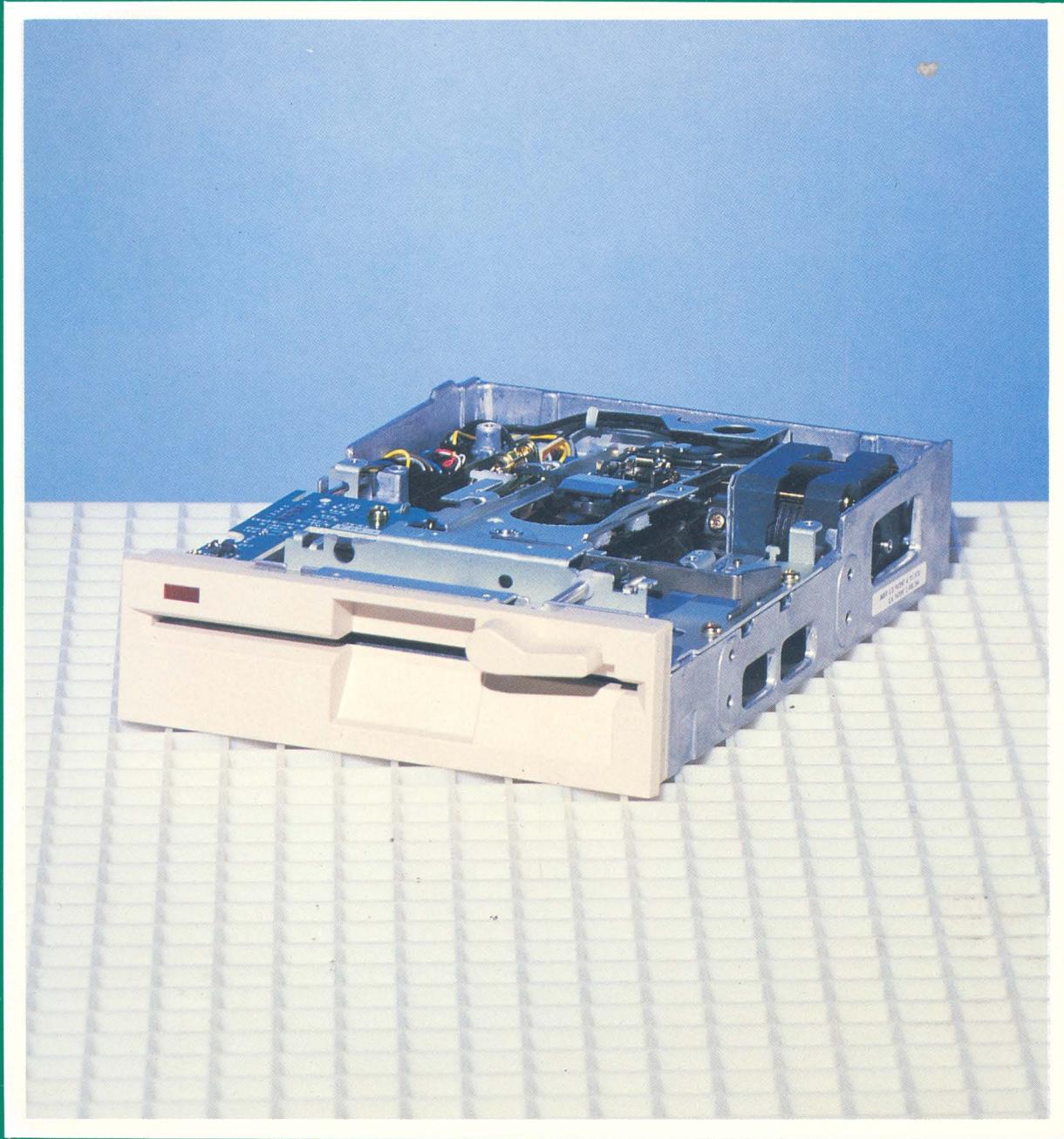


# COMPUTERFACTS™

Technical Service Data

TEAC®  
**MODEL FD-55BV-75**  
DISK DRIVE



FEATURES COMPLETE SCHEMATICS • PRELIMINARY SERVICE CHECKS • TROUBLESHOOTING TIPS •  
EASY-READ WAVEFORMS • REPLACEMENT PARTS LISTS • SEMICONDUCTOR CROSS-REFERENCE

CD17 TEAC MODEL FD-55BV-75

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TEST EQUIPMENT

Digital Volt/Ohm Meter  
Dual Input Oscilloscope  
Logic Probe

TOOLS

Phillips Screwdriver  
91% Isopropyl Alcohol  
Lint-free Cloth  
Soldering Iron

PARTS LIST

No.	Part No.	Description
M2	14769070-60 (1)	Stepping Motor
PQ52	15532060-27A (1)	Write Protect Sensor
	14733730-01 (1)	Main Control Board
		Motor Control Board
		Read/Write Head

(1) Number on Unit.



Howard W. Sams &amp; Co.

4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co. as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co. by the manufacturers of the particular type of replacement part listed.

87CD19010 DATE 10-87

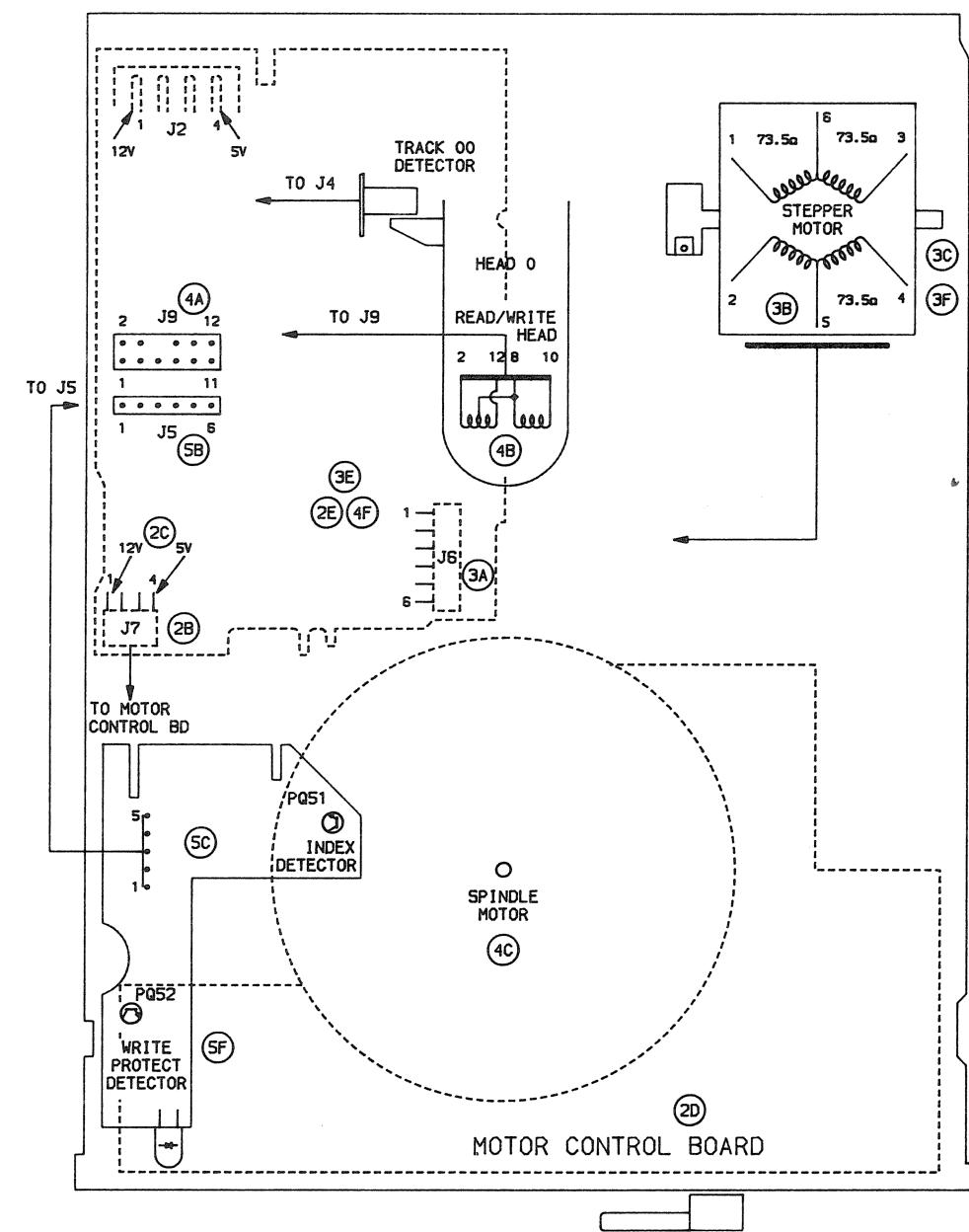
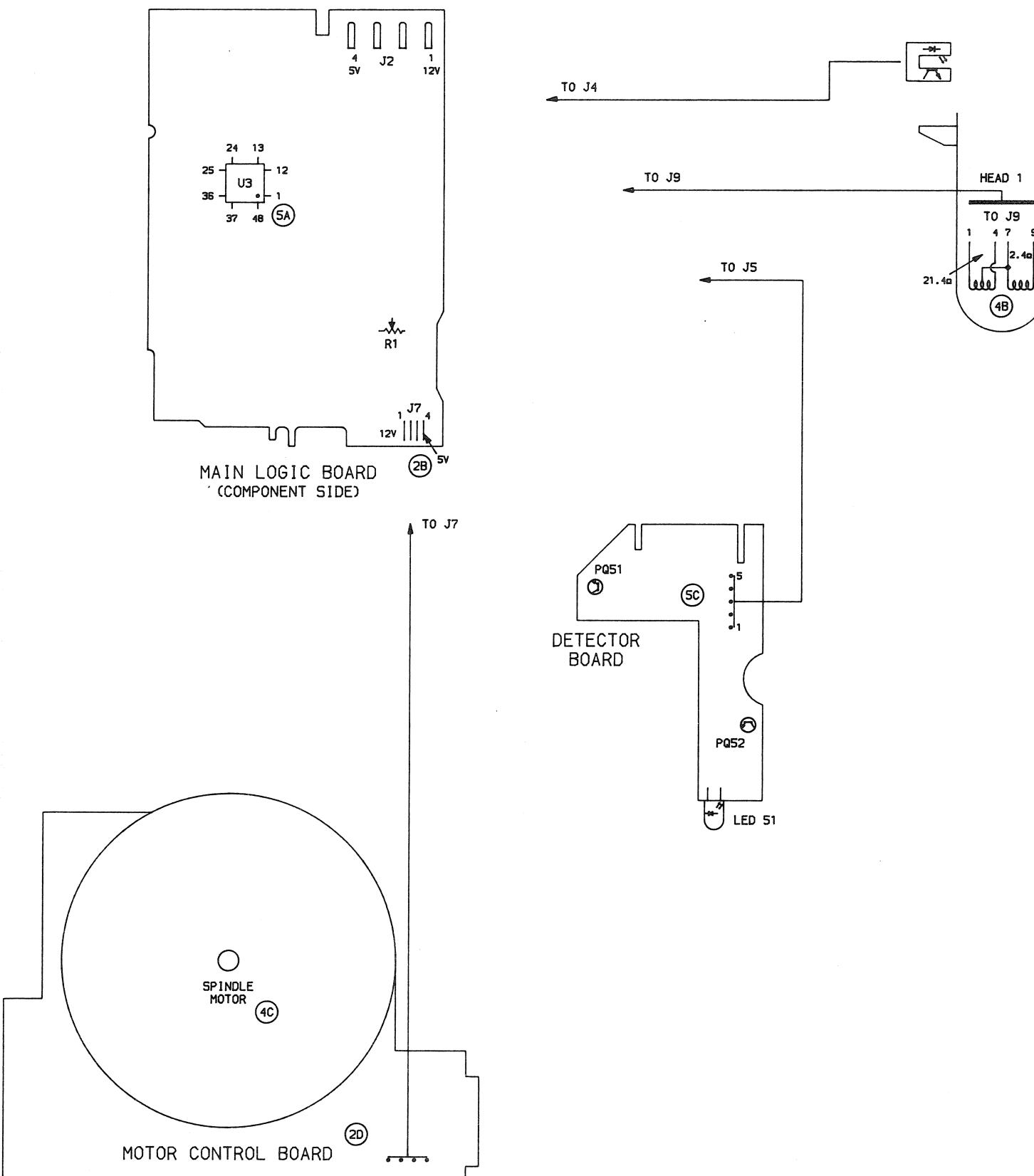
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## PRELIMINARY SERVICE CHECK (Continued)

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# PRELIMINARY SERVICE CHECK (Continued)

## SERVICE CHECKS

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.

### ① DISK DRIVE IS ERRATIC

NOTE: Check for possible interference from monitor or other electrical equipment. Position Disk Drive away from monitor and other equipment, then check operation of the Drive.

- (A) Clean Head with a cotton swab or lint-free cloth dampened with 91% isopropyl alcohol and dry with a lint-free cloth.

NOTE: Head cleaning diskettes are not recommended because they may be too abrasive.

- B) Check the spindle speed for 300rpm.  
(C) Check the Radial Head Alignment and Track 00 Adjustment.

### ② DRIVE MOTOR DOES NOT TURN DISK

- (A) Check the Hub Ring (Collet).  
(B) Check Connector J7 for good connection.  
(C) Check voltages at J7. Check for 12V at pin 1, 5V at pin 4 and 3.8V at pin 3 when the motor should be turning.  
(D) If voltages are present and Drive Motor still does not turn, check the Motor Control Board by substitution.  
(E) If the 3.8V at pin 3 of J7 is not present, check the Main Logic Board by substitution.

### ③ STEPPING MOTOR INOPERATIVE

- (A) Check Connector J6 for good connection.  
(B) Check Stepping Motor (M2) windings.  
(C) If any winding checks open, check Stepping Motor by substitution.

(D) Check voltages and waveforms at J6 when Stepping Motor should be On.

(E) If waveforms are not present, check Main Logic Board by substitution.

(F) If waveforms are present, check Stepping Motor by substitution.

### ④ READ/WRITE FUNCTION INOPERATIVE

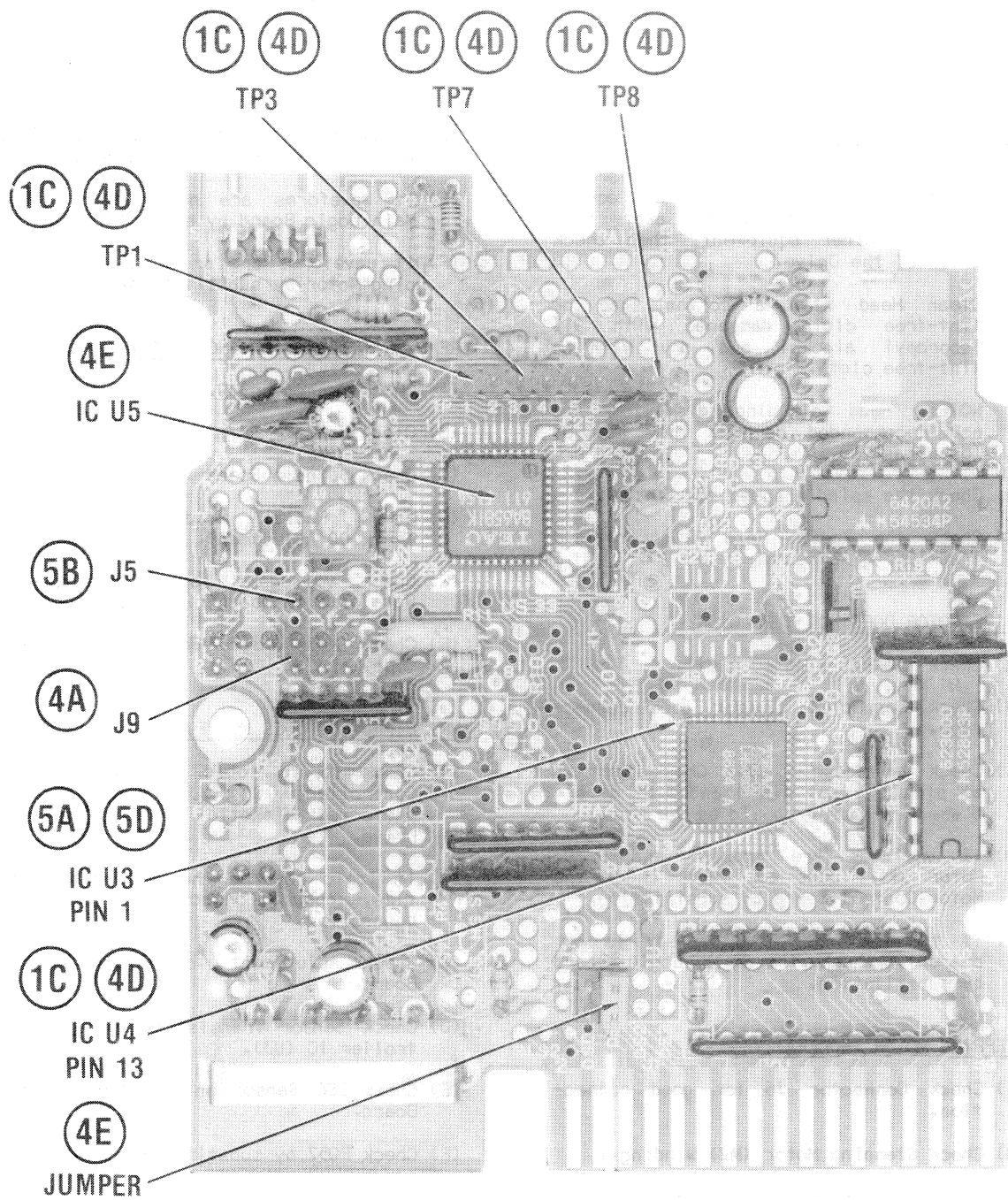
- (A) Check Connector J9.  
(B) Clean Heads.  
(C) Check Spindle Speed for 300rpm.  
(D) Check Radial Head Alignment and Track 00 Adjustment.  
(E) Check voltages, logic readings and waveforms on Read/Write Amp IC (U4).  
(F) Check Main Logic Board by substitution.

### ⑤ WRITE PROTECT DOES NOT FUNCTION

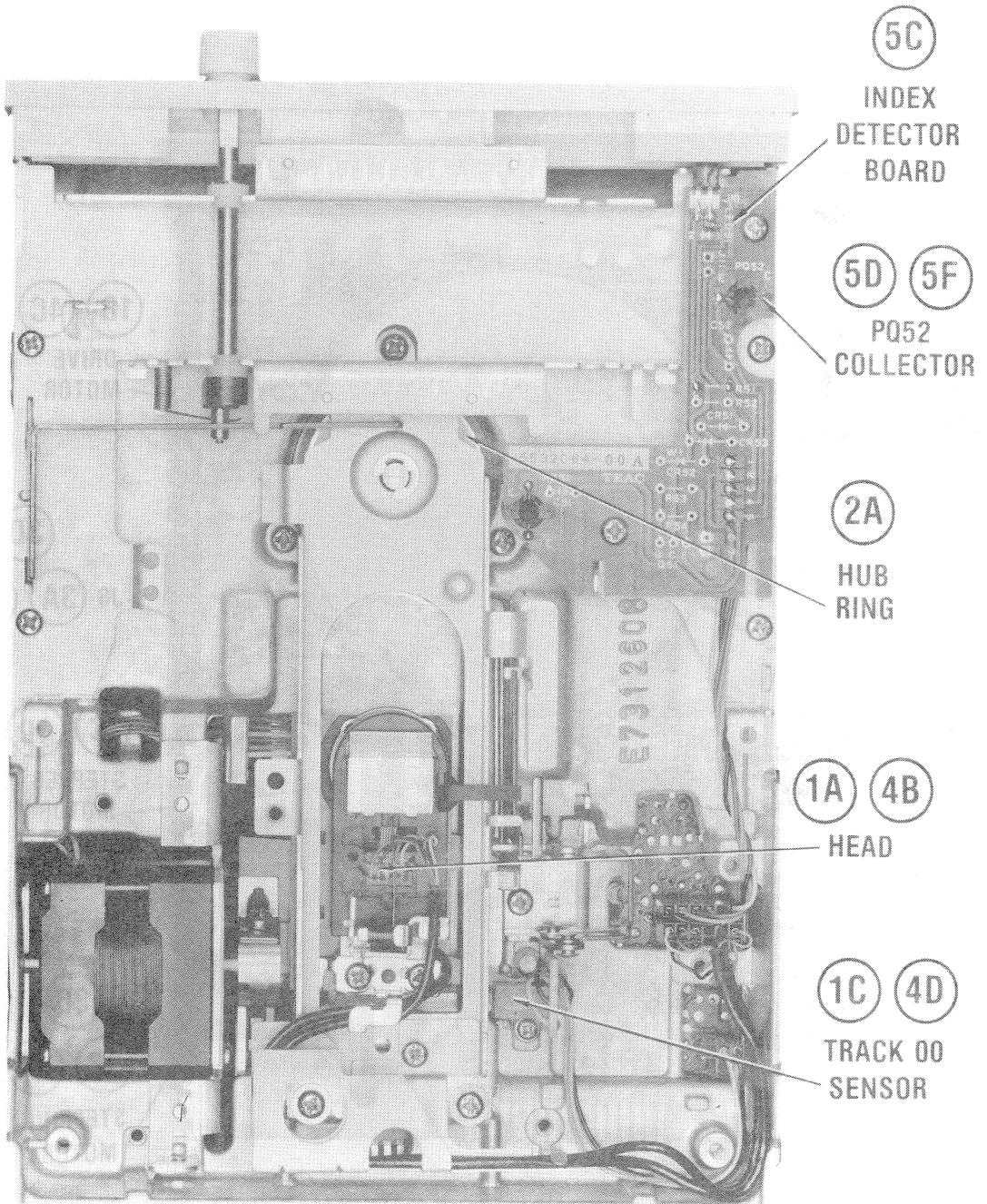
- (A) Check for a logic Low at pin 1 of Controller IC (U3) with a non-protected diskette inserted in Disk Drive.  
(B) If logic reading checks High all the time, check Connector J5 for good connection.  
(C) Check Adjustment of Index Detector Board.  
(D) Check Sensor Transistor PQ52 and Controller IC (U3).  
(E) Check LED Sensor on the Motor Control Board.  
(F) Check PQ52 by substitution.

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## PRELIMINARY SERVICE CHECK (Continued)



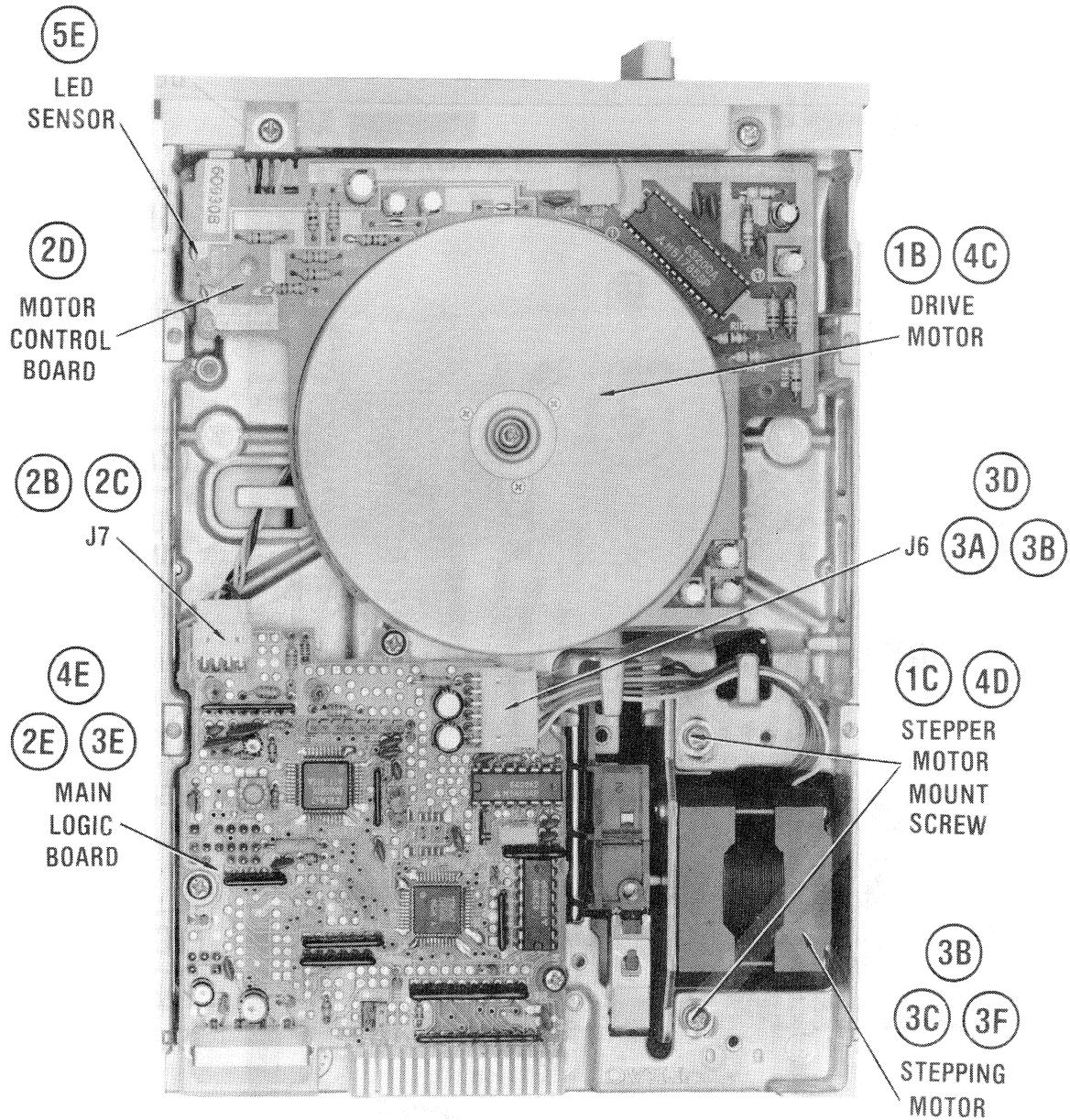
## PRELIMINARY SERVICE CHECK (Continued)



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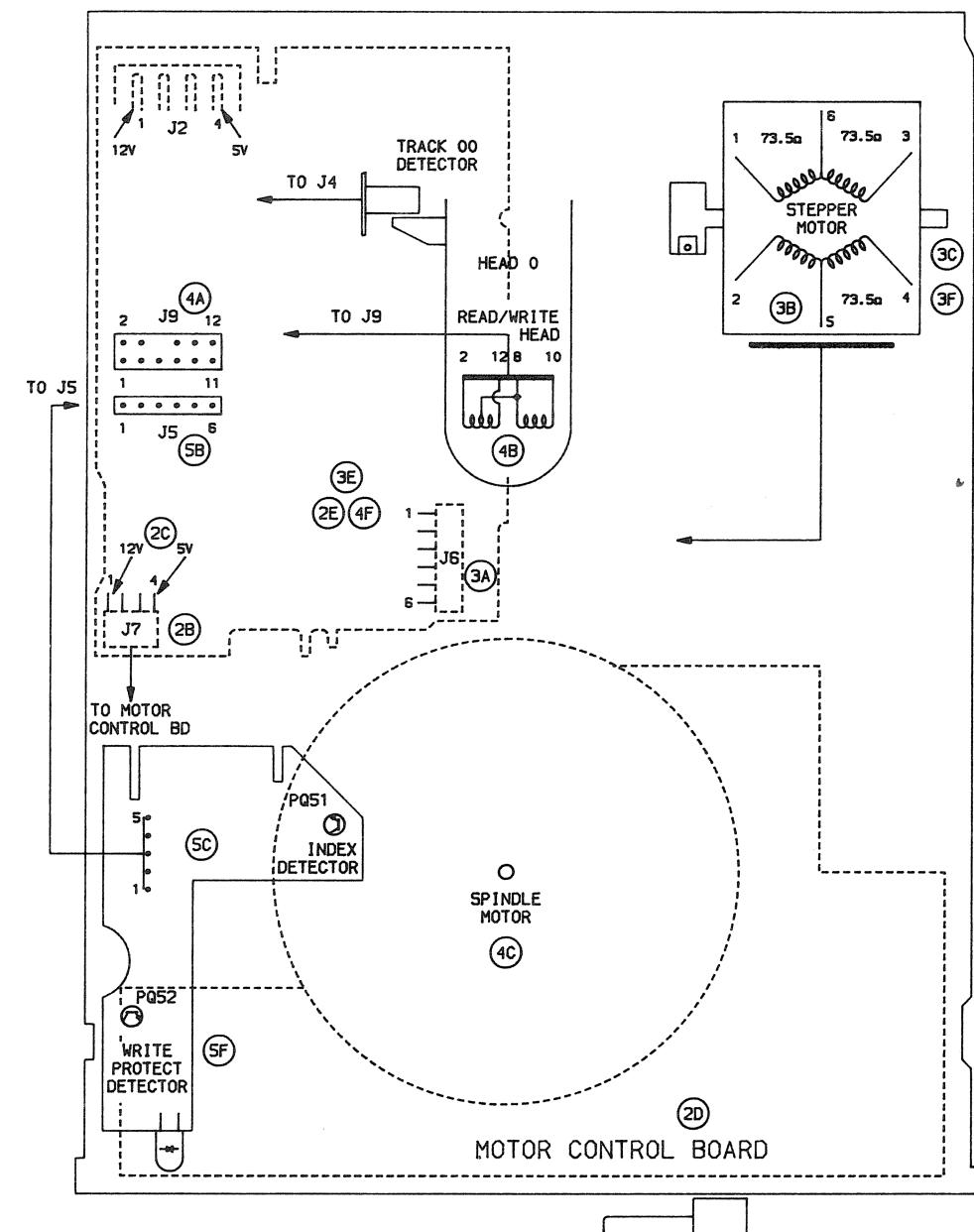
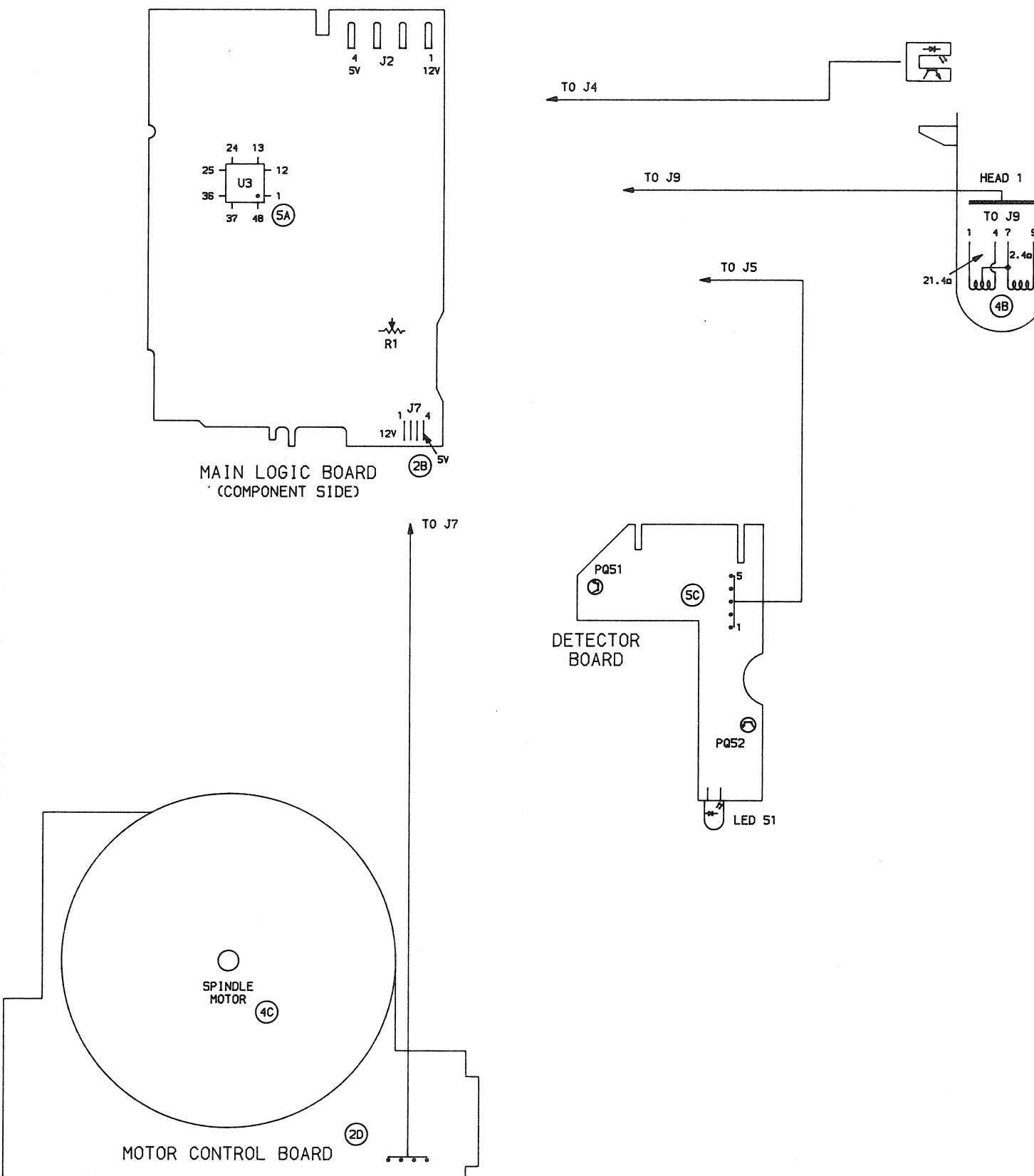
CHASSIS-TOP VIEW

## PRELIMINARY SERVICE CHECK (Continued)



## PRELIMINARY SERVICE CHECK (Continued)

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MODEL FD-55BV-75



## PRELIMINARY SERVICE CHECKS (Continued)

### PREVENTATIVE MAINTENANCE

#### **ENVIRONMENT**

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to maintain a smoke-free area around the Computer. Do not block cabinet vents of Computer, Monitor, Printer, or other power devices.

#### **ELECTRICAL POWER**

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner, or non-interruptable power supply may be needed to cure the problem. **Do not** switch power On and Off frequently.

#### **KEYBOARD**

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab to clean between the keys. Use a non-abrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

#### **DISK DRIVES**

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If Disk Drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

#### **PRINTERS**

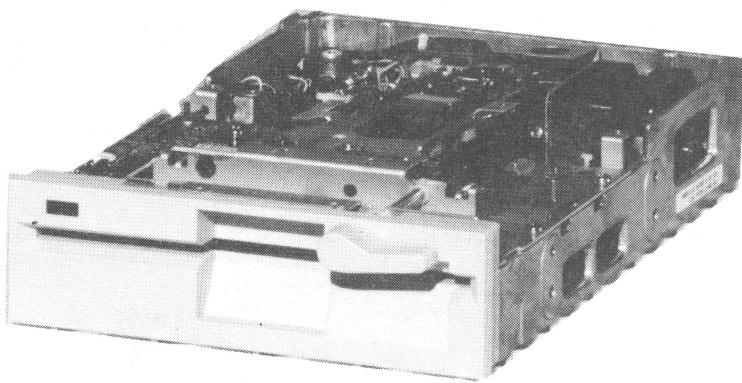
Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not oil the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

#### **STATIC ELECTRICITY**

Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials, and maintain good humidity in the Computer environment.

#### **MONITOR**

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long period of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens, to preserve the glare-reduction feature.

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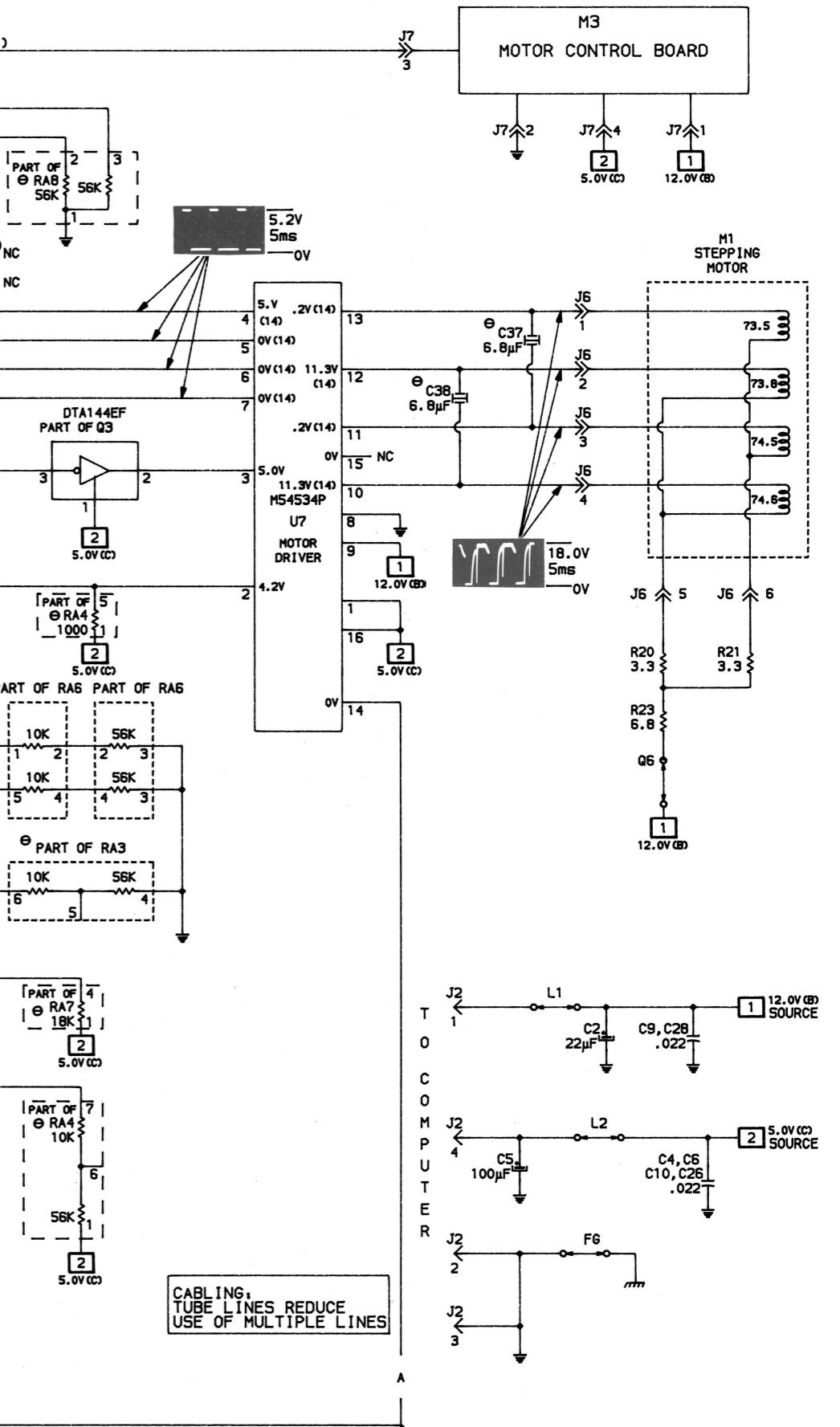
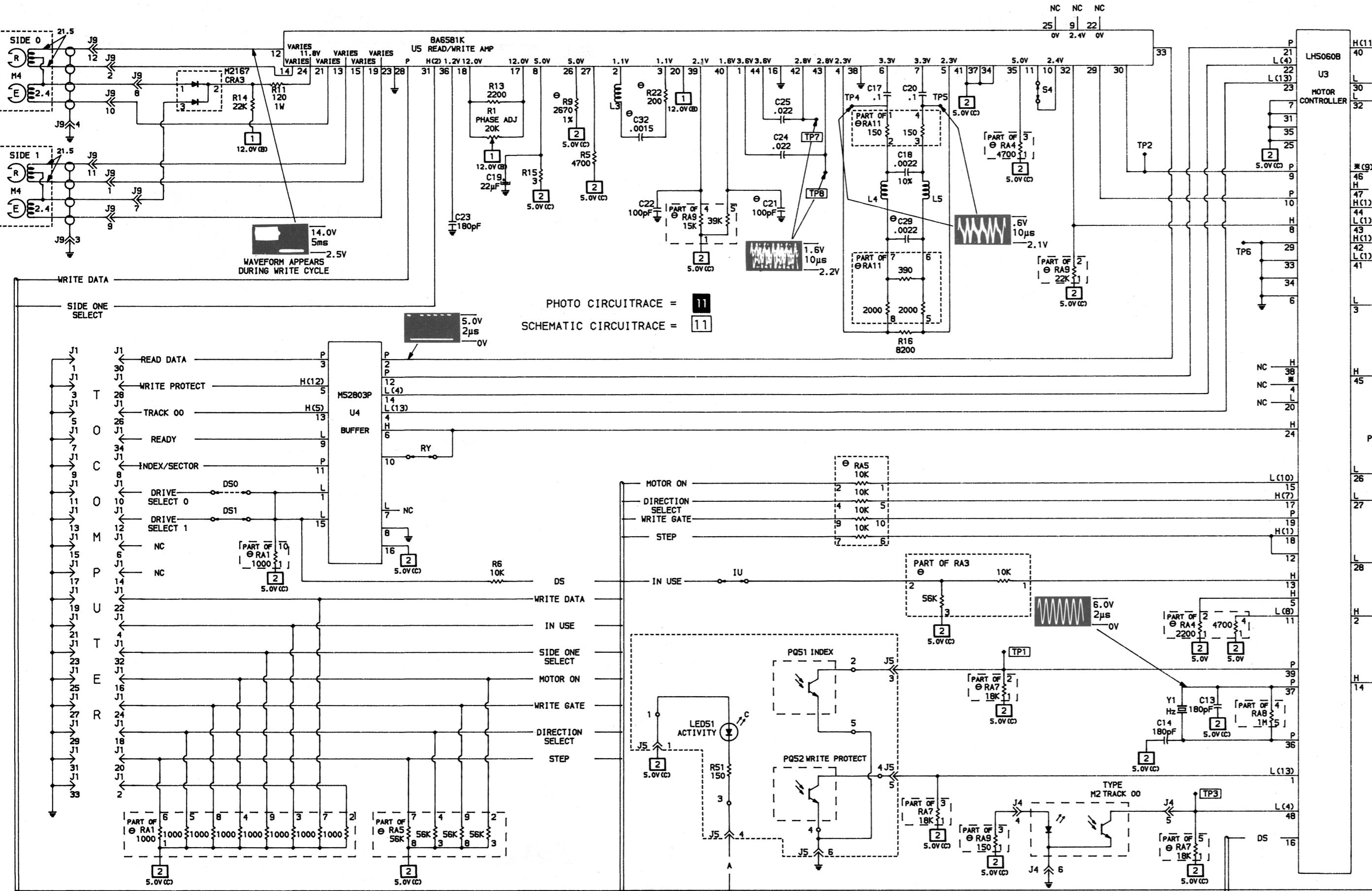
**SAFETY PRECAUTIONS**

See page 16

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A PHOTOFAC STANDARD NOTATION SCHEMATIC  
WITH CIRCUITTRACE

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## ALIGNMENT

### EQUIPMENT REQUIRED

A test program or a Disk Drive Tester is required which will turn On the Disk Drive, select side 0 or 1 and step the head to the track specified in the alignment procedures. Use a Dysan Analog Alignment Diskette 224/2A when an Alignment Diskette is specified in the alignment procedures. NOTE: This alignment diskette has only alignment patterns on it and does not contain any alignment programs.

### DRIVE TRACK PROGRAM

The following Basic programs can be used to step the Disk Drive head to the Track specified by the user. To stop the program, press the Ctrl and Break keys.

NOTE: The programs select side 0 only.

#### Operates Drive A

```
10 CLS
20 OUT 1014,128:OUT 1010,16:OUT 1010,20
30 OUT 1013,7:S=INP(1012)
40 OUT 1013,1:S=INP(1012)
50 INPUT "ENTER TRACK NUMBER "; TR
60 IF TR>40 THEN 50
70 OUT 1010,20
80 OUT 1013,15:S=INP(1012)
90 OUT 1013,1:S=INP(1012)
100 OUT 1013,TR:S=INP(1012)
110 FOR T=1 TO 400:NEXT T
120 PRINT"PRESS ANY KEY TO STOP"
130 A$=INKEY$:OUT 1010,20:IF A$="" THEN 130
ELSE 50
```

#### Operates Drive B

```
10 CLS
20 OUT 1014,128:OUT 1010,33:OUT 1010,37
30 OUT 1013,7:S=INP(1012)
40 OUT 1013,1:S=INP(1012)
50 INPUT "ENTER TRACK NUMBER ";TR
60 IF TR>40 THEN 50
70 OUT 1010,37
80 OUT 1013,15:S=INP(1012)
90 OUT 1013,1:S=INP(1012)
100 OUT 1013,TR:S=INP(1012)
110 FOR T=1 TO 400:NEXT T
120 PRINT"PRESS ANY KEY TO STOP"
130 A$=INKEY$:OUT 1010,37:IF A$="" THEN 130
ELSE 50
```

### SPINDLE SPEED CHECK

If a Disk Drive Tester which provides a readout of the speed in rpm is being used, check for a speed of 300 rpm  $\pm 4.5$  rpm.

If a Disk Drive Tester is not available, center and paste a strobe pattern on the Drive motor on the bottom of the Disk Drive, see Figure 1. Insert a diskette into the Drive and close the door. Type in and run the program listed under "Continuous Operation of Disk Drive" to keep the Disk Drive running. Use the outside pattern when 60 cycle fluorescent lighting is used or the inside pattern for 50 cycle lights.

The speed is correct if the pattern appears to stand still.

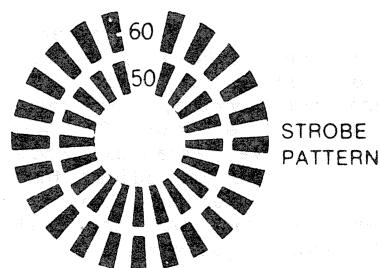


Figure 1

### RADIAL HEAD ALIGNMENT

Connect the channel A input of a dual trace scope to TP7, channel B to TP8, and the external trigger input to TP1. Connect ground lead to TP6. Set the scope to add mode with one channel inverted, the sweep time to 20mSec and the voltage range to .2V. Set both scope inputs to AC. Insert the Alignment Diskette into the Disk Drive and close the door. Turn On the Disk Drive and step the head to track 16, Side 0. The cat's-eye pattern shown in Figure 2 should be displayed on the scope.

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#### EQUAL AMPLITUDE

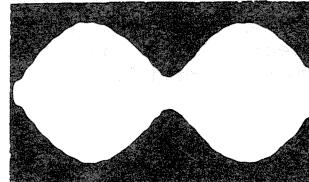


Figure 2

The amplitude of the two lobes displayed must be within 70% of each other. If the lobes are out of tolerance, loosen two screws holding Stepping Motor (M1). Adjust Motor until the two lobes are equal in amplitude and tighten Motor mount screws. Check the adjustment by stepping the head to Track 39 and back to Track 16, then to Track 00 and back to Track 16, checking the lobes each time the head is on Track 16. Check the Track 00 Stop and Detector adjustments after performing the Radial Head Alignment. Select side 1 and check Radial alignment of Head 1 using the above procedures.

### TRACK 00 SENSOR

Connect a scope to TP8 and set the sweep time to 20uSec. Set the voltage range to .2V. Insert the Alignment Diskette into the Disk Drive and close the door. Turn On the Disk Drive and set the Head to Track 00. A 125KHz sine wave should be displayed on the scope.

## ALIGNMENT (Continued)

If the 125kHz signal is not present, step the head forward or back until the 125kHz signal is present. When the 125kHz signal is present on the scope, the head is on Track 00.

Connect the input of a voltmeter to TP3. Check for 5V when the Head is on Track 00 and 0V when the Head is on Track 02. If the readings are not correct, set the Head to Track 01, loosen the Track 00 Sensor (M2) screw (see Disk Drive Mechanical Photo) on the top of the Disk Drive and adjust the detector until the voltmeter reading jumps from 0V to 5V. Tighten the Track 00 screw and recheck the Track 00 Sensor adjustment.

### INDEX SENSOR ADJUSTMENT

Connect the channel A input of a dual trace scope to TP8, channel B input to TP1 (Index pulse) and the scope ground to TP6. Set the scope display to channel A with the voltage range set to 20mV and the sweep time set to 50μS. Set the channel B input to noninverting mode and trigger the scope on channel B with the trigger set to negative slope.

Insert the Alignment Diskette in the Disk Drive and close the door. Turn On Disk Drive, select side 0 and set the head to track 01. Confirm that the leading edge of the burst occurs 200μS ±200μS after the leading edge of the Index pulse, see Figure 3. If the Index Sensor (PQ51) is out of adjustment, loosen two screws holding the board with the Index detector on the top of the Disk Drive and adjust the Board for 200μS ±200μS, see Disk Drive Mechanical, Top View Photo. If side 0 checks good, select side 1 and repeat the above procedure to check Head 1.

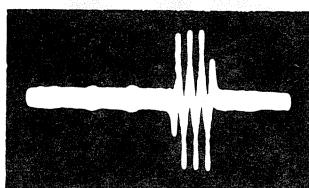


Figure 3

### AZIMUTH CHECK

Connect the channel A input of a dual trace scope to TP7, channel B input to TP8, external trigger input to TP1 and connect the scope ground to TP6. Set the scope to add mode with channel B inverted, sweep time to .5ms, AC input, trigger to negative slope and voltage to .1V range.

Insert the Alignment Diskette, turn on the Disk Drive, select side 0 and set the head to track 34. Confirm that the pattern appears as shown in Figure 4. The amplitude of bursts 1 and 4 must be equal to or less than the amplitudes of bursts 2 and 3.

If the azimuth of Head 0 checks good, select side 1 and repeat the above procedure to check the azimuth of Head 1.

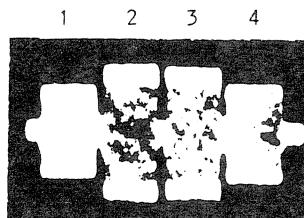


Figure 4

### READ CIRCUIT ADJUSTMENT

To do this adjustment a Disk Drive Tester or program is required that will continuously write a 1F (62.5KHz) pattern on a blank diskette inserted in the Drive.

Connect the input of a scope to pin 3 of IC U4 (Read Data Line). Set the sweep time to 2u Sec, voltage range to 2V and trigger on negative slope. Insert a BLANK diskette in the Drive and close the Drive door. Continuously write a 1F pattern to the diskette. Two pulses should appear on the scope screen. If the Phase Adj Control (R1) is out of adjustment, the second pulse will appear to be two pulses out of phase, see Figure 5. If R1 is out of adjustment, adjust it until the second pulse appears to be one pulse, see Figure 6.

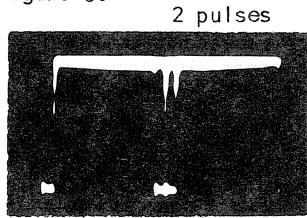


Figure 5  
1 pulse

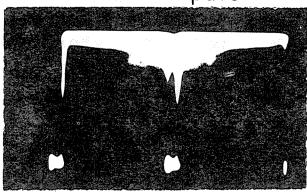


Figure 6

# TROUBLESHOOTING

## TEST SETUP

Connect a Disk Drive known to be operating properly to the Computer as Disk Drive A. Connect the defective Disk Drive as Disk Drive B. Use Disk Drive A to load any alignment or test program needed to check the defective Disk Drive.

**WARNING:** It is possible for a defective Disk Drive to write on or erase information on a diskette, even if the diskette is write protected. Check the Disk Drive by first using a diskette that has programs that have been backed up on another diskette. Do not leave the alignment diskette in the drive while checking voltages and waveforms unless specified in the alignment procedures. The test equipment may cause the Disk Drive circuits to erase sections of the alignment diskette even if the diskette is write protected.

Check all setup jumpers and switches for correct positions and check all interconnecting cables for good connections.

## HEAD CLEANING INSTRUCTIONS

Use a cotton swab or lint-free cloth dampened with 91% isopropyl alcohol and dry with a lint-free cloth or use a non-abrasive cleaning Diskette.

## CONTINUOUS OPERATION OF DISK DRIVE

Use the following Basic program to keep Drive A running continuously in the read mode. Change the number 20 in the program to number 37 to make Drive B run continuously.

```
10 OUT 1014,128:OUT 1010,20:GOTO 10
```

## OSCILLATOR

Verify the oscillator is working properly by checking the 480KHz waveform at pin 37 of Drive Controller IC (U3). If waveform is missing or the frequency not correct, check Crystal Y1, Capacitors C13 and C14, Resistor RAB from pin 4 to pin 5, and IC U3.

## WILL NOT READ

Insert a diskette containing data in Disk Drive B and close the door. Type in and run the following Basic program to keep the Disk Drive running in read mode.

```
10 CLS
20 OUT 1014,128:OUT 1010,33:OUT 1010,37
30 OUT 1013,74:S=INP(1012)
40 OUT 1013,Y:S=INP(1012)
50 FOR X=1 TO 7
60 S=INP(1013):S=INP(1012):PRINT S
70 NEXT X:LOCATE 1,1
80 IF Y=1 THEN Y=5 ELSE Y=1
90 GOTO 20
```

To operate Drive A, change line 10 to OUT 1014,128:OUT 1010,16:OUT 1010,20.

The program displays seven numbers on the Monitor screen. The numbers should change when a

diskette with data on it is inserted in the Drive and the Drive door closed. While the above program is running, check for a logic High on the Write gate (pin 24) of Connector J1 on the Disk Drive Board to verify the Disk Drive is in read mode.

If reading is not correct, check the Disk Drive Interface circuit on the Computer System Board. If reading is correct, check for a logic Low at pin 10 of Drive Controller IC (U3). If reading is not correct, check IC U3. If reading is correct, check the waveform at pin 2 of Buffer IC (U4) while opening and closing the Drive door (with diskette in Drive). There should be a noticeable change in the waveform as the Drive door is opened and closed. If there is no change, check the head winding for continuity, check Connector J9 for good connections, and check the voltages and components associated with pins 1 thru 26 and 34 thru 44 of Read/Write Amp IC (U5). If the waveform checks good at pin 2 of IC U4, check for pulses at pin 3 of IC U4. If pulses are missing, check IC U4. If pulses are present, check the Drive cable and check the Disk Drive Interface circuit on the Computer System Board.

## WILL NOT WRITE

Insert a blank diskette into the Disk Drive and close the door. Type in and run the following Basic program which writes continuously to the Diskette and displays a number on the upper left corner of the Monitor screen. The number should be 0 when the Diskette is not write protected and change to 2 when a write protected Diskette is inserted into the Drive. If the numbers are not correct, refer to the "Write Protect Does Not Function" section of this Troubleshooting guide.

```
10 CLS
20 OUT 1014,128:OUT 1010,33:OUT 1010,37
30 S=INP(1012)
40 OUT 1013,77:S=INP(1012)
50 OUT 1013,Y:S=INP(1012)
60 OUT 1013,1:S=INP(1012)
70 OUT 1013,12:S=INP(1012)
80 OUT 1013,12:S=INP(1012)
90 OUT 1013,0:S=INP(1012)
100 S=INP(1013):S=INP(1012)
110 PRINT INP(1013) AND 2:S=INP(1012)
120 FOR X=1 TO 5
130 S=INP(1013):S=INP(1012)
140 NEXT X:LOCATE 1,1
150 IF Y=1 THEN Y=5 ELSE Y=1
160 GOTO 20
```

**NOTE:** this program will not write to the diskette if the diskette index sensor circuits are not working. Check for index pulses at pin 11 of Buffer IC (U4) while the Drive is running with a blank diskette inserted. If pulses are missing, refer to the "Index Sensor" section of this Troubleshooting guide.

While the above program is running, check for pulses at pins 22 and 24 of Connector J1. If pulses are missing, check the Drive cable and check the Disk Drive Interface circuits on the

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## TROUBLESHOOTING (Continued)

Computer System Board. If pulses are present, check for pulses at pins 9 (TP2) and 10 of Drive Controller IC U3. If pulses are missing, check IC U3. If pulses are present, check the head windings for continuity, check Connector J9 for good connections, and check the voltages and components associated with pins 12 thru 27 of Read/Write Amp IC (U5).

### WRITE PROTECT DOES NOT FUNCTION

Type in and run the program listed under the "Will Not Write" section of this Troubleshooting guide. The program will display the number 0 on the left upper corner of the Monitor screen if a diskette that is not write protected is inserted into the Drive and the number 2 if the diskette is write protected.

**WARNING:** This program also writes on the diskette. Do not use a diskette that has data on it that is important. Insert a blank write protected diskette into the Drive and close the door.

While the program is running, insert a write protected diskette into the Drive and check for a logic High at pin 5 of Connector J5. If reading is not correct, check Connector J5 for good connections and check the Write Protect Sensor (PQ52). If reading is correct, check for a logic High at pin 4 and logic Low at pin 5 of Buffer IC U4. If reading is not correct at pin 4, check Drive Controller IC (U3). If reading is correct at pin 4 and not correct at pin 5, check IC U4.

### INDEX SENSOR

To check the Index Sensor circuits, type in and run the program given under "Continuous Operation of Disk Drive" to keep the drive running. Insert a diskette in the Disk Drive and close the door. Check for pulses at TP1 (pin 3 of Connector J5). If pulses are missing, check Connector J5 for good connections, Resistor RA7 from pin 2 to pin 1 and the Index Sensor (PQ51). If pulses are present, check for pulses at pin 12 of the Buffer IC (U4). If pulses are missing, check the Drive Controller IC (U3). If pulses are present, check for pulses at pin 11 of IC U4. If pulses are missing, check IC U4. If pulses are present, check pin 8 of Connector J1 for good connections.

### TRACK 00 SENSOR

Disk Drive Head bangs against the Track 00 stop. Type in and run the following Basic program to check the Track 00 detector circuits. The program will step the Head back to Track 00 and display the number 16 on the Monitor screen to indicate the head is on Track 00. If the head is manually pushed off Track 00 the number should change to the number 0.

### DRIVE A

```
10 OUT 1014,128:OUT 1010,16:OUT 1010,20  
20 OUT 1013,7:S=INP(1012)  
30 OUT 1013,1:S=INP(1012)
```

```
40 FOR T=1 TO 500:NEXT T  
50 OUT 1014,128:OUT 1010,16:OUT 1010,20  
60 S=INP(1012)  
70 OUT 1013,4:S=INP(1012)  
80 OUT 1013,2:S=INP(1012)  
90 CLS:PRINT INP(1013) AND 16:S=INP(1012)  
100 GOTO 40
```

### DRIVE B

```
10 OUT 1014,128:OUT 1010,33:OUT 1010,37  
20 OUT 1013,7:S=INP(1012)  
30 OUT 1013,1:S=INP(1012)  
40 T=1 TO 500:NEXT T  
50 OUT 1014,128:OUT 1010,33:OUT 1010,37  
60 S=INP(1012)  
70 OUT 1013,4:S=INP(1012)  
80 OUT 1013,2:S=INP(1012)  
90 CLS:PRINT INP(1013) AND 16:S=INP(1012)  
100 GOTO 40
```

If the number on the Monitor screen is not correct, check for a logic High at TP3 when the head is On Track 00 and a logic Low when the head is Off Track 00. If readings are not correct, check Connector J4 for good connections, check the Track 00 Sensor (M2) and Resistor RA7 from pin 5 to pin 1. If readings are correct, check for a logic High at pin 14 and a logic Low at pin 13 of Buffer IC (U4) with the head On Track 00 and a logic Low at pin 14 and a logic High at pin 13 with the head Off Track 00. If readings are not correct at pin 14, check Drive Controller IC (U3). If readings are correct at pin 14 and not correct at pin 13, check IC U4.

### DRIVE MOTOR

Drive Motor will not run. Check Connectors J1 and J7 on the Disk Drive Board for good connections. Check for 5.0V at pin 4 and 12.0V at pin 1 of Connector J2 on the Disk Drive Board. If the voltages are missing, check the power supply.

Type in and run the program given under "Continuous Operation of Disk Drive" to keep the Drive running. Check for a logic Low at pin 16 of Connector J1 on the Disk Drive Board. If reading is not correct, check the Drive cable and check the Disk Drive Interface on the Computer System Board. If reading is correct, check for a logic High at pin 3 of Connector J7. If reading is not correct, check the Drive Controller IC (U3). If reading is correct, check Connector J7 for good connections and check the Drive Motor Control Board.

### STEPPING MOTOR

Head position motor not working. Type in and run the following Basic program. The program continuously alternates the head on Drive B between Tracks 00 and 16.

### DRIVE A

```
10 OUT 1014,128:OUT 1010,16:OUT 1010,20  
20 OUT 1013,7:S=INP(1012)  
30 OUT 1013,1:S=INP(1012)  
40 OUT T=1 TO 500:NEXT T
```

**TROUBLESHOOTING (Continued)**

```

50 OUT 1010,20
60 OUT 1013,15:S=INP(1012)
70 OUT 1013,1:S=INP(1012)
80 OUT 1013,16:S=INP(1012)
90 FOR T=1 TO 500:NEXT T
100 GOTO 10

```

**DRIVE B**

```

10 OUT 1014,128:OUT 1010,33:OUT 1010,37
20 OUT 1013,7:S=INP(1012)
30 OUT 1013,1:S=INP(1012)
40 OUT T=1 TO 500:NEXT T
50 OUT 1010,37
60 OUT 1013,15:S=INP(1012)
70 OUT 1013,1:S=INP(1012)
80 OUT 1013,16:S=INP(1012)
90 FOR T=1 TO 500:NEXT T
100 GOTO 10

```

**TEST EQUIPMENT**

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

**TEST EQUIPMENT (COMPUTERFACTS)**

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1570A,1590A,1596	SC61	
LOGIC PROBE	DP51,DP21		
LOGIC PULSER	DP101,DP31		
DIGITAL VOM	2830,2806	DVM37,DVM56,SC61	
ANALOG VOM	277,111,116		
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
FREQUENCY COUNTER	1803,1805	FC71,SC61	
COLOR BAR GENERATOR	1211A,1251,1260,1249	CG25,VA62	
RGB GENERATOR	1260,1249		
FUNCTION GENERATOR	3020,3011,3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200	
TEMPERATURE PROBE	TP-28,TP-30		
CRT ANALYZER	467,470	CR70	
DIGITAL IC TESTER	560,550,552		
CAPACITANCE ANALYZER		LC53,LC75,LC76 LC77	
INDUCTANCE ANALYZER		LC53,LC75,LC76 LC77	

## PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

### SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.			ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
DISK DRIVE								
CRA3	M2167 1SS233F DTA144EF LH5060B							
Q3								
U3								
U4	M52803P BA6381K M54534P	NTE2072	ECG2072					
U5								
U7								

## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
	DISK DRIVE	
C37 C38	6.8 25V NP 6.8 25V NP	

ITEM No.	RATING	MFGR. PART No.

### CAPACITORS

ITEM No.	RATING	MFGR. PART No.
	DISK DRIVE	
C21	100pF 500V 2%	
C29	.0022 500V 2%	
C32	.0015 500V 2%	

ITEM No.	RATING	MFGR. PART No.

### COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
	DISK DRIVE	
L3	Peaking	
L4	Peaking	
L5	Peaking	

ITEM No.	FUNCTION	MFGR. PART No.

### CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R1	DISK DRIVE Balance	20K		

### RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
	DISK DRIVE			
R9	2670 1% 1/8W Carbon Film			
R22	200 1% 1/8W Carbon Film	(1)		
RA1	Resistor Network	(2)		
RA3	Resistor Network	(3)		
RA4	Resistor Network	(4)		
RA5	Resistor Network	(4)		
RA6	Resistor Network	(5)		
RA7	Resistor Network	(6)		
RA8	Resistor Network	(7)		
RA9	Resistor Network	(8)		
RA11	Resistor Network			

(1) 1000 5% x 9

(2) 10K x 2, 56K x 2

(3) 56K, 10K, 1000, 2200 and 4700 x 2

(4) 10K x 4, 56K x 4

(5) 18K x 4

(6) 56K x 2, 1M x 1

(7) 22K, 39K, 15K, 150

(8) 150 x 2, 2000 x 2, 390

## PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

### MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
	DISK DRIVE		
LED51	LED		Activity, Red
M1	Motor		Stepping
M2	Sensor		Track 00
M3	Motor		Drive
M4	Head		Read/Write/Erase
PQ51	Sensor		Index
PQ52	Sensor		Write Protect

### SCHEMATIC NOTES

▽ Isolated ground.

--- Circuitry not used in some versions

--- Circuitry used in some versions

⊕ See parts list

± Ground

≡ Chassis

Voltages, waveforms and logic readings taken while running the following Basic program. Readings shown were taken when the disk drive head was not moving unless noted.

NOTE: Insert a formatted diskette (not write protected) in Drive B before running the program.

```
10 OPEN "B:SAMS.DAT" FOR OUTPUT AS #1
20 FOR X=1 TO 300
30 PRINT #1, "HOWARD W SAMS"
40 NEXT X
50 CLOSE #1
60 GOTO 10
```

Voltages measured with digital meter.

Waveforms and voltages taken from ground, unless noted otherwise.

Supply voltage maintained as shown at input.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% unless noted.

Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are 1/2W or less, 5% unless noted.

Value in () used in some versions.

Measurements with switching as shown, unless noted.

Logic Probe Display

L = Low

H = High

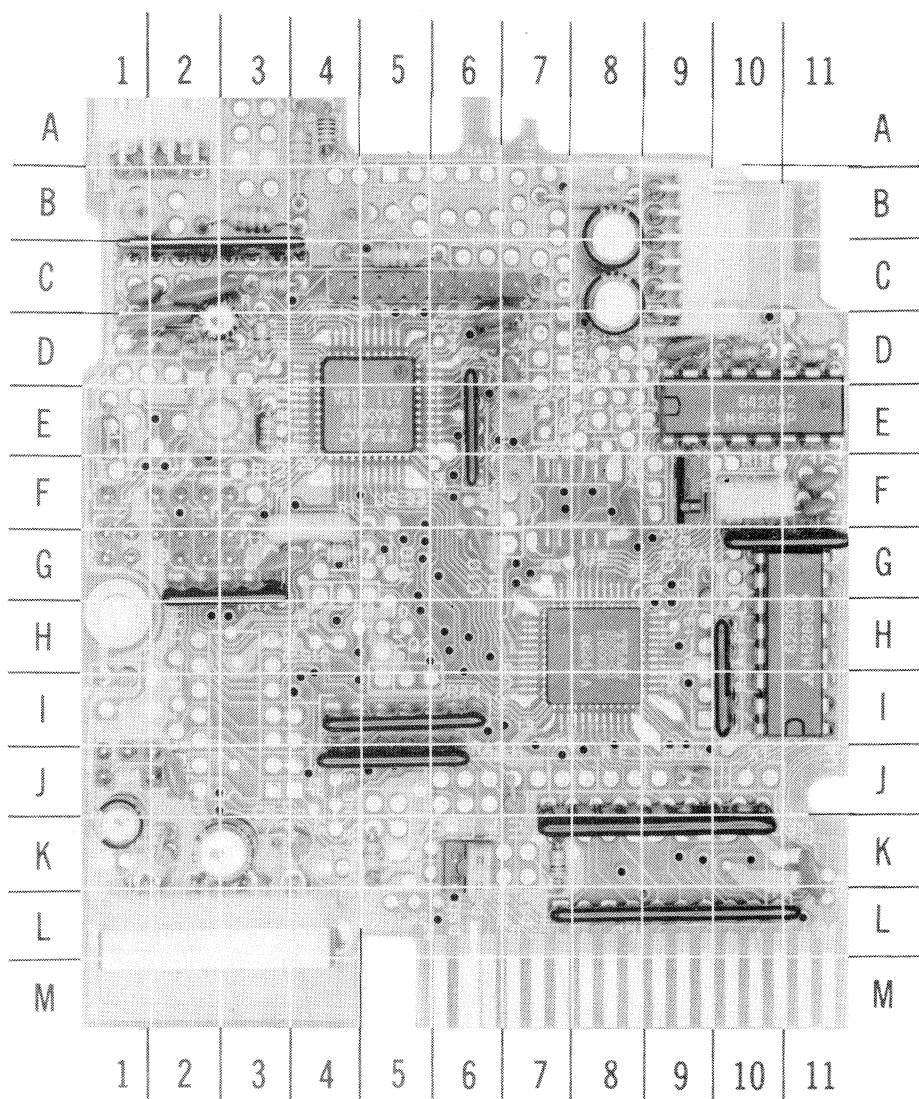
P = Pulse

\* = Open (No lights On)

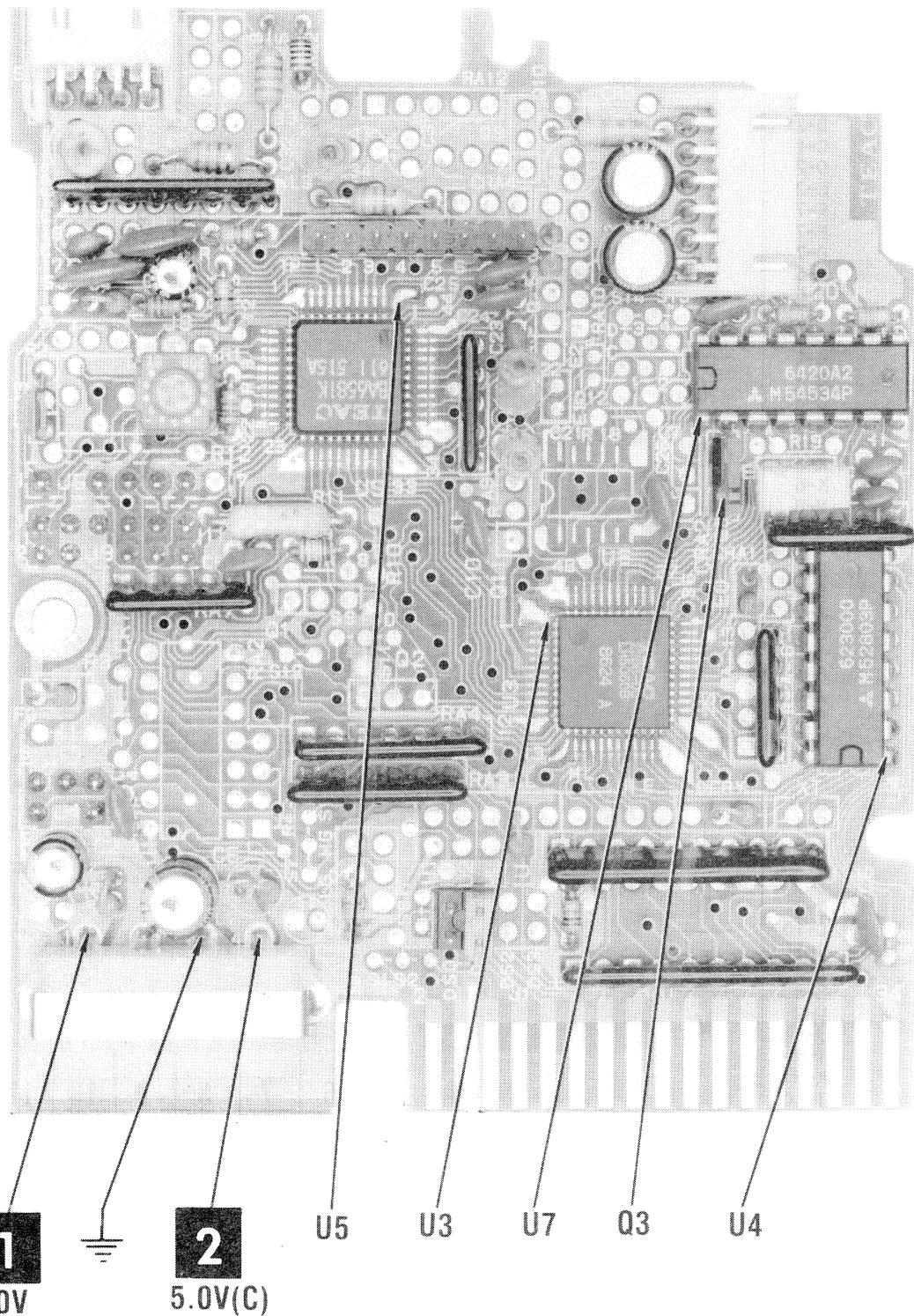
- (1) Probe indicates P when head is moving.
- (2) Probe indicates L when head 0 is selected, H when head 1 is selected.
- (3) Probe indicates H when head 0 is selected, L when head 1 is selected.
- (4) Probe indicates H when head is on track 00 and L when off track 00.
- (5) Probe indicates L when head is on track 00 and H when off track 00.
- (6) Probe indicates H when head is moving in and L when head is moving out from the center of the diskette.
- (7) Probe indicates L when head is moving in and H when head is moving out from the center of the diskette.
- (8) Probe indicates H when head is moving.
- (9) Probe indicates L when head is moving.
- (10) Probe indicates H when Drive Motor is off.
- (11) Probe indicates L when Drive Motor is off.
- (12) Probe indicates L if diskette is write protected.
- (13) Probe indicates H if diskette is write protected.
- (14) Voltage varies when head is moving.

## GridTrace LOCATION GUIDE

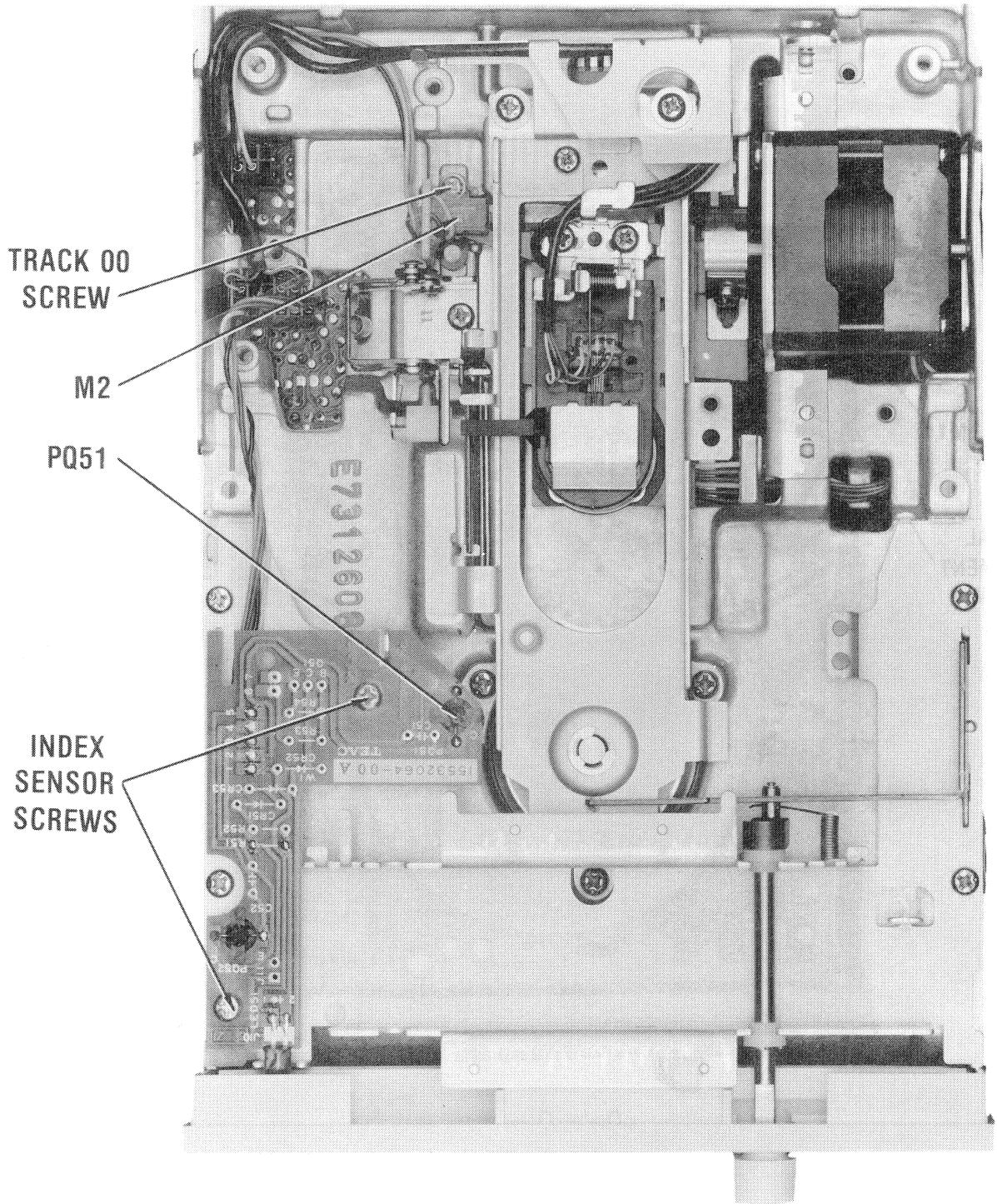
C2	K-1
C4	J-3
C5	K-3
C6	K-11
C9	G-3
C10	G-6
C13	F-11
C14	F-11
C17	D-2
C18	C-1
C19	D-2
C20	C-2
C21	F-7
C22	E-7
C23	D-7
C24	D-6
C25	D-6
C26	F-8
C28	D-9
C29	B-1
C32	B-4
C37	C-8
C38	B-8
CRA3	E-1
DS0	K-6
DS1	K-6
J1	M-8
J2	L-3
J4	J-1
J5	F-1
J6	C-10
J7	A-2
J9	G-1
L3	C-5
L4	B-3
L5	A-4
Q3	F-9
R1	E-3
R5	K-5
R6	K-7
R9	G-4
R11	F-4
R13	E-3
R14	D-2
R15	D-3
R16	C-3
R20	D-10
R21	D-11
R22	A-4
R23	B-8
RA1	L-9
RA3	J-5
RA4	I-5
RA5	K-9
RA6	I-10
RA7	G-3
RA8	G-11
RA9	E-6
RA11	C-2
TP1	C-4
TP2	C-5
TP3	C-5
TP4	C-5
TP5	C-6
TP6	C-6
TP7	C-6
TP8	C-7
U3	H-8
U4	H-11
U5	E-5
U7	E-10
Y1	F-10



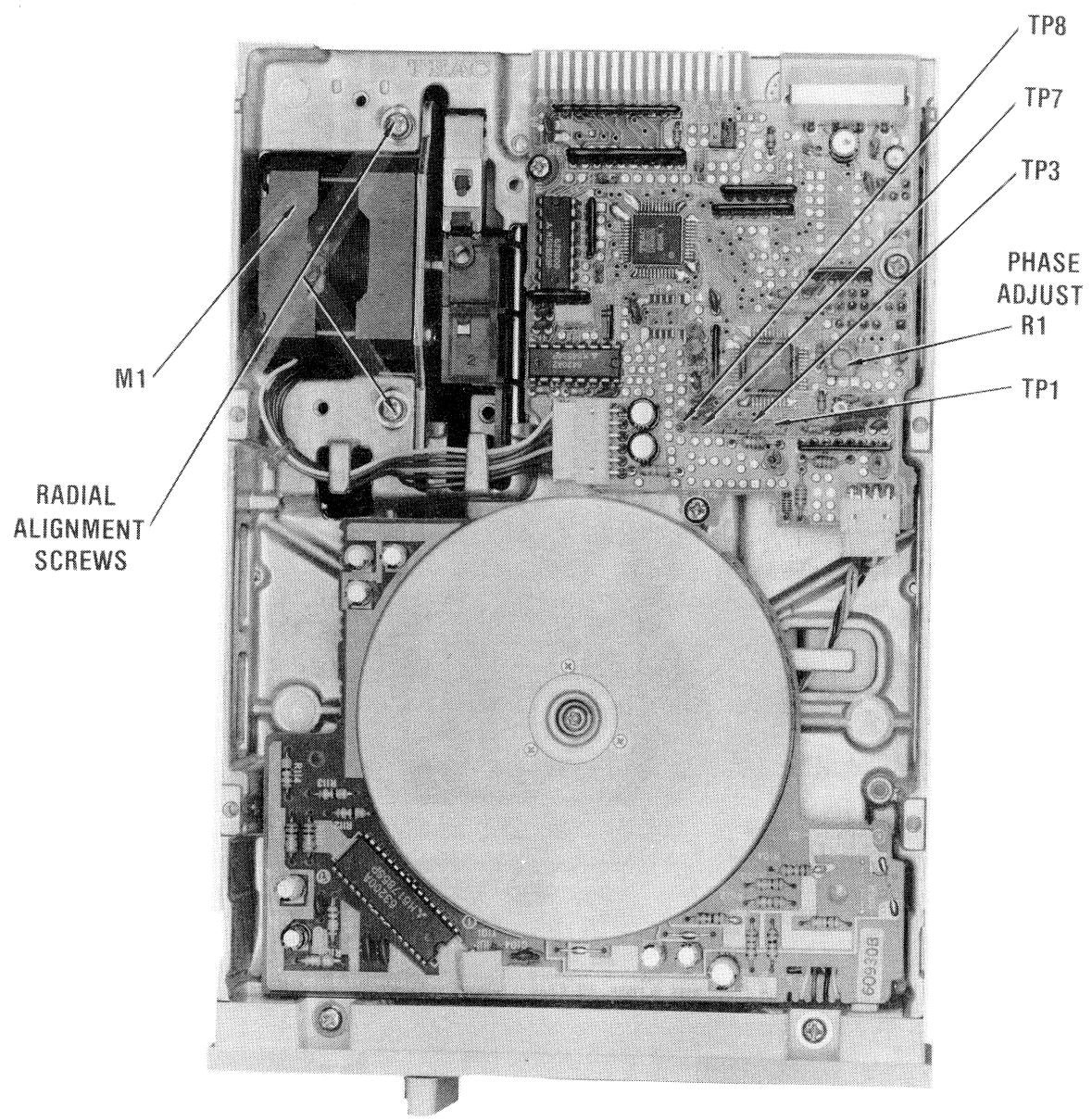
TEAC  
MODEL FD-55BV-75



NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED



CHASSIS-TOP VIEW



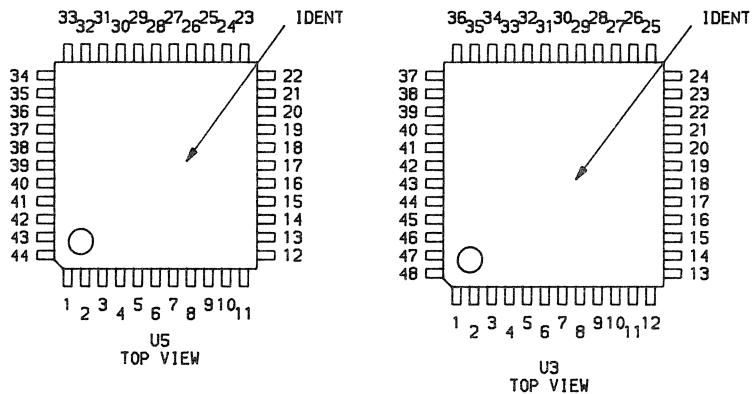
CHASSIS - BOTTOM VIEW

## **LOGIC CHART**

## FLOPPY DISK DRIVE

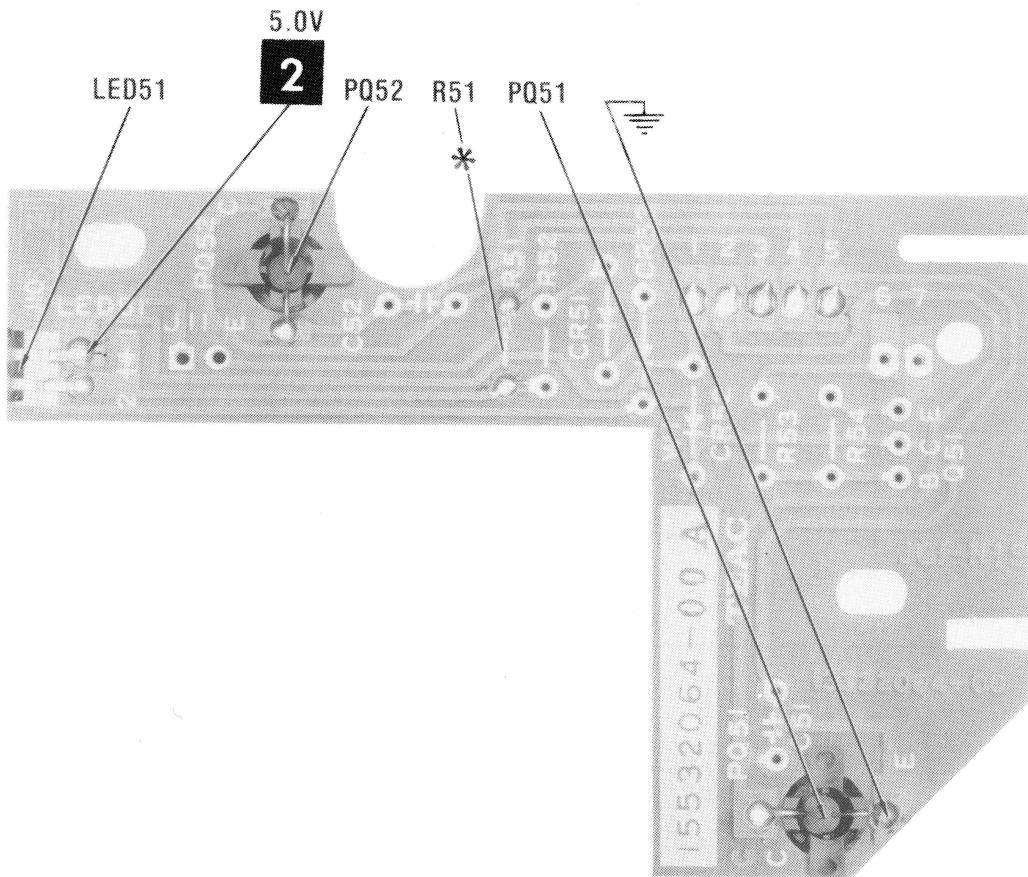
PIN NO.	IC U3	PIN NO.	IC U3	PIN NO.	IC U3	PIN NO.	IC U4	IC U5	PIN NO.	IC U5
1	L(13)	21	P	41	L(1)	1	L		21	
2	H	22	L(4)	42	H(1)	2	P		22	
3	L	23	L(13)	43	L(1)	3	P		23	
4	*	24	H	44	H(1)	4	L(13)		24	
5	H	25	H	45	H	5	H(12)		25	
6	L	26	L	46	*(9)	6	H		26	
7	H	27	L	47	H	7	L		27	H
8	H	28	L	48	L(4)	8	L		28	P
9	P	29	L			9	L		29	P
10	P	30	L			10	H		30	P
11	L(8)	31	H			11	P		31	H(2)
12	H(1)	32	L			12	P		32	H
13	H	33	L			13	H(5)		33	P
14	H	34	L			14	L(4)			
15	L(10)	35	H			15	L			
16	L	36	P			16	H			
17	H(7)	37	P							
18	H(1)	38	H							
19	P	39	P							
20	L	40	H(11)							

## TERMINAL GUIDES



## SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Disk Drive before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install boards with AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. The Disk Drive is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The Disk Drive cabinet is equipped with vents to prevent heat build-up. Never block, cover, or obstruct these vents.



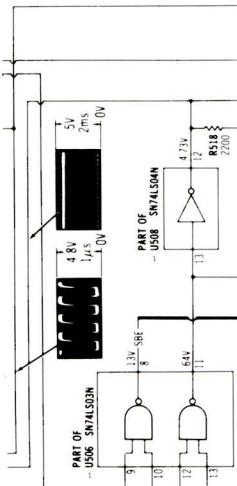
**SENSOR BOARD**

\*LOCATED OTHER SIDE OF BOARD

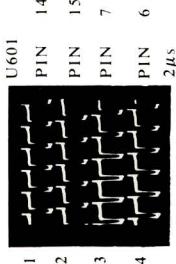
**HOWARD W. SAMS & COMPANY****COMPUTERFACTSTM put easy to use, informative technical data right at your fingertips. Each edition includes specific service information on the individual component, along with some overall troubleshooting hints.**

The following information is just a sample of the many valuable time saving features contained in this exclusive Sams COMPUTERFACTS publication:

- Preliminary Service Checks section is an easy to use, step by step guide for the experienced technician or hobbyist, and even beginners.
- SAMS famous industry accepted standardized notation schematics containing CIRCUITTRACE®, GRIDTRACE™, waveforms, voltages and stage identification.



- Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

**TROUBLESHOOTING****MICROPROCESSOR CHIP (CPU) OPERATION**

Verify the processor is functioning by checking the address lines pins 10 thru 24 of IC U100 and the data lines (pins 41 thru 56) using a logic probe or a scope if a logic probe is used refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.

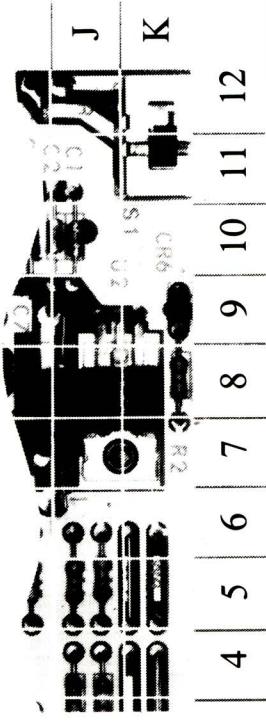
- Logic Chart containing logic probe readings to isolate defective circuitry and components.

**LOGIC**

PIN NO	IC U100	PIN NO	IC U100	PIN NO	IC U102	IC U103	IC U104	IC U105	IC U106	IC U107	IC U108	IC U109
1	P	21	P	2	L	L	P	H	L	P	H	L
2	P	22	P	3	P	P	H	H	P	H	P	H
3	P	23	P									

Remove staples and use cover for file folder.

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITTRACE, and component photographs.



- Complete Components Parts List in an easy to use format with field replacements shown when possible. SAMS unique semiconductor, chip and IC cross-reference gives you many replacements to choose from and is available at your Electronic Distributor.

**SEMICONDUCTORS (Select replacement for best results)**

REPLACEMENT DATA					
ITEM No.	TYPE No.	MFGR. Part No.	ECG Part No.	NIE Part No.	RCA Part No.
D102	ISS53	1149-2576	ECG519	NTE519	SK8909/177
D103	2N606M	1149-2527	ECG109	NTE109	SK8908
D201	1N4004GP	1201-4205	ECG116	NTE116	SK3312
DS01 thru DS03	ISS53	1149-2576	ECG519	NTE519	SK8909/177

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