HEATHKIT® MANUAL

for the

H19 - TO - H88 CONVERSION

Model H19-2

597-2215-01

HEATH COMPANY • BENTON HARBOR, MICHIGAN

HEATH COMPANY PHONE DIRECTORY

The following telephone numbers are direct lines to the departments listed:

Kit orders and delivery information ..... (616) 982-3411
Credit ..... (616) 982-3561
Replacement Parts ..... (616) 982-3571

Technical Assistance Phone Numbers
8:00 A.M. to 12 P.M. and 1:00 P.M. to 4:30 P.M., EST, Weekdays Only

R/C, Audio, and Electronic Organs ..... (616) 982-3310
Amateur Radio ..... (616) 982-3296
Test Equipment, Weather Instruments and Home Clocks ..... (616) 982-3315
Television ..... (616) 982-3307
Aircraft, Marine, Security, Scanners, Automotive, Appliances and General Products ..... (616) 982-3496
Computers ..... (616) 982-3309

YOUR HEATHKIT 90-DAY FULL WARRANTY

If you are not satisfied with our service - warranty or otherwise - or with our products, write directly to our Director of Customer Services, Heath Company, Benton Harbor, Michigan 49022. He will make certain your problems receive immediate, personal attention.

Our attorney, who happens to be quite a kitbuilder himself, insists that we describe our warranty using all the necessary legal phrases in order to comply with the new warranty regulations. Fine. Here they are:

For a period of ninety (90) days after purchase, Heath Company will replace or repair free of charge any parts that are defective either in materials or workmanship. You can obtain parts directly from Heath Company by writing us at the address below or by telephoning us at (616) 982-3571. And we'll pay shipping charges to get those parts to you — anywhere in the world.

We warrant that during the first ninety (90) days after purchase, our products, when correctly assembled, calibrated, adjusted and used in accordance with our printed instructions, will meet published specifications.

If a defective part or error in design has caused your Heathkit product to malfunction during the warranty period through no fault of yours, we will service it free upon proof of purchase and delivery at your expense to the Heath factory, any Heathkit Electronic Center (units of Schlumberger Products Corporation), or any of our authorized overseas distributors.

You will receive free consultation on any problem you might encounter in the assembly or use of your Heathkit product. Just drop us a line or give us a call. Sorry, we cannot accept collect calls.

Our warranty does not cover and we are not responsible for damage caused by the use of corrosive solder, defective tools, incorrect assembly, misuse, fire, or by unauthorized modifications to or uses of our products for purposes other than as advertised. Our warranty does not include reimbursement for customer assembly or set-up time.

This warranty covers only Heathkit products and is not extended to allied equipment or components used in conjunction with our products. **We are not responsible for incidental or consequential damages.** Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

HEATH COMPANY
BENTON HARBOR, MI. 49022

Prices and specifications subject to change without notice.

Heathkit® Manual

for the

H19 - TO - H88 CONVERSION

Model H19-2

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This Modification Kit allows you to convert your H19 Video Terminal into an H88 Computer.

SPECIAL NOTICE

Before you unpack your Modification Kit and begin to install it, please review the enclosed manual information and consider the following:

1. This Modification Kit is provided as a service to Heathkit customers. The modification instructions have been thoroughly evaluated and tested.
2. Be extremely careful when you perform the modification. An incorrect installation can cause operational difficulties.
3. For the first ninety (90) days after you receive it, Heath will replace, free of charge, any parts contained within this Modification Kit that are defective, either in materials or workmanship. No warranty is implied nor extended to any other parts or service associated with the modification. Replacement parts can be obtained from Heath's Parts Department (phone number (616)-982-3571) or a Heathkit Electronic Center.
4. This Modification Kit is authorized only for the product(s) designated in the enclosed Manual.
5. You must perform the entire modification before Heath can accept the product for service. If service is required, labor and parts charges will apply (except for parts supplied with the modification kit, which will be replaced no charge if defective).

If you find that the Modification Kit is not suitable for your purposes at this time, you may return it prepaid for credit or a refund by contacting Heath Company, Marketing Services (phone (616)-982-3578). But, once the kit has been unpacked and/or assembly commenced, it is no longer resalable as a kit and a credit or refund request cannot be accommodated.

HEATH COMPANY
BENTON HARBOR, MICHIGAN 49022

TABLE OF CONTENTS

PARTS LIST

Unpack the kit and check each part against the following list. The key numbers correspond to the numbers on the "Parts Pictorial" (Illustration Booklet, Pages 1 and 2). Any part that is packed in an individual envelope with the part number on it, should be returned to the envelope after you identify it, until that part is called for in a step. Do not discard any packing material 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 located inside the front cover. For prices, refer to the separate "Heath Parts Price List."

ELECTROLYTIC CAPACITORS

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
A1	25-197	3	1 μF tantalum	C105, C106, C107
A2	25-891	1	470 μF	C104
A3	25-906	1	4700 μF	C102
A3	25-902	2	10,000 μF	C101, C103

DIODES — REGULATOR — FUSE

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
	57-42 (4)	4	3A1 diode	D101, D102, D103, D104
B1	57-27	4	1N2071 diode	D109, D110, D111, D112
B2	57-67	1	10A20 rectifier	BR101
B3	442-651	1	78H05KC regulator	U101
B4	421-25	1	1-1/2 ampere slow-blow fuse	F1

WIRE — CABLE — SLEEVING

340-8	12"	Bare wire
344-15	72"	Black wire
344-16	36"	Red wire (thin insulation)
344-183	42"	Red wire (thick insulation)
344-80	42"	Orange wire
344-154	7"	Yellow wire
344-155	66"	Green wire
344-156	12"	Blue wire
344-81	7"	Violet wire
344-82	7"	White wire
134-1075	1	Interconnect cable
343-11	8'	Gray shielded cable
343-15	3'	Black shielded cable
347-55	2'	Flat 8-wire cable
347-60	8'	2-wire cable
346-67	2"	Small sleeving
346-64	3"	Large sleeving

SOCKETS — SHELLS

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
C1	434-117	3	Transistor socket	
C2	432-974	1	2-hole connector shell	
C3	432-148	1	3-hole male connector shell	
C4	432-149	1	3-hole female connector shell	
C5	434-319	1	4-hole male plug	
C6	432-954	1	Small 4-hole connector shell	
C6	432-1070	1	Large 4-hole connector shell	
C7	432-1022	1	8-hole connector shell	
C8	432-794	1	9-hole male connector shell with ears	
C9	432-183	1	9-hole female connector shell	
C10	432-958	1	Small 10-hole connector shell	
C11	432-1061	2	Large 10-hole connector shell	
C12	432-1137	1	Single male connector shell	
C13	432-1138	1	Single female connector shell	

PLUGS — PINS — CONNECTORS

KEY No.	HEATH Part No.	QTY.	DESCRIPTION
D1	438-26	2	Red phone plug
D2	438-52	2	Black subminiature phone plug
D3	432-943	1	2-pin plug
D4	432-1069	1	4-pin plug
D5	432-876	2	8-pin plug
D6	432-1064	1	10-pin plug
D7	432-855	13	Small female pin (one extra)
D8	432-1002	4	Large female pin
D9	432-854	13	Male pin (one extra)
D10	432-866	8	Small spring connector
D11	432-753	37	Large spring connector (one extra)

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

HARDWARE

#6 Hardware

E1	250-56	4	6-32 × 1/4" screw
E2	250-1157	4	6-32 hex spacer
E3	250-381	8	6-32 × 3/8" black screw
E4	250-1264	9	6-32 × 3/8" hex head screw
E5	250-155	4	6-32 × 3/8" black sheet metal screw
E6	250-162	6	6-32 × 1/2" screw
E7	250-1315	2	6-32 × 1-7/8" hex head screw
E8	250-1316	2	6-32 × 1-7/8" hex head sheet metal screw
E9	252-3	3	6-32 nut
E10	254-1	2	#6 lockwasher
E11	259-1	6	#6 solder lug
E12	252-725	4	Brass insert

#8 Hardware

F1	250-1314	1	8-32 × 3/8" screw
F2	254-2	1	#8 lockwasher
F3	259-2	1	#8 solder lug

Control Hardware

G1	254-4	1	Control lockwasher
G2	253-75	1	Control flat washer
G3	252-7	1	Control nut
G4	259-10	1	Control solder lug

D-CONNECTOR HARDWARE

H1	252-15	4	4-40 nut
H2	254-9	3	#4 lockwasher
H3	255-757	4	Hex spacer
H4	259-30	1	#4 solder lug

CIRCUIT BOARDS

181-3052	1	Wired CPU circuit board
181-3054	1	Wired Cassette interface circuit board
85-2384-1	1	Power supply circuit board

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

HOLE COVERS

H5	485-35	3	2-1/8" long
	485-36	1	2-3/8" long
	485-37	1	3-1/4" long
	485-39	1	2-7/8" long

METAL PARTS

J1	255-66	1	1-3/8" spacer
J2	204-182	1	Capacitor support bracket
J3	204-2452	1	Fan mounting plate
J4	204-2518	1	Accessory bracket
J5	205-1824-1	1	Rear panel plate
J6	215-637	1	Power supply heat sink
J7	214-226-1	1	Connector chassis

MISCELLANEOUS

K1	11-53	1	500 Ω control	
	54-969	1	Power transformer	T1
K2	73-92	5"	Foam strip	
K3	73-166	11"	Edge strip	
	74-4	1	Electrical tape	
K4	75-790	1	Insulator paper	
K5	350-12	1	Cement	
K6	352-31	1	Thermal compound	
K7	490-185	1	Solder-removal braid	
K8	438-55	2	Small polarizing plug	
	438-48	4	Large polarizing plug	
K9	420-607	1	Fan	
K10	354-5	10	Small cable tie	
K11	354-7	1	Large cable tie	
K12	73-80	1	Foam pad	
K13	266-944	9	Nylon guide	
		1	Blue and white label	
	390-1674	1	H88 label	
	390-1720	1	Caution label	
	597-260	1	Parts Order Form	
		1	H88 Operation Manual (see Page 1 for the part number)	
		1	Conversion Manual (see Page 1 for the part number)	
			Solder	

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.

STEP-BY-STEP ASSEMBLY

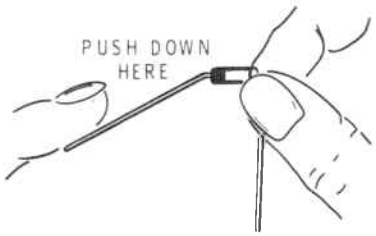
POWER SUPPLY

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 when you install other parts on the board.

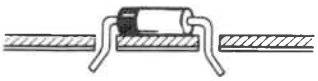
(✓) Position the circuit board as shown with the printed side (not the foil side) up.

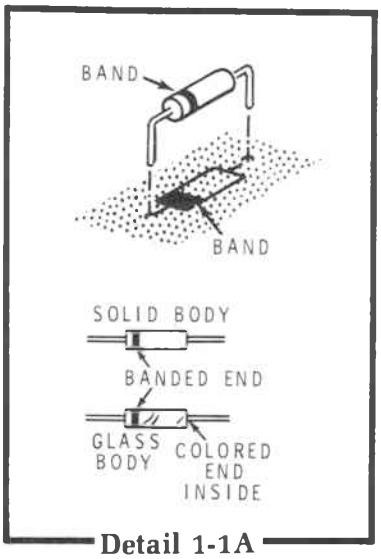
(✓) D101: Hold a 3A1 diode (#57-42) by the body as shown and bend the leads straight down.



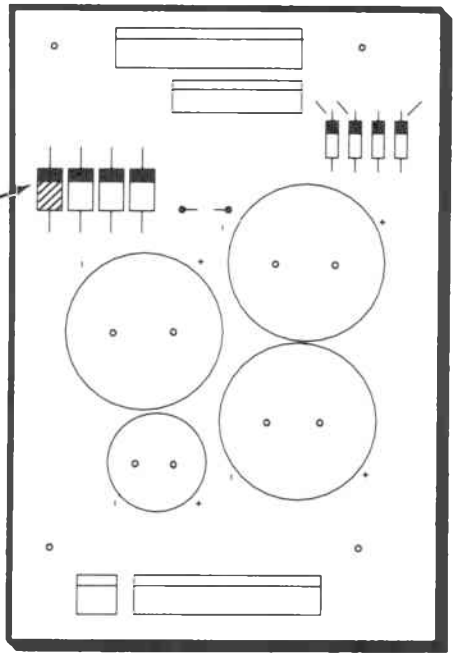
( ) Push the leads through the holes at the indicated location on the circuit board. Match the band mark on the circuit board. See Detail 1-1A. THE CIRCUITRY WILL NOT WORK PROPERLY IF A DIODE IS INSTALLED BACKWARDS.

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





Detail 1-1A

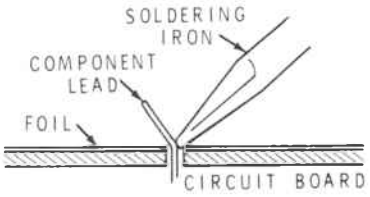


PICTORIAL 1-1

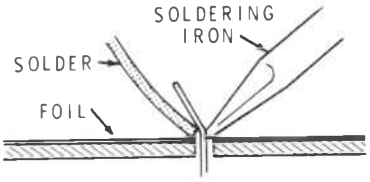
CONTINUE

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

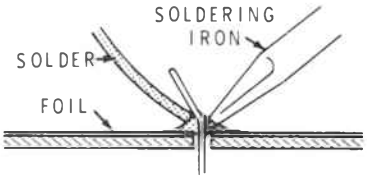
1. Push the soldering iron tip against both the lead and the circuit board foil. Heat **both** for two or three seconds.



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



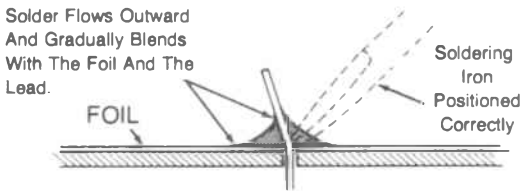
3. As the solder begins to melt, allow it to flow around the connection. Then remove the solder and the iron and let the connection cool.



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

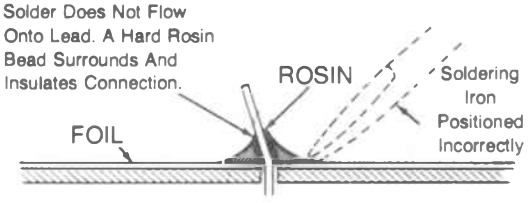
( ) Check each connection. Compare it to the illustrations on Page 6. After you have checked the solder connections, proceed with the assembly on Page 7. Use the same soldering procedure for each connection.

A GOOD SOLDER CONNECTION

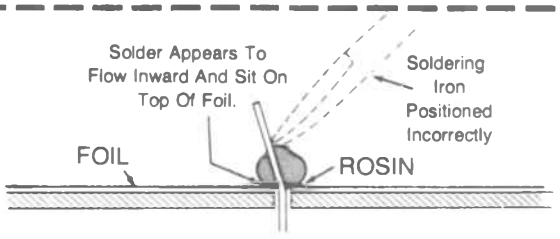


When you heat the lead and the circuit board foil at the same time, the solder will flow evenly onto the lead and the foil. The solder will make a good electrical connection between the lead and the foil.

POOR SOLDER CONNECTIONS



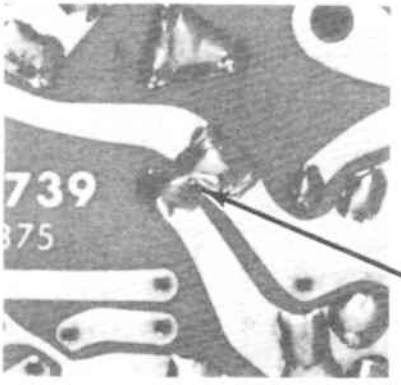
When the lead is not heated sufficiently, the solder will not flow onto the lead as shown above. To correct, reheat the connection and, if necessary, apply a small amount of additional solder to obtain a good connection.



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

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.

START

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

Install 3A1 diodes (#57-42) in the following three locations.

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

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

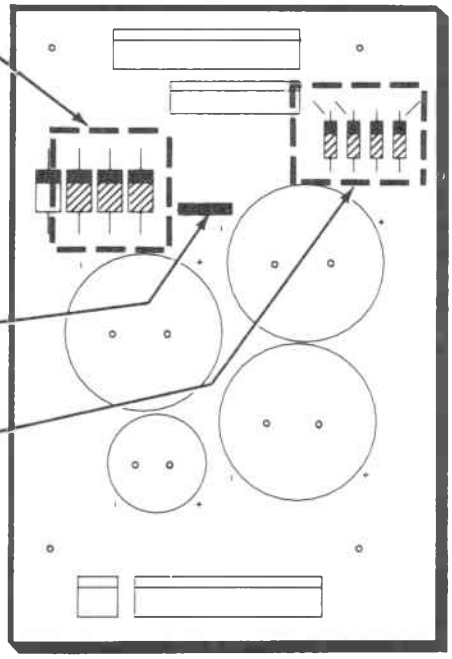
( ) Cut a 3/4" bare wire.

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

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

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

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



PICTORIAL 1-2

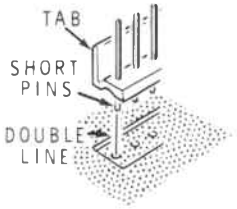
START

( ) 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.

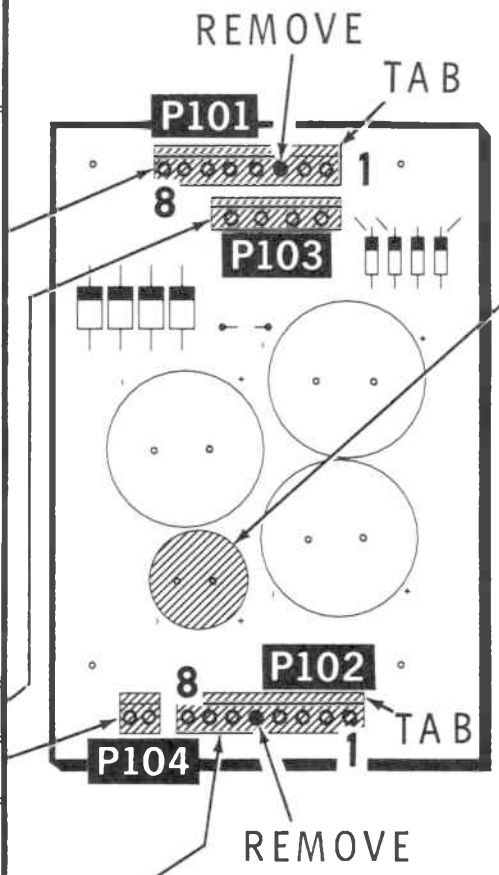


( ) P103: 4-pin plug.

( ) P104: 2-pin plug.

( ) Use long-nose pliers to remove pin number 5 from an 8-pin plug. Note the position of the tab on this Pictorial before you remove pin 5.

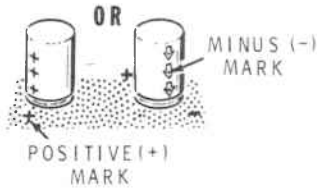
( ) P102: 8-pin plug.



PICTORIAL 1-3

CONTINUE

NOTE: When you install electrolytic capacitors, always position the plus (+) or minus (−) marking on the capacitor toward the corresponding mark on the circuit board.



( ) C104: 470 μF electrolytic. 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 connections.

( ) Poor solder connections.

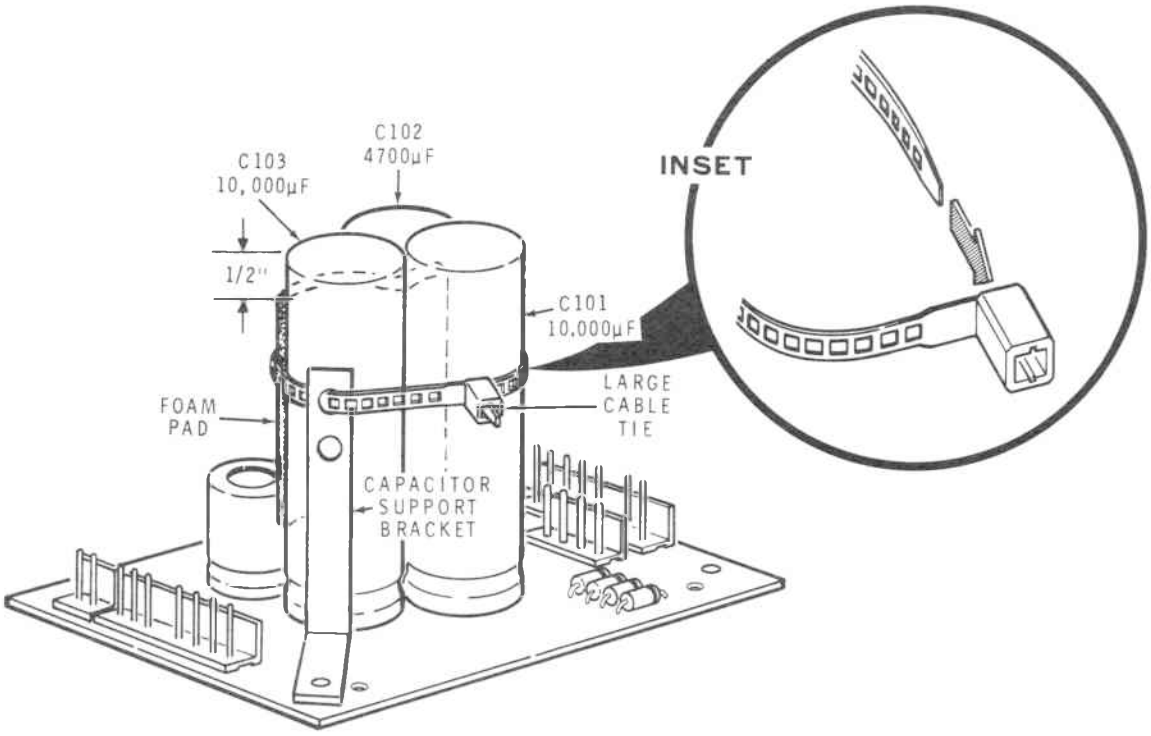
( ) Solder bridges between foils.

( ) Protruding leads which could touch together.

( ) Electrolytic capacitor for the correct position of the positive (+) end.

( ) Diodes for the correct position of the banded end.

FINISH



PICTORIAL 1-4

Refer to Pictorial 1-4 and use the following procedure to install the two 10,000 µF and the 4700 µF electrolytic capacitors in the power supply circuit board:

( ) 1. C101, C103: Insert the leads of the two 10,000 µF capacitors into their corresponding circuit board holes. Be sure to observe the correct plus (+) and minus (−) markings. Push the capacitors down tight against the circuit board. Then solder the leads to the foil and cut off the excess lead lengths.

( ) 2. Cut a 2-1/2" × 1-1/2" pad from the 2-1/2" × 5" foam pad. Discard the remaining foam pad.

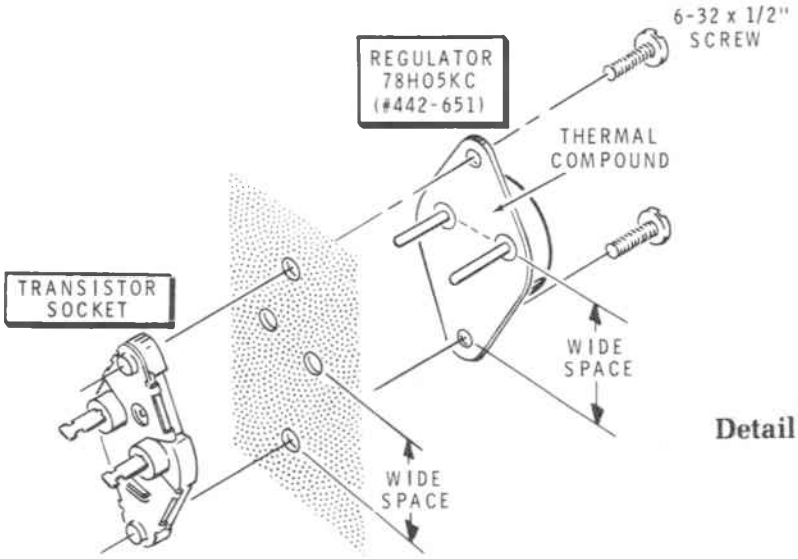
( ) 3. Remove the paper backing from one side of the 2-1/2" × 1-1/2" foam pad. Then press the sticky side of the pad against the indicated side of capacitors C101 and C103. Position the top of the pad down approximately 1/2" from the top of the capacitors.

( ) 4. C102: Insert the leads of the 4700 µF capacitor into their corresponding circuit board holes. Use the holes that best fit the capacitor lead spacing and be sure to observe the correct plus (+) and minus (−) markings. Push the capacitor down tight against the circuit board and bend the leads to hold the capacitor in place. Do not solder the leads yet.

( ) 5. Align the bottom hole in the capacitor support bracket with the larger hole in the circuit board and install a large cable tie (11" long) through the top hole in the bracket and around the three capacitors. Pull the cable tie tight (see the inset drawing) and cut off any excess tie. The support bracket will be secured to the circuit board later.

( ) 6. Solder the leads of the 4700 µF capacitor to the foil and cut off the excess lead lengths.

Set the power supply circuit board aside temporarily.



Detail 1-5A

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

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 happens, rinse your eyes with warm water. If the compound gets on your clothing, it may require professional cleaning, so handle the compound carefully. This compound contains zinc oxides, SiO_2 and slight traces of CO_2.

( ) Locate the thermal compound and make a small slit in one side of the container.

( ) Position the power supply heat sink as shown.

Refer to Detail 1-5A for the next two steps.

( ) Spread a coating of thermal compound on the 78H05KC regulator (#442-651). Use this regulator in the next step.

NOTE: The regulator pins are closer to one end of the regulator than to the other end. Note this difference in spacing in the next step. The regulator will properly mount only one way.

( ) U101: Mount the regulator and transistor socket to the power supply heat sink at U101. Use two 6-32 × 1/2" screws.

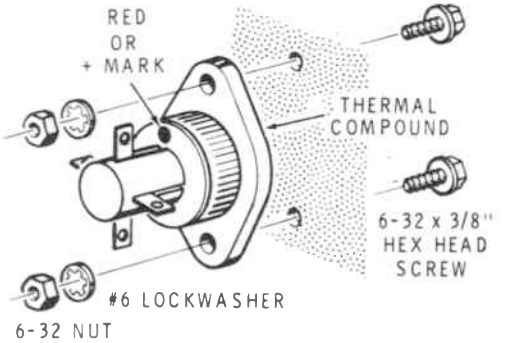
NOTE: The next two transistor sockets will be installed without IC's. These are for later expansion of your power supply if you choose to add on to your System.

( ) Mount a transistor socket at U102 with two 6-32 × 1/2" screws.

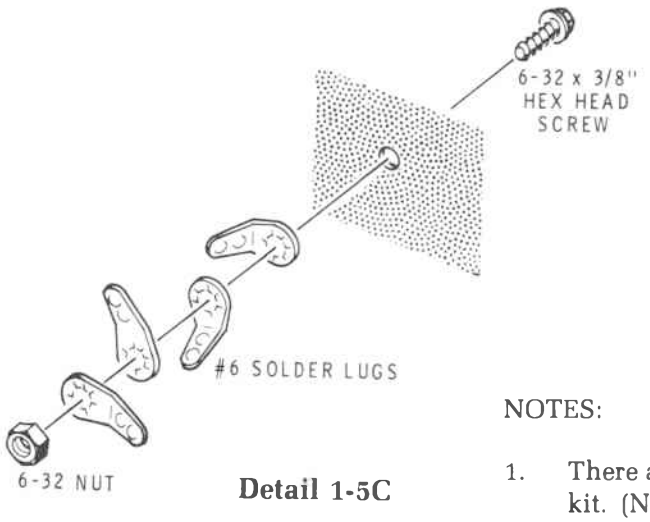
( ) In the same manner, mount a transistor socket at U103.

( ) Locate the 10A20 bridge rectifier (#57-67) and apply thermal compound to its flat side.

( ) BR101: Refer to Detail 1-5B and mount the bridge rectifier to the heat sink at BR101. Be sure to position it with the red or plus (+) marked lug toward U101 as shown. Use two 6-32 × 3/8" hex head screws, two #6 lockwashers and two 6-32 nuts. (Your rectifier may look different from the one shown.)



Detail 1-5B



Detail 1-5C

( ) Refer to Detail 1-5C and mount four #6 solder lugs to the heat sink at GA. Use a 6-32 × 3/8" screw hex head and a 6-32 nut.

( ) Locate three 1 μF tantalum capacitors. Cut the leads of each capacitor 1/2" from the body.

NOTES:

1. The tantalum capacitors are marked with either a plus (+) or color mark on one end or a minus (−) mark on the other end. If your capacitors have a minus (−) mark only, consider the other end to be the plus (+) marked end.

2. In the following steps, (NS) means not to solder the connection because other wires or leads will be added later. (S-) with a number such as (S-3) means to solder the connection. The number following the "S" tells how many wires are in the connection.

( ) C105: Connect the plus (+) marked end of a 1 μF tantalum capacitor to U101 lug 1 (NS) and the other end to lug 3 (NS).

( ) C106: In the same manner, connect a 1 μF tantalum capacitor to U102 between lugs 1 (NS) and 3 (NS).

( ) C107: In the same manner, connect a 1 μF tantalum capacitor to U103 between lugs 1 (NS) and 3 (NS).

NOTES:

1. There are two sizes of red stranded wire in this kit. (Note that the insulation on one wire is thicker than on the other.) When red stranded wire is called for, use the red wire with the thinner insulation unless otherwise specified.

2. When you prepare a wire, cut it to the indicated length and then remove 1/4" of insulation from each end. Twist together the fine wire strands and apply a small amount of solder to hold the strands in place.

( ) Prepare the following wires.

1-1/2" black	2-1/2" black
2" black	3" red
2-1/2" black	3" red

( ) Connect a 1-1/2" black wire between the **LOWER** HOLE (hole nearest the nut) in solder lug GA lug 1 (S-1) and U101 lug 3 (S-2).

( ) Connect a 2" black wire between the lower hole in GA lug 4 (S-1) and U102 lug 3 (S-2).

( ) Connect a 2-1/2" black wire between the lower hole in GA lug 3 (S-1) and U103 lug 3 (S-2).

( ) Connect a 2-1/2" black wire between the lower hole in GA lug 2 (S-1) and BR101 lug 3 (NS).

( ) Connect a 3" red wire between U101 lug 1 (NS) and U102 lug 1 (S-2).

( ) Connect a 3" red wire between U101 lug 1 (S-3) and BR101 lug 1 (NS).

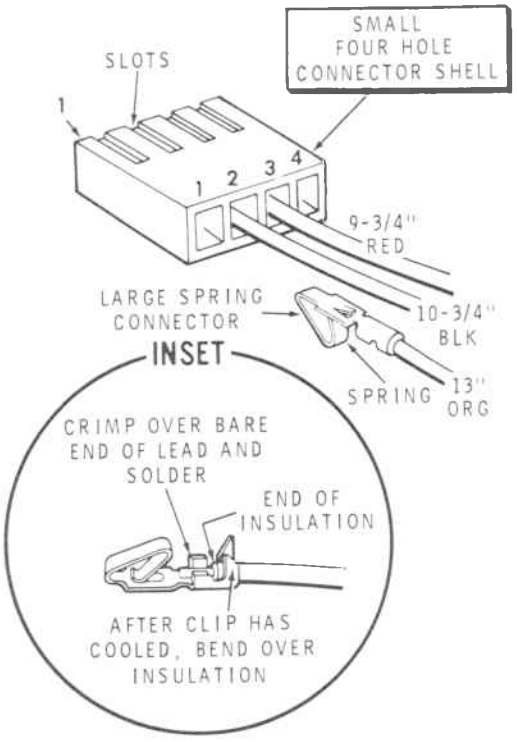
Refer to Pictorial 1-6 (Illustration Booklet, Page 3) for the following steps.

( ) Prepare the following stranded wires. Remove 1/4" of insulation from one end of each wire and 1/8" of insulation from the other end.

9-3/4" red (thin insulation)
10-3/4" black
13" orange

( ) Refer to Detail 1-6A and crimp and solder a large spring connector onto the 1/8" end of each wire.

( ) Locate the small 4-hole connector shell and the large 4-hole connector shell and place them side by side. Use the **small** 4-hole connector shell in the next step.



Detail 1-6A

Again refer to Detail 1-6A and insert the spring connector on each wire into a small 4-hole connector shell as follows:

( ) Orange wire in hole 1.

( ) Black wire in hole 2.

( ) Red wire in hole 3.

( ) No wire in hole 4.

( ) Gently pull on the wires to make sure the spring connectors are securely locked in the connector shell.

Connect the other end of these wires as follows:

( ) Red wire to U101 lug 2 (S-1).

( ) Black wire to the upper hole in GA lug 2 (S-1).

( ) Orange wire to U103 lug 1 (NS).

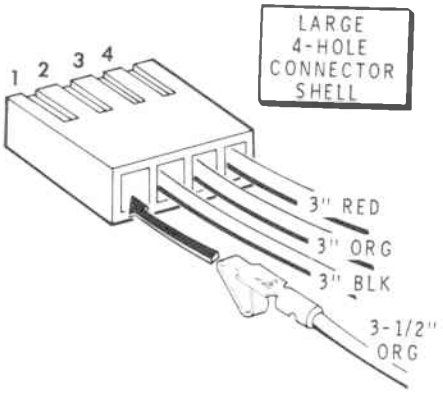
( ) Install a small cable tie around the three wires approximately 2" from the connector. See the inset drawing.

( ) In the same manner, install a second small cable tie approximately 4" from the first tie and a third small cable tie near U101.

( ) Prepare the following stranded wires. Remove 1/4" of insulation from one end of each wire and 1/8" of insulation from the other end.

3-1/2" orange
3" orange
3" black
3" red (thin insulation)

( ) Crimp and solder a large spring connector onto the 1/8" end of each wire.



Detail 1-6B

Refer to Detail 1-6B and insert the spring connector on each wire into a large 4-hole connector shell as follows:

( ) Longer (3-1/2") orange wire into hole 1.
( ) 3" black wire into hole 2.
( ) 3" orange wire into hole 3.
( ) 3" red wire into hole 4.

( ) Gently pull on the wires to make sure the spring connectors are securely locked in the connector shell.

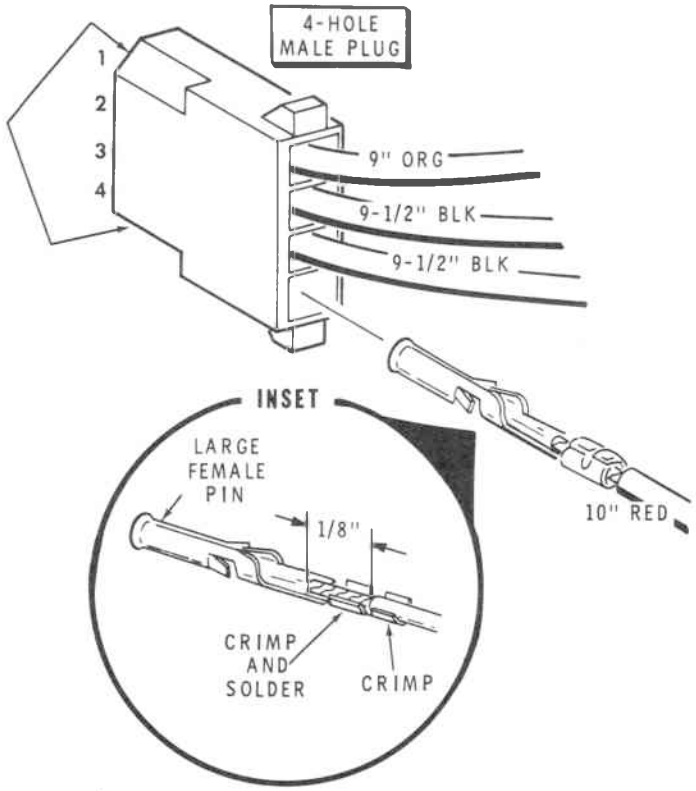
Connect the other end of these wires as follows:

( ) First orange wire (from hole 1) to BR101 lug 2 (S-1).
( ) Black wire to BR101 lug 3 (S-2).
( ) Second orange wire to BR101 lug 4 (S-1).
( ) Red wire to BR101 lug 1 (S-2).

( ) Install a small cable tie around the wires coming from BR101. Position this cable tie approximately midway between the connector and BR101.

( ) Prepare the following stranded wires. Remove 1/8" of insulation from one end of each wire and 1/4" of insulation from the other end.

9" orange
9-1/2" black
9-1/2" black
10" red (thin insulation)



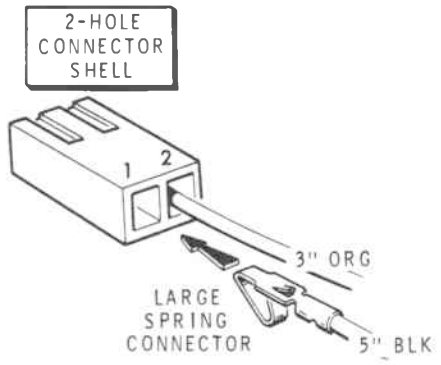
Detail 1-6C

( ) Refer to Detail 1-6C and crimp and solder a large **female** pin onto the 1/8" bare end of each wire.

Again refer to Detail 1-6C and insert the female pins on the wires into the 4-hole male plug as follows:

( ) Orange wire in hole 1.
( ) Black wire in hole 2.
( ) Black wire in hole 3.
( ) Red wire in hole 4.

( ) Gently pull on the wires to make sure the socket pins are securely locked into the plug.



Detail 1-6D

Connect the other end of these wires as follows:

( ) Orange wire to U103 lug 2 (S-1).

( ) Either black wire to the upper hole in GA lug 1 (NS).

( ) Other black wire to the upper hole in GA lug 4 (S-1).

( ) Red wire to U102 lug 2 (S-1).

( ) Install a small cable tie around these wires approximately 1-1/2" from the socket.

( ) Install a second small cable tie around the wires approximately 3" from the first tie.

( ) Prepare the following stranded wires. Remove 1/8" of insulation from one end of each wire and 1/4" of insulation from the other end.

3" orange
5" black

( ) Crimp and solder a large spring connector on the 1/8" end of each wire.

Refer to Detail 1-6D and insert the spring connectors on the wires into the 2-hole connector shell as follows:

( ) Black wire in hole 1.
( ) Orange wire in hole 2.

( ) Gently pull on the wires to make sure the socket pins are securely locked in the connector shell.

Connect the other end of these wires as follows:

( ) Orange wire to U103 lug 1 (S-3).
( ) Black wire to the upper hole in GA lug 1 (S-2).

( ) Install a small cable tie around the wires near U103.

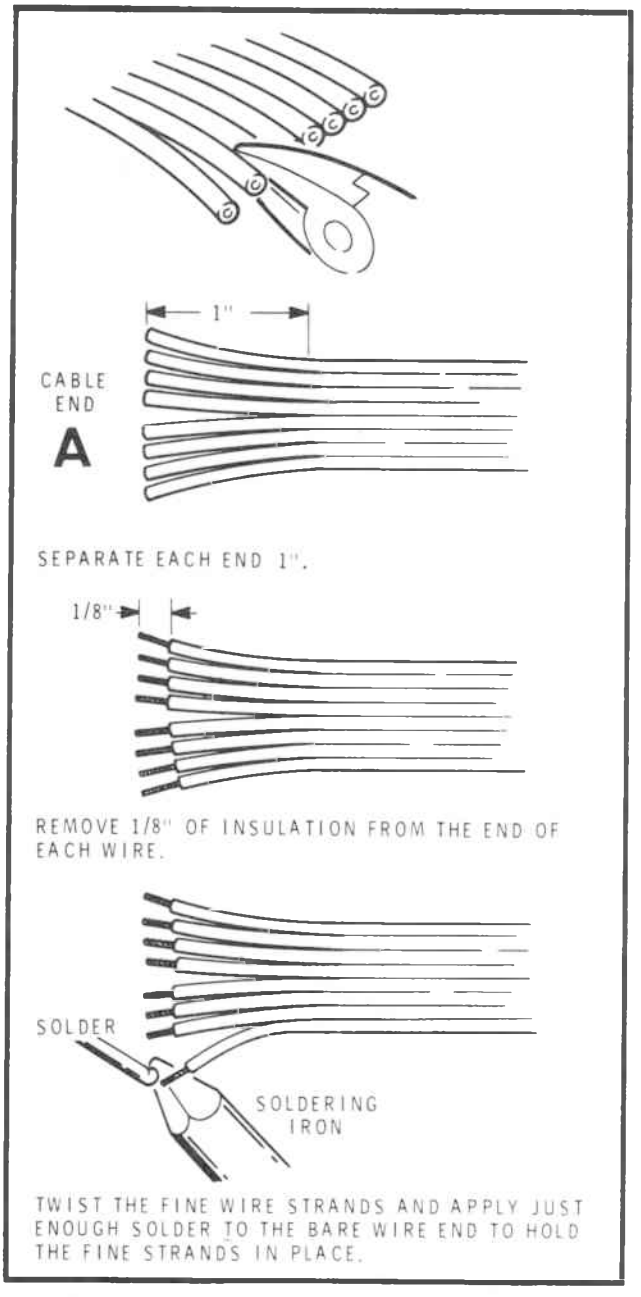
This completes this portion of the assembly and wiring of the power supply heat sink. Set the assembly aside temporarily.

CABLE ASSEMBLY

Refer to Pictorial 1-7 (Illustration Booklet, Page 4) for the following steps.

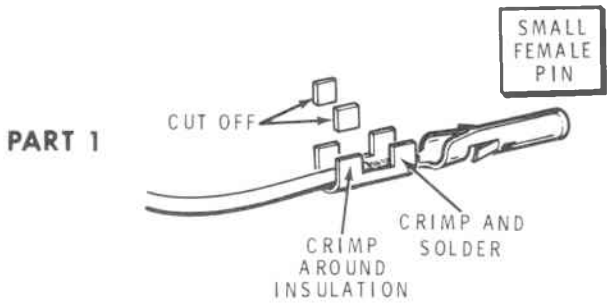
( ) Locate the 2-foot length of flat 8-wire cable.

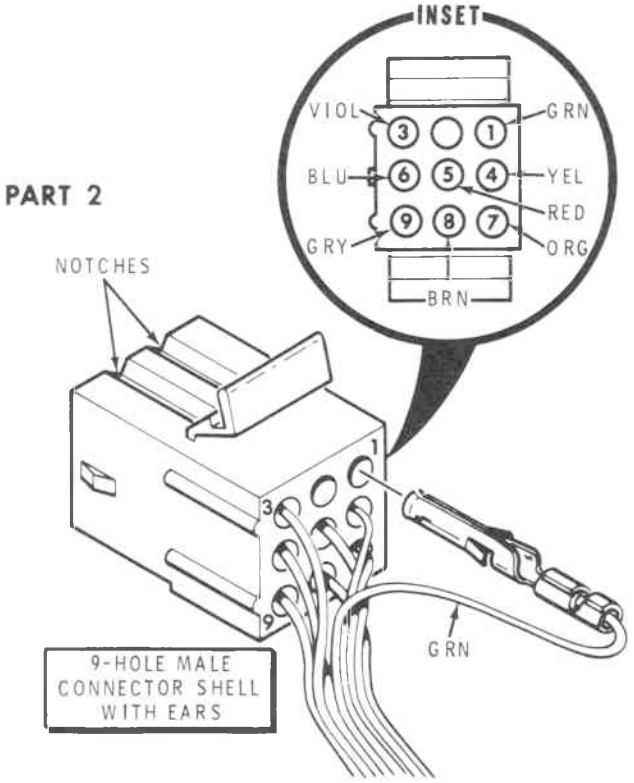
( ) Refer to Detail 1-7A and prepare end A of the flat 8-wire cable as shown. Use diagonal cutters or a knife to start separating the wires.



Detail 1-7A

( ) Refer to Part 1 of Detail 1-7B and crimp and solder a small female pin on the end of each prepared wire. Remove 1/2 of each indicated tab on the female pin before you crimp it to the wire.





Detail 1-7B

NOTE: Refer to Part 2 of Detail 1-7B and insert the female pins on the end of the following wires into the 9-hole male connector shell with ears as follows. Note that the hole numbers are stamped in the back of the connector. Each time you install a pin, gently pull on the wire to make sure the wire is locked in place.

( ) Green wire in hole 1.

( ) Do not install a pin in hole 2.

( ) Violet wire in hole 3.

( ) Yellow wire in hole 4.

( ) Red wire in hole 5.

( ) Blue wire in hole 6.

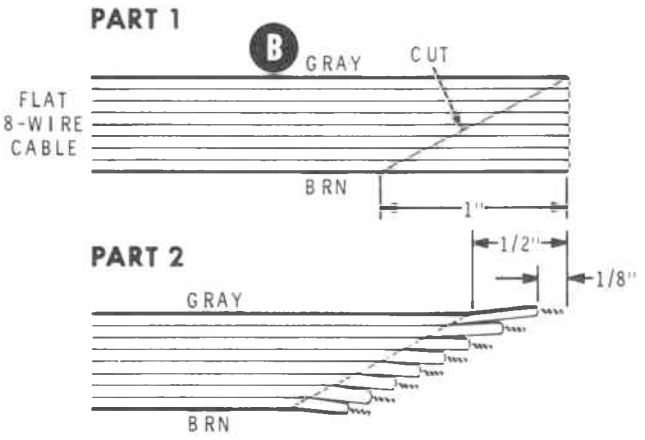
( ) Orange wire in hole 7.

( ) Brown wire in hole 8.

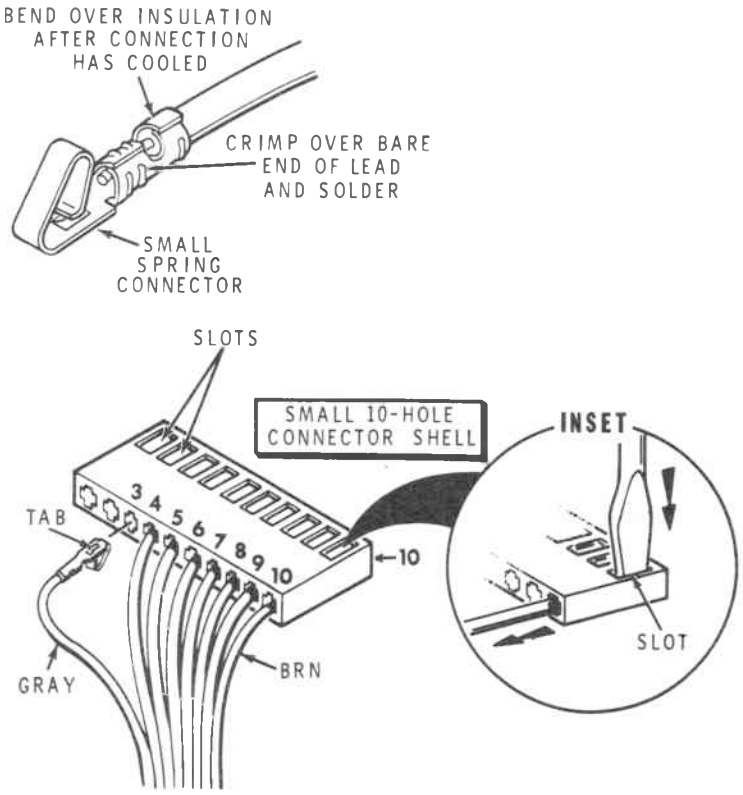
( ) Gray wire in hole 9.

( ) Refer to Part 1 of Detail 1-7C and cut end B of the flat 8-wire cable as shown.

( ) Refer to Part 2 of Detail 1-7C, separate each wire end 1/2", remove 1/4" of insulation from the wire ends, apply a small amount of solder to the bare ends, and then cut the bare ends to 1/8".



Detail 1-7C



Detail 1-7D

( ) Refer to Detail 1-7D and crimp and solder a small spring connector on the end of each prepared wire.

NOTES:

1. Insert the spring connector on the ends of the following wires into the small 10-hole connector shell as follows, with the tabs toward the slotted side of the connector shell. Note that the number 10 is stamped in the end of the connector. Each time you install a connector pin, gently pull on the wire to make sure the wire is locked in place.

2. If it is ever necessary to remove a spring connector from a connector shell, use a small screwdriver to depress the tab on the connector through the slot in the connector shell while you pull on the wire. See the inset drawing.

( ) Gray wire in hole 3.

( ) Violet wire in hole 4.

( ) Blue wire in hole 5.

( ) Green wire in hole 6.

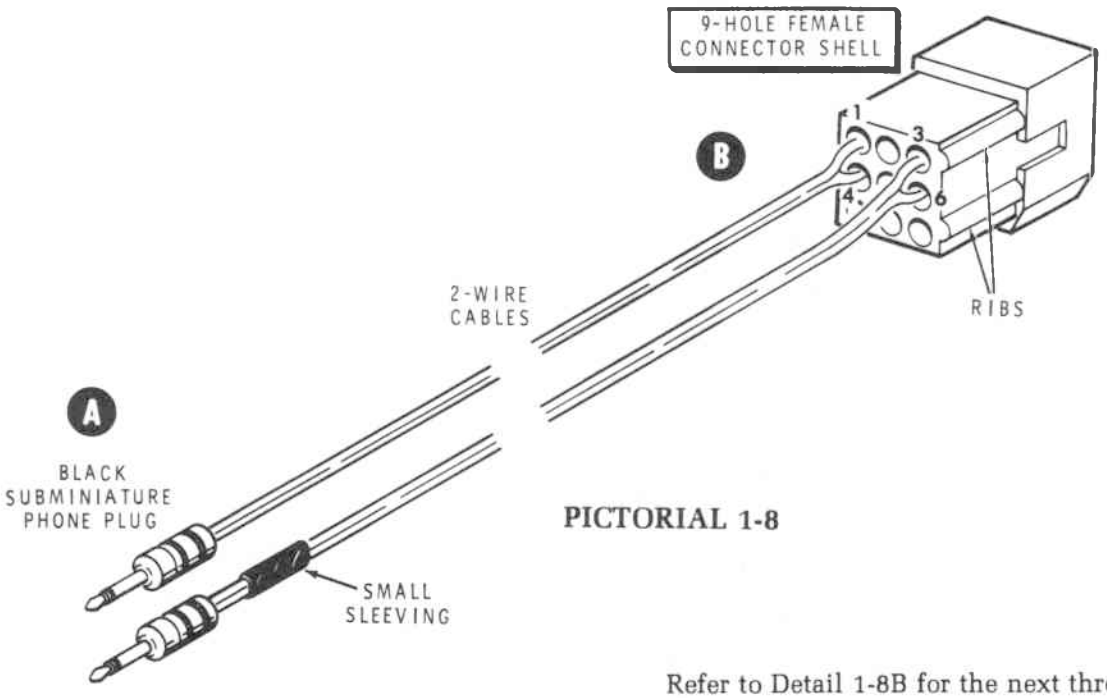
( ) Yellow wire in hole 7.

( ) Orange wire in hole 8.

( ) Red wire in hole 9.

( ) Brown wire in hole 10.

Set the cable aside.



PICTORIAL 1-8

Refer to Pictorial 1-8 for the following steps.

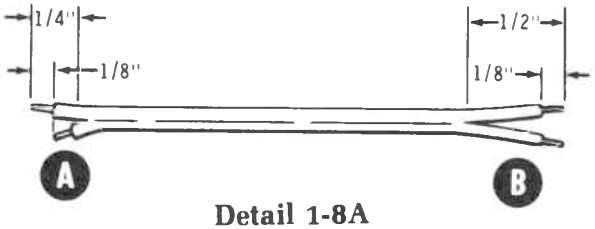
( ) Cut two 1" lengths of small sleeving.

( ) Cut the gray shielded cable into two equal lengths.

( ) Cut the 2-wire cable into two equal lengths.

NOTE: In the following steps, you will assemble two 2-wire cables. Complete the first cable; then repeat the steps where indicated by double check spaces for the second cable. Some steps use only one check space. Perform these steps only once as instructed. Do not start the second cable until a step tells you to.

( ) ( ) Refer to Detail 1-8A and prepare ends A and B of the 2-wire cable as shown.



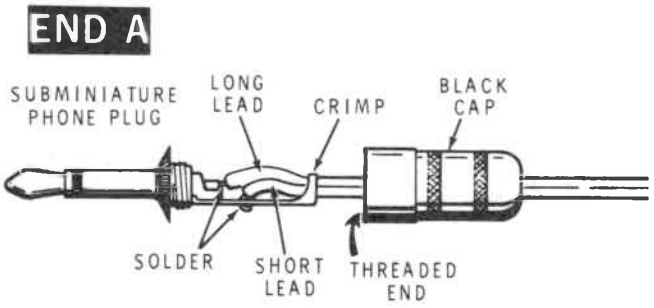
Detail 1-8A

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

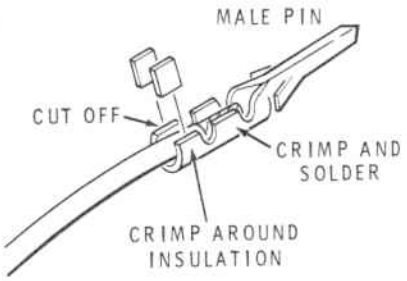
( ) ( ) Remove the black cap from the subminiature phone plug. Slide the cap over the 2-wire cable at end A with the threaded end as shown.

( ) ( ) Solder the long and short wires at end A of the 2-wire cable to the indicated lugs on the subminiature phone plug. NOTE: You may find it easier to clamp the phone plug in a small vice to hold it steady while you solder the wires to it.

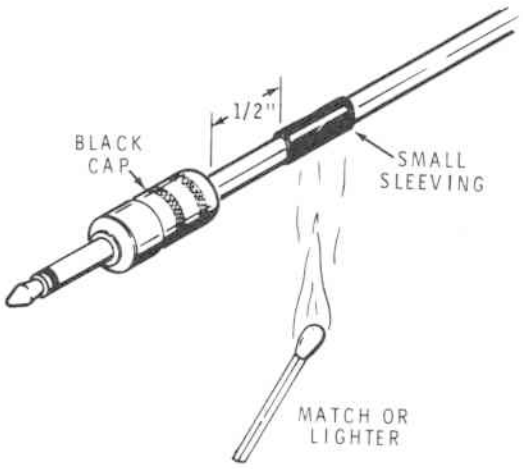
( ) ( ) After the connections cool, crimp the indicated lugs around the 2-wire cable as shown. Replace the black cap on the phone plug.



Detail 1-8B



Detail 1-8C



Detail 1-8D

( ) ( ) Refer to Detail 1-8C and crimp and solder a male pin on the end of each prepared wire at end B of the 2-wire cable.

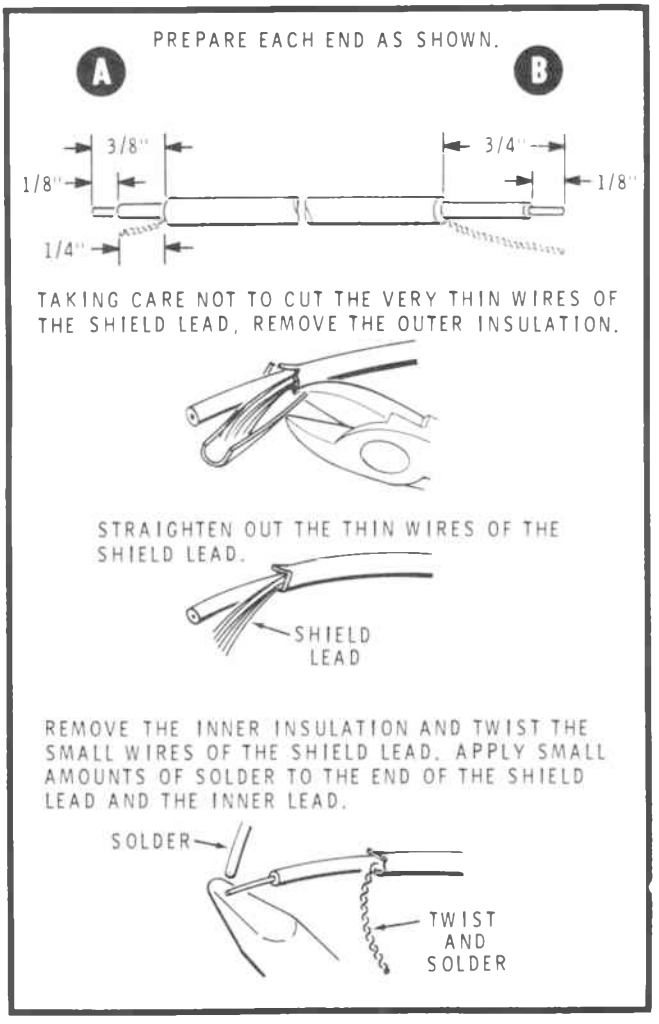
( ) Slide a length of small sleeving onto end A of the remaining 2-wire cable. Then repeat the previous steps and assemble the second 2-wire cable.

( ) Position the female connector shell with the ribs as shown in Pictorial 1-8.

( ) Push the male pins of the 2-wire cable with small sleeving into connector holes 3 and 6 (either pin into either hole). Gently pull on the wires to make sure they are locked in place.

( ) Position the length of small sleeving approximately 1/2" from the subminiature phone plug. Shrink the sleeving in place with a lighter or match. Be careful not to melt the cable insulation. See Detail 1-8D.

( ) Push the male pins of the remaining 2-wire cable into connector holes 1 and 4 (either pin into either hole). Gently pull on the wires to make sure they are locked in place.

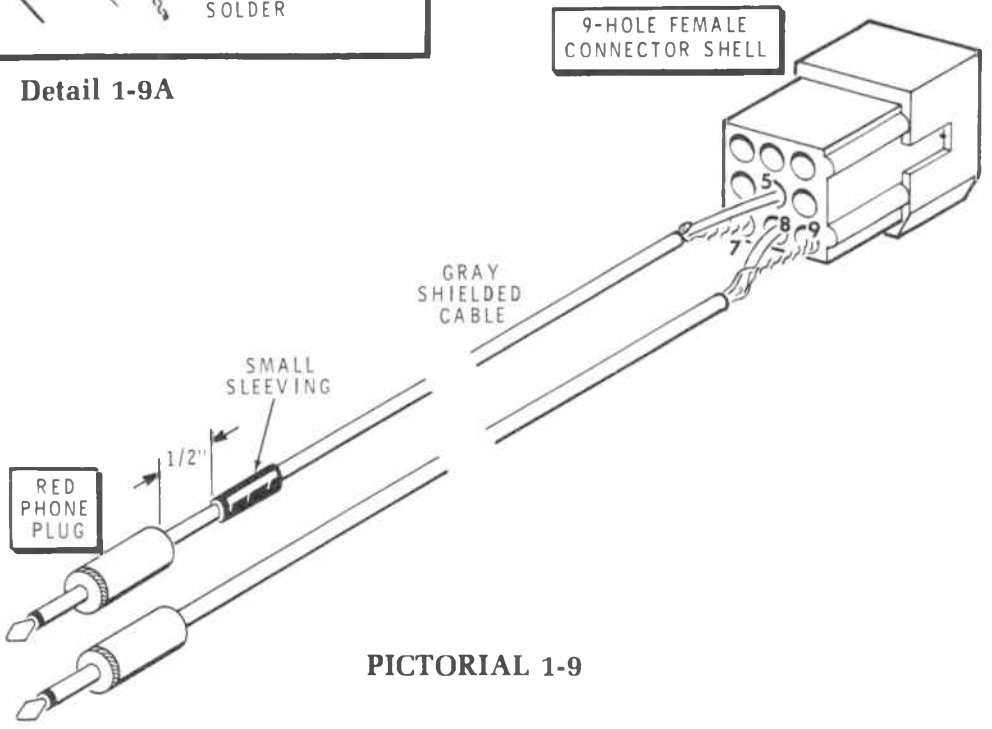


Detail 1-9A

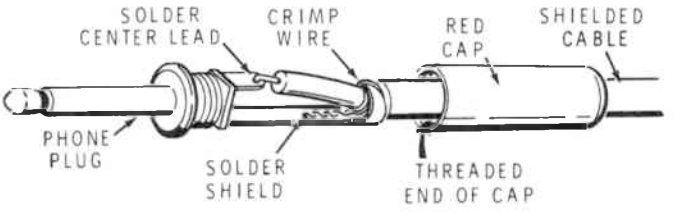
Refer to Pictorial 1-9 for the following steps.

NOTE: In the following steps, you will be instructed to assemble two shielded cables. After you complete the first cable, repeat the steps for the second cable; double check spaces are provided. Do not start the second cable until a step tells you to.

( ) ( ) Refer to Detail 1-9A and prepare a gray shielded cable as shown.



PICTORIAL 1-9

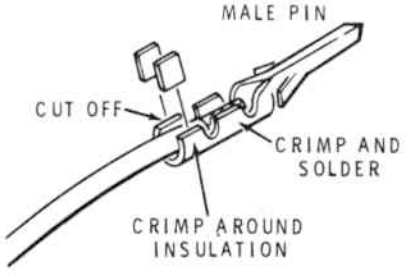


Detail 1-9B

( ) ( ) Remove the red cap on one of the phone plugs and slide it over the shielded cable at end A with the threaded end as shown in Detail 1-9B.

( ) ( ) Refer to Detail 1-9B and solder the center lead of the shielded cable to the indicated lug of the phone plug. Solder the shield to the indicated location on the phone plug. After the connection cools, crimp the tabs around the wire and replace the red cap on the phone plug.

( ) ( ) Refer to Detail 1-9C and crimp and solder a male pin on the end of the center lead and the shield lead of end B of a shielded cable.



Detail 1-9C

( ) Slide a length of small sleeving over end A of the second shielded cable and repeat the previous steps and assemble another shielded cable.

( ) Locate the 9-hole female connector shell with the two previously installed 2-wire cables.

( ) Push the male pins of the shielded cable with small sleeving into the 9-hole female connector shell holes as follows. Gently pull on the wires to make sure they are locked in place.

Shield lead to hole 7.

Center lead to hole 5.

( ) Position the length of small sleeving approximately 1/2" from the phone plug. Shrink the sleeving in place with a lighter or match.

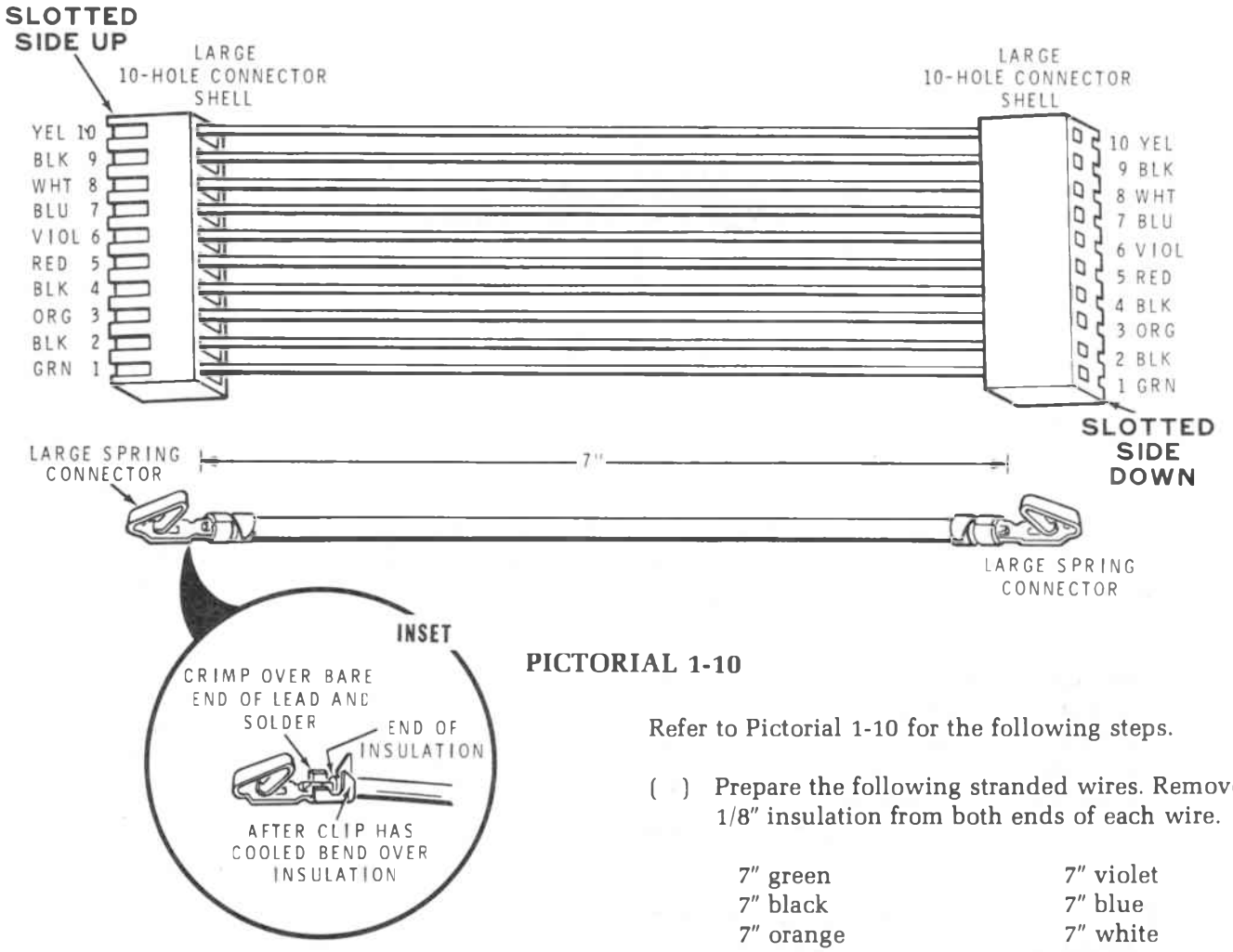
( ) Push the male pins of the remaining cable into the connector holes as follows. Gently pull on the wires to make sure they are locked in place.

Shield lead to hole 9.

Center lead to hole 8.

( ) If an ohmmeter is available, make continuity checks on the cables to be sure there are no short or open circuits.

( ) Set this cable assembly aside.



PICTORIAL 1-10

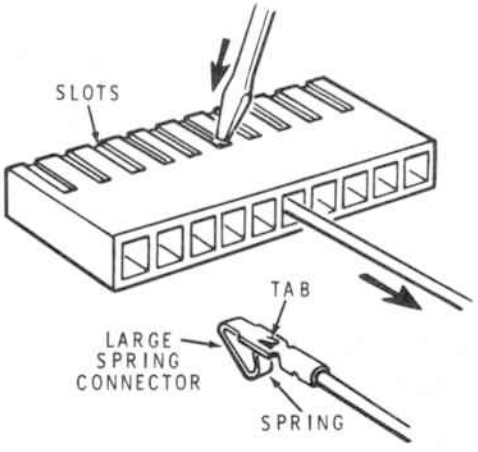
Refer to Pictorial 1-10 for the following steps.

( ) 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 (thin insulation)	7" yellow

( ) Crimp and solder large spring connectors onto both ends of each wire. See the inset drawing.

NOTE: If it is ever necessary to remove a spring connector from a connector shell, use a small screwdriver to depress the tab on the connector through the slot in the connector shell while you pull on the wire. See Detail 1-10A. For this reason, always install the spring connectors with the tab toward the slotted side of the connector shell.

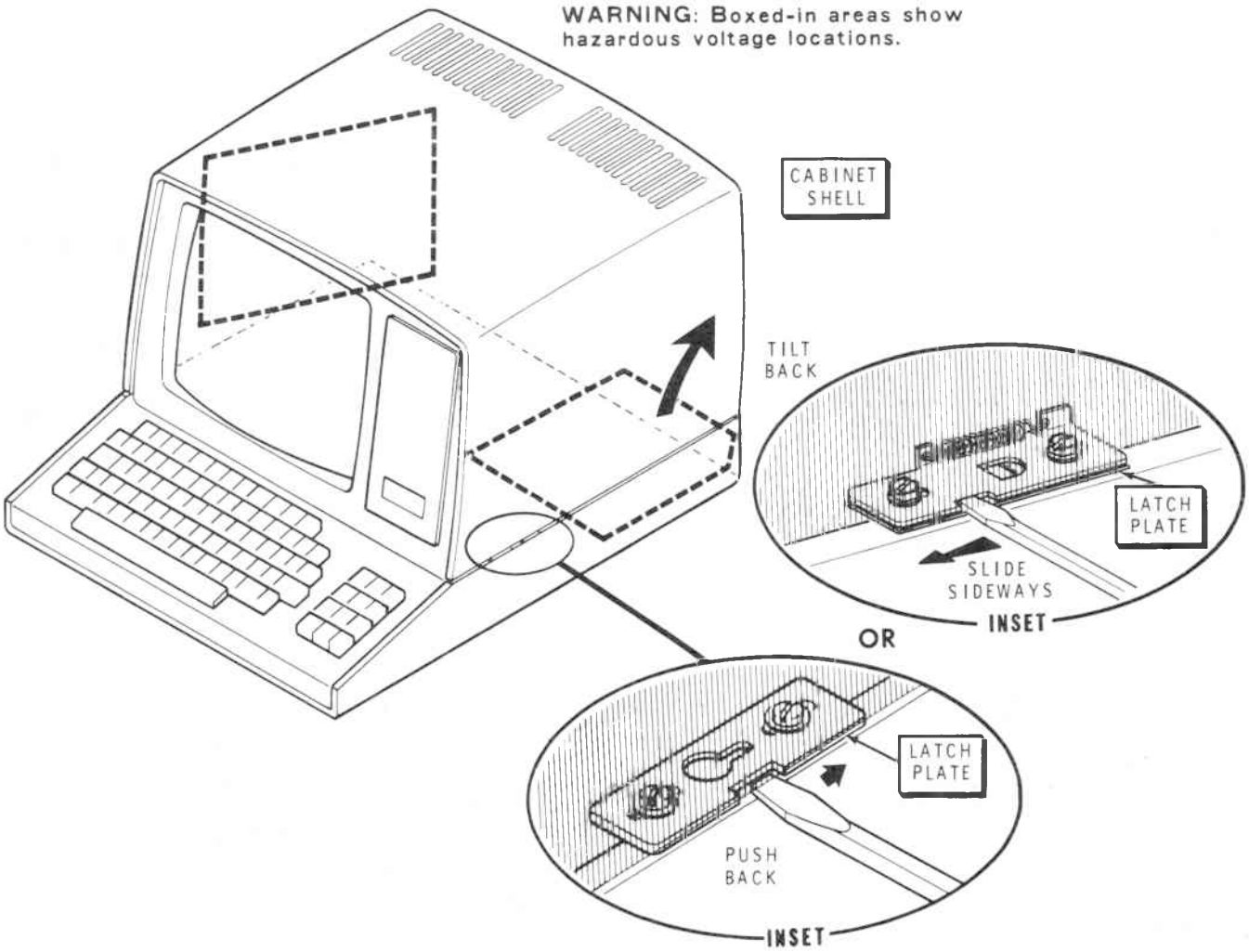


Detail 1-10A

( ) Insert the prepared wires into two 10-hole connector shells as shown. Be sure the slotted side of the left-hand connector shell is up and the slotted side of the right-hand connector shell is down.

( ) Set this cable aside.

CABINET REMOVAL



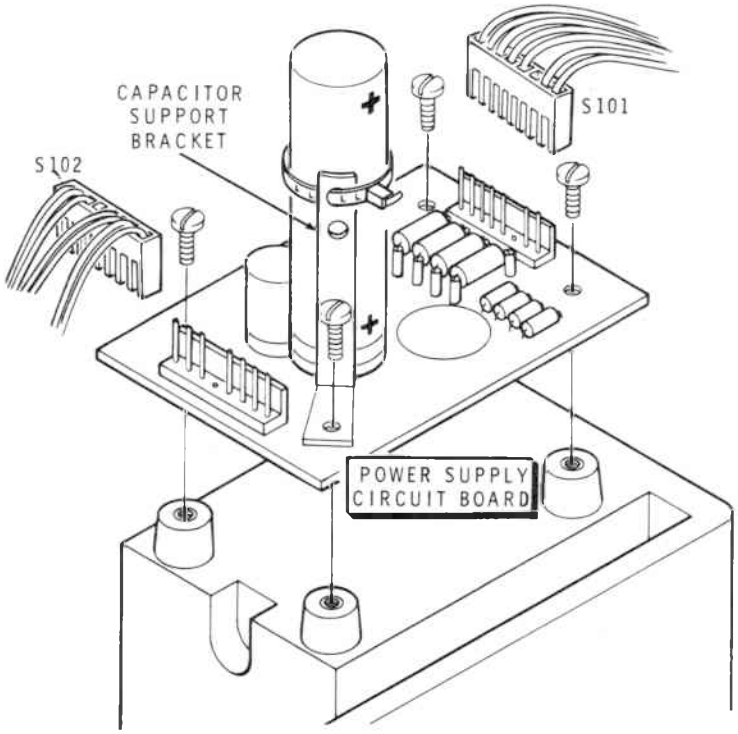
PICTORIAL 2-1

Whenever you need to remove the cabinet shell:

- Refer to the inset drawings on Pictorial 2-1, insert the blade of a small screwdriver into the notch in the latch plate, and then slide the latch plate as shown in the inset drawings.
- Likewise, open the latch plate on the other side of the cabinet shell.
- **WARNING:** When the line cord is connected to an AC outlet, hazardous voltages can be present inside the unit. See Pictorial 2-1.
- Carefully tilt the cabinet shell back. NOTE: The hinges are designed so you can easily remove the cabinet shell once you have opened it completely.

Reverse this procedure to close and lock the cabinet shell.

DISASSEMBLY



PICTORIAL 2-2

REAR PANEL

( ) Unplug the line cord on your Video Terminal.

( ) Refer back to Pictorial 2-1 (on Page 23) and remove the cabinet shell.

Refer to Pictorial 2-2 for the following steps.

( ) Unplug sockets S101 and S102 from the power supply circuit board.

( ) Remove the four screws that hold the power supply circuit board. They will be used later.

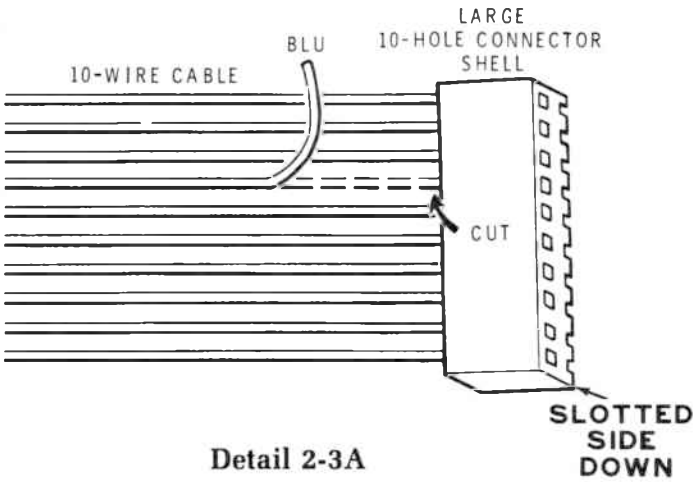
( ) Discard the power supply circuit board and the capacitor support bracket. They will not be used.

Refer to Pictorial 2-3 (Illustration Booklet, Page 4) for the following steps.

( ) Unplug sockets S401, S402, S403, and S404 (on the back of the board) from the terminal logic circuit board.

( ) Remove the two indicated screws and lift out the terminal logic circuit board. Save the screws; they will be used later.

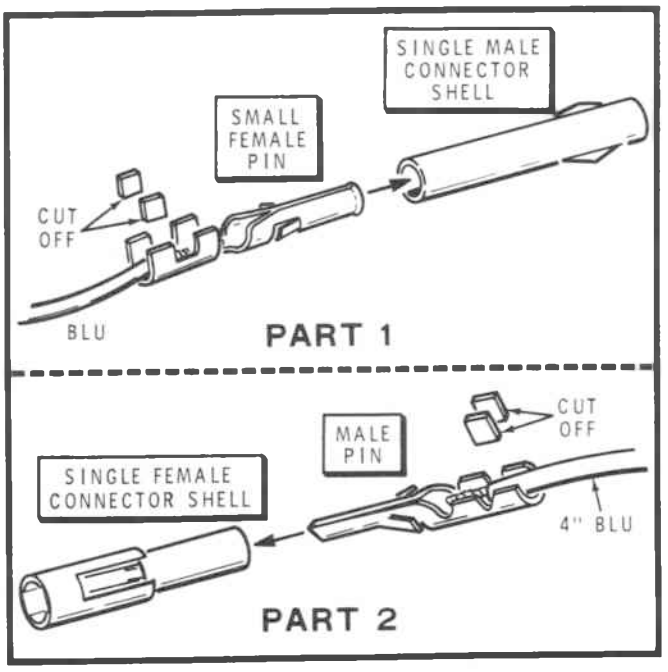
( ) Look at plug P401 and see if pin 7 has been cut off or is missing. If so, perform the following steps. If not, proceed to step nine.



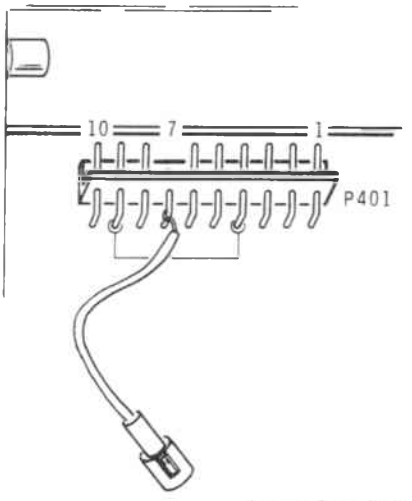
Detail 2-3A

1. ( ) Refer to Detail 2-3A and position either end of the previously prepared 10-wire cable so that the connector slots are down as shown.

2. ( ) Cut the blue wire as close to the connector as possible.



Detail 2-3B



Detail 2-3C

3. ( ) Refer to Part 1 of Detail 2-3B, prepare 1/8" of the free end of the blue wire, and install a small female pin onto the end of the wire as shown.

4. ( ) Insert the small female pin into the single male connector shell as shown.

5. ( ) Cut a 4" blue wire and prepare 1/8" of its ends as shown.

6. ( ) Refer to Part 2 of Detail 2-3B and install a small male connector onto either end of this blue wire. Then push the connector into the single female connector shell as shown.

7. ( ) Refer to Detail 2-3C and carefully connect the free end of the wire to the indicated section of pin 7 of plug P401 (S-1). Be sure the wire end does not touch any other nearby pins or circuit board foils.

8. ( ) Refer to the inset drawing on Pictorial 2-3, plug the 10-wire cable onto plug P401 of the terminal logic circuit board, and connect the single connector shells as shown. (Then proceed to step 10.)

9. ( ) Connect either end of the 10-wire cable that you prepared earlier onto plug P401. The other end of this cable will be connected later.

10. ( ) Refer to Detail 2-3D (Illustration Booklet, Page 5) and remove the rear panel DTE connector. Be sure to cut the black wire off close to the solder lug. Set the connector, cable, and hardware aside. (Your rear panel plate may not look like the one shown.)

NOTE: Perform the steps under "Long Rear Panel Plate" only if your rear panel plate looks like the one in Detail 2-3F (Illustration Booklet, Page 5). Otherwise, proceed to "Short Rear Panel Plate."

LONG REAR PANEL PLATE

( ) Refer to Detail 2-3F and remove and discard the rear panel plate.

( ) Replace the rear panel plate with the one supplied in this kit. When you replace the control, use a control solder lug and control flat washer as shown. Do not mount the rear panel plate on the chassis at this time.

( ) Prepare an 18" green wire. Connect the wire from the control solder lug (S-1) to the closest solder lug of transformer T1 (S-1).

Proceed to "Brightness Control Modification".

SHORT REAR PANEL PLATE

Refer to Detail 2-3E (Illustration Booklet, Page 5) and remove and discard the rear panel plate.

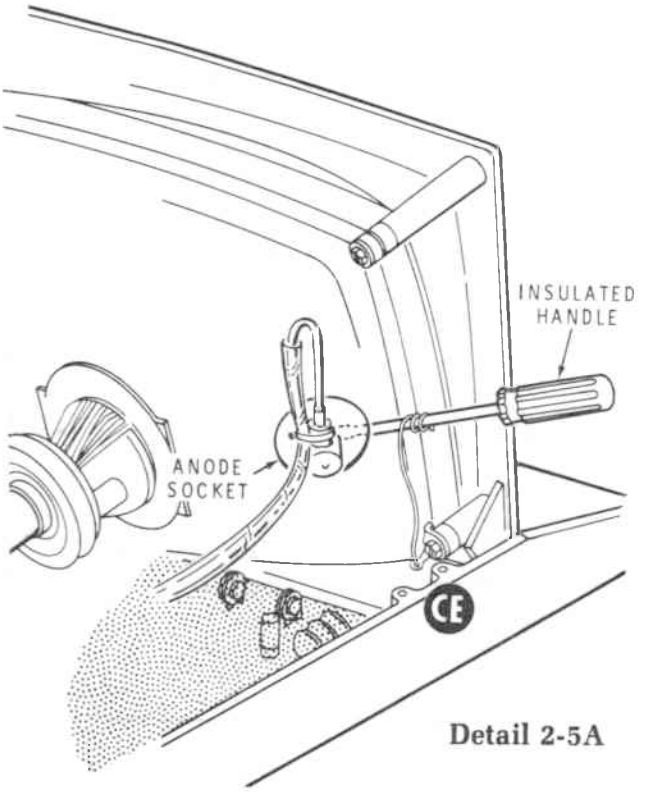
BRIGHTNESS CONTROL MODIFICATION

( ) Refer to Pictorial 2-4 (Illustration Booklet, Page 6) and remove and set aside the long support bracket as shown (if your Terminal has one).

Refer to Pictorial 2-5 (Illustration Booklet, Page 6) for the following steps.

WARNING: High voltage may be present at the anode lead of the CRT. Perform the following steps carefully.

( ) Refer to Detail 2-5A and temporarily solder one end of the supplied bare wire to the ground lug at CE. Then wrap the other end of the wire around the bare shaft of a small-bladed screwdriver. 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.



Detail 2-5A

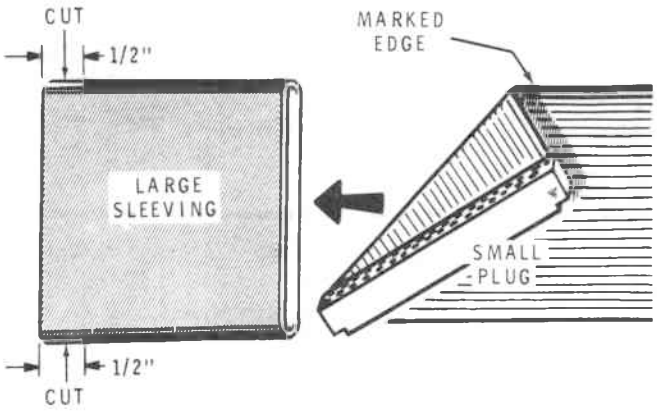
( ) Fold back the plastic boot and use a screwdriver to push one of the high voltage clips towards the other, and remove the connector. See the inset drawing #1 in Pictorial 2-5.

( ) Remove the bare wire that you temporarily soldered to lug CE.

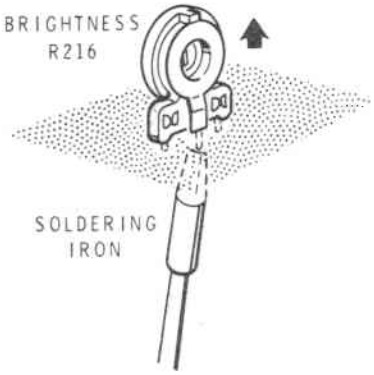
( ) Remove the four screws that hold the video circuit board at B, C, D, and E.

( ) Do not unplug P203, but unplug the CRT socket, P201, P202, P204, and disconnect the black wire connector from lug CE.

( ) Remove the video circuit board.



Detail 2-5B



Detail 2-6A

( ) Locate the large sleeving and make two 1/2" cuts in it at one end. See Detail 2-5B.

( ) Refer to Detail 2-5B and twist one end of the flat cable coming from the keyboard. Then slide the **uncut** end of the sleeving over the cable. Flatten the cable out again and slide the sleeving down to the small plug so the cut portion is over the plug.

If you have the **long** rear panel plate, proceed to "Video Circuit Board Reinstallation" on Page 30.

Refer to Pictorial 2-6 (Illustration Booklet, Page 7) for the following steps.

Remove BRIGHTNESS control R216 from the video circuit board as follows:

( ) 1. Refer to Detail 2-6A and, on the bottom (foil side) of the circuit board, remove the solder from the three control lug connections with the solder-removal braid supplied with your kit. (Use the instructions supplied with the braid.) Then lift the control from the board and discard the control.

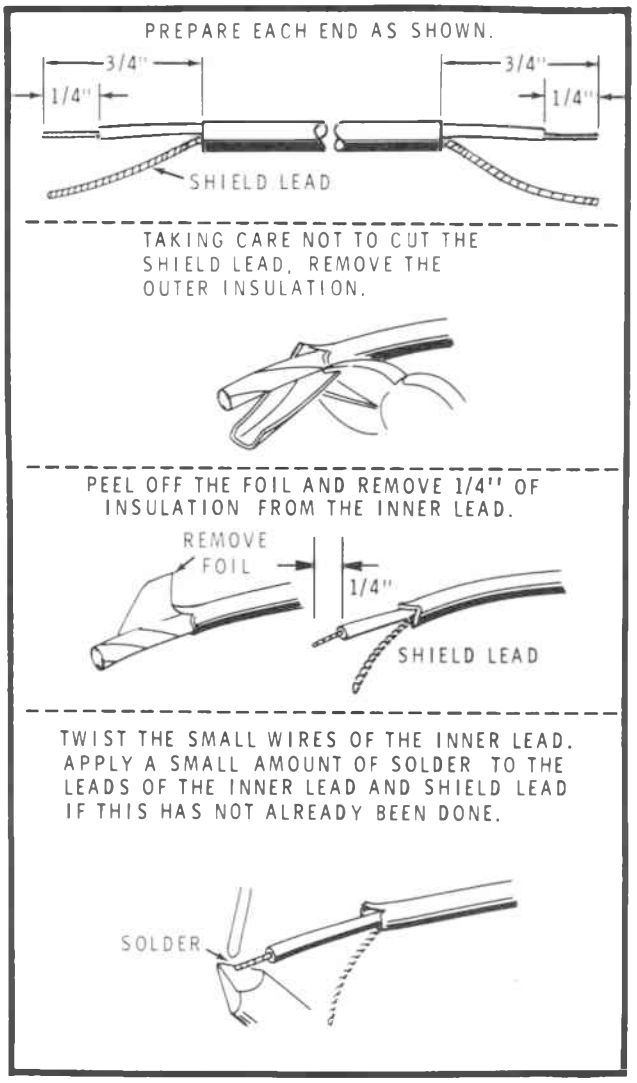
( ) 2. Make sure the three circuit board mounting holes at R216 are free of solder. If necessary, use the solder-removal braid again.

( ) Cut the 3' black shielded cable into two equal lengths.

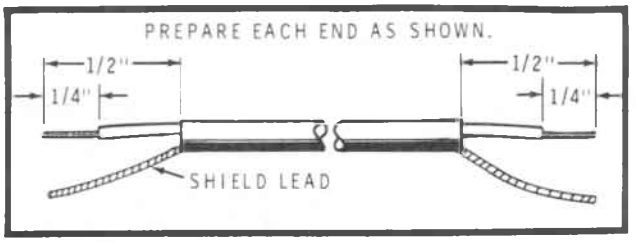
( ) Refer to Detail 2-6B and prepare one of the cables as shown. (Do not prepare the other cable yet).

( ) Select either end of the prepared cable and insert the inner lead of the cable into hole 1 as shown in Pictorial 2-6. Then solder the lead to the foil.

( ) Cut off the excess lead length close to the connection. WARNING: Clip the lead so the end will not fly toward your eyes.



Detail 2-6B



Detail 2-6C

( ) Insert the shield lead into hole 3 but do not solder the connection yet.

( ) Refer to Detail 2-6C and prepare the other black shielded cable as shown.

( ) Select either end of the cable and insert the inner lead into hole 2 and solder the connection.

( ) Insert the shield lead into hole 3 with the other shield lead and solder both leads to the foil.

Connect the free end of the cable coming from holes 2 and 3 to 500 Ω control as follows:

( ) Connect the inner lead to lug 2. Solder the connection.

( ) Connect the shield lead to lug 1. Do not solder the connection yet.

Connect the free end of the remaining cable as follows:

( ) Connect the inner lead to lug 3. Solder the connection.

( ) Connect the shield lead to lug 1 with the other shield lead. Be sure only 1/4" of this lead extends from the lug as shown. Solder both leads to the lug.

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

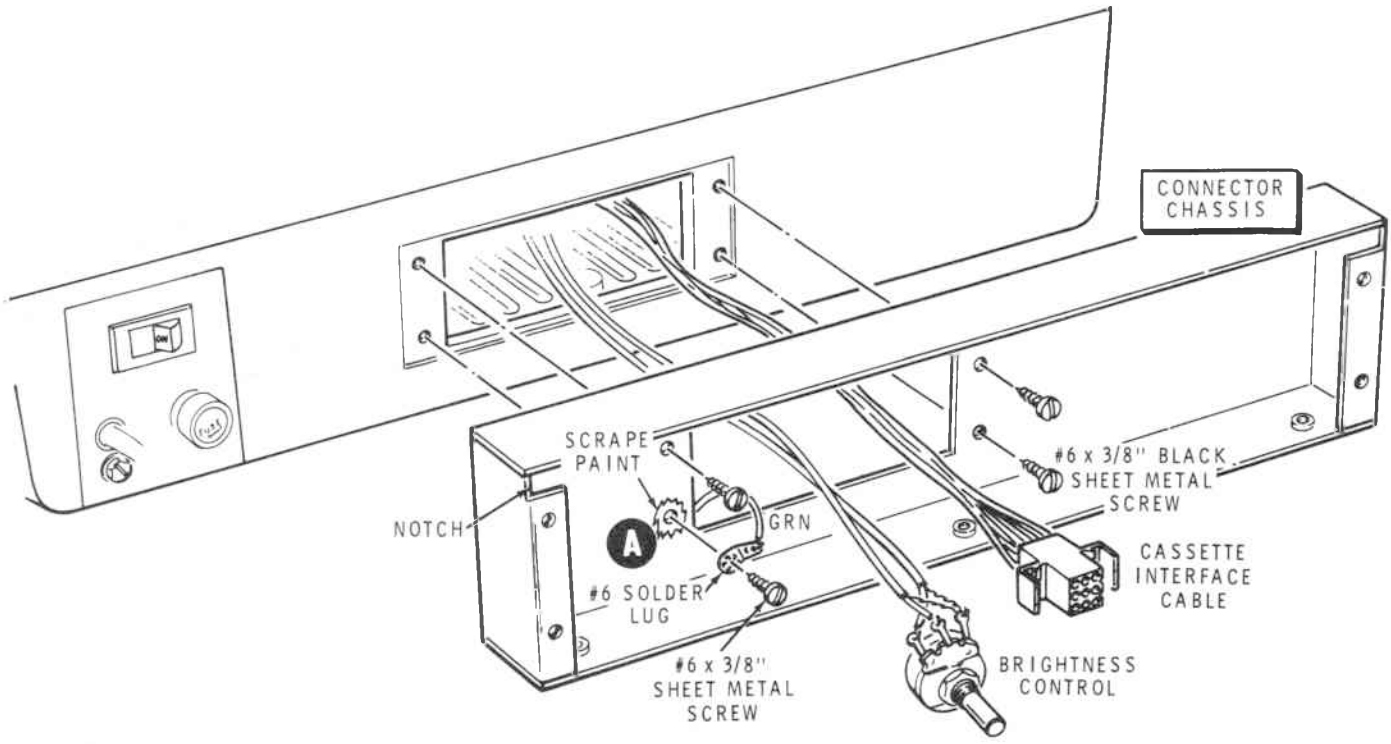
( ) Refer to Detail 2-7A and scrape the paint from the connector chassis at hole A.

( ) Again refer to Detail 2-7A and the inset drawing on Pictorial 2-7, route the new Brightness control through the connector chassis opening, and mount the connector chassis to the rear of your Computer with four #6 × 3/8" black sheet metal screws. Use a #6 solder lug at A and be sure to mount the chassis with the indicated notch positioned up as shown. Also, do not pinch any wires between the chassis and the Computer.

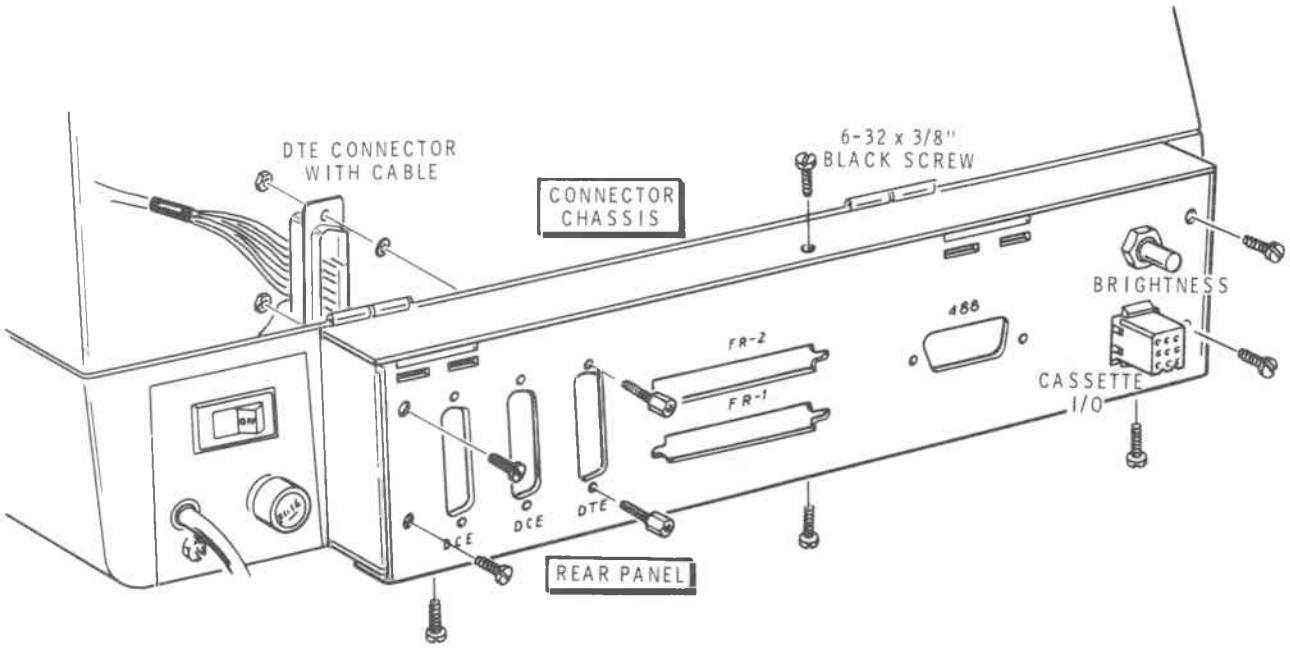
( ) Cut the solder lug from the end of the green wire and remove 1/4" of insulation from the end of the wire.

( ) Connect and solder the green wire to solder lug A.

( ) Route the indicated cassette interface cable as shown. It will be connected later.



Detail 2-7A



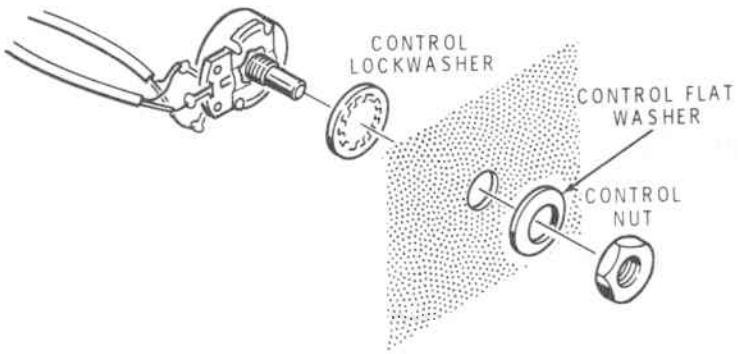
PICTORIAL 2-8

Refer to Pictorial 2-8 for the following steps.

( ) Refer to Detail 2-8A and mount the control at BRIGHTNESS with a control lockwasher, control flat washer, and a control nut as shown.

VIDEO CIRCUIT BOARD REINSTALLATION

( ) Remount the video circuit board in the Computer. Use the four screws you removed earlier, but leave screw B loose. NOTE: Be sure the large flat ribbon cable coming from the keyboard is under this circuit board.



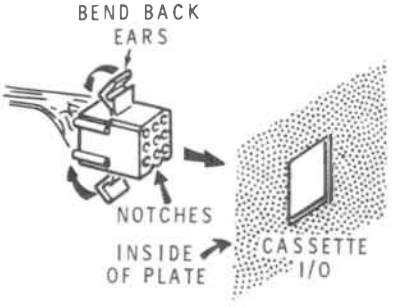
Detail 2-8A

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. You can receive a dangerous shock if you operate the unit without this black wire connected.

( ) Again refer to Pictorial 2-5 and reconnect the black wire at CE. Then reconnect plugs P201, P202, P204, the CRT socket (see inset drawing #2), and the anode lead to the CRT (see inset drawing #1).

( ) Refer to the inset drawing on Pictorial 2-4 and insert the lower end of the brace under screw B on the heat sink. Insert the other end of the brace under the other indicated screw. 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.



Detail 2-8B

REAR PANEL CONTINUED

Refer to Pictorial 2-8 for the following steps. (NOTE: Your rear panel assembly may not look like the one shown.)

( ) Refer to Detail 2-8B and install the indicated cassette interface cable in the rear panel as shown.

( ) Mount the DTE connector with cable on the new rear panel in the DTE cutout. Use the hardware you removed earlier.

( ) Mount the rear panel to the connector chassis. Use eight 6-32 × 3/8" black screws.

( ) Refer to Pictorial 2-9 and install hole covers as shown. (The part numbers are molded inside the covers.)

POWER SUPPLY MODIFICATION

Refer to Pictorial 2-10 (Illustration Booklet, Page 8) for the following steps.

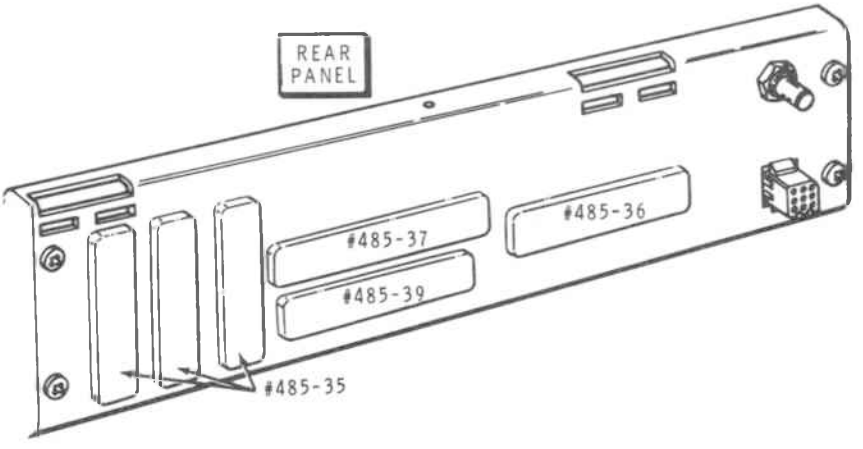
( ) Cut and discard the indicated small cable tie.

( ) Remove the three indicated hex head screws that hold the AC chassis, and the four sets of hardware that hold the power transformer. Set all this hardware aside. It will be used later.

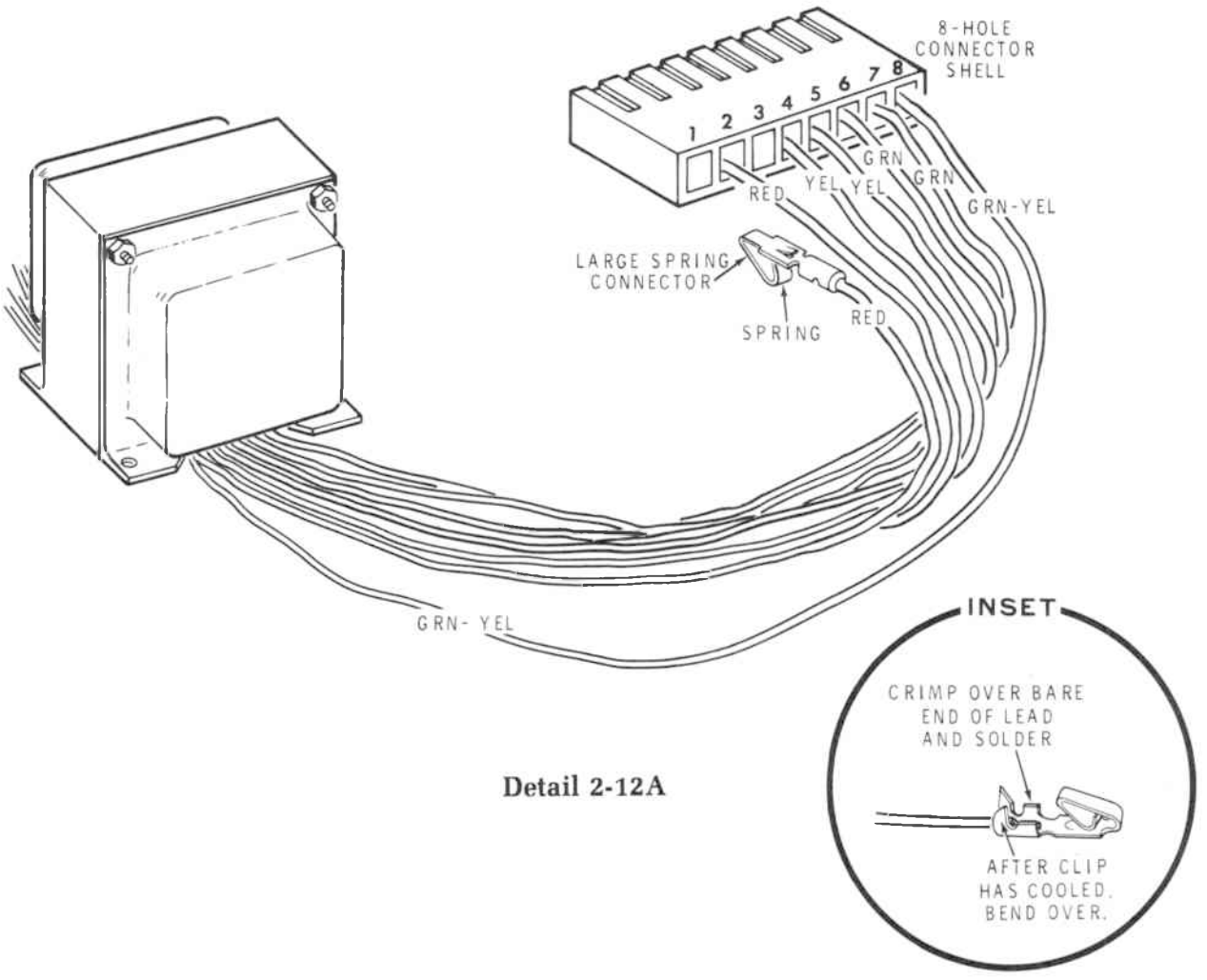
Refer to Pictorial 2-11 (Illustration Booklet, Page 8) for the following steps.

( ) Unsolder and remove the indicated six transformer leads from switches SW1 and SW2 on the AC chassis. If necessary, use solder-removal braid to remove excess solder from the lug holes.

( ) Remove and discard power transformer T1. It will not be used.



PICTORIAL 2-9



Detail 2-12A

Refer to Pictorial 2-12 (Illustration Booklet, Page 9) and Detail 2-12A for the following steps.

NOTE: Use the new transformer in the following steps.

( ) Cut the bare end of the red, yellow, green, and green-yellow transformer leads to 1/8".

( ) Refer to the inset drawing on Detail 2-12A 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.

( ) In the same manner, crimp and solder large spring connectors onto the following transformer leads.

Other red lead.
Either green lead.
Other green lead.
Either yellow lead.
Other yellow lead.
Green-yellow lead.

( ) Position the 8-hole connector shell as shown with the slotted side up.

Again refer to Detail 2-12A and insert the spring connectors into the 8-hole connector shell as follows. Insert each connector until it locks in place.Disregard any numbers stamped on the shell.

( ) 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.

( ) Prepare the following green wires.

12″
12″
10″

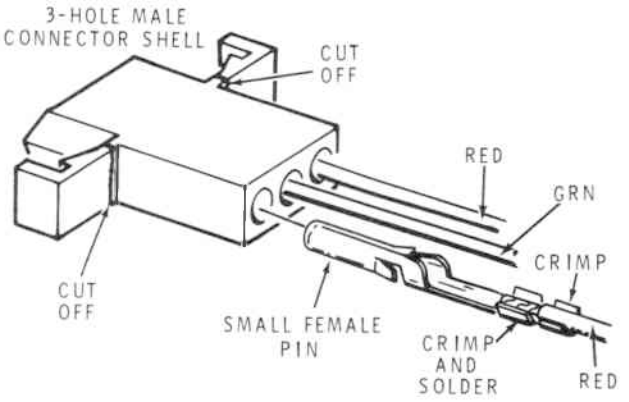
( ) Connect one 12″ green wire to a solder lug (NS).

( ) Connect the other 12″ green wire to the same solder lug (S-2).

( ) Again temporarily refer to Pictorial 2-10 and mount the new power transformer at T1. Be sure red, yellow, and green leads are positioned as shown. Use the hardware you removed earlier, and use the cabinet mounting holes that best fit the mounting holes in your transformer. (Be sure you mount the two solder lugs with the green wires at DE.)

( ) Connect the 10″ green wire from the indicated solder lug at DE to solder lug CF of the CRT. Solder both connections. See inset drawing #1.

( ) Route the transformer leads (not connected to the 8-hole connector shell) around capacitor C1 and through the hole in the back of the AC housing.



Detail 2-12B

( ) Refer to inset drawing #2 on Pictorial 2-12 and install a small cable tie around the indicated leads and wires. Pull the cable tie tight and cut off the excess.

( ) Prepare two 15″ red wires (thick insulation). Remove 1/4″ of insulation from one end of each wire and 1/8″ of insulation from the other end.

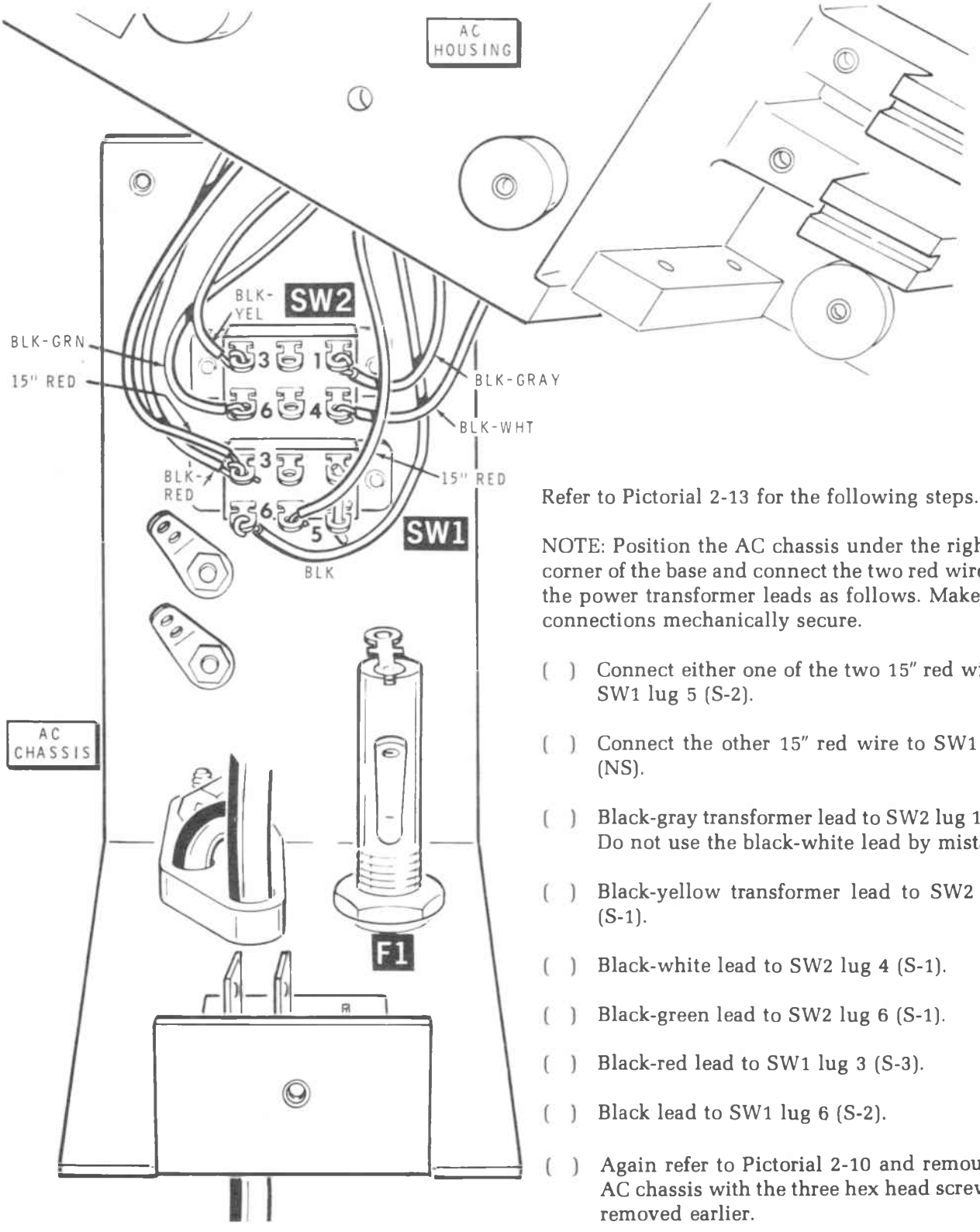
( ) Locate a 3-hole male connector shell. Then refer to Detail 2-12B and cut off the ears. Use this socket in the next step.

( ) Refer to Detail 2-12B and crimp and solder a small female pin onto the 1/8″ end of each of the red wires. Then insert these pins into the two outside holes of a 3-hole male connector shell as shown.

( ) Insert the other end of these two red wires through the small hole in the back of the AC housing (same as the power transformer leads).

( ) As before, crimp and solder a small female pin on the end of the indicated 12″ green wire coming from solder lug DE.

( ) Insert this pin into the center hole of the 3-hole male connector shell as shown in Detail 2-12B.



PICTORIAL 2-13

Refer to Pictorial 2-13 for the following steps.

NOTE: Position the AC chassis under the right rear corner of the base and connect the two red wires and the power transformer leads as follows. Make these connections mechanically secure.

( ) Connect either one of the two 15" red wires to SW1 lug 5 (S-2).

( ) Connect the other 15" red wire to SW1 lug 3 (NS).

( ) Black-gray transformer lead to SW2 lug 1 (S-1). Do not use the black-white lead by mistake.

( ) Black-yellow transformer lead to SW2 lug 3 (S-1).

( ) Black-white lead to SW2 lug 4 (S-1).

( ) Black-green lead to SW2 lug 6 (S-1).

( ) Black-red lead to SW1 lug 3 (S-3).

( ) Black lead to SW1 lug 6 (S-2).

( ) Again refer to Pictorial 2-10 and remount the AC chassis with the three hex head screws you removed earlier.

( ) Replace fuse F1 with the 1-1/2 ampere slow-blow fuse supplied.

INSTALLATION AND CHECKOUT

NOTE: The following test will require a high input impedance volt/ohmmeter. 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.

Refer to Pictorial 3-1 (Illustration Booklet, Page 10) for the following steps.

( ) Set your ohmmeter range switch to the X1 position.

( ) Connect your negative ohmmeter lead to one of the solder lugs on the power transformer.

( ) Set the POWER switch to OFF (ON side of switch out).

( ) Touch the positive ohmmeter lead to first one and then the other flat prong on the line cord plug. The meter should read INFINITE.

( ) Touch the positive ohmmeter lead to the round prong on the line cord plug. The meter should read "0" resistance.

( ) Connect the negative ohmmeter lead to one flat prong and the positive ohmmeter lead to the other flat prong of the line cord plug. The meter should read INFINITE.

( ) With the ohmmeter leads still connected as in the previous step, set the POWER switch to ON. The ohmmeter should read approximately two ohms.

( ) Disconnect the ohmmeter leads and place the POWER switch in the OFF position.

POSSIBLE AREA OF TROUBLE
1. Faulty wiring between switches.
2. Ohmmeter is connected to the round prong in place of the flat prong on the line cord plug.

Refer to Pictorial 3-2 (Illustration Booklet, Page 11) for the following steps.

( ) Refer to Detail 3-2A and mount the power supply heat sink to the top of the AC housing with four 6-32 hex spacers.

( ) Locate the free end of the 12" green wire coming from the solder lug on the power transformer. Connect this wire to the outer hole in GA lug 3 (S-1) on the power supply heat sink.

( ) Install two small cable ties at the locations shown in Pictorial 3-2.

( ) Refer to Detail 3-2A and position the red, green, and yellow transformer leads along the edge of the base shown.

( ) Again refer to Detail 3-2A and mount the power supply circuit board to the top of the hex spacers with the four 6-32 × 1/4" screws you removed earlier. Make sure the circuit board is positioned with plug P101 toward the rear of this unit.

( ) Set your ohmmeter range switch to the ×1000 position.

NOTE: The internal wiring of most ohmmeters is such that the positive terminal of the meter battery is connected to the positive test lead and the negative battery terminal is connected to the negative test lead. In some ohmmeters, this wiring is reversed, and this could give you the wrong readings. 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	POSITIVE OHMMETER	OHMMETER
( )	P101. pin 1	P101. Pin 2	INFINITE
( )	P101. pin 4	P101; pin 5	Greater than 10 kΩ.
( )	P101. pin 8	P101. pin 6	Greater than 10 kΩ.
( )	P101. pin 8	P101. pin 7	Greater than 10 kΩ.
( )	P101. pin 8	P101, pins 1, 2, 4, and 5 (one at a time).	INFINITE at each pin

( ) Refer to the inset drawing on Pictorial 3-2 and insert a large polarizing plug into socket S101 hole 3.

( ) In the same manner (if not already done), insert another large polarizing plug into socket S102, hole 5.

Refer to Pictorial 3-3 (Illustration Booklet, Page 12) for the following steps.

NOTE: Whenever you install a connector on a circuit board plug as in the next step, always position the slotted side of the connector away from the raised part of the plug (the slots should be easily visible after the connector is installed). Also, make sure you do not install the connector one pin off. For example: you can install the connector with plug pin 2 in hole 1 of the connector.

( ) Connect the 4-hole connector coming from BR101 (S103) to plug P103 on the power supply circuit board.

( ) Connect the 8-hole connector on the power transformer leads to plug P101 on the power supply circuit board.

( ) Connect the 8-hole harness connector to plug P102 on the power supply circuit board.

( ) Connect the 2-hole connector coming from the power supply heat sink to plug P104 on the power supply circuit board.

WARNING: When the line cord is connected to an AC outlet, dangerous AC voltage is present inside the AC housing. Do not operate the unit with the AC chassis removed from the AC housing. To do so could result in a hazardous electrical shock.

( ) Plug in the line cord plug.

( ) Set the POWER switch to ON.

( ) Set your voltmeter to read approximately 150 volts DC. Reduce this range setting if a measurement requires a lower range.

NOTE: In the following steps, touch your meter probe to the spring connector through the slot in the side of the shell.

Make the following tests on the pins of P102 on the power supply circuit board and check for the indicated meter reading.

	NEGATIVE LEAD TO:	POSITIVE LEAD TO:	APPROXIMATE METER READING:
( )	P102, pin 2	P102, pin 1	50 VDC
( )	P102, pin 4	P102, pin 3	13 VDC
( )	P102, pin 7	P102, pin 6	+20 VDC
( )	P102, pin 7	P102, pin 8	−20 VDC
( )	Heat sink	S516 pin 3	5 VDC
( )	Heat sink	S516 pin 1	18 VDC

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.

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

Refer to Pictorial 3-4 (Illustration Booklet, Page 13) for the following steps.

( ) Locate the interconnect cable (9-wire cable with 15-hole connectors on each end). Insert a small polarization plug into hole 2 (empty hole next to the black wire) in the socket at either end of the cable, and insert another small polarization plug into hole 4 of the socket at the other end of the cable (see inset drawing #2). Lay this cable in the base as shown; it will be connected later.

( ) Refer to inset drawing #1 and install six nylon guides in the side brackets as shown.

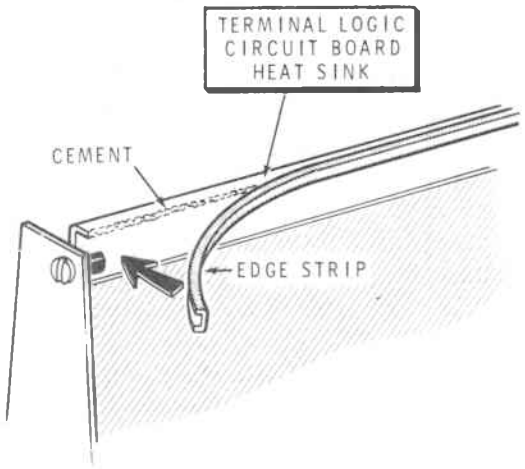
( ) Be sure the cassette interface cable is positioned as shown.

( ) 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 socket S402 onto plug P402 on the terminal 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 as shown.

( ) Refer to inset drawing #2 on Pictorial 3-4 and cut pin 4 off plug P404 (if not already done). Remove the pin close to the body of the plug.



Detail 3-4B

( ) Open the tube of cement. Then refer to Detail 3-4B and form a bead of cement along the top edge of the terminal logic circuit board heat sink as shown.

( ) Press the edge strip in place along the length of the heat sink as shown in the Detail.

( ) Cut two 1" pieces from the 5" foam strip.

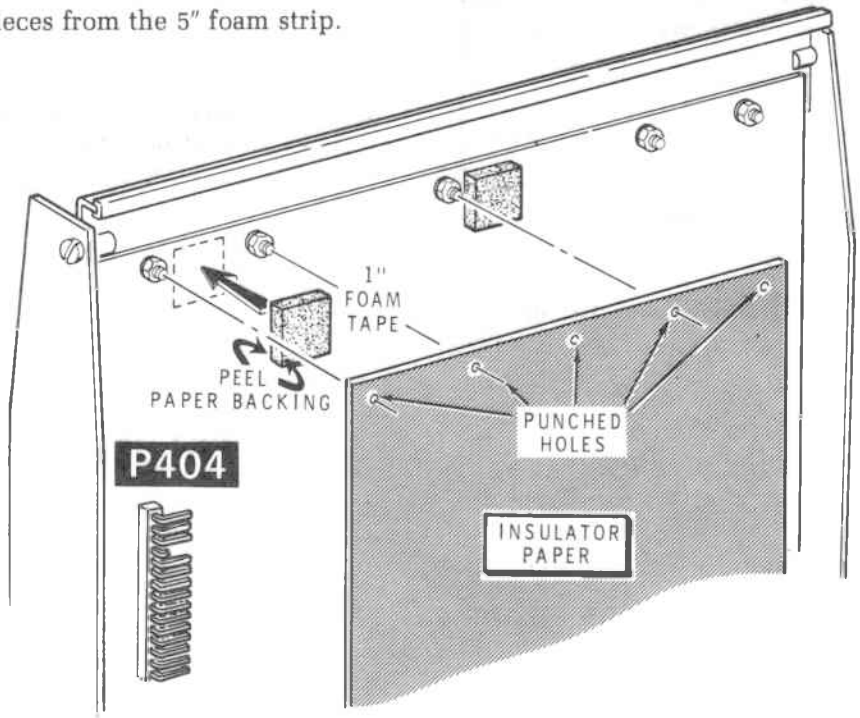
( ) Peel the backing paper off one side of one piece of foam strip. Then refer to Detail 3-4C, press the foam strip in place near the corner as shown, and remove the remaining backing paper.

( ) In a similar manner, install the other piece of foam strip as shown.

( ) Align the punched holes of the insulator paper with the screws extending through the terminal logic circuit board. Then slip the insulator paper behind plug P404 and press the insulator paper against the two foam strips.

( ) Refer to inset drawing #2 on Pictorial 3-4 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" hex head screws.



Detail 3-4C

Refer to Pictorial 3-5 (Illustration Booklet, Page 13) for the following steps.

( ) Refer to Detail 3-5A and make sure switches S401 and S402 on the terminal logic board are set as shown. (You may also see Pages 5-1 and 5-2 of your H88 Operation Manual.)

( ) Locate the wired CPU logic circuit board and cut pin 2 off plug P513.

( ) Position the wired CPU logic circuit board 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.

( ) Locate pin 7 of plug P514 and cut it off close to the plug body (if not already done).

( ) Locate the 10-hole connector on the harness, and insert a large polarization plug into hole 7 (if this has not already been done).

( ) Connect the 10-hole connector on the harness to plug P514 on the CPU logic circuit board. Be sure to route the cable as shown.

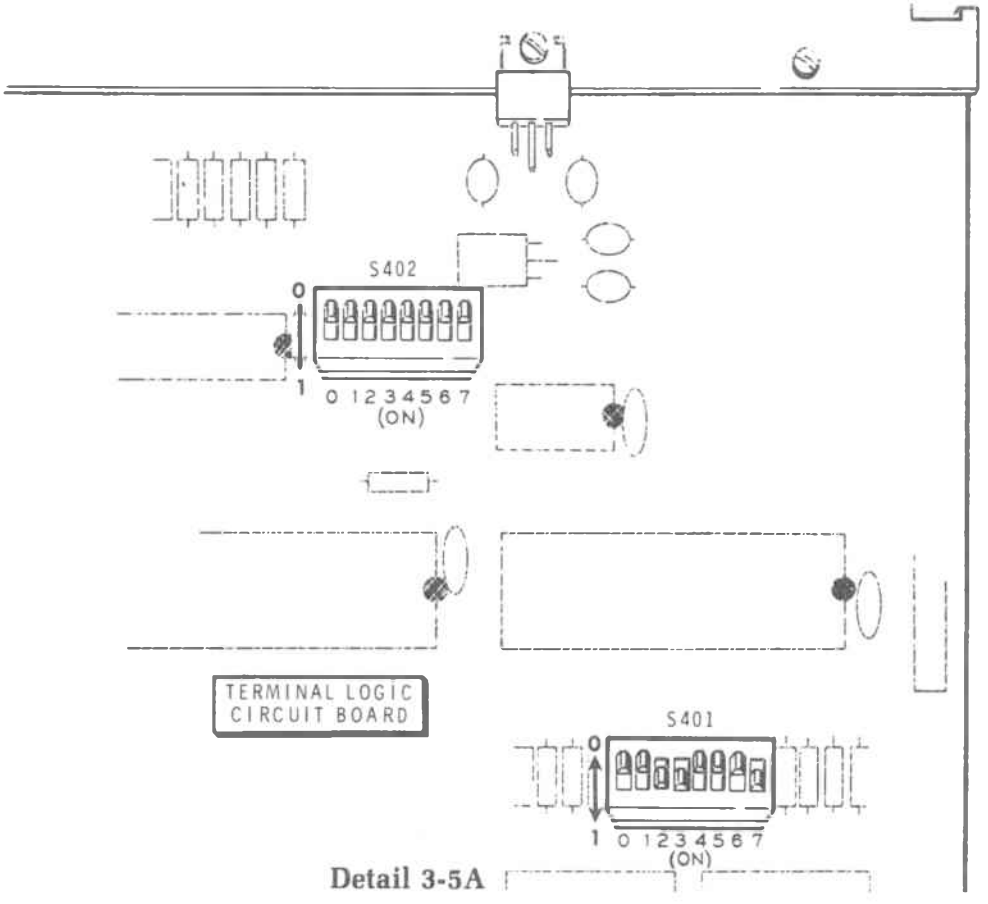
( ) Locate pin 4 of plug P516 and cut it off close to the plug body (if not already done).

( ) Locate the 4-hole connector coming from the power supply heat sink and insert a large polarization plug in hole 4.

( ) Connect the remaining end of the interconnect cable to plug P513 on the CPU logic circuit board. Be sure to position the black wire up. NOTE: Lift the circuit board slightly while you install the cable.

( ) Secure the CPU logic circuit board heat sink to the circuit board brackets with two 6-32 × 3/8" hex head screws.

( ) Turn the rear panel BRIGHTNESS control full clockwise (as viewed from the rear of the computer).



Detail 3-5A

FINAL ASSEMBLY

Refer to Pictorial 4-1 (Illustration Booklet, Page 14) for the following steps.

( ) Mount the 1-3/8" spacer onto the accessory mounting bracket. Use an 8-32 × 3/8" screw and a #8 lockwasher.

( ) As before, mount three nylon guides onto the accessory mounting bracket as shown.

( ) Plug the prewired cassette I/O circuit board into plugs P504 and P510 on the CPU logic circuit board.

( ) Plug the cassette interface cable into plug P703 of the cassette I/O circuit board. Be sure the gray wire is up as shown.

( ) Mount the accessory mounting bracket to the CPU logic circuit board heat sink. Use two 6-32 × 3/8" hex head screws. Position nylon guide A onto the edge of the cassette I/O circuit board.

( ) Connect the 4-hole connector (3-wire cable coming from the power supply heat sink - see Pictorial 3-3) to plug P516 on the CPU logic circuit board as shown.

( ) Plug the remaining cassette cable into the rear panel cassette I/O connector.

Refer to Pictorial 4-2 (Illustration Booklet, Page 15) for the following steps.

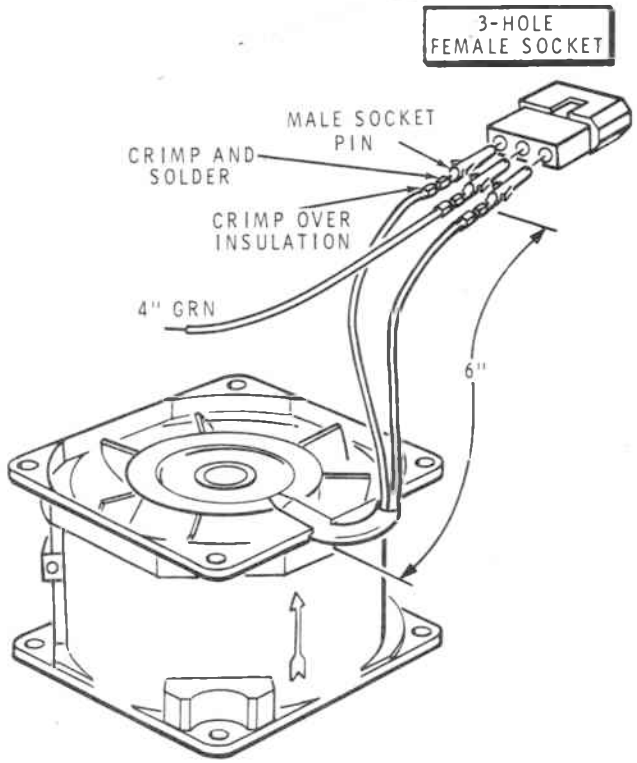
( ) Refer to the inset drawing and install brass inserts at EM, EK, EG, and EJ.

Refer to Detail 4-2A for the following ten steps.

( ) Cut both fan leads to 6". Measure them from the edge of the fan housing. Then prepare the ends of the leads.

( ) Crimp and solder male socket pins onto the end of each lead.

( ) Insert these pins into the two outside holes in a 3-hole female connector shell.



Detail 4-2A

( ) Prepare a 4" green wire.

( ) Crimp and solder a male pin onto one end of the wire.

( ) Insert the pin into the center hole in the 3-hole female connector shell.

( ) 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.)

( ) Locate the following hardware and use it in the next step.

1	Fan mounting plate
2	6-32 × 3/8" hex head screws
2	6-32 × 1-7/8" hex head screws
2	#6 × 1-7/8" hex head sheet metal screws
1	#6 solder lug

( ) Refer to Pictorial 4-2 and first mount the fan to the fan mounting plate; then mount the fan in the cabinet. Use the hardware from the previous step. Position the wires in the corner as shown. Do not overtighten the long screws.

( ) Connect the green wire to #6 solder lug A (S-1).

Refer to Pictorial 4-3 (Illustration Booklet, Page 15) for the following steps.

( ) Connect the fan plug to the fan socket.

( ) Again refer to Pictorial 2-1 and replace the cabinet shell.

( ) Remove the protective paper backing from the Caution label. Then refer to inset drawing on Pictorial 4-3 and press the label to the top of the cabinet in the right rear corner just behind the air vents.

( ) Remove the H19 label. Then remove the protective paper backing from the H88 model label and press the label into place.

( ) Remove the protective paper backing from the blue and white label. Then press the label to the back of the terminal base beside the Brightness control. Refer to the numbers on this label in any communications you may have with the Heath Company concerning this kit.

This completes the modification of your Video Terminal. One power supply plug remains unconnected. This is for the floppy drive accessory if you ever choose to install it. Numerous other parts may also be left over. Some of these parts will be used if you install accessories. Proceed to the H88 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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