ③ Do not mount or dismount printed-circuit board connectors before confirming that the DC power is turned off. This is important to prevent damage to semiconductor devices.
- ④ Do not under any circumstances touch the disk surface or magnetic head surface by hand, or move magnetic material near them.
- ⑤ When using this drive in read-only mode (when using the CE disk, etc.) be sure the disk is write-protected and the drive is in write protect mode, otherwise do not attempt write operation to prevent destruction of written records.
- ⑥ Never touch the steel band by hand or adjust the related mechanism.

- ⑦ Do not apply undue force, impacts etc., to the head carriage assembly; it has been precisely adjusted. Do not loosen and readjust nuts, screws, etc., unless it is specifically required in the manual.
- ⑧ Do not touch pins of the ICs in Locations 1A and 2C on the printed-circuit board except with static-free tools. These ICs are MOS units.

5.2 Tools

Use only designated tools for maintenance or adjustments. Work will be difficult and drive function may be impaired if the specified tools are not used.

① Special tools and equipment

- | | | |
|-----------------------------|-----|-----------------|
| ① Maintenance tester: | P/N | KEISAKI-J20944 |
| ② Alignment disk (CE disk): | P/N | DC342795-001 |
| ③ Oiler: | P/N | DCPS-J20008-001 |

② General-purpose tools and equipment

- | | |
|-----------------------------|--|
| ① Phillips screwdriver: | No.1, No.2 |
| ② Hexagonal wrench: | Nominal 1.5 |
| ③ Open-End wrench: | Nominal 5.5 |
| ④ Oscilloscope (with probe) | Triggerable, frequency band more than 10 MHz |

③ Maintenance supplies

- | | |
|---|------------------------|
| ① Sylvon paper | |
| ② Isopropyl alcohol (95% reagent 1st class) | |
| ③ Guide rod and carriage
assy bearing lubricant: | Applicable lubricants: |

MITSUBISHI DIAMOND OIL: LUB RQ10

SHELL: FELLUS C10

ESSO: SPINESSO 10

MOBIL: VOLOCITE OIL NO. 6



6. PERIODIC MAINTENANCE

Parts and devices used in the drive have a finite life and are corroded and worn out during use over a long period of time. Periodic and special visual inspection, cleaning, exchange of consumable supplies, confirmation of operation, and other steps help to maintain drive functions and to discover trouble at an early stage.

The maintenance period has been calculated on a basis of 8 working hours per day. The period should be changed if the actual operating rate differs greatly.

6.1 Maintenance Tasks

No.	Item	Details	Method	⊛ Period				Maintenance	Remarks
				Random	3 months	6 months	12 months		
1	Cleaning and visual check of belt system	1) Remove corrosion on contact surfaces of belt, motor pulley, and spindle pulley. 2) Check for cracking on belt surface.	6.2.2				o		
2	Belt replacement	Service life*	6.2.3						
3	Confirmation of operation by CE disk	Confirm R/W head radial alignment, R/W head azimuth, and index sensor alignment	6.2.4				o		

(cont'd)

No.	Item	Details	Method	⊛ Period				Maintenance	Remarks
				Random	3 months	6 months	12 months		
4	Guide rod oiling	Apply a lubricant to the guide rod and carriage assembly bearing section.					o		

⊛ Special maintenance is performed when troubles such as read errors occur frequently.

* Belt service life

When used for a long time, a belt may break due to cracking caused by material degradation, etc. The belt is recommended to be replaced every 18 months in order to maintain the functions of the drive.

6.2 Maintenance Procedures

6.2.1 Mounting and dismounting of printed-circuit board (PCA-NAFHL)

(1) The printed-circuit board (PCA-NAFHL) is mounted on the bottom of the disk drive with four screws.

(2) Dismounting of printed-circuit board

Ⓐ Turn off AC and DC power supplies.

Ⓑ Disconnect connectors to outside units:

External signal connector J1

DC power connector J5

Ⓒ Disconnect connectors inside the drive:

Internal signal connector J2

Head connector J3

NOTE: Refer to figure 2 for connector positions.

- ④ Loosen two screws on the front panel side (holes for mounting on the printed-circuit board side are notched, and the screws do not have to be pulled out).
- ⑤ Remove two screws on the side opposite the front panel (external signal connector J1 side) and dismount the printed-circuit board from the drive.

(3) Mounting of printed-circuit board

Reverse the dismounting sequence to mount the printed-circuit board.

NOTE: Securely connect each connector.

6.2.2 Cleaning and visual check of belt system

- ① Turn off all the power supplies.
- ② Pull out the disk drive (deck).
- ③ Remove the printed-circuit board (PCA-NAFHL) in accordance with paragraph 6.2.1.
- ④ Dismount the belt from the pulleys while rotating it by hand.
- ⑤ Clean the belt and pulleys with Sylvon paper soaked with 95% isopropyl alcohol.
- ⑥ Wipe with dry Sylvon paper. Check for cracks in the belt at the same time.

NOTE: Replace the belt if it is cracked.

- ⑦ Mount the belt and install the printed-circuit board.

6.2.3 Belt replacement

- ① Dismount the printed-circuit board (PCA-NAFHL) in accordance with paragraph 6.2.1 before replacing the belt.
- ② Dismount the belt from the pulleys while rotating the belt by hand.
- ③ Install a new belt on the pulleys.
- ④ Mount the printed-circuit board.

CAUTION: Be sure not to elongate the belt unnecessarily and not to damage the belt surfaces when mounting and dismounting the belt.

6.2.4 Confirmation of operation by CE disks

- ① Confirm the following items during periodic maintenance:
 - Ⓐ R/W heads radial alignment
 - Ⓑ R/W heads azimuth
 - Ⓒ Index sensor alignment (index photodetector alignment)
- ② Confirmations should be made on the head "0" side. (and head "1" side for Ⓐ and Ⓑ.)

NOTES: 1) The CE disk tracks are as follows: (inverted disk use for head "1")

- Ⓐ Track 38 (34) for R/W heads radial alignment
- Ⓑ Track 76 (72) for R/W heads azimuth
- Ⓒ Tracks 00 and 73 for Index sensor alignment

2) The CE disk should not be written on to protect the data. Be sure the disk is write protected and the write-protect circuit is operating.

(1) R/W heads radial alignment

- ① Connect TP-11 to ground to prevent recording on the CE disk even in the event of a malfunction.
- ② Mount the CE disk.
- ③ Connect an oscilloscope

Synchronous trigger EXT: +INDEX (TP19) polarity + DC mode

CH1/CH2: TP3/TP4 ADD (differential) AC mode

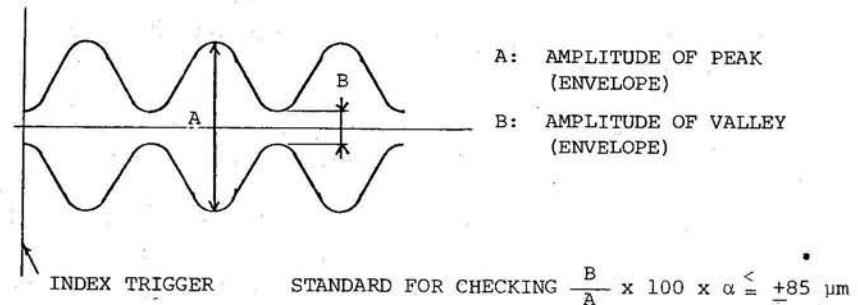
Vertical deflection: 100 mV/div

Horizontal deflection: 20 ms/div

- ④ Seek Track 38 (Side "0"), Track 34 (Side "1")
 - (a) When seeking Track 38 (34) from Track 00
 - (b) When seeking Track 38 (34) from Track 76
- ⑤ Load the head.



- ⑥ The oscilloscope waveforms should be within the tolerances shown in figure 11 for both cases ④-a and ④-b.
- ⑦ R/W head radial alignment is not acceptable when the readings are out of tolerance. Replace the deck.



- NOTES: ① α is a coefficient supplied by CE disk correction guide.
- ② Radial alignment readings may exceed the standard for checking slightly when checked with the drive in an upright posture. Less than 25 μm exceeding inner may be allowable for data interchangeability.
- ③ Do not adjust the radial alignment in the field, as the adjustment requires other necessary procedures and standards.

Figure 11

(2) R/W heads azimuth

- ① Connect TP-11 to ground to prevent recording on the CE disk even in the event of malfunction.
- ② Mount the CE disk.
- ③ Connect an oscilloscope.

Synchronous trigger EXT: +INDEX (TP 19) polarity + DC mode

CH1/CH2: +TP3/TP4 ADD (differential)
AC mode

Vertical deflection: 50 mV/div

Horizontal deflection: 5 ms/div

- ④ Seek Track 76. (Track 72)
- ⑤ Load the head.

- ⑥ Confirm that oscilloscope readings are within the tolerances shown in figure 12.

R/W heads azimuth standard for check: $0^\circ \pm 18'$

- ⑦ R/W heads azimuth is not acceptable if the readings are outside the tolerance. Replace the deck.

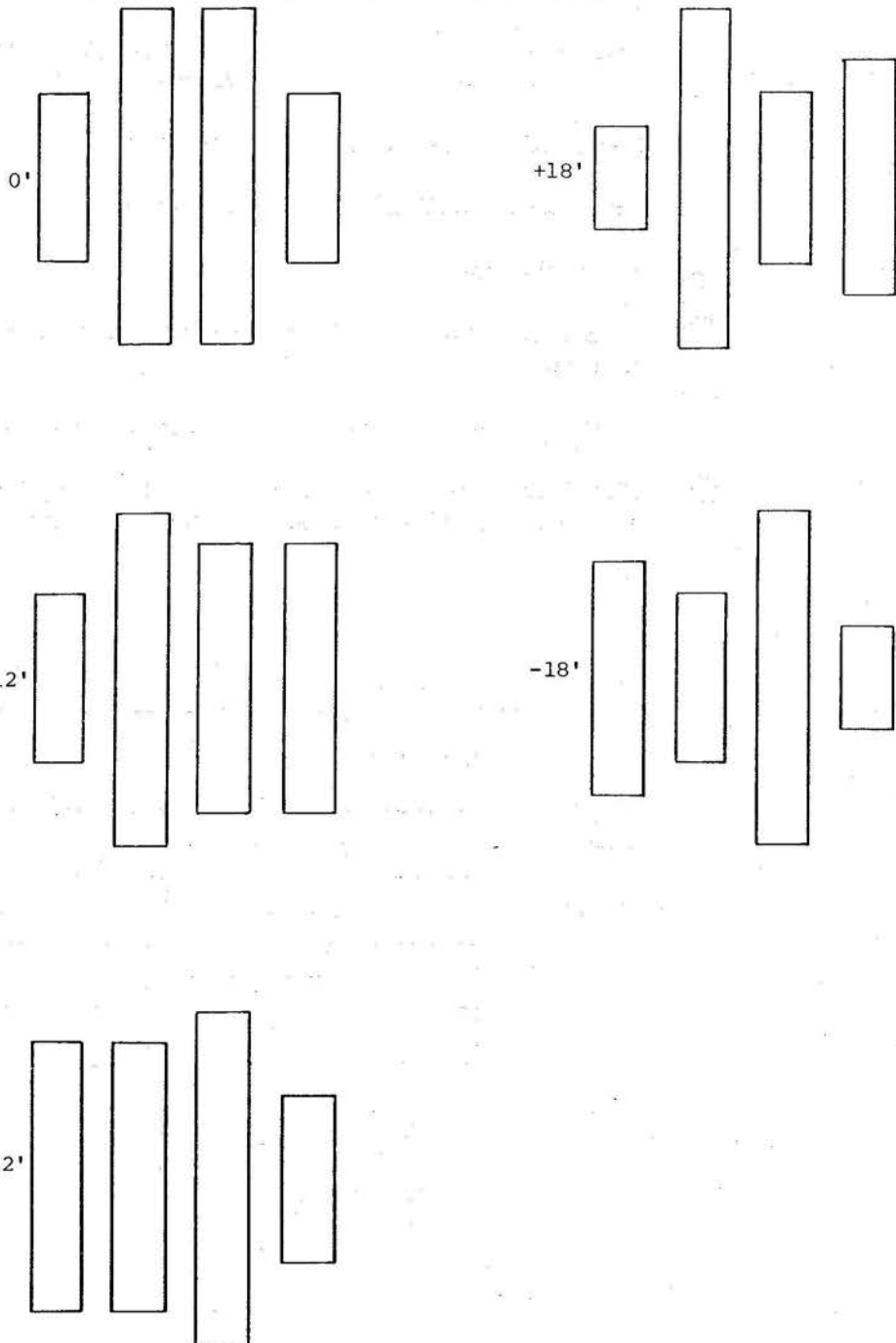


Figure 12 Azimuth Burst Patterns



(3) Index sensor alignment (index photodetector)

- ① Connect TP-11 to ground to prevent recording on the CE disk even in the event of malfunction.
- ② Mount the CE disk.
- ③ Connect the oscilloscope.

Synchronous trigger EXT: +INDEX (TP19) polarity + DC mode

CH1/CH2: TP3/TP4 ADD (differential)
AC mode

Vertical deflection: 500 mV/div

Horizontal deflection: 50 μ s/div

- ④ Load the head.
- ⑤ Readings by the oscilloscope shall be within the following tolerance:

$t = 700 \pm 200 \mu$ s (for both Track 00 and Track 73)

- ⑥ The index sensor alignment is not acceptable if readings are outside the tolerance. Replace the deck.

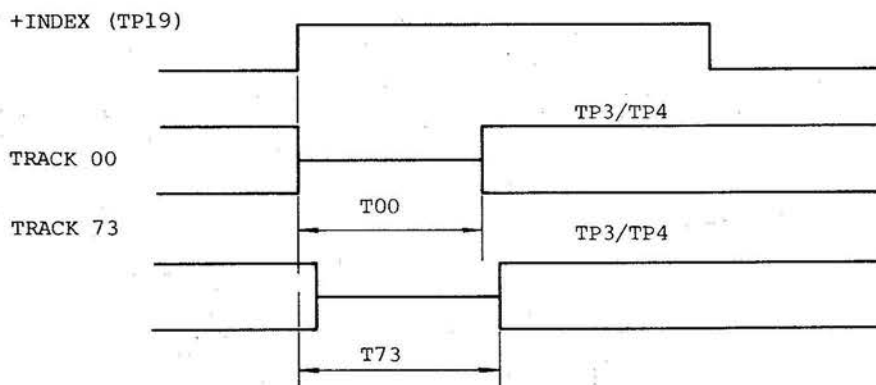


Figure 13

6.2.5 Track 00 detection confirmation and adjustment

(1) Confirmation of Track 00 Output timing

- ① First, confirm that the R/W head radial alignment is within tolerance.

NOTE: Perform R/W head radial alignment check according to paragraph 6.2.4 - (1).

- ② Mount the disk.
- ③ Connect the oscilloscope.

CH1: TP17

CH2: TP16

Synchronous trigger: +STEP (TP17)

Vertical deflection: 1 V/div

Horizontal deflection: 1 ms/div

- ④ Repetitively seek Track 00-01 and confirm that the TP-16 timing is within tolerance. (Refer to figure 14.)

Standard: Within 2.7 ms

NOTE: The step time (track to track time) of the head carriage assembly must be $3^{+0.2}_{-0}$ ms.

- ⑤ Confirm that the output of TP14 is within tolerance:

Track 00: Above +2.5 V

Track 01: Below +0.5 V

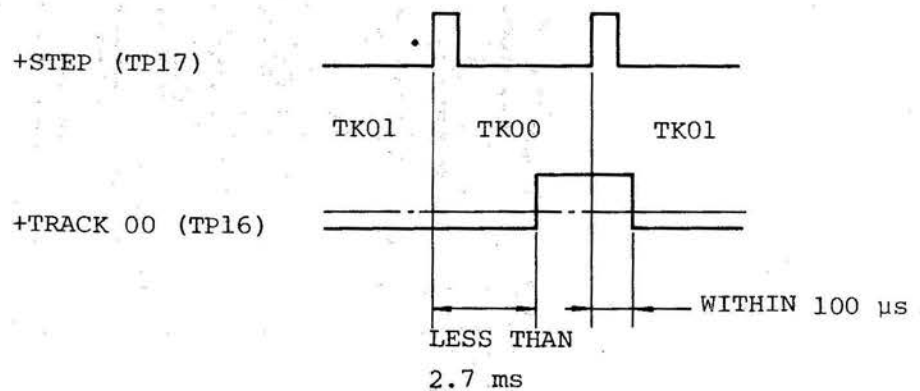


Figure 14

(2) Adjustment of Track 00 (TK00) Sensor

- ① Perform steps ① through ⑤ in Confirmation Procedure (1).
- ② Turn the setscrew of the Track 00 sensor counterclockwise to loosen (rotate 1/2 to 1 turn).

NOTE: Loosen the setscrew through a screwdriver hole near the characters "TK00" on the cartridge guide (see figure 15).

- ③ Move the Track 00 sensor right or left (toward Track 00 or Track 76), adjust to the standard level, and tighten the setscrew (see figure 16).

Standard: TP16 timing: Within 2.7 ms

TP14 output: Track 00: +2.5 V or above

Track 01: +0.5 V or below

NOTE: Move the Track 00 sensor right or left for adjustment while pushing the sensor toward the padding surfaces of the frame.

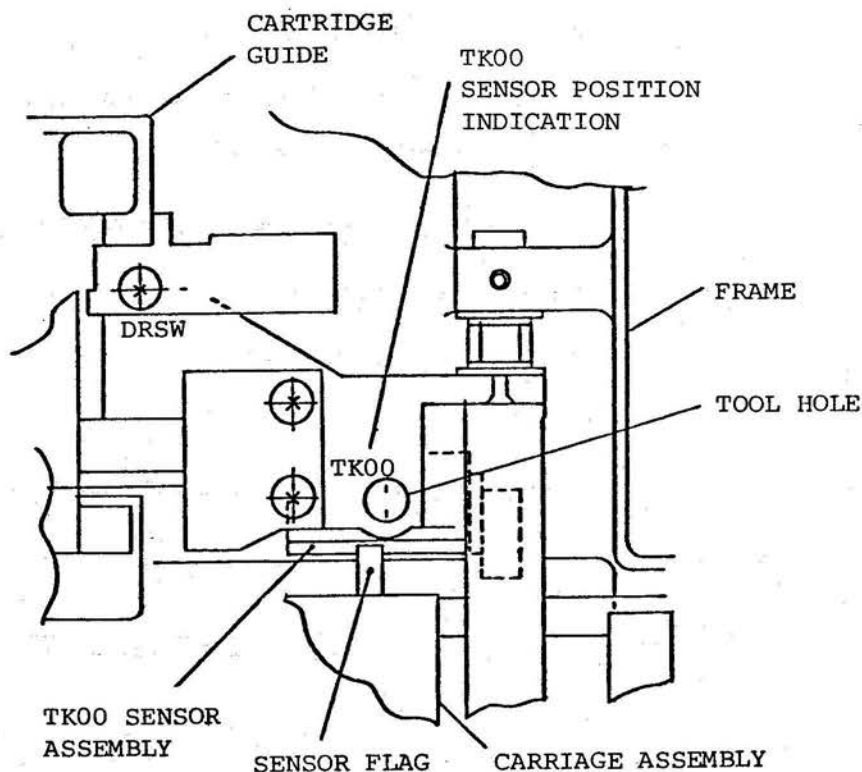


Figure 15 As Seen From Above Drive

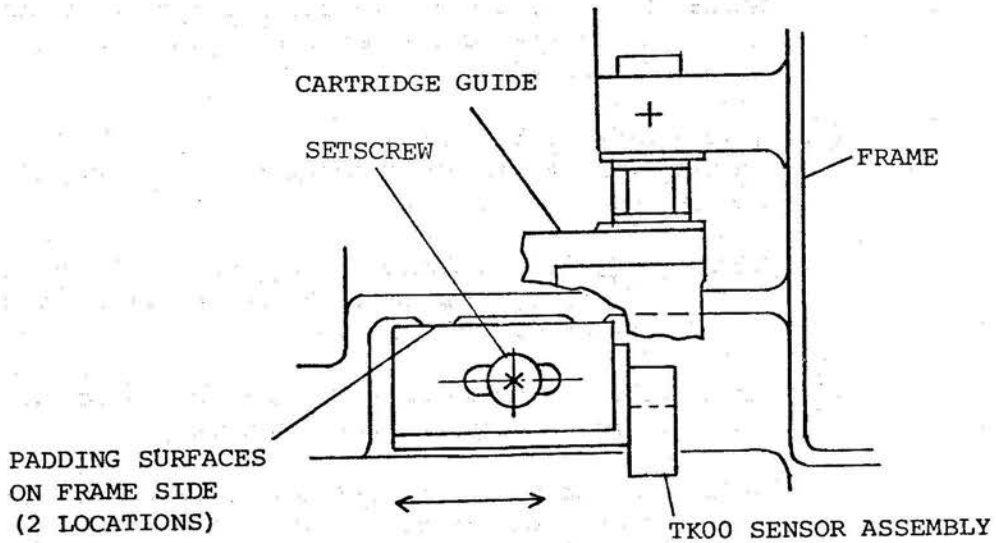


Figure 16

6.2.6 Guide rod (carriage assy bearing) oiling

Oiling the guide rod is effective in preventing unusual wear and tear of the carriage assembly bearing section and in reducing carriage assembly seek sound.

(1) Precautions for oiling

- ① Oil quantity should be a minimum only.
- ② Drip lubrication shall be used for oiling, and the specified oiler shall be used.

Absolutely no oil is allowed on the head and other sections requiring no lubrication. Be careful not to splash the lubricant.

(2) Oiling procedure

- ① Turn off all power supplies.
- ② Pull out the disk drive.
- ③ Dismount the printed-circuit board in accordance with paragraph 6.2.1.



- ④ Push the carriage assembly toward TK00 by hand and move it gently to a position where it contacts the stopper on the TK00 side.

NOTE: Do not touch the carriage assembly at sections other than those designated (positions "a" and "b" in figure 17).

- ⑤ Drip lubricant in places designated for oiling in the carriage assembly using the oiler specified in figure 18.

NOTE: Oil the designated places with only one or two drops of oil ejected by pushing the piston of the oiler one time. (figure 19)

- ⑥ After oiling, gently move the carriage assembly back and forth by hand to spread the lubricant.

NOTE: Do not touch the carriage assembly except at the designated sections (see figure 17).

- ⑦ Mount the printed-circuit board in accordance with paragraph 6.2.1.

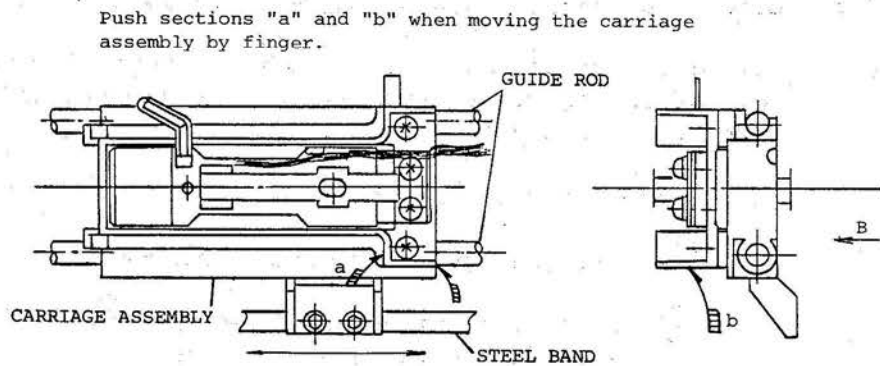


Figure 17

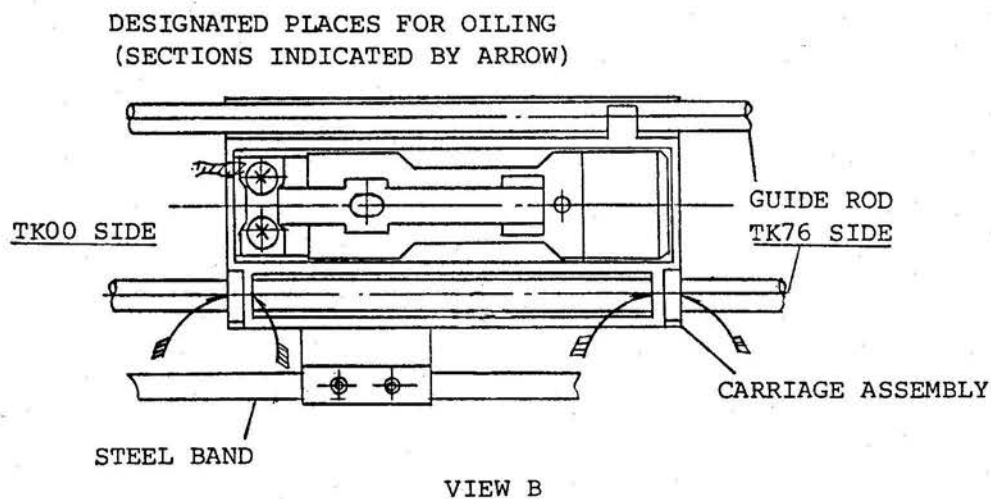
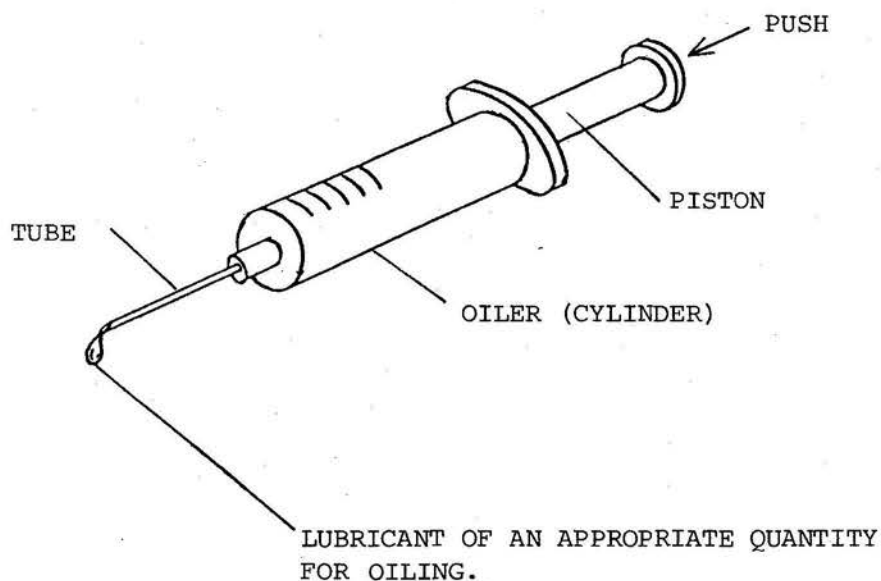


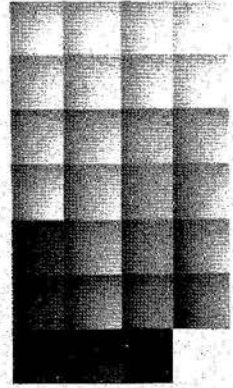
Figure 18

Apply lubricant once or twice by an oiler, forming a drop of oil at the tip of the oiler tube by surface tension of the lubricant when the piston of the oiler is slowly pushed.



NOTE: A syringe whose tube diameter is 0.02" (0.5 mm) can substitute for the oiler.

Figure 19



TECHNICAL MANUAL

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MECHANICAL DESCRIPTIONS

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MECHANICAL DESCRIPTIONS

1. GENERAL

This section describes the mechanical components of the M2894-63 Double-Sided, Double-Density Flexible Disk Drive.

2. RELATED DOCUMENTS

Schematics and Logic Manual of M2894-63.

3. LIST OF MECHANICAL PARTS

①	Spindle motor (drive motor):	SPM
②	Phase advance capacitor:	C1
③	Belt:	BELT
④	Stepping motor (Stepper motor):	STM
⑤	Index LED assembly:	IXLD
⑥	Index phototransistor:	IXPT
⑦	Track 00 detector (TK00 sensor):	TK00 DT
⑧	Magnetic heads:	HEAD0, HEAD1
⑨	Head load magnet (Head load solenoid):	HLMG
⑩	Write protect detector (Write protect sensor):	WPDT
⑪	Door lock magnet (Door lock solenoid):	DLMG
⑫	Activity light:	IN USE
⑬	Door switch:	DRSW
⑭	Detector coil:	DTCL

4. OPERATING DESCRIPTION

4.1 Spindle Motor (Drive Motor) (SPM)

4.1.1 The spindle motor rotates the disk at a constant speed. It is a single-phase AC 115 V, or 230 V, synchronous motor.

4.1.2 The rotation speed varies in proportion to the power frequency, and selection of 50 or 60 Hz is made by exchanging the pulley.

4.2 Belt (BELT)

The belt transmits revolution of the spindle motor to the spindle. The spindle rotates at 360 rpm, set by the ratio of the motor and spindle pulleys. (The motor rotates at 1800 rpm (60 Hz) or 1500 rpm (50 Hz).)

4.3 Stepping Motor (Stepper Motor) (STM)

4.3.1 This motor is normally called a pulse motor. In this drive, the motor is used to position the magnetic heads.

4.3.2 The motor rotates 1.8° in angle in each step when one input pulse is applied, and the magnetic heads advance, or retreat, by one track (1/48 inch or 0.529 mm) for each step.

4.3.3 The motor revolution direction is determined by a sequence of pulses to the four-phase excitation coils, normally activating two out of four.

4.4 Index LED Assembly (IXLD)

IXLD is an assembly of two light emitting diodes. As light sources for optical circuits, they detect the indexing hole in single- or double-sided disks.

4.5 Index Phototransistor Assembly (IXPT)

Either of the IXPT phototransistors are turned on by light from the light-emitting diodes passing through the indexing hole of a single- or double-sided disk.

IXPT then sends a signal to the index pulse detection circuit.

4.6 Track 00 Detector (TK00 Sensor) (TK00 DT)

The Track 00 detector is an optical-circuit switch containing a light emitting diode and photodetector. The switch is turned on or off by a shielding plate mounted on the head carriage. Normally, its light path is open, but it is turned off when positioned at Track 00. It sends an output signal when it detects the TK00 position.

4.7 Magnetic Heads (HEAD0, HEAD1)

These two heads contact the disk surface for reading, writing and tunnel-erasing during recording.

4.8 Head Load Magnet (Head Load Solenoid) (HLMG)

The HLMG is a solenoid for the up and down motion of the magnetic heads so that the heads contact the disk surface during read and write operations. Normally, it is enabled only during a read or a write.

9 Write Protect Detector (Write Protect Sensor) (WPDT)

An optical circuit switch containing a light-emitting diode and photodetector to detect prohibition of writing on a disk. When a normal disk (a disk without a write-protect notch) is mounted, the light path is shielded, and a switch is turned off prohibiting writes. A disk with a write-protect notch cannot be recorded on.

10 Door Lock Magnet (Door Lock Solenoid) (DLMG)

This is a solenoid that locks the door to prevent it from opening when the controller is accessing the drive. It operates when a DRIVE SELECT signal is received, or when an IN USE signal and a DRIVE SELECT signal are received. Some other optional applications are possible.

11 Activity Light (In-Use LED)

A light-emitting diode (LED) on the front panel shows that the controller is accessing the drive. Normally, it comes on when a DRIVE SELECT or IN USE signal is received while in READY state.

12 Door Switch (DRSW)

A switch detects opening or closing of the door. When it detects the door closed, an index signal is detected, it outputs a READY signal.

13 Detector Coil (DTCL)

The detector coil is mounted on the head load magnet. The coil detects the head load/unload speed, and feeds back the electromotive voltage of the coil to the HLMG drive circuit.

CIRCUIT DESCRIPTIONS

1. GENERAL

This section describes the operation of each section of printed-circuit boards of the M2894-63 Double-Sided, Double-Density Flexible Disk Drive.

2. RELATED DOCUMENTS

Schematic and Logic Manual of M2894-63

3. SUMMARY OF INPUT AND OUTPUT SIGNALS

3.1 Input Signals

40	①	<u>WRITE GATE</u>
38	②	<u>WRITE DATA</u>
2	③	<u>WRITE CURRENT SWITCH</u>
36	④	<u>STEP</u>
34	⑤	<u>DIRECTION SELECT</u>
18	⑥	<u>HEAD LOAD</u>
14	⑦	<u>SIDE SELECT</u>
16	⑧	<u>IN USE</u>
26	⑨	<u>DRIVE SELECT 1</u>
28	⑩	<u>DRIVE SELECT 2</u>
30	⑪	<u>DRIVE SELECT 3</u>
32	⑫	<u>DRIVE SELECT 4</u>

3.2 Output Signals

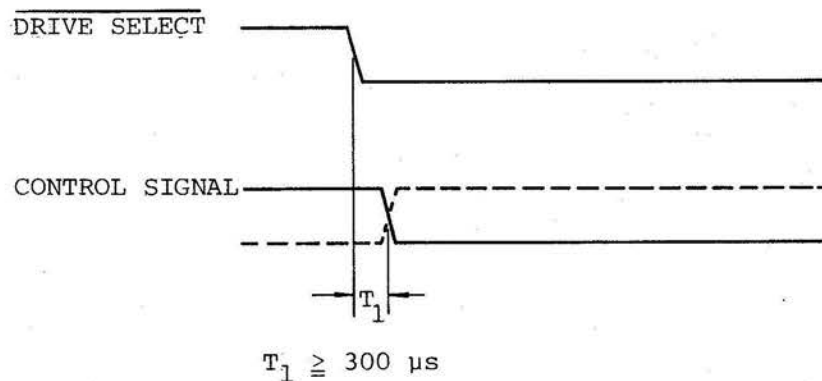
42	⑬	<u>TRACK 00</u>
12	⑭	<u>DISK CHANGE</u>
10	⑮	<u>TWO SIDED</u>
20	⑯	<u>INDEX</u>
22	⑰	<u>READY</u>



- 4 ⑮ ALTERNATE I/O 2
- 6 ⑯ ALTERNATE I/O 3
- 8 ⑰ ALTERNATE I/O 4
- 46 ⑱ READ DATA
- 44 ⑳ WRITE PROTECT

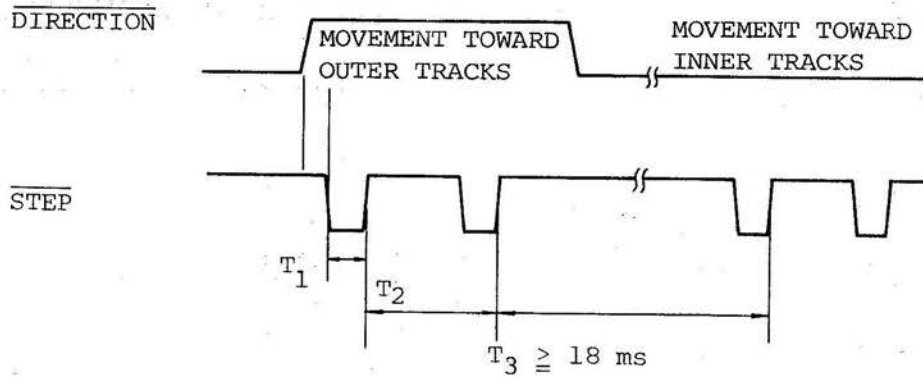
3.3 Timing Chart

Refer to figures 1 through 6 for time relationships among input and output signals.



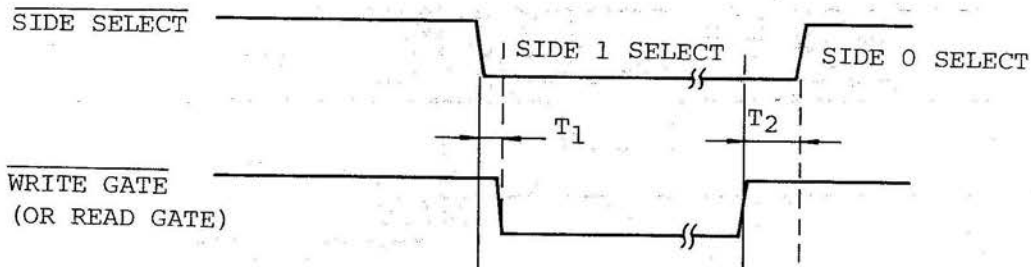
A CONTROL signal must always be sent later than a DRIVE SELECT signal.

Figure 3.3.1 Drive Select Signal and Control Signal



- T_1 : 1 μs to 1 ms, T_2 : 3 ms or 6 ms
- T_3 : When reversing direction, issue a next step pulse after more than 18 ms counting from the step pulse before inversion.

Figure 3.3.2 Direction Signal and Step Signal



- T_1 : Head select delay time $T_1 \leq 100 \mu\text{s}$ (R/W Prohibited)
- T_2 : Erase delay time $T_2 \leq 700 \mu\text{s}$

Figure 3.3.3 Head Select Signal and Write Gate Signal or Read Operation

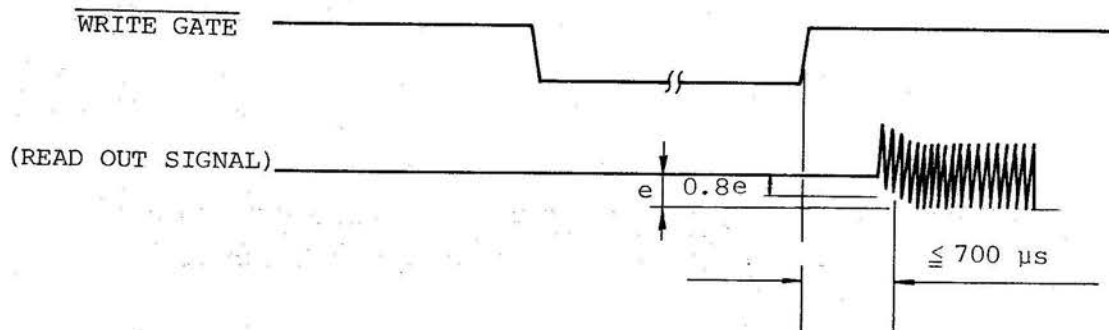


Figure 3.3.4 Read Recovery Time

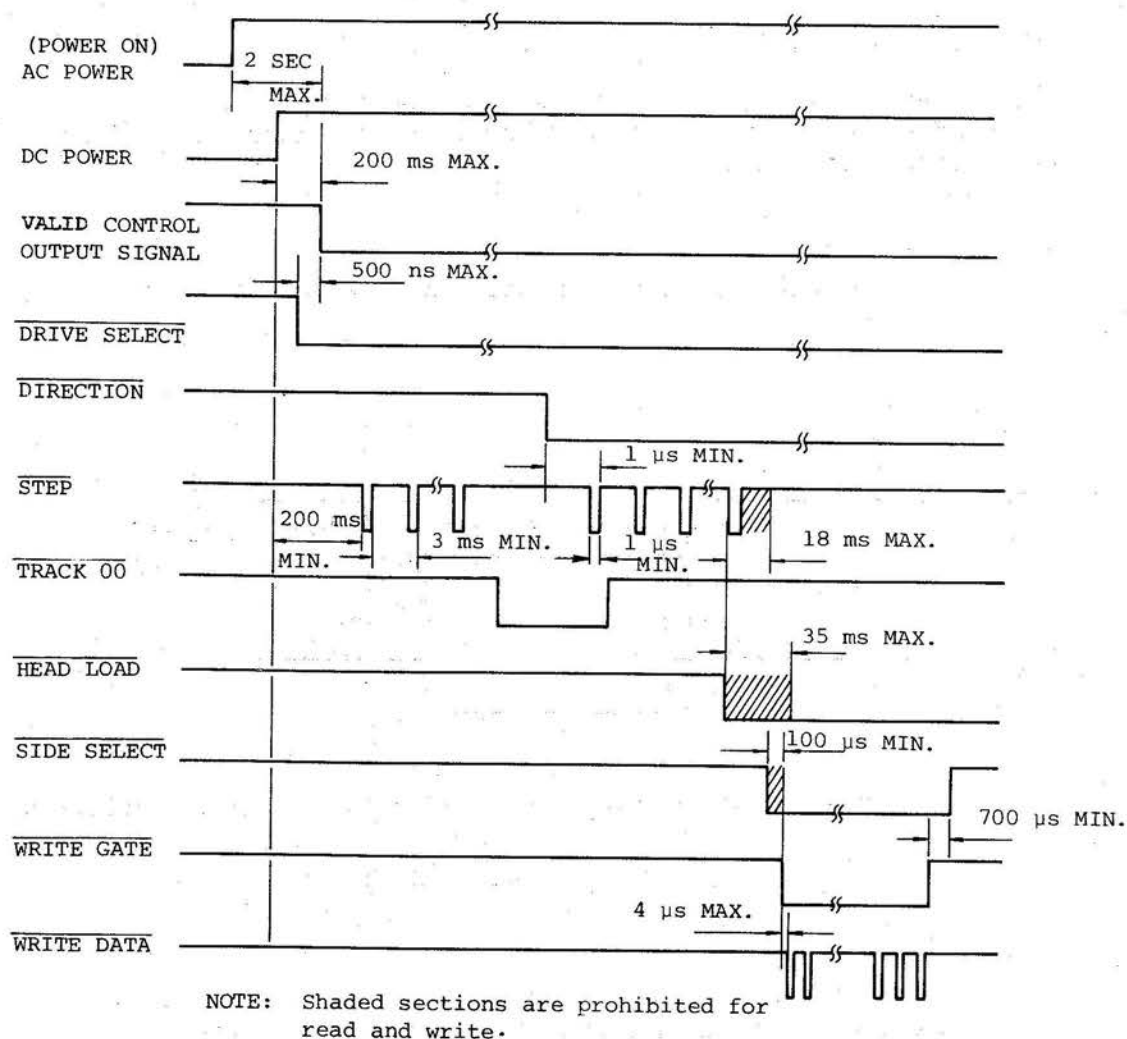
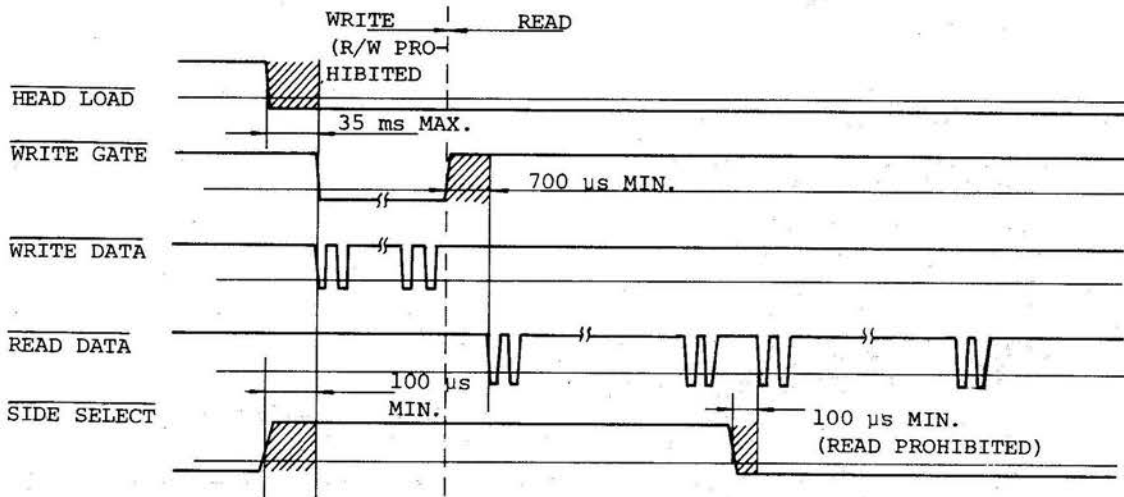


Figure 3.3.5 Write Operation



NOTE: No read/write is allowed for the shaded sections.

Figure 3.3.6 Read Operation (After Write Operation)

4. CLASSIFICATION OF PRINTED-CIRCUIT BOARD CIRCUIT

(c.f. BLOCK DIAGRAM page 28)

- 4.1 Power Circuit
- 4.2 Read Circuit
- 4.3 Write Circuits 1, 2
- 4.4 Detect Circuit
- 4.5 Control Circuits 1, 2, 3
- 4.6 Motor, Solenoid Drive Circuits

5. CLASSIFICATION OF CIRCUITS BY FUNCTION

- 5.1 Line Driver Circuit
- 5.2 Line Receiver circuit
- 5.3 Write Circuit
- 5.4 Erase Circuit
- 5.5 Write Protection Circuit
- 5.6 Read Circuit
- 5.7 Positioning Circuit
- 5.8 Head Load Circuit



- 5.9 Head Select Circuit
- 5.10 Drive Select Circuit
- 5.11 Door Lock Circuit
- 5.12 Track 00 Detection Circuit
- 5.13 Index Detection Circuit
- 5.14 MPU Clock Circuit

6. CIRCUIT OPERATION

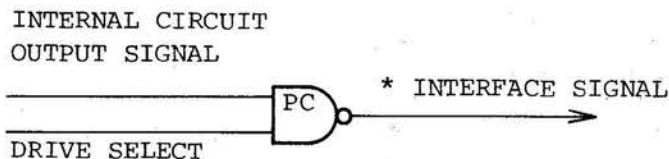
NOTE 1: Dotted lines in the BLOCK DIAGRAM classified circuits.

NOTE 2: Interface signals between the controller and flexible disk drive are marked with *.

6.1 Line Driver Circuit

6.1.1 The driver circuit is ANDed with output signals of various internal circuits and with a DRIVE SELECT signal, and an interface signal is output only by the selected drive.

6.1.2 The driver is an open-collector IC (SN7438N, or its equivalent), and the maximum sink current (I_{OL}) is 48 mA.

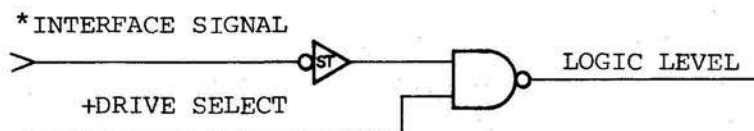


NOTE: PC is an open-collector, power type gate.

6.2 Line Receiver Circuit

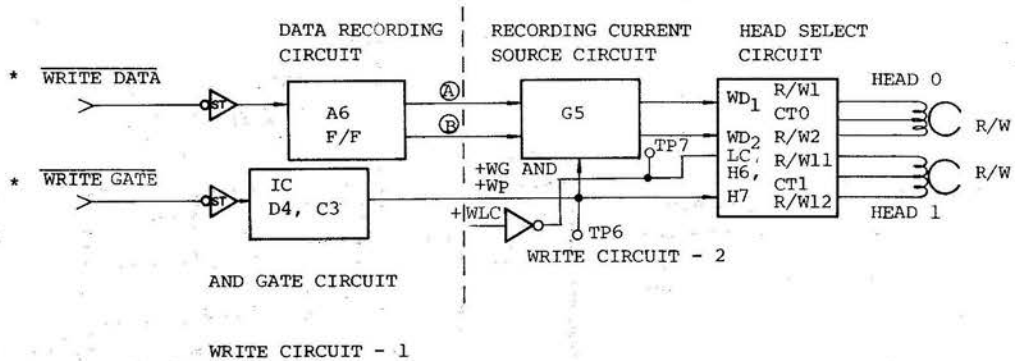
6.2.1 The receiver output is ANDed with a DRIVE SELECT signal, and an interface signal is input only into the selected drive.

6.2.2 The receiver is a Schmitt trigger type IC (SN7414N, or its equivalent) and outputs a stable logic level with a 0.8-volt hysteresis level.



NOTE: ST stands for Schmitt trigger type.

6.3 Write Circuit



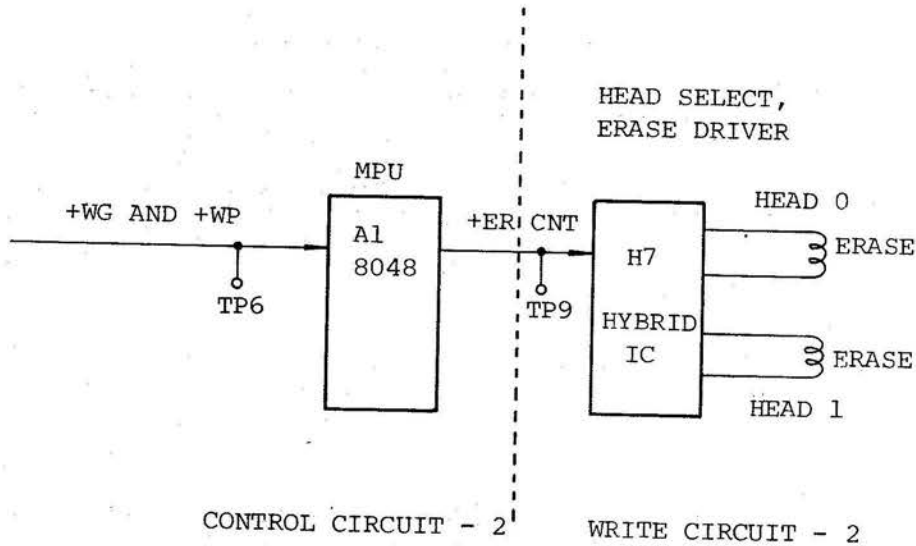
*The timing for WRITE DATA (interface signal) is determined in the data recording circuit through the receiver.
WRITE CIRCUIT -1

Current made by the hybrid ICs (H6, H7) is supplied to the magnetic heads according to the timing of the data recording circuit, and outputs are made by the driver. The value of the current for writing is selected by the WRITE CURRENT SWITCH signal or the LOW CURRENT signal of MPU (A1).
WRITE CIRCUIT -2

*The WRITE GATE (interface signal) is ANDed with DRIVE SELECT (+DS2) and READY (+RDY) after passing through the receiver. It is then ANDed with +WP OR +RST, to become a +WG AND +WP signal.
WRITE CIRCUIT -2

The +WG AND +WP signal is input to WE of the hybrid IC (H6) and WRITE G/STEP of MPU (A1).
WRITE CIRCUIT -2
CONTROL CIRCUIT -2

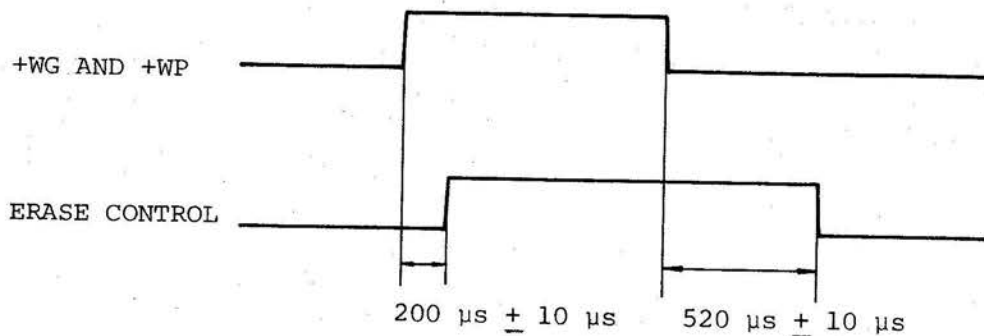
6.4 Erase Circuit



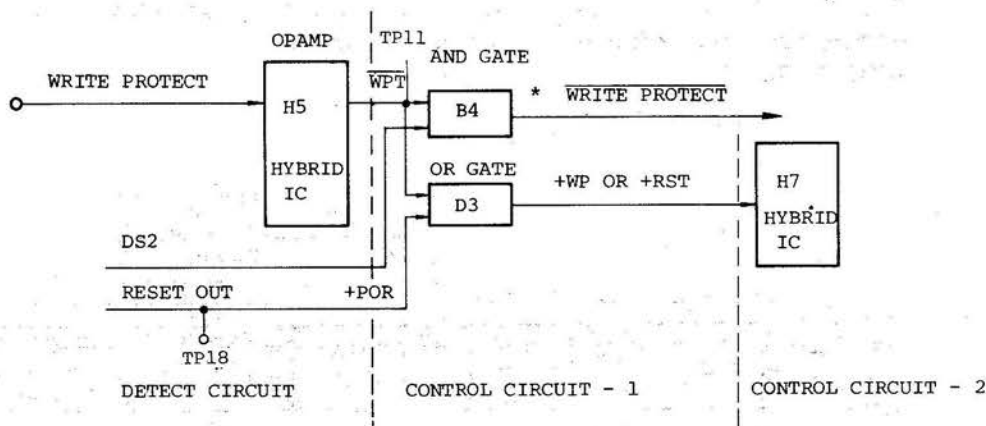
Using WRITE GATE +WG and +WP as input, the erase timing produces (using MPU A1) an ERASE CONTROL (+ER CNT) with a leading edge 200 μ s and a trailing edge 520 μ s behind the WRITE GATE.
CONTROL CIRCUIT -2

The current of the erase signal produced by MPU is amplified by the current source driver in the hybrid IC (H7), and is supplied to the heads.

WRITE CIRCUIT -2



6.5 Write Protection Circuit



The write protect signal is detected by the optical sensor and creates a stable logic level at the hybrid IC (H5).

DETECT CIRCUIT

WPT on a logic level is Ored with RESET OUT of MPU and becomes a +WP OR +RST signal.

CONTROL CIRCUIT -1

Writing is inhibited by input of this signal, even during input of write data.

CONTROL CIRCUIT -2

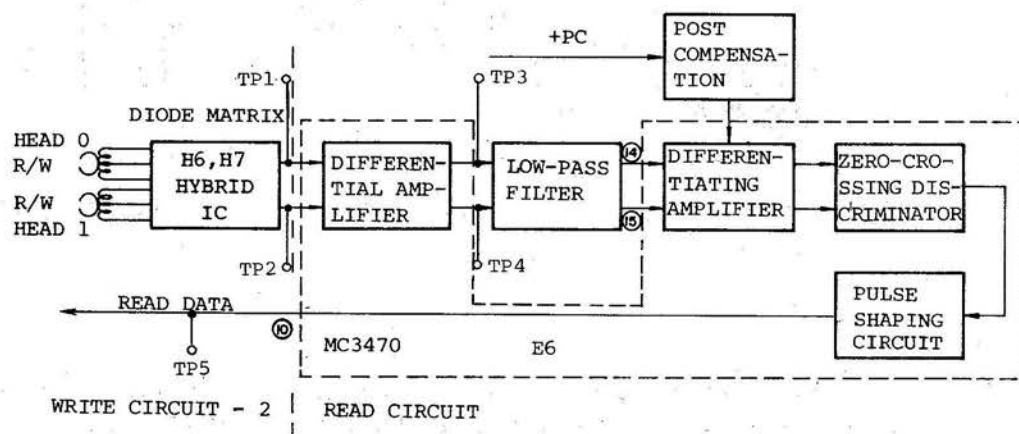
It is ANDed with the drive select signal and is output (interface signal) as WRITE PROTECT.

CONTROL CIRCUIT -1



6.6 Read Circuit

READ CIRCUIT



6.6.1 Diode matrix

The heads are selected by the diode matrix in the hybrid IC (H6, H7).

6.6.2 Differential amplifier

A linear amplifier amplifies a read-out voltage from the selected head.

6.6.3 Low-pass filter

A filter structured by L, C, and R removes high-frequency noise.

6.6.4 Differentiating amplifier

This amplifier transforms the peak of a read-out voltage into a zero crossing point by differentiating it.

6.6.5 Post compensation

The timing margin during reading is made larger by switching the filter of the differentiating amplifier, in conjunction with the read-out track number.

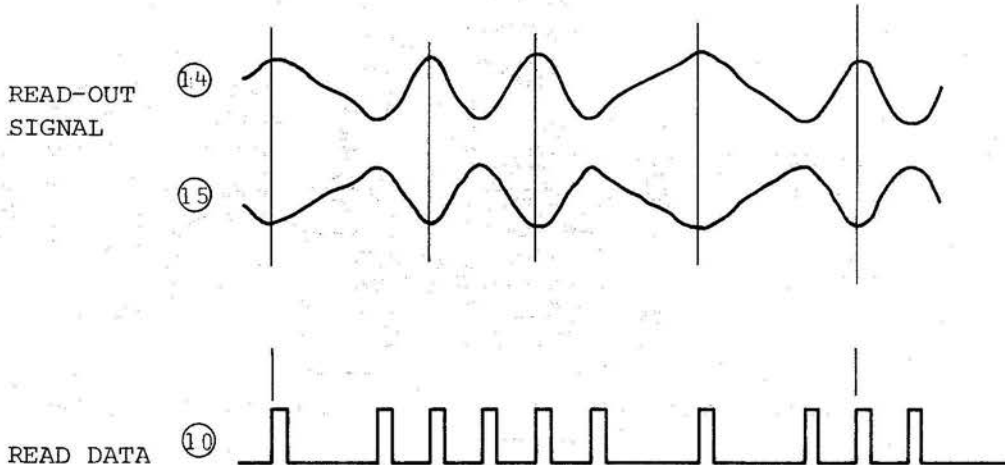
6.6.6 Zero-crossing discriminator

This generates a pulse that has a zero crossing point detected by the differentiating amplifier as its front edge.

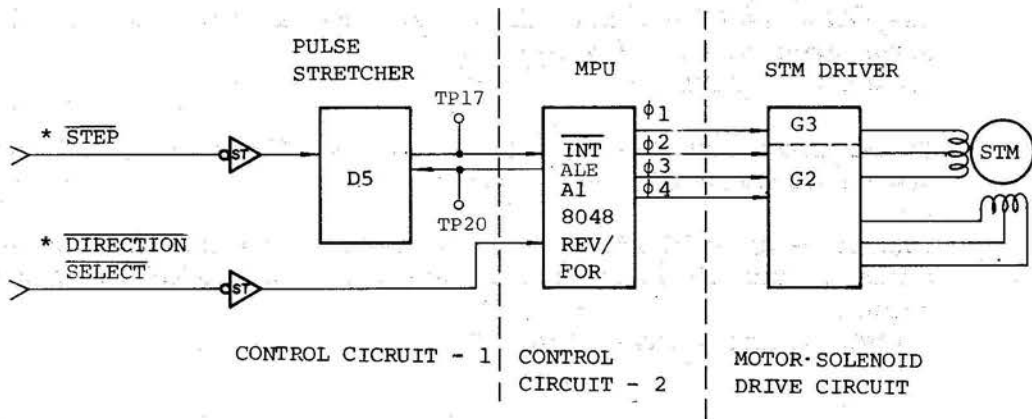
6.6.7 Pulse shaping circuit

This arranges an output pulse shape into a certain width.

6.6.8 Waveforms of various sections



6.7 Positioning Circuit



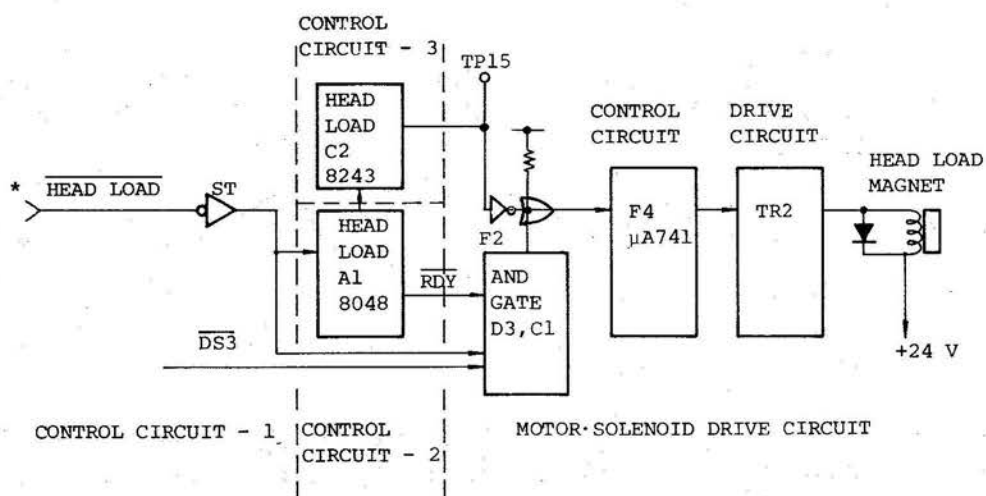
The STEP interface signal is ANDed with TRACK 00 signal (+TK00) and a DRIVE SELECT (DS1) after passing the receiver. The resultant signal is input in INT as a required pulse width by the pulse stretcher circuit, since the input pulse width of MPU is regulated.
CONTROL CIRCUIT -1

The DIRECTION SELECT interface signal is input in FOR/REV of the MPU after passing the receiver.
CONTROL CIRCUIT -1

The preceding two signals are processed by the MPU and are output from ports $\phi 1$, $\phi 2$, $\phi 3$, and $\phi 4$ of the MPU as control pulses to the stepping motor (STM).
CONTROL CIRCUIT -2

The stepping motor is driven by the STM driver.
MOTOR-SOLENOID DRIVE CIRCUIT

6.8 Head Load Circuit



The HEAD LOAD interface signal is input at HEAD LOAD of the MPU after passing the receiver.

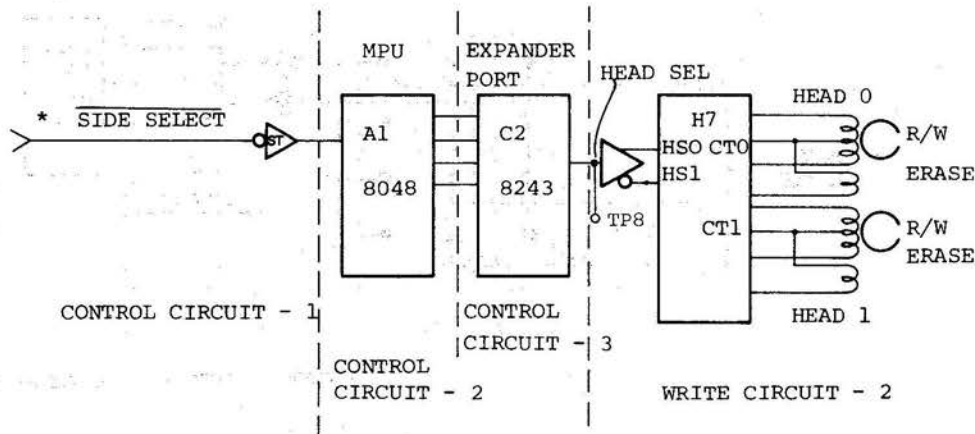
CONTROL CIRCUIT -1

It is ANDed with READY (RDY) and DRIVE SELECT (DS3) and enters the head load magnet drive circuit.

The drive circuit of the HEAD LOAD has a control circuit and drive circuit, and the head loading speed is controlled at an optimal value.

MOTOR-SOLENOID DRIVE CIRCUIT

6.9 Head Select Circuit

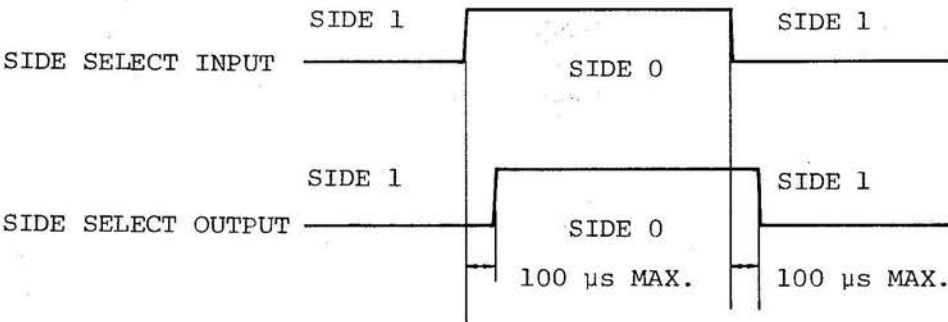


The SIDE SELECT interface signal enters SIDE SEL 0/1 of the MPU after passing the receiver.
CONTROL CIRCUIT -1

The output signal processed by the MPU is output from HEAD SEL of the expander port.
CONTROL CIRCUIT -3

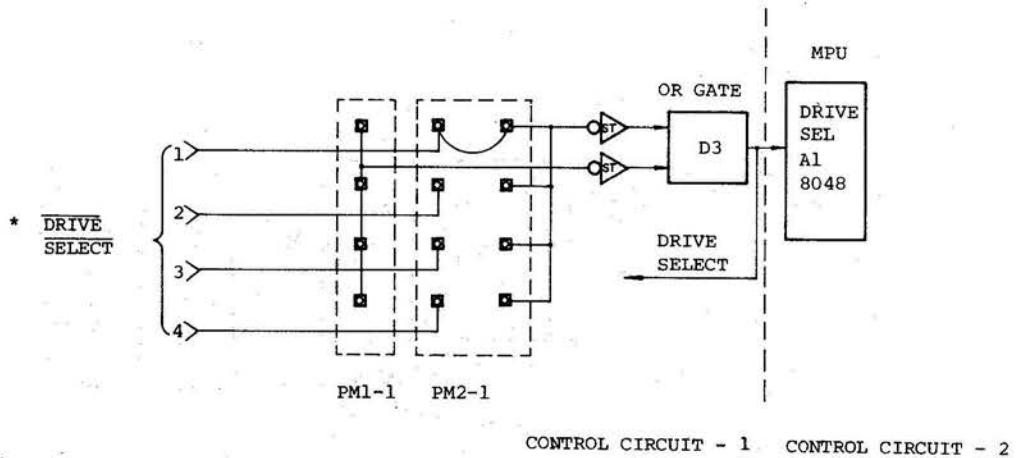
HEAD SEL is input to HS0 and HS1 of the hybrid IC (H7) and selects during READ and WRITE operations.
WRITE CIRCUIT -2

The delay between switching of a SIDE SELECT input signal and a real change shows at output, as shown in the diagram below.





6.10 Drive Select Circuit



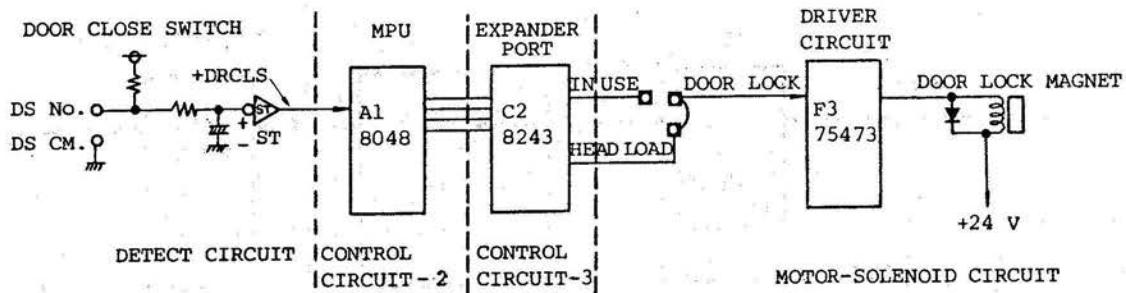
A DRIVE SELECT signal designated by a drive select pin PM2-1 arranged in PCB becomes valid, and a drive input signal is input in MPU through the receiver.

CONTROL CIRCUIT -1

Furthermore, they are hardware gate signals of the input and output signals shown below.

Input Signal	Output Signal
STEP	WRITE PROTECT
WRITE GATE	DISK CHANGE
WRITE DATA	TWO SIDED
	IN USE
	READ DATA
	INDEX
	TRACK 00
	READY

6.11 Door Lock Circuit



The waveform of a door close signal is shaped after being detected by the door close switch.

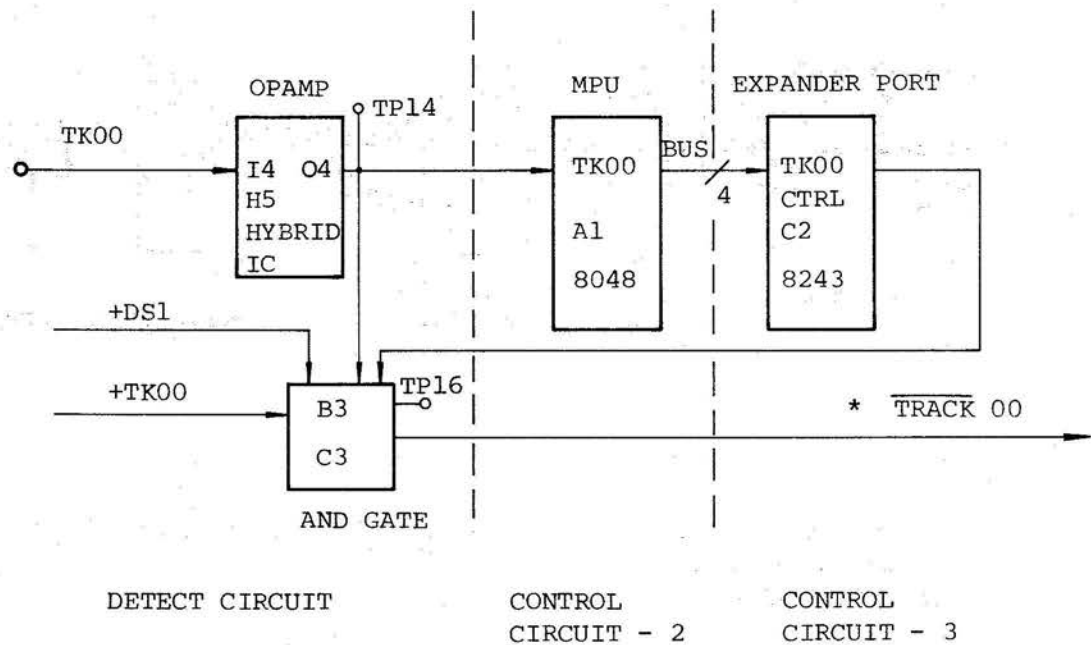
DETECT CIRCUIT

A door close signal (+DRCLS) is input at DOOR CLOSE of the MPU. It is processed by the MPU.

Locking the door is caused by IN-USE signal or HEAD LOAD signal from the expander port.



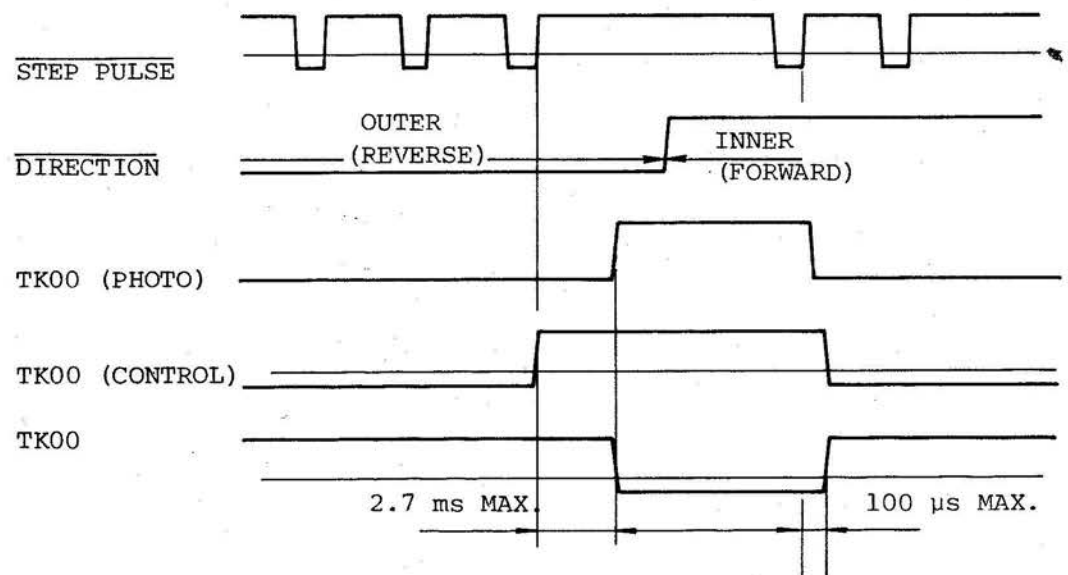
6.12 Track 00 Detection Circuit



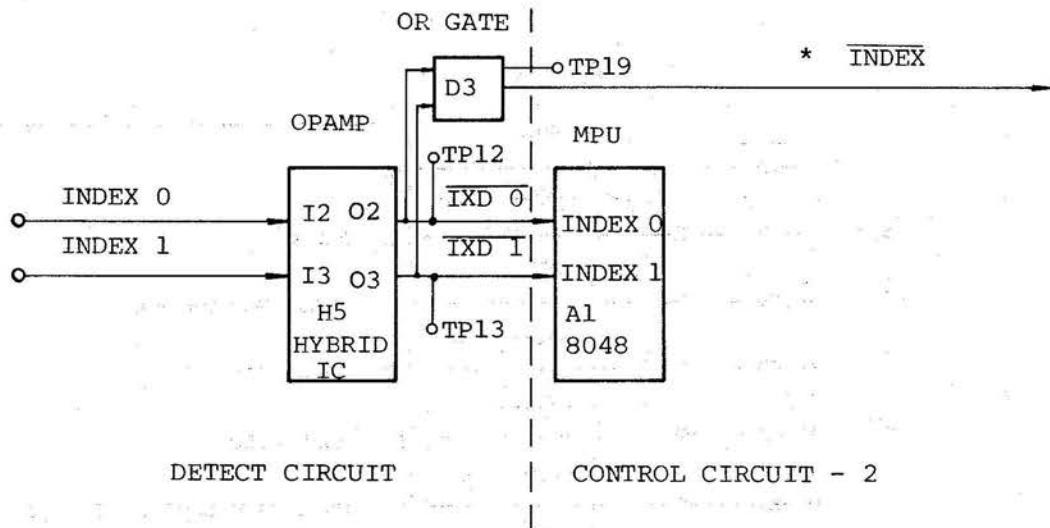
TK00 is detected by an optical sensor and creates stable logic level at the hybrid IC (H5).
DETECT CIRCUIT

The signal +TK00 is input to TK00 of MPU.
CONTROL CIRCUIT -2

The TRACK 00 CONTROL SIGNAL is output simultaneously with an input of a step pulse when its direction is reverse and when the step drivers $\phi 1$ and $\phi 4$ are both at a low level.



6.13 Index Detection Circuit



Index signals 0 and 1 are detected by an optical sensor and create a stable logic level at the hybrid IC (H5).

DETECT CIRCUIT

Signals $\overline{IXD0}$ and $\overline{IXD1}$ are input to INDEX0 and INDEX1 of MPU and are processed as timing signals.

CONTROL CIRCUIT -2

6.14 MPU Clock Circuit

The MPU obtains its clock from a 6-MHz ceramic oscillator, CL1, and dedicated capacitor, CML.

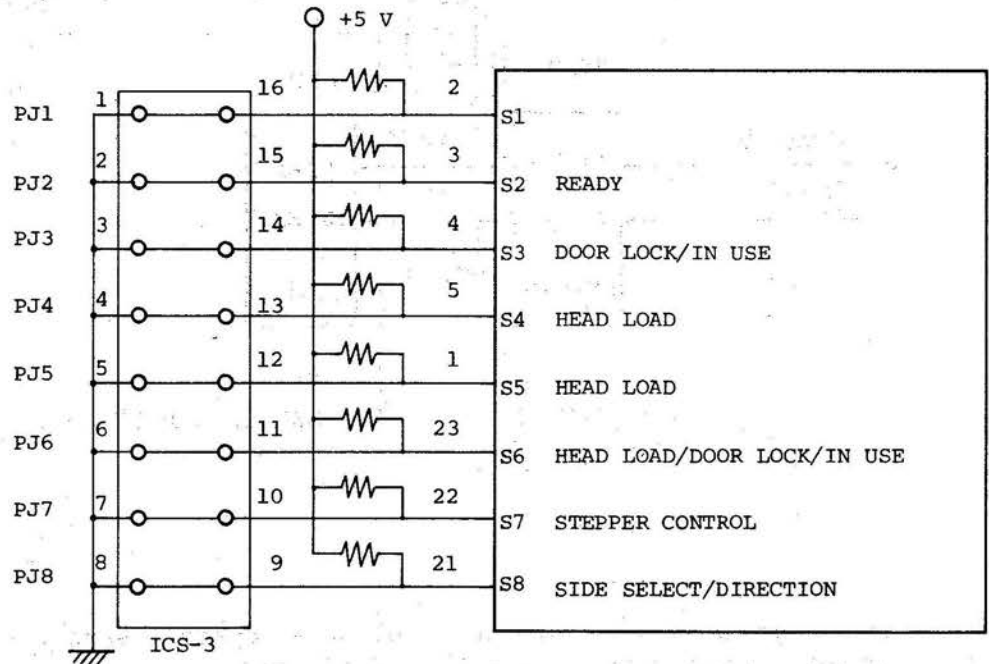
CONTROL CIRCUIT -2



7. OPTIONAL FUNCTIONS

7.1 MODE SET SHUNT Function

Modes can be selected by the MODE SET SHUNT on the printed-circuit board.



NOTE 1: Functions below PJ2 are not executed unless the door is closed.

2: PJ6 is valid only when SW4 is open and PJ5 is closed.

3: PJ3 is invalid when SW4 is open and PJ5 is closed.

7.2 Selection by MODE SET SHUNT

The RESET OUT terminal of the MPU becomes active (high level) during POWER ON RESET. During this time, the state of the MODE SET SHUNT is read through the multiplexer.

PJ1

Close	Open
Has no meaning.	Has no meaning.

PJ2

Close	Open
READY STANDARD - READY condition includes "Coincidence between medium and side select".	READY MODIFIED - "Coincidence between medium and side select" is excluded from READY condition.

PJ3

Close	Open
To receive the $\overline{\text{DRIVE SELECT}}$ signal and to output DOOR LOCK and IN USE signals.	To latch IN USE signal to make it into DOOR LOCK and IN USE signals.

PJ4

Close	Open
To receive the $\overline{\text{DRIVE SELECT}}$ signal and to output HEAD LOAD signal.	No meaning.

PJ5

Close	Open
No meaning.	To receive the $\overline{\text{HEAD LOAD}}$ signal and to output the HEAD LOAD signal.



PJ6

Close	Open
To output a HEAD LOAD signal relative to input of HEAD LOAD signal. Latching of a HEAD LOAD signal is accomplished using DRIVE SELECT, and HEAD UNLOAD is performed by again inputting DRIVE SELECT signal after making HEAD LOAD signal high.	To output a HEAD LOAD signal relative to input of IN USE signal. Latching of a HEAD LOAD signal is accomplished using DRIVE SELECT, and HEAD UNLOAD is performed by again inputting DRIVE SELECT signal after making an IN USE signal high.

PJ7

Close	Open
The stepping motor is activated when inputting the DRIVE SELECT.	The stepping motor is activated when inputting the HEAD LOAD.

PJ8

Close	Open
The SIDE SELECT and DIRECTION SELECT are separated and input.	The SIDE SELECT and DIRECTION SELECT signals are read from the DIRECTION terminal by time division.

7.3 Selection by Jumper Plugs

Selection is made by the plugs on the PCB.

Jumper Plug	Function
DS1 to DS4	Used to allocate DRIVE SELECT numbers.
1B to 4B	SIDE SELECT is performed by using DRIVE SELECT. Make trace "S2" open and "S3" closed at this time.
JUMPER WP CUT NP	The write protect notches on disks enable a WRITE PROTECT detection signal to be sent to the host side.
JUMPER NP CUT WP	WRITE PROTECT signal is ignored, and WRITE is always possible.
JUMPER Z CUT Y JUMPER F JUMPER Y CUT Z CUT F CUT Y CUT Z JUMPER F	Take OR of IN USE and DRIVE SELECT light up IN-USE. Light up IN-USE LED when HEAD LOAD. Light up IN-USE LED when IN USE (Option) is active.
JUMPER IW CUT CW JUMPER CW CUT IW	To output "LOW CURRENT" by a signal from outside. To output "LOW CURRENT" by a track counter value inside.
JUMPER SF CUT NSF JUMPER NSF CUT SF	Output "SW FILTER" by a track counter value inside. To stop SW filter functions.
JUMPER HUD CUT HUN JUMPER HUN CUT HUD	Head load condition is maintained for about 1 second. Head load condition has no delay.
JUMPER DLI CUT DLH JUMPER DLH CUT DLI	Door is locked when IN-USE is activated. Door is locked when HEAD LOAD is activated.
JUMPER DLM1 CUT DLM2 JUMPER DLM2 CUT DLM1	DOOR-LOCK is gated by DRIVE SELECT. DOOR-LOCK is not gated by DRIVE SELECT.



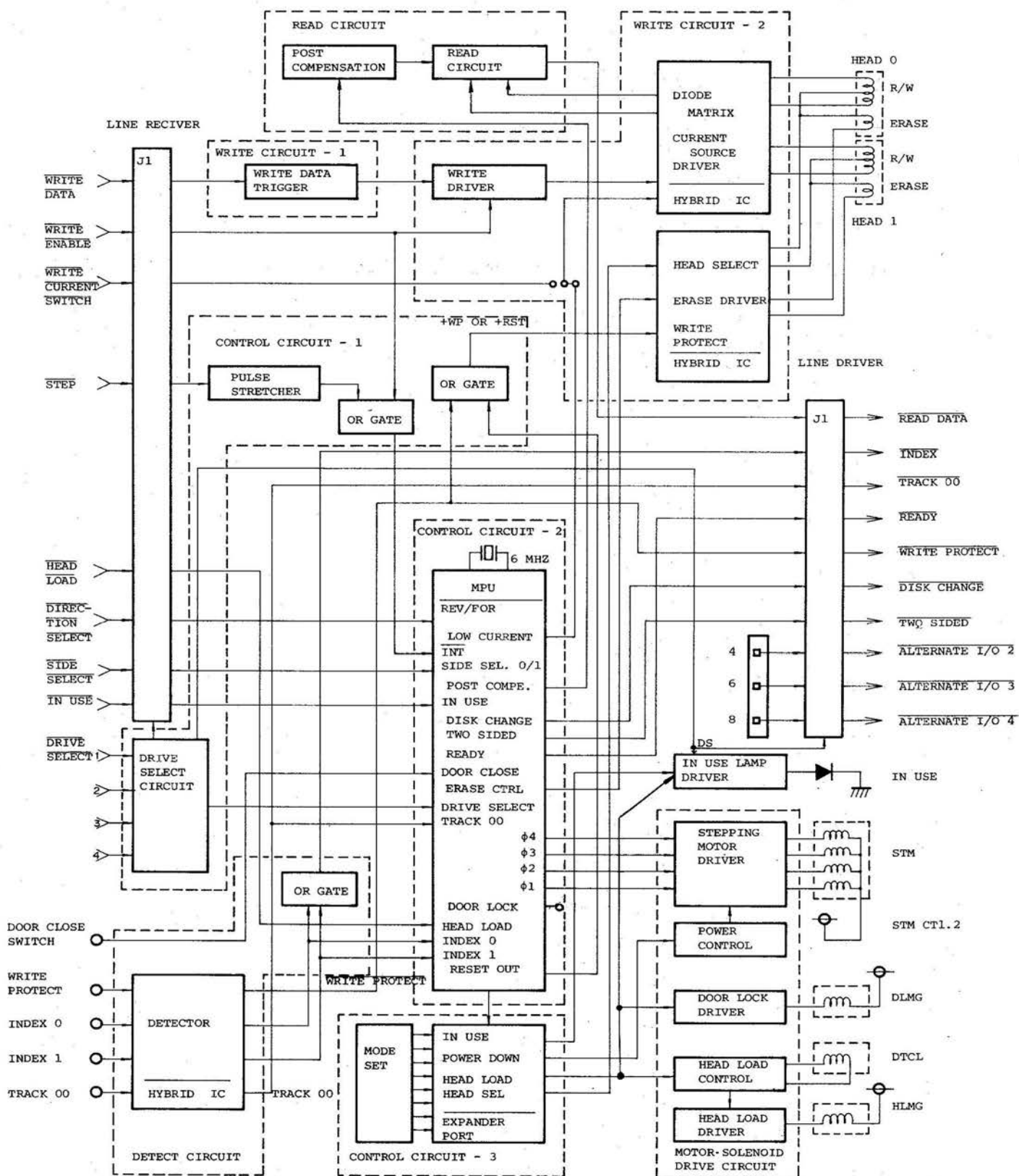
7.4 MODE SET SHUNT and Jumper Plug Applications

Jumper and Shunt	Function
CLOSE PJ4 OPEN PJ5 OPEN PJ7	When DRIVE is already selected, and wishing to control HEAD and STEPPER ENABLE only.
OPEN PJ4 OPEN PJ5 CLOSE PJ7	When wishing to seek with DOOR open and without loading the head.
OPEN PJ4 OPEN PJ5 CLOSE PJ7 JUMPER A	When wishing to make copies from disk to disk.
CUT R JUMPER ALTERNATE I/O	Used during star connection of READY.
CUT I JUMPER ALTERNATE I/O	Used during star connection of INDEX.
JUMPER DC	When wishing to use a DISK CHANGE signal.
OPEN PJ8	SIDE SELECT using DIRECTION terminal.
OPEN PJ3	When wishing to hold DOOR LOCK by a DRIVE SELECT signal even when an IN-USE signal is non-operable.
JUMPER S2	When wishing to use a TWO SIDED signal.
OPEN PJ2	When not wishing to make NOT READY, even when SIDE 1 is designated while a single-sided disk is mounted.

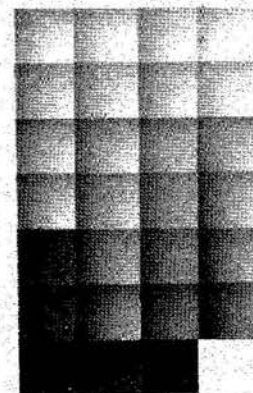


8. TEST POINTS

TP1	READ DATA
TP2	READ DATA
TP3	READ DATA (Amplified signal)
TP4	READ DATA (Amplified signal)
TP5	+READ DATA
TP6	+WRITE GATE (A signal ANDing $\overline{\text{WRITE PROTECT}}$ and $\overline{\text{WRITE GATE}}$)
TP7	$\overline{\text{WRITE CURRENT SWITCH}}$
TP8	$\overline{\text{SIDE SELECT (HEAD 1)}}$
TP9	$\overline{\text{ERASE CONTROL}}$
TP10	+READY
TP11	$\overline{\text{WRITE PROTECT}}$
TP12	$\overline{\text{INDEX 0}}$
TP13	$\overline{\text{INDEX 1}}$
TP14	+TRACK 00
TP15	+HEAD LOAD
TP16	+TRACK 00
TP17	+STEP
TP18	+POWER RESET
TP19	+INDEX (A signal ORing $\overline{\text{INDEX 0}}$ and $\overline{\text{INDEX 1}}$)
TP20	+CLOCK



Attachment 1 (Block Diagram)



ILLUSTRATED PARTS LIST

CONTENTS

	Fig. No.	Page
1. FLEXIBLE DISK DRIVE	1	2
Front Panel Assy	2	3
Handle Assy	3	4
PCA, NAFHL	4	5
2. MECHANISM ASSY	5	6,8
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DLMG (Door Lock Magnet) Assy	7	11
Idler Assy	8	12
STM (Stepping Motor) Assy	9	13
3. CARTRIDGE GUIDE ASSY	10	14
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Collet Assy	12	16
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(NOTICE)

The Illustrated Parts List is arranged so that figures are above or precede the parts' listings.

The quantity listed is the quantity used in a drive.

The numerical index is cross referenced to the figure and the corresponding list.

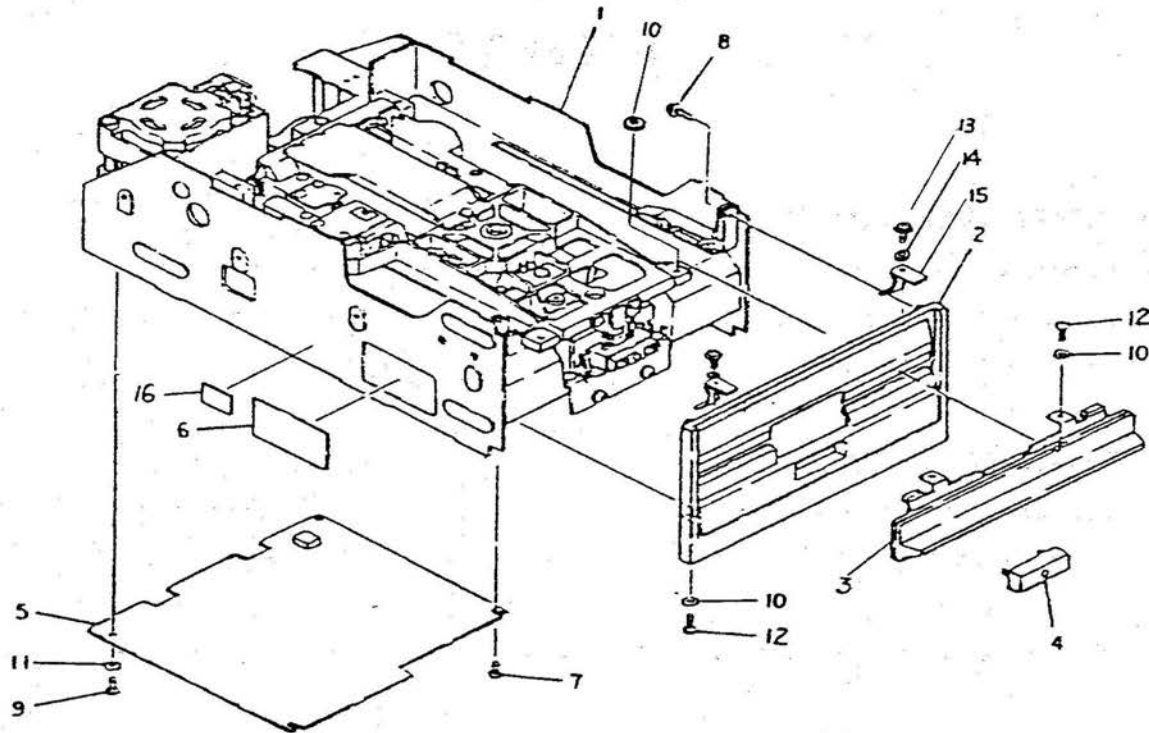


Figure 1 Flexible Disk Drive

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 1	DC141300-G01	Flexible Disk Drive (M2894-63B) (115V,50Hz)	
Fig. 1	DC141300-G02	Flexible Disk Drive (M2894-63B) (115V,60Hz)	
Fig. 1	DC141300-G03	Flexible Disk Drive (M2894-63D) (230V,50Hz)	
Fig. 1	DC141300-G04	Flexible Disk Drive (M2894-63D) (230V,60Hz)	
-1	DC141299-G01	Mechanism Assy (115V,50Hz) (See Fig. 5.)	1
-1	DC141299-G02	Mechanism Assy (115V,60Hz) (See Fig. 5.)	1
-1	DC141299-G03	Mechanism Assy (230V,50Hz) (See Fig. 5.)	1
-1	DC141299-G04	Mechanism Assy (230V,60Hz) (See Fig. 5.)	1
-2	DC243008-002	Front Panel (See Fig. 2.)	1
-3	DC342968-G01	Handle Assy (See Fig. 3.)	1
-4	DC342904-001	Button	1
-5	DC444786-G01	PCA NAFHL (See Fig. 4.)	1
-6	DC343037-001	Name Plate	1
-7	DCPS-112012-007	Screw, Tap-Tight, M4x0.7x8 FE	3
-8	DCPS-112003-002	Screw, Pan Hd, Washered, M3x0.5x12 FE	2
-9	DCPS-112005-014	Screw, Pan Hd, M4x0.7x8 BS	1
-10	DCPS-132003-003	Washer, Plain, M4 FE	6
-11	DCPS-132003-009	Washer, Plain, M4 BS	1
-12	DCPS-112012-008	Screw, Tap-Tight, M4x0.7x10 FE	4
-13	DC446230-001	Screw	2
-14	DCPS-132003-002	Washer, Plain, M3 FE	2
-15	DC446194-002	Spring	2
-16	DC343038-001	Name Plate CSA	1

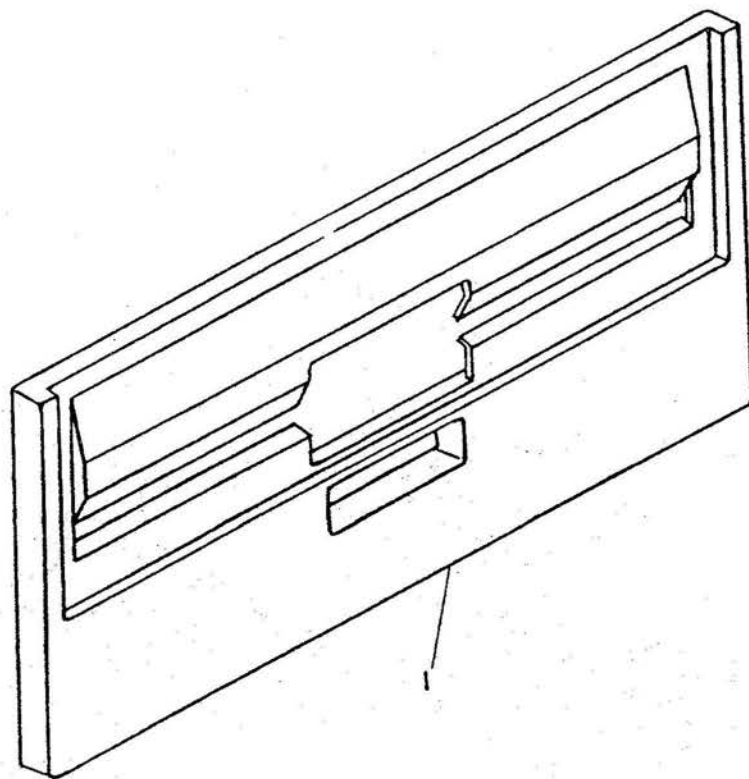


Figure 2 Front Panel

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 2	DC243008-002	Front Panel (With indicator)	1

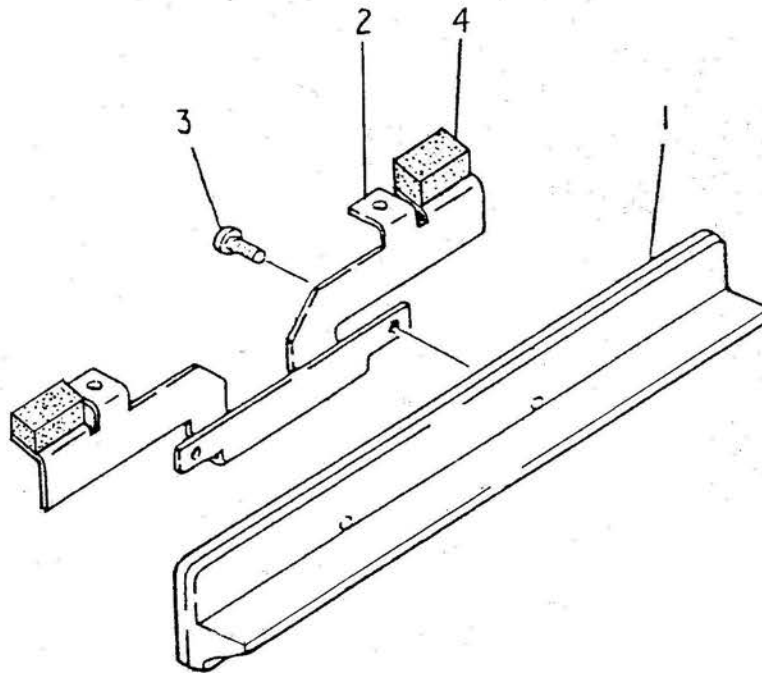
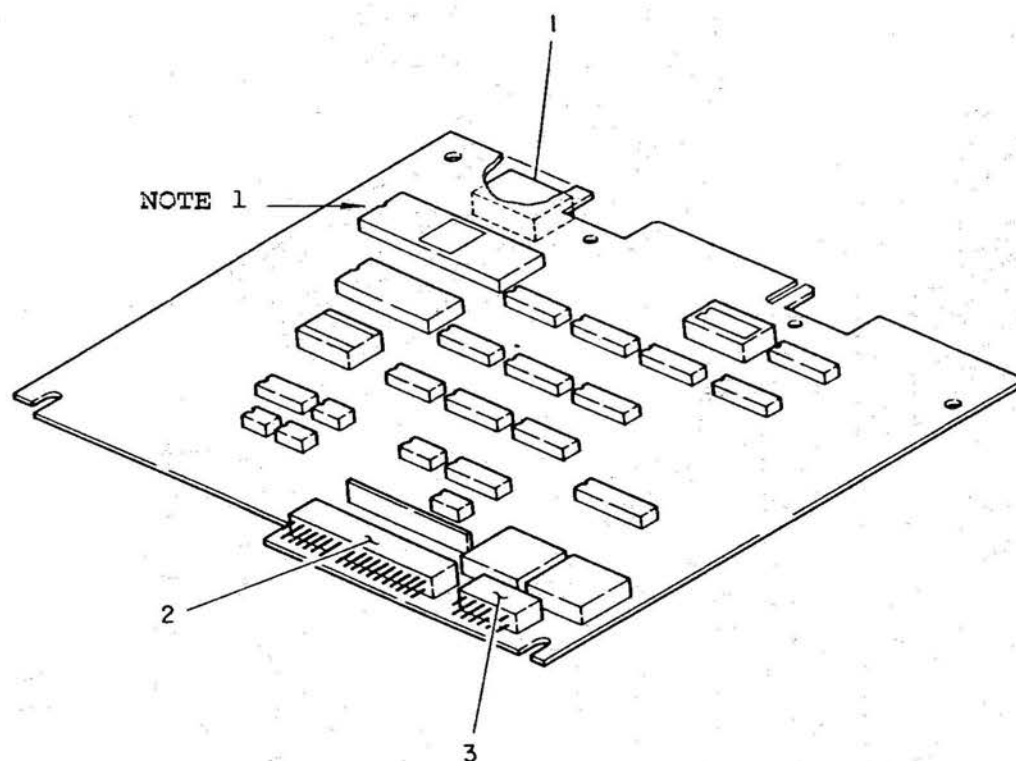


Figure 3 Handle Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 3	DC342968-G01	Handle Assy	
-1	DC342893-G01	Handle	1
-2	DC342895-001	Bracket, Handle	1
-3	DCPS-112004-002	Screw, Pan Hd, M3x0.5x6 FE	2
-4	DC445782-001	Cushion sheet	2



NOTE 1. Part number is stamped as following : DC444947
 ▲ NAFHL- □ H □
 Part number (Stamped)

Figure 4 PCA, NAFHL

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 4	DC444947-00-M	PCA, NAFHL	
-1	DC445045-011	Connector, PWB, 1-380999-0	1
-2	DC445045-013	Connector, PWB, PS-40PA-D4LT1-A1	1
-3	DC445045-014	Connector, PWB, 65625-114 #6	1

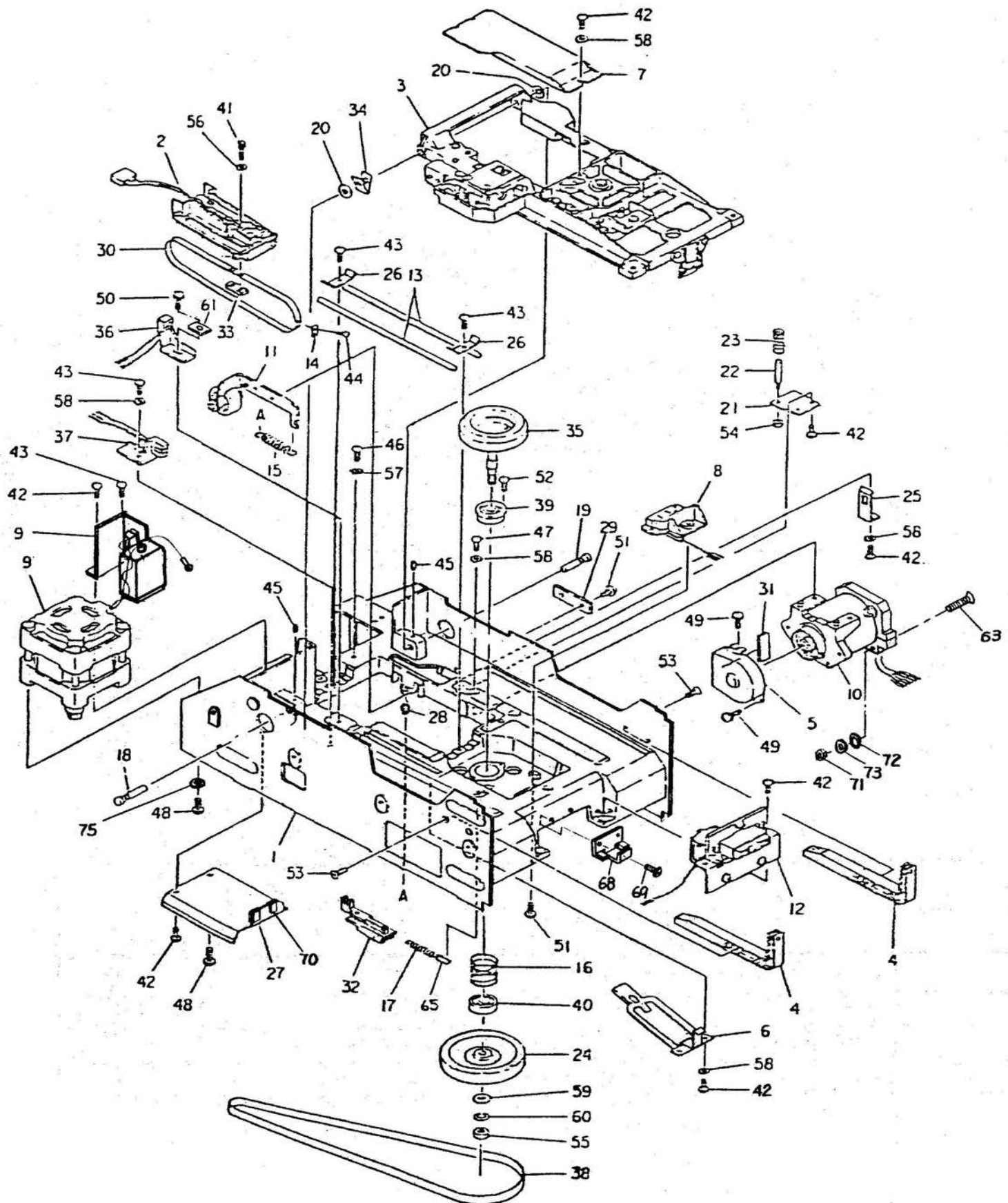


Figure 5 Mechanism Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 5	DC141299-G01	Mechanism Assy (115V, 50Hz)	
Fig. 5	DC141299-G02	Mechanism Assy (115V, 60Hz)	
Fig. 5	DC141299-G03	Mechanism Assy (230V, 50Hz)	
Fig. 5	DC141299-G04	Mechanism Assy (230V, 60Hz)	
-1	DCS14022-001	Frame	1
-2	DC241726-G01	Carriage Assy (See Fig. 13.)	1
-3	DC242582-G03	Cartridge Guide Assy (See Fig. 10.)	1
-4	DC342790-G01	Guide, Block	2
-5	DC342408-001	Cover	1
-6	DCS34068-001	P Spring, Ejector	1
-7	DC342414-001	Cover, Carriage	1
-8	DC444905-G01	Index Sensor (D) Assy	1
-9	DC342966-G02	Spindle Motor Assy (115V, 60Hz) (See Fig. 6.)	1
-9	DC342966-G03	Spindle Motor Assy (230V, 50Hz) (See Fig. 6.)	1
-10	DC342525-G01	STM Assy (See Fig. 9.)	1
-11	DC342526-G01	Idler Assy (See Fig. 8.)	1
-12	DC342967-G01	DIMG Assy (See Fig. 7.)	1
-13	DC441073-004	Guide, Rod	2
-14	DC441159-001	Holder, Band	1
-15	DC442169-001	Spring, Idler	1
-16	DC443046-001	Spring, Pre-load	1
-17	DC445100-001	Spring, Ejector	1
-18	DC444710-001	Pin(A), Cartridge Guide	1
-19	DC444710-002	Pin(B), Cartridge Guide	1
-20	DC444711-001	Spacer	2
-21	DC444712-001	Plate	1
-22	DC444713-001	Pin	1
-23	DC445586-004	Spring, Cartridge Guide	1
-24	DCS44178-001	Pulley, Spindle	1
-25	DC444718-001	Spring, Leaf, Cartridge Guide	1
-26	DC444719-001	Clamp	2
-27	DCS44192-001	Guide, Cable	1
-28	DC444721-001	Pin, Spring	1
-29	DC444722-001	Plate, Idler	1
-30	DC444723-001	Band	1
-31	DC444725-001	Cleaner	1
-32	DC444900-G02	Ejector, Sub, Assy	1
-33	DC441050-001	Holder, Band A	1
-34	F914053-003	Spring, Plate B	1

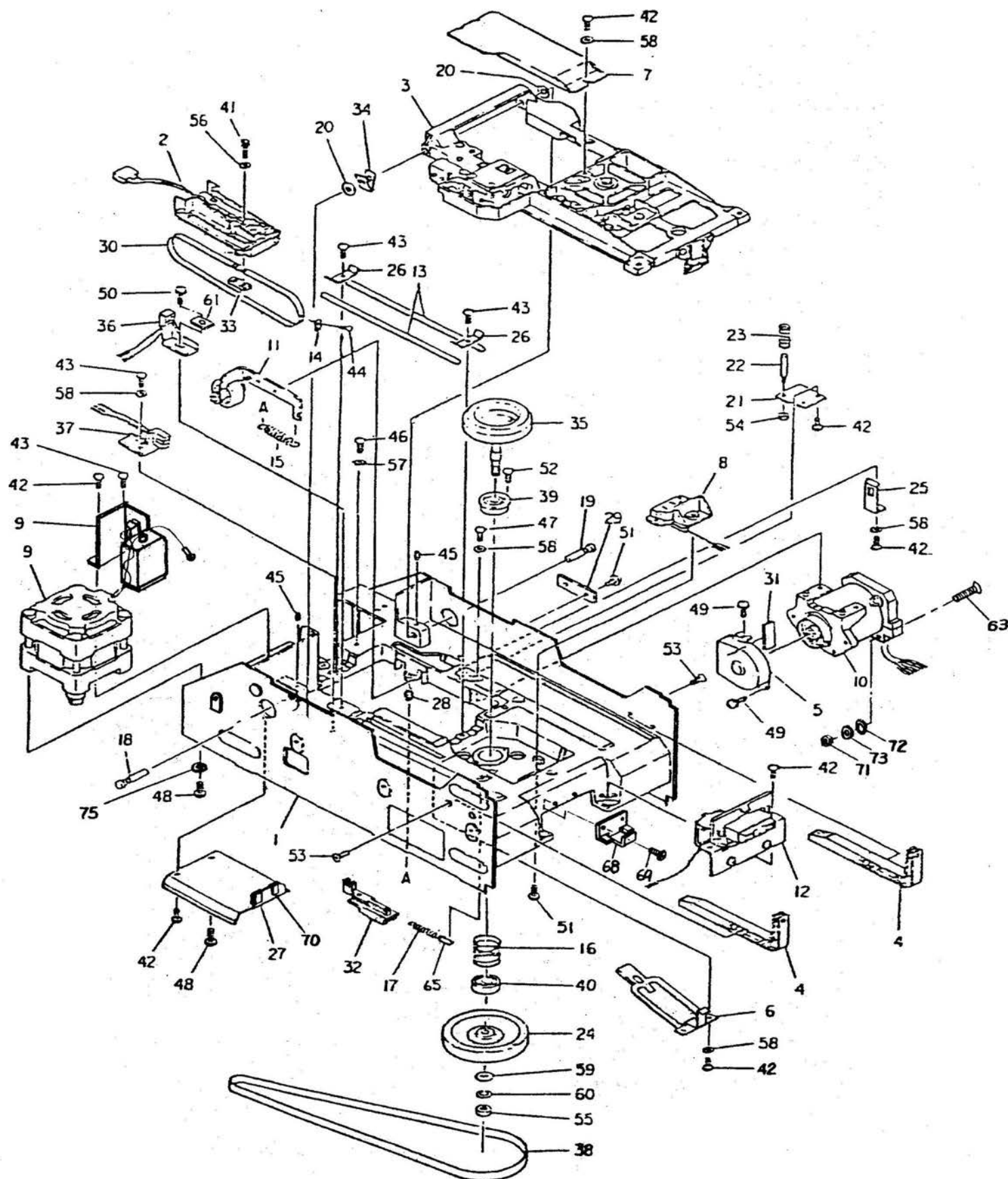


Figure 5 Mechanism Assy

Fig. & Index Number	Part Number	Description	Q'ty
-35	F932300-002	Spindle	1
-36	DC444096-G01	TKCO, Sensor Assy	1
-37	DC444907-G01	Write, Protector Sensor Assy	1
-38	DCPS-20023	Belt	1
-39	DCPS-152034-001	Bearing, F608ZZPS	1
-40	DCPS-152034-002	Bearing, 608ZZMC3E	1
-41	DCPS-112009-004	Bolt, Socket, M2.6x6 FE	2
-42	DCPS-112012-007	Screw, Tap-Tight, M4x0.7x8 FE	10
-43	DCPS-112012-008	Screw, Tap-Tight, M4x0.7x10 FE	4
-44	DCPS-112005-004	Screw, Pan Hd, M2.6x5 BS	1
-45	DCPS-112011-001	Screw, Set-Socket, M3x0.5x4 FE	2
-46	DCPS-112005-014	Screw, Pan Hd, M4x0.7x8 BS	1
-47	DCPS-112004-007	Screw, Pan Hd, M4x0.7x12 FE	2
-48	DCPS-112004-012	Screw, Pan Hd, M5x0.8x16 FE	4
-49	DCPS-112002-006	Screw, Pan Hd, Washered, M3x0.5x6 BS	2
-50	DCPS-112004-006	Screw, Pan Hd, M4x0.7x10 FE	1
-51	DCPS-112001-009	Screw, Pan Hd, Washered, M4x0.7x14 FE	3
-52	DCPS-112006-005	Screw, Truss Hd, M3x0.5x8 BS	2
-53	DCPS-112007-003	Screw, Flat Hd, M3x0.5x12 FE	2
-54	DCPS-112019-003	Nut, Hex, M4x0.7 FE	1
-55	DCPS-112018-004	Nut, Hex, M6, Left-Hand Thread FE, Class 1	1
-56	DCPS-132003-001	Washer, Plain, M2.6 FE	2
-57	DCPS-132001-002	Washer, Tooth-AB, M4 FE	1
-58	DCPS-132003-003	Washer, Plain, M4 FE	
-59	DCPS-132003-005	Washer, Plain, M6 FE	1
-60	DCPS-132004-005	Washer, Spring, M6 FE	1
-61	DC445250-001	Washer	1
-63	DCPS-112008-007	Screw, Flat Hd, M4x0.7x25 BS	2
-65	DCS44185-001	Coil	1
-68	DC445781-001	Latch, Stopper	1
-69	DCPS-112003-001	Screw, Pan Hd, Washered, M3x0.5x8 FE	2
-70	DC445782-004	Cushion	2
-71	DCPS-112019-009	Nut, Hex, M4x0.7 BS	2
-72	DCPS-132003-009	Washer, Plain, M4 BS	2
-73	DCPS-132004-009	Washer, Spring, M4	2

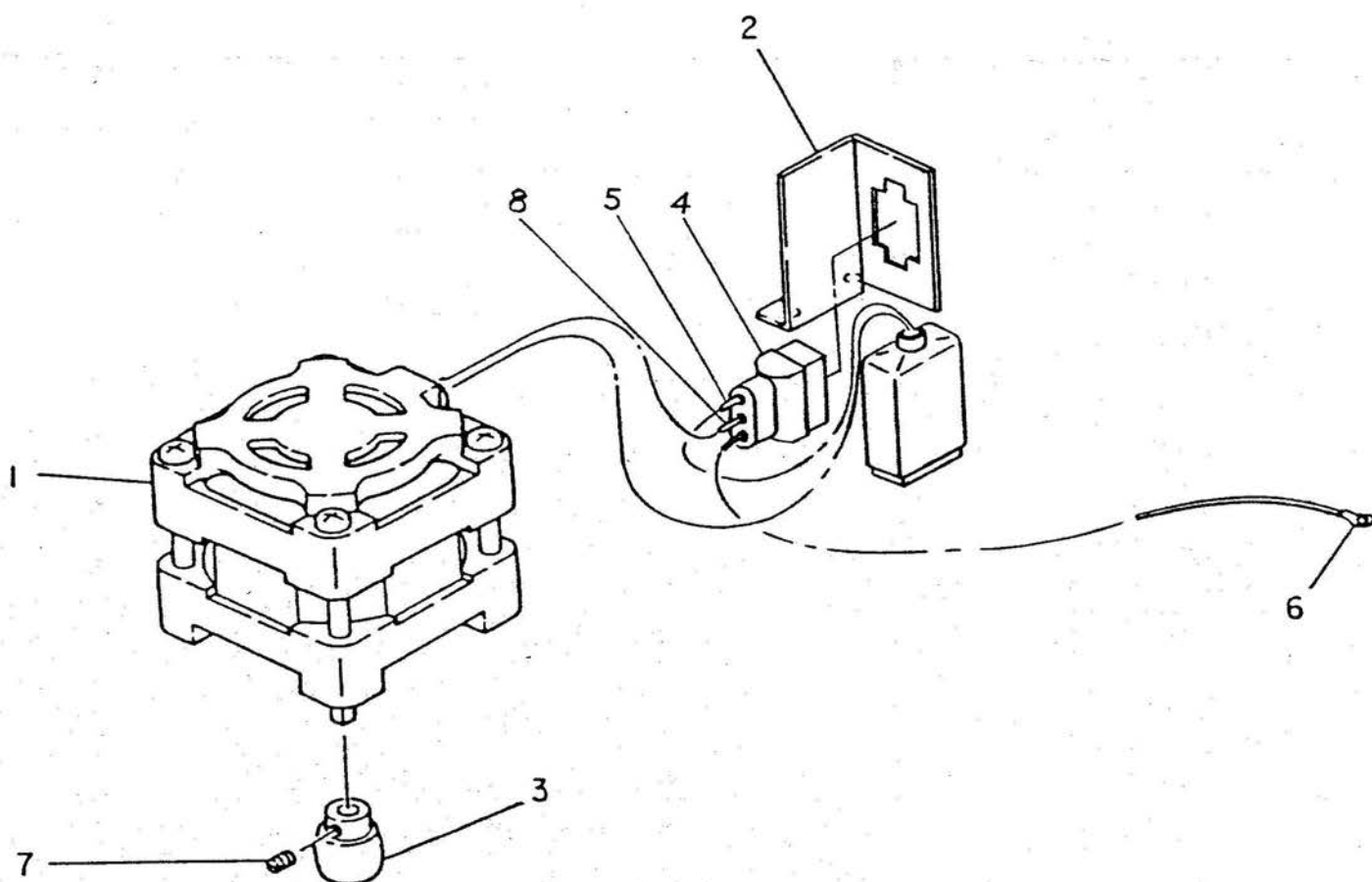


Figure 6 Spindle Motor Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 6	DC342966-G01	Spindle Motor Assy (115V, 50Hz)	
Fig. 6	DC342966-G02	Spindle Motor Assy (115V, 60Hz)	
Fig. 6	DC342966-G03	Spindle Motor Assy (230V, 50Hz)	
Fig. 6	DC342966-G04	Spindle Motor Assy (230V, 60Hz)	
-1	KEISAKI-J20916-001	Spindle Motor (115V) (With a capacitor capped)	1
-1	KEISAKI-J20916-002	Spindle Motor (230V) (With a capacitor capped)	1
-2	DC445796-001	Bracket, Connector	1
-3	DC444717-001	Motor Pulley, 50 (50Hz)	1
-3	DC444717-002	Motor Pulley, 60 (60Hz)	1
-4	DC445045-001	Connector, Rectangular, 1-480701-0	1
-5	DC445045-021	Contact, Connector, 350690-1	2
-6	DC445045-051	Terminal, Crimp, V1.25-M4	1
-7	DCPS-112011-001	Screw, Set-Socket, M3x0.5x4 FE	1
-8	DC445045-80	Contact, Connector, 350669-1	1

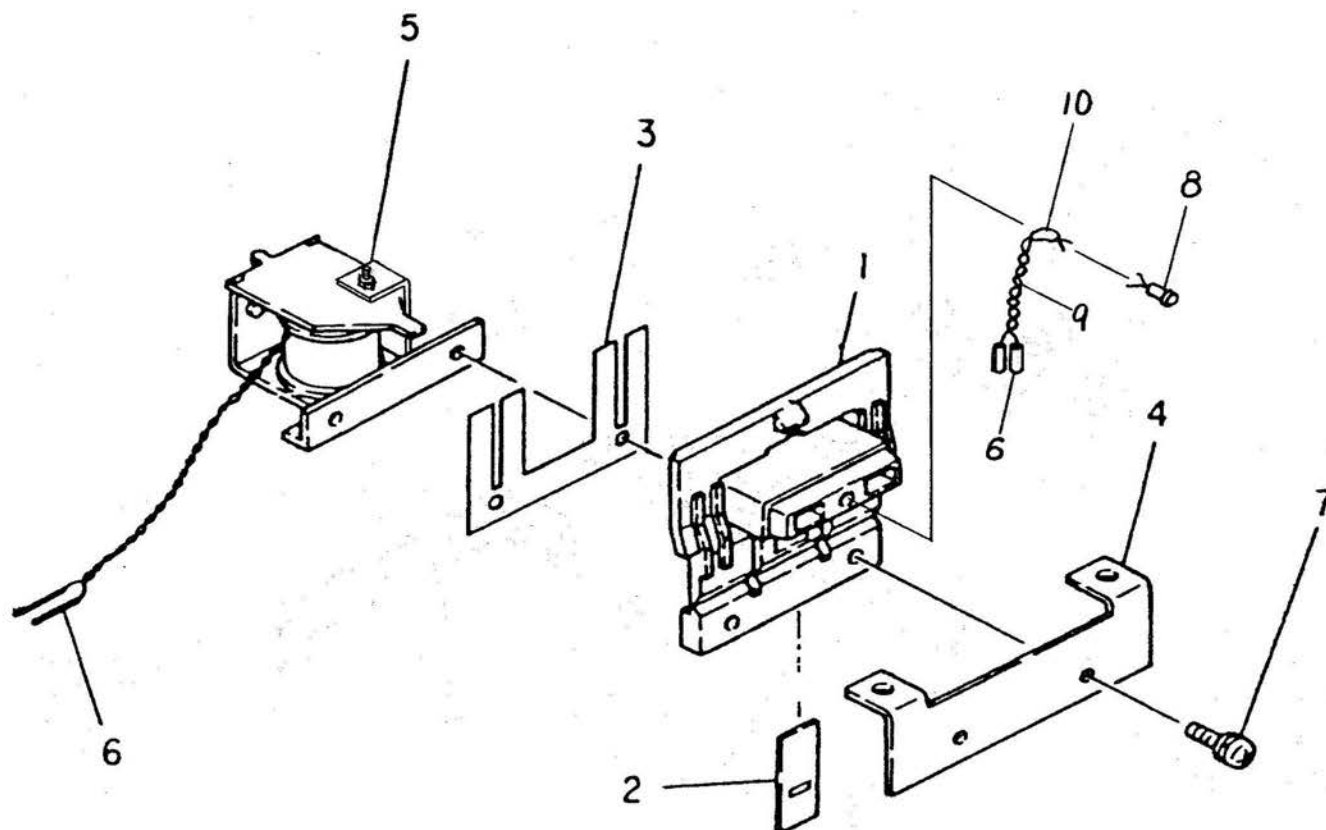


Figure 7 DLMG (Door Lock Magnet) Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 7	DC342967-G01	DLMG Assy	
-1	DCS34069-G01	Latch (s)	1
-2	DCS44189-001	Slider, Plate	1
-3	DCS44190-001	Spring, Latch	1
-4	DC445775-001	Bracket, Latch	1
-5	KEISAKI-J20854	Solenoid	1
-6	DC445045-026	Contact, Connector, 031-50628	4
-7	DCPS-112003-002	Screw, Pan Hd, Washered, M3x0.5x12 FE	2
-8	DCPS-512000	Diode, LED, TLR102 KB	1
-9	DC445043-001	Wire, Vinyl, UL1061 AWG24 (7)x2-0x2 0.38M	1
-10	DC445043-011	Tube, Vinyl, Inside 2ø Clear 0.02M	2

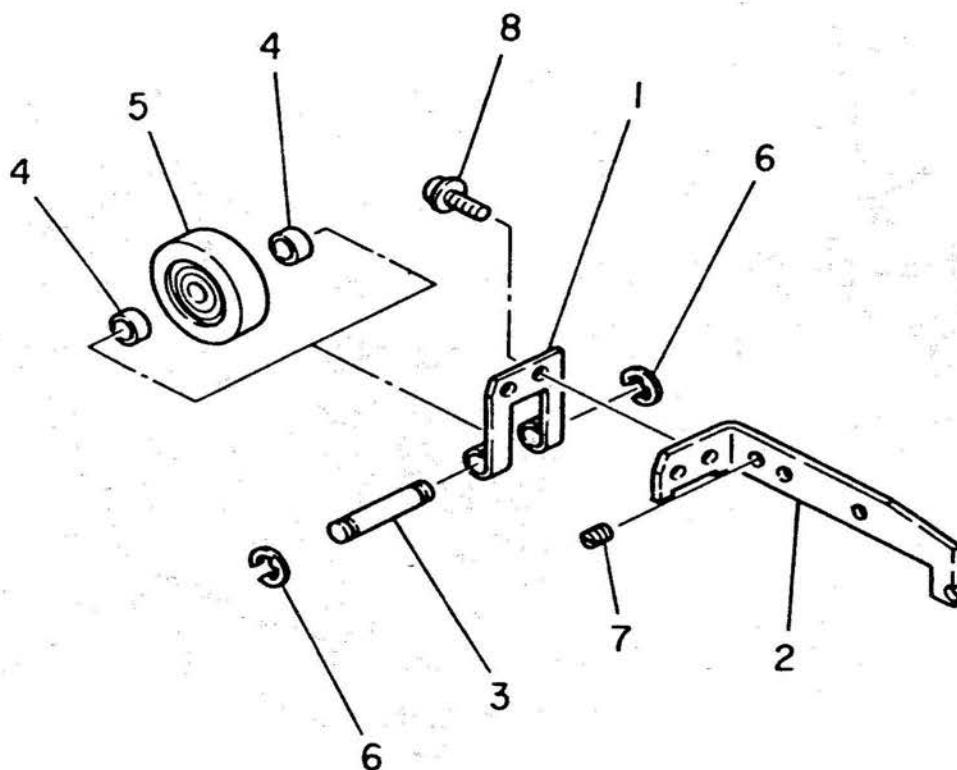


Figure 8 Idler Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 8	DC342526-G01	Idler Assy	.
-1	DC444729-001	Lever, Idler	1
-2	DC444730-001	Holder, Idler	1
-3	DC444731-001	Pin, Idler	1
-4	DC444732-001	Collar	2
-5	DC444899-G01	Idler, Sub. Assy	1
-6	DCPS-J20002-003	Ring, E, 5 ϕ , Sus	2
-7	DCPS-112016-003	Screw, Set-Slot, M4x0.7x6 FE	1
-8	DCPS-112001-006	Screw, Pan Hd, Washered, M4x0.7x8 FE	2

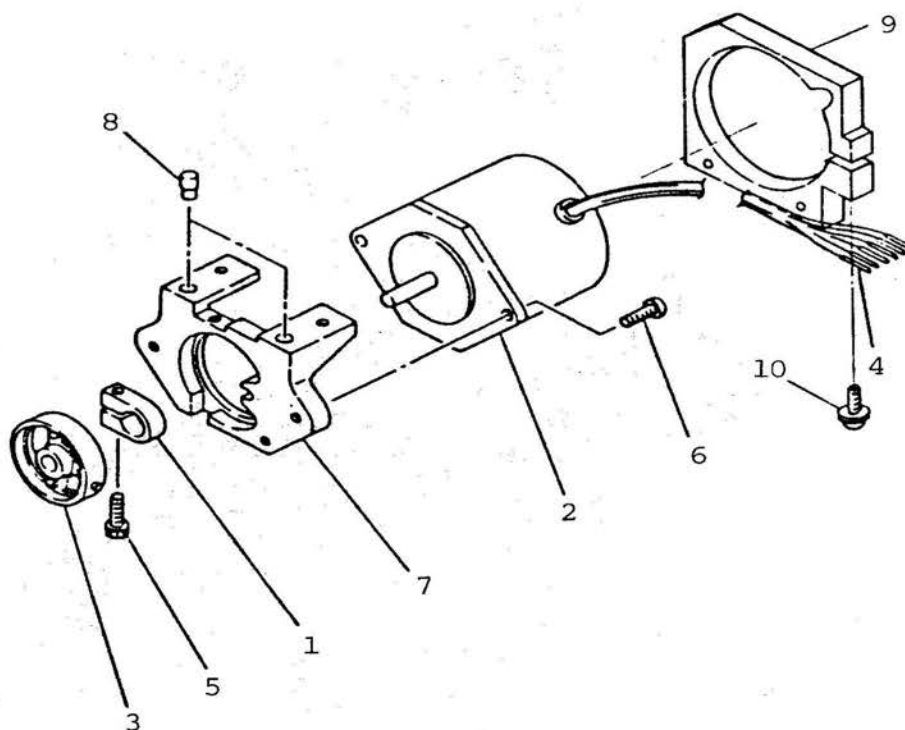


Figure 9 STM (Stepping Motor) Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 9	DC342525-G01	STM Assy	
-1	DC445065-001	Clamp (Cap)	1
-2	DC444842-001	Stepping Motor	1
-3	DC444898-001	Capstan Assy	1
-4	DC445045-026	Contact, Connector, 031-50628	6
-5	DCPS-112009-008	Bolt, Socket, M4x0.7x16 FE	1
-6	DCPS-112004-007	Screw, Pan Hd, M4x0.7x12 FE	2
-7	DC342629-001	Adapter	1
-8	DC444779-001	Pin	2
-9	DCS44175-001	Clamp, STM	1
-10	DCPS-112003-007	Screw, Pan Hd, Washered, M4x0.7x25 FE	1

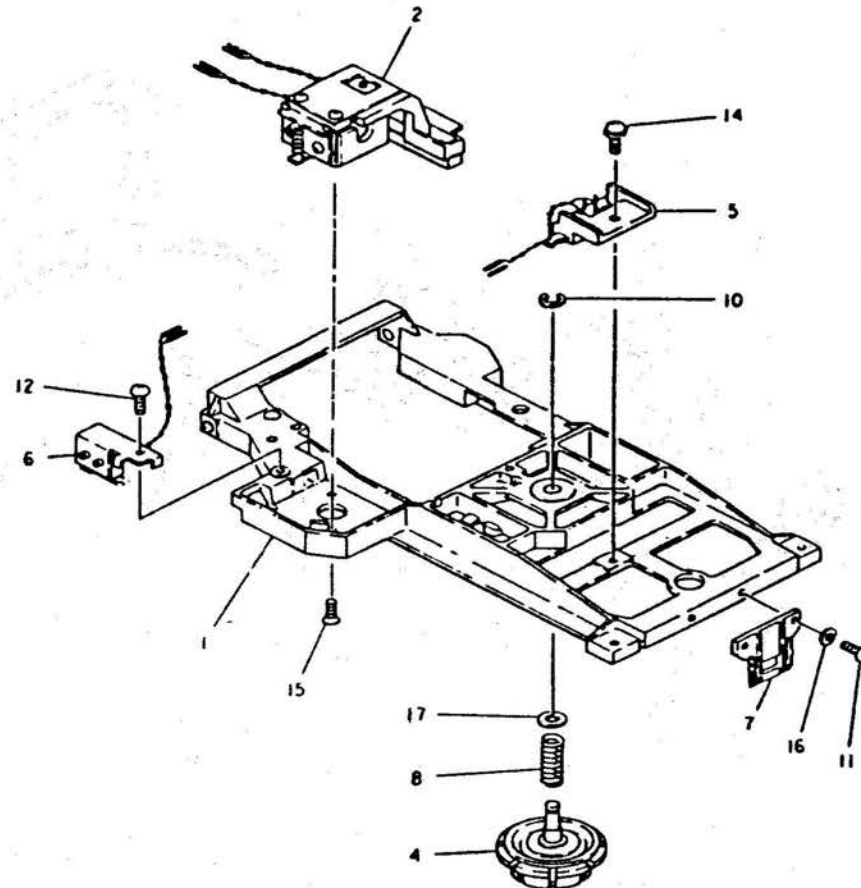


Figure 10 Cartridge Guide Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 10	DC242582-G03	Cartridge Guide Assy	
-1	DC141114-001	Cartridge Guide	1
-2	DC342528-G01	HLMG Assy (See Fig. 11.)	1
-4	DC444901-G01	Collet Assy (See Fig. 12.)	1
-5	DC444903-G01	Index Sensor (U) Assy	1
-6	DC444904-G01	DRSW Assy	1
-7	DC445776-001	Plate, Latch	1
-8	F914470-001	Spring, Collet	1
-10	DCPS-J20002-003	Ring, E, 5φ, Sus	1
-11	DCPS-112012-002	Screw, Tap-Tight, M3x0.5x8 FE	2
-12	DCPS-112012-007	Screw, Tap-Tight, M4x0.7x8 FE	1
-14	DCPS-112003-005	Screw, Pan Hd, Washered, M4x0.7x10 FE	1
-15	DCPS-112008-002	Screw, Flat, M3x0.5x8 BS	2
-16	DCPS-132003-002	Washer, Plain, M3 FE	2
-17	DCPS-132003-005	Washer, Plain, M6 FE	1

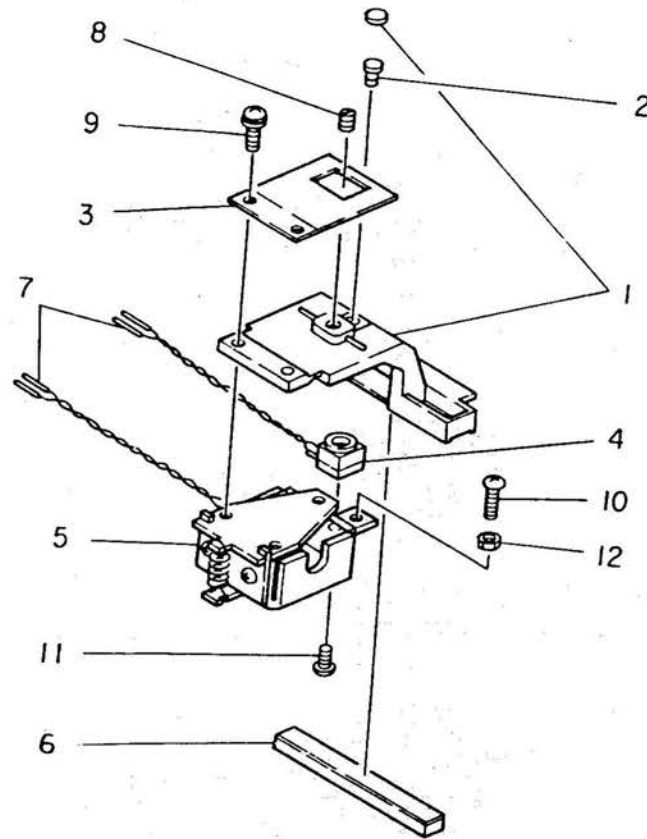


Figure 11 HLMG (Head Load Magnet) Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 11	DC342528-G01	HLMG Assy	
-1	DC342412-G01	Guide, HLMG	1
-2	DC444059-G01	Magnet, Assy	1
-3	DC444727-001	Spring, Veil	1
-4	KEISAKI-J20843-001	Sensor Coil A	1
-5	KEISAKI-J20898	Solenoid, NA-S	1
-6	KEISAKI-J20794-001	Soft Tape A	1
-7	DC445045-026	Contact, Connector, 031-50628	4
-8	DCPS-112016-003	Screw, Set-Slot, M4x0.7x6 FE	1
-9	DCPS-112005-010	Screw, Pan Hd, M3x0.5x8 BS	2
-10	DCPS-112005-013	Screw, Pan Hd, M3x0.5x16 BS	1
-11	DCPS-112006-002	Screw, Truss Hd, M2.6x6 BS	1
-12	DCPS-112019-008	Nut, Hex, M3x0.5 BS	1

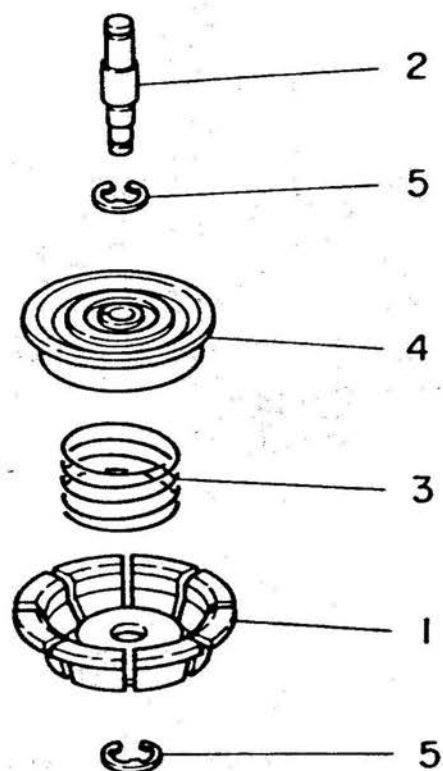


Figure 12 Collet Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 12	DC444901-G01	Collet Assy	
-1	DC444741-001	Collet A	1
-2	DC444743-001	Shaft	1
-3	DC444744-001	Spring, Collet, P	1
-4	DC444902-G01	Collet, B, Sub Assy	1
-5	DCPS-J20002-003	Ring, E, 5 ϕ , Sus	2

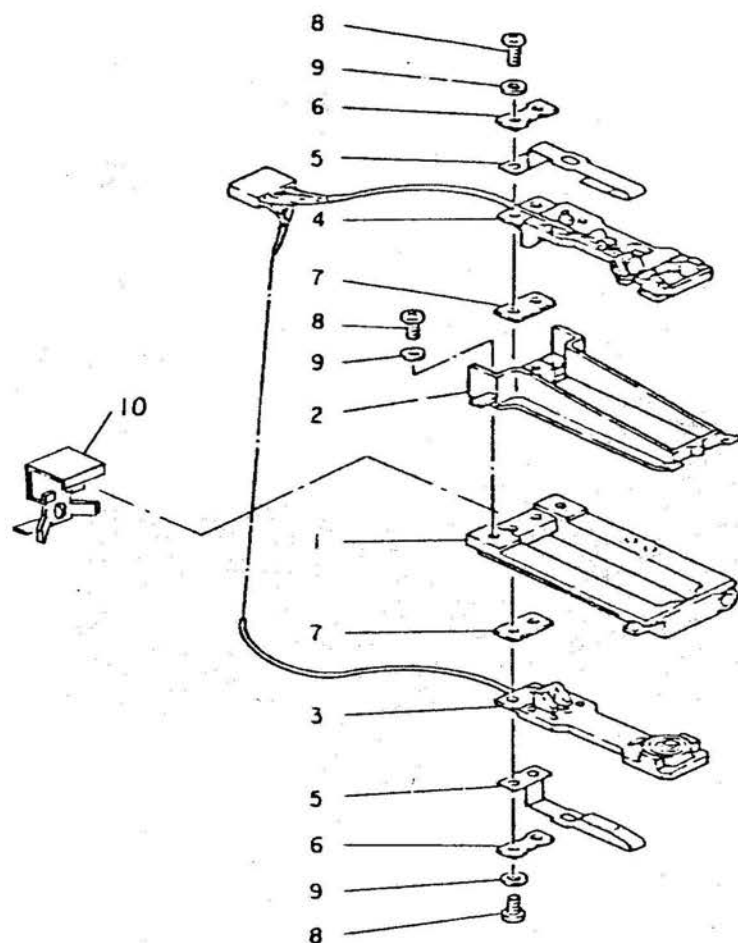


Figure 13 Carriage Assy

Fig. & Index Number	Part Number	Description	Q'ty
Fig. 13	DC241726-G01	Carriage Assy (Integrated part)	
-1	DC241731-G01	Carriage (S0)	1
-2	DC241730-G01	Carriage (S1)	1
-3	DC241727-G01	Arm (S0) (With head)	1
-4	DC241728-G01	Arm (S1) (With head)	1
-5	DCS44296-001	Spring Leaf	2
-6	DCS44291-001	Arm Plate	2
-7	DCS44301-001	Plate	2
-8	DCPS-112004-002	Screw, Pan Hd, M3x0.5x6 FE	6
-9	DCPS-132003-002	Washer, Plain, M3 FE	6
-10	DC445621-G01	Cable Clamp	1

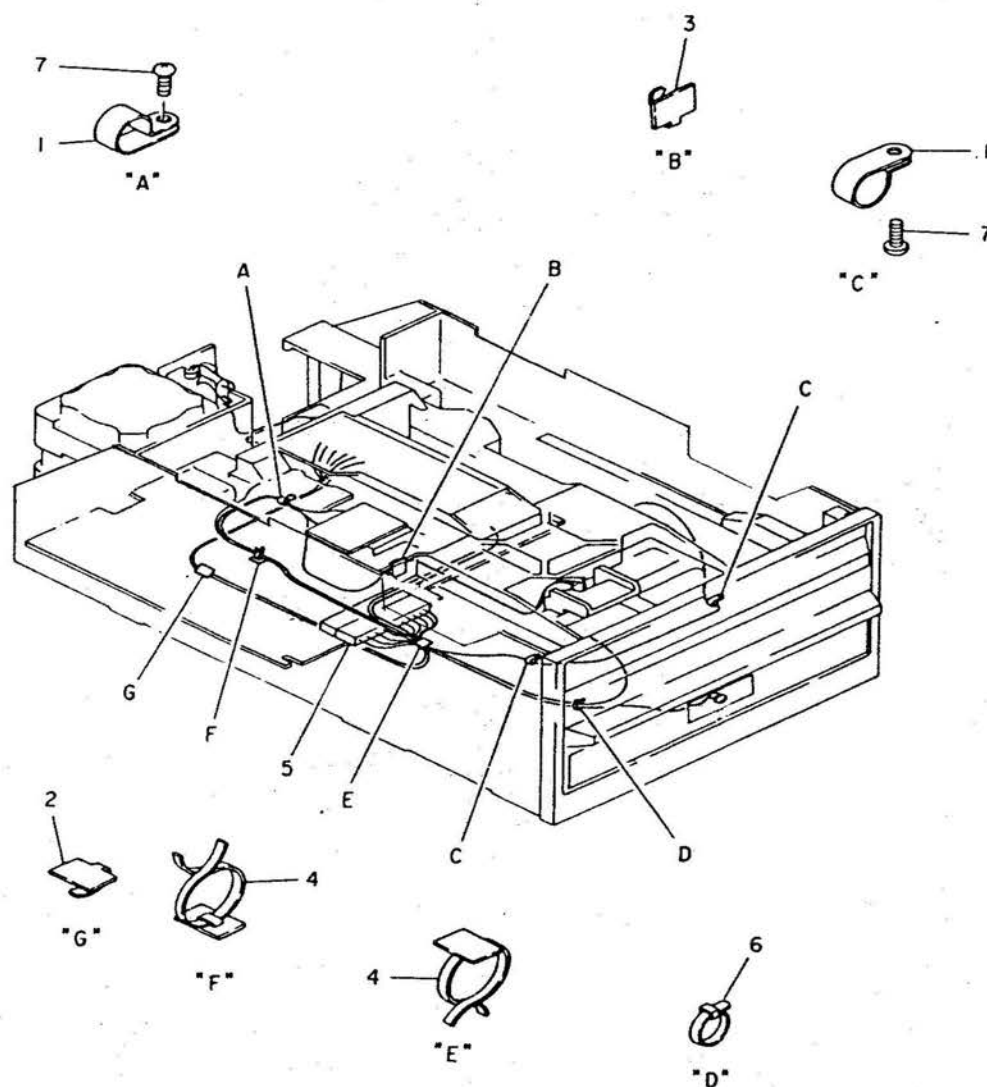
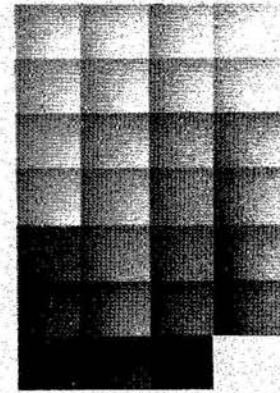
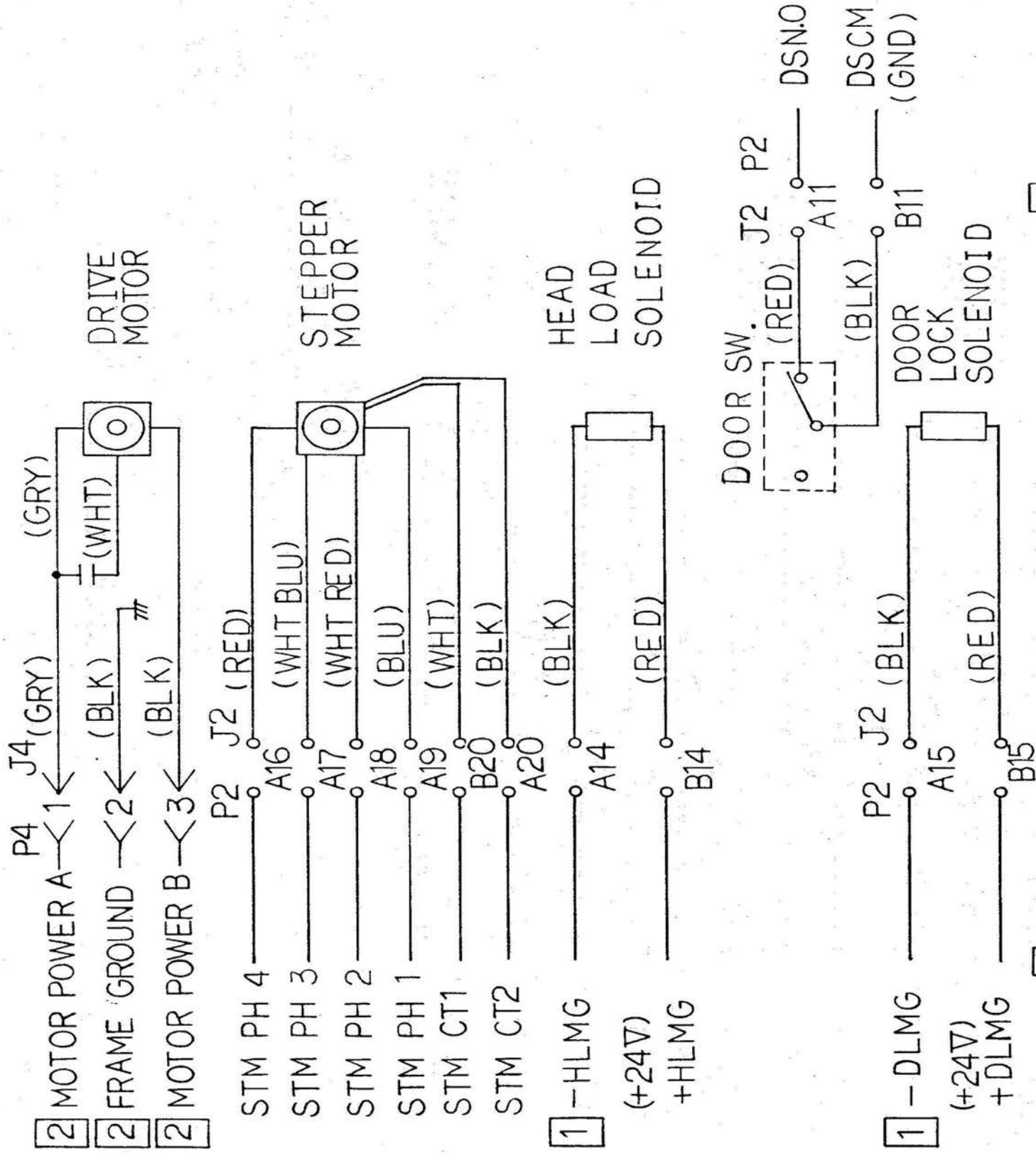


Figure 14 Flexible Disk Drive Wiring Diagram

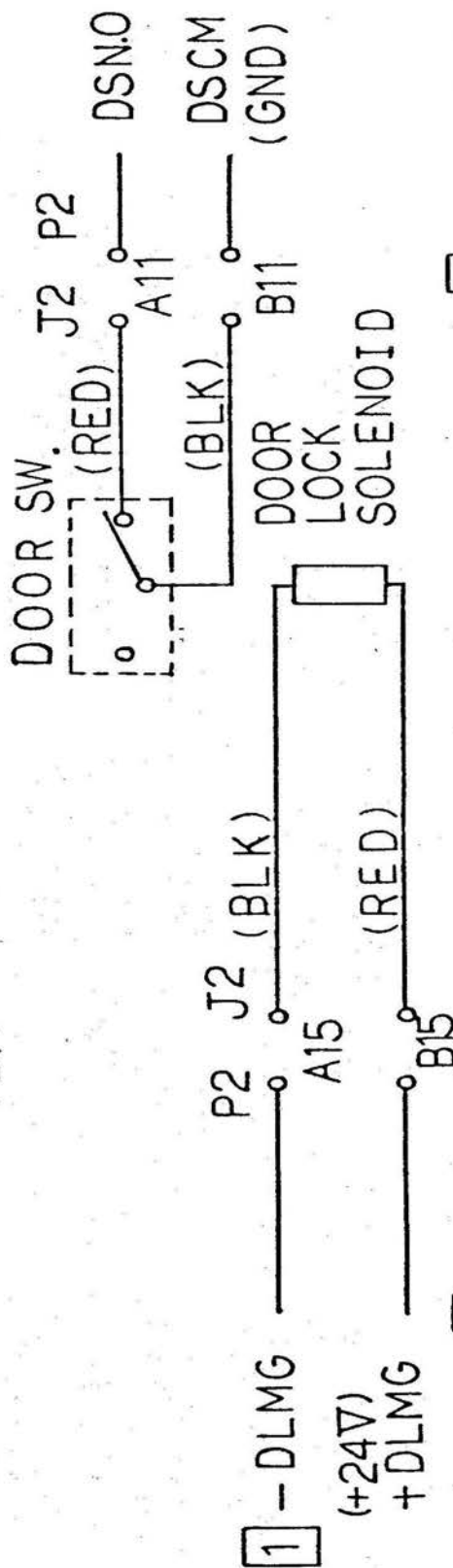
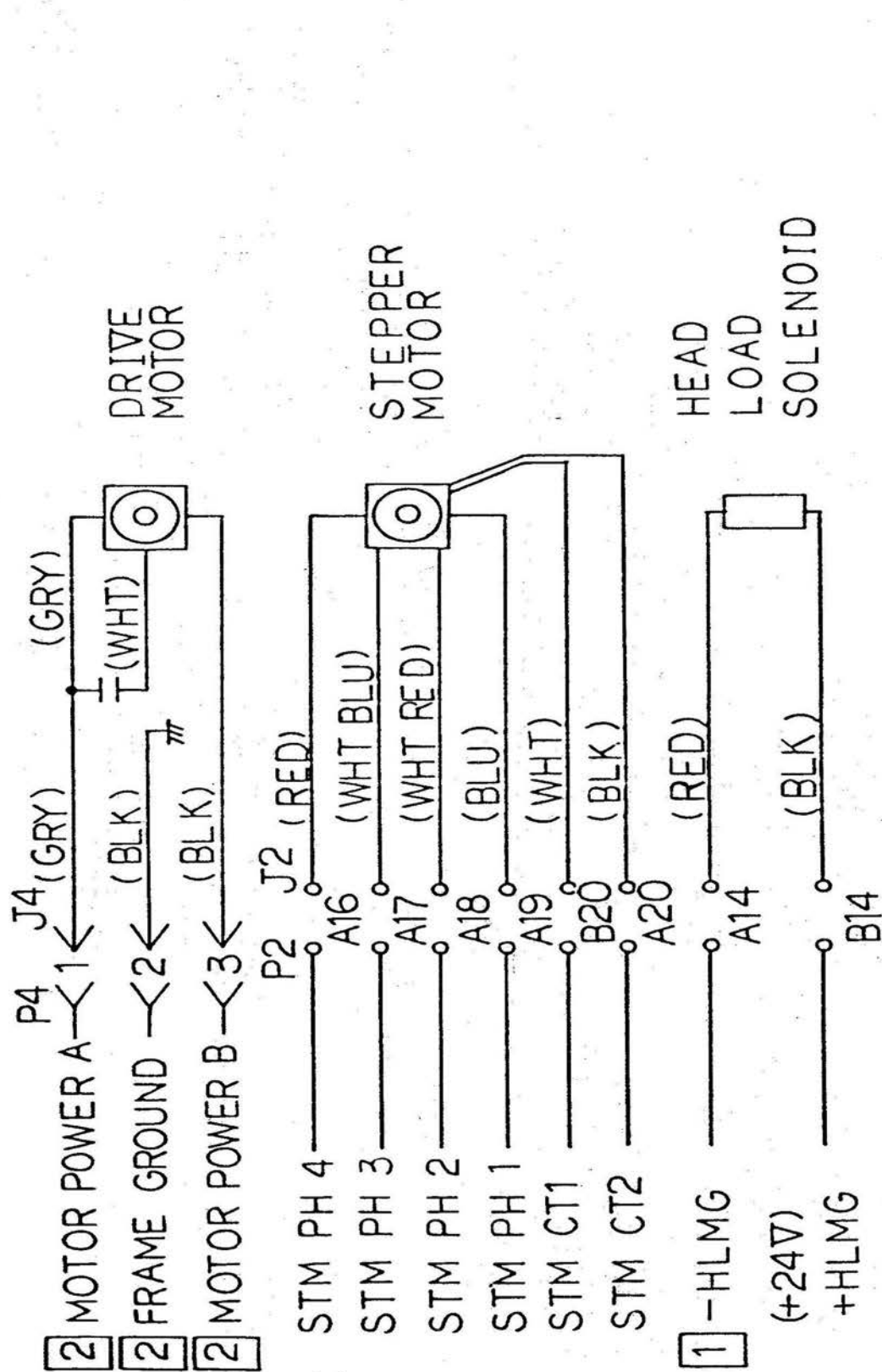
Fig. & Index Number	Part Number	Description	Q'ty
Fig. 14	DC141152-G01	Flexible Disk Drive Wiring Diagram	
-1	DCPS-J20003-002	Clamp, Wire, HP-4N	3
-2	DCPS-172023-001	Clamp, Type M	1
-3	DCPS-172023-002	Clamp, Type MM	1
-4	DCPS-172023-003	Clamp, Type MY	2
-5	DC445045-015	Connector, PWB, PS-40SD-D4C2	1
-6	DCPS-J20004-001	Band, Wire, SST1M	2
-7	DCPS-112012-007	Screw, Tap-Tight, M4x0.7x8 FE	2



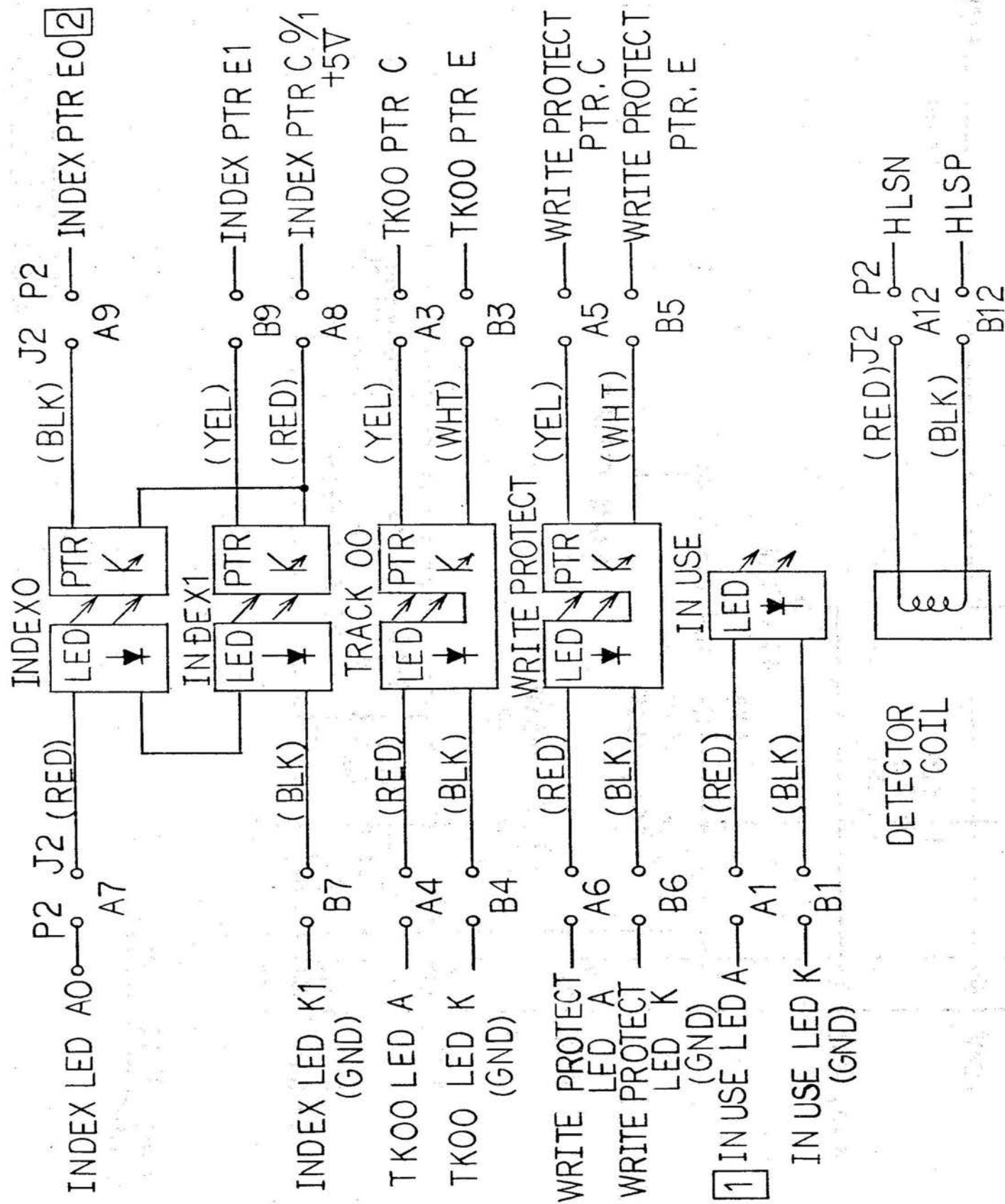
SCHEMATICS AND LOGIC MANUAL



NOTES: 1 GND WHEN ACTIVE & +24 WHEN INACTIVE. 2 115 OR 230 VAC.

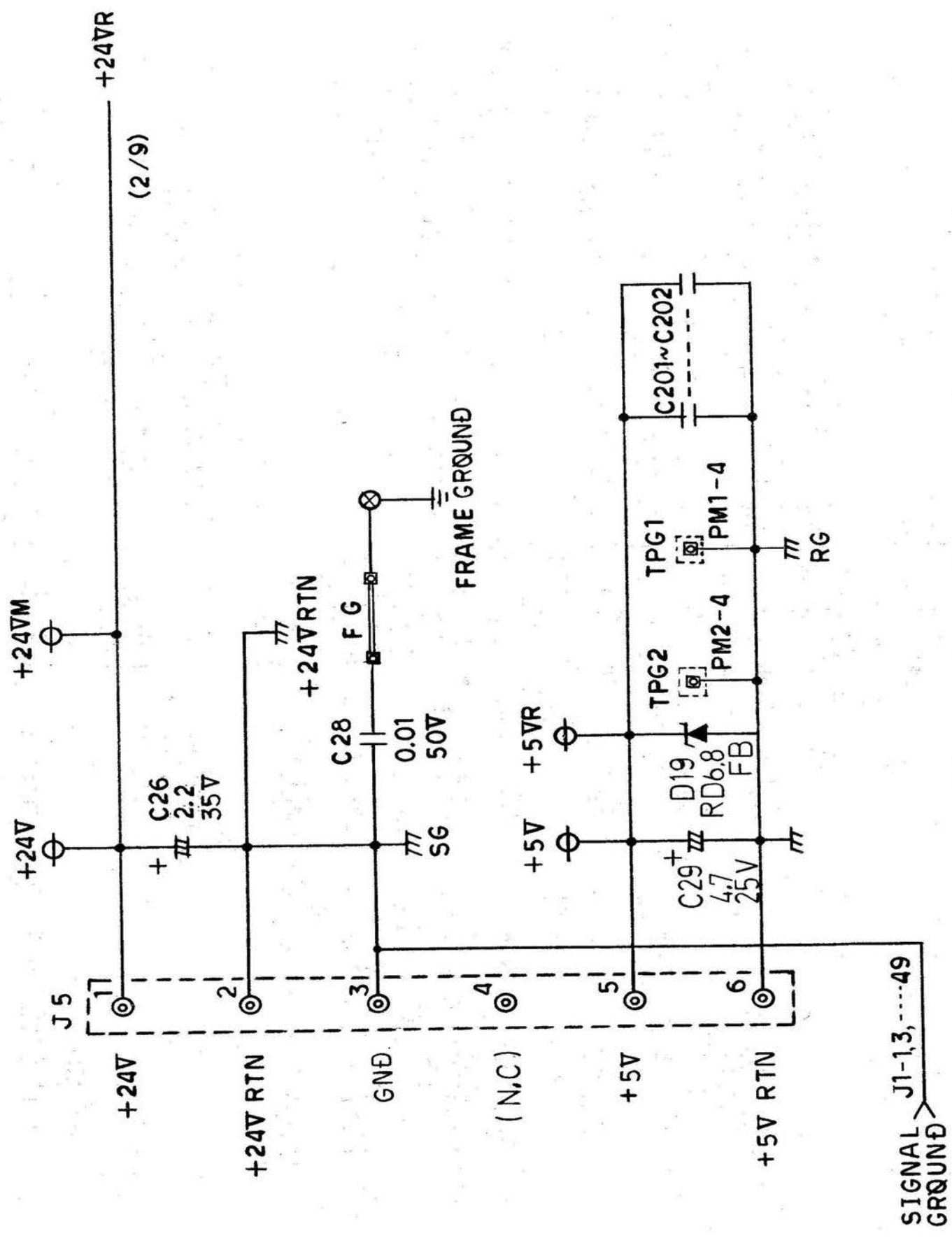


NOTES: 1 GND WHEN ACTIVE & +24 WHEN INACTIVE. 2 115 OR 230 VAC.

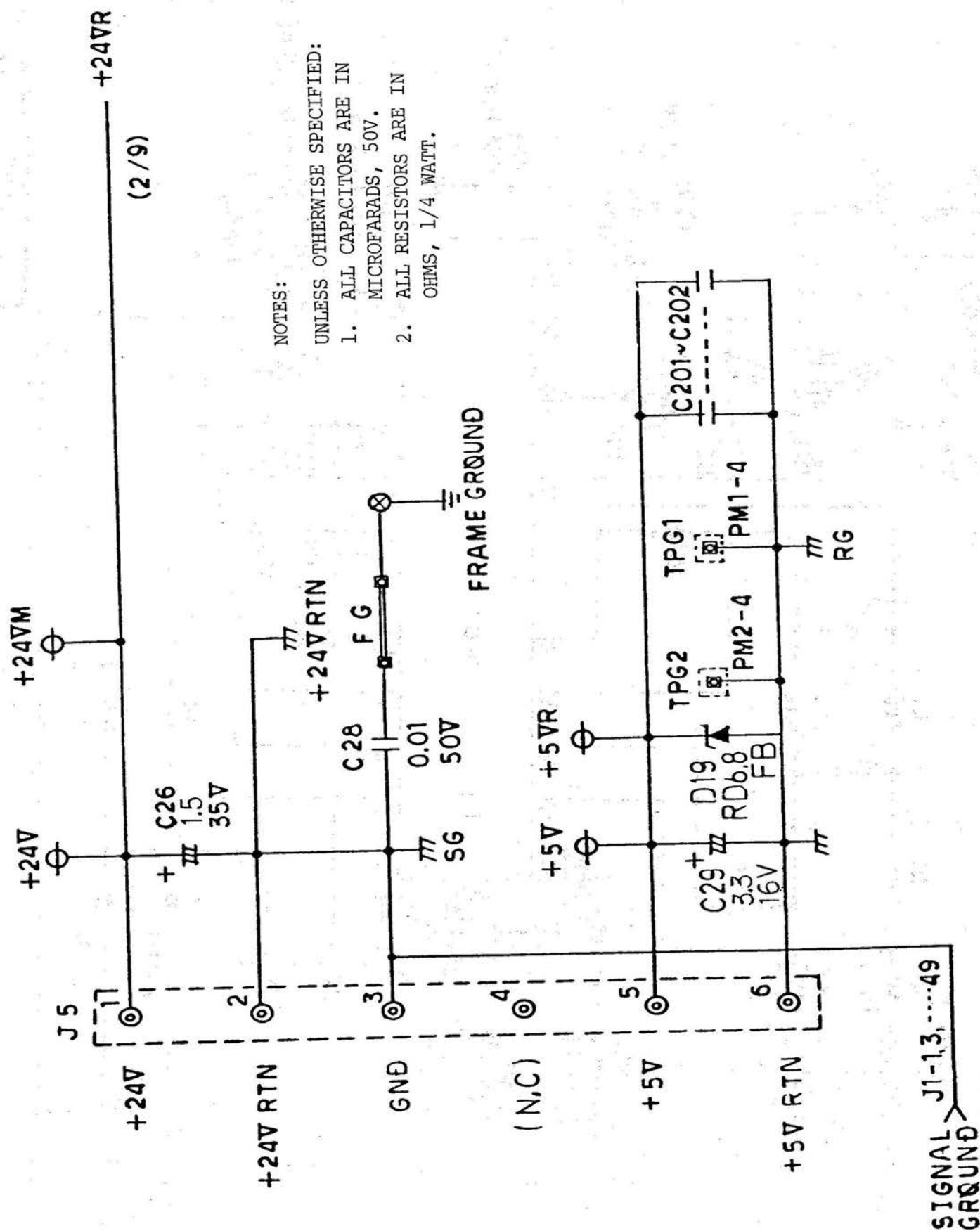


NOTES:

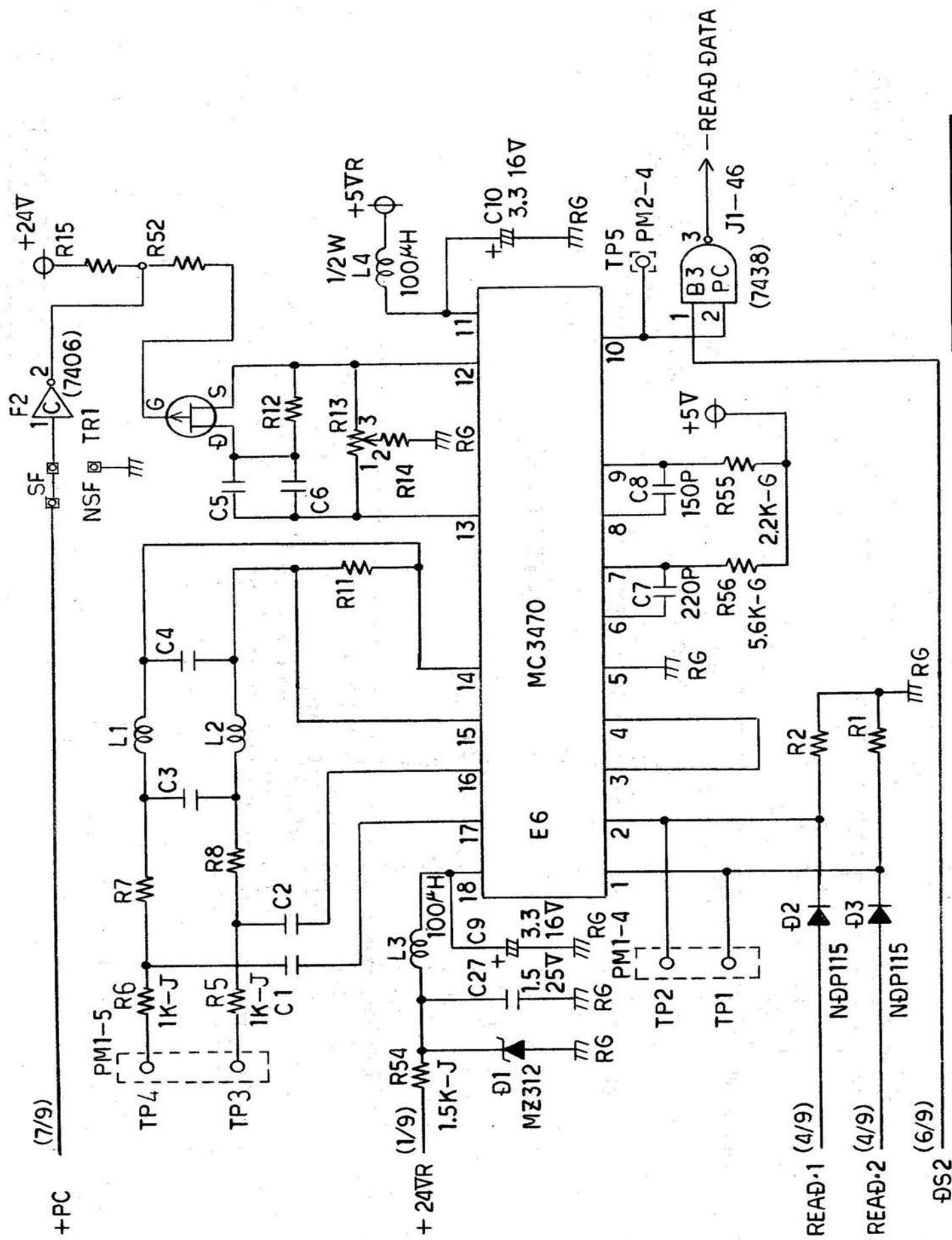
[1] GND WHEN INACTIVE AND +1.5VDC WHEN ACTIVE [2] PTR: PHOTO TRANSISTOR



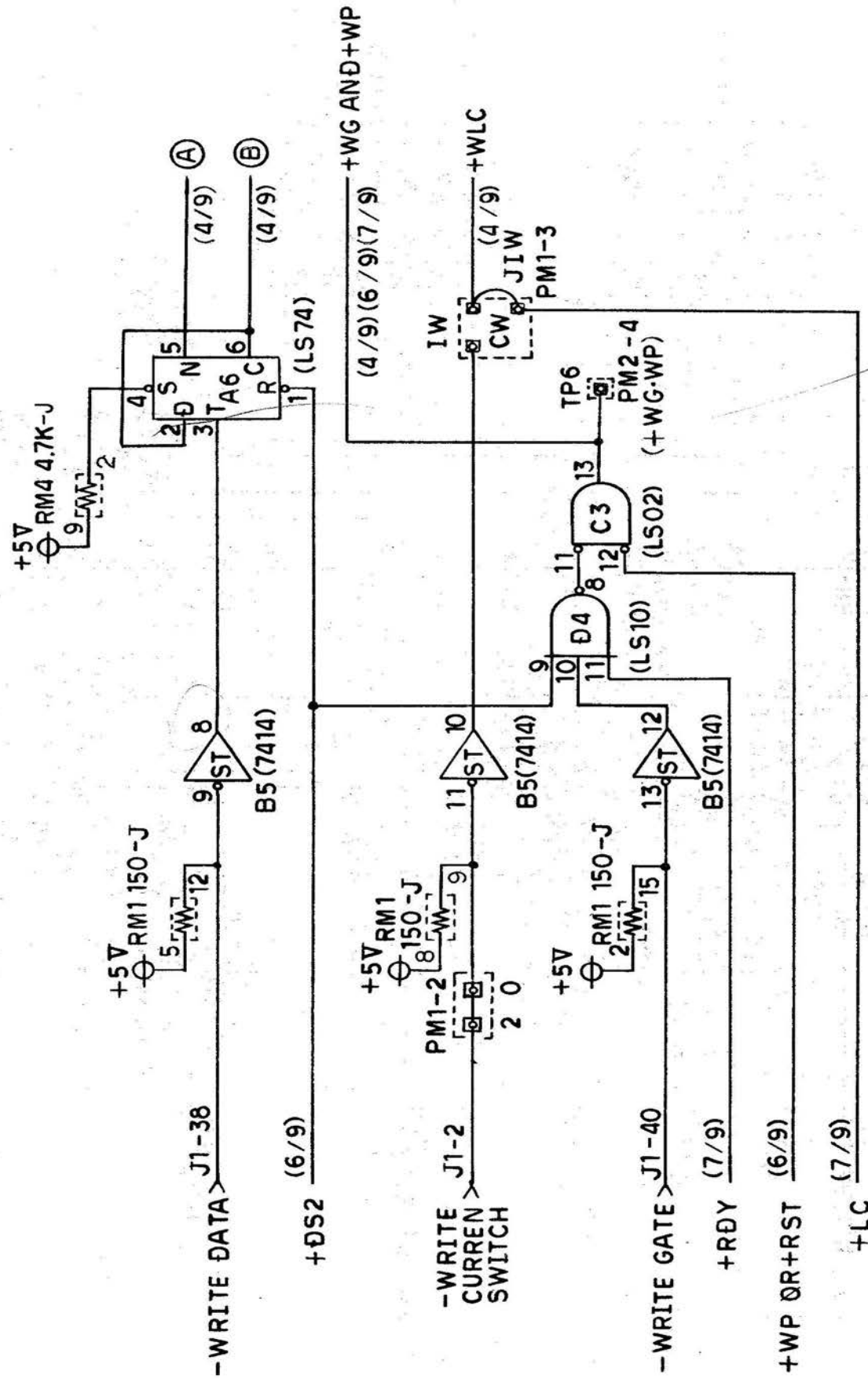
POWER CIRCUIT (1/9) B



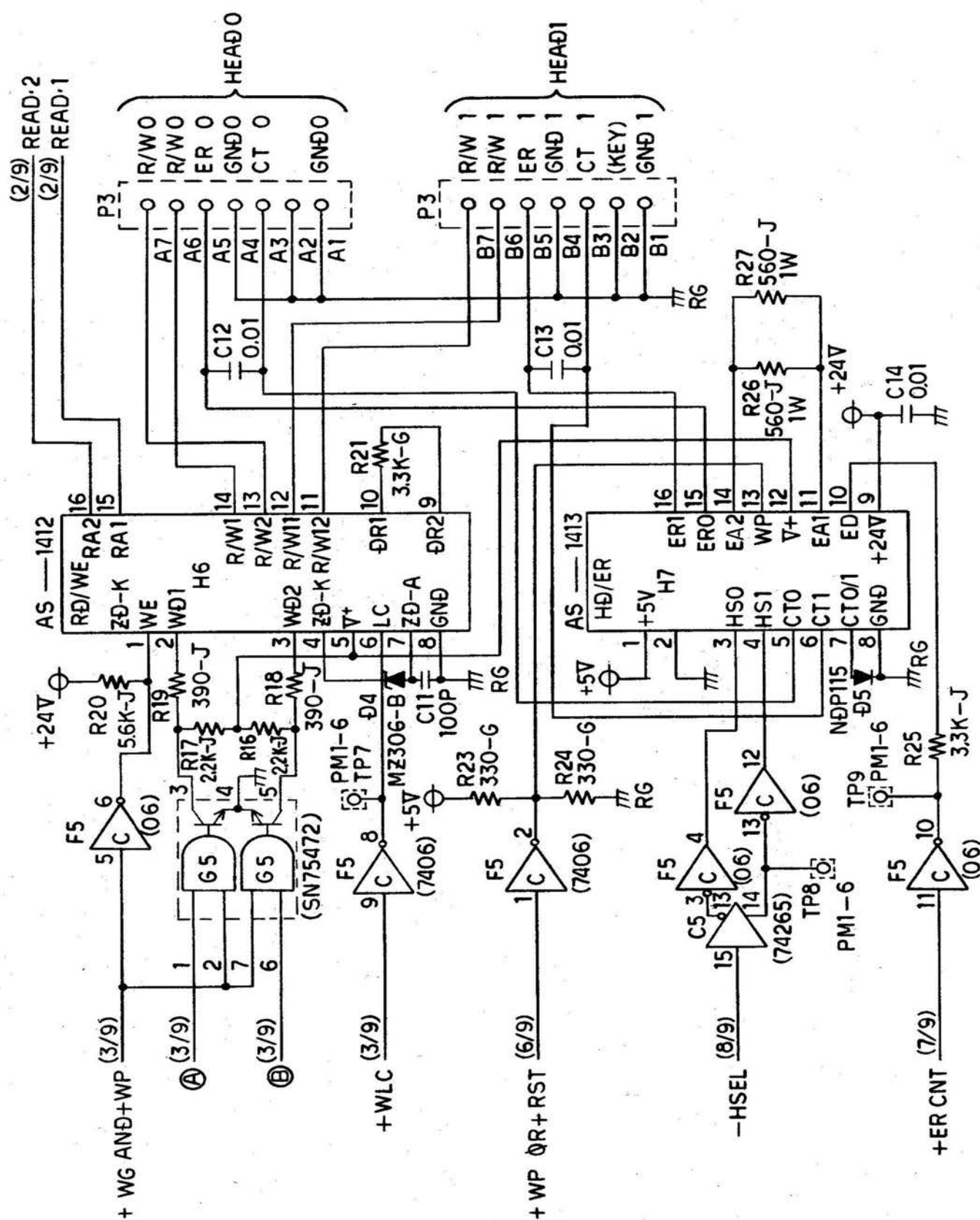
POWER CIRCUIT (1/9) F

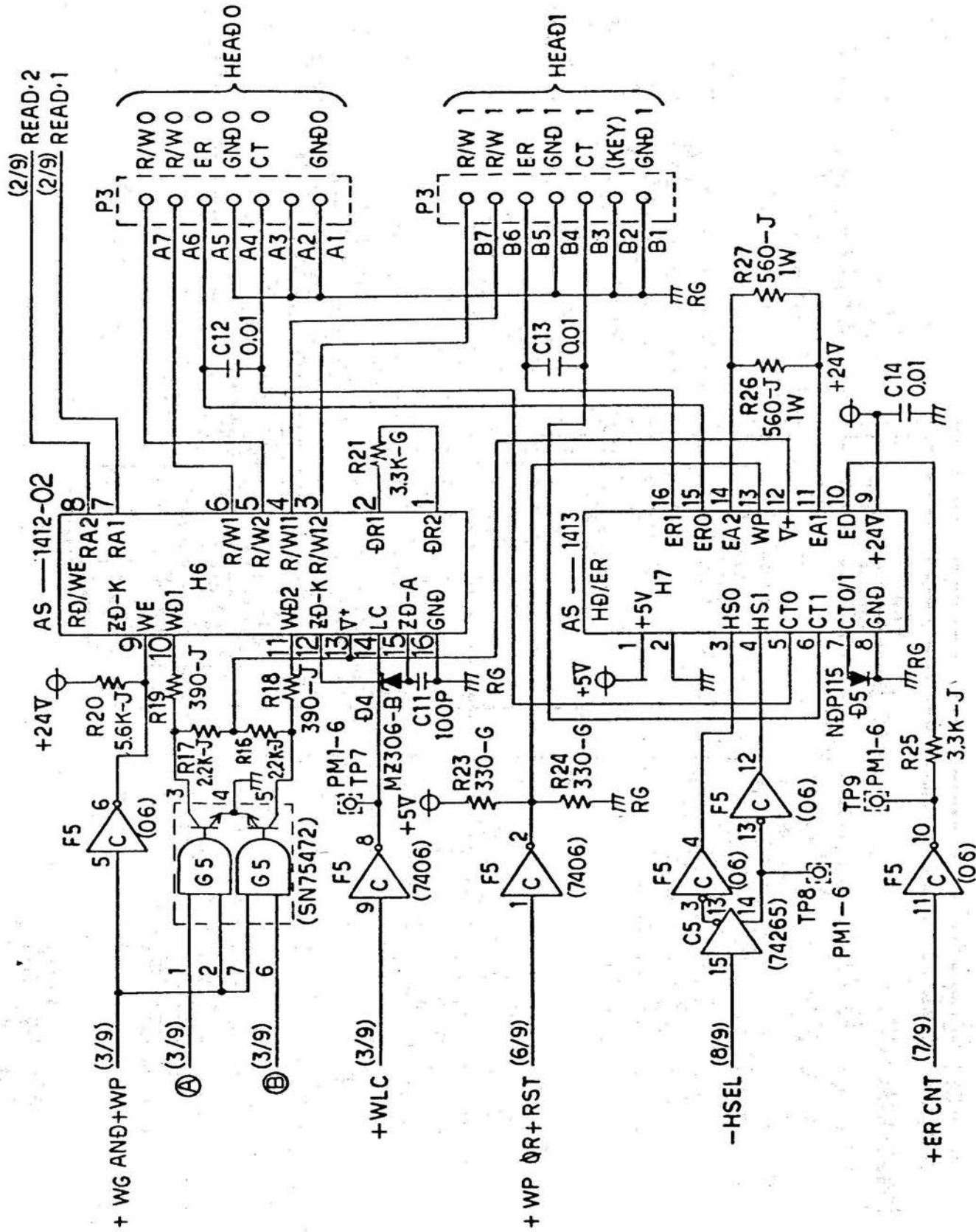


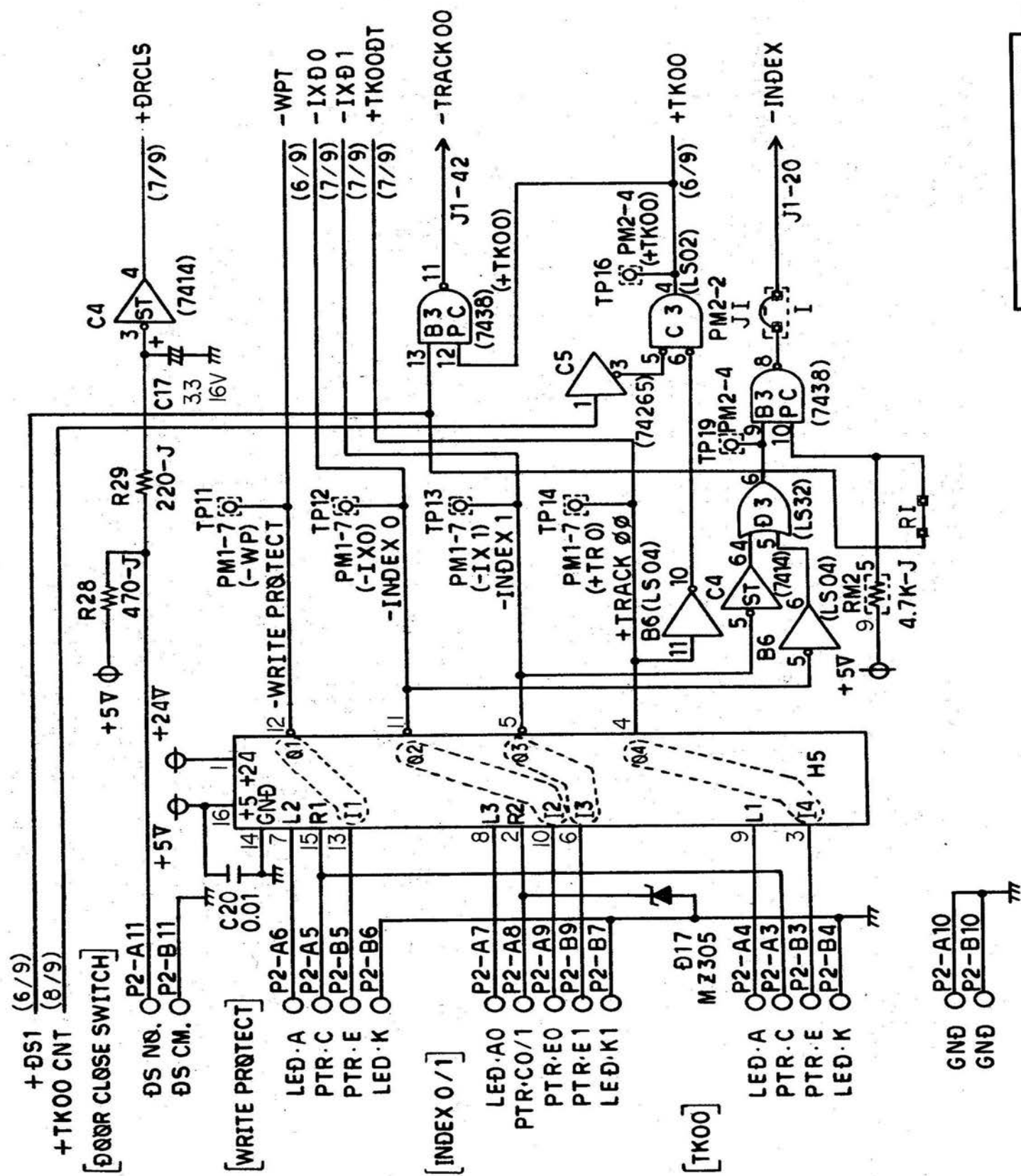
READ CIRCUIT (2/9) B



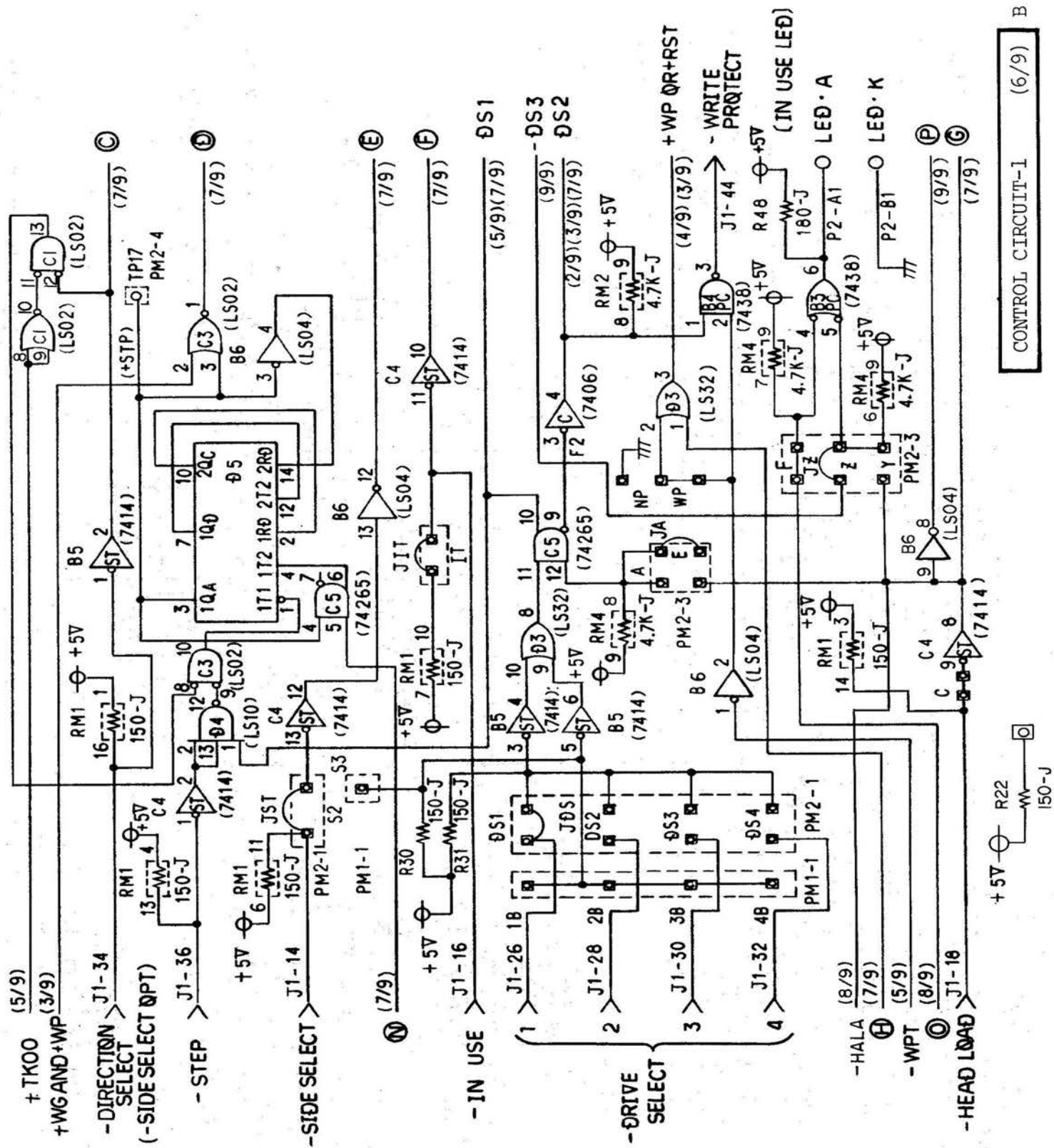
WRITE CIRCUIT-1 (3/9) B

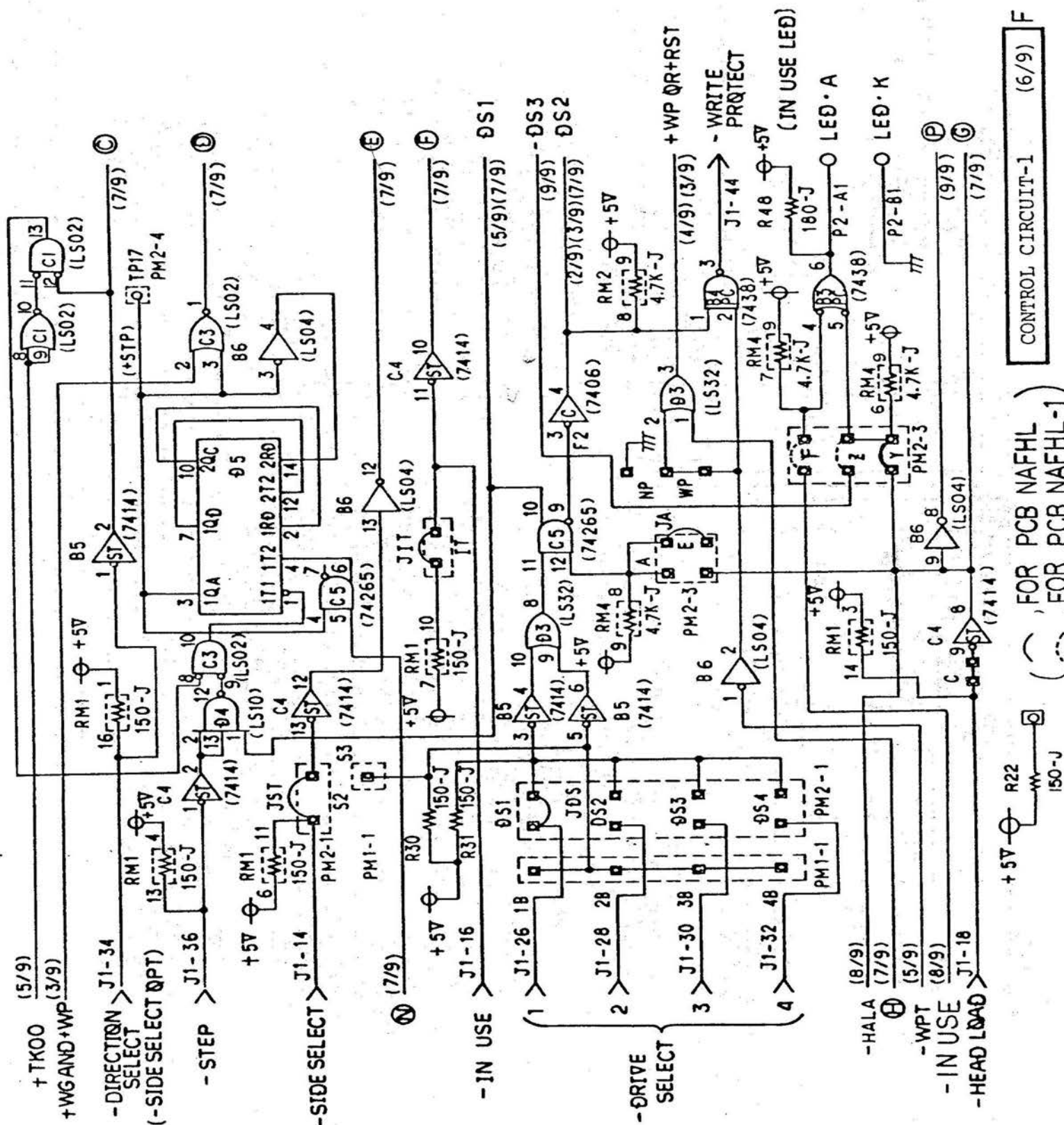






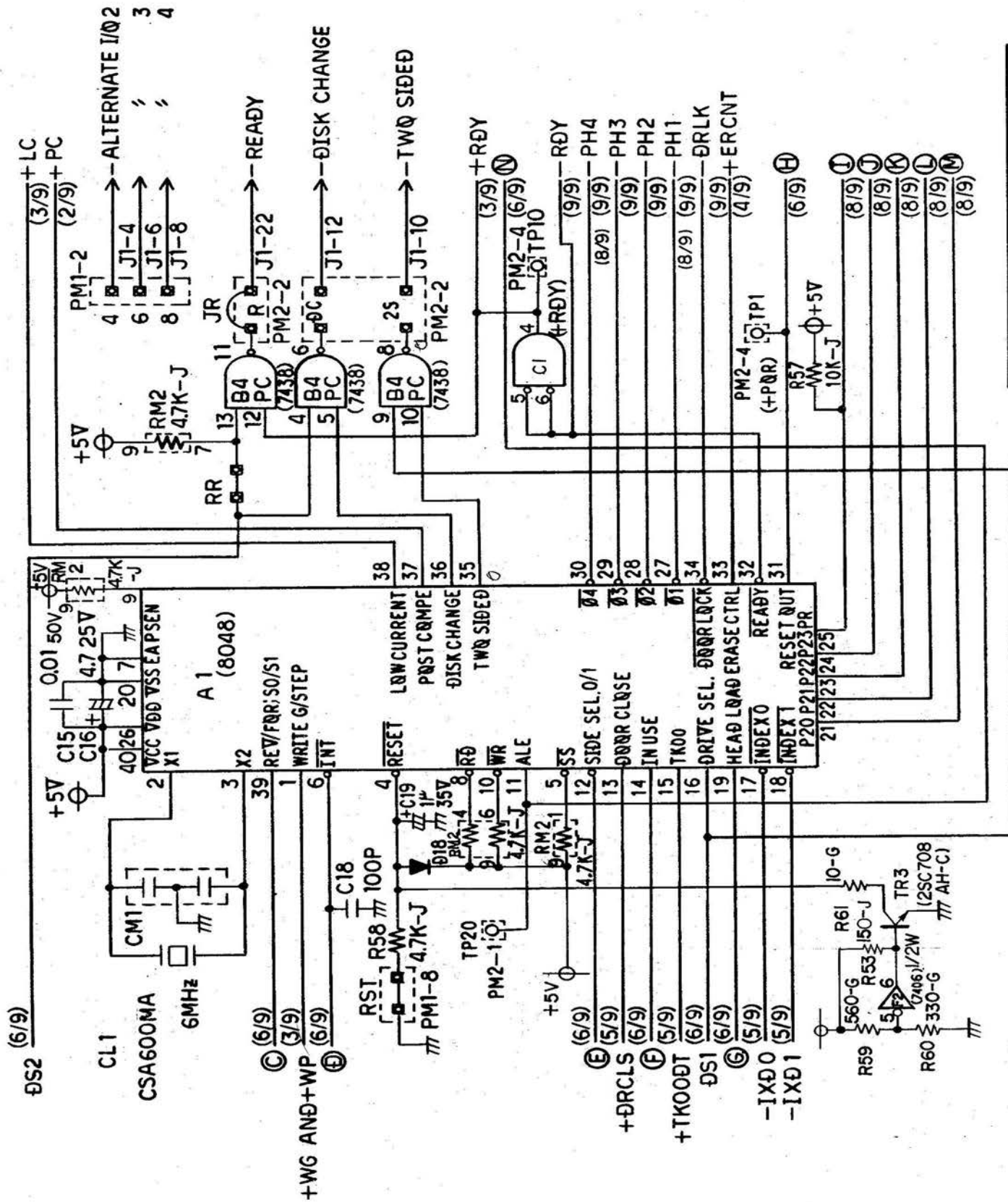






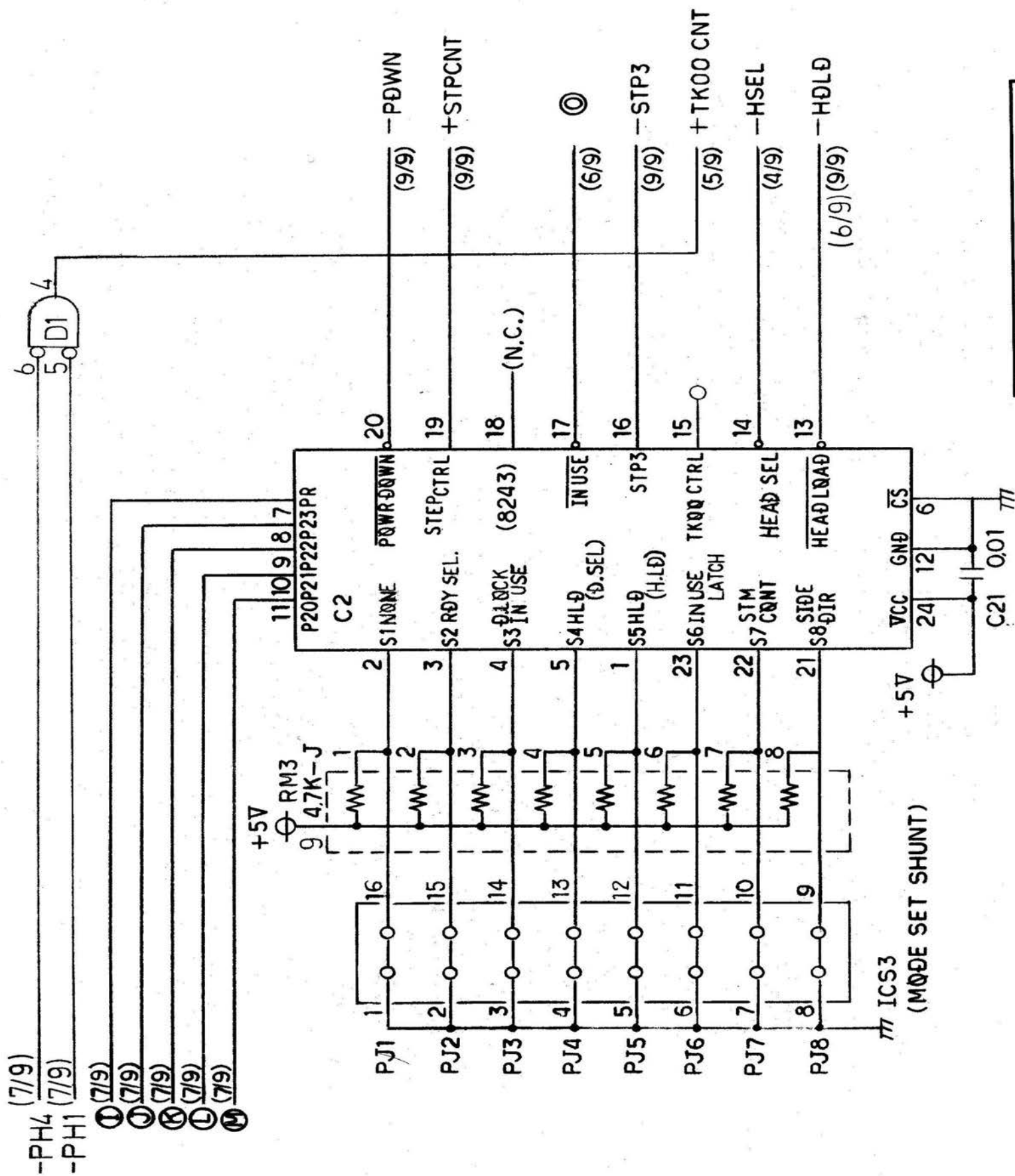
CONTROL CIRCUIT-1 (6/9) F

(---), FOR PCB NAFHL
(---), FOR PCB NAFHL-1

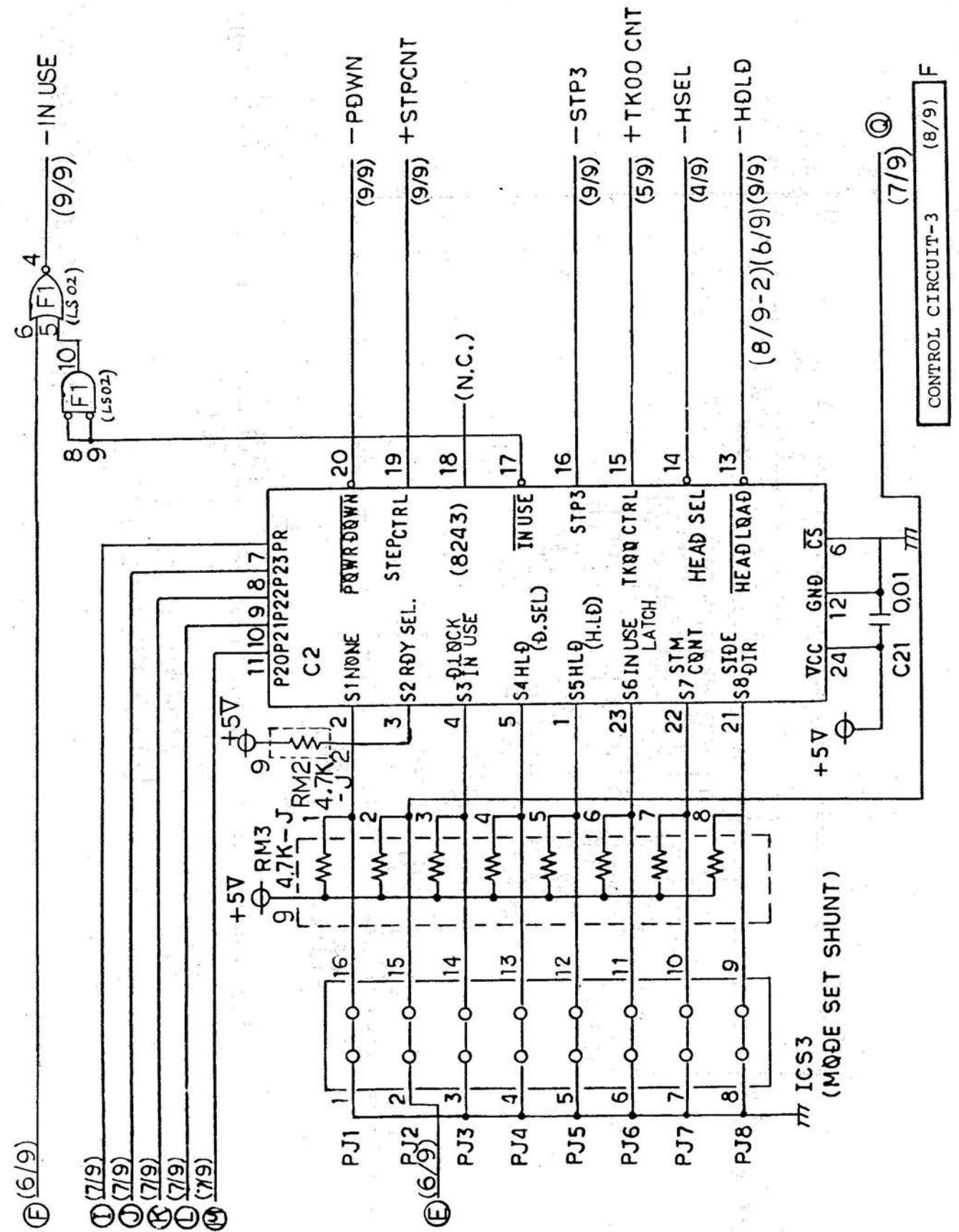


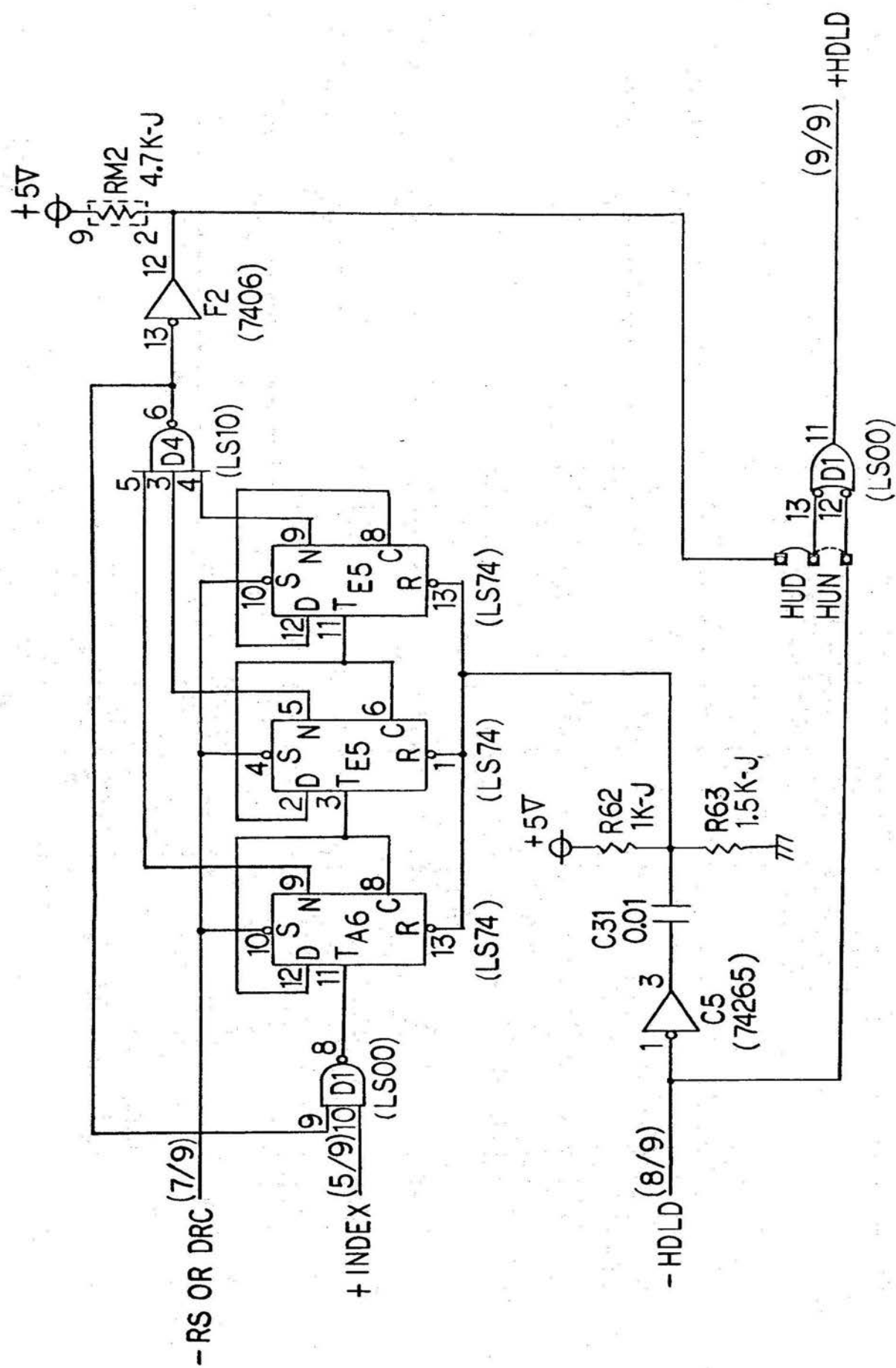
CONTROL CIRCUIT-2 (7/9) B





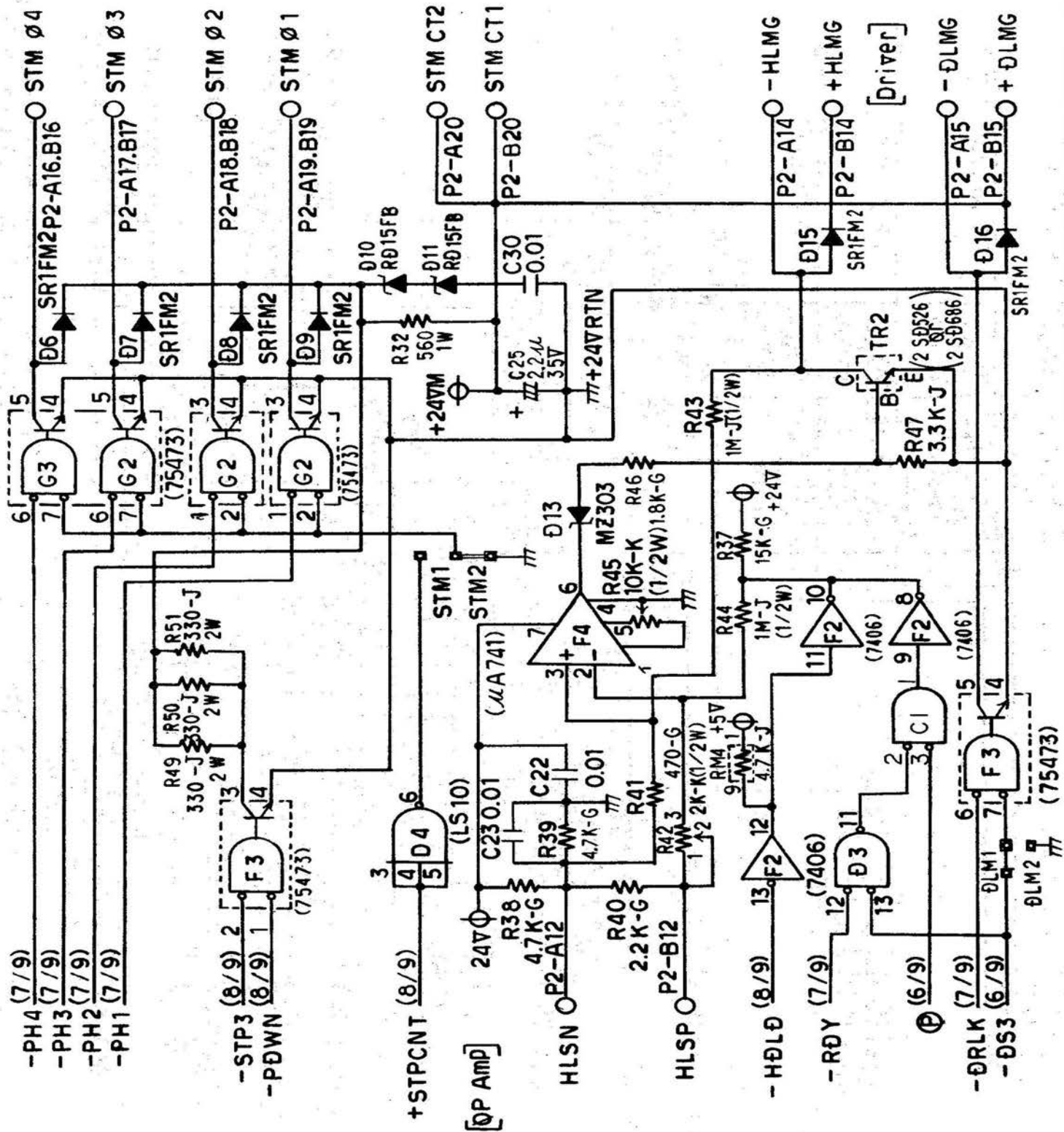
CONTROL CIRCUIT-3 (8/9) B



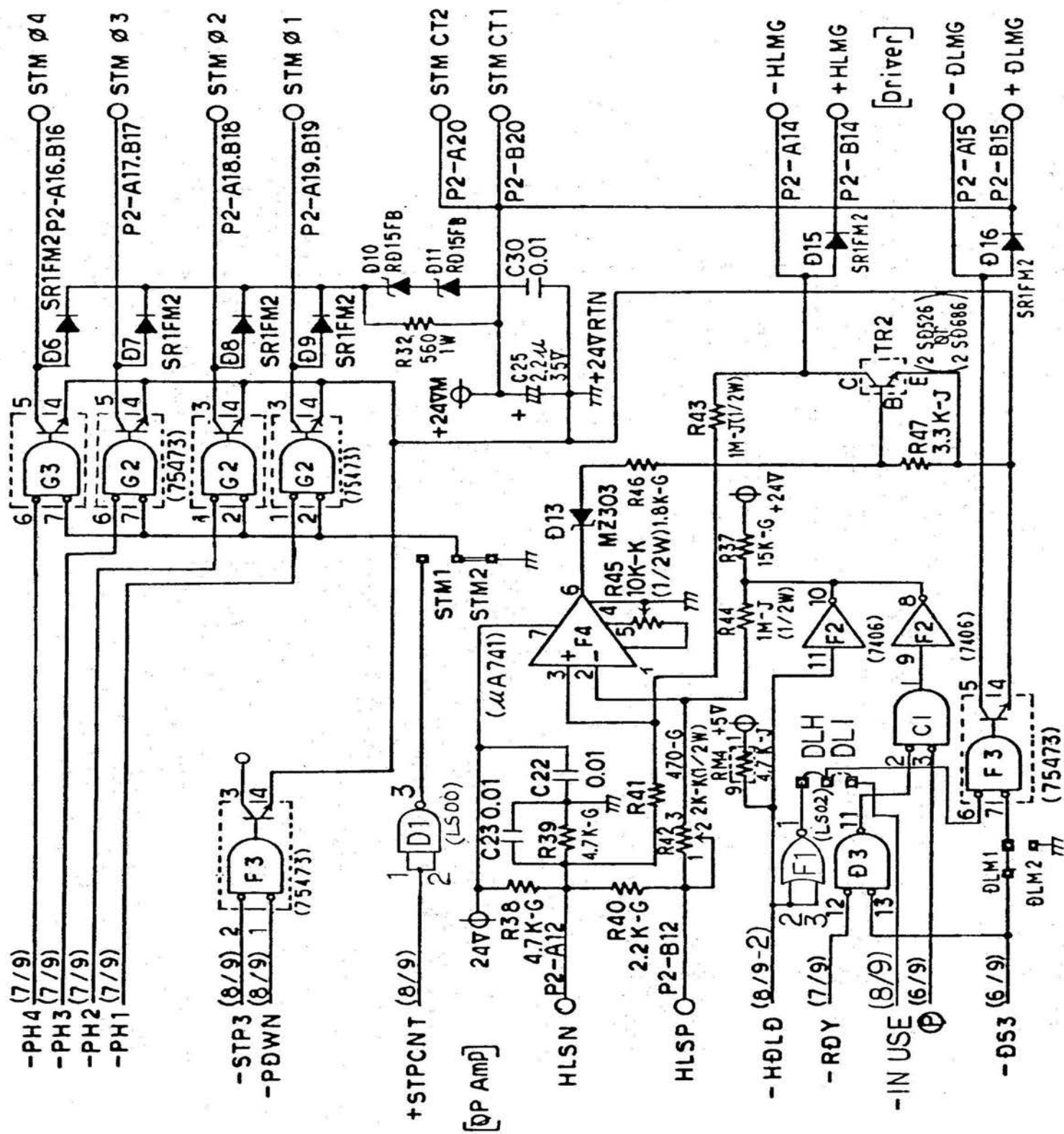


() FOR PCB, NAFHL
(;) FOR PCB, NAFHL-1

CONTROL CIRCUIT -4 (8/9-2) F

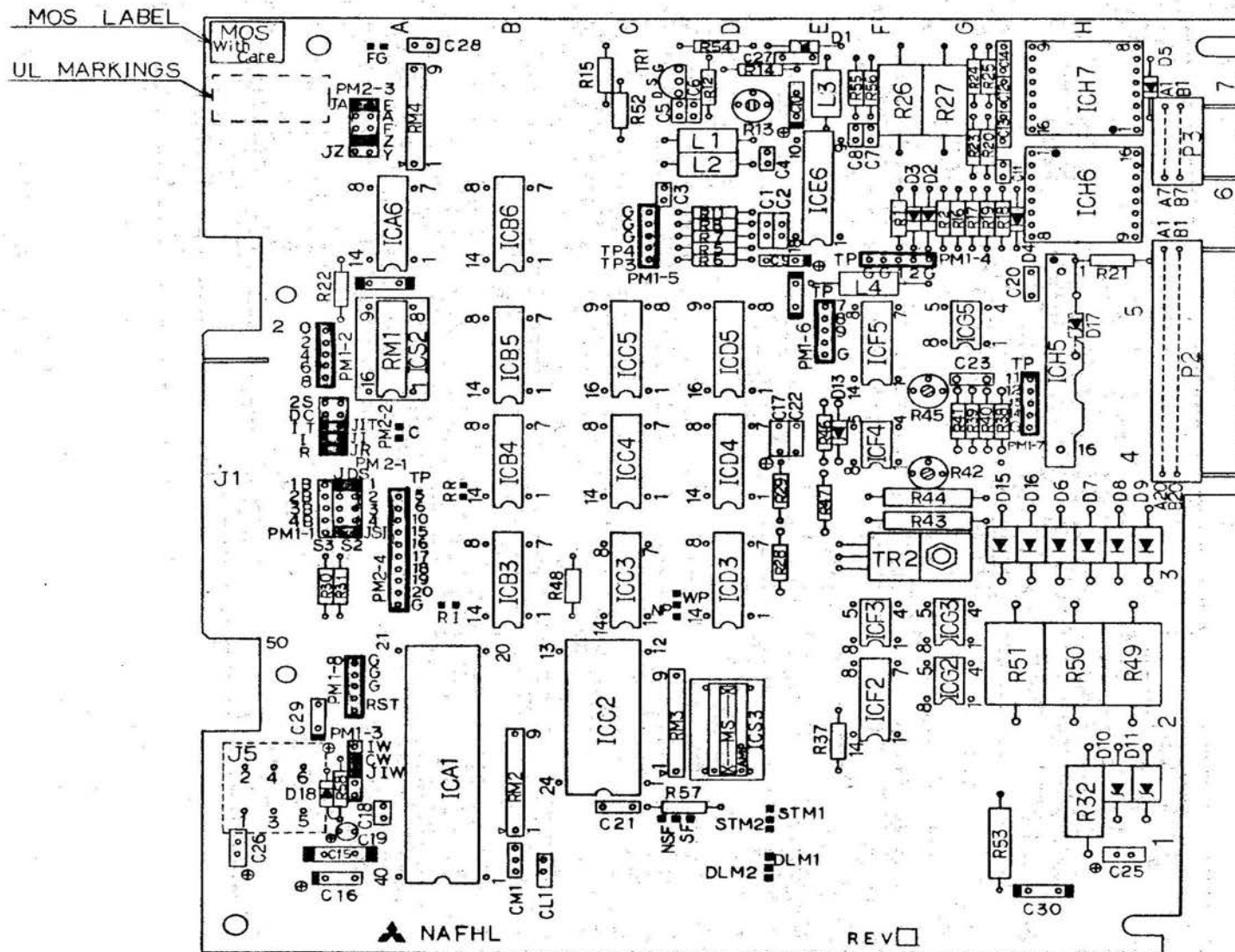


MOTOR-SOLENOID DRIVE CIRCUIT (9/9) B



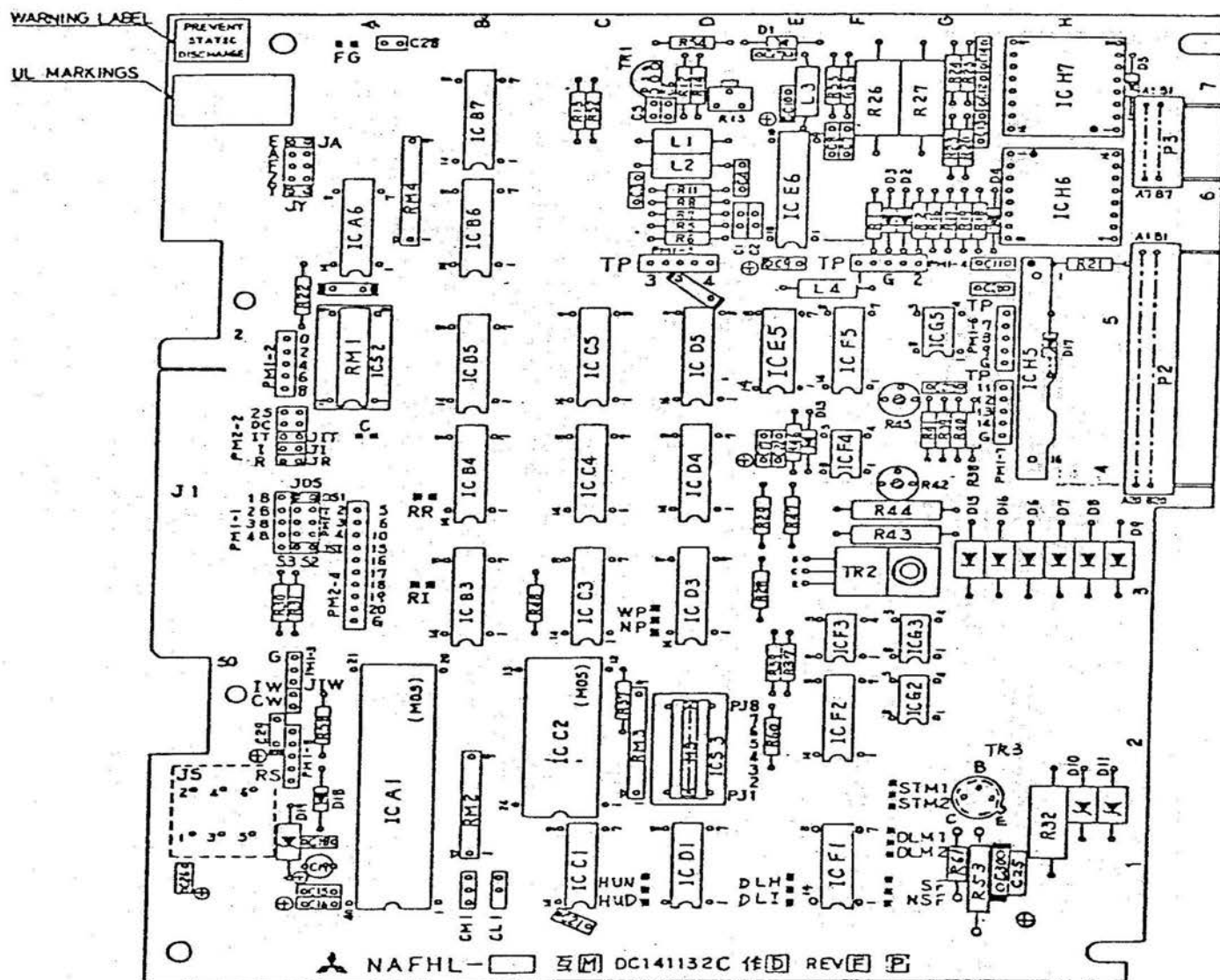
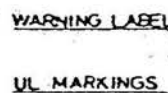
MOTOR-SOLENOID DRIVE CIRCUIT (9/9) F

() FOR PCB, NAFHL
(;) FOR PCB, NAFHL-1



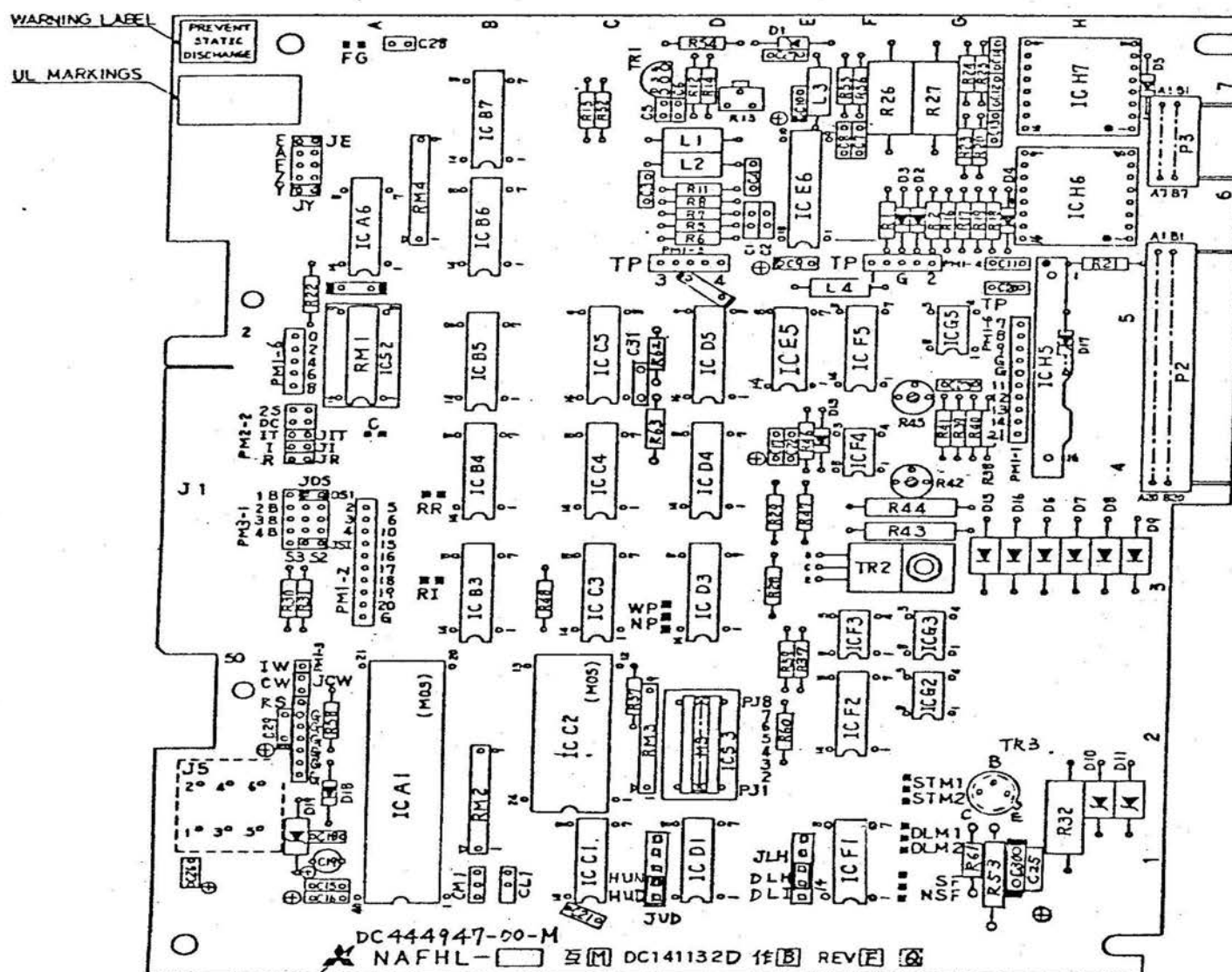
Printed-Circuit Board

PCB (PCA, NAFHL) COMPONENT LOCATIONS B



PCB (PCA, NAFHL) COMPONENT LOCATIONS	F
1	1
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4	4
5	5
6	6
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8	8
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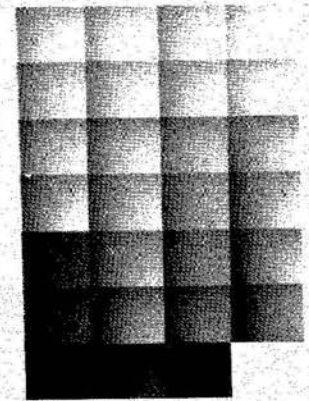
Printed-Circuit Board



(NAFHL-1 互M DC141132D 作B REV B C)

Part number (Stamped)

Printed-Circuit Board



PACKING PROCEDURE

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1. **OBJECTIVE**

This procedure describes the packaging of the flexible disk drive in its container and provides handling and unpacking instructions.

2. **ENVIRONMENTAL CONDITIONS**

- ① Vibration and shock: Less than 3.0 G
- ② Temperature: -10 to 50°C (-14 to 122°F)
- ③ Relative humidity: 20 to 80% (non-condensing)
- ④ Temperature gradient: Less than 20°C per hour

3. **HANDLING OF PACKAGED DRIVE**

- ① No more than ten drives should be stacked vertically. Observe stacking directions for the drives when stacking.

NOTE: Instructions are given on packaging case.

- ② Handle with care.
 - Ⓐ Do not throw packages.
 - Ⓑ Do not drop packages.
 - Ⓒ Do not store outdoors.

NOTE: Impacts or temperature extremes may seriously damage the drive.

- ③ Be sure the drive does not get wet.

4. **UNPACKAGING AND PACKAGING**

- ① Unpackaging

Follow the unpackaging procedure shown in figures 1 and 2.

- ② Packaging

Follow the packaging procedure shown in figures 1 and 2.

5. **PACKAGING FOR INCORPORATION IN SYSTEM**

- ① Package an entire system so as to satisfy the conditions shown in Section 2.



- ② Observe the following items for a flexible disk drive (see figure 2):
 - a) Insert the head protection sheet provided in the unit.
 - b) Close the door handle and apply adhesive tape between the door handle and panel to fasten them.

6. STORAGE OF PACKAGING MATERIALS

- ① Those packaging materials that can be reused should be saved for possible reuse in the future.
- ② Packaging box can be opened and folded flat for storage, as shown in figure 3.

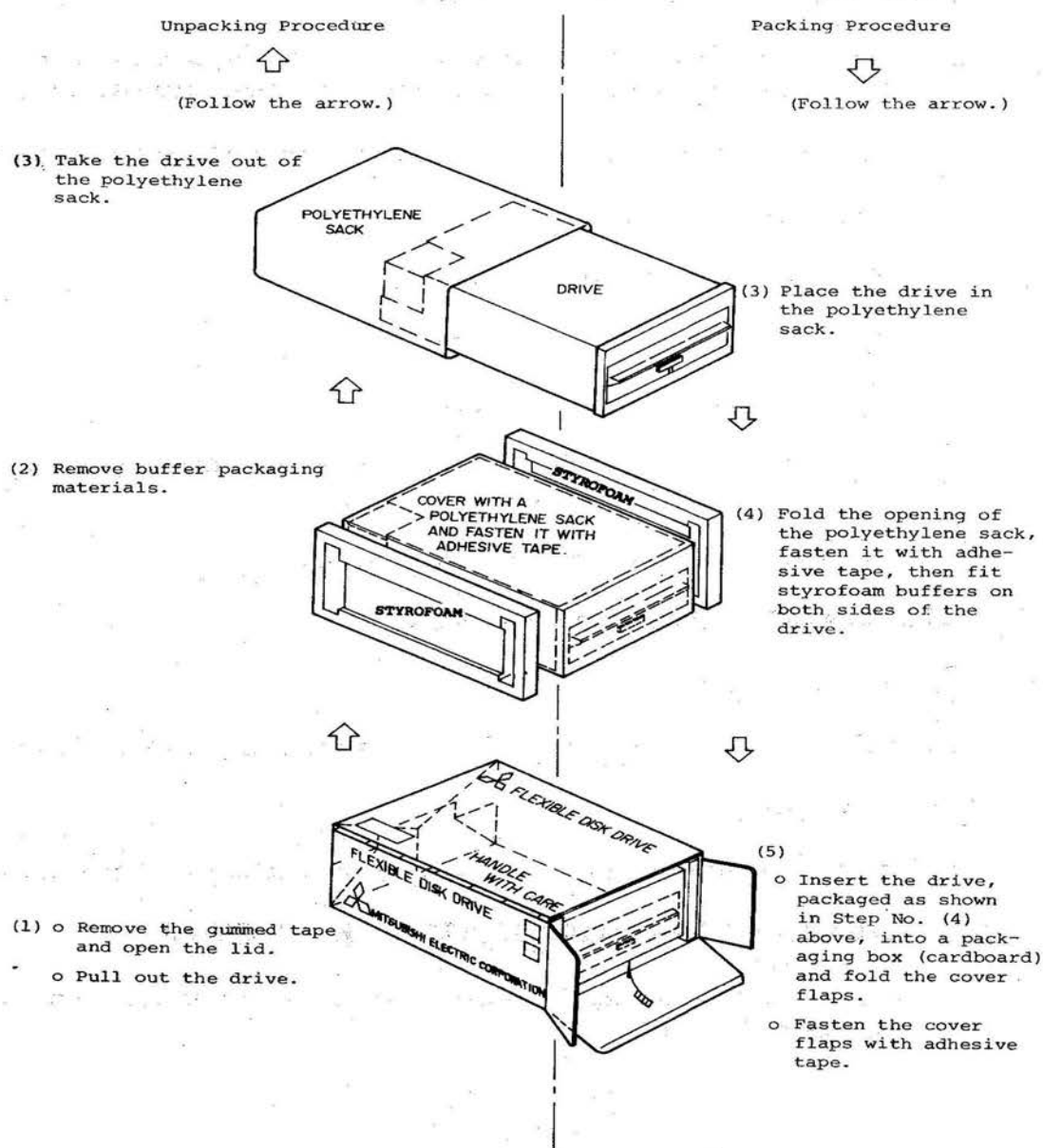


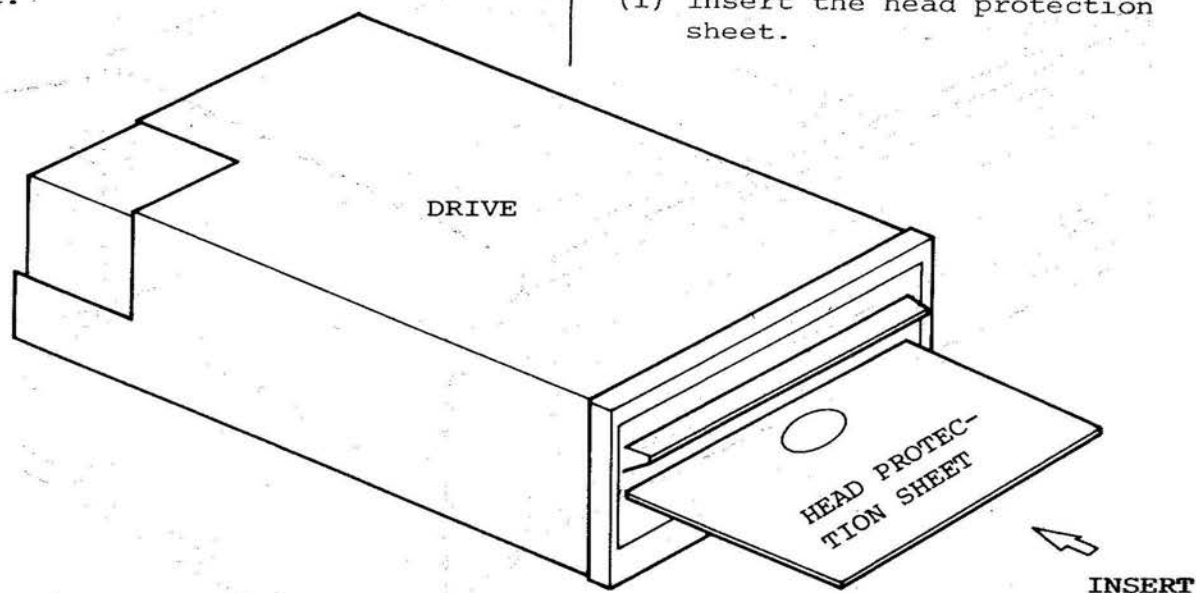
Figure 1

Unpacking Procedure

Packing Procedure

- (5) Push the release button and take out the head protection sheet.

- (1) Insert the head protection sheet.



- (4) Remove the adhesive tape fastening the door handle.

- (2) Stick adhesive tape on the door handle and panel after closing the door handle.
(non-soiling, factory-used adhesive tape recommended)

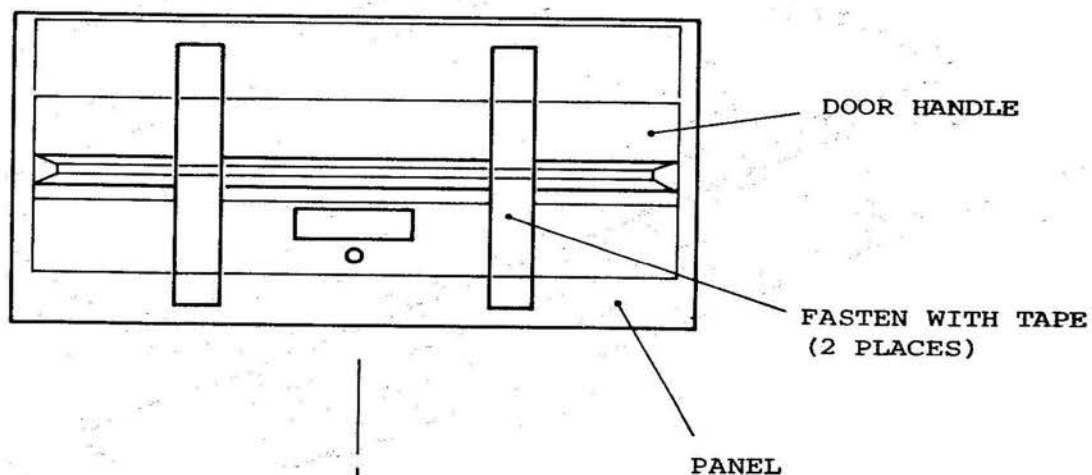
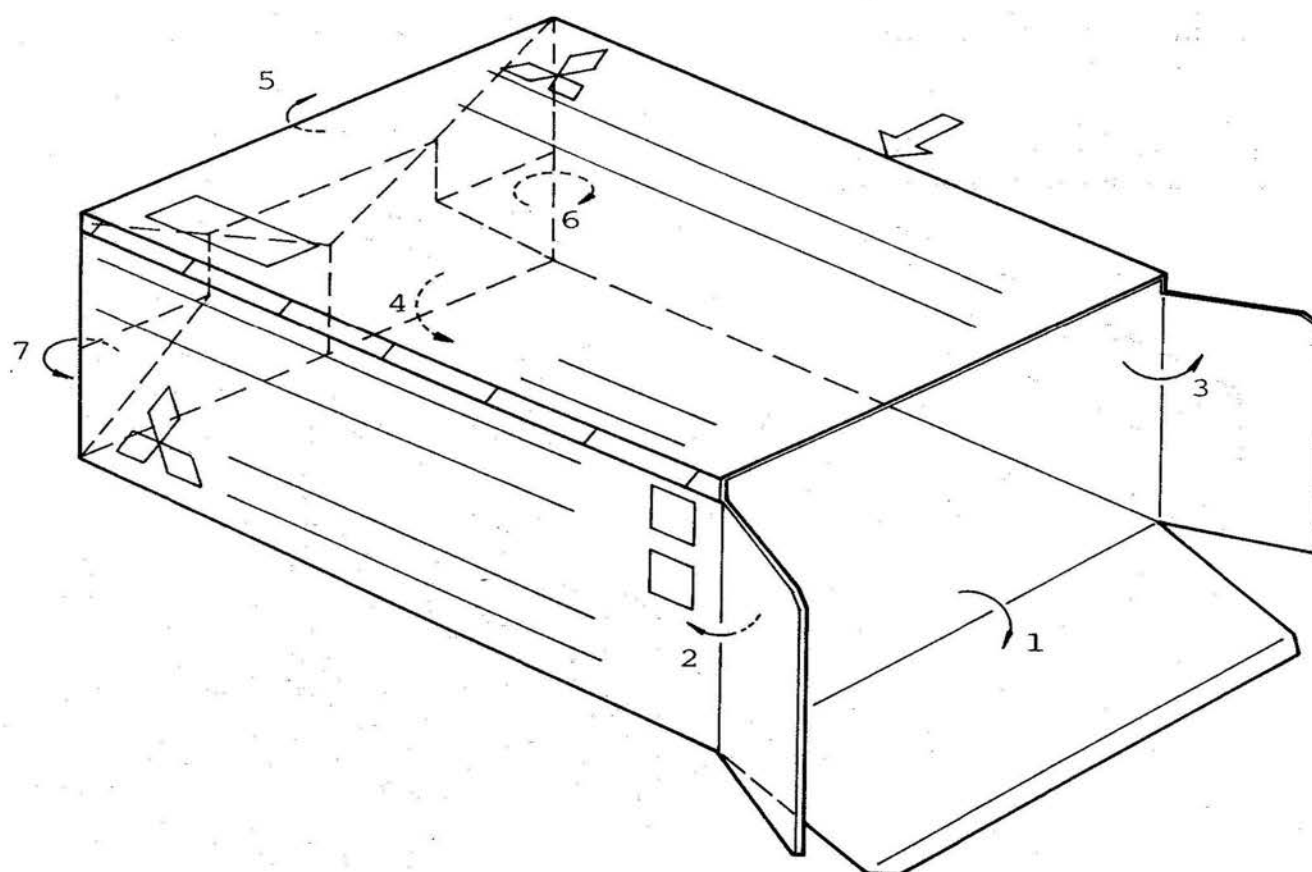


Figure 2



Open the box following the sequence from Step 1 to Step 7, then push the box in the direction indicated by the arrow in the diagram. Store the box flat as shown in the diagram below.

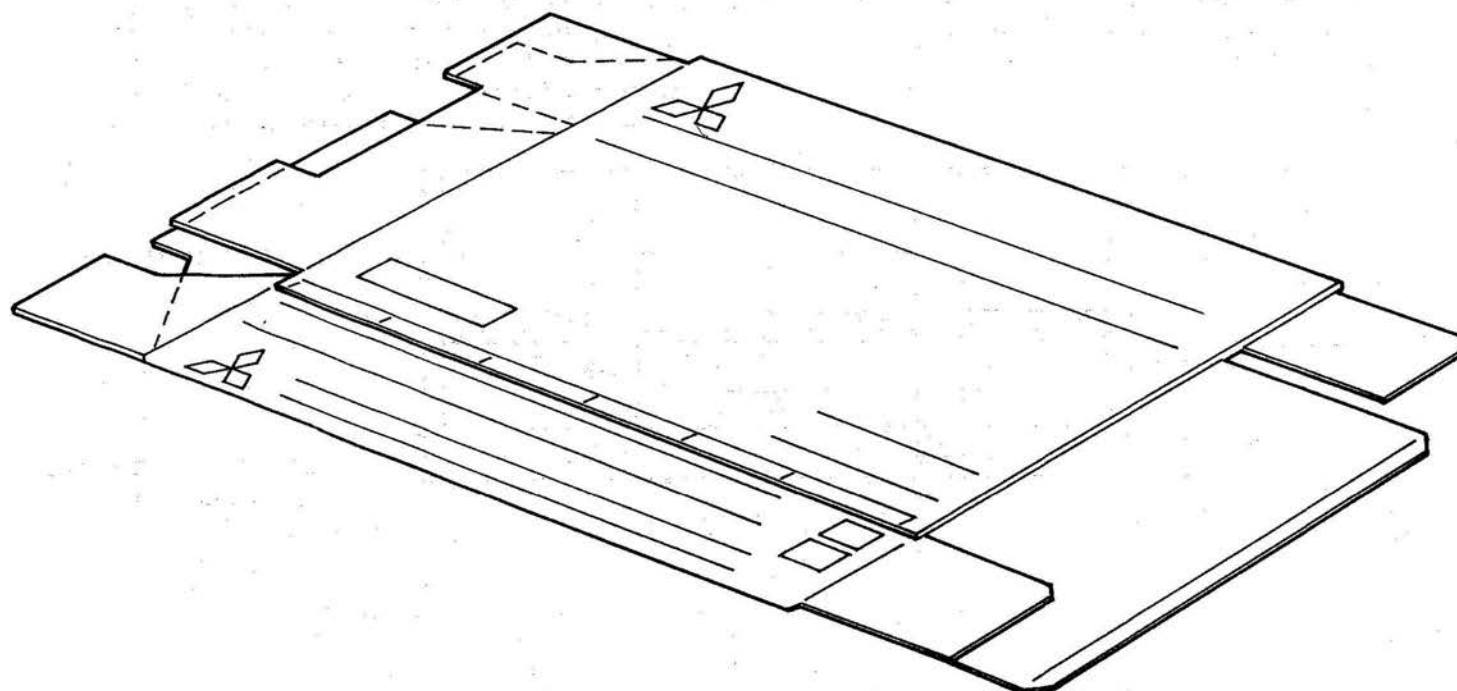


Figure 3

7. PACKING PROCEDURE (special requirements)

- ① Cover with a polyethylene sack and fasten it with adhesive tape.
- ② Fit styrofoam buffers on both side (Upper, Bottom) of the drive and insert the drive into a packing box. (Cardboard)

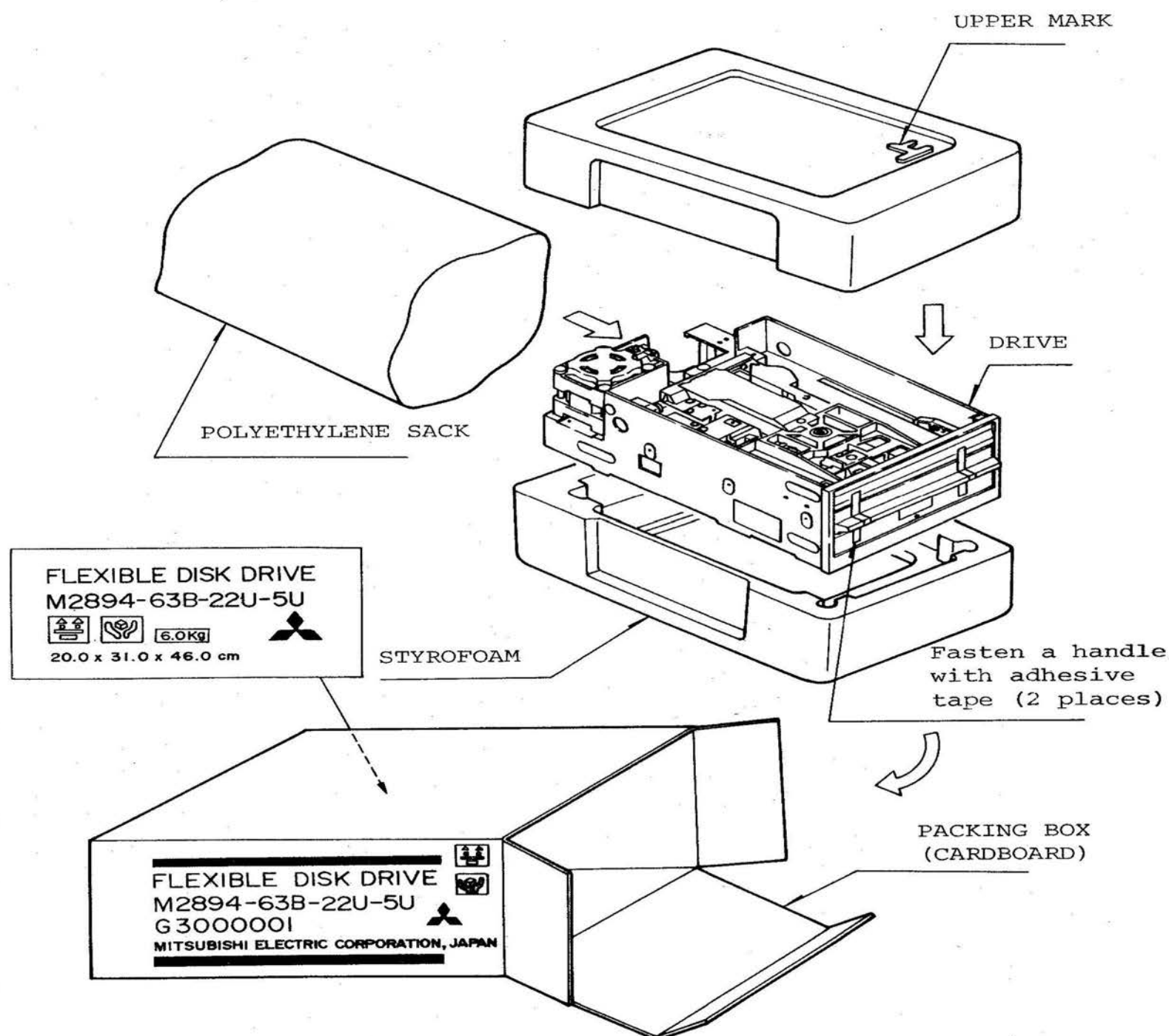


Figure 4

