

SERVICE MANUAL

8050 • 8250

DUAL DISK DRIVES

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Commodore Business Machines, Inc.

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8050 • 8250 DISK DRIVES

PRODUCT SPECIFICATIONS

GENERAL DESCRIPTION

The 8050 and 8250 are dual, 5-1/4 inch floppy disk drive units. The 8050 uses a 77 track, 100 TPI, single headed drive. The 8250 has double the amount of tracks, 154, with a 100 TPI double headed drive. They are intelligent devices containing their own microprocessors, RAM, ROM and operating system software.

MAXIMUM STORAGE

8050 — 1.05 Megabytes of data (formatted).
Free Blocks — 2052

8250 — 2.12 Megabytes of data (formatted).
Free Blocks — 4133

MEDIA

5-1/4 inch floppy disk.
8050 — single sided, double density
8250 — double sided, double density

INPUT/OUTPUT

IEEE Interface

CONTROLLERS

2 MOS 6502 microprocessors — 1 MHz clock

MEMORY

4K RAM, 16K ROM

DATA TRANSFER RATE

400 Bytes/sec

FILE TYPES

Program, sequential, relative, random-access and user

COMPUTERS

PET, 4000 series, 8000 series, B128

POWER REQUIREMENTS

120 Volts AC, 60Hz — integral power supply with external 1 Amp fuse

POWER CONSUMPTION

50 Watts maximum — 8050
60 Watts maximum — 8250

ASSEMBLY IDENTIFICATION

There have been 4 different drive assemblies used in the dual disk drive models 8050 and 8250. The various suppliers are listed, along with the respective PCB assemblies used in these units.

TYPE		DRIVE #	ANALOG #	DIGITAL #
Micropolis	8050	8050031-01	8050006-01	8050002-01
	8250	8250016-01	8250023-02 8250023-01	8050002-04
Microp Safari	8050	8250039-01	8250023-02	8050002-04
	8250	8250039-02	8250023-01	8050002-04
Tandon	8050	8050047-01	8050044-01	8050002-02
	8250	8250015-01	8050044-01	8050002-03
MPI	8050	8050059-01/02	8250023-03	8050002-05
	8250	8250029-01/02	8250023-03	8050002-06

Please note that the analog boards vary with the drive assembly but the digital board is the same PCB with ROM, CONTROLLER and JUMPER changes.

DOS/CONTROLLER ROMS FOR DIGITAL PCB #8050002

DESCRIPTION	PCB PART NO.	DOS CONTROLLER ROMS		
		UL1	UH1	UK3
2.5 Micropolis	8050002-01	901482-07	901482-06	901483-03
2.5 Tandon	8050002-02	901482-07	901482-06	901483-04
2.7 Tandon	** 8050002-03	901887-01	901888-01	901884-01
2.7 Micropolis	** 8050002-04	901887-01	901888-01	901885-04
2.7 MPI 8050	8050002-05	901887-01	901888-01	901869-01
2.7 MPI 8250	8050002-06	901887-01	901888-01	901869-01

* *Pcb part numbers 8050002-03 and -04 are stocked with the appropriate jumpers for use in an 8250. Before installing in an 8050, remove the two jumpers.

The 8250 jumper locations are illustrated on the PCB layout drawing on page 23.

ACCESSORY PARTS

REPLACEMENT CASEWORK FOR METAL UNITS IS NO LONGER AVAILABLE.

POWER CORD C 903501-01

DEMO DISKETTE 8050 C 8050050-01

DEMO DISKETTE 8250 C 8250002-01

USER'S MANUAL C 320899-01

INTERFACE CABLES:

IEEE TO IEEE C 905080-01

PET TO IEEE C 320101-01

HARNESS ASSEMBLY POWER ANALOG C 320814-01

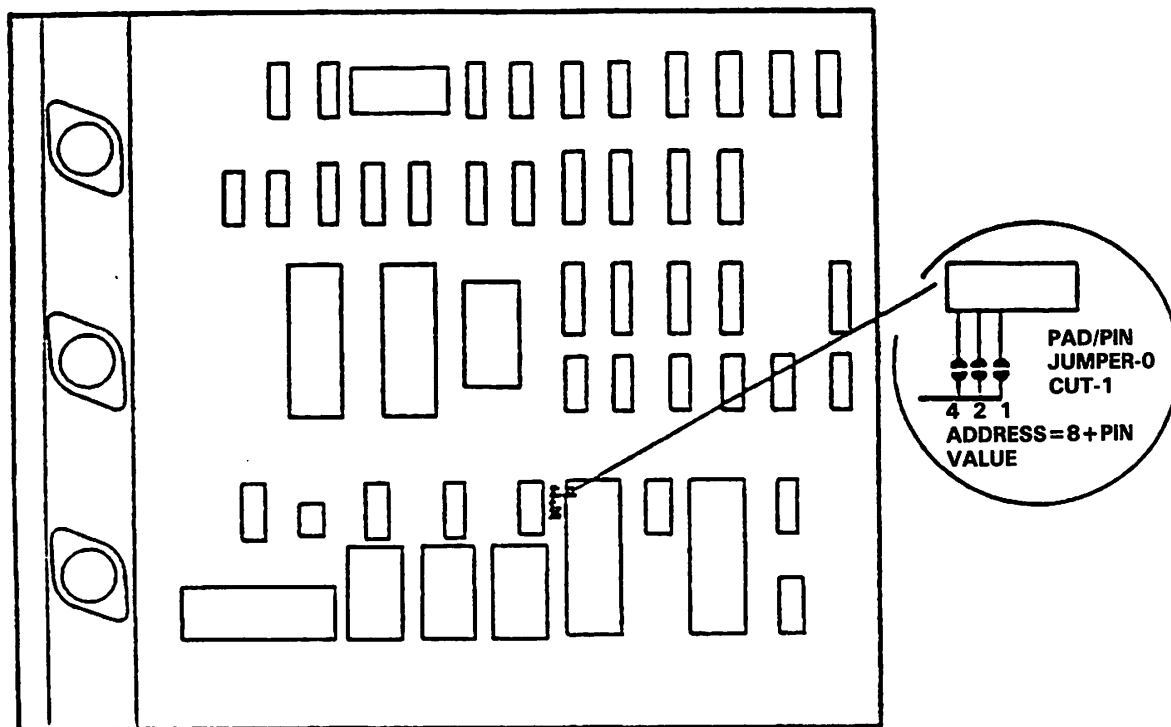
RIBBON CONNECT CABLE C 903000-01

THE 8050/8250 DEVICE NUMBER

The 8050/8250 disk drives have been assigned device #8 on the IEEE-488. However, it is possible for the digital board to be altered to select device numbers 8 thru 15.

At power-on reset, the three pins 22, 23 and 24 of the 6532 at location UE1 are read as a binary input. The factory supplied board has the pins tied to ground, so the inputs will read as binary 0's. By lifting one or a combination of pins, this input can be altered. The corresponding input will read as a binary 1 and is added to the base device number of 8 to derive the final device number. All subsequent communications will use this computed device number.

To compute the desired device number consider that pin 24 is the least significant bit and pin 22 is the most significant bit. For example, to select device #9, pin 24 would be cut and the input would be read as $8 + 1 = 9$. Lifting the remaining pins or combinations of pins will result in the additional device number selections.



DEVICE CHANGE PIN LOCATION

CARE AND MAINTENANCE

- DO NOT use MAGNETIZED tools when repairing or adjusting a disk drive.
- DO NOT place a disk drive near any device which generates "noise" e.g., — motors, radios, televisions.
- DO NOT stack drives upon each other or in any way inhibit air flow around the unit. HEAT BUILD-UP can cause disk failures.
- Periodically CLEAN the read/write head with 90% isopropyl alcohol and a cotton swab. CHECK load pad for excess wear. Clean or replace as necessary.
- Take the following precautions when handling a diskette:
 - ALWAYS store a diskette in its jacket.
 - Use ONLY felt-tip pens when writing on the label of a diskette.
 - Do not bend or physically damage a diskette.
 - Do not place a diskette in the area of a magnetic field.
 - Do not attempt to clean a diskette.
 - Do not touch the exposed area of a diskette.

DIAGNOSTIC and ADJUSTMENT procedures are outlined in the diagnostic disk and manual package. Order Part #314052-01 Version 3.0 & 3.5 Diagnostic Package.

POWER UP DIAGNOSTIC FOR 8050/8250 FLASH CODE

On power up, the three LED's on the drive should blink. The drive LED's go off and the center Tri-State LED remains green. The sytem has a built in self diagnostic which can be read in the form of a flash code. In the event of a failure, the 3 LED's will blink in a repetitive sequence. The number of blinks between intervals will indicate the possible location of a failure.

ERROR INDICATIONS

NUMBER OF FLASHES	ERROR CAUSE	COMPONENT /LOCATION	
1	Zero Page	6532	UC1,UE1
2	ROM \$E000-\$EFFFF	2364	UL1
3	ROM \$C000-\$DFFFF	2364	UH1
4	Unused		
5	Zero Page	6530	UK3
		6502	UH3
6	Common RAM \$1000-\$13FF	2114	UC4,UC5
7	Common RAM \$2000-\$23FF	2114	UD4,UD5
8	Common RAM \$3000-\$33FF	2114	UE4,UE5
9	Common RAM \$4000-\$43FF	2114	UF4,UF5
10	Controller ROM	6530	UK3
		6502	UH3

If the LED's come on and stay on, the microprocessor UN1 is probably at fault.

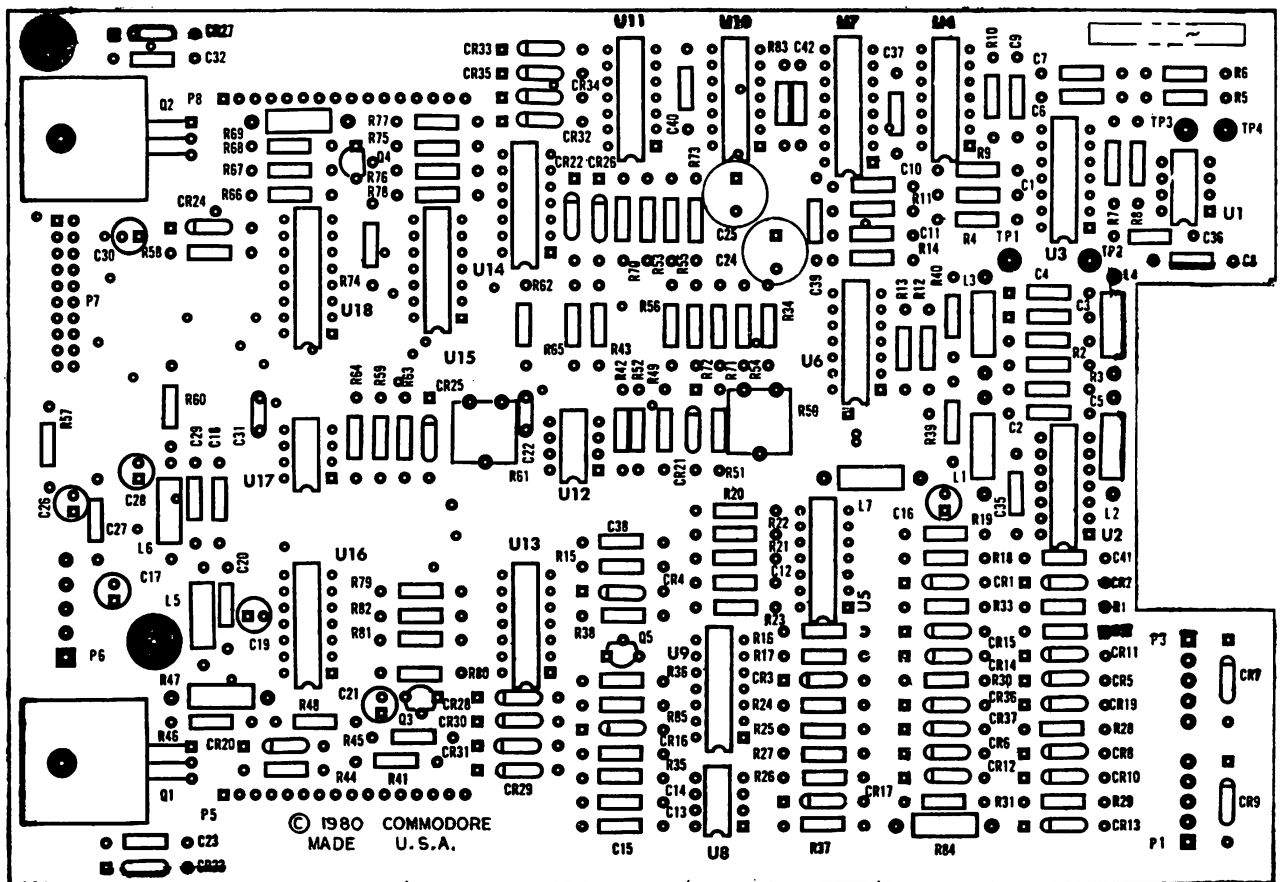
TROUBLESHOOTING GUIDE

NOTE: Always check for latest ROM/ECO upgrade, refer to schematic notes and ROM chart. If socketed IC is suspected bad, be sure to check socket with ohmmeter.

SYMPTOM:	POSSIBLE SOLUTION:
No LED's on power up.	Is Power cord plugged into wall outlet correctly? Is Power cord plugged into the disk drive correctly? Check line fuse. Check power switch. Check clock on 6502 pin 37. Check +5 and +12 volt lines.
Flash code.	See power-up diagnostic on page 5.
Device not present message appears.	Check for device number change. Check UA2 (7414) and the ATN line on the IEEE. Check UB1, UB2, UD2 (MC3446).
AC ripple in 5 or 12 volt lines.	Check power supply filter caps.
No reset pulse.	Check 555 and related components on digital board.
Motor won't run and head does not move.	Check UM3 (6522). Check UJ2 (741s00). Check +12 voltage sources.
One or both drive motors run continuously.	Check +12V. Check UH3, 6522 and logic gates. Check ROMs.
Loads programs with red error LED flashing.	Check drive speed. Check stepper motor. Check drive alignment. Check controller ROM UK3.
Loading is intermittent.	Check ROMs. Check drive speed. Check drive alignment.
Does not load when hot.	Check ROMs.
Locks-up when loading.	Check IEEE components. Check ROMs.
Message of 'FILE NOT FOUND' is displayed.	Clean drive head w/alcohol. Check read circuits. Check alignment.
Drive fails to read.	Check the 311, 9602, 592's, etc. on analog board. Check stepper and drive motors.

TROUBLESHOOTING GUIDE (Continued)

SYMPTOM:	POSSIBLE SOLUTION:
<p>When loading a program, the time is excessive and stepper motor is heard (bump sound) a number of times.</p> <p>Data file error.</p> <p>Appears to load but won't run.</p> <p>Won't format/write.</p>	<p>Check that the diskette is centered properly. Check drive speed. Check drive alignment.</p> <p>Check GCR ROM UK6.</p> <p>Check 6532's. Check UK3 controller ROM.</p> <p>Check write protect tab in disk and switch on drive. Check write circuitry on analog board. Check write enable on digital board.</p>



BOARD LAYOUT
PCB ASSEMBLY #8050006

PARTS LIST

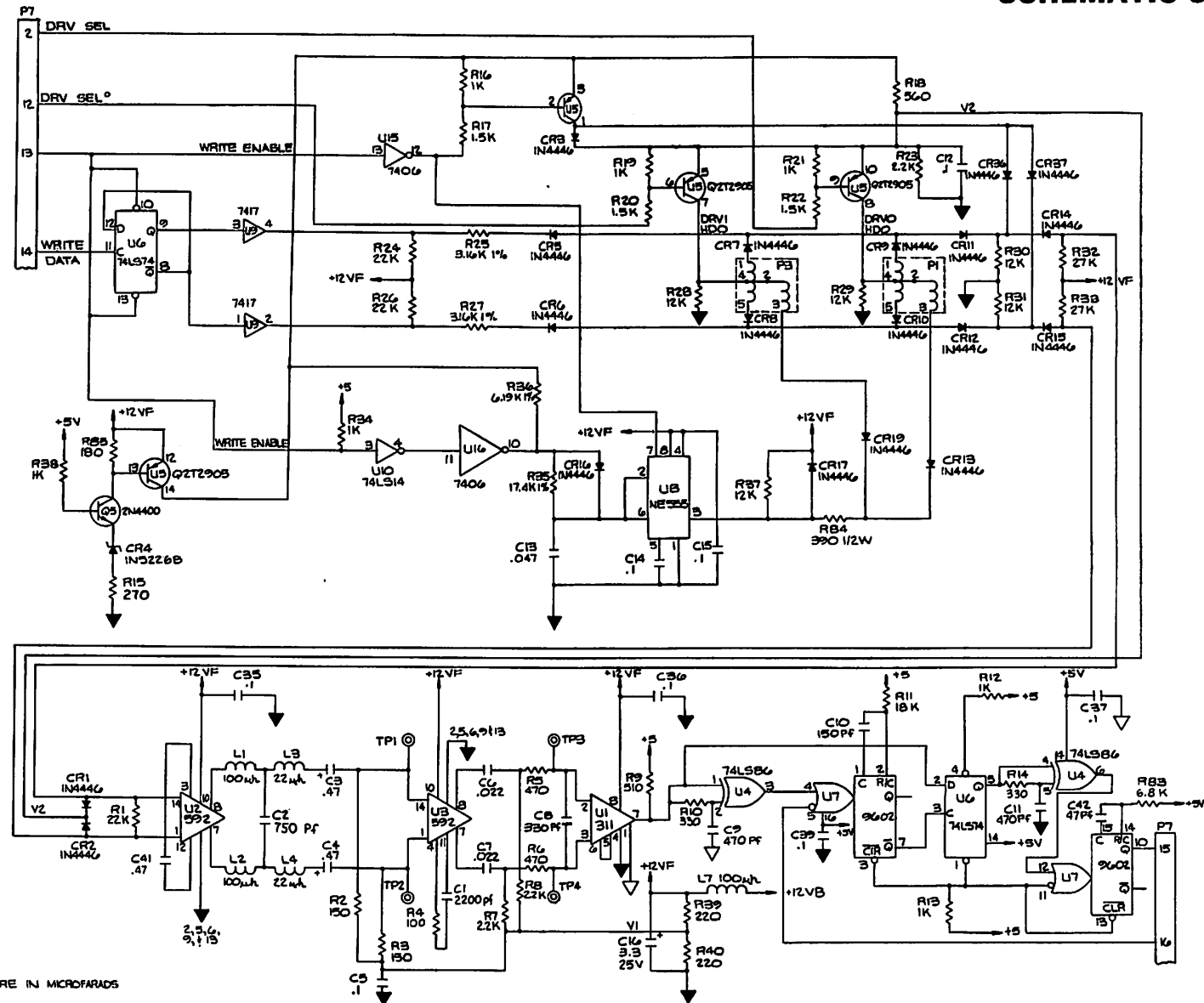
PCB ASSEMBLY #8050006

PLEASE NOTE:

Commodore part numbers are provided for reference only and do not indicate the availability of parts from Commodore. Industry standard parts (Resistors, Capacitors, Connectors) should be secured locally. Approved cross-references for TTL chips, Transistors, etc. are available in manual form through the Service Department, order part #314000-01. Unique or non-standard parts will be stocked by Commodore and are indicated on the parts list by a "C". Vendor Name and part number have been provided for your convenience in ordering custom or unique parts.

INTEGRATED CIRCUITS				RESISTORS (Continued)			
U1	311			R55	220	R67	1K
U2,3	592			R56	47K	R68	470
U4	74LS86			R57	1K	R69	1 1/2W, 5%
U5	Q2T2905 Trans Pk			R58	150K	R70,71	1K
U6	74LS74			R59	270	R72	47K
U7	9602			R60	10K	R73	220
U8	555			R61	5K Potentiometer	R74	1K
U9	7417			R62	10K	R75-82	750
U10	74LS14			R63	12K	R83	6.8K
U11	74LS32			R64	47K	R84	390 1/2W, 5%
U12	741			R65	1K	R85	180
U13,14	FPQ3724 Trans Pk			R66	470		
U14,16	7406						
U17	741						
U18	74LS139						
TRANSISTORS				CAPACITORS			
Q1,2	TIP110			C1	CER	2200pF,	50V
Q3,4,5	2N4400			C2	CER	750pF,	50V
DIODES				C3,4	CER	.47μF,	50V
CR1-3	1N4446			C5	CER	.1μF,	50V
CR4	1N5226 B 3.3V Zener			C6,7	CER	.022μF,	50V
CR5-17	1N4446			C8	CER	330pF,	50V
CR19,20	1N4446			C9	CER	470pF,	50V
CR21	1N5235 B 6.8V Zener			C10	CER	150pF,	50V
CR22, 23	1N4002			C11	CER	470pF,	50V
CR24	1N4446			C12	CER	.1μF,	50V
CR25	1N5235 B 6.8V Zener			C13	CER	.047μF,	50V
CR26,27	1N4002			C14,15	CER	.1μF,	50V
CR28-35	1N4003			C16,17	TANT	3.3μF,	25V
CR36,37	1N4446			C18	CER	.1μF,	50V
RESISTORS — All Values are in ohms- 1/4 W 5% unless noted otherwise.				C19	TANT	3.3μF,	25V
R1	22K	R27	3.16K 1/4W, 1%	C20	CER	.1μF,	50V
R2,3	150	R28-31	12K	C21	TANT	3.3μF,	25V
R4	100	R32,33	27K	C22	MONOLITHIC	1μF,	50V
R5,6	470	R34	1K	C23	CER	.1μF,	50V
R7,8	2.2K	R35	17.4K 1/4W, 1%	C24,25	ELECT	220μF,	16V
R9	510	R36	6.19K 1/4W, 1%	C26	TANT	3.3μF,	25V
R10	330	R37	12K	C27	CER	.1μF,	50V
R11	18K	R38	1K	C28	TANT	3.3μF,	25V
R12,13	1K	R39,40	220	C29	CER	.1μF,	50V
R14	330	R41	10K	C30	TANT	3.3μF,	25V
R15	270	R42	47K	C31	MONOLITHIC	1μF,	50V
R16	1K	R43	1K	C32	CER	.1μF,	50V
R17	1.5K	R44	470	C35-40	CER	.1μF,	50V
R18	560	R45	1K	C41	CER	.47μF,	50V
R19	1K	R46	470	C42	CER	47pF,	50V
R20	1.5K	R47	1 1/2W, 5%				
R21	1K	R48	150K				
R22	1.5K	R49	270				
R23	2.2K	R50	5K Potentiometer				
R24	22K	R51	10K				
R25	3.16K 1/4W, 1%	R52	12K				
R26	22K	R53,54	1K				
MISCELLANEOUS				L1,2	RF Shielded Choke,	100μH	
				L3,4	RF Shielded Choke,	27μH	
				L5,6	RF Shielded Choke,	10μH	
				L7	RF Shielded Choke,	100μH	
				P1,3	Header, St. Post, 5 pin		
				P5	Header, Rt. Angle, 16 pin		
				P6	Header, 5 pin, .156 center		
				P7	Header, Dual Row 20 pin, .1 center		
				P8	Header, Rt. Angle, 16 pin		

SCHEMATIC 8050005



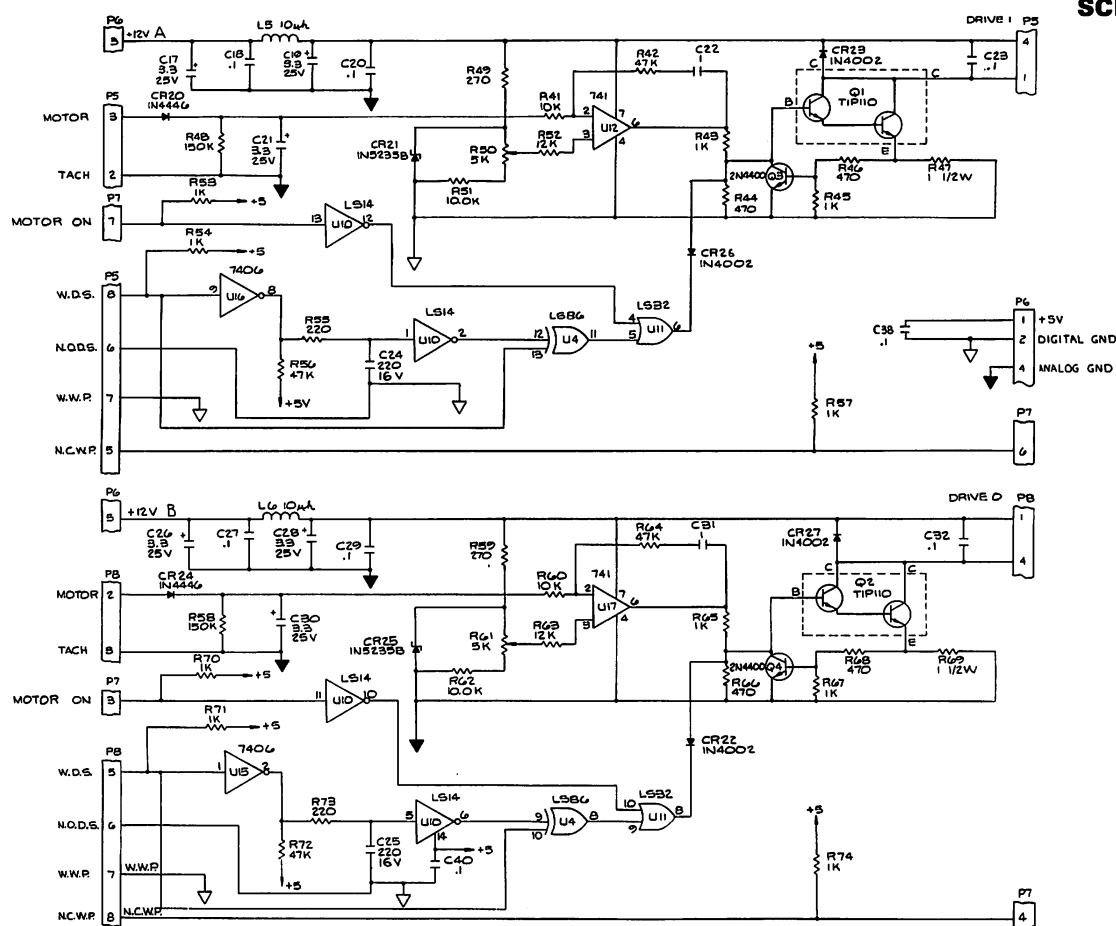
2. ALL CAPACITOR VALUES ARE IN MICROFARADS AND ARE 50 VDC.

1. ALL RESISTOR VALUES ARE IN OHMS $\pm 5\%$ ARE $\frac{1}{4}$ WATT.

NOTES - UNLESS OTHERWISE SPECIFIED:

MICROPOLIS ANALOG PCB ASSEMBLY #8050008 SHEET 1 OF 3

SCHEMATIC 8050005

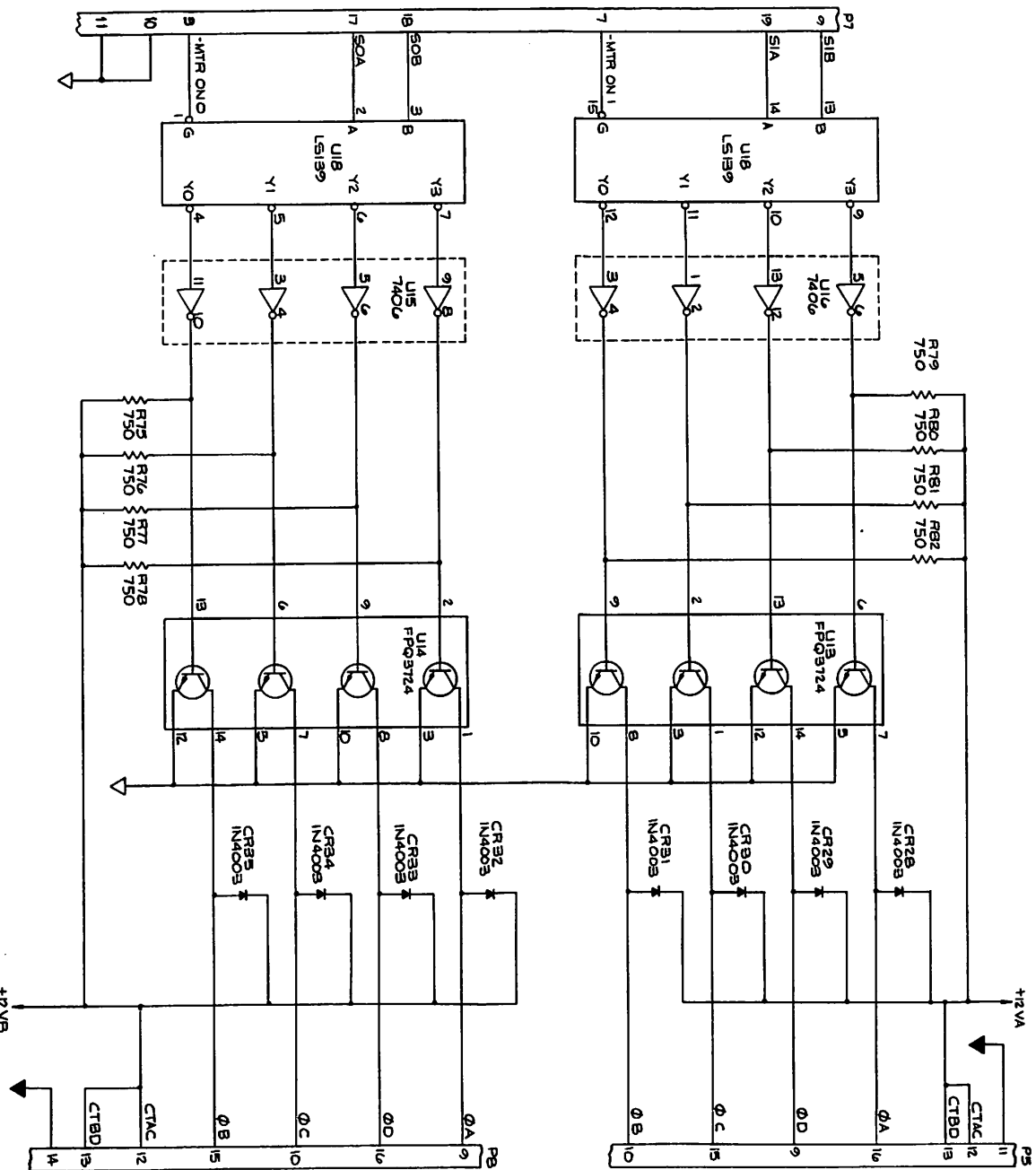


PIN#	IC #	GND
1	U1	P6/2
7	U4, 6, 9, 10, 11, 15, 16	P6/2
8	U7, 15	P6/2

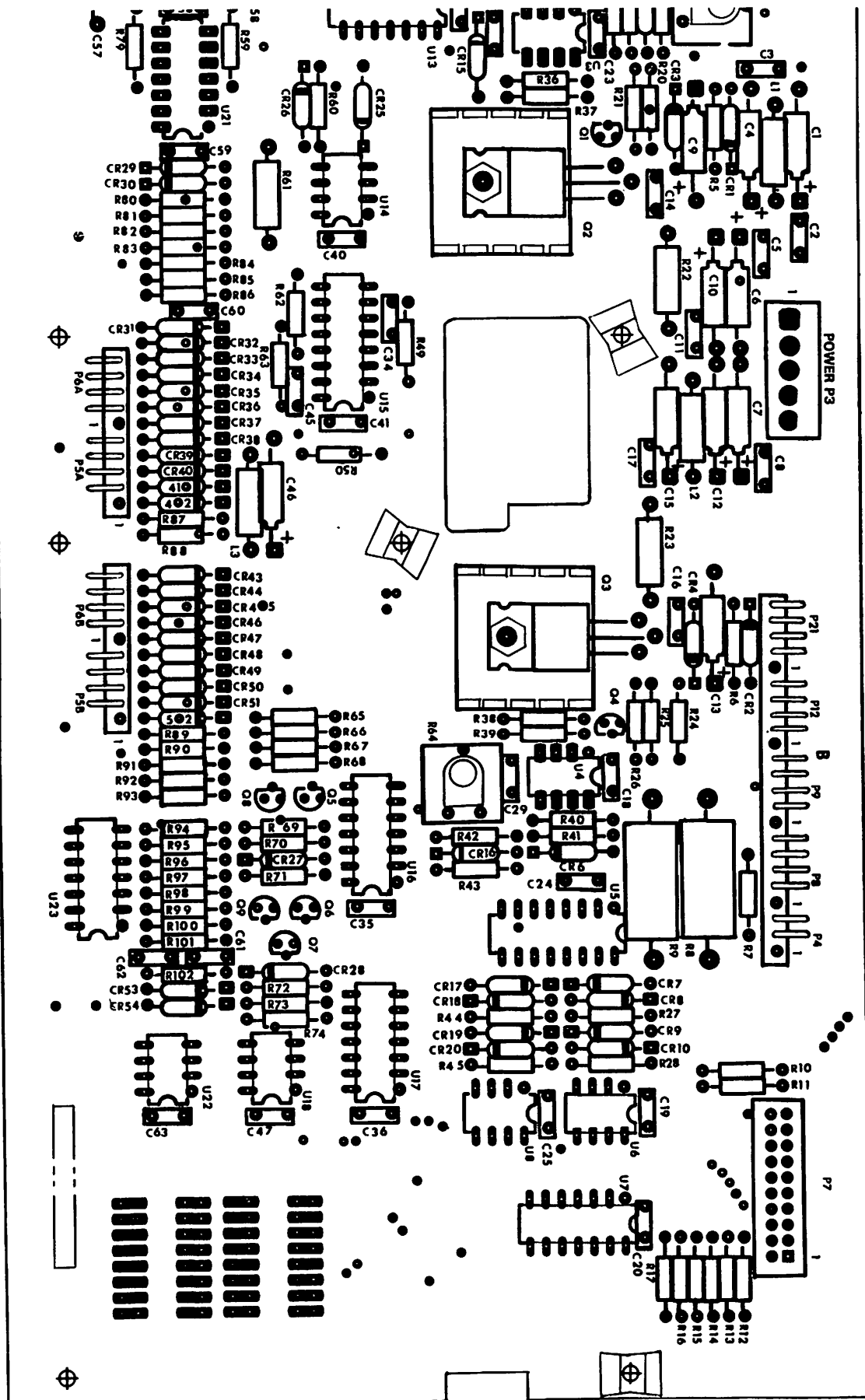
NOT USED	
IC #	PINS
U9	5, 6, 8, 9, 10, 11, 12, 13
U10	8, 9
U11	1, 2, 3, 11, 12, 13

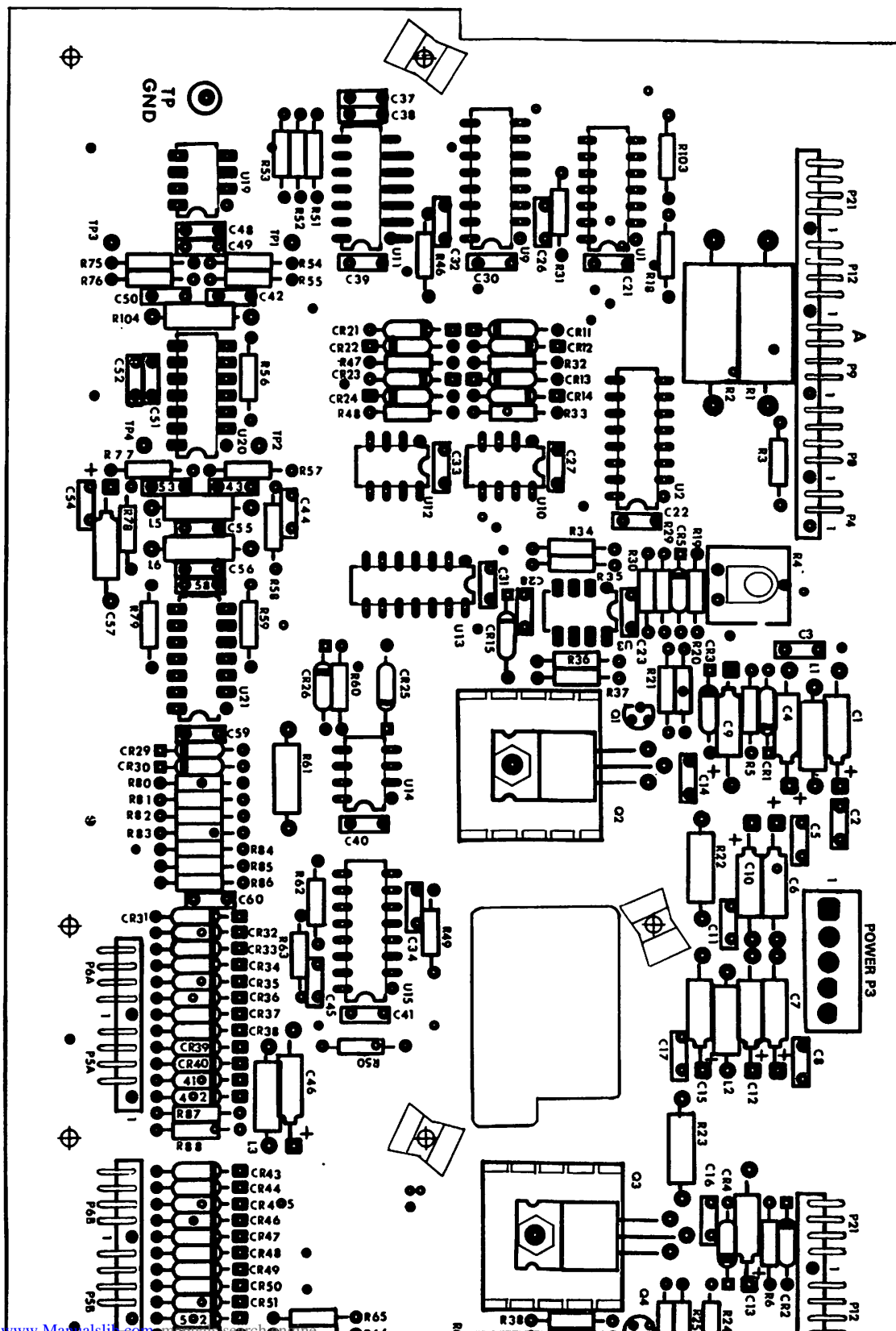
MICROPOLIS ANALOG PCB ASSEMBLY #8050006 SHEET 2 OF 3

SCHEMATIC 8050005



BOARD LAYOUT **PCB ASSEMBLY #8050044**





PARTS LIST TANDON ANALOG PCB ASSEMBLY #8050044

PLEASE NOTE:

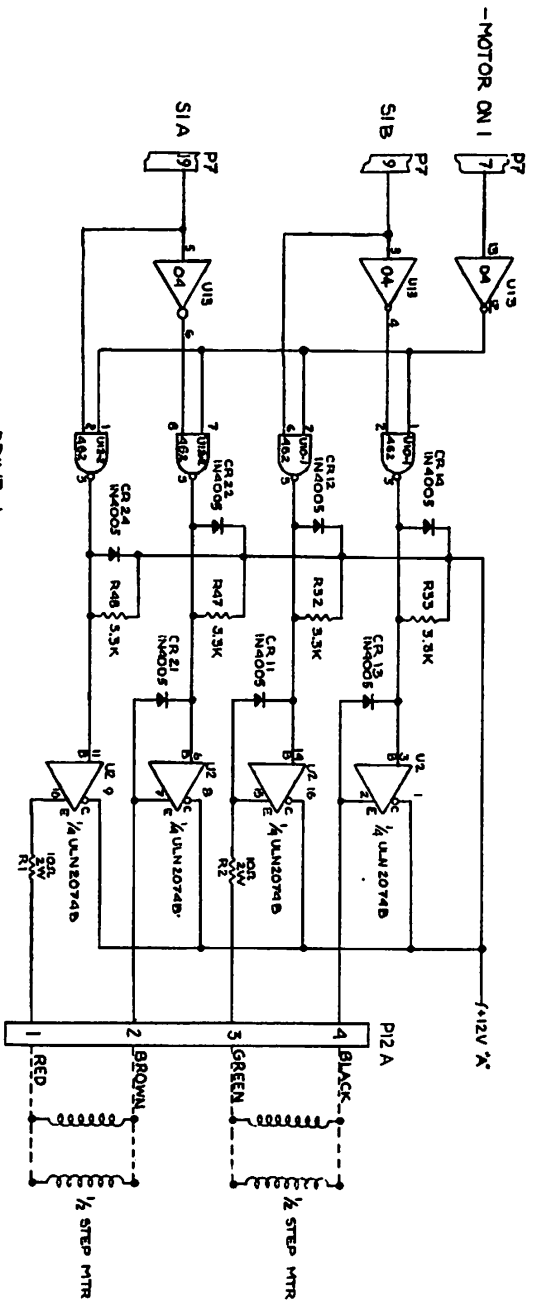
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INTEGRATED CIRCUITS			
U1	74LS74		
U2	ULN2074 B Trans Pk		
U3,4	741 C		
U5	ULN2074 B Trans Pk		
U6	75462		
U7	7404		
U8	75462		
U9	9602		
U10	75462		
U11	74LS86		
U12	77462		
U13	7404		
U14	75462		
U15	74123		
U16	7406		
U17	7404		
U18	75462		
U19	311		
U20,21	592		
U22	75462		
U23	Q2T2905 Trans Pk		
TRANSISTORS			
Q1	2N4400		
Q2,3	TIP110		
Q4,5	2N4400		
Q6,7	2N4403		
Q8,9	2N4400		
DIODES			
CR1,2	1N4446		
CR3,4	1N4005		
CR5	1N5235 B 6.8V Zener		
CR6-15	1N4005		
CR16	1N5235 B 6.8V Zener		
CR17-24	1N4005		
CR26	1N4446		
CR27	1N5226 B 3.3V Zener		
CR28-53	1N4446		
CR54	1N5234 B 6.2V Zener		
RESISTORS — All Values are in ohms- 1/4 W 5% unless noted otherwise.			
R1,2	10 2W, 5%	R34	47K
R3	180	35	12K
R4	5K Potentiometer	36	1K
R5,6	150K	R37	470
R7	180	R38	12K
R8,9	10 2W, 5%	R39	47K
R10-14	1K	R40	1K
R15	10K	R41	470
R16-18	1K	R42	6.8K
R19	6.8K	R43	270
R20	470	R44,45	3.3K
R21	1K	R46	6.8K
R22,23	1 1/2W, 5%	R47,48	3.3K
R24	10K	R49	12.4K 1/8W, 1%
R25	1K	R50	1K
R26	470	R51,52	330
R27,28	3.3K	R53	470
R29	270	R54	330
R30	10K	R55	1K
R31	18K	R56	1.2K
R32,33	3.3K	R57-59	1K

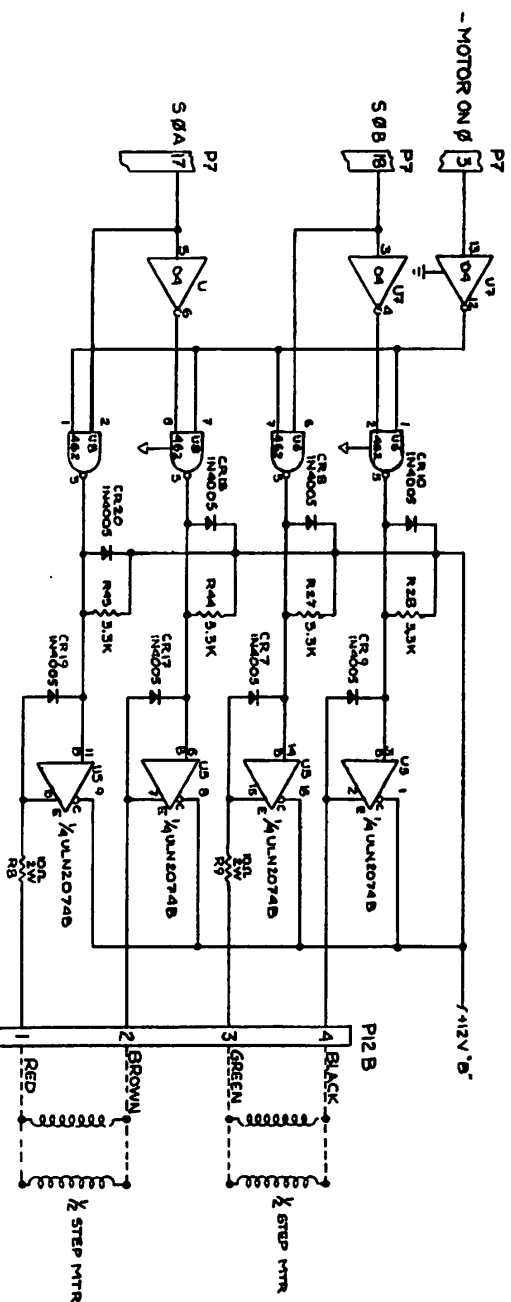
RESISTORS (Continued)			
R60	12K	R82	3.16K 1/8W, 1%
R61	330 1/2W, 5%	R83	19.6K 1/8W, 1%
R62	1K	R84	12K
R63	30.9K 1/8W, 1%	R85,86	8.25K 1/8W, 1%
R64	5K Potentiometer	R87-90	12K
R65	1.54K 1/8W, 1%	R91,92	2.2K
R66	768 1/8W, 1%	R93	47K
R67	1.3K 1/8W, 1%	R94	1.5K
R68	768 1/8W, 1%	R95	1K
R69	270	R96	1.5K
R70	180	R97	1K
R71	1K	R98	1.5K
R72	360	R99	1K
R73	1K	R100	1.5K
R74	1.5K	R101	1K
R75	470	R102	2.2K
R76-79	1K	R103	1K
R80	15K	R104	BUSSWIRE
R81	19.6K 1/8W, 1%		
CAPACITORS			
C1	TANT	3.3μF	15V
C2,3	CER	.01μF	50V
C4	TANT	3.3μF	15V
C5	CER	.01μF	50V
C6,7	TANT	3.3μF	15V
C8	CER	.01μF	50V
C9,10	TANT	3.3μF	15V
C11	CER	.01μF	50V
C12,13	TANT	3.3μF	15V
C14	CER	.01μF	50V
C15	TANT	3.3μF	15V
C16-25	CER	.01μF	50V
C26	CER	150pF	200V
C27	CER	.01μF	50V
C28,29	CER	1μF	50V
C30,31	CER	.01μF	50V
C32	CER	47pF	200V
C33	CER	.01μF	50V
C34	CER	.1μF	50V
35,36	CER	.01μF	50V
C37,38	CER	470pF	200V
C39-41	CER	.01μF	50V
C42,43	CER	.1μF	50V
C44	CER	.01μF	50V
C45	CER	.1μF	50V
C46	TANT	4.7μF	35V
C47	TANT	4.7μF	16V
C48	CER	.01μF	50V
C49	CER	470pF	200V
C50	CER	.1μF	50V
C51	CER	330pF	200V
C52	TANT	4.7μF	16V
C53	CER	.1μF	50V
C54	CER	.01μF	50V
C55	CER	68pF	200V
C56	CER	470pF	200V
C57	TANT	4.7μF	35V
C58	CER	.47μF	50V
C59-63	CER	.01μF	50V
MISCELLANEOUS			
L1,2	RF Shielded Choke,	10μH	
L3	RF Shielded Choke,	100μH	
L5,6	RF Shielded Choke,	390μH	
P3	Header, 5 pin, .156 center		
P5,6-A,B	Header, Rt. Angle, 10 pin		
P4-21-A,B	Header, Rt. Angle, 23 pin		
P7	Header, Dual Row, 20 pin, .1 center		
P8	Header, Rt. Angle, 16 pin		

15

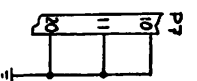
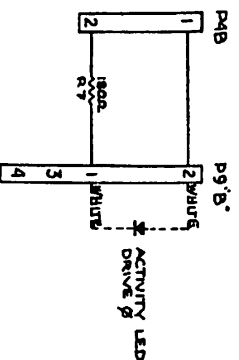
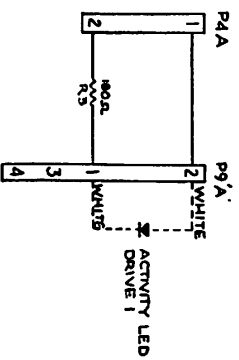
SCHEMATIC 8050042



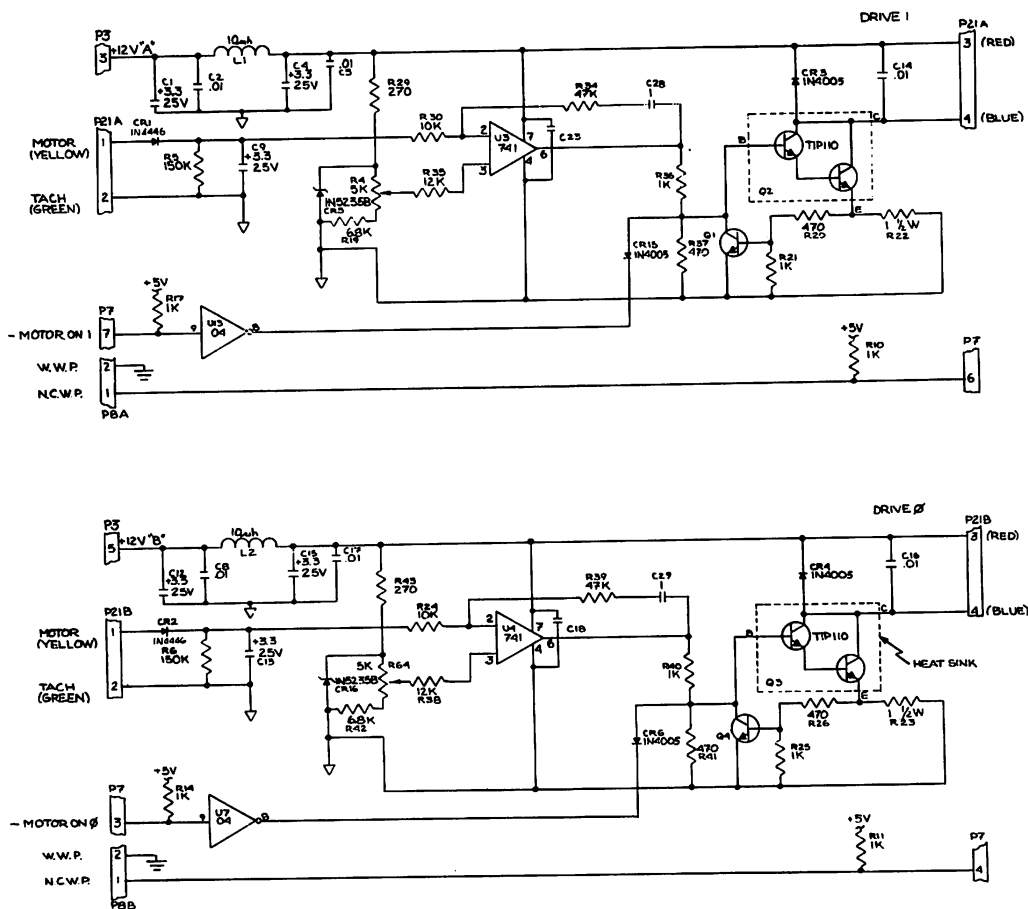
DRIVE 1



DRIVE 2

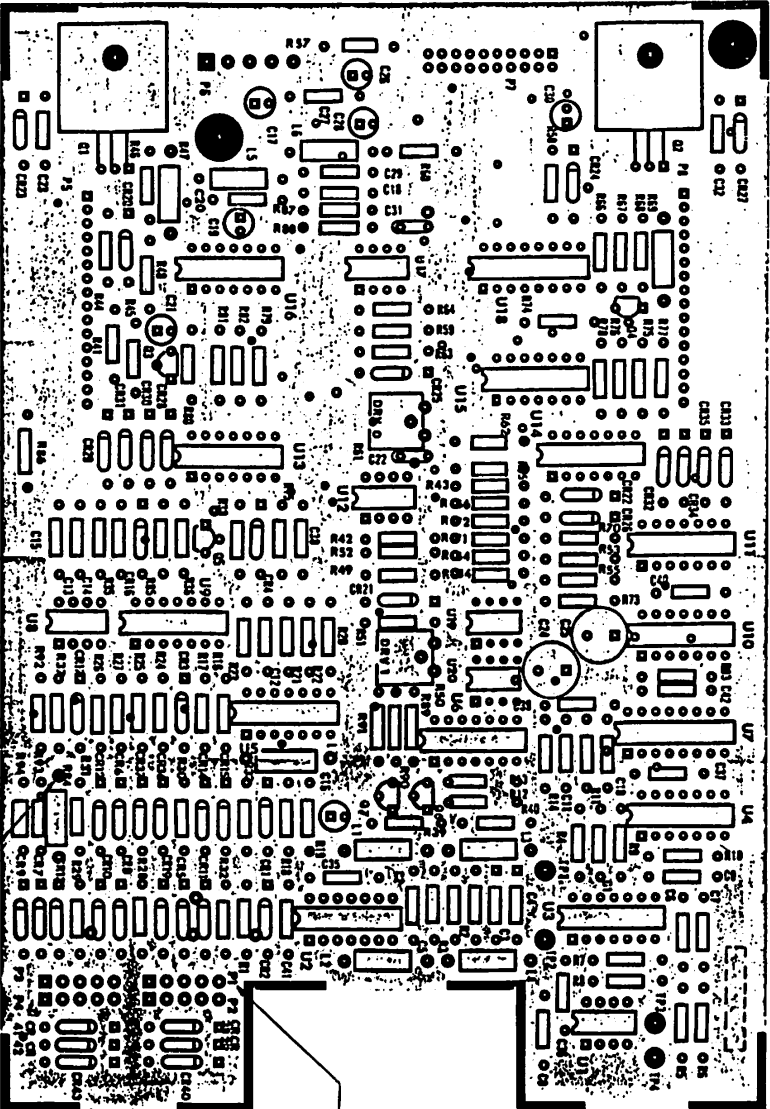


SCHEMATIC 8050042



TANDON ANALOG PCB ASSEMBLY #8050044 SHEET 3 OF 3

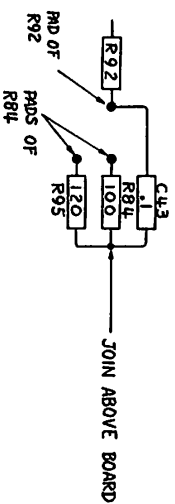
BOARD LAYOUT PCB ASSEMBLY #8250023



P1 - P4 PIN CONFIGURATIONS			
X indicates the header pin should be missing			
8050	Micropolis and	P3 1X111 111X1	P1
	Micropolis Safari	P4 11111 11111	P2
MPI		P3 1X111 1X111	P1
		P4 11111 11111	P2
8250	Micropolis	P3 11111 11111	P1
		P4 11111 11111	P2
Micropolis Safari		P3 1X111 111X1	P1
		P4 1X111 111X1	P2
MPI		P3 1X111 1X111	P1
		P4 1X111 1X111	P2

THE FOLLOWING CIRCUIT CORRECTION SHOULD BE PRESENT ON ALL 8250023 BOARDS:

REMOVE R84 (220 Ω)
ADD 100 Ω (R84) AND 120 Ω (R95) AND CAP C43 AS BELOW:



PARTS LIST

MICROPOLIS/MPI ANALOG

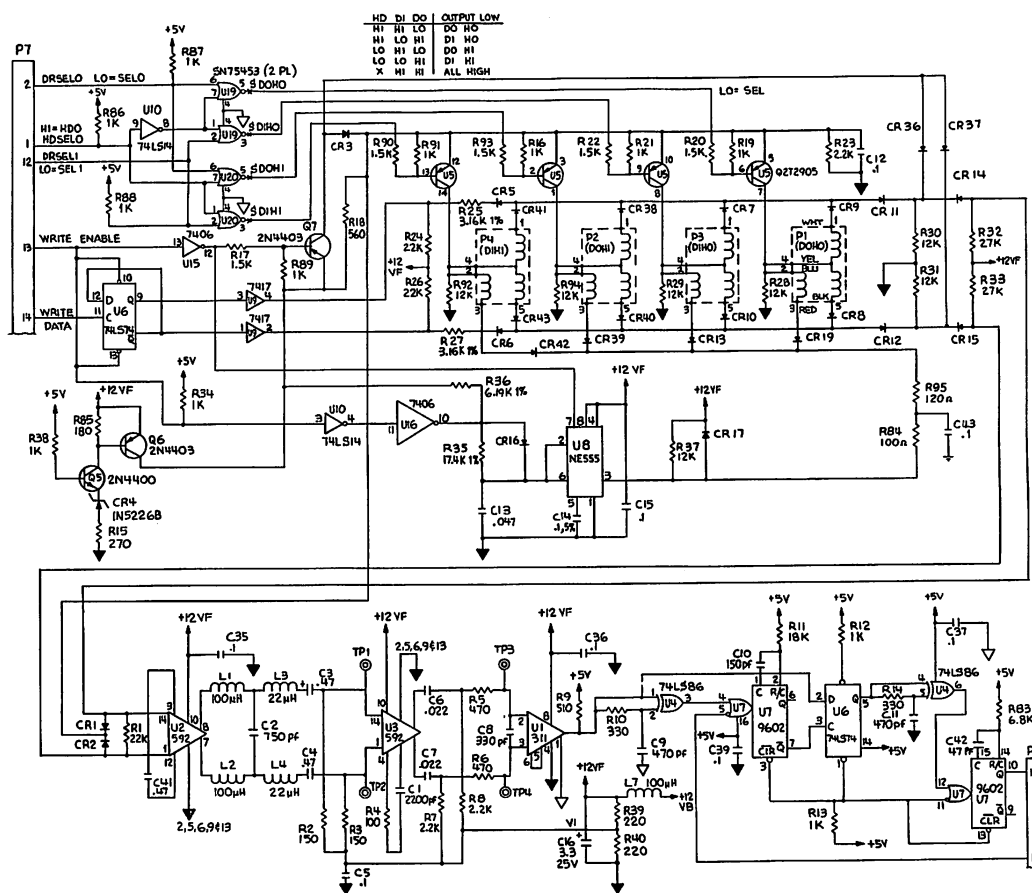
PCB ASSEMBLY #8250023

PLEASE NOTE:

Commodore part numbers are provided for reference only and do not indicate the availability of parts from Commodore. Industry standard parts (Resistors, Capacitors, Connectors) should be secured locally. Approved cross-references for TTL chips, Transistors, etc. are available in manual form through the Service Department, order part #314000-01. Unique or non-standard parts will be stocked by Commodore and are indicated on the parts list by a "C". Vendor Name and part number have been provided for your convenience in ordering custom or unique parts.

INTEGRATED CIRCUITS		RESISTORS (Continued)			
U1	311	R52	12K	R69	1 1/2W, 5%
u2,3	592	R53,54	1K	R70,71	1K
U4	74LS86	R55	220	R72	47K
U5	Q2T2905 Trans Pk	R56	47K	R73	220
U6	74LS74	R57	1K	R74	1K
U7	9602	R58	150K	R75-82	750
U8	555	R59	270	R83	6.8K
U9	7417	R60	10K	R84	100
U10	74LS14	R61	5K Potentiometer	R85	180
U11	74LS32	R62	10K	R86-89	1K
U12	741	R63	12K	R90	1.5K
U13,14	FPQ3724 Trans Pk	R64	47K	R91	1K
U15,16	7406	R65	1K	R92	12K
U17	741	R66	470	R93	1.5K
U18	74LS139	R67	1K	R94	12K
U19,20	SN75453	R68	470	R95	120
TRANSISTORS		CAPACITORS			
Q1,2	Tip 110	C1	CER	2200pF,	50V
Q3,4,5	2N4400	C2	CER	750pF,	50V
Q6,7	2N4403	C3,4	CER	.47μF,	50V
DIODES		C5	CER	.1μF,	50V
CR1-3	1N4446	C6,7	CER	.022μF,	50V
CR4	1N5226 B 3.3V Zener	C8	CER	330pF,	50V
CR5-20	1N4446	C9	CER	470pF,	50V
CR21	1N5235 B 6.8V Zener	C10	CER	150pF,	50V
CR22,23	1N4002	C11	CER	470pF,	50V
CR24	1N4446	C12	CER	.1μF,	50V
CR25	1N5235 B	C13	CER	.047μF,	50V
CR26,27	1N4002	C15	CER	.1μF,	50V
CR36-43	1N4446	C16,17	TANTALUM	3.3μF,	25V
RESISTORS — All Values are in ohms- 1/4 W 5% unless noted otherwise.		C18	CER	.1μF,	50V
R1	22K	C19	TANTALUM	3.3μF,	25V
R2,3	150	C20	CER	.1μF,	50V
R4	100	C21	TANT	3.3μF,	25V
R5,6	470	C22	MONOLITHIC	1μF,	50V
R7,8	2.2K	C23	CER	.1μF,	50V
R9	510	C24,25	ELECT	220μF,	16V
R10	330	C26	TANT	3.3μF,	25V
R11	18K	C27	CER	.1μF,	50V
R12,13	1K	C28	TANT	3.3μF,	25V
R14	330	C29	CER	.1μF,	50V
R15	270	C30	TANT	3.3μF,	25V
R16	1K	C31	MONOLITHIC	1μF,	50V
R17	1.5K	C32,35-40	CER	.1μF,	50V
R18	560	C41	CER	.47μF,	50V
R19	1K	C42	CER	47pF,	50V
R20	1.5K	C43	CER	.1μF,	50V
R21	1K	MISCELLANEOUS			
R22	1.5K	L1,2	RF Shielded Choke,	100μH	
R23	2.2K	L3,4	RF Shielded Choke,	27μH	
R24	22K	L5,6	RF Shielded Choke,	10μH	
R25	3.16K 1/4W, 1%	L7	RF Shielded Choke,	100μH	
R26	22K	P1-4	Header, St. Post, 5 pin		
R27	3.16K 1/4W, 1%	P5	Header, Rt. Angle, 16 pin		
R28-31	12K	P6	Header, 5 pin, .156 center		
R32,33	27K	P7	Header, Dual Row, 20 pin, .1 center		
R34	1K	P8	Header, Rt. Angle, 16 pin		
R35	17.4K 1/4W, 1%				
R36	6.19K 1/4W, 1%				
R37	12K				
R38	1K				
R39,40	220				
R41	10K				
R42	47K				
R43	1K				
R44	470				
R45	1K				
R46	470				
R47	1 1/2W, 5%				
R48	150K				
R49	270				
R50	5K Potentiometer				
R51	10K				

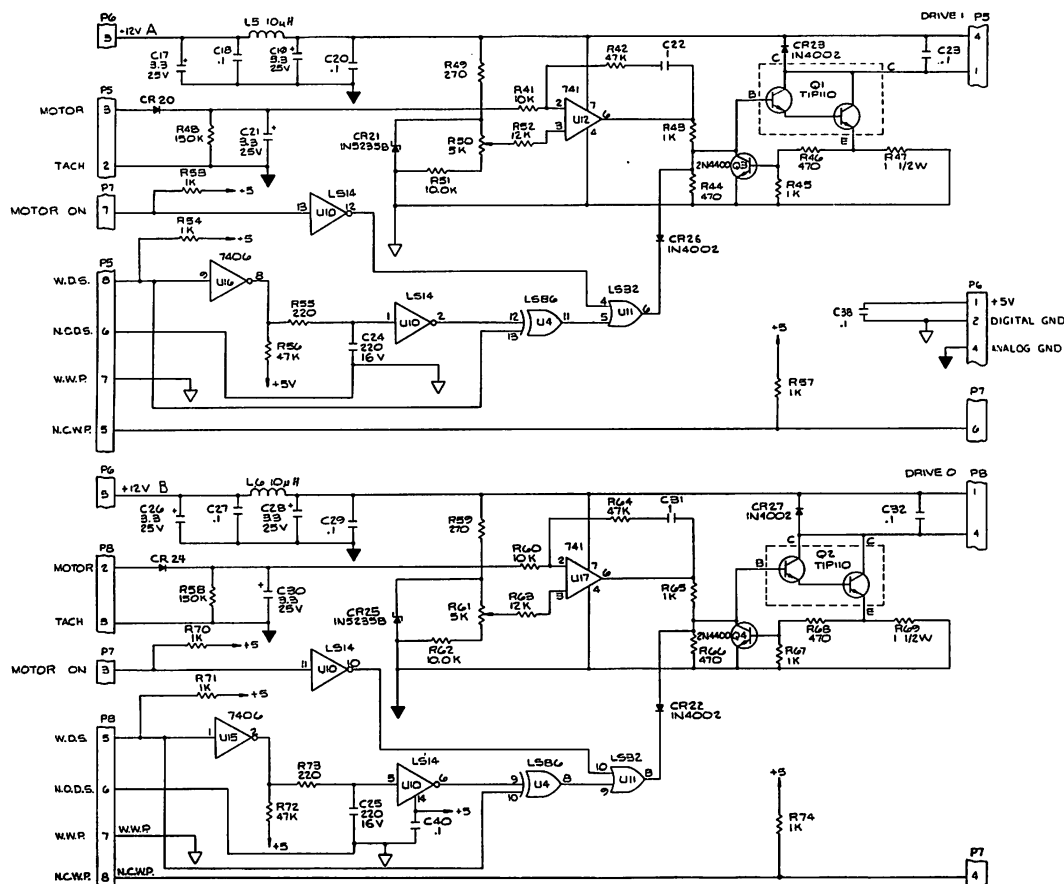
SCHEMATIC 8250022



1. ALL RESISTOR VALUES ARE IN OHMS ±5% & ARE 1/4 WATT.
 2. ALL CAPACITOR VALUES ARE IN MICROFARADS AND ARE 50 VDC.
 3. ALL DIODES ARE 1N4146.
- NOTES-UNLESS OTHERWISE SPECIFIED:

MICROPOLIS/MPI ANALOG PCB ASSEMBLY #8250023 SHEET 1 OF 3

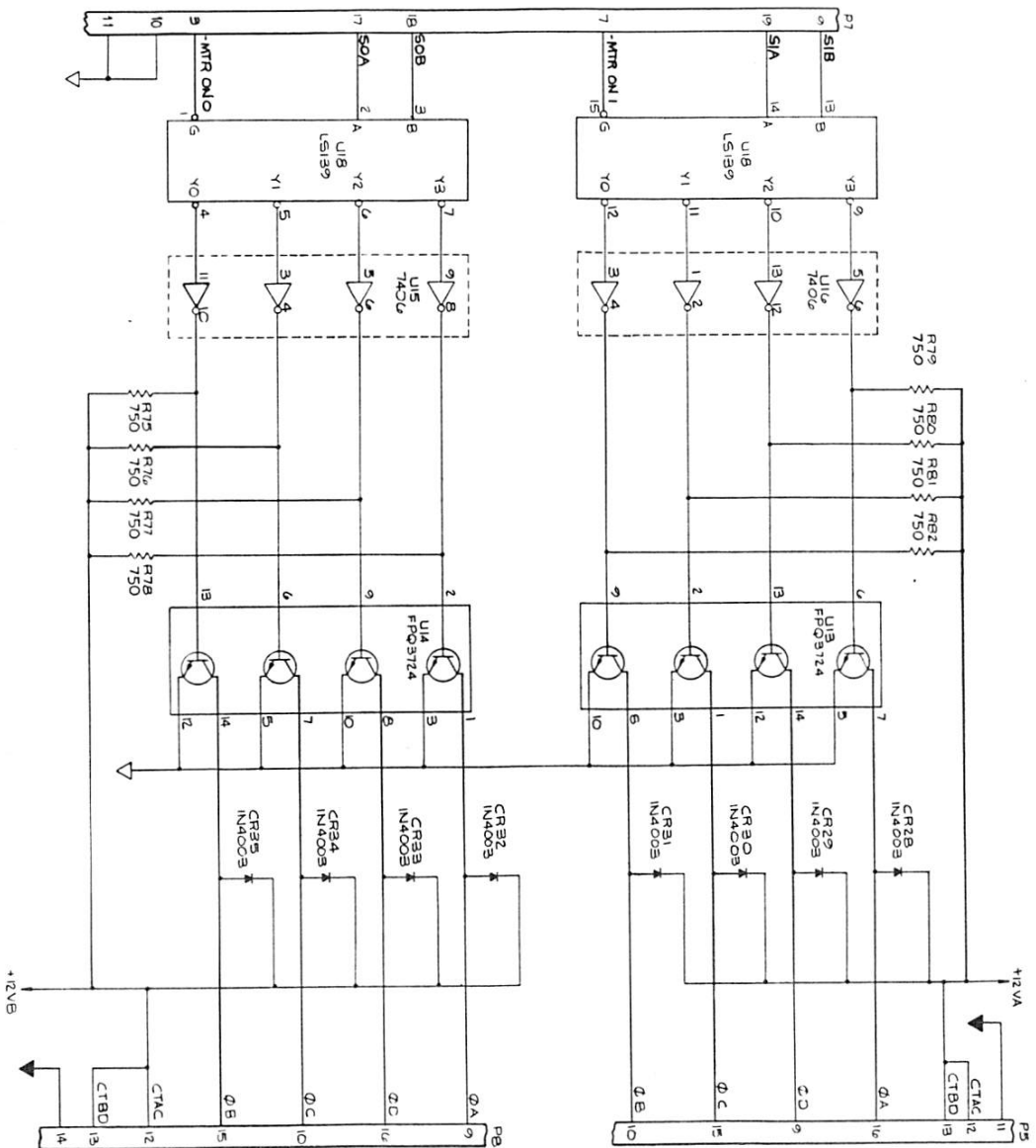
SCHEMATIC 8250022



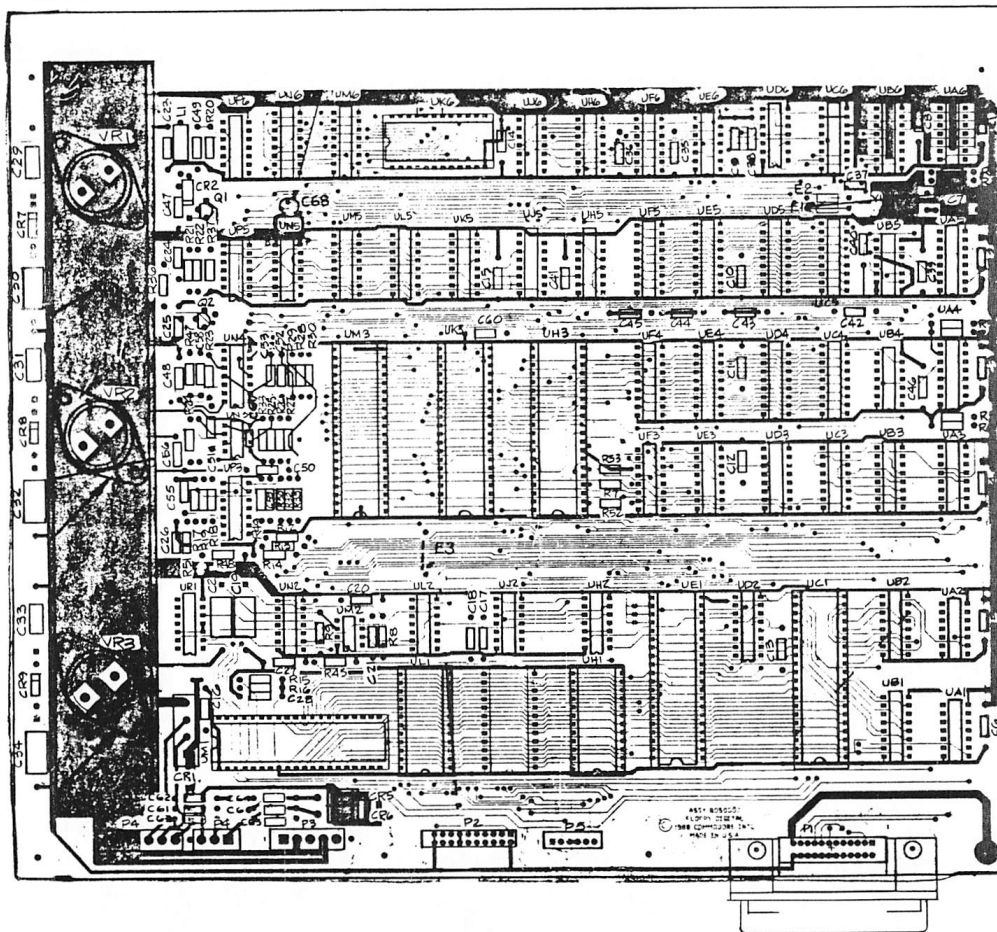
PIN#	IC #	GND
1	U1	P6.2
7	U4, 6, 9, 10, 11, 15, 16	P6.2
8	U7, 18	P6.2
4	U19, 20	P6.2
NOT USED		
IC #	PINS	
U9	5, 6, 8, 9, 10, 11, 12, 13	
U11	1, 2, 3, 11, 12, 13	

MICROPOLIS/MPI ANALOG PCB ASSEMBLY #8250023 SHEET 2 OF 3

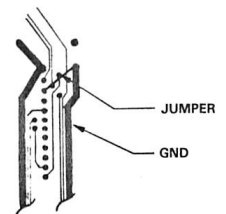
SCHEMATIC 8250022



BOARD LAYOUT PCB ASSEMBLY #8050002



DASH NO.	USED ON	JUMPER E3
-01	8050	OUT
-02	8050	OUT
-03	8250	IN
-04	8250	IN
-05	8050	OUT
-06	8250	IN



CIRCUIT SIDE VIEW
OF UK3-18

FOR 8250 PCB ASSY'S ONLY, ADD A JUMPER WIRE ON THE CIRCUIT SIDE OF THE BOARD, BETWEEN UK3 PIN 18 & GND AND AT LOCATION E3 ON THE COMPONENT SIDE OF THE BOARD.

PARTS LIST

DIGITAL PCB ASSEMBLY #8050002

PLEASE NOTE:

Commodore part numbers are provided for reference only and do not indicate the availability of parts from Commodore. Industry standard parts (Resistors, Capacitors, Connectors) should be secured locally. Approved cross-references for TTL chips, Transistors, etc. are available in manual form through the Service Department, order part #314000-01. Unique or non-standard parts will be stocked by Commodore and are indicated on the parts list by a "C". Vendor Name and part number have been provided for your convenience in ordering custom or unique parts.

INTEGRATED CIRCUITS			
UA1	74LS02		
UA2	7414		
UA3	74LS42		
UA4	74LS194		
UA5	74LS153		
UA6	74S04		
UB1,2	3446		
UB3	74LS42		
UB4	74LS00		
UB5	74LS74		
UB6	74LS175		
UC1	6532 PIA	C 901458-01	
UC3	74LS157		
UC4,5	2114 RAM 300ns		
UC6	74LS163		
UD2	3446		
UD3	74LS157		
UD4,5	2114 RAM 300ns		
UD6	74LS00		
UE1	6532 PIA	C 901458-01	
UE3	74LS157		
UE4,5	2114 RAM 300ns		
UE6	74LS04		
UF3	74LS157		
UF4,5	2114 RAM 300ns		
UF6	74LS02		
UH1	ROM 2364	See Page 2 for Part #	
UH2	74LS02		
UH3	6502 μ Processor	C 901435-01	
UH5	74190		
UH6	74LS00		
UJ2	74LS00		
UJ5	74LS157		
UK3	6530 PIA	See Page 2 for Part #	
UK5	74LS157		
UK6	ROM 6316	C 901467-01	
UL1	ROM 2364	See Page 2 for Part #	
UL2	74LS04		
UL5	74LS157		
UM2	555		
UM3	6522 VIA	C 901437-01	
UM5	74LS133		
UM6	74LS194		
UN1	6502 μ Processor	C 901435-01	
UN3	353		
UN4	4066		
UN5	74LS164		
UN6	74LS165		
UP3	Q2T2222 Trans Pk		
UP5	74LS164		
UP6	74LS02		
UR1	74LS08		
TRANSISTORS			
Q1	2N3904		
Q2	2N3906		

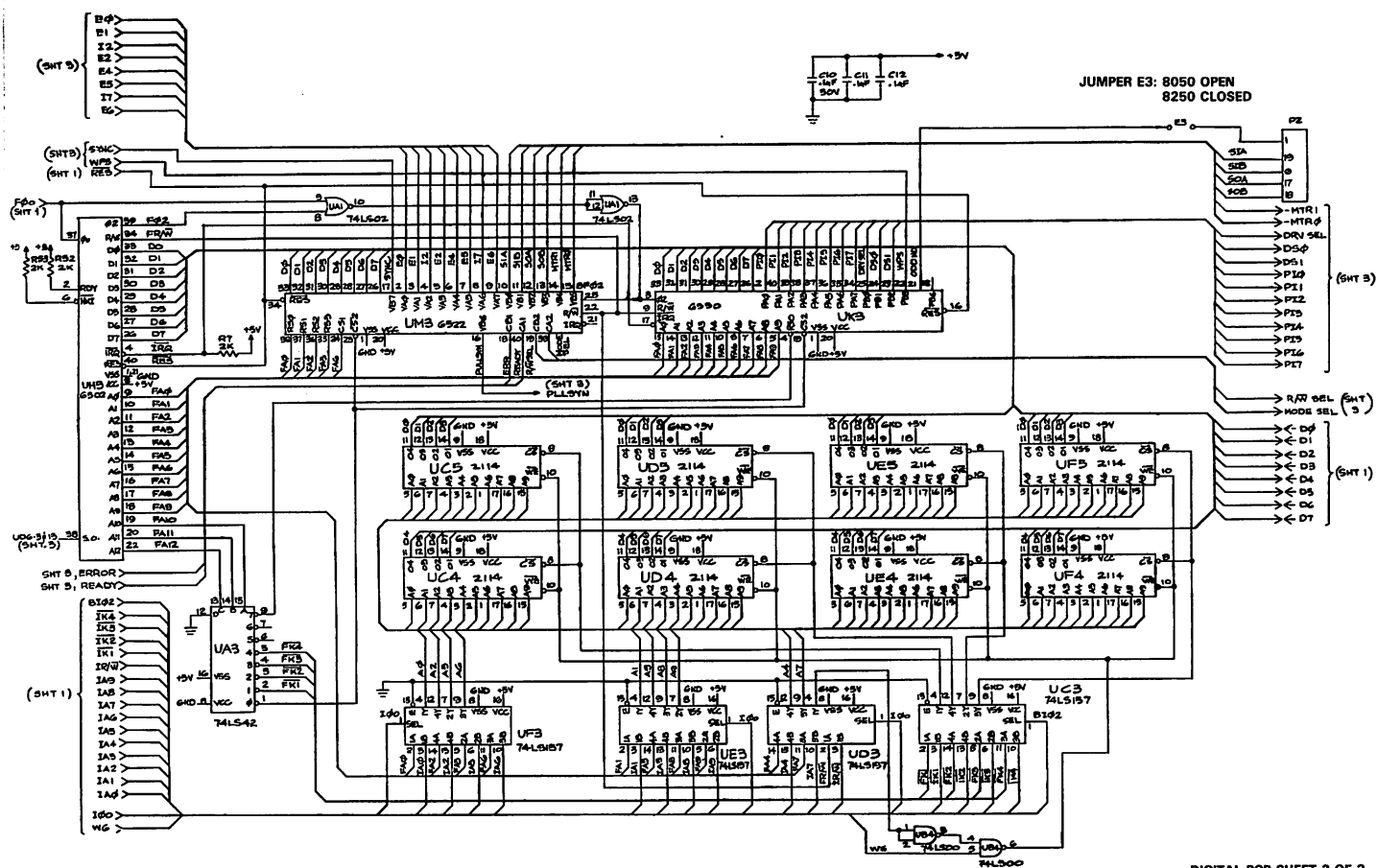
DIODES			
CR1	Bridge Rect KBL02		
CR2	1N4148		
CR5,6	1N5402 3A, 200V		
CR7,8,9	1N4001 1A, 50V		
RESISTORS			
R1,2	470	R28	82K
R3,4	5.1K	R29	43K
R5,6	2.4K	R30	7.15K 1/4W, 1%
R7	2K	R32	2.2K
R8,9	10K	R33	680
R12,13,14	120	R35	2K
R15,16	2K	R36	1K
R17	226 1/4W, 1%	R37	2.2K
R18	75 1/4W, 1%	R45	120
R19	100 1/4W, 1%	R47	2.2K
R20	1K	R48	680
R21	2K	R49	10K
R22	15K	R50	2.2K
R23,24,25	10K	R51	200 1/4W, 1%
R26	2.7K	R52,53	2K
R27	33K		
CAPACITORS			
C1-6	CER	.1 μ F	50V
C7	CER	100pF	
C8-18	CER	.1 μ F	50V
C19	ELECT, LL	10 μ F	25V
C20	CER	.01 μ F	
C21	CER	.1 μ F	50V
C22	ELECT	220 μ F	16V
C23-28	CER	.1 μ F	50V
C29	ELECT, LL	1 μ F	50V
C30	ELECT	10 μ F	25V
C31	ELECT, LL	1 μ F	50V
C32	ELECT	10 μ F	25V
C33	ELECT, LL	1 μ F	50V
C34	ELECT	47 μ F	16V
C35-48	CER	.1 μ F	50V
C49	CER	47pF	
C50	CER	.1 μ F	50V
C51	CER	200pF	
C52,53	CER	330pF	
C55,56	CER	.1 μ F	50V
C58	CER	100pF	
C59-66	CER	.1 μ F	50V
C67	CER	150pF	
C68	CER	200pF	250V
MISCELLANEOUS			
VR1,2	7812 Voltage Regulator	12V, 1.5A	
VR3	LM323 Voltage Reg	5V, 3A	
L1	RF Shielded Choke,	100 μ H	
Y1	12 MHz Crystal		
P1	Cnnct, Rt. Angle, IEEE		
P2	Header, Dual, 20 pin, .1 center		
P3	Header, 5 pin, .156 center		
P4	Header, 3 pin, .156 center		
P4	Header, 6 pin, .156 center		
P5	Header, 6 pin, .1 center		

SCHEMATIC 8050001

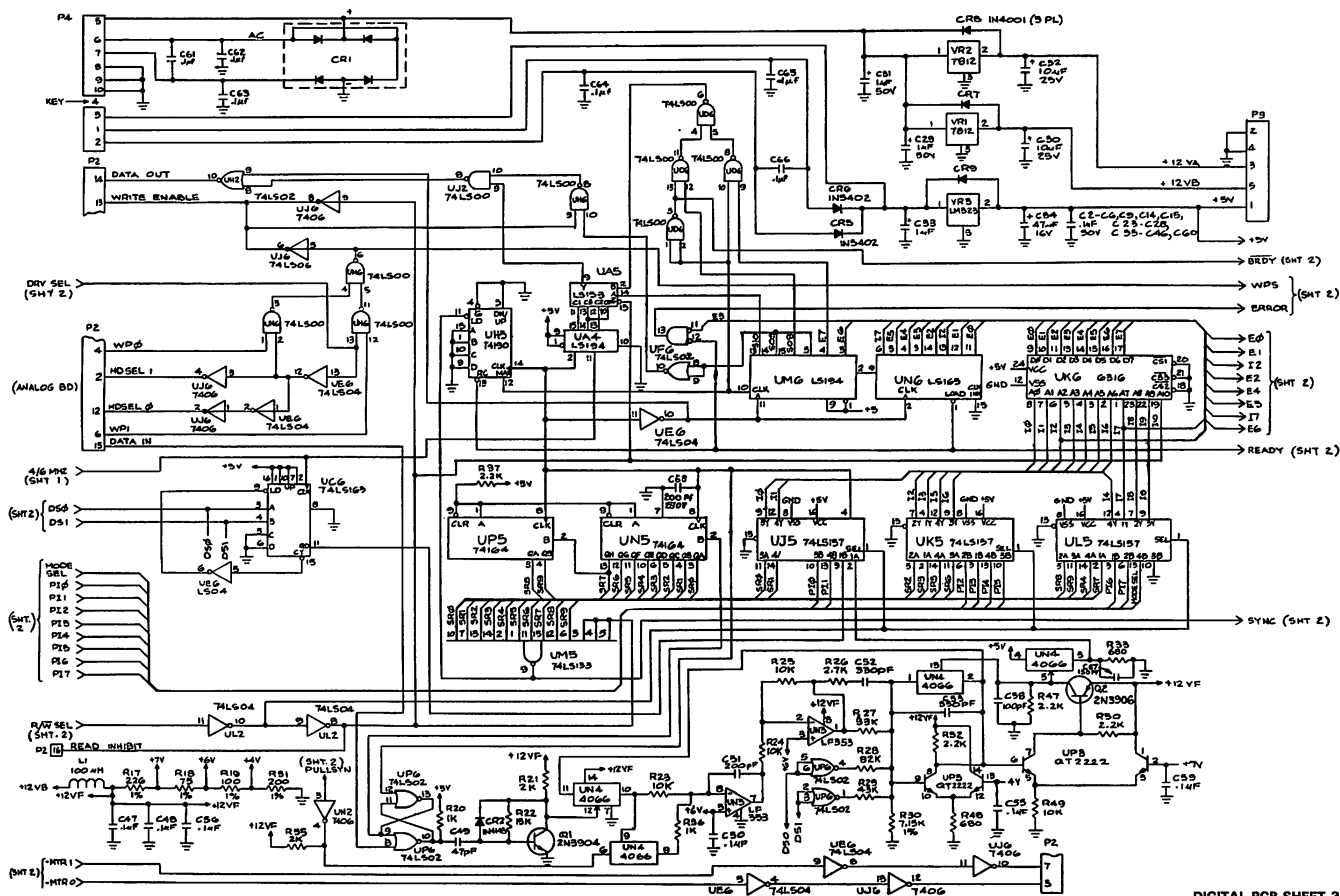


DIGITAL PCB SHEET 1 OF 3

SCHEMATIC 8050001



SCHEMATIC 8050001

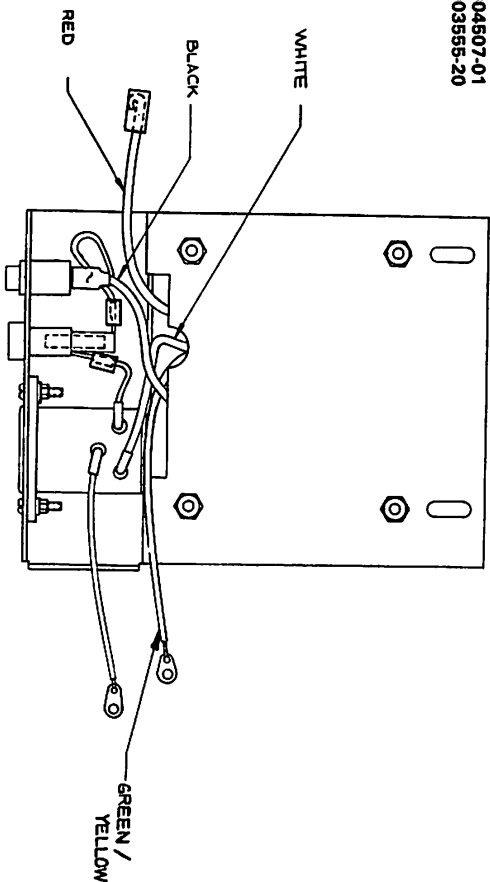
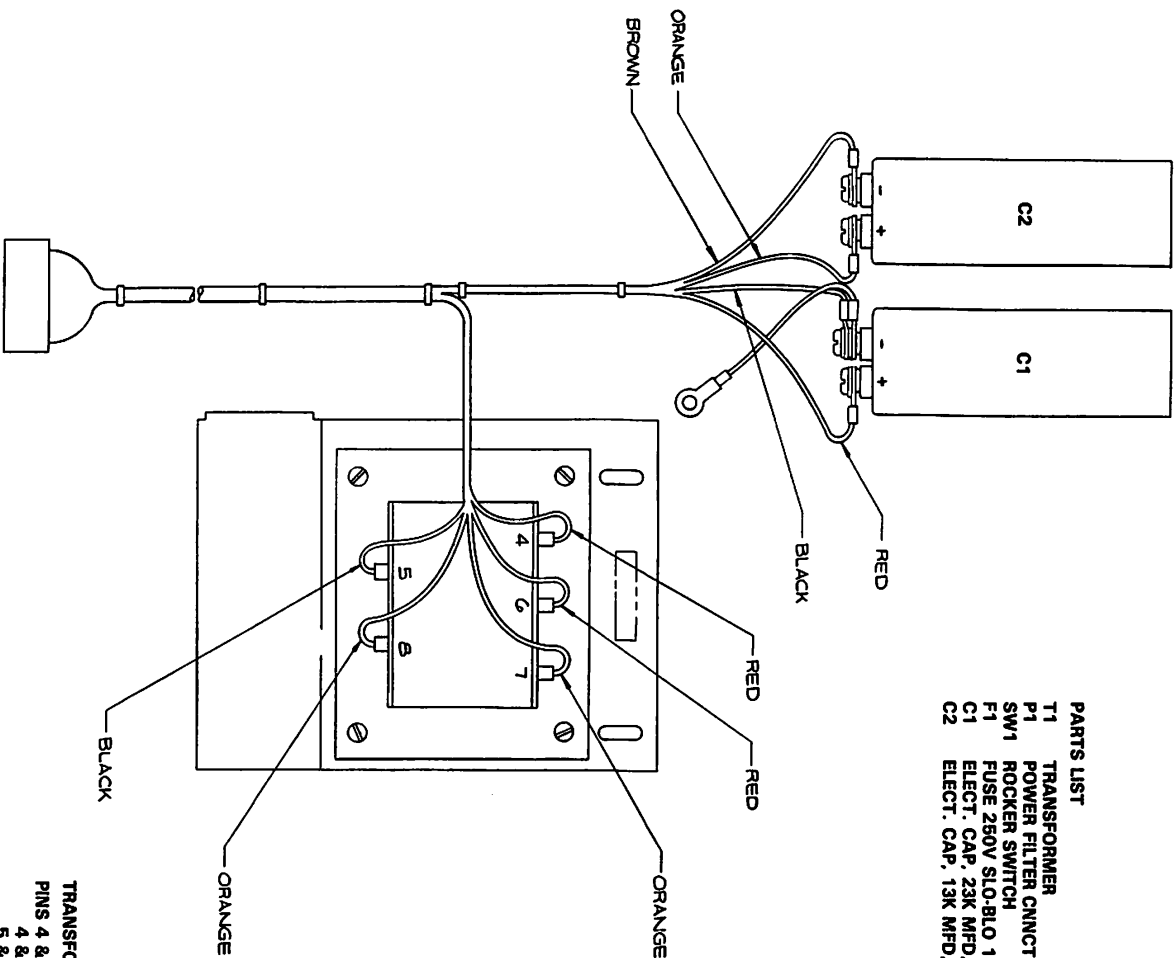


DIGITAL PCB SHEET 3 OF 3

POWER SUPPLY ASSEMBLY #8050029

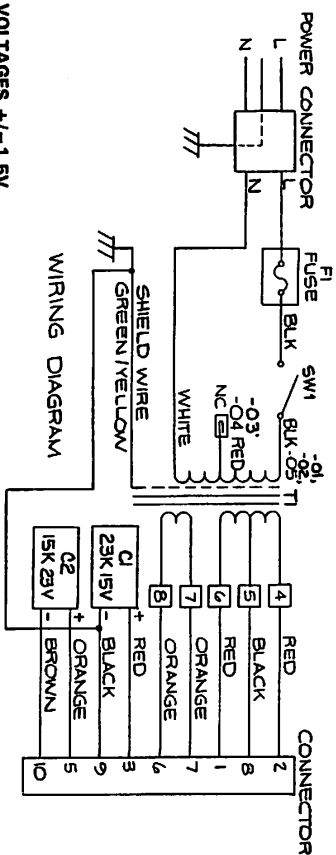
PARTS LIST

T1	TRANSFORMER	320085-02
P1	POWER FILTER CNCT	903467-03
SW1	ROCKER SWITCH	904507-01
F1	FUSE 250V SLO-BLO 1.0A	903555-20
C1	ELECT. CAP. 23K MFD. 15V	
C2	ELECT. CAP. 13K MFD. 25V	

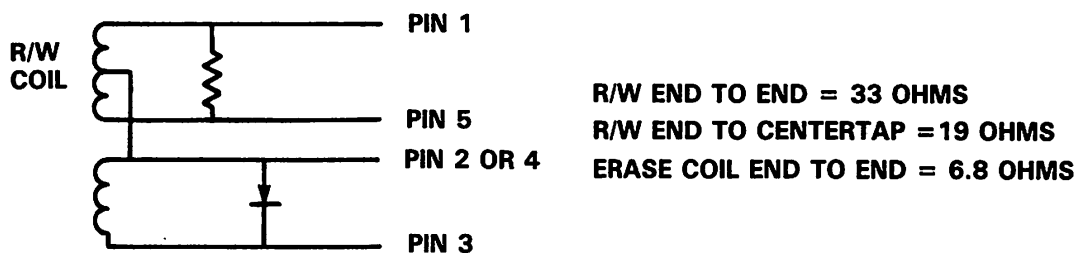
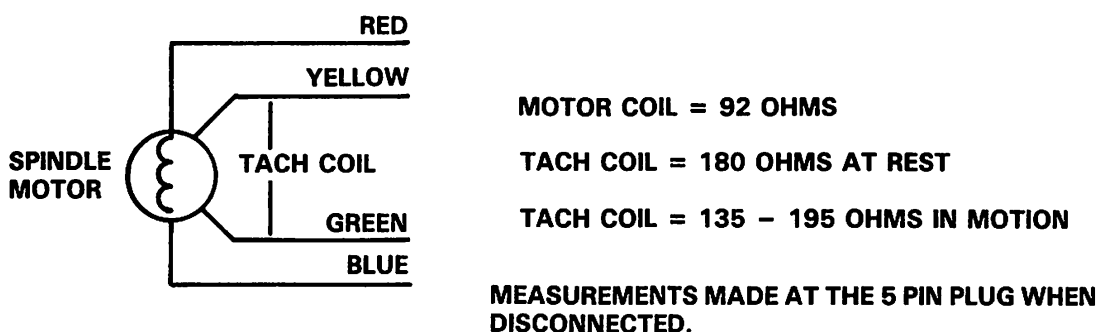
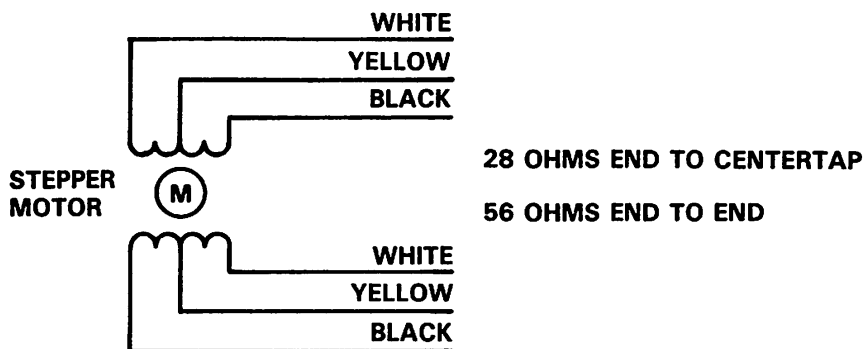


TRANSFORMER VOLTAGES +/-1.5V.

PINS 4 & 6	16.5VAC
4 & 5	8.2VAC
5 & 6	8.2VAC
7 & 8	16 VAC

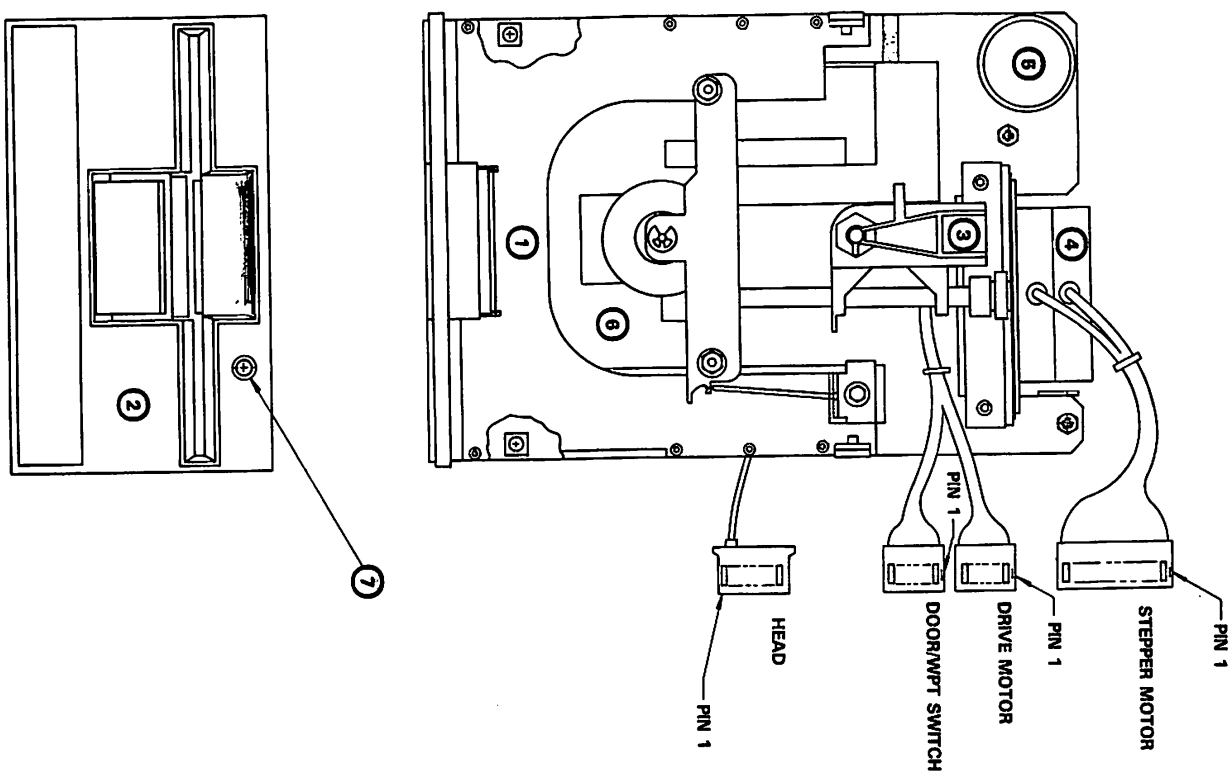


RESISTANCE CHECKS MICROPOLIS AND MICROPOLIS SAFARI DRIVES



ALL MEASUREMENTS MADE AT THE APPROPRIATE CONNECTION WHEN DISCONNECTED FROM THE ANALOG PCB.

MICROPOLIS DRIVE ASSEMBLIES **8050/8250**



STEPPER MOTOR	8	BLACK	POSITIONER MOTOR 04
	7	WHITE	02
	6	GREEN	CASE GROUND
	5	YELLOW	CENTER TAP 2
	4	YELLOW	CENTER TAP 1
	3	N/C	
	2	BLACK	03
	1	WHITE	POSITIONER MOTOR 01
DRIVE MOTOR	4	RED	+12V TO MOTOR
	3	YELLOW	TACHOMETER OUTPUT
	2	GREEN	TACHOMETER RETURN
	1	BLUE	SPINDLE DRIVE MOTOR
DOOR/WPT SWITCH	4	GREEN	DOOR SWITCH COMMON
	3	YELLOW	DOOR SWITCH NORMAL OPEN CONTACT
	2	BROWN/WHITE	WRITE PROTECT SWITCH COMMON CONTACT
	1	WHITE/RED	WRITE PROTECT SWITCH NORMAL CLOSED
	5	BLACK	READ/WRITE GROUND
HEAD SWITCH	4	YELLOW	ERASE GROUND
	3	RED	ERASE POSITIVE (W/RESPECT TO YEL)
	2	BLACK/CRIMP TERM	PLUG
	1	WHITE	READ/WRITE POSITIVE (W/RESPECT TO BLACK)
CONNECTOR	PIN NO.	WIRE COLOR	WIRE DESTINATION

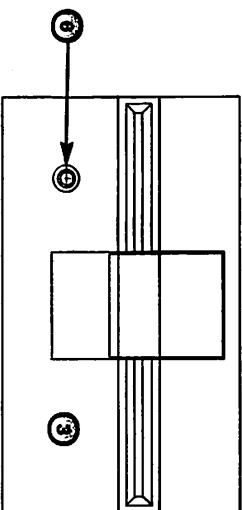
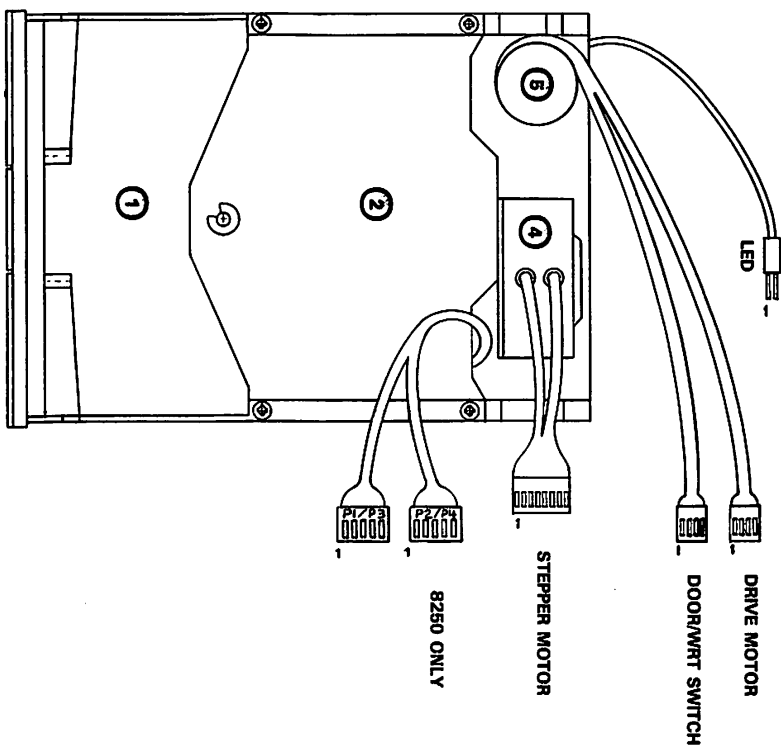
PARTS LIST

805003101 Micropolis Drive 8050

825001601 Micropolis Drive 8250

- ① 31416501 MIC DOOR/HUB ASSEMBLY
 - 1-Door Assy. w/Latch & Spring
 - 2-Disk Clamp Assy.
 - 3-Write Protect & Micro Switch Assy.
 - 4-Disk Eject Latch & Spring
- ② 31416601 MIC FRONT BEZEL
 - 31416701 MIC 8050 R/W HEAD Assy.
 - 1-R/W Head w/Harness
 - 2-Load Arm w/Pad
- ③ 31416801 MIC 8250 R/W HEAD Assy.
 - 1-Up/Low R/W Head w/Harness
- ④ 31416901 MIC STEPPER MOTOR Assy.
 - 1-Stepper Motor w/Harness
 - 2-Stepper Mounting Bracket
- ⑤ 31417001 MIC/MSA TACH MOTOR
- ⑥ 31417101 MIC HOUSING/SPINDLE Assy.
 - 1-Housing Base w/Standoffs
 - 2-Spindle/Tach Assy.
 - 3-Plastic Mountings
- 31417201 MIC DRIVE BELT
- 31417301 MIC HARDWARE
 - 1-Assorted Screws
 - 2-Assorted Springs
 - 3-1 Each: Platen, Pivot
- 31417401 Univ. Load Pad
- ⑦ 90382001 Univ. LED Holder (2 pc.)
- 32086901 Drive 0 Label
- 32086902 Drive 1 Label

MICROPOLIS SAFARI DRIVE ASSEMBLIES **8050/8250**



NO LABEL (LED)	2	BLACK	LED, CATHODE
	1	WHITE	LED, ANODE
	8	WHITE	STEPPER PHASE D
	7	BLACK	STEPPER PHASE B
	6	KEY	N/C
	8	YELLOW	STEPPER MOTOR +12
	4	YELLOW	STEPPER MOTOR +12
	3	KEY	N/C
NO LABEL (STEPPER MOTOR)	2	WHITE	STEPPER PHASE C
	1	BLACK	STEPPER PHASE A
	4	WHITERED	WRITE PROTECT SWITCH
	3	WHITE/BROWN	DOOR SWITCH
	2	YELLOW	DOOR SWITCH
	1	GREEN	DC-DR SWITCH
	4	BLUE	DRIVE MOTOR RETURN
	3	GREEN	TACHOMETER
NO LABEL (DRIVE MOTOR)	2	YELLOW	TACHOMETER
	1	RED	DRIVE MOTOR +12
	5	BLACK	READ/WRITE HEAD
	4	BLACK	R/W AND ERASE COMMON
	3	BLACK	ERASE HEAD
	2	KEY	N/C
	1	BLACK	READ/WRITE HEAD
	5	BLACK	READ/WRITE HEAD
P1/P3	4	BLACK	R/W AND ERASE COMMON
	3	BLACK	ERASE HEAD
	2	KEY	N/C
	1	BLACK	READ/WRITE HEAD
	5	BLACK	READ/WRITE HEAD
	4	BLACK	R/W AND ERASE COMMON
	3	BLACK	ERASE HEAD
	2	KEY	N/C
CONNECTOR	1	BLACK	READ/WRITE HEAD
	2	KEY	N/C
	3	BLACK	ERASE HEAD
	4	BLACK	R/W AND ERASE COMMON
	5	BLACK	READ/WRITE HEAD
	6	WHITE	LED, ANODE
	7	BLACK	STEPPER PHASE B
	8	WHITE	LED, CATHODE

PARTS LIST

825003901 Microp. Safari Drive 8050

825003902 Microp. Safari Drive 8250

- ① 31424001 MSA DOOR ASSEMBLY
1-Door w/Door Plate & Spring
- ② 31424101 MSA HUB ASSEMBLY
1-Top Housing w/Hub
2-Write Protect & Micro Switch Assy.
- ③ 31424201 MSA FRONT BEZEL

31424301 MSA 8050 R/W HEAD ASSY.
1-R/W Head w/Harness
2-Load Arm w/Pad

31424401 MSA 8250 R/W HEAD ASSY.
1-Up/Low R/W Head w/Harness
- ④ 31424501 MSA STEPPER MOTOR ASSY.
1-Stepper Motor w/Harness
- ⑤ 31417001 MIC/MSA TACH MOTOR

31424601 MSA HOUSING/SPINDLE ASSY.
1-Housing Base
2-Spindle/Tach Assy.

31424701 MSA DRIVE BELT

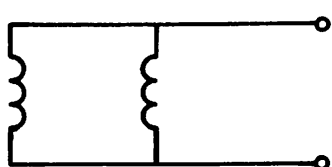
31424801 MSA HARDWARE
1-Assorted Screws
2-Assorted Springs

31417401 UNIV. Replacement Load Pad
- ⑥ 90382001 UNIV. LED Holder (2 pc.)

32086901 Drive 0 Label

32086902 Drive 1 Label

RESISTANCE CHECKS TANDON DRIVES

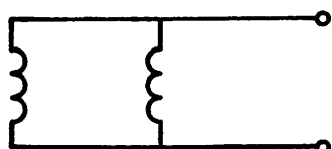


RED/YEL PIN 1

37 OHMS — PIN 1 TO PIN 2

BRN/ORG PIN 2

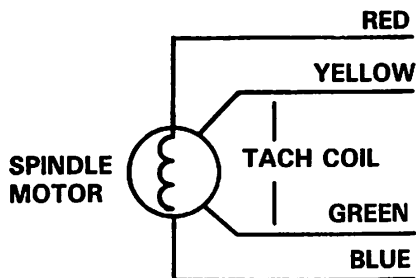
**STEPPER
MOTOR**



WHT/GRN PIN 3

37 OHMS — PIN 3 TO PIN 4

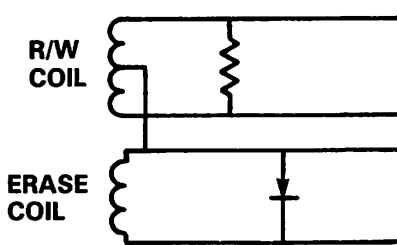
BLK/BLU PIN 4



MOTOR COIL = 137 OHMS

TACH COIL = 177 OHMS AT REST

TACH COIL = 160 – 195 OHMS IN MOTION



WHITE PIN 4

R/W END TO END = 23 OHMS

BLACK PIN 2
YELLOW PIN 3

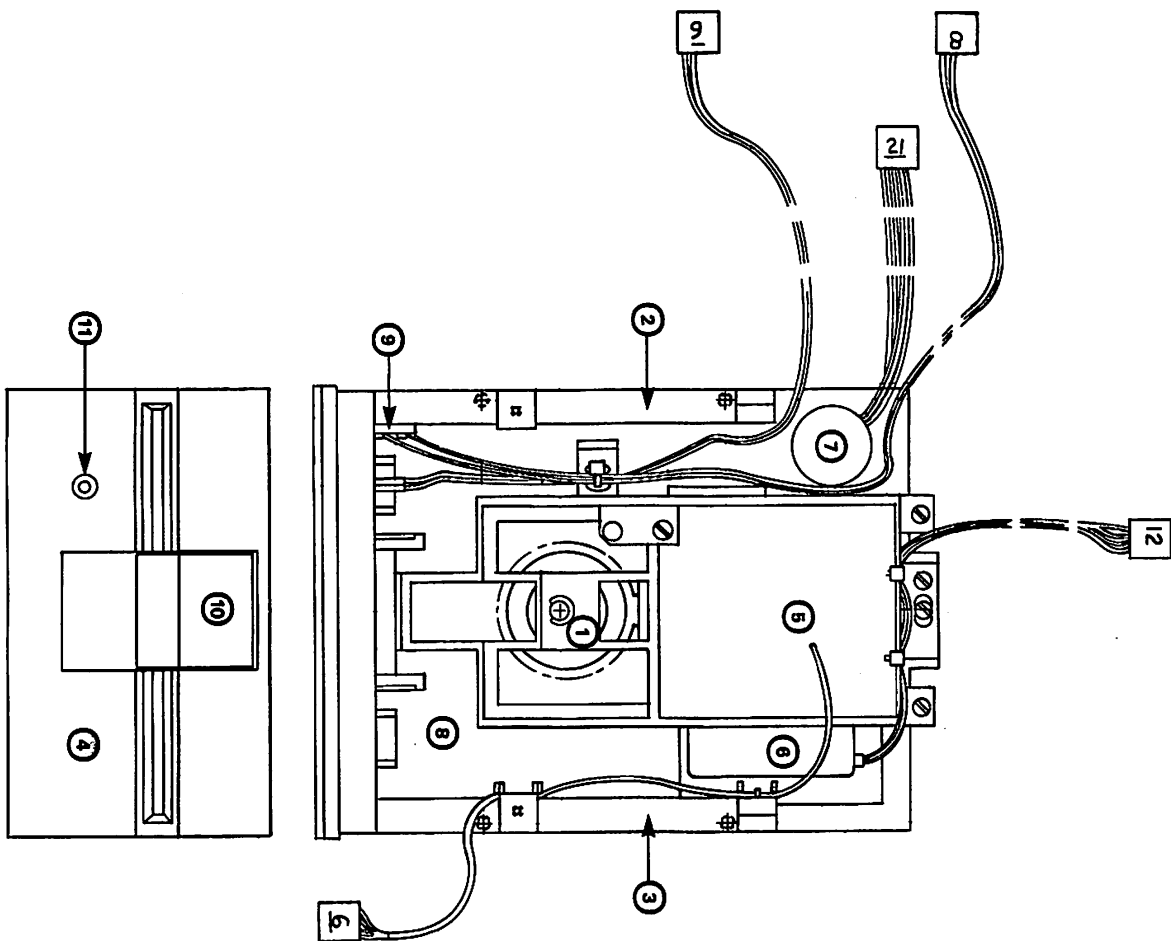
R/W END TO CENTERTAP = 11 OHMS

ERASE COIL END TO END = 1.07 OHMS

RED PIN 1

**ALL MEASUREMENTS MADE AT THE APPROPRIATE CONNECTION WHEN DISCONNECTED
FROM THE ANALOG PCB.**

TANDON DRIVE ASSEMBLIES **8050/8250**



P8	1	WHITE	WRITE PROTECT SWITCH NORMAL CLOSED
	2	WHITE	WRITE PROTECT SWITCH COMMON
	3	NC	-
	4	NC	-
P9	1	WHITE	ACTIVITY LED CATHODE
	2	WHITE	ACTIVITY LED ANODES
	3	NC	-
	4	NC	-
P12	1	RED	STEPPER MOTOR
	2	BROWN	STEPPER MOTOR
	3	GREEN	STEPPER MOTOR
	4	BLACK	STEPPER MOTOR
P21	1	YELLOW	TACHOMETER OUTPUT
	2	GREEN	TACHOMETER RETURN
	3	RED	MOTOR DRIVE
	4	BLUE	MOTOR RETURN
P8	1	RED	ERASE
	2	BLACK	READ/WRITE
	3	BLUE/YELLOW	CENTER TAPE/ERASE (2 WIRES)
	4	WHITE	READ/WRITE
CONN. NO.	5	BRAID	SHIELD
	6	WIRE COLOR	WIRE DESTINATION

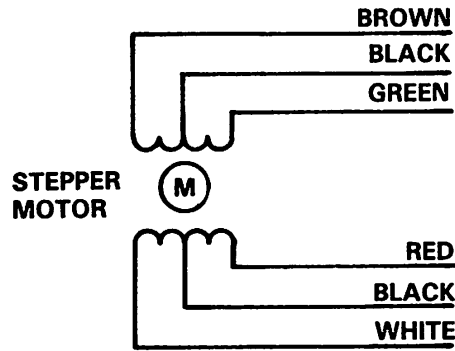
PARTS LIST

805004701 Tandon Drive 8050

825001501 Tandon Drive 8250

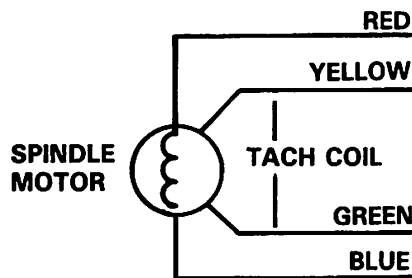
- ① 31419001 TAN DOOR/HUB ASSEMBLY
 - 1-Door Assy. w/Frame
 - 2-Hub/Collet Assy.
- ② 31419101 TAN LEFT DISK GUIDE
 - 1-Left Disk Guide w/Actuator
- ③ 31419201 TAN RIGHT DISK GUIDE
- ④ 31419301 TAN FRONT BEZEL
- ⑤ 31419401 TAN 8050 R/W HEAD ASSY.
 - 1-R/W Head w/Harness
 - 2-Load Arm w/Pad
- 31419501 TAN 8250 R/W HEAD ASSY.
 - 1-Up/Low R/W Head w/Harness
- ⑥ 31419601 TAN STEPPER MOTOR
 - 1-Stepper Motor w/Harness
- ⑦ 31419701 TAN DC MOTOR
- ⑧ 31419801 TAN HOUSING/SPINDLE ASSY.
 - 1-Housing Base
 - 2-Spindle/Tach Assy.
 - 3-L/R Guide Shafts
- 31419901 TAN DRIVE BELT
- 31420001 TAN HARDWARE
 - 1-Assorted Screws
 - 2-Assorted Springs, Etc.
- ⑨ 31420101 TAN WRITE PROTECT ASSY.
 - 1-Write Protect Switch w/Harness
 - 2-LED Indicator w/Harness
- ⑩ 31420201 TAN DOOR
- 31417401 UNIV. Replacement Load Pad
- ⑪ 90382001 UNIV. LED Holder (2 pc.)
- 32086901 Drive 0 Label
- 32086902 Drive 1 Label

RESISTANCE CHECKS MPI DRIVES



75 OHMS END TO CENTERTAP

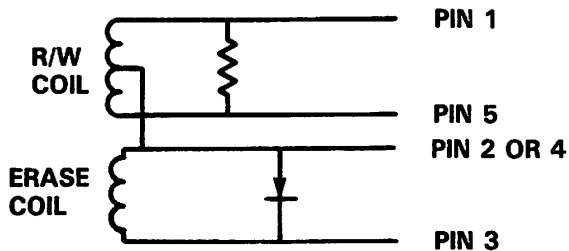
151 OHMS END TO END



MOTOR COIL = 92 OHMS

TACH COIL = 180 OHMS AT REST

TACH COIL = 135 - 195 OHMS IN MOTION

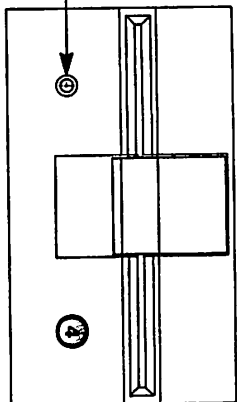


R/W END TO END = 28 OHMS

R/W END TO CENTERTAP = 14 OHMS

ERASE COIL END TO END = .08 OHMS

ALL MEASUREMENTS MADE AT THE APPROPRIATE CONNECTION WHEN DISCONNECTED FROM THE ANALOG PCB.



P4	5	NOTE*	HEAD 1 (UPPER),	RAW HEAD
	6	GRN/SHIELD,	SHIELD, CENTER TAP, COMMON	
	3	RED,	BASE HEAD	
	2	N/C	-	
P4	1	NOTE*	HEAD 1 (UPPER),	RAW HEAD
P3	5	NOTE*	HEAD 0 (LOWER),	RAW HEAD
	4	GRN/SHIELD,	SHIELD CENTER TAP, COMMON	
	3	RED,	BASE HEAD	
	2	N/C	-	
P3	1	NOTE*	HEAD 0 (LOWER),	RAW HEAD
P5	1	BLUE	DRIVE MOTOR RETURN	
	2	YEL	TACHOMETER	
	3	GRN	TACHOMETER	
	4	RED	DRIVE MOTOR, +12V	
	5	RED	(P3-1) WRITE PROTECT SWITCH, AMPUTER	
	6	BLK	(P3-2) WRITE PROTECT SWITCH, COMMON	
	7	BLK	DOOR SWITCH, NORMAL OPEN	
	8	RED	DOOR SWITCH, COMMON	
	9	WHT	STEPPER MOTOR, PHASE D	
	10	RED	STEPPER MOTOR, PHASE B	
	11	N/C	-	
	12	N/C	-	
	13	BLK	STEPPER MOTOR, +12V	
	14	N/C	-	
	15	GRN	STEPPER MOTOR, PHASE C	
P6	16	BRN	STEPPER MOTOR, PHASE A	
P3	2	BLK	(P6-6) WRITE PROTECT SWITCH, COMMON	
P3	1	RED	(P6-6) WRITE PROTECT SWITCH, AMPUTER	
P1	4	BLK	WR PROTECT, LED, CATHODE	
	3	BLK	TRANSISTOR, EMITTER	
	2	RED	TRANSISTOR, COLLECTOR	
P1	1	WHTZ	LED, ANODE	
NO LABEL	2	GRN	DRIVE LED, ANODE	
NO LABEL	1	BLK	DRIVE LED, CATHODE	
CONNECTOR	PPQ NO.	WIRE COLOR	WIRE DESTINATION	

DRIVE 1 WIRING

PARTS LIST

805005901 Drv0 MPI Drive 8050*
805005902 Drv1 MPI Drive 8050*

825002901 Drv0 MPI Drive 8250*
825002902 Drv1 MPI Drive 8250*

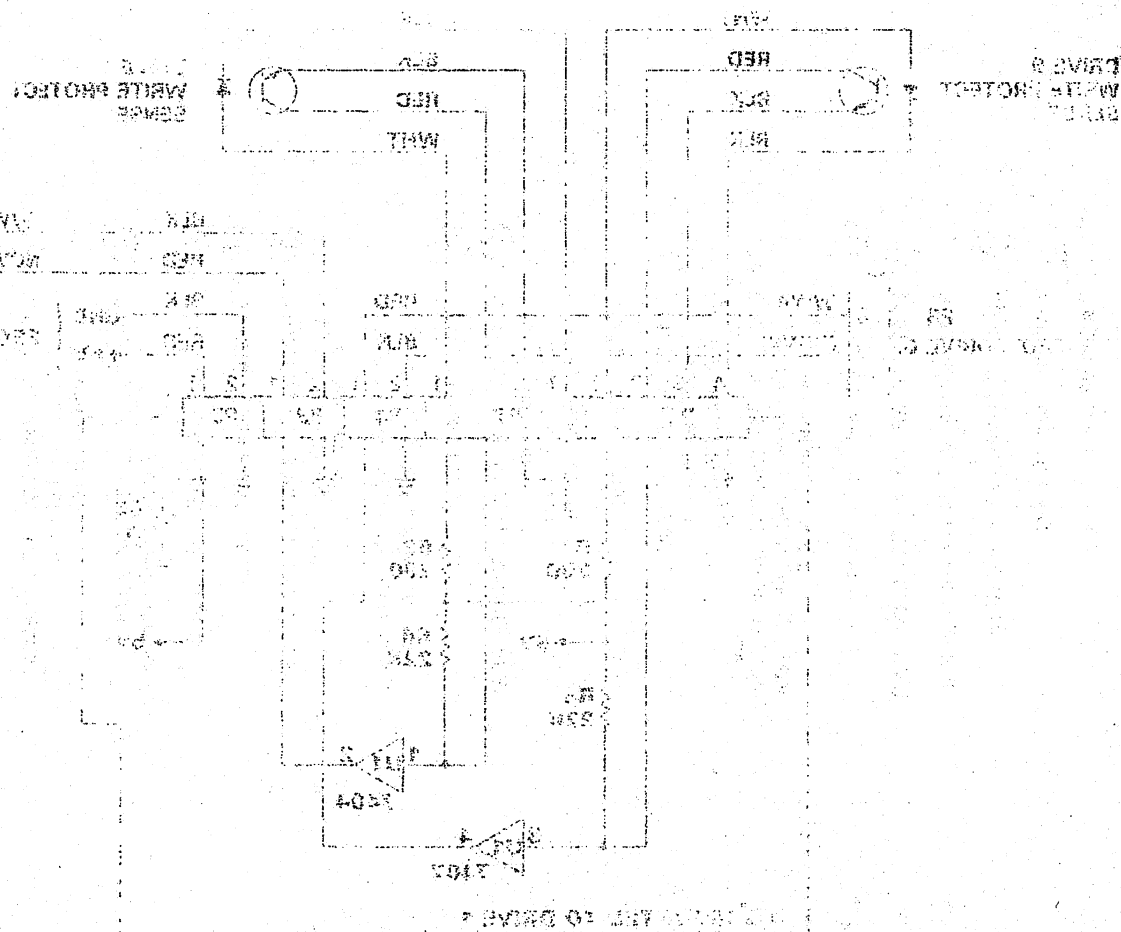
***NOTE:** Drv0 and Drv1 parts are interchangeable.
Separate part numbers are required for complete drives due to the manner in which the wiring harnesses are assembled.

- ① 31421501 MPI DOOR/HUB ASSEMBLY
 - 1-Door Assy. w/Frame
 - 2-Hub/Collect Assy.
- ② 31421601 MPI LEFT DISK GUIDE
 - 1-Left Disk Guide w/Write Protect Assy.
- ③ 31421701 MPI RIGHT DISK GUIDE
- ④ 31421801 MPI FRONT BEZEL
- ⑤ 31421901 MPI 8050 R/W HEAD ASSY.
 - 1-R/W Head w/Harness
 - 2-Load Arm w/Pad

31422001 MPI 8250 R/W HEAD ASSY.
1-Up/Low R/W Head w/Harness
- ⑥ 31422201 MPI DC MOTOR
- ⑦ 31422301 MPI HOUSING/SPINDLE ASSY.
 - 1-Housing Base
 - 2-Spindle/Tach Assy.
 - 3-L/R Guide Shafts

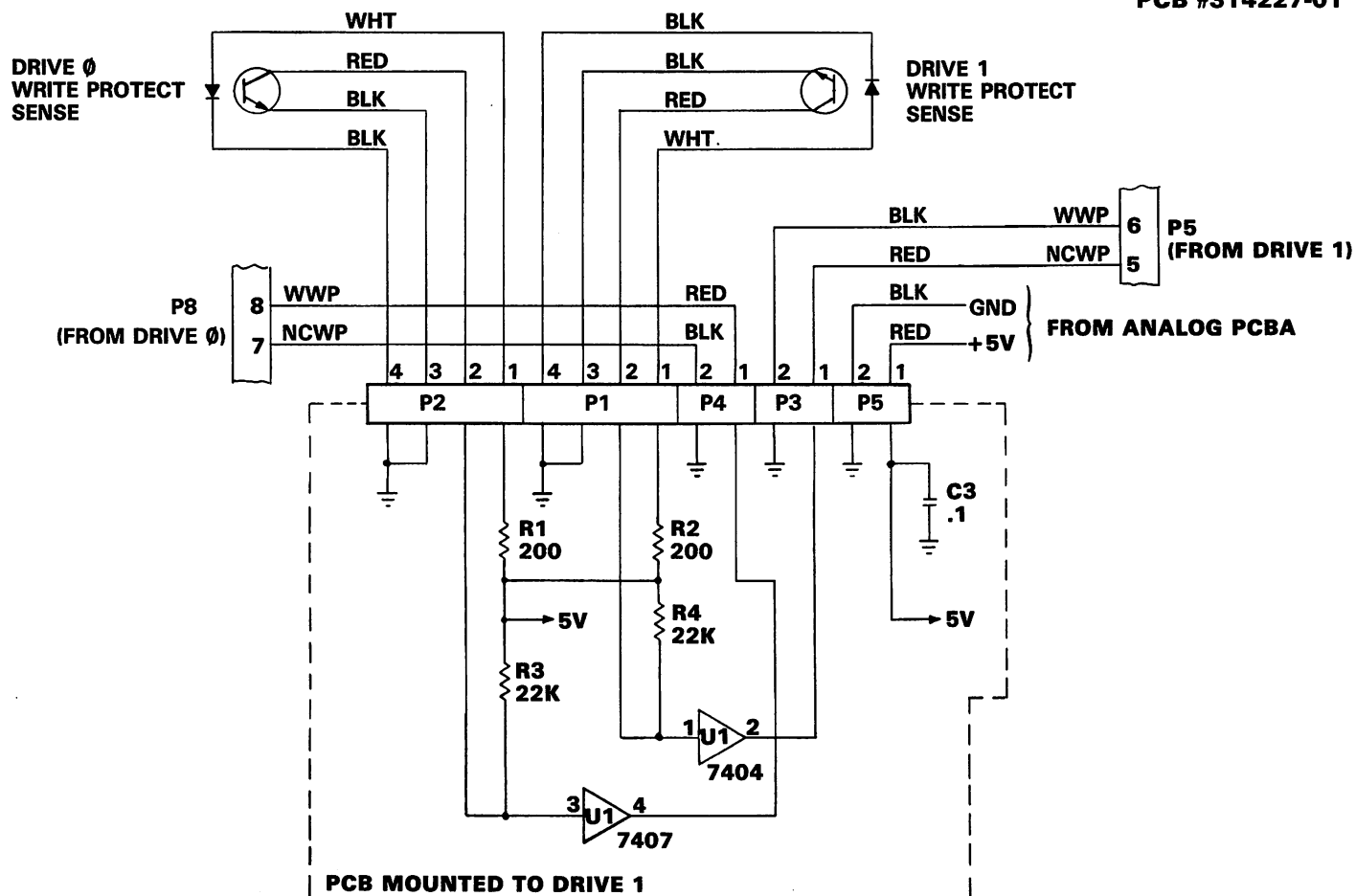
31422401 MPI DRIVE BELT

31422501 MPI HARDWARE
 - 1-Assorted Screws
 - 2-Assorted Springs, Etc.
- ⑧ 31422601 MPI SWITCH/HARNESS ASSY.
 - 1-Door Sensor Switch w/Mtg Bracket
 - 2-Wiring Harness W/P & LED
- ⑨ 31422701 MPI W/P Servo PCB Drv1
- 31422801 MPI Analog PCB Bracket Drv0
- 31417401 UNIV. Replacement Load Pad
- ⑩ 90382001 UNIV. LED Holder (2 pc.)
- 32086901 Drive 0 Label
- 32086902 Drive 1 Label

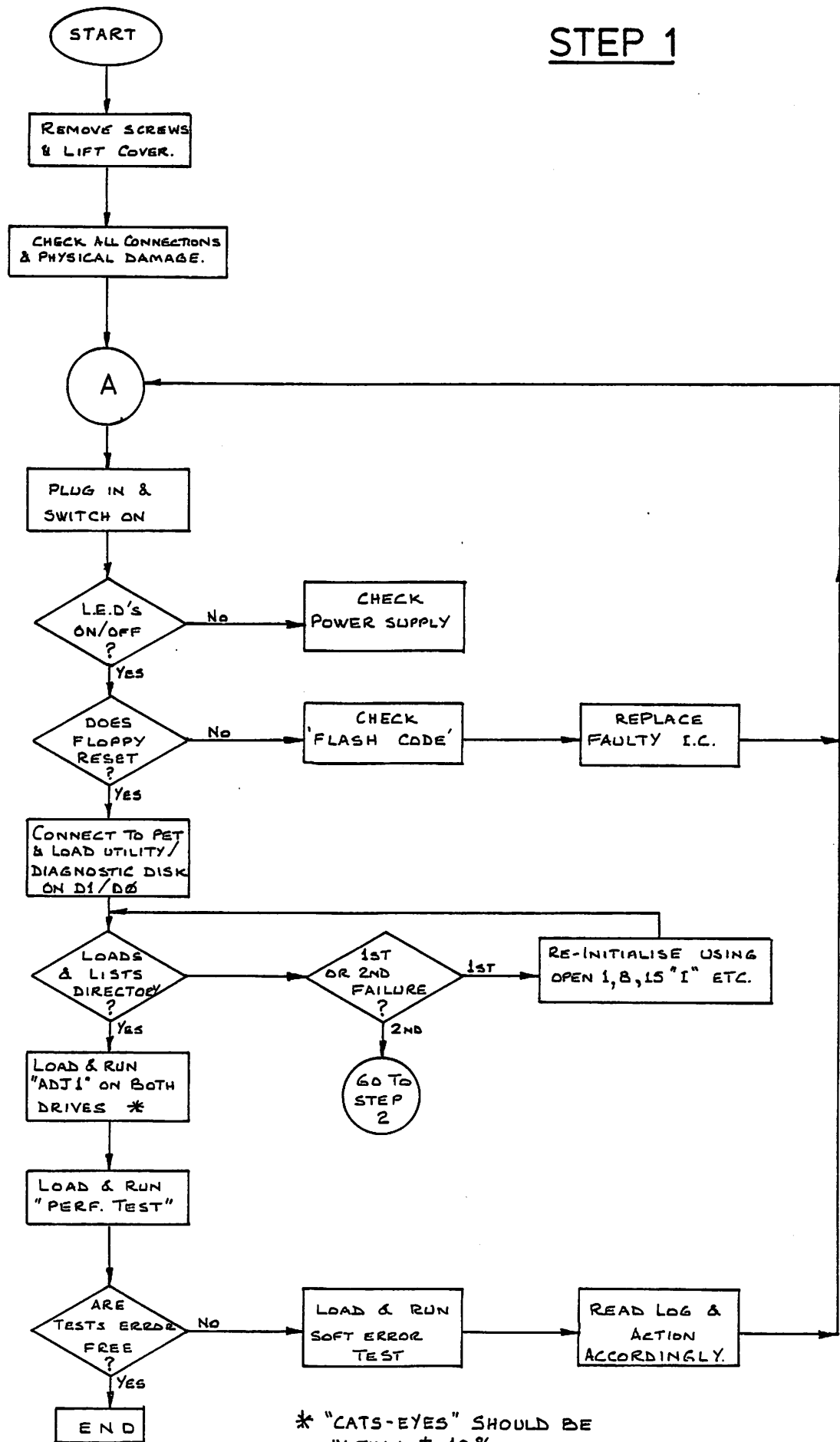


200

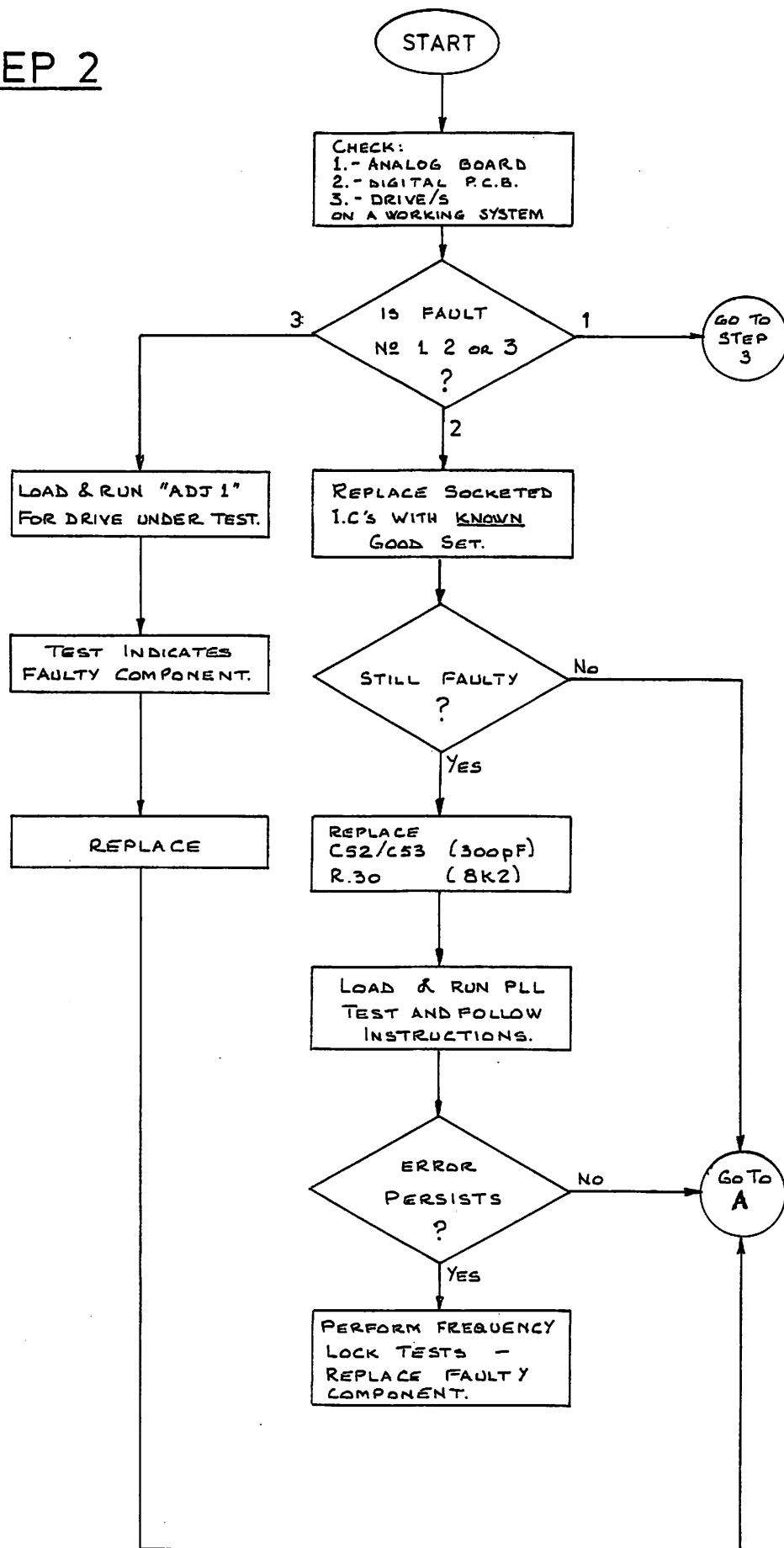
SCHEMATIC MPI SERVO PCB #314227-01



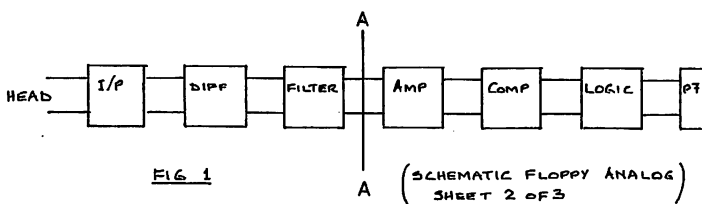
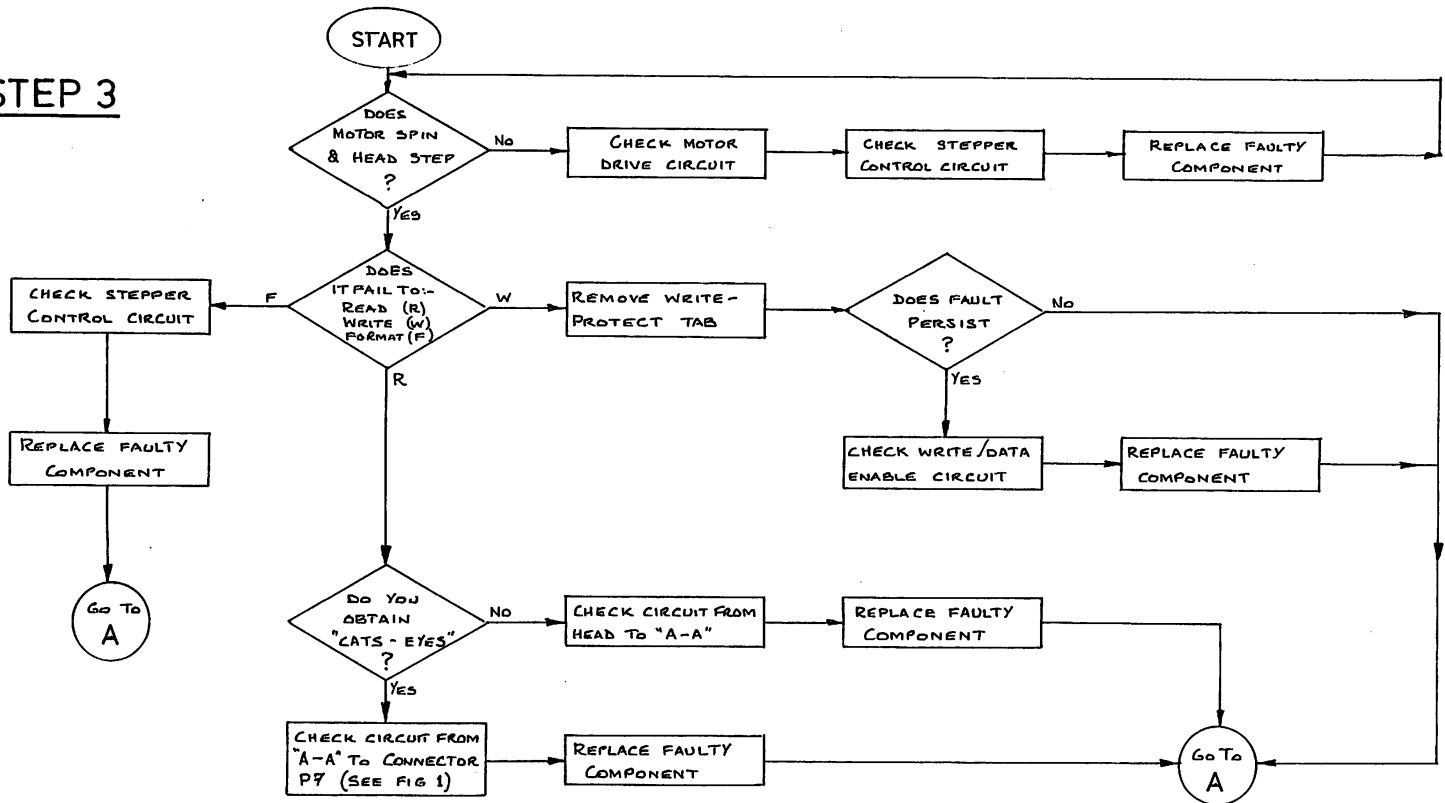
STEP 1



STEP 2



STEP 3



Note: Applies to 8050M & 8050T Dual floppy disk.

Assumes good media, IEEE ~ PET cable & working PET.