SAMS

CD13 08994

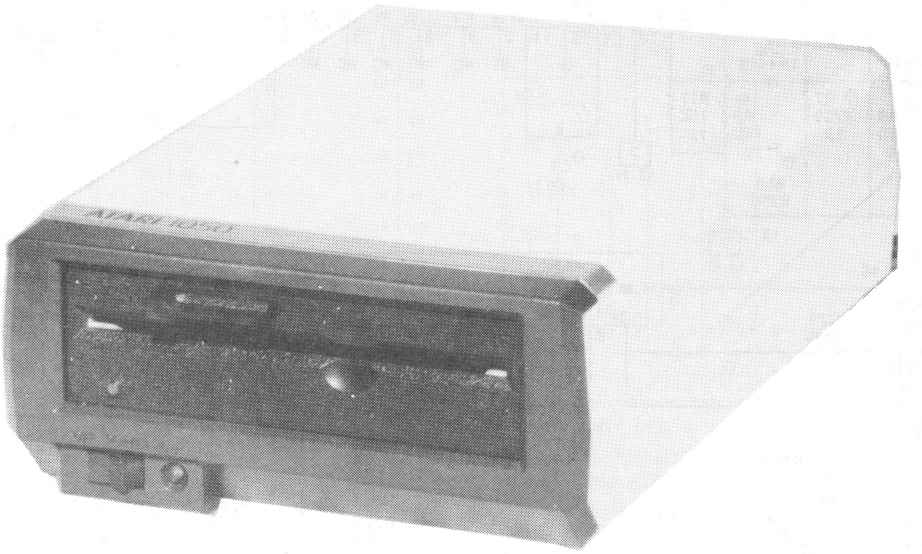
COMPUTERFACTS™

TECHNICAL SERVICE DATA

ATARI®
MODEL 1050
DISK DRIVE

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

CD13 ATARI MODEL 1050



SAFETY PRECAUTIONS

See Page 15

PRELIMINARY SERVICE CHECKS

ENCLOSED

CD13 ATARI MODEL 1050

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SAMS™ Howard W. Sams & 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.

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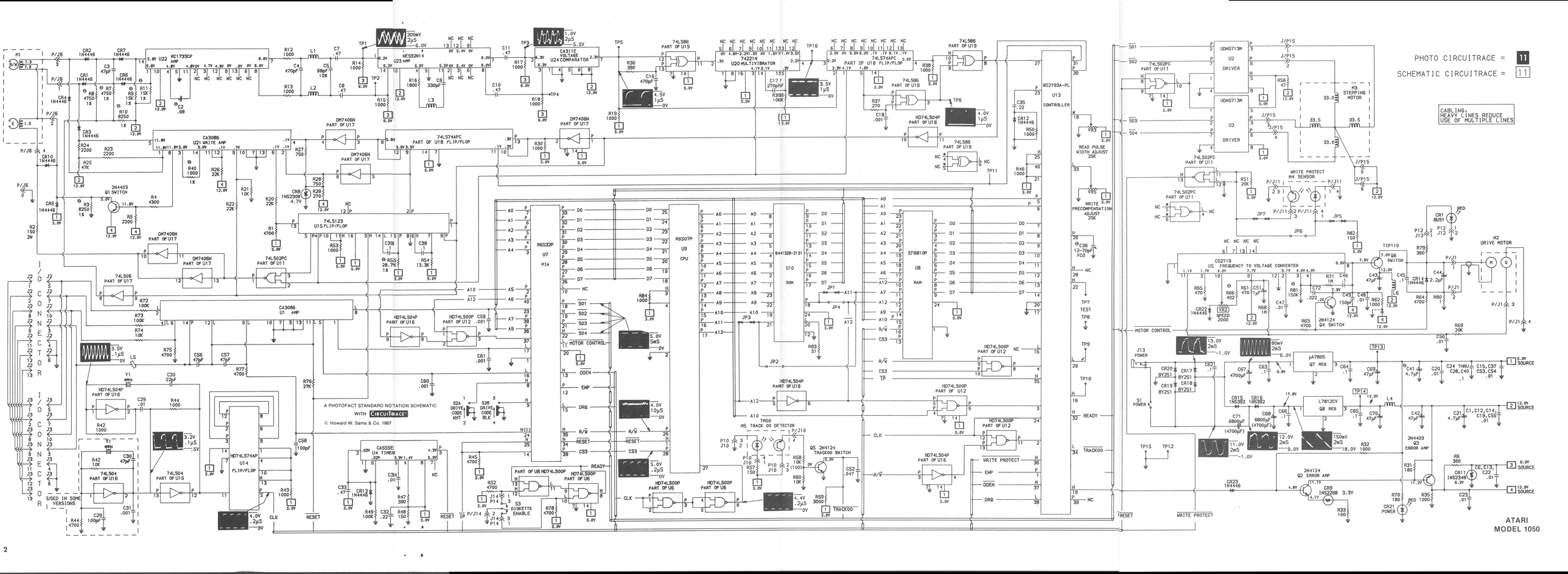
PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11
CABLING:
HEAVY LINES REDUCE
USE OF MULTIPLE LINES
A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE
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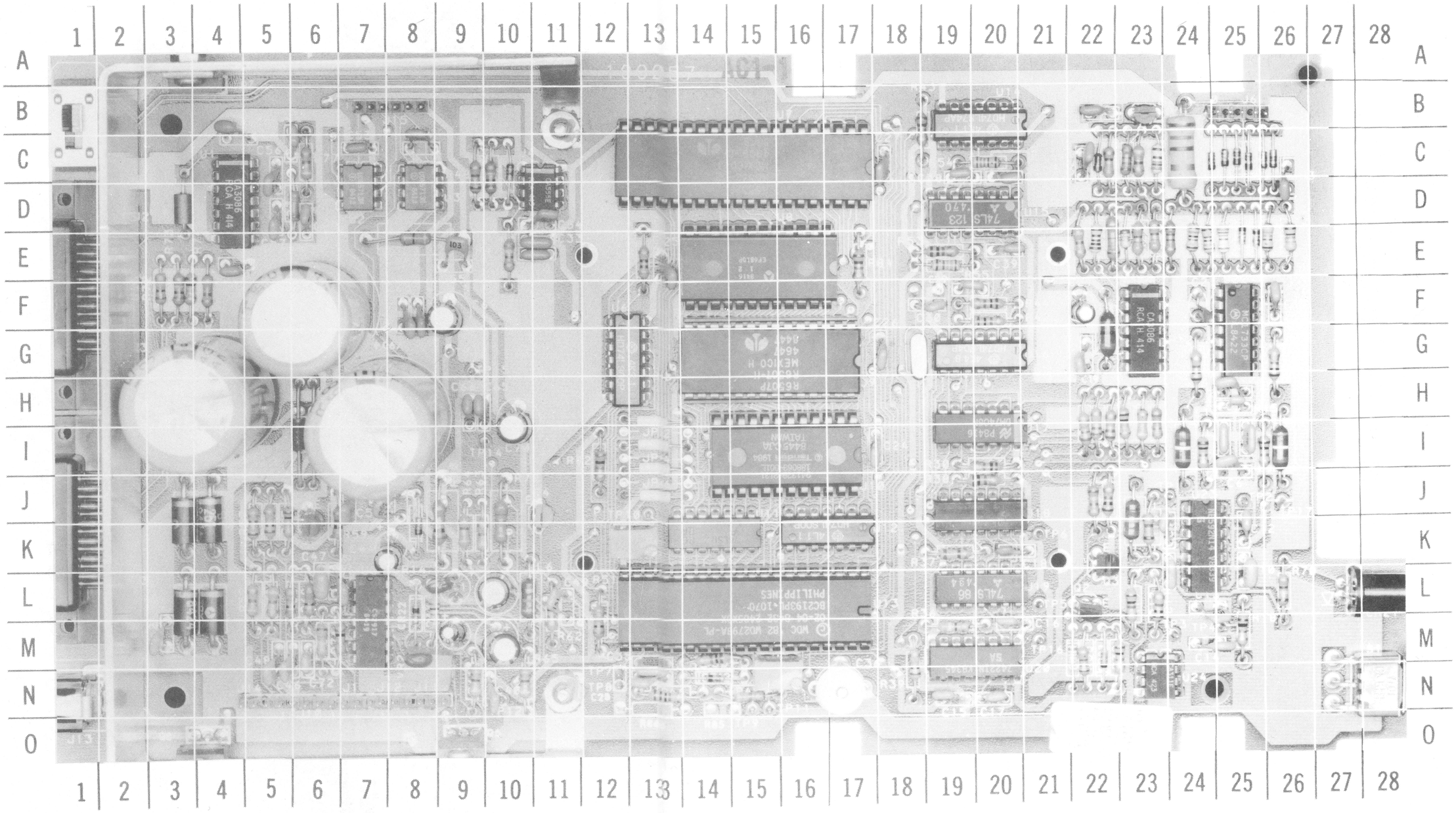
ATARI
MODEL 1050
I/O CONNECTOR
USED IN SOME VERSIONS
MOTOR CONTROL
READY
RESET
TRACK00
WRITE PROTECT
CLK
R6507P U9 CPU
R6532P U7 P1A
MC1733CP U22 AMP
CA3086 U21 WRITE AMP
CA3086 U1 AMP
NE592N14 U23 AMP
CA3111E VOLTAGE COMPARATOR U24
74221N U20 MULTIVIBRATOR
74LS123 U15 FLIP/FLOP
74LS74APC PART OF U18 FLIP/FLOP
HD74LS74AP U14 FLIP/FLOP
CA3080 U4 TIMER
MM5213M U2 DRIVER
MM5213M U3 DRIVER
MD2793A-PL U13 CONTROLLER
CS2719 US FREQUENCY TO VOLTAGE CONVERTER
TMS0 MS TRACK 00 DETECTOR
2N4403 Q1 SWITCH
2N4124 Q4 SWITCH
2N4124 Q2 ERROR AMP
2N4403 Q3 ERROR AMP
TIP110 7.9V Q6 SWITCH
μA7805 Q7 REG
L7812CV Q8 REG
M3 STEPPING MOTOR
M2 DRIVE MOTOR
DISKETTE ENABLE
TRACK00 SWITCH
READ PULSE WIDTH ADJUST 25K
WRITE PRECOMPENSATION ADJUST 25K
SPEED 2000
WRITE PROTECT M4 SENSOR
J/P15
J/P11
J/P10
J/P12
J/P13
J/P14
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16



A Howard W. Sams GRIDTRACE™ Photo

GridTrace LOCATION GUIDE

C1	F-26	CR5	C-25	R25	I-23	TP15	G-9
C2	F-24	CR6	E-25	R26	I-22	TP16	M-21
C3	D-26	CR7	E-25	R27	E-23	TP17	J-26
C4	H-25	CR8	E-23	R28	E-23	U1	C-4
C5	H-25	CR9	M-22	R29	E-22	U2	C-7
C6	I-25	CR10	C-25	R30	I-20	U3	C-8
C7	I-25	CR11	C-22	R31	J-22	U4	D-11
C8	I-25	CR12	N-14	R32	M-22	U5	L-7
C9	K-23	CR13	C-10	R33	M-22	U6	G-12
C10	L-25	CR14	K-8	R35	J-22	U7	C-15
C11	L-24	CR15	I-6	R36	M-19	U8	E-15
C12	K-25	CR16	I-6	R37	K-19	U9	G-15
C13	M-25	CR17	J-3	R38	J-20	U10	I-15
C14	M-25	CR18	J-4	R39	N-18	U11	K-14
C15	N-19	CR19	L-4	R40	E-22	U12	K-17
C16	M-20	CR20	L-3	R42	F-20	U13	L-16
C17	N-20	CR21	L-28	R43	B-19	U14	B-20
C18	K-20	CR22	L-8	R44	F-20	U15	C-20
C19	G-22	CR23	M-22	R45	N-15	U16	G-20
C21	G-22	J1	N-7	R46	N-13	U17	I-20
C22	C-22	J2	E-1	R47	E-10	U18	J-20
C23	B-22	J3	J-1	R48	C-9	U19	L-20
C24	I-17	J6	B-25	R49	C-10	U20	M-20
C25	E-13	J10	N-6	R50	M-14	U21	F-23
C26	G-18	J11	N-8	R51	L-12	U22	F-25
C27	N-18	J12	N-8	R52	L-5	U23	K-24
C28	N-13	J13	N-1	R53	E-19	U24	N-23
C29	F-19	J14	N-5	R54	C-20	VR2	M-8
C30	F-19	J15	B-8	R55	E-19	VR3	K-13
C32	E-11	JP1	H-13	R56	E-8	VR5	N-15
C33	E-11	JP2	I-13	R57	J-5	Y1	G-18
C34	D-11	JP3	I-13	R58	J-5		
C35	N-13	JP4	I-13	R59	K-6		
C36	N-17	JP5	I-13	R60	J-5		
C37	C-20	JP6	J-13	R61	N-9		
C38	C-19	JP7	J-13	R62	L-11		
C39	E-20	L1	I-24	R63	K-9		
C40	N-10	L2	I-26	R64	K-9		
C41	L-9	L3	K-33	R65	N-10		
C42	L-10	L4	G-22	R66	L-8		
C43	M-10	L5	D-3	R68	L-5		
C44	K-7	L6	L-10	R69	L-6		
C45	J-7	Q1	B-23	R70	L-26		
C46	N-5	Q2	L-22	R71	M-6		
C47	L-6	Q3	K-22	R72	F-3		
C48	M-5	Q4	J-11	R73	F-3		
C49	L-11	Q5	J-6	R74	F-3		
C50	L-7	Q6	O-9	R75	F-4		
C51	M-9	Q7	A-4	R76	D-6		
C52	J-7	Q8	O-4	R77	C-6		
C53	C-7	R1	E-22	R78	L-5		
C54	C-8	R2	C-24	R79	J-10		
C55	E-9	R3	C-23	R80	J-9		
C56	C-5	R4	C-23	R81	M-6		
C57	D-5	R5	C-23	R82	I-12		
C58	C-6	R6	C-22	R83	E-13		
C59	D-6	R7	E-26	R84	E-17		
C60	E-4	R8	E-26	S1	N-28		
C61	B-4	R9	E-24	S2A	B-1		
C62	M-3	R10	E-25	S2B	B-1		
C63	F-8	R11	E-24	TP1	J-24		
C64	F-8	R12	G-24	TP2	J-25		
C65	H-9	R13	G-26	TP3	M-24		
C66	H-9	R14	I-24	TP4	M-25		
C67	F-6	R15	I-26	TP5	L-21		
C68	I-7	R16	K-23	TP6	K-21		
C69	F-9	R17	L-23	TP7	N-12		
C70	I-10	R18	M-25	TP8	N-12		
C71	H-3	R19	L-23	TP9	N-15		
C72	M-6	R20	I-22	TP10	J-13		
CR1	B-26	R21	I-23	TP11	N-15		
CR2	C-25	R22	I-22	TP12	N-10		
CR3	B-26	R23	E-24	TP13	G-9		
CR4	C-25	R24	I-23	TP14	I-10		

CD13

ATARI MODEL 1050

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 Name	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		

TROUBLESHOOTING

POWER SUPPLY

Plug in Power Pack and check for 10.9V AC at the output plug. If voltage is missing replace Power Pack. If voltage is present, plug in Power Pack to Connector J13 on Disk Drive. Turn Power ON. Check for about 11.1V at cathode of Diodes CR17 and CR18. If the 11.1V is missing check Power Jack (J13), Power Switch (S1) and Diodes CR17 thru CR20. If 11.1V is present, check for 5V at test point TP13. If 5V is missing check 5V Regulator (Q7) and associated components. Check for 12V at test point TP14. If 12V is missing check for 22.4V at pin 1 of 12V Regulator (Q8). If 22.4V is missing check Diodes CR15 and CR16, Capacitor C66 and Electrolytic C68. If 22.4V is present, check 12V Regulator (Q8), Electrolytic C70 and Capacitor C65.

DISK DRIVE INOPERATIVE

If Drive Motor (M2) is not running check Connector J1 for good connections. Check Diskette Enable Switch (S3) and check Connector J14 for good connections. Check resistance of Drive Motor Windings, 11 ohms between pins 1 and 2 and 186 ohms between pins 3 and 4 of Connector P1. If resistance is not correct, replace Drive Motor.

If Drive Motor is good, check voltages and components associated with Switch Transistors (Q4 and Q6) and Frequency to Voltage Converter IC (U5). Check for 3.2V at pin 11 of PIA IC (U7) when Drive Motor is not running and .1V when motor is running. If readings at pin 11 of IC U7 are not correct, check IC U7 by substitution.

STEPPING MOTOR INOPERATIVE

Check for 12V at pins 1 thru 6 of Plug P15. If voltage is missing at any pins check P15 for good connections. Check resistance of Stepper Motor. It should measure about 33Ω for each winding. If any winding checks open replace the Drive Mechanism. If voltages are normal, check waveforms at pins 18, 19, 21 and 22 of the PIA IC (U7). If any of waveforms are missing, check IC U7 by substitution.

NO COMMUNICATION BETWEEN THE COMPUTER AND THE DISK DRIVE

Check setting of Drive Select Switch (S2). Check interface cable between Computer and Disk Drive. Check PIA IC (U7) by substitution. If IC U7 checks good, check Amp IC (U1) by substitution. If the message I/O failure appears check RAM IC (U8) by substitution. If the message boot error appears check Controller IC (U13) by substitution.

PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA				NOTES
			NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	
CR1 thru	1N4446		NTE519	ECG519	SK3100/519	103-131	
CR7							
CR8	1N5230B		NTE5009A	ECG5009A	SK4A7/5009A	103-279-09	
CR9	1N5226B		NTE5005A	ECG5005A	SK3A3/5005A		
CR10	1N4446		NTE519	ECG519	SK3100/519	103-131	
CR11	1N5234B		NTE5003A	ECG5003A	SK2A8/5003A		
CR12,3,4	1N4446		NTE519	ECG519	SK3100/519	103-131	
CR15,6	1N5392		NTE125	ECG125	SK3081/125	212-Z9000	
CR17 thru	BY251		NTE156	ECG156	SK3051/156	212-Z9000	
CR20							
CR22,3	1N4446		NTE519	ECG519	SK3100/519	103-131	
Q1	2N4403		NTE159	ECG159	SK3466/159	121-Z9003	
Q2	2N4124		NTE123AP	ECG123AP	SK3854/123AP	121-Z9000A	
Q3	2N4403		NTE159	ECG159	SK3466/159	121-Z9003	
Q4,5	2N4124		NTE123AP	ECG123AP	SK3854/123AP	121-Z9000A	
Q6	TIP110		NTE261	ECG261	SK3180/263	121-Z9085	
Q7	UA7805		NTE960	ECG960	SK3591/960	221-Z9043	
Q8	L7812CV		NTE966	ECG966	SK3592/966	HE-442-674	
U1	CA3086		NTE912	ECG912	SK3543/912	221-Z9018	
U2,3	UDN5713M						
U4	CA555E		NTE955M	ECG955M	SK3564/955M	221-Z9042	
U5	CS2917		NTE995	ECG995	SK9209/995		
U6	HD74LS00P		NTE74LS00	ECG74LS00	SK74LS00	HE-443-728	
U7	R6532P		NTE6532	ECG6532			
U8	EF6810P		NTE6810	ECG6810	SK6810/6810		
U9	R6507P		NTE6507	ECG6507			
U10	94132B-2131						
U11	74LS02PC		NTE74LS02	ECG74LS02	SK74LS02	HE-443-779	
U12	HD74LS00P		NTE74LS00	ECG74LS00	SK74LS00	HE-443-728	
U13	WD2793A-PL						

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA				
			NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
U14	HD74LS74AP		NTE74LS74A	ECG74LS74A	SK74LS74A	HE-443-730	
U15	74LS123		NTE74LS123	ECG74LS123	SK74LS123	HE-443-942	
U16	HD74LS04P		NTE74LS04	ECG74LS04	SK74LS04	HE-443-755	
U17	DM7406N		NTE7406	ECG7406	SK7406	HE-443-698	
U18	74LS74APC		NTE74LS74A	ECG74LS74A	SK74LS74A	HE-443-730	
U19	74LS86		NTE74LS86	ECG74LS86	SK74LS86	HE-443-891	
U20	74221N		NTE74LS221	ECG74LS221	SK74LS221		
U21	CA3086		NTE912	ECG912	SK3543/912	221-Z9018	
U22	MC1733CP		NTE927D	ECG927D	SK7617/927D		
U23	NE592N14		NTE927D	ECG927D	SK7617/927D		
U24	CA311E		NTE922M	ECG922M	SK3668/922M	HE-442-75	

WIRING DATA

Shielded Hook-up Wire	Use BELDEN No.	8401 or 8421 (Single-Conductor) 8208 (Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8529 (Solid) Available in 13 Colors 8522 (Stranded) Available in 13 Colors

PARTS LIST AND DESCRIPTION (Continued)

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

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C2	.68 35V	

ITEM No.	RATING	MFGR. PART No.
C41	4.7 16V	

CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C36	12-70pF Trimmer	

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
R3	8250 1% 1/8W Carbon Film			
R7	4750 1% 1/8W Carbon Film			
R8	4750 1% 1/8W Carbon Film			
R9	15K 1% 1/8W Carbon Film			
R10	8250 1% 1/8W Carbon Film			
R11	15K 1% 1/8W Carbon Film			
R40	1000 1% 1/8W Carbon Film			
R54	13.3K 1% 1/8W Carbon Film			
R55	28.7K 1% 1/8W Carbon Film			
R66	402 1% 1/8W Carbon Film			

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

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
VR2	Speed Adjust	2000		
VR3	Read Pulse Width	25K		
VR5	Write Precompensation	25K		

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
L1	Peaking	
L2	Peaking	
L3	Peaking	

ITEM No.	FUNCTION	MFGR. PART No.
L4	RF Choke	
L6	RF Choke	

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
CR1	LED		Busy, Red
CR21	LED		Power, Red
L5	Ferrite Bead		
M1	Head		Read/Write/Erase
M2	Motor		Drive
M3	Motor		Stepping
M4	Sensor		Write Protect
M5	Detector		Track 00
S1	Switch		Power
S2	Switch		Drive Code
S3	Switch		Diskette Enable
Y1	Crystal		4MHz

LOGIC CHART

PIN NO.	IC U1	IC U2	IC U3	IC U4	IC U5	IC U6	PIN NO.	IC U7	PIN NO.	IC U7	PIN NO.	IC U8	PIN NO.	IC U8
1	L	L	L	L	L	P	1	L	21	P	1	L	13	P
2	L	P	P	L	P	P	2	P	22	H	2	P	14	P
3	L	P	P	H	H	P	3	P	23	L	3	P	15	P
4	L	L	L	*	H	P	4	P	24	H	4	P	16	P
5	L	H	H	H	*	P	5	P	25	H	5	P	17	P
6	L	P	P	L	*	P	6	P	26	P	6	P	18	P
7	L	P	P	*	*	L	7	P	27	P	7	P	19	P
8	L	H	H	H	H	H	8	H	28	P	8	P	20	P
9	L				H	L	9	H	29	P	9	P	21	P
10	L				H	L	10	L	30	P	10	P	22	P
11	L				P	L	11	L	31	P	11	P	23	P
12	L				L	H	12	P	32	P	12	P	24	H
13	L				*	H	13	H	33	P				
14	P				*	H	14	H	34	H				
15							15	L	35	P				
16							16	L	36	P				
17							17	L	37	P				
18							18	P	38	P				
19							19	H	39	P				
20							20	H	40	P				

PIN NO.	IC U9	PIN NO.	IC U9	PIN NO.	IC U10	PIN NO.	IC U10	PIN NO.	IC U11	IC U12	PIN NO.	IC U13	PIN NO.	IC U13
1	H	15	P	1	P	13	P	1	P	P	1	P	21	H
2	L	16	P	2	P	14	P	2	P	P	2	P	22	H
3	H	17	P	3	P	15	P	3	P	P	3	P	23	P
4	H	18	P	4	P	16	P	4	L	P	4	P	24	P
5	P	19	P	5	P	17	P	5	*	P	5	P	25	H
6	P	20	P	6	P	18	P	6	*	P	6	P	26	P
7	P	21	P	7	P	19	P	7	L	L	7	P	27	P
8	P	22	P	8	P	20	L	8	H	P	8	P	28	H
9	P	23	P	9	P	21	P	9	H	P	9	P	29	L
10	P	24	P	10	P	22	P	10	L	P	10	P	30	P
11	P	25	P	11	P	23	P	11	L	P	11	P	31	P
12	P	26	P	12	L	24	H	12	L	P	12	P	32	H
13	P	27	P					13	H	P	13	P	33	L
14	P	28	P					14	H	P	14	P	34	L
15								15			15	L	35	H
16								16			16	H	36	H
17								17			17	L	37	H
18								18			18	*	38	L
19								19			19	H	39	P
20								20			20	L	40	H

LOGIC CHART (Continued)

PIN NO.	IC U14	IC U15	IC U16	IC U17	IC U18	IC U19	IC U20	IC U21	IC U22	IC U23	IC U24
1	H	P	P	P	P	P	L	P	H	H	L
2	P	P	P	P	P	P	P	P	*	*	P
3	P	H	P	P	P	P	P	P	H	H	H
4	H	P	P	P	H	*	P	L	H	H	L
5	P	P	P	P	P	*	L	H	L	L	H
6	P	H	P	P	P	L	H	L	*	*	H
7	L	P	L	L	L	L	L	L	P	P	P
8	P	L	P	P	P	P	L	P	H	H	H
9	P	P	P	P	P	P	*	L	*	*	
10	H	H	P	P	P	H	*	L	H	H	
11	P	H	P	P	P	P	*	P	H	H	
12	P	P	P	P	P	P	H	P	H	H	
13	H	P	P	P	P	P	P	L	*	*	
14	H	L	H	H	H	H	P	P	H	H	
15		P					P				
16		H					H				

LINE DEFINITIONS

A0 THRU A12 ..... Address Bits 0 Thru 12
CLK ..... Clock Timing Pulses
CLKET ..... Clock Timing Pulses
CS3 ..... Chip Select 3, Read Enable
D0 THRU D7 ..... Data Bits 0 Thru 7
DDEN ..... Double Density Enable
DRQ ..... Data Request
ENP ..... Enable Write Precompensation
IP ..... Index Pulse, Disk Index Hole Location
MOTOR CONTROL ..... Drive Motor Control Pulses
PA6 ..... Port A, Bit 6
R/W ..... Read/Write
READY ..... Ready, Disk Read and Write
READYDATAA ..... Data Ready
RESET ..... Reset
SO1 THRU SO4 ..... Stepper Motor Driving Pulses
TRACK00 ..... Track00 Sensor, R/W Head Position
WRITE PROTECT ..... Write Protect, Disk Overwrite Protection

SCHEMATIC NOTES

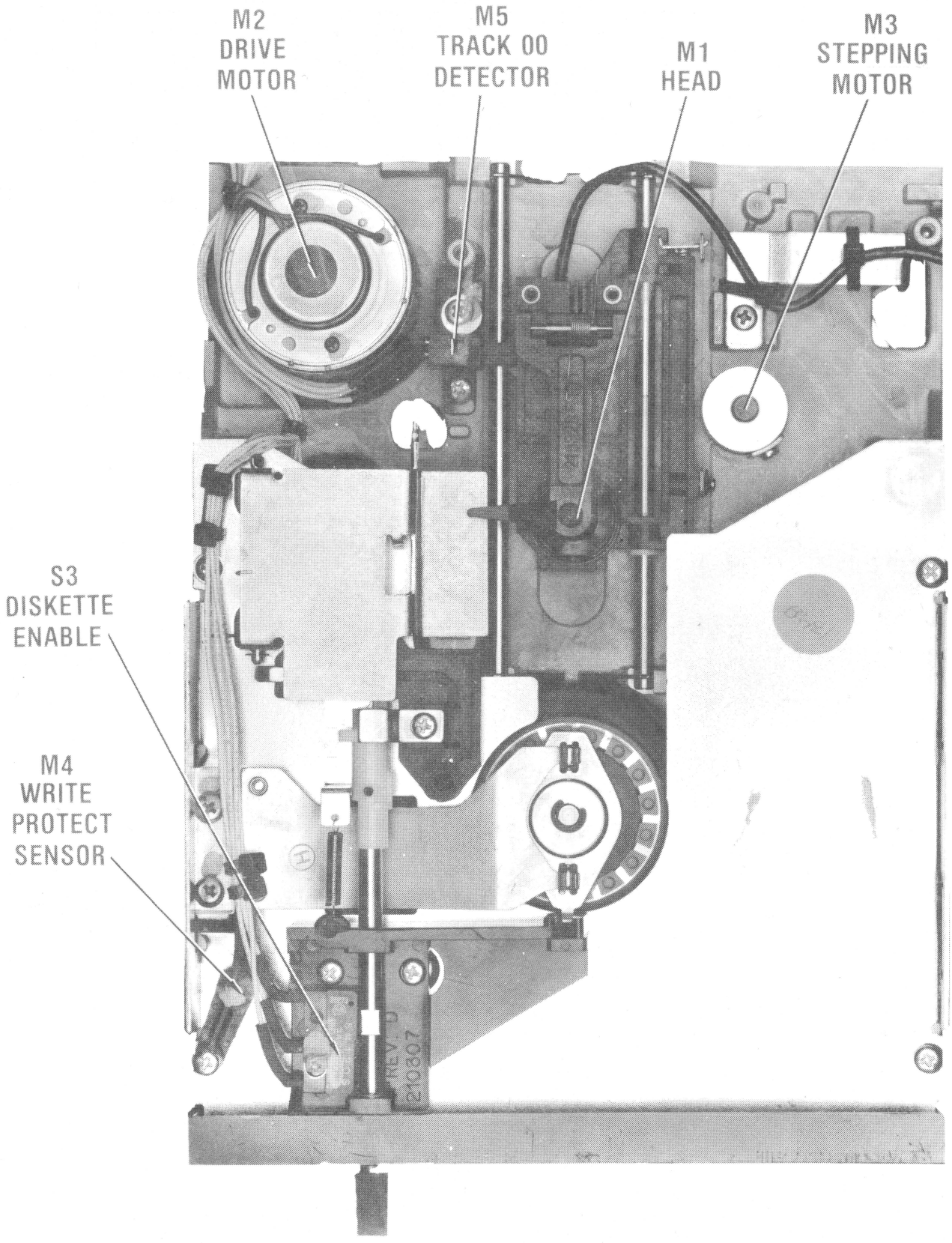
—x— Circuitry not used in some versions
- - - Circuitry used in some versions
θ See parts list
⏚ Ground

Waveforms and voltages taken from ground, unless noted.
Waveforms taken with triggered scope and Sweep/Time switch in Calibrate position, scope input set for DC coupling on 0 reference voltage waveforms. Switch to AC input to view waveforms after DC reference is measured when necessary. Each waveform is 7cm. width with DC reference voltage given at the bottom line of each waveform.
Time in μsec. per cm, given with p-p reading at the end of each waveform.
Item numbers in rectangles appear in the alignment/adjustment instructions.
Supply voltages maintained as shown at input.
Voltages measured with digital meter, no signal.
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 ½W or less, 5% unless noted.
Value in ( ) used in some versions.
Measurements with switching as shown, unless noted.

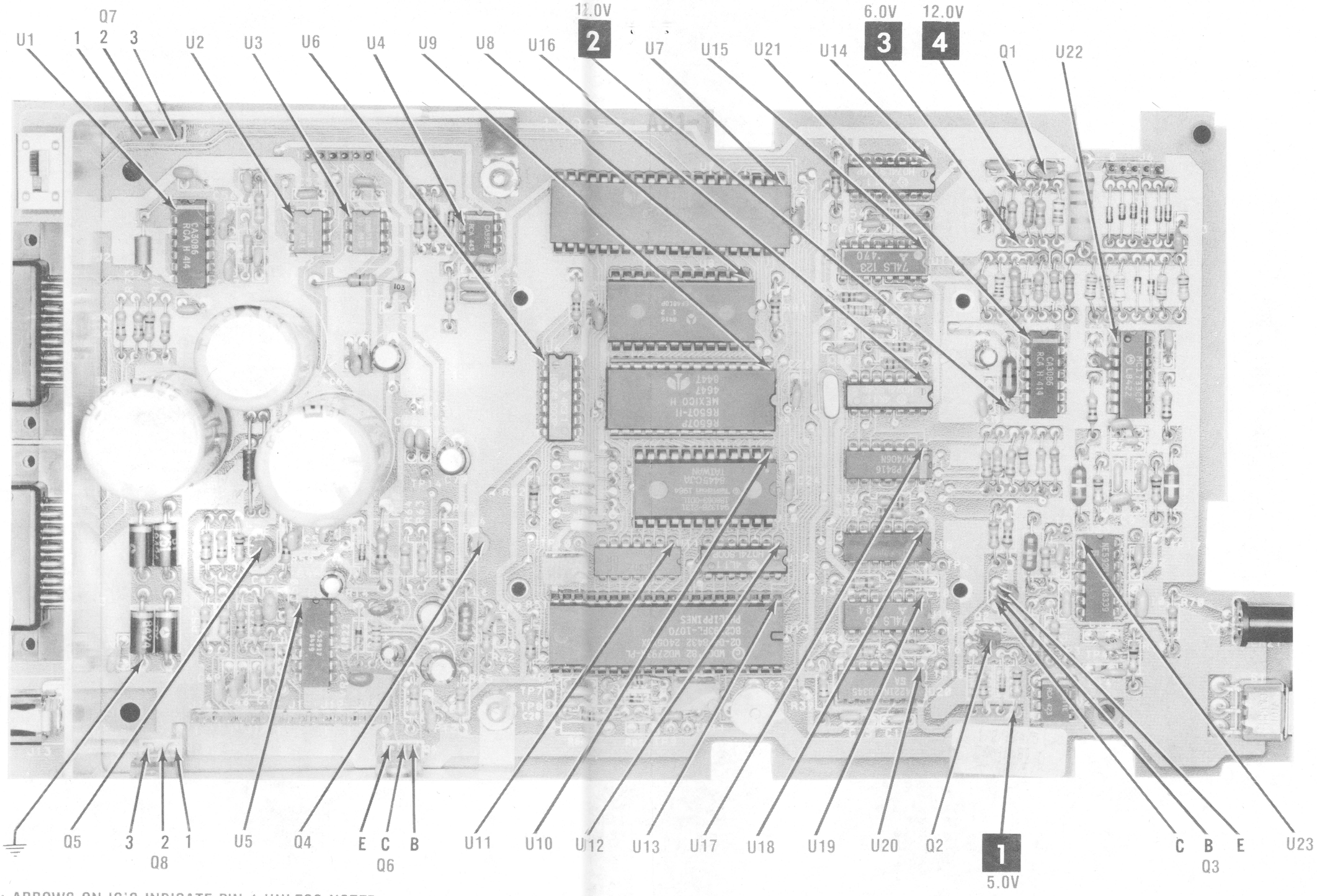
An Atari 800 Computer was used to operate the Disk Drive. Voltages, Waveforms and Logic readings were taken while running the following Basic program.

```
10 PRINT "THIS IS A DISK TEST"
20 OPEN #7,8,0,"D:SAMS.FIL"
30 FOR X = 1 TO 200
40 PRINT #7 "THIS IS A DISK TEST"
50 NEXT X
60 CLOSE #7
70 GOTO 10
```

Logic Probe Display
L = Low
H = High
P = Pulse
* = Open (No Light On)



CHASSIS-TOP VIEW



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

A Howard W. Sams CIRCUITRACE® Photo

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.

12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.

13. Never expose the Disk Drive to water. If exposed to water turn the unit Off. Do not place the Disk Drive near possible water sources.

14. Never leave the Disk Drive unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.

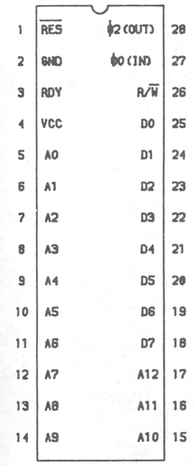
15. Do not allow anything to rest on AC power cord.

16. Unplug AC power cord from outlet before cleaning Disk Drive.

17. Never use liquids or aerosols directly on the Disk Drive. Spray on cloth and then apply to the Disk Drive cabinet. Make sure the Disk Drive is disconnected from the AC power line.

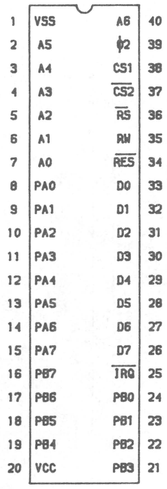
IC PINOUTS & TERMINAL GUIDES

R6507P



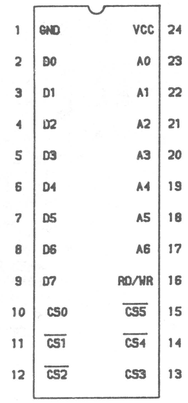
U9
CPU
TOP VIEW

R6532P



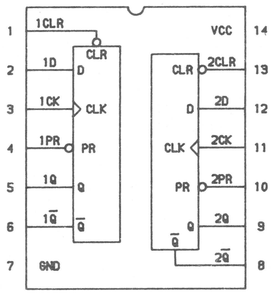
U7
PIA
TOP VIEW

EF6810P



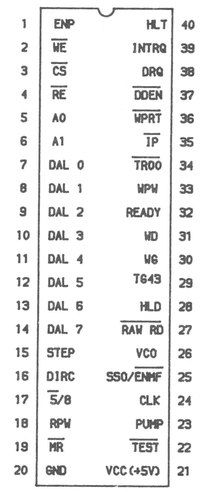
U8
ROM
TOP VIEW

HD74LS74AP
74LS74APC



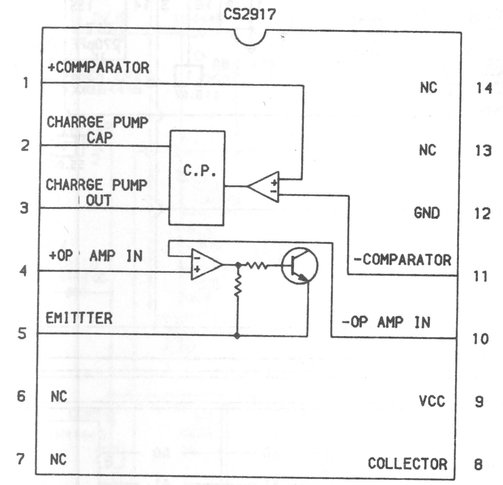
U14,U18
FLIP/FLOP
TOP VIEW

WD2793A-PL



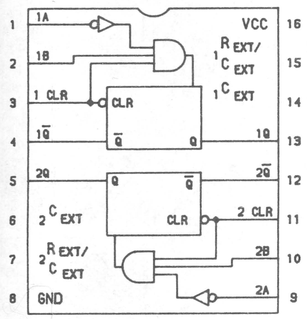
U13
CONTROLLER
TOP VIEW

CS2917



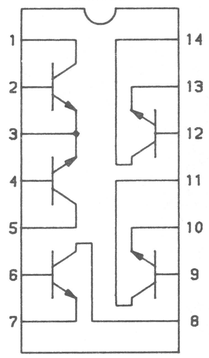
U5
FREQUENCY TO VOLTAGE CONVERTER
TOP VIEW

74LS123



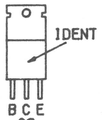
U15
FLIP/FLOP
TOP VIEW

CA3086



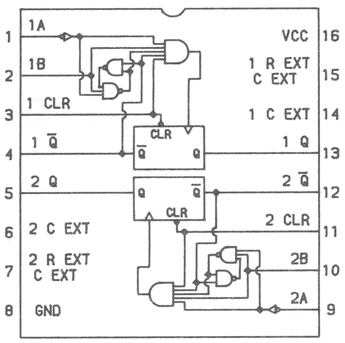
U1,U21
WRITE AMP
TOP VIEW

Q1 THRU Q5
BOTTOM VIEW

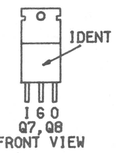


Q6
FRONT VIEW

74221N

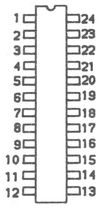


U20
MULTIVIBRATOR
TOP VIEW

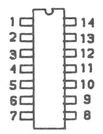


Q7,Q8
FRONT VIEW

U2,U3
TOP VIEW

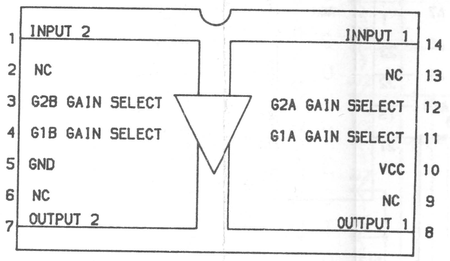


U10
TOP VIEW



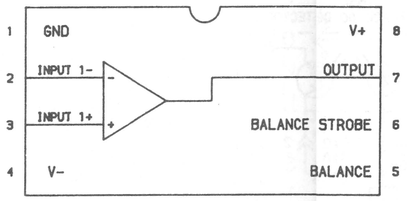
U6,U11,U12,
U16,U17,U19
TOP VIEW

MC1733CP
NE592N14



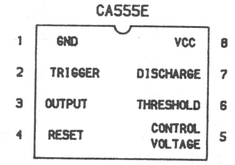
U22,U23
OP AMP
TOP VIEW

CA311E



U24
VOLTAGE COMPARATOR
TOP VIEW

CA555E



U4
TIMER
TOP VIEW

GENERAL OPERATING INSTRUCTIONS

Connect an ATARI 400 or 800 Computer to the Disk Drive. Load Disk Drive with DOS. Turn Disk Drive On then turn Computer On, Disk Drive will boot the DOS program. If DOS 1.0 or 2.0 is used, strike the Return Key to display the DOS menu. If DOS 2.5 is used the DOS menu will come up automatically. NOTE: If the Basic cartridge is installed in the Computer, type DOS and press the Return key to display the menu. To display the current disk directory, select menu option A and press the Return Key twice. If there is more than one Disk Drive connected to the Computer, select the drive desired by typing D1: or D2: then press the Return key.

FORMATTING A DISKETTE

A blank diskette must be formatted before it can be used. DOS Menu I will format a new diskette. To boot a formatted diskette use the DOS menu H.

LOADING PROGRAMS IN BASIC

To run the Disk Drive with Basic select DOS menu B. Type Run "D1:name.Ext" and press the return key.

SAVING BASIC PROGRAMS

To save a Basic program to the Disk Drive, type SAVE "D1:program name" and press the Return Key.

ERROR CODES

NUMBER	MEANING	REMARKS
2	Out of Memory	Not enough RAM to run the program.
128	Break Abort	Appears if Break key is pressed while a program is running.
135	Read-Only Error	Trying to write to protected diskette.
138	Device Time-Out	
144	Disk Error	
162	Disk Full	Disk has no more sectors.
165	Bad File Name	
167	File Locked	Files cannot be modified before being unlocked.
169	Directory Full	Directory limit is 64 Files.
170	File Not Found	File not in the current disk directory.
173	Bad Sectors at Format Time.	

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of Disk Drive malfunctions.

Check all interconnecting cables for good connection and correct hookup before making service checks.

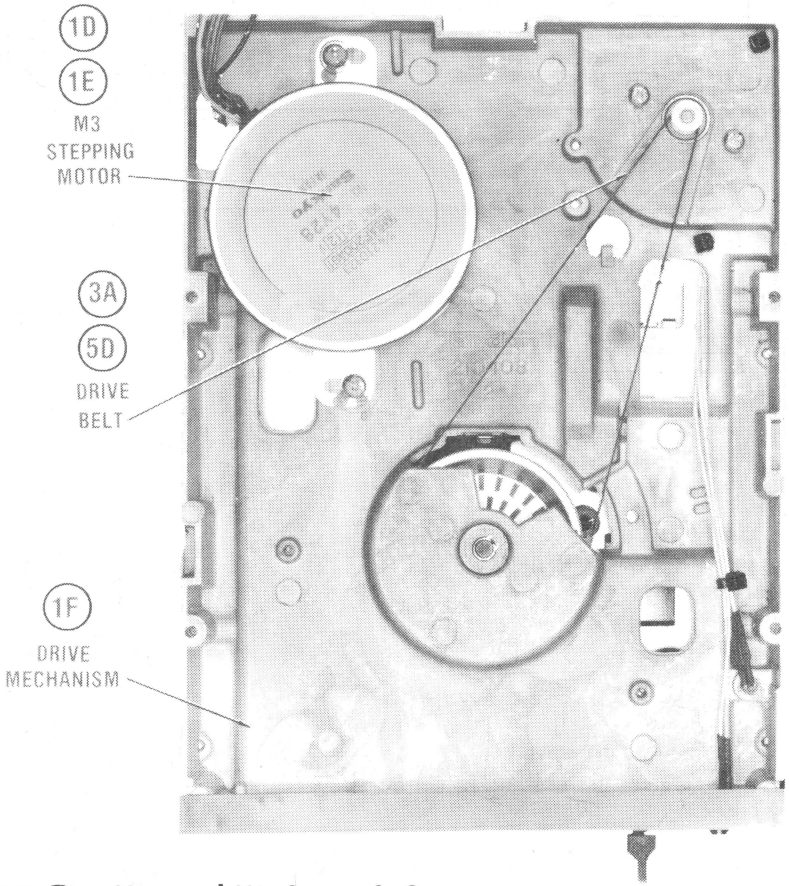
DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

Remove four philips screws from cabinet bottom. Place Disk Drive upright and remove cabinet top.

TEST EQUIPMENT AND TOOLS

TEST EQUIPMENT	TOOLS
Digital Volt/Ohm Meter	Phillips Screwdriver
Logic Probe	Methyl alcohol or 91% isopropyl alcohol
	Cotton swabs or lint-free cloth
	Spray contact cleaner



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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.

87CD14997 DATE 2-87

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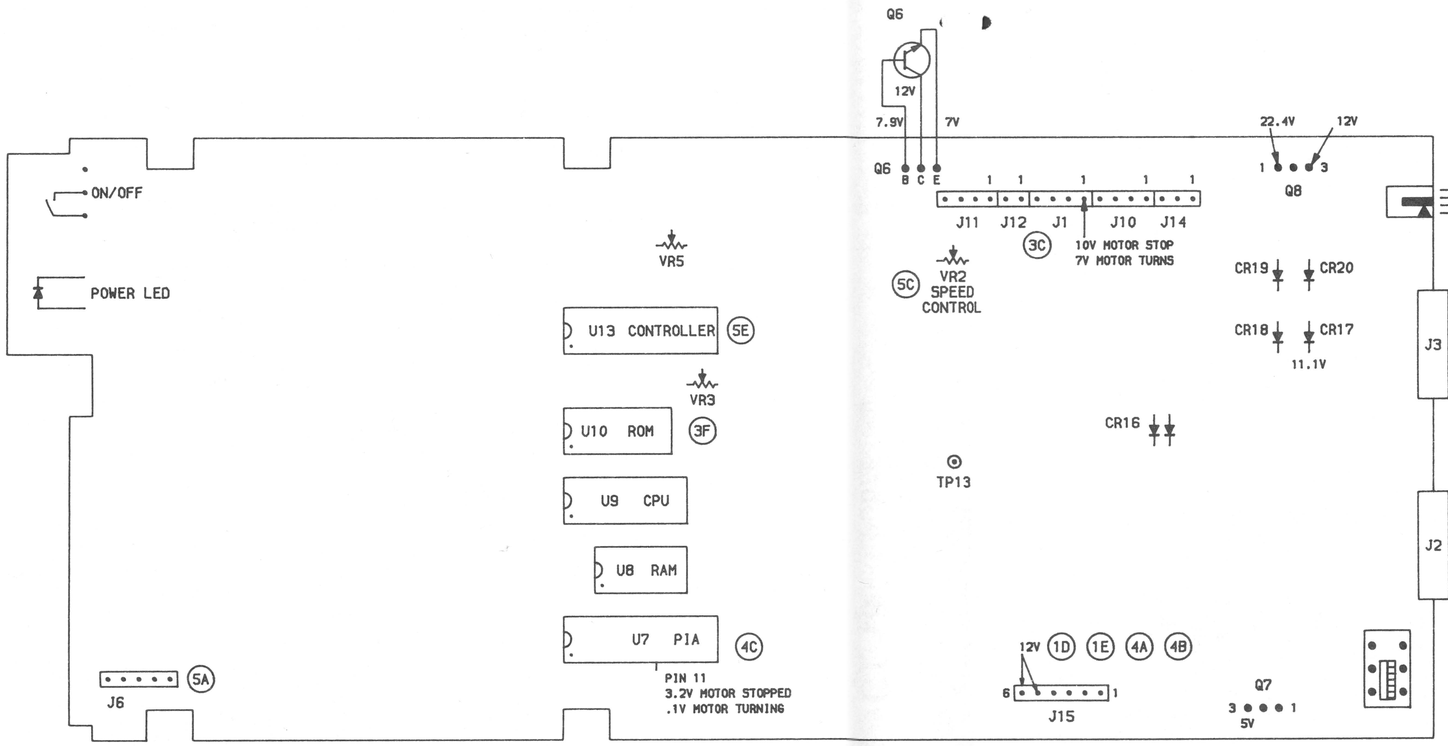
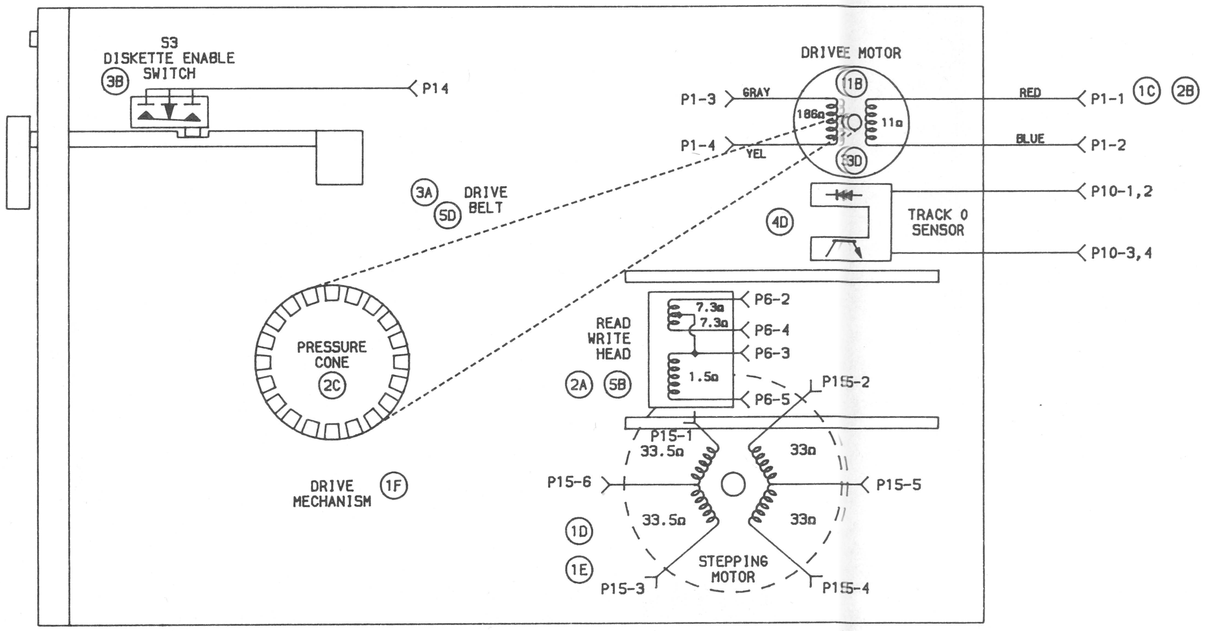
CD13 ATARI MODEL 1050

PRELIMINARY SERVICE CHECKS (Continued)





INTERCONNECTING DIAGRAM

GENERAL OPERATING INSTRUCTIONS

Connect an ATARI 400 or 800 Computer to the Disk Drive. Load Disk Drive with DOS. Turn Disk Drive On then turn Computer On, Disk Drive will boot the DOS program. If DOS 1.0 or 2.0 is used, strike the Return Key to display the DOS menu. If DOS 2.5 is used the DOS menu will come up automatically. NOTE: If the Basic cartridge is installed in the Computer, type DOS and press the Return key to display the menu. To display the current disk directory, select menu option A and press the Return Key twice. If there is more than one Disk Drive connected to the Computer, select the drive desired by typing D1: or D2: then press the Return key.

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162	Disk Full	Disk has no more sectors.
165	Bad File Name	
167	File Locked	Files cannot be modified before being unlocked.
169	Directory Full	Directory limit is 64 Files.
170	File Not Found	File not in the current disk directory.
173	Bad Sectors at Format Time.	

INTERCONNECTING DIAGRAM

PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

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

(1) POWER SUPPLY

(A) No power, check for 10V AC at output of power pack. If 10V AC is missing replace power pack.

(B) If Power LED is ON and Drive Motor does not run, check resistance of Drive Motor. If resistance is not correct, replace Drive Motor.

(C) If resistance is normal, turn Disk Drive ON, check for 10V at pin 1 of Connector P1 (Red lead), if voltage is good check Drive Motor by substitution.

(D) Stepping Motor does not run. Check Connector P15 for good connections. Check for 12V at pins 5 and 6 of Connector P15.

(E) Check the resistance of Stepping Motor.

(F) If resistance of Stepping Motor is not correct replace Drive Mechanism.

(2) DISK OPERATION IS ERRATIC

(A) Clean Head with a lint free cloth dampened with 91% isopropyl alcohol.

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

(B) Check pressure cone for broken tabs.

(3) DRIVE MOTOR DOES NOT TURN DISK

(A) Check drive belt.

(B) Check Diskette Enable Switch.

(C) Check Connector P1 for good connections.

(D) Check resistance of Drive Motor, if bad replace motor.

(E) Check Drive Motor by substitution.

(F) Check ROM IC (U10) by substitution.

(4) STEPPING MOTOR INOPERATIVE

(A) Check Connector J15 for good connections.

(B) Check for 12V at pins 5 and 6 of Connector P15.

(C) Check PIA IC (U7) by substitution.

(D) Check Track 00 Sensor (M5).

(5) READ/WRITE FUNCTION INOPERATIVE

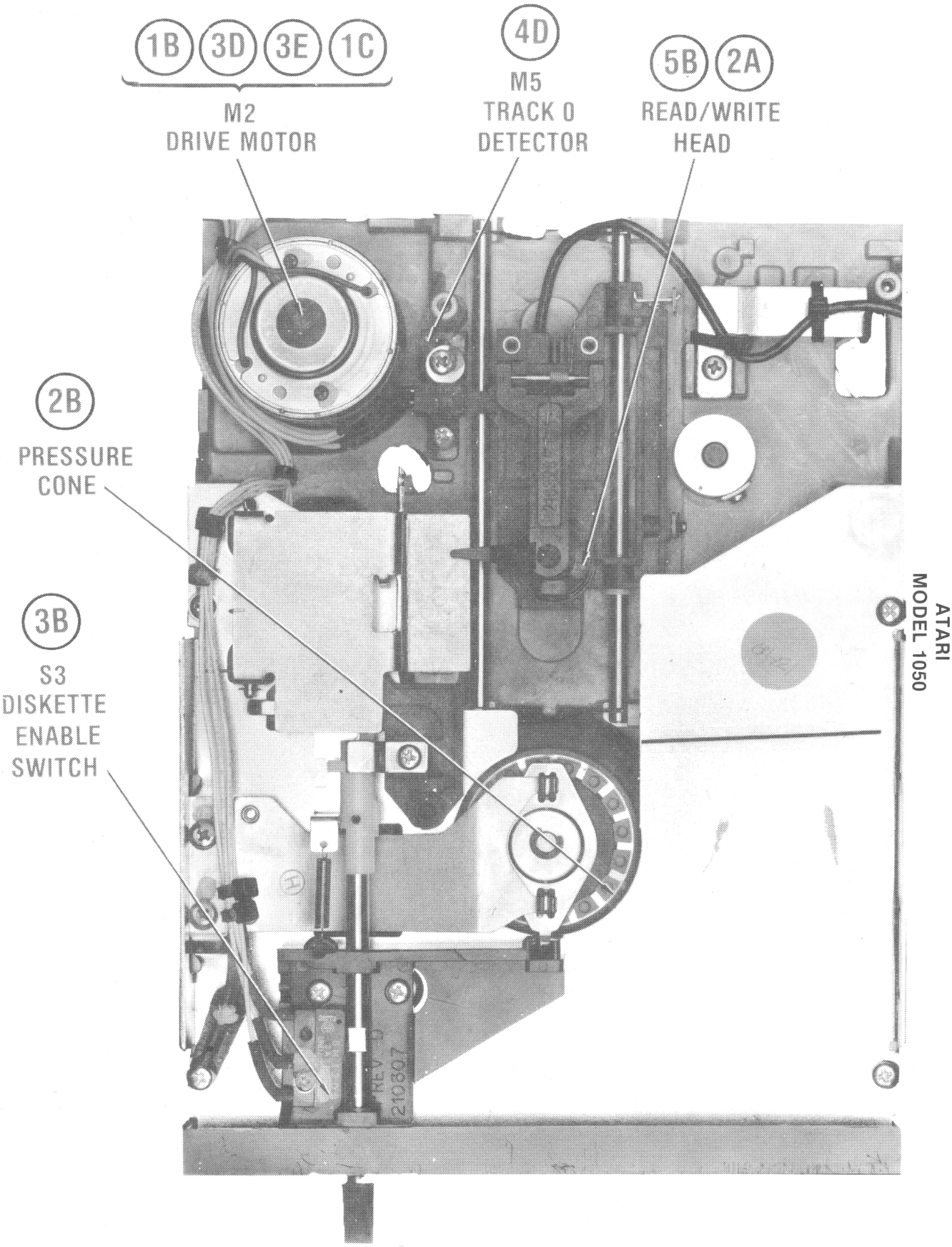
(A) Check Connector J6 for good connections.

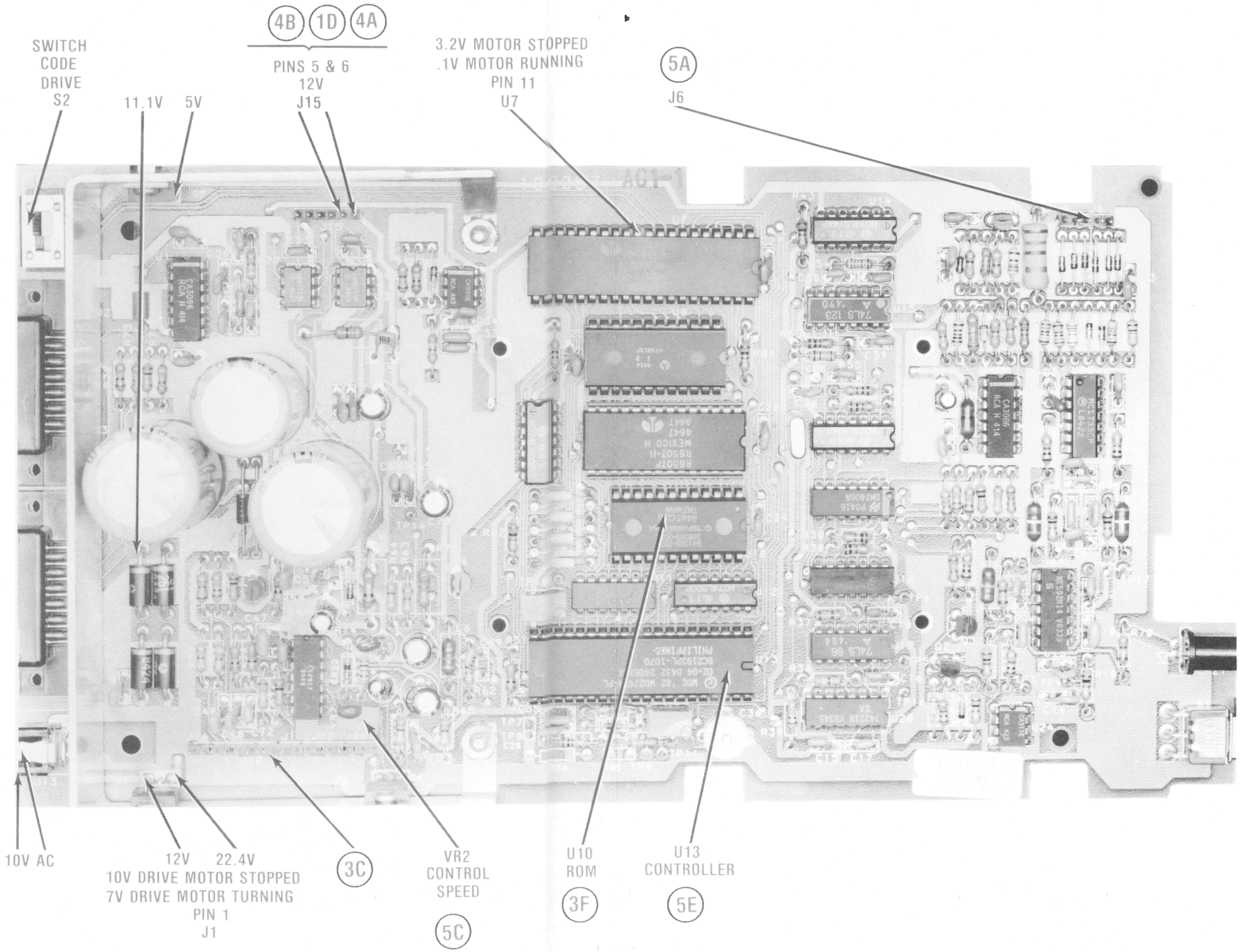
(B) Dirty Read/Write head, clean head with 91% isopropyl alcohol.

(C) Check Drive Motor speed. Adjust Speed Control (VR2) for 300 RPMs.

(D) Check Drive Belt tension, if belt is slipping, replace.

(E) Check Controller IC (U13) by substitution.


1B 3D 3E 1C
M2
DRIVE MOTOR
4D
M5
TRACK 0
DETECTOR
5B 2A
READ/WRITE
HEAD
2B
PRESSURE
CONE
3B
S3
DISKETTE
ENABLE
SWITCH
ATARI
MODEL 1050


SWITCH
CODE
DRIVE
S2
11.1V
5V
4B 1D 4A
PINS 5 & 6
12V
J15
3.2V MOTOR STOPPED
.1V MOTOR RUNNING
PIN 11
U7
5A
J6
10V AC
12V 22.4V
10V DRIVE MOTOR STOPPED
7V DRIVE MOTOR TURNING
PIN 1
J1
3C
VR2
CONTROL
SPEED
5C
U10
ROM
3F
U13
CONTROLLER
5E

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 mantain 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 jclt 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.

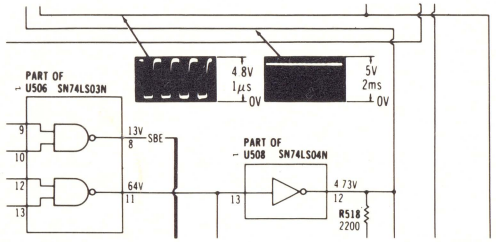
SAMS

Remove staples and use cover for file folder.

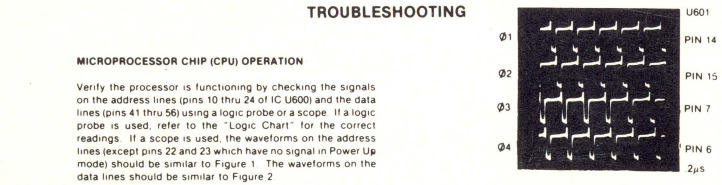
COMPUTERFACTS™ put easy to use, informative technical data right at your fingertips. Each edition includes specific service information on the individual component, along with some overall troubleshooting hints.

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 CIRCUITRACE®, 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

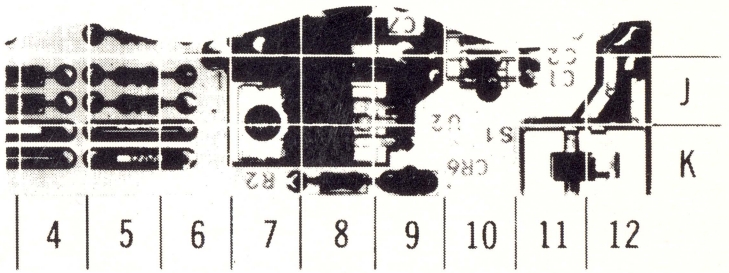
Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope. If a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address 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	1	L	L	L	L	L	L	L	L
2	P	22	P	2	P	P	P	P	P	P	P	P
3	P	23	P	3	H	H	H	H	H	H	H	H

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITRACE, 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)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			ECG PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NTE PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
D102	1SS53	1149-2576	ECG519	GE-514	1N4935	NTE519	SK9091/177	WEP925/519	103-131
D103	1N60FM	1149-2527	ECG109	1N60		NTE109	SK3088	WEP134/109	103-Z9001
D201	1N4004GP	1201-4205	ECG116	GE-504A	1N4004	NTE116	SK3312	WEP157	212-76-02
D501 thru D503	1SS53	1149-2576	ECG519	GE-514	1N4935	NTE519	SK9091/177	WEP925/519	103-131

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