

HOWARD W. SAMS & COMPANY

CP27 09005

COMPUTERFACTS™

Technical Service Data

APPLE®

**ImageWriter™ II
MODEL A9M0310
PRINTER**



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

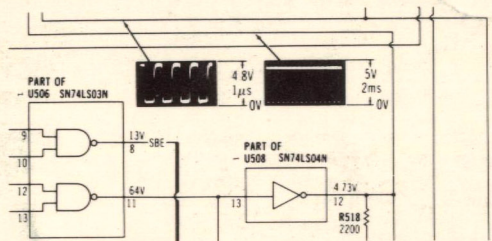
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Remove staples and use cover for file folder.

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.

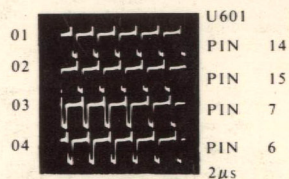


- Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

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.

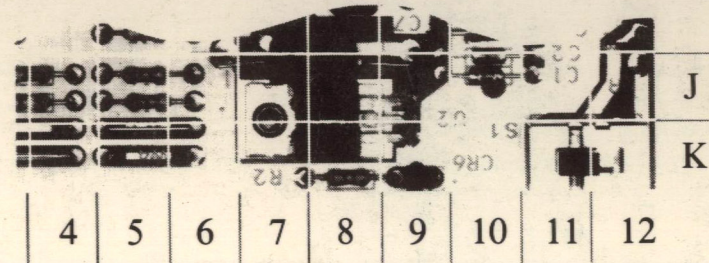


- Logic Chart containing logic probe readings to isolate defective circuitry and components.

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.	MFR. Part No.	REPLACEMENT DATA					NOTES
			ECG Part No.	NTE Part No.	RCA Part No.	ZENITH Part No.		
D102	ISS53	1149-2576	ECG519	NTE519	SK9091/177	103-131		
D103	2N60FM	1149-2527	ECG109	NTE109	SK3088	103-Z9001		
D201	1N4004GP	1201-4205	ECG116	NTE116	SK3312	212-76-02		
D501 thru D503	ISS53	1149-2576	ECG519	NTE519	SK9091/177	103-131		

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To order, or for more information see your Sams Distributor, or telephone 800-428-SAMS.



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PRELIMINARY SERVICE CHECKS

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

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

Replacement or repair of the Main Board or connectors may be necessary after the malfunction has been isolated.

TEST EQUIPMENT AND TOOLSTEST EQUIPMENT

Digital Volt/Ohm Meter
Logic Probe

TOOLS

Low Wattage Soldering Iron
Desoldering Equipment
Head Cleaning Equipment
Phillips Screwdriver
Flat Blade Screwdriver

REPLACEMENT PARTS

<u>Item No.</u>	<u>Description</u>
FU1	Fuse, 2A @ 250V Fast Acting
FU2	Fuse, 5A @ 125VAC Slow Blow
IR1	Bridge Rectifier
L1	Noise Filter
M1	Color Ribbon Cam Motor
M2	Line Feed Motor
M3	Carriage Motor
M4	Print Head
SW1	Power Switch
T1	Power Transformer
	Drive Gear Assembly
	Power Cord
	Power Supply/Driver Board
	Print Head Cable

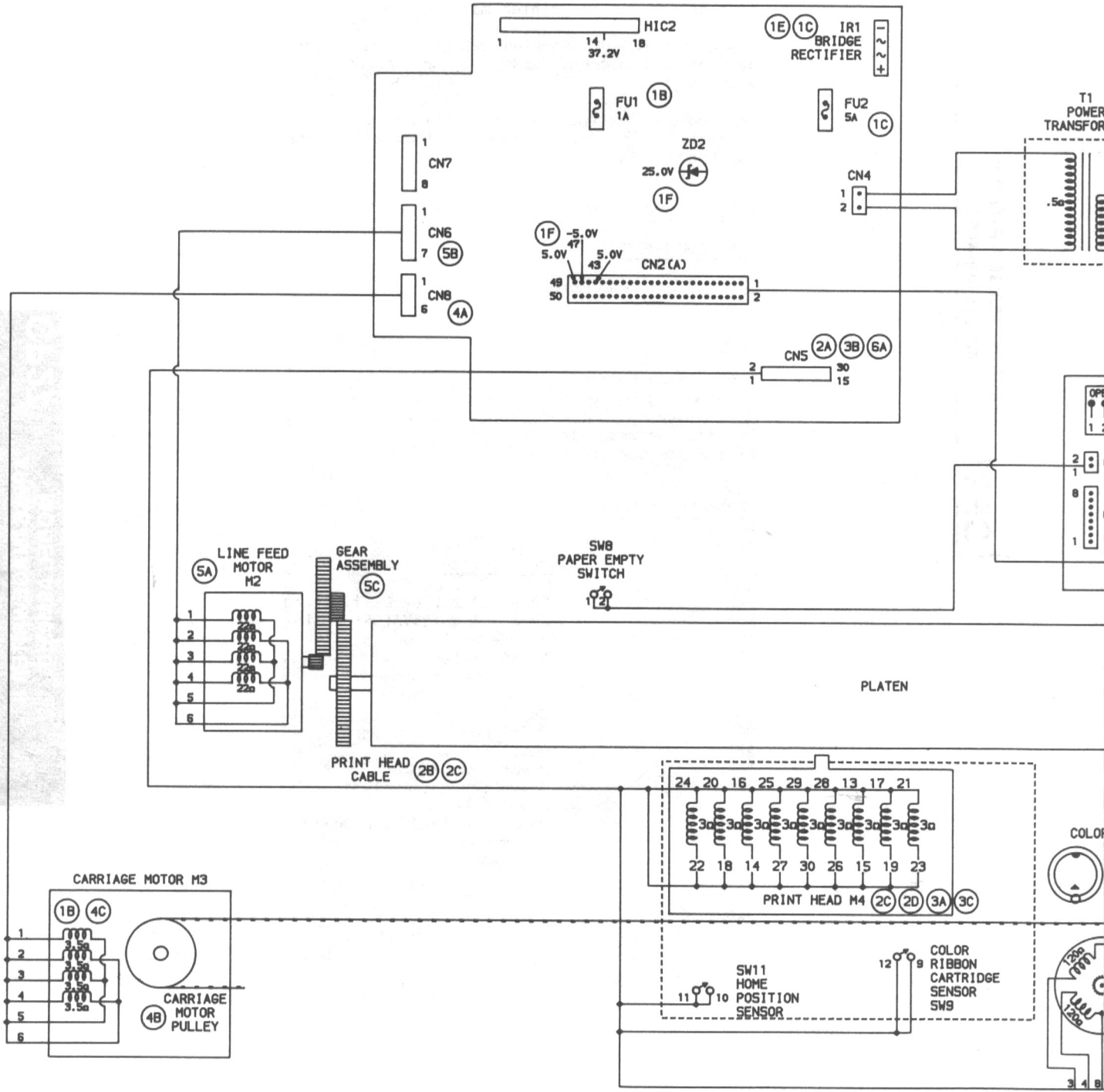
APPLE IMAGEWRITER II
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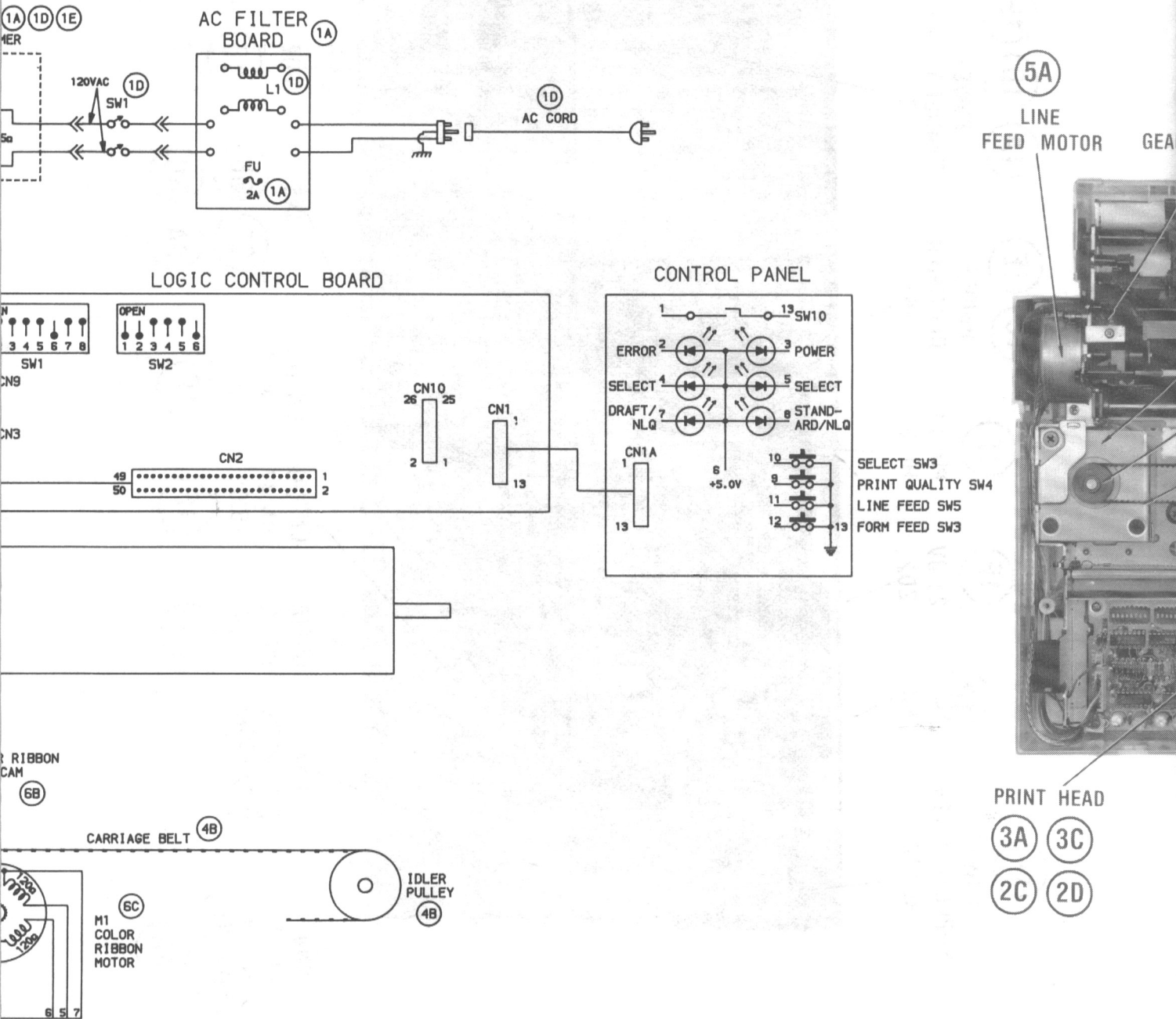
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POWER SUPPLY/DRIVER BOARD

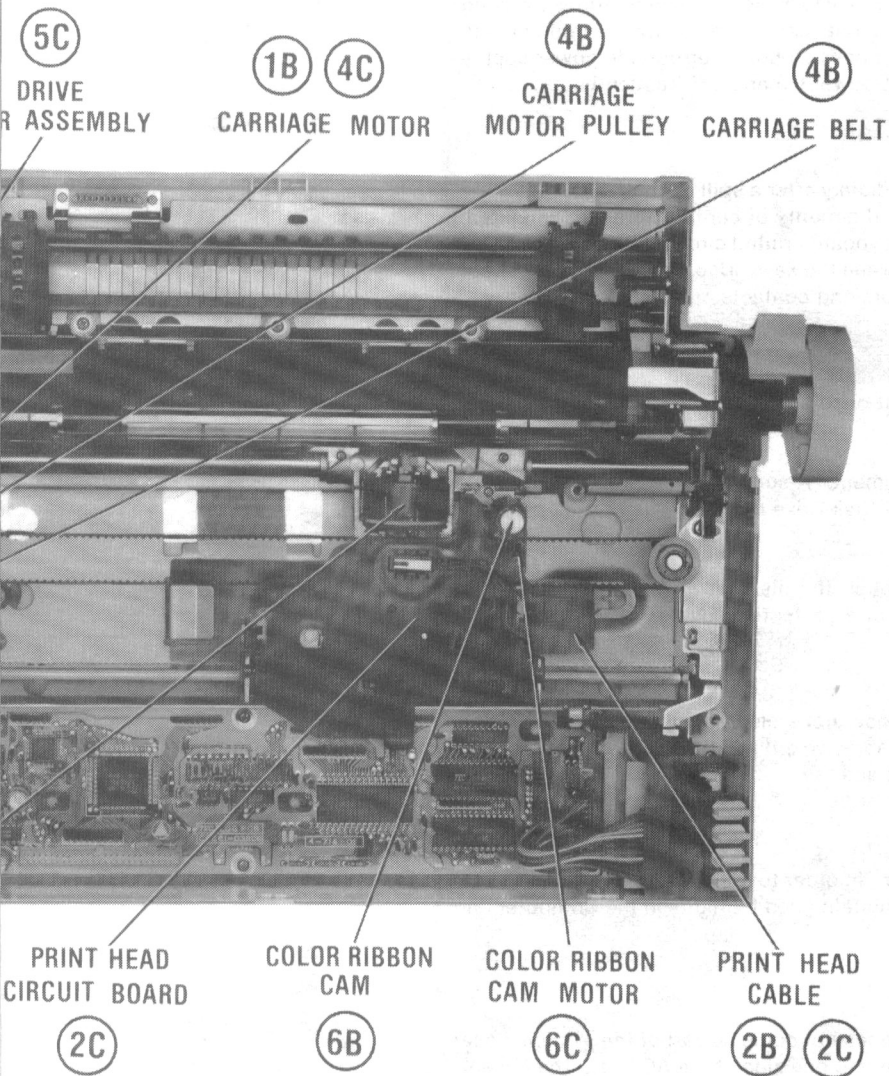


INTERCONNECTING DIAGRAM

PRELIMINARY SERVICE CHECKS (Continued)



INTERCONNECTING DIAGRAM



APPLE IMAGEWRITER II
 CHASSIS - TOP VIEW MODEL A9M0310

PRELIMINARY SERVICE CHECKS (Continued)

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

SERVICE CHECKS

① POWER SUPPLY

- (A) Check AC Fuse (FU). If open, check the Power Transformer (T1) and AC Filter Board before replacing Fuse and turning Printer On.
- (B) Check Fuse (FU1). If open, check resistance of Carriage Motor (M3) before replacing fuse and turning Printer On.
- (C) Check Fuse (FU2). If open, check for shorts at Bridge Rectifier (IR1) before replacing fuse and turning Printer On.
- (D) Check for 120VAC from the White lead to the Black lead of Transformer T1 primary. If missing, check Power Switch SW1, Noise Filter L1 and the AC cord.
- (E) Check for approximately 37.2V at pin 14 of Regulator IC (HIC2). If missing, check Transformer (T1) and Bridge Rectifier (IR1) by substitution.
- (F) Check for approximately 25.0V at the cathode of Zener Diode (ZD2), 5.0V at pins 49 and 43 of Connector CN2(A), and -5.0V at pin 47 of CN2(A). If any voltages are not correct, check Connector CN2(A) and the Power Supply/Driver Board by substitution.

② WILL NOT PRINT

- (A) Check Connector (CN5) for good connection.
- (B) Check Print Head Cable.
- (C) Check Print Head and Print Head Cable for good connections.
- (D) Check resistance of Print Head windings.

③ MISSING DOTS IN PRINT PATTERN

- (A) Check for a dirty or clogged Print Head. Clean if necessary.
- (B) Check Connector CN5 for good connections.
- (C) Check resistance of Print Head windings for continuity (3 ohms each winding).

④ CARRIAGE MOTOR MALFUNCTIONS

- (A) Check Connector CN8 for good connection.
- (B) Check Carriage Motor pulley and belt for binding.
- (C) Check the Carrier Motor windings for continuity (3.5 ohms each winding). Check from pin 5 to pins 1 and 3 and from pin 6 to pins 2 and 4 of Connector CN8.

⑤ LINE FEED MOTOR MALFUNCTIONING

- (A) Check the windings on the Line Feed Motor for continuity (22 ohms each winding). Check from pin 5 to pins 2 and 4 and from pin 6 to pins 1 and 3 of Connector CN6.
- (B) Check Connector CN6 for good connections.
- (C) Check the operation of the Drive Gear Assembly on the left side of the Platen for possible broken gears.

⑥ COLOR RIBBON CAM MOTOR MALFUNCTIONING

- (A) Check Connector CN5 for good connection.
- (B) Check Color Ribbon Cam for defects.
- (C) Check windings of Color Ribbon Cam Motor for continuity (120 ohm each winding). Check from pin 7 to pins 3 and 5 and from pin 8 to pins 4 and 6 of Connector CN5.

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MODEL A9M0310

PRELIMINARY SERVICE CHECKS (Continued)

MISCELLANEOUS ADJUSTMENTS

VERTICAL CHARACTER DEVIATION

Insert paper in Printer and turn On. Type in and run the following program:

```

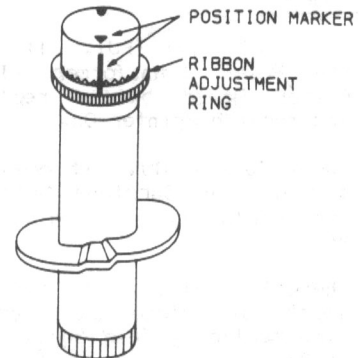
10 PR# 1
20 FOR X = 1 TO 7: PRINT : NEXT X
30 PRINT CHR$( 27) CHR$( 69)
40 FOR X = 1 TO 70: PRINT "H";: NEXT X
50 PRINT
60 PRINT CHR$( 27) CHR$( 114)
70 FOR X = 1 TO 70: PRINT "H";: NEXT X
80 PRINT
90 PRINT CHR$( 27) CHR$( 102)
100 PR# 0: HOME : PRINT "PRESS ANY KEY TO
    PRINT ANOTHER LINE"
110 GET A$: PR# 1: GOTO 30
    
```

The program will print one line of the letter H, then go back and print over the same line with the print head going in the opposite direction. If the left to right printed H's are not aligned with the right to left printed H's, change the setting of Switches 5 and 6 on DIP Switch (SW2). Press any key on the computer to print another line and recheck the alignment of the H's. Repeat this procedure until the switch settings for the best alignment are found.

RIBBON SHIFT CAM ADJUSTMENT

Insert paper in Printer and install a Color Cassette. Initiate the self-test by holding down the Form Feed button while turning Printer On. After Printer has printed several

lines in color, stop the printer and inspect the printed lines for proper colors. If the colors are incorrect, locate the ribbon adjustment assembly to the right of print head. See Figure below.



The Ribbon Adjustment Ring can be turned 180° either clockwise or counterclockwise. Caution: Turning the Ribbon Adjustment Ring more than 180° in either direction can break the mechanism. Push the red Ribbon Adjustment Ring down to turn it. If the color overlap is at the bottom of the characters, turn the ring clockwise. If the color overlap is at the top of the characters, turn the ring counterclockwise.

Release the ring and rerun the self-test to check for proper adjustment. Repeat the adjustment procedure if necessary.

DIP SWITCH SETTINGS

					SW1-8		
				Carriage return only		Open	
				Carriage return plus		Closed	
				line feed			
American	Open	Open	Open				
Italian	Closed	Open	Open				
Danish	Open	Closed	Open		SW2-1	SW2-2	
British	Closed	Closed	Open				
German	Open	Open	Closed	300 baud	Open	Open	
Swedish	Closed	Open	Closed	1200	Closed	Open	
French	Open	Closed	Closed	2400	Open	Closed	
Spanish	Closed	Closed	Closed	9600	Closed	Closed	
							SW2-3
Form length 11 inches		Open		Hardware Handshake Protocol		Open	
Form length 12 inches		Closed		XON/XOFF Protocol		Closed	
							SW2-4
Perforation skip inactive		Open		Option disabled (no		Open	
Perforation skip active		Closed		option card)		Closed	
				Option enabled			
							SW2-5
10 characters per inch		Open	Open	Hammer-Fire Timing		Preset by manufac-	
12 characters per inch		Closed	Open	Control		turer. Do not adjust.	
17 characters per inch		Open	Closed				
160 dots per inch		Closed	Closed				
(proportional)							SW2-6
				Hammer-Fire Timing		Preset by manufac-	
				Control		turer. Do not adjust.	

Robert

PRELIMINARY SERVICE CHECKS (Continued)

GENERAL OPERATING INSTRUCTIONS

SELECT BUTTON

The Printer is Selected (ready to receive data from computer) when the Select button LED's are On. The Printer is deselected when the Select button LED's are Off. Pressing the Select button once puts Printer in deselected state, and pressing it again puts Printer back in the selected state. The Printer must be in deselected state before Print Quality, Line Feed and Form Feed buttons will work.

PRINT QUALITY BUTTON

When Printer is turned On, the Print Quality will be in Draft Quality mode (left LED On). Pressing the Print Quality button once puts Printer in Standard Quality mode (right LED On). Pressing the button again puts Printer in New Letter Quality mode (both LED's On).

LINE FEED AND FORM FEED BUTTONS

The Line Feed button advances the paper one line at a time when pressed. The Form Feed button advances the paper one page at a time when pressed.

ERROR LIGHT

The red LED Error light will be On if Printer is out of paper, blinking if front cover is not in place or the print mechanism is jammed and blinking irregularly if the Option DIP Switch (SW2-4) is not set properly.

SELF-TEST

WARNING: Be sure paper is installed in Printer before running the self-test to avoid possible damage to Print Head and Platen.

The Printer has a built-in self-test that can be started by holding the Form Feed button down while turning Printer On. The test will

print ROM revision number, DIP switch settings and indicate which option card is installed, then the ripple pattern will be printed continuously until the test is stopped. If the Line Feed button is held down while turning Printer On, the carriage assembly will move back and forth without printing and without any line feeds. The test can be stopped by pressing the Line Feed button. The Print Quality, Line Feed and Form Feed buttons will then work normally. The test can be restarted by pressing the Select button. To stop self-test, turn Printer Off and back On again.

LOOPBACK TEST

The Printer has a built in loopback test that can be used to check the Input/Output Interface Circuits. An adapter plug must be used with the test for it to work properly. Use an 8-pin plug that fits the I/O socket on the rear of Printer. Connect the handshake pins (pins 1 and 2) together and data pins (pins 3 and 5) together.

Plug adapter into the I/O socket on Printer. Insert paper in Printer. Hold the Print Quality Button (SW4) down while turning Printer On, then release the button. The test will print the ROM revision number, DIP switch settings and indicate which option card is installed, then start printing the ripple pattern. If a problem is found, the message "LOOPBACK TESTS FAILS" will be printed.

The Loopback test can be stopped by pressing the Line Feed Button (SW5) and started again by pressing the Select Button (SW3). The print quality can be changed by pressing the Print Quality Button (SW4) after stopping the test by pressing the Line Feed button. To stop the test, turn Printer Off and back On again.

APPLE IMAGEWRITER II
MODEL A9M0310

PRELIMINARY SERVICE CHECKS (Continued)

DISASSEMBLY INSTRUCTIONS

CABINET TOP REMOVAL

Lift paper cover and carriage cover from top of Printer. Remove ribbon cartridge and push print head to left side of carriage. Loosen two screws holding cabinet top (do not remove the screws). Lift the cabinet top up and unplug the control panel.

BOTTOM PANEL REMOVAL

Remove two phillips screws from rear top (just behind the tractor assembly). Turn Printer upside down and remove four phillips screws holding bottom panel. Carefully lift panel up from the rear of Printer, disconnect Connectors CN6, CN7 and CN8 on the right side, Connector CN2 (gray ribbon cable) and the ground straps on the left and right sides. Carefully flip panel over toward front of cabinet and unplug Print Head Ribbon Cable and Power Transformer Plug.

TRACTOR COVER REMOVAL

The Tractor Cover snaps in place. Carefully pull the cover loose and remove from Printer.

RIGHT LEG REMOVAL

Remove paper feed knob and paper friction lever from Printer. Turn the Printer upside down. Remove phillips screw from center of leg. Pull leg down, then out to the side to remove.

LEFT LEG REMOVAL

Turn Printer upside down. Remove phillips screw from center of leg. Pull leg down, then out to the side to remove.

PRINTER MECHANISM REMOVAL

Remove two phillips screws from the rubber mounts under the Print Head assembly. Remove one phillips screw located on left side of Printer between the Line Feed Motor and the Carriage Motor. Release retaining tabs, at rear of cabinet holding Printer Mechanism, and lift Printer Mechanism out of Cabinet.

LOGIC BOARD REMOVAL

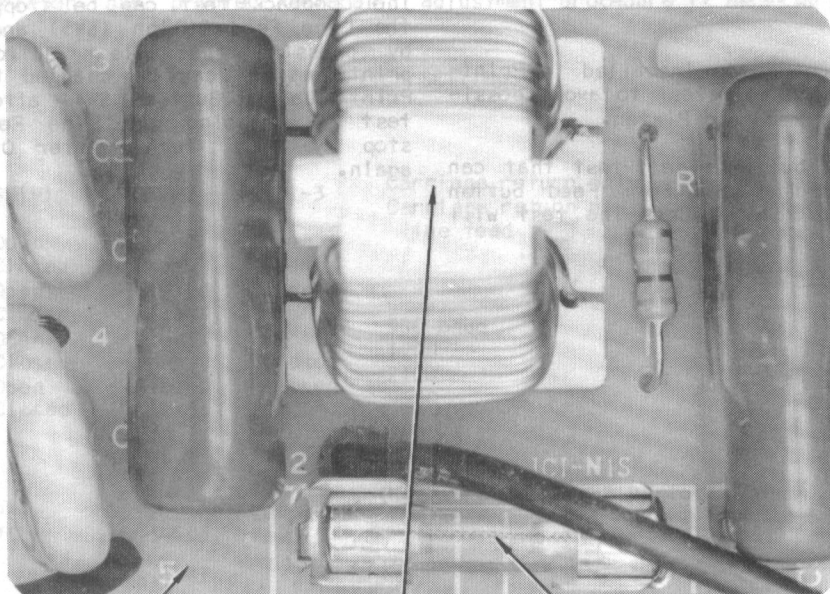
Disconnect Connectors CN2, CN3 and CN9 and the ground strap. Remove six phillips screws holding Logic Board and lift board from Printer.

POWER SUPPLY/DRIVER BOARD REMOVAL

Perform Bottom Panel Removal procedure. Disconnect Connector CN4. Remove four phillips screws holding Power Supply/Driver Board and remove board.

CONTROL PANEL REMOVAL

Remove Cabinet Top. Remove three screws holding Control Panel to Top Cover and remove panel.



AC
FILTER
BOARD

1A

L1
NOISE
FILTER

1D

AC
FUSE
(FU)

1A

AC INPUT BOARD

REBORN

PRELIMINARY SERVICE CHECKS (Continued)

PREVENTATIVE MAINTENANCE

ENVIRONMENT

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

ELECTRICAL POWER

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

KEYBOARD

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

DISK DRIVES

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

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

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

PRINTERS

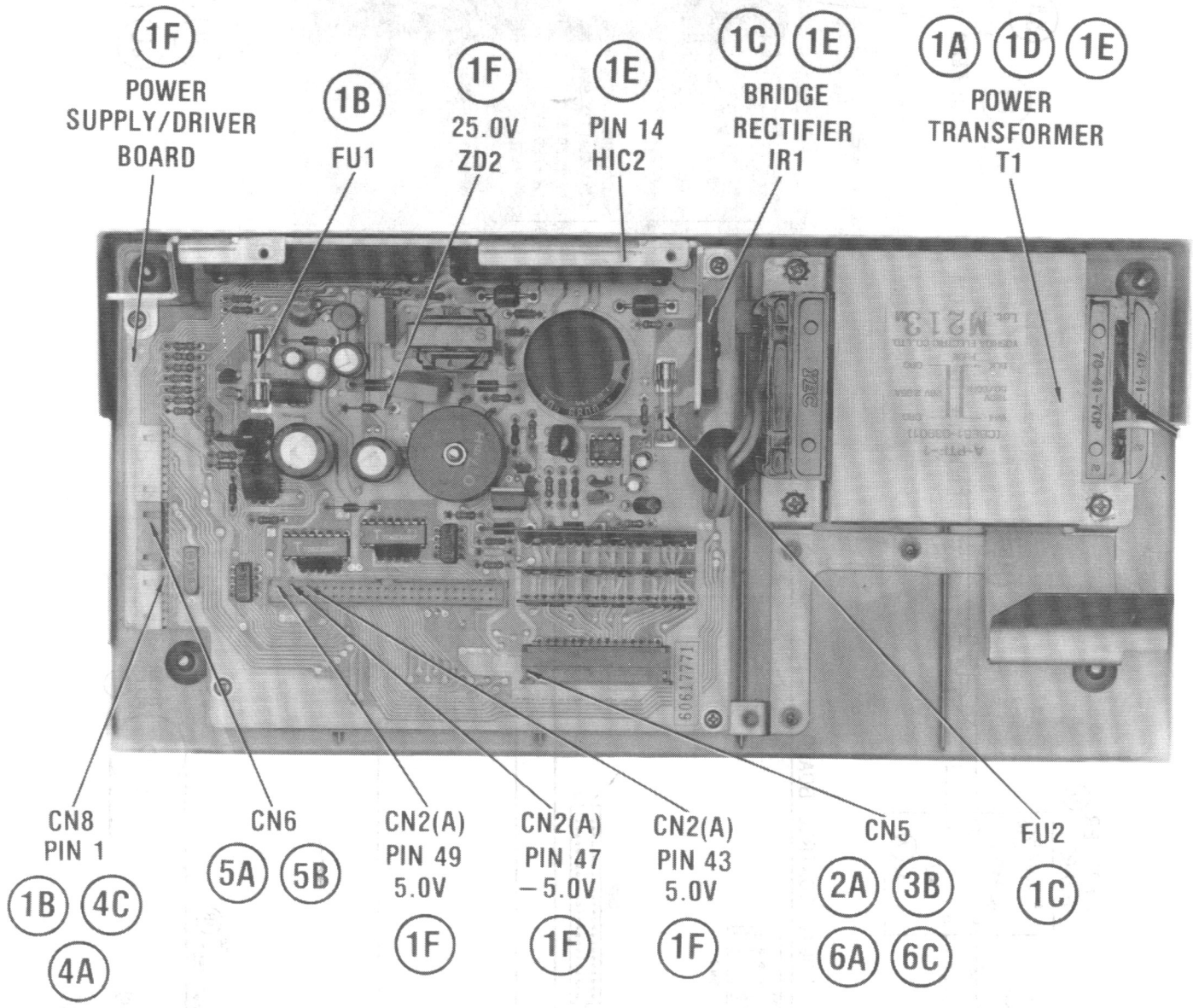
Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not oil the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

STATIC ELECTRICITY

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

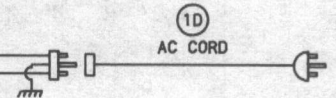
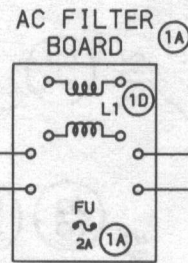
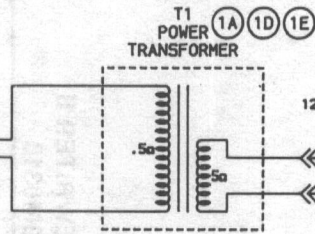
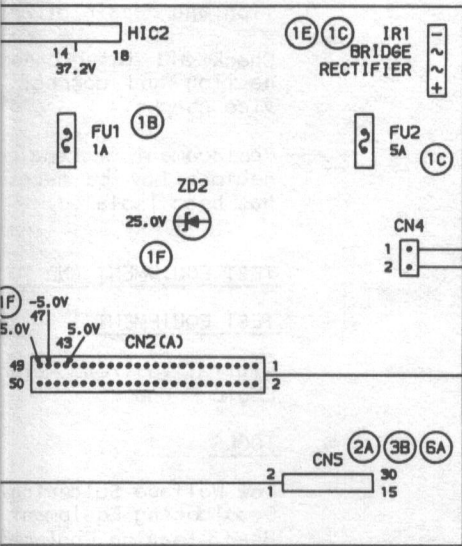
MONITOR

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

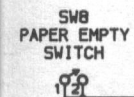
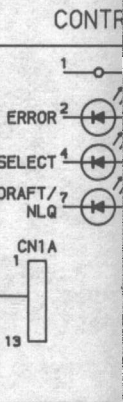
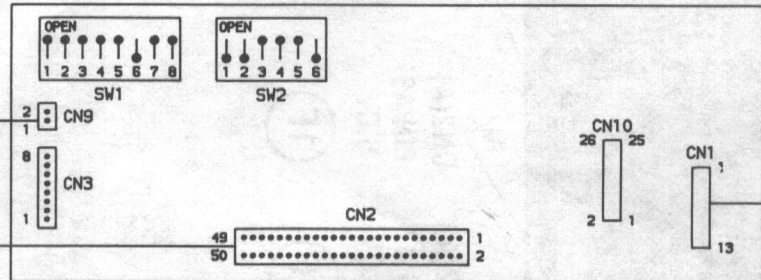


PRELIMINARY SERVICE CHECKS (Continued)

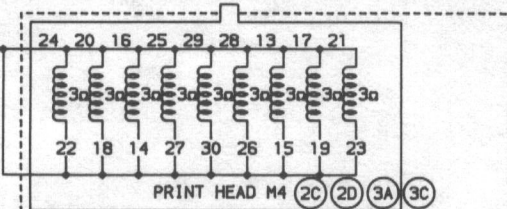
POWER SUPPLY/DRIVER BOARD



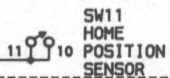
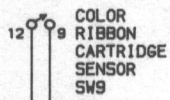
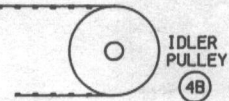
LOGIC CONTROL BOARD



PLATEN

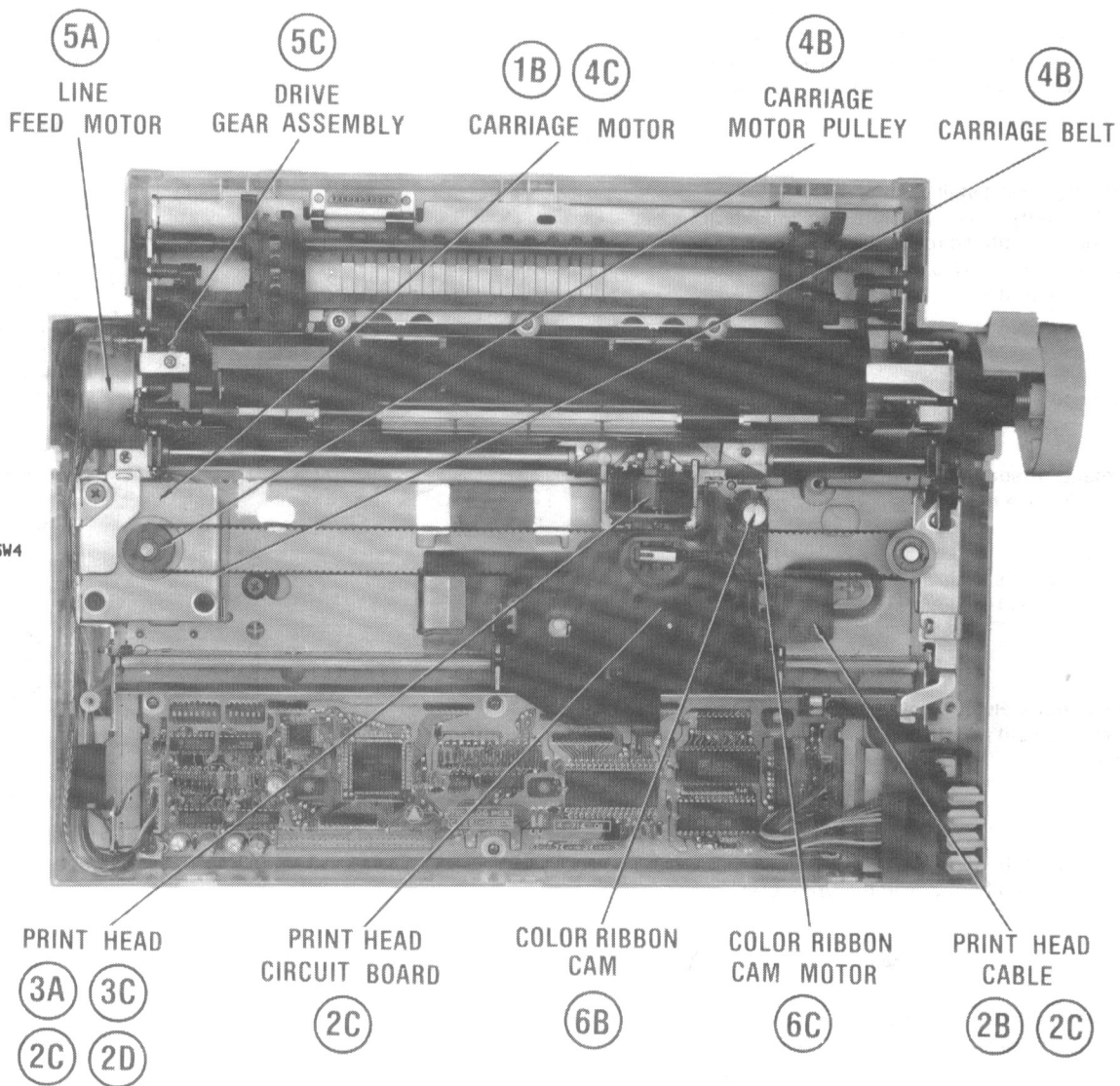
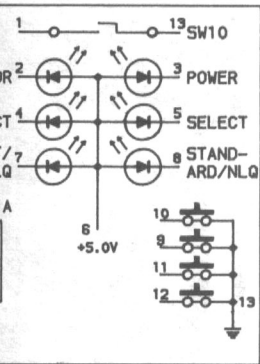


CARRIAGE BELT

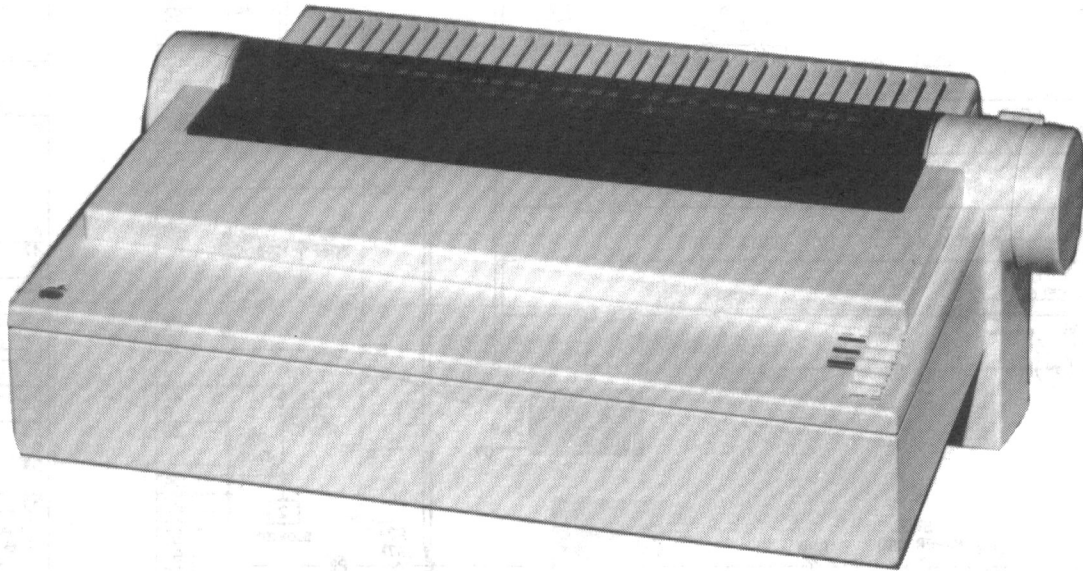


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CONTROL PANEL



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APPLE IMAGEWRITER II
MODEL A9M0310

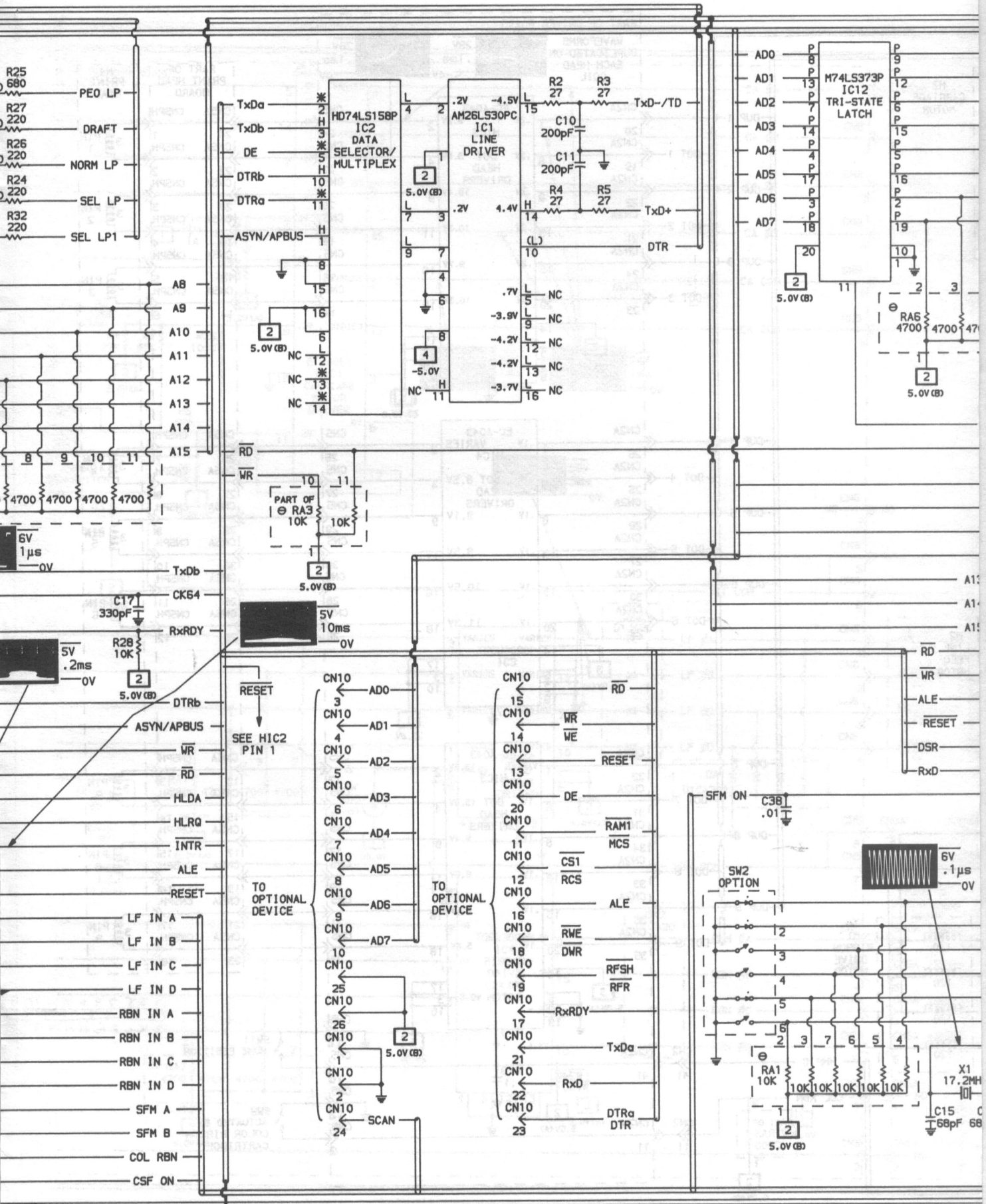
SAFETY PRECAUTIONS

See page 32.

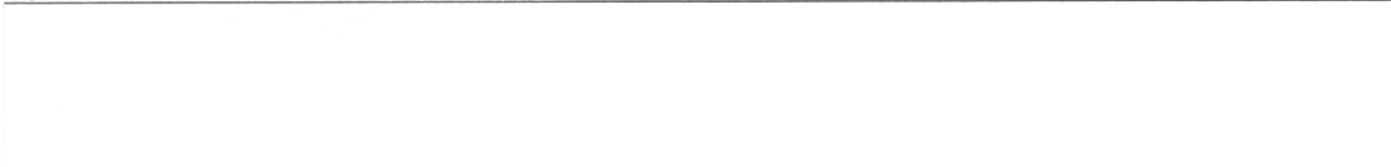
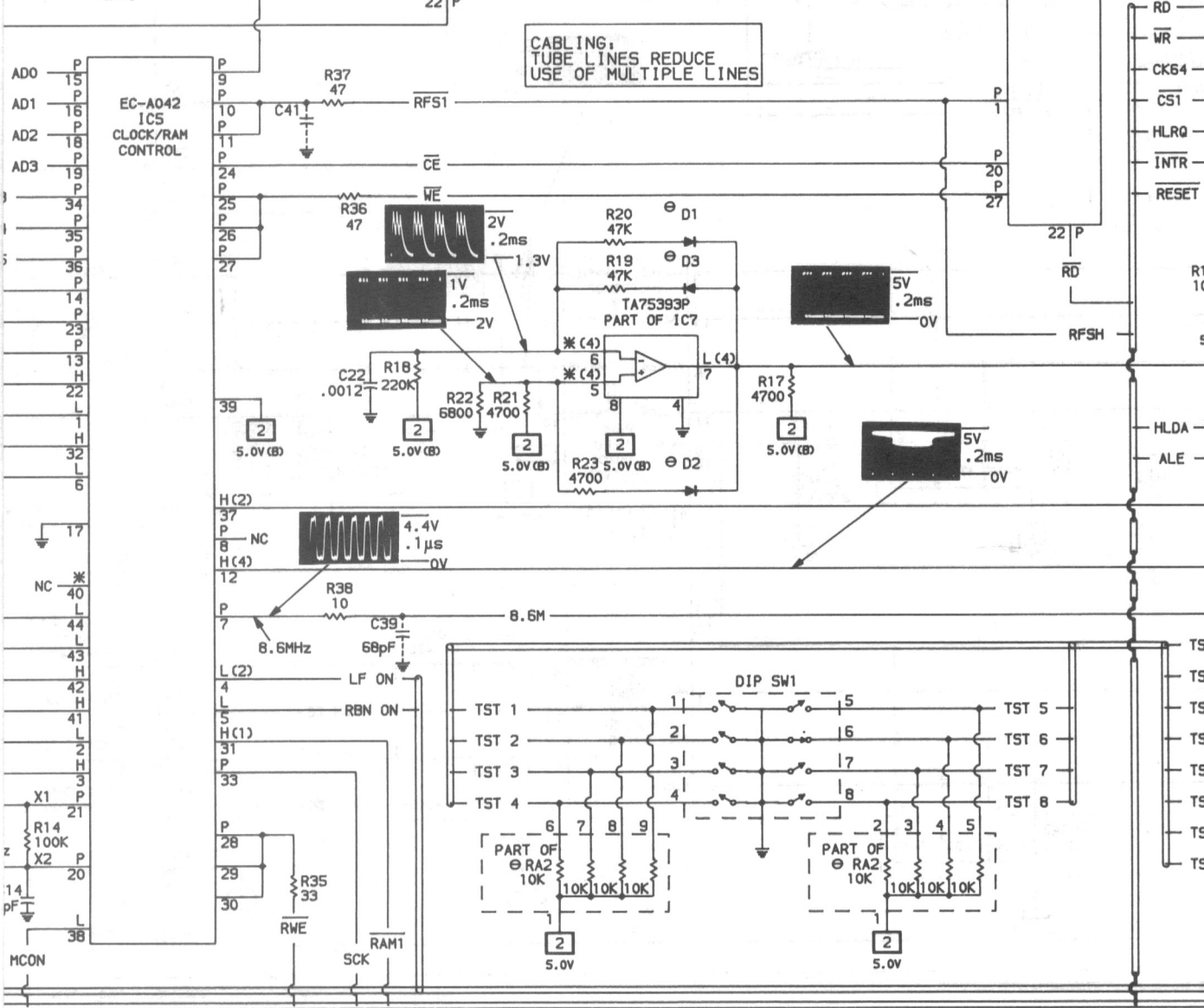
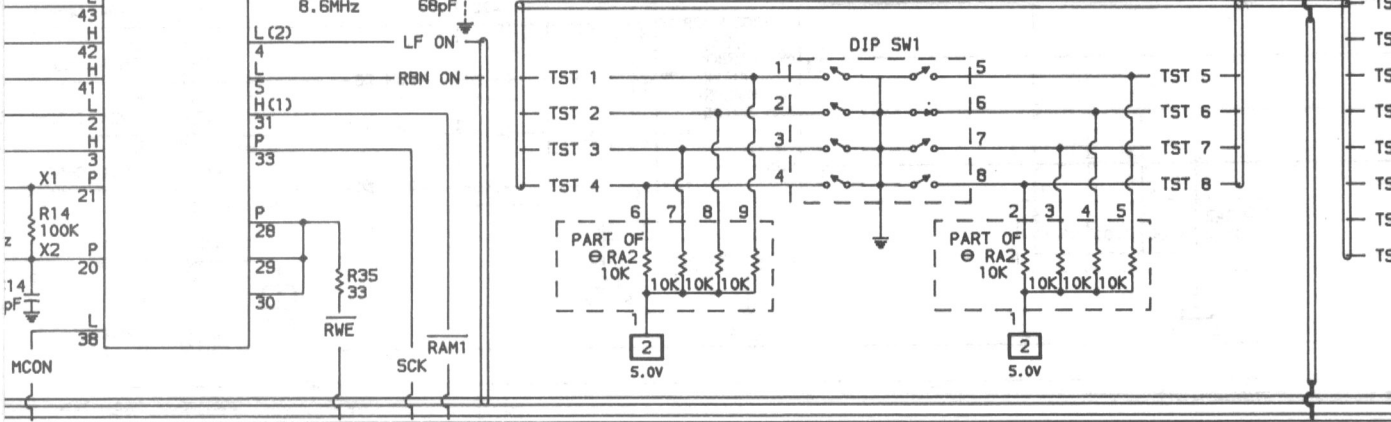
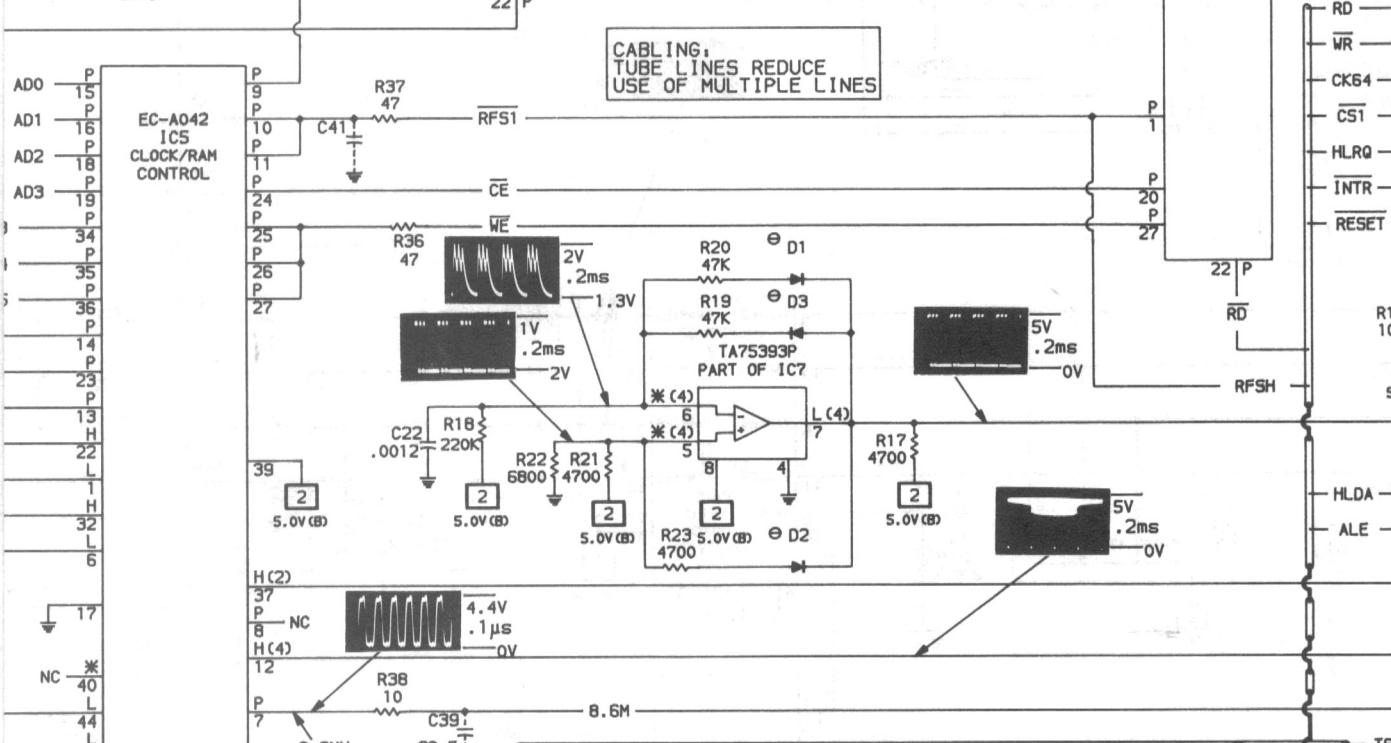
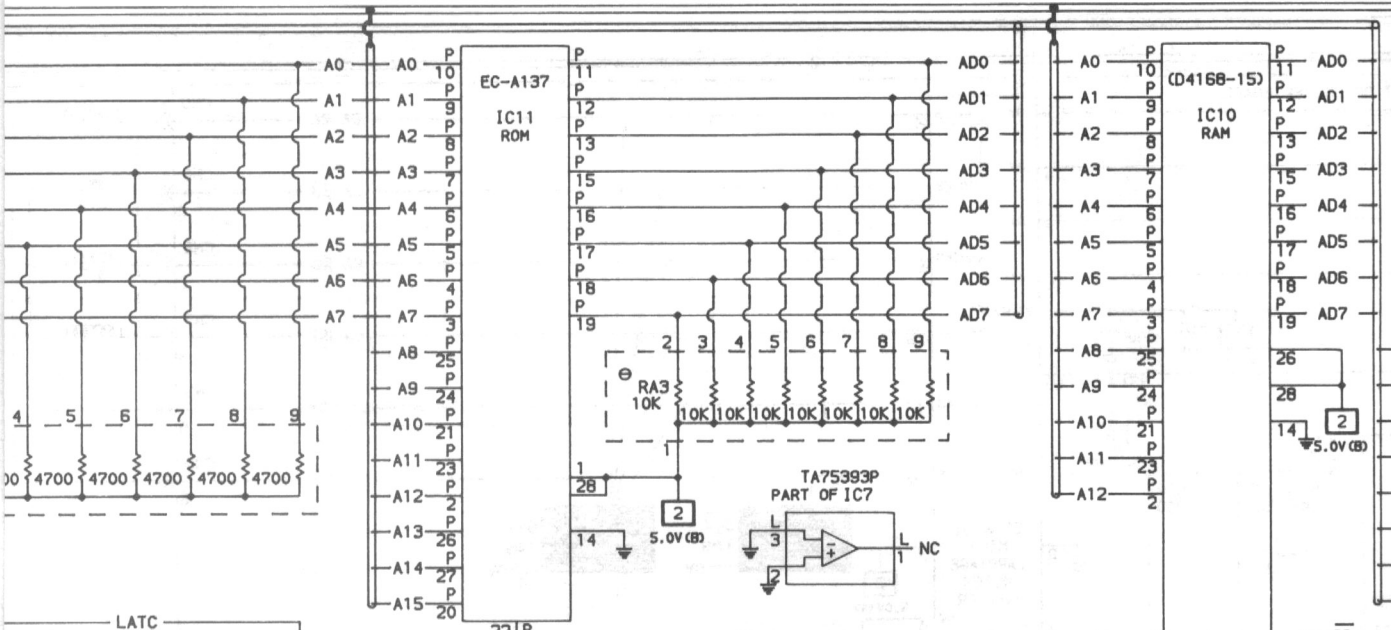
SERVICE INFORMATION

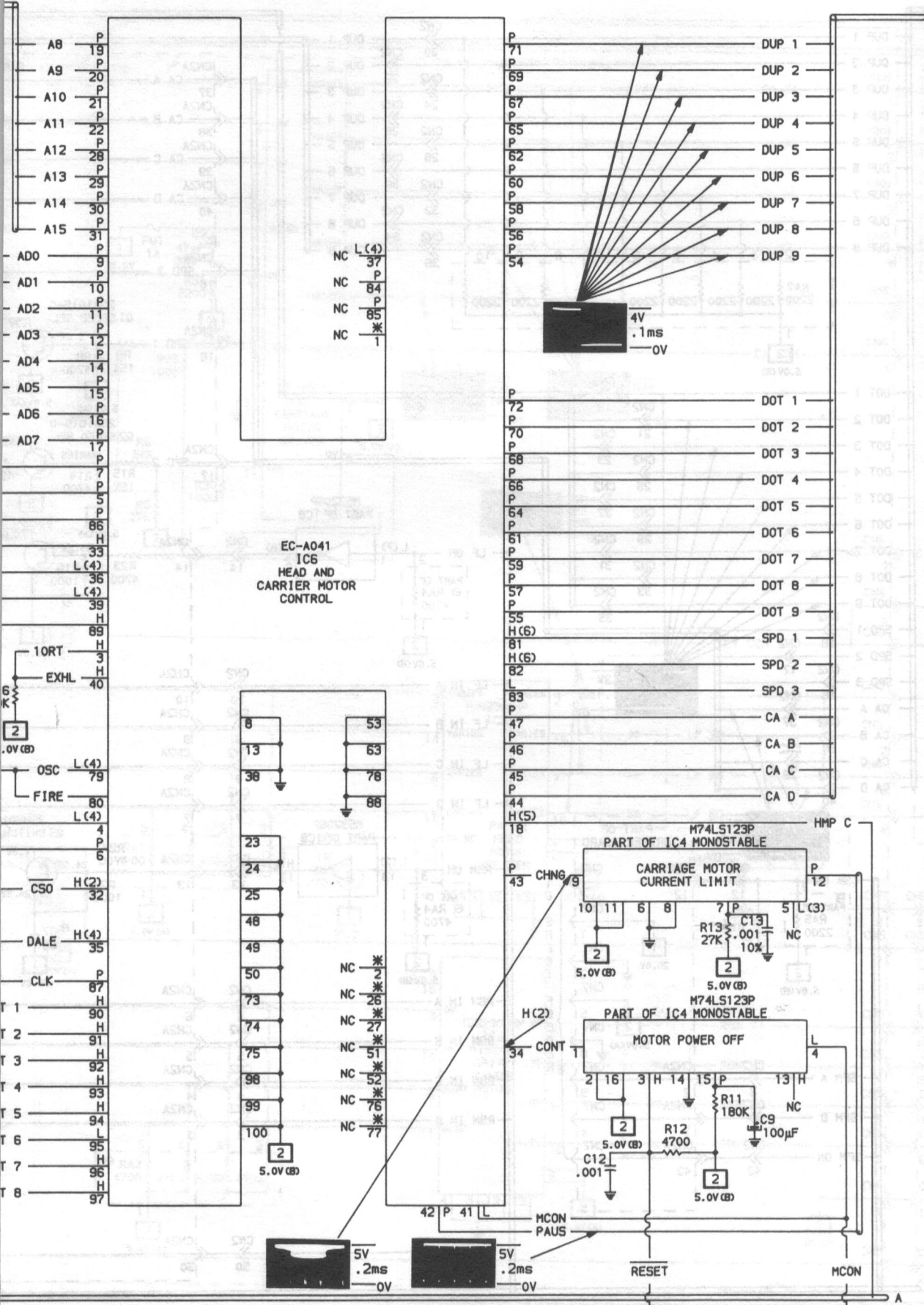
INDEX

	Page		Page
Disassembly Instructions.....	26	Photos	
General Operating Instructions.....	16	AC Input Board.....	22
GridTrace Location Guide		Chassis-Top View.....	21
Logic Board.....	6	Control Panel.....	22
Power Supply/Driver Board.....	5	Logic Board.....	6,7,30,31
IC Pinouts and Terminal Guides.....	9,28	Mechanical-Top View.....	15
Line Definitions	32	Power Supply/Driver Board..	4,8,29,33
Logic Charts.....	23,24	Safety Precautions.....	32
Mechanical Removal and		Schematics.....	2,3,34,35,36,37
Replacement.....	14	Schematic Notes.....	25
Miscellaneous Adjustments.....	27	Test Equipment.....	10
Parts List.....	17,18,19,20	Troubleshooting.....	10,11,12,13

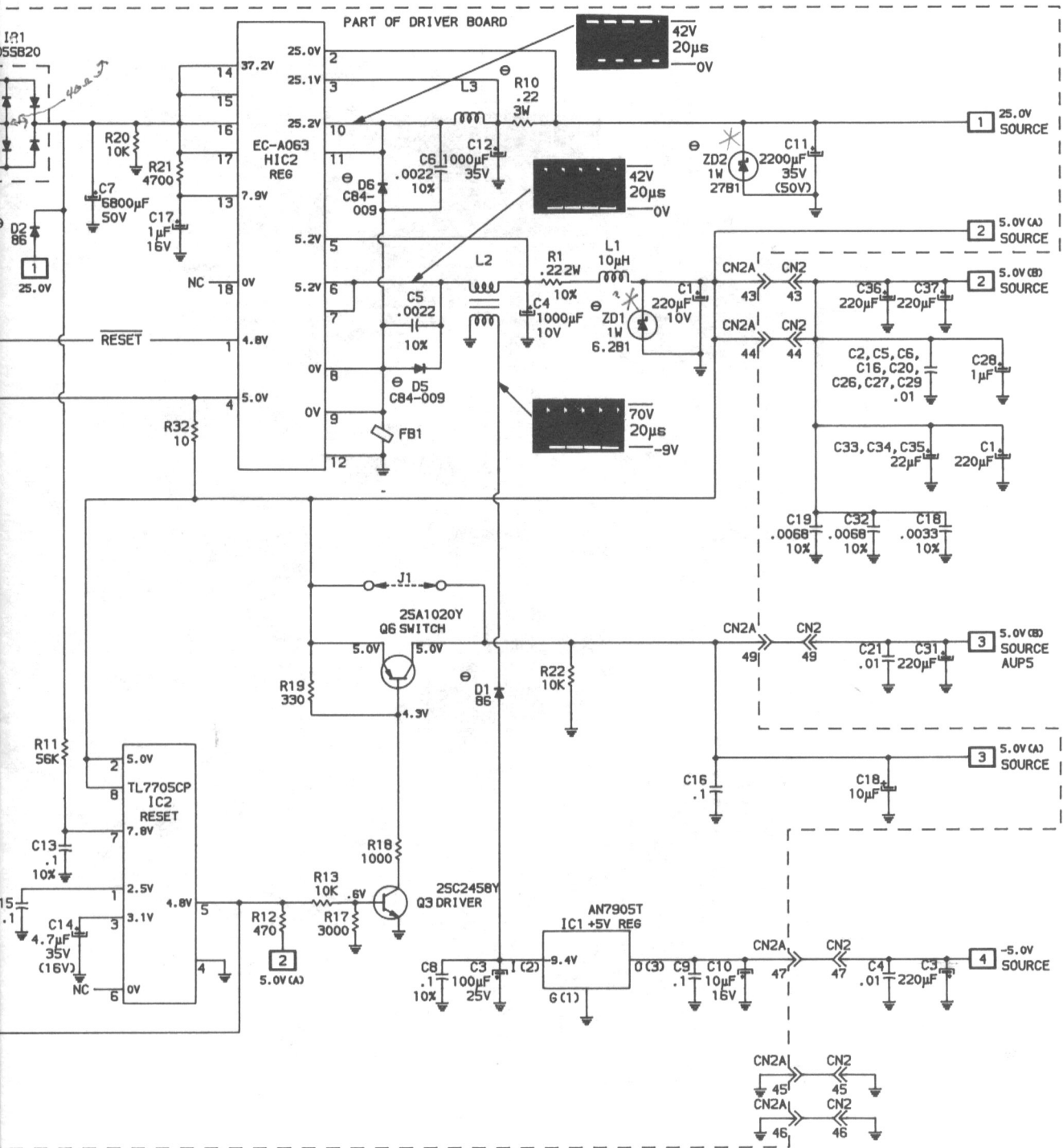


APPLE II EXPANSION CARD
MODEL A8M0310

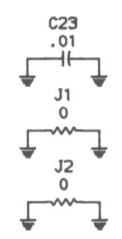




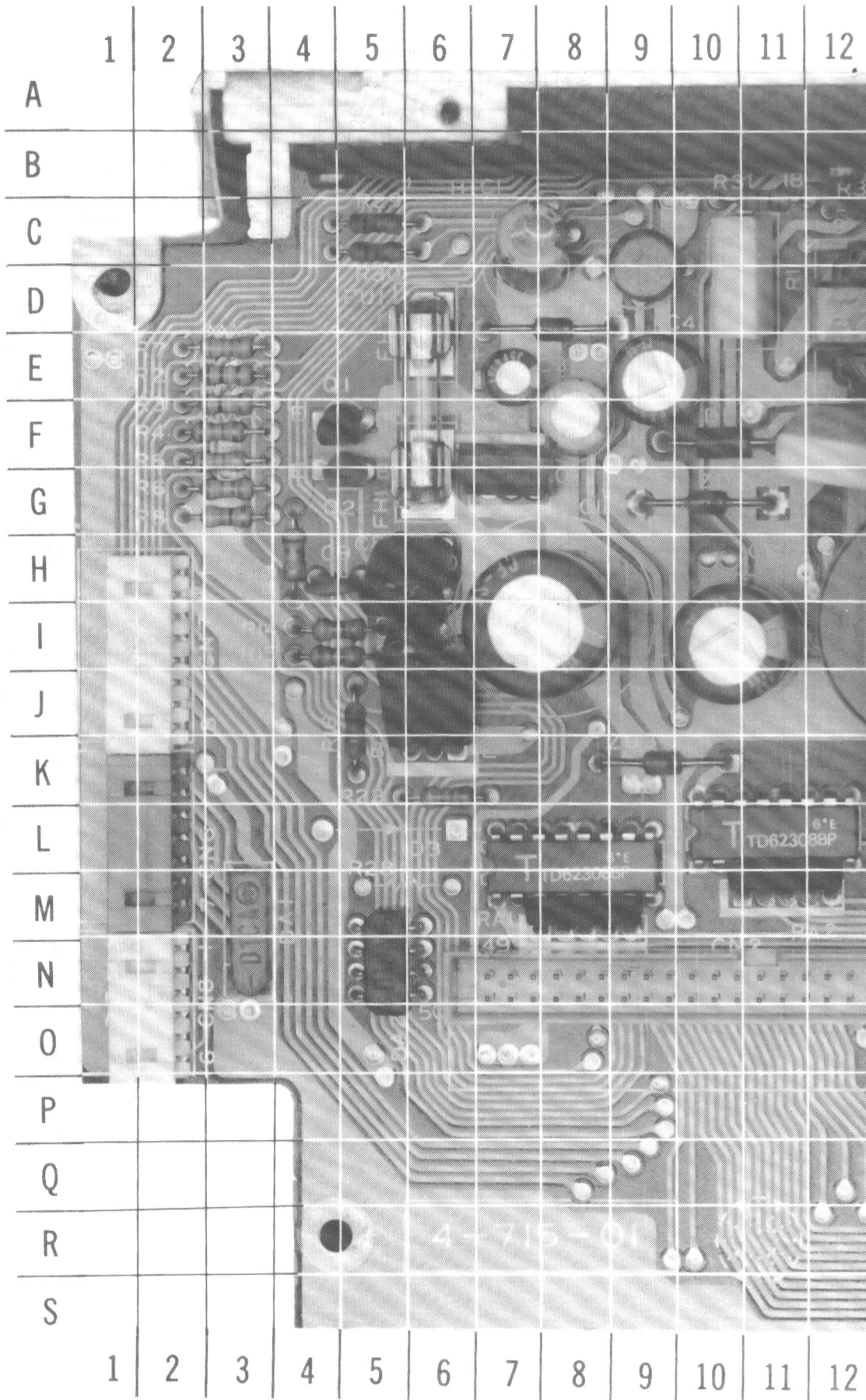
EC-A041
IC6
HEAD AND
CARRIER MOTOR
CONTROL



* Blow's AC fuse.



PIN 28



POWER SUPPLY/DRIVER BOARD

A Howard W. Sams **GRIDTRACE™** Photo

**POWER SUPPLY/DRIVER BOARD
GridTrace LOCATION GUIDE**

C1	C-7	R19	J-18
C2	E-7	R20	P-21
C3	F-8	R21	G-21
C4	E-9	R22	K-20
C5	D-16	R23	K-6
C6	E-15	R24	K-14
C7	E-18	R25	L-15
C8	H-5	R26	M-15
C9	H-4	R27	M-15
C10	I-6	R29	C-5
C11	I-7	R30	C-5
C12	I-10	R31	C-11
C13	H-18	R32	C-13
C14	I-21	RA1	M-8
C15	I-18	RA2	M-11
C16	J-19	ZD1	D-8
C17	J-21	ZD2	G-10
C18	K-21	ZD3	K-9
C19	J-16		
CN2A	N-10		
CN4	I-23		
CN5	Q-19		
CN6	L-2		
CN7	I-2		
CN8	O-2		
D1	F-10		
D2	F-15		
D4	L-15		
D5	C-15		
D6	C-21		
D7	L-18		
DA1	N-3		
DA2	M-5		
DA3	L-13		
FB1	C-16		
FU1	F-6		
FU2	G-22		
HIC1	B-9		
HIC2	B-18		
HIC3	L-19		
HIC4	M-19		
HIC5	N-19		
IC1	F-7		
IC2	I-19		
IC3	L-8		
IC4	L-11		
IR1	E-23		
L1	D-9		
L2	D-13		
L3	I-14		
Q1	F-5		
Q2	G-5		
Q3	I-16		
Q4	J-6		
Q5	K-16		
Q6	J-19		
R1	D-10		
R2	E-3		
R3	F-3		
R4	F-3		
R5	F-3		
R6	G-3		
R7	E-3		
R8	G-3		
R9	H-4		
R10	F-12		
R11	G-15		
R12	H-16		
R13	H-16		
R14	I-5		
R15	I-5		
R16	J-5		
R17	J-17		
R18	J-18		

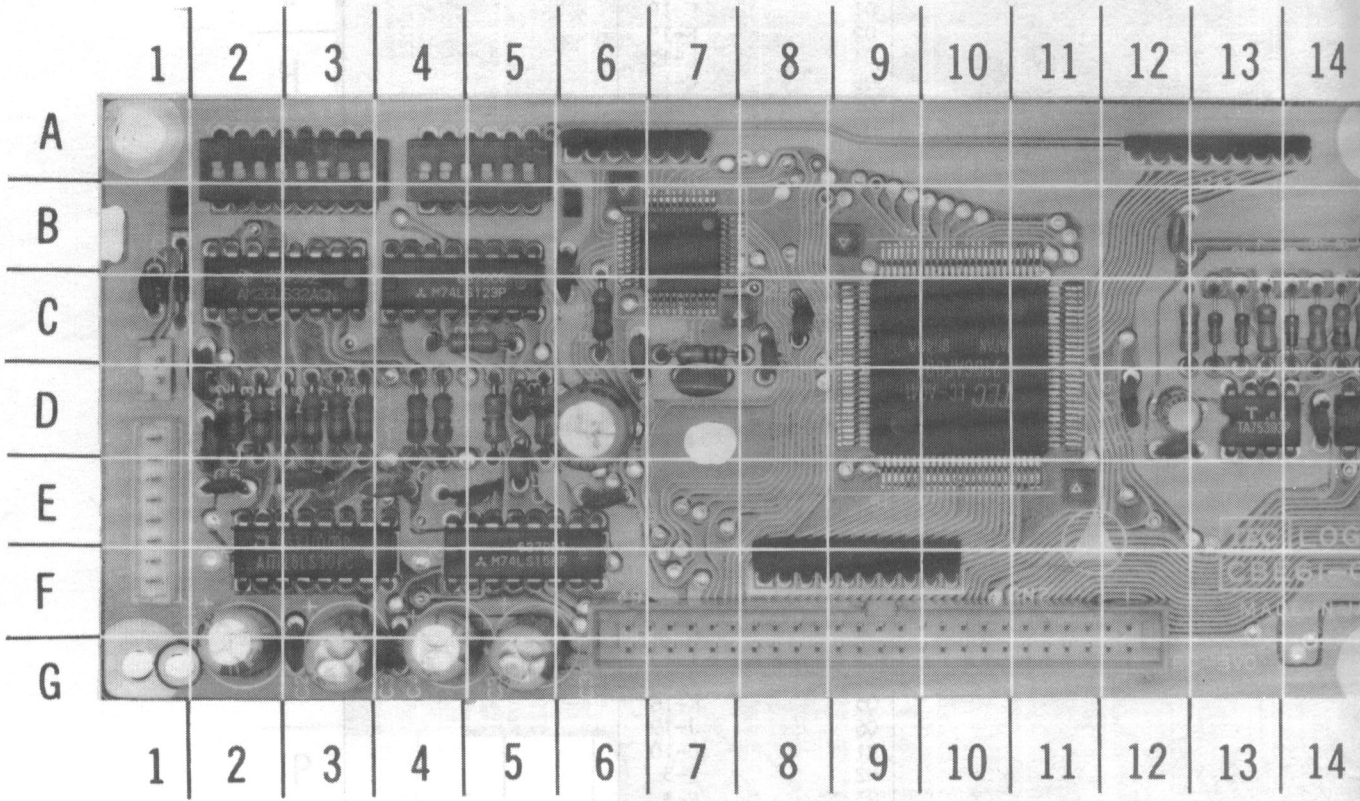
CP27

**APPLE IMAGEWRITER II
MODEL A9M0310**

GridTrace LOCATION GUIDE

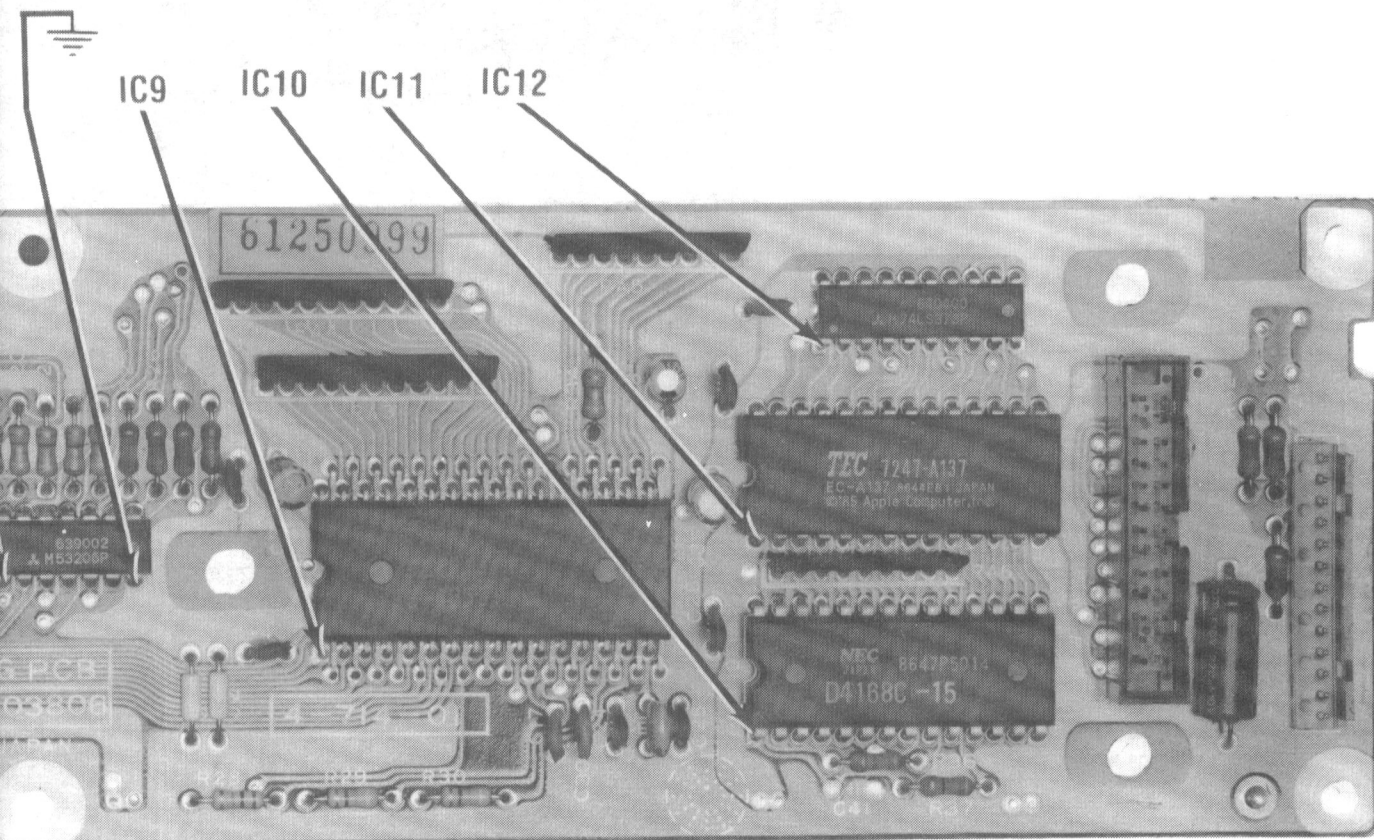
C1	G-2	C21	D-14	CN2	G-9	J2	F-17	R23
C2	G-3	C22	B-12	CN3	E-1	R2	D-2	R24
C3	G-3	C23	C-17	CN9	D-1	R3	D-2	R25
C4	G-4	C24	F-21	CND	D-26	R4	D-3	R26
C5	E-2	C25	F-21	D1	C-13	R5	D-3	R27
C6	E-5	C26	E-22	D2	C-13	R7	D-3	R28
C7	E-3	C27	B-22	D3	C-14	R8	D-3	R29
C8	E-4	C28	B-21	IC1	F-3	R9	D-4	R30
C9	D-6	C29	B-22	IC2	F-5	R10	D-4	R31
C10	D-2	C30	F-20	IC3	C-2	R11	D-5	R32
C11	D-2	C31	G-4	IC4	C-4	R12	C-5	R34
C12	E-5	C32	C-8	IC5	B-7	R13	D-5	R35
C13	D-5	C33	D-12	IC6	C-10	R14	C-7	R36
C14	C-6	C34	C-17	IC7	D-13	R16	C-13	R37
C15	C-8	C35	D-22	IC8	D-15	R17	C-13	R38
C16	C-1	C36	G-5	IC9	D-19	R18	C-14	RA1
C17	F-20	C37	E-27	IC10	E-23	R19	C-14	RA2
C18	B-6	C38	E-6	IC11	C-23	R20	C-14	RA3
C19	D-12	C40	E-17	IC12	B-24	R21	C-15	RA4
C20	D-12	CN1	D-28	J1	F-16	R22	C-15	RA5

CB5J
 MODEL 98M0310
 APPLE IMAGEWRITER II

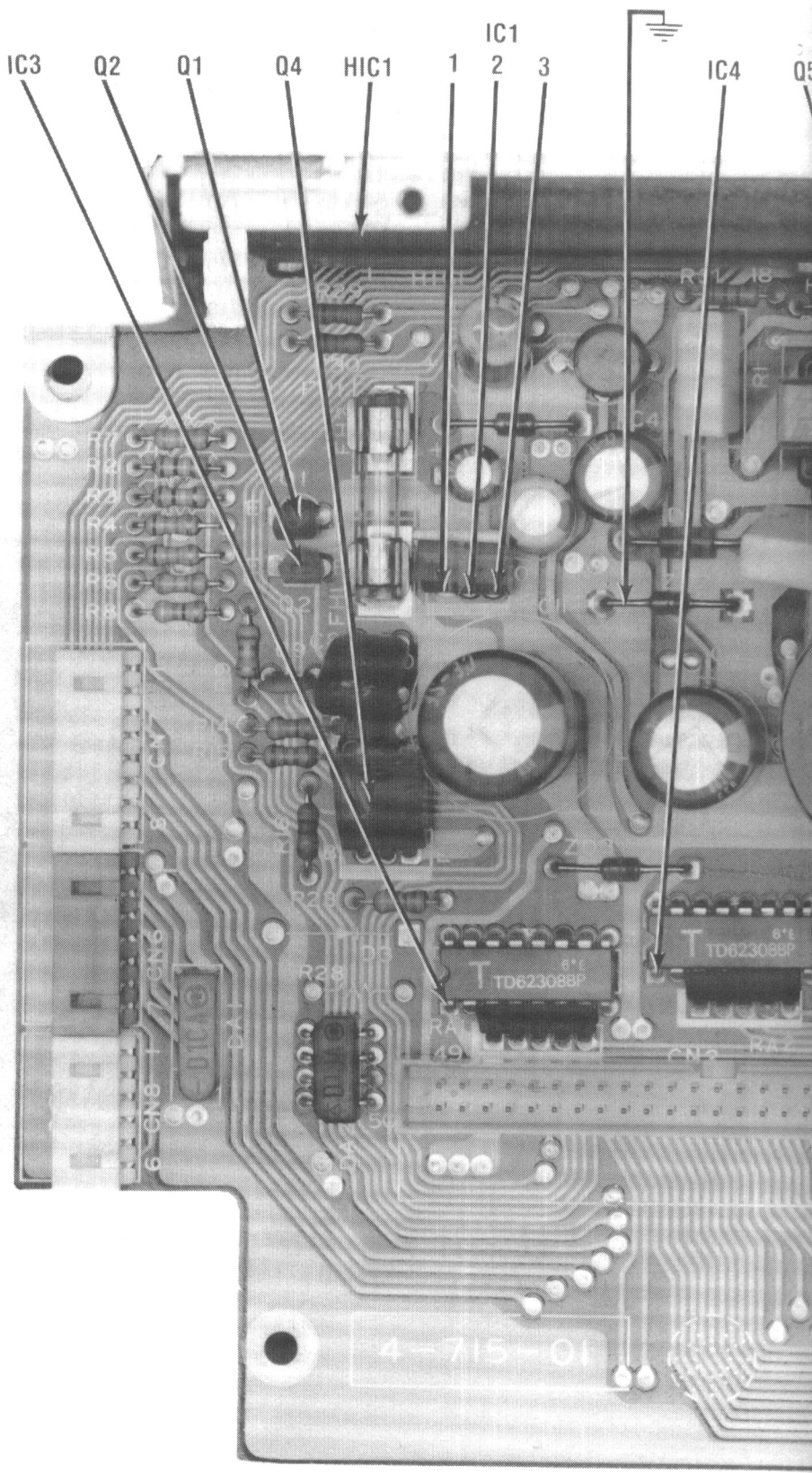


CP27

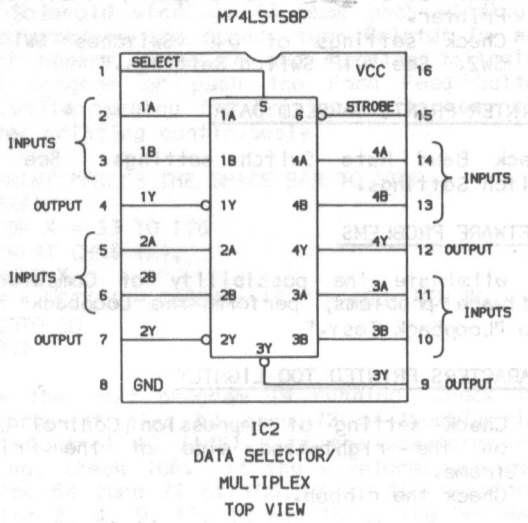
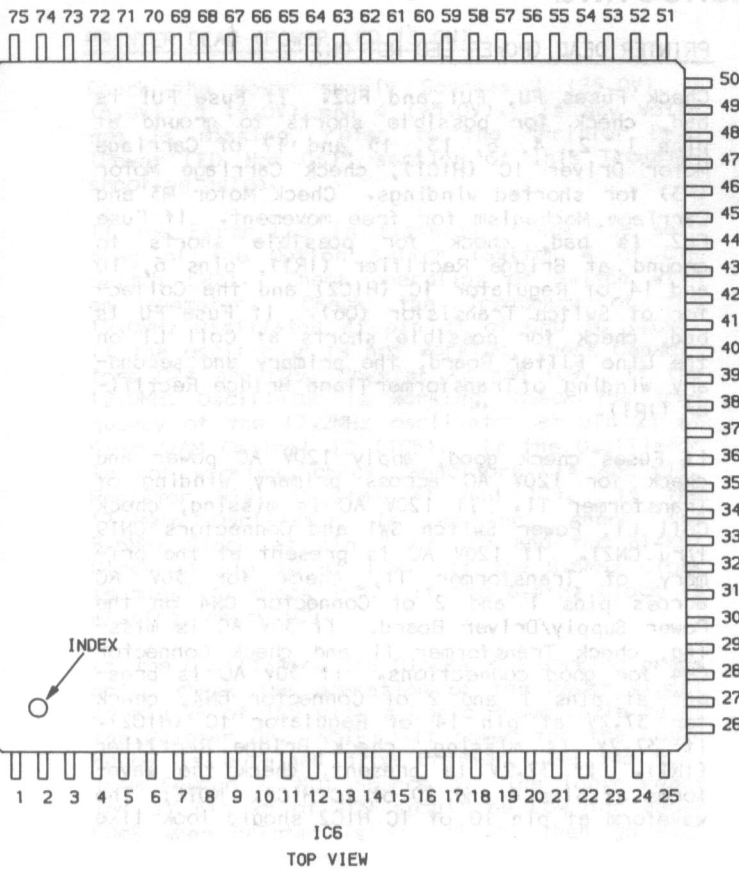
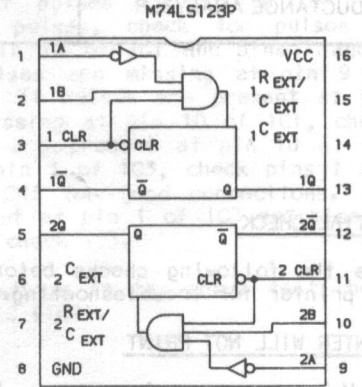
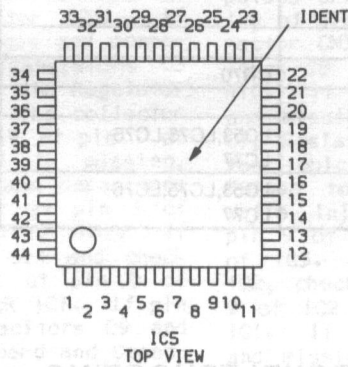
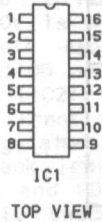
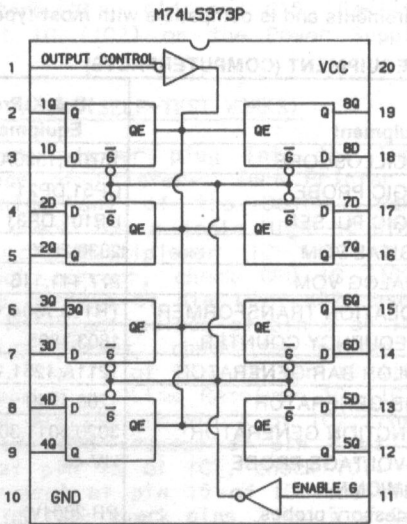
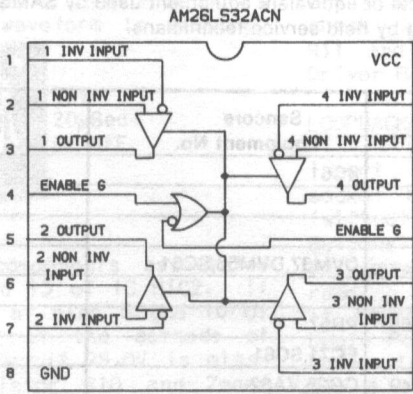
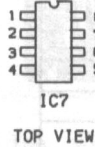
**APPLE IMAGEWRITER II
MODEL A9M0310**



LOGIC BOARD



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



CP27
APPLE IMAGEWRITER II
MODEL A9M0310

TEST EQUIPMENT

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

TEST EQUIPMENT (COMPUTERFACTS)

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

TROUBLESHOOTING

INITIAL CHECK

Make the following checks before disassembling the printer for troubleshooting.

PRINTER WILL NOT PRINT

1. Make sure carrier cover is properly installed. Printer will not operate with cover off.
2. Check cable that connects Printer to Computer for good connections.
3. Make sure paper is properly inserted in Printer.
4. Check settings of DIP Switches SW1 and SW2. See "DIP Switch Settings."

PRINTER PRINTS GARBLED DATA

Check Baud Rate Switch settings. See "DIP Switch Settings."

SOFTWARE PROBLEMS

To eliminate the possibility of Computer or software problems, perform the Loopback Test. See "Loopback Test."

CHARACTERS PRINTED TOO LIGHTLY

1. Check setting of Impression Control Lever on the right-hand side of the Printer frame.
2. Check the ribbon.

PRINTER DEAD (POWER LED NOT ON)

Check Fuses FU, FU1 and FU2. If Fuse FU1 is bad, check for possible shorts to ground at pins 1, 2, 4, 6, 13, 15 and 17 of Carriage Motor Driver IC (HIC1), check Carriage Motor (M3) for shorted windings. Check Motor M3 and Carriage Mechanism for free movement. If Fuse FU2 is bad, check for possible shorts to ground at Bridge Rectifier (IR1), pins 6, 10 and 14 of Regulator IC (HIC2) and the Collector of Switch Transistor (Q6). If Fuse FU is bad, check for possible shorts at Coil L1 on the Line Filter Board, the primary and secondary winding of Transformer T1 and Bridge Rectifier (IR1).

If Fuses check good, apply 120V AC power and check for 120V AC across primary winding of Transformer T1. If 120V AC is missing, check Coil L1, Power Switch SW1 and Connectors CN19 thru CN21. If 120V AC is present at the primary of Transformer T1, check for 30V AC across pins 1 and 2 of Connector CN4 on the Power Supply/Driver Board. If 30V AC is missing, check Transformer T1 and check Connector CN4 for good connections. If 30V AC is present at pins 1 and 2 of Connector CN4, check for 37.2V at pin 14 of Regulator IC (HIC2). If 37.2V is missing, check Bridge Rectifier (IR1). If 37.2V is present, check the waveforms at pins 6 and 10 of IC HIC2. NOTE: The waveform at pin 10 of IC HIC2 should look like

TROUBLESHOOTING (Continued)

the waveform shown in Figure 2 when Printer is not printing. If either waveform is missing,

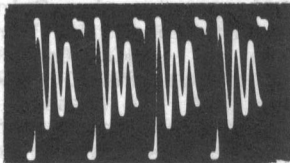


Figure 2

check the voltages and components associated with pins 1 thru 6, 10 and 13 of IC HIC2. If the waveforms are present at pins 6 and 10 of IC HIC2, check for 25.0V at the cathode of Zener Diode ZD2 (Source 1). If 25.0V is missing, check Coil L3, Resistor R10 and Zener Diode ZD2. If 25.0V is present, check for 5.0V at pin 43 of Connector CN2A (Source 2). If 5.0V is missing, check Transformer L2, Resistor R1 and Coil L1. If 5.0V is present at pin 43 of Connector CN2A, check for 5.0V at the collector of Switch Transistor (Q6). If 5.0V is missing, check the voltages and components associated with Switch Transistors Q3 and Q6 and pins 1, 3, 5 and 7 of the Regulator IC (IC2). If 5.0V is present at the collector of Transistor Q6, check for -9.4V at pin 1 of Regulator IC (IC1). If -9.4V is missing, check Transformer L2, Diode D1 and Capacitors C3 and C8. If -9.4V is present at pin 1 of IC1, check for -5.0V at pin 0 of IC1. If -5.0V is missing, turn Printer Off and check for a possible short to ground at pin 0 of IC1. If no short is found, check IC1. If pin 0 of IC1 is shorted, check Capacitors C9 and C10 on the Power Supply/Driver Board and Capacitors C3 and C4 on the Logic Board.

PRINTER DEAD (POWER LED IS ON)

Check the power supply Sources 1 (25.0V), 2 (5.0V), 3 (5.0V) and 4 (-5.0V). If any voltage is missing, refer to the "Printer Dead (Power LED Not On)" section of this Troubleshooting guide.

If the Error LED is flashing, check the setting of the Option Switch (Switch 4 of DIP Switch SW2). Check operation of Switch with an ohmmeter. Check the frequency of the 12.0MHz Oscillator at pin 31 of CPU IC (IC9). If the oscillator is not working, check Capacitors C24 and C25, Crystal X2 and IC9. If the 12.0MHz Oscillator is working, check the frequency of the 17.2MHz oscillator at pin 21 of Clock/RAM Control IC (IC5). If the Oscillator is not working, check Capacitors C14 and C15, Resistor R14, Crystal X1 and IC5. If the 17.2MHz Oscillator is working, check the 8.6MHz Clock at pin 7 of IC5 and the 614KHz Clock at pin 20 of IC9. If the 8.6MHz Clock is missing, check IC5. If the 614KHz Clock is missing, check IC9.

If the Oscillators and Clocks are working properly, check the operation of the Reset signal at pin 28 of IC9 with a Logic Probe while turning Printer On. NOTE: If power for the Logic Probe is obtained from Printer, use the 5.0V from Source 2, NOT Source 3. The logic reading at pin 28 of IC9 should be Low for about 60MS when Printer is turned On, then go High

and stay High. If the reading is not correct, check Capacitors C13, C14 and C15, Resistor R11 and Reset IC (IC2) on the Power Supply/Driver Board.

LOOPBACK TEST FAILS (SELF-TEST WORKS)

Insert loopback adapter plug into the input socket on rear of Printer. Turn Printer On (without pushing any of the Control Panel Buttons) and check for a logic High at pin 1 of Data Selector/Multiplexer IC (IC2). If reading is not correct, check CPU IC (IC9). If reading is correct at pin 1 of IC2, use a Logic Pulser to inject pulses at pin 3 of IC2. While injecting pulses, check for pulses at pin 4 of IC2, pin 15 of Line Driver IC (IC1) and pins 7 and 5 of Line Receiver IC (IC3). If pulses are missing at pin 4 of IC2, check IC2. If pulses are present at pin 4 of IC2 and missing at pin 15 of IC1, check IC1. If pulses are present at pin 15 of IC1 and missing at pin 7 of IC3, check pins 3 and 5 of Connector CN3 for good connection and check Capacitors C8 and C10 and Resistors R2, R3, R9 and R10. If pulses are present at pin 7 of IC3 and missing at pin 5 of IC3, check Capacitor C7, Resistors R6, R7 and R8 and IC3. If all the logic readings check good, use the Logic Pulser to inject pulses at pin 10 of IC2. While injecting pulses, check for pulses at pin 9 of IC2, pin 10 of IC1 and pins 1 and 3 of IC3. If pulses are missing at pin 9 of IC2, check IC2. If pulses are present at pin 9 of IC2 and missing at pin 10 of IC1, check IC1. If pulses are present at pin 10 of IC1 and missing at pin 1 of IC3, check pins 1 and 2 of Connector CN3 for good connections. If pulses are present at pin 1 of IC3 and missing at pin 3 of IC3, check IC3.

If all logic readings in the above test check good, check CPU IC (IC9).

PRINT HEAD

Print Head (M4) does not work or dots are missing. Check the Print Head wires for dirt. Check Print Head Ribbon Cable for tears and check Connectors CN2, CN2A, CN5 and CN5A for good connections. Check resistance of Print Head Solenoid windings (3 ohms each winding). If no problems are found, turn Printer On and insert paper. Type in and run the following Basic program or push the Form Feed button down while turning the Printer On to keep the Printer printing continuously.

```
10 PRINT "PRESS THE SPACE BAR TO STOP"
20 PR#1
30 FOR X = 33 TO 126
40 PRINT CHR$(X);
50 NEXT X
60 Y = PEEK (-16384): IF Y = 160 THEN 80
70 GOTO 30
80 PR# 0
```

While the test program is running, check the waveforms at pins 54 thru 72 of Head/Carrier Motor Control IC (IC6). If the waveforms are missing, check IC6. If the waveforms are good at pins 54 thru 72 of IC6, check the waveforms at pins 2, 4, 9, 11, 16 and 18 of the Dot Head

TROUBLESHOOTING (Continued)

Driver IC's (HIC3, HIC4 and HIC5). If any waveform is not correct or missing, check the IC with the defective waveform.

Poor print quality. Check adjustment of the Impression Control Lever on the right side of Printer. Check Print Head wires for dirt and clogging. If no problems are found, put Printer in self-test mode, see the "Self-Test" section and check the waveform at pin 7 of IC7 on the Logic Board while Printer is printing. If the waveform is missing, check the voltages and components associated with pins 5, 6 and 7 of IC7 and check IC7.

CARRIAGE (PRINT HEAD) MOTOR

Carriage Motor (M3) does not operate. Remove and check the Ribbon Cartridge for possible binding (the knob on the cartridge should turn freely in a clockwise direction). If the Ribbon Cartridge checks good, manually move the carriage assembly to check for possible binding. If the carriage assembly works properly, check Fuse FU1 on the Power Supply/Driver Board. If FU1 is bad, check for possible shorts to ground at pins 2, 4, 6, 13, 15 and 17 of the Carriage Motor (M3) windings (3.5 ohms from pins 1 to 5, 3 to 5, 2 to 6 and 4 to 6 of Connector CN8). If Fuse FU1 is good, turn Printer On and check for 24.5V at pin 1 of IC HIC1. If 24.5V is missing, refer to the "Printer Dead (Power LED Not On)" section of this Troubleshooting guide. If 24.5V is present at pin 1 of IC HIC1, insert paper in Printer, type in and run the following Basic program or push the Line Feed button down while turning Printer On to keep the carriage assembly moving back and forth continuously.

NOTE: Insert 70 spaces between the dots in line 30.

```
10 PRINT "PRESS THE SPACE BAR TO STOP"
20 PR#1
30 PRINT ". ."
40 X = PEEK ( - 16384 ) : IF X = 160 THEN 60
50 GOTO 30
60 PR# 0
```

While the test program is running, check for a logic Low at pin 83 and check the waveforms at pins 44 thru 47 of the Head and Carrier Motor Control IC (IC6). If the logic reading or waveforms are not correct, check IC6. If the logic reading and waveforms are correct, check the waveforms at pins 2, 4, 6, 13, 15 and 17 of IC HIC1. If the waveforms are not correct, check the Carriage Motor (M3) windings and check IC HIC1.

Carriage assembly moves slightly to the right, then stops and the Control Panel buttons have no effect, when Printer is turned On. Check for a possible shorted or stuck Home Position Switch (SW11).

Carriage assembly bangs against the left stop continuously when Printer is turned On. Check to see if the Home Position Switch (SW11) is being activated properly when the carriage assembly reaches the left stop. Also check Switch SW11 for a possible open circuit and check pin 41 of Connector CN2 and pin 10 of Connector CN5 for good connections.

PAPER FEED MOTOR

Paper Feed Motor (M2) operates when Printer is turned On, but the Line Feed SW5 and Form Feed SW6 buttons do not work. Check for a logic Low at pin 35 of the CPU IC (IC9) when the Line Feed Button (SW5) is pressed and at pin 36 of IC9 when the Form Feed Button (SW6) is pressed. If the readings are not correct, check pins 11, 12 and 13 of Connectors CN1 and CN1A for good connections, check Switches (SW5 and SW6) for continuity when pressed and check Resistor Pack RA5. If the logic readings are correct at pins 35 and 36 of IC9, check IC9.

Paper Feed Motor (M2) does not operate. Manually turn the Platen Knob to check for possible binding of the gears or motor. If the platen operates properly, check Connector CN6 for good connections and check the resistance of the Paper Feed Motor (M2) windings (22 ohms from pins 1 to 5, 3 to 5, 2 to 6 and 4 to 6 of Connector CN6). If the connector and motor check good, turn the Printer On and check for 24.6V at pin 9 of the Paper Feed Motor Driver IC (IC3). If 24.6V is missing, check Zener Diode ZD3. If 24.6V is present at pin 9 of IC3, type in and run the following Basic program which makes the Paper Feed Motor (M2) run continuously.

```
10 PR# 1
20 PRINT CHR$(12):GOTO 20
```

While the program is running, check for a logic High at pin 4 of Clock/RAM Control IC (IC5) on the Logic Board. If the reading is not correct, check IC5. If pin 4 of IC5 checks logic High, check for a logic Low at pin 2 of IC8. If pin 2 of IC8 does not read logic Low, check IC8. If pin 2 of IC8 reads logic Low, check for 24.6V at the Collector of Switch Transistor (Q4) on the Power Supply/Driver Board. If 24.6V is missing, check Transistor Q4, Resistors R16 and R23 and check pin 14 of Connector CN2 for good connections. If 24.6V is present at the collector of Transistor Q4, check the waveforms at pins 3, 6, 11 and 14 of IC3. If the waveforms are missing, check CPU IC (IC9) on the Logic Board and check pins 7 thru 9 of Connector CN2 for good connections. If the waveforms are present at pins 3, 6, 11 and 14 of IC3, check the waveforms at pins 2, 7, 10 and 15 of IC3. If the waveforms are not correct, check IC3, Diodes DA1 and DA2 and the Paper Feed Motor (M2).

COLOR RIBBON

Ribbon Drive Motor (M1) does not operate. NOTE: The Ribbon Drive Motor should move the ribbon assembly down and up once when the Printer is turned On when either the regular ribbon or color ribbon is installed. Check the ribbon carrier assembly and Ribbon Drive Motor (M1) for free movement with no binding. Check the Ribbon Cable for possible tears and check Connectors CN5, CN2 and CN2A for good connections. Check the resistance of Motor (M1) windings (120 ohms from pins 3 to 7, 5 to 7, 4 to 8 and 6 to 8 of Connector CN5). If no problems are found, insert paper into the Printer and turn Printer On. Type in and run the following Basic program or run the built-in

TROUBLESHOOTING (Continued)

self-test, see the "Self-Test" section of this Troubleshooting guide.

```
10 PRINT "PRESS THE SPACE BAR TO STOP"
20 DATA 48,49,50,51
30 PRINT CHR$(4);"PR# 1"
40 FOR X = 1 TO 4
50 READ Y
60 PRINT CHR$(27) CHR$(75) CHR$(Y);
70 PRINT "HHHHH";
80 NEXT X
90 PRINT
100 RESTORE
110 Y = PEEK ( - 16384): IF Y = 160 THEN 130
120 GOTO 40
130 PRINT CHR$(4);"PR# 0"
```

Color Ribbon must be installed in the Printer or the Color Ribbon Switch (SW9) on the ribbon assembly must be taped closed before a program can operate the Ribbon Drive Motor. While the test program is running, check the logic readings at pins 12 and 13 of IC8 on the Logic Board. Pin 13 should be pulsing High and pin 12 pulsing Low each time Motor (M1) is turned On to change the ribbon color. If the logic reading is not correct at pin 13 of IC8, check IC5. If the logic reading is correct at pin 13 and not correct at pin 12 of IC8, check IC8. If the logic readings are correct at pins 12 and 13 of IC8, check for a voltage change of 4V to 22V at the Collector of Switch Transistor (Q5) each time Motor (M1) is turned On to change the ribbon color. If the voltage is not correct at the Collector of Transistor Q5, check Diodes D4 and D7, Resistors R25 and 27 and Transistor Q5. If the voltage is correct at Transistor Q5, check the waveforms at

pins 3, 6, 11 and 14 of the Ribbon Drive Motor IC (IC4). If the waveforms are missing, check CPU IC (IC9). If the waveforms are present, check the waveforms at pins 2, 7, 10 and 15 of IC4. If the waveforms are missing at pins 2, 7, 10 or 15 of IC4, check Diode DA3 and IC 4.

Ribbon Drive Motor operates when Printer is first turned On, but not when the self-test is run or a program is used that uses color. Check for a logic Low at pin 40 of IC9 (with color ribbon installed). If the reading is not correct, check pin 11 of Connectors CN2 and CN2A and pins 9 and 12 of Connector CN5 for good connections. If the connectors check good, check the Color Ribbon Switch (SW9) for proper operation and continuity when closed.

Colors are not correct. Check the adjustment of the Ribbon Shift Cam. See "Miscellaneous Adjustments."

PRINTER PRINTS GARBLED DATA (BAUD RATE SWITCHES SET PROPERLY)

Check the frequency of the 17.2MHz Oscillator at pin 21 of the Clock/RAM Control IC (IC5). If the oscillator is off frequency, check Capacitors C14 and C15 and Crystal X1. If the frequency is correct, check the frequency at pin 19 of CPU IC (IC9) which should be 16 times the baud rate set by Switches 1 and 2 of DIP Switch SW2 (300 baud = 4800Hz, 1200 baud = 19.2kHz, 2400 baud = 38.4 kHz and 9600 baud = 153.6kHz). If the frequency is not correct, check Switches 1 and 2 of DIP Switch SW2 for continuity and check IC5. If the frequency is correct at pin 19 of IC9, check IC9.

CP27
APPLE IMAGEWRITER II
MODEL A9M0310

MECHANICAL REMOVAL AND REPLACEMENT

PRINT HEAD

Remove Cabinet Top Cover and Ribbon Cartridge. Push white plastic Latch (1) away from Print Head (13) and carefully pull Print Head straight up. The printed board fits securely into the Cable Socket (14) and may require a hard pull to remove.

RIBBON CASSETTE

Remove the Cabinet Top Cover. Carefully push outward on the Cassette Latch Arms (2) while lifting up on Cassette.

To replace Ribbon Cassette, place new cassette on the Ribbon Cassette Mount Plate (11) and push downward until it snaps in place. Turn the Cassette Knob until Cassette Drive Gear (3) slips into place.

RIBBON WIRE

Remove Cabinet Top Cover and Ribbon Cassette. Remove Color Cassette Sensor Wires (4) from wire guide on Ribbon Cassette Mount Plate (11). Press in on the left and right Shaft Brackets (5) and lift to release Ribbon Cassette Mount Plate from the Carriage Assembly (6). Release four tabs securing Color Cassette Sensor (15) to Ribbon Cassette Mount Plate, and push sensor up through bottom of Ribbon Cassette Mount Plate. Lay sensor out of the way. Note how Ribbon Wire (7) is wrapped around Ribbon Pulley Gear (8), and how Ribbon Wire is positioned through Ribbon Cassette Mount Plate. Remove Ribbon Wire from Tension Spring (12) on Left Ribbon Wire Arm (8). Remove Ribbon Wire from Right Ribbon Wire Arm (9). Remove Ribbon Wire from Ribbon Pulley Gear.

To install the Ribbon Wire, attach one end to Right Ribbon Wire Arm. Thread wire around Ribbon Pulley Gear and attach Tension Spring on Left Ribbon Wire Arm. Press in left and right Shaft Brackets and install Ribbon Cassette Mount Plate to Carriage Assembly. Push Color Cassette Sensor into opening on Ribbon Cassette Mount Plate until it locks into place. Place Color Cassette Sensor Wire back into wire guide on Ribbon Cassette Mount Plate. Reinstall Ribbon Cassette and Cabinet Top Cover.

CARRIER BELT

Remove Cabinet Top Cover, Print Head and Ribbon Wire. Loosen Carrier Belt Tension Screw (16). Press in on Carrier Belt Tension Lever (17) and remove Carrier Belt (18) from Idler Pulley (19) and Carrier Motor Pulley (20). Remove Carrier Belt Clamp (21) and remove Belt. The belt and clamp may be glued into place. A drop of rubber cement solvent can be used to loosen. CAUTION: Too much solvent can damage belt and clamp. Reinstall in the reverse order.

CARRIER MOTOR

Remove Printer Mechanism. Loosen Carrier Belt Tension Screw (16). Press in on Carrier Belt Tension Lever (17) and remove Carrier Belt (18) from Carrier Motor Pulley (20). Remove three screws and washers securing Carrier

Motor (22) to Printer Mechanism and disconnect Connector CN8 on Logic Board (23). Remove Carrier Motor. Reinstall in reverse order.

LINE FEED MOTOR

Remove Printer Mechanism. Remove two screws securing Line Feed Motor (24). Remove motor. Reinstall in reverse order.

TRACTOR FEED ASSEMBLY

Remove Printer Mechanism. Remove two screws securing Connector P8 (26) and move Connector aside. Remove two screws (27), one on each end of Tractor Assembly (28), and slide Tractor Assembly out of Printer. Reassemble in reverse order.

PLATEN

Remove Carrier Cover, Ribbon Cartridge, Tractor Cover, Left Leg, Right Leg and Print Head (13). Remove front Paper Guide (29) by removing two screws holding it to Carriage Assembly (6). Remove two Springs (31) from Paper Ball (30). Remove Platen Knob (33) and Paper Release Assembly (34) by sliding off of Platen Shaft (36). Remove screws securing left and right Platen Holders (32). Push Paper Ball away from Platen (35). Lift Platen straight up and out of Printer. Reassemble in reverse order.

CARRIAGE ASSEMBLY

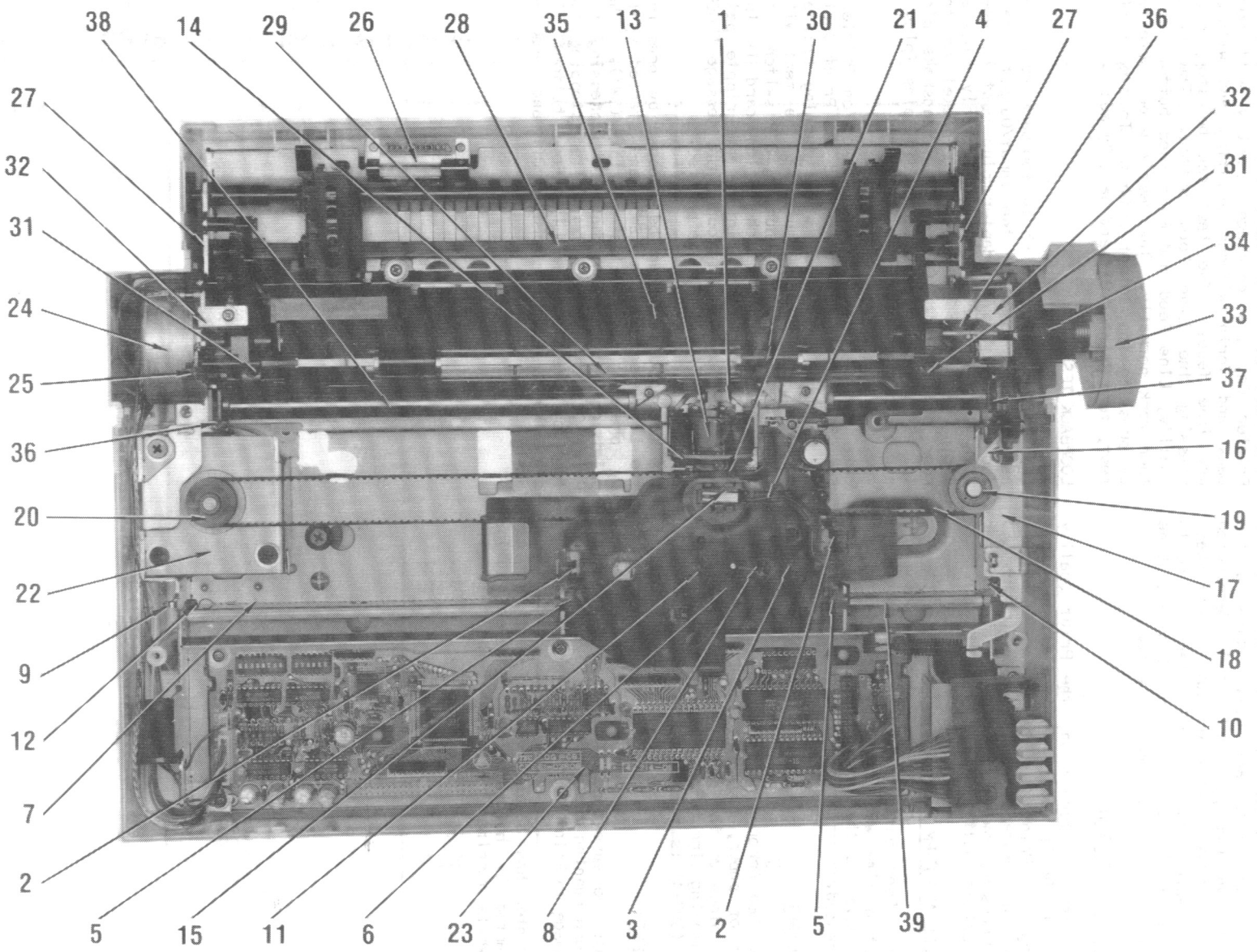
Perform Printer Mechanism Removal. Remove Print Head and Line Feed Motor. Remove front Paper Guide (29) by removing two screws securing it to Carriage Assembly (6). Remove Ribbon Wire (7) and Carrier Belt (18). Remove screw securing Left Carrier Shaft Bracket (36). Press in on tab securing Left Carrier Shaft Bracket to Printer Mechanism and pry up on Carrier Shaft (38) to release Left Carrier Shaft Bracket. Press in on tab securing Right Carrier Shaft Bracket (37) to Printer Mechanism, and pry up on Carrier Shaft (38) to release Right Carrier Shaft Bracket. Slide Carriage Assembly to right until it lines up with the indentation in Carriage Assembly Rail (39). Release front of Carriage and remove Carriage Assembly. Reassemble in reverse order.

COLOR RIBBON MOTOR

Remove Carriage Assembly. Remove two screws securing Color Ribbon Motor Bracket to Carriage Assembly. Disconnect Color Ribbon Motor Connector from Print Head Board. Slide Color Ribbon Motor Bracket from Carriage Assembly. Remove two screws holding Color Ribbon Motor to bracket. Remove Color Ribbon Connector from bracket and remove wires from clip on bottom of bracket. Reassemble in reverse order.

PRINT HEAD BOARD

Remove Carriage Assembly. Disconnect Print Head Cable from Print Head Board. Remove two screws securing Print Head Board to Carriage Assembly. Disconnect Color Ribbon Motor Connector and remove board. Reassemble in reverse order.



CP27
 APPLE IMAGEWRITER II
 MODEL A9M0310

MECHANICAL - TOP VIEW

GENERAL OPERATING INSTRUCTIONS

SELECT BUTTON

The Printer is Selected (ready to receive data from computer) when the Select button LED's are On. The Printer is deselected when the Select button LED's are Off. Pressing the Select button once puts Printer in deselected state, and pressing it again puts Printer back in the selected state. The Printer must be in deselected state before Print Quality, Line Feed and Form Feed buttons will work.

PRINT QUALITY BUTTON

When Printer is turned On, the Print Quality will be in Draft Quality mode (left LED On). Pressing the Print Quality button once puts Printer in Standard Quality mode (right LED On). Pressing the button again puts Printer in New Letter Quality mode (both LED's On).

LINE FEED AND FORM FEED BUTTONS

The Line Feed button advances the paper one line at a time when pressed. The Form Feed button advances the paper one page at a time when pressed.

ERROR LIGHT

The red LED Error light will be On if Printer is out of paper, blinking if front cover is not in place or the print mechanism is jammed and blinking irregularly if the Option DIP Switch (SW2-4) is not set properly.

SELF-TEST

WARNING: Be sure paper is installed in Printer before running the self-test to avoid possible damage to Print Head and Platen.

The Printer has a built-in self-test that can be started by holding the Form Feed button down while turning Printer On. The test will

print ROM revision number, DIP switch settings and indicate which option card is installed, then the ripple pattern will be printed continuously until the test is stopped. If the Line Feed button is held down while turning Printer On, the carriage assembly will move back and forth without printing and without any line feeds. The test can be stopped by pressing the Line Feed button. The Print Quality, Line Feed and Form Feed buttons will then work normally. The test can be restarted by pressing the Select button. To stop self-test, turn Printer Off and back On again.

LOOPBACK TEST

The Printer has a built in loopback test that can be used to check the Input/Output Interface Circuits. An adapter plug must be used with the test for it to work properly. Use an 8-pin plug that fits the I/O socket on the rear of Printer. Connect the handshake pins (pins 1 and 2) together and data pins (pins 3 and 5) together.

Plug adapter into the I/O socket on Printer. Insert paper in Printer. Hold the Print Quality Button (SW4) down while turning Printer On, then release the button. The test will print the ROM revision number, DIP switch settings and indicate which option card is installed, then start printing the ripple pattern. If a problem is found, the message "LOOPBACK TESTS FAILS" will be printed.

The Loopback test can be stopped by pressing the Line Feed Button (SW5) and started again by pressing the Select Button (SW3). The print quality can be changed by pressing the Print Quality Button (SW4) after stopping the test by pressing the Line Feed button. To stop the test, turn Printer Off and back On again.

PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.					NOTES
		NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	
LOGIC BOARD						
D1,2,3						
IC1	AM26LS30PC	NTE519	ECG519	SK3100/519	103-131	
IC2	M74LS158P	NTE74LS158	ECG74LS158	SK7CT158		
IC3	AM26LS32ACN					
IC4	M74LS123P	NTE74LS123	ECG74LS123	SK74LS123	HE-443-942	
IC5	EC-A042					
IC6	EC-A041					
	2106AF001					
IC7	TA75393P	NTE943M	ECG943M	SK9278	905-420	
IC8	M53206P	NTE7406	ECG7406	SK7406	HE-443-698	
IC9	EC-A056					
IC10	D4168C-15					
IC11	EC-A137					
	7247-A137					
IC12	M74LS373P	NTE74LS373	ECG74LS373	SK74LS373	HE-443-867	
ZD1	6.2B1	NTE5013A	ECG5013A	SK6A2/5013A	103-Z9008	
POWER SUPPLY/DRIVER BOARD						
D1,2	86	NTE116	ECG116	SK3311	212-76-02	
D3		NTE116	ECG116	SK3311	212-76-02	
D4	86	NTE116	ECG116	SK3311	212-76-02	
D5,6	C84-009					
D7	86	NTE116	ECG116	SK3311	212-76-02	
DA1	D1CA					
DA2,3	D1JA					
HIC1	EC-A051					
HIC2	EC-A063					
IC1	AN7905T	NTE961	ECG961	SK3671/961	HE-442-630	
IC2	TL7705CP					

USED IN SOME VERSIONS

8 PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFR. PART No./ TYPE No.	NTE	ECG	RCA	ZENITH	NOTES
		PART No.	PART No.	PART No.	PART No.	
IC3,4 IR1 Q1,2 Q3 Q4,5 Q6 ZD1 ZD2,3	TD62308BP D5SB20 A1015-O(JAPAN) C2458Y(JAPAN) B601K(JAPAN) A1020Y(JAPAN) 6.2B1(1WATT) 27B1(1WATT)	NTE290A NTE85 NTE262 NTE294 NTE5070A NTE5082A	ECG290A ECG85 ECG262 ECG294 ECG5070A ECG5082A	SK9132 SK3124A/289A SK3897/262 SK3841/294 SK6V0/5070A SK25V/5082A	121-Z9003* 921-1114 121-Z9059 121-Z9067 103-Z9008 103-251	
* Lead configuration may vary from original.						

SEMICONDUCTORS (select replacement for best results)

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

PARTS LIST AND DESCRIPTION

GENERAL OPERATING INSTRUCTIONS

REBAN

PARTS LIST AND DESCRIPTION (Continued)

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

CAPACITORS

ITEM No.	RATING	MFGR. PART No.	ITEM No.	RATING	MFGR. PART No.
C24	30 NPO 50V 5%		C25	30 NPO 50V 5%	

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
RA1	LOGIC BOARD			
RA2	Resistor Network	10K 5% x 6		
RA3	Resistor Network	(2)		
RA4	Resistor Network	(3)		
RA5	Resistor Network	(4)		
RA6	Resistor Network	(5)		
RA7	Resistor Network	(4)		
	POWER SUPPLY			
R10	.22 10% 3W Metal Film			
RA1	Resistor Network	(1)		
RA2	Resistor Network	(1)		

- (1) 4700 5% x 4
- (2) 10K 5% x 8
- (3) 10K 5% x 10
- (4) 4700 5% x 8
- (5) 2200 5% x 8
- (6) 2200 5% x 9

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
FU	AC LINE FILTER BOARD			
	2 Amp @ 250VAC			
	POWER SUPPLY			
FU1	1 Amp @ 125VAC			
FU2	5 Amp @ 125VAC			

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
T1	POWER		CBE61-03901	
L1	AC LINE FILTER BOARD AC Line Filter			
L1	DRIVER BOARD			
L2	RF Choke			
L3	Coupling Transformer			
	RF Choke			

APPLE IMAGEWRITER II
MODEL A9M0310

PARTS LIST AND DESCRIPTION (Continued)

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

MISCELLANEOUS

ITEM No.	PART NAME	MFR. PART No.	NOTES
LED1	LED		Power, Green
LED2	LED		Draft/NLQ, Green
LED3	LED		Standard, Green
LED4	LED		Error, Red
LED5	LED		Select, Green
LED6	LED		Select, Green
M1	Motor		Ribbon Drive
M2	Motor		Line Feed
M3	Motor		Carriage
M4	Head		Print
SW1	DIP Switch		
SW2	DIP Switch		
S1	Switch		Option
SW3	Switch		Power
SW4	Switch		Select
SW5	Switch		Print Quality
SW6	Switch		Line Feed
SW8	Switch		Form Feed
SW9	Switch		Paper End
SW10	Switch		Color Ribbon
SW11	Switch		Carriage Cover
X1	Crystal		Home Position
X2	Crystal		17.2MHz 12MHz

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
 Shielded Four Connector Disk Drive Cable.. 9534
 Coax Computer Cable 9269

ITEM NO.	DESCRIPTION	DEVICE	HOLDER	NOTES
F1	AC LINE FILTER BOARD			
F2	2 Amp @ 250VAC			
F3	POWER SUPPLY			
F4	1 Amp @ 125VAC			
F5	2 Amp @ 125VAC			

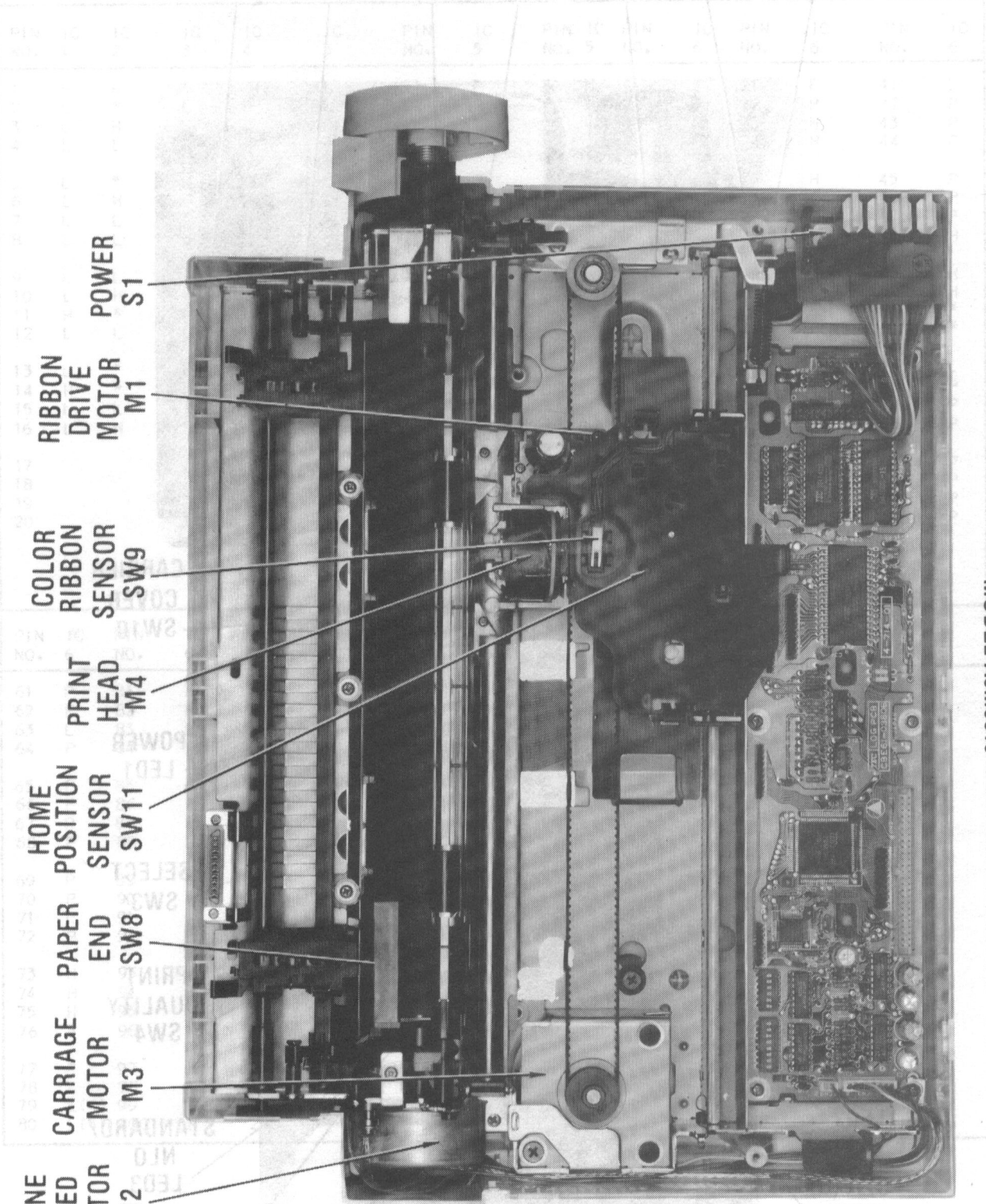
ITEM No.	FUNCTION	MFR. PART No.	IDENTIFICATION	NOTES
T1	POWER			
T2	AC LINE FILTER BOARD			
T3	AC Line Filter			
T4	DRIVER BOARD			
T5	PC Choke			
T6	Coupling Transformer			
T7	RF Choke			

REBAN

AC INPUT BOARD

LOGIC CHART

C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22 C23 C24 C25 C26 C27 C28 C29 C30 C31 C32 C33 C34 C35 C36 C37 C38 C39 C40 C41 C42 C43 C44 C45 C46 C47 C48 C49 C50 C51 C52 C53 C54 C55 C56 C57 C58 C59 C60 C61 C62 C63 C64 C65 C66 C67 C68 C69 C70 C71 C72 C73 C74 C75 C76 C77 C78 C79 C80 C81 C82 C83 C84 C85 C86 C87 C88 C89 C90 C91 C92 C93 C94 C95 C96 C97 C98 C99 C100



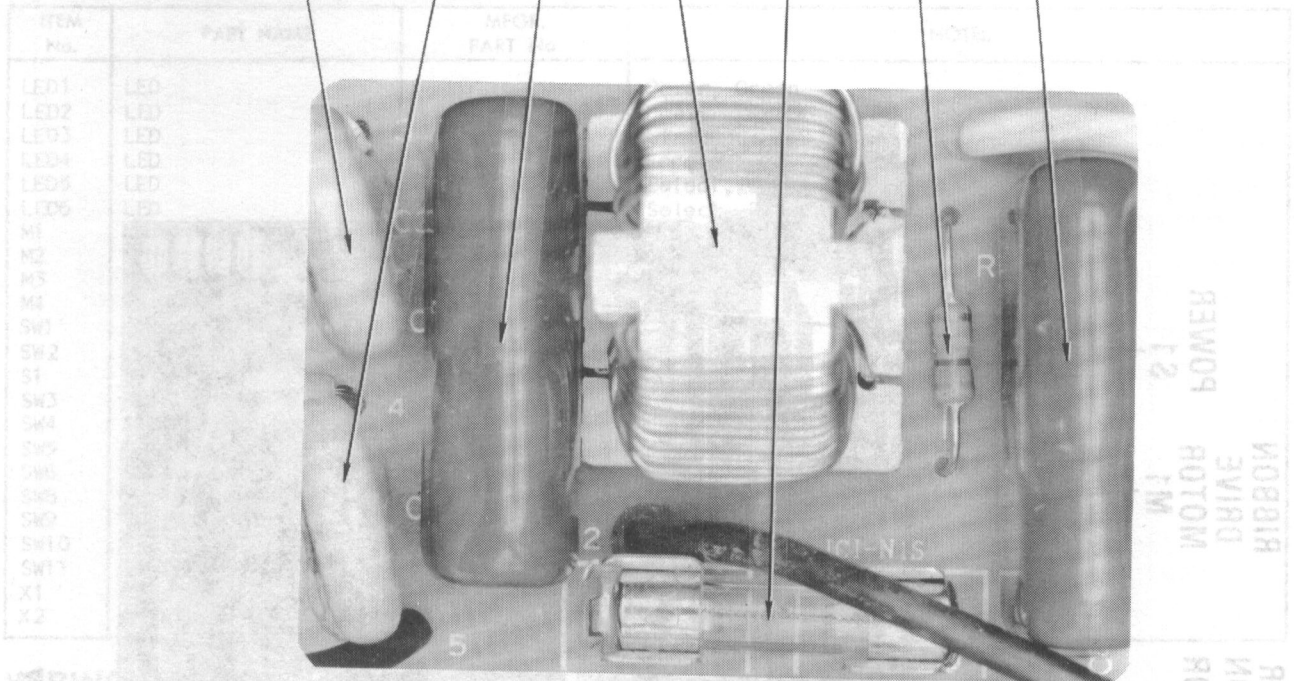
APPLE IMAGEWRITER II
MODEL A9M0310

CHASSIS - TOP VIEW

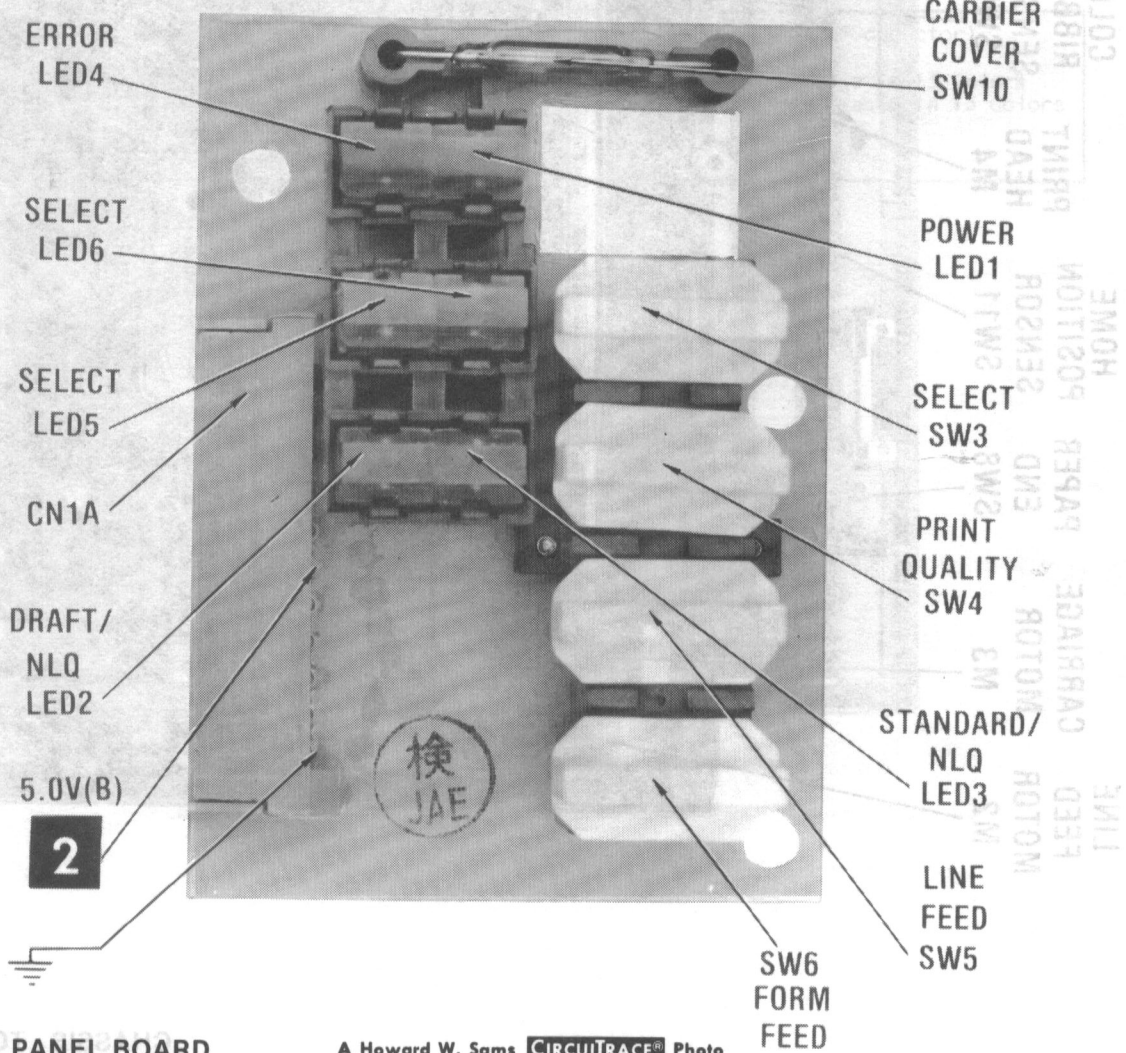
AC INPUT BOARD DESCRIPTION (Continued)

When ordering parts, specify Part Number and Description.

MISCELLANEOUS



MODEL 94M0310
TYPE INKWRITER II



CONTROL PANEL BOARD

A Howard W. Sams CIRCUITRACE® Photo

REBAN

LOGIC CHART

PIN NO.	IC 1	IC 2	IC 3	IC 4	IC 5	PIN NO.	IC 5	PIN NO.	IC 5	PIN NO.	IC 6	PIN NO.	IC 6	PIN NO.	IC 6
1	H	H	*	H(2)	L	21	P	41	H	1	*	21	P	41	L
2	L	*	L	H	L	22	H	42	H	2	*	22	P	42	P
3	L	H	L	H	H	23	P	43	L	3	H	23	H	43	P
4	L	L	H	L	L(2)	24	P	44	L	4	L(4)	24	H	44	P
5	L	*	H	L(3)	L	25	P			5	P	25	H	45	P
6	L	H	H	L	L	26	P			6	P	26	*	46	P
7	L	L	*	P	P	27	P			7	P	27	*	47	P
8	L	L	L	L	P	28	P			8	L	28	P	48	H
9	L	L	*	P	P	29	P			9	P	29	P	49	H
10	L	H	H	H	P	30	P			10	P	30	P	50	H
11	H	*	H	H	P	31	H(1)			11	P	31	P	51	*
12	L	L	L	P	H(4)	32	H			12	P	32	H(2)	52	*
13	L	*	H	H	P	33	P			13	L	33	H	53	L
14	H	*	H	L	P	34	P			14	P	34	H(2)	54	P
15	L	L	*	P	P	35	P			15	P	35	H(4)	55	P
16	L	H	H	H	P	36	P			16	P	36	L(4)	56	P
17					L	37	H(2)			17	P	37	L(4)	57	P
18					P	38	L			18	H(5)	38	L	58	P
19					P	39	H			19	P	39	L(4)	59	P
20					P	40	*			20	P	40	H	60	P

PIN NO.	IC 6	PIN NO.	IC 6	PIN NO.	IC 7	IC 8	IC 9	PIN NO.	IC 9	PIN NO.	IC 9	PIN NO.	IC 9
61	P	81	H(6)	1	L	L(7)	L(2)	21	L	41	H	61	P
62	P	82	H(6)	2	L	H(8)	L(9)	22	H	42	P	62	P
63	L	83	L	3	L	L(12)	H(2)	23	H	43	P	63	H
64	P	84	P	4	L	H(22)	H(10)	24	H	44	P	64	H
65	P	85	P	5	*(4)	H(14)	L(11)	25	H	45	P		
66	P	86	P	6	*(4)	L(23)	L(12)	26	P	46	P		
67	P	87	P	7	L(4)	L	H(13)	27	P	47	P		
68	P	88	L	8	H	L(24)	H(14)	28	H	48	P		
69	P	89	H	9		H(13)	L(3)	29	P	49	P		
70	P	90	H	10		H(25)	L(3)	30	P	50	P		
71	P	91	H	11		L(11)	H(3)	31	P	51	P		
72	P	92	H	12		H(2)	H(3)	32	L	52	P		
73	H	93	H	13		L(2)	H	33	H	53	P		
74	H	94	H	14		H	H	34	H(15)	54	P		
75	H	95	L	15		H	H	35	H(16)	55	P		
76	*	96	H	16		H	H	36	H(17)	56	P		
77	*	97	H	17		H	H	37	H(18)	57	P		
78	L	98	H	18		H	H	38	H(19)	58	P		
79	L(4)	99	H	19		P	P	39	L(20)	59	P		
80	L(4)	100	H	20		P	P	40	H(21)	60	P		

APPLE IMAGEWRITER II
MODEL A9M0310

LOGIC CHART (Continued)

PIN NO.	IC 10	PIN NO.	IC 10	PIN NO.	IC 11	PIN NO.	IC 11	PIN NO.	IC 12
1	P	21	P	1	H	21	P	1	L
2	P	22	P	2	P	22	P	2	P
3	P	23	P	3	P	23	P	3	P
4	P	24	P	4	P	24	P	4	P
5	P	25	P	5	P	25	P	5	P
6	P	26	H	6	P	26	P	6	P
7	P	27	P	7	P	28	P	7	P
8	P	28	H	8	P	28	H	8	P
9	P			9	P			7	P
10	P			10	P			10	L
11	P			11	P			11	P
12	P			12	P			12	P
13	P			13	P			13	P
14	L			14	L			14	P
15	P			15	P			15	P
16	P			16	P			16	P
17	P			17	P			17	P
18	P			18	P			18	P
19	P			19	P			19	P
20	P			20	P			20	H

SCHEMATIC NOTES

- Circuitry not used in some versions
- Circuitry used in some versions
- o See parts list
- ⊕ Ground
- ⊖ Chassis

Waveforms and voltages taken from ground, unless noted otherwise.

Logic probe, voltages and waveforms taken with Printer in Self-Test mode. Print quality set to near letter quality, black ribbon cassette installed, DIP Switches SW1 and SW2 set as follows:

SW1	SW2
1 Open	1 Closed
2 Open	2 Closed
3 Open	3 Open
4 Open	4 Open
5 Open	5 Open
6 Open	6 Closed
7 Open	
8 Open	

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 7 cm. width with DC reference voltage given at the bottom line of each waveform.

Time in uSec. per cm, given with p-p reading at the end of each waveform.

Item numbers in rectangles appear in the alignment/adjustment instructions.

Supply voltage 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.

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

Value in () used in some versions.

Measurements with switching as shown, unless noted.

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

- (1) Probe indicates P when Print Head reaches each end of Carriage.
- (2) Probe indicates P when Line Feed Motor is On.
- (3) Probe indicates P when Color Ribbon Motor is On.
- (4) Probe indicates P while Print Head is printing.
- (5) Probe indicates L when Print Head is in Home Position.
- (6) Probe indicates L when Carrier Motor speed increases.
- (7) Probe indicates H when Line Feed Motor is On.
- (8) Probe indicates L when Line Feed Motor is On.
- (9) Probe indicates P when Line Feed Motor is On, H during second printing of the same line.
- (10) Probe indicates P when Line Feed Motor is On, L during second printing of the same line.
- (11) Probe indicates H when Error LED (LED4) is On.
- (12) Probe indicates H when Printer is On Line (Select On).
- (13) Probe indicates L when Print Quality is In Draft Quality.
- (14) Probe indicates L when Print Quality is In Standard Quality.
- (15) Probe indicates L when Select Button (SW3) is pressed.
- (16) Probe indicates L when Line Feed Button (SW5) is pressed.
- (17) Probe indicates L when Form Feed Button (SW6) is pressed.
- (18) Probe indicates L when Print Quality Button (SW4) is pressed.
- (19) Probe indicates L when Printer is out of paper.
- (20) Probe indicates H when Top Cover is open (SW10 Open).
- (21) Probe indicates L if color ribbon is installed.
- (22) Probe indicates L when Printer is Off Line (Select Off).
- (23) Probe indicates H when Print Quality is In Standard Quality.
- (24) Probe indicates H when Print Quality is In Draft Quality.
- (25) Probe indicates L when Error LED (LED4) is On.

APPLE IMAGEWRITER II
MODEL A9M0310

DISASSEMBLY INSTRUCTIONS

CABINET TOP REMOVAL

Lift paper cover and carriage cover from top of Printer. Remove ribbon cartridge and push print head to left side of carriage. Loosen two screws holding cabinet top (do not remove the screws). Lift the cabinet top up and unplug the control panel.

BOTTOM PANEL REMOVAL

Remove two phillips screws from rear top (just behind the tractor assembly). Turn Printer upside down and remove four phillips screws holding bottom panel. Carefully lift panel up from the rear of Printer, disconnect Connectors CN6, CN7 and CN8 on the right side, Connector CN2 (gray ribbon cable) and the ground straps on the left and right sides. Carefully flip panel over toward front of cabinet and unplug Print Head Ribbon Cable and Power Transformer Plug.

TRACTOR COVER REMOVAL

The Tractor Cover snaps in place. Carefully pull the cover loose and remove from Printer.

RIGHT LEG REMOVAL

Remove paper feed knob and paper friction lever from Printer. Turn the Printer upside down. Remove phillips screw from center of leg. Pull leg down, then out to the side to remove.

LEFT LEG REMOVAL

Turn Printer upside down. Remove phillips screw from center of leg. Pull leg down, then out to the side to remove.

PRINTER MECHANISM REMOVAL

Remove two phillips screws from the rubber mounts under the Print Head assembly. Remove one phillips screw located on left side of Printer between the Line Feed Motor and the Carriage Motor. Release retaining tabs, at rear of cabinet holding Printer Mechanism, and lift Printer Mechanism out of Cabinet.

LOGIC BOARD REMOVAL

Disconnect Connectors CN2, CN3 and CN9 and the ground strap. Remove six phillips screws holding Logic Board and lift board from Printer.

POWER SUPPLY/DRIVER BOARD REMOVAL

Perform Bottom Panel Removal procedure. Disconnect Connector CN4. Remove four phillips screws holding Power Supply/Driver Board and remove board.

CONTROL PANEL REMOVAL

Remove Cabinet Top. Remove three screws holding Control Panel to Top Cover and remove panel.

REBAN

MISCELLANEOUS ADJUSTMENTS

VERTICAL CHARACTER DEVIATION

Insert paper in Printer and turn On. Type in and run the following program:

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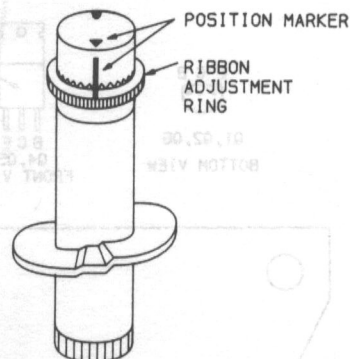
10 PR# 1
20 FOR X = 1 TO 7: PRINT : NEXT X
30 PRINT CHR$ (27) CHR$ (69)
40 FOR X = 1 TO 70: PRINT "H";: NEXT X
50 PRINT
60 PRINT CHR$ (27) CHR$ (114)
70 FOR X = 1 TO 70: PRINT "H";: NEXT X
80 PRINT
90 PRINT CHR$ (27) CHR$ (102)
100 PR# 0: HOME : PRINT "PRESS ANY KEY TO
    PRINT ANOTHER LINE"
110 GET A$: PR# 1: GOTO 30
  
```

The program will print one line of the letter H, then go back and print over the same line with the print head going in the opposite direction. If the left to right printed H's are not aligned with the right to left printed H's, change the setting of Switches 5 and 6 on DIP Switch (SW2). Press any key on the computer to print another line and recheck the alignment of the H's. Repeat this procedure until the switch settings for the best alignment are found.

RIBBON SHIFT CAM ADJUSTMENT

Insert paper in Printer and install a Color Cassette. Initiate the self-test by holding down the Form Feed button while turning Printer On. After Printer has printed several

lines in color, stop the printer and inspect the printed lines for proper colors. If the colors are incorrect, locate the ribbon adjustment assembly to the right of print head. See Figure below.



The Ribbon Adjustment Ring can be turned 180° either clockwise or counterclockwise. Caution: Turning the Ribbon Adjustment Ring more than 180° in either direction can break the mechanism. Push the red Ribbon Adjustment Ring down to turn it. If the color overlap is at the bottom of the characters, turn the ring clockwise. If the color overlap is at the top of the characters, turn the ring counterclockwise.

Release the ring and rerun the self-test to check for proper adjustment. Repeat the adjustment procedure if necessary.

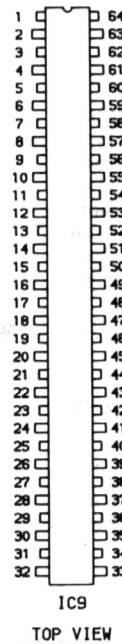
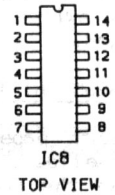
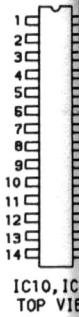
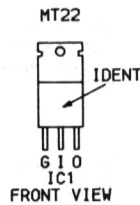
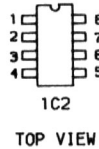
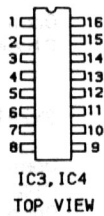
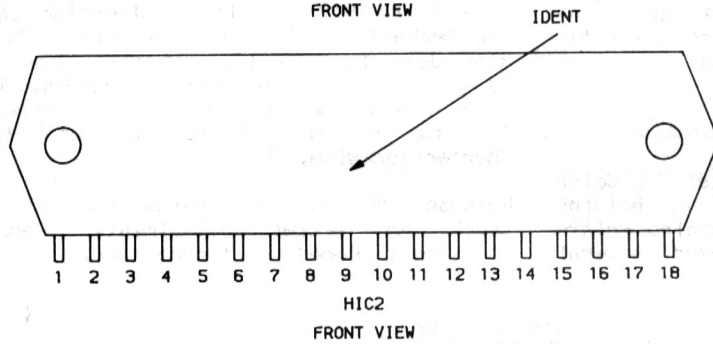
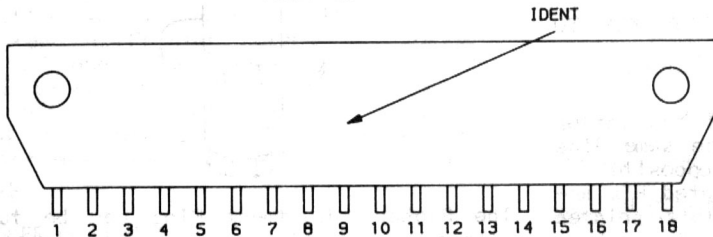
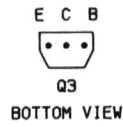
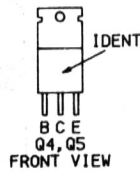
APPLE IMAGEWRITER II
MODEL A9M0310

DIP SWITCH SETTINGS

	SW1-1	SW1-2	SW1-3		SW1-8	
American	Open	Open	Open	Carriage return only	Open	
Italian	Closed	Open	Open	Carriage return plus line feed	Closed	
Danish	Open	Closed	Open			SW2-1 SW2-2
British	Closed	Closed	Open	300 baud	Open	Open
German	Open	Open	Closed	1200	Closed	Open
Swedish	Closed	Open	Closed	2400	Open	Closed
French	Open	Closed	Closed	9600	Closed	Closed
Spanish	Closed	Closed	Closed			
		SW1-4			SW2-3	
Form length 11 inches		Open		Hardware Handshake Protocol	Open	
Form length 12 inches		Closed		XON/XOFF Protocol	Closed	
		SW1-5			SW2-4	
Perforation skip inactive		Open		Option disabled (no option card)	Open	
Perforation skip active		Closed		Option enabled	Closed	
		SW1-6	SW1-7		SW2-5	
10 characters per inch		Open	Open	Hammer-Fire Timing Control	Preset by manufacturer. Do not adjust.	
12 characters per inch		Closed	Open			
17 characters per inch		Open	Closed			
160 dots per inch (proportional)		Closed	Closed		SW2-6	
				Hammer-Fire Timing Control	Preset by manufacturer. Do not adjust.	

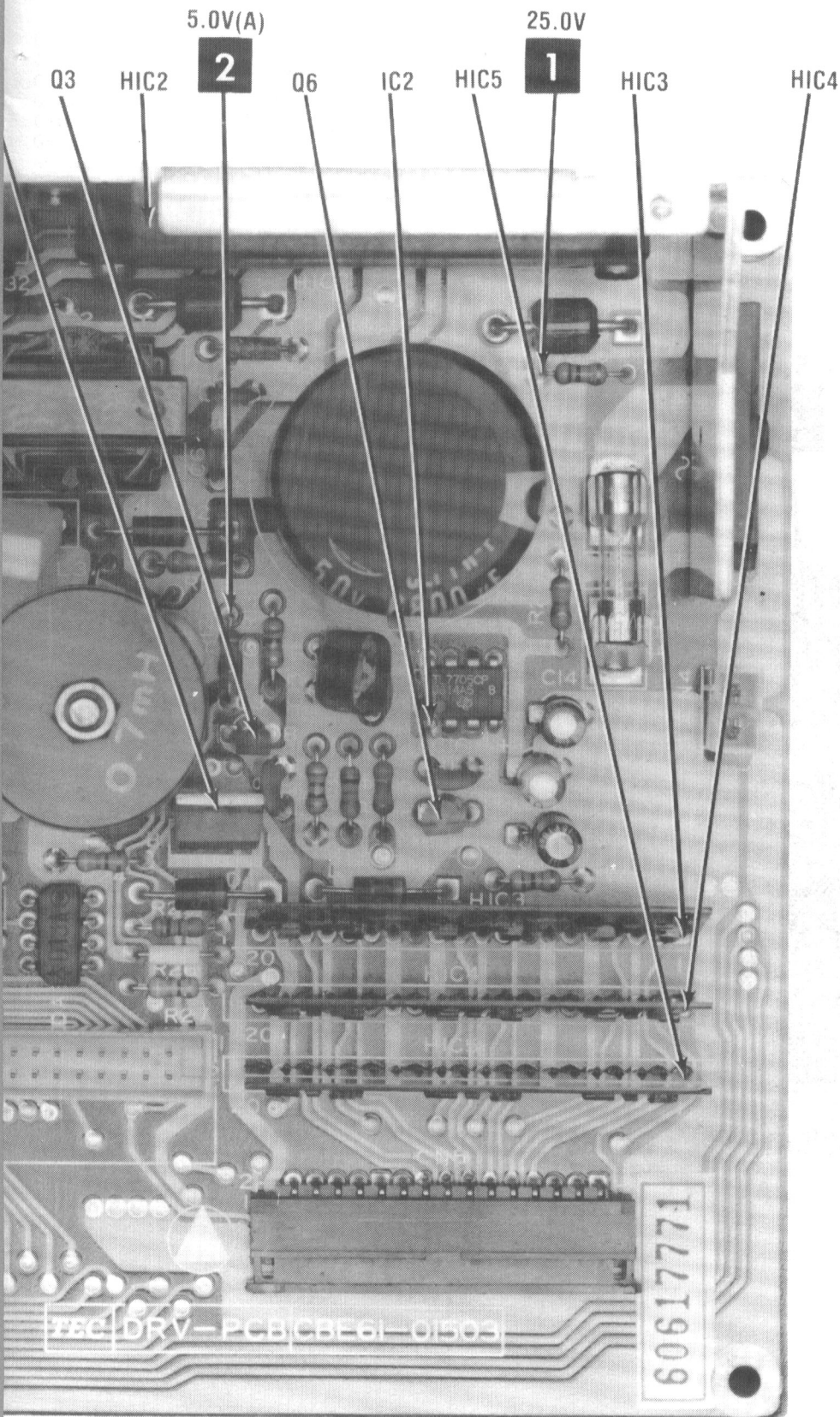
POWER SUPPLY DRIVER BOARD

POWER SUPPLY/DRIVER BOARD



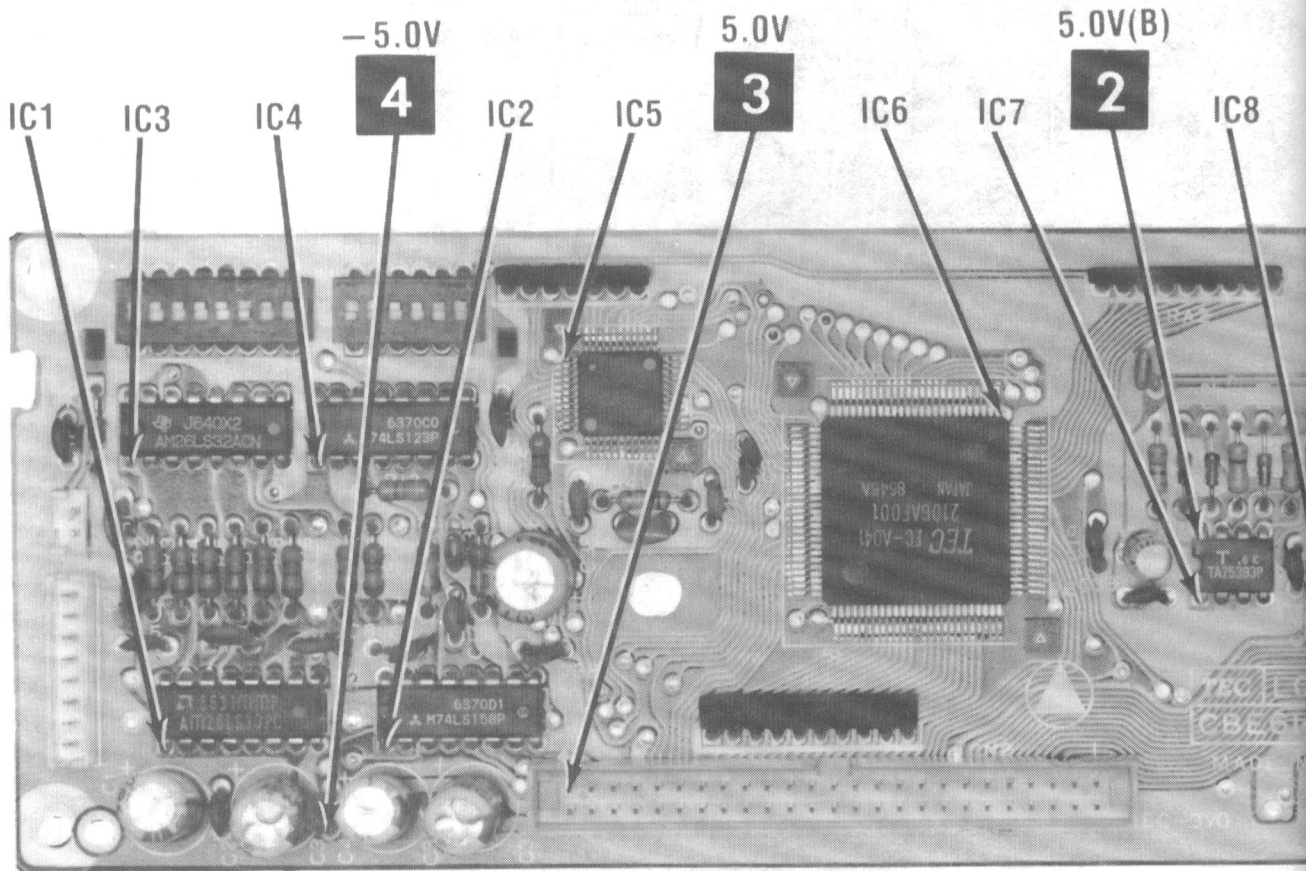
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REBAN



APPLE IMAGEWRITER II
MODEL A9M0310

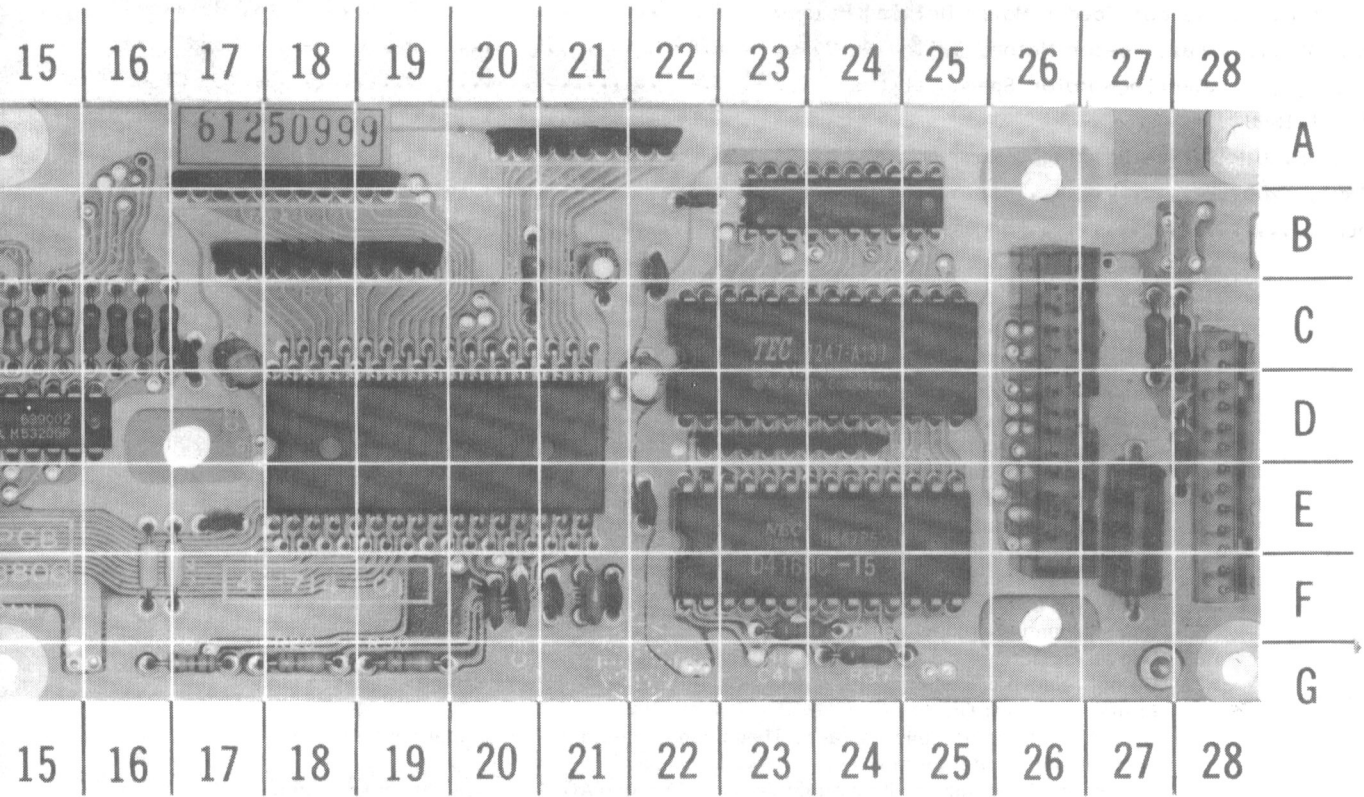
POWER SUPPLY/DRIVER BOARD



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

REBAN

- C-15 RA6 D-23
- C-28 RA7 F-9
- C-16 SW1 A-2
- C-16 SW2 A-5
- C-16 X1 D-7
- G-17 X2 F-21
- G-18 ZD1 C-1
- G-19
- D-28
- C-27
- B-20
- C-16
- F-23
- G-24
- C-6
- A-6
- A-12
- B-18
- A-18
- A-21



APPLE IMAGEWRITER II
MODEL A9M0310

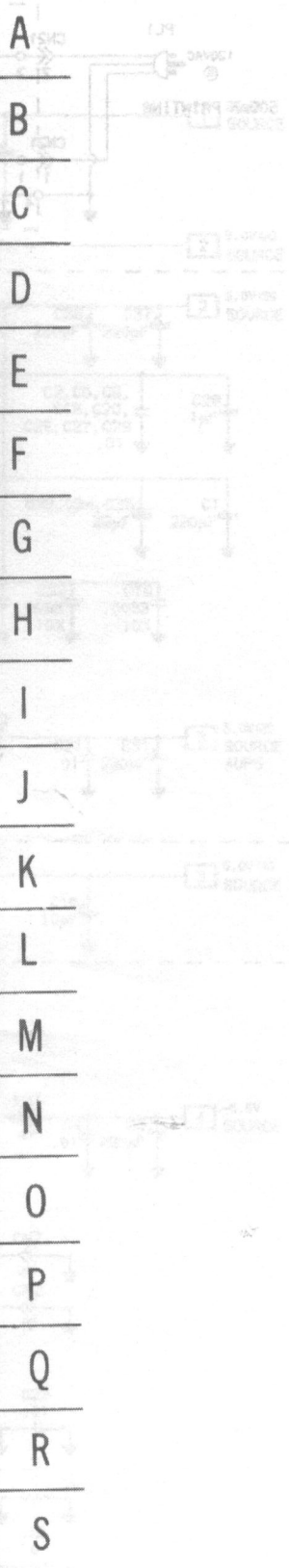
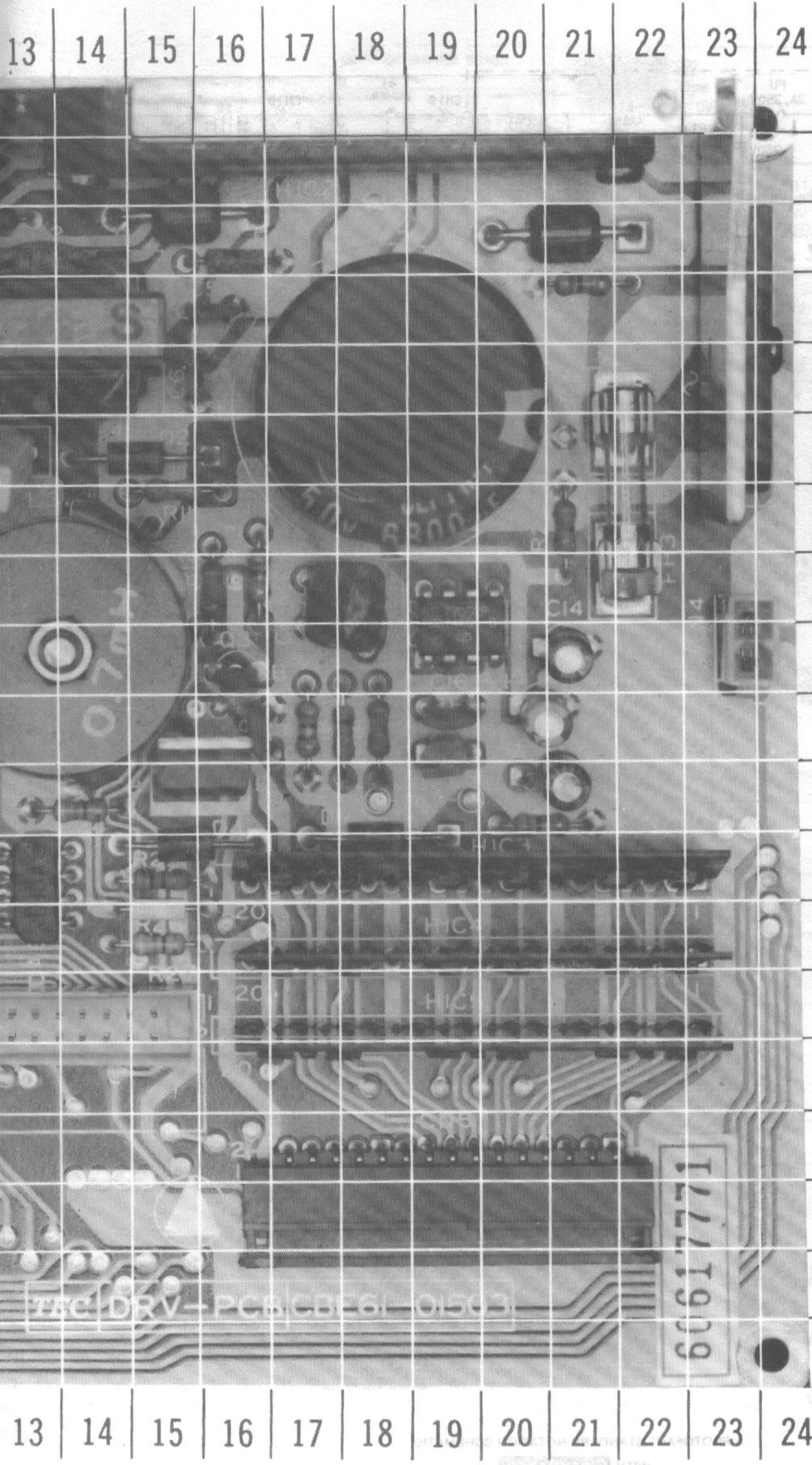
LINE DEFINITIONS

AO THRU A15.....	Address Bits 0 thru 15	ASYN/APBUS.....	Interface Switching
ADO THRU AD7.....	Data Bits 0 thru 7	CK64.....	Clock
CA A,B,C,D.....	Carriage Motor Driving Pulses	CS1.....	Chip Select
COL RBN.....	Color Ribbon	DRAFT.....	Draft Indicator, LED
CSF ON.....	Control Sheet Feeder On	DSR.....	Data Set Ready
DOT 1 THRU DOT 9.....	Print Head Driving Pulses	DTR.....	Data Terminal Ready
DTRa, DTRb.....	Serial Data Sent to Optional I/O	DWR.....	Delayed Write, I/O
DUP 1 THRU DUP 9.....	Print Head Driving Pulses	HLDA.....	Hold Acknowledge
HMP C.....	Home Position Sensor	HLRQ.....	Hold Request
LF IN A,B,C,D.....	Line Feed Motor Driving Pulses	INTR.....	Interrupt Request
NORM LP.....	Normal Lamp, LED	MCON...Head and Carrier Motor Control, Power On	
PEO LP.....	Error Lamp, LED	RAM1.....	RAM Access I/O
RBN IN A,B,		RD.....	Read Data
C,D.....	Ribbon Drive Motor Driving Pulses	RESET.....	Reset
RBN ON.....	Ribbon Drive Motor, Switch On Pulse	RFSH.....	Refresh Address For Dynamic Memory
SEL LP.....	Select Lamp, LED	RWE.....	Delayed Write, I/O
SEL LP1.....	Select Lamp, LED	RxD.....	Received Data
SFM A,B.....	Sheet Feeder Motor Driving Pulses	RxD+.....	Received Data, Balanced
SFM ON.....	Sheet Feeder Motor, Switch On Pulse	RxD-/RD.....	Received Data -/Read Data
SPD 1,2,3,..	Carriage Motor Speed Selects 1,2,3	SCK.....	Serial Clock
TST 1 THRU		TxD+.....	Transmitted Data, Balanced
TST 8..DIP Switch Settings, Machine Parameters		TxD-/TD.....	Transmitted Data-
TxDa, TxDb	Transmitted Data a,b	WE.....	Write Enable
ALE.....	Address Latch Enable	WR.....	Write (Place Data)

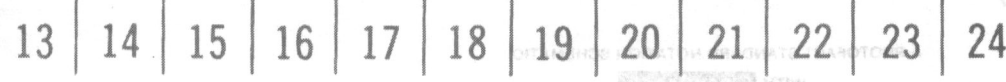
SAFETY PRECAUTIONS

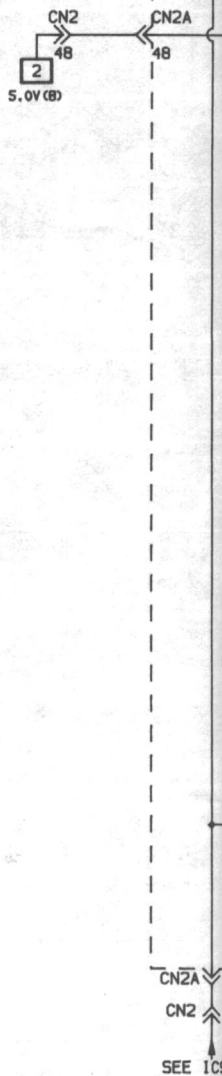
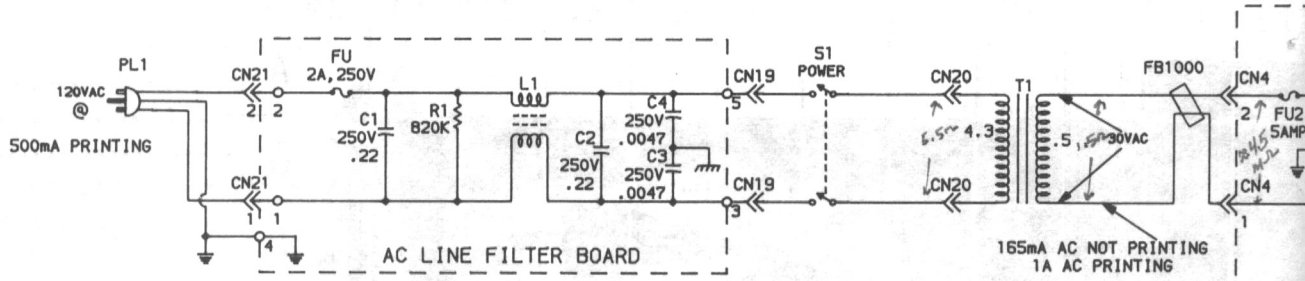
1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Printer before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme 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 board, mechanical or electrical parts, or other peripherals with Printer AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This Printer 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 Printer 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 Printer to water. If exposed to water turn the unit Off. Do not place the Printer near possible water sources.
14. Never leave the Printer 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 Printer.
17. Never use liquids or aerosols directly on the Printer. Spray on cloth and then apply to the Printer cabinet. Make sure the Printer is disconnected from the AC power line.

RELOAN



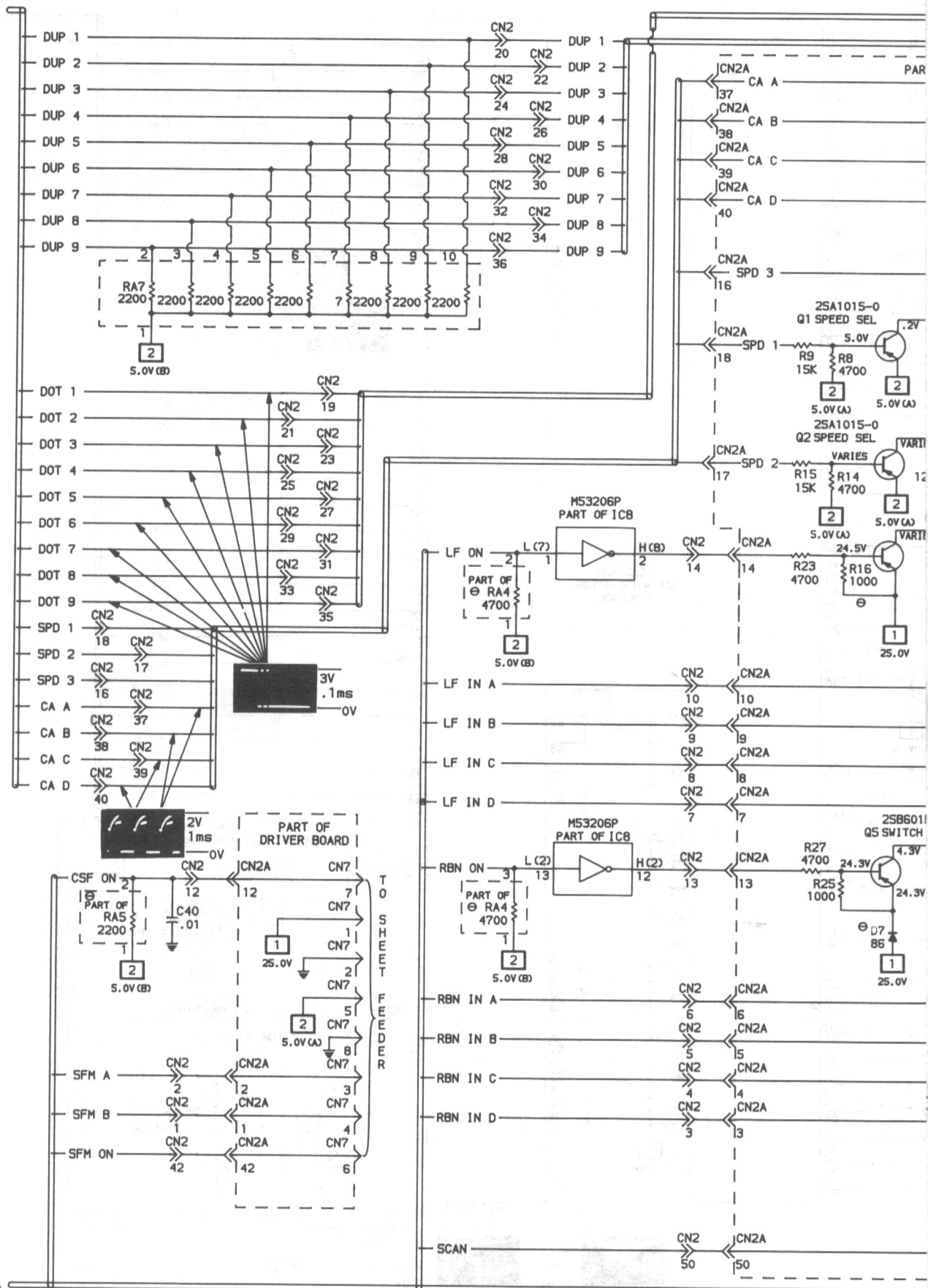
CP27
APPLE IMAGEWRITER II
MODEL A9M0310





A PHOTOFACIT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE

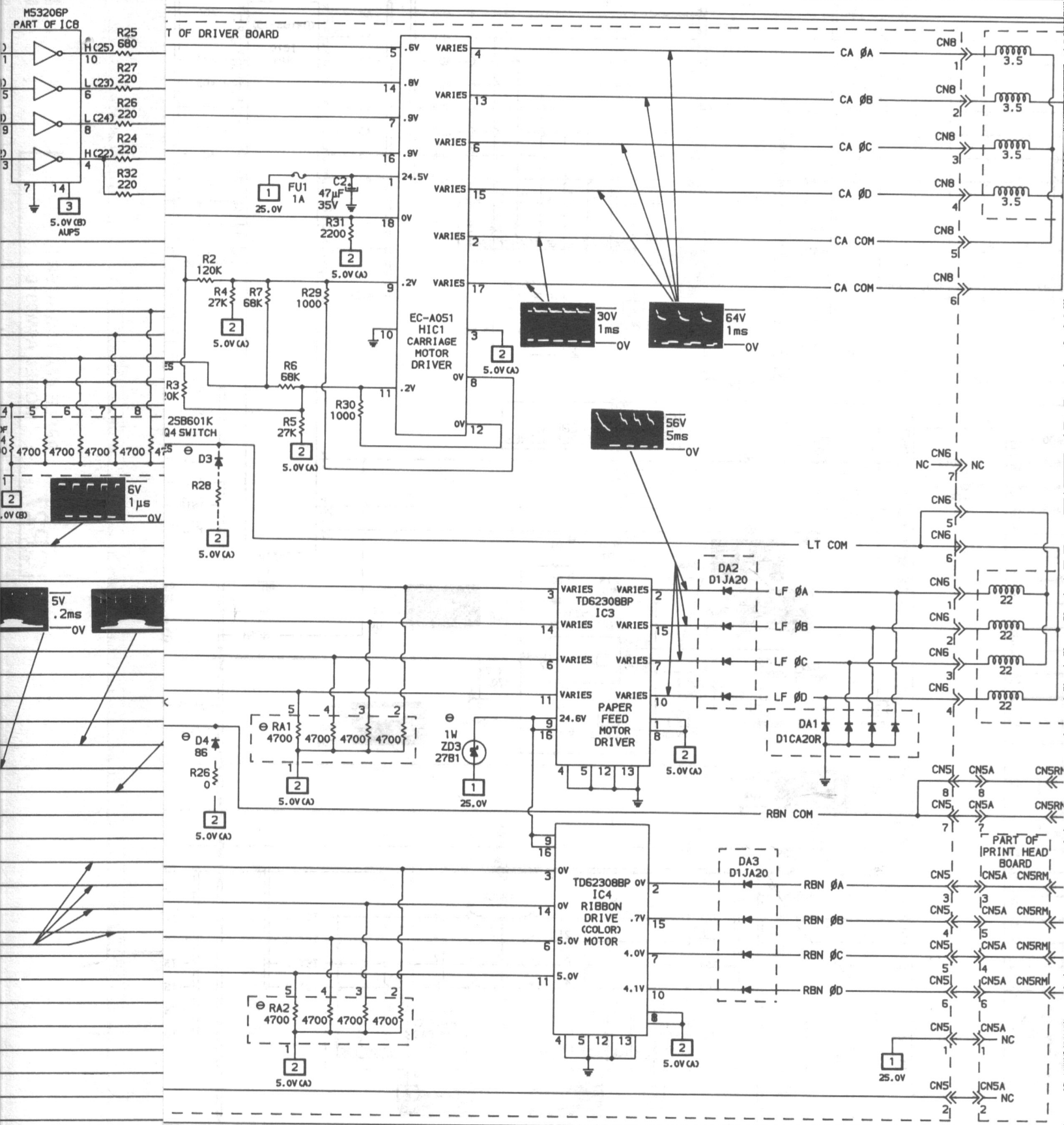
© Howard W. Sams & Co. 1987

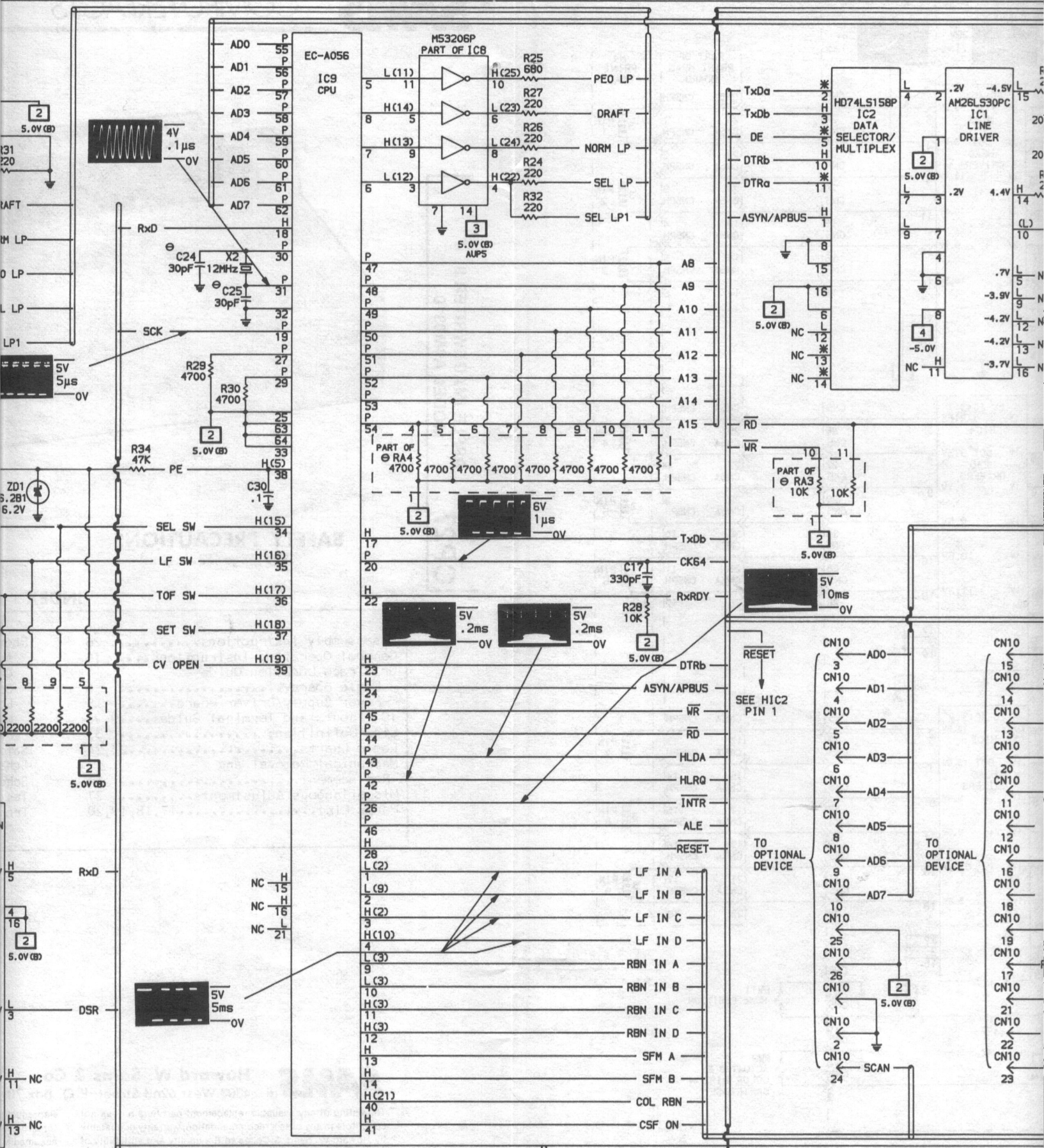


A PHOTOFAC STANDARD NOTATION SCHEMATIC

WITH **CIRCUITRACE**

REGAN





EC-A056
IC9
CPU

M53206P
PART OF ICB

HD74LS158P
IC2
DATA
SELECTOR/
MULTIPLEX

AM26LS30PC
IC1
LINE
DRIVER

NC H 15
NC H 16
NC L 21

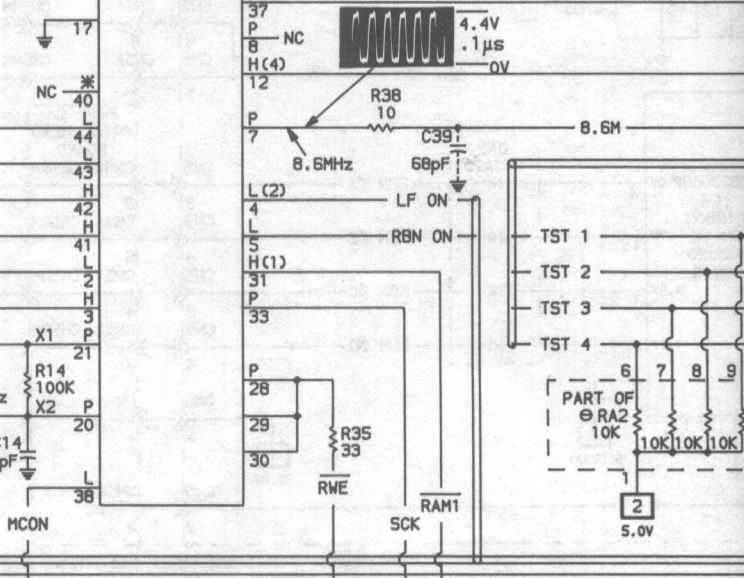
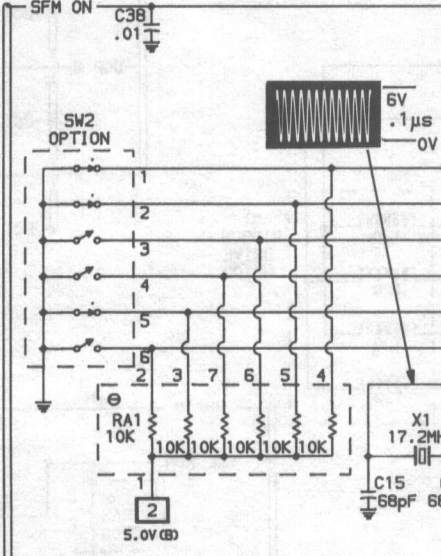
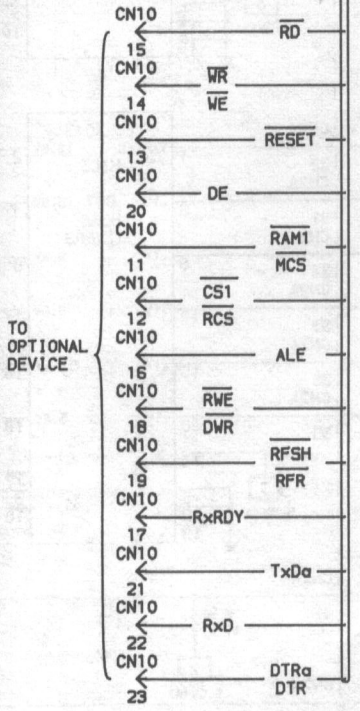
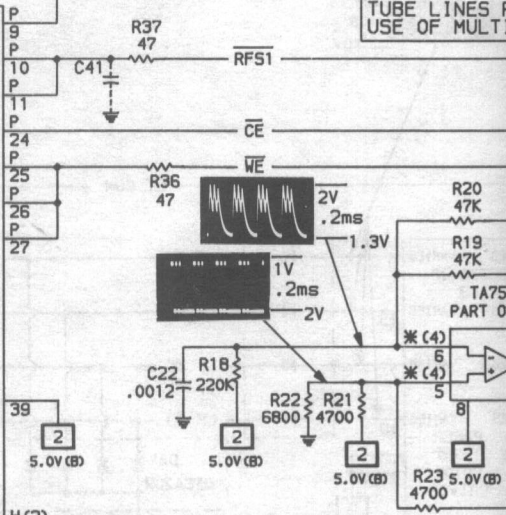
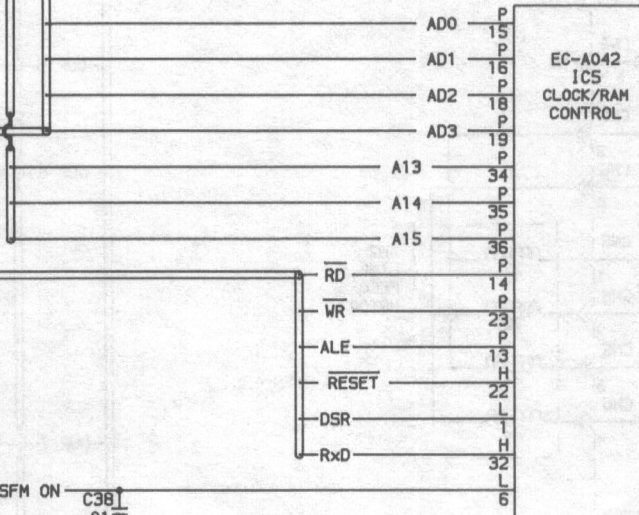
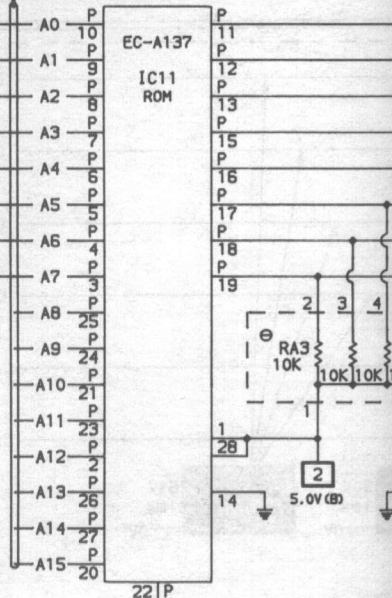
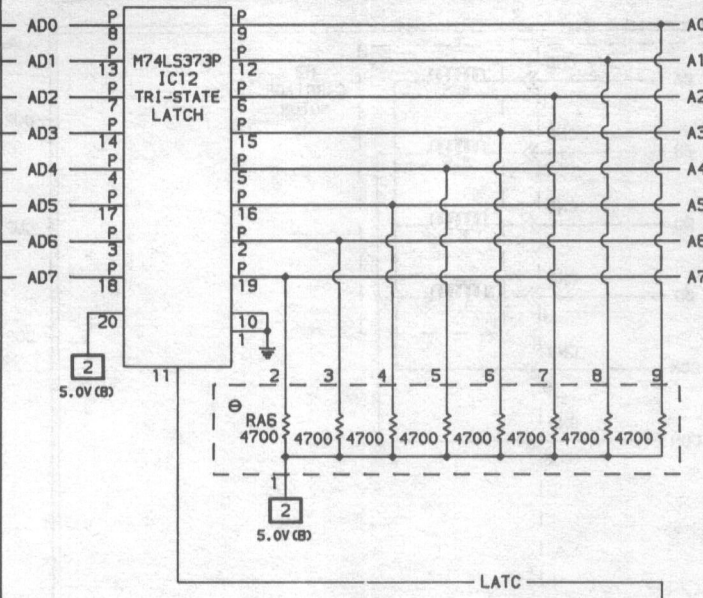
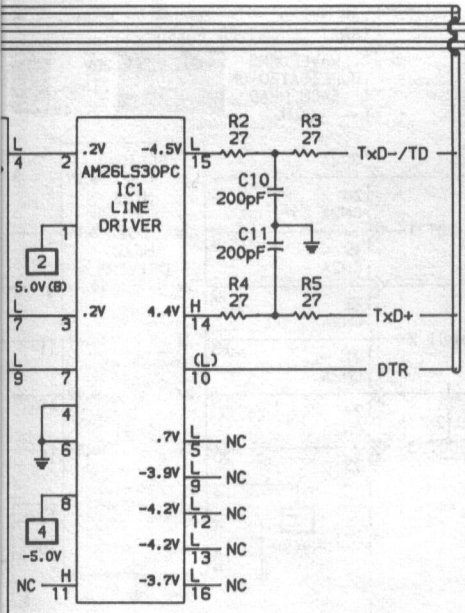
TO OPTIONAL
DEVICE

TO OPTIONAL
DEVICE

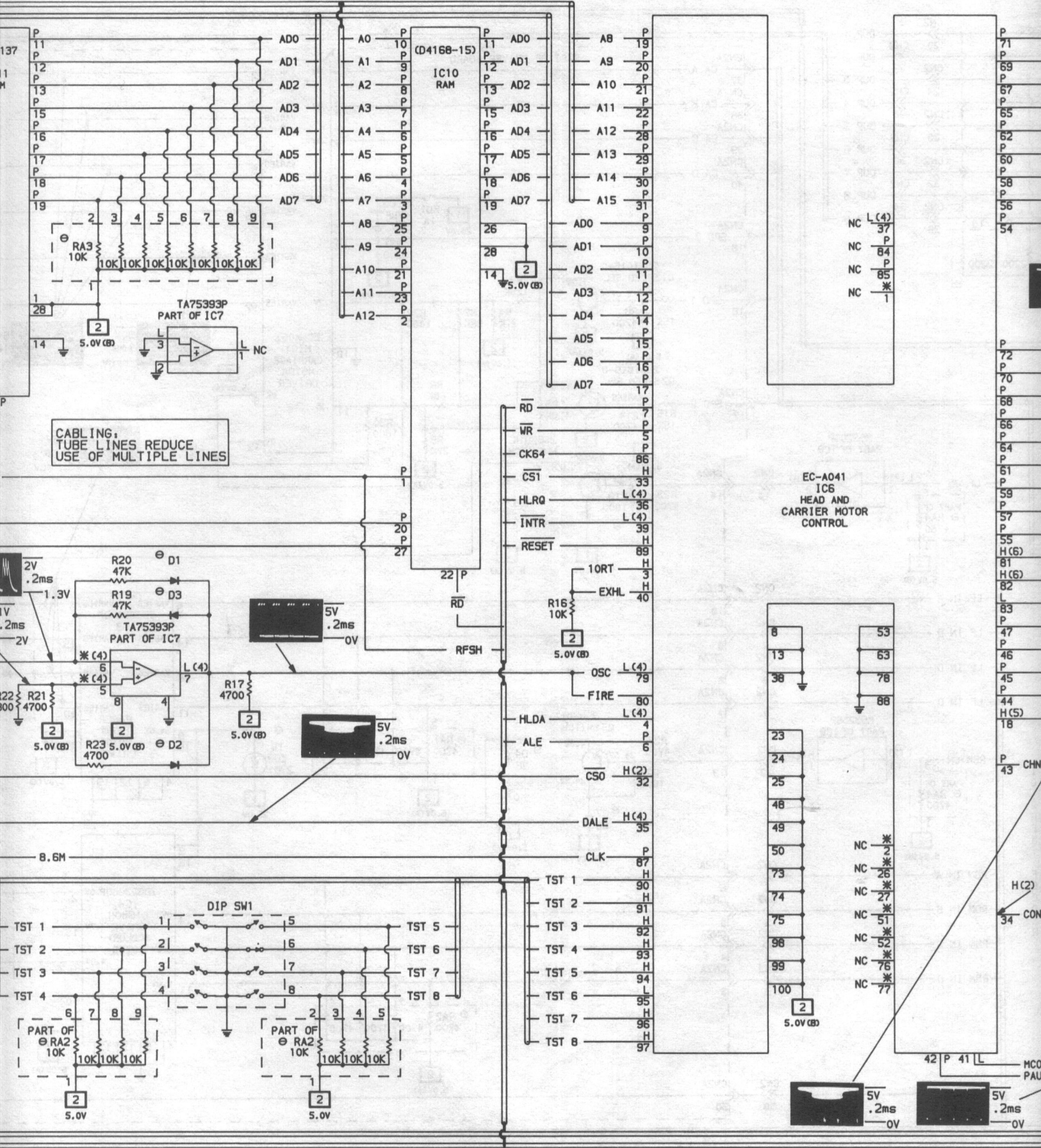
RESET
SEE HIC2
PIN 1

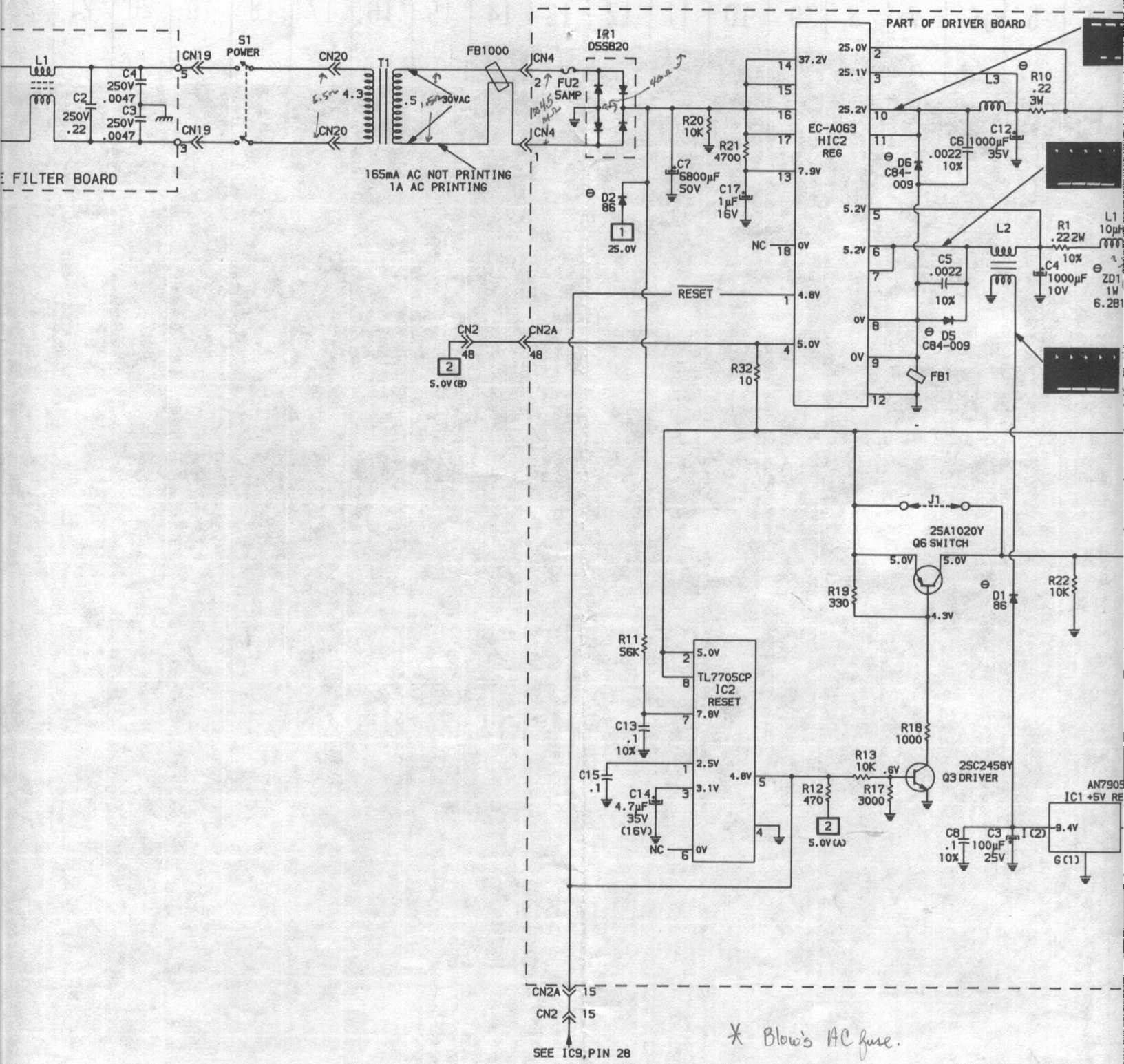
SCAN

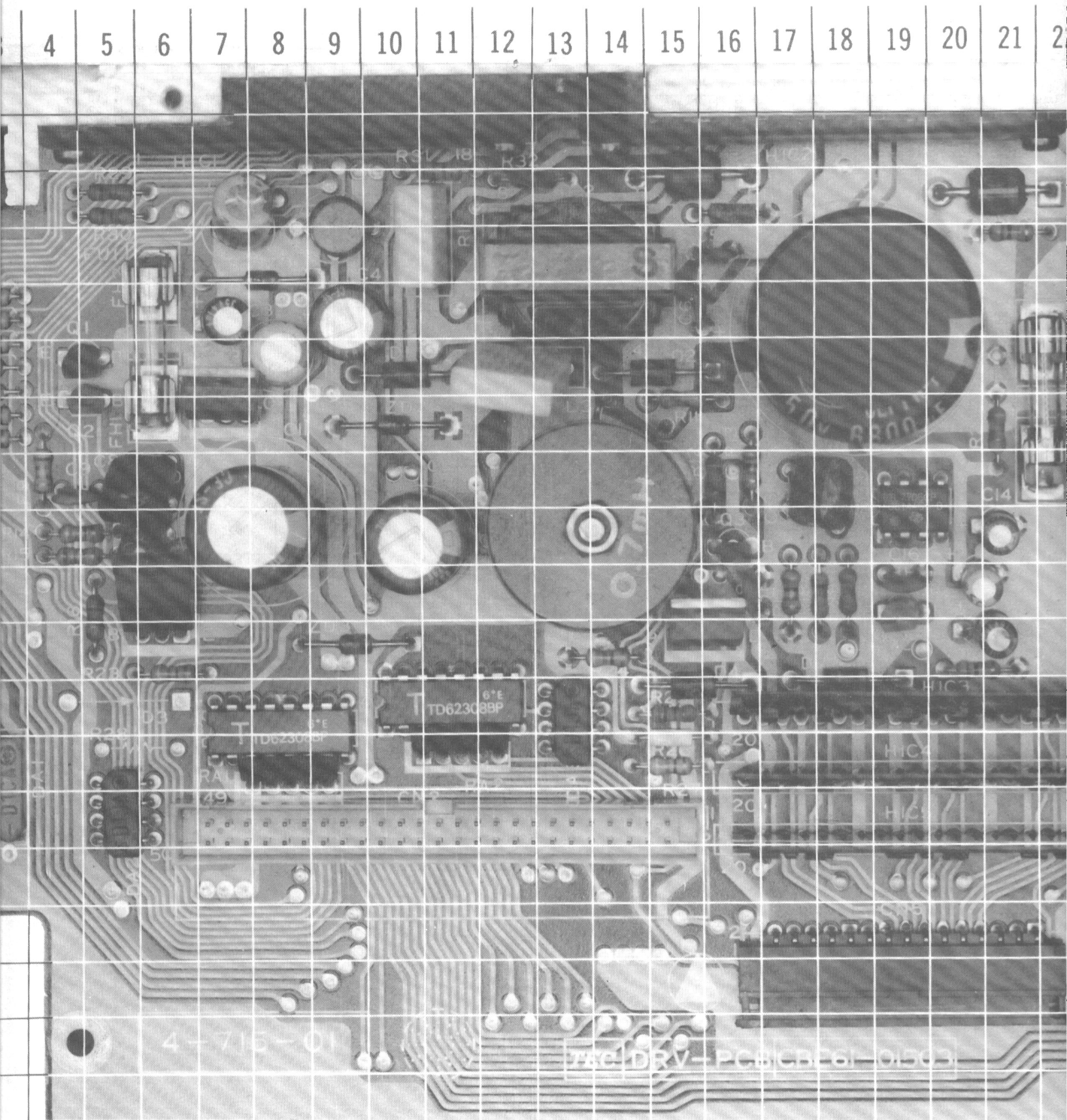
ALPHAC IMAGEWRITER
MODEL AEM0310



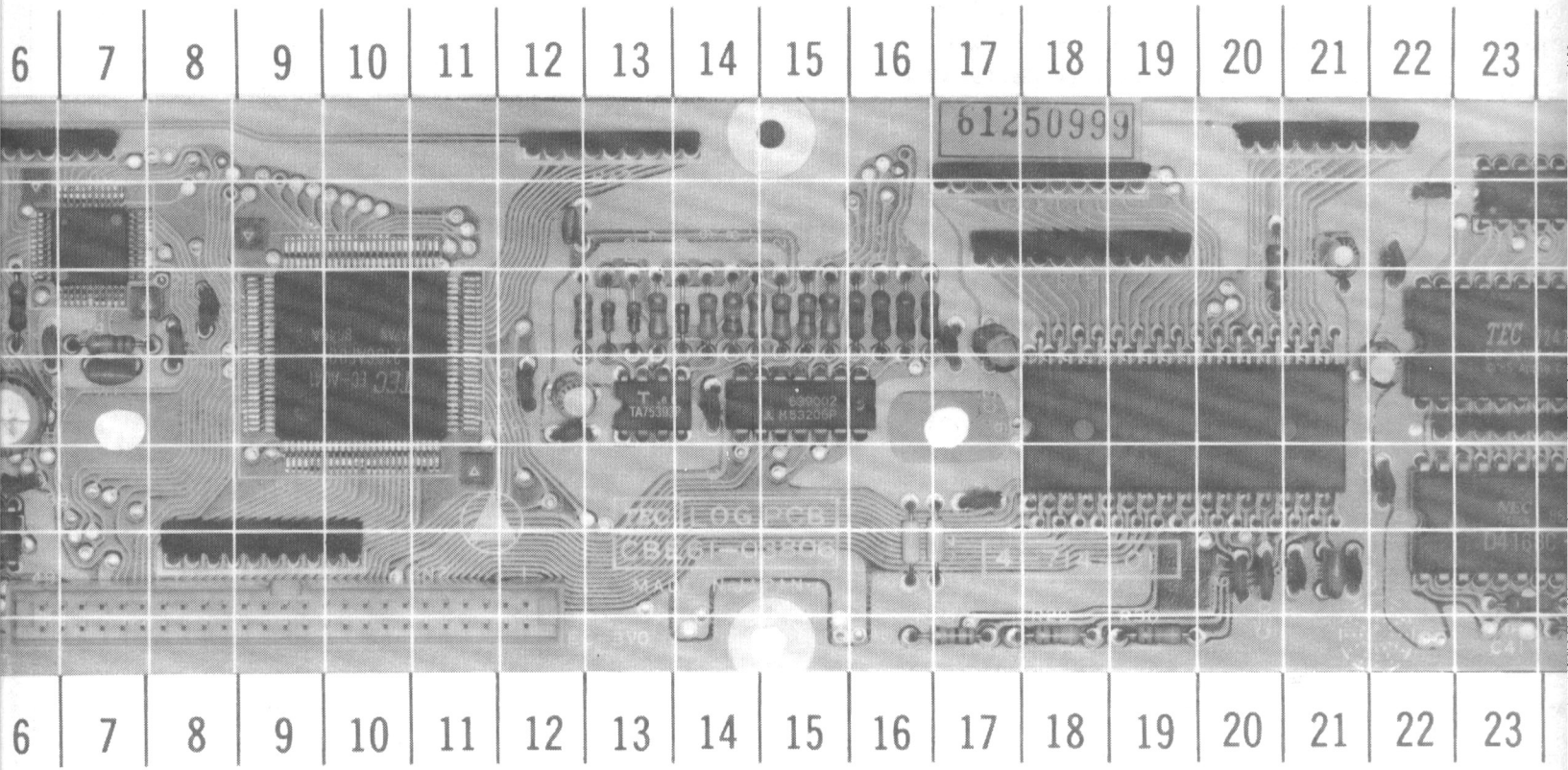
CABLING: TUBE LINES R USE OF MULTI

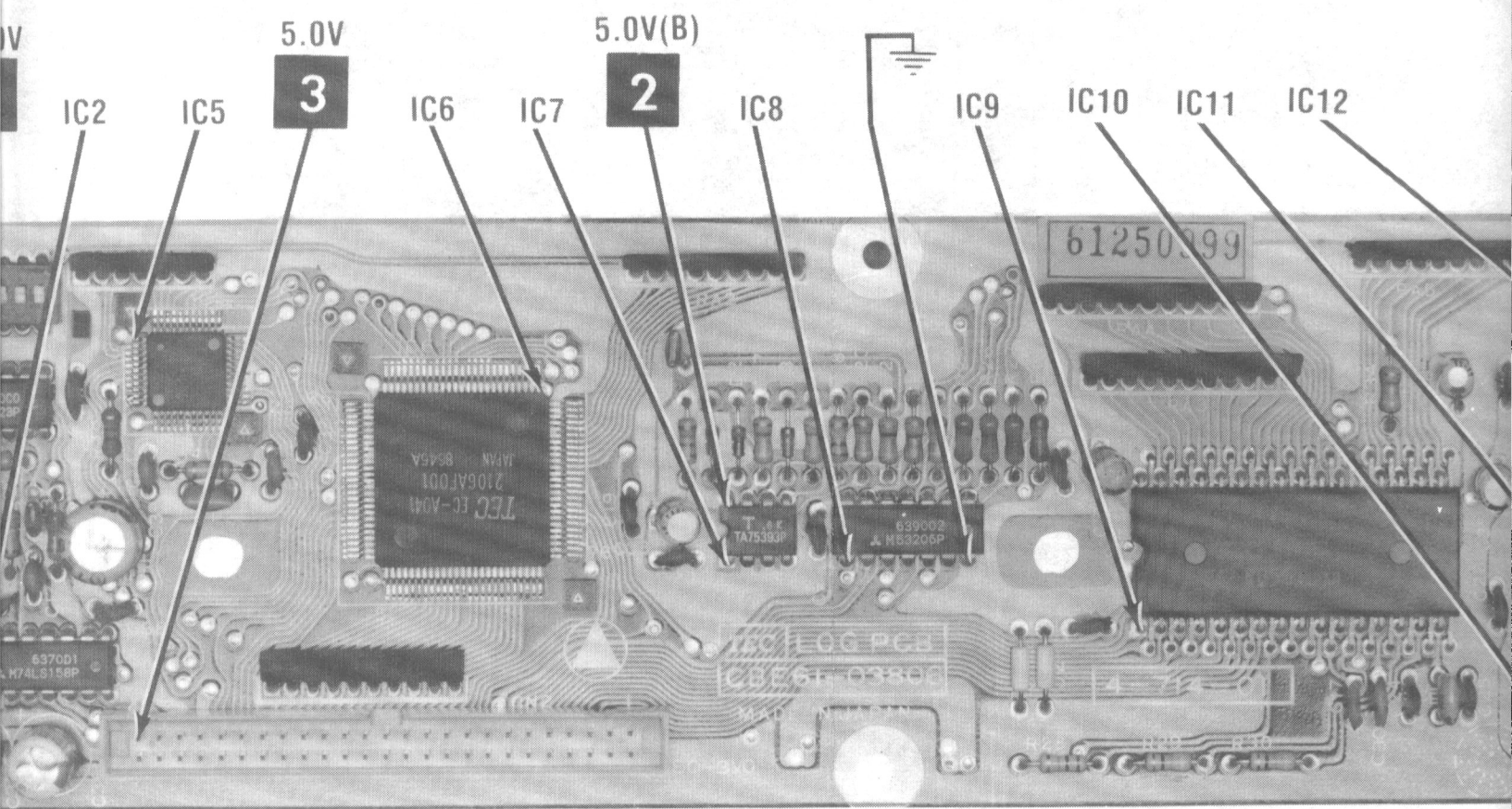




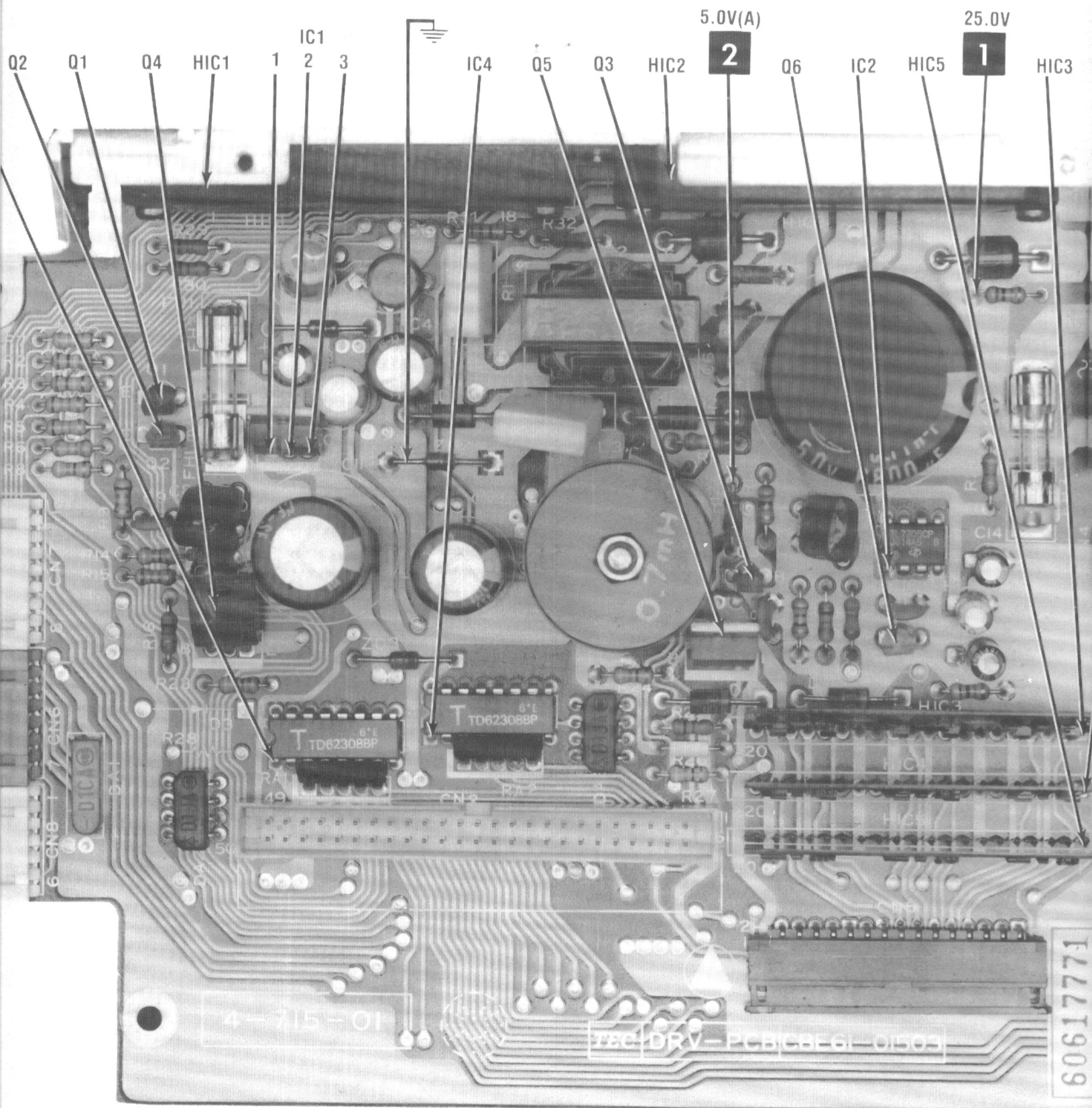


D-14	CN2	G-9	J2	F-17	R23	C-15	RA6	D-23
B-12	CN3	E-1	R2	D-2	R24	C-28	RA7	F-9
C-17	CN9	D-1	R3	D-2	R25	C-16	SW1	A-2
F-21	CND	D-26	R4	D-3	R26	C-16	SW2	A-5
F-21	D1	C-13	R5	D-3	R27	C-16	X1	D-7
E-22	D2	C-13	R7	D-3	R28	G-17	X2	F-21
B-22	D3	C-14	R8	D-3	R29	G-18	ZD1	C-1
B-21	IC1	F-3	R9	D-4	R30	G-19		
B-22	IC2	F-5	R10	D-4	R31	D-28		
F-20	IC3	C-2	R11	D-5	R32	C-27		
G-4	IC4	C-4	R12	C-5	R34	B-20		
C-8	IC5	B-7	R13	D-5	R35	C-16		
D-12	IC6	C-10	R14	C-7	R36	F-23		
C-17	IC7	D-13	R16	C-13	R37	G-24		
D-22	IC8	D-15	R17	C-13	R38	C-6		
G-5	IC9	D-19	R18	C-14	RA1	A-6		
E-27	IC10	E-23	R19	C-14	RA2	A-12		
E-6	IC11	C-23	R20	C-14	RA3	B-18		
E-17	IC12	B-24	R21	C-15	RA4	A-18		
D-28	J1	F-16	R22	C-15	RA5	A-21		





TE PIN 1 UNLESS NOTED



ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED

IC PINOUTS & TERMINAL GUIDES

/DRIVER BOARD

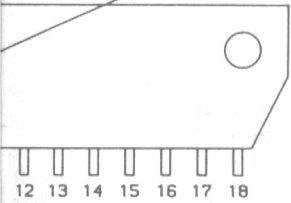
E C B



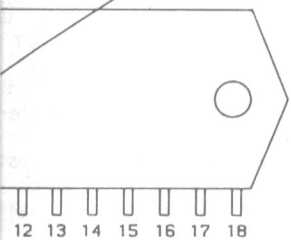
Q3

BOTTOM VIEW

IDENT



IDENT



MT22



IDENT

G I O
IC1

FRONT VIEW

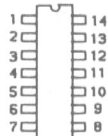


IC10, IC11
TOP VIEW



IC7

TOP VIEW



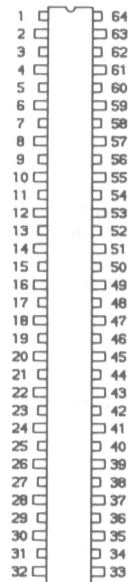
IC8

TOP VIEW



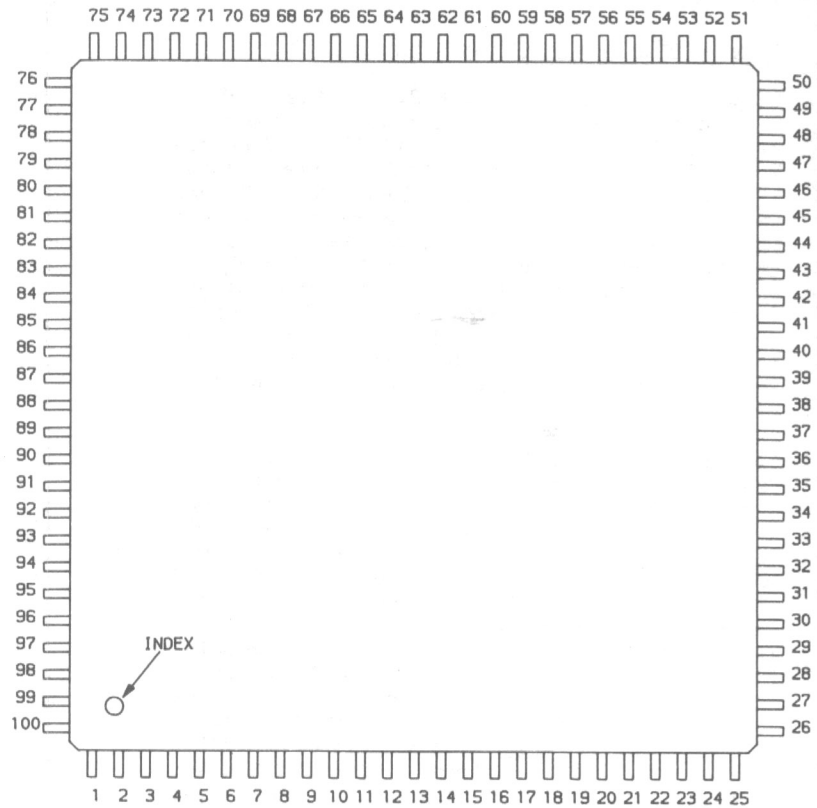
IC1

TOP VIEW



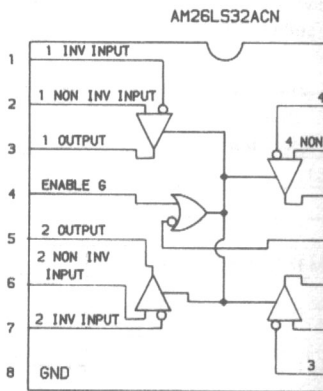
IC9

TOP VIEW

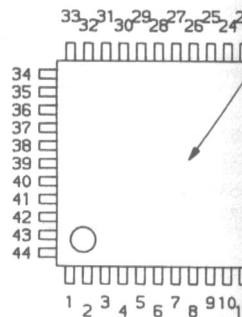


IC6

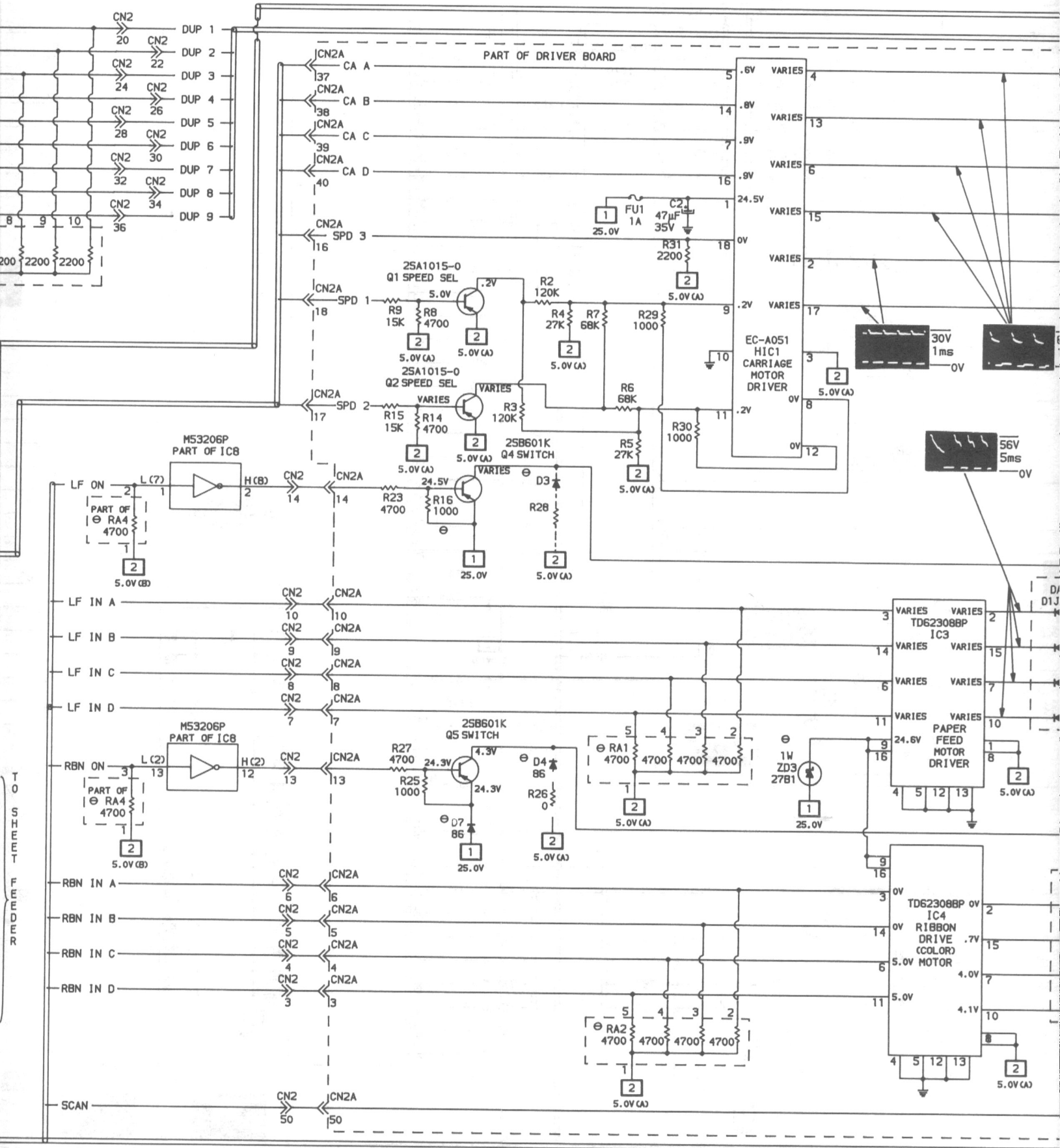
TOP VIEW



IC3
LINE RECEIVER
TOP VIEW



IC5
TOP VIEW



REGAN

