

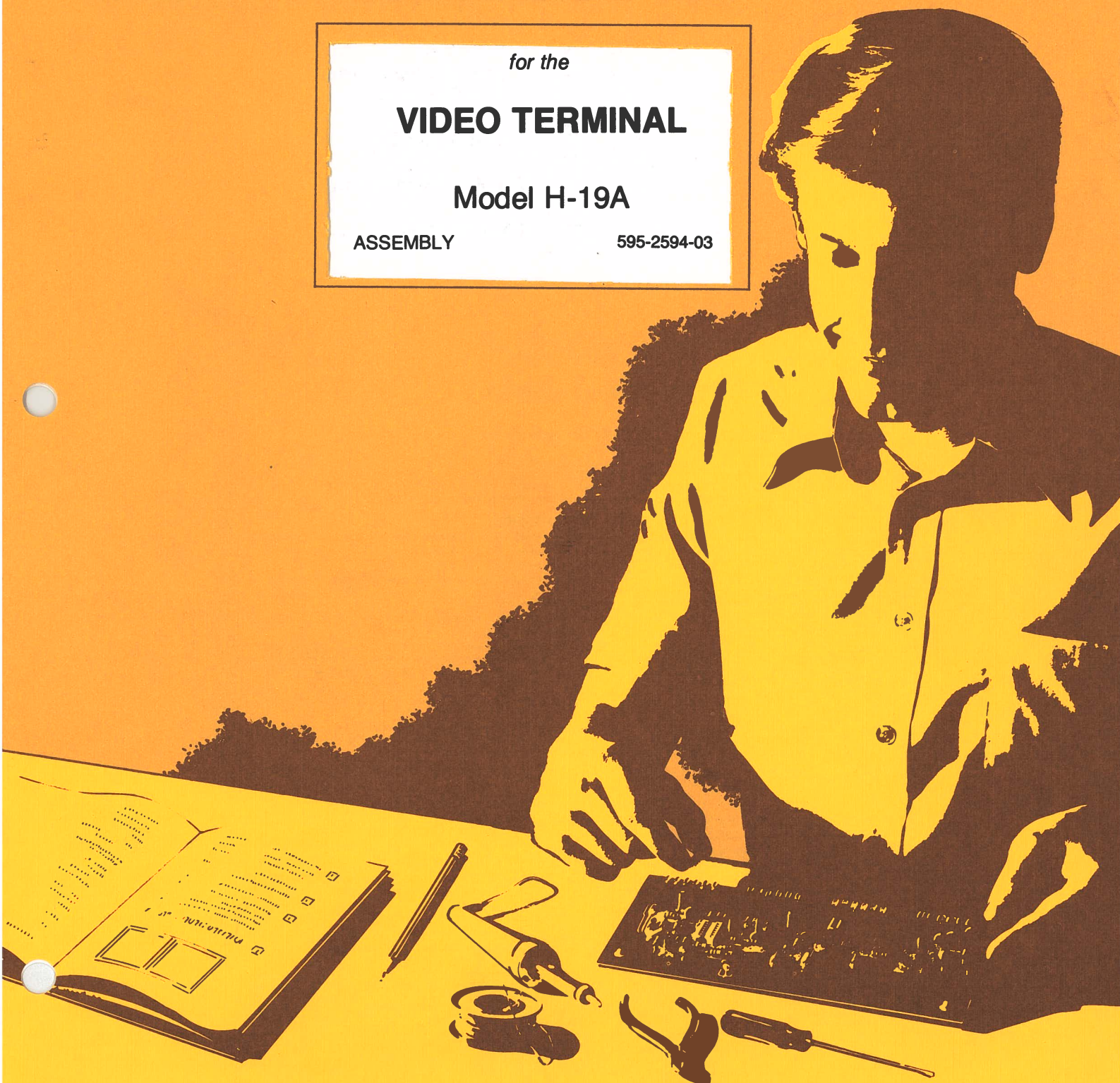
# HEATHKIT<sup>®</sup> MANUAL

*for the*  
**VIDEO TERMINAL**

**Model H-19A**

**ASSEMBLY**

**595-2594-03**



**HEATH COMPANY • BENTON HARBOR, MICHIGAN**

443-913 Keyboard Encoder © 5.15

(495)

12 April 93

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Attn: Parts Dept H

# Heathkit® Manual

for the

## VIDEO TERMINAL

Model H-19A

ASSEMBLY

595-2594-03

**HEATH COMPANY**  
BENTON HARBOR, MICHIGAN 49022

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### WARNING

Federal Communications Commission requirements prescribe certification of personal computers and any interconnected peripherals in Part 15 Subpart J of the rules and regulations. This computing device will meet these requirements when constructed in strict accordance with the instructions in this manual, using only components and materials supplied with the kit or the exact equivalent thereof. You will be instructed to sign and date the enclosed FCC ID label and affix the label to the equipment certifying that you have constructed this equipment in accordance with the above mentioned instructions. In order to meet legal requirements, be certain to follow the instructions exactly as they are stated in this manual.

# INTRODUCTION

The Heath Model H-19A Video Terminal is a professional, 24-line, video terminal. Not only does it have the features commonly found in other high-quality video terminals, but it also has many exclusive features. The terminal will connect to other equipment that uses an EIA RS-232C serial interface, and the high-quality keyboard, video display, and state-of-the-art logic circuitry make this Video Terminal an outstanding peripheral for your computer or MODEM.

The information is displayed on a 12" (diagonal), high-quality, cathode ray tube (CRT) that is capable of displaying 1,920 characters at one time (24 rows of 80 characters). The type P4 or type P31 phosphor used in the CRT provides excellent character definition. Upper case characters are formed by a 5 × 7 dot matrix. Lower case characters, which have descenders, use a 5 × 9 dot matrix. The Terminal can also display 33 special graphic characters that can be arranged and grouped to form any number of graphic displays and effects. The graphic symbols are formed on an 8 × 10 dot matrix.

Special local and software controllable escape sequences allow you to select and use thirty-two special functions. These include:

- Using either Heath or ANSI escape sequences.
- Eight user-defined special function keys.
- Alternate keypad output (for sending more user-defined special codes to your computer).
- Shifted keypad (so you can obtain the shifted keypad functions without using the SHIFT key).

- Keyboard enable/disable.
- Keyclick enable/disable.
- Cursor type select (underline or block).
- Auto LF, auto CR.
- Hold screen mode (for scrolling lines and pages).
- Cursor control (left, right, up, down, home).
- Direct cursor addressing.

and you can also:

- Transmit page.
- Transmit 25th line.
- Insert and delete characters and lines.
- Enter and exit the graphics and reverse video modes.
- Erase lines or page of text.
- Modify baud rates.

The highly reliable standard-size electronic keyboard uses a universally accepted, standard typewriter format. Each key stroke is affirmed by an audible key click.

A 12-key keypad duplicates the numeric keys in a calculator format. This lets you rapidly enter data in programs that call for just numbers. In addition, the shifted keypad functions allow you to insert and delete lines and characters, and move the cursor.

These features, along with the stylish molded cabinet, make the Video Terminal a versatile peripheral for your computer system.



## UNPACKING INSTRUCTIONS

This kit is packed in two cartons. The smaller one contains the CRT (Cathode Ray Tube). Do not open this carton until you are instructed to do so.

The large carton contains some loose parts and an "Electronics Pack." Open the electronics pack and remove Packs #1, #2, and #3. (If any of the smaller packages are not marked as such, mark them so you will be able to identify them later.) Place the elec-

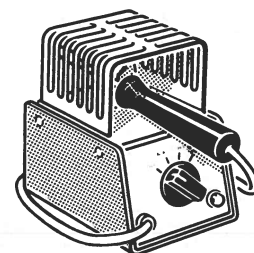
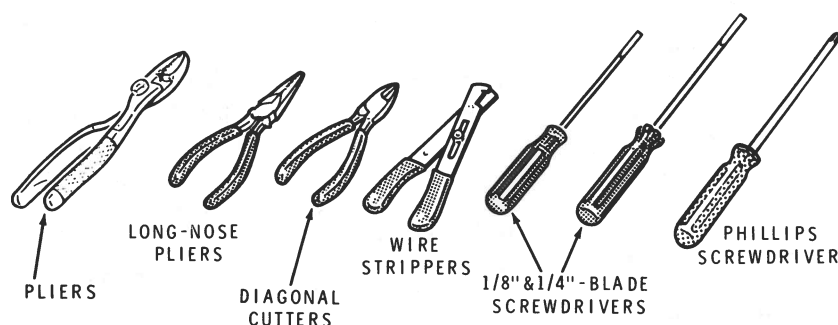
tronics pack (minus packs #1, #2, and #3) back into the large carton.

Also locate one prewired circuit board and three unassembled circuit boards in the large carton. Set these aside with Packs #1, #2, and #3. The parts that now remain in the large shipping carton are all part of the "main pack." You will work from the main pack first.

# ASSEMBLY NOTES

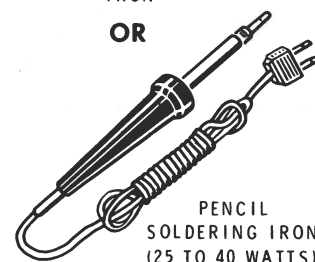
## TOOLS

You will need these tools to assemble your kit.



HEATHKIT  
SOLDERING  
IRON

OR



PENCIL  
SOLDERING IRON  
(25 TO 40 WATTS)

### OTHER HELPFUL TOOLS



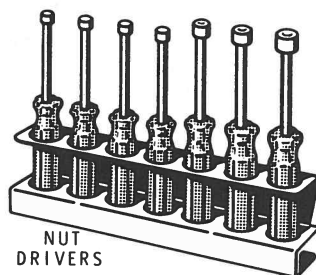
NUT STARTER  
(MAY BE SUPPLIED  
WITH KIT)



DESOLDERING  
BULB\*



DESOLDERING  
BRAID\*



NUT  
DRIVERS

\*TO REMOVE SOLDER FROM CIRCUIT CONNECTIONS.

## ASSEMBLY

1. Follow the instructions carefully. Read the entire step before you perform each operation.
2. The illustrations in the Manual are called Pictorials and Details. Pictorials show the overall operation for a group of assembly steps; Details generally illustrate a single step. When you are directed to refer to a certain Pictorial "for the following steps," continue using that Pictorial until you are referred to another Pictorial for another group of steps.
3. Most kits use a separate "Illustration Booklet" that contains illustrations (Pictorials, Details, etc.) that are too large for the Assembly Manual. Keep the "Illustration Booklet" with the Assembly Manual. The illustrations in it are arranged in Pictorial number sequence.
4. Position all parts as shown in the Pictorials.
5. Solder a part or a group of parts only when you are instructed to do so.

6. Each circuit part in an electronic kit has its own component number (R2, C4, etc.). Use these numbers when you want to identify the same part in the various sections of the Manual. These numbers, which are especially useful if a part has to be replaced, appear:
- In the Parts List,
  - At the beginning of each step where a component is installed,
  - In some illustrations,
  - In the Schematic,
  - In the section at the rear of the Manual.
7. When you are instructed to cut something to a particular length, use the scales (rulers) provided at the bottom of the Manual pages.

**SAFETY WARNING:** Avoid eye injury when you cut off excessive lead lengths. Hold the leads so they cannot fly toward your eyes.

## SOLDERING

Soldering is one of the most important operations you will perform while assembling your kit. A good solder connection will form an electrical connection between two parts, such as a component lead and a circuit board foil. A bad solder connection could prevent an otherwise well-assembled kit from operating properly.

It is easy to make a good solder connection if you follow a few simple rules:

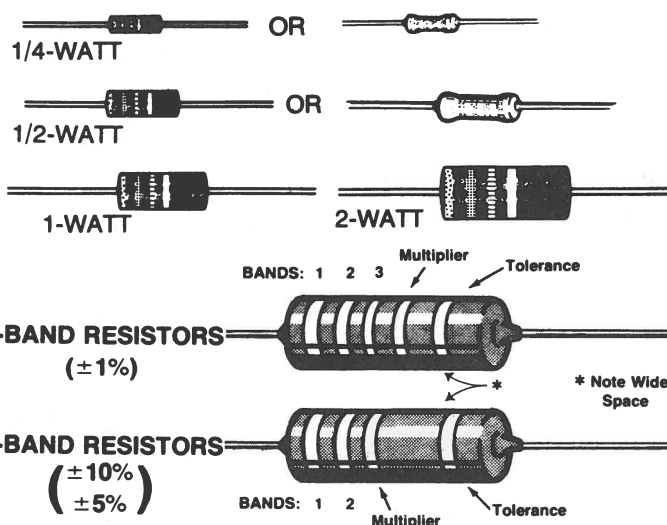
1. Use the right type of soldering iron. A 25 to 40-watt pencil soldering iron with a 1/8" or 3/16" chisel or pyramid tip works best.
2. Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to the tip to give the entire tip a wet look. This process is called tinning, and it will protect the tip and enable you to make good connections. When solder tends to "ball" or does not stick to the tip, the tip needs to be cleaned and retinned.

**NOTE:** Always use rosin core, radio-type solder (60:40 or 50:50 tin-lead content) for all of the soldering in this kit. This is the type we have supplied with the parts. The Warranty will be void and we will not service any kit in which acid core solder or paste has been used.

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## PARTS

**Resistors** are identified in Parts Lists and steps by their resistance value in  $\Omega$  (ohms),  $k\Omega$  (kilohms), or  $M\Omega$  (megohms). They are usually identified by a color code and four or five color bands, where each color represents a number. These colors (except for the last band, which indicates a resistor's "tolerance") will be given in the steps in their proper order. Therefore, the following color code is given for information only. NOTE: Occasionally, a "precision" or "power" resistor may have the value stamped on it.



Band 1 1st Digit		Band 2 2nd Digit		Band 3 (if used) 3rd Digit		Multiplier		Resistance Tolerance	
Color	Digit	Color	Digit	Color	Digit	Color	Multiplier	Color	Tolerance
Black	0	Black	0	Black	0	Black	1	Silver	$\pm 10\%$
Brown	1	Brown	1	Brown	1	Brown	10	Gold	$\pm 5\%$
Red	2	Red	2	Red	2	Red	100	Brown	$\pm 1\%$
Orange	3	Orange	3	Orange	3	Orange	1,000		
Yellow	4	Yellow	4	Yellow	4	Yellow	10,000		
Green	5	Green	5	Green	5	Green	100,000		
Blue	6	Blue	6	Blue	6	Blue	1,000,000		
Violet	7	Violet	7	Violet	7	Silver	0.01		
Gray	8	Gray	8	Gray	8	Gold	0.1		
White	9	White	9	White	9				

**Capacitors** will be called out by their capacitance value in  $\mu F$  (microfarads) or pF (picofarads) and type: ceramic, Mylar\*, electrolytic, etc. Some capacitors may have their value printed in the following manner:

### EXAMPLES:

$$151K = 15 \times 10 = 150 \text{ pF}$$

$$759 = 75 \times 0.1 = 7.5 \text{ pF}$$

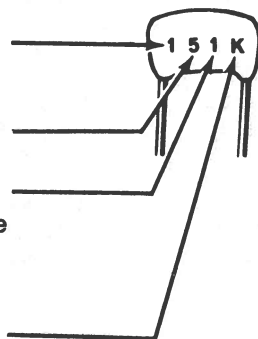
NOTE: The letter "R" may be used at times to signify a decimal point: as in: 2R2 = 2.2 (pF or  $\mu F$ ).

First digit of capacitor's value: 1

Second digit of capacitor's value: 5

Multiplier: Multiply the first & second digits by the proper value from the Multiplier Chart.

To find the tolerance of the capacitor, look up this letter in the Tolerance columns.



MULTIPLIER		TOLERANCE OF CAPACITOR		
FOR THE NUMBER:	MULTIPLY BY:	10 pF OR LESS	LETTER	OVER 10 pF
0	1	$\pm 0.1 \text{ pF}$	B	
1	10	$\pm 0.25 \text{ pF}$	C	
2	100	$\pm 0.5 \text{ pF}$	D	
3	1000	$\pm 1.0 \text{ pF}$	F	$\pm 1\%$
4	10,000	$\pm 2.0 \text{ pF}$	G	$\pm 2\%$
5	100,000		H	$\pm 3\%$
			J	$\pm 5\%$
8	0.01		K	$\pm 10\%$
9	0.1		M	$\pm 20\%$

\*DuPont Registered Trademark



# CHASSIS

## PARTS LIST

Unpack the kit and check each part in the main pack against the following list. Any part that is packed in an individual envelope with the part number on it should be placed back in the envelope after you identify it until all the parts are accounted for.

The key numbers correspond to the numbers on the "Parts Pictorial" in the separate "Illustration Booklet" on Page 1.

To order a replacement part: Always include the PART NUMBER. Use the Parts Order Form furnished with the kit. If one is not available, see "Replacement Parts" inside the rear cover of the Manual. Your Warranty is located inside the front cover. For prices, refer to the separate "Heath Parts Price List."

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
------------	-------------------	------	-------------	----------------------

### ELECTRICAL COMPONENTS

A1	25-857	1	1500 $\mu$ F electrolytic capacitor	C1
A2	54-965	1	Power transformer	T1
A3	58-19	1	CRT yoke	T2
A4	60-642	1	115/230 slide switch	SW1
A4	60-643	1	NORM/LOW slide switch	SW2
A5	61-43	1	On-Off switch	SW3

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
------------	-------------------	------	-------------	----------------------

### Electrical Components (Cont'd.)

NOTE: You ordered one of the following three CRT's with your kit. The CRT is shipped in a separate carton; do not open this carton until you are instructed to do so in an assembly step.

	411-838	1	Regular white CRT	V1
	OR			
	411-851	1	Non-glare white CRT	V1
	OR			
	411-852	1	Non-glare green CRT	V1
A6	423-11	1	Fuseholder	
A7	401-163	1	Speaker	
A8	51-200	1	Flyback transformer	T202
A9	51-197	1	Driver transformer	T201
A10	10-1178	1	500 $\Omega$ control	R1
A11	150-109	1	Line filter	FL1

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KEY No.	HEATH Part No.	QTY.	DESCRIPTION
---------	----------------	------	-------------

## ASSEMBLIES

B1	64-892	1	Assembled keyboard
B2	181-3404	1	Assembled terminal logic circuit board

NOTE: Do not install an IC at location U436.

## CABINET PARTS

C1	90-1262-1	1	Cabinet base
C2	90-1263-1	1	Cabinet top
C3	92-751-1	1	Front panel
C4	90-1238-1	1	Keyboard cover
C5	90-1244-1	1	Panel insert
C6	205-1821-2	1	Rear panel

## METAL PARTS

D1	204-2362	3	Keyboard bracket
D2	204-2520	1	Right circuit board bracket
D3	204-2521	1	Left circuit board bracket
D4	204-2361	1	Insert mounting plate
D5	204-2517-1	1	AC chassis
D6	205-1839-1	1	Left locking plate
D7	205-1840-1	1	Right locking plate
D8	205-1841	1	Left guide plate
D9	205-1842	1	Right guide plate
D10	206-1379	1	Small TLB shield
D11	206-1363	1	Large TLB shield
D12	205-1777	2	Front panel mounting plate
D13	207-86	1	Capacitor clamp
D14	215-657	1	Video board heat sink
D15	<del>204-2434</del>	1	CRT brace

204-2641

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
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CIRCUIT Comp. No.
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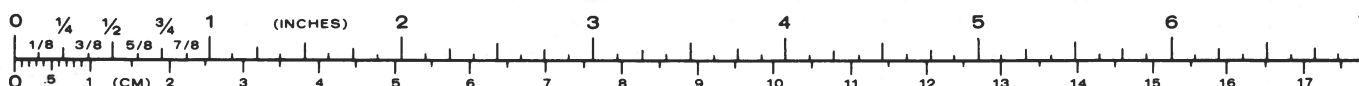
## CONNECTORS-PLUG

E1	432-753	30	Large spring connector (one extra)
E2	432-866	6	Small spring connector (one extra)
E3	432-954	2	4-hole connector shell
E4	432-865	2	3-hole connector shell
E5	432-1022	1	8-hole connector shell
<del>E6</del>	<del>432-1053</del>	<del>1</del>	<del>34 pin plug</del>

## WIRE-CABLES-SLEEVING-BRAID

	89-60	1	Line cord
E7	134-1070	1	Interconnect cable
E8	134-1142	1	Flat keyboard cable
E9	134-1133	1	Wire harness
	134-1155	1	6' extension cable.
	340-8	36"	Bare wire
	344-15	20"	Black stranded wire
	344-16	8"	Red wire
	344-33	24"	Black solid wire
	344-59	9"	Small white solid wire
	344-79	16"	Large brown wire
	344-80	8"	Orange wire
	344-82	8"	Large white wire
	344-126	48"	Small brown wire
	344-154	8"	Yellow wire
	344-155	40"	Green wire
	345-1	72"	Wire braid
	346-7	36"	Small clear sleeving
	346-21	6"	Small Teflon* sleeving
	346-76	6"	Large clear sleeving
	346-4	1"	Fiber sleeving
	346-35	1"	Heat shrinkable sleeving
	347-35	30"	2-conductor shielded cable

\*DuPont Registered Trademark



KEY	HEATH	QTY.	DESCRIPTION
No.	Part No.		

**HARDWARE****NOTES:**

1. The hardware will be in more than one packet. Open all packets of a given size before you check the hardware.
2. Hardware is shown to size. To identify a piece of hardware, place it over the illustration.

**#2, #3, and #4 Hardware**

F1	250-175	3	2-56 × 3/8" screw
F2	250-1361	4	4-40 × 1/4" hex head screw
F3	250-1299	1	#4 × 3/8" self-tapping screw
F4	250-34	5	4-40 × 1/2" screw
F5	250-323	4	4-40 × 5/8" screw
F6	250-1319	4	4-40 × 5/8" phillips head screw
F7	250-1373	3	4-40 × 3/4" hex head screw
F8	252-51	3	2-56 nut
F9	252-2	15	Large 4-40 nut
F10	252-15	2	Small 4-40 nut
F11	252-135	2	4-40 locknut
F12	253-94	6	#3 flat washer
F13	253-80	1	#4 flat washer
F14	254-9	21	#4 lockwasher
F15	255-757	2	#4 threaded stud
F16	259-9	2	#4 solder lug
F17	259-30	1	#3 solder lug

**#6 Hardware**

G1	250-56	4	6-32 × 1/4" screw
G2	250-1264	43	6-32 × 3/8" hex head screw
G3	250-1280	11	6-32 × 3/8" black phillips head screw
G4	250-1150	1	6-32 × 1/2" phillips head screw
G5	252-3	7	6-32 nut
G6	252-725	41	Brass insert
G7	253-21	2	#6 flat washer
G8	254-1	5	#6 lockwasher
G9	259-1	3	#6 solder lug

KEY	HEATH	QTY.	DESCRIPTION
No.	Part No.		

**#8 Hardware**

H1	250-16	1	8-32 × 3/16" setscrew
H2	250-1383	6	8-32 × 5/8" hex head screw
H3	250-1309	4	8-32 × 3/4" phillips head screw
H4	250-1310	4	8-32 × 3/4" hex head screw
H5	252-4	8	8-32 nut
H6	253-45	10	#8 flat washer
H7	254-2	7	#8 lockwasher
H8	259-2	2	#8 solder lug

**#10 Hardware**

J1	250-1311	4	10-32 × 1" hex head screw
J2	250-1318	4	#10 × 1-1/2" self-tapping screw
J3	252-5	1	10-32 nut
J4	253-98	9	#10 flat washer
J5	259-5	4	#10 solder lug

**Other Hardware**

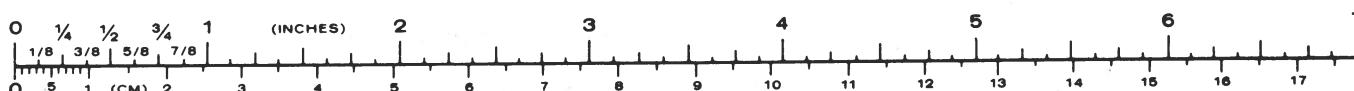
K1	75-792	4	Black shoulder washer
K2	252-7	1	Control nut
K3	253-10	1	Control flat washer
K4	258-132	2	Short spring
K5	258-33	2	Long spring
K6	259-10	1	Control solder lug
K7	262-50	2	Latch pin
K8	432-66	1	Push-on connector
K9	432-1077	1	Ground connector

**SPACERS**

L1	255-1	2	1/8" spacer
L2	255-753	8	Beveled spacer
L3	255-767	4	3/32" spacer

**TOOLS**

N1	205-778	1	Alignment tool blade
N2	490-1	1	Alignment tool
N3	490-5	1	Nut starter
	490-185	1	Desoldering braid
N4	490-189	1	IC puller



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KEY	HEATH	QTY.	DESCRIPTION
No.	Part No.		

## MISCELLANEOUS

N5	75-802	1	Clear switch cover
N6	258-730	1	Speaker bracket
N7	261-6	4	Foot
N8	265-39	2	Hinge
N9	266-1121	2	Card guide
N10	352-33	2	Vibra-Tite*
N11	354-5	3	Small cable tie
N12	354-7	2	Large cable tie
N13	440-24	1	Capacitor cap
N14	438-55	1	Small plug pin
N15	438-48	8	Large plug pin (one extra)
N16	462-17	1	Control knob
	489-1	1	Sandpaper

Solder

KEY	HEATH	QTY.	DESCRIPTION
No.	Part No.		

## PRINTED MATERIAL

390-147	1	"DANGER" label
391-651	1	Model label
390-1783	1	ASCII Conversion card
	1	FCC label
	1	Blue and white label
597-1656-1	1	H.U.G. Application
597-260	1	Parts Order Form
	1	Assembly Manual (See title page for part number.)
	1	Operation Manual (See title page for part number.)

NOTE: All of the wire and hardware for your kit is in this main pack.  
Some parts in this pack will be called out in other parts lists.



## STEP-BY-STEP ASSEMBLY

### CABINET BASE ASSEMBLY

Refer to Pictorial 1-1 (Illustration Booklet, Page 4) for the following steps.

- (✓) Position the cabinet base on your work surface as shown.

#### NOTES:

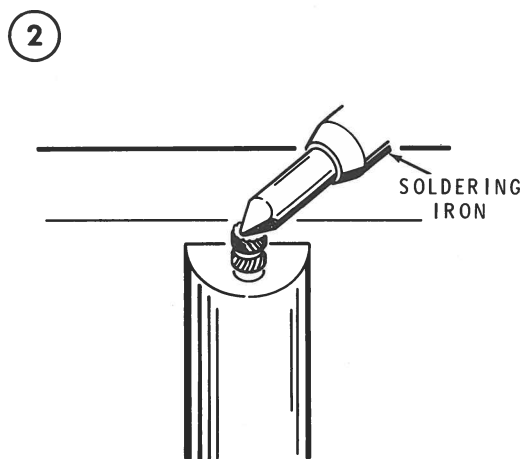
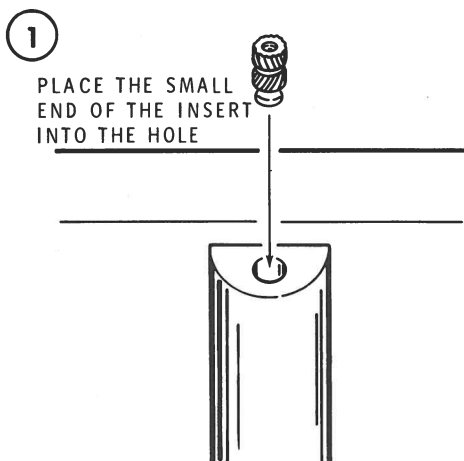
1. When hardware is called for in a step, only the screw size will be given. For instance, if 8-32  $\times$  3/4" hardware is called for, use an 8-32  $\times$  3/4" screw, one or more #8 lockwashers, and an 8-32 nut. The Pictorial or Detail will show the number of lockwashers to use.

2. Use the plastic nut starter to pick up and start 4-40 and 6-32 nuts on screws. Also, use the nut starter to hold and start hex-head screws.

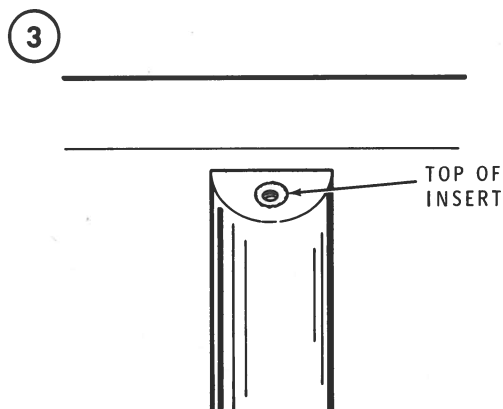
- (✓) Refer to inset drawing #1 on the Pictorial and mount a rubber foot on the underside of the cabinet base at DA using 8-32  $\times$  3/4" phillips head hardware.

- (✓) In the same manner, mount rubber feet on the cabinet base at DB, DC, and at DD.

**NOTE:** When you install brass inserts in the following steps, first make sure your soldering iron is clear of solder or solder may flow down into the insert.



APPLY HEAT TO THE TOP OF THE INSERT WITH YOUR SOLDERING IRON, USING A SLIGHT DOWNWARD PRESSURE. SEAT THE INSERT FLUSH WITH THE TOP OF THE HOLE.



Detail 1-1A

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Refer to Detail 1-1A for the following steps.

Install a brass insert as shown in the Detail at each of the following 18 locations:

(✓) AA  
(✓) AB  
(✓) AC  
(✓) AD  
(✓) AE  
(✓) AF

(✓) AG  
(✓) AH  
(✓) AJ  
(✓) AK  
(✓) AL  
(✓) AM

(✓) AS  
(✓) AT  
(✓) AU  
(✓) AV  
(✓) AW  
(✓) AX

NOTE: The Vibra-Tite sealant that you will use in the next step will stain anything it gets on. Be careful that you do not get it on your clothing or on the outside of the terminal base.

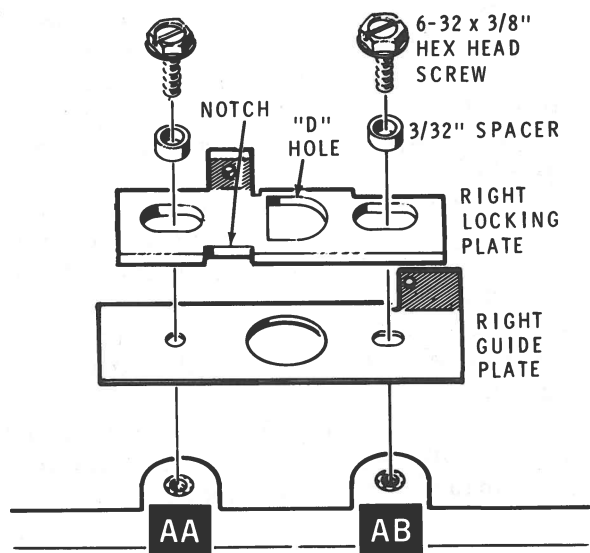
(✓) Locate a vial of Vibra-Tite sealant and cut off the tip. Then apply a liberal amount of the sealant to the inner threads of the inserts at AA, AB, AC, and AD. Discard the remaining sealant in this vial.

(✓) Refer to Detail 1-1B and locate the right guide plate. Place this plate on the cabinet edge at AA and AB. Be sure the plate is positioned as shown.

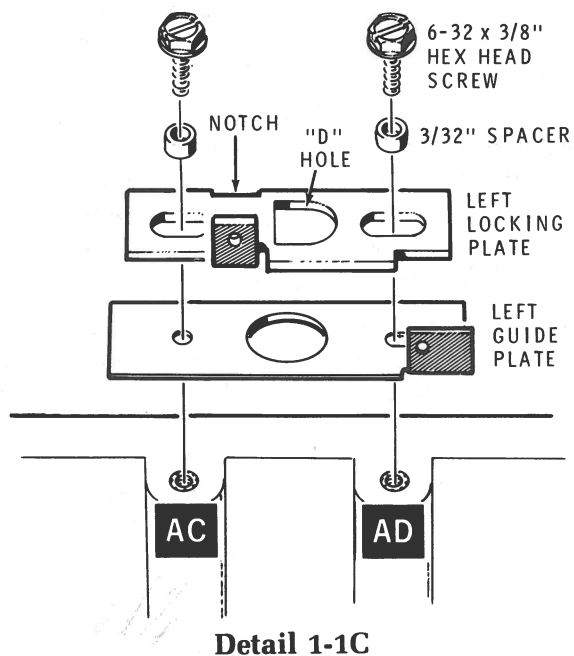
(✓) Refer again to Detail 1-1B and locate the right locking plate. Place this plate on top of the guide plate with the notch facing the outer edge and the round part of the "D" hole facing the rear of the cabinet.

(✓) Mount the plates to the cabinet with two 6-32 × 3/8" hex head screws and two 3/32" spacers. Be sure the locking plate can slide freely. Be sure not to use the 1/8" spacer.

(✓) Hook a short spring onto the tabs of the locking plate and the guide plate as shown in the Pictorial.



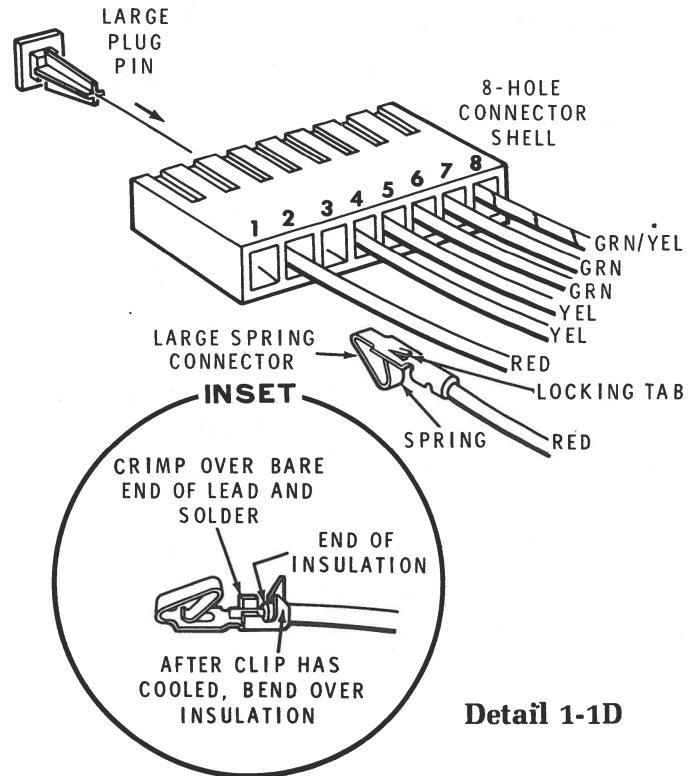
Detail 1-1B



Detail 1-1C

- (✓) Refer to Detail 1-1C and locate the left guide plate. Place this plate on the cabinet base edge at AC and AD. Be sure the plate is positioned as shown.
- (✓) Refer again to Detail 1-1C and locate the left locking plate. Place this plate on top of the guide plate with the notch facing the outer edge and the round part of the "D" hole toward the rear of the cabinet base.
- (✓) Mount the plates onto the cabinet with two 6-32 × 3/8" hex head screws and two 3/32" spacers. Be sure the locking plate can slide freely. Be sure you do not use the 1/8" spacer.
- (✓) Hook a short spring onto the tabs of the locking plate and the guide plate as shown in the Pictorial.
- (✓) Locate the power transformer (#54-965) and cut the following bare lead ends to 1/8":

Both red leads  
Both yellow leads  
Both green leads  
Green-yellow lead



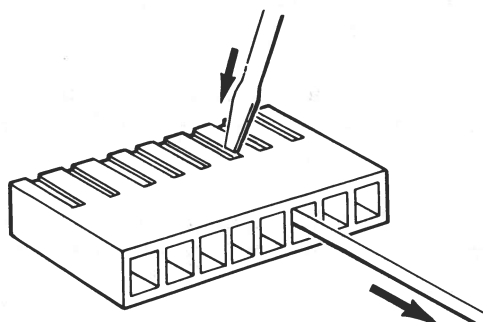
Detail 1-1D

Refer to Detail 1-1D for the following steps.

- (✓) Refer to the inset drawing on Detail 1-1D and crimp and solder a large spring connector onto the bare end of either red transformer lead. Be sure you do not solder the spring part of the connector so that it cannot move freely.
- (✓) Check your solder connection to make sure it is solid. It should have a smooth shiny appearance. If it is dull or grainy, reheat the connection. Also make sure there is not excessive solder on the connector since it must fit into a small space in the connector shell.
- (✓) In the same manner, crimp and solder large spring connectors onto the following transformer leads:

Other red lead  
Both green leads  
Both yellow leads  
Green-yellow lead

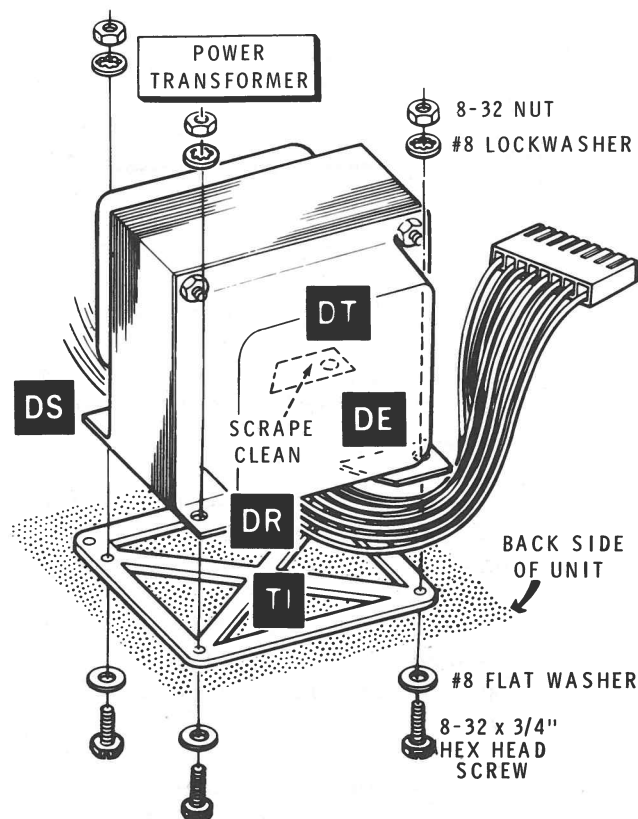
- (✓) Refer to Detail 1-1D and position the 8-hole connector shell as shown. Make sure the slotted side is up.



Detail 1-1E

NOTE: If it is ever necessary to remove a spring connector from the connector shell, use a small screwdriver through the slot in the connector shell to depress the locking tab on the connector while you pull on the wire. See Detail 1-1E. Always install the spring connectors with the tabs toward the slotted side of the connector shell. Refer again to Detail 1-1D and insert the spring connectors into the 8-hole connector shell as follows. Insert each connector until it locks in place.

- (✓) Either red lead into hole 1.
- (✓) Other red lead into hole 2.
- (✓) No lead in hole 3.
- (✓) Either yellow lead into hole 4.
- (✓) Other yellow lead into hole 5.
- (✓) Either green lead into hole 6.
- (✓) Other green lead into hole 7.
- (✓) Green-yellow lead into hole 8.
- (✓) Gently pull on each wire in the connector shell to make sure the spring connectors are securely locked in place.
- (✓) Refer again to Detail 1-1D and insert a large plug pin in hole 3 of the connector shell. Insert the pin in the hole as shown, with its head square to the shell, and press the pin into the shell until it snaps into place.

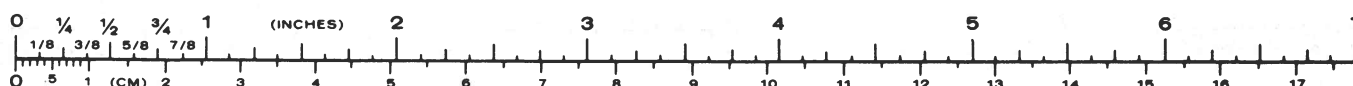


Detail 1-1F

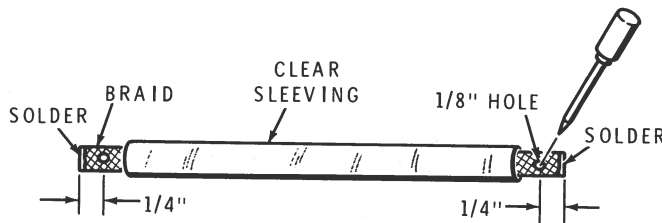
- (✓) Position the power transformer as shown in Detail 1-1F. Then locate mounting foot DT and, with a knife or other sharp tool, scrape the varnish or paint from the top of the mounting foot.
- (✓) T1: Refer to Detail 1-1F and loosely mount the power transformer (#54-965) at T1 with three sets of 8-32 x 3/4" hex head hardware at DE, DR, and DS as shown. Use #8 flat washers on the underside of the cabinet base. NOTE: The hardware at DT will be installed in a following step.
- (✓) From the length of wire braid supplied, cut the following lengths:
 

6"	11"
9"	3-1/2"
- (✓) Cut the following lengths of small clear sleeving:
 

5"	4"
7-1/4"	5-1/2"
9-1/4"	







Detail 1-1G

Refer to Detail 1-1G for the next six steps.

- (✓) 1. At both ends of a 6" wire braid, add a small amount of solder to hold the fine strands together.
- (✓) 2. At one end of the 6" braid, using a sharp pointed tool, form a 1/8" hole through the braid 1/4" from the end.
- (✓) 3. Slide a 5" piece of small clear sleeving onto the braid. Set this braid aside; it will be used later. Do **not** form a hole in the other braid end.
- (✓) 4. In the same manner, prepare **one end** of a 9" and an 11" braid. Place a 7-1/4" sleeve on the 9" braid and a 9-1/4" sleeve on the 11" braid.
- (✓) 5. Add a small amount of solder to the unprepared ends of the 9" and 11" braids. Then form a 1/8" hole in each braid end 3/4" from the tip.
- (✓) 6. Prepare a 3-1/2" braid as described in Steps 1 and 2, but do not put sleeving on the braid. Form another hole in the other end of the braid as shown in the Detail.
- (✓) Set each of the prepared braids aside temporarily.

Refer to Detail 1-1H (Illustration Booklet, Page 5) and prepare the remaining long length of braid in the following steps.

- (✓) To one end of the braid, add a small amount of solder.
- (✓) As in a previous step, form a 1/8" hole 1/4" from the braid end.
- (✓) Slide a 4" piece of clear sleeving up onto the prepared end of the braid.

- (✓) Measure from this hole along the braid to a point 4-1/2" away (just above the 4" sleeve). Form a hole at this location.
- (✓) From the unprepared end of the braid, slide a 5-1/2" piece of clear sleeving down the braid and position it as shown in the Detail.

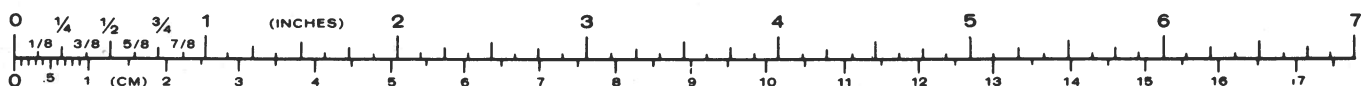
In the following steps, continue to form 1/8" holes in the braid, measuring from the previously prepared end.

Form 1/8" holes at the following points on the braid; measure each new hole from the last-formed hole:

- (✓) Hole 2 to hole 3 = 10-1/2".
- (✓) Hole 3 to hole 4 = 2-1/2".
- (✓) Hole 4 to hole 5 = 3-5/8".
- (✓) Hole 5 to hole 6 = 4-1/8".
- (✓) Hole 6 to hole 7 = 4-1/8".
- (✓) Cut off the braid just past the last formed hole. Add a small amount of solder to the braid end. Then cut off the braid 1/8" from the hole.

Refer to Pictorial 1-1 and to inset drawing #2 on the Pictorial for the following steps.

- (✓) Position the long braid into the cabinet base so the sleeved end is near the front edge as shown.
- (✓) Locate the **third** hole from the sleeved end of the braid; enlarge this hole slightly. Loosely secure **braid hole 3** and the power transformer mounting foot at DT with an 8-32 × 3/4" hex head screw, a #8 flat washer, two #8 solder lugs, and an 8-32 nut. Position the solder lugs as shown in Pictorial 1-1.
- (✓) Position the power transformer as far as possible toward the center of the cabinet base and tighten the mounting hardware. Be sure to position the solder lugs at DT as shown in the Pictorial.
- (✓) Push the sleeved braid as far as possible under the side of the power transformer.



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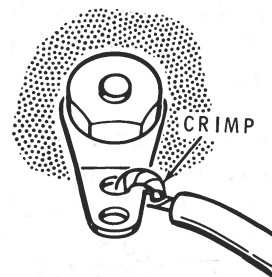
- (✓) Bend the solder lugs at DT up at a 45-degree angle.

NOTE: When you are instructed to prepare wires, as in the following step, cut them to the length indicated and remove 1/4" of insulation from each wire end. For stranded wires, tightly twist together the bare wire ends and add a small amount of solder to hold the fine strands together.

- (✓) Prepare a 13" and an 11" green stranded wire.

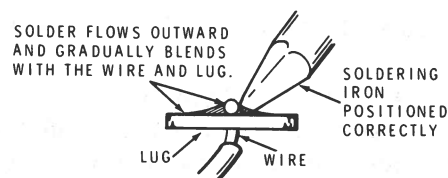
NOTE: To make a "secure mechanical connection," as in the following step, be sure to crimp the wire end tightly around the indicated lug as shown in Detail 1-1J.

- (✓) Connect one end of the 13" green wire to the solder lug at DT nearest the edge of the cabinet base. Make this a mechanically secure connection. Do not solder the connection at this time.
- (✓) Refer to the following instructions and solder the wire to solder lug DT.



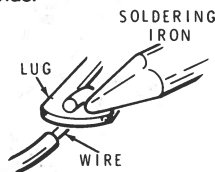
Detail 1-1J

## A GOOD SOLDER CONNECTION

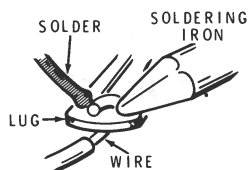


When both the wire and the lug are heated at the same time, the solder will flow onto the wire and the lug evenly. The solder will make a good electrical connection between the wire and the lug.

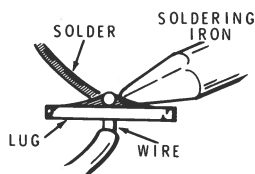
1. Push the soldering iron tip against the wire and the lug. Heat both the wire and the lug for two or three seconds.



2. Apply solder to the wire and the lug, **not** to the soldering iron. **IMPORTANT:** Let the heat of the wire and lug melt the solder.

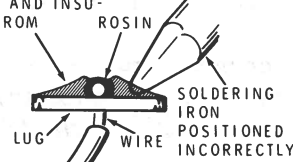


3. As the solder begins to melt, allow it to flow around the connection. Then remove the solder and the iron and let the connection cool.



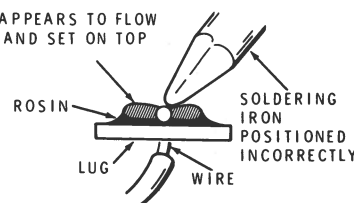
## POOR SOLDER CONNECTIONS

SOLDER DOES NOT FLOW ONTO THE LUG AND WIRE. A DARK ROSIN BEAD SURROUNDS AND INSULATES THE WIRE FROM THE CONNECTION.



When the wire is not heated sufficiently, the solder will not flow onto the wire as shown above. To correct, reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection.

SOLDER APPEARS TO FLOW INWARD AND SET ON TOP OF LUG.



When the lug is not heated sufficiently, the solder will blob on the lug as shown above. To correct, reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection.

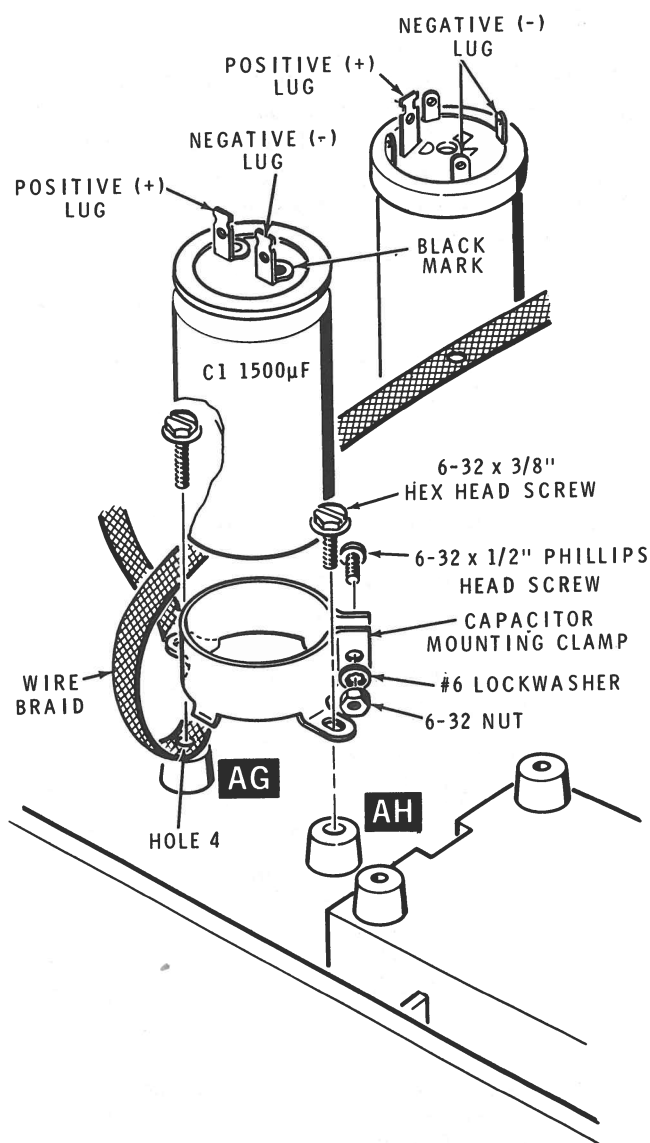
- (✓) Solder one end of the 11" green wire to the other solder lug at DT. Then route this wire as shown in the Pictorial.
- (✓) Refer to inset drawing #3 on Pictorial 1-1 and install a small cable tie around the power transformer wires and the 13" green wire. Position the wires as shown and pull the cable tie tight. Cut off the excess cable tie end.
- (✓) Route the transformer leads (not connected to the 8-hole connector shell) and the 13" green wire through the hole in the back of the AC housing.

Refer to Detail 1-1K for the following steps.

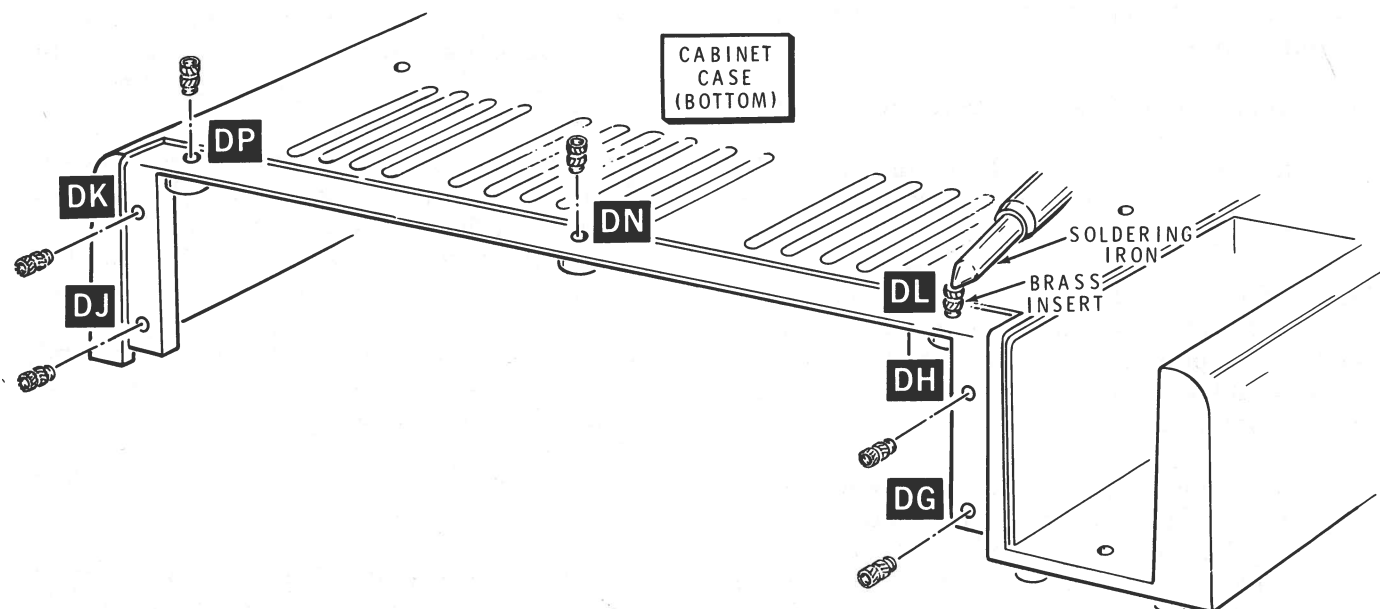
- (✓) Install a 6-32  $\times$  1/2" phillips head screw, a #6 lockwasher, and a 6-32 nut through the tabs of the capacitor mounting clamp as shown. Just start the nut onto the screw threads at this time.
- (✓) Position the capacitor clamp on the cabinet base mounting bosses as shown. Then loosely secure the rear tab at AH with a 6-32  $\times$  3/8" hex head screw. At AG, push a 6-32  $\times$  3/8" hex head screw through braid hole 4 (coming from the transformer mounting foot). Tighten the screw at AG securely.
- (✓) C1: Position the 1500  $\mu$ F capacitor (#25-857) into the clamp as shown.

NOTE: In the next step, be sure to position the negative (-) marked capacitor lug as shown. This capacitor may be either style shown in the Detail.

- (✓) Push the capacitor down as far as it will go, making sure the marked lug is positioned as shown in the Detail. Tighten the side-tab hardware and the bracket screw at AH.



Detail 1-1K



PICTORIAL 1-2

Refer to Pictorial 1-2 for the following steps.

- (✓) Reposition the cabinet base on your work area as shown.

Install seven brass inserts in the locations listed below. Use the same procedure as you did in Detail 1-1A.

- (✓) DG
- (✓) DH
- (✓) DJ
- (✓) DK
- (✓) DL
- (✓) DN
- (✓) DP

Set the cabinet base assembly aside temporarily.



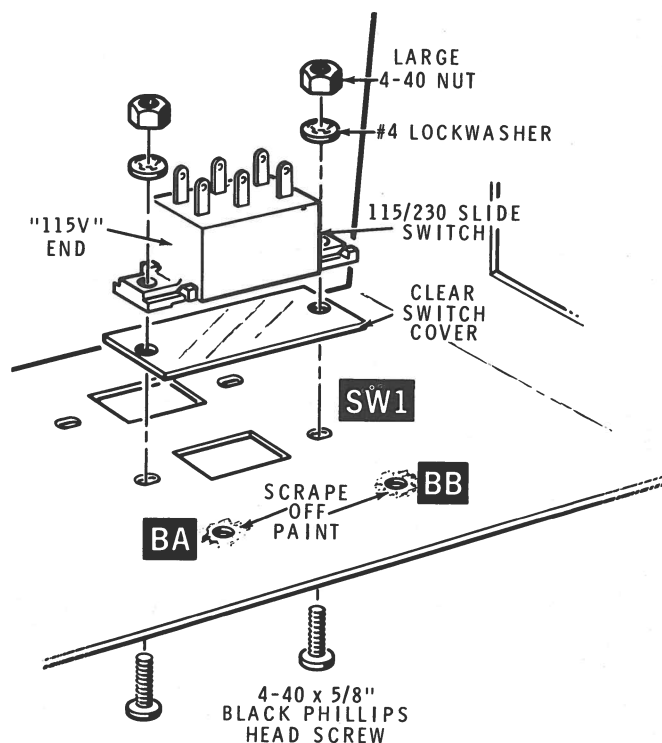
## AC CHASSIS ASSEMBLY AND WIRING

Refer to Pictorial 1-3 (Illustration Booklet, Page 5) for the following steps.

- (✓) Locate the AC chassis and position it as shown.
- (✓) Refer to Detail 1-3A and, if necessary, scrape the paint off the AC chassis around holes BA and BB.

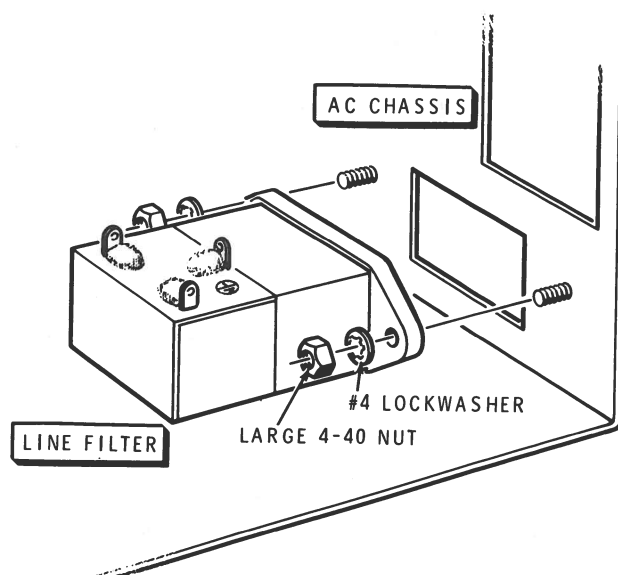
NOTE: If your supply voltage (line voltage) is 115 VAC, set the 115/230 slide switch in the next step so the "115" appears on the slider after the switch is mounted. If your supply voltage is 230 VAC, set the slider to show "230."

- (✓) Locate the 115/230 slide switch and set the slider to the appropriate voltage setting for your area. Push the slide toward the "230" end for 115-volt service, and toward the "115V" end for 230-volt service.

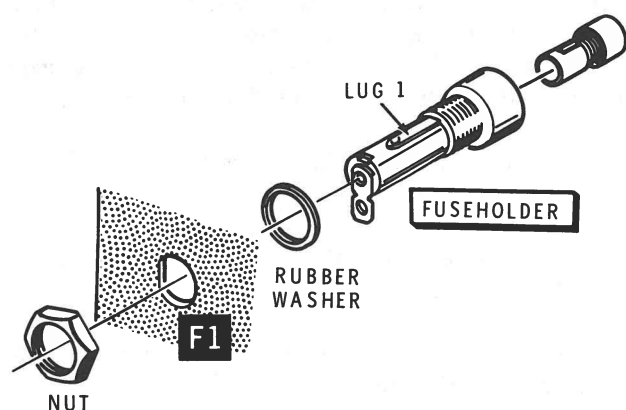


Detail 1-3A

- (✓) SW1: Refer again to Detail 1-3A and mount the 115/230 slide switch and the clear switch cover at SW1 with the switch lettering positioned as shown in the Pictorial. Secure the switch with two sets of 4-40 × 5/8" black phillips head hardware.
- (✓) SW2: Similarly, except without a clear switch cover, mount the NORM/LOW slide switch at SW2. Set the switch slider so the "NORM" is showing. Refer to the inset drawing on Pictorial 1-3 for the correct position of the switch lugs.
- (✓) Mount a #6 solder lug on the AC chassis at BA using a 6-32 × 3/8" hex head screw and a 6-32 nut. Position the lug as shown.
- (✓) In the same manner, install another #6 solder lug at BB.
- (✓) Refer to Detail 1-3B and mount the line filter to the inside of the AC chassis with two #4 lockwashers and two large 4-40 nuts. Position the inner lugs upward as shown.

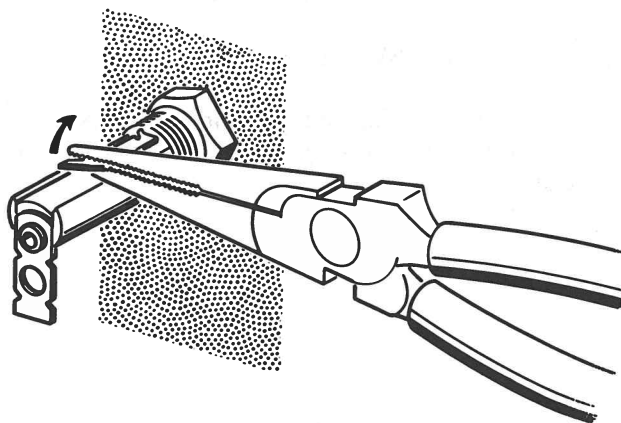


Detail 1-3B

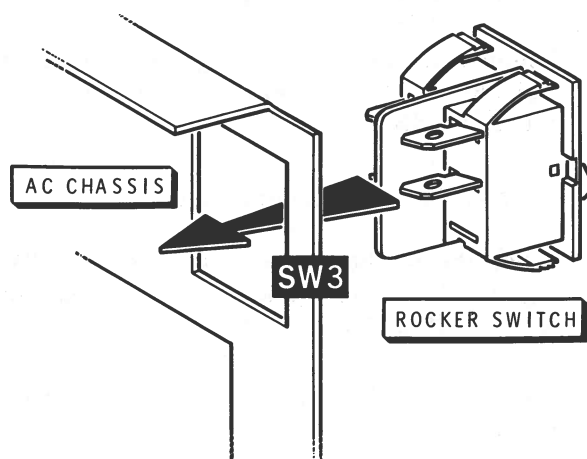


Detail 1-3C

- (✓) Refer to Detail 1-3C and install the fuseholder at F1. Use the hardware supplied with the fuseholder. Position the fuseholder lugs as shown in the Pictorial. NOTE: Do not overtighten the hardware or the fuseholder may break.
- (✓) Refer to Detail 1-3D and bend lug 1 of fuseholder F1 upward slightly as shown. Be careful that you do not apply pressure to the lug where it emerges from the fuseholder.



Detail 1-3D



Detail 1-3E

NOTE: The fuse will be installed later. If the fuseholder cap is not already installed, you may wish to install it now so the cap does not become lost. Do not overtighten the cap.

- (✓) SW3: Refer to Detail 1-3E and install the rocker switch in the AC chassis at SW3 from the outside of the panel. Make sure the lugs are positioned as shown.

## NOTES:

1. All the wire connections in the AC chassis should be made mechanically secure.
2. In the following steps, (NS) means not to solder a connection as other wires or leads will be added later. (S-) with a number, such as (S-2), means that the connection should be soldered. The number following the "S-" tells how many wires are in the connection.
3. When black wire is called for in a step, use the black **solid** wire for all AC chassis wiring.

- (✓) Cut and prepare a 3-1/2" piece of green wire.
- (✓) Connect one end of the 3-1/2" green wire to filter FL1 lug 2 (S-1), and connect the other end to solder lug BB (S-1).

- ( ) Cut a 3/4" piece of small bare wire.
- ( ) Install the 3/4" bare wire between switch SW1 lugs 3 and 6. Solder the wire to both switch lugs and cut off the excess wire ends.

- ( ) Prepare the following lengths of black **solid** wire:

1-1/2"	3-1/4"
2-1/2"	1-3/4"
2"	1-3/4"
3-1/4"	

- (✓) Connect a 1-1/2" black wire from fuseholder lug 1 (S-1), to switch SW3 lug 2 (S-1).
- (✓) Connect a 2-1/2" black wire from filter FL1 lug 1 (S-1) to switch SW3 lug 5 (S-1).
- (✓) Connect a 2" black wire from filter FL1 lug 3 (S-1) to fuseholder F1 lug 2 (S-1).

NOTE: In the following steps, when you connect a wire end to the lugs of switches SW1 and SW2, first form a hook in the bare wire end. Then firmly crimp the hook through the indicated switch lug.

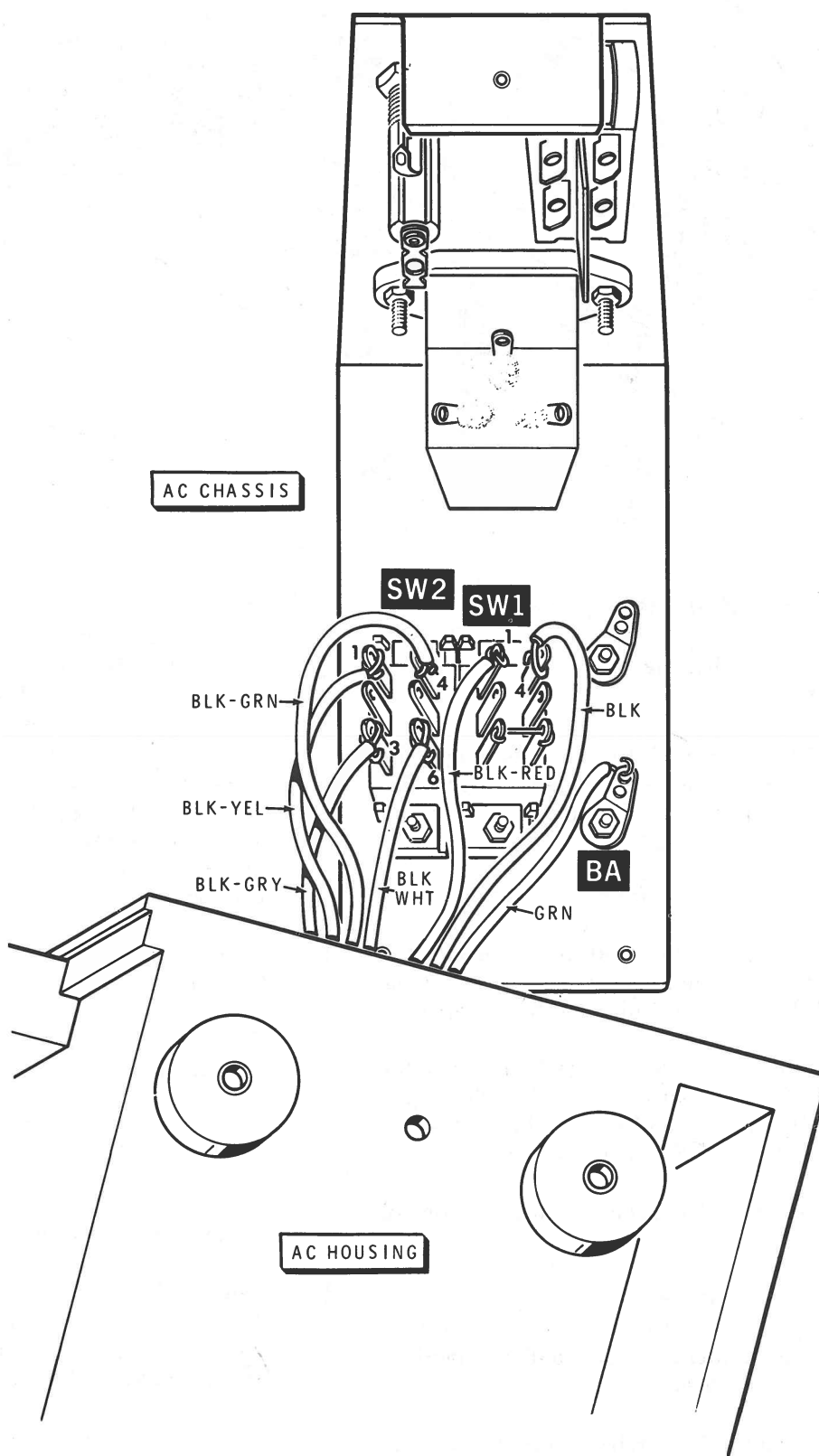
- (✓) Connect a 3-1/4" black wire from switch SW3 lug 1 (S-1) to SW1 lug 4 (NS).
- (✓) Connect a 3-1/4" black wire from switch SW3 lug 4 (S-1) to SW1 lug 1 (NS).
- (✓) Connect a 1-3/4" black wire from SW1 lug 2 (S-1) to SW2 lug 2 (S-1).
- (✓) Connect a 1-3/4" black wire from SW1 lug 5 (S-1) to SW2 lug 5 (S-1).

Refer to Pictorial 1-4 for the following steps.

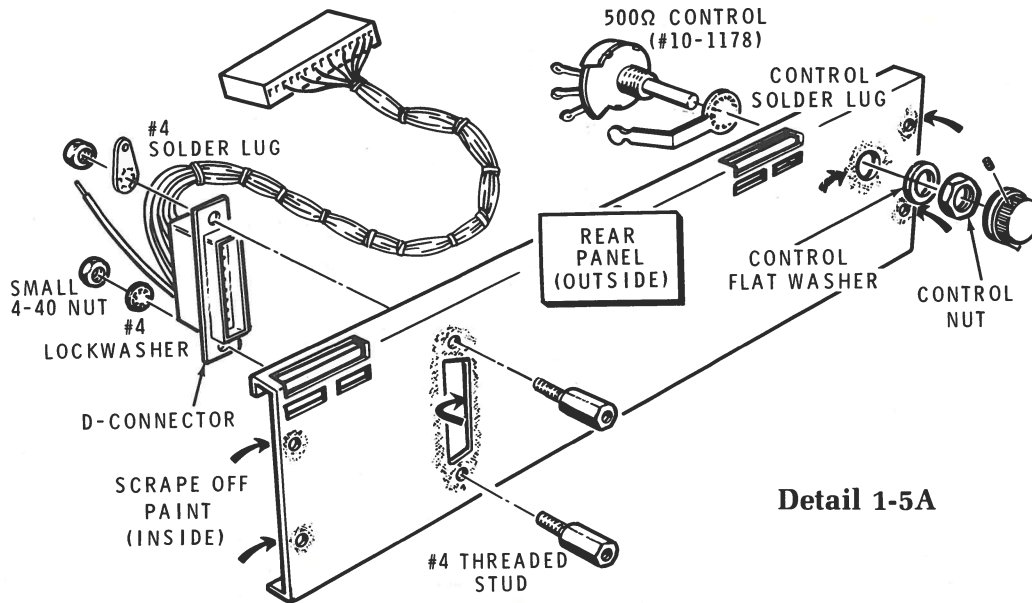
Position the AC chassis under the right rear corner of the cabinet base and connect the power transformer leads as follows. Make each connection mechanically secure.

- (✓) Black-gray lead to SW2 lug 3 (S-1)
- (✓) Black-yellow lead to SW2 lug 1 (S-1).
- (✓) Black-white lead to SW2 lug 6 (S-1).
- (✓) Black-green lead to SW2 lug 4 (S-1).
- (✓) Black-red lead to SW1 lug 1 (S-2).
- (✓) Black lead to SW1 lug 4 (S-2).
- (✓) Connect the green wire to solder lug BA (S-1). Be sure to make a mechanically secure connection.





PICTORIAL 1-4



Detail 1-5A

### CABINET BASE ASSEMBLY (cont'd.)

Refer to Pictorial 1-5 (Illustration Booklet, Page 6) for the following steps.

- ( ) Mount the AC chassis into the AC housing with three 6-32 × 3/8" hex head screws. Secure the wire braid (hole 5) with the inner screw as shown in the Pictorial.

Refer to Detail 1-5A for the following steps.

- (✓) On the **inside** of the rear panel, using the sandpaper supplied, remove the paint from around the six holes indicated by the arrows.
- (✓) R1: Mount the 500 Ω control (#10-1178) on the rear panel at R1 using a control solder lug, a control flat washer, and a control nut. Position the solder lug as shown in the Detail.
- (✓) Start an 8-32 × 3/16" setscrew into the control knob.
- (✓) Turn the shaft of control R1 fully clockwise. Then place the control knob onto the control shaft so the pointer is at the 5 o'clock position. Tighten the knob setscrew.
- (✓) Cut the short black wire coming from the D-connector on the interconnect cable (#134-1070) to 2-1/2". Prepare the end of the wire.

- (✓) Mount the interconnect cable D-connector on the inside of the rear panel with two #4 threaded studs, one #4 lockwasher, one #4 solder lug, and two **small** 4-40 nuts. Position the solder lug toward the top of the panel.

- (✓) Refer to inset drawing #1 on Pictorial 1-5 and push a small plug pin into hole 4 (between the red and brown wires) in the 15-hole connector shell on the other end of the interconnect cable as shown.

- (✓) Bend the solder lug on the D-connector away from the panel.

- (✓) Connect the D-connector black wire to the solder lug at the top of the connector (NS).

- ( ) Cut a 16" and an 11" length of 2-conductor shielded cable.

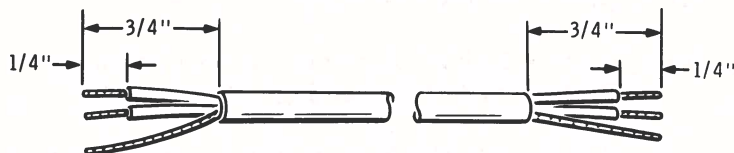
- ( ) Refer to Detail 1-5B and prepare the 2-conductor cables as shown.

- (✓) Refer to Detail 1-5C and on one end of the 16" 2-conductor shielded cable, cut the lead ends to 1/8". Then crimp and solder a **large** spring connector onto the clear lead as shown.

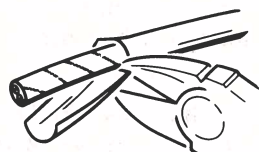
- (✓) Twist together the ends of the black and shield leads. Then crimp and solder a push-on connector onto the twisted leads.

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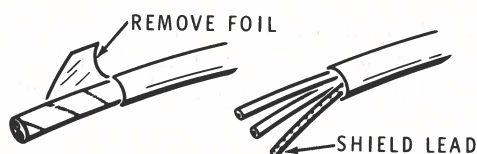
PREPARE EACH END AS SHOWN



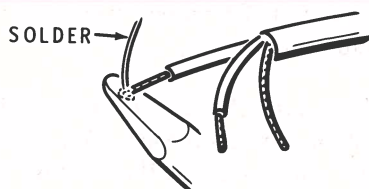
TAKING CARE NOT TO CUT THE SHIELD LEAD, REMOVE THE OUTER INSULATION.



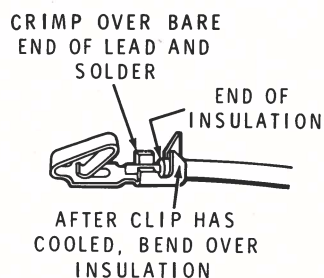
PEEL OFF THE FOIL.



REMOVE THE INNER INSULATION AND TWIST THE SMALL WIRES OF THE INNER LEAD. APPLY A SMALL AMOUNT OF SOLDER TO THE END OF THE INNER LEAD.

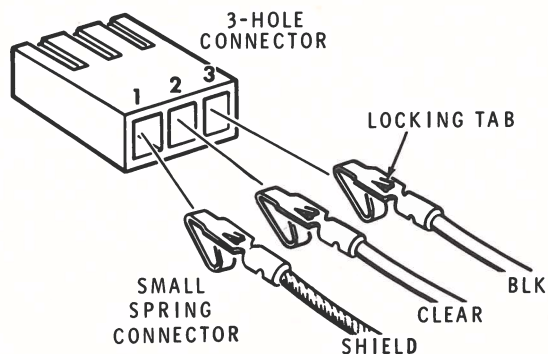


Detail 1-5B



Detail 1-5C

- (✓) At the other end of the 16" 2-conductor shielded cable, connect the clear lead to control R1 lug 1 (S-1) and the black lead to lug 3 (NS). Wrap the shield lead around the control solder lug (NS).
- (✓) Refer to Detail 1-5C and, on one end of the 11" 2-conductor shielded cable, cut the clear and black lead ends to 1/8". Then crimp and solder **small spring connectors** onto both leads **and the shield lead** as shown.
- (✓) Locate a small 3-hole connector shell. Refer to Detail 1-5D and push the spring connector on the shield lead into hole 1, the clear lead into hole 2, and black lead into hole 3 as shown. Tug on all three leads to make sure their connectors are latched in the socket.
- (✓) At the other end of the 11" 2-conductor shielded cable, connect the clear lead to control R1 lug 2 (S-1), and the black lead to lug 3 (S-2). Wrap the shield lead around the control solder lug (S-2). Cut off any excess lead ends.



Detail 1-5D



- ( ) Position the rear panel onto the cabinet base. Place one end of the 3-1/2" braid (prepared in a previous step) between the rear panel and the cabinet base at DJ as shown. Just start a 6-32 × 3/8" black phillips head screw through the braid end and into the brass insert at DJ.
- (✓) At the other end of the panel, position the last hole (hole 7) of the long braid between the cabinet base and the rear panel at DG. Loosely secure the panel and braid at DG with a 6-32 × 3/8" black phillips head screw.
- (✓) Mount the rear panel to the cabinet base with five additional 6-32 × 3/8" black phillips head screws as shown in the Pictorial. (Install three of the screws from the underside of the panel). Tighten all seven rear panel mounting screws.
- (✓) Route the 11" green wire coming from transformer solder lug DT as shown. Connect the wire end to the D-connector solder lug (S-2).
- ( ) Locate the wire harness (#134-1133) and position it into the cabinet base with the two blue and two black wires near capacitor C1.

NOTE: Since capacitor C1 may be one of two different styles, refer to Pictorial 1-5 or to inset drawing #2 as you perform the next two steps.

- (✓) Connect both black harness wires to capacitor C1 negative (-) marked lug 2 (S-2).
- (✓) Connect both blue harness wires to capacitor C1 positive (+) lug 1 (S-2).
- (✓) Refer to inset drawing #3 on Pictorial 1-5 and push the insulator cap down onto the top of capacitor C1 as shown.
- (✓) Find the wire harness 8-hole connector shell. Insert a large plug pin (#438-48) into hole 5 of the shell.
- (✓) Locate the wire harness 11-pin connector shell. Insert another large plug pin into hole 5 of the shell (if this has not already been done).
- (✓) Locate the free end of the 16" 2-conductor shielded cable with a spring connector and push-on connector. Push the connector on the clear lead of the cable into 11-pin connector hole 11 as shown. The push-on connector will be connected later.

Set the cabinet base assembly aside temporarily. You will need some of the parts, the hardware, and some of the wire from the main pack in the following steps.

# POWER SUPPLY CIRCUIT BOARD

## PARTS LIST

Locate Pack #1 and check each part against the following list. Any part that is packed in an individual envelope with the part number on it should not be removed from its envelope until it is called for in a step. Do not discard any packing materials until all parts are accounted for.

To order a replacement part, always include the Part Number and use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, use one of the "Expedited Parts Order Forms" at the rear of this Manual, or refer to "Replacement Parts" inside the rear cover. Your Warranty is inside the front cover. For prices, refer to the separate "Heath Parts Price List."

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### CAPACITORS

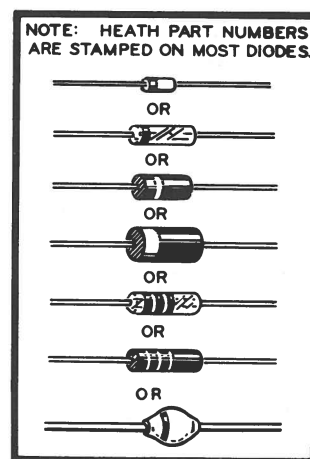
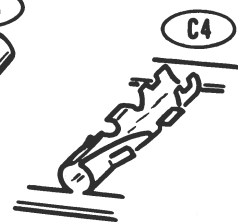
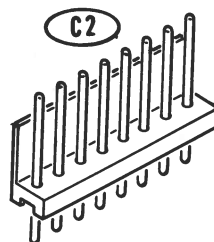
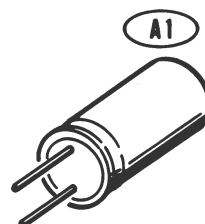
A1	25-891	2	470 $\mu$ F electrolytic	C102, C104
A1	25-902	1	10,000 $\mu$ F electrolytic	C103

### DIODES

B1	57-42	4	3A1 diode	D105, D106, D107, D108
B1	57-65	4	1N4002 diode	D101, D102, D103, D104
B1	57-27	4	1N2071 diode	D109, D110, D111, D112

### MISCELLANEOUS

C1	204-182	1	Support bracket	
85-284-2	<del>85-2767-2</del>	1	Power supply circuit board	
C2	432-876	2	8-pin connector	P101, P102
C3	421-23	1	1-ampere fuse	
C4	432-855	1	Female connector pin	





## ASSEMBLY NOTES

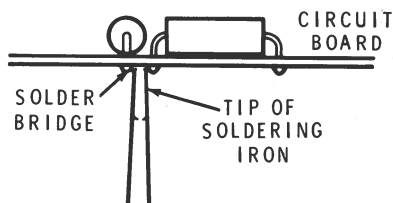
### ASSEMBLY

1. Position all parts as shown in the Pictorial.
2. Solder a part or a group of parts only when you are instructed to do so.

### SOLDERING

1. Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to the tip to give the entire tip a wet look. This process is called tinning, and it will protect the tip and enable you to make good connections. When solder tends to "ball" or does not stick to the tip, the tip needs to be cleaned and retinned.

2. Do not create solder bridges between adjacent circuit board foils. A solder bridge usually occurs when you use too much solder and then drag the soldering iron across the board when you remove it from the connection. Always use just enough solder to make a good connection, and lift the soldering iron straight up from the circuit board. If a solder bridge should develop, turn the circuit board foil side down and heat the solder between connections. The excess solder will run onto the tip of the soldering iron, and this will remove the solder bridge. See the drawing below. You can also place the desoldering braid on a solder bridge. Then heat the braid with the soldering iron and the braid will soak up the excess solder. If you suspect a solder bridge exists, but are not sure, compare the foil side of the circuit board with the "X-Ray View" of that circuit board.



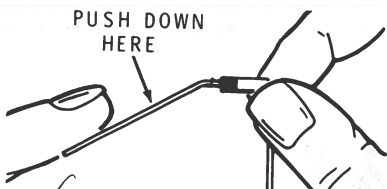
## STEP-BY-STEP ASSEMBLY

### START

In the following steps, you will be given detailed instructions on how to install and solder the first part on the circuit board. Read and perform each step carefully. Then use the same procedure whenever you install parts on a circuit board.

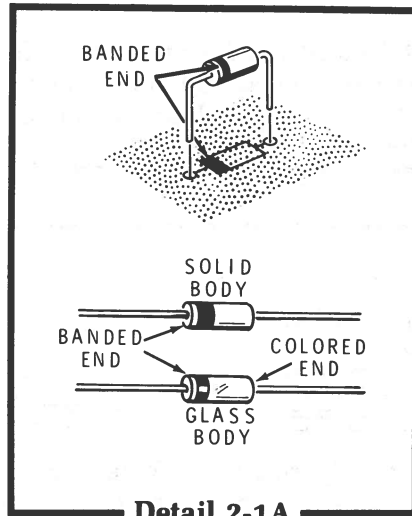
- (✓) Position the circuit board as shown with the printed side (not the foil side) up.

- (✓) Hold a 1N4002 diode (#57-65) by the body as shown and bend the leads straight down.

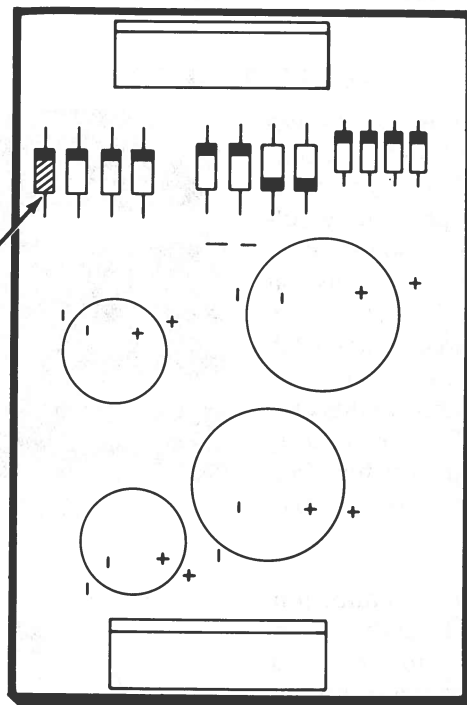


- (✓) D101: Push the diode leads through the holes at the indicated location on the circuit board. Match the band on the diode with the band mark on the circuit board. See Detail 2-1A. THE CIRCUITRY WILL NOT WORK PROPERLY IF A DIODE IS INSTALLED BACKWARDS.

- (✓) Press the diode against the circuit board. Then bend the leads outward slightly to hold the diode in place.



Detail 2-1A

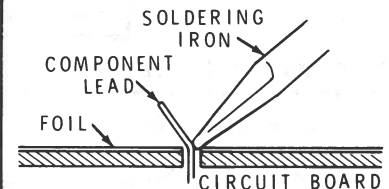


PICTORIAL 2-1

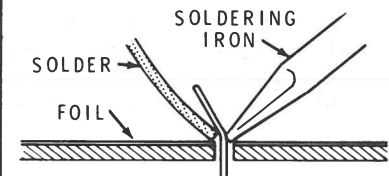
### CONTINUE

- (✓) Solder the diode leads to the circuit board as follows:

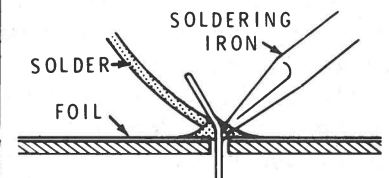
1. Push the soldering iron tip against both the lead and the circuit board foil. Heat both for two or three seconds.



2. Then apply solder to the other side of the connection. IMPORTANT: Let the heated lead and the circuit board foil melt the solder.



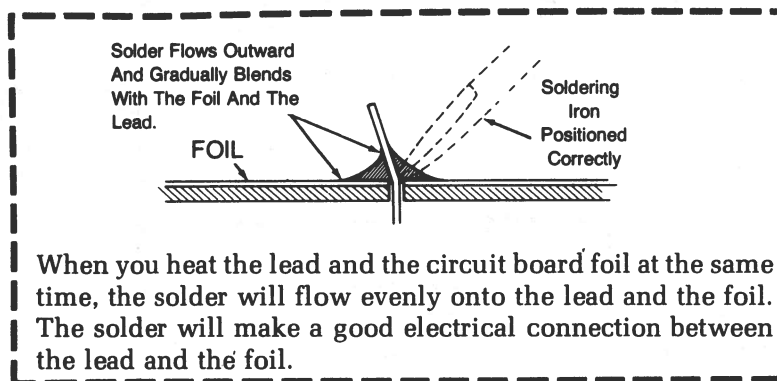
3. As the solder begins to melt, allow it to flow around the connection. Then remove the solder and the iron and let the connection cool.



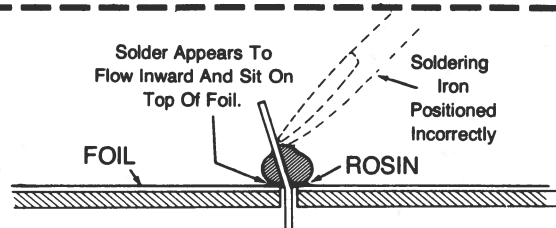
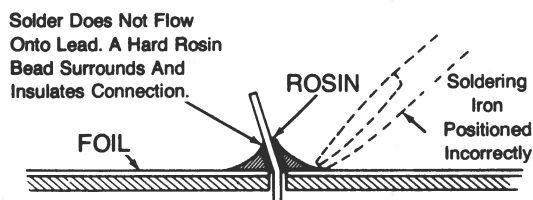
- (✓) Cut off the excess lead lengths close to the connection. WARNING: Clip the leads so the ends will not fly toward your eyes.

- (✓) Check each connection. Compare it to the illustrations on Page 30. After you have checked the solder connections, proceed with the assembly on Page 31. Use the same soldering procedure for each connection.

### A GOOD SOLDER CONNECTION



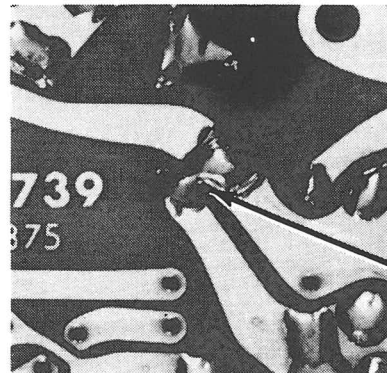
### POOR SOLDER CONNECTIONS



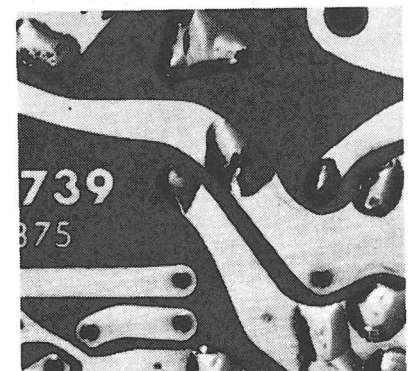
### SOLDER BRIDGES

A solder bridge between two adjacent foils is shown in photograph A. Photograph B shows how the connection should appear. A solder bridge may occur if you accidentally touch an adjacent previously soldered connection, if you use too much solder, or if you "drag" the soldering iron across other foils as you remove it from the connection. A good rule to follow is: always take a good look at the foil area around each lead before you solder it. Then, when you solder the connection, make sure the solder remains in this area and does not bridge to another foil. This is especially important when the foils are small and close together. NOTE: It is alright for solder to bridge two connections on the same foil.

Use only enough solder to make a good connection, and lift the soldering iron straight up from the circuit board. If a solder bridge should develop, turn the circuit board foil-side-down and heat the solder between connections. The excess solder will run onto the tip of the soldering iron, and this will remove the solder bridge. NOTE: The foil side of most circuit boards has a coating on it called "solder resist." This is a protective insulation to help prevent solder bridges.



**A**  
**SOLDER BRIDGE**



## START

NOTE: Make sure you have installed the first diode in Pictorial 2-1.

Install 1N2071 diodes (#57-27) in the following four locations.

- ( ) D109 .....
- ( ) D110 .....
- ( ) D111 .....
- ( ) D112 .....

Install 1N4002 diodes (#57-65) in the following three locations.

- ( ) D102 .....
- ( ) D103 .....
- ( ) D104 .....

( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) Cut eight 3/8" pieces of small Teflon sleeving.

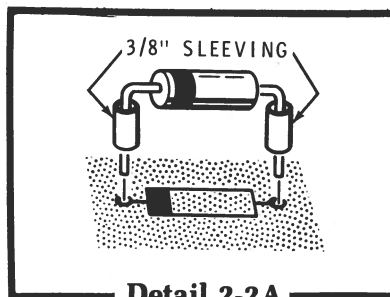
( ) Slide a 3/8" piece of sleeving over the leads of four 3A1 diodes (#57-42) as shown in Detail 2-2A. Install the diodes at the following locations:

- ( ) D105 .....
- ( ) D106 .....
- ( ) D107 .....
- ( ) D108 .....

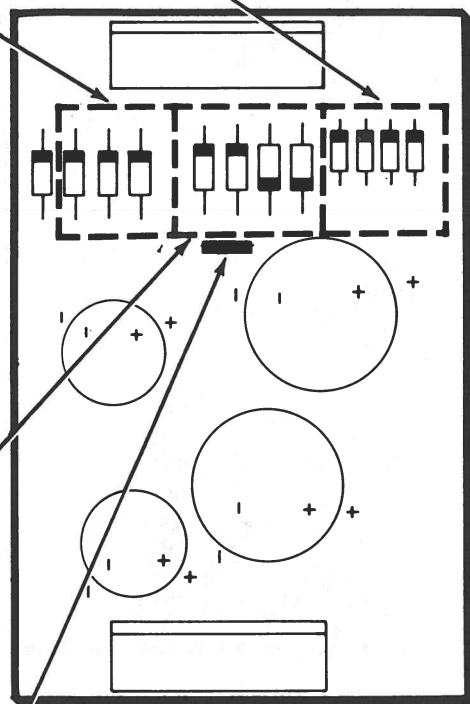
( ) Solder the leads to the foil and cut off the excess lead lengths.

( ) Cut a 3/4" bare wire.

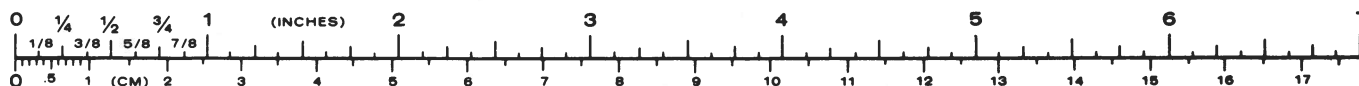
( ) 3/4" bare wire. Solder the wire ends to the foil and cut off the excess.



Detail 2-2A



PICTORIAL 2-2



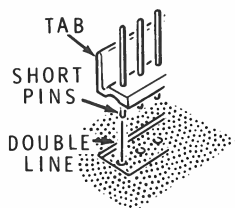
**START** ➡

- (✓) Use long-nose pliers to remove pin number 3 from an 8-pin plug. Note the position of the tab on this Pictorial before you remove pin 3.

- (✓) P101: 8-pin plug.

Install the plug as follows:

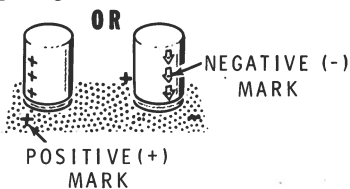
1. Match the tab side of the plug with the double line of the outline on the board.
2. Insert the short pins in the holes and solder them to the foil.



- (✓) Pull pin number 5 from the other 8-pin plug.

- (✓) P102: 8-pin plug.

NOTE: When you install electrolytic capacitors, always position the positive (+) or negative (-) marking on the capacitor toward the corresponding mark on the circuit board. Use the holes that best fit the capacitor lead spacing.

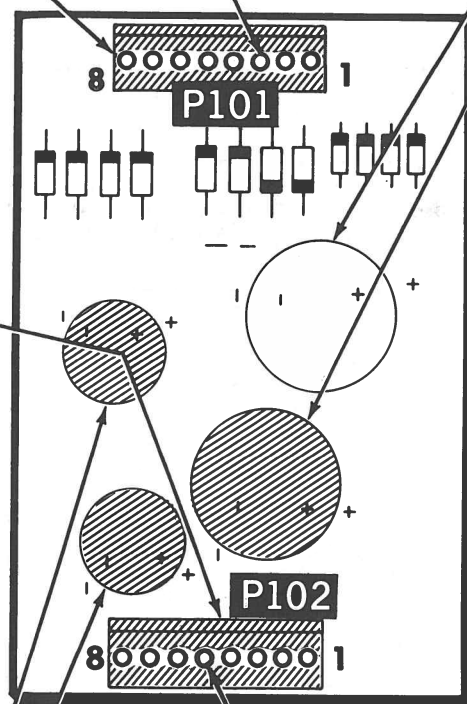


- (✓) C102: 470  $\mu$ F electrolytic (#25-891).

- (✓) C104: 470  $\mu$ F electrolytic (#25-891).

- (✓) Solder the leads to the foil and cut off the excess lead lengths.

PULL OUT  
PIN 3



PULL OUT  
PIN 5

PICTORIAL 2-3

**CONTINUE** ➡

Do not install a part at this location.

- (✓) C103: 10,000  $\mu$ F electrolytic (#25-902). Solder the leads to the foil and cut off the excess lead lengths.

**CIRCUIT BOARD CHECKOUT**

Carefully inspect the circuit board for the following conditions.

- (✓) Unsoldered connection.
- (✓) Poor solder connections.
- (✓) Solder bridges between foils.
- (✓) Protruding leads which could touch together.
- (✓) Electrolytic capacitors for the correct position of the positive (+) or negative (-) marked ends.
- (✓) Diodes for the correct position of the banded end.

This completes the power supply circuit board assembly. Proceed to "Installation and Checkout." NOTE: There are some unused holes on the circuit board.

**FINISH**

## INSTALLATION AND CHECKOUT

NOTE: The following test will require a high input impedance normal type volt/ohm meter. If you do not have a meter we suggest that you borrow one, as these measurements are very important to insure that your unit will not be damaged when power is applied.

Perform each of the following measurements. If you do not obtain the correct meter reading, refer to the "Possible Area of Trouble" chart that follows the section. Correct any problem that you may encounter before you continue.

### POWER OFF TEST

NOTE: If your supply voltage (line voltage) is 115 VAC, install the 1-ampere fuse in the next step. If your supply voltage is 230 VAC, install a 1/2-ampere fuse (not supplied).

- (✓) On the cabinet base AC chassis, remove the fuseholder cap and install the appropriate fuse. Then reinstall the fuseholder cap. Do not over-tighten the cap.

Refer to Pictorial 3-1 (Illustration Booklet, Page 7) for the following steps.

- (✓) Set your ohmmeter range switch to the  $\times 1$  position.
- (✓) Connect your negative ohmmeter lead to either solder lug at power transformer mounting foot DT.
- (✓) Set the POWER switch to OFF (top side of switch out).

- (✓) Touch the positive ohmmeter lead to first one and then the other of the bottom two flat prongs (lugs 1 and 3) on the line filter on the back of the AC chassis. The meter should read INFINITE.
- (✓) Touch the positive ohmmeter lead to the upper (center) lug 2 prong on the line filter. The meter should read "0" resistance.
- (✓) Connect the negative ohmmeter lead to one lower flat prong and the positive ohmmeter lead to the other lower flat prong (prongs 1 and 3) of the line filter. The meter should read INFINITE.
- (✓) With the ohmmeter leads still connected as in the previous step, set the POWER switch to ON (top in). The ohmmeter should read approximately five ohms.
- (✓) Disconnect the ohmmeter leads and place the POWER switch in the OFF (top out) position.
- (✓) Set your ohmmeter range switch to the  $\times 1000$  position.

#### POSSIBLE AREA OF TROUBLE

1. Fuseholder (fuse not installed).
2. Faulty wiring between switches and fuseholder.
3. Ohmmeter is connected to the wrong prong on the line filter.

Refer to Pictorial 3-2 (Illustration Booklet, Page 7) for the following steps.

**NOTE:** The internal wiring of most ohmmeters is such that the positive terminal of the meter battery is connected to the positive (red) test lead and the negative battery terminal is connected to the negative (black) test lead. In some ohmmeters this wiring is reversed, and this could give the wrong readings below. Therefore, if you do not obtain the correct results in the following tests, reverse your ohmmeter leads and measure again. If the readings are now correct, change the first line of the chart below as follows:

Change the word "negative" to "positive."

Change the word "positive" to "negative."

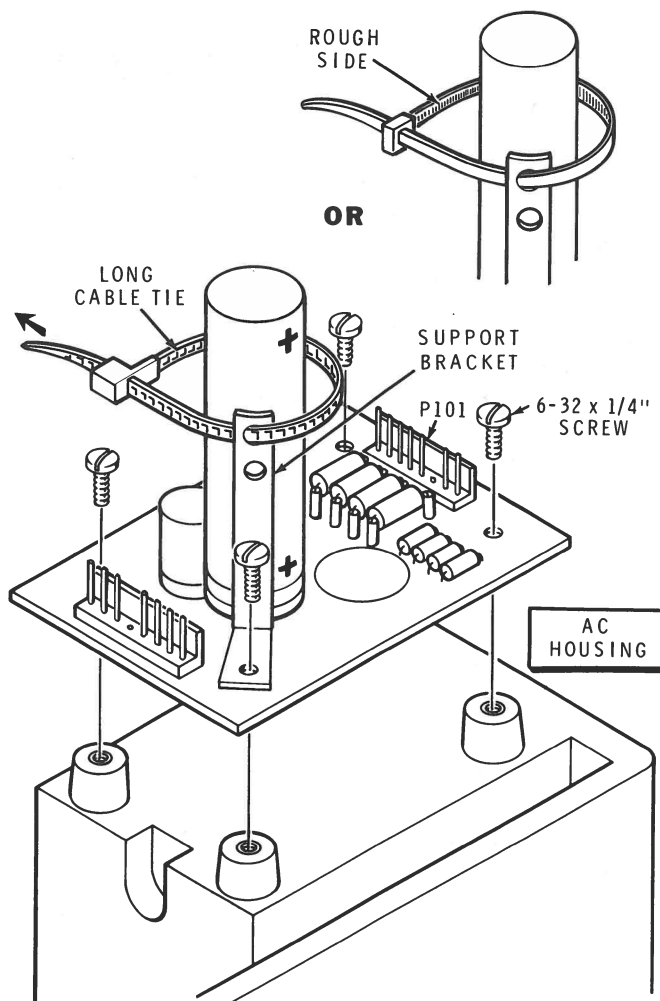
Make the following ohmmeter readings on plug P101 on the power supply circuit board. Permit the meter needle time to stop moving before you read it.

NEGATIVE OHMMETER LEAD	POSITIVE OHMMETER LEAD	OHMMETER READING
(✓) P101, pin 1	P101, pin 2	INFINITE
(✓) P101, pin 4	P101, pin 5	Greater than 10 k $\Omega$ .
(✓) P101, pin 8	P101, pin 6	Greater than 10 k $\Omega$ .
(✓) P101, pin 8	P101, pin 7	Greater than 10 k $\Omega$ .
(✓) P101, pin 8	P101, pins 1, 2, 4, and 5 (one at a time).	INFINITE at each pin.

## POWER ON TESTS

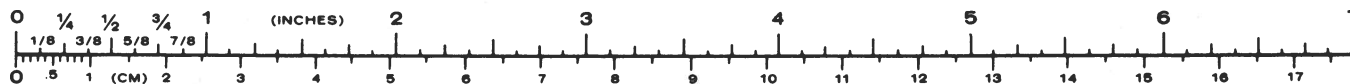
Refer to Pictorial 3-2 (Illustration Booklet, Page 7) for the following steps.

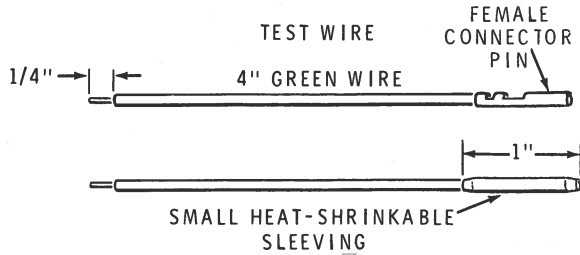
- (✓) Refer to Detail 3-2A and mount the power supply circuit board to the top of the AC housing with four 6-32  $\times$  1/4" screws and a support bracket. Make sure the circuit board is positioned with plug P101 toward the rear of the unit.



Detail 3-2A

- (✓) Position a large cable tie through the top hole in the bracket and around the capacitor. Pull the cable tie tight and cut off the excess length.
- (✓) Connect the 8-hole connector on the power transformer leads to plug P101 on the power supply circuit board. Position the cables down along the inner edge of the cabinet base.
- (✓) Refer to Detail 3-2B and prepare a 4" test wire as shown. First crimp and solder a female connector pin onto a 4" green wire. Then slide the length of small heat-shrinkable sleeving over the connector pin. Use the heat from your soldering iron or a flame to shrink the sleeving.





Detail 3-2B

**WARNING:** When the line cord is connected to an AC source, hazardous AC voltages are present inside the AC housing. Do not operate the unit with the AC chassis removed from its housing. To do so could result in a severe electrical shock.

- ( ) Plug one end of the line cord into the AC chassis line filter and the other end into an AC outlet.
- ( ) Set the POWER switch to ON.
- ( ) Set your meter to read +DC volts.

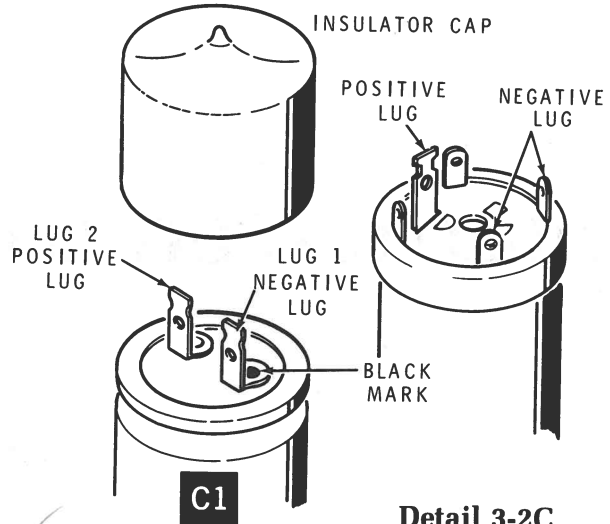
Make the following tests on the pins of P102 on the power supply circuit board and check for the indicated meter readings. Connect the test wire to the plug pin listed under "Negative Lead To:" and the negative meter lead to the free end of this wire. If you do not get the proper results, set the POWER switch to OFF and refer to the "Possible Area of Trouble" chart below.

NEGATIVE LEAD TO:	POSITIVE LEAD TO:	APPROXIMATE METER READING:
( ) P102, pin 4	P102, pin 3	11 VDC
( ) P102, pin 8	P102, pin 6	36 VDC
( ) P102, pin 8	P102, pin 7	18 VDC

- ( ) Set the POWER switch to OFF.

**POSSIBLE AREA OF TROUBLE**

1. Diodes D101 thru D112 installed backward or faulty.
2. Solder bridge on the foil side of the circuit board.
3. Fuse open. Check for a short somewhere else in the circuit.
4. Electrolytic capacitor C1, C101, C102, or C104.



Detail 3-2C

- ( ) Momentarily touch the blade of the screwdriver between the following pins of P102 to discharge the power supply capacitors. Sparking may occur.

Between pins 3 and 4.

Across pins 6, 7, and 8.

- ( ) Push the 8-hole harness connector onto plug P102 on the power supply circuit board.
- ( ) Temporarily remove the insulator cap from the top of capacitor C1.
- ( ) Refer to Detail 3-2C and connect the negative voltmeter lead to capacitor C1 lug 1 (negative lug). Connect the positive lead to lug 2.
- ( ) Turn the POWER switch ON.
- ( ) Measure +60 to +80 volts DC.
- ( ) Turn the POWER switch to OFF and disconnect the line cord.
- ( ) Replace the insulator cap onto the top of capacitor C1.
- ( ) Refer to the inset drawing on Pictorial 3-2 and secure the section of the harness to the top of capacitor C1 with a large cable tie. Cut off the excess tie end.

This completes the power supply checkout.



# VIDEO CIRCUIT BOARD

## PARTS LIST

Locate Pack #2 and check each part against the following list and the Video Circuit Board Parts Pictorial (Illustration Booklet, Page 8). Any part that is packed in an individual envelope with the part number on it should not be removed from its envelope until it is called for in a step. Do not discard any packing materials until all parts are accounted for.

To order a replacement part, always include the Part Number and use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, use one of the "Expedited Parts Order Forms" at the rear of this Manual, or refer to "Replacement Parts" inside the rear cover. Your Warranty is inside the front cover. For prices, refer to the separate "Heath Parts Price List."

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### RESISTORS

#### NOTES:

- These resistors may be packed in more than one envelope. Open all the resistor envelopes in this pack before you check them against the Parts List.
- All resistors are 5%, 1/2-watt unless otherwise specified. 5% resistors have a gold fourth color band. 10% resistors have a silver fourth color band.

A1	6-279	2	2.7 $\Omega$ (red-viol-gold)	R239, R241
A1	6-479	1	4.7 $\Omega$ (yel-viol-gold)	R242
A1	6-150	1	15 $\Omega$ (brn-grn-blk)	R237
A1	6-470	2	47 $\Omega$ (yel-viol-blk)	R213, R252
A1	6-101	3	100 $\Omega$ (brn-blk-brn)	R206, R232, R255
A1	6-201	1	200 $\Omega$ (red-blk-brn)	R251
A1	6-331	1	330 $\Omega$ (org-org-brn)	R259
A1	6-471	1	470 $\Omega$ (yel-viol-brn)	R238
A1	6-102	4	1000 $\Omega$ (brn-blk-red)	R203, R209, R243, R268
A1	6-122	1	1200 $\Omega$ (brn-red-red)	R229
A1	6-152	1	1500 $\Omega$ (brn-grn-red)	R215
A1	6-182	1	1800 $\Omega$ (brn-gry-red)	R231
A1	6-222	1	2200 $\Omega$ (red-red-red)	R236

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### Resistors (cont'd.)

A1	6-332	1	3300 $\Omega$ (org-org-red)	R216
A1	6-392	2	3900 $\Omega$ (org-wht-red)	R249, R253
A1	6-472	2	4700 $\Omega$ (yel-viol-red)	R202, R205
A1	6-6491	2	6490 $\Omega$ , 1 % (blu-yel-wht-brn)	R207, R247
A1	6-682	1	6800 $\Omega$ (blu-gry-red)	R204
A1	6-822	1	8200 $\Omega$ (gry-red-red)	R224
A1	6-103	3	10 k $\Omega$ (brn-blk-org)	R225, R228, R234
A1	6-223	3	22 k $\Omega$ (red-red-org)	R218, R235, R244
A1	6-273	3	27 k $\Omega$ (red-viol-org)	R222, R245, R248
A1	6-473	2	47 k $\Omega$ (yel-viol-org)	R227, R261
A1	6-623	1	62 k $\Omega$ (blu-red-org)	R226
A1	6-823	1	82 k $\Omega$ (gry-red-org)	R263
A1	6-104	2	100 k $\Omega$ (brn-blk-yel)	R217, R258
A1	6-224	1	220 k $\Omega$ (red-red-yel)	R221
A1	6-394	1	390 k $\Omega$ (org-wht-yel)	R265
A1	6-105	2	1 M $\Omega$ (brn-blk-grn)	R201, R233
A1	6-335	2	3.3 M $\Omega$ (org-org-grn)	R266, R267

# Heathkit®

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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## Resistors (cont'd)

A2	6-1871-12	1	1870 $\Omega$ , 1/4-watt, 1% (brn-gry-viol-brn)	R208
A3	3-6-2	1	.51 $\Omega$ , 2-watt (grn-brn-silv-gold)	R211
A3	3-22-2	3	1.2 $\Omega$ , 2-watt, 10% (brn-red-gold-silv)	R254, R256, R257
A4	3-57-5	1	1500 $\Omega$ , 5-watt, 10%	R212

## CAPACITORS

### Ceramic

B1	21-75	2	100 pF	C217, C219
B1	21-140	2	.001 $\mu$ F	C202, C215
B1	21-176	4	.01 $\mu$ F	C206, C214, C218, C222
B1	21-122	3	.02 $\mu$ F	C235, C236, C237
B2	21-193	1	.005 $\mu$ F spark gap	C233

### Tantalum

B3	25-841	1	4.7 $\mu$ F (4.7 M)	C211
B3	25-220	3	10 $\mu$ F (10 M)	C204, C205, C226

### Electrolytic

B4	25-299	1	1.5 $\mu$ F	C229
B4	25-865	2	10 $\mu$ F	C203, C213
B5	25-911	1	22 $\mu$ F, 25 V or 35 V	C201
B5	25-882	2	22 $\mu$ F, 100 V	C225, C227
B5	25-883	1	47 $\mu$ F, 35 V	C207
B5	25-913	1	47 $\mu$ F, 160 V or 200 V	C234
B6	25-890	1	330 $\mu$ F	C216

### Mylar

B7	27-73	1	.047 $\mu$ F	C224
B7	27-145	2	.22 $\mu$ F	C208, C209

### Polycarbonate

B8	27-206	1	1 $\mu$ F	C232
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KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
---------	----------------	------	-------------	-------------------

## Polypropylene

B8	29-56	1	.006 $\mu$ F	C228
B8	29-57	1	.22 $\mu$ F	C231

## Polystyrene

B9	29-22	2	4700 pF (.0047)	C221, C223
B9	29-32	1	6800 pF (.0068)	C212

## DIODES-TRANSISTORS-INTEGRATED CIRCUITS (IC's)

C1	56-56	3	1N4149 diode	D202, D204, D206
C1	56-58	1	6.2 V zener diode	D203
C1	56-73	1	MZ2360 diode	D205
C1	56-94	1	12.8 V zener diode	D201
C1	57-27	3	1N2071 diode	D207, D209, D210
C1	57-64	1	DRS110 diode	D211
C1	57-614	1	MR508 diode	D208

NOTE: Transistors (and integrated circuits) are marked for identification in one of the following four ways:

1. Part number.
2. Type number. (On integrated circuits, this refers only to the numbers; the letters may be different or missing.)
3. Part number and type number.
4. Part number with a type number other than the one shown.

C2	417-811	1	MPSL01 transistor	Q201
C2	417-821	1	MPSA06 transistor	Q208
C2	417-822	1	MPSA56 transistor	Q207
C2	417-823	1	MPU131 transistor	Q205
C2	417-874	1	2N3906 transistor	Q203
C2	417-885	1	MPSA65 transistor	Q206
C3	417-195	1	MJE340 transistor	Q213
C3	417-924	1	MJE172 transistor	Q202
C3	417-263	1	SJE607 transistor	Q212
C3	417-264	1	SJE608 transistor	Q211
C4	417-926	2	MPSU06, or NSDU06, or RCP701C transistor	Q209, Q210
C5	417-282	1	MJ2841 transistor	Q204
C5	417-923	1	BU500 transistor	Q214
C6	442-53	2	NE555 integrated circuit	U201, U202

BU500 (MJ12004)

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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**INDUCTORS-CHOKES-TRANSFORMERS**

D1	40-2081	1	120 $\mu$ H inductor	L203
D2	40-1948	1	52 $\mu$ H inductor	L204
D3	40-581	1	620 $\mu$ H inductor (blu-red-brn)	L201
D4	45-42	1	8.75 $\mu$ H choke	L202

**CONTROLS**

E1	10-311	1	5000 (5K) $\Omega$ control	R246
E1	10-390	2	20 k $\Omega$ control	R219, R223
E1	10-941	1	100 k $\Omega$ control	R262
E1	10-1049	1	2 M $\Omega$ control	R264

**INSULATORS**

F1	75-60	2	Large transistor insulator
F2	75-807	3	Small transistor insulator
F3	75-142	2	Transistor cover

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
------------	-------------------	------	-------------	----------------------

**CONNECTORS-SOCKETS**

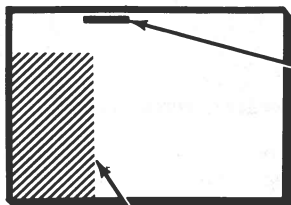
G1	432-66	1	Push-on connector	
G2	432-827	2	4-pin plug	P201, P204
G3	432-825	1	6-pin plug	P202
G4	432-877	1	10-pin plug	P203
G5	432-1061	2	10-hole connector shell	
G6	434-230	2	8-pin IC socket	

**MISCELLANEOUS**

H1	73-1	2	Small rubber grommet
H2	73-2	2	Large rubber grommet
	85-2553-2	1	Video circuit board
H3	352-31	1	Thermal compound

## STEP-BY-STEP ASSEMBLY

IDENTIFICATION  
DRAWING



PART  
NUMBER

**START** →

(✓) Position the video circuit board printed side up as shown. Due to its large size, only part of the circuit board will be shown in each Pictorial. Refer to the shaded area in the identification drawing at the top of each page to see what area you are working in.

(✓) R217: 100 kΩ (brn-blk-yel).

(✓) R216: 3300 Ω (org-org-red).

(✓) R222: 27 kΩ (red-viol-org).

(✓) R221: 220 kΩ (red-red-yel).

(✓) R224: 8200 Ω (gry-red-red).

(✓) R235: 22 kΩ (red-red-org).

(✓) Solder the leads to the foil and cut off the excess lead lengths.

(✓) R228: 10 kΩ (brn-blk-org).

(✓) R231: 1800 Ω (brn-gry-red).

(✓) R233: 1 MΩ (brn-blk-grn).

(✓) R236: 2200 Ω (red-red-red).

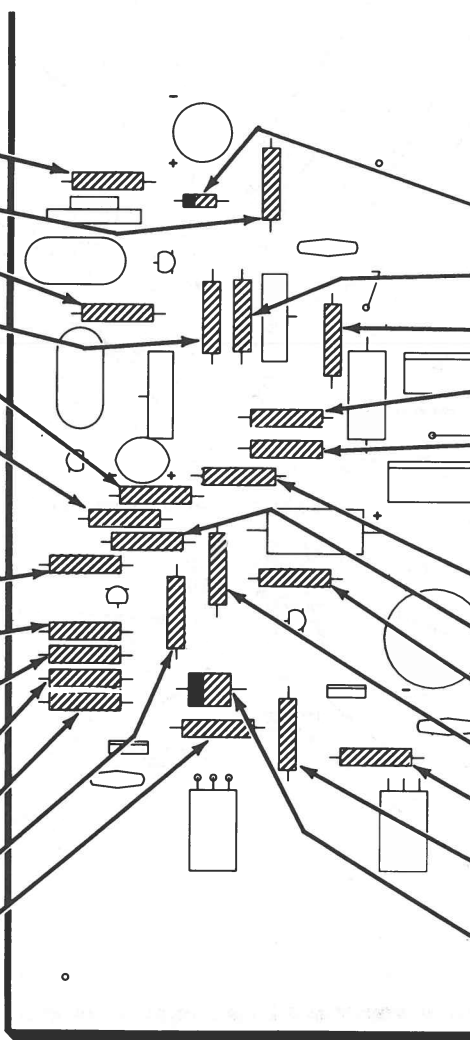
(✓) R238: 470 Ω (yel-viol-brn).

(✓) R234: 10 kΩ (brn-blk-org).

(✓) R237: 15 Ω (brn-grn-blk).

(✓) Solder the leads to the foil and cut off the excess lead lengths.

The steps performed in this Pictorial are in this area of the circuit board.



**CONTINUE** →

NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board. THE CIRCUIT WILL NOT WORK IF A DIODE IS INSTALLED BACKWARDS.



(✓) D204: 1N4149 diode (#56-56).

(✓) R215: 1500 Ω (brn-grn-red).

(✓) R218: 22 kΩ (red-red-org).

(✓) R242: 4.7 Ω (yel-viol-gold).

(✓) R232: 100 Ω (brn-blk-brn).

(✓) Solder the leads to the foil and cut off the excess lead lengths.

(✓) R229: 1200 Ω (brn-red-red).

(✓) R227: 47 kΩ (yel-viol-org).

(✓) R225: 10 kΩ (brn-blk-org).

(✓) R226: 62 kΩ (blu-red-org).

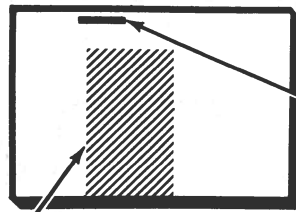
(✓) R239: 2.7 Ω (red-viol-gold).

(✓) R241: 2.7 Ω (red-viol-gold).

(✓) D205: MZ2360 diode (#56-73). Be sure to position the banded end as shown.

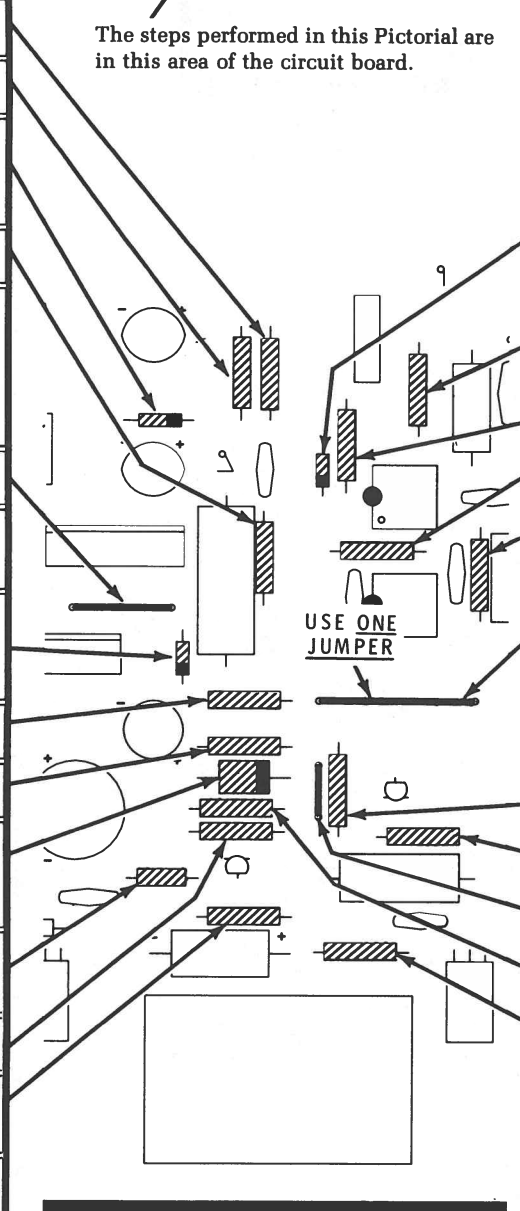
(✓) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 4-1

IDENTIFICATION  
DRAWINGPART  
NUMBER**START** ➡

- (✓) R244: 22 kΩ (red-red-org).
- (✓) R213: 47 Ω (yel-viol-blk).
- (✓) D203: 6.2 V zener diode (#56-58). Be sure to position the banded end as shown.
- (✓) R243: 1000 Ω (brn-blk-red).
- NOTE: When wire jumpers are called for, use the small white (solid) wire. Cut the wire to the indicated length and remove 1/4" of insulation from each wire end.
- (✓) 1-1/4" white jumper.
- (✓) Solder the leads to the foil and cut off the excess lead lengths.
- (✓) D202: 1N4149 diode (#56-56). Be sure to position the banded end as shown.
- (✓) R201: 1 MΩ (brn-blk-grn).
- (✓) R202: 4700 Ω (yel-viol-red).
- (✓) D201: 12.8 V zener diode (#56-94). Be sure to position the banded end as shown.
- (✓) R208: 1870 Ω, 1/4-watt, 1% (brn-gry-viol-brn).
- (✓) R203: 1000 Ω (brn-blk-red).
- (✓) R207: 6490 Ω, 1% (blu-yel-wht-brn).
- (✓) Solder the leads to the foil and cut off the excess lead lengths.

The steps performed in this Pictorial are in this area of the circuit board.

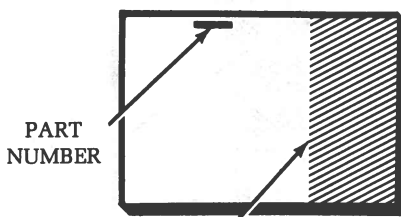
**CONTINUE** ➡

- (✓) D206: 1N4149 diode (#56-56). Be sure to position the banded end as shown.
- (✓) R247: 6490 Ω, 1% (blu-yel-wht-brn).
- (✓) R245: 27 kΩ (red-viol-org).
- (✓) R248: 27 kΩ (red-viol-org).
- (✓) R249: 3900 Ω (org-wht-red).
- (✓) 1-1/2" white jumper. NOTE: Install this jumper across **both** jumper locations printed on the circuit board.
- (✓) Solder the leads to the foil and cut off the excess lead lengths.
- (✓) R209: 1000 Ω (brn-blk-red).
- (✓) R204: 6800 Ω (blu-gry-red).
- (✓) 1" white jumper wire.
- (✓) R205: 4700 Ω (yel-viol-red).
- (✓) R206: 100 Ω (brn-blk-brn).
- (✓) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 4-2



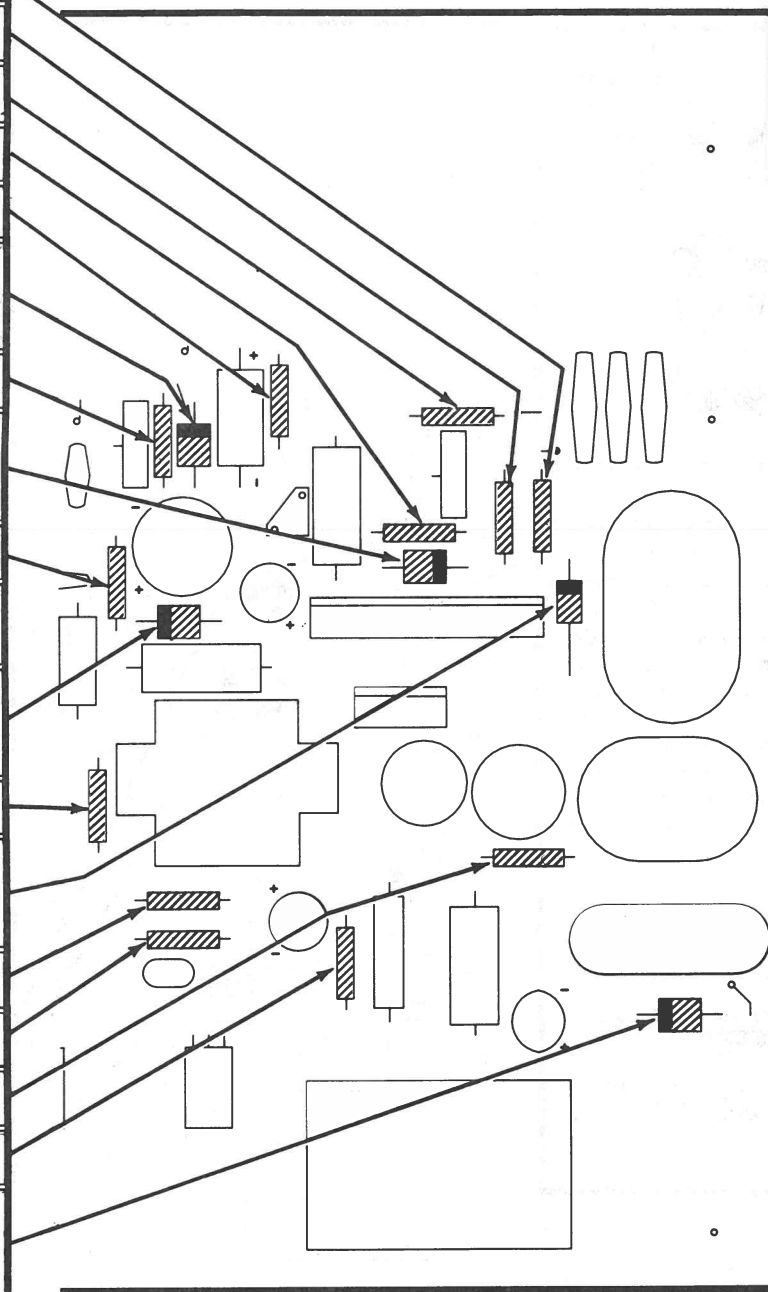
## IDENTIFICATION DRAWING



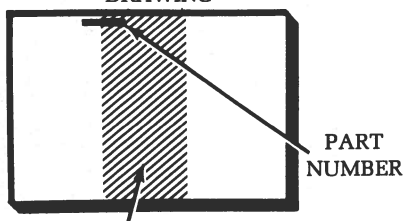
The steps performed in this Pictorial are in this area of the circuit board.

## START

- (✓) R266: 3.3 M $\Omega$  (org-org-grn).
- (✓) R265: 390 k $\Omega$  (org-wht-yel).
- (✓) R267: 3.3 M $\Omega$  (org-org-grn).
- (✓) R259: 330  $\Omega$  (org-org-brn).
- (✓) R258: 100 k $\Omega$  (brn-blk-yel).
- (✓) D210: 1N2071 diode (#57-27). Position the banded end as shown.
- (✓) R263: 82 k $\Omega$  (gry-red-org).
- (✓) D207: 1N2071 diode (#57-27). Position the banded end as shown.
- (✓) R261: 47 k $\Omega$  (yel-viol-org).
- (✓) Solder the leads to the foil and cut off the excess lead lengths.
- (✓) D209: 1N2071 diode (#57-27). Position the banded end as shown.
- (✓) R252: 47  $\Omega$  (yel-viol-blk).
- ( ) D211: DRS110 diode (#57-64). Position the banded end as shown.
- ( ) R253: 3900  $\Omega$  (org-wht-red).
- ( ) R251: 200  $\Omega$  (red-blk-brn).
- (✓) R268: 1000  $\Omega$  (brn-blk-red).
- (✓) R255: 100  $\Omega$  (brn-blk-brn).
- (✓) D208: MR508 diode (#57-614). Be sure to position the banded end as shown.
- (✓) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 4-3

IDENTIFICATION  
DRAWING

The steps performed in this Pictorial are in this area of the circuit board.

## START

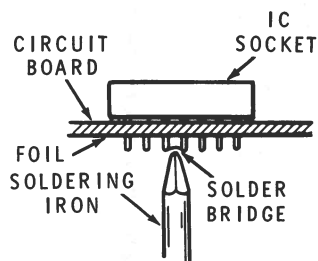
NOTE: When you install an IC socket, position it so the index mark on the circuit board is visible after the socket is installed. Be sure all of the pins go through the circuit board. Solder each pin to the foil.



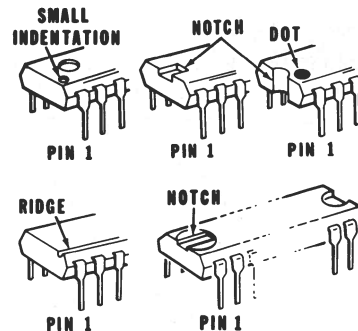
(✓) U201: 8-pin IC socket.

(✓) U202: 8-pin IC socket.

Carefully check each socket for solder bridges between pins. If a solder bridge has occurred, hold the circuit board foil-side-down as shown, and hold the soldering iron tip between the two points that are bridged. The solder will flow down the soldering iron tip, or use the desoldering braid as explained in the Assembly Notes on Page 28.



NOTE: The pin 1 end of the inline integrated circuits may be marked in a number of ways; with a notch, triangle, dot, the numeral 1, etc.

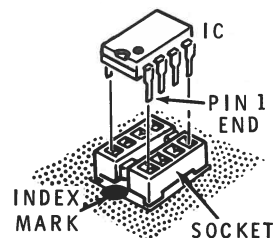


Detail 4-4A

## CONTINUE

Be sure you install each IC so its pin 1 end is toward the index mark on the circuit board.

Before you apply downward pressure to an IC, make sure each pin is centered in its proper socket hole. Handle IC's with care, as their pins are very easily bent.



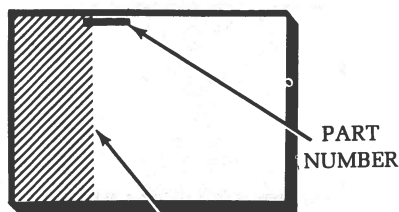
Install NE555V integrated circuits (#442-53) at the two following locations. Refer to Detail 4-4A and identify pin 1. Then position pin 1 at the index mark on the circuit board.

(✓) U201.  
(✓) U202.

(✓) R211: .51  $\Omega$ , 2-watt (grn-brn-silver). Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 4-4

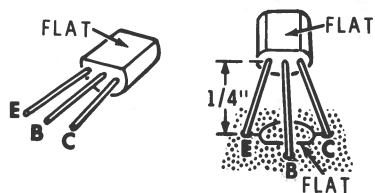
## IDENTIFICATION DRAWING



## START

NOTE: In the following steps, install each of the transistors as follows:

1. Refer to the illustration example below and identify the E, B, and C leads of the transistor.
2. Bend the B lead of each transistor **toward the flat**.
3. Insert the transistor leads into the corresponding E, B, and C holes in the circuit board.
4. Position the transistor approximately 1/4" above the circuit board.
5. Turn the circuit board over, solder the leads to the foil, and cut off the excess lead lengths.

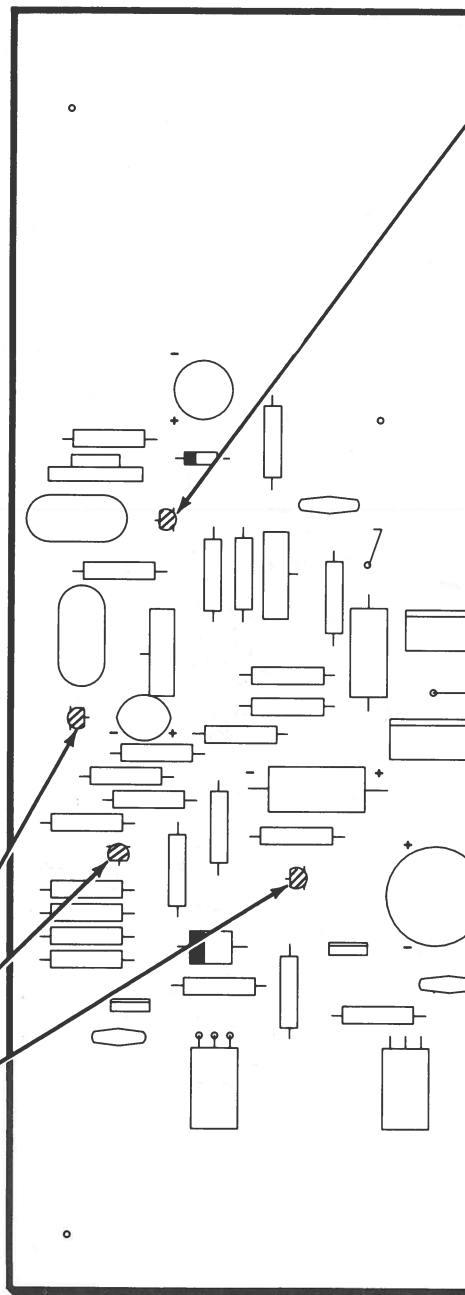


( ) Q206: MPSA65 transistor (#417-885).

( ) Q208: MPSA06 transistor (#417-821).

( ) Q207: MPSA56 transistor (#417-822).

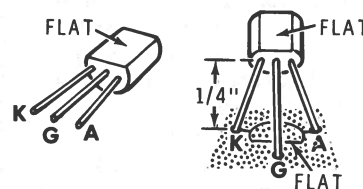
The steps performed in this Pictorial are in this area of the circuit board.



## CONTINUE

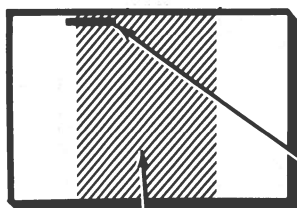
( ) Q205: MPU131 (#417-823). Install this transistor as follows:

1. Refer to the illustration and identify the K, G, and A leads of the transistor.
2. Match the flat on the transistor with the outline of the flat on the circuit board. Insert the leads into the corresponding K, G, and A holes in the circuit board.
3. Position the transistor approximately 1/4" above the circuit board. Then turn the board over, solder the leads to the foil, and cut off the excess lead lengths.

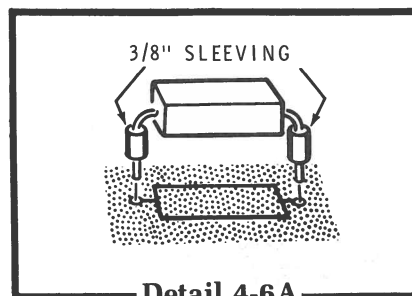


PICTORIAL 4-5



IDENTIFICATION  
DRAWINGPART  
NUMBER

The steps performed in this Pictorial are in this area of the circuit board.



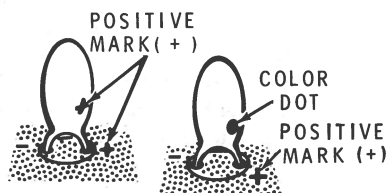
Detail 4-6A

**START** →

(✓) C221: .0047  $\mu$ F (4700) polystyrene.

(✓) C223: .0047  $\mu$ F (4700) polystyrene.

NOTE: When you install a tantalum capacitor, always position the positive (+) or dot marked lead of the capacitor in the positive (+) marked hole.



(✓) C204: 10  $\mu$ F (10M) tantalum.

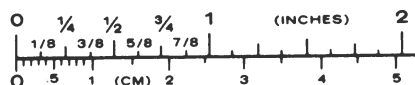
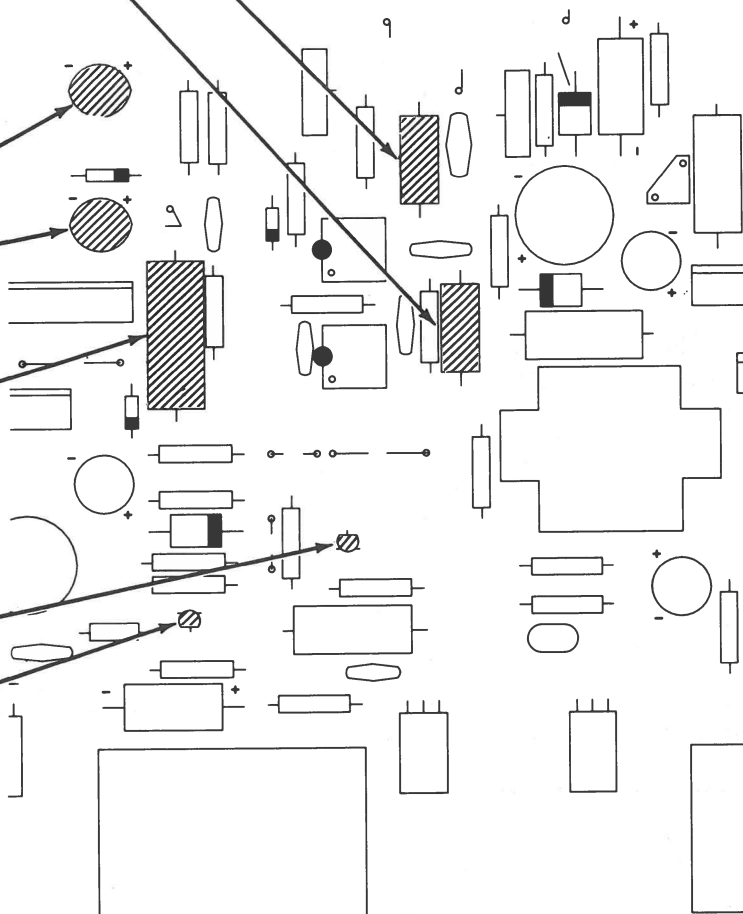
(✓) C205: 10  $\mu$ F (10M) tantalum.

(✓) R212: 1500  $\Omega$  (1.5K), 5-watt, 10%. Cut two 3/8" pieces of small Teflon sleeving and slide them over the leads as shown in Detail 4-6A. Bend the leads and install the resistor into the circuit board holes. Cut off the excess lead lengths.

(✓) Solder the leads to the foil and cut off the excess lead lengths.

(✓) Q203: 2N3906 transistor (#417-874).

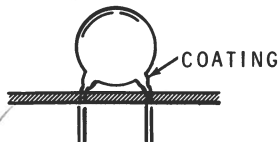
(✓) Q201: MPSL01 transistor (#417-811).



PICTORIAL 4-6

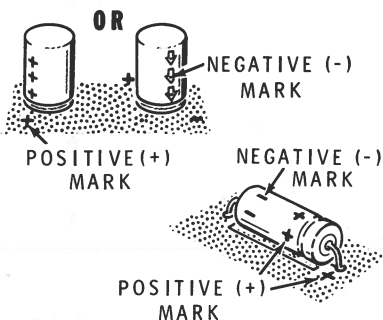
## START

NOTE: When you install a ceramic capacitor, space it about 1/8" above the circuit board. This will prevent the coating on the leads from protruding through the circuit board and making soldering difficult.



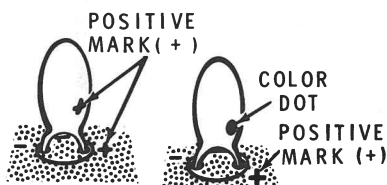
(✓) C206: .01  $\mu$ F ceramic.

NOTE: When you install an electrolytic capacitor, be sure to position the positive (+) lead toward the positive mark on the circuit board, or position the negative (-) lead toward the negative (-) mark on the circuit board.



(✓) C207: 47  $\mu$ F electrolytic. Be sure to use the smaller 47  $\mu$ F capacitor at this location.

NOTE: When you install tantalum capacitors, be sure to position the positive (+) marked or dot (•) marked leads in the positive (+) marked holes.



(✓) C211: 4.7  $\mu$ F tantalum.

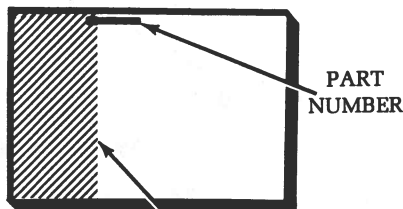
(✓) C213: 10  $\mu$ F electrolytic (#25-865).

(✓) C215: .001  $\mu$ F ceramic.

(✓) C216: 330  $\mu$ F electrolytic.

(✓) Solder the leads to the foil and cut off the excess lead lengths.

## IDENTIFICATION DRAWING

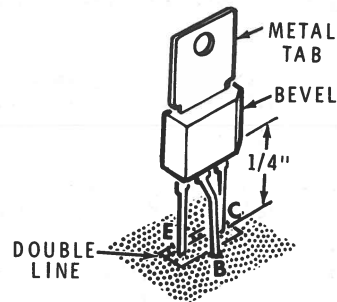


The steps performed in this Pictorial are in this area of the circuit board.

## CONTINUE

Install the next two transistors as follows:

1. Position the transistor so the metal tab, which is closer to one side of the transistor, is toward the double line of the circuit board outline. Also note the bevel, as shown.
2. Insert the transistor leads in holes E, B, and C.
3. Position the transistor approximately 1/4" above the board. Solder the leads to the foil and cut off the excess lead lengths.



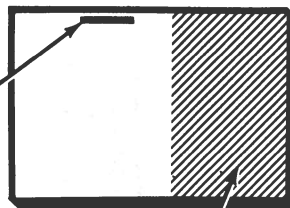
(✓) Q210: MPSU06 (NSDU06) transistor (#417-926).

(✓) Q209: MPSU06 (NSDU06) transistor (#417-926).

(✓) C214: .01  $\mu$ F ceramic.

(✓) Solder the leads to the foil and cut off the excess lead lengths.

PICTORIAL 4-7

IDENTIFICATION  
DRAWINGPART  
NUMBER

The steps performed in this Pictorial are in this area of the circuit board.

**START**

- (✓) C229: 1.5  $\mu$ F electrolytic (#25-299).

Install 1.2  $\Omega$ , 2-watt, 10% (brn-red-gold) resistors at the following locations.

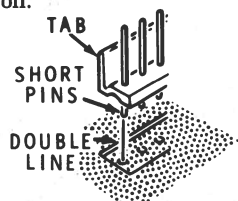
- (✓) R257 .....  
(✓) R256 .....

- (✓) Solder the leads to the foil and cut off the excess lead lengths.

- (✓) Use long-nose pliers to remove **pin number 3** from a 10-pin plug. Note the position of the tab on this Pictorial before you remove pin 3.

- (✓) P203: 10-pin plug. Install the plug as follows:

1. Match the tab side of the plug with the double line of the outline on the board.
2. Insert the short pins in the holes and solder them to the foil.



- (✓) Use long-nose pliers to remove **pin number 3** from a 4-pin plug. Note the position of the tab on this Pictorial before you remove pin 3.

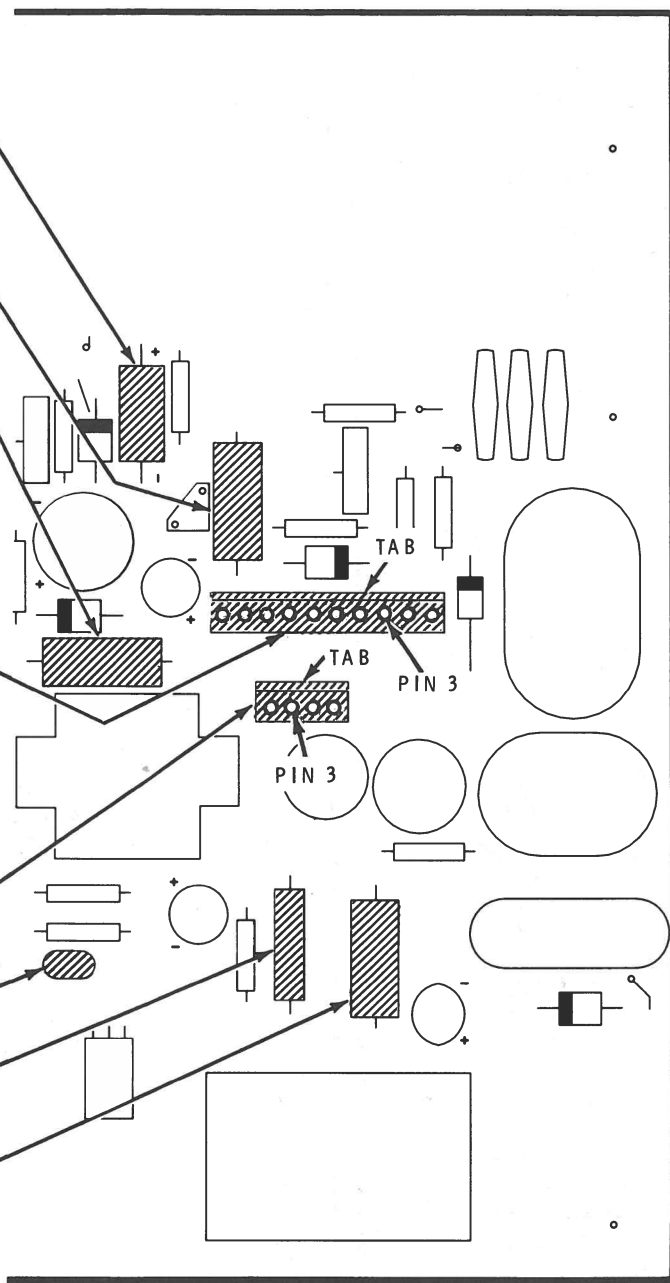
- (✓) P204: 4-pin plug.

- (✓) C224: .047  $\mu$ F Mylar.

- (✓) L202: 8.75  $\mu$ H choke (#45-42). Bend the leads toward the slots in the coil form.

- (✓) R254: 1.2  $\Omega$ , 2-watt, 10% (brn-red-gold).

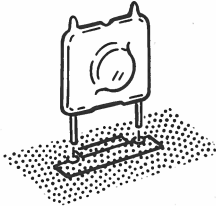
- (✓) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 4-8

## START

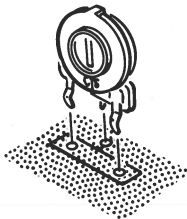
- (✓) L201: 620  $\mu$ H (blu-red-brn) coil.  
Solder the lugs to the foil.



- (✓) C209: .22  $\mu$ F Mylar.

- (✓) C208: .22  $\mu$ F Mylar.

Install each of the following controls as shown, and solder the lugs to the foil.



- (✓) R223: 20 k $\Omega$  control (#10-390).

- (✓) R219: 20 k $\Omega$  control (#10-390).

- (✓) C212: .0068  $\mu$ F (6800) polystyrene.

- (✓) Use long-nose pliers to remove **pin number 4** from a 6-pin plug.  
Note the position of the tab on this Pictorial before you remove pin 4.

- (✓) P202: 6-pin plug.

- (✓) Use long-nose pliers to remove **pin number 2** from a 4-pin plug.  
Note the position of the tab on this Pictorial before you remove pin 2.

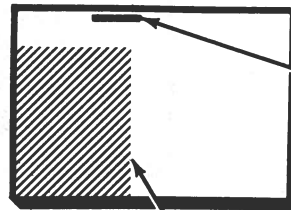
- (✓) P201: 4-pin plug.

- (✓) C201: Small 22  $\mu$ F electrolytic.

- (✓) C203: 10  $\mu$ F electrolytic. Be sure to position the marked lead as shown.

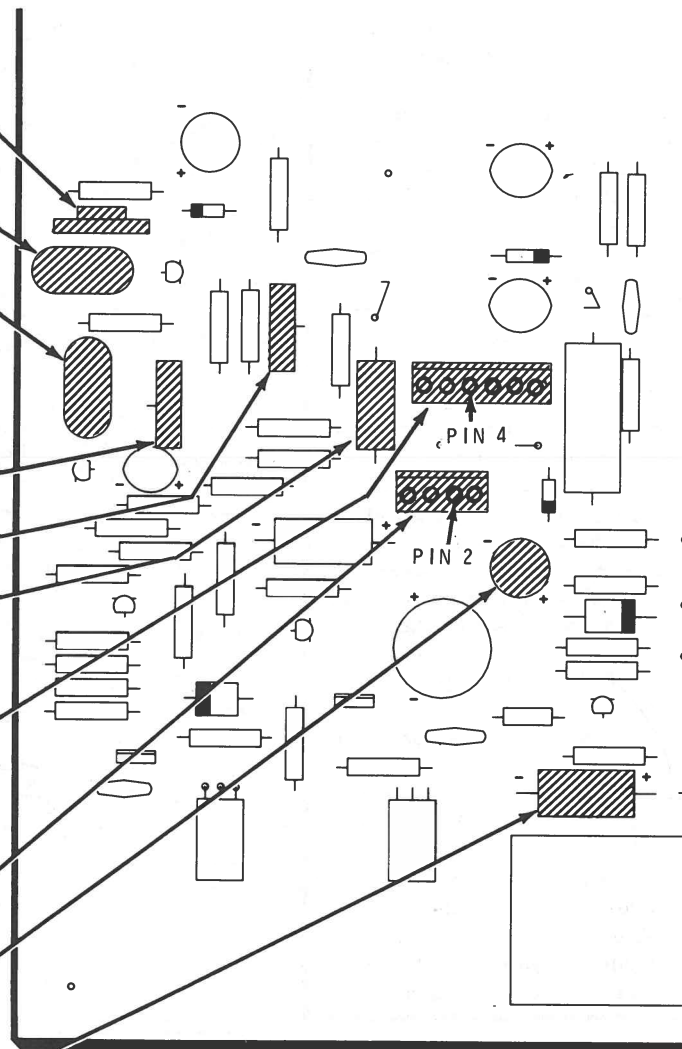
- (✓) Solder the leads to the foil and cut off the excess lead lengths.

## IDENTIFICATION DRAWING

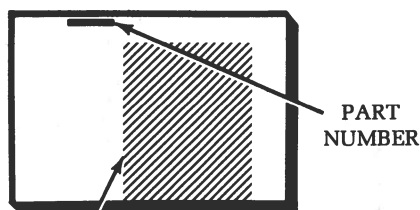


PART  
NUMBER

The steps performed in this Pictorial are in this area of the circuit board.



PICTORIAL 4-9

IDENTIFICATION  
DRAWING

The steps performed in this Pictorial are in this area of the circuit board.

**START**

(✓) R262: 100 k $\Omega$  control (#10-941).

(✓) C233: .005  $\mu$ F spark gap.

(✓) R246: 5000  $\Omega$  (5K) control (#10-311).

(✓) C234: Large 47  $\mu$ F electrolytic capacitor (#25-913). Be sure to position the marked lead as shown.

(✓) C218: .01  $\mu$ F ceramic.

(✓) C217: 100 pF ceramic.

(✓) C222: .01  $\mu$ F ceramic.

(✓) C219: 100 pF ceramic.

(✓) C227: Large 22  $\mu$ F electrolytic (#25-882).

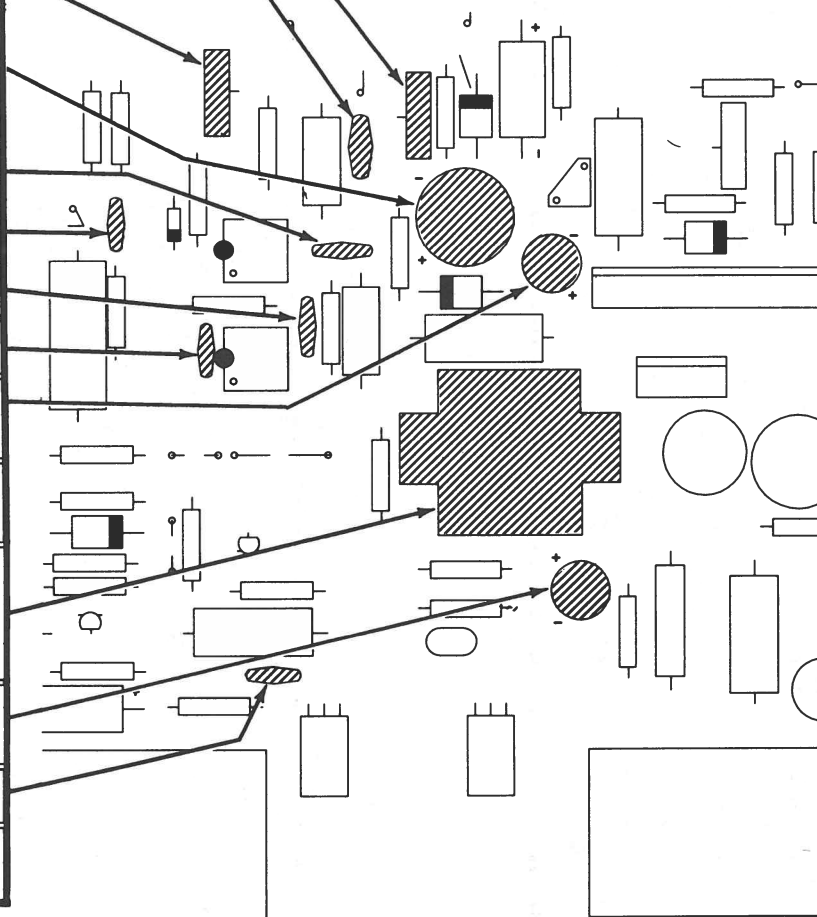
(✓) Solder the leads to the foil and cut off the excess lead lengths.

(✓) T201: Driver transformer (#51-197). Solder the leads to the foil and cut off the excess lead lengths.

(✓) C225: Large 22  $\mu$ F electrolytic (#25-882).

(✓) C202: .001  $\mu$ F ceramic.

(✓) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 4-10

## START

NOTE: As you mount each component in this Pictorial, solder its leads to the foil and cut off any excess lead lengths.

Install .02  $\mu$ F ceramic capacitors at the following three locations.

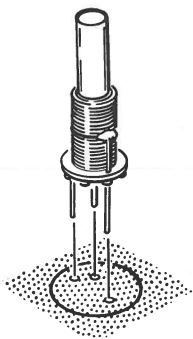
- (✓) C236 .....
- (✓) C235 .....
- (✓) C237 .....

(✓) R264: 2 M $\Omega$  control (#10-1049).

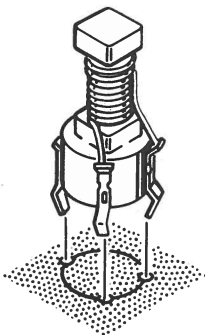
(✓) C231: .22  $\mu$ F polypropylene.

(✓) C232: 1  $\mu$ F polycarbonate.

(✓) L203: 120  $\mu$ H coil (#40-2081).



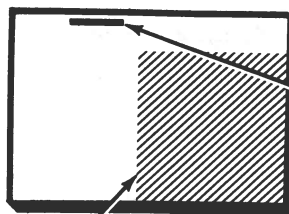
(✓) L204: 52  $\mu$ H coil (#40-1948).



(✓) C226: 10  $\mu$ F (10M) tantalum.

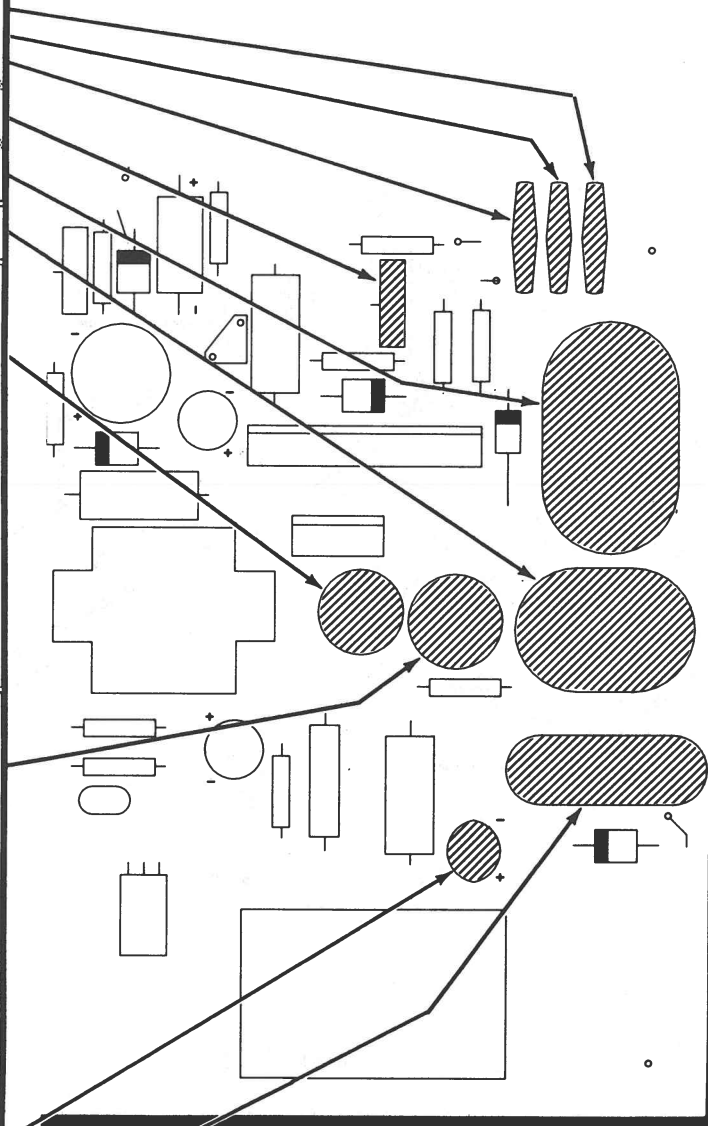
(✓) C228: .006  $\mu$ F polypropylene.

## IDENTIFICATION DRAWING



PART  
NUMBER

The steps performed in this Pictorial are in this area of the circuit board.



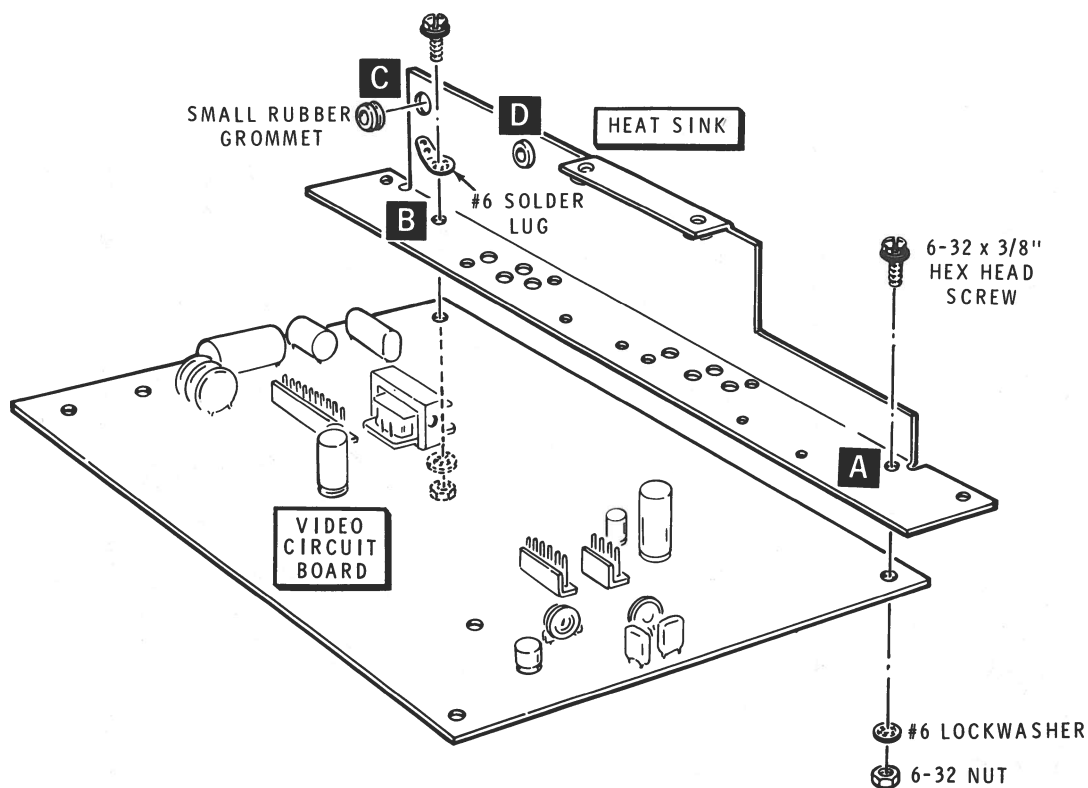
PICTORIAL 4-11

**HEAT SINK ASSEMBLY**

Refer to Pictorial 4-12 (Illustration Booklet, Page 9) for the following steps.

- ( ✓ ) Position the video circuit board as shown.
- ( ✓ ) Refer to Detail 4-12A and install small rubber grommets in holes C and D in the video circuit board heat sink as shown.

- ( ) Refer again to Detail 4-12A and mount the heat sink onto the video circuit board. Use 6-32 × 3/8" hex head hardware at A and 6-32 × 3/8" hex head hardware and a #6 solder lug at B. Do not tighten the screws at this time.



**Detail 4-12A**

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**WARNING:** You will be using Dow Corning 340 thermal compound in the following steps. Although this compound is not caustic, it may cause temporary discomfort if it gets into your eyes. If this should happen, rinse your eyes with warm water. If the compound gets on your clothing, the clothing may require professional cleaning, so handle the compound carefully. This compound contains zinc oxides,  $\text{SiO}_2$ , and slight traces of  $\text{CO}_2$ .

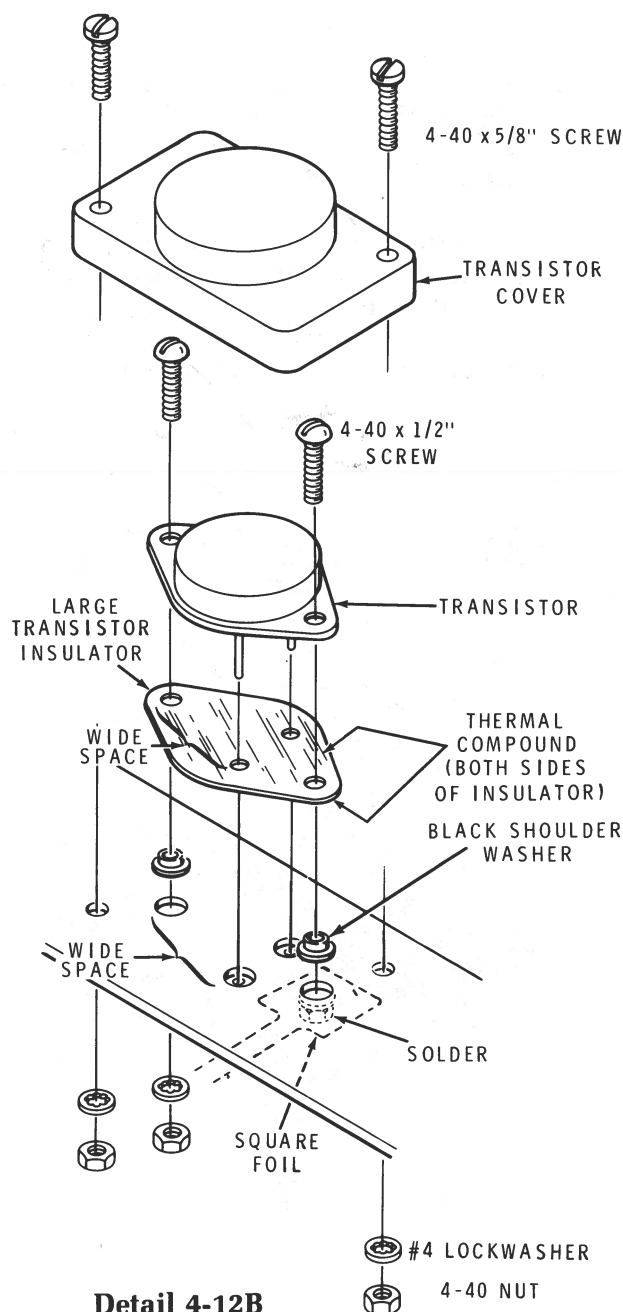
- (✓) Locate the thermal compound pod and make a small slit in one side. Squeeze the pod to remove the compound.
- ( ) Refer to Detail 4-12B and mount an MJ2841 transistor (#417-282) at Q204 in the following manner:

- A. Place a black shoulder washer into each mounting hole with the larger part toward the circuit board. **NOTE:** Check each of the shoulder washers and, if any small burrs are present, remove them with a knife or other sharp tool.
- B. Coat both sides of a large transistor insulator with thermal compound.

**NOTE:** Transistor pins are further from one end of the transistor than from the other end. Refer to this wide space in the next two steps to properly position the transistor insulator and the transistor; they will properly mount in only one way.

- C. Position the transistor insulator on the heat sink at Q204.
- D. Insert the transistor leads through the insulator, through the heat sink, and into the circuit board. Secure the transistor with two sets of 4-40  $\times$  1/2" hardware.
- E. If necessary, clean any excess thermal compound from the transistor leads and circuit board foils.
- F. Solder both of the transistor leads to the foil and cut off the excess lead lengths.
- G. Solder the nut of the transistor mounting hardware to the circuit board foil. **NOTE:** There is no foil on one of the nuts.

- (✓) Q214: In the same manner, mount a BU500 transistor (#417-923) at Q214.
- (✓) Tighten both heat sink mounting screws. Be sure solder lug B is positioned toward the left side of the circuit board as shown.
- (✓) Mount a transistor cover over transistor Q204. Use two sets of 4-40  $\times$  5/8" hardware.
- (✓) In the same manner, mount the other transistor cover over transistor Q214.



**Detail 4-12B**



(✓) Cut three 1/4" pieces of fiber sleeving (#346-4). Use this sleeving in the next three steps.

(✓) Q211: Refer to Part A of Detail 4-12C and mount an SJE608 transistor (#417-264) at Q211 as follows:

A. Coat both sides of a small transistor insulator with thermal compound.

B. Position the insulator onto the heat sink at Q211 as shown.

C. Bend all three transistor leads 90 degrees toward the bare metal side. The bend should be 1/4" from the transistor body as shown.

D. Insert the transistor leads into the B, C, and E holes in the circuit board. Then mount the transistor with a 2-56 × 3/8" screw, two #3 flat washers, a 1/4" piece of sleeving, and a 2-56 nut as shown. Do not overtighten this hardware.

E. Solder the transistor leads to the foil and cut off the excess lead lengths.

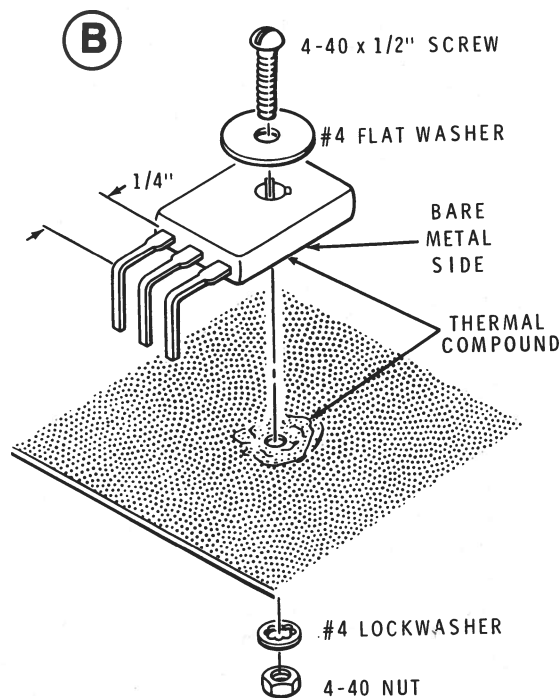
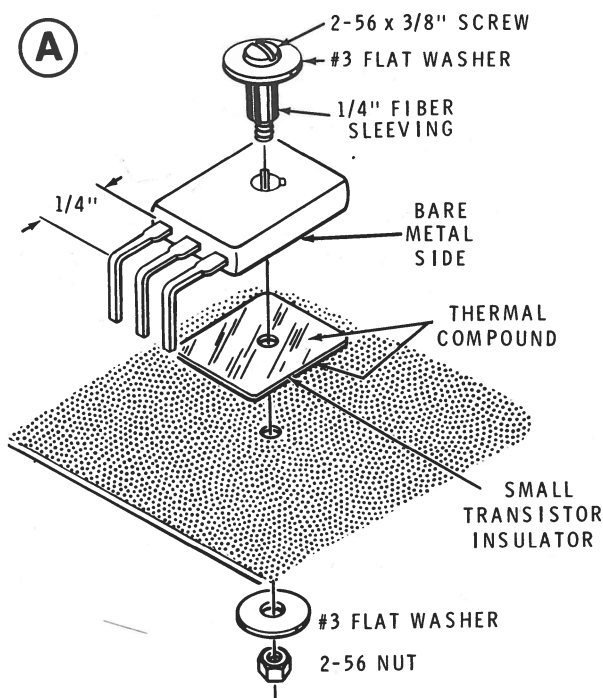
(✓) Q202: In the same manner, mount an MJE172 transistor (#417-924) at Q202.

(✓) Q213: In the same manner, mount an MJE340 transistor (#417-195) at Q213.

(✓) Q212: Refer to Part B of Detail 4-12C and mount an SJE607 transistor (#417-263) at Q212. Do not use an insulator or a sleeve with this transistor. Apply thermal compound to the transistor. Use 4-40 × 1/2" hardware and a #4 flat washer. Do not overtighten this hardware. Save the thermal compound for use later.

(✓) Cut and prepare the following lengths of heavy stranded wire; remove 1/4" of insulation from one end and 1/8" of insulation from the other end of each wire.

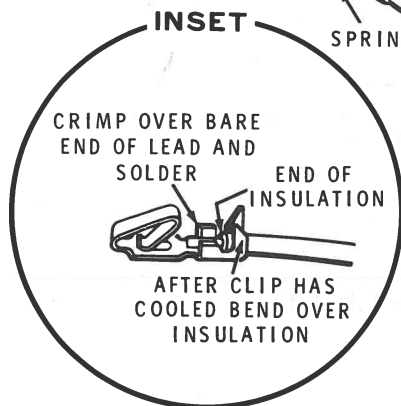
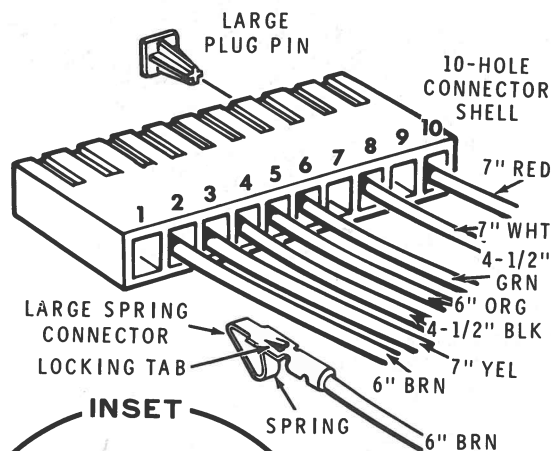
Two 6" brown	One 4-1/2" green
One 7" yellow	One 7" red
One 4-1/2" black	One 7" white
One 6" orange	



**Detail 4-12C**

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- (✓) Refer to the inset drawing on Detail 4-12D and crimp and solder large spring connectors onto the 1/8" prepared ends of the eight wires as shown.



**Detail 4-12D**

Refer to Detail 4-12D and insert the spring connectors into a 10-hole connector shell as follows. Insert each connector locking tab upward as shown until it locks in place.

- (✓) Either 6" brown wire in hole 1.
- (✓) Other 6" brown wire in hole 2.
- (✓) 7" yellow wire in hole 3.
- (✓) 4-1/2" black wire in hole 4.
- (✓) 6" orange wire in hole 5.
- (✓) 4-1/2" green wire in hole 6.
- (✓) No wire in hole 7.
- (✓) 7" white wire in hole 8.
- (✓) No wire in hole 9.
- (✓) 7" red wire in hole 10.
- (✓) Insert a large plug pin in hole 7 of the 10-hole connector shell.
- (✓) Install a small cable tie around the eight wires approximately 2" from the connector shell.

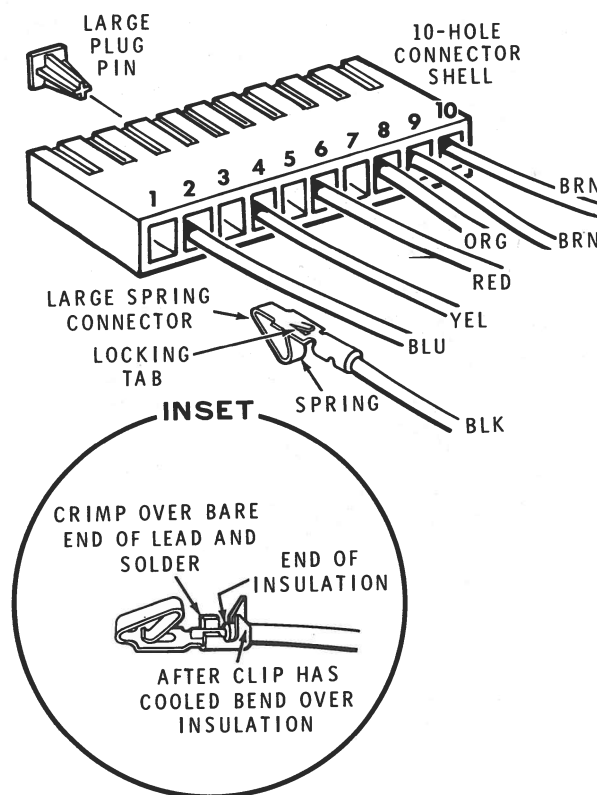


Solder the eight wires coming from the 10-hole connector shell to the indicated video circuit board holes in the following steps. Then cut off the excess wire ends.

- (✓) Either brown wire to one FIL hole.
- (✓) Other brown wire to the remaining FIL hole.
- (✓) Yellow wire to 53V.
- (✓) Black wire to GND 1.
- (✓) Orange wire to 6V.
- (✓) Green wire to G1.
- (✓) White wire to G4.
- (✓) Red wire to G2.
- (✓) Locate the flyback transformer (#51-200) in the main pack. Cut the bare end of each lead to 1/8", if this has not already been done.
- (✓) Refer to the inset drawing on Detail 4-12E and crimp and solder a large spring connector onto each flyback transformer lead.

Refer to Detail 4-12E and insert the flyback transformer leads into a 10-hole connector shell as follows. Be sure to position the slotted side of the shell as shown.

- (✓) Black wire in hole 1.
- (✓) Blue wire in hole 2.
- (✓) No wire in hole 3.
- (✓) Yellow wire in hole 4.
- (✓) No wire in hole 5.
- (✓) Red wire in hole 6.
- (✓) No wire in hole 7.
- (✓) Orange wire in hole 8.
- (✓) Either brown wire in hole 9.
- (✓) Other brown wire in hole 10.



**Detail 4-12E**

- (✓) Insert a large plug pin in hole 3 of the 10-hole connector.
- (✓) Install a small cable tie around the flyback transformer leads approximately 2" from the transformer.
- (✓) Remove the backing paper from the "DANGER" label and press the label to the front of the heat sink as shown. NOTE: This will be directly below T202 after it is mounted in the next step.
- (✓) T202: Remove the rubber band (if there is one) from the flyback transformer. Then mount the transformer to the heat sink. Use two 1/8" spacers, two #6 flat washers, a #4 lockwasher at D, a #4 solder lug at C, and two 4-40 locknuts. Position the solder lug at C toward the nearby end of the heat sink.
- (✓) Prepare a 4" large black stranded wire. Connect this wire from solder lug B (S-1) to solder lug C (S-1).

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- (✓) Prepare a 6" large black stranded wire.
- (✓) Refer to the inset drawing on Pictorial 4-12 and crimp and solder a push-on connector onto one end of the 6" black wire.
- (✓) Locate the GND hole near the front center of the circuit board. Install the free end of the wire into the GND hole. Solder the wire to the foil and cut off the excess wire end.

## CIRCUIT BOARD VISUAL CHECK

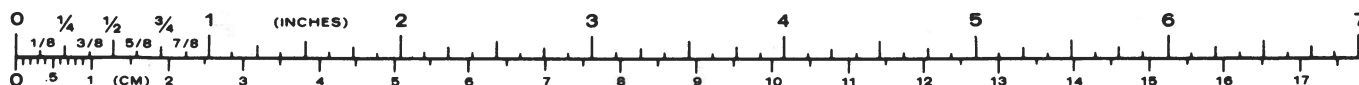
It is important that the following checkout procedure be done after the circuit board is completed.

Carefully inspect the foil side of the circuit board for the following most commonly made errors.

- (✓) Unsoldered connections.
- (✓) Poor solder connections.
- (✓) Solder bridges between foil patterns. NOTE: If you suspect a solder bridge, check the foil on the circuit board against the foil pattern shown in the "X-Ray Views" section of the Operation Manual.
- (✓) Protruding leads which could touch together.

When you make the following visual checks, refer to the Pictorial where the part was installed and check it against the installation instructions.

- (✓) Check the diodes for proper installation.
- (✓) Check the transistors for proper type and installation.
- (✓) Check the integrated circuits for proper installation.
- (✓) Check the electrolytic and tantalum capacitors for the correct position of the positive (+) and negative (-) ends.
- (✓) Check the plugs for proper installation.



## INSTALLATION AND CHECKOUT

### POWER OFF TESTS

Refer to Pictorial 4-13 (Illustration Booklet, Page 9) for the following steps.

- (✓) Set your ohmmeter to the  $\times 1000$  range.
- (✓) Connect the negative meter lead to the video circuit board heat sink. The lead will remain connected to this point for the following tests.

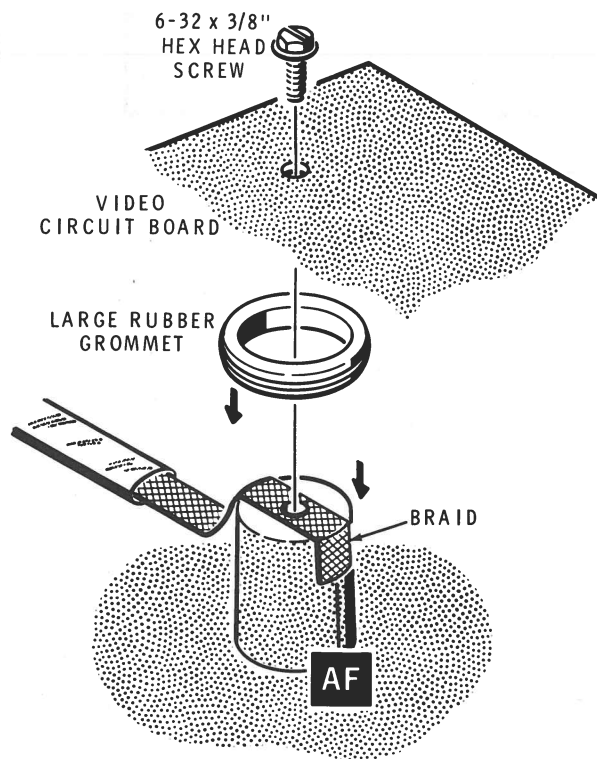
Perform the following resistance measurements on the video circuit board. If you obtain the correct meter reading, proceed to the next test. If you do not obtain the correct reading, refer to the "Possible Area of Trouble" column and correct the problem. Then continue with the tests.

POSITIVE METER LEAD TO:	APPROXIMATE METER READING	POSSIBLE AREA OF TROUBLE (Refer to "Possible Circuit Board Problems" on Page 82).
(✓) TP1	Greater than 5000 $\Omega$	1. Transistors Q202, Q203, Q204.
(✓) TP2	INFINITE	1. Solder bridge on foil.
(✓) TP3	INFINITE	1. Solder bridge on foil.
(✓) TP4	100 k $\Omega$	1. Solder bridge on foil.
(✓) TP5	INFINITE	1. Solder bridge on foil.
(✓) TP6	Greater than 2000 $\Omega$	1. Capacitor C227.
(✓) TP7 (collector of Q211)	Greater than 2000 $\Omega$	1. Transistors Q209, Q211.
(✓) TP8 (collector of Q202)	Greater than 2000 $\Omega$	1. Transistors Q202, Q203.
(✓) TP9 (collector of Q213)	Greater than 2000 $\Omega$	1. Transistor Q213. 2. T201.
(✓) TP10 (nut on foil side).	INFINITE	1. Your ohmmeter. Reverse the test leads. 2. Transistor Q214. 3. Diode D208.

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Refer to Pictorial 4-14 (Illustration Booklet, Page 10) for the following steps.

- (✓) Locate the previously prepared 9" and 11" sleeved braids; these will be used in the following steps.
- (✓) Refer to Detail 4-14A and, at the end of the 9" sleeved braid that has the hole 3/4" from the end, secure the braid to cabinet base mounting boss AF with a 6-32 × 3/8" hex head screw.
- (✓) Fold the braid down along the sides of mounting boss AF and then push a large rubber grommet down over the braid to hold it in place. Position the braid as shown in the Pictorial.
- (✓) Remove the screw from AF.
- (✓) In exactly the same manner, secure the end of the 11" prepared braid to mounting boss AE. Remove the screw from AE.



Detail 4-14A

- (✓) Locate the flat keyboard cable (#134-1142). Place the cable, **smooth side up** into the cabinet base as shown in Pictorial 4-14. Make sure the **marked** cable lead is on the side nearest the power transformer. NOTE: This marked lead will be on the underside of the cable. The cable plugs will be connected later.
- (✓) Position the video circuit board inside the cabinet base as shown in Pictorial 4-14.
- (✓) Loosely mount the video circuit board to the cabinet base with 6-32 × 3/8" hex head screws at AE, AF, AU, and AX. Be sure to position the harness and all other wires (except the wire braids) on the top of the circuit board. When the four screws are started, tighten the two screws at AE and AF.
- (✓) Connect the negative lead of your meter to the video circuit board heat sink. Set the meter to read +DC volts.
- (✓) Push the 6-hole connector on the wire harness onto plug P202 on the video circuit board. NOTE: The connector is "keyed" and will fit correctly only one way.

Do **not** connect the flyback transformer 10-hole connector at this time.

**POWER ON TESTS**

Refer to Pictorial 4-15 for the following tests.

**WARNING: MAKE SURE THAT THE FLYBACK CONNECTOR IS NOT CONNECTED TO THE CIRCUIT BOARD PLUG.**

(✓) Connect the line cord plug to an AC outlet and set the POWER switch to ON.

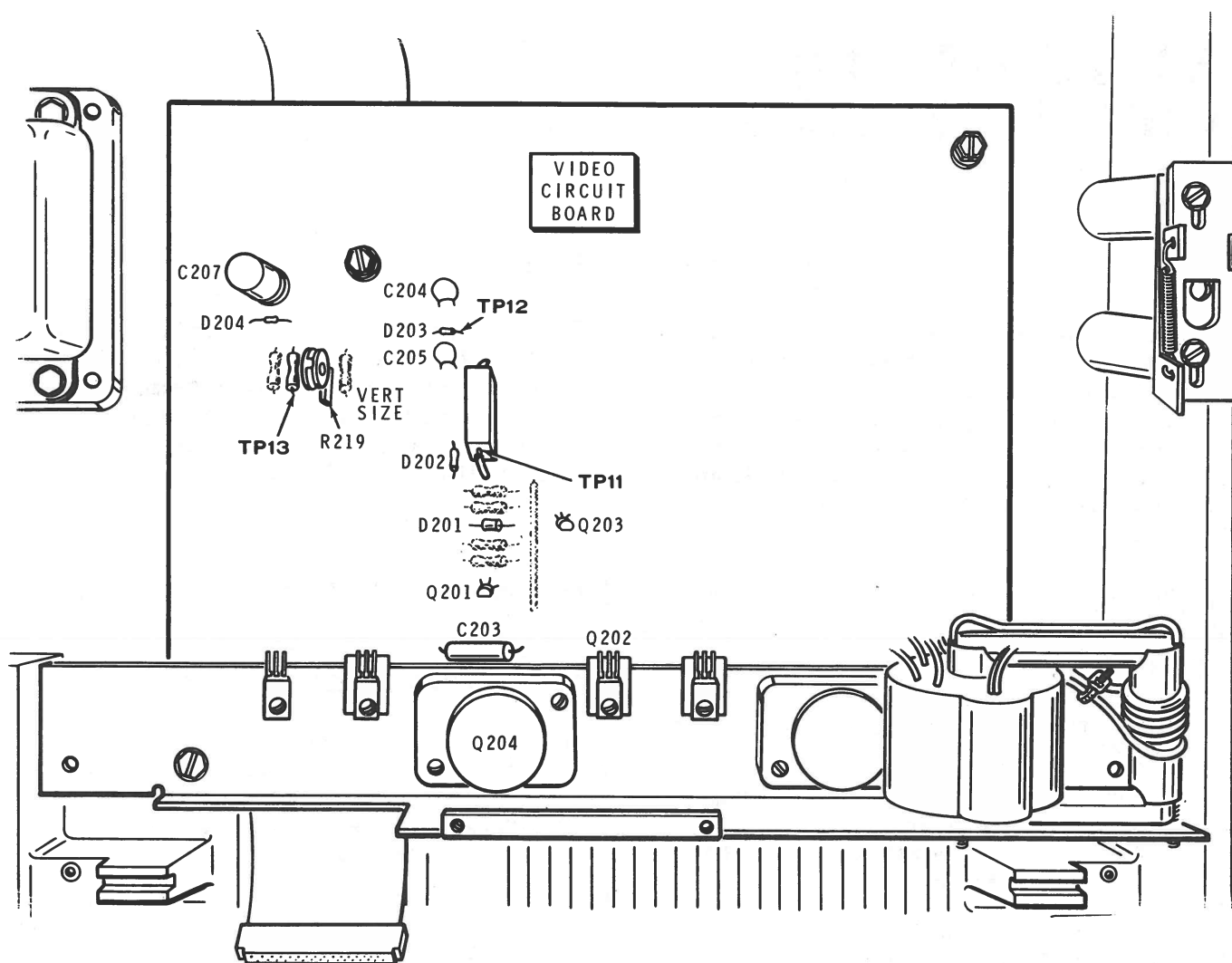
(✓) Make the following voltage measurements on the video circuit board. If you obtain the correct meter reading, proceed to the next test. If you do not obtain the correct reading, refer to the "Possible Area of Trouble" column.

POSITIVE METER LEAD TO:	APPROXIMATE METER READING	POSSIBLE AREA OF TROUBLE (Refer to "Possible Circuit Board Problems" on Page 82.)
(✓) TP11	53 VDC	1. Diodes D201, D202, or D203. 2. Capacitor C203. 3. Transistors Q201 through Q204.
(✓) TP12	6.2 VDC	1. Diode D203. 2. Capacitors C204 or C205.
(✓) TP13	Approximately 7 V. Vary control R219; meter reading should change (approximately 5 to 9 volts).	1. Diode D204. 2. Capacitor C207. 3. SCR Q205.

(✓) Set the POWER switch to OFF and disconnect the line cord.

(✓) Disconnect the harness connector from plug P202 on the video circuit board.

This completes the video circuit board checkout.



PICTORIAL 4-15



# VIDEO DRIVER CIRCUIT BOARD

## PARTS LIST

Locate Pack #3 and check each part against the following list and the Video Driver Circuit Board Parts Pictorial (Illustration Booklet, Page 11). Any part that is packed in an individual envelope with the part number on it should not be removed from its envelope until it is called for in a step. Do not discard any packing materials until all parts are accounted for.

To order a replacement part, always include the Part Number and use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover. Your Warranty is inside the front cover. For prices, refer to the separate "Heath Parts Price List."

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### RESISTORS

The following resistors are 1/2-watt, 5% tolerance unless otherwise noted.

A1	6-220-12	1	22 $\Omega$ , 1/4-watt (red-red-blk)	R906
A1	6-330-12	1	33 $\Omega$ , 1/4-watt (org-org-blk)	R911
A1	6-750-12	1	75 $\Omega$ , 1/4-watt (viol-grn-blk)	R905
A1	6-102-12	1	1000 $\Omega$ , 1/4-watt (brn-blk-red)	R902
A1	6-105-12	1	1 M $\Omega$ , 1/4-watt (brn-blk-grn)	R901
A2	1-45	1	220 $\Omega$ , 10% (red-red-brn)	R904
A2	1-9	1	1000 $\Omega$ , 10% (brn-blk-red)	R907
A2	1-25	2	47 k $\Omega$ , 10% (yel-viol-org)	R908, R909
A3	1-50-2	1	820 $\Omega$ , 2-watt (gry-red-brn)	R903

### CAPACITORS

B1	20-106	1	390 pF mica	C906
B2	21-176	6	.01 $\mu$ F ceramic	C901, C902, C903, C904 C907, C908
B3	25-882	1	22 $\mu$ F electrolytic	C905

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### DIODES-TRANSISTORS

C1	56-93	1	FD333 diode	D902
C1	57-27	1	1N2071 diode	D901

NOTE: Transistors may be marked for identification in any one of the following four ways:

1. Part number.
2. Type number
3. Part number and type number.
4. Part number with a type number other than the one listed.

C2	417-834	1	MPSU10 transistor	Q901
C3	417-875	1	2N3904 transistor	Q902

### MISCELLANEOUS

D1	45-39	1	4.65 $\mu$ H inductor	L901
	85-2636-1	1	Video driver circuit board	
D2	432-1064	1	10-pin right angle connector plug	P901
D3	432-986	1	3-pin right angle connector plug	P902
D4	434-353	1	CRT socket assembly	

## STEP-BY-STEP ASSEMBLY

### START

Position the video driver circuit board printed side up as shown. Then proceed with the following steps.

- (✓) L901: 4.65  $\mu$ H inductor (#45-39). Bend the leads toward the slots as shown.



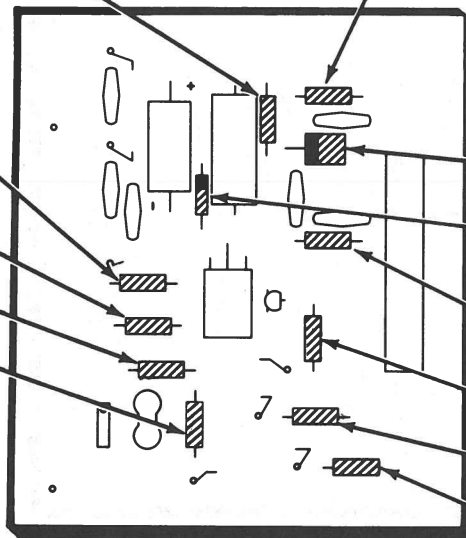
- (✓) R904: 220  $\Omega$ , 10% (red-red-brn).

- (✓) R905: 75  $\Omega$ , 1/4-watt (viol-grn-blk).

- (✓) R911: 33  $\Omega$ , 1/4-watt (org-org-blk).

- (✓) R906: 22  $\Omega$ , 1/4-watt (red-red-blk).

- (✓) Solder the leads to the foil and cut off the excess lead lengths.



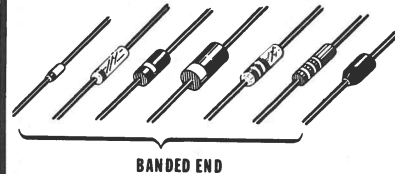
PICTORIAL 5-1

### CONTINUE

- ( ) R901: 1 M $\Omega$ , 1/4-watt (brn-blk-grn).

NOTE: When you install a diode, as in the following steps, position its banded end as shown in the Pictorial. A circuit will not operate properly if the diode is installed backward.

IMPORTANT: THE BANDED END OF DIODES CAN BE MARKED IN A NUMBER OF WAYS.



- (✓) D901: 1N2071 diode (#57-27).

- (✓) D902: FD333 diode (#56-93).

- (✓) R902: 1000  $\Omega$ , 1/4-watt (brn-blk-red). NOTE: This is the smaller of the two 1000  $\Omega$  resistors.

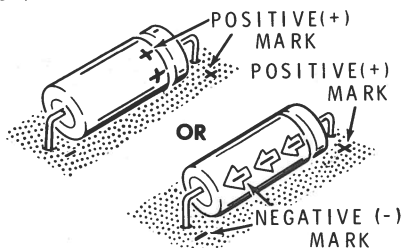
- (✓) R907: 1000  $\Omega$ , 10% (brn-blk-red).

- (✓) R908: 47 k $\Omega$ , 10% (yel-viol-org).

- (✓) R909: 47 k $\Omega$ , 10% (yel-viol-org).

- (✓) Solder the leads to the foil and cut off the excess lead lengths.

NOTE: Before you install an electrolytic capacitor, note the position of the identified (+ or -) lead. Be sure you connect the positive (+) lead to the positive (+) marked point on the circuit board.

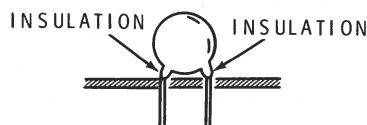


Detail 5-2A

## START

- ( ) C905: 22  $\mu$ F electrolytic. See Detail 5-2A.

NOTE: When you install ceramic capacitors, do not push the insulated portion of the leads into the circuit board holes. This could make it difficult to solder the leads to the foil.



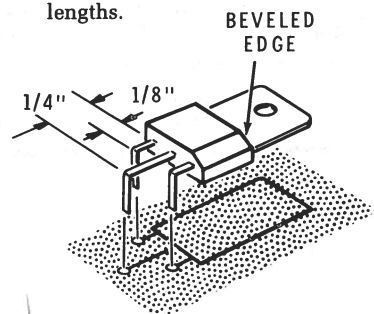
- (✓) C904: .01  $\mu$ F ceramic.

- (✓) C907: .01  $\mu$ F ceramic.

- (✓) C908: .01  $\mu$ F ceramic.

- (✓) Solder the leads to the foil and cut off the excess lead lengths.

- (✓) Q901: MPSU10 transistor (#417-834). Bend the transistor leads as shown. Then mount the transistor onto the board, beveled edges upward. Solder the leads to the foil and cut off the excess lead lengths.



- (✓) P902: 3-pin right-angle connector.

- (✓) C906: 390 pF mica capacitor

- (✓) Solder the leads to the foil and cut off the excess lead lengths.

## CONTINUE

- (✓) R903: 820  $\Omega$ , 2-watt resistor (gry-red-brn).

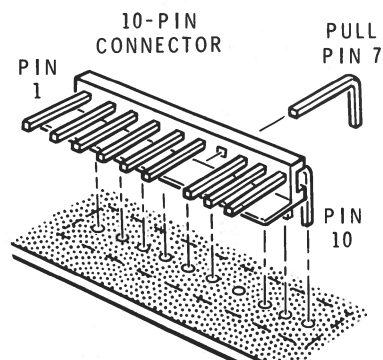
- (✓) C903: .01  $\mu$ F ceramic.

- (✓) C901: .01  $\mu$ F ceramic.

- (✓) C902: .01  $\mu$ F ceramic.

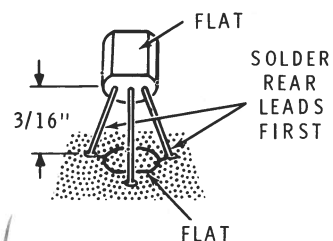
- (✓) Solder the leads to the foil and cut off the excess lead lengths.

- (✓) With pliers, remove and discard pin 7 from the 10-pin right-angle connector as shown.



- (✓) P901: Turn the circuit board printed side down and firmly push the 10-pin connector onto the foil side of the board so the pins point outward. Solder all possible pins to the foil. Turn the board printed side up.

To mount the transistor in the next step, first bend the center lead toward the flat side of the transistor. Then line up the flat on the transistor with the outline of the flat on the circuit board, and insert the leads into their corresponding holes. Solder the two rear leads to the foil; then bend the transistor forward until it is flat against the surface. Solder the center lead and cut off the excess lead lengths.



- (✓) Q902: 2N3904 transistor (#417-875).

PICTORIAL 5-2

Refer to Pictorial 5-3 for the following steps.

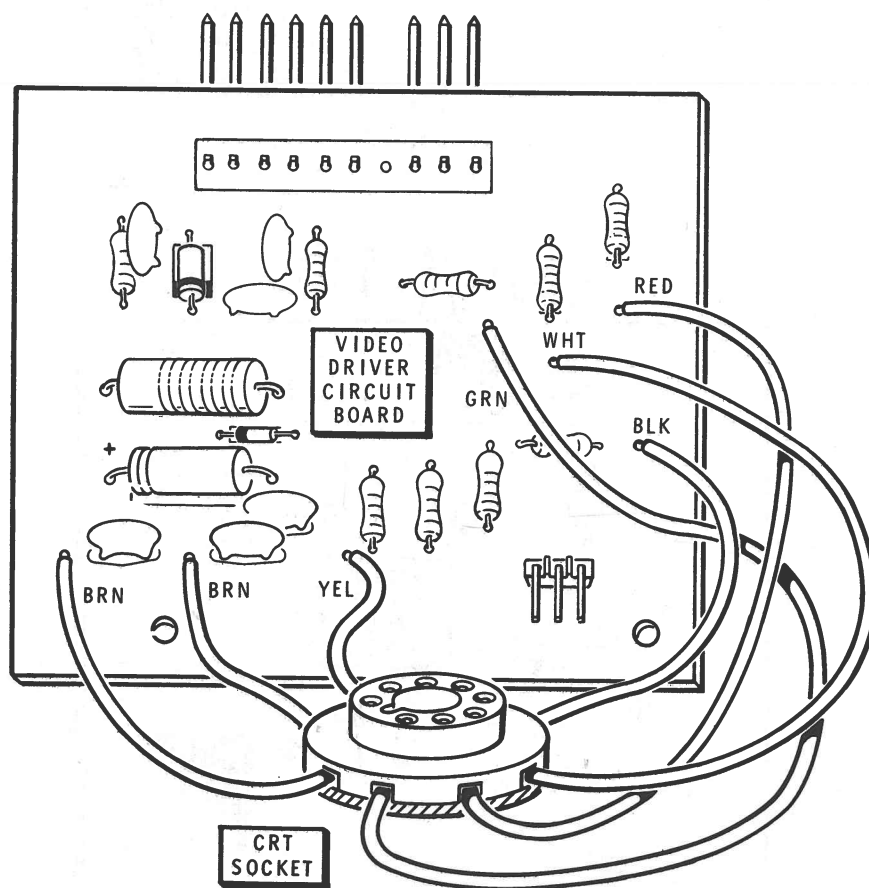
Locate the CRT socket. When you install the socket leads onto the video driver circuit board in the following steps, solder each lead as it is installed and cut off the excess lead end.

- (✓) Connect the green socket lead to GRN.
- (✓) Connect the red socket lead to RED.
- (✓) Connect the white socket lead to WHT.
- (✓) Connect the black socket lead to BLK.
- (✓) Connect the yellow socket lead to YEL.
- (✓) Connect either brown lead to either BRN.
- (✓) Connect the other brown lead to the remaining BRN.

## CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions.

- (✓) Unsoldered connections.
- ( ) Solder connections that have a grainy appearance.
- (✓) Solder bridges between foil patterns.
- (✓) Protruding leads which could touch together.
- (✓) Transistors for the proper **type** and **installation**.
- (✓) Electrolytic capacitors for the correct position of the marked end.
- (✓) Diodes for the correct position of the banded end.



PICTORIAL 5-3

## INSTALLATION AND CHECKOUT

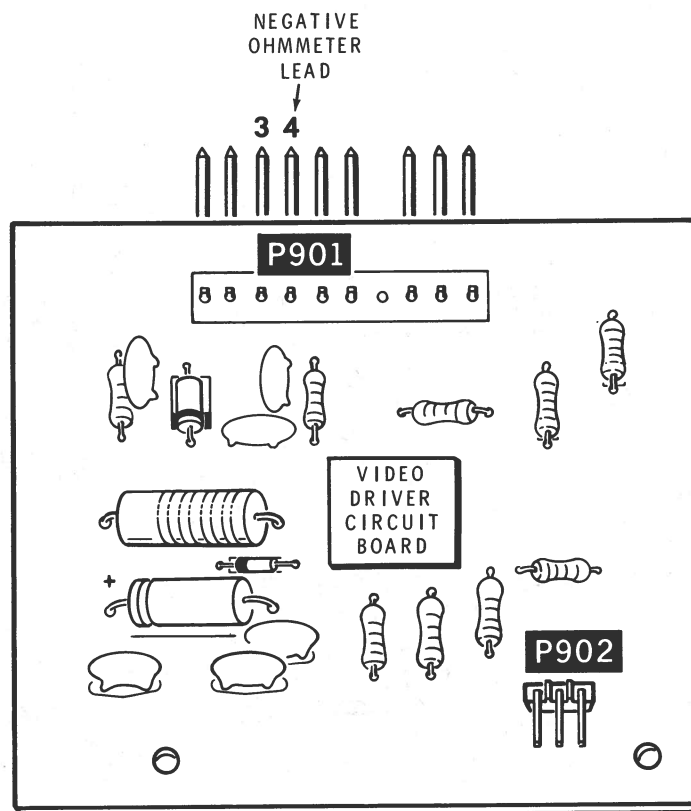
### POWER OFF TESTS

Refer to Pictorial 5-4 for the following steps.

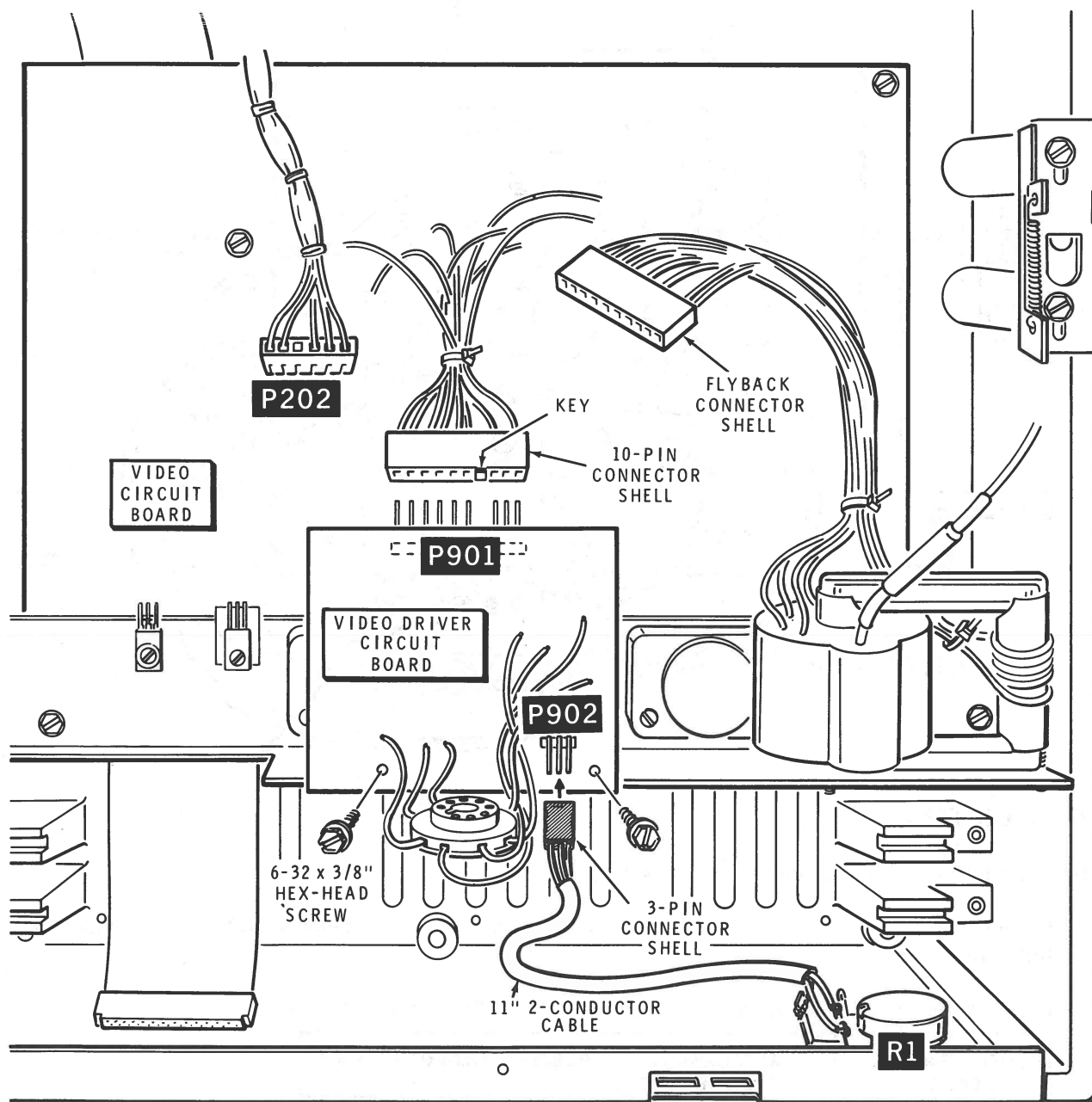
- ( ) Set your ohmmeter to the  $\times 1000$  range.
- ( ) Connect the negative meter lead to pin 4 (gnd) on connector plug P901.
- ( ) With the positive meter lead, measure each of the remaining connector pins on P901. Each pin should indicate an infinite (top-scale) meter reading. NOTE: Pin 3 will begin to read "on-scale," but will come to rest at the high end.
- ( ) Check the center pin of 3-pin connector P902. The meter should indicate greater than 5000  $\Omega$ .

Refer to Pictorial 5-5 for the following steps.

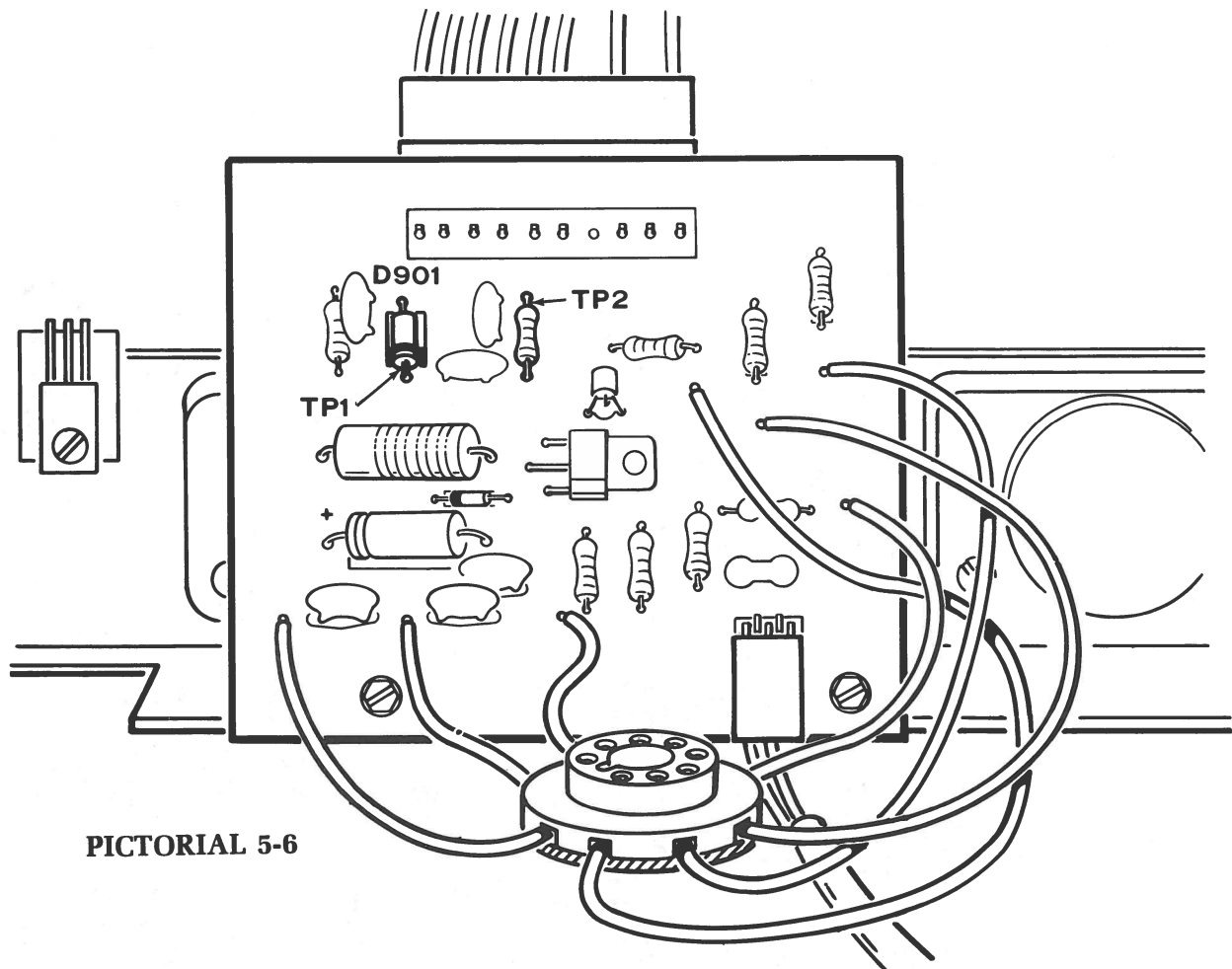
- ( ) Mount the video driver circuit board onto the top flange on the video circuit board heat sink with two 6-32  $\times$  3/8" hex head screws as shown.
- ( ) Push the 10-pin connector shell with eight wires coming from the video circuit board onto video driver board plug P901 as shown. NOTE: The connector shell can be correctly mounted in only one way.
- ( ) Locate the small 3-pin connector shell coming from control R1 on the rear panel. Push the connector onto 3-pin plug P902 as shown. NOTE: This connector can be correctly installed in either direction.
- ( ) Make sure, on the video circuit board, that the 10-pin flyback connector shell is not connected to the circuit board plug. Reconnect the 6-pin connector to P202.



PICTORIAL 5-4



PICTORIAL 5-5



PICTORIAL 5-6

POWER ON TESTS

Refer to Pictorial 5-6 as you make the following tests.

- (✓) Connect the negative lead of your voltmeter to the video circuit board heat sink. Measure the voltages in the following chart.
- (✓) Connect the line cord to an AC outlet and set the POWER switch to ON.

POSITIVE METER LEAD TO:	APPROXIMATE METER READING	POSSIBLE AREA OF TROUBLE
TP1	53 volts DC	1. Diode D901. 2. Capacitor C905. 3. Transistors Q901 or Q902.
TP2	6.2 volts DC	1. Capacitor C902. 2. Transistor Q901. 3. Connector P901.

- ( ) Set the POWER switch to OFF and disconnect the line cord.

This completes the checkout of the video driver circuit board.

## CHASSIS (cont'd)

### FRONT PANEL AND CRT INSTALLATION

Refer to Pictorial 6-1 (Illustration Booklet, Page 11) for the following steps.

- (✓) Position the front panel on your work area as shown.
- (✓) As in a previous step, install four brass inserts in the front panel at CA, CB, CC, and CD.

- (✓) Mount the panel insert to the front of the front panel at CA, CB, CD, CJ, and CL with the panel mounting plate and five 6-32  $\times$  3/8" hex head screws. Note the position of the indentation on the bottom front of the panel insert. At CC, secure one end of the previously prepared 6" wire braid with sleeving using a 6-32  $\times$  3/8" hex head screw. The free end of the braid will be connected later.



Refer to Detail 6-1A for the next six steps.

- ( ) 1. Locate the small brown wire and cut it into two equal lengths. Twist these two wires together to form a twisted pair.
- ( ) 2. Prepare the four wire ends.
- ( ) 3. At one end of the twisted wire pair, connect one wire to either speaker lug (S-1) and the other wire to the remaining lug (S-1).
- ( ) 4. At the other end of the twisted wire pair, cut each bare wire end to 1/8".
- ( ) 5. Crimp and solder small spring connectors onto the ends of both brown wires.
- ( ) 6. Insert the spring connectors into the outer holes of a small 3-hole connector shell as shown in the inset drawing on the Detail.
- ( ) Position the speaker into the rear of the front panel as shown. Make sure the front edge of the speaker fits into the small notch in the panel. Then secure the speaker in place with the speaker bracket and a #4 × 3/8" self-tapping screw.

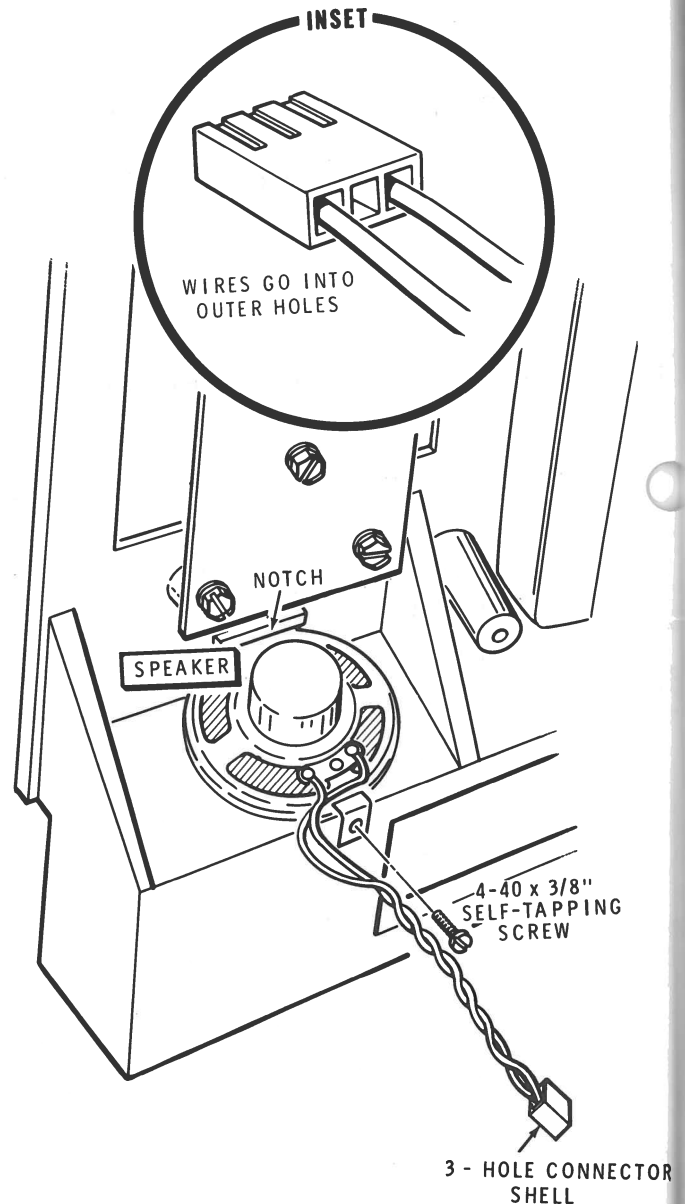
### WARNING

Use extreme caution when you handle the CRT. Do not strike, scratch, or subject the picture tube to more than moderate pressure at any time. Due to its high vacuum and large glass surface, a fracture of the glass could result in an implosion of considerable force.

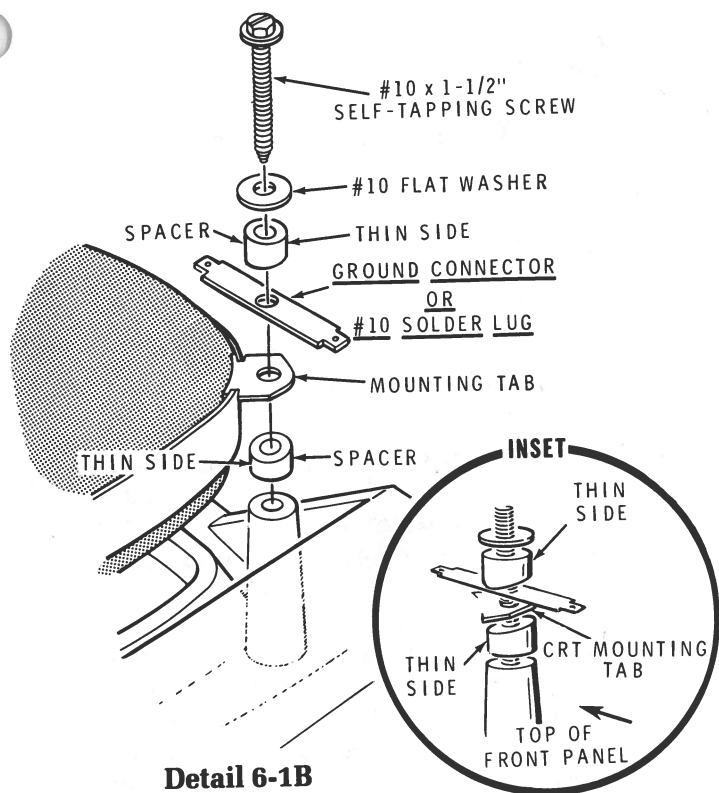
NEVER LIFT THE CRT BY ITS NECK. Always lift it by the edges around the face of the tube. When you handle the CRT, do not touch the anode socket; you can receive an electrical shock even though the CRT has not been used.

- ( ) Open the CRT carton so the face of the tube (not the neck) is positioned up. Then hold the CRT in the box and turn the box upside down on a padded surface.
- ( ) Lift the carton slowly from the CRT, allowing the CRT to slide out onto the padded surface.

- ( ) If there is a thin plastic film over the face of the CRT, remove it.
- ( ) Place the CRT face down on the front panel as shown. Note the position of the anode socket.
- ( ) Locate eight beveled spacers, three #10 solder lugs, a ground connector, four #10 flat washers, and four #10 × 1-1/2" self-tapping screws. Use these hardware parts in the following steps.



**Detail 6-1A**

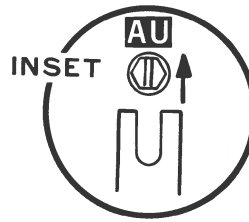
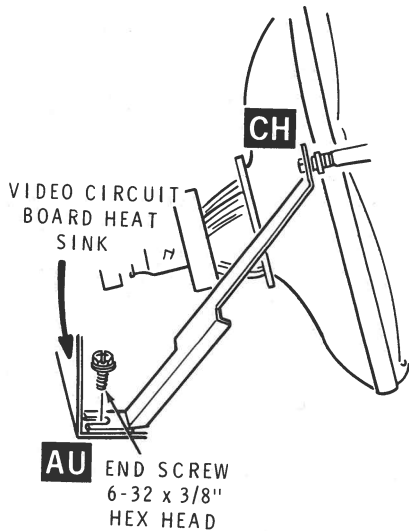


Detail 6-1B

**NOTE:** When you install the beveled spacers in the next step, be sure to position their beveled sides toward one another.

- (✓) Refer to Detail 6-1B and loosely mount the CRT mounting tab to the front panel at CE with two beveled spacers, a ground connector, a #10 flat washer, and a #10 × 1-1/2" self-tapping screw as shown. Do not tighten this hardware.
- (✓) Similarly, loosely mount the CRT mounting tabs at CF, CG, and CH, using a #10 × 1-1/2" self-tapping screw, a #10 flat washer, a beveled spacer, a #10 solder lug, (the CRT mounting tab), and another beveled spacer, in **exactly** that order as called for in Detail 6-1B. Use **two** solder lugs at CF.
- (✓) Refer to the inset drawing on Detail 6-1B and position the bevel of the spacers at CE as shown. Also refer to Pictorial 6-1 and position the ground connector as shown. Then tighten the mounting screw.
- (✓) Similarly, position the spacers and solder lugs at CF, CG, and CH, as shown in the Pictorial and tighten each mounting screw.
- ( ) Connect the hooked end of a long spring to the indicated solder lug CF and connect another spring at CG.

- (✓) Insert one end of the bare wire through the **upper hole** in the ground connector at CE. Twist 1-1/2" of the wire back around itself to secure it. Solder the wire to the ground connector.
- (✓) Pass the free end of the wire through the springs at CF and CG and through solder lug CH as shown. Pull the wire through the solder lug until both springs are stretched slightly. Bend the wire back on itself at the solder lug and cut the wire end 1-1/2" from the lug. Twist the 1-1/2" end around the running length of wire coming from CG.
- (✓) Bend the lower half of the ground connector CE up at a 90-degree angle.
- (✓) Locate the CRT yoke and trim the four bare wire ends to 1/8".
- (✓) Crimp and solder a large spring connector onto the end of each yoke lead.
- (✓) Refer to the Pictorial and insert the spring connector on the end of the blue yoke lead into hole 4 of a 4-hole connector shell as shown.
- (✓) In the same manner, insert the red yoke lead spring connector into hole 2 of the same connector shell.
- (✓) Insert a large plug pin into hole 3 of the same connector shell.
- (✓) Insert the spring connector on the yellow yoke wire into hole 1 of another 4-pin connector shell.
- (✓) Insert the brown yoke lead spring connector into hole 3 of the connector shell.
- (✓) Insert a large plug pin into hole 2 of this second connector shell.
- (✓) Slide the yoke onto the neck of the CRT with the leads coming from the yoke as shown. Push the yoke firmly against the flared part of the CRT.
- (✓) Tighten the yoke clamp screw only enough to keep the yoke from moving freely on the neck of the CRT.



Detail 6-2A

Refer to Pictorial 6-2 (Illustration Booklet, Page 12) for the following steps.

- (✓) Position the front of the cabinet base over the edge of your work surface enough that you can reach the mounting holes on the underside. Be careful that you do not extend the base too far over the edge.
- (✓) Locate four 10-32  $\times$  1" hex head screws, five #10 flat washers, one 10-32 nut, and the two front panel mounting plates. Use these components in the following steps.

**NOTE:** Have someone help you mount the front panel in the following steps to avoid damage to the CRT. Be sure to keep all wires, cables, and braids behind the bottom of the front panel to avoid pinching them between the two assemblies.

- (✓) Set the front panel into the cabinet base and secure it with the two mounting plates, four 10-32  $\times$  1" hex head screws, and four #10 flat washers. Install all of the screws and flat washers before you tighten the hardware. Position the front panel as far forward as possible and tighten the screws.
- (✓) Push the cabinet base back onto your work surface.

- (✓) Behind the left side of the front panel, locate the sleeved braid coming from video circuit board mounting boss AF. Position this braid around the lower left side of the front panel as shown in the Pictorial.
- (✓) Push the sleeved end of the long wire braid through the lower front panel opening as shown. Secure hole 2 of the braid to the top of front panel mounting screw CN with a #10 flat washer and a 10-32 nut. Position the end of the braid as shown in the Pictorial.
- (✓) Locate the sleeved braid coming from video circuit board mounting boss AE. Route this braid through the lower right front panel opening and position it as shown in the Pictorial.
- (✓) Push the flat keyboard cable through the lower right front panel opening and position it as shown.

**NOTE:** The free ends of the braids and the keyboard cable will be connected later.

Refer to Detail 6-2A for the next two steps.

- (✓) Loosen the CRT screw at CH and the 6-32  $\times$  3/8" hex head screw at AU on the left rear corner of the video circuit board heat sink. Do not remove the screws.
- (✓) Refer to the inset drawing on the Detail and insert the lower end of the CRT brace under the heat sink mounting screw at AU. Position the upper end of the brace under screw CH. Tighten both mounting screws.

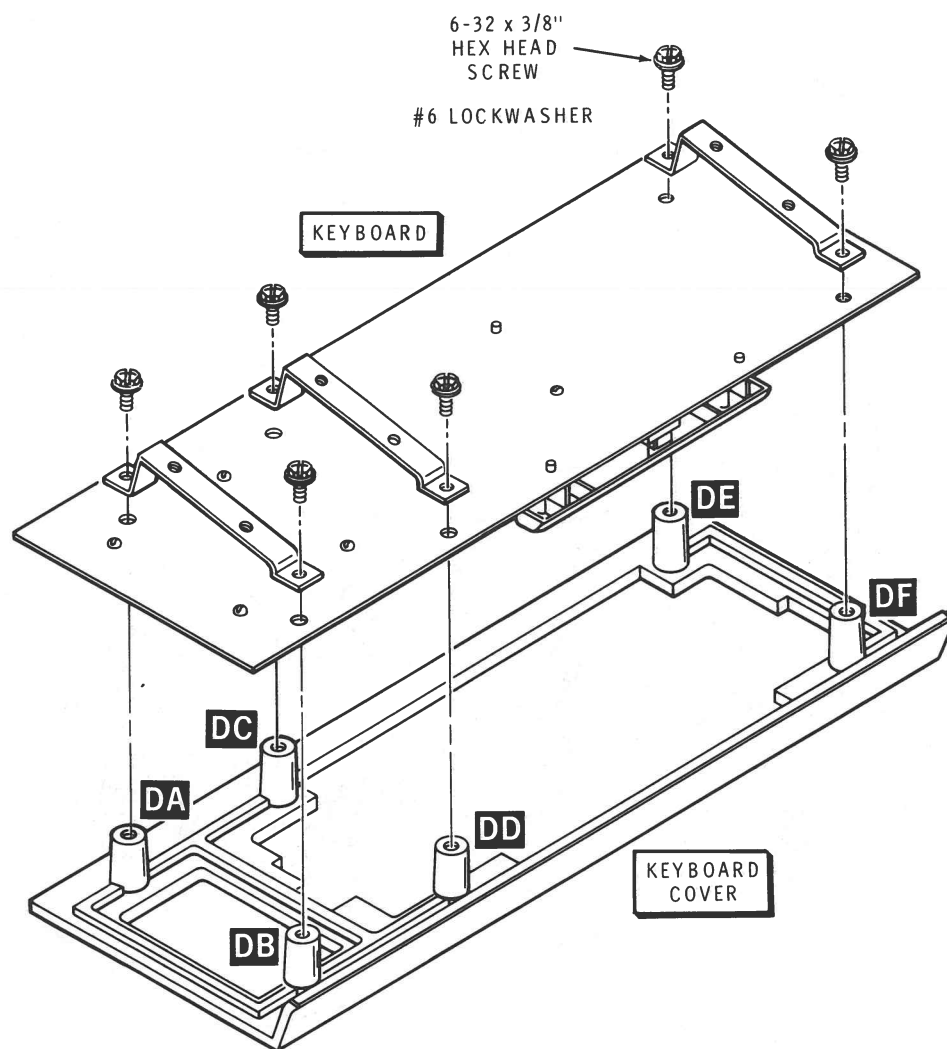
Set the cabinet base assembly aside temporarily and proceed to the "Keyboard Assembly."

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## KEYBOARD ASSEMBLY

Refer to Pictorial 6-4 for the following steps.

- (✓) Locate the keyboard cover and place it painted-side-down on a soft cloth as shown.
- (✓) As in previous steps, install brass inserts into the bosses at DA, DB, DC, DD, DE, and DF. Use the same method you used earlier.
- (✓) Place the keyboard assembly onto the keyboard cover as shown. Then mount a keyboard bracket at DE and DF with two 6-32 × 3/8" hex head screws. Tighten the screws finger tight.
- (✓) In the same manner, install brackets at DA and DB, and at DC and DD.
- (✓) Tighten all six screws until they are just snug.
- (✓) Turn the keyboard upright. Push all of the keys on the keyboard and check for freedom of movement. If any of the keys bind against the keyboard cover, loosen the bracket mounting screws slightly. Then carefully move the keyboard a small amount in the desired direction and again tighten the bracket hardware. Recheck the keys for movement.

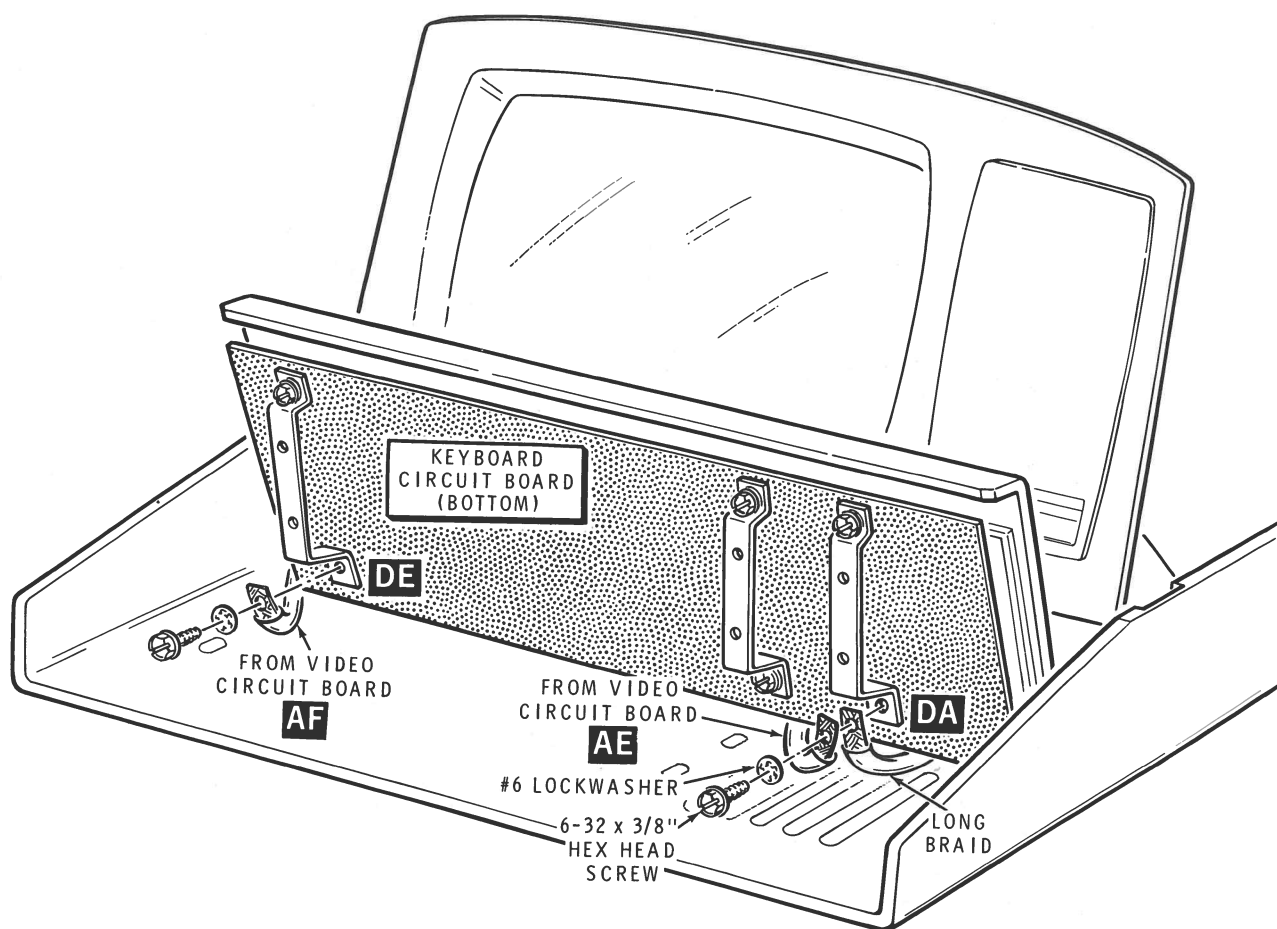


PICTORIAL 6-4

**KEYBOARD INSTALLATION**

Refer to Pictorial 6-5 for the following steps.

- ( ) 1. Temporarily remove the screws from the keyboard at DA and DE.
- ( ) 2. Position the keyboard onto the front of the cabinet base, tilted upward so the bottom of the circuit board is facing outward as shown.
- ( ) 3. At the left side of the keyboard, secure the end of the sleeved braid coming from AF to the keyboard bracket at DE with a #6 lockwasher and a 6-32 × 3/8" hex head screw.
- ( ) 4. In the same manner, at the other end of the keyboard, secure the end of the long braid and the end of the braid coming from AE to hole DA with a #6 lockwasher and a 6-32 × 3/8" hex head screw.

**PICTORIAL 6-5**

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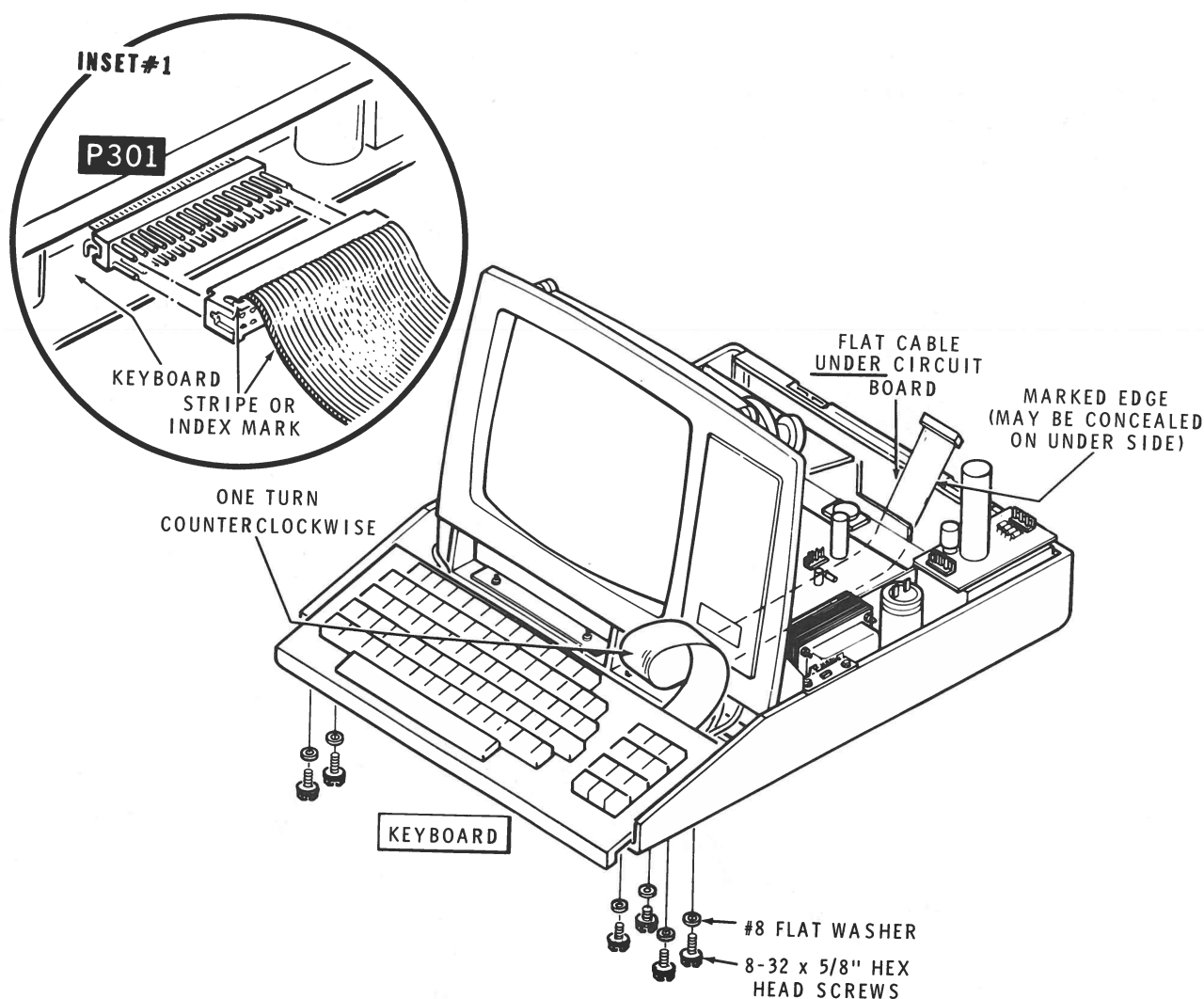
Refer to Pictorial 6-6 for the following steps.

( ) Rotate the keyboard assembly forward and position it as shown in the Pictorial.

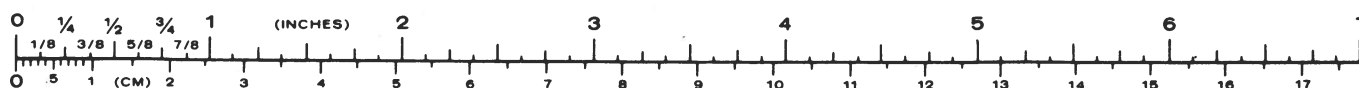
(✓) Refer to inset drawing #1 and identify the marked side of the wide flat keyboard cable. The marked side will have either a marked index (■) on one end of the socket or a stripe along the outside wire edge as shown. This cable is coming through the opening in the lower right of the front panel.

(✓) Twist the flat cable one full turn clockwise as shown in the Pictorial. Then refer again to inset drawing #1, and push the 34 pin plug on the identified end of the flat cable onto keyboard plug P301 as shown. Position the index-marked socket end or side identification wire as shown. NOTE: The cable stripe may not be visible from the top.

(✓) Secure the keyboard to the cabinet base with six 8-32 x 5/8" hex head screws and six #8 flat washers.

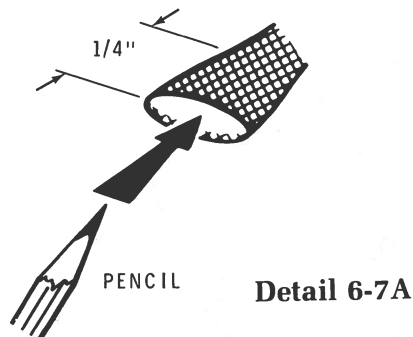


PICTORIAL 6-6



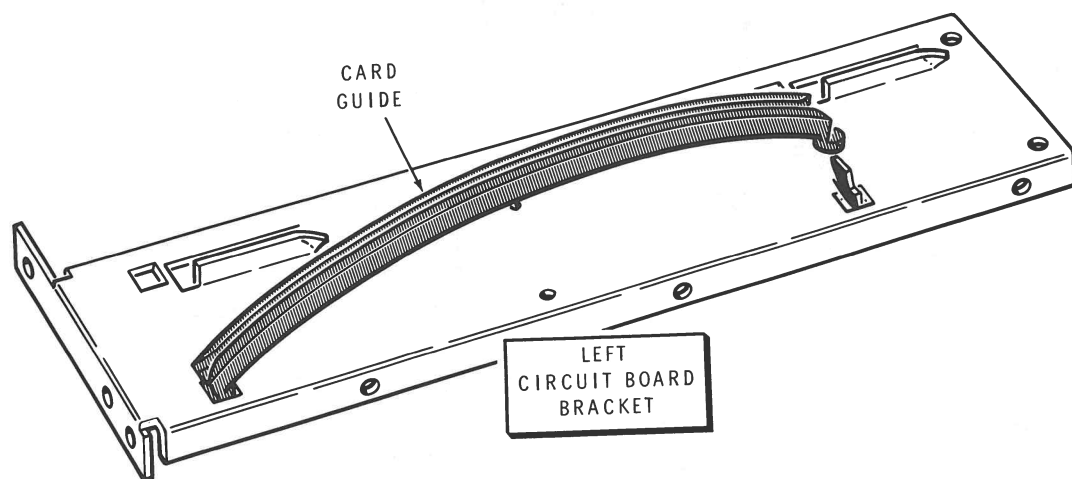
Refer to Pictorial 6-7 (Illustration Booklet, Page 12) for the following steps.

- (✓) Route the speaker wires along the video circuit board toward the rear panel and under the video circuit board heat sink.
- (✓) Locate the length of braid running forward from power transformer mounting foot DT. Pull upward on the slack in the braid and loop it over the top of the #10 solder lug on CRT mounting tab CF. Crimp the braid tightly around the end of the solder lug and solder the connection. NOTE: Leave as much of the **tip** of the solder lug exposed as possible.
- (✓) Refer to Detail 6-7A and, with the tip of a sharp pencil, force the end of the 6" braid (coming from CC) open. Push the open braid end onto the end of the solder lug at CF to which you connected the long braid in the previous step. Crimp and solder the braid to the lug.



Refer to Pictorial 6-8 (Illustration Booklet, Page 13) for the following steps.

- (✓) Refer to Detail 6-8A and install a card guide into the left circuit board bracket as shown. Position one end of a card guide into the bottom slot; then bow the center of the guide outward as you install the top mounting tab into its slot.
- (✓) In the same manner, install a card guide into the right circuit board bracket.
- (✓) Temporarily remove the video circuit board mounting screws at AU and AX.
- (✓) Refer to Detail 6-8B (Illustration Booklet, Page 13) and position the front flange on the right circuit board bracket under the right edge of the video circuit board heat sink as shown. Loosely secure the flange and the heat sink at AX with the screw previously removed.
- (✓) Loosely secure the rear of the circuit board bracket at AV with a 6-32 × 3/8" hex head screw. Then push a 6-32 × 3/8" hex head screw through hole 6 in the long braid and secure the braid and the bracket at hole AW.
- (✓) Tighten the three right circuit board bracket mounting screws.
- (✓) In the same manner, secure the left circuit board bracket at AU, AS, and AT with 6-32 × 3/8" hex head screws. At AT, secure the end of the short braid coming from the top left rear panel mounting screw.



## TERMINAL LOGIC CIRCUIT BOARD

Refer to Pictorial 7-1 (Illustration Booklet, Page 14) for the following steps.

- (✓) Position the terminal logic circuit board component side up on your work area as shown.
- (✓) If necessary, using diagonal cutters, cut and remove **pin 5** from 11-pin plug P401 as shown.
- (✓) Locate 3-pin plug P402 on the lower edge of the circuit board and, if it has not already been done, cut and remove center **pin 2** from the plug.
- (✓) Turn the circuit board over from side to side. Locate P404 on the left side of the board. Then, as in a previous step, cut and remove **pin 4** from the 15-pin plug.
- (✓) Turn the board over and position it as shown in the Pictorial.
- (✓) Position the large TLB shield under the board in such a manner that the larger cutout in the shield is directly under 15-pin plug P404 as shown.
- (✓) Loosely secure the terminal logic circuit board to the shield with fourteen 4-40  $\times$  1/4" hex head screws. Use a #3 solder lug and a #4 lockwasher at location LA as shown on the Pictorial. The mounting locations are indicated by heavy arrows.
- (✓) Position the small TLB shield near the center of the circuit board, and over the three indicated mounting holes as shown in the Pictorial. Secure the small shield with three 4-40  $\times$  3/4" hex head screws.
- (✓) Tighten all seventeen 4-40 mounting screws. Bend the solder lug at LA up slightly.

Refer to Pictorial 7-2 (Illustration Booklet, Page 15) for the following steps.

- (✓) Locate the wire harness 11-pin plug. Position this harness cable around the outside of the right circuit board bracket and out the rear of the cabinet base.
- (✓) Locate the 15-pin (small) plug coming from the rear panel D-connector. Position this plug and the wires out over the top of the rear panel.
- (✓) Locate the small plug with brown wires coming from the speaker. Route the wires around the outside of the right circuit board bracket and back toward the center of the cabinet base.
- (✓) Position the terminal logic circuit board, component side forward, down into the two card guide slots in the circuit board brackets as shown. Stop when the circuit board is approximately half the way down.
- (✓) Place the 3-hole connector shell with brown wires coming from the speaker onto the two-pin plug at P402 as shown.
- (✓) Locate the wide-flat cable coming from under the right rear corner of the video circuit board. Be sure to keep this cable marked lead toward the outside of the chassis as you connect it.
- (✓) Push the 34-pin connector straight upward onto circuit board plug P403 as shown in the Pictorial. NOTE: The striped edge may be on the underside of the cable — not visible from the top.



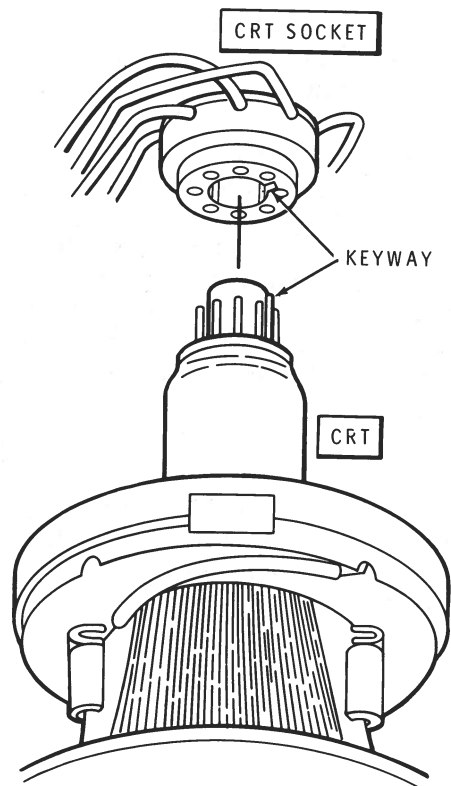
NOTE: In the next step, as you push the circuit board down, carefully pull forward and upward on the wide cable to keep it from under the edge of the circuit board.

- (✓) Push the terminal logic circuit board all the way down into the card guides.
- (✓) Route the harness cable with the 11-pin plug across the rear of the terminal logic circuit board, around the left circuit board bracket. Then, on the component side of the circuit board, in the upper left corner, push the 11-pin wire harness connector shell onto 11-pin plug P401. NOTE: Because of the "key" in the wire harness connector, this plug may be connected correctly in only one way.
- (✓) Push the push-on connector on the 2-conductor shielded cable onto solder lug LA as shown in the Pictorial. NOTE: If the push-on connector is not snug, carefully squeeze it just a little with pliers until it fits snugly.

Refer to Pictorial 7-3 (Illustration Booklet, Page 16) for the following steps.

- (✓) On the back of the circuit board, through the opening in the shield, plug the 15-pin connector shell coming from the rear panel D-connector onto circuit board plug P404. Note that the keyed connector shell will fit correctly in only one manner.
- (✓) Secure the upper corners of the circuit board to the circuit board brackets with two 6-32 × 3/8" hex head screws. Tighten the screws finger tight.
- (✓) Secure the sides of the circuit board shield to the two circuit board brackets with six 6-32 × 3/8" hex head screws. Tighten the screws finger tight.
- (✓) Tighten all eight circuit board and shield mounting screws securely, starting with the top two circuit board screws.

Proceed to "CRT Adjustments."



Detail 8-1A

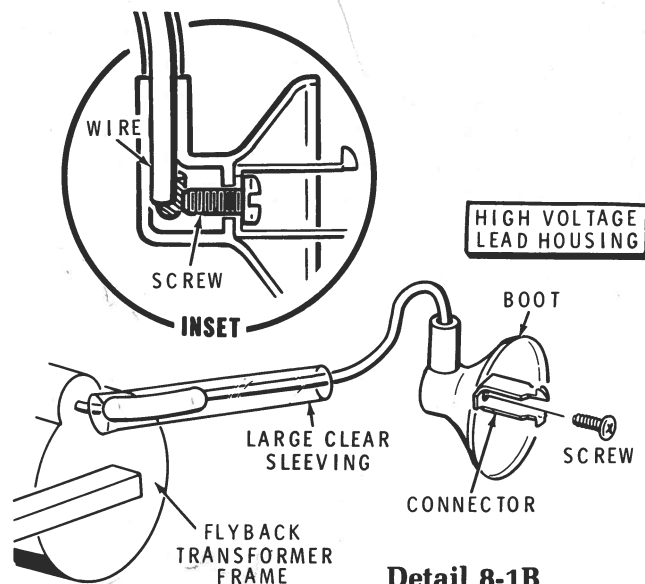
## CRT ADJUSTMENTS

Refer to Pictorial 8-1 (Illustration Booklet, Page 17) for the following steps.

- (✓) Push the 4-hole socket with the blue and red wires onto plug P204 on the video circuit board.
- (✓) Push the 4-hole socket with the brown and yellow wires onto plug P201 on the video circuit board.
- (✓) Push the 10-hole socket coming from the flyback transformer onto plug P203 on the video circuit board.

**WARNING:** It is extremely important that the black GND wire, that you will connect in the next step, always be connected whenever the unit is in operation. To apply power to the unit without this wire connected will result in a very dangerous high voltage situation.

- (✓) Push the connector on the end of the black GND wire onto CRT ground connector at CE.
- (✓) Remove and discard the plastic pin protector from the CRT pins.



Detail 8-1B

- (✓) Refer to Detail 8-1A and line up the keyway in the CRT socket with the key on the CRT. Then carefully push the socket onto the CRT.
- (✓) Temporarily connect one end of the remaining black wire to the solder lug at CE. Then touch the other end of this wire to the anode socket on the CRT to discharge any stored-up charge. Then remove the wire. See Detail 8-1C.

Refer to Detail 8-1B for the next four steps.

- (✓) 1. Remove the screw and connector from the high voltage lead housing.
- (✓) 2. Pull the high voltage lead out of the lead housing.
- (✓) 3. Slide the length of large clear sleeving over the high voltage lead. Position the sleeving down to the flyback transformer.

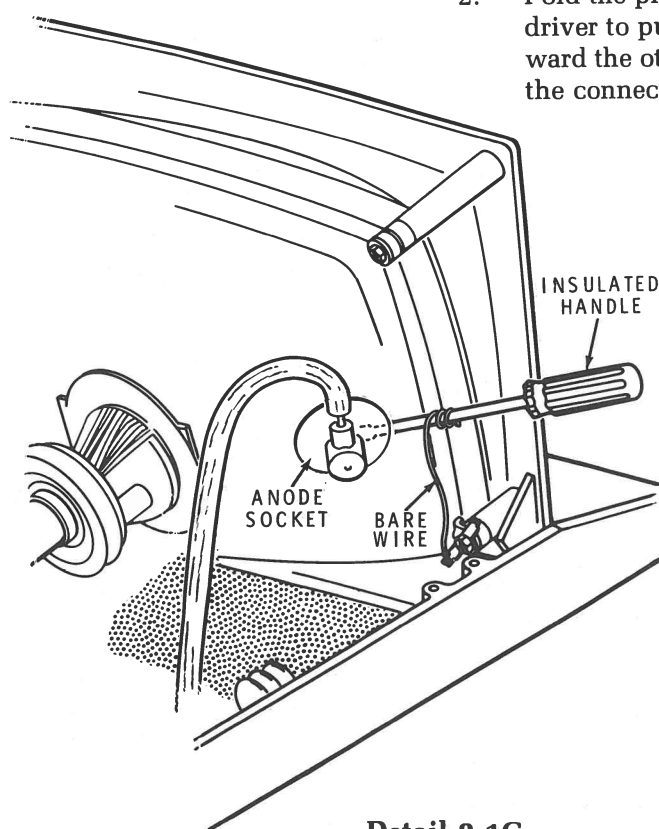
NOTE: When you reinstall the high voltage lead in the next step, position the bare wire so that the screw will make contact with the wire when it is reinstalled. See the inset drawing on Detail 8-1B.

- (✓) 4. Insert the high voltage lead into the housing as far as it will go. Then reinstall the connector and screw.
- (✓) Refer to the inset drawing on Pictorial 8-1 and install the high voltage lead in the anode socket. Position the lead housing so the lead is up (exits toward the top of the CRT). Make sure this lead is positioned away from the CRT brace.

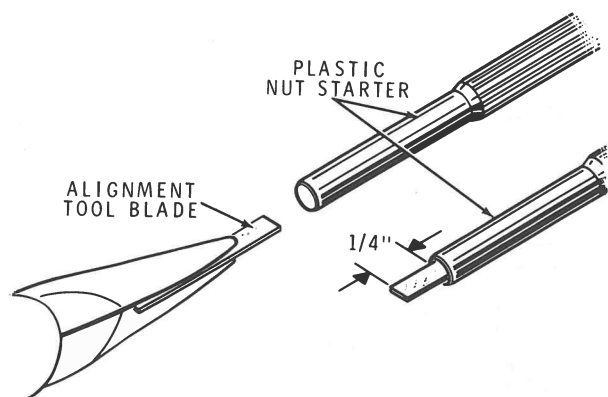
**WARNING:** When the Video Terminal power is on, the voltage on the high voltage lead is very high (especially next to the high voltage transformer) and will arc to any other wires near it. Refer to Pictorial 8-1 and position all other leads away from the high voltage lead and the high voltage transformer.

**NOTE:** If it ever becomes necessary to remove the high voltage lead from the CRT, refer to Detail 8-1C and proceed as follows:

1. First discharge the CRT. This is important, since the high voltage present at the CRT anode is dangerous. Connect one end of a wire to the solder lug at CE, and connect the other end to a small-blade screwdriver. Then slip the screwdriver under the plastic housing on the high voltage connector to make contact with the anode socket. **CAUTION:** Do not touch anything with your other hand while you perform this step.
2. Fold the plastic housing back and use a screwdriver to push one of the high voltage clips toward the other. This will permit you to remove the connector.



**Detail 8-1C**



Detail 8-1D

- (✓) Refer to Detail 8-1D and push the alignment tool blade into the small end of the nut starter. Leave 1/4" of the blade protruding as shown. Use this tool to turn circuit board controls.

## VIDEO ADJUSTMENTS

- (✓) Set rear panel BRIGHTNESS control R1 to its full clockwise rotation as viewed from the rear of the cabinet base.
- (✓) Set the five controls on the video circuit board to their centers of rotation.
- ( ) On the terminal logic circuit board, set switch slider #2 on S402 to its "1" position. (See Pictorial 7-1, Illustration Booklet, Page 14.)

NOTE: When power is applied to the Video Terminal circuits, avoid contact with the flyback transformer, the high voltage lead, or the anode socket in the back of the CRT, as it is possible to receive an electrical shock from these areas. Also, to lessen the chances of an electrical shock while you are making adjustments, keep your other hand away from the Video Terminal and all other metallic objects.

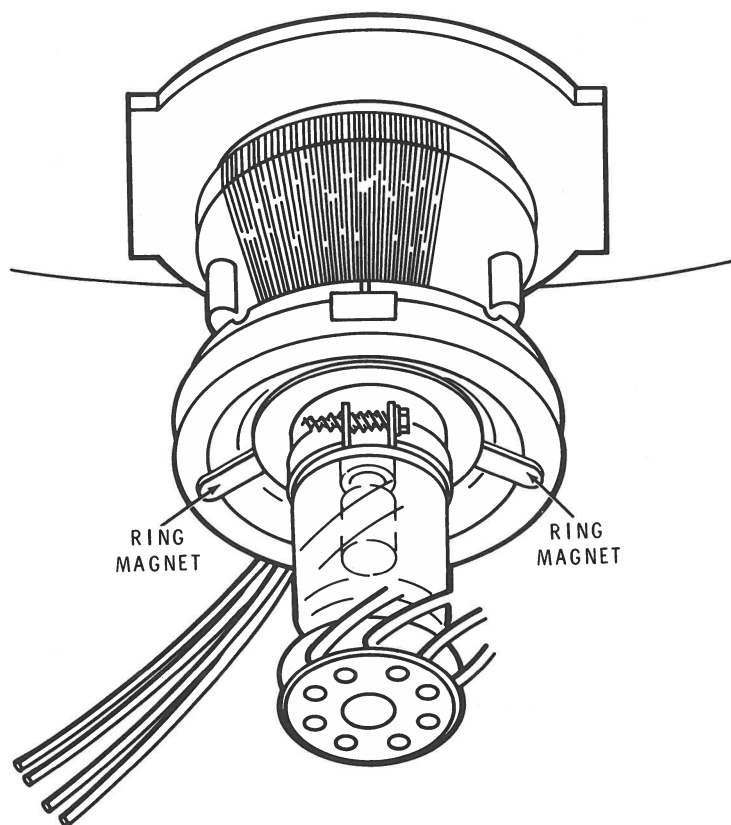
CAUTION: Whenever you turn the power on, make sure you wait at least 30 seconds or until you get a cursor or light raster on the screen before you turn the power off again. A quick turn on and off can cause damage to the CRT.

- ( ) Connect the line cord to an AC outlet and set the POWER switch to ON.

- (✓) After a short warm-up time, a light raster (an illuminated rectangular area) should appear on the screen. If it does not, adjust control G1 (R262) counterclockwise, as viewed from the left side, to cause the raster to appear. NOTE: The raster may be slanted at this time.
- (✓) Grasp the yoke on the back of the CRT and slowly turn the yoke to properly line up the raster on the screen, so the top and bottom edges are as horizontal as possible.
- (✓) Adjust VERT SIZE control R219 (on the video circuit board) so the display is approximately 6" high.
- (✓) Refer to Pictorial 8-2 and rotate the ring magnets on the back of the yoke to center the display on the screen.
- ( ) Adjust rear panel BRIGHTNESS control R1 to obtain the brightness that is most suitable to you.

NOTE: If the cursor (small dashed line) is approximately 1/8" long and positioned near the upper left, disregard the next step. If the cursor is longer and not at the left side of the screen, proceed with the next step.

- (✓) Turn HORIZ CENTERING control R246 (on the video circuit board) counterclockwise, as viewed from the left side, until the cursor moves all the way left and then just begins to move right again. Then turn the control counterclockwise until the cursor is positioned approximately 1/4" in from the left edge of the raster.
- (✓) Set the OFF LINE and CAPS LOCK keys to their down position.
- ( ) Hold the "Z" key and the REPEAT key down and fill the screen with characters.
- (✓) Adjust HORIZ CENTERING control R246 on the video circuit board to center the display horizontally.
- (✓) Adjust VERT LINEARITY control R223 on the video circuit board so the top and bottom row of characters are of uniform size.



PICTORIAL 8-2

NOTE: The next adjustment should be made in a darkened room.

- (✓) Turn control G1 (R262) on the video circuit board clockwise (as viewed from the left) until the raster just disappears.
- (✓) If the display width is not approximately 8-1/2", use the alignment tool and adjust WIDTH coil (L203) to correct the width.
- (✓) Adjust rear panel BRIGHTNESS control R1 to obtain the brightness which is most suitable to you.
- (✓) Adjust FOCUS control R264 (on the video circuit board) for the best focus.
- (✓) Recheck the display for proper alignment of the screen. If necessary, rotate the yoke a small amount. Then tighten the yoke clamp screw only enough to hold the yoke from turning.
- (✓) Set the POWER switch to OFF and disconnect the line cord.
- (✓) Set slider #2 of switch S402 on the logic circuit board to its "0" position.

This completes the video adjustments. Proceed to "Final Assembly."

## POSSIBLE CIRCUIT BOARD PROBLEMS

**NOTE: Disregard this section unless you have a problem on a circuit board.**

The components listed in the "Possible Area of Trouble" column only indicate an area. This means that the component or part of the circuit associated with this component may be faulty. The causes of trouble most often found are listed below. Check these possibilities carefully.

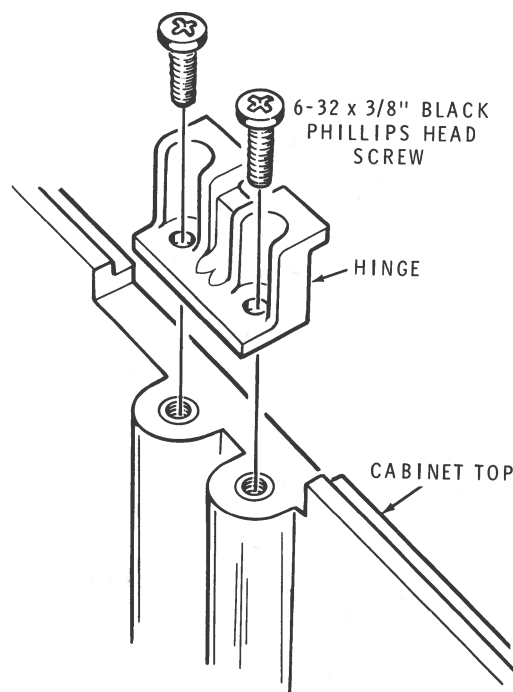
1. Solder bridges between two different foil pads. If the solder is bridged between two connections on the same foil, it is all right.
2. Diodes installed backward. Some diode bands are difficult to see. A diode that is installed backward will not operate properly.
3. Transistors installed backward. A transistor that is installed backward will not operate properly.
4. Diodes or transistors installed in the wrong location. Refer back to the steps where these components were installed and check the part numbers.
5. Electrolytic capacitors installed backward. Make sure that the positive (+) or negative (-) marks on the capacitor correspond to the markings on the circuit board.
6. IC's incorrectly installed in their sockets. An IC pin may be bent under the IC instead of inserted into the socket hole. An IC that is installed backward will not operate properly.
7. Capacitors (mica, ceramic or Mylar) may be the wrong value. For instance, it is easy to install a 500 pF capacitor in place of a .005  $\mu$ F.

If you can not resolve your problems here, refer to the "In Case of Difficulty" section in the "Operation Manual."

## FINAL ASSEMBLY

Refer to Pictorial 9-1 (Illustration Booklet, Page 17) for the following steps.

- (✓) Refer to inset drawing #1 on the Pictorial. Remove the paper backing from the blue and white label and press the label vertically in place on the right rear corner of the cabinet base. NOTE: Be sure to refer to the Model and Series numbers on the blue and white label in any correspondence you have with the Heath Company about your kit.
- (✓) Sign and date the FCC label on the indicated line. Then remove the paper backing and press the label in place on the outside center of the cabinet top back panel as shown in inset drawing #2 on Pictorial 9-1.
- (✓) Install six brass inserts in the cabinet top: two at EA, two at EB, one at EC, and one at ED.
- (✓) Apply Vibra-Tite to the inside threads of the inserts at EC and ED.
- ( ) Refer to Detail 9-1A and mount a hinge to the cabinet top at EA. Use two 6-32 × 3/8" black phillips head screws.
- ( ) In the same manner, mount a hinge to the cabinet top at EB.
- ( ) Turn a latch pin into the cabinet top at EC until it is tight.
- ( ) In the same manner, turn a latch pin into the cabinet top at ED.



Detail 9-1A

- (✓) Position the cabinet top over the cabinet base and lower the cabinet hinges into the slots in the rear panel on the base.
- (✓) Lower the front of the cabinet top so that the latch pins enter the holes in the locking plates. The pins should lock into place.
- (✓) Remove the protective paper backing from the "Heathkit" label. Then press the label onto the lower bottom of the panel insert on the front panel.

This completes the assembly of your Video Terminal. Proceed to the Operation Manual.





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- Be sure to follow instructions carefully.
- Use a separate letter for all correspondence.
- Please allow 10 - 14 days for mail delivery time.

**DO NOT WRITE IN THIS SPACE****INSTRUCTIONS**

- Please print all information requested.
- Be sure you list the correct **HEATH** part number exactly as it appears in the parts list.
- If you wish to prepay your order, mail this card and your payment in an envelope. Be sure to include 10% (25¢ minimum, \$3.50 maximum) for insurance, shipping and handling. Michigan residents add 4% tax.

Total enclosed \$\_\_\_\_\_

- If you prefer COD shipment, check the COD box and mail this form. COD ☐

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ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

The information requested in the next two lines is not required when purchasing nonwarranty replacement parts, but it can help us provide you with better products in the future.

Model # \_\_\_\_\_ Invoice # \_\_\_\_\_  
Date \_\_\_\_\_ Location \_\_\_\_\_  
Purchased \_\_\_\_\_ Purchased \_\_\_\_\_

LIST <b>HEATH</b> PART NUMBER	QTY.	PRICE EACH	TOTAL PRICE

TOTAL FOR PARTS

HANDLING AND SHIPPING

MICHIGAN RESIDENTS ADD 4% TAX

TOTAL AMOUNT OF ORDER

SEND TO: **HEATH COMPANY**  
BENTON HARBOR  
MICHIGAN 49022  
**ATTN: PARTS REPLACEMENT**

Phone (Replacement parts only): 616 982-3571

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Total enclosed \$\_\_\_\_\_

- If you prefer COD shipment, check the COD box and mail this form. COD ☐

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CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

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Date \_\_\_\_\_ Location \_\_\_\_\_  
Purchased \_\_\_\_\_ Purchased \_\_\_\_\_

LIST <b>HEATH</b> PART NUMBER	QTY.	PRICE EACH	TOTAL PRICE

TOTAL FOR PARTS

HANDLING AND SHIPPING

MICHIGAN RESIDENTS ADD 4% TAX

TOTAL AMOUNT OF ORDER

SEND TO: **HEATH COMPANY**  
BENTON HARBOR  
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**ATTN: PARTS REPLACEMENT**

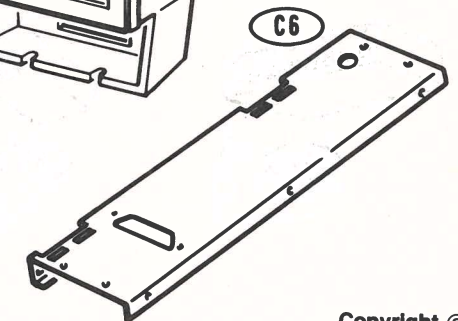
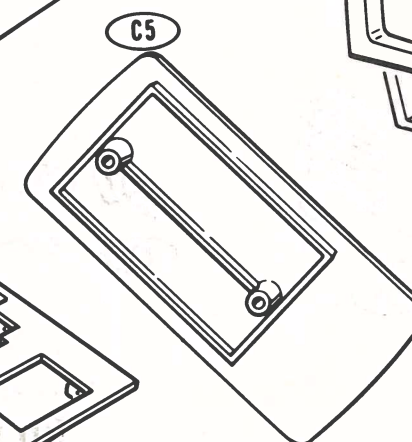
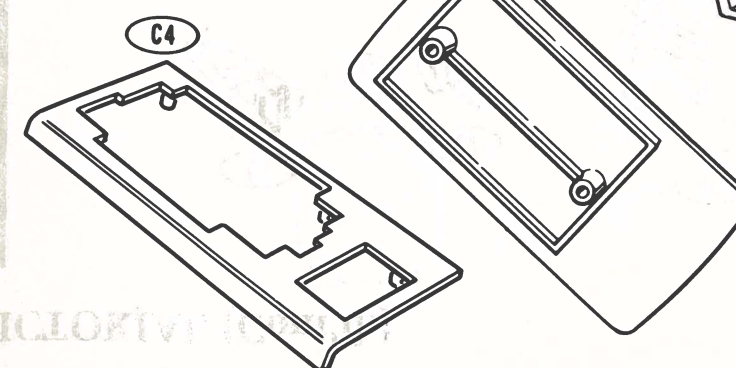
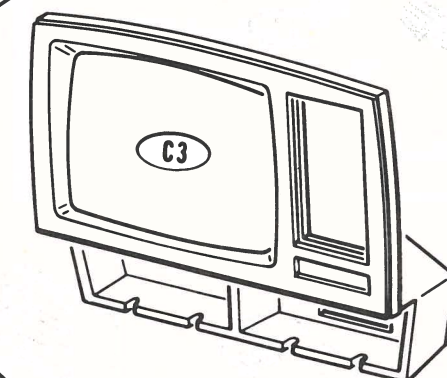
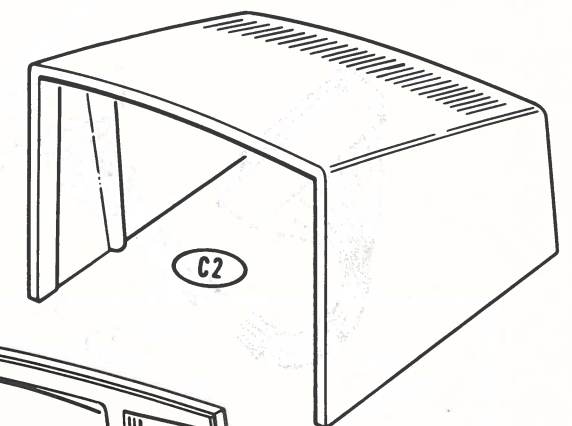
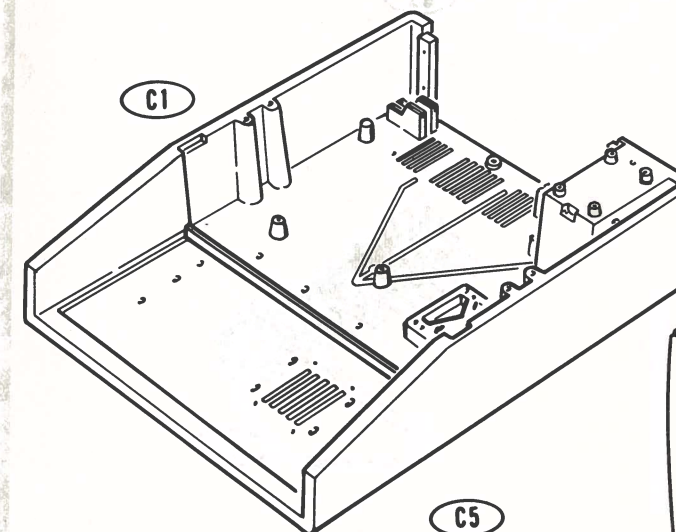
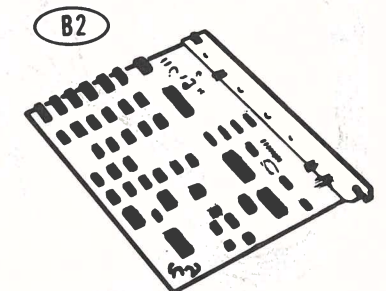
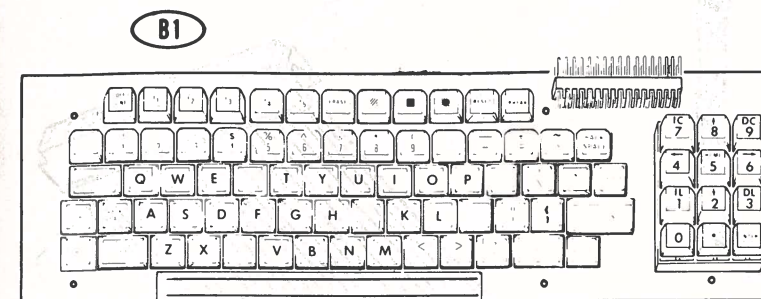
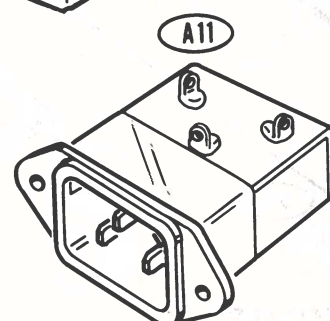
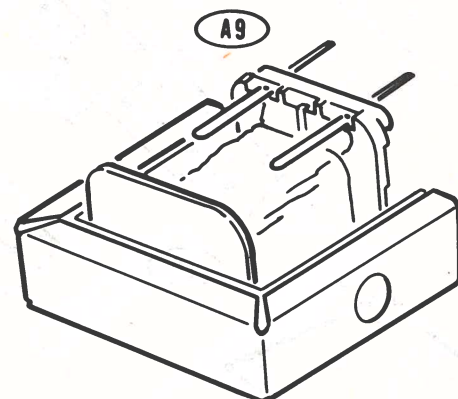
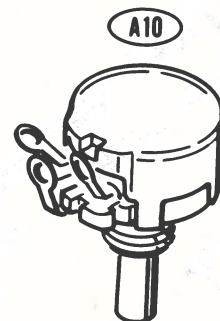
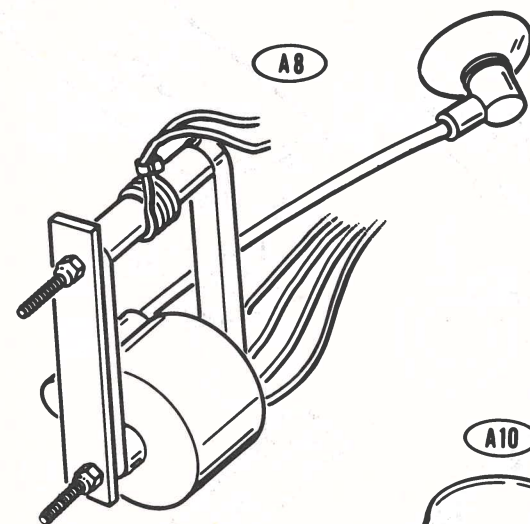
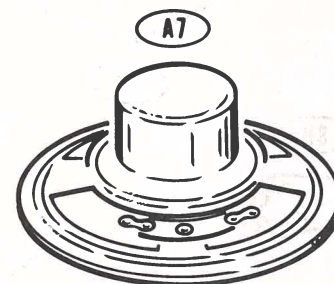
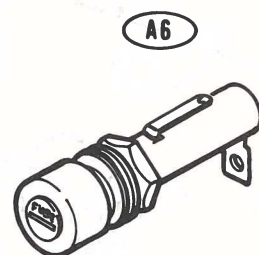
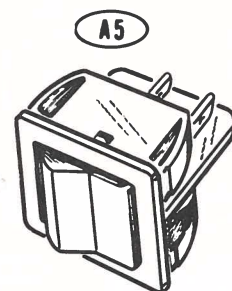
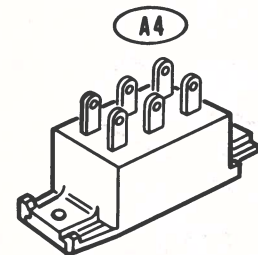
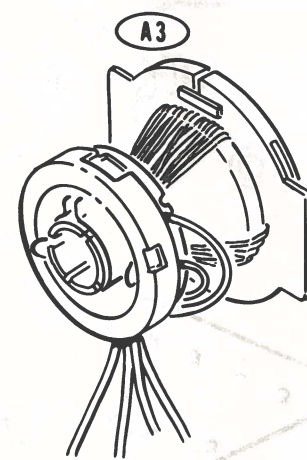
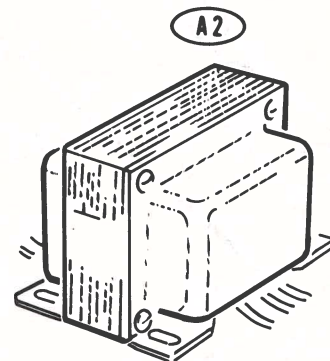
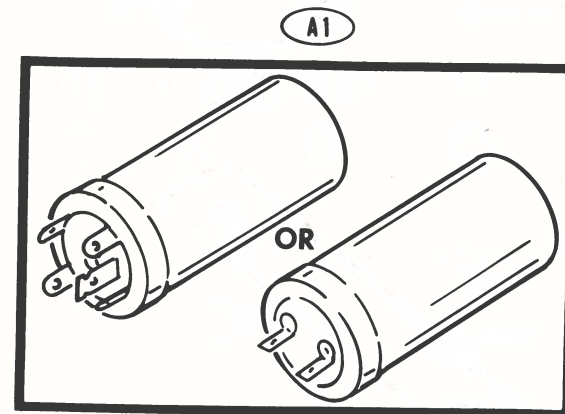
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# ILLUSTRATION BOOKLET

Part of 595-2594-03

## CHASSIS PARTS PICTORIAL

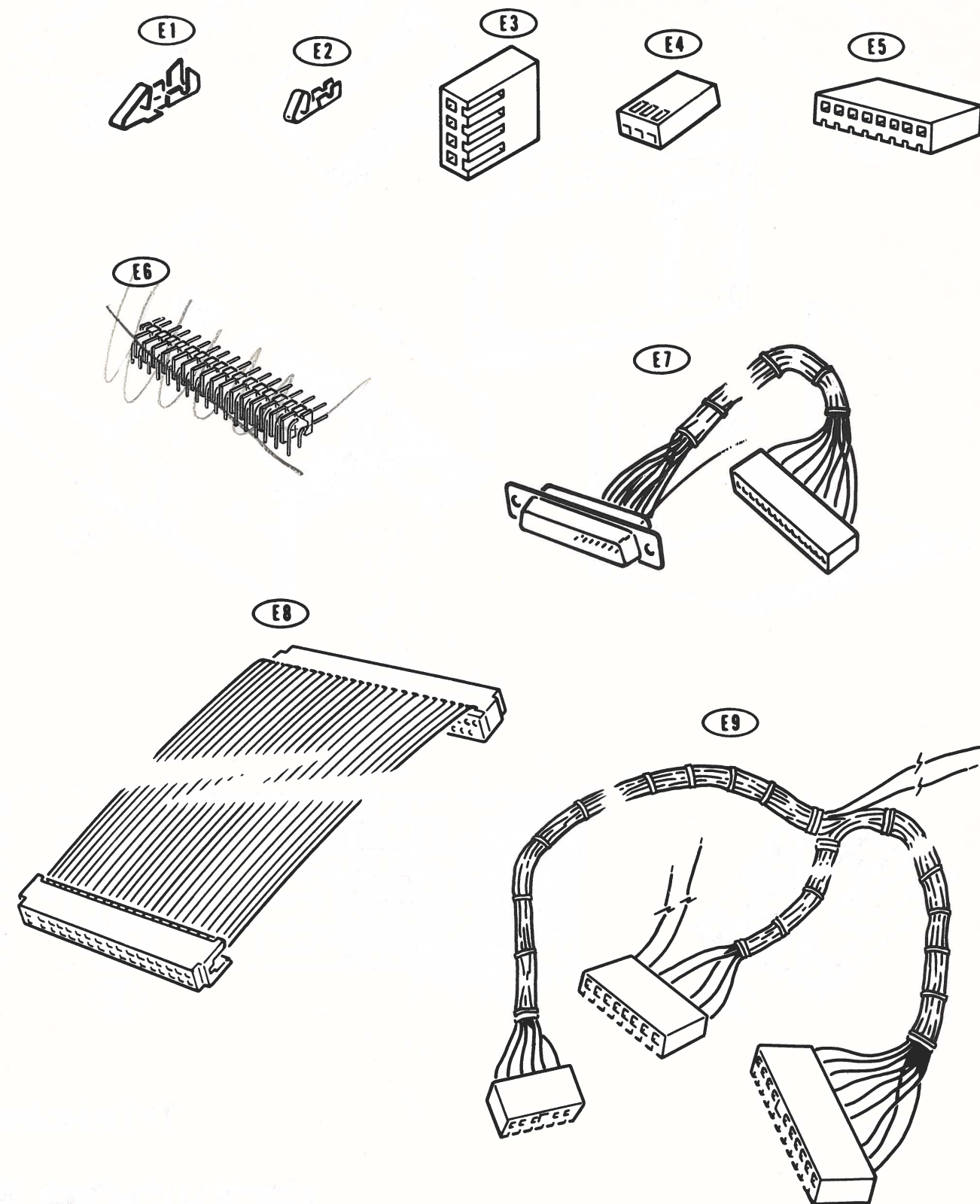
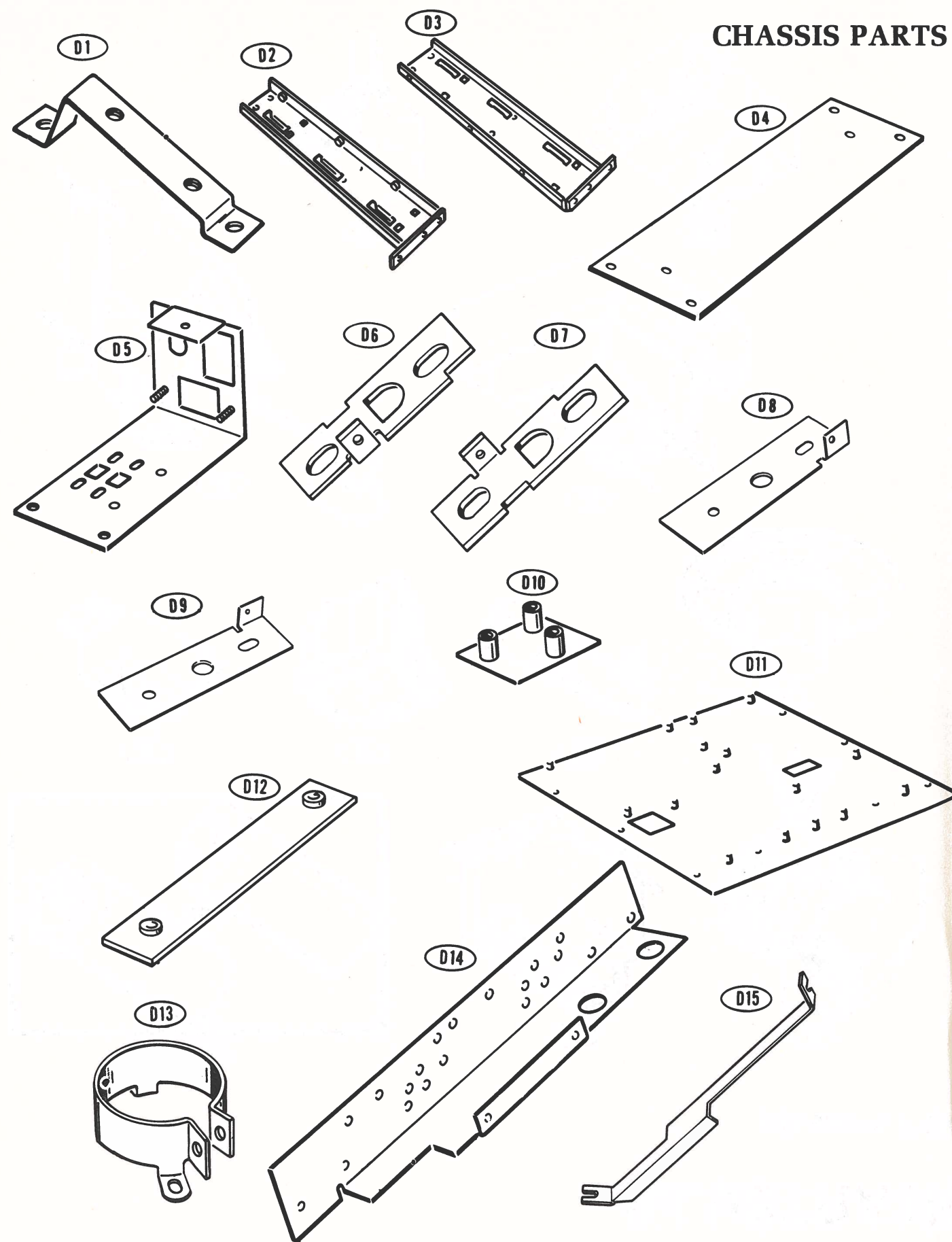


Model H-19A Assembly

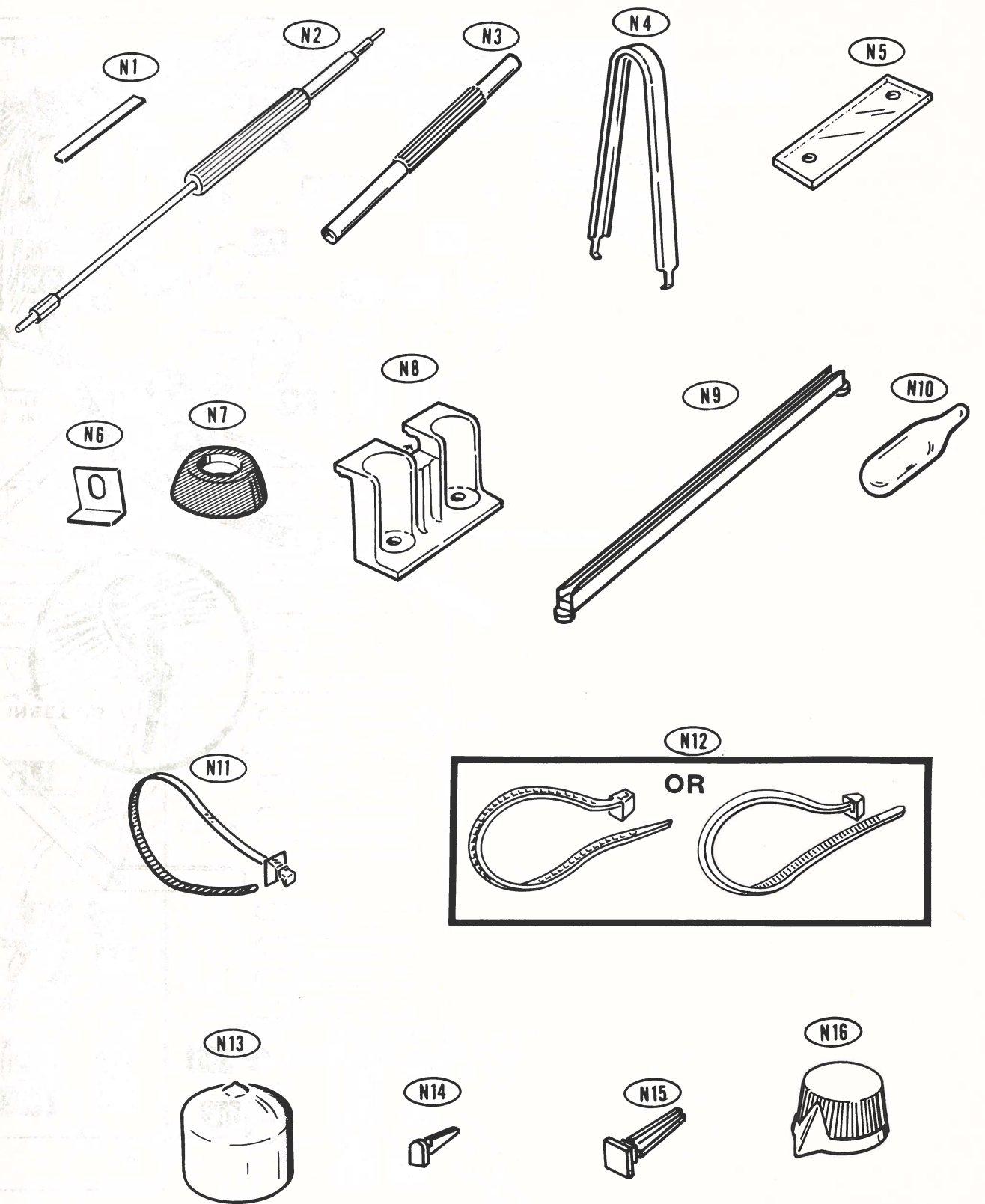
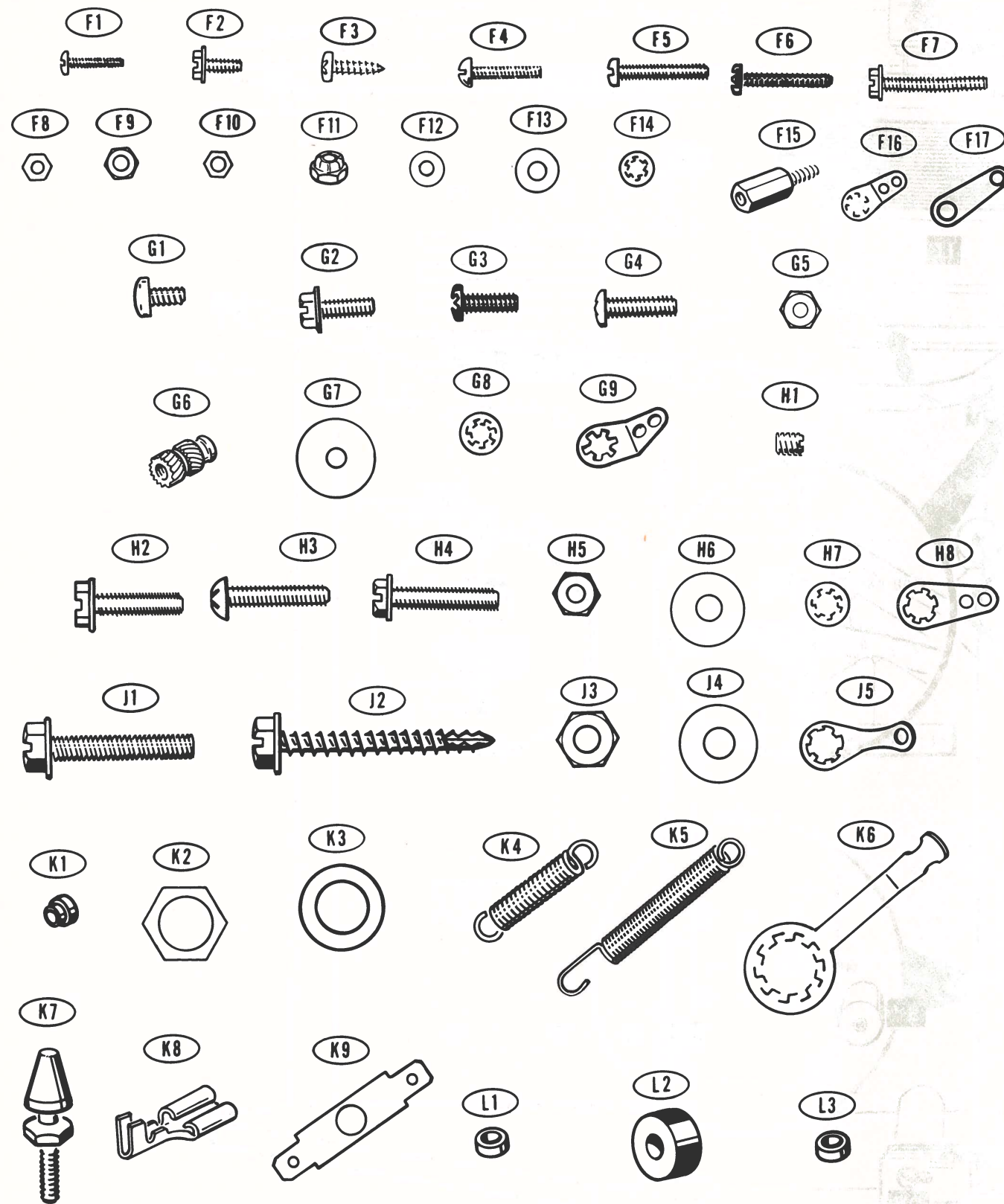
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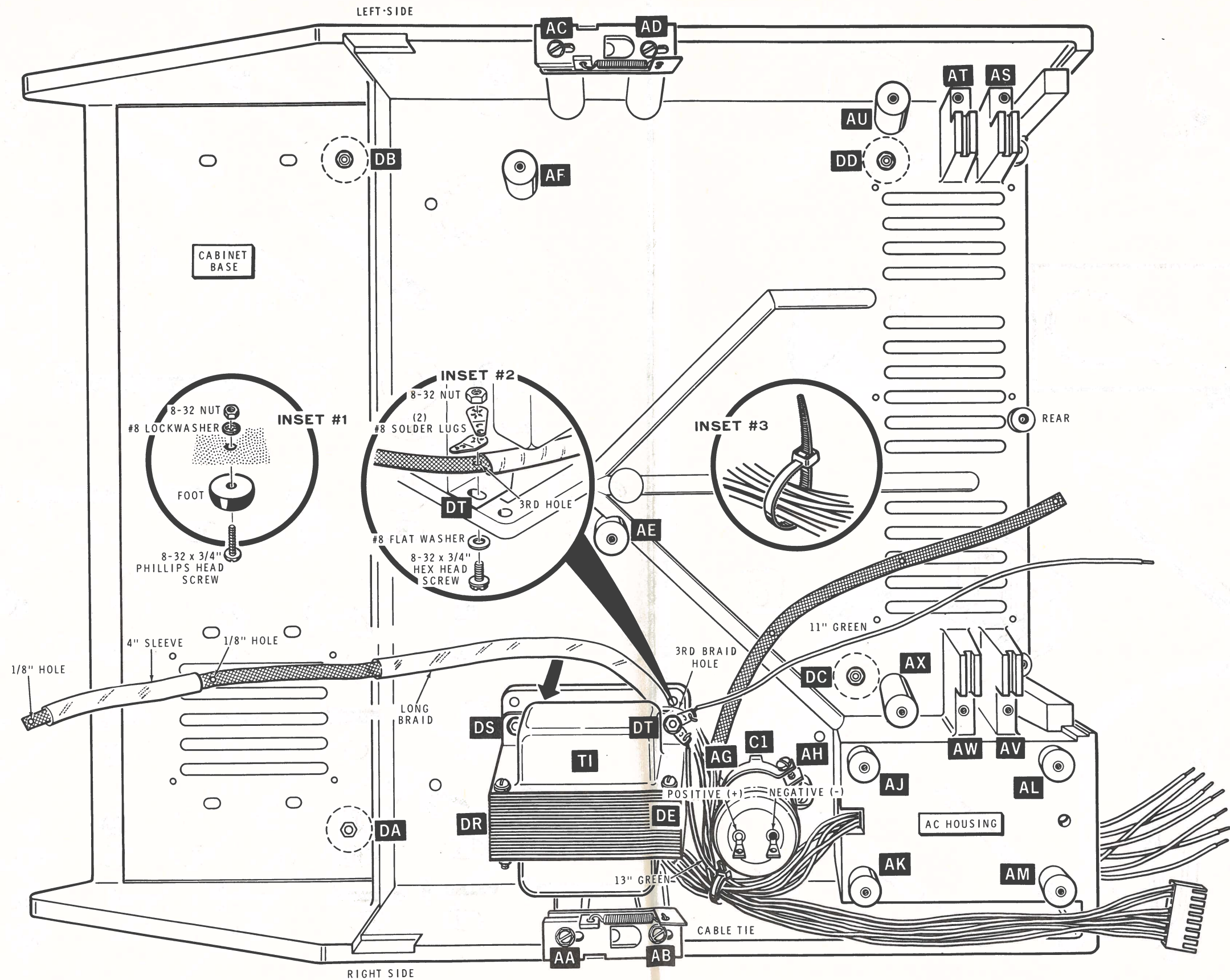
# CHASSIS PARTS PICTORIAL (Cont'd.)



## CHASSIS PARTS PICTORIAL (Cont'd.)

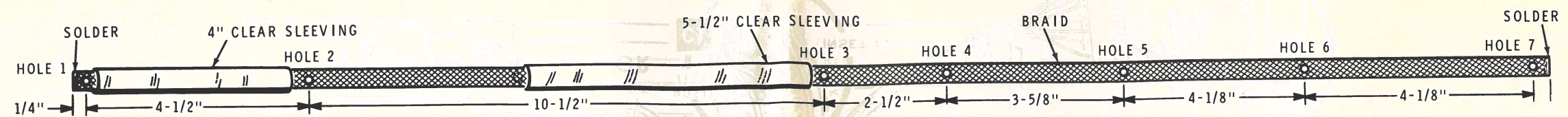




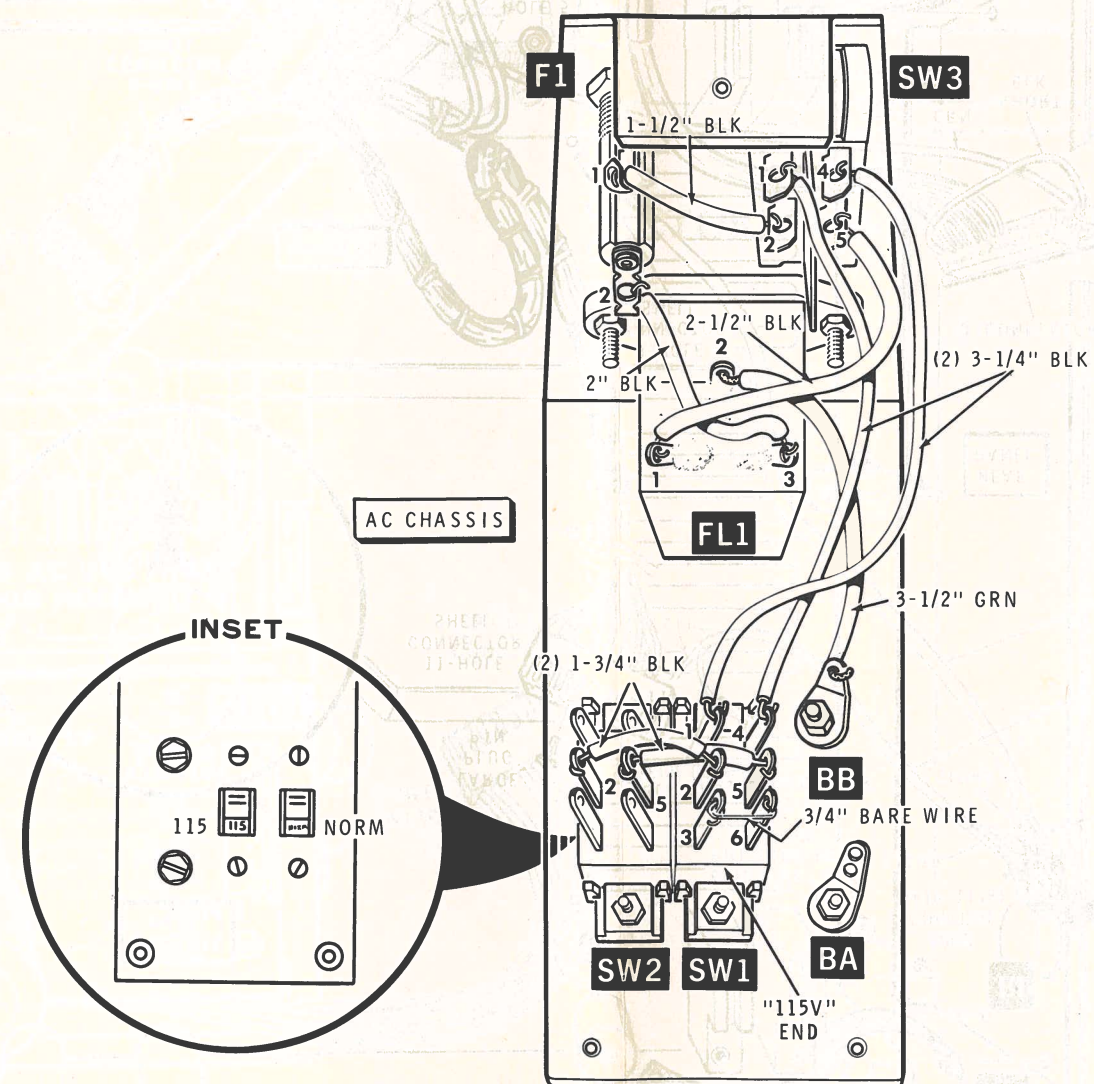


PICTORIAL 1-1



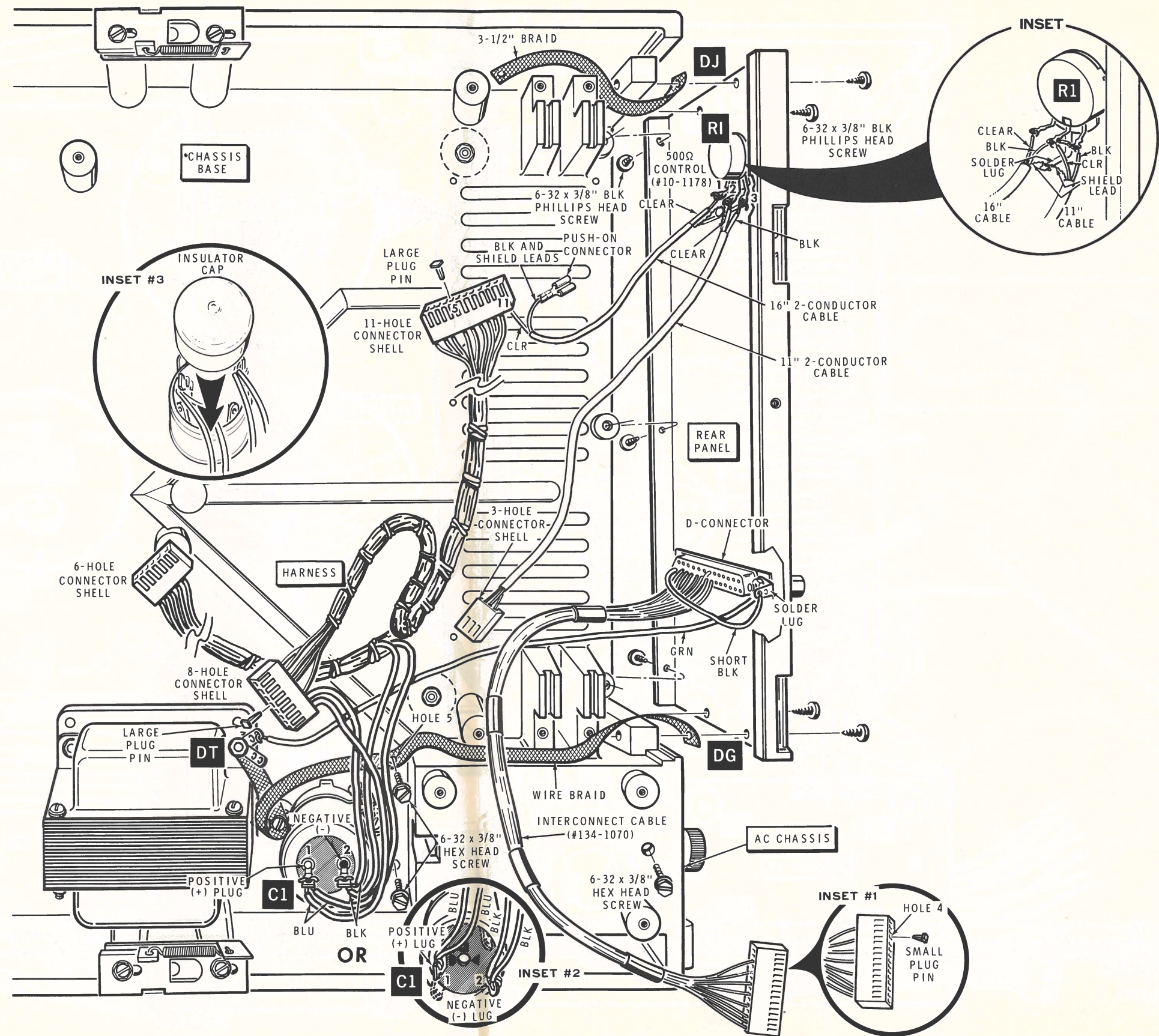


Detail 1-1H



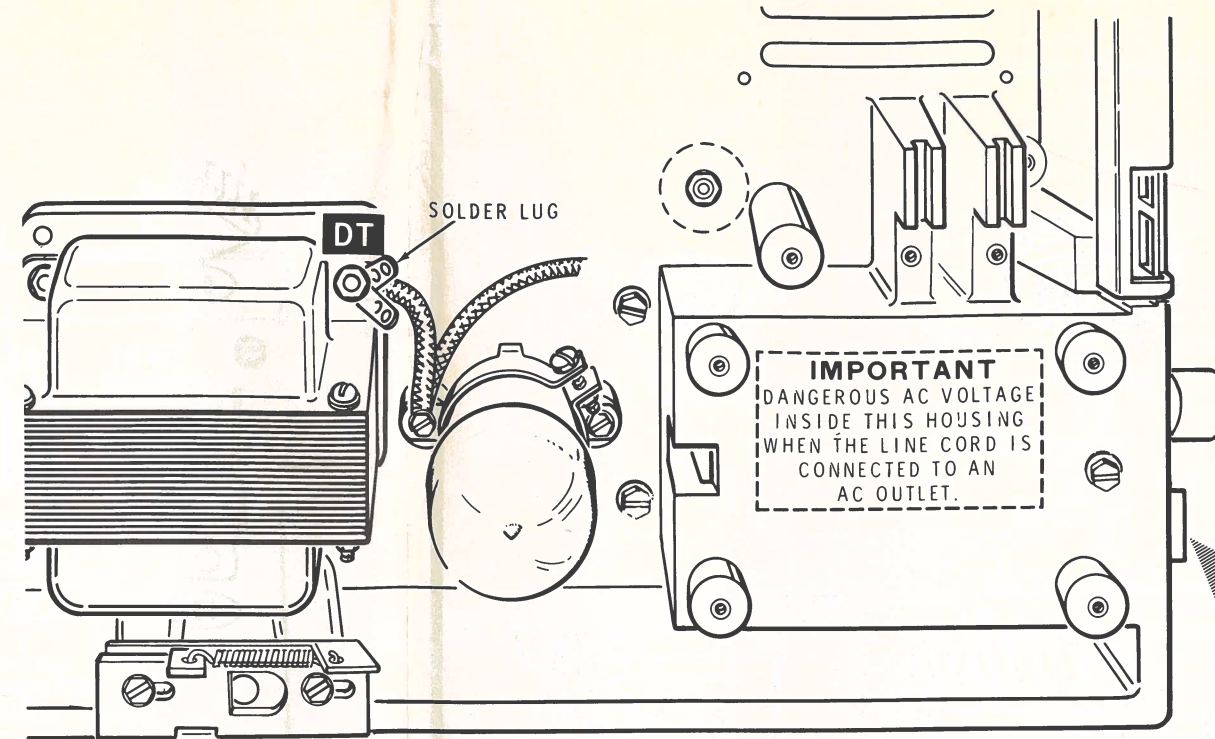
PICTORIAL 1-3



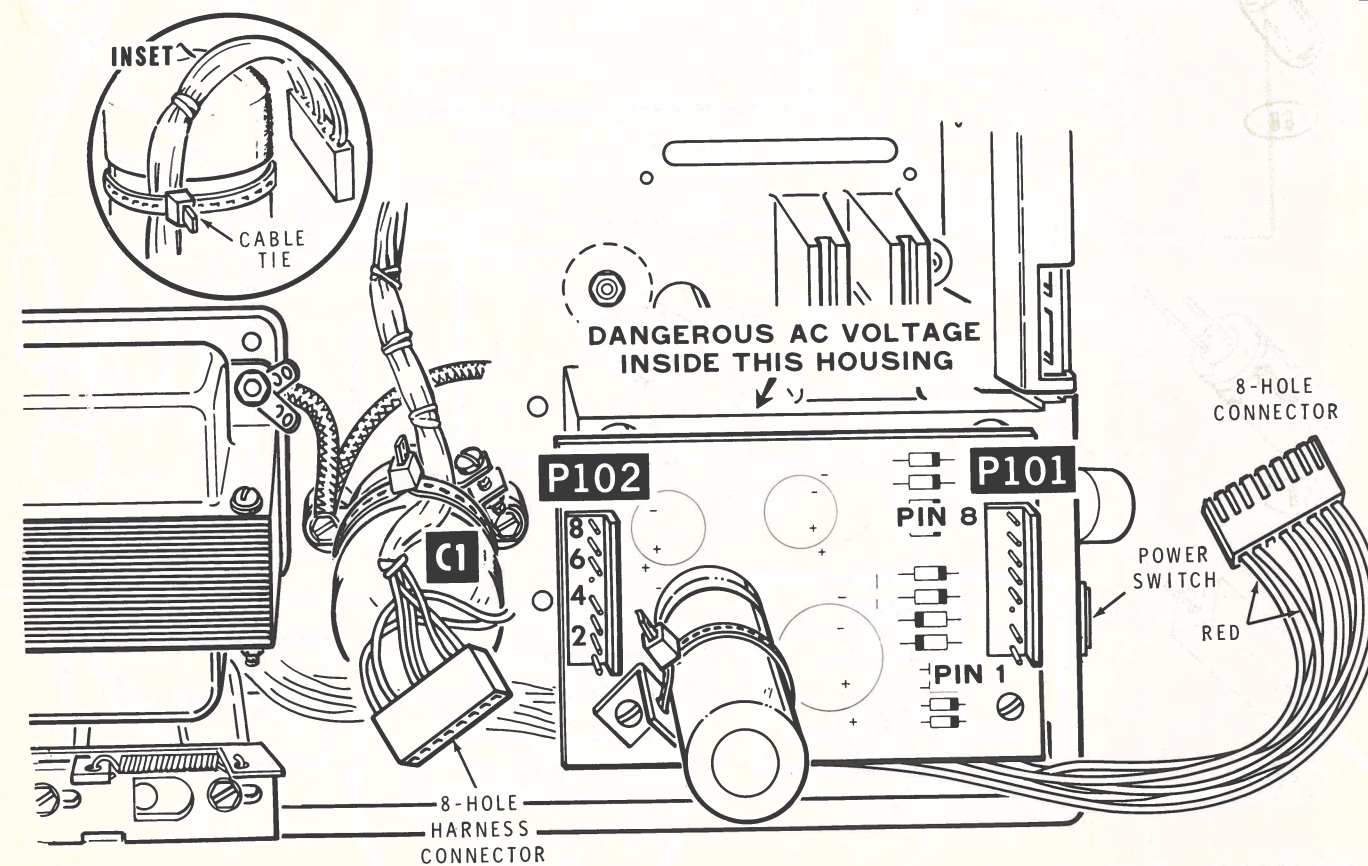


PICTORIAL 1-5

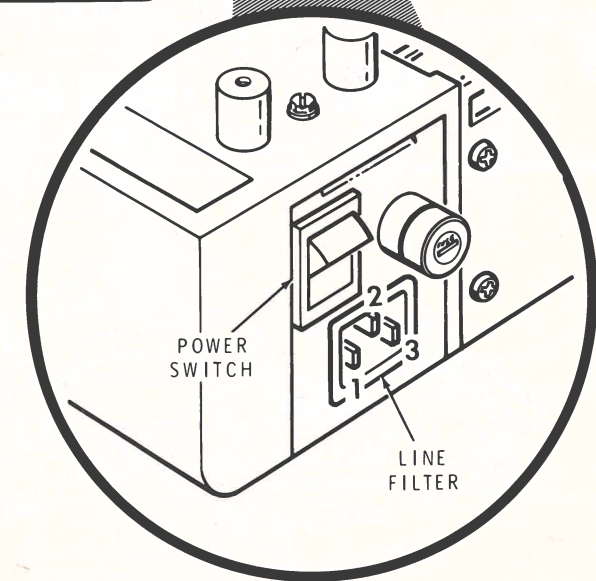




PICTORIAL 3-1

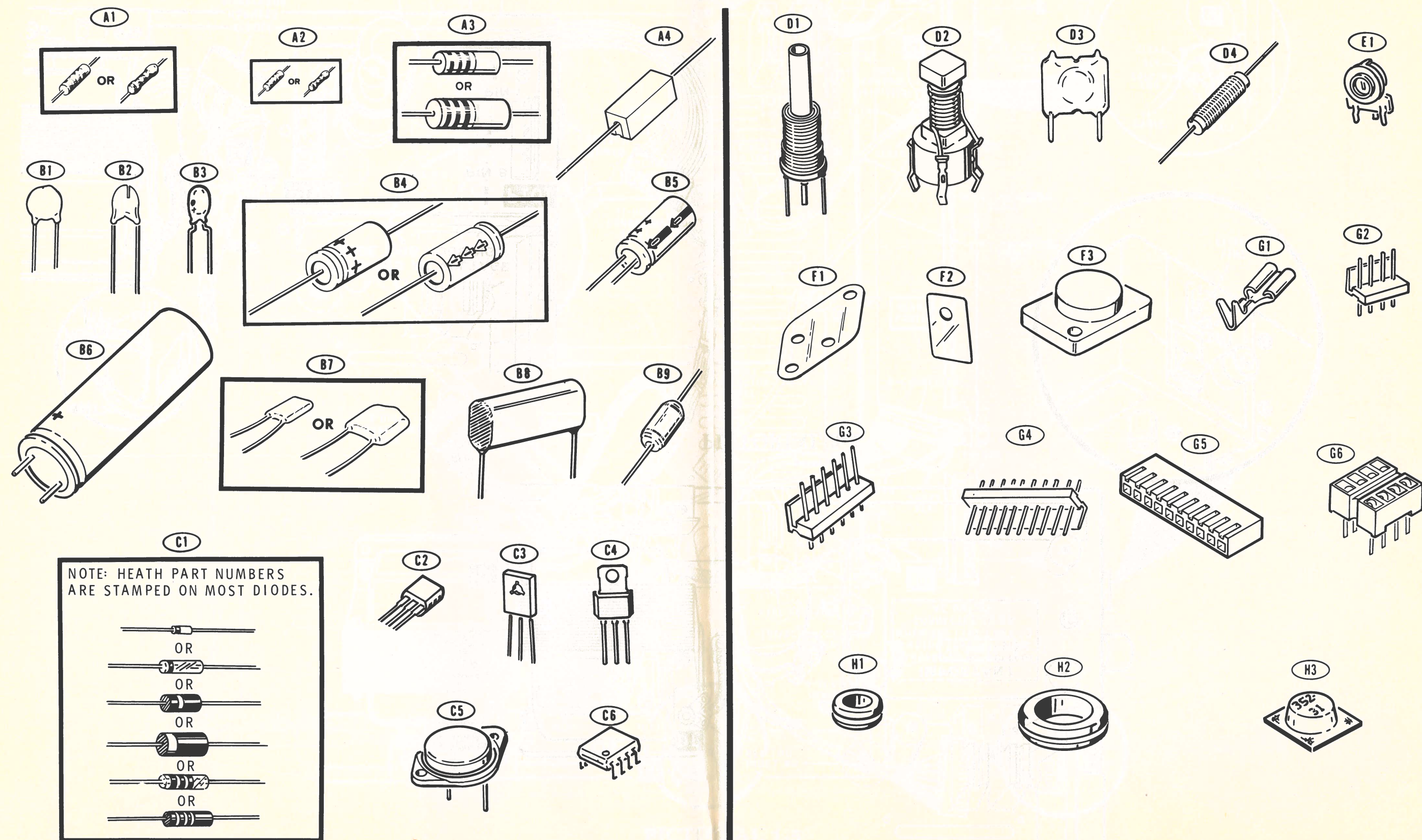


PICTORIAL 3-2

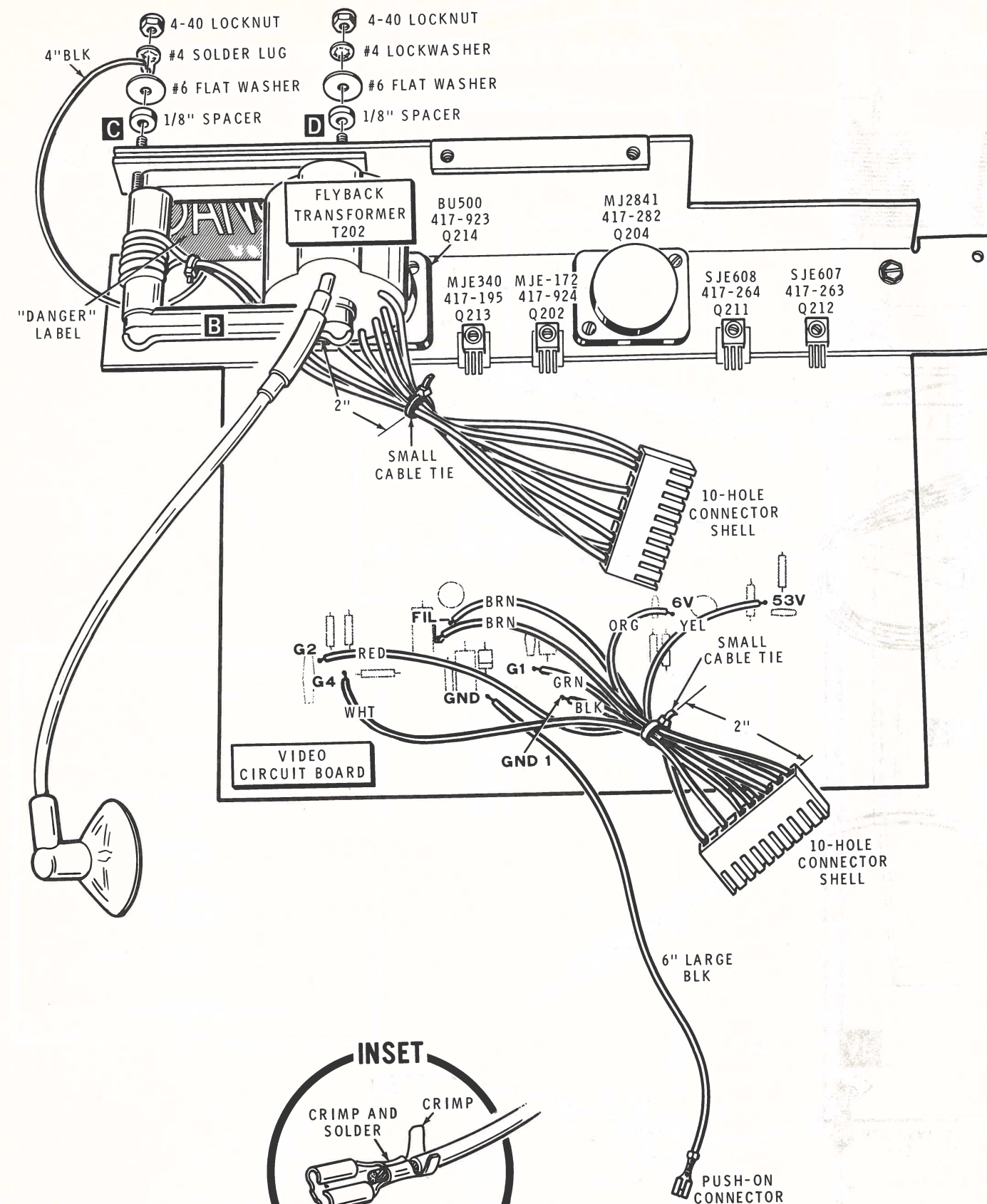




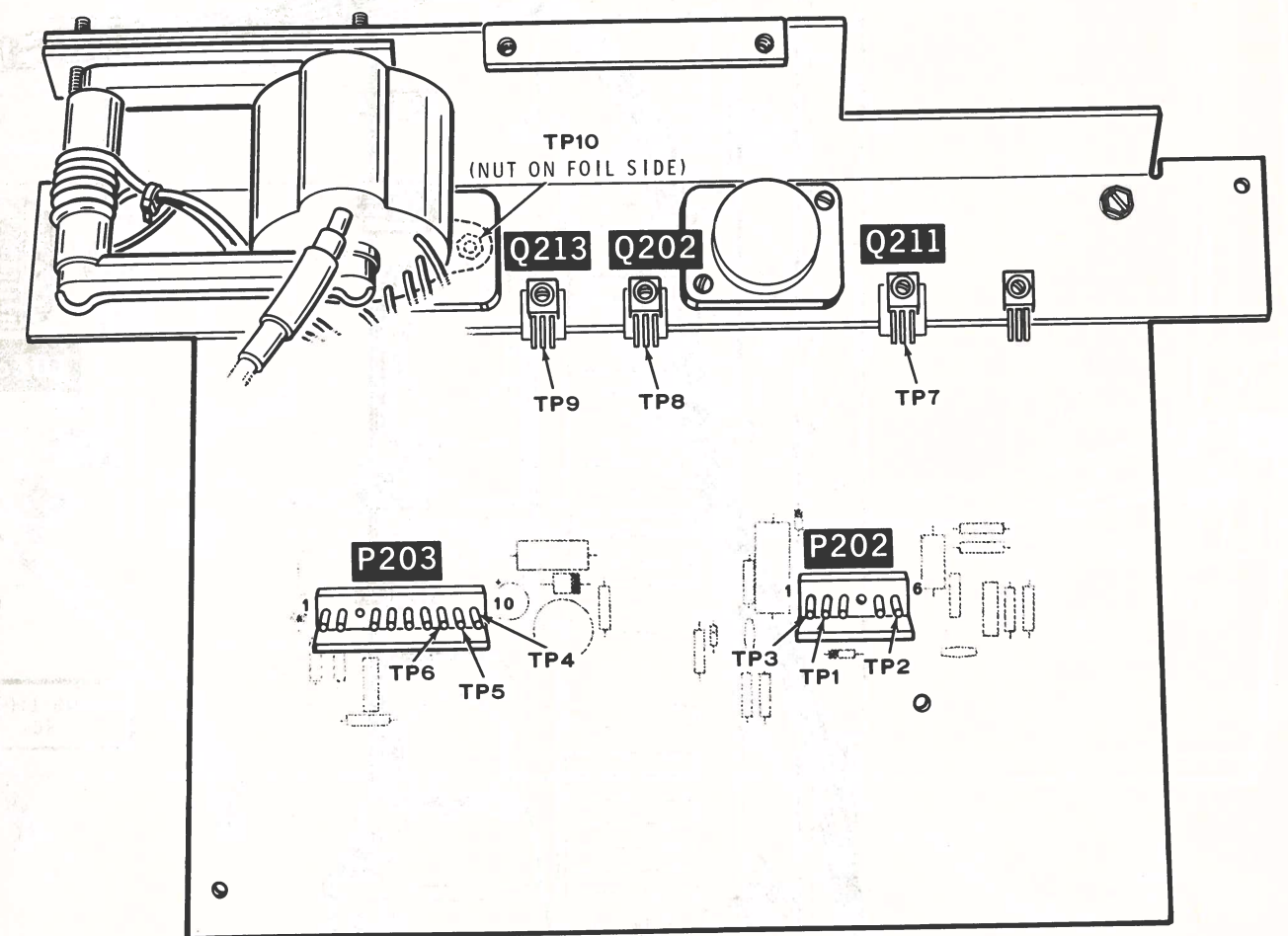
# VIDEO CIRCUIT BOARD PARTS PICTORIAL



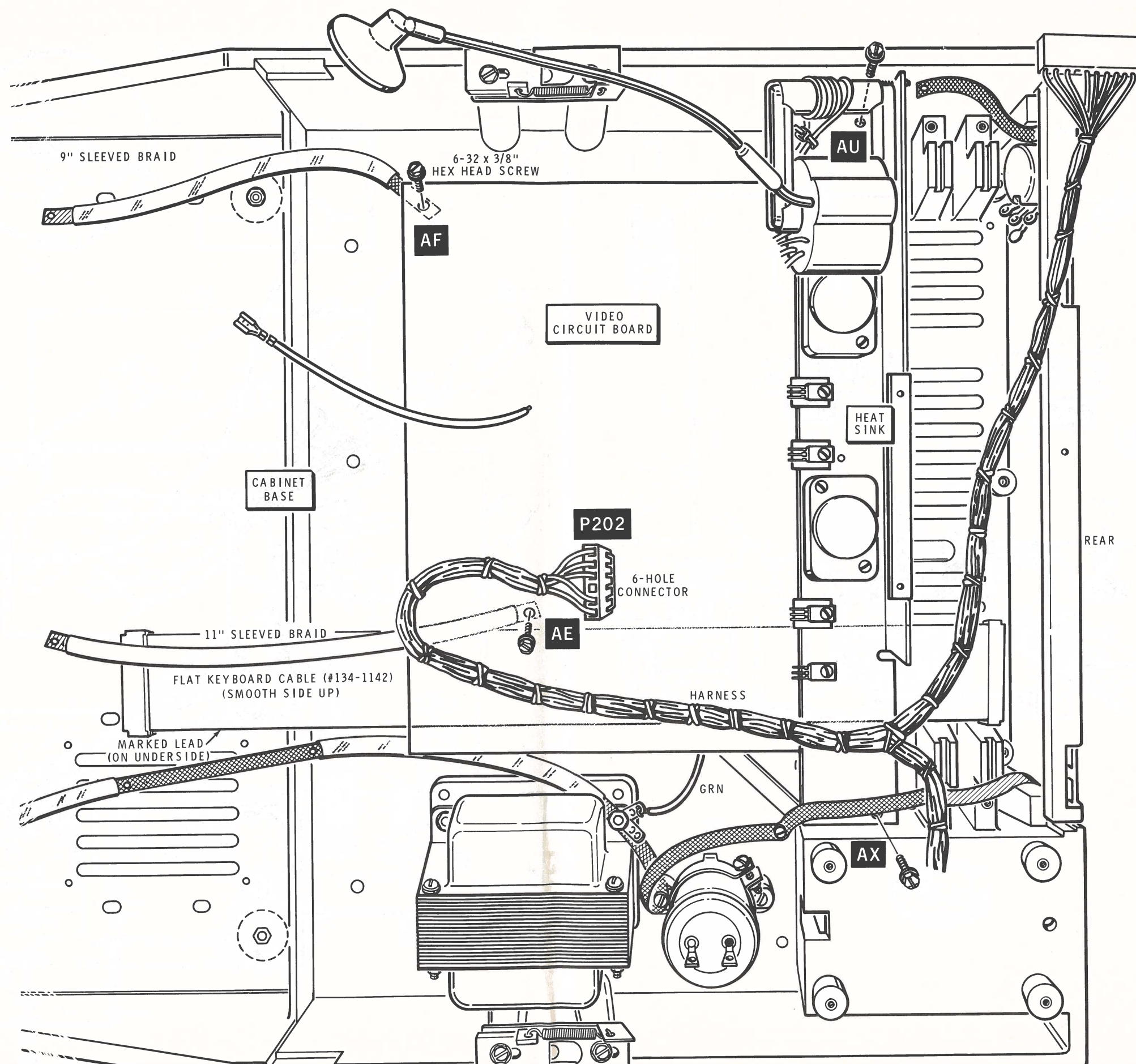




PICTORIAL 4-12



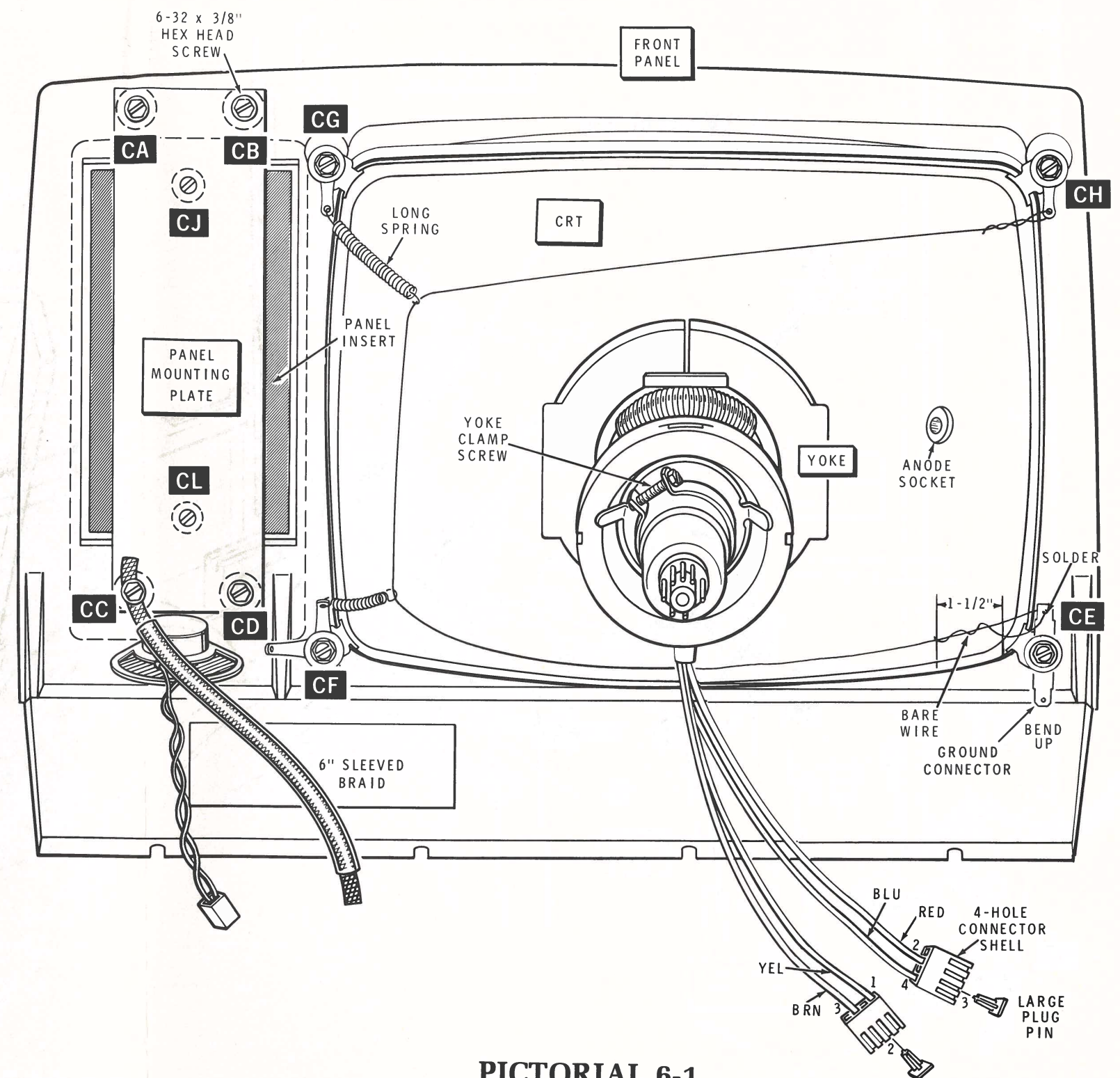
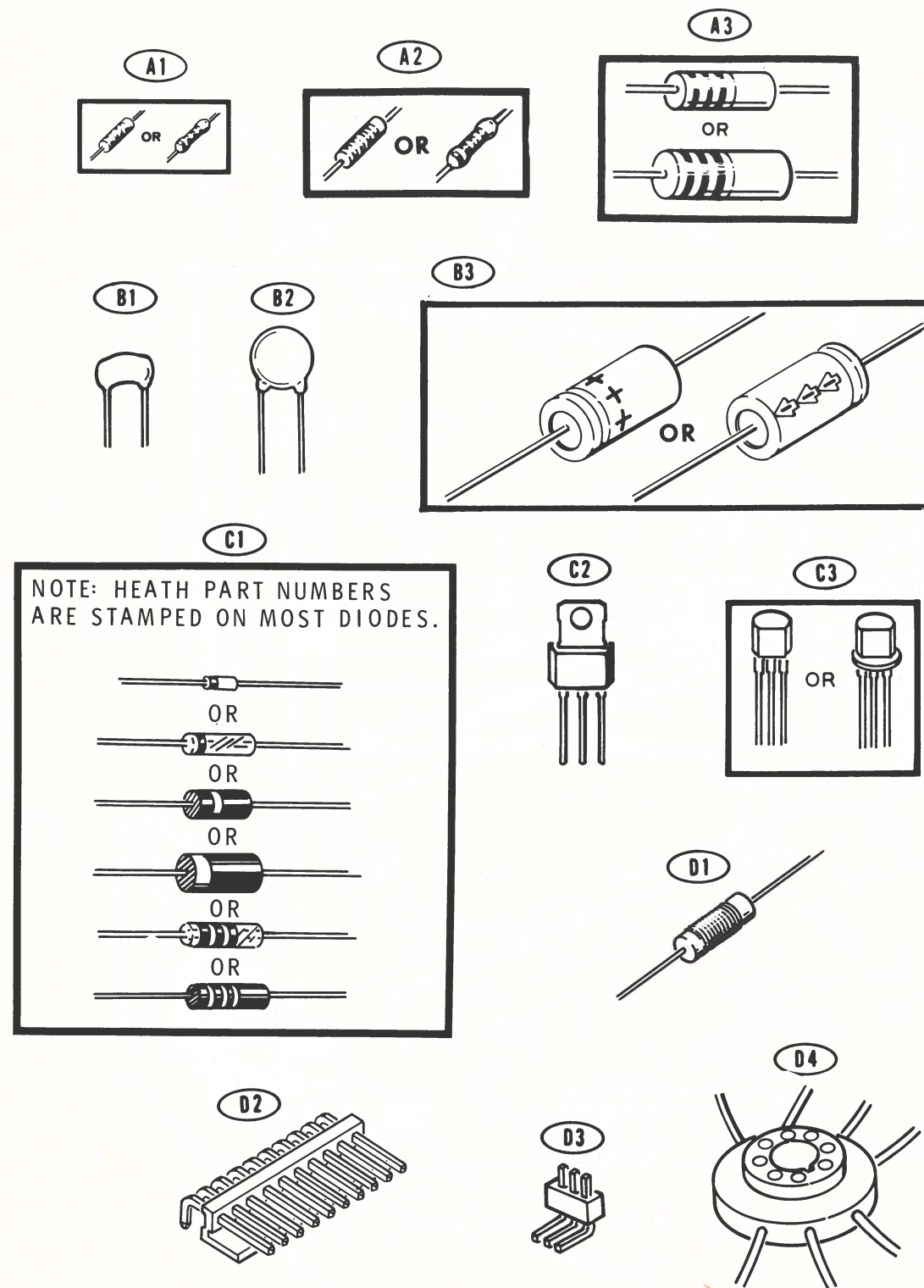
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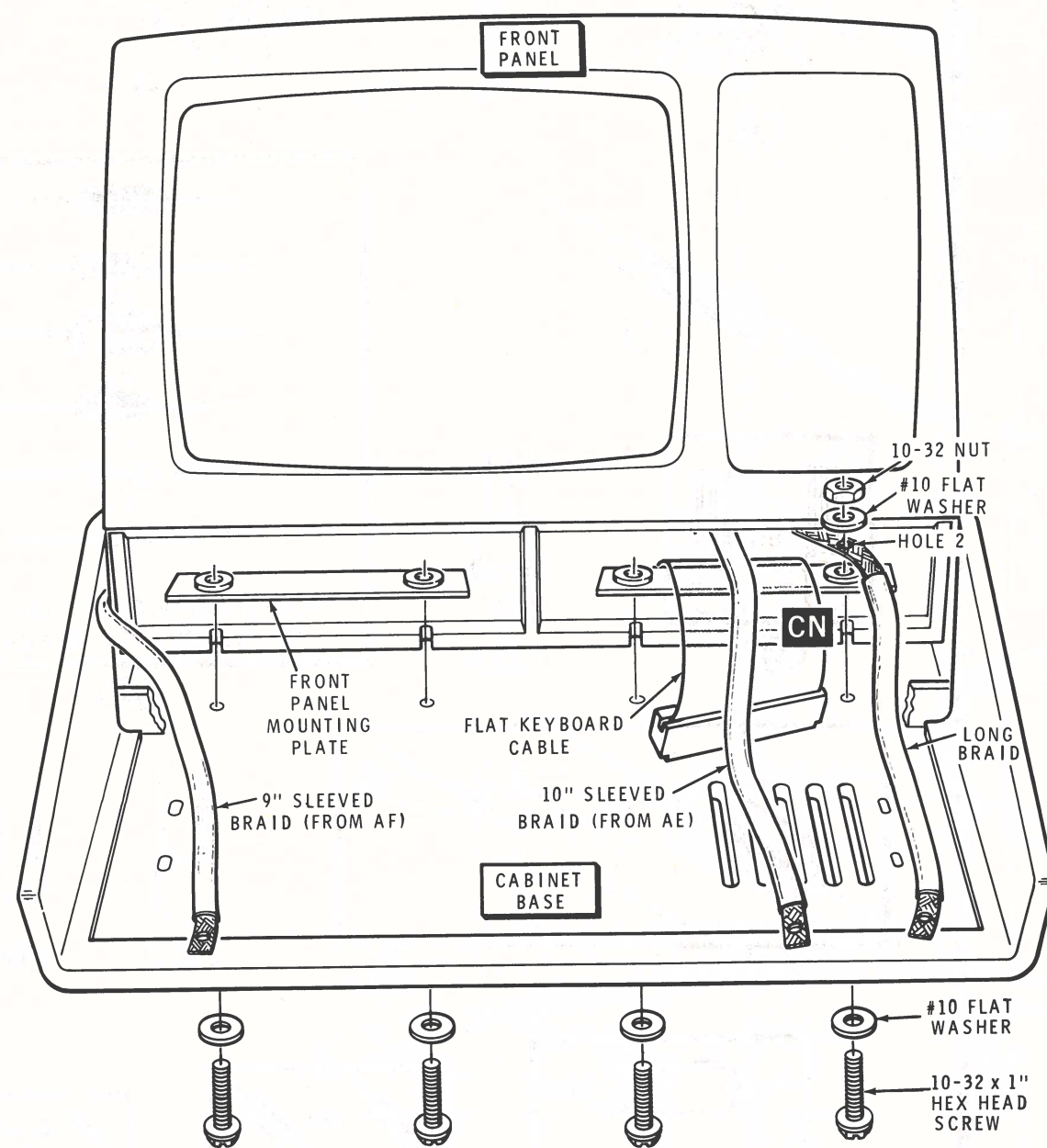


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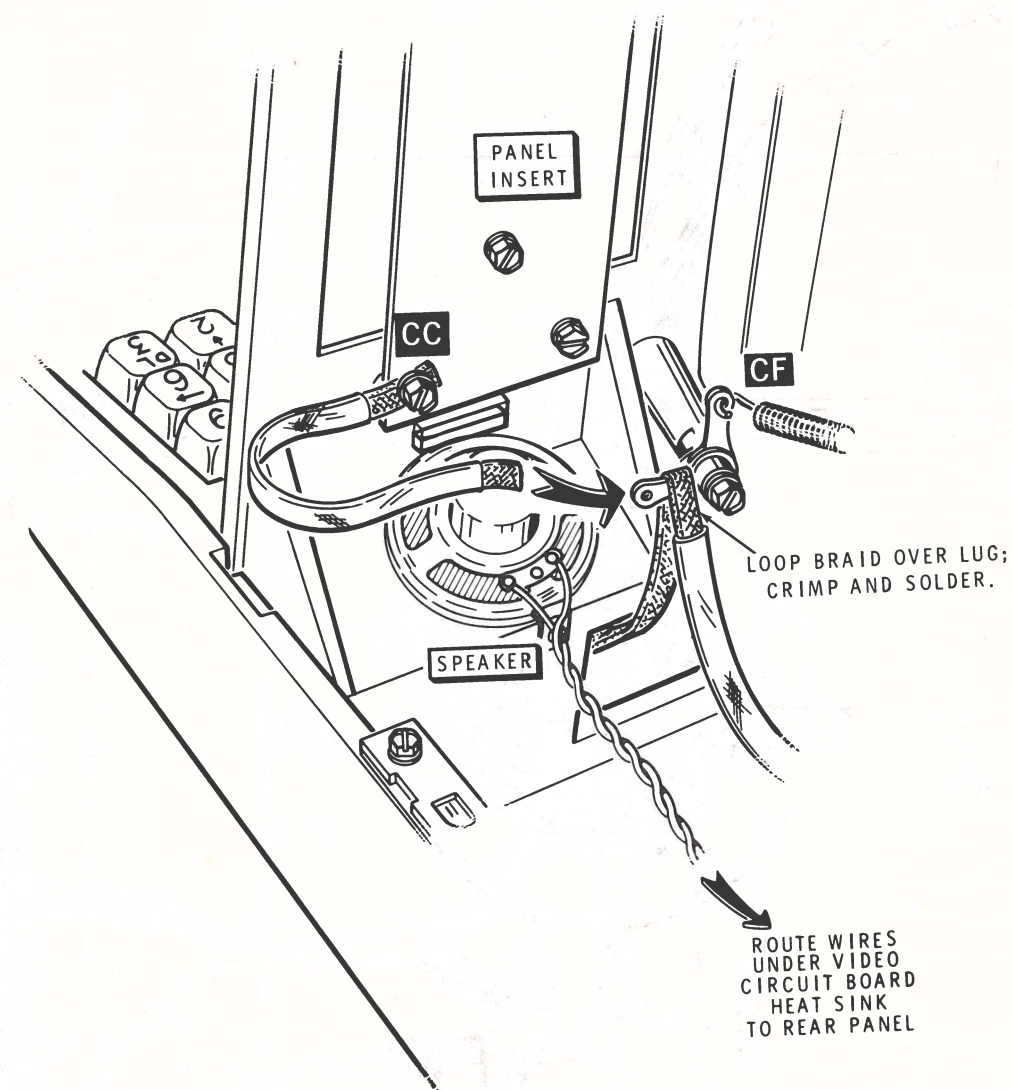


# VIDEO DRIVER CIRCUIT BOARD PARTS PICTORIAL



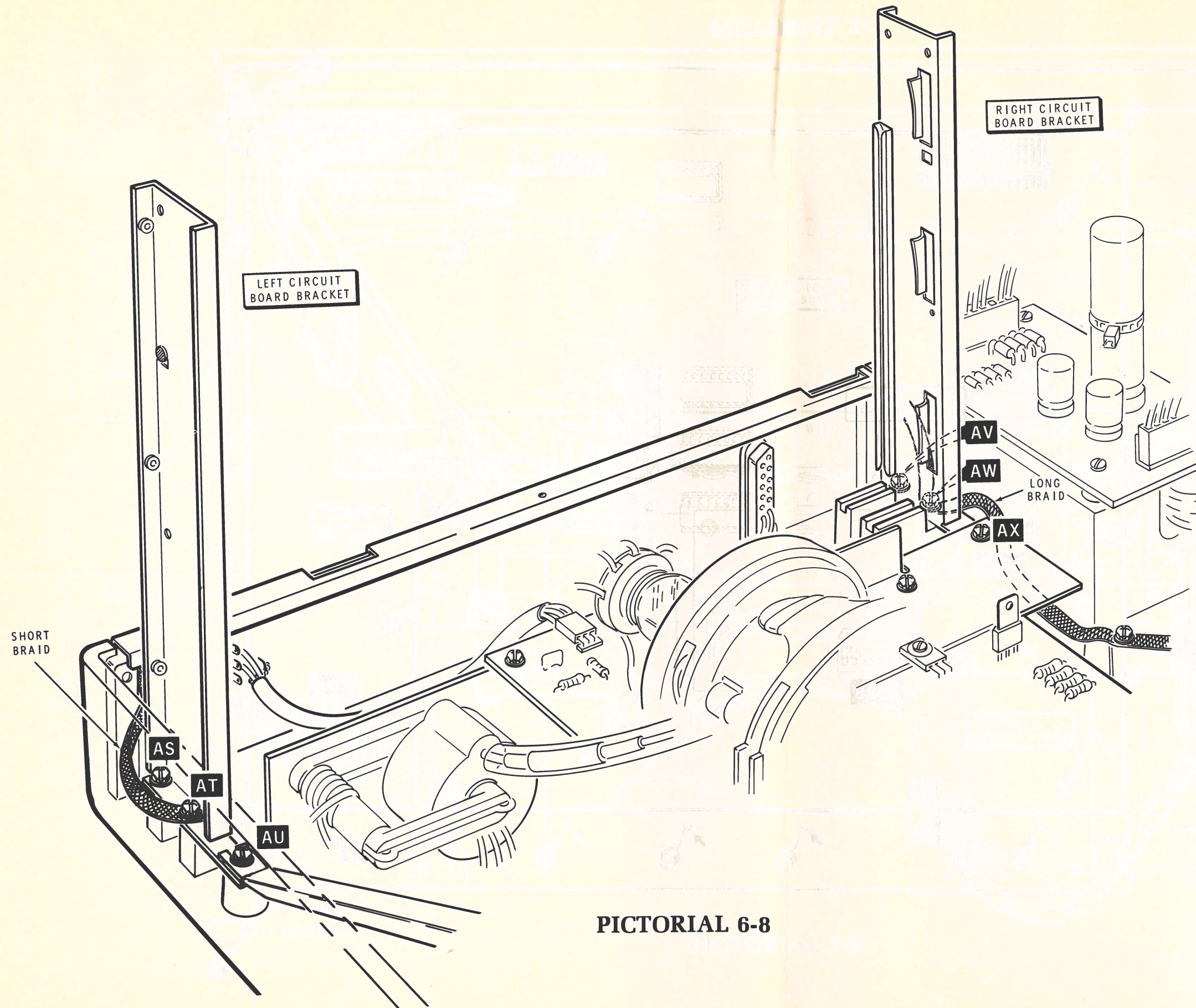


PICTORIAL 6-2

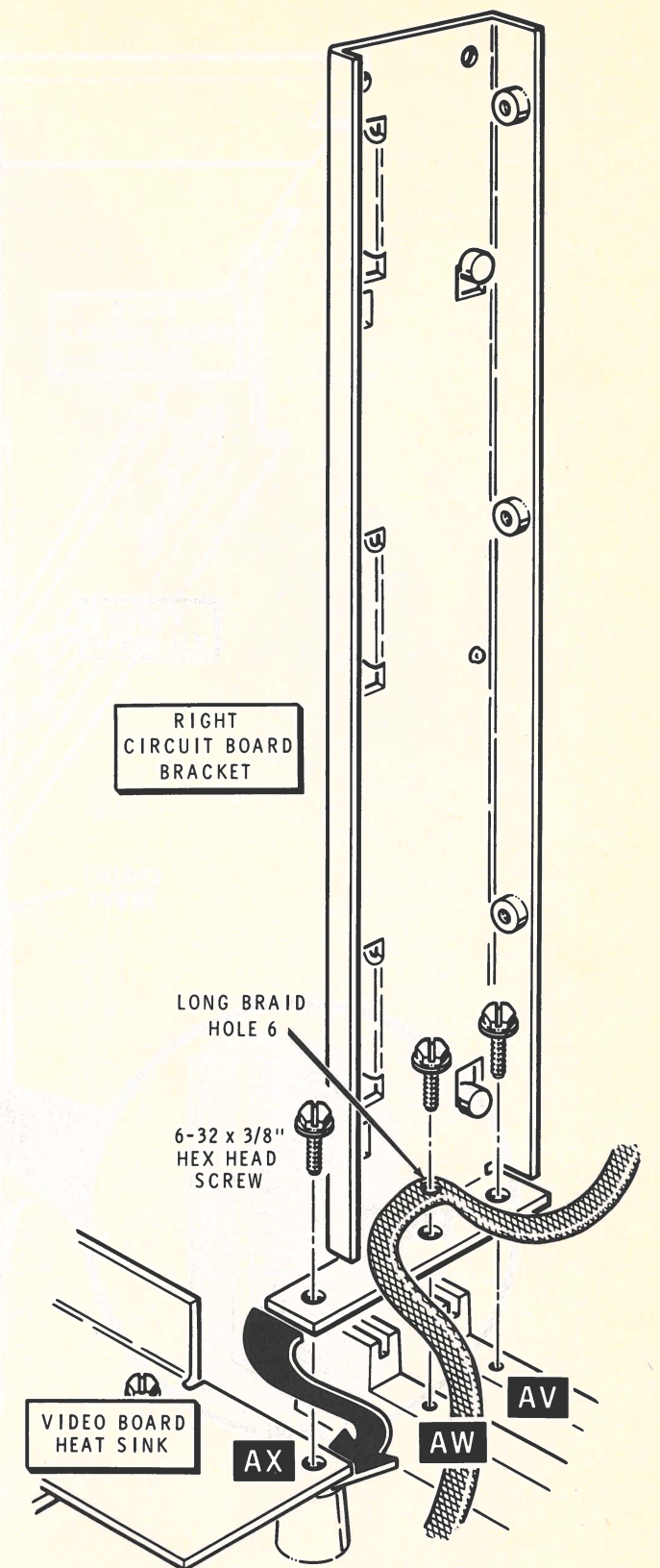


PICTORIAL 6-7



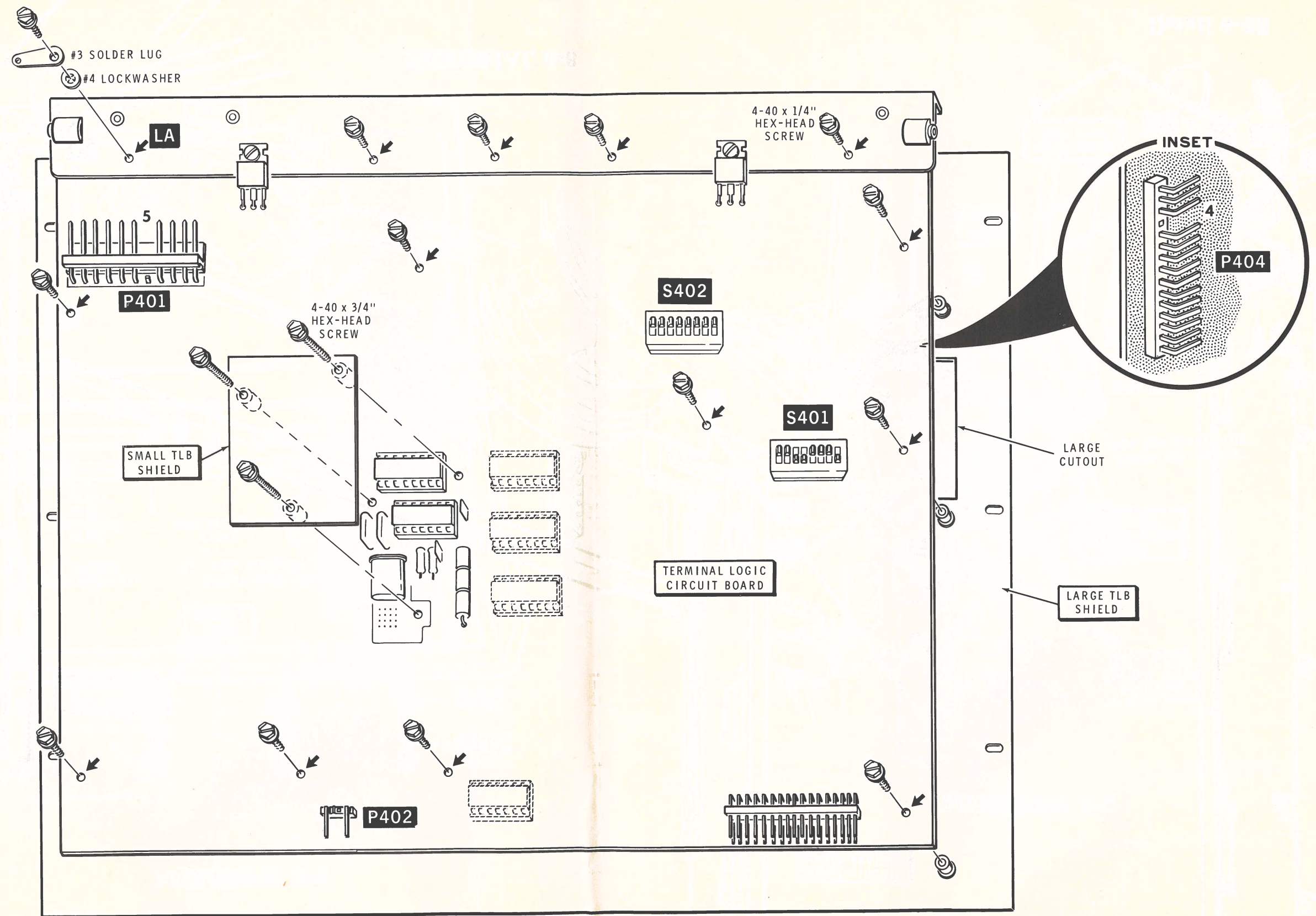


PICTORIAL 6-8

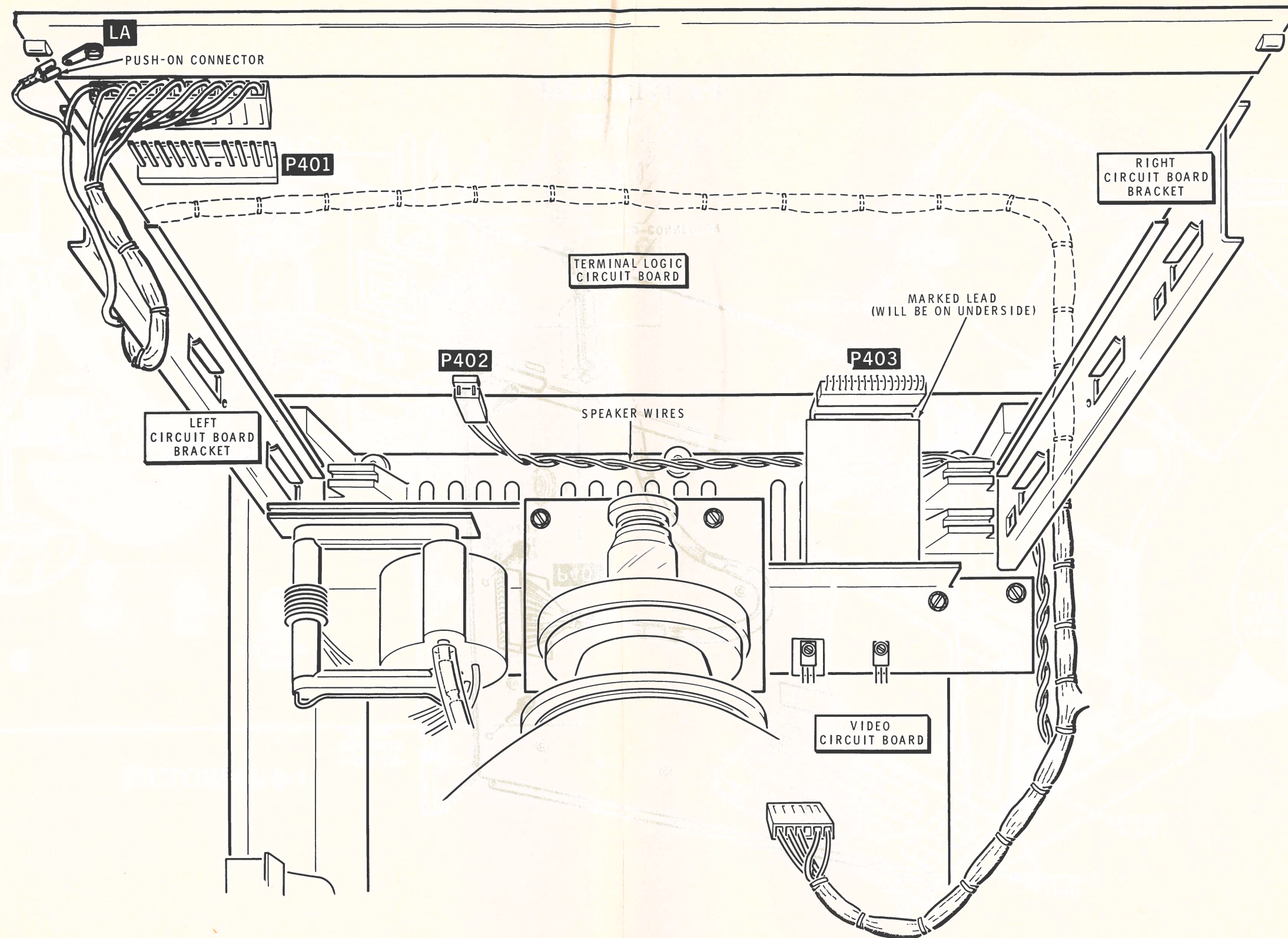


Detail 6-8B



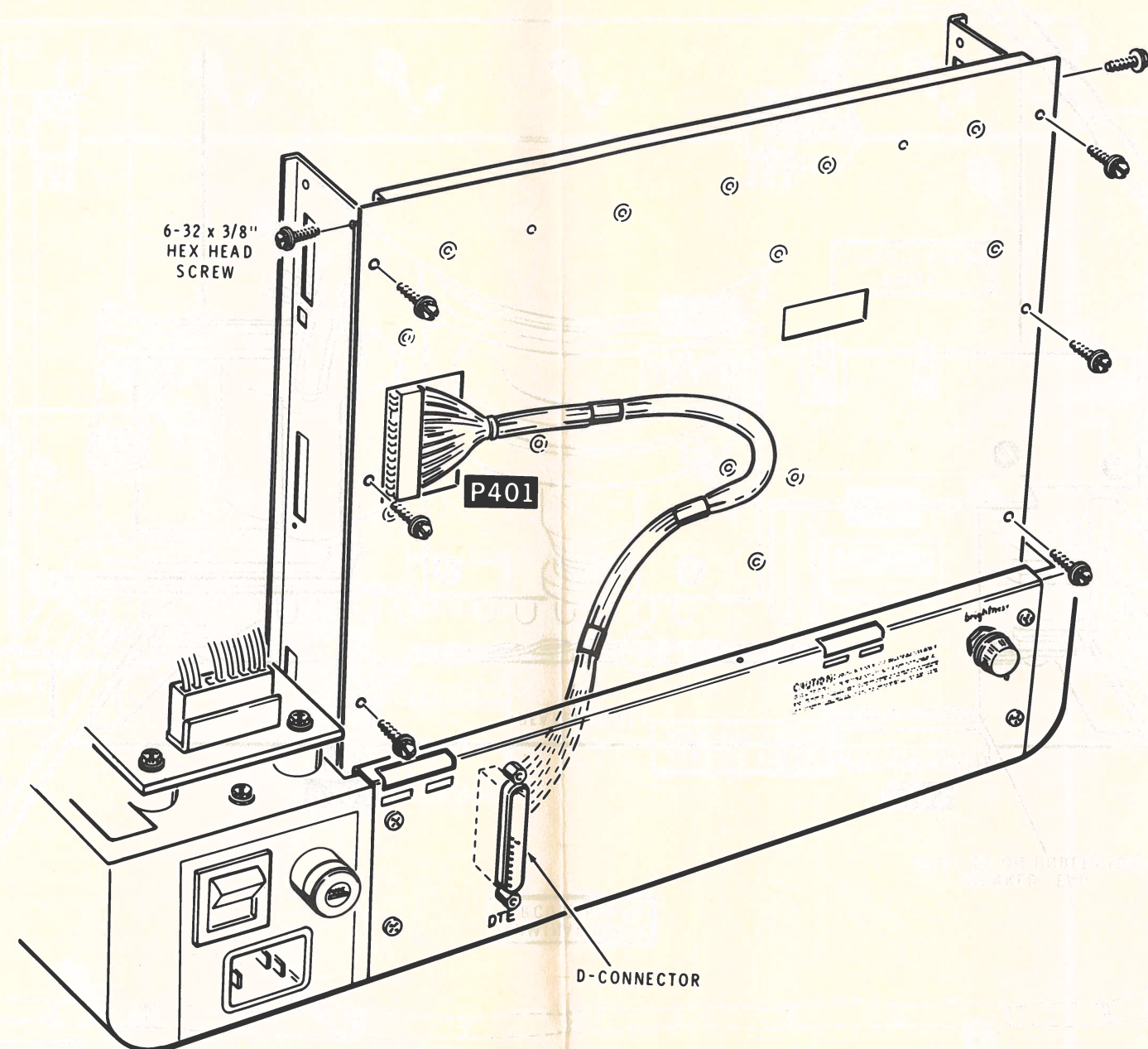


PICTORIAL 7-1



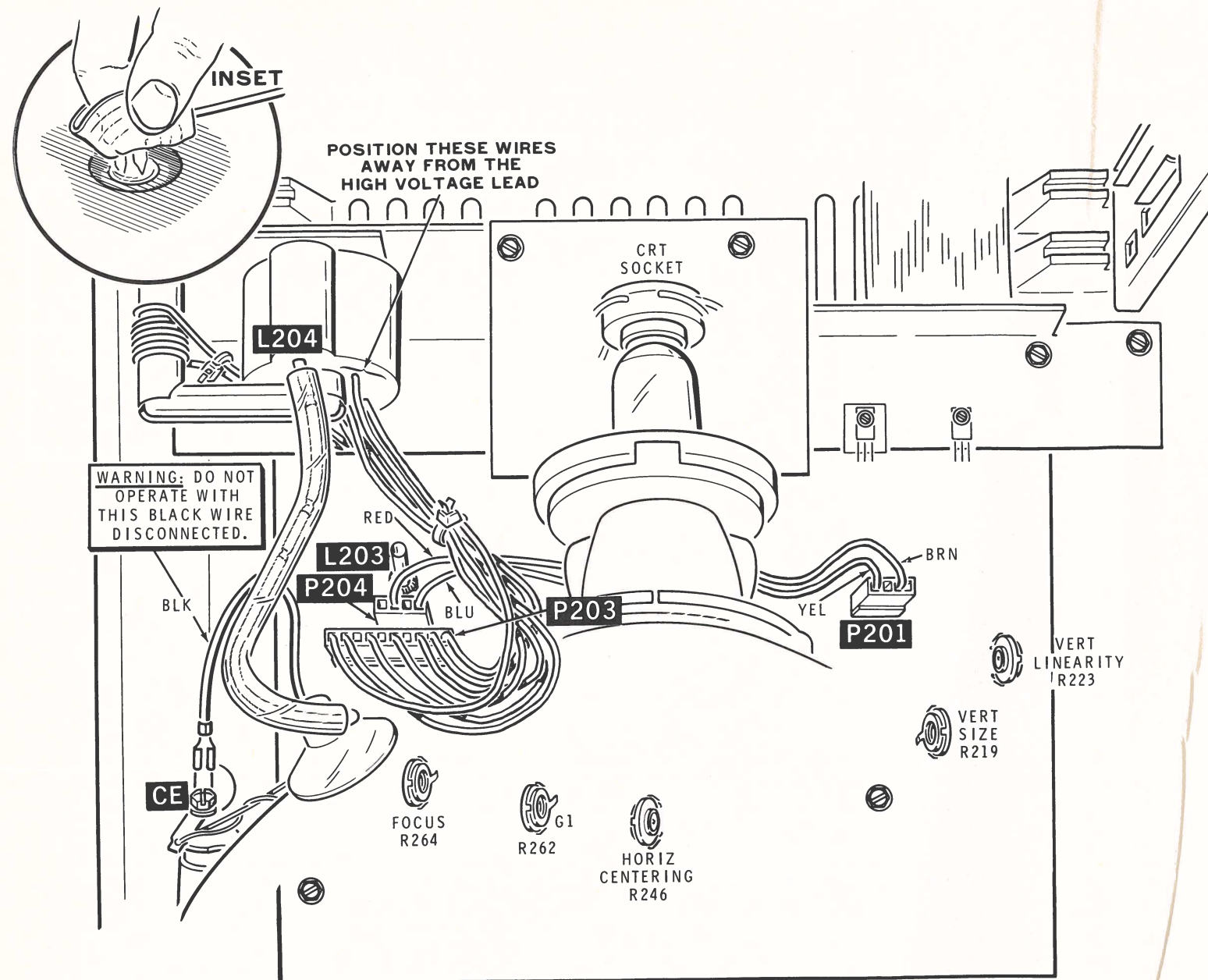
PICTORIAL 7-2



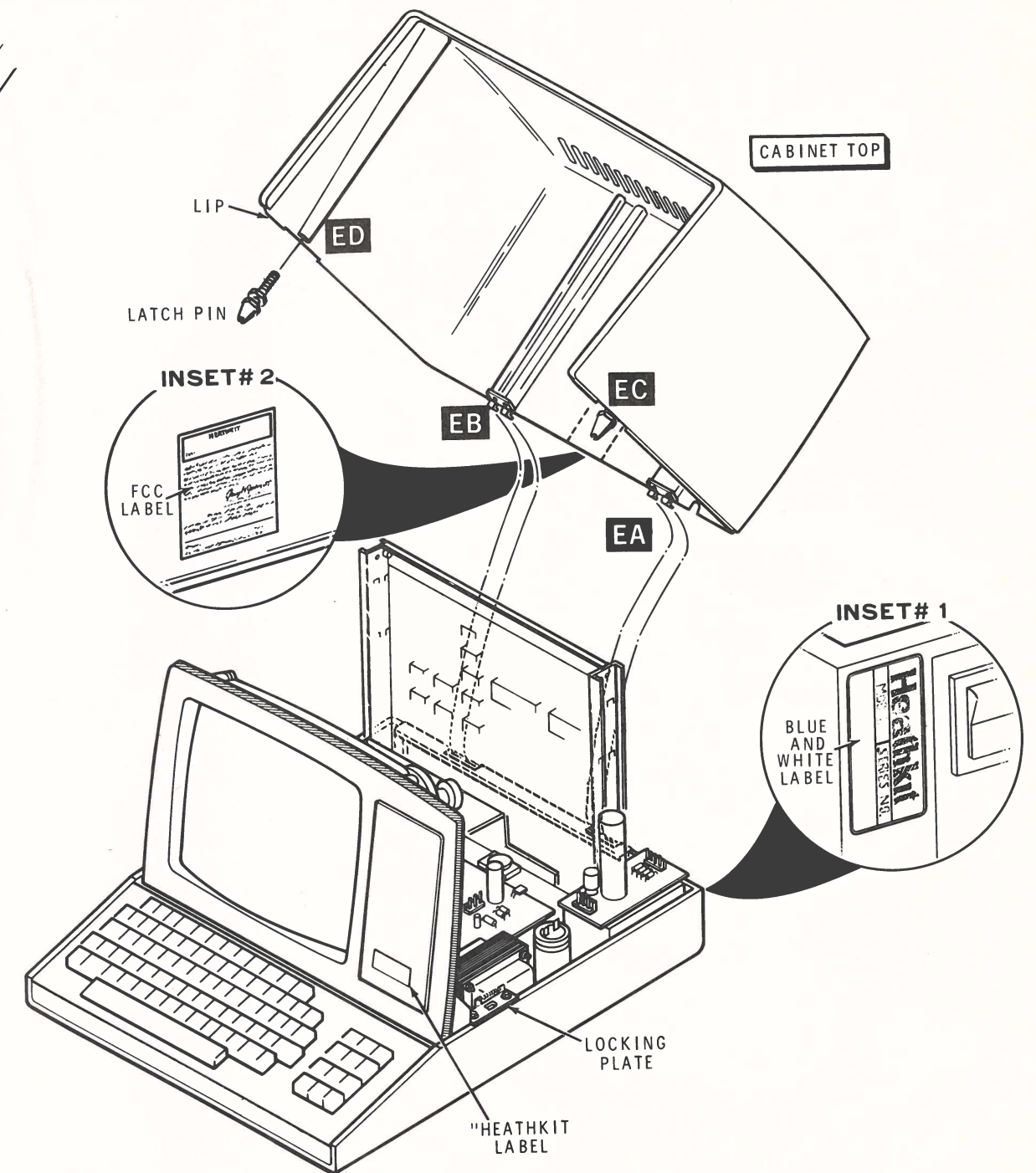


### PICTORIAL 7-3





PICTORIAL 8-1



PICTORIAL 9-1

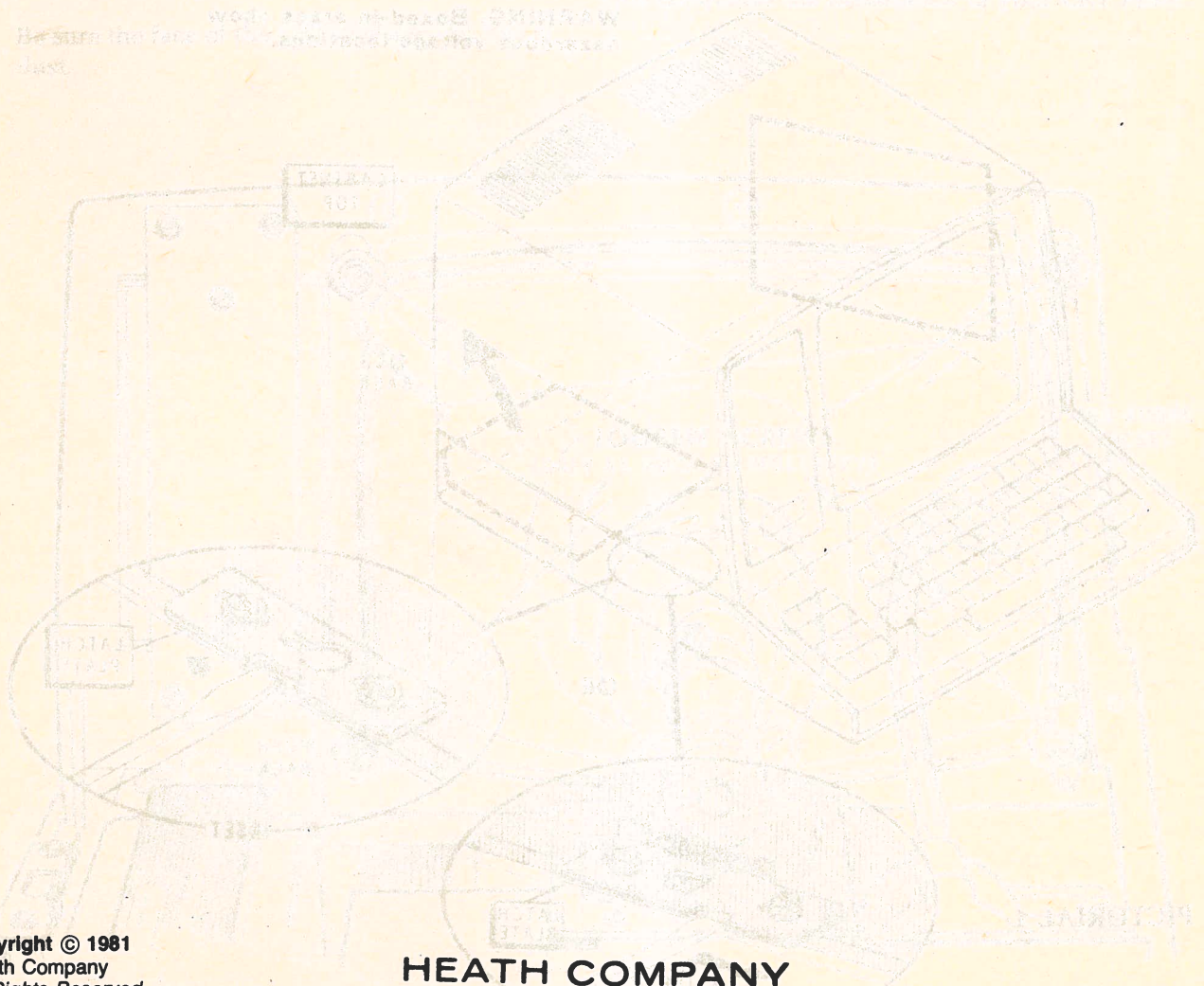
# Instructions

for the



## ANTI-GLARE CRT FILTER

### Models HCA-3 and HCA-4



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**HEATH COMPANY**  
**BENTON HARBOR, MICHIGAN 49022**

597-2387



## CABINET REMOVAL

**WARNING:** When the line cord is connected to an AC outlet, hazardous voltages can be present inside your machine. See Pictorial 1.

Remove the cabinet as follows:

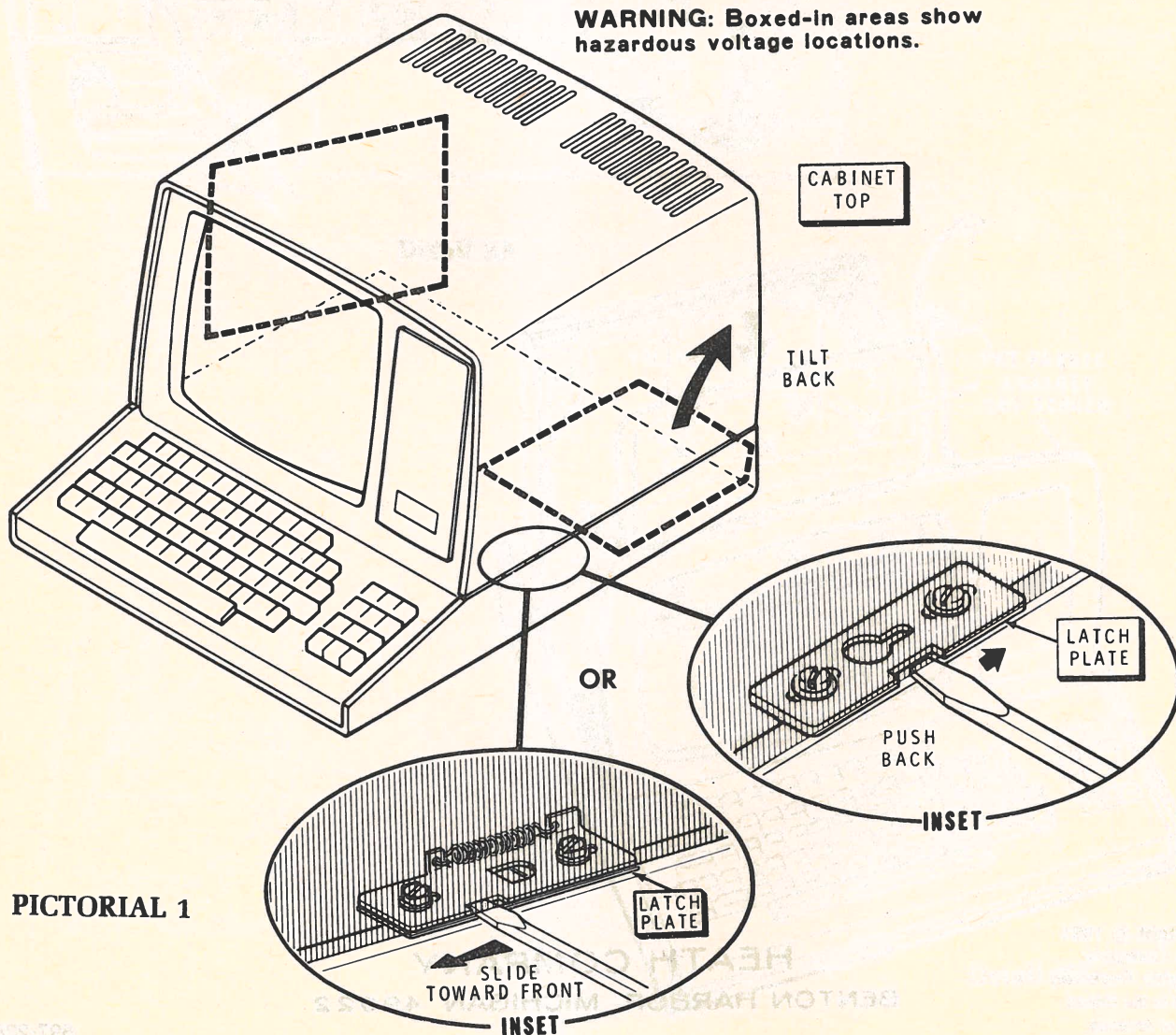
- Unplug the line cord from the AC outlet.
- Refer to the inset drawings on Pictorial 1 and, using the blade of a small screwdriver, operate the latch plate.
- Likewise, open the latch plate on the other side of the cabinet shell.

- Carefully tilt the cabinet shell back. **NOTE:** Never allow the cabinet shell to hang unsupported. (The hinges are designed so you can easily remove the cabinet shell from the chassis once you have opened it completely.)

- Unplug the fan.

Simply reverse this procedure to close and lock the cabinet shell.

**WARNING:** Boxed-in areas show hazardous voltage locations.





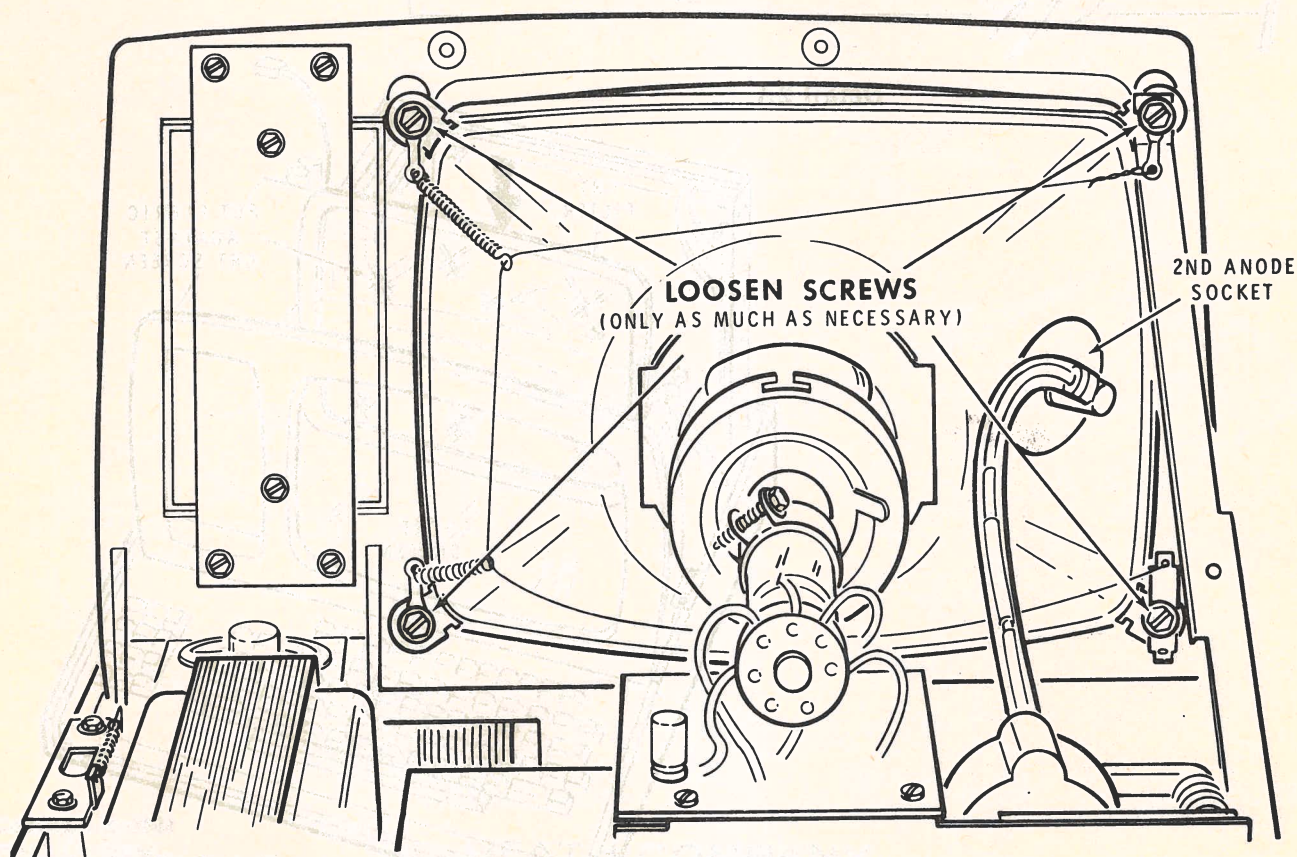
## INSTALLATION

Refer to Pictorial 2 for the following steps.

**NOTE:** In the following step, you will loosen the CRT mounting screws. If you cannot reach a screw in your machine because of internal obstacles, refer to Detail 2A, remove the indicated screws, and temporarily lift the circuit boards as necessary to reach the screw.

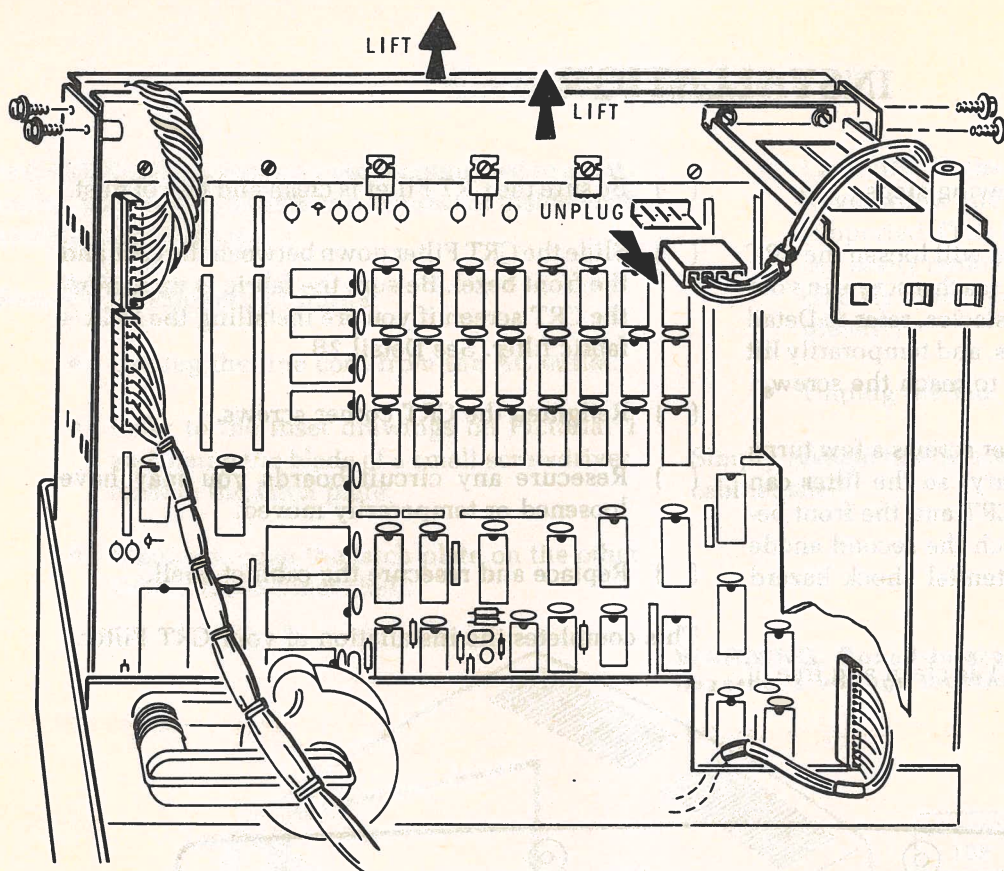
- ( ) Loosen the four CRT corner screws a few turns (only as much as necessary) so the filter can slide down between the CRT and the front bezel. (Be careful not to touch the second anode socket of the CRT. A potential shock hazard exists there.)
- ( ) Be sure the face of the CRT is clean and free of dust.
- ( ) Be sure the CRT Filter is clean and free of dust.
- ( ) Slide the CRT Filter down between the CRT and the front bezel. Be sure the fabric is up against the CRT screen if you are installing the HCA-4 fabric filter. See Detail 2B.
- ( ) Retighten the CRT corner screws.
- ( ) Resecure any circuit boards you may have loosened or temporarily moved.
- ( ) Replace and resecure the cabinet shell.

This completes the installation of your CRT Filter.

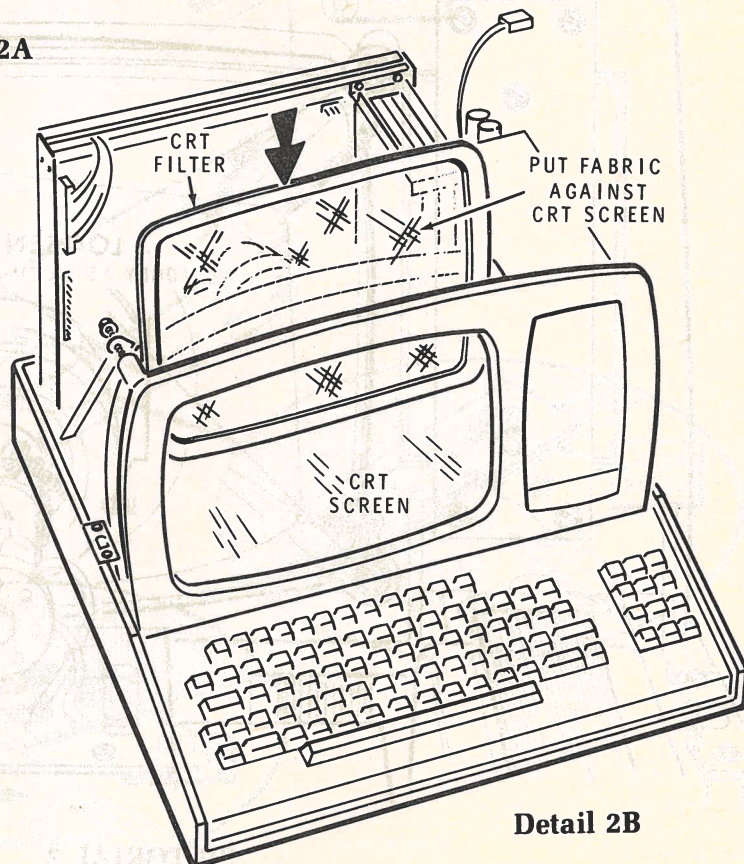


PICTORIAL 2





Detail 2A



Detail 2B



# HEATH PARTS PRICE LIST

H - 19-A ECL 19

02/05/82

PAGE 1 OF 2

KEEP THIS PARTS LIST WITH YOUR MANUAL AND USE THE PRICES SHOWN BELOW WHEN ORDERING PARTS. THESE PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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ADDITIONAL 3 FT ROLLS OF SOLDER, #331-6, CAN BE ORDERED FOR 25 CENTS EACH.

PART NUMBER	PRICE	* PART NUMBER	PRICE	* PART NUMBER	PRICE	* PART NUMBER	PRICE
1- 9	.25	* 6-1871-12	.55	* 45- 39	.80	* 204- 182	.60
1- 25	.25	* 6-6491	.50	* 45- 42	.80	* 204-2361	1.55
1- 45	.25	* 9- 98	1.45	* 45- 612	.90	* 204-2362	1.30
1- 50- 2	.80	* 9- 106	1.40	* 45- 613	.85	* 204-2454	2.70
3- 6- 2	.75	* 10- 311	.75	* 51- 197	3.70	* 204-2517	4.05
3- 22- 2	.75	* 10- 390	.75	* 51- 200	15.50	* 204-2517- 1	4.05
3- 57- 5	1.75	* 10- 941	.75	* 54- 965	25.00	* 204-2520	7.50
6- 100-12	.30	* 10-1049	.85	* 56- 56	.60	* 204-2521	7.50
6- 101	.25	* 10-1178	2.00	* 56- 58	.75	* 205- 778	.35
6- 101-12	.30	* 20- 101	.50	* 56- 73	.60	* 205-1777	1.60
6- 102	.25	* 20- 103	.55	* 56- 93	.60	* 205-1821	*****
6- 102-12	.30	* 20- 106	.75	* 56- 94	1.55	* 205-1821- 2	5.50
6- 103	.25	* 21- 46	.30	* 57- 27	.65	* 205-1839	2.40
6- 103-12	.30	* 21- 56	.25	* 57- 42	.75	* 205-1839- 1	2.40
6- 104	.25	* 21- 75	.25	* 57- 64	.90	* 205-1840	*****
6- 105	.25	* 21- 122	.70	* 57- 65	.50	* 205-1840- 1	1.20
6- 105-12	.30	* 21- 140	.35	* 57- 614	1.50	* 205-1841	1.55
6- 122	.25	* 21- 167	.25	* 58- 19	15.70	* 205-1842	1.55
6- 150	.25	* 21- 176	.35	* 60- 621	3.85	* 206-1363	6.50
6- 152	.25	* 21- 185	1.10	* 60- 642	3.15	* 206-1379	5.00
6- 182	.25	* 21- 192	.60	* 60- 643	3.15	* 207- 86	.70
6- 201	.25	* 21- 193	.55	* 61- 43	2.75	* 215- 642	2.80
6- 201-12	.30	* 21- 745	.75	* 64- 892	90.00	* 215- 657	3.80
6- 222	.25	* 21- 761	.35	* 73- 1	.10	* 215- 657- 1	4.10
6- 222-12	.30	* 25- 195	.90	* 73- 2	.10	* 235- 192	.65
6- 223	.25	* 25- 197	1.05	* 73- 92	.25	* 250- 16	.05
6- 224	.25	* 25- 220	1.75	* 75- 60	.15	* 250- 34	.05
6- 224-12	.30	* 25- 276	2.20	* 75- 142	.70	* 250- 56	.05
6- 273	.25	* 25- 299	.70	* 75- 718	.45	* 250- 175	.05
6- 279	.25	* 25- 841	1.90	* 75- 792	.50	* 250- 323	.05
6- 330-12	.30	* 25- 857	5.85	* 75- 802	.25	* 250-1150	.05
6- 331	.25	* 25- 865	.45	* 75- 807	.30	* 250-1264	.20
6- 331-12	.30	* 25- 882	.65	* 85-2384- 2	2.90	* 250-1280	.20
6- 332	.25	* 25- 883	.40	* 85-2553- 2	10.20	* 250-1309	.05
6- 335	.25	* 25- 890	1.00	* 85-2636- 1	2.00	* 250-1310	.05
6- 392	.25	* 25- 891	.80	* 85-2650- 1	29.95	* 250-1311	.05
6- 394	.25	* 25- 902	6.30	* 89- 60	4.45	* 250-1318	.30
6- 470	.25	* 25- 911	.40	* 90-1238	*****	* 250-1319	.25
6- 470-12	.30	* 25- 913	.95	* 90-1238- 1	9.45	* 250-1361	.10
6- 471	.25	* 25- 921	1.90	* 90-1239	*****	* 250-1373	.10
6- 472	.25	* 27- 73	.35	* 90-1239- 1	16.40	* 250-1383	.05
6- 472-12	.30	* 27- 145	.60	* 90-1244	*****	* 252- 2	.05
6- 473	.25	* 27- 206	2.80	* 90-1244- 1	3.00	* 252- 3	.05
6- 479	.25	* 29- 22	.70	* 90-1262- 1	38.05	* 252- 4	.05
6- 561-12	.30	* 29- 32	.40	* 90-1263- 1	35.60	* 252- 5	.05
6- 623	.25	* 29- 56	1.05	* 134-1070	7.45	* 252- 7	.05
6- 682	.25	* 29- 57	1.55	* 134-1133	7.60	* 252- 15	.05
6- 750-12	.30	* 40- 581	.80	* 134-1142	18.65	* 252- 51	.05
6- 822	.25	* 40-1947	2.10	* 134-1155	15.15	* 252- 135	.10
6- 823	.25	* 40-1948	2.05	* 150- 109	14.70	* 252- 725	.10



# HEATH PARTS PRICE LIST

H - 19-A ECL 19

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PAGE 2 OF 2

KEEP THIS PARTS LIST WITH YOUR MANUAL AND USE THE PRICES SHOWN BELOW WHEN ORDERING PARTS. THESE PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

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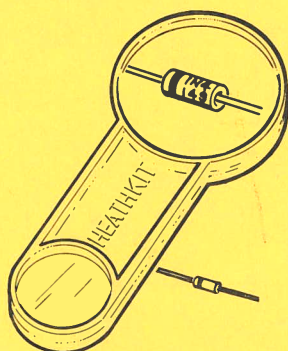
PART NUMBER	PRICE	* PART NUMBER	PRICE	* PART NUMBER	PRICE	* PART NUMBER	PRICE
253-10	.05	* 352-33	.15	* 434-310	.70	* 434-311	.90
253-21	.05	* 354-5	.15	* 434-353	3.50	* 438-48	.40
253-45	.05	* 354-7	.15	* 438-55	.30	* 440-24	.35
253-80	.05	* 390-147	.15	* 442-53	1.25	* 442-54	3.50
253-94	.05	* 390-1783	3.90	* 442-630	4.35	* 442-663	2.00
253-98	.10	* 391-651	1.85	* 442-664	2.00	* 443-18	1.05
254-1	.05	* 401-163	2.10	* 443-34	1.30	* 443-721	7.20
254-2	.05	* 404-613	5.10	* 443-727	1.80	* 443-728	.95
254-9	.05	* 406-664	.40	* 443-730	1.25	* 443-733	1.80
255-1	.10	* 417-195	1.30	* 443-757	2.35	* 443-760	2.30
255-753	.05	* 417-263	1.80	* 443-764	7.85	* 443-779	.95
255-757	1.15	* 417-264	1.50	* 443-780	.95	* 443-791	4.60
255-767	.30	* 417-282	2.60	* 443-792	1.50	* 443-794	2.35
258-33	.20	* 417-811	.65	* 443-795	2.35	* 443-799	1.80
258-132	.40	* 417-821	.60	* 443-805	4.05	* 443-875	.95
259-1	.05	* 417-822	.70	* 443-877	2.00	* 443-881	18.00
259-2	.05	* 417-823	1.05	* 443-885	3.55	* 443-891	1.00
259-5	.05	* 417-834	1.15	* 443-892	2.40	* 443-900	1.70
259-9	.05	* 417-874	.50	* 443-906	24.20	* 443-913	12.00
259-10	.05	* 417-875	.50	* 443-915	1.50	* 443-952	13.05
259-30	.05	* 417-885	1.30	* 444-29	13.15	* 444-37	13.15
261-6	.15	* 417-923	5.80	* 444-46	16.30	* 462-17	.60
262-50	.65	* 417-924	1.50	* 489-1	.30	* 490-1	.40
265-39	.40	* 417-926	1.25	* 490-5	.35	* 490-185	2.85
266-929	.35	* 417-937	.65	* 490-189			
266-1121	.25	* 421-23	1.10				
325-2	*****	* 423-13	2.30				
325-3	*****	* 432-66	.10				
340-8	.05@	* 432-753	.05				
343-15	.15	* 432-825	.45				
344-15	.05@	* 432-827	.30				
344-16	.05@	* 432-855	.05				
344-33	.05@	* 432-865	.20				
344-59	.05@	* 432-866	.03				
344-79	.10@	* 432-876	.35				
344-80	.10@	* 432-877	.75				
344-82	.10@	* 432-954	.20				
344-126	.05@	* 432-986	.85				
344-154	.20	* 432-1022	.40				
344-155	.20	* 432-1053	3.75				
344-189	.15	* 432-1061	.50				
345-1	.15@	* 432-1064	1.00				
346-4	.15@	* 432-1067	1.55				
346-7	.10@	* 432-1077	.30				
346-21	.40@	* 432-1140	1.30				
346-35	.25@	* 434-230	.40				
346-76	.25	* 434-253	1.60				
346-77	1.30	* 434-298	.30				
347-35	.15@	* 434-299	.30				
352-31	.85	* 434-307	.95				

\*\*\*\*\* WRITE HEATH COMPANY FOR PRICE INFORMATION.  
@ PRICE PER FOOT.

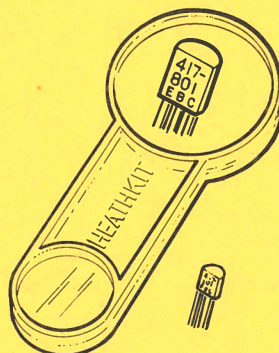


# USE THE MAGNIFYING GLASS SUPPLIED WITH THIS KIT FOR . . .

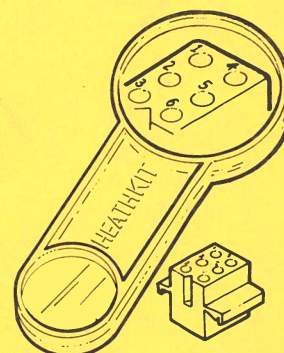
## Parts



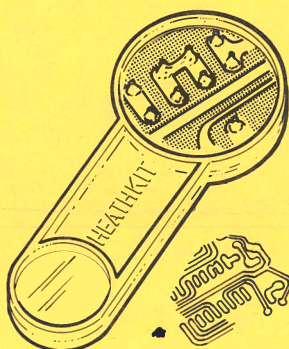
To identify the banded end of small diodes. Also, to identify the diode part number.



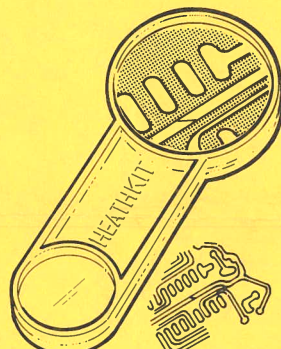
To identify transistors by type or part number. Also, in some cases, the "EBC" lead identification.



To identify numbered holes on most plugs and sockets.



To examine circuit board solder connections — especially those of IC's.

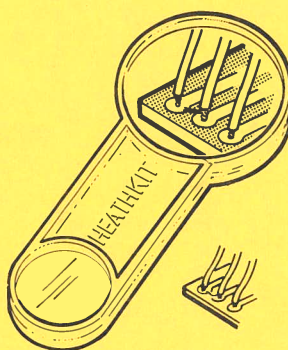


To find a hairline break in a circuit board foil.

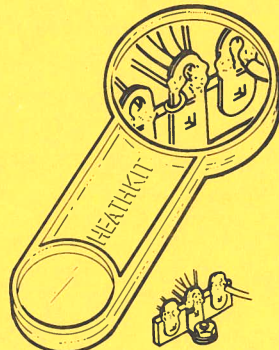
## Circuit Boards



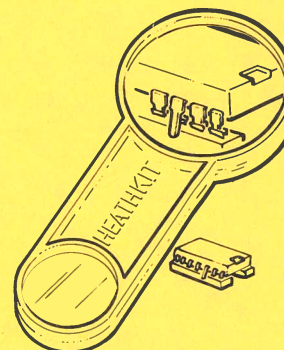
## Other Uses



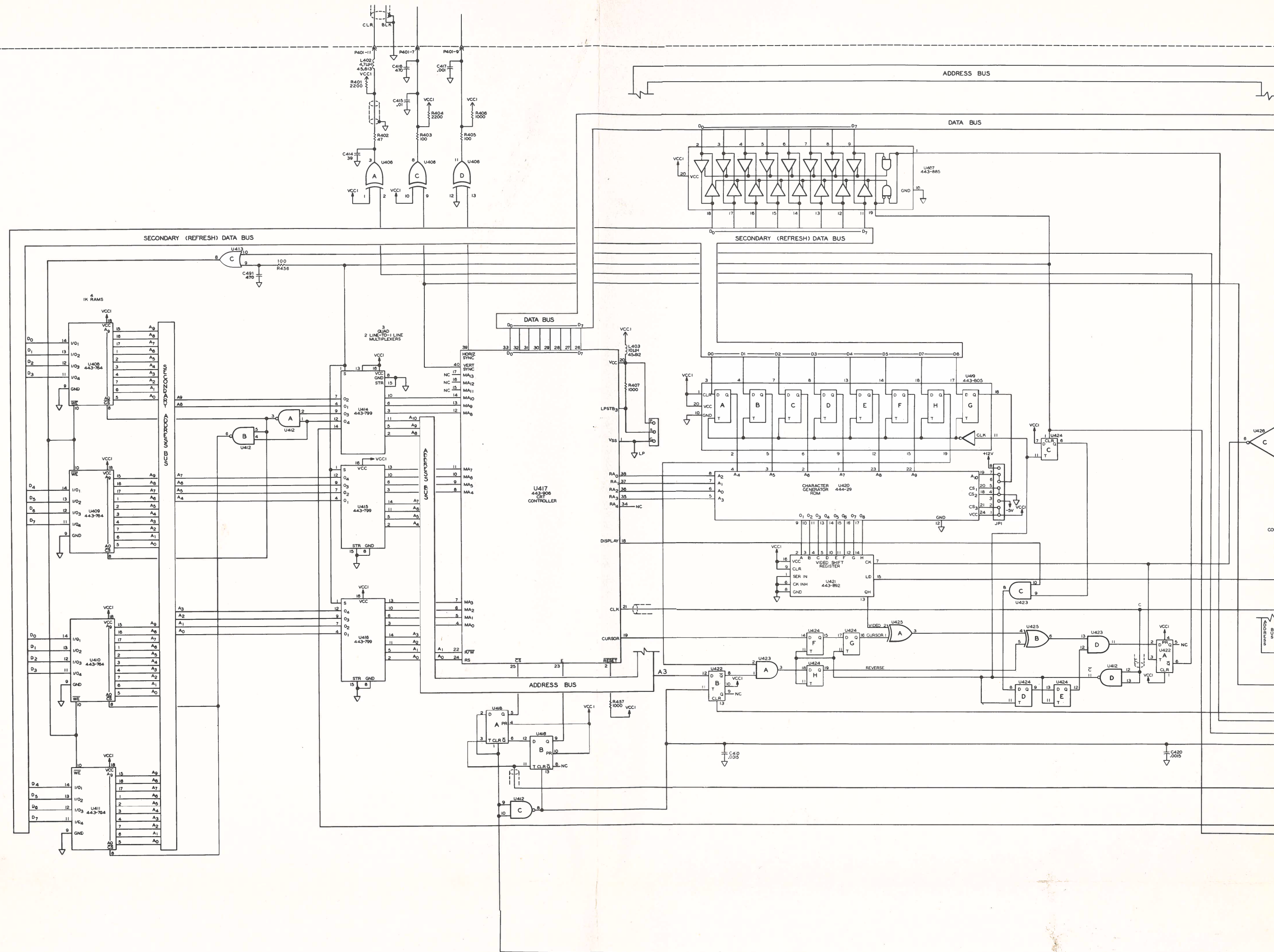
To detect stray wires from stranded wire ends.



To check for an unsoldered wire at a multiconnection lug.



To examine IC pins after installation.

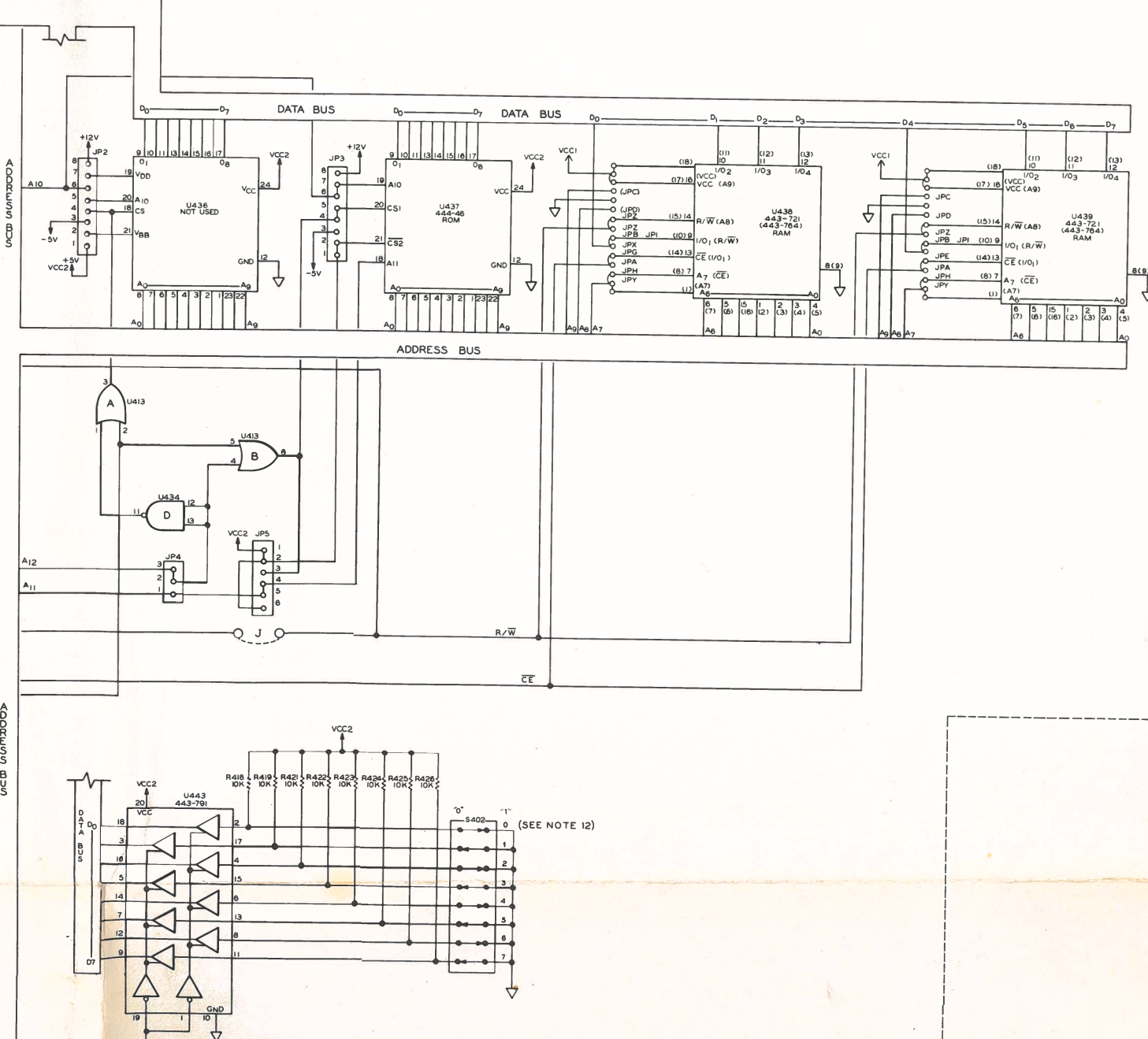
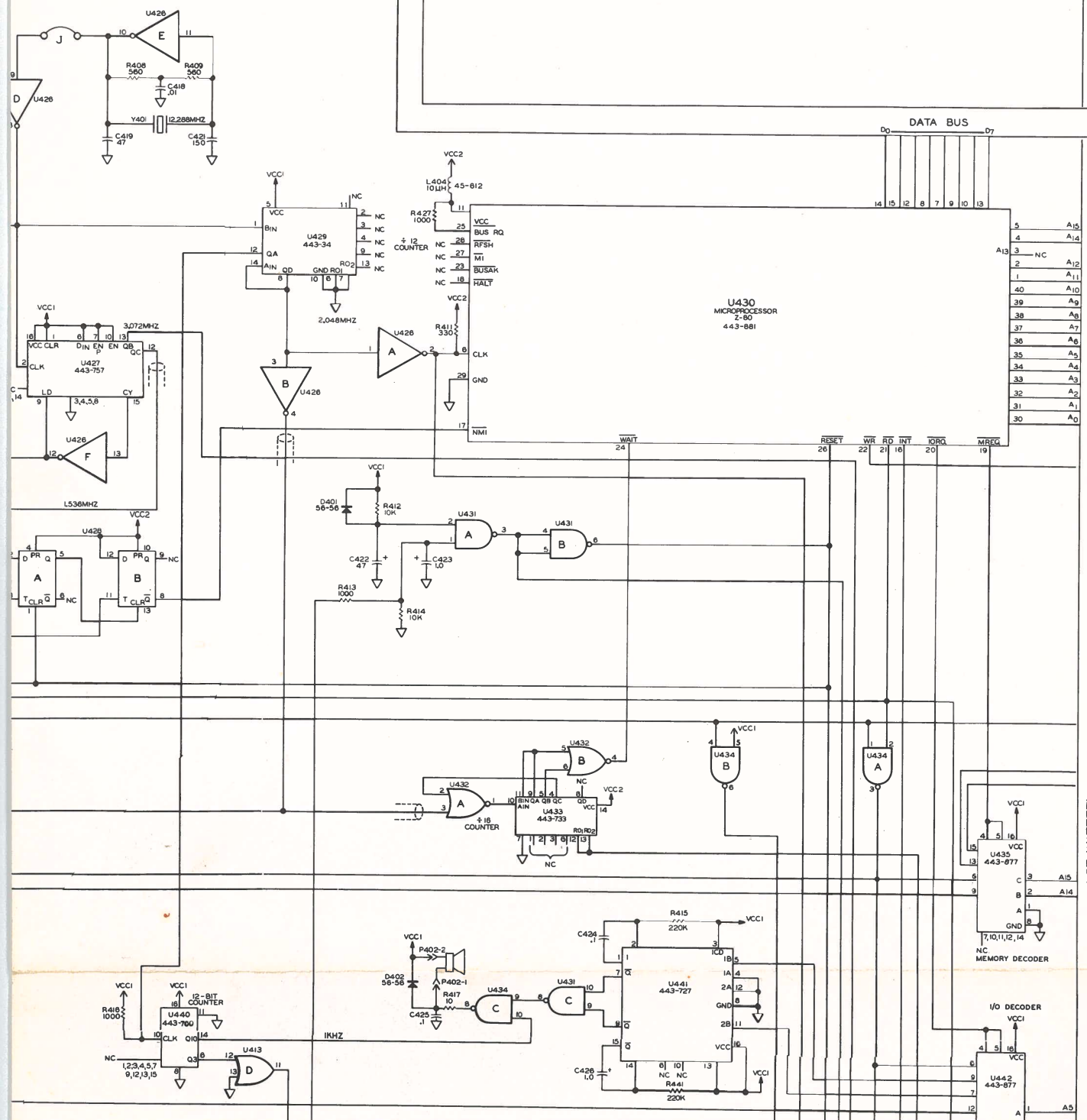


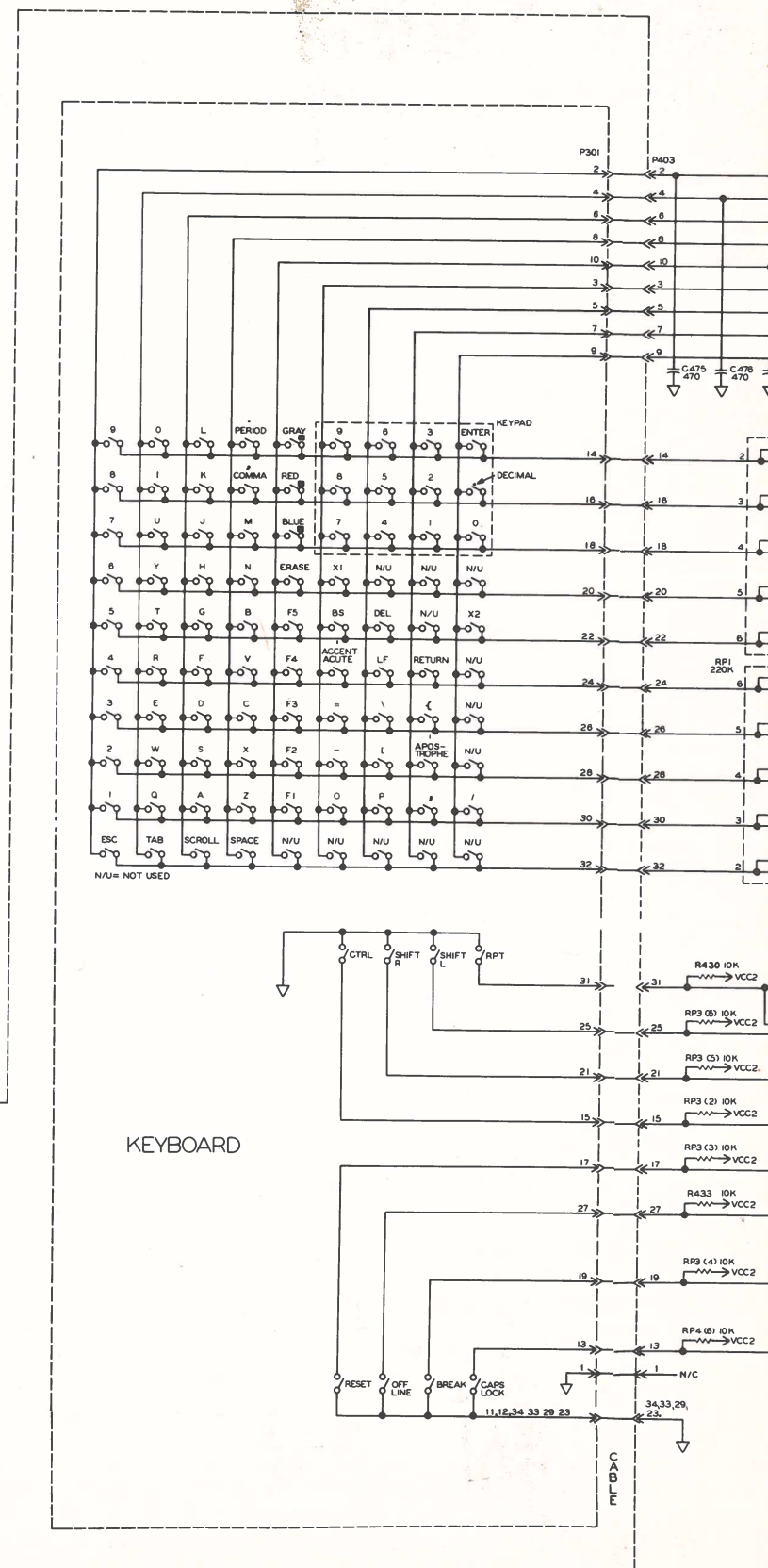
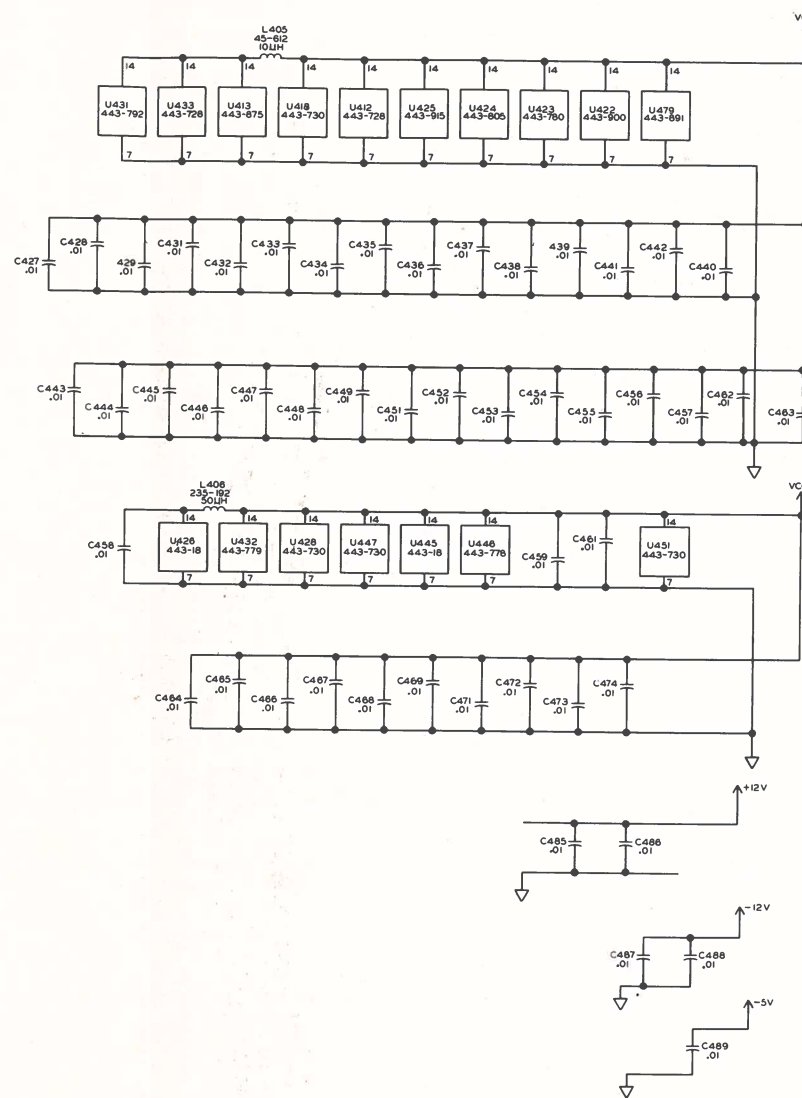
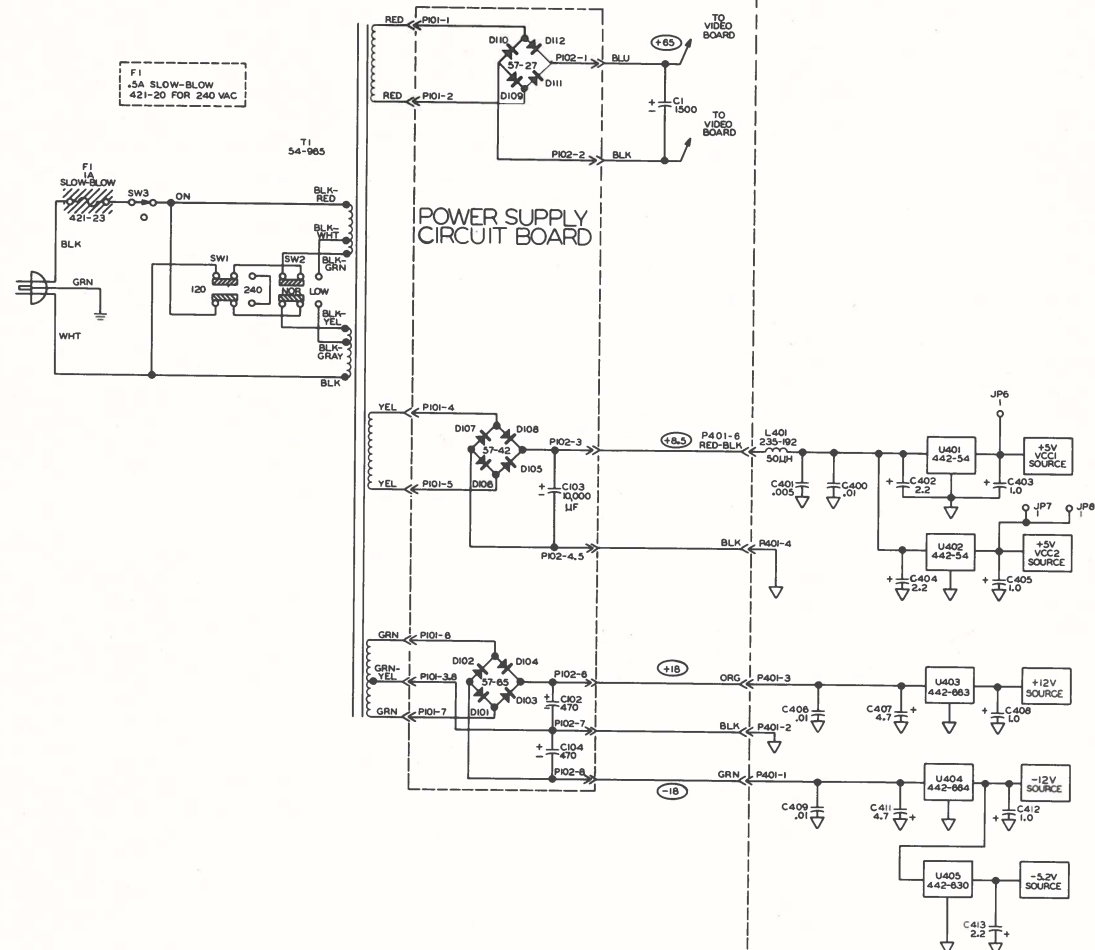
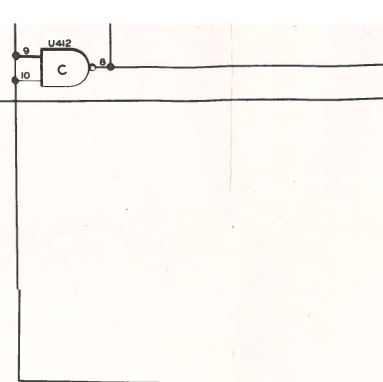
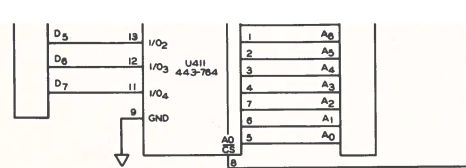


ADDRESS BUS

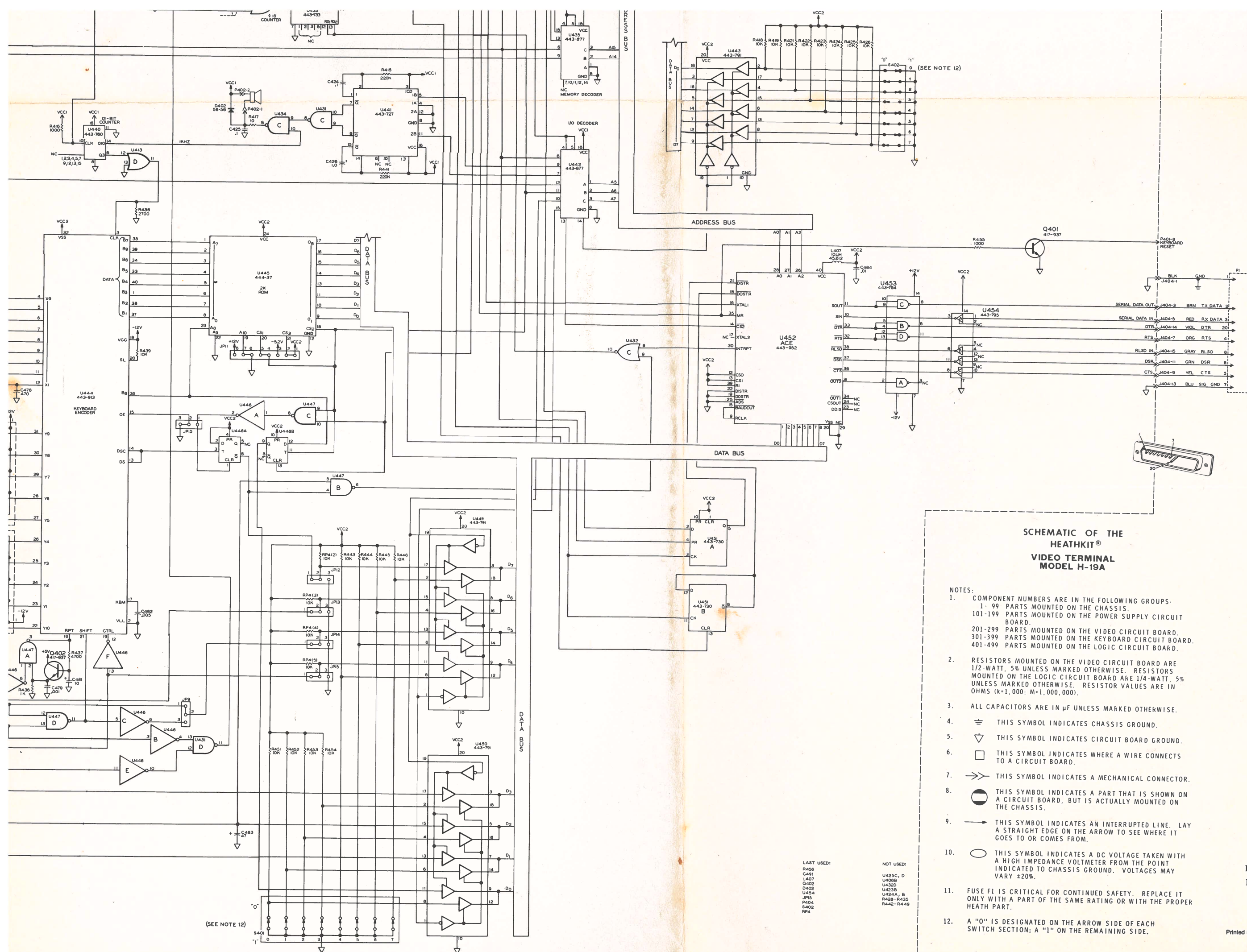
TERMINAL  
LOGIC  
CIRCUIT  
BOARD

MASTER CLOCK







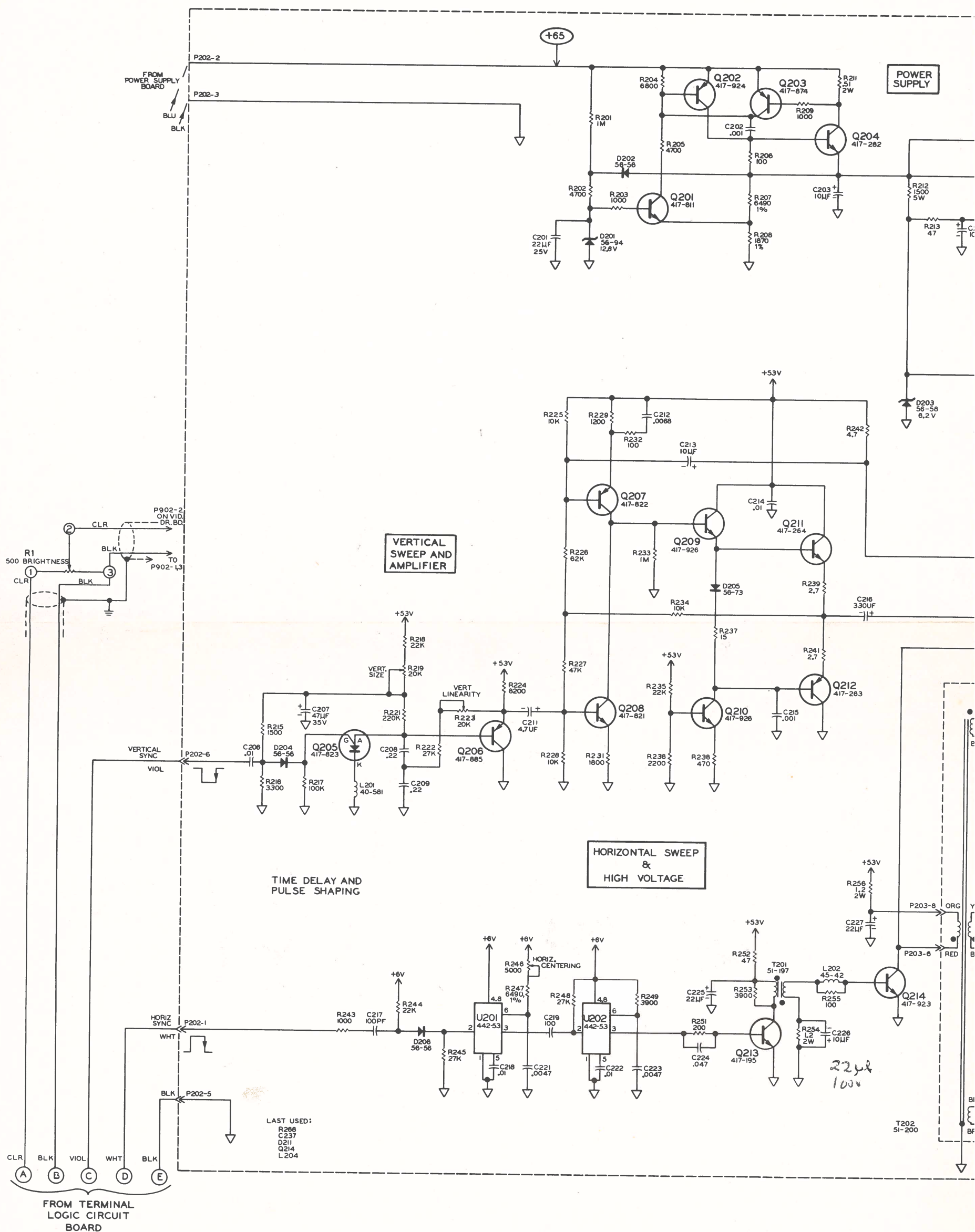


# SCHEMATIC OF THE HEATHKIT® VIDEO TERMINAL MODEL H-19A

- NOTES:
- COMPONENT NUMBERS ARE IN THE FOLLOWING GROUPS.  
1- 99 PARTS MOUNTED ON THE CHASSIS.  
101-199 PARTS MOUNTED ON THE POWER SUPPLY CIRCUIT BOARD.  
201-299 PARTS MOUNTED ON THE VIDEO CIRCUIT BOARD.  
301-399 PARTS MOUNTED ON THE KEYBOARD CIRCUIT BOARD.  
401-499 PARTS MOUNTED ON THE LOGIC CIRCUIT BOARD.
  - RESISTORS MOUNTED ON THE VIDEO CIRCUIT BOARD ARE 1/2-WATT, 5% UNLESS MARKED OTHERWISE. RESISTORS MOUNTED ON THE LOGIC CIRCUIT BOARD ARE 1/4-WATT, 5% UNLESS MARKED OTHERWISE. RESISTOR VALUES ARE IN OHMS (K=1,000; M=1,000,000).
  - ALL CAPACITORS ARE IN  $\mu$ F UNLESS MARKED OTHERWISE.
  - THIS SYMBOL INDICATES CHASSIS GROUND.
  - THIS SYMBOL INDICATES CIRCUIT BOARD GROUND.
  - THIS SYMBOL INDICATES WHERE A WIRE CONNECTS TO A CIRCUIT BOARD.
  - THIS SYMBOL INDICATES A MECHANICAL CONNECTOR.
  - THIS SYMBOL INDICATES A PART THAT IS SHOWN ON A CIRCUIT BOARD, BUT IS ACTUALLY MOUNTED ON THE CHASSIS.
  - THIS SYMBOL INDICATES AN INTERRUPTED LINE. LAY A STRAIGHT EDGE ON THE ARROW TO SEE WHERE IT GOES TO OR COMES FROM.
  - THIS SYMBOL INDICATES A DC VOLTAGE TAKEN WITH A HIGH IMPEDANCE VOLTMETER FROM THE POINT INDICATED TO CHASSIS GROUND. VOLTAGES MAY VARY  $\pm 20\%$ .
  - FUSE F1 IS CRITICAL FOR CONTINUED SAFETY. REPLACE IT ONLY WITH A PART OF THE SAME RATING OR WITH THE PROPER HEATH PART.
  - A "0" IS DESIGNATED ON THE ARROW SIDE OF EACH SWITCH SECTION; A "1" ON THE REMAINING SIDE.

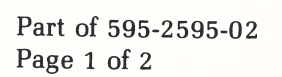
Part of 595-2595-02  
Part 2 of 2

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# SCHEMATIC OF THE HEATHKIT® VIDEO TERMINAL MODEL H-19A



# CUSTOMER SERVICE

## REPLACEMENT PARTS

Please provide complete information when you request replacements from either the factory or Heath Electronic Centers. Be certain to include the **HEATH** part number exactly as it appears in the parts list.

## ORDERING FROM THE FACTORY

Print all of the information requested on the parts order form furnished with this product and mail it to Heath. For telephone orders (parts only) dial 616 982-3571. If you are unable to locate an order form, write us a letter or card including:

- Heath part number.
- Model number.
- Date of purchase.
- Location purchased or invoice number.
- Nature of the defect.
- Your payment or authorization for COD shipment of parts not covered by warranty.

Mail letters to: Heath Company  
Benton Harbor  
MI 49022  
Attn: Parts Replacement

**Retain original parts until you receive replacements. Parts that should be returned to the factory will be listed on your packing slip.**

## OBTAINING REPLACEMENTS FROM HEATH ELECTRONIC CENTERS

For your convenience, "over the counter" replacement parts are available from the Heath Electronic Centers listed in your catalog. Be sure to bring in the original part and purchase invoice when you request a warranty replacement from a Heath Electronic Center.

## TECHNICAL CONSULTATION

Need help with your kit? — Self-Service? — Construction? — Operation? — Call or write for assistance. you'll find our Technical Consultants eager to help with just about any technical problem except "customizing" for unique applications.

The effectiveness of our consultation service depends on the information you furnish. Be sure to tell us:

- The Model number and Series number from the blue and white label.
- The date of purchase.
- An exact description of the difficulty.
- Everything you have done in attempting to correct the problem.

Also include switch positions, connections to other units, operating procedures, voltage readings, and any other information you think might be helpful.

**Please do not send parts for testing**, unless this is specifically requested by our Consultants.

Hints: Telephone traffic is lightest at midweek — please be sure your Manual and notes are on hand when you call.

Heathkit Electronic Center facilities are also available for telephone or "walk-in" personal assistance.

## REPAIR SERVICE

Service facilities are available, if they are needed, to repair your completed kit. (Kits that have been modified, soldered with paste flux or acid core solder, cannot be accepted for repair.)

**If it is convenient, personally deliver your kit to a Heathkit Electronic Center. For warranty parts replacement, supply a copy of the invoice or sales slip.**

If you prefer to ship your kit to the factory, attach a letter containing the following information directly to the unit:

- Your name and address.
- Date of purchase and invoice number.
- Copies of all correspondence relevant to the service of the kit.
- A brief description of the difficulty.
- Authorization to return your kit COD for the service and shipping charges. (This will reduce the possibility of delay.)

Check the equipment to see that all screws and parts are secured. (Do not include any wooden cabinets or color television picture tubes, as these are easily damaged in shipment. Do not include the kit Manual.) Place the equipment in a strong carton with at least **THREE INCHES** of *resilient* packing material (shredded paper, excelsior, etc.) on all sides. Use additional packing material where there are protrusions (control sticks, large knobs, etc.). If the unit weighs over 15 lbs., place this carton in another one with 3/4" of packing material between the two.

Seal the carton with reinforced gummed tape, tie it with a strong cord, and mark it "Fragile" on at least two sides. Remember, the carrier will not accept liability for shipping damage if the unit is insufficiently packed. Ship by prepaid express, United Parcel Service, or insured Parcel Post to:

Heath Company  
Service Department  
Benton Harbor, Michigan 49022





HEATH COMPANY • BENTON HARBOR, MICHIGAN  
***THE WORLD'S FINEST ELECTRONIC EQUIPMENT IN KIT FORM***

LITHO IN U.S.A.