

**SERVICE MANUAL
DATASETTE
MODEL C2N/1530/1531**

Preliminary

OCT. 1984 PN-314002-02

 **commodore**
COMPUTERS

**SERVICE MANUAL
DATASETTE
MODEL C2N/1530/1531**

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OCT. 1984 PN-314002-02

The Commodore Datasette has undergone many changes both in physical appearance and electronic circuitry. This preliminary package is an attempt to cover as many different versions as possible. If you need information for a version of Commodore Datasette not covered, please write to Service Documentation, Box C-2654, West Chester, PA 19380. Be sure to include an accurate description of the datasette in need of repair.

Commodore Business Machines, Inc.

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CONTENTS

Title	Page
SPECIFICATIONS	1
DATASETTE OVERVIEW	1
COMMODORE PARTS LIST	2
TROUBLESHOOTING FLOW CHART	
TAPE DOES NOT RUN	3
DOES NOT LOAD	4
DOES NOT SAVE	5
DOES NOT AUTO STOP	6
DOES NOT LIGHT	6
PCB ASSEMBLY #320009	
BOARD LAYOUT	7
PARTS LIST AND SCHEMATIC	8
PCB ASSEMBLY #320109	
BOARD LAYOUT	9
PARTS LIST AND SCHEMATIC	10
PCB ASSEMBLY #320275	
BOARD LAYOUT	11
PARTS LIST AND SCHEMATIC	12
PCB ASSEMBLY #CMR-001-0	
BOARD LAYOUT	13
WIRING DIAGRAM	14
PARTS LIST AND SCHEMATIC	15
PCB ASSEMBLY #NP-090	
WIRING DIAGRAM	16
PARTS LIST AND SCHEMATIC	17
PCB ASSEMBLY #017-5001-01	
BOARD LAYOUT	18
WIRING DIAGRAM	19
PARTS LIST AND SCHEMATIC	20

SPECIFICATIONS

SPEED

300 baud throughput, programs saved twice for internal error checking, check-summing for data files.

CONTROLS

Keys for play, record, fast-forward, rewind, and stop. Sensor for software detection of key press. Counter for tape location.

FORMAT

Commodore propriety format using pulse-width modulation and square waves. Allows naming of programs and files, verification of programs, end of tape marker sensing.

TAPES

Uses standard audio cassette tapes. Digital tapes not required.

COMPATABILITY

C2N/1530 — VIC20, C64, PET Series Computer
1531 — PLUS 4, C16

DATASETTE OVERVIEW

The electronics of the datasette contains read/write circuits that replace the audio-type circuits in a standard audio tape recorder.

Status/Motor Control — When the play switch is depressed, a ground potential is applied to the cassette enable line of the microprocessor. It, in turn, signals the cassette drive motor through a transistor switch located on the main computer board. The cassette is then ready for read/write operation.

Write/Record Amplifier — The computer outputs a square wave signal to the datasette. These TTL logic-level shifts are converted by the pre-amplifier and power amplifier to a proportional current output. This current output is then applied to the read/write coil of the head. Through induction, magnetic fields are produced on the tape representing the data.

Read/Playback Amplifier — The read amplifier circuit takes the reproduced transition signals from the tape and converts them back to TTL logic-level shifts. This is accomplished by an amplifier limiter which removes the amplitude variations and a switching circuit that toggles the output data between 0 and 5 volts. The signal is then ready for output to the computer.

NOTE: We are unable to stock the numerous small parts of the various mechanisms that have been used in the Commodore Datasette. Therefore, references have been made throughout this document to the vendor names we have used as our suppliers. If you would like to have parts for these mechanisms, may we suggest you contact the vendors directly.

PARTS LIST

Parts that are available from Commodore at this printing:

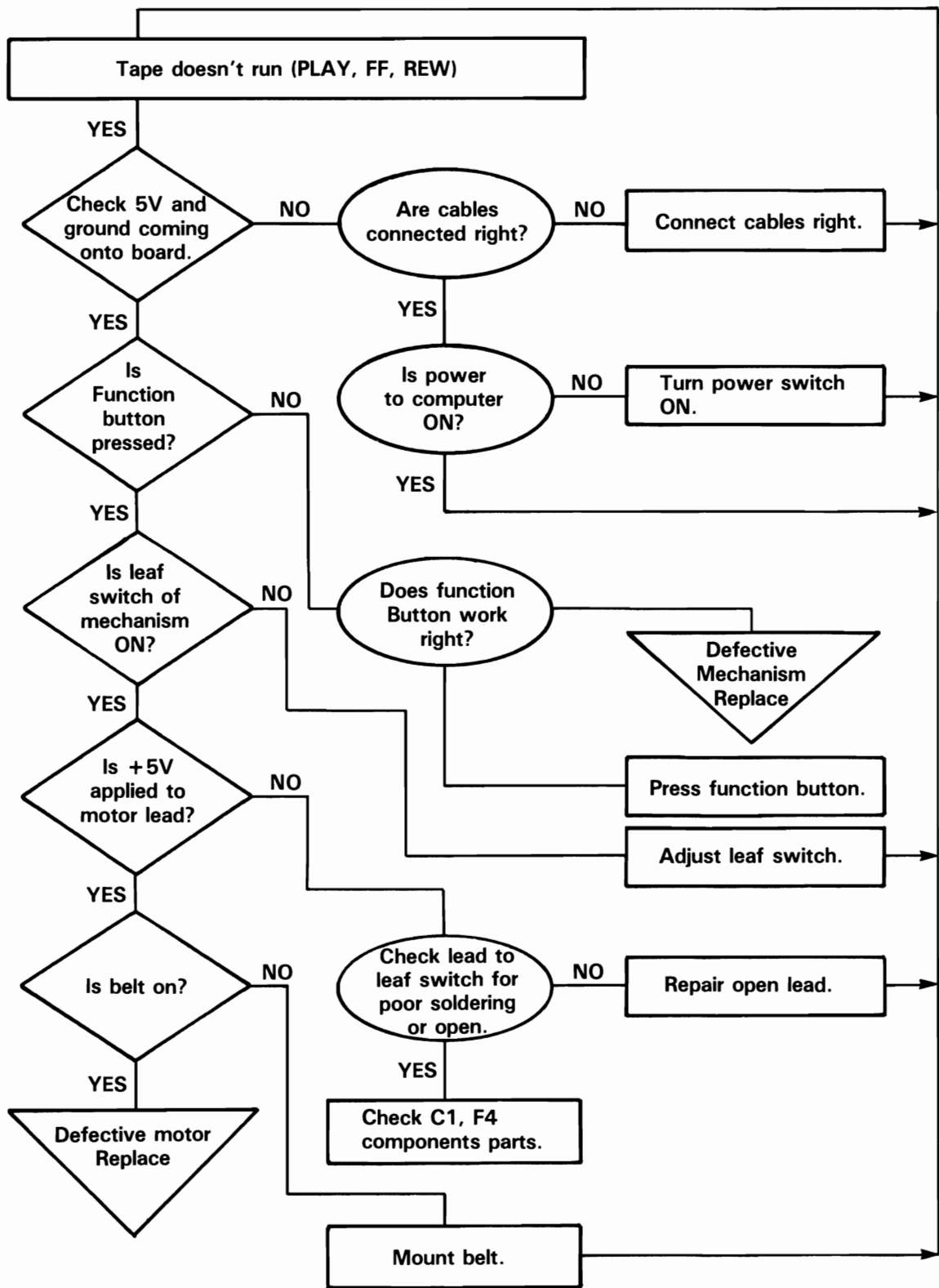
32004001	C2N/1530 I/O Harness Assembly
980040	C2N/1530 Case (2 piece) OLD style
980048	C2N/1530 Replacement PCB Assembly # 320275

Parts that will be available from Commodore — Call for Part Number, Price, Availability.

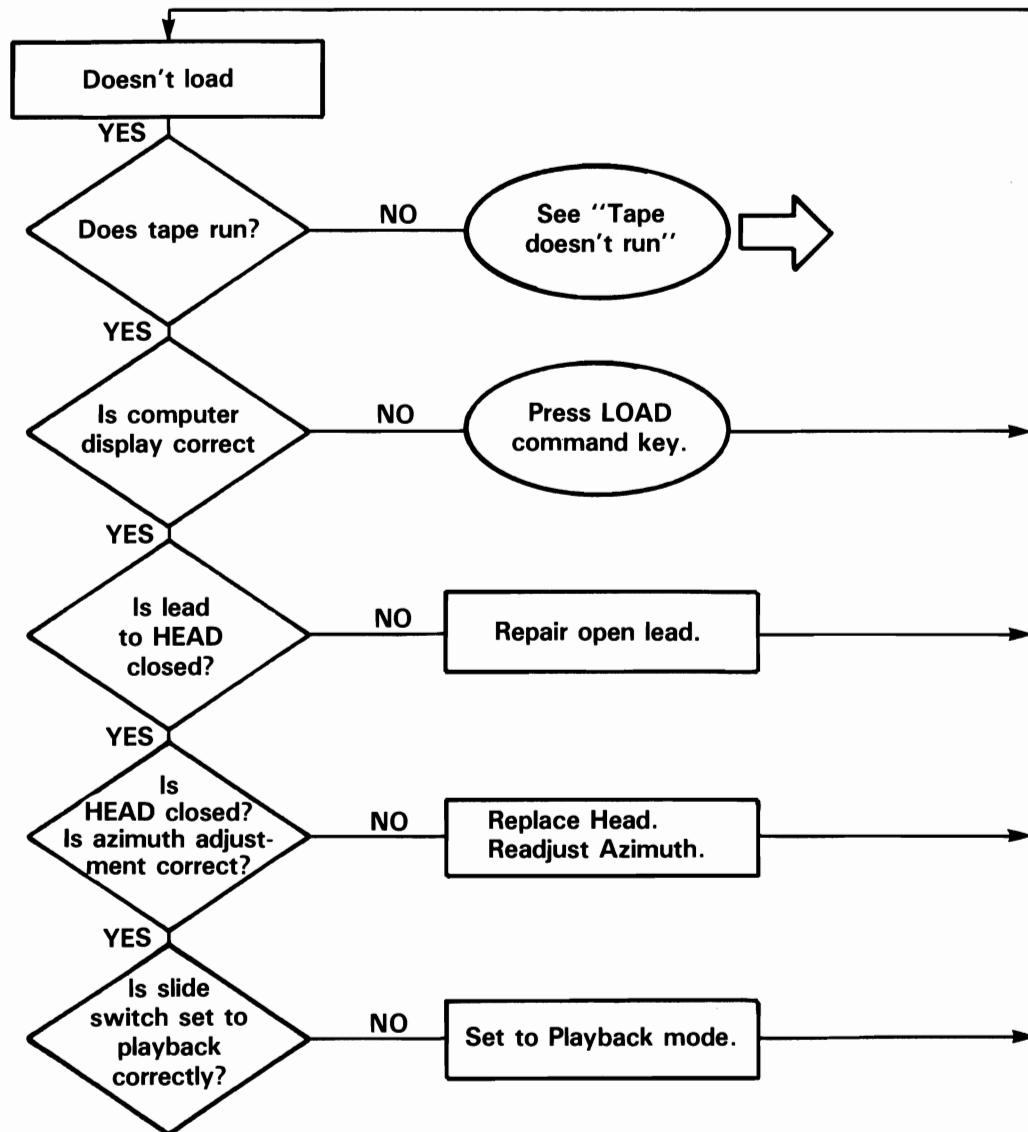
C2N/1530 Case (2 piece) NEW style
1531 Case (2 piece)
1531 I/O Harness Assembly

TROUBLESHOOTING

TAPE DOES NOT RUN



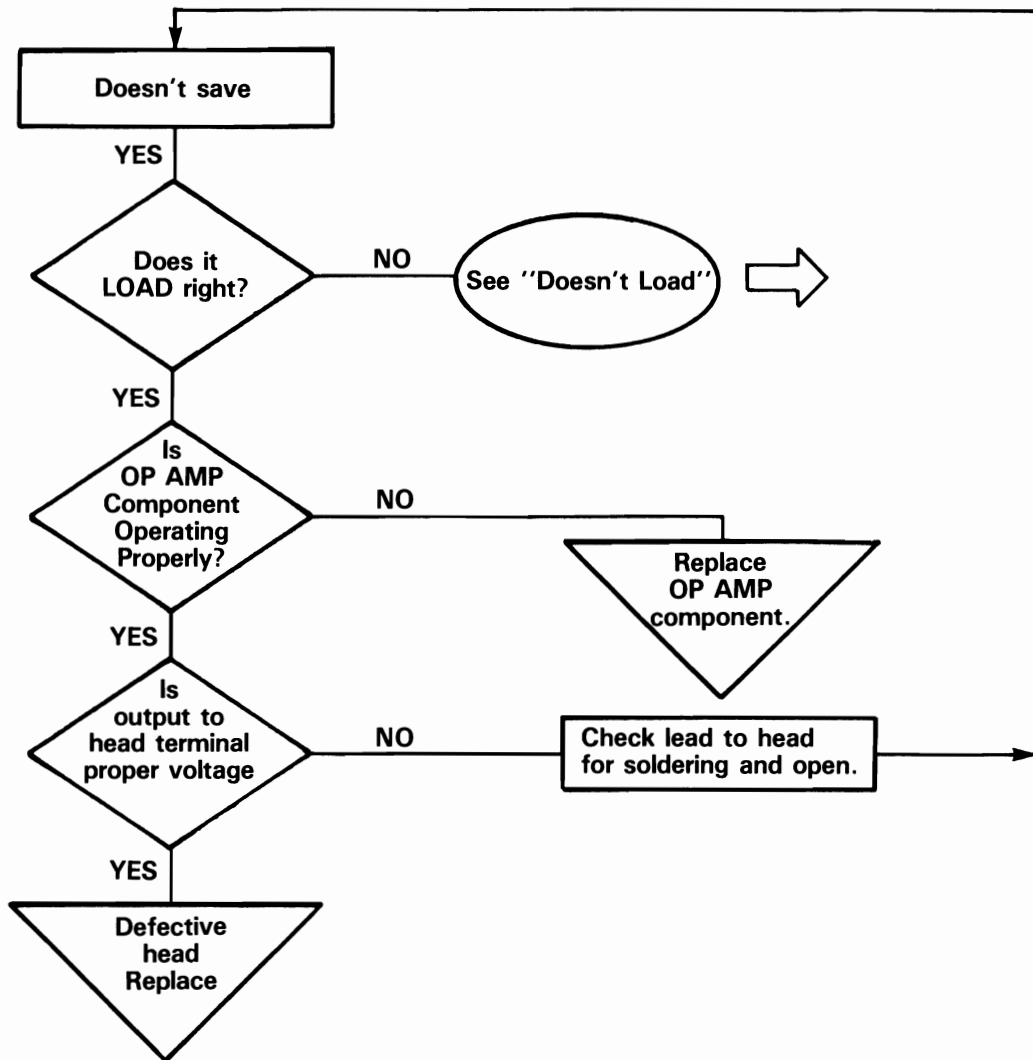
DOES NOT LOAD



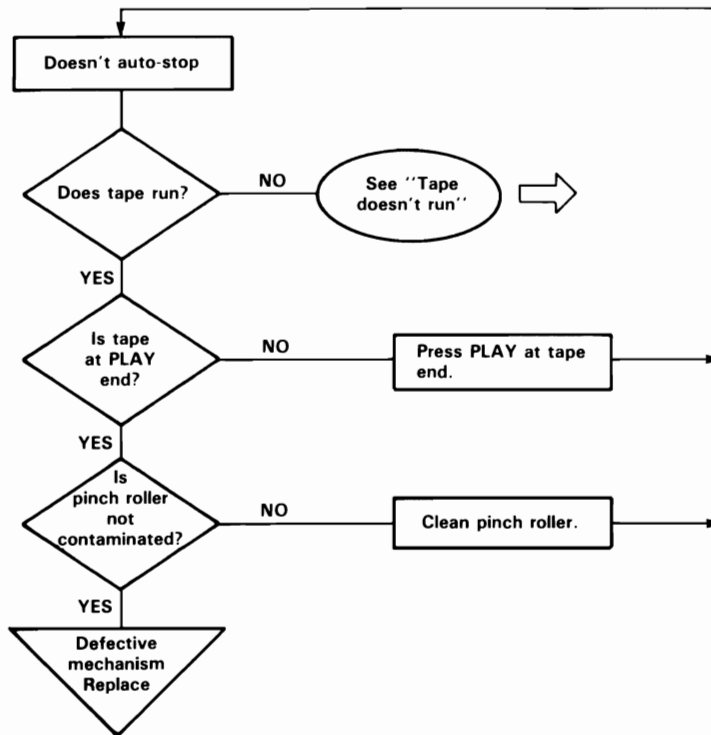
Due to the variety of Datasets in the field, it is not possible to develop a flowchart to cover all of the component failures that are possible. From this point it is suggested that you:

- 1) Check for proper head alignment
- 2) Check for proper operation of the semi-conductor components on the PCB assembly
- 3) Check component parts directly related to the proper operation of the I.C.'s and transistors in the circuit.
- 4) Check I/O cable to computer and proper operation of the computer.

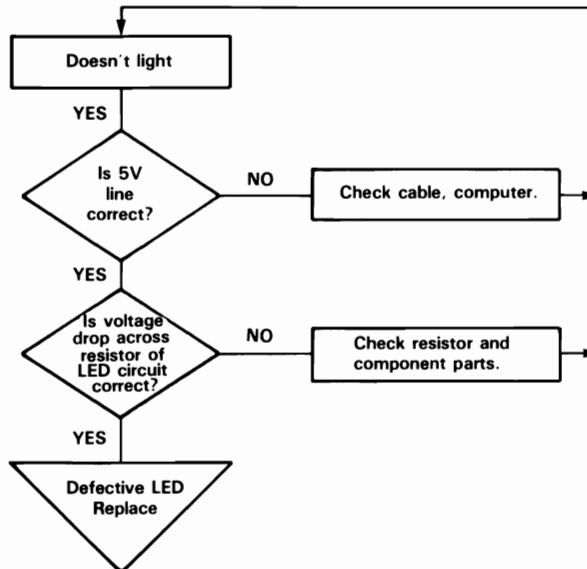
DOES NOT SAVE

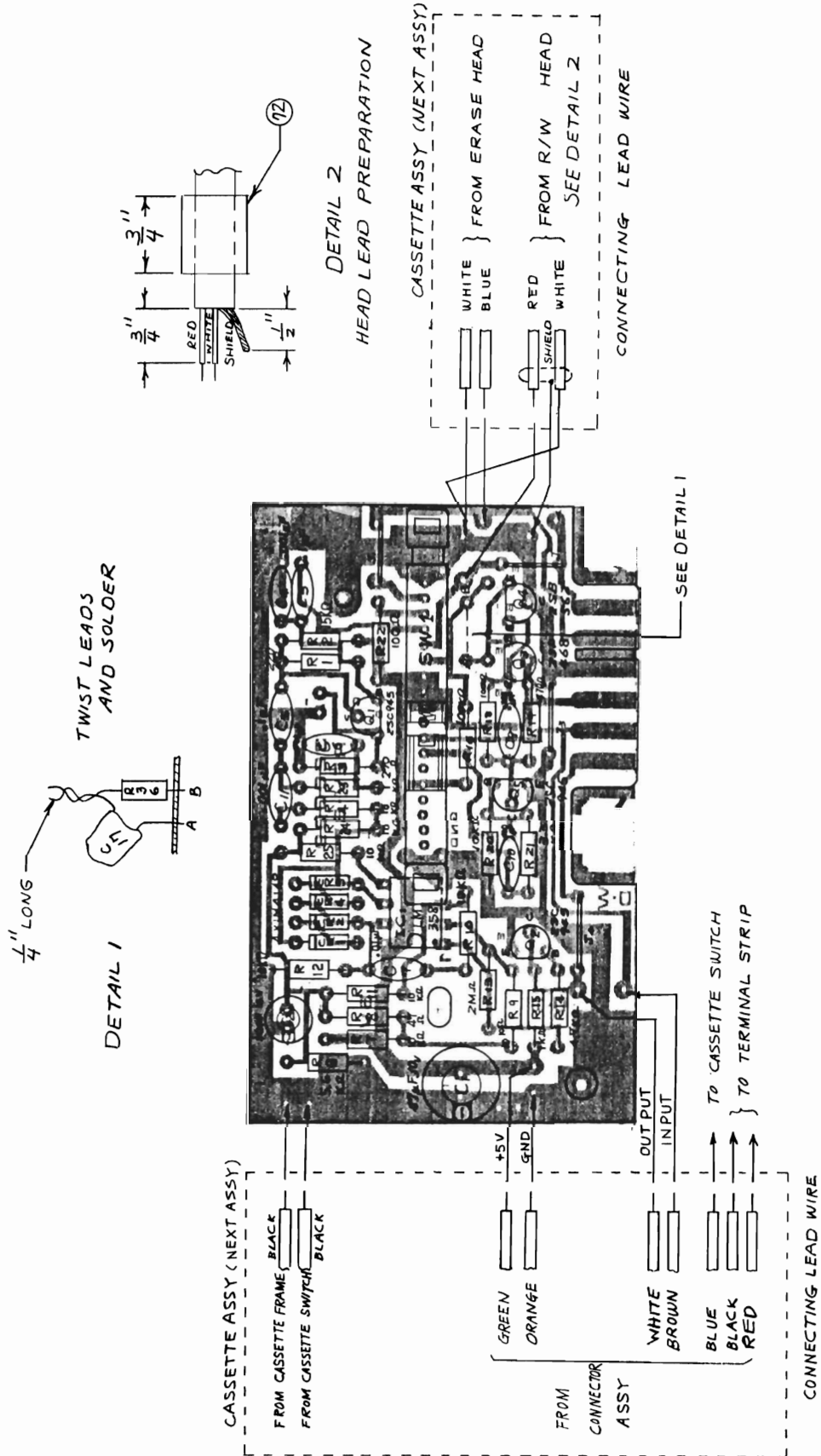


DOES NOT AUTO STOP



DOES NOT LIGHT

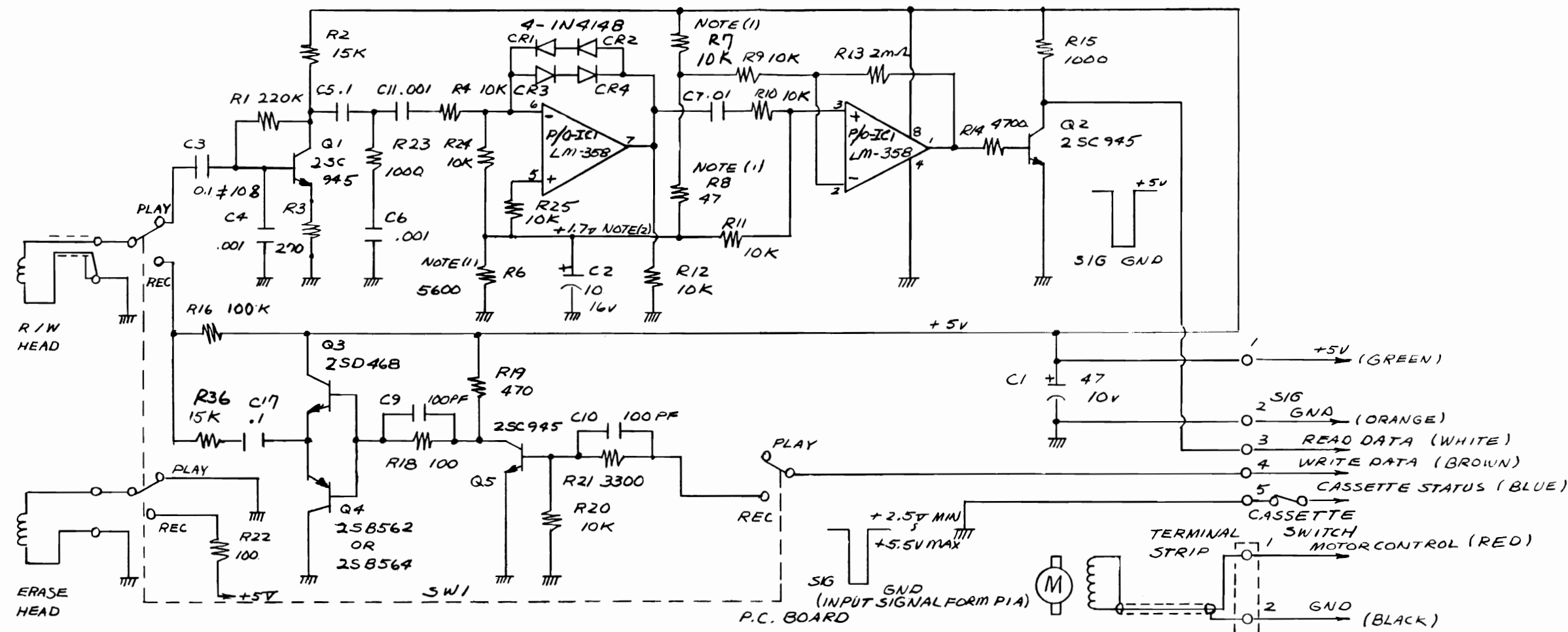




NOTE:
 1. R6, R7, R8 TOLERANCE $\pm 2\%$ RESISTORS

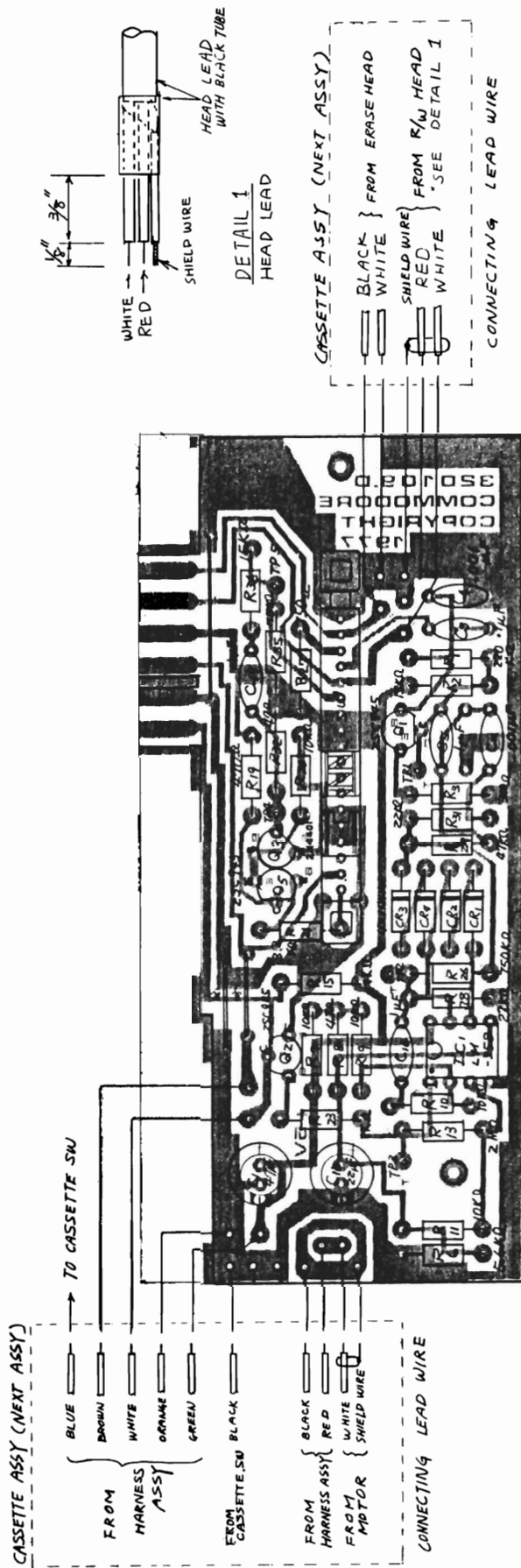
NOTE: DATASETTE PARTS ARE NOT AVAILABLE FROM COMMODORE — parts list is for cross reference only.

INTERGRATED CIRCUITS		RESISTORS (Continued)	
IC1	LM 358 (T.I.) Sub: NA 798 (Fairchild) Sub: LM 258 (T.I.)	R16	100K
TRANSISTORS		R18	100
		R19	470
Q1	NPN 2SC945 Sub: 2N3904	R20	10K
Q2	NPN 2SC945 Sub: 2N3904	R21	3.3K
Q3	NPN 2SD468 (H) Sub: 2SD471 (NEC)	R22	100
Q4	NPN 2SB562 (H) Sub: 2SB564 (NEC)	R23	1K
Q5	NPN 2SC945 Sub: 2N3904	R24	10K
DIODES		R25	10K
		R36	15K
RESISTORS — All values are in ohms-1/4 W 5% unless noted otherwise.		CAPACITORS	
CR1—CR4	IN4148	C1	Electrolytic 47 μ F 10V
R1	220K	C2	Electrolytic 10 μ F 10V
R2	15K	C3	Film .1 μ F 100V
R3	270	C4	Ceramic .001 μ F 50V
R4	10K	C5	Ceramic .1 μ F 16V
R6	5.6K 1/4w 2% (sub 1%)	C6	Ceramic .001 μ F 50V
R7	10K 1/4w 2% (sub 1%)	C7	Ceramic .01 μ F 50V
R8	47 1/4w 2% (sub 1%)	C9	Ceramic 100 pF 50V
R9	10K	C10	Ceramic 100 pF 50V
R10	10K	C11	Ceramic .001 μ F 50V
R11	10K	C17	Ceramic .1 μ F 16V
R12	10K	MISC.	
R13	2M	SW1	Slide Switch SEA-621
R14	4.7K		
R15	1K		



NOTES:

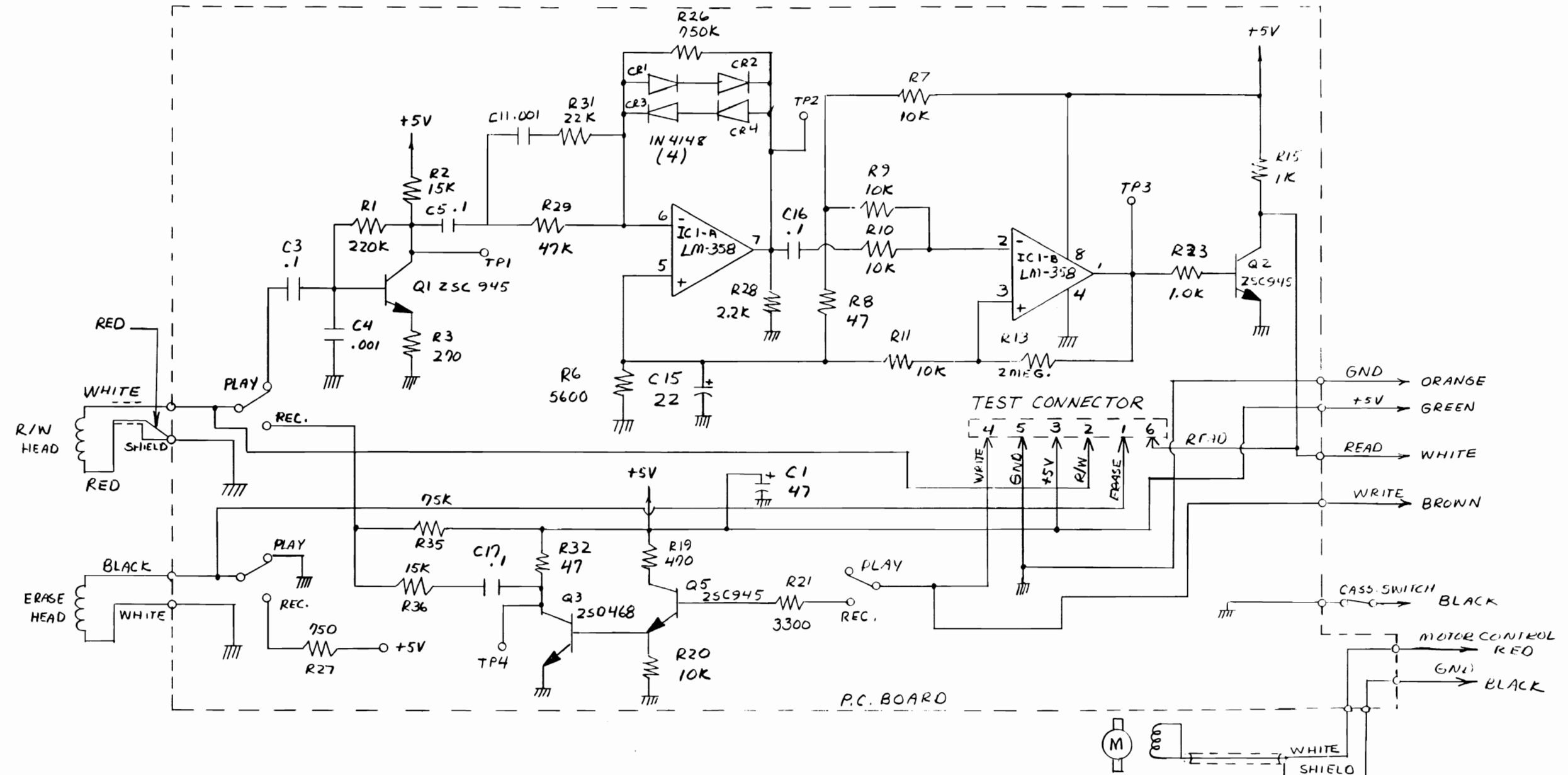
1. R6, R7, R8, $\pm 2\%$, 1/4 WATT.
2. THE BIAS SHOULD BE $+1.7 \pm 0.005V$ AT 5V POWER SUPPLY.
3. UNLESS OTHERWISE NOTED, 1/4 WATT CARBON FILM 5% WITH VALUES IN OHMS.
4. UNLESS OTHERWISE NOTED, ALL CAPACITOR VALUES IN MICRO FARADS.



- NOTES:**
1. R6, R7, R8 ± 2%, 1/4W RESISTOR
 2. ✕ MARK ARE JUMPER WIRES
 3. ALL CONNECTIONS TO COMPONENTS SIDE

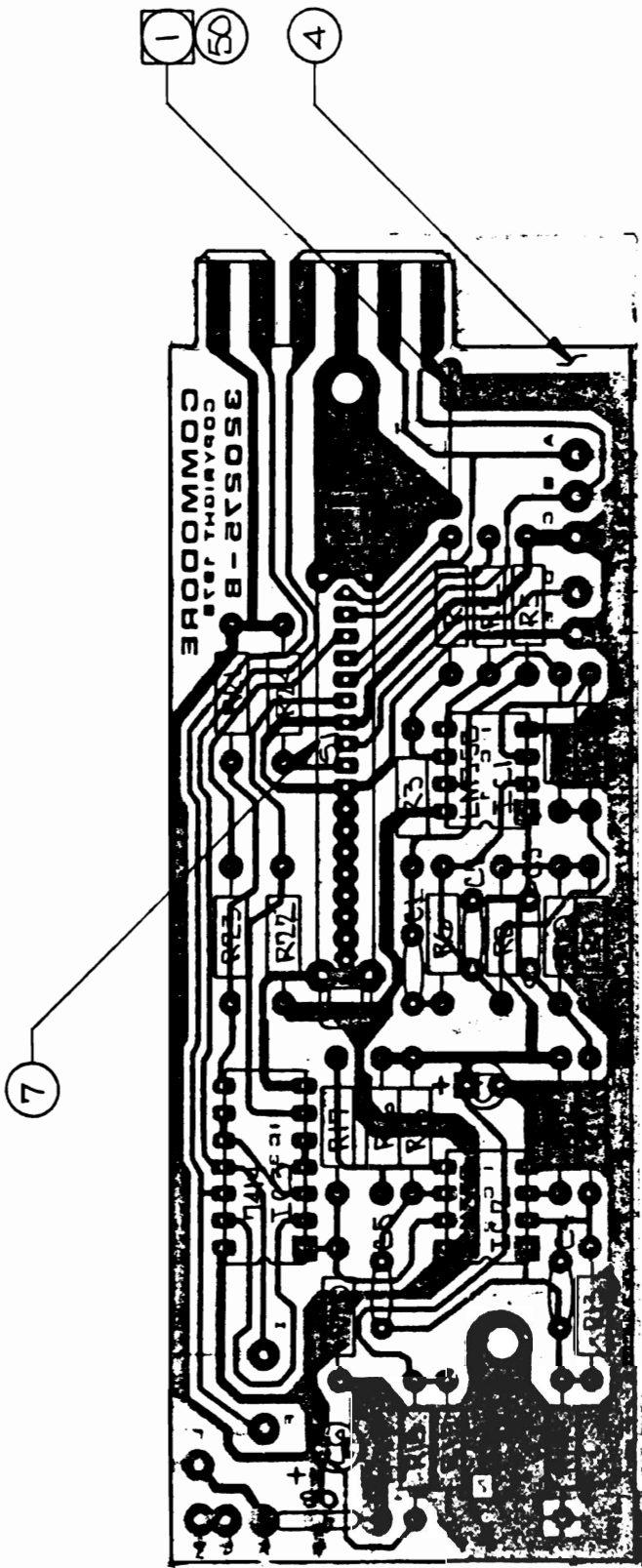
NOTE: DATASETTE PARTS ARE NOT AVAILABLE FROM COMMODORE — parts list is for cross reference only.

INTERGRATED CIRCUITS		RESISTORS (Continued)	
IC1	LM 358 (T.I.) Sub: NA 798 (Fairchild) Sub: LM 258 (T.I.)	R21	3.3K
TRANSISTORS		R22	100
Q1	NPN 2SC945 Sub: 2N3904	R23	1K
Q2	NPN 2SC945 Sub: 2N3904	R26	750K
Q3	NPN 2N4401	R27	750
Q5	NPN 2SC945 Sub: 2N3904	R28	2200
DIODES		R29	47K
CR1—CR4	IN4148	R31	22K
RESISTORS — All Values are in ohms-1/4 W 5% unless noted otherwise.		R32	47
R1	220K	R35	75K
R2	15K	R36	15K
R3	270	CAPACITORS	
R6	5.6K 1/4w 2% (sub 1%)	C1	Electrolytic 47 μ F 10V
R7	10K 1/4w 2% (sub 1%)	C3	Film .1 μ F 16V
R8	47 1/4w 2% (sub 1%)	C4	Ceramic .001 μ F 50V
R9	10K	C5	Ceramic .1 μ F 16V
R10	10K	C11	Ceramic .001 μ F 50V
R11	10K	C15	Electrolytic 22 μ F 10V
R13	2M	C16	Ceramic .1 μ F 16V
R15	1K	C17	Ceramic .1 μ F 16V
R19	470	MISC.	
R20	10K	SWI	Slide Switch SEA-621



NOTES:

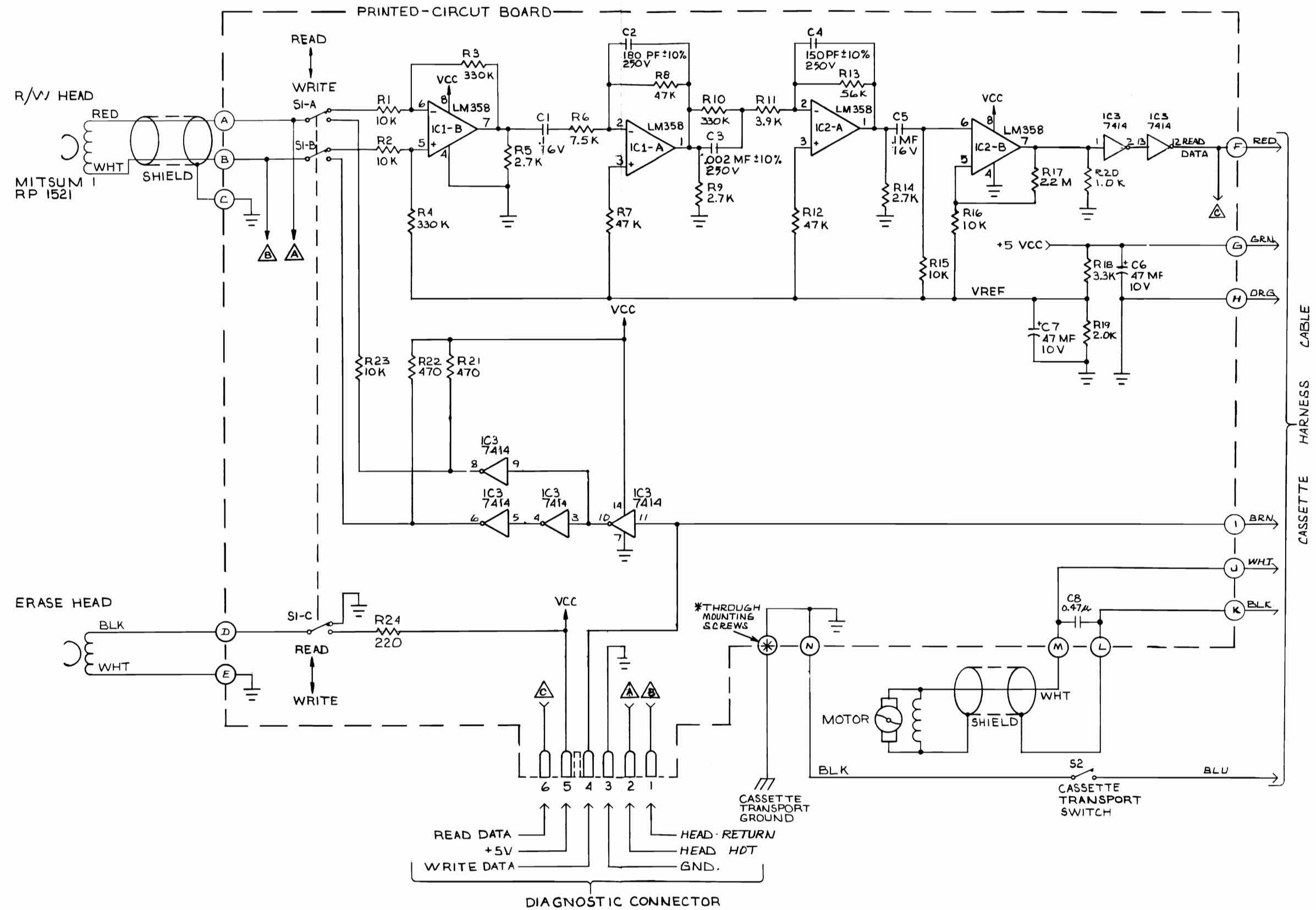
1. R6, R7, R8, $\pm 2\%$, 1/4 WATT.
2. THE BIAS SHOULD BE $+1.7 \pm 0.005V$ AT 5V POWER SUPPLY.
3. UNLESS OTHERWISE NOTED, 1/4 WATT CARBON FILM 5% WITH VALUES IN OHMS.
4. UNLESS OTHERWISE NOTED, ALL CAPACITOR VALUES IN MICRO FARADS.



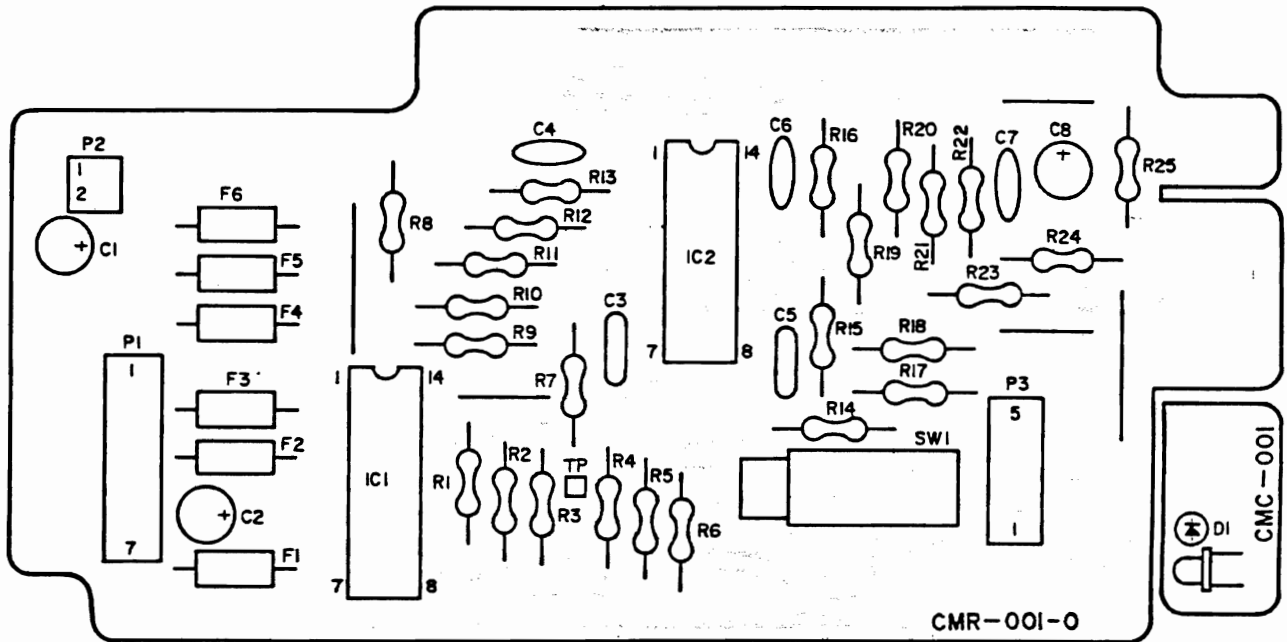
 SYMBOL INDICATES JUMPER WIRE.
NOTES: UNLESS OTHERWISE SPECIFIED

NOTE: DATASETTE PARTS ARE NOT AVAILABLE FROM COMMODORE — parts list is for cross reference only.

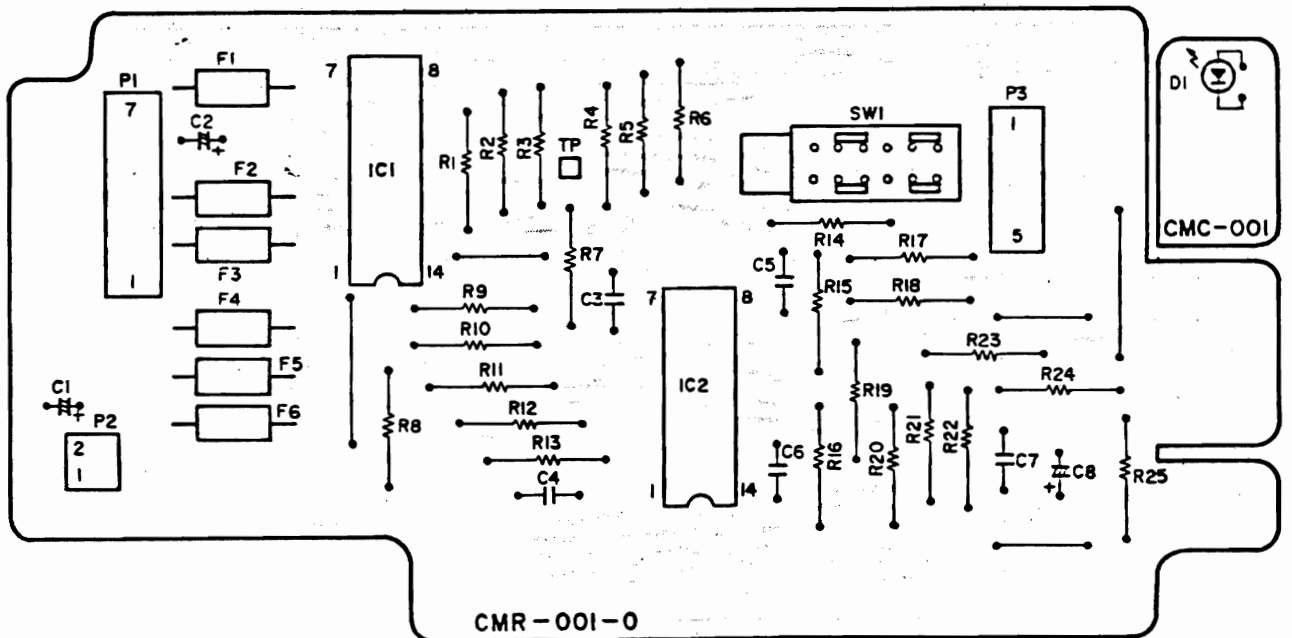
INTERGRATED CIRCUITS		RESISTORS (Continued)	
IC1	LM 358 (T.I.) Sub: NA798 (Fairchild) Sub: LM258 (T.I.)	R16	10K
IC2	LM 358 (T.I.) Sub: NA798 (Fairchild) Sub: LM 258 (T.I.)	R17	2.2M
IC3	7414 Hex Inverter	R18	3.3K
		R19	2K
		R20	1K
		R21	470
		R22	470
		R23	10K
		R24	220
RESISTORS — All Values are in ohms-1/4 W 5% unless noted otherwise.		CAPACITORS	
R1	10K	C1	Ceramic .1 μ F 16V
R2	10K	C2	Ceramic 180 pF 250V (+ -) 10%
R3	330K	C3	Ceramic .002 μ F 250V (+ -) 10%
R4	330K	C4	Ceramic .150 pF 250V (+ -) 10%
R5	2.7K	C5	Ceramic .1 μ F 16V
R6	7.5K	C6	Electrolytic 47 μ F 10V
R7	47K	C7	Electrolytic 47 μ F 10V
R8	47K	C8	Monolythic .47 μ F 50V
R9	2.7K		
R10	330K		
R11	3.9K		
R12	47K		
R13	56K		
R14	2.7K		
R15	10K		
MISC.			
SWI	Slide Switch SEA-621		



1. ALL RESISTANCE VALUES IN OHMS, 1/4W \pm 5%.
NOTES: UNLESS OTHERWISE SPECIFIED —

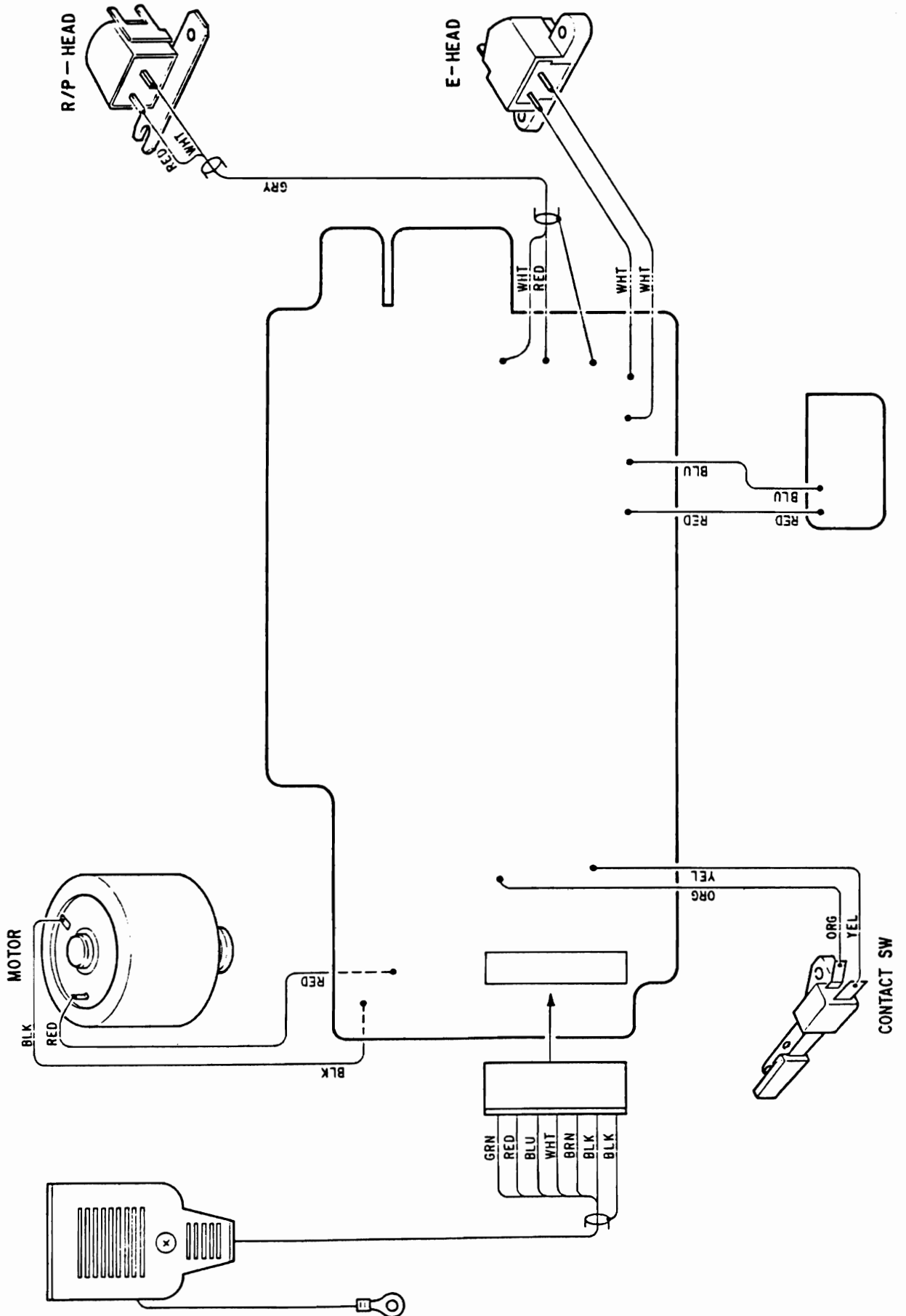


TOP VIEW



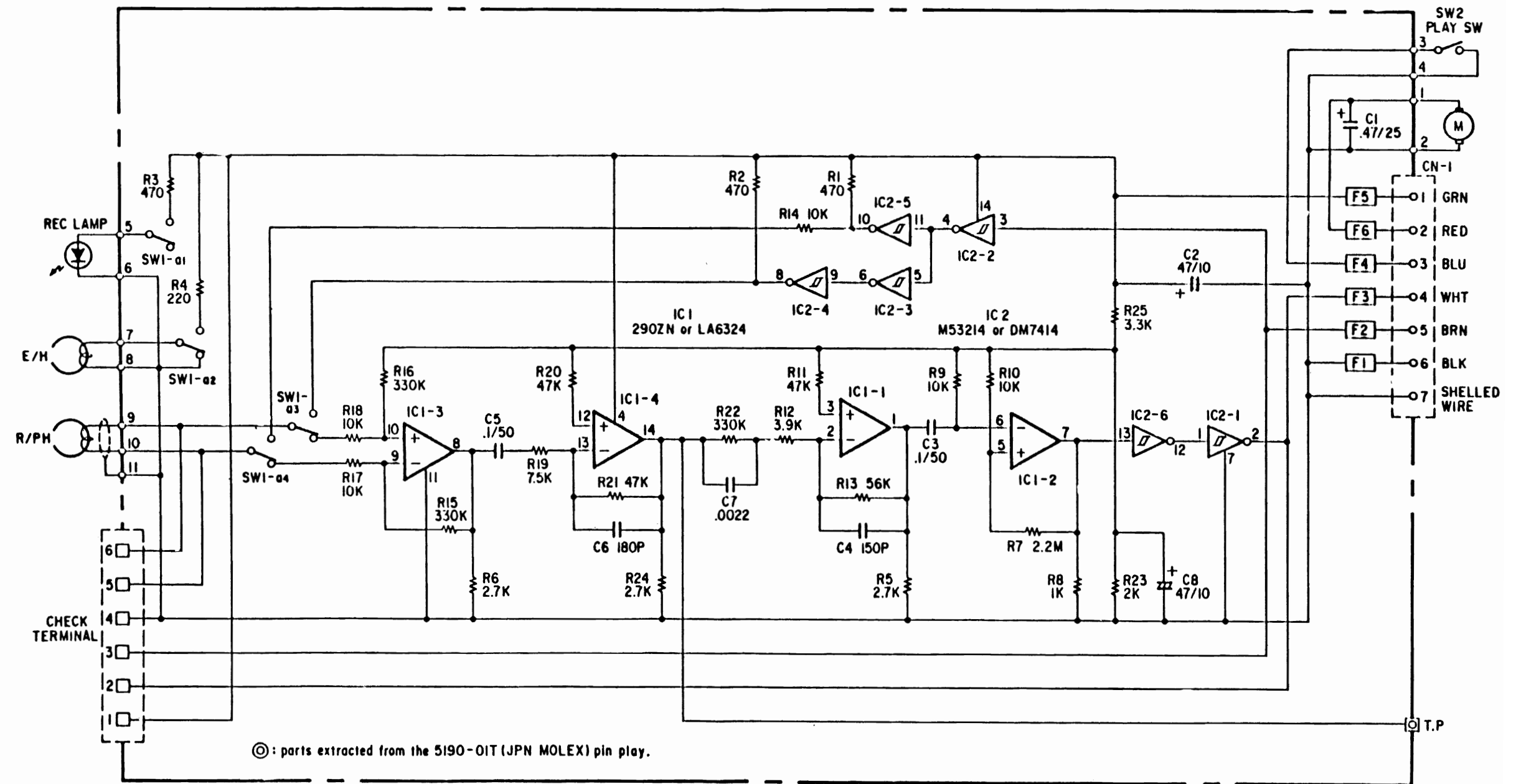
BOTTOM VIEW

Wiring Diagram — PCB Assembly #CMR-001-0

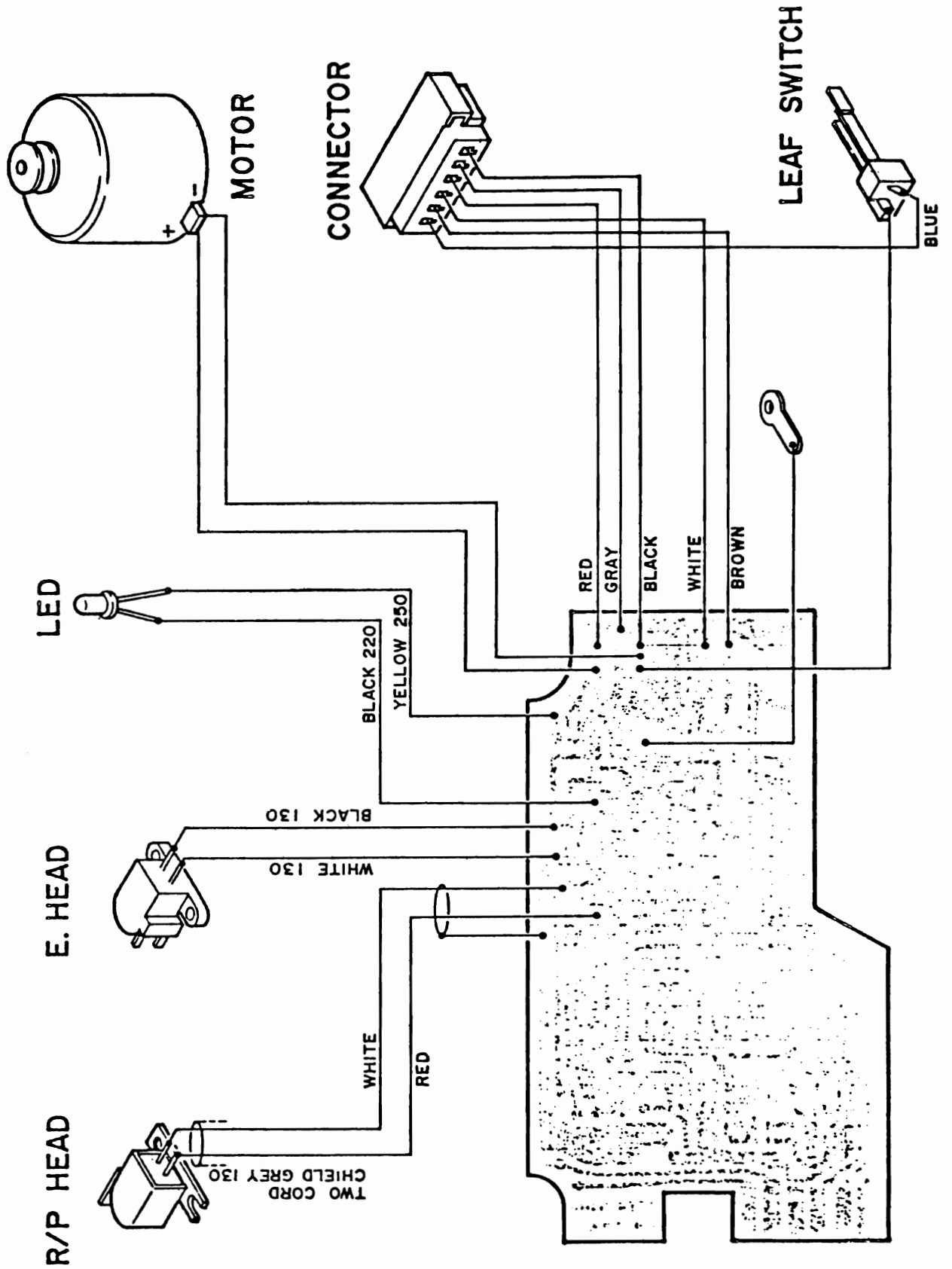


NOTE: DATASETTE PARTS ARE NOT AVAILABLE FROM COMMODORE — parts list is for cross reference only.

INTERGRATED CIRCUITS		RESISTORS (Continued)	
IC1	IC LA6324 or NJM-2902N	R19	7.5k ohm
IC2	IC M53214P or DM7414N	R20	47k ohm
DIODES		R21	47k ohm
D1	LED RED 3φ LED Spacer	R22	330k ohm
RESISTORS — All Values are in ohms-1/4 W 5% unless noted otherwise.		R23	2k ohm
R1	470 ohm	R24	2.7k ohm
R2	470 ohm	R25	3.3k ohm
R3	470 ohm	CAPACITORS	
R4	220 ohm	C1	Aluminum 0.47μ/25V
R5	2.7k ohm	C2	Electrolytic 47μ/10V
R6	2.7k ohm	C3	Mylar 47μ/10V
R7	2.2M ohm	C4	Ceramic 150p
R8	1k ohm	C5	Mylar 0.1μ
R9	10k ohm	C6	Ceramic 180p
R10	10k ohm	C7	Ceramic 0.0022μ
R11	47k ohm	C8	Electrolytic 47μ/10V
R12	3.9k ohm	MISC.	
R13	56k ohm	SW1	Slide Switch
R14	10k ohm	F1	Ferrite Bead
R15	330k ohm	F2-F6	Ferrite Bead QIBRHW3.5x4.5x0.8
R16	330k ohm	CN1	7 Pin Connector
R17	10k ohm		
R18	10k ohm		

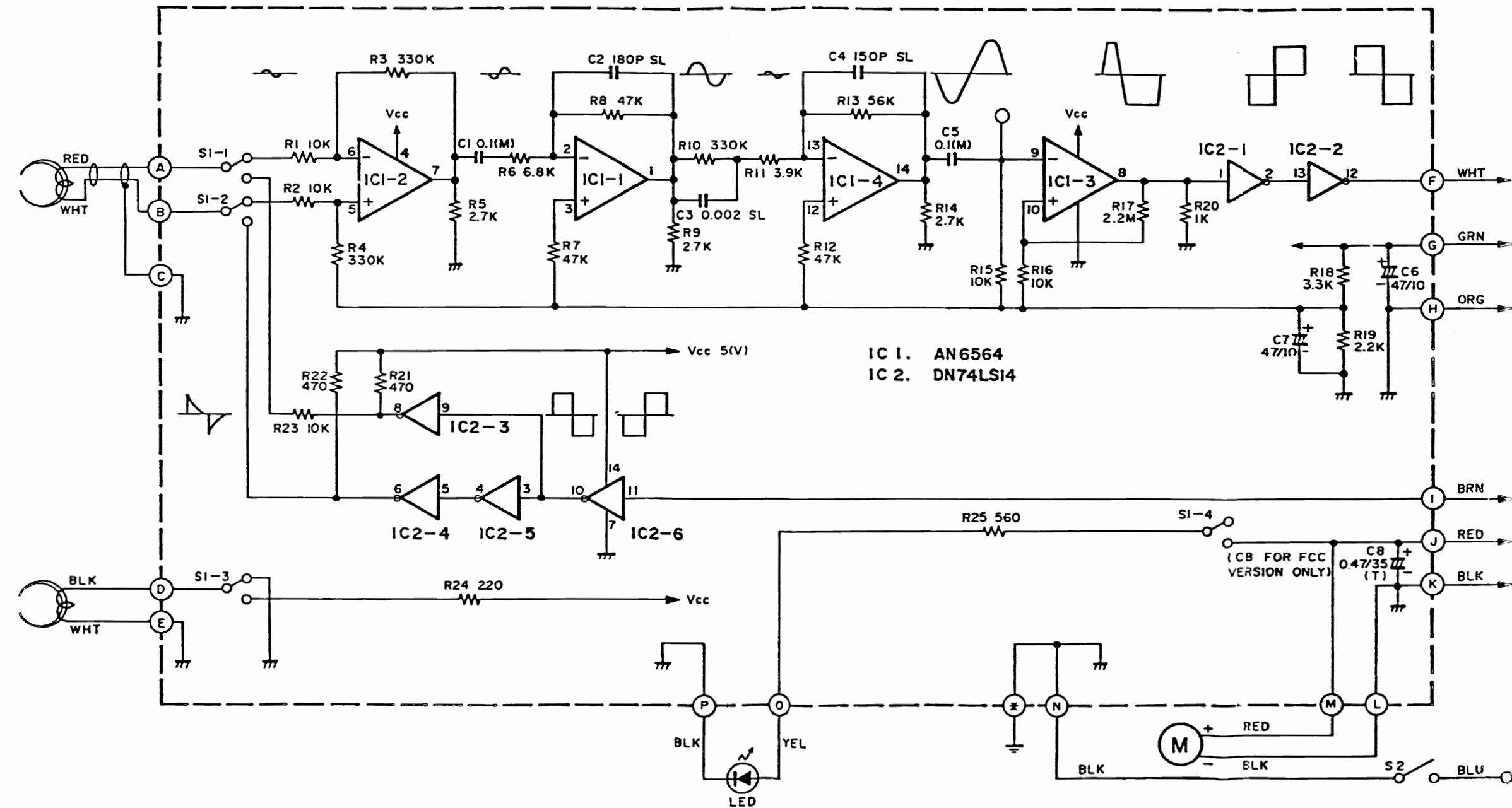


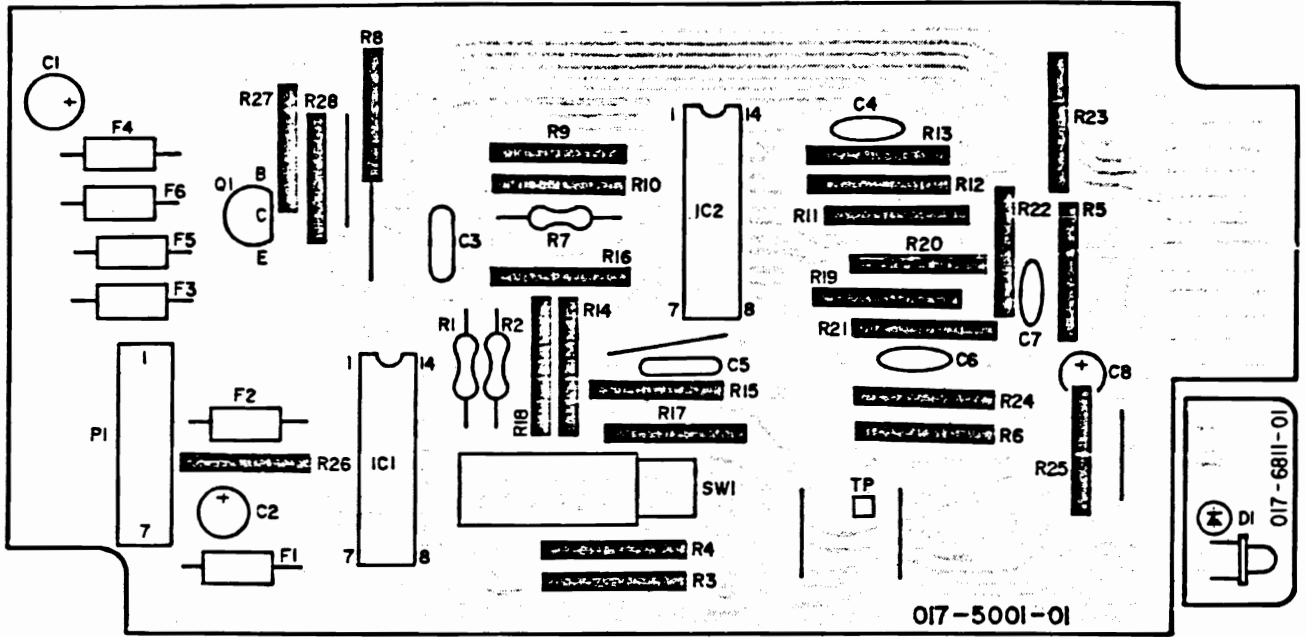
- All Resistance values are in Ω, K=10³, M=10⁶.
- All Resistors are rated at 1/4 watt, ± 5%.
- All Capacitance values are in μF, P=10⁻⁶ μF.
- All Capacitors are rated at 50WV.



NOTE: DATASETTE PARTS ARE NOT AVAILABLE FROM COMMODORE — parts list is for cross reference only.

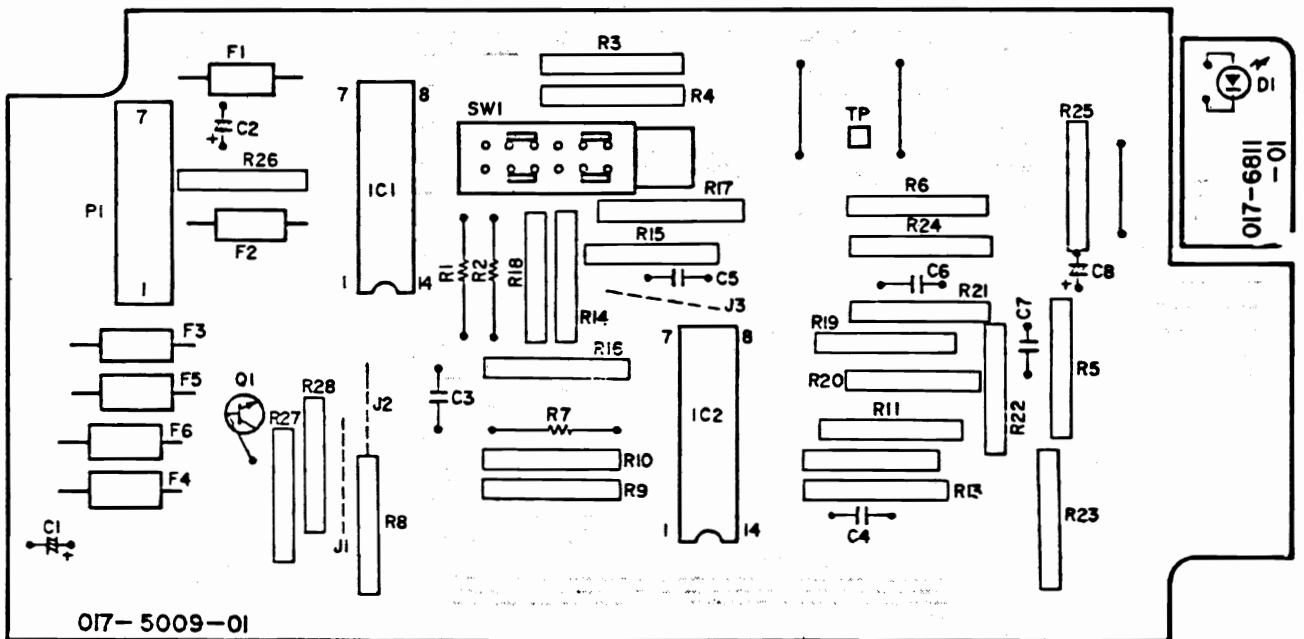
INTERGRATED CIRCUITS		RESISTORS (Continued)	
IC1	AN-6562	R16	10K
IC2	AN-6562	R17	2.2M
IC3	74LS14	R18	3.3K
RESISTORS — All Values are in ohms-1/4 W 5% unless noted otherwise.		R19	2.2K
		R20	1K
R1	10K	R21	470
R2	10K	R22	470
R3	330K	R23	10K
R4	330K	R24	220
R5	2.7K	R25	560
R6	6.8K	CAPACITORS	
R7	47K	C1	Mylar 0.1 μ F
R8	47K	C2	Ceramic 180 pF
R9	2.7K	C3	Ceramic 0.002 μ F
R10	330K	C4	Ceramic 150 pF
R11	3.9K	C5	Mylar .1 μ F
R12	47K	C6	Electrolytic 47 μ F 10V
R13	56K	C7	Electrolytic 47 μ F 10V
R14	2.7K	C8	Tantalum 0.47 μ F 35V FCC Version Only
R15	10K		





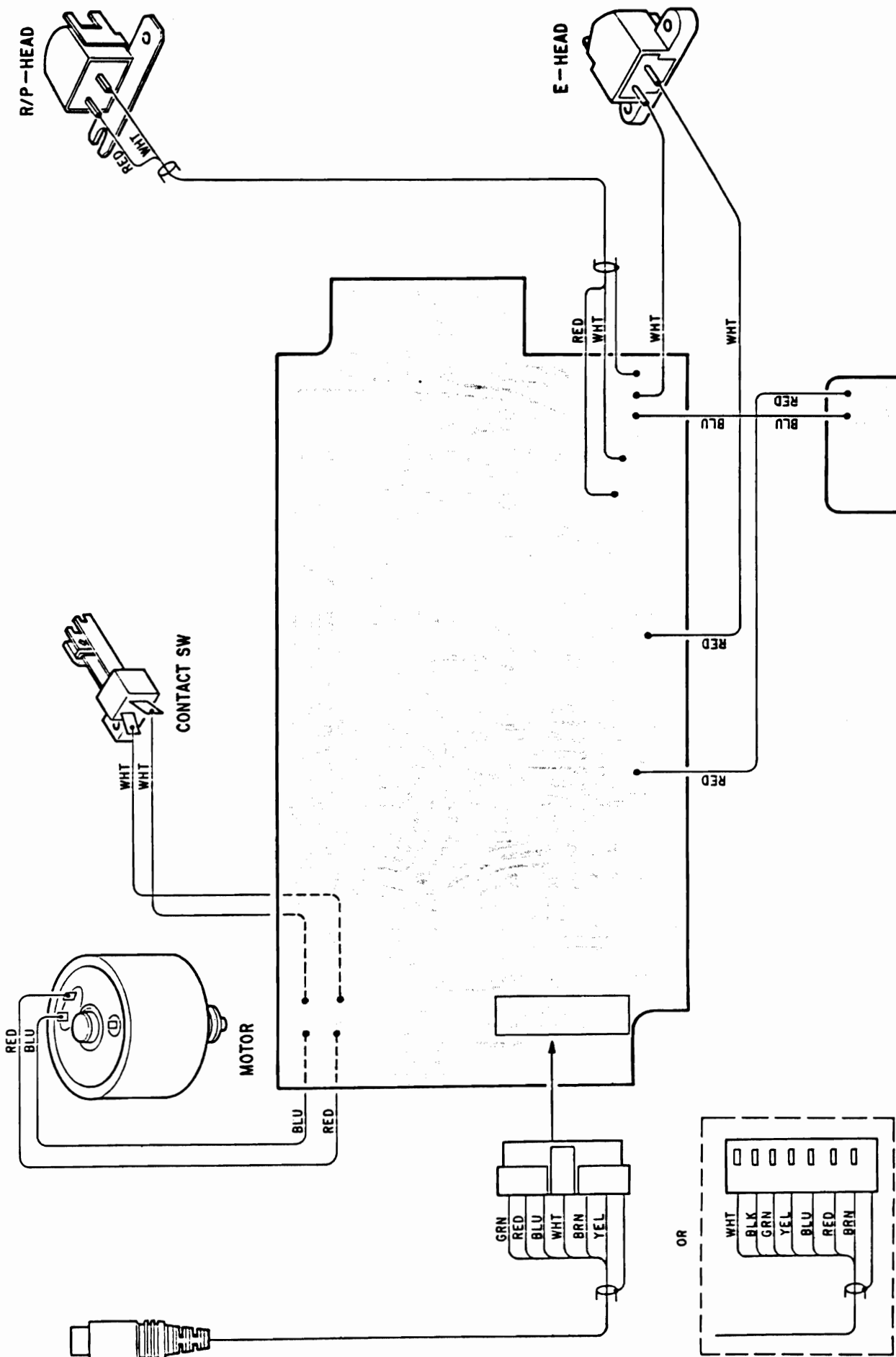
TOP VIEW

NOTE: "■" Resistors are printed resistor



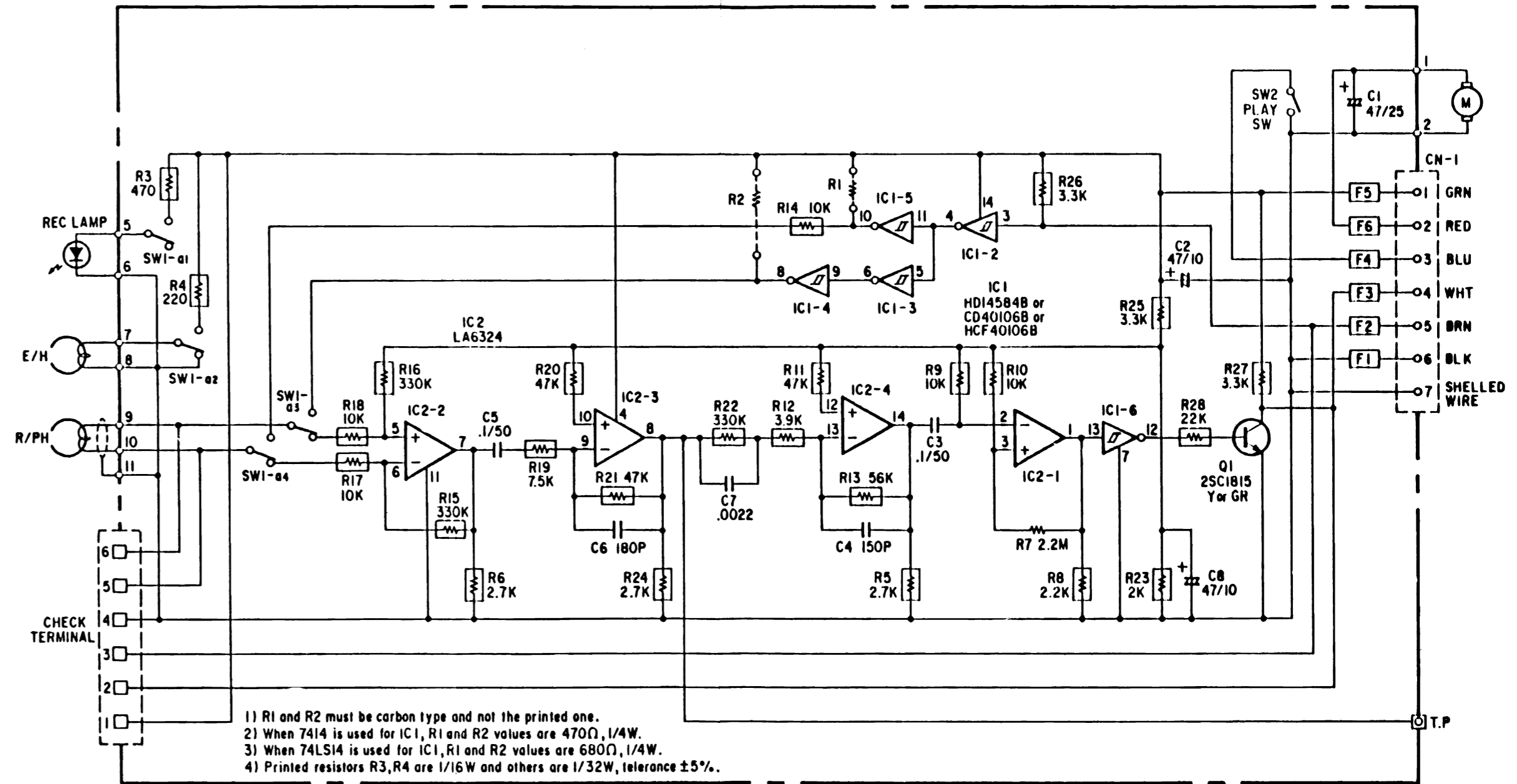
BOTTOM VIEW

Wiring Diagram – PCB Assembly #017-5001-01



NOTE: DATASETTE PARTS ARE NOT AVAILABLE FROM COMMODORE — parts list is for cross reference only.

INTERGRATED CIRCUITS		CAPACITORS	
IC1	IC LA6324	C1	Aluminum 0.47 μ /25V
IC2	IC DM7414	C2	Electrolytic 47 μ /10V
TRANSISTORS		C3	Mylar 0.1 μ
Q1	2SC1815Y or GR	C4	Ceramic 150p
DIODES		C5	Mylar 0.1 μ
D1	LED RED 3 ϕ	C6	Ceramic 180p
RESISTORS — All Values are in ohms-1/4 W 5% unless noted otherwise.		C7	Ceramic 0.0022 μ
R1	470 ohm	C8	Electrolytic 47 μ /10V
R2	470 ohm	MISC.	
R7	2.2M ohm	F1-F6	Ferrite Bead Q1BRHW3.5x4.5x0.8
		SW1	Slide Switch
		CN1	7 Pin Connector



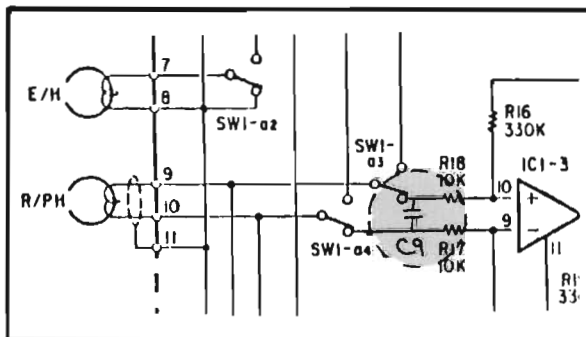
- All Resistance values are in Ω , K=10³, M=10⁶.
- All Resistors are rated at 1/4 watt, $\pm 5\%$.
- All Capacitance values are in μ F, P=10⁻⁶ μ F.
- All Capacitors are rated at 50WV.
- Resistors are printed Resistors.

Issue 1, 1984 : Datasette 1

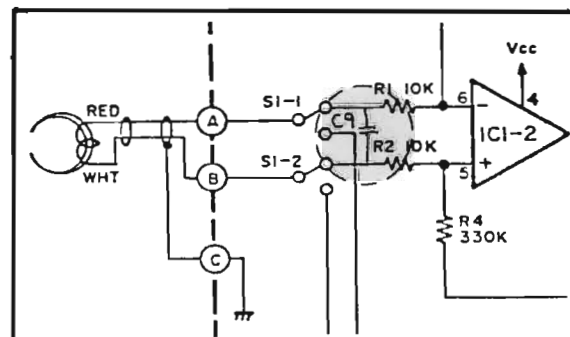
Model: 1530, 1531

PROBLEM: External noise interferences cause a LOAD ERROR with some newer model datasettes. An engineering change has been issued; however, the possibility remains that some units have reached the field uncorrected. **SOLUTION:**

- | PCB Assy # | PCB Assy# | PCB Assy # |
|---|--|----------------------------|
| CMR-001-0 | 017-5001-01 | NP-090 |
| 1) REMOVE the 150pF cap at C4 and REPLACE with a Ceramic 470pF 50WV | 1) REMOVE the 150pF cap at C4 and REPLACE with a Ceramic 470pF 50WV | 1) Check C4 for 470pF cap |
| 2) ADD C9 across R17 and R18 | 2) ADD C9 across R17 and R18
Note: use pins on SW1 - resistors are printed type | 2) ADD C9 across R1 and R2 |



PCB Assy #:
CMR-001-0
017-5001-01



PCB Assy #:
NP-090

Note - Correct Values:

- | | | | | |
|----|-------------------|---------|---------|------------------|
| C4 | Ceramic capacitor | 470pF | +/- 20% | 50 Working Volts |
| C9 | Ceramic capacitor | .0033uF | +/- 20% | 50 Working Volts |



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