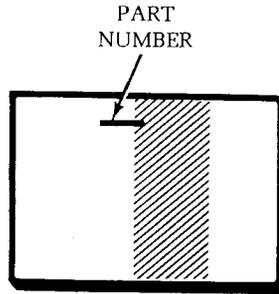
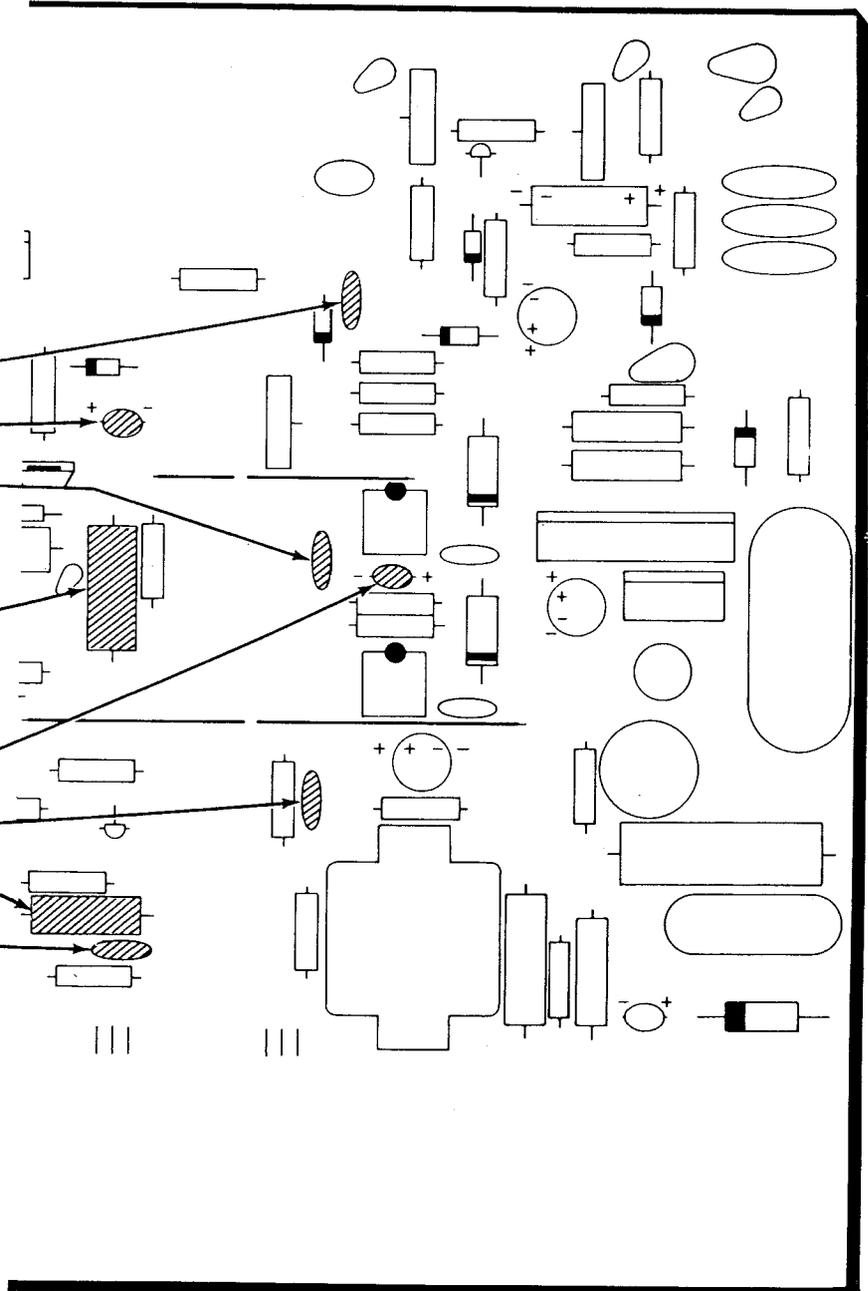


Detail 4-9A



- START** ↓
- ↗) C218: 100 pF ceramic.
 - ↘) C205: 10 μF tantalum.
 - ↗) C222: 100 pF ceramic.
 - ↘) R212: 1500 Ω, 2-watt, 10% (brn-grn-red). Refer to Detail 4-9A and cut two 3/8" pieces of white sleeving and slide them over the leads. Bend the leads and install the resistor into the circuit board holes. Cut off the excess lead lengths.
 - ↗) C204: 10 μF tantalum.
 - ↘) C225: .047 μF Mylar.
 - ↗) R211: .51 Ω, 2-watt (grn-brn-sil).
 - ↘) C201: .001 μF ceramic.
 - ↗) Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 4-9

START ▼

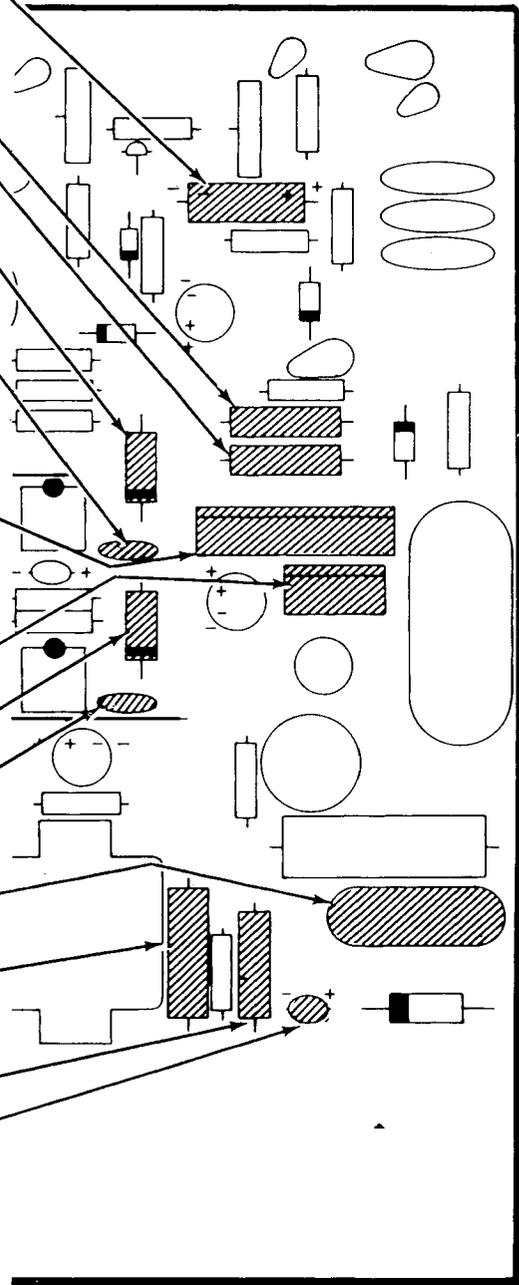
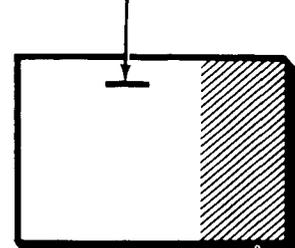
- ✓) C231: 1.5 μ F electrolytic.
- Install 1.2 Ω , 2-watt, 10% (brn-red-gld) resistors at the following locations.
- ✓) R264
- ✓) R263
- ✓) C221: 4700 pF polystyrene. Position the banded end as shown on the circuit board.
- ✓) C219: .01 μ F ceramic.
- ✓) Solder the leads to the foil and cut off the excess lead lengths.
- ✓) P203: 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.

TAB
SHORT PINS
DOUBLE LINE

- ✓) P204: 4-pin plug.
- ✓) C224: 4700 pF polystyrene.
- ✓) C223: .01 μ F ceramic.
- ✓) C229: .006 μ F polypropylene.
- ✓) L203: 8.8 μ H choke (#45-42). Bend the leads toward the slots in the coil form.
- ✓) R263: 1.2 Ω , 2-watt, 10% (brn-red-gld).
- ✓) C227: 10 μ F tantalum.
- ✓) Solder the leads to the foil and cut off the excess lead lengths.

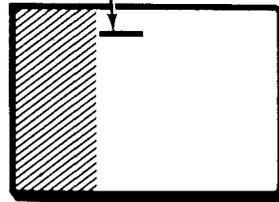
PART NUMBER



PICTORIAL 4-10

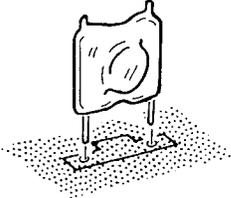


PART NUMBER



START →

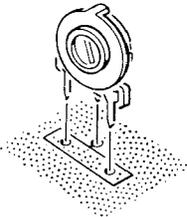
1) L202: 620 μ H coil. Solder the lugs to the foil.



() C212: .22 μ F Mylar.

2) C211: .22 μ F Mylar.

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

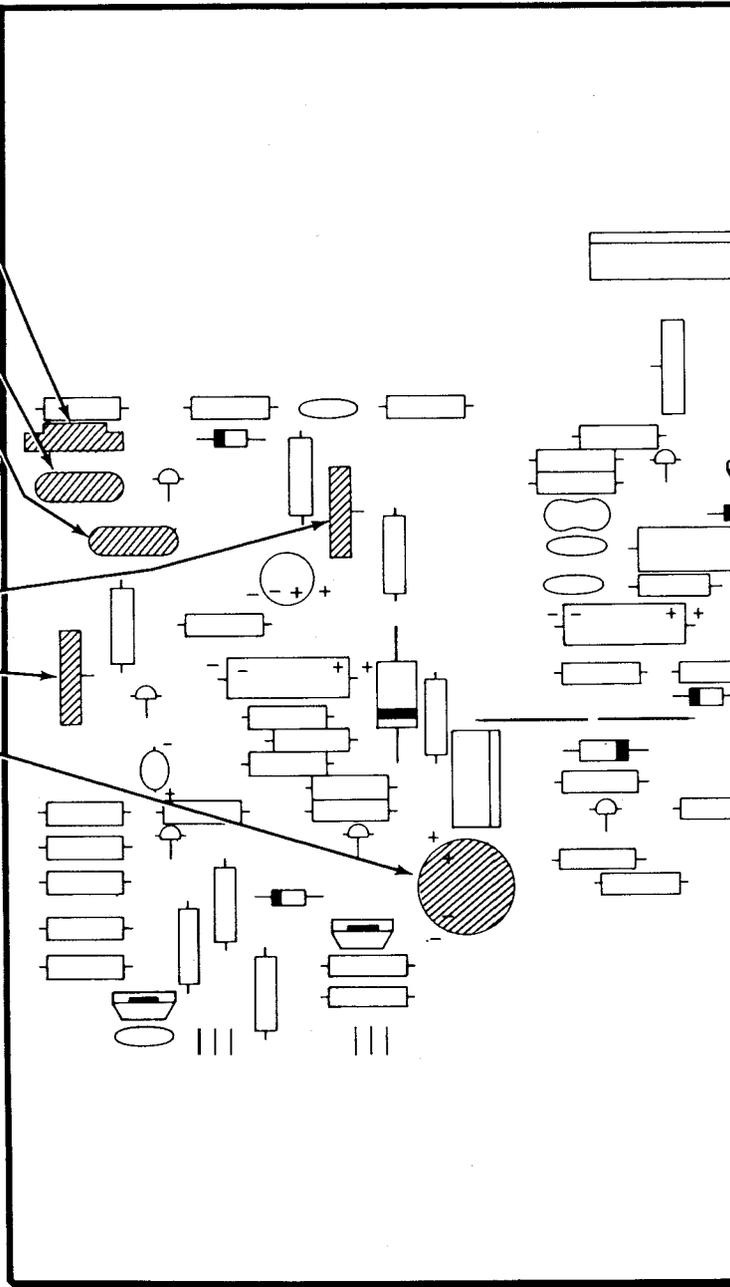


() R226: 20 k Ω control (#10-390).

() R228: 20 k Ω control (#10-390).

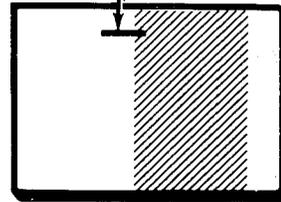
() C217: 330 μ F electrolytic.

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

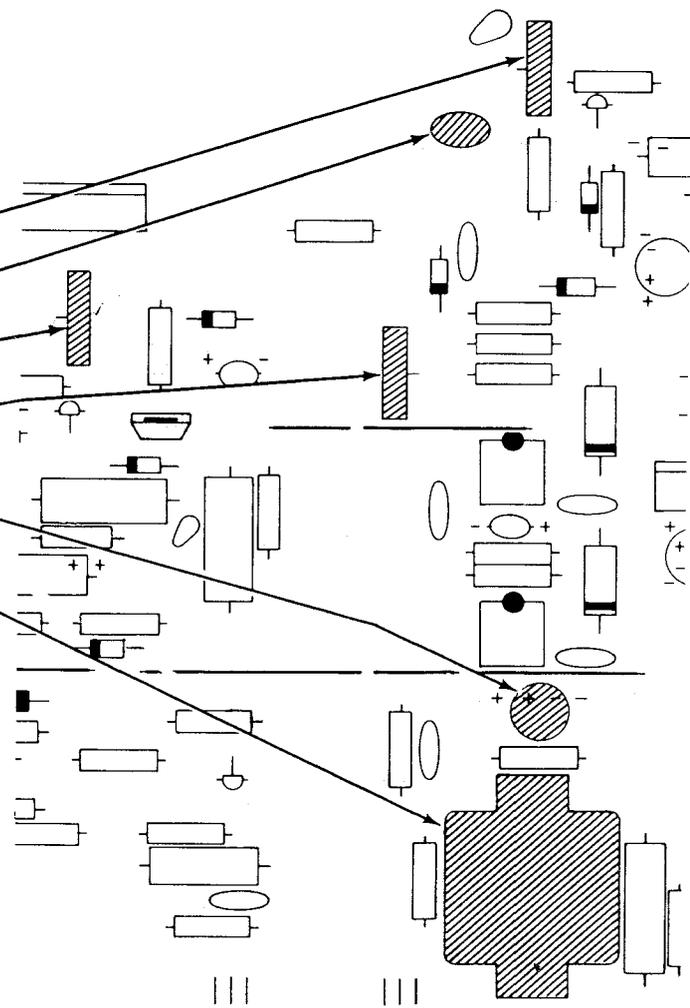


PICTORIAL 4-11

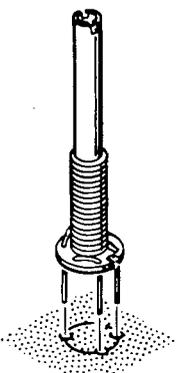
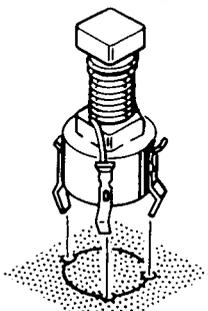
PART
NUMBER

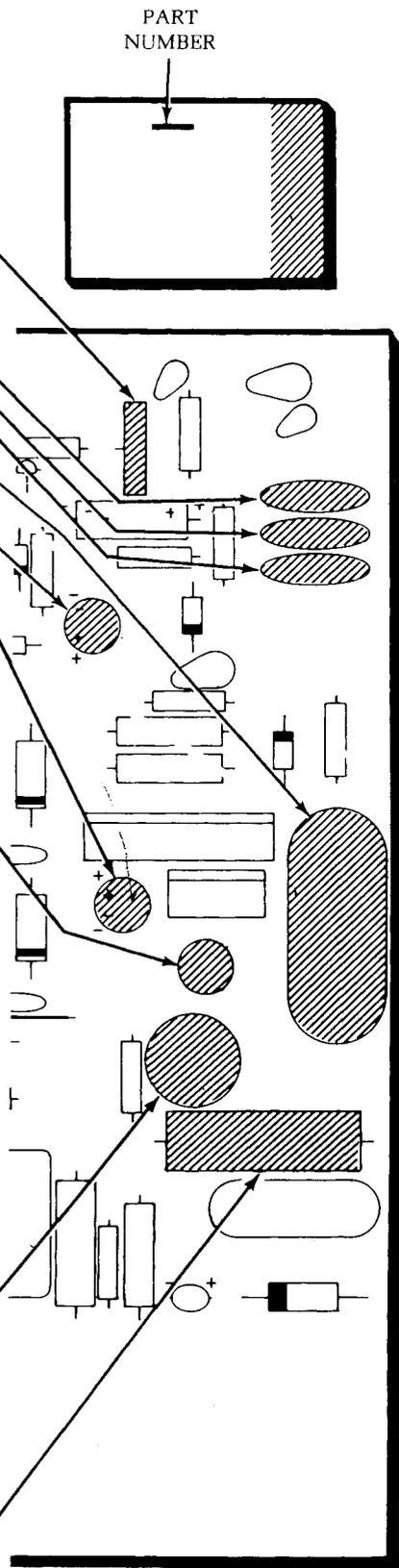


- START** ↓
- ↪) R268: 100 k Ω control (#10-941).
 - ↪) C234: .005 μ F ceramic spark gap.
 - ↪) R216: 500 Ω control (#10-918).
 - ↪) R253: 5000 Ω (5 k) control (#10-311).
 - ↪) C226: 22 μ F electrolytic.
 - ↪) T201: Driver transformer (#51-197). NOTE: This part is located in the main pack.
 - ↪) Solder the leads to the foil and cut off the excess lead lengths.



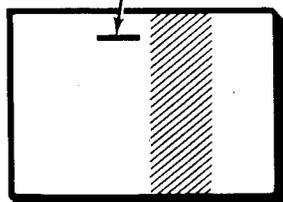
PICTORIAL 4-12

- START** ↓
- () R271: 2 MΩ control (#19-1049).
- Install .02 μF ceramic capacitors at the following three locations.
- () C236
 - () C237
 - () C238
- () C232: .22 μF polypropylene.
 - () C235: 22 μF electrolytic.
 - () C228: 22 μF electrolytic.
- () Solder the leads to the foil and cut off the excess lead lengths.
- () L204: 19 μH coil (#40-1947). Solder the pins to the foil and cut off the excess pin lengths.
- 
- () L205: 52 μH coil (#40-1948). Solder the leads to the foil and cut off the excess lead lengths.
- 
- () C233: 1 μF polycarbonate. Solder the leads to the foil and cut off the excess lead lengths.



PICTORIAL 4-13

PART NUMBER

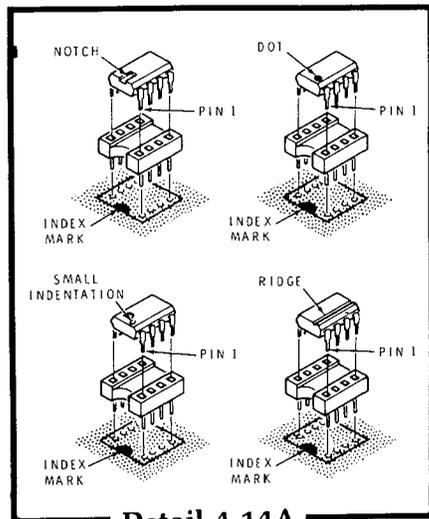
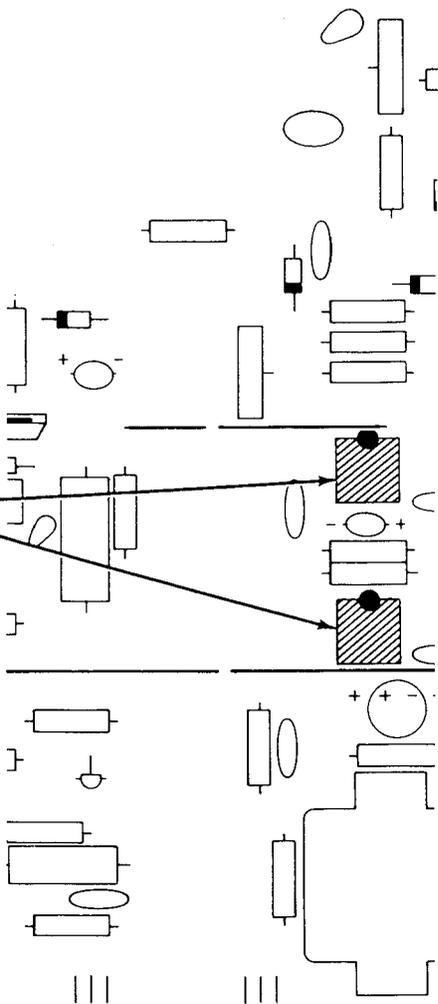


START ↘

Install NE555V integrated circuits (#442-53) at the two following locations. Refer to Detail 4-14A and identify pin 1. Then position pin 1 at the index mark on the circuit board.

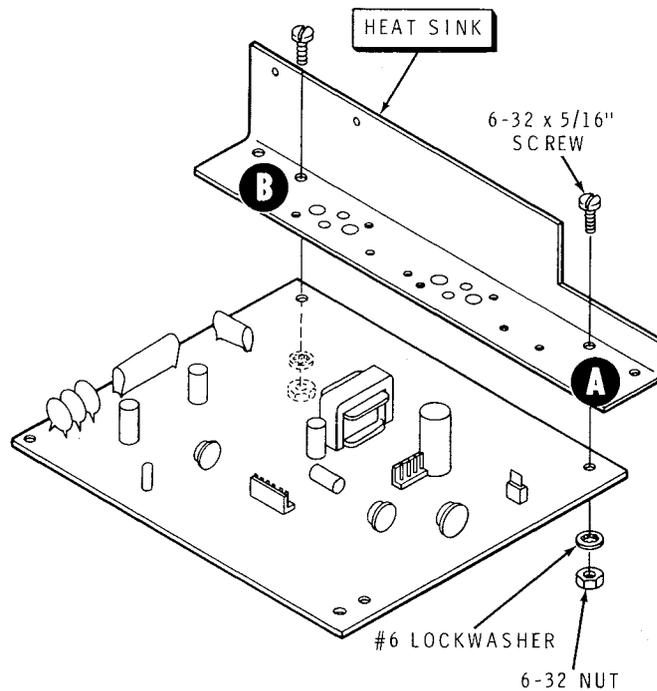
- U201
- U202

FINISH



Detail 4-14A

PICTORIAL 4-14



Detail 4-15A

Refer to Pictorial 4-15 (Illustration Booklet, Page 12) for the following steps.

- () Position the video circuit board as shown.
- () Locate the large heat sink and wipe it clean with a cloth to remove dust and any small metal particles.
- () Refer to Detail 4-15A and mount the large heat sink to the circuit board at A and B with two 6-32 x 5/16" screws, two #6 lockwashers, and two 6-32 nuts.

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 clothes may require professional cleaning, so handle the compound carefully. This compound contains zinc oxides, SiO₂ and slight traces of CO₂.

- () Locate the thermal compound pod that was used earlier.

Note: Do not tighten screws at this time

() Q213: Refer to Detail 4-15B and mount an MJ2841 transistor (#417-282) at Q213 as follows:

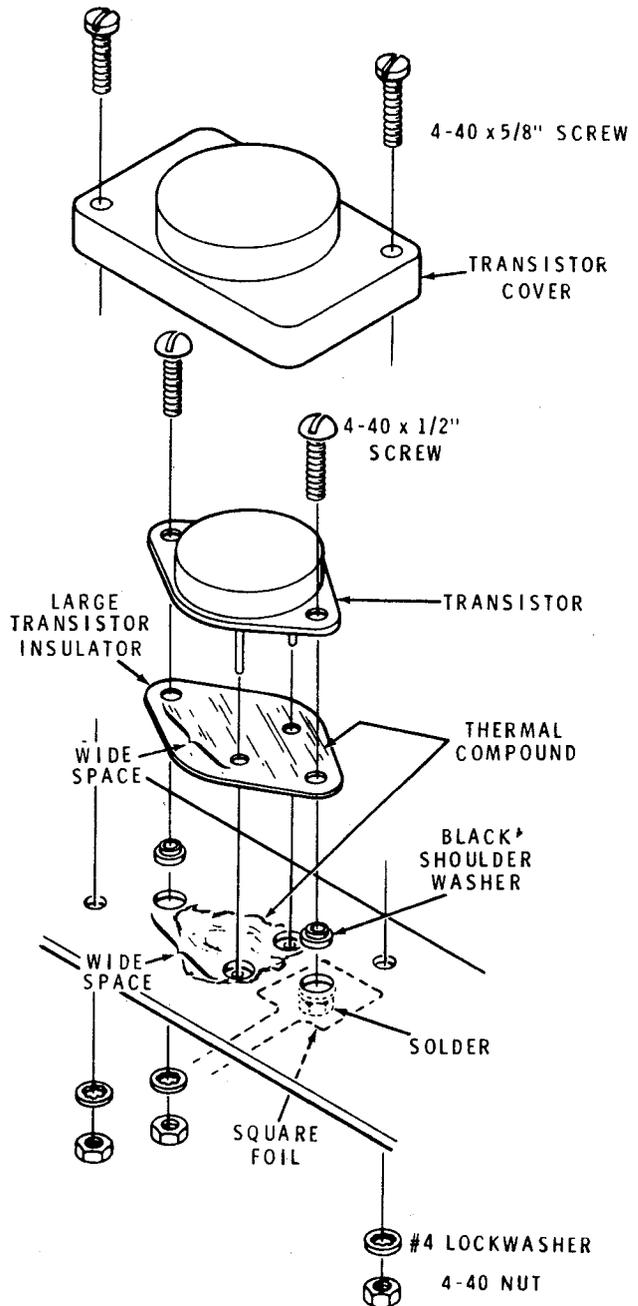
1. Place a black shoulder washer into each of the two transistor mounting holes with the larger part positioned down against the circuit board.
2. Apply a small amount of thermal compound on the heat sink at Q213.
3. Position the transistor insulator on the heat sink at Q213. (Note the wide space.) Apply more thermal compound to the top of the insulator.
4. Insert the transistor leads through the circuit board and mount the transistor with two 4-40 x 1/2" screws, #4 lockwashers, and 4-40 nuts.
5. Solder both of the transistor leads to the circuit board foil and cut off the excess lead lengths.
6. Solder the nut of the transistor mounting hardware to the square foil. The other nut does not have foil around it.

() Q217: In the same manner, mount a BU500 transistor (#417-923) at Q217.

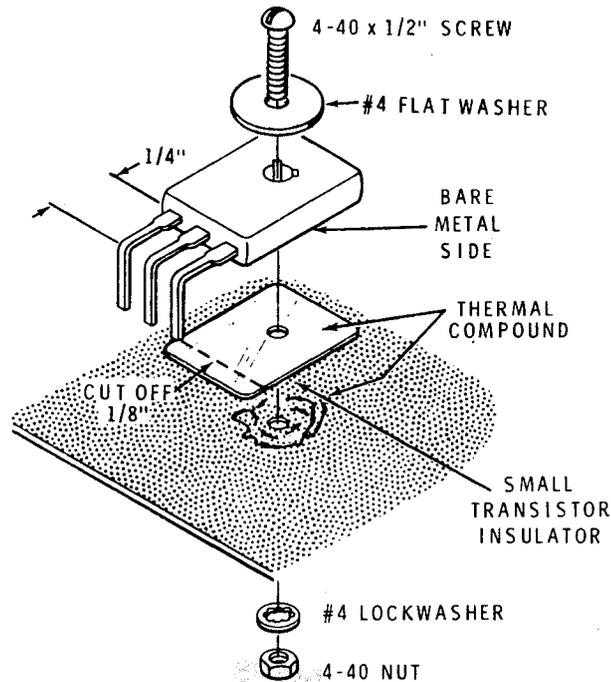
() Mount a transistor cover over transistor Q213 with two 4-40 x 5/8" screws, #4 lockwashers, and 4-40 nuts.

() In the same manner, mount a transistor cover over transistor Q217.

() Tighten the two heat sink mounting screws.



Detail 4-15B



Detail 4-15C

Q207: Refer to Detail 4-15C and mount an MJE182 transistor (#417-932) as follows:

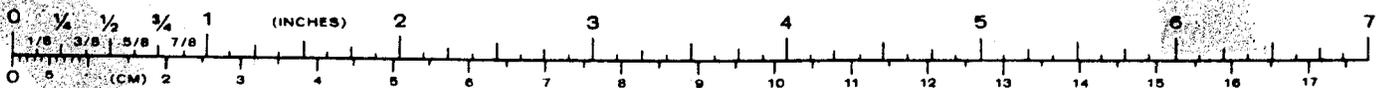
1. Apply a small amount of thermal compound on the heat sink at Q207.
2. Locate a small transistor insulator and cut 1/8" off the lower edge. Then place this insulator onto the heat sink at Q207.
3. Apply more thermal compound to the top of the insulator.
4. Bend the leads of transistor 90° toward the bare metal side. The bend should be 1/4" from the bottom of the transistor.
5. Insert the transistor leads into the B, C and E holes in the circuit board. Then mount the transistor with a 4-40 x 1/2" screw, a #4 lockwasher, a #4 flat washer and a 4-40 nut. Do not overtighten this hardware.

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

Q211: In the same manner, mount an MJE172 transistor (#417-924) at heat sink location Q211.

Q216: Again, mount an MJE340 transistor (#417-195) at Q216.

Q208: Mount an MJE172 transistor (#417-924) at Q208. Do not use an insulator with this transistor. Apply thermal compound to the transistor.



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.

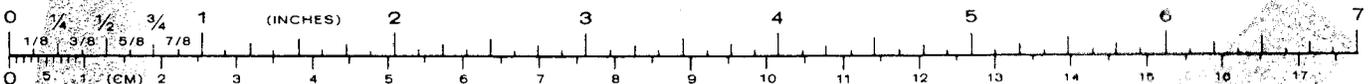
- Unsoldered connections.
- Poor solder connections.
- Solder bridges between foil patterns. NOTE: If you suspect a solder bridge, check the foil on the circuit board against the foil pattern shown in the X-Ray View section of the Operation Manual.
- Protruding leads which could touch together.

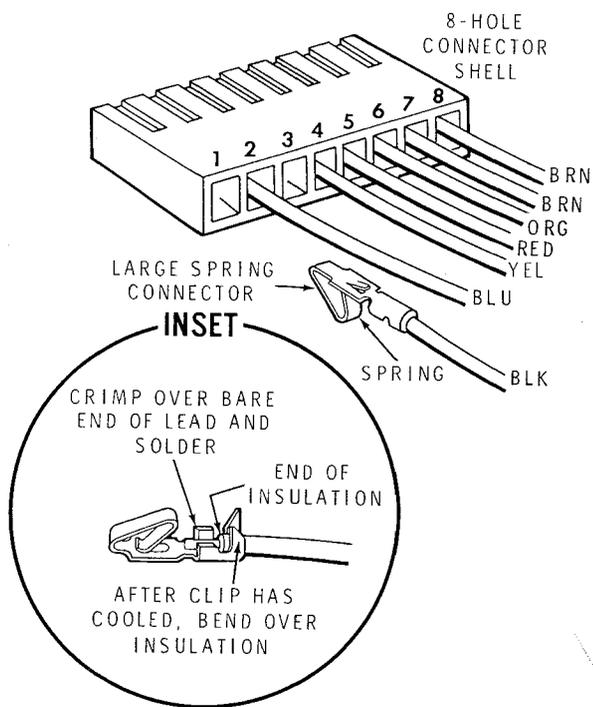
When you make the following visual checks, refer to the Pictorial where the part was installed and check it against the installation instructions.

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

Locate the CRT socket with leads and cut 2" off the end of the yellow lead. Prepare the end of the yellow lead. Then solder the leads to the circuit board holes as follows:

- Black to GND. (Use either hole.)
- Red to G2.
- White to G4.
- Green to G1.
- Both brown leads to FIL.
- Yellow to K.
- Cut off any excess lead length on the foil side of the circuit board.
- Install a small cable tie around all of the leads coming from the CRT socket, except for the yellow lead. Position this tie approximately 4" from the socket. Position the yellow lead away from the other leads.
- Prepare a 7-1/4" black stranded wire. Then crimp and solder a push-on connector on one end of the black wire.
- Solder the other end of this black wire to the other hole marked GND on the circuit board.
- Locate the flyback transformer in the main pack and cut the bare end of each lead to 1/8".





Detail 4-15D

() Refer to the inset drawing on Detail 4-15D and crimp and solder a large spring connector onto each flyback transformer lead.

Refer to Detail 4-15D and insert the flyback transformer leads into an 8-hole connector shell as follows. Be sure to position the slotted side of the shell as shown.

- () Black in hole 1.
- () Blue in hole 2.
- () None in hole 3.
- () Yellow in hole 4.
- () Red in hole 5.
- () Orange in hole 6.
- () Either brown in hole 7.
- () Other brown in hole 8.
- () Install a small cable tie around the flyback transformer leads approximately 2" from the transformer.

NOTE: In the next step, when you remove the nuts from the flyback transformer mounting bracket; be sure to hold the transformer halves together or they will come apart.

() Remove the two 4-40 nuts (and the rubber band, if there is one) from the flyback transformer mounting bracket. Mount the transformer to the heat sink at C and D with two #4 lockwashers and the two 4-40 nuts. Do not overtighten the nuts.

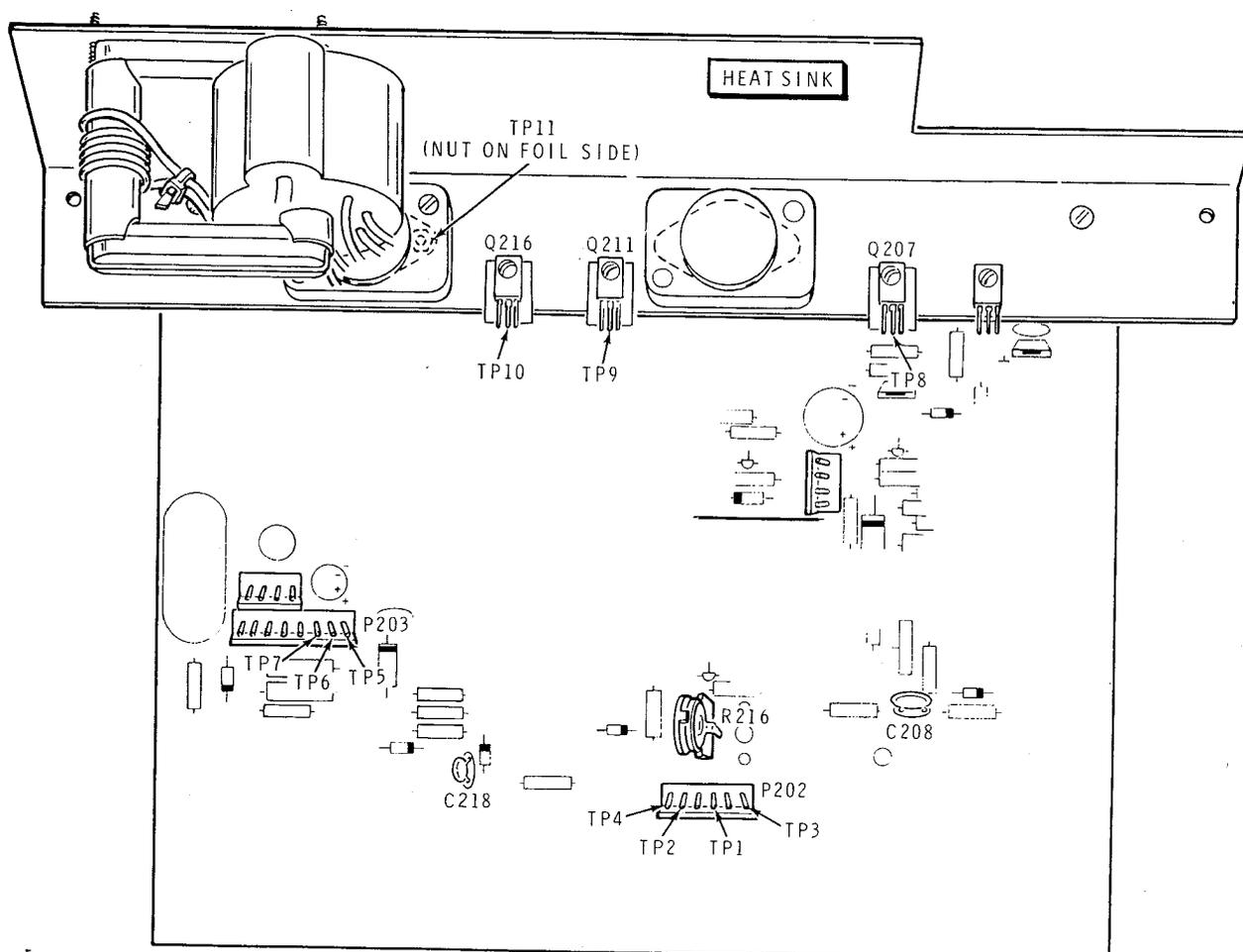
() Remove the backing paper from the "DANGER" label and press the label to the front of the heat sink under the flyback transformer.

INSTALLATION AND CHECKOUT

POWER OFF TESTS

Refer to Pictorial 4-16 for the following steps.

- () Set your ohmmeter to the $\times 1000$ range if the range is not indicated otherwise.
- () Connect the negative meter lead to the video circuit board heat sink. Leave the lead at this location for the following tests.



PICTORIAL 4-16



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.

NOTE: A Heath vacuum tube voltmeter was used to make these measurements. If you are using a digital type or other than vacuum tube type meter, your measurements may vary.

POSITIVE METER LEAD TO:	APPROXIMATE METER READING	POSSIBLE AREA OF TROUBLE (Refer to "Possible Circuit Board Problems" on Page 96.)
TP1	Greater than 150 Ω (ohmmeter range × 100)	1. Transistor Q215.
TP2	Greater than 5000 Ω.	1. Transistors Q211, Q212, Q213.
TP3	INFINITE	1. Solder bridge on foil.
TP4	INFINITE	1. Solder bridge on foil.
TP5	Greater than 100 kΩ	1. Solder bridge on foil.
TP6	INFINITE	1. Solder bridge on foil.
TP7	Greater than 2000 Ω	1. Capacitor C228.
TP8	Greater than 2000 Ω	1. Transistors Q205, Q207.
TP9 (collector of Q211).	Greater than 2000 Ω	1. Transistors Q211, Q212.
TP10 (collector of Q216).	Greater than 2000 Ω	1. Transistor Q216. 2. T201.
TP11 (nut on foil side).	INFINITE <i>3 kΩ</i>	1. Transistor Q217. 2. Diode D208.

*infinite + gnd OK according to Benten
Trans OK
Diode OK*

Disconnect the meter leads.

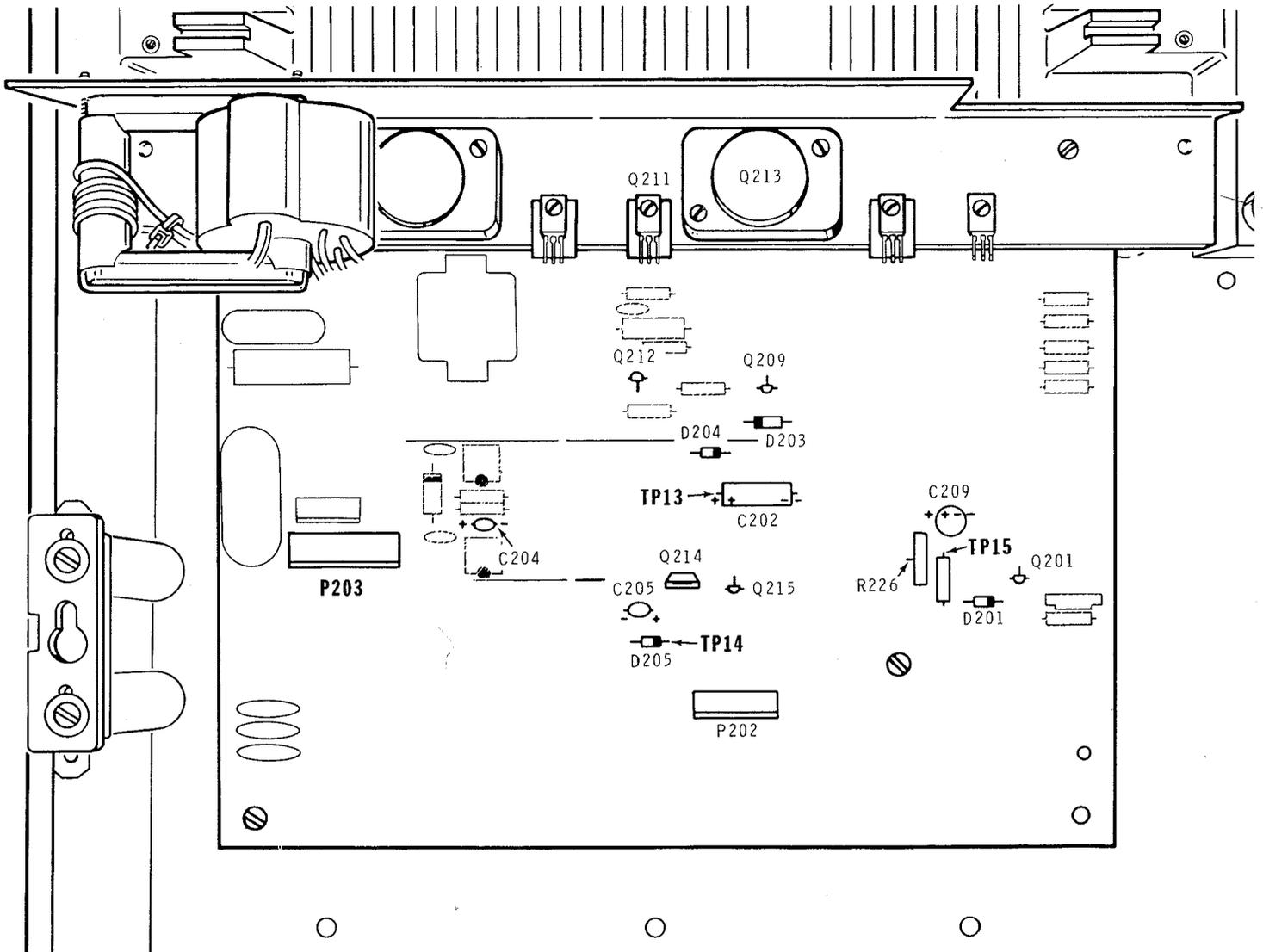
NOTE: In the following steps, remove the necessary parts and hardware from the final pack.

Position the black ground wire (coming from GND on the video circuit board) over the edge of the base so it does not touch other connections.

Refer to Pictorial 4-17 (Illustration Booklet, Page 12) and mount the video circuit board to the terminal base with four 6-32 × 3/8" screws. Be sure to position the harness and all other wires except the green wire on top of the circuit board.

Push the 6-hole connector on the harness onto plug P202 on the video circuit board.

Connect the negative lead of your meter to the heat sink. Set your meter to read DC volts.



PICTORIAL 4-18



POWER ON TESTS

WARNING: MAKE SURE THAT THE FLYBACK CONNECTOR IS NOT CONNECTED TO THE CIRCUIT BOARD PLUG P203.

Refer to Pictorial 4-18 for the following tests.

- ✓) Connect the line cord plug to an AC outlet and set the POWER switch to ON.
- ✓) Set your voltmeter to read approximately 150 volts DC. Reduce this range setting if a lower range is necessary.
- ✓) 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 80.)
() TP13	53 VDC <i>12V</i> <i>53 ✓</i>	<ol style="list-style-type: none"> 1. 6-hole connector (one pin off on plug P202). 2. Diodes D203, D204, or D205. 3. Capacitor C202. 4. Transistors Q209, Q211, Q212, Q213.
() TP14	6.2 VDC <i>4V</i> <i>6.2V</i>	<ol style="list-style-type: none"> 1. Diodes D205 or D206. 2. Capacitors C202, C204, or C205. 3. Transistors Q214, Q215.
() TP15	Approximately 7 V. vary control R226; meter reading should change <i>7V</i> <i>10</i> <i>3 or 4 or 2</i>	<ol style="list-style-type: none"> 1. Diode D201. 2. Capacitor C209. 3. SCR Q201.

- ✓) 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. Proceed to "Terminal Base Assembly (Cont'd.)"

TERMINAL BASE ASSEMBLY (Cont'd.)

FRONT PANEL AND CRT INSTALLATION

Refer to Pictorial 5-1 (Illustration Booklet, Page 13) for the following steps.

- () Locate the front panel and place it on your work surface on a soft cloth.
- () Install brass inserts in the front panel at CA, CB, CC, and CD. Use the 6-32 × 3/8" hex head screw as before. Save this screw; it will be used again later.
- () Mount the bezel cover to the front of the front panel with the bezel mounting plate and six 6-32 × 3/8" screws.
- () If there is a plastic film over the face of the CRT, remove it.
- () Place the CRT face down in the front panel as shown. Note the position of the anode socket.
- () Locate two beveled spacers, a ground connector, a #10 flat washer, and a 10 × 1-1/2" self-tapping screw. Use these parts in the next step.
- () Refer to the inset drawing on Pictorial 5-1 and bend one end of the ground lug at a 90° angle as shown. Do not bend this lug at the mounting hole.

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

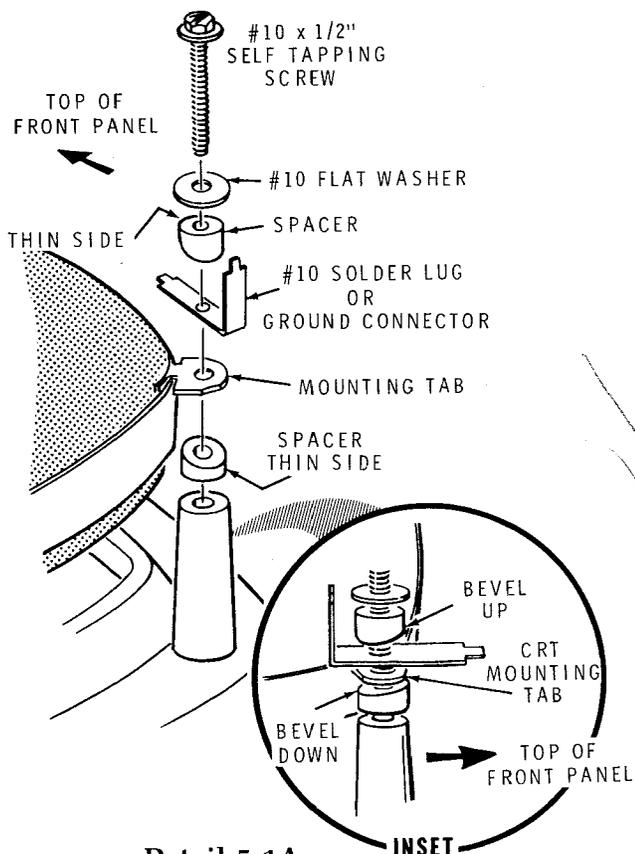
WARNING

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 violence.

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, as you can receive an electrical shock even though the CRT has not been used.

- () Refer to Detail 5-1A and mount the CRT mounting tab to the front panel at CE with the hardware from the previous step. Do not tighten this hardware.
- () In the same manner mount the CRT mounting tab at the other three corners of the CRT except use a #10 solder lug at each location in place of the ground lug.
- () Refer to the inset drawing on Detail 5-1A and position the bevel of the spacers at CE as shown. Also refer to Pictorial 5-1 and position the ground lug as shown. Then tighten the hardware.
- () In the same manner, position the spacers and solder lugs at the other three corners of the CRT and tighten the hardware.
- () Open the CRT box from the end that is printed "Open This End." Then hold the CRT in the box and turn the box bottom-side-up on a padded surface.
- () ~~Lift the box slowly, allowing the CRT to slide out onto the padded surface.~~

*Remove the CRT
! Safely! Not by
the neck!*



Detail 5-1A

INSET

- () Connect the hooked end of a spring to solder lug CF and connect another spring to CG.
- () Insert one end of the bare wire through the **upper hole** in the ground connector at CE for a length of a 1-1/2" and wrap it back around itself to secure it. Then solder the wire to the lug.
- () Route the other end of this wire through the springs at CF and CG and through solder lug CH. Pull on the wire until both springs are stretched slightly. Then securely fasten the wire back on itself at CH. Cut off the excess bare wire.
- () Locate the yoke and trim the bare wire ends to 1/8".

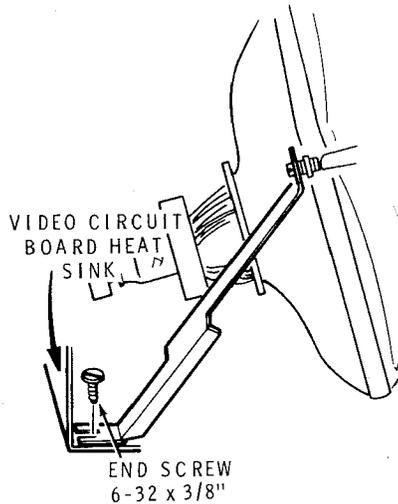
- () Crimp and solder a large spring connector to the end of each yoke lead.
- () Insert the spring connector on the blue yoke lead into hole 4 of a 4-hole connector shell.
- () In the same manner, insert the red yoke lead into hole 2 of the same connector shell.
- () Insert the spring connector on the yellow yoke lead into hole 1 of another 4-hole connector shell.
- () In the same manner, insert the brown yoke lead into hole 3 of the same connector.
- () Slide the yoke over 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.

Refer to Pictorial 5-2 (Illustration Booklet, Page 14) for the following steps.

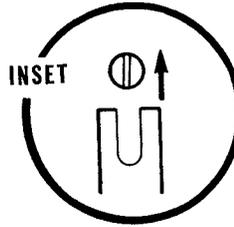
- () Position the front of the terminal base over the edge of your work surface far enough so you can reach the mounting holes underneath. Be careful that you do not extend the base too far over the edge.
- () Locate four 10-32 x 1" screws, four #10 flat washers, and two front panel mounting plates. Use this hardware in the following step.

NOTE: It is advisable to have someone help you mount the front panel in the following steps.

- () Set the front panel into the terminal base and secure it with the hardware from the previous step. Install all of the hardware before you tighten it. Position the front panel as far forward as the hardware will permit. Then set the terminal base back on your work surface.



Detail 5-2A



- () Refer to Detail 5-2A and loosen the screw at CH and the 6-32 x 3/8" screw at the left end of the video circuit board heat sink. Do not remove these screws.
- () Refer to the inset drawing on Detail 5-2A and insert the lower end of the brace under the 6-32 x 3/8" screw on the heat sink. Insert the other end of the brace under the screw at CH. Tighten both screws.
- () Make sure that the high voltage lead is not positioned near the brace or arcing may occur. Reposition the high voltage lead if necessary.

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

KEYBOARD ASSEMBLY

Refer to Pictorial 5-3 (Illustration Booklet, Page 14) for the following steps.

- () Position the circuit board with the foil side facing up. Make sure there are two pins present at each key location under the keyboard. If a pin is missing at any of the designated hole locations, remove the keyboard mounting hardware, straighten the bent pin, and replace the keyboard. After you check all of the pad locations for pins, solder the pins to the foil.

- () Position the keyboard facing up as in the Pictorial.

- () Mount the 4-key keypad (Off Line-f1-f2-f3) at location A with a #4 x 3/8" self-tapping screw. Position the keypad as shown and solder the pins to the foil.

- () Mount the 4-key keypad (f4-f5-Erase-Blue) at location B with two #4 x 3/8" self-tapping screws. Position the keypad as shown and solder the pins to the foil.

Mount the 4-key keypad (Red-White-Reset-Break) at location C with two #4 x 3/8" self-tapping screws. Position the keypad as shown and solder the pins to the foil.

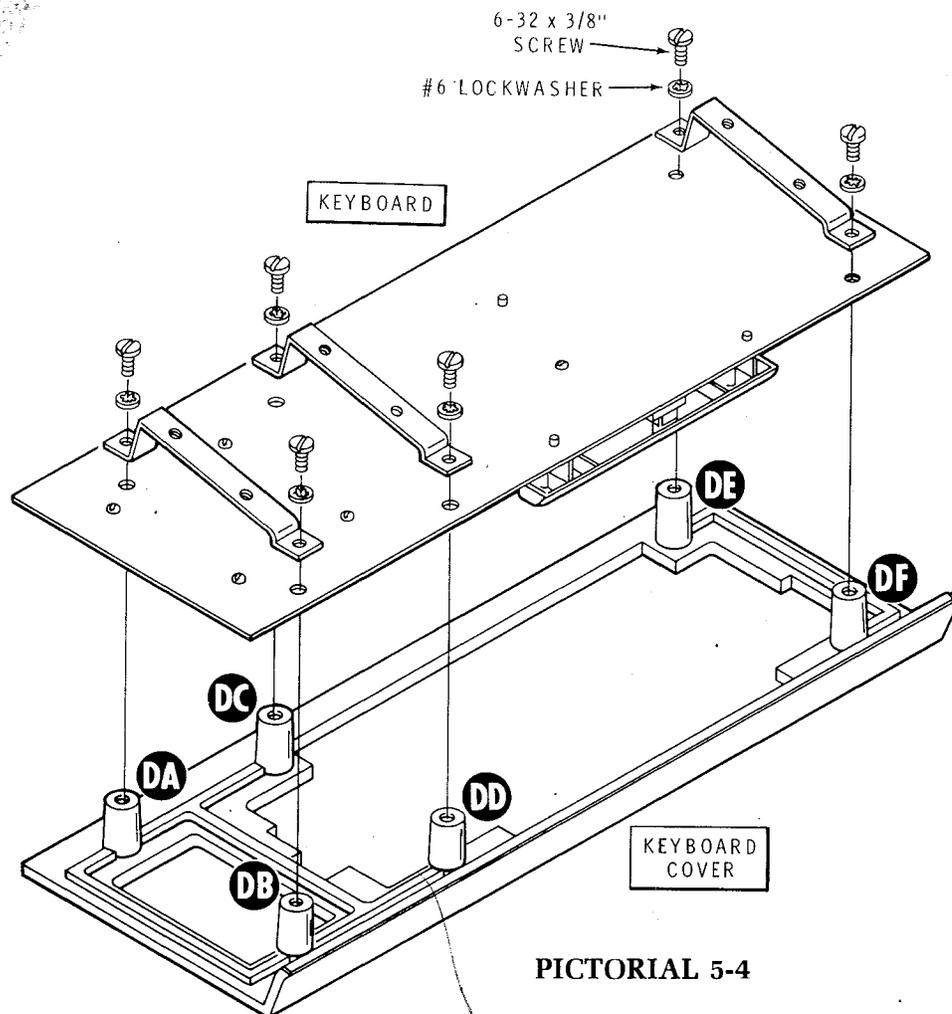
- () Mount the 12-key keypad at location D with four #4 x 3/8" self-tapping screws. Position the keypad as shown and solder the pins to the foil.

- () Mount the 34-pin plug at location E. Insert the right angle pins through the circuit board holes and solder the pins to the foil.

CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following conditions:

- () Unsoldered pin connections.
- () Poor solder connections.
- () Solder bridges between foil patterns.

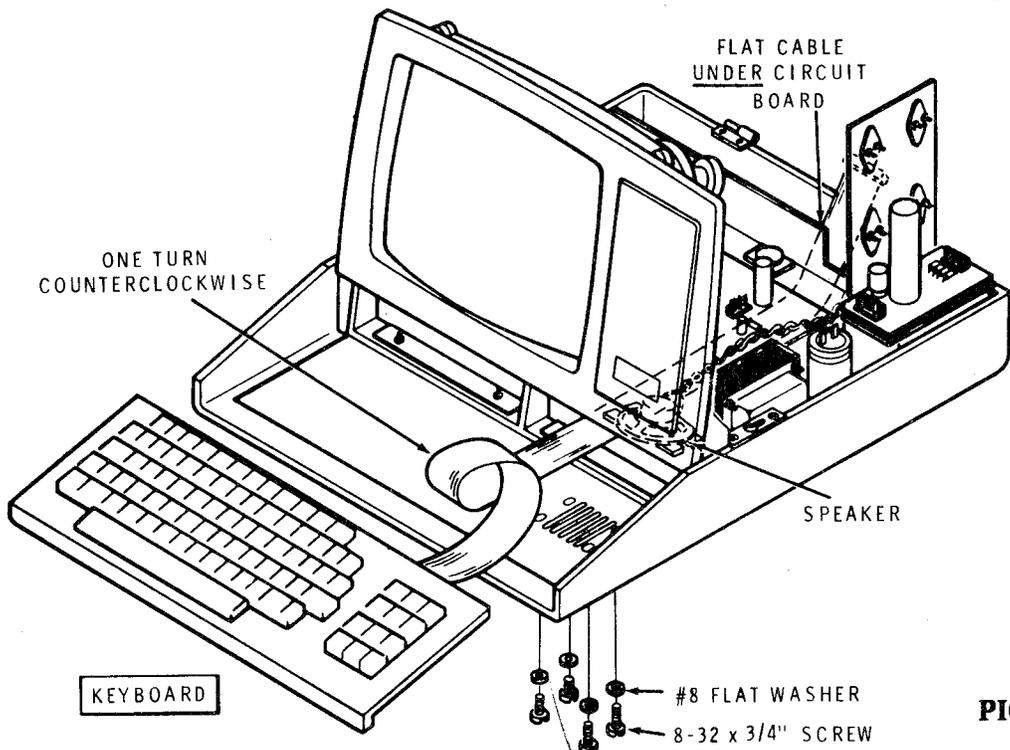
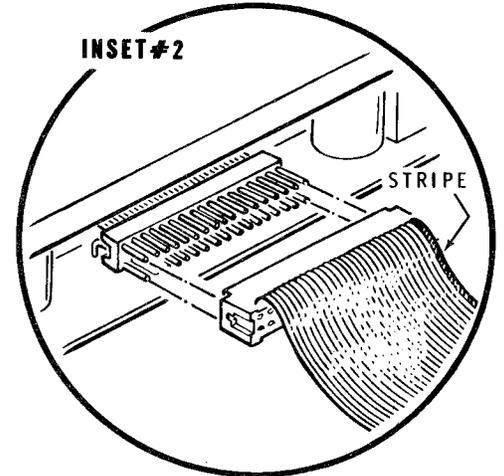
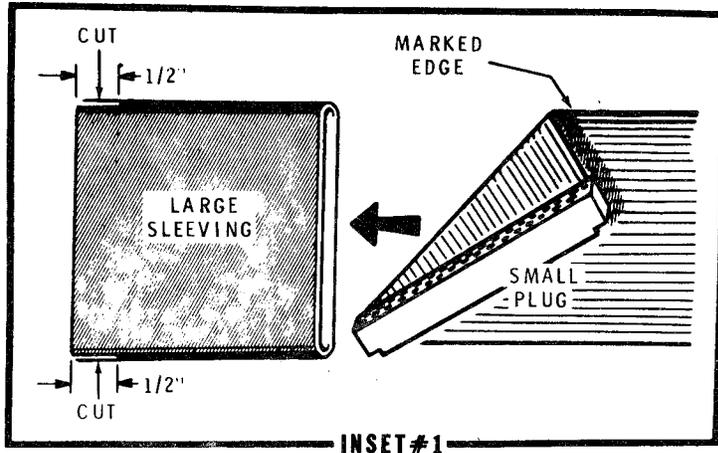


KEYBOARD INSTALLATION

Refer to Pictorial 5-4 for the following steps.

- () Locate the keyboard cover and place it painted side down on a soft cloth.
- () Install brass inserts into the bosses at DA, DB, DC, DD, DE and DF.
- () Place the keyboard in the keyboard cover. Then mount a keyboard bracket at DE and DF with two 6-32 × 3/8" screws and two #6 lockwashers. Do not tighten this hardware.

- () In the same manner, install a keyboard bracket at DA and DB. Do not tighten this hardware.
- () Install a keyboard bracket at DC and DD. Gently tighten the hardware on all three brackets.
- () Push all of the keys nearest the keyboard cover and check for freedom of movement. If any of the keys bind against the keyboard cover, loosen the screws in the keyboard brackets and reposition the cover. Then tighten the screws.



PICTORIAL 5-5

Refer to Pictorial 5-5 for the following steps.

- (1) Locate the large sleeving and make two 1/2" cuts in it at one end (see inset drawing #1).
- (2) Refer again to inset drawing #1 and twist one end of the cable. Then slide the uncut end of the sleeving over the cable. Flatten the cable out again and slide the sleeving down to the connector.
- (3) Refer to inset drawing #2 on Pictorial 5-5 and push the non-sleeving end of the flat cable onto plug P301 on the keyboard. Note the stripe along the edge of the cable. The sleeving should be at the other end of this cable.
- (4) Set the keyboard in front of the terminal as shown. Then twist the flat cable one full turn counterclockwise.
- (5) Route the end of the flat cable through the opening in the front panel and under the video circuit board.
- (6) Mount the keyboard to the terminal base with six 8-32 x 3/4" screws and six #8 flat washers.



SPEAKER INSTALLATION

Refer to Detail 5-5A for the next eight steps.

1. Locate the brown wire and cut it into two equal lengths. Then twist these two wires together to form a twisted pair.

2. Remove 1/8" of insulation from one end of each brown wire and 1/4" of insulation from the other end. Apply a small amount of solder to the bare wire ends to hold the fine wire strands in place.

Small Solder
3. Crimp and solder small spring connectors onto the 1/8" ends of the twisted pair.

4. Insert the spring connectors into a 3-hole connector shell as shown.

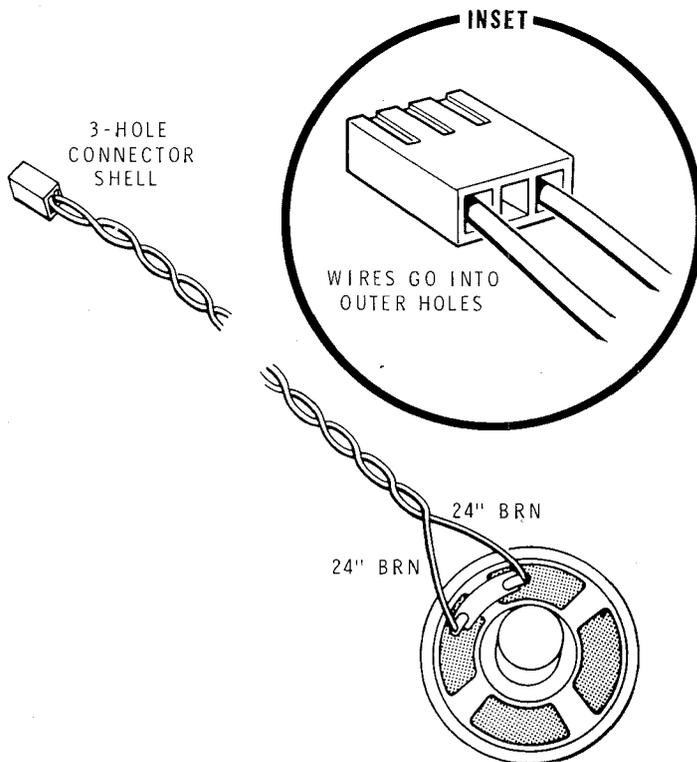
5. Solder the other end of the twisted pair to the speaker lugs. It does not matter which wire goes to which lug.

6. Locate the 3/4" x 5" foam gasket and cut it into two equal lengths.

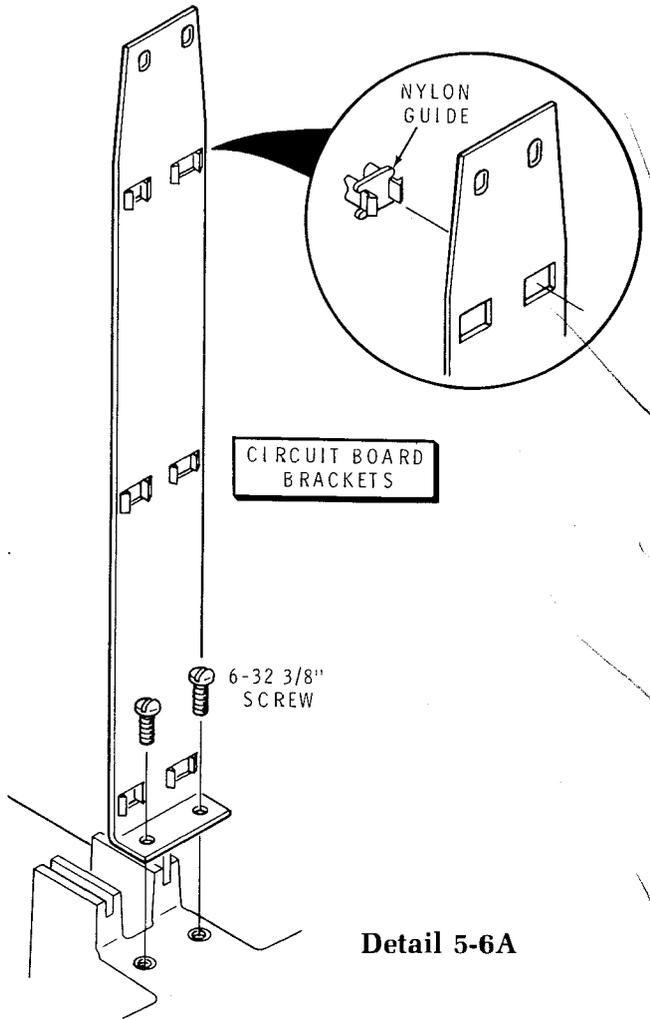
7. Remove the protective paper backing from one side of both foam gaskets and press the gaskets to the cone side of the speaker. It does not matter if the gasket sticks to the paper cone; however, do not press on the paper cone.

8. Remove the protective paper backing from the other side of the foam gasket. Then press the speaker to the back of the front panel just forward of the power transformer.

Route the speaker wires along the video circuit board toward the rear panel and under the video circuit board heat sink.



Detail 5-5A



Detail 5-6A

TERMINAL LOGIC AND CPU LOGIC CIRCUIT BOARD INSTALLATION

Refer to Pictorial 5-6 (Illustration Booklet, Page 15) for the following steps.

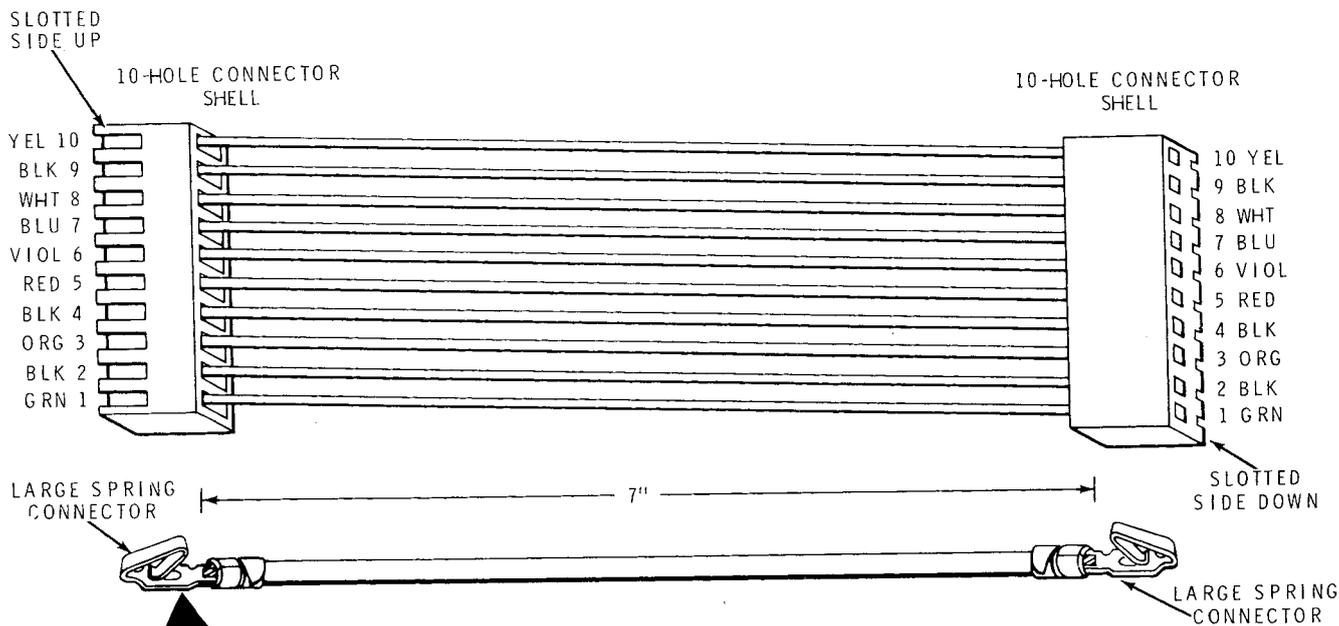
- () Locate two circuit board brackets and twelve nylon guides.
- () Refer to Detail 5-6A and install these nylon guides into each bracket.
- () Refer again to Detail 5-6A and mount the brackets in the base with four 6-32 × 3/8" screws.
- () Locate the interconnect cable (9-wire cable with 15-hole connectors on each end). Lay this cable in the base as shown. It will be connected later.

- () Locate the prewired terminal logic circuit board. Then refer to Detail 5-6C and set the sliders on S401 as shown.
- () Set all of the sliders on S402 to their "0" positions.
- () Position the terminal logic circuit board with its component side toward the front and the heat sink on top. Then slide it down into the rear set of nylon guides. Set the bottom of the board into the grooves in the base.
- () Push the connector on the end of the twisted speaker wires onto plug P402 on the logic circuit board.
- () Push the connector on the flat cable onto plug P403 on the logic circuit board. Make sure the cable is positioned with the stripe away from the edge of the circuit board.
- () Refer to the inset drawing on Pictorial 5-6 and push the back connector of the interconnect cable onto plug P404 (on the foil side of the terminal logic circuit board). Make sure the pin 1 end of the connector (black wire) is positioned up.
- () Secure the circuit board heat sink to the circuit board brackets with two 6-32 × 3/8" screws.

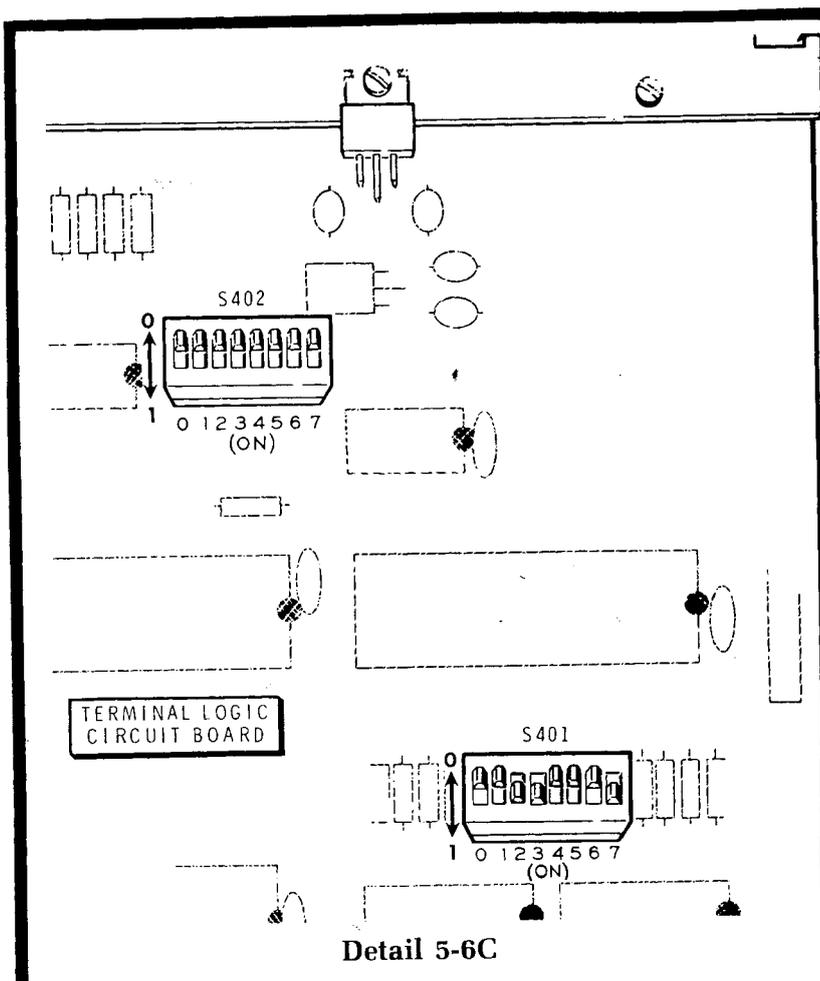
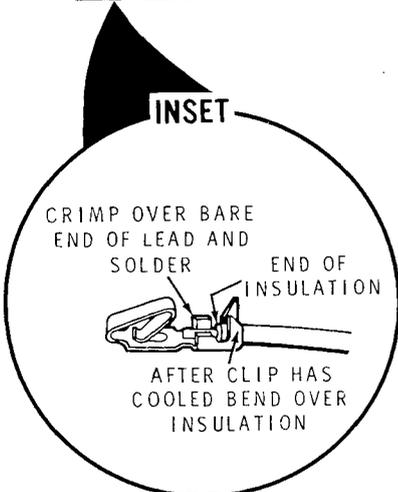
- () Prepare the following stranded wires. Remove 1/8" insulation from both ends of each wire.

- | | |
|-----------|-----------|
| 7" green | 7" violet |
| 7" black | 7" blue |
| 7" orange | 7" white |
| 7" black | 7" black |
| 7" red | 7" yellow |

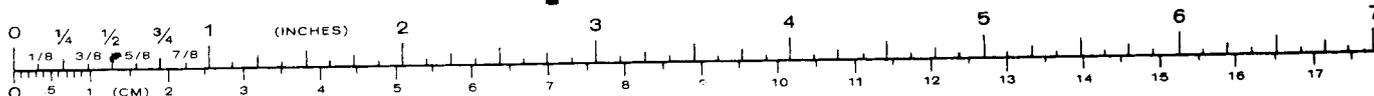
- () Refer to Detail 5-6B and crimp and solder large spring connector onto both ends of each wire.
- () Again refer to Detail 5-6B and insert the prepared wires into two 10-hole connector shells as shown.
- () Connect one end of the 7" cable that you just prepared onto plug P401. The other end of this cable will be connected later.

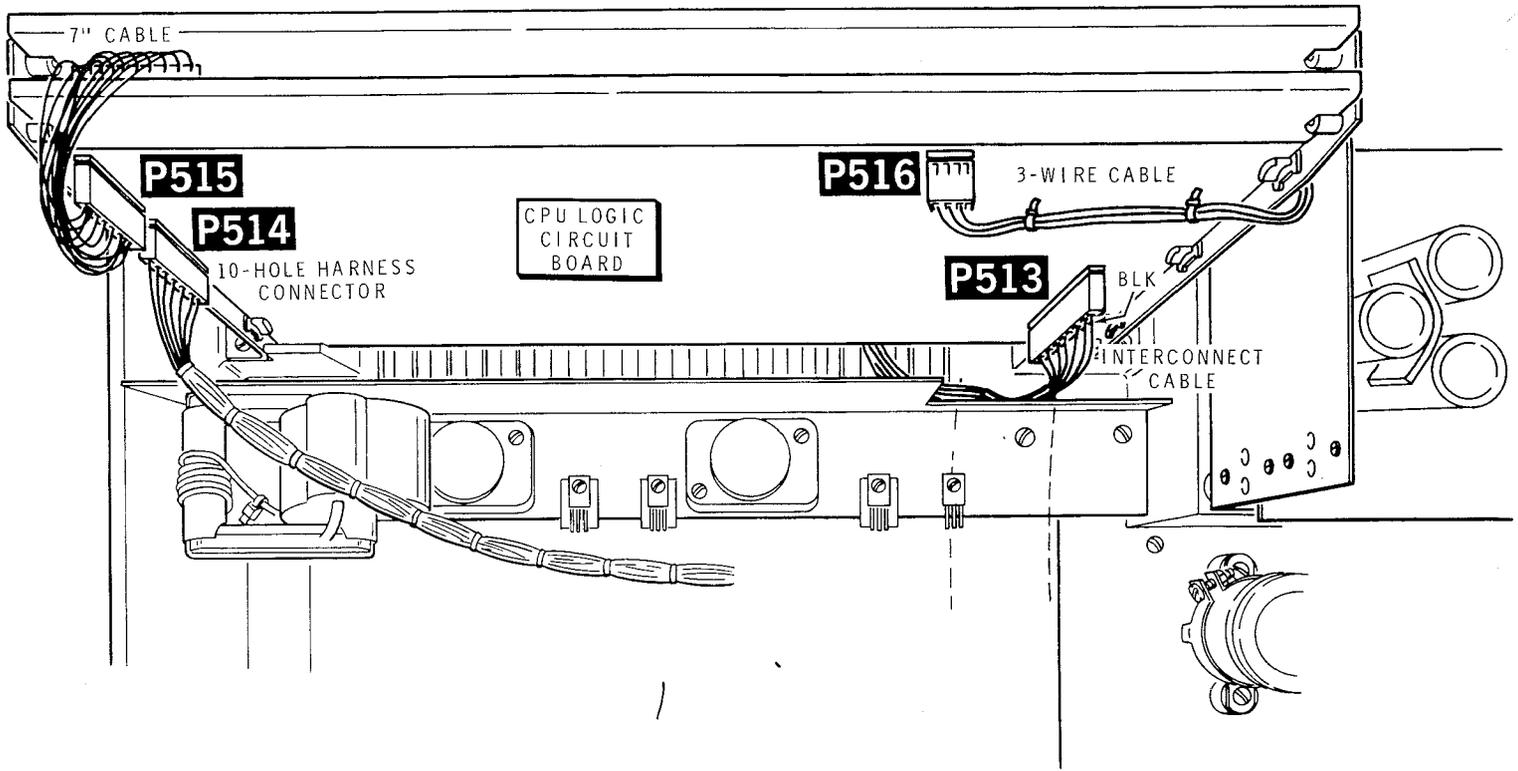


Detail 5-6B



Detail 5-6C



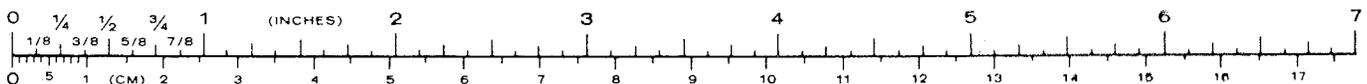


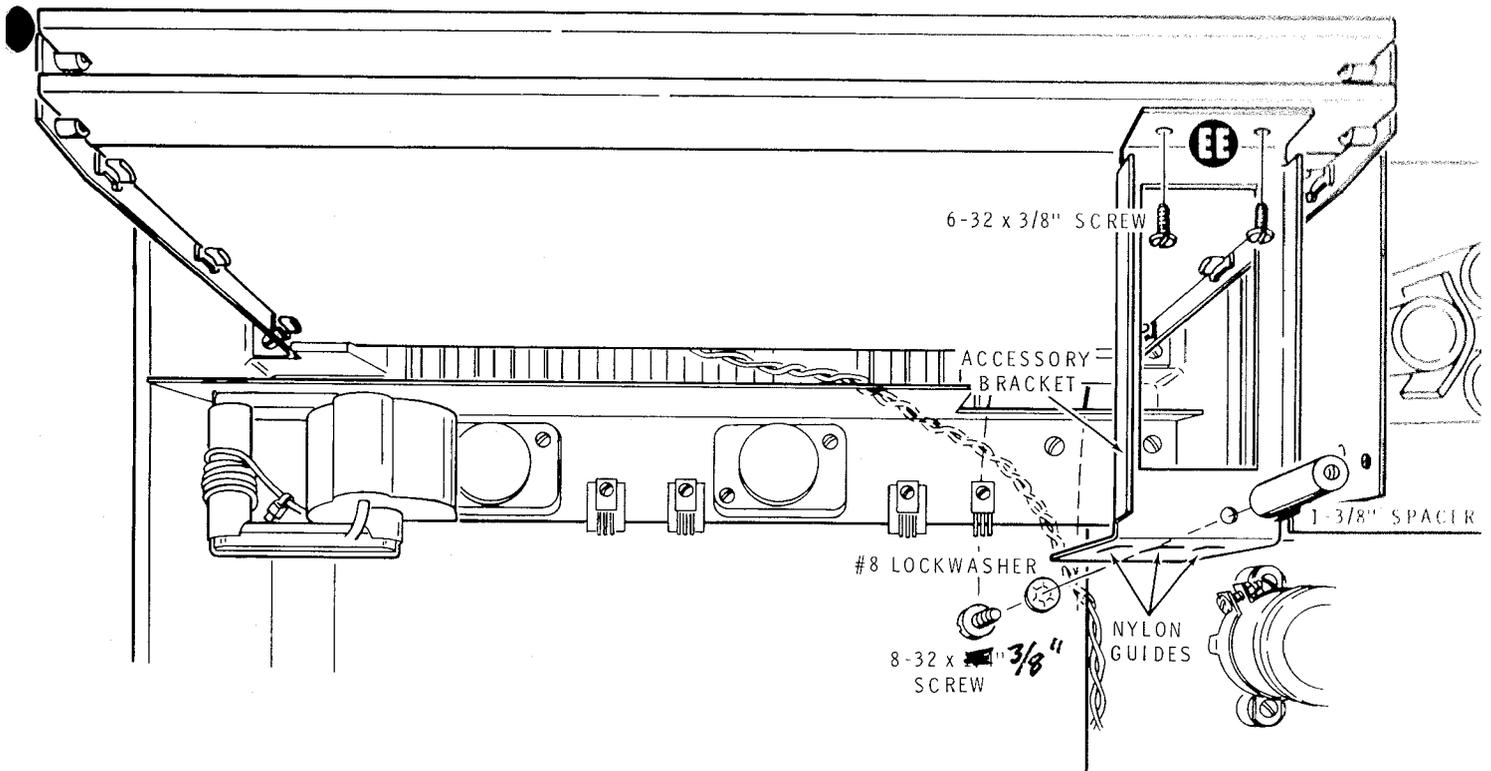
PICTORIAL 5-7

Refer to Pictorial 5-7 for the following steps.

- () Locate the wired CPU logic circuit board and position it with its component side forward. Then slide it down into the second set of nylon guides in the circuit board brackets.
- () Connect the other end of the 7" cable (coming from the terminal logic circuit board) to plug P515 on the CPU logic circuit board.
- () Connect the 10-hole connector on the harness to plug P514 on the CPU logic circuit board.

- () Make sure that the last two connectors are not installed one pin off (for instance, pin 1 in hole #2 of the connector). This is very important.
- () Connect the 4-hole connector (3-wire cable coming from the power supply heat sink) to plug P516 on the CPU logic circuit board.
- () Connect the other end of the interconnect cable to plug P513 on the CPU logic circuit board. Be sure to position the black wire up.
- () Secure the CPU logic circuit board heat sink to the circuit board brackets with two 6-32 x 3/8" screws.





PICTORIAL 5-8

Refer to Pictorial 5-8 for the following steps.

- () Locate an accessory mounting bracket and three nylon guides. Install the nylon guides in the bracket from the inside.
- () Mount the 1-3/8" spacer to the top side of the bracket as shown with an 8-32 x ~~3/8"~~ ^{3/8"} screw and a #8 lockwasher.
- () Mount the accessory mounting bracket to the CPU logic circuit board heat sink at EE. Use two 6-32 x 3/8" screws.

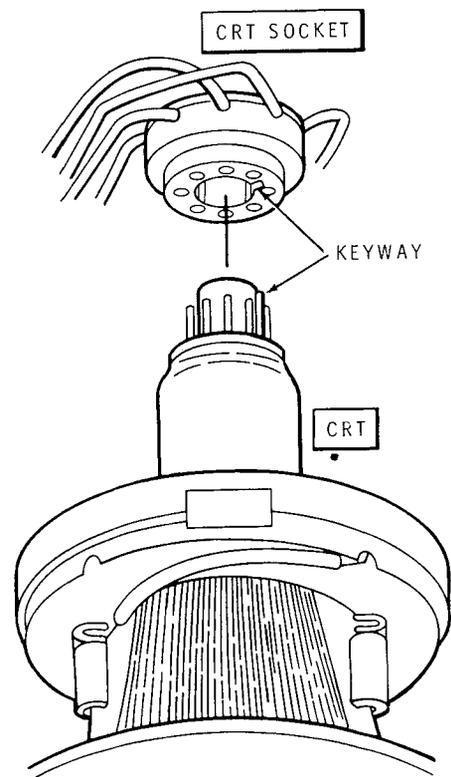
VIDEO ADJUSTMENTS

Refer to Pictorial 6-1 (Illustration Booklet, Page 15) 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 8-hole socket coming from the flyback transformer onto plug P203 on the video circuit board.

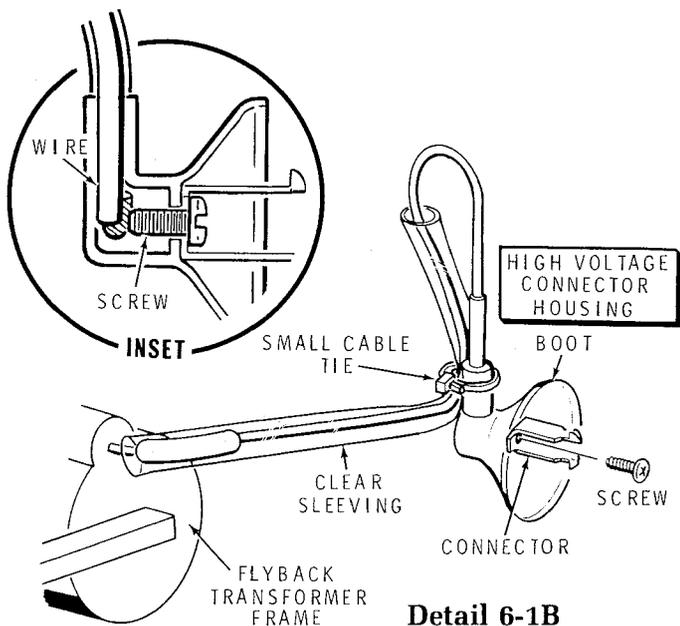
WARNING: It is extremely important that the black GND wire that will be connected in the next step, always be connected whenever the unit is in operation. To apply power to the unit without this wire connected will result in a very dangerous high voltage situation.

- () Push the connector on the end of the black GND wire onto the solder lug at CE.
- () Remove and discard the plastic pin protector from the CRT pins.
- () Refer to Detail 6-1A and line up the keyway in the CRT socket with the key on the CRT. Then carefully push the socket onto the CRT.
- () Route the CRT socket leads down to the video board and away from the high voltage transformer.



Detail 6-1A

- () 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.



Detail 6-1B

Refer to Detail 6-1B for the next four steps.

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

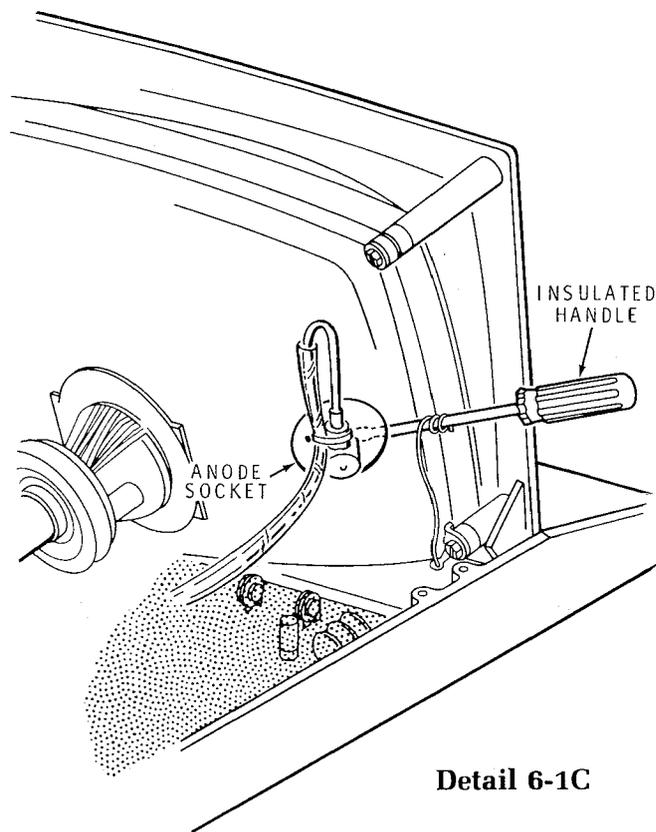
NOTE: When you reinstall the high voltage lead in the next step, position the bare wire so that the screw will make contact with the wire when it is reinstalled. See the inset drawing on Detail 6-1B.

- () Insert the high voltage lead into the housing as far as it will go. Then reinstall the connector and screw. Do not install the cable tie at this time.
- () Refer to the inset drawing on Pictorial 6-1 and install the high voltage lead in the anode socket. Position the connector housing so that the lead is up (exits toward the top of the CRT).
- () Refer again to Detail 6-1B and form a loop in the high voltage lead as shown. The object of this loop is to position the high voltage lead away from the flyback transformer frame. Then install a small cable tie around the lead and the connector housing.

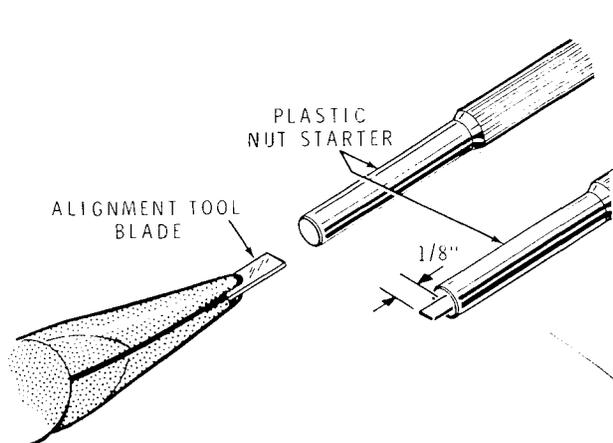
WARNING: The voltage on the high voltage lead is very high (especially next to the high voltage transformer) and will arc to any other wires near it. Refer to Pictorial 6-1 and position all other leads away from the high voltage lead and the high voltage transformer.

NOTE: If it ever becomes necessary to remove the high voltage lead from the CRT, refer to Detail 6-1C 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 boot 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 boot back and use a screwdriver to push one of the high voltage clips towards the other. This will permit you to remove the connector.



Detail 6-1C



Detail 6-1D

Refer to Detail 6-1D and push the alignment tool blade into the small end of the nut starter. Leave 1/8" of the blade protruding as shown. Use this tool to turn circuit board controls.

Refer to Pictorial 6-1 (Illustration Booklet, Page 15) for the location of controls on the video circuit board.

Set the BRIGHTNESS control on the video circuit board fully counterclockwise as viewed from the left side of the terminal base.

Set the other controls on the video circuit board to their center of rotation.

Push the 6-hole harness connector onto plug P202 on the video circuit board.

WARNING: When power is applied to the 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 one hand away from the unit 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 damage the CRT.

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

After a few minutes, a light raster should appear on the screen. If it does not, adjust control G1 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.

Adjust the VERT SIZE control on the video circuit board so the raster is approximately 6" high.

Refer to Pictorial 6-2 and rotate the ring magnets on the back of the yoke to center the display on the screen.

NOTE: The next adjustment should be made in a darkened room. If a darkened room is not available, shade the CRT screen.

Turn control G1 clockwise until the raster just disappears.

Set the OFF LINE and CAPS LOCKS keys to their down position.

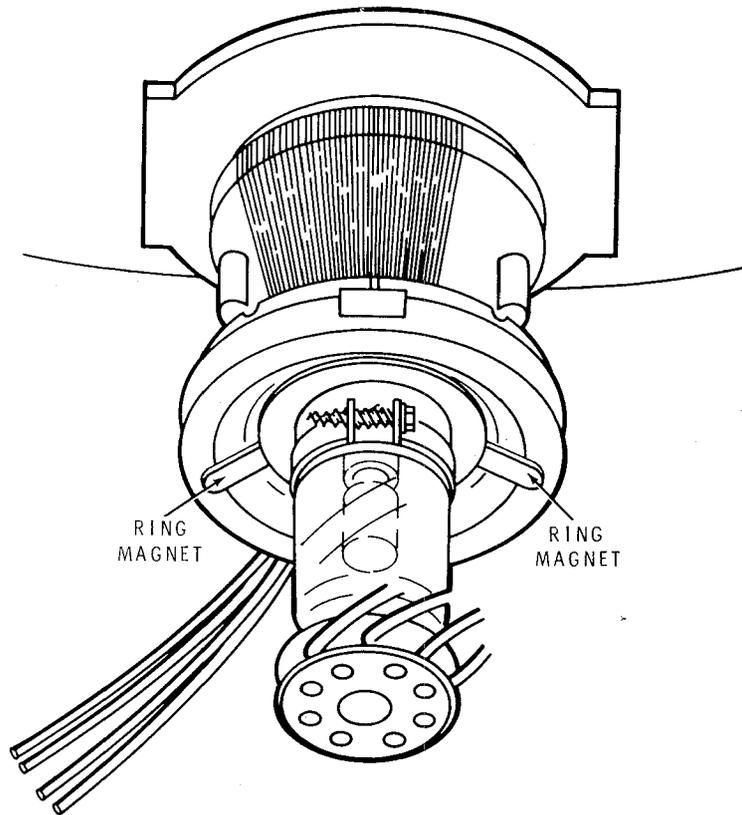
Adjust the BRIGHTNESS control until the blinking cursor (underline) appears.

NOTE: If the cursor 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 the HORIZ CENTERING control 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.

Hold the "Z" key and the REPEAT key down to produce a full line of characters across the screen. If the line of characters tend to fold over at one edge of the screen, it will be corrected in the next step.

Adjust the HORIZ CENTERING control on the video circuit board to center the display horizontally.



PICTORIAL 6-2

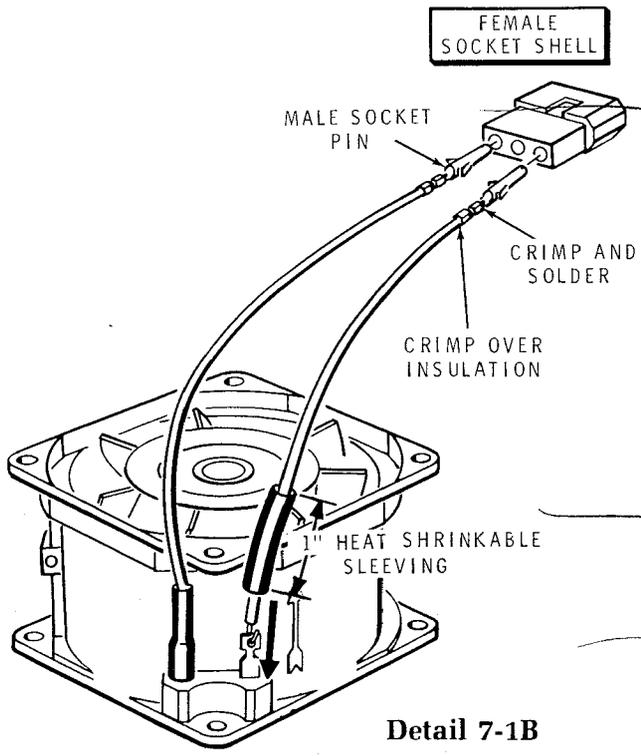
- () Push the RETURN key and then the LINE FEED key to restore the cursor to the left side of the screen and one line down.
- () Again hold the "Z" key and the REPEAT key to produce another full line of characters.
- () Repeat this procedure until the last line of characters is erased each time you push the LINE FEED key. This indicates that you have a full display.
- () Adjust the VERT LINEARITY control on the video circuit board so the top and bottom row of characters are of uniform size.

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

- () Turn control G1 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", adjust the WIDTH coil (L204) to correct the width.
- () Adjust the BRIGHTNESS control (R216) to obtain the brightness which is most suitable to you.
- () Adjust FOCUS control R271 for the best focus over the entire screen.
- () 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.

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



Detail 7-1B

Slide the sleeving on each wire down over its lug. Then use a heat source such as a hair dryer or light bulb to apply heat to the sleeving to cause it to shrink.

Install brass inserts in the cabinet at EG, EM, EJ, and EK.

Locate the following hardware. Use this in the following next step.

- 1 Fan mounting plate
- 4 6-32 × 3/8" screws
- 2 6-32 × 1-7/8" screws
- 2 #6 lockwashers
- 2 6-32 nuts

Note the arrow on the side of the fan. This arrow indicates the direction of air flow. In the next step, mount the fan so that the air flow is out through the top of the cabinet. (The cabinet is positioned up side down at this time.)

Mount the fan in the cabinet with the hardware from the previous step. Position the wires in the corner as shown. Do not overtighten the long screws.

Refer to Detail 7-1B for the following steps.

Prepare two 6" red stranded wires (thick insulation). Do not apply solder to one end of each wire.

Crimp and solder male socket pins onto the soldered end of each wire.

Insert these pins into the two outside holes in a female socket shell.

Slide a 1" length of heat shrinkable sleeving over the other end of each red wire.

NOTE: In the next step, tightly twist the fine wire strands before you insert the end of the wire through the lug.

Connect either red stranded wire to lug 1 of the fan (S-1).

Connect the other red wire to lug 2 of the fan (S-1).

Refer to the inset drawing on Pictorial 7-2 and install detent screws and grommets into the cabinet shell at EC and ED.

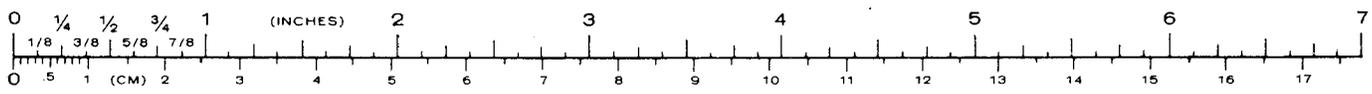
Refer to Pictorial 7-2 for the following steps.

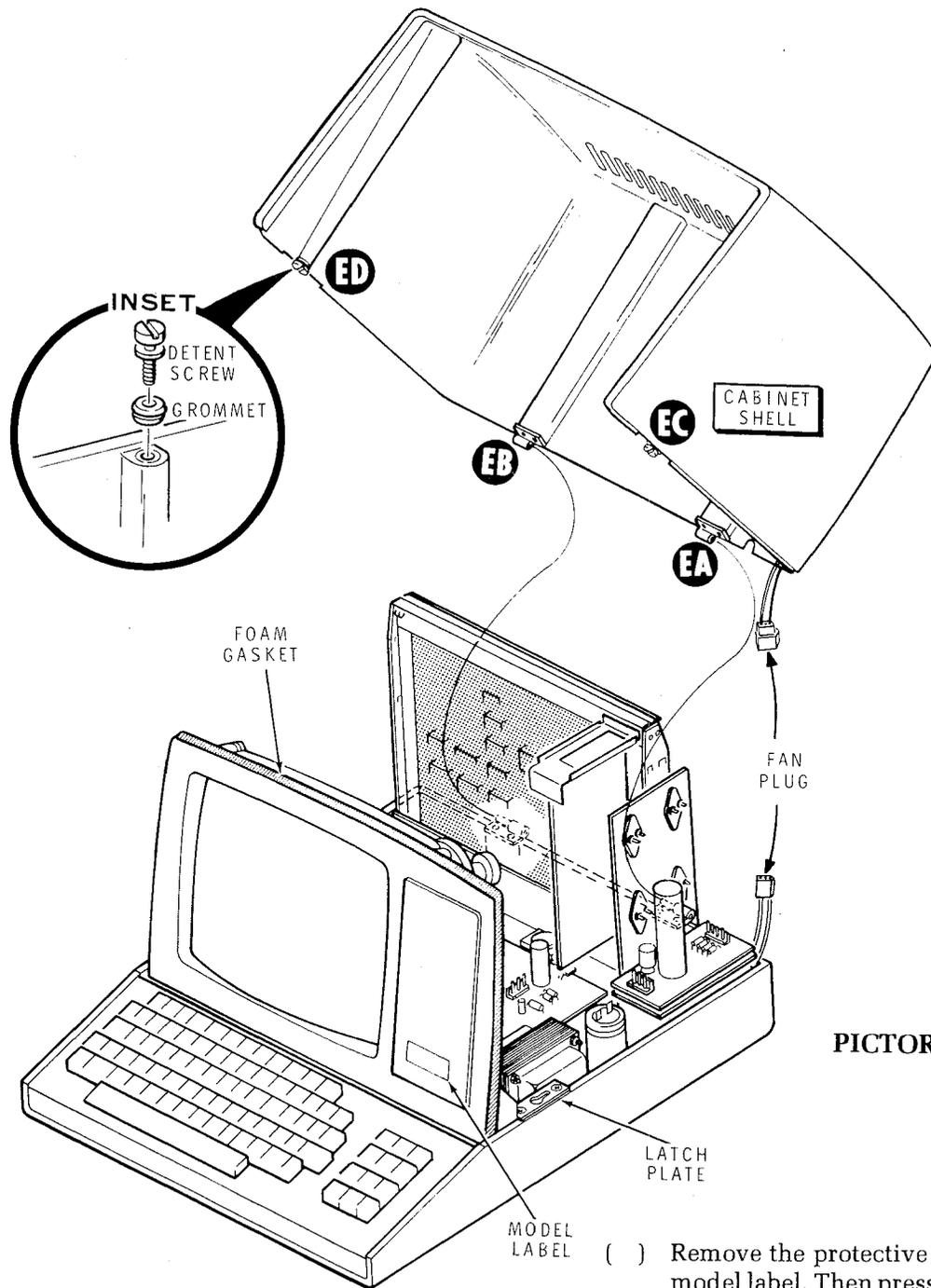
Locate the long foam gasket and peel the protective paper from one end for a length of approximately 3". Peel more paper off as you install the gasket.

Starting at the base on the right side, press the gasket to the edge of the front panel. Proceed around the front panel edge to the base on the other side. Cut off any excess foam gasket.

Position the cabinet over the terminal and slide the cabinet hinge halves onto the hinge halves on the terminal base.

Connect the fan plug to the fan socket.

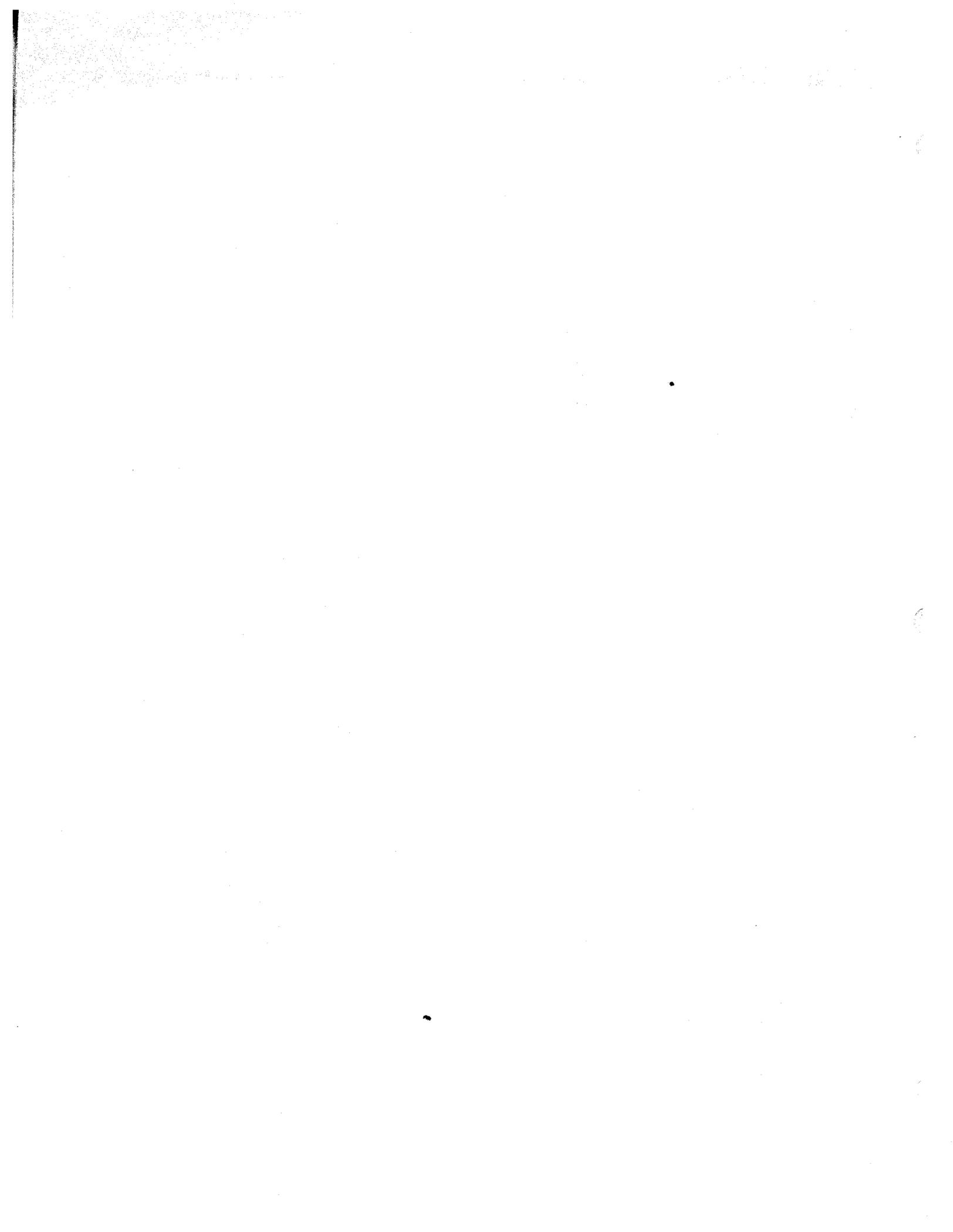




PICTORIAL 7-2

- () Make sure the latch plates are positioned back as far as they will go. Then lower the front of the cabinet shell so that the detent screws enter the holes in the latch plate.
- () Use a small screwdriver to slide the latch plate forward. If the latch plate is too tight or too loose, raise the cabinet and loosen or tighten the latch plate screw.
- () Remove the protective paper backing from the model label. Then press the label onto the lower bottom of the bezel cover on the front panel.
- () Remove the protective paper backing from the blue and white label. Then press the label to the back of the terminal base beside the connector plate. Refer to the numbers on this label in any communications you may have with the Heath Company concerning this kit.

This completes the assembly of your Computer. Proceed to the Operation Manual.



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

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