PRICE $1.00

HEATH COMPANY • BENTON HARBOR, MICHIGAN

HEATHKIT®
ASSEMBLY MANUAL

HEATHKIT® by Daystrom

TUBE TESTER

MODEL TT-1A

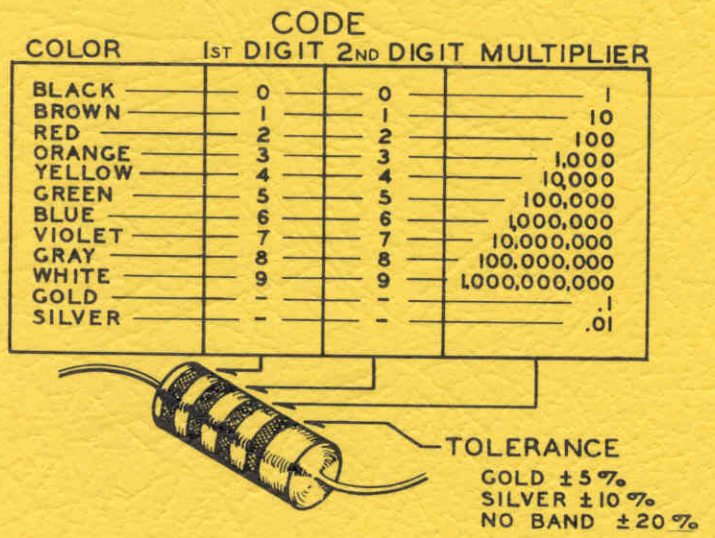
RESISTOR AND CAPACITOR COLOR CODES

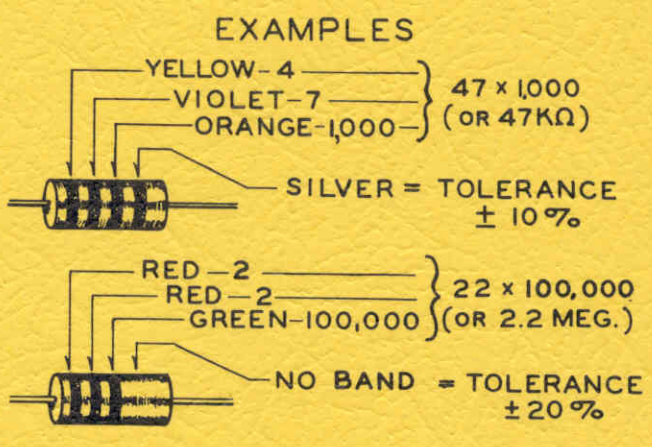
RESISTORS

The colored bands around the body of a color coded resistor represent its value in ohms. These colored bands are grouped toward one end of the resistor body. Starting with this end of the resistor, the first band represents the first digit of the resistance value; the second band represents the second digit; the third band represents the number by which the first two digits are multiplied. A fourth band of gold or silver represents a tolerance of ±5% or ±10% respectively. The absence of a fourth band indicates a tolerance of ±20%.

The physical size of a composition resistor is related to its wattage rating. Size increases progressively as the wattage rating is increased. The diameters of 1/2 watt, 1 watt and 2 watt resistors are approximately 1/8", 1/4" and 5/16", respectively.

The color code chart and examples which follow provide the information required to identify color coded resistors.

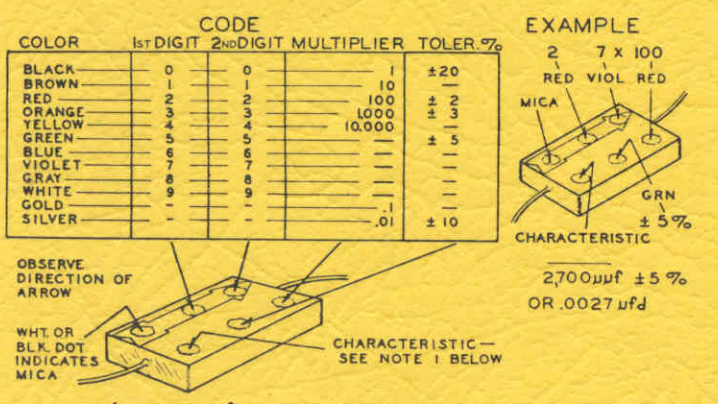




CAPACITORS

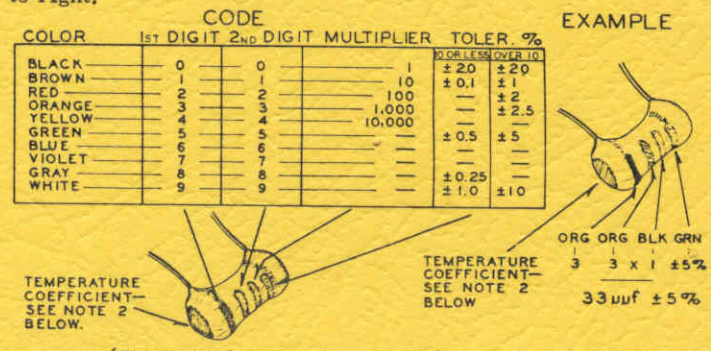
Generally, only mica and tubular ceramic capacitors, used in modern equipment, are color coded. The color codes differ somewhat among capacitor manufacturers, however the codes shown below apply to practically all of the mica and tubular ceramic capacitors that are in common use. These codes comply with EIA (Electronics Industries Association) Standards.

MICA



TUBULAR CERAMIC

Place the group of rings or dots to the left and read from left to right.



NOTES:

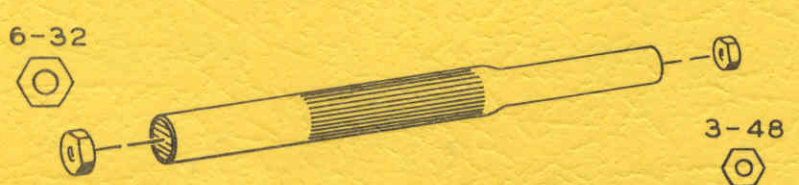
1. The characteristic of a mica capacitor is the temperature coefficient, drift capacitance and insulation resistance. This information is not usually needed to identify a capacitor but, if desired, it can be obtained by referring to EIA Standard, RS-153 (a Standard of Electronic Industries Association.)

2. The temperature coefficient of a capacitor is the predictable change in capacitance with temperature change and is expressed in parts per million per degree centigrade. Refer to EIA Standard, RS-198 (a Standard of Electronic Industries Association.)

3. The farad is the basic unit of capacitance, however capacitor values are generally expressed in terms of μfd (microfarad, .000001 farad) and μμf (micro-micro-farad, .000001 μfd); therefore, 1,000 μμf = .001 μfd, 1,000,000 μμf = 1μfd.

USING A PLASTIC NUT STARTER

A plastic nut starter offers a convenient method of starting the most used sizes: 3/16" and 1/4" (3-48 and 6-32). When the correct end is pushed down over a nut, the pliable tool conforms to the shape of the nut and the nut is gently held while it is being picked up and started on the screw. The tool should only be used to start the nut.



Assembly and Operation of the

HEATHKIT by Daystrom

TUBE TESTER

MODEL TT-1A

HEATH COMPANY,
BENTON HARBOR,
MICHIGAN

a subsidiary of DAYSTROM, INCORPORATED

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All prices are subject to change without notice. The Heath Company reserves the right to discontinue instruments and to change specifications at any time without incurring any obligation to incorporate new features in instruments previously sold.

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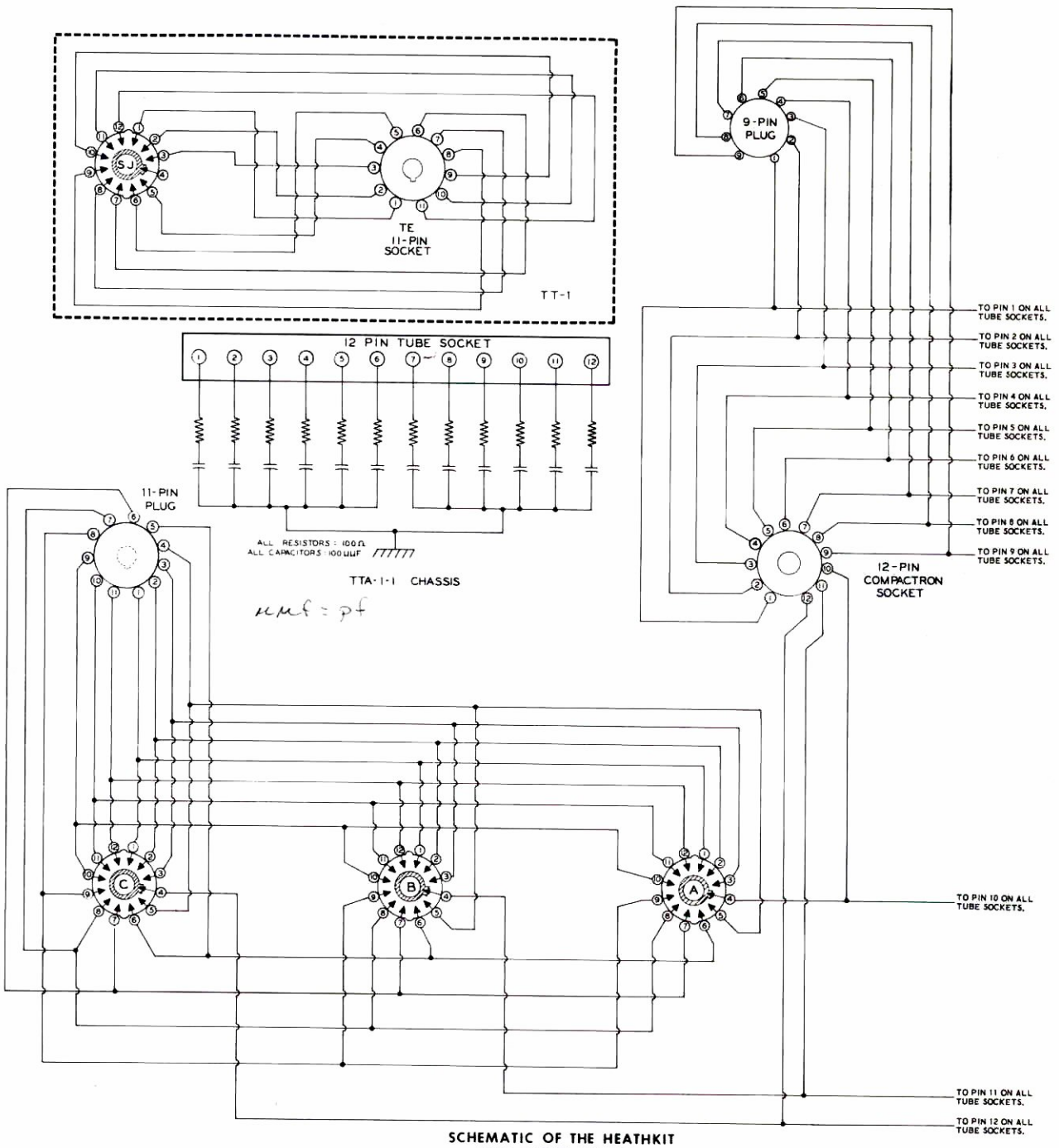


SCHEMATIC OF THE HEATHKIT TUBE SOCKET ADAPTER MODEL TT-1A

INTRODUCTION

Your Model TT-1A Tube Tester consists of the TT-1 Tube Tester, plus a Tube Socket Adapter that will enable you to test a greater variety of new tubes than was possible with the TT-1 Tube Tester alone.

To accommodate using the Tube Socket Adapter, it is necessary to make minor changes to the existing circuitry of the Tube Tester. Necessary changes to the Tube Tester can be handled best by working them into the Step-By-Step Assembly instruction of the TT-1 manual before putting the Tube Tester together. To get the manual changes in proper sequence, we suggest that you mark the pages of the TT-1 Manual to indicate that a change is required on the marked page. Then, when a change is needed during assembly of the Tube Tester, you can refer back to this manual for the new assembly steps and changes.

The parts which make up the Tube Tester and the Tube Socket Adapter are all packed together. However, the Adapter should be wired after the Tube Tester is completed. Therefore, the parts for each unit should be kept separate, according to the Parts Lists in the TT-1 Operational Manual and in this, the TT-1A Manual.

The proper sequence of "What To Do To Get Your TT-1A Tube Tester Together And Operating" is provided in this manual. Use this manual as a guide to coordinate the instructions in the other two manuals, TT-1, furnished with this kit.

CHECKING PARTS

Please mark the following changes in the Parts List of the TT-1 Operation Manual.

Page 18 -

Add:	134-43	1	11-conductor cable assembly
Delete:	434-1	1	Blank socket
Add:	434-118	1	11-pin socket
Delete:	91-50	1	Cabinet
Add:	91-104	1	Cabinet

After making the preceding changes in the TT-1 Parts List, check the Tube Tester parts. Then check the remaining parts, using the following Parts List. These parts will be used to assemble the Tube Socket Adapter after the Tube Tester is assembled. Set these parts aside until they are called for later.

TUBE SOCKET ADAPTER PARTS LIST

PART No.	PARTS Per Kit	DESCRIPTION
Wire-Cable-Sleeving		
347-5	1	11-conductor cable
347-25	1	9-conductor cable
344-1	10	Lengths of hookup wire, 1 each of: brown, red, orange, yellow, green, blue, violet, gray, white, and black.
346-1	1	Length sleeving
Hardware		
250-8	3	#6 x 3/8" sheet metal screw
250-170	3	#6 x 1/4" sheet metal screw
250-49	6	3-48 x 1/4" screw
250-56	4	6-32 x 1/4" screw
252-1	6	3-48 nut
252-3	4	6-32 nut
252-7	3	Control nut
253-10	3	Control flat washer
254-7	6	#3 lockwasher
254-1	3	#6 lockwasher
254-5	3	Control lockwasher
259-1	1	#6 solder lug

PART No.	PARTS Per Kit	DESCRIPTION
Sockets		
434-118	1	11-pin
434-119	1	5-pin Nuvistor
434-139	1	7-pin Nuvistor
434-120	1	9-pin Novar
434-121	1	12-pin Compactron
434-122	1	11-pin miniature
Plugs		
432-19	1	9-pin
438-29	1	11-pin

PART No.	PARTS Per Kit	DESCRIPTION
Miscellaneous		
63-217	3	Rotary switch
73-1	2	Rubber grommet
84-18	2	P.E.C. (Packaged Electronic Circuit)
440-1	1	11-pin plug cap
440-4	1	9-pin plug cap
462-67	3	Knob
485-2	2	Plug button
203-M295F677	1	Panel
331-6		Solder
595-553	1	Manual

ROSIN CORE SOLDER HAS BEEN SUPPLIED WITH THIS KIT. THIS TYPE OF SOLDER MUST BE USED FOR ALL SOLDERING IN THIS KIT. ALL GUARANTEES ARE VOIDED AND WE WILL NOT REPAIR OR SERVICE EQUIPMENT IN WHICH ACID CORE SOLDER OR PASTE FLUXES HAVE BEEN USED. IF ADDITIONAL SOLDER IS NEEDED, BE SURE TO PURCHASE ROSIN CORE (60:40 or 50:50 TIN-LEAD CONTENT) RADIO TYPE SOLDER.

TT-1 ASSEMBLY CHANGES

Please make the following changes in the Step-By-Step Assembly instructions of the TT-1 Assembly Manual.

Page 8 - Change the last step in the left-hand column to read:

( ) 11-pin socket at TE.

Pages 16, 18, 19, and 20 - Change the soldering instructions in all steps that refer to switch SJ to (NS). This includes terminals 1 through 3 and 5 through 12.

Page 28 - After completing all of the steps on Page 28 of the TT-1 Assembly Manual, perform all of the following steps. This additional information concerns installing the 11-pin socket wiring harness so the Tube Socket Adapter can be added later.

Refer to Pictorial 1 (of this manual) for the following steps.

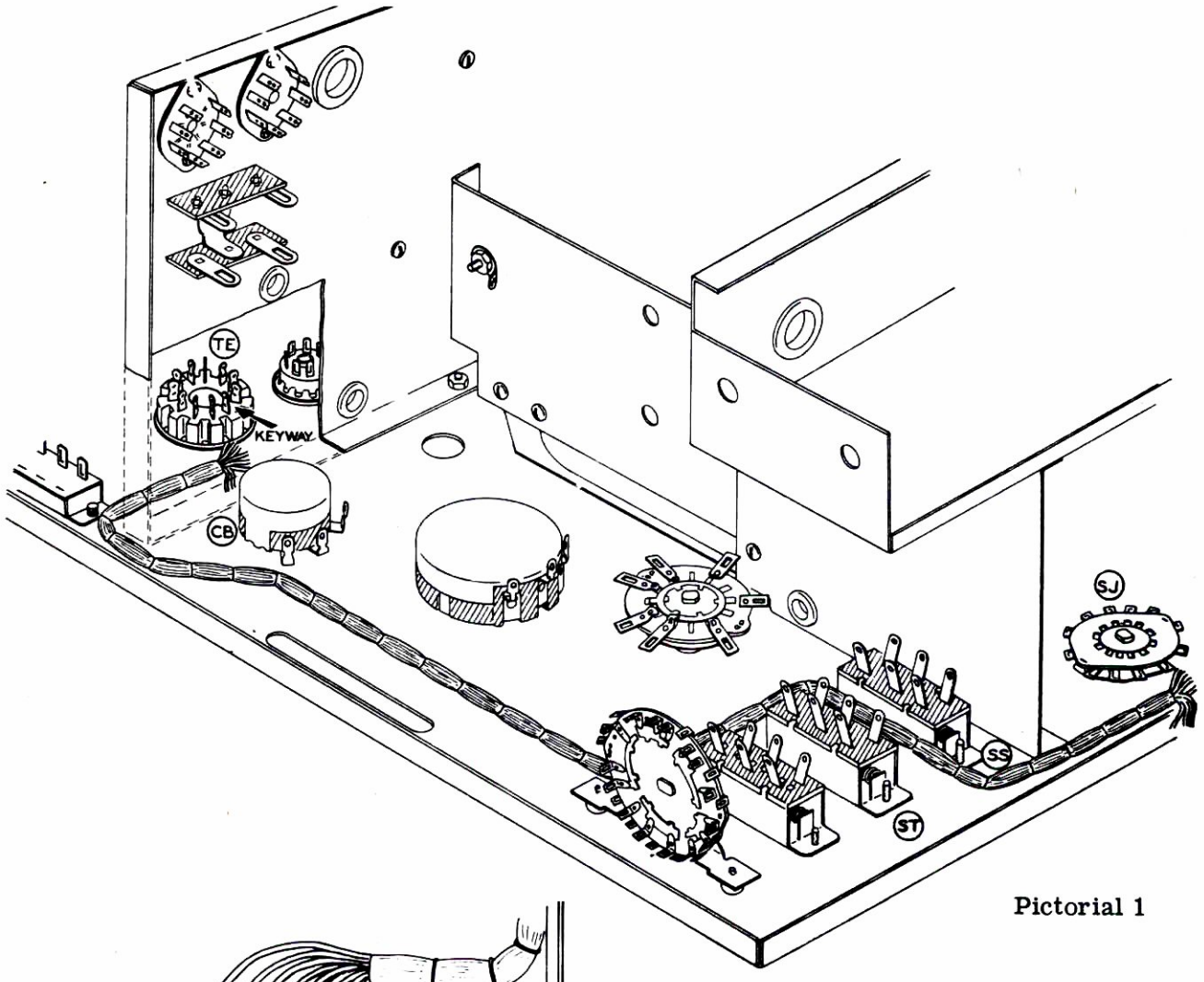
( ) Position the cable harness (#134-43) as shown. The end with the long gray and white wires should be at switch SJ. Work the harness into place carefully to avoid cutting the harness wire insulation on the sharp chassis edges.

Refer to Detail 1A and connect the socket end of the wiring harness to socket TE as follows:

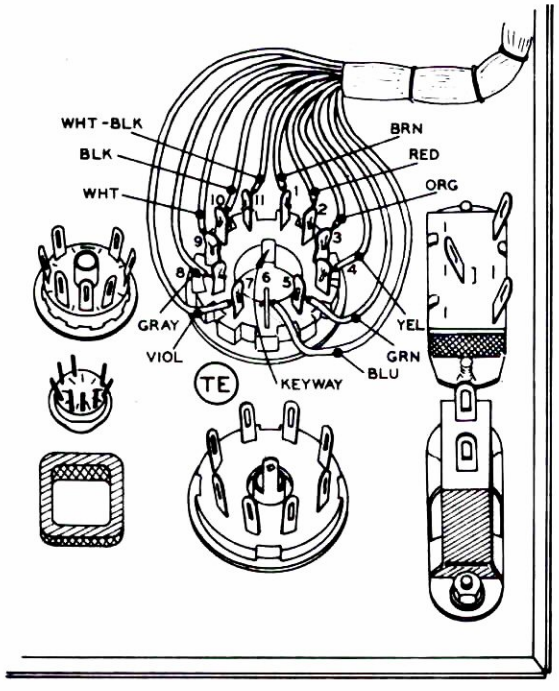
	COLOR	LUG
( )	Brown	1 (S-1)
( )	Red	2 (S-1)
( )	Orange	3 (S-1)
( )	Yellow	4 (S-1)
( )	Green	5 (S-1)
( )	White-black	11 (S-1)
( )	Black	10 (S-1)
( )	White	9 (S-1)
( )	Gray	8 (S-1)
( )	Violet	7 (S-1)
( )	Blue	6 (S-1)

( ) Position the wires of the harness down against the panel.

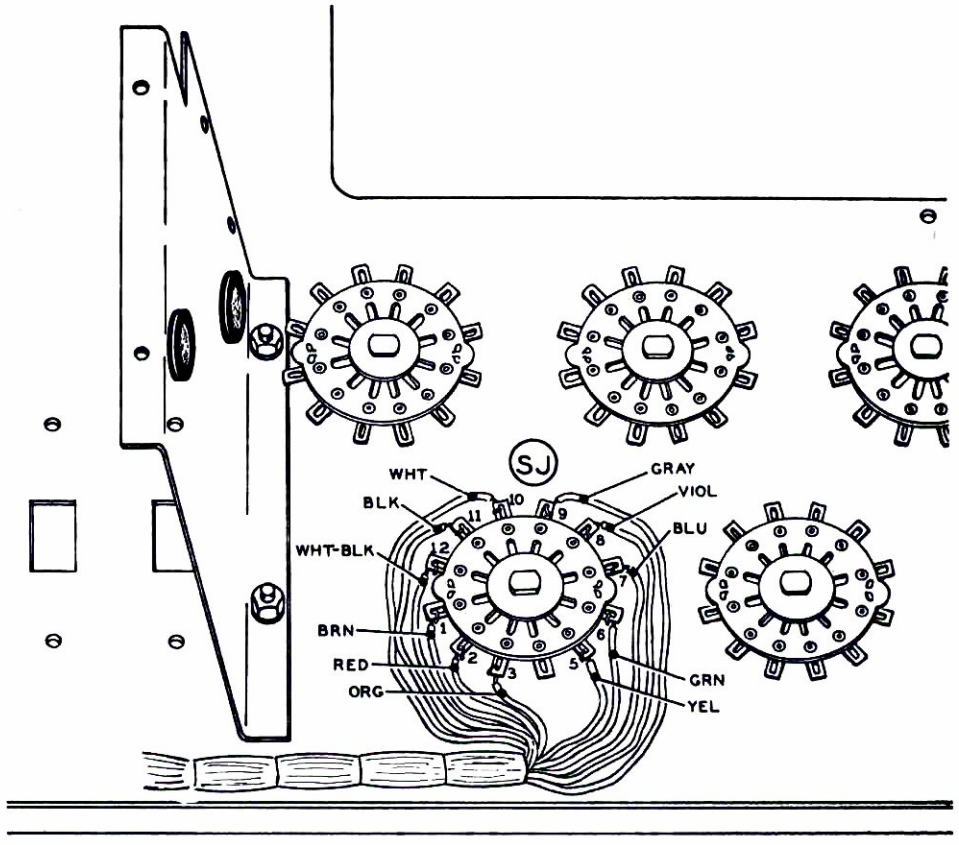
( ) Position the wires of adjacent sockets down against the panel.



Pictorial 1



Detail 1A



Detail 1B

Refer to Detail 1B and connect the wires at the other end of the harness to switch SJ as follows:

	COLOR	LUG
( )	Brown	1 (S-2)
( )	Red	2 (S-2)
( )	Orange	3 (S-2)
( )	Yellow	5 (S-2)
( )	Green	6 (S-2)
( )	Blue	7 (S-2)
( )	Violet	8 (S-2)
( )	Gray	9 (S-2)
( )	White	10 (S-2)
( )	Black	11 (S-2)
( )	White-black	12 (S-2)

( ) Position the wires down against the panel.

( ) Repeat the continuity test, described under Figure 8 on Page 13 of the TT-1 Assembly Manual, on socket TE. Be sure the switch rotors are in the long (common) clip (#4) during this testing procedure.

( ) In a like manner, test selector switch SJ by the following instructions 1 and 2 at the bottom of Page 20 of the TT-1 Assembly Manual.

Page 61 - Change the first step in the left-hand column to read:

( ) Prepare one tube cap with an 18" lead as shown in Figure 77: and prepare the other tube cap with a 24" lead.

Change the second step in the left-hand column to read:

( ) Pass the 18" tube cap lead through the square panel grommet as shown and connect it to H1 (S-2).

Change the third step in the left-hand column to read:

( ) Pass the 24" tube cap lead through the other square panel hole and connect it to J1 (S-2).

This completes changes in the Step-By-Step Assembly section of the TT-1 Assembly Manual.

After the TT-1 Tube Tester has been completed and tested, refer back to this manual to assemble and install the Tube Socket Adapter, according to the following steps. Use the Adapter Parts that you separated when checking the Parts Lists.

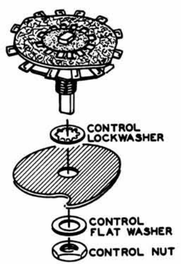
ADAPTER ASSEMBLY

PARTS MOUNTING

Refer to Pictorial 2 for the following steps.

( ) Position the Adapter panel as shown.

( ) Refer to Detail 2A and mount a Selector switch at A on the panel. Use a control lockwasher, a control flat washer, and a control nut. Position the long clip of the switch toward the flange as shown by the large arrows.

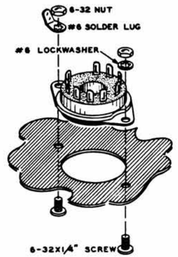


Detail 2A

( ) In a like manner, mount Selector switches at positions B and C.

( ) Install the knobs on the switch shafts. Be sure the knob screw is tightened against the flat of the shaft. Rotate the pointer of the knobs to "0" on the panel. Loosen control nut and adjust if necessary for proper knob alignment with the panel markings.

( ) Refer to Detail 2B and mount the 9-pin Novar tube socket at position F. Use a 6-32 x 1/4" screw, a #6 solder lug, and a 6-32 nut at the rear hole. Use a 6-32 x 1/4" screw, a #6 lockwasher, and a 6-32 nut at the other hole. Position the socket as shown.



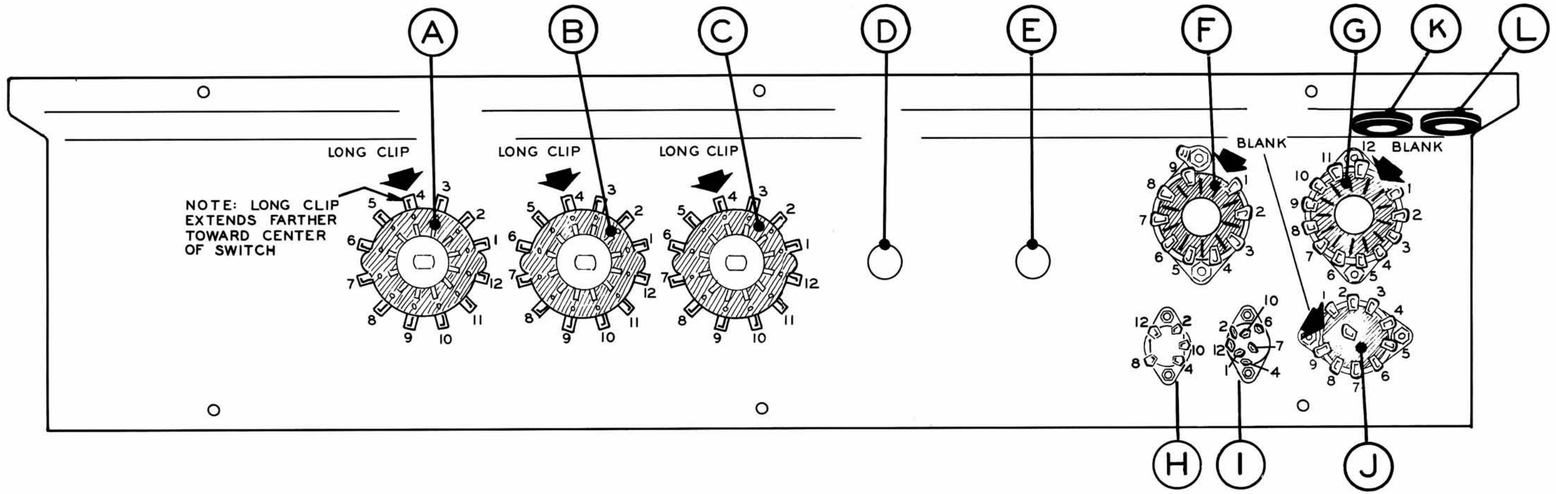
Detail 2B

( ) Mount the 12-pin Compactron socket at G. Use 6-32 x 1/4" screws, #6 lockwashers, and 6-32 nuts. Position as shown.

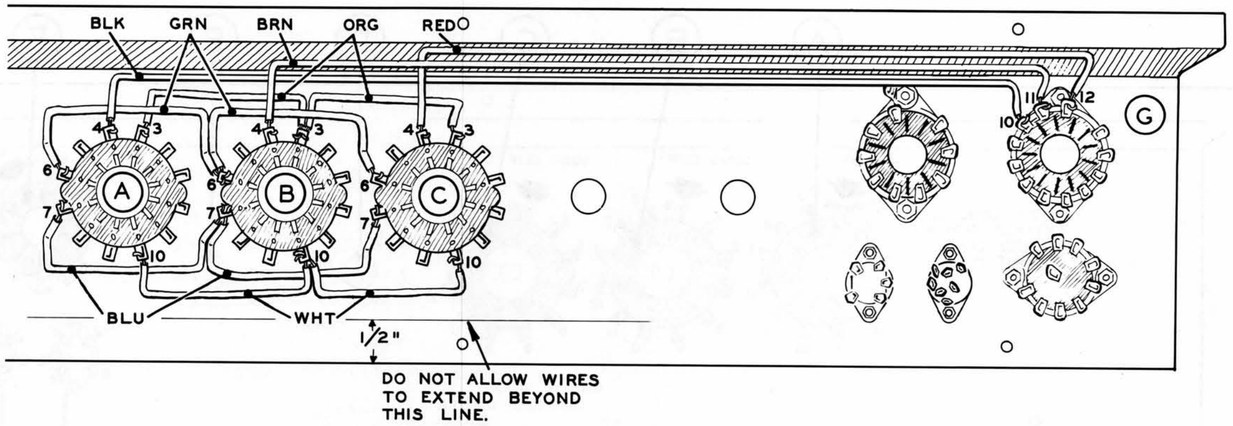
( ) Locate the 10-pin (9-pin with center pin) tube socket and mount it at J. Use 3-48 x 1/4" screws, #3 lockwashers, and 3-48 nuts. Position as shown.

( ) In a like manner and using the same variety of hardware, mount the 5-pin Nuvistor socket at H, and the 7-pin Nuvistor socket at I. Position as shown.

( ) Mount 3/8" rubber grommets at K and L.



Pictorial 2



Pictorial 2A

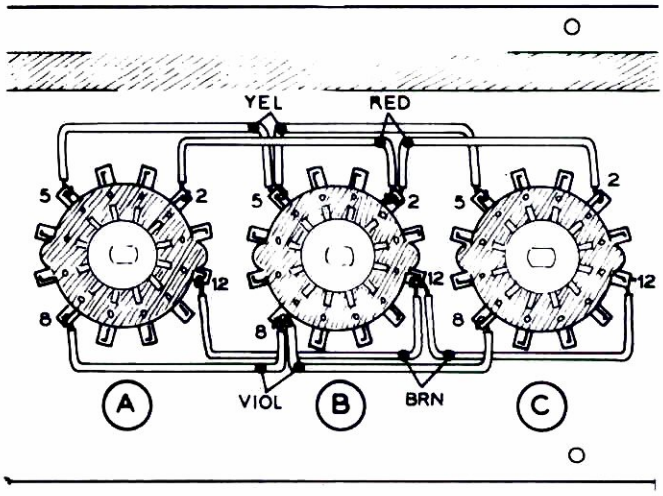
SWITCH WIRING

NOTE: Cut hookup wires to the specified lengths for each group of wiring steps and strip 1/4" of insulation from each end. Keep the wires in the sequence listed, then do the wiring.

Refer to Pictorial 2A for the following steps.

Connect wires as follows:

COLOR	LENGTH	FROM	TO
( ) Green	3-3/4"	A6 (S-1)	B6 (NS)
( ) Green	3-3/4"	B6 (S-2)	C6 (NS)
( ) Orange	3-3/4"	A3 (S-1)	B3 (NS)
( ) Orange	3-3/4"	B3 (S-2)	C3 (NS)
( ) Blue	3-3/4"	A7 (S-1)	B7 (NS)
( ) Blue	3-3/4"	B7 (S-2)	C7 (NS)
( ) White	3-3/4"	A10 (S-1)	B10 (NS)
( ) White	3-3/4"	B10 (S-2)	C10 (NS)
( ) Black	12-1/2"	A4 (S-1)	G10 (NS)
( ) Brown	11"	B4 (S-1)	G11 (NS)
( ) Red	9-1/2"	C4 (S-1)	G12 (NS)

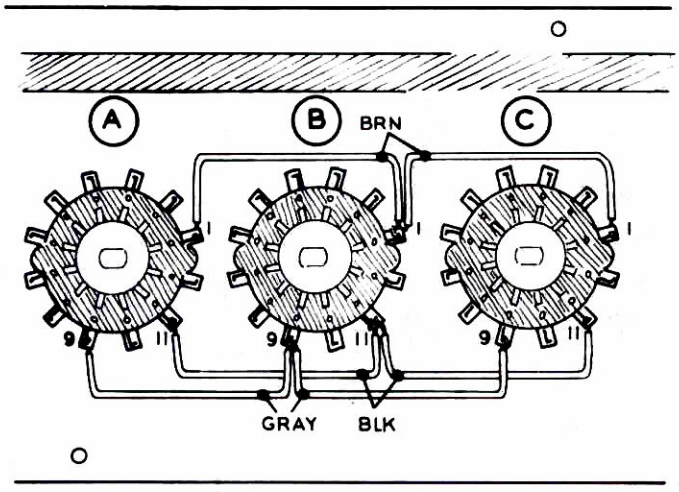


Pictorial 3

Refer to Pictorial 3 for the following steps.

Connect wires as follows:

	COLOR	LENGTH	FROM	TO
( )	Yellow	3-3/4"	A5 (S-1)	B5 (NS)
( )	Yellow	3-3/4"	B5 (S-2)	C5 (NS)
( )	Red	3-3/4"	A2 (S-1)	B2 (NS)
( )	Red	3-3/4"	B2 (S-2)	C2 (NS)
( )	Violet	3-3/4"	A8 (S-1)	B8 (NS)
( )	Violet	3-3/4"	B8 (S-2)	C8 (NS)
( )	Brown	3-3/4"	A12 (S-1)	B12 (NS)
( )	Brown	3-3/4"	B12 (S-2)	C12 (NS)



Pictorial 4

Refer to Pictorial 4 for the following steps.

Connect wires as follows:

	COLOR	LENGTH	FROM	TO
( )	Brown	3-3/4"	A1 (S-1)	B1 (NS)
( )	Brown	3-3/4"	B1 (S-2)	C1 (NS)
( )	Gray	3-3/4"	A9 (S-1)	B9 (NS)
( )	Gray	3-3/4"	B9 (S-2)	C9 (NS)
( )	Black	3-3/4"	A11 (S-1)	B11 (NS)
( )	Black	3-3/4"	B11 (S-2)	C11 (NS)

Wiring mistakes or short circuits in the Selector switch wiring will be much easier to locate and correct before proceeding further with the assembly. Any type of continuity tester or ohmmeter is suitable for this purpose. If no instrument of this nature is at hand, a simple continuity tester may be made up quickly from ordinary flashlight components.

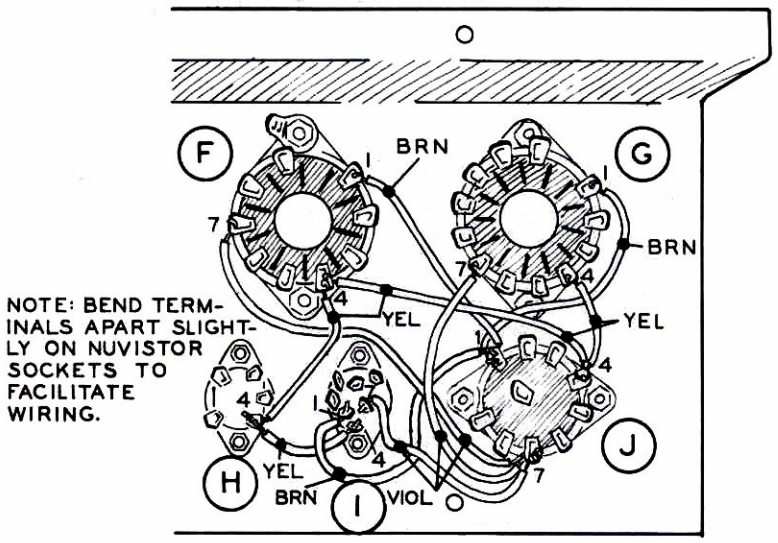
Be sure the switches are in the "0" position during this testing procedure.

The Selector switches are wired correctly if:

1. Continuity is shown between all terminals of the same number (except #4).

2. Continuity is NOT shown from the panel to any terminal, regardless of number.

3. Continuity is NOT shown between any differently numbered terminals.



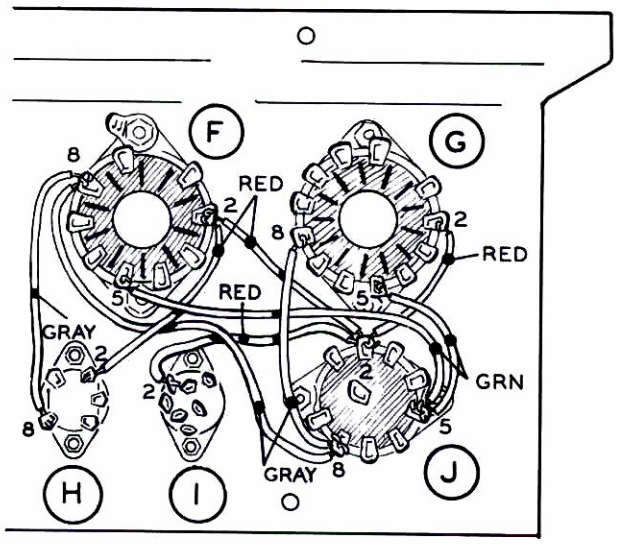
Pictorial 5

TUBE SOCKET WIRING

Connect wires as follows:

Refer to Pictorial 5 for the following steps.

	COLOR	LENGTH	FROM	TO
( )	Brown	3"	G1 (NS)	J1 (NS)
( )	Brown	2-1/2"	J1 (NS)	F1 (S-1)
( )	Brown	2-1/2"	J1 (S-3)	I 1 (S-1)
( )	Yellow	2"	G4 (NS)	J4 (NS)
( )	Yellow	3"	J4 (S-2)	F4 (NS)
( )	Yellow	2-1/4"	F4 (S-2)	H4 (NS)
( )	Yellow	2-1/4"	H4 (S-2)	I4 (S-1)
( )	Violet	2-3/4"	G7 (NS)	J7 (NS)
( )	Violet	3-3/4"	J7 (NS)	F7 (S-1)
( )	Violet	2"	J7 (S-3)	I7 (S-1)

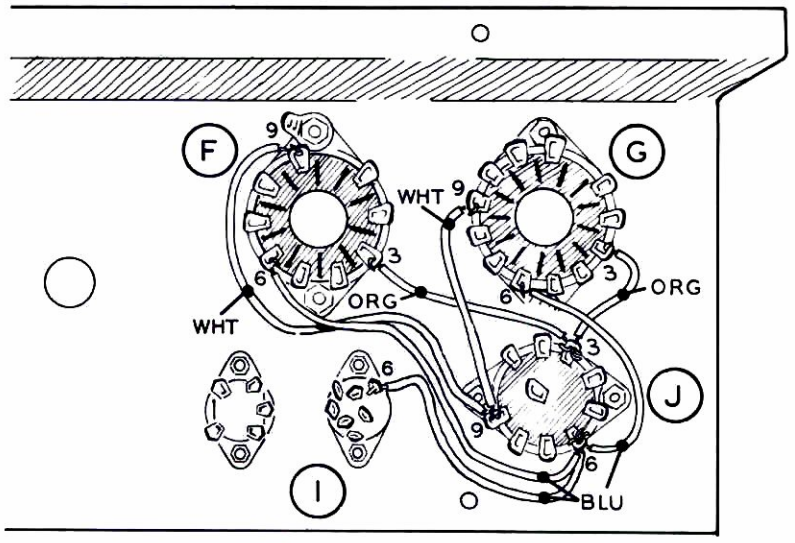


Pictorial 6

Refer to Pictorial 6 for the following steps.

Connect wires as follows:

COLOR	LENGTH	FROM	TO
( ) Red	2-1/4"	G2 (NS)	J2 (NS)
( ) Red	2-1/2"	J2 (NS)	F2 (NS)
( ) Red	2-1/2"	J2 (S-3)	I2 (S-1)
( ) Red	2-1/2"	F2 (S-2)	H2 (S-1)
( ) Green	2"	G5 (NS)	J5 (NS)
( ) Green	3-1/2"	J5 (S-2)	F5 (S-1)
( ) Gray	2-1/2"	G8 (NS)	J8 (NS)
( ) Gray	4"	J8 (S-2)	F8 (NS)
( ) Gray	3-1/2"	F8 (S-2)	H8 (S-1)

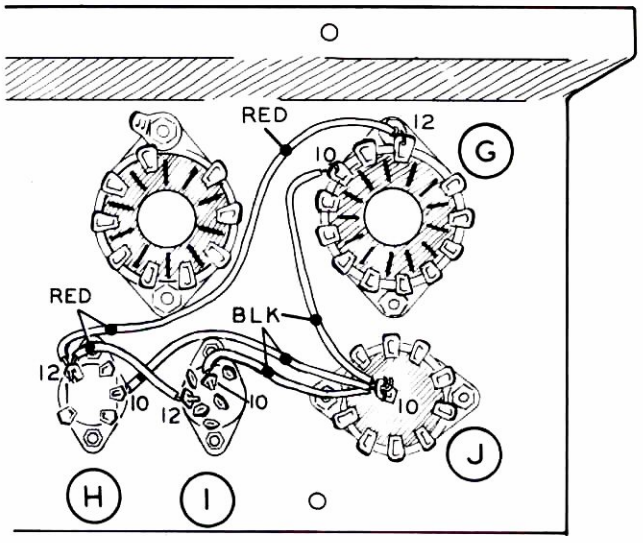


Pictorial 7

Refer to Pictorial 7 for the following steps:

Connect wires as follows:

	COLOR	LENGTH	FROM	TO
( )	Orange	2"	G3 (NS)	J3 (NS)
( )	Orange	2-1/4"	J3 (S-2)	F3 (S-1)
( )	Blue	3"	G6 (NS)	J6 (NS)
( )	Blue	3-3/4"	J6 (NS)	F6 (S-1)
( )	Blue	2-1/2"	J6 (S-3)	I 6 (S-1)
( )	White	2-1/2"	G9 (NS)	J9 (NS)
( )	White	4"	J9 (S-2)	F9 (S-1)



Pictorial 8

Refer to Pictorial 8 for the following steps.

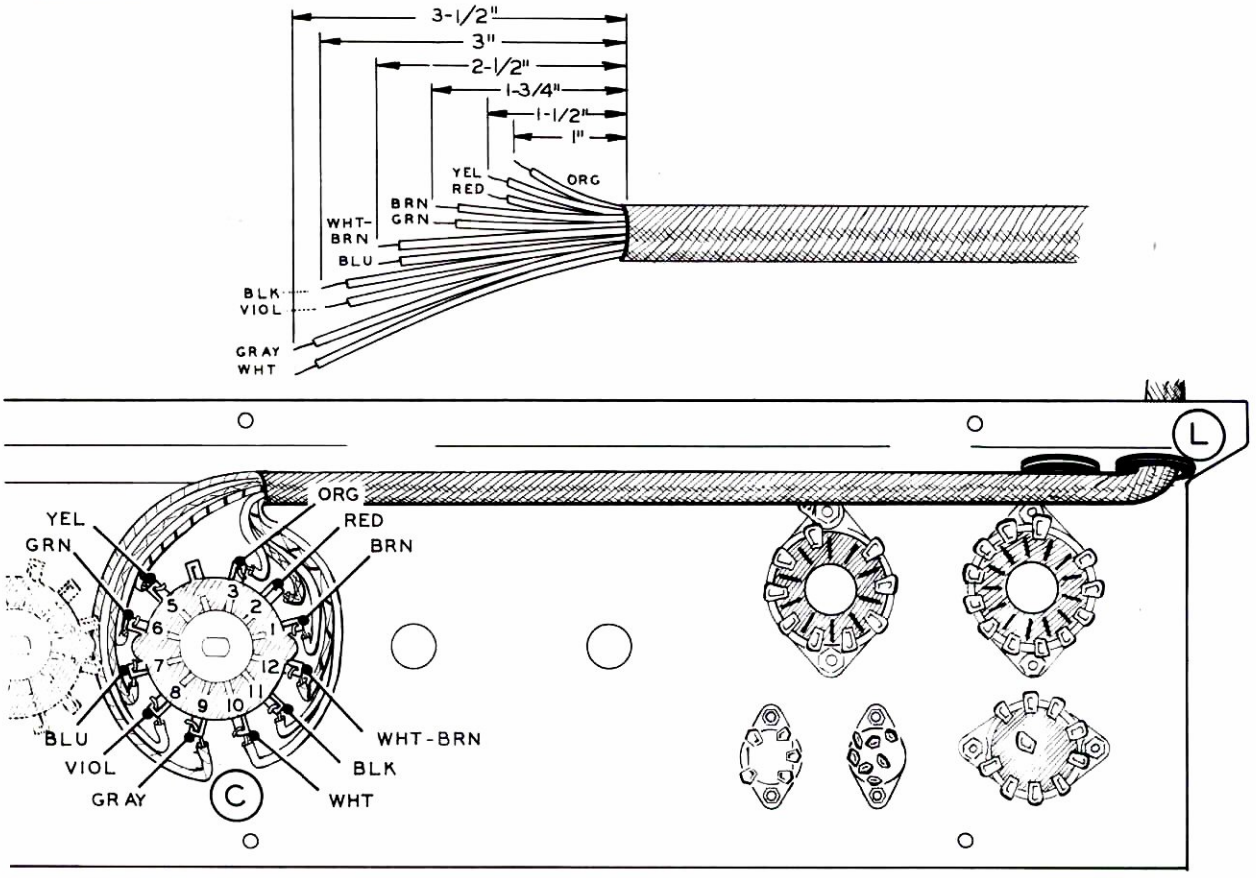
Connect wires as follows:

	COLOR	LENGTH	FROM	TO
( )	Black	3"	G10 (NS)	J10 (NS)
( )	Black	1-3/4"	J10 (NS)	I 10 (S-1)
( )	Black	2-1/2"	J10 (S-3)	H10 (S-1)
( )	Red	4-1/4"	G12 (NS)	H12 (NS)
( )	Red	2"	H12 (S-2)	I 12 (S-1)

The continuity and short circuit testing procedure outlined for the Selector switch wiring should be applied now to the tube sockets.

With all Selector switches in the "0" position the tube sockets are wired correctly if:

1. All socket pins show continuity between like numbers; that is, any #1 pin should show continuity to all other #1 pins, any #2 pin to all other #2 pins, etc.
2. There is no continuity from the panel to any pin, regardless of its number.
3. No continuity is shown between pins of different numbers; that is, the #1 pins should not be connected to any other number, the #2 pins should not be connected to any other number, etc.



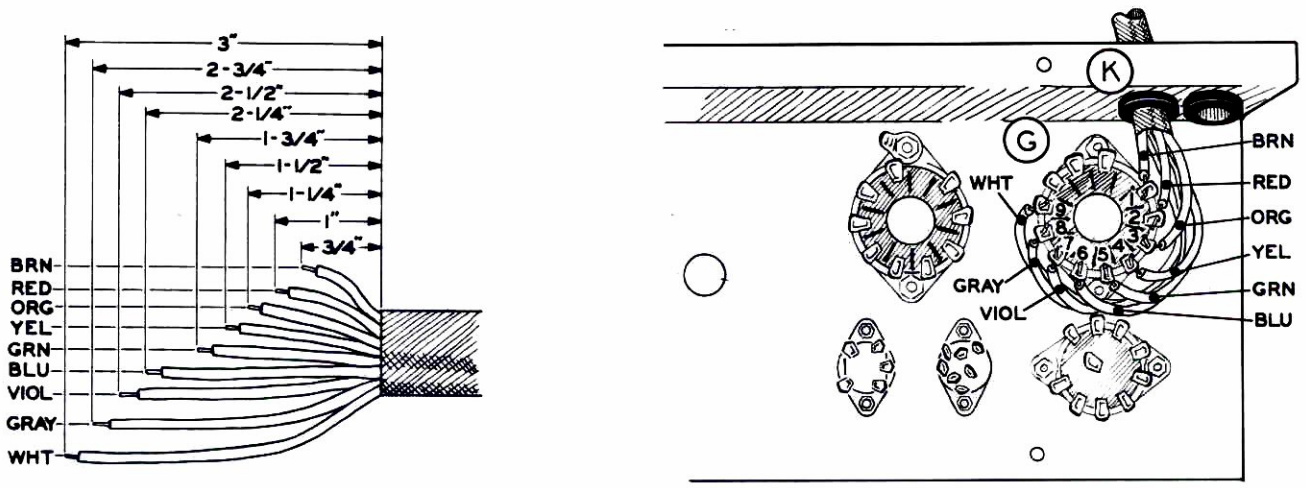
Pictorial 9

Refer to Pictorial 9 for the following steps.

( ) Locate the length of 11-conductor cable and prepare one end as shown. Strip each lead end 1/4", and tin. "Tin" means to melt a small amount of solder on the exposed lead end.

( ) Install the 11-conductor cable through grommet L as shown and connect the wires of the 11-conductor cable to Selector switch C as follows:

COLOR	LUG
( ) Brown	1 (S-2)
( ) Red	2 (S-2)
( ) Orange	3 (S-2)
( ) Yellow	5 (S-2)
( ) Green	6 (S-2)
( ) Blue	7 (S-2)
( ) Violet	8 (S-2)
( ) Gray	9 (S-2)
( ) White	10 (S-2)
( ) Black	11 (S-2)
( ) White-brown	12 (S-2)



Pictorial 10

Refer to Pictorial 10 and prepare one end of the 9-conductor cable as shown. Strip each lead end 1/4" and tin.

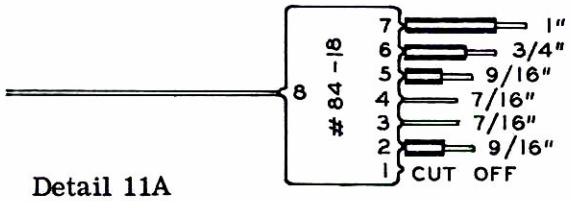
( ) Pass one end of the cable through grommet K and position the prepared end next to socket G.

( ) Connect the wires of the cable to socket G as follows:

COLOR	LUG
( ) Brown	1 (NS)
( ) Red	2 (NS)
( ) Orange	3 (NS)
( ) Yellow	4 (NS)
( ) Green	5 (NS)
( ) Blue	6 (NS)
( ) Violet	7 (NS)
( ) Gray	8 (NS)
( ) White	9 (NS)

Refer to Pictorial 11 for the following steps.

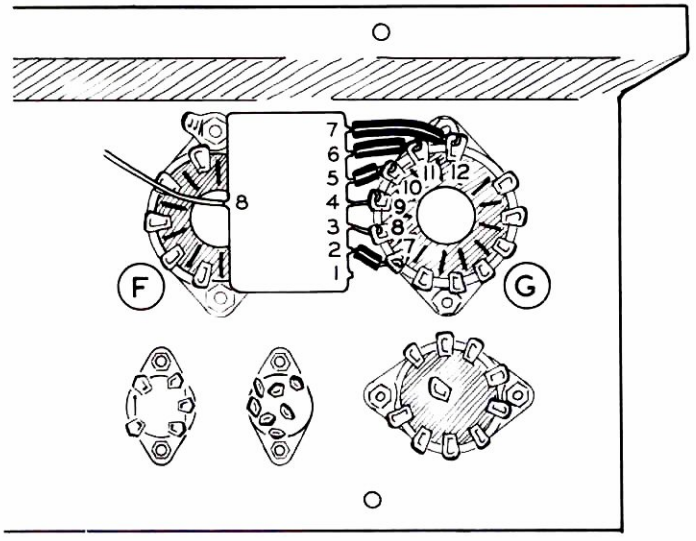
( ) Refer to Detail 11A and prepare one of the P.E.C. units (#84-18, Packaged Electronic Circuit) as shown. Place sleeving on the leads indicated.



Detail 11A

( ) Connect the leads of the P.E.C. to tube socket G as follows:

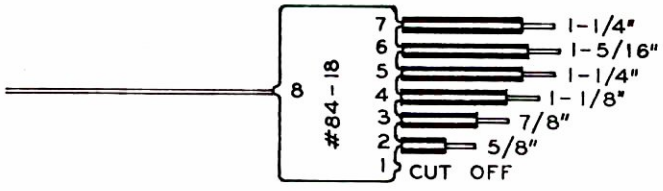
LEAD	LUG
( ) 7	12 (S-3)
( ) 6	11 (S-2)
( ) 5	10 (S-3)
( ) 4	9 (S-3)
( ) 3	8 (S-3)
( ) 2	7 (S-3)



Pictorial 11

Refer to Pictorial 12 for the following steps.

( ) Refer to Detail 12A and prepare the other P.E.C. as shown. Place sleeving on all leads.



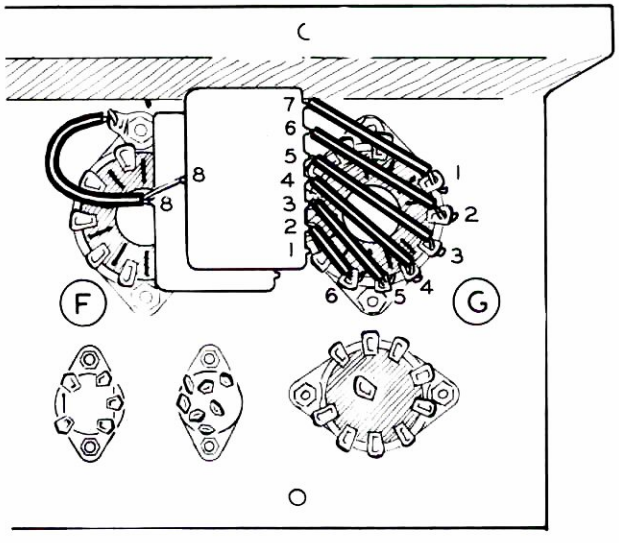
Detail 12A

( ) Connect the leads of the P.E.C. to tube socket G as follows:

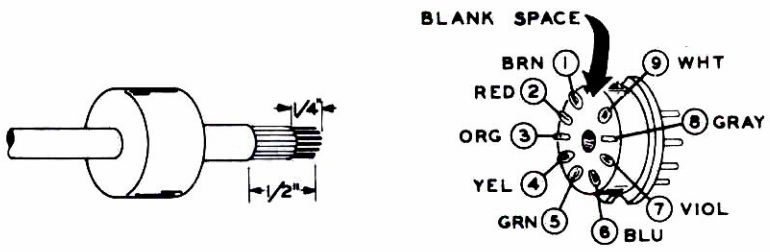
LEAD	LUG
( ) 7	1 (S-3)
( ) 6	2 (S-3)
( ) 5	3 (S-3)
( ) 4	4 (S-3)
( ) 3	5 (S-3)
( ) 2	6 (S-3)

( ) Position the two P.E.C. units as shown and slip a 2" piece of sleeving over the two #8 leads. Connect both #8 leads to the solder lug at socket F (S-2). Be careful not to burn the cable or leads near the solder lug.

All connections on the panel should now be soldered. Check to see that no shorts exist between tube socket pins or switch terminals. Remove all wire clippings and solder splashes.



Pictorial 12



Pictorial 13

Refer to Pictorial 13 for the following steps.

( ) Prepare the free end of the 9-conductor cable as shown. Strip each lead end 1/4" and tin.

( ) Place the rubber 9-pin plug cap on the 9-conductor cable.

NOTE: Disregard any numbers that may be stamped on the plug when connecting wires in the following steps. See Pictorial 13 for the numbering sequence used.

COLOR	PIN
( ) Brown	1 (S-1)
( ) Red	2 (S-1)
( ) Orange	3 (S-1)
( ) Yellow	4 (S-1)
( ) Green	5 (S-1)
( ) Blue	6 (S-1)
( ) Violet	7 (S-1)
( ) Gray	8 (S-1)
( ) White	9 (S-1)

( ) Check to see that no shorts exist between the pins of the plug.

( ) Push the rubber plug cap down onto the 9-pin plug.

Refer to Pictorial 14 for the following steps.

( ) Prepare the free end of the 11-conductor cable as shown. Strip each lead end 3/4" and tin.

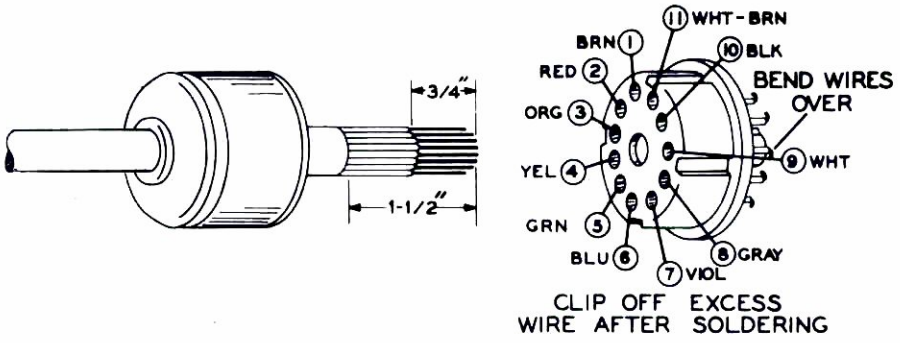
( ) Place the 11-pin plug cap on the 11-conductor cable.

( ) Connect the wires of the cable to the 11-pin plug as follows:

COLOR	PIN
( ) Brown	1 (S-1)
( ) Red	2 (S-1)
( ) Orange	3 (S-1)
( ) Yellow	4 (S-1)
( ) Green	5 (S-1)
( ) Blue	6 (S-1)
( ) Violet	7 (S-1)
( ) Gray	8 (S-1)
( ) White	9 (S-1)
( ) Black	10 (S-1)
( ) White-brown	11 (S-1)

( ) Snap the plug cap on the 11-pin plug.

This completes the wiring of the Tube Socket Adapter. Check it carefully to insure that no shorts or errors exist.

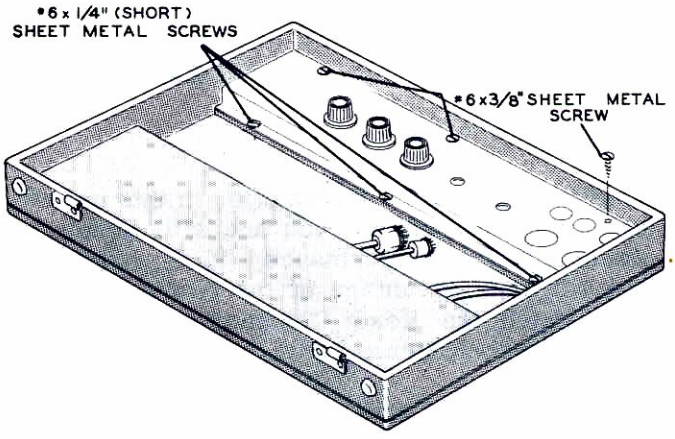


Pictorial 14

( ) Push a plug button into each of the two blank holes in the panel.

( ) Refer to Pictorial 15 and mount the Tube Socket Adapter in the cabinet top. Use #6 x 3/8" screws in the top row of holes, and #6 x 1/4" screws in the bottom row of holes. CAUTION: If the long screws are used on the bottom holes, they will come through the top of the cabinet top.

This completes the assembly of the Tube Socket Adapter.



Pictorial 15

OPERATION

When testing a tube in the Tube Socket Adapter, the Tube Tester will function the same as for any of its other tube sockets. Selectors 10, 11 and 12 (on the Adapter) read from left to right, just as in the case of the Tube Tester.

The following procedure should be used when checking a tube in the Tube Socket Adapter.

1. Plug the 9-pin plug extending from the Adapter into the 9-pin socket of the Tube Tester.
2. Plug the 11-pin plug extending from the Adapter into the 11-pin socket of the Tube Tester.
3. Set the controls to the proper settings in accordance with the test data.
4. Place the tube in the proper socket of the Adapter and make the test as with any other tube. Determine whether the tube is good or bad by following the information given on the roll chart and in the Operation Manual for the Tube Tester.

The majority of tubes that will require testing in the Adapter will be multi-element tubes. Although some tubes having two sections (dual-triode, etc.) can be tested by the use of the K, P, G switches, other tubes may have three sections (triple triode, etc.) and will require more than one setup of the controls. In such a case, always remember to place the Normal-Disconnect switch in the Disconnect position when changing Selectors to prevent damage to the Tester and tube being tested.

There is a handy pocket in the cabinet top for storing the Adapter cables when the Tube Tester is being transported. Room is also available for the Operation Manual and roll chart supplements.

IN CASE OF DIFFICULTY

1. Recheck the wiring. Trace each lead in colored pencil on the Pictorial as it is checked. It is frequently helpful to have a friend check your work. Someone who is not familiar with the unit may notice something consistently overlooked by the constructor.

2. It is interesting to note that about 90% of the kits that are returned for repair do not function properly due to poor connections and soldering. Therefore, many troubles can be eliminated by reheating all connections to make sure that they are soldered as described in the Construction Notes section of this manual.

3. Check for bits of solder, wire ends or other foreign matter which may be lodged in the wiring.

SERVICE INFORMATION

SERVICE

If, after applying the information in this manual and your best efforts, you are still unable to obtain proper performance, it is suggested that you take advantage of the technical facilities which the Heath Company makes available to its customers.

The Technical Consultation Department is maintained for your benefit. This service is available to you at no charge. Its primary purpose is to provide assistance for those who encounter difficulty in the construction, operation or maintenance of HEATHKIT equipment. It is not intended, and is not equipped to function as a general source of technical information involving kit modifications nor anything other than the normal and specified performance of HEATHKIT equipment.

Although the Technical Consultants are familiar with all details of this kit, the effectiveness of their advice will depend entirely upon the amount and the accuracy of the information furnished by you. In a sense, YOU MUST QUALIFY for GOOD technical advice by helping the consultants to help you. Please use this outline:

1. Before writing, fully investigate each of the hints and suggestions listed in this manual under In Case Of Difficulty. Possibly it will not be necessary to write.

2. When writing, clearly describe the nature of the trouble and mention all associated equipment. Specifically report operating procedures, switch positions, connections to other units, and anything else that might help to isolate the cause of trouble.

3. Report fully on the results obtained when testing the unit initially and when following the suggestions under In Case Of Difficulty. Be as specific as possible.

4. Identify the kit model number and date of purchase, if available. Also mention the date of the kit assembly manual.

5. Print or type your name and address, preferably in two places on the letter.

With the preceding information, the consultant will know exactly what kit you have, what you would like it to do for you and the difficulty you wish to correct. The date of purchase tells him whether or not engineering changes have been made since it was shipped to you. He will know what you have done in an effort to locate the cause of trouble and, thereby, avoid repetitious suggestions. In short, he will devote full time to the problem at hand, and through his familiarity with the kit, plus your accurate report, he will be able to give you a complete and helpful answer. If replacement parts are required, they will be shipped to you, subject to the terms of the Warranty.

The Factory Service facilities are also available to you, in case you are not familiar enough with electronics to provide our consultants with sufficient information on which to base a diagnosis of your difficulty, or in the event that you prefer to have the difficulty corrected in this manner. You may return the completed equipment to the Heath Company for inspection and necessary repairs and adjustments. You will be charged a minimal service fee, plus the price of any additional parts or material required. However, if the completed kit is returned within the Warranty period, parts charges will be governed by the terms of the Warranty. State the date of purchase, if possible.

Local Service by Authorized HEATHKIT Service Centers is also available in some areas and often will be your fastest, most efficient method of obtaining service for your HEATHKIT equipment. Although charges for local service are generally somewhat higher than for factory service, the amount of increase is usually offset by the transportation charge you would pay if you elected to return your kit to the Heath Company.

HEATHKIT Service Centers will honor the regular 90 day HEATHKIT Parts Warranty on all kits, whether purchased through a dealer or directly from Heath Company; however, it will be necessary that you verify the purchase date of your kit.

Under the conditions specified in the Warranty, replacement parts are supplied without charge; however, if the Service Center assists you in locating a defective part (or parts) in your kit, or installs a replacement part for you, you may be charged for this service.

HEATHKIT equipment purchased locally and returned to Heath Company for service must be accompanied by your copy of the dated sales receipt from your authorized HEATHKIT dealer in order to be eligible for parts replacement under the terms of the Warranty.

THIS SERVICE POLICY APPLIES ONLY TO COMPLETED EQUIPMENT CONSTRUCTED IN ACCORDANCE WITH THE INSTRUCTIONS AS STATED IN THE MANUAL. Equipment that has been modified in design will not be accepted for repair. If there is evidence of acid core solder or paste fluxes, the equipment will be returned NOT repaired.

For information regarding modification of HEATHKIT equipment for special applications, it is suggested that you refer to any one or more of the many publications that are available on all phases of electronics. They can be obtained at or through your local library, as well as at most electronic equipment stores. Although the Heath Company sincerely welcomes all comments and suggestions, it would be impossible to design, test, evaluate and assume responsibility for proposed circuit changes for special purposes. Therefore, such modifications must be made at the discretion of the kit builder, using information available from sources other than the Heath Company.

REPLACEMENTS

Material supplied with HEATHKIT products has been carefully selected to meet design requirements and ordinarily will fulfill its function without difficulty. Occasionally, improper operation can be traced to a faulty component. Should inspection reveal the necessity for replacement, write to the Heath Company and supply all of the following information.

A. Thoroughly identify the part in question by using the part number and description found in the manual Parts List.

B. Identify the type and model number of kit in which it is used.

C. Mention date of purchase.

D. Describe the nature of defect or reason for requesting replacement.

The Heath Company will promptly supply the necessary replacement. PLEASE DO NOT RETURN THE ORIGINAL COMPONENT UNTIL SPECIFICALLY REQUESTED TO DO SO. Do not dismantle the component in question as this will void the guarantee. This replacement policy does not cover the free replacement of parts that may have been broken or damaged through carelessness on the part of the kit builder.

SHIPPING INSTRUCTIONS

In the event that your equipment must be returned for service, these instructions should be carefully followed.

Wrap the equipment in heavy paper, exercising care to prevent damage. Place the wrapped equipment in a stout carton of such size that at least three inches of shredded paper, excelsior, or other resilient packing material can be placed between all sides of the wrapped equipment and the carton. Close and seal the carton with gummed paper tape, or alternately, tie securely with stout cord. Clearly print the address on the carton as follows:

To: HEATH COMPANY
Benton Harbor, Michigan

ATTACH A LETTER TO THE OUTSIDE OF THE CARTON BEARING YOUR NAME, COMPLETE ADDRESS, DATE OF PURCHASE, AND A BRIEF DESCRIPTION OF THE DIFFICULTY ENCOUNTERED. Also, include your name and return address on the outside of the carton. Preferably affix one or more "Fragile" or "Handle With Care" labels to the carton, or otherwise so mark with a crayon of bright color. Ship by insured parcel post or prepaid express; note that a carrier cannot be held responsible for damage in transit if, in HIS OPINION, the article is inadequately packed for shipment.

WARRANTY

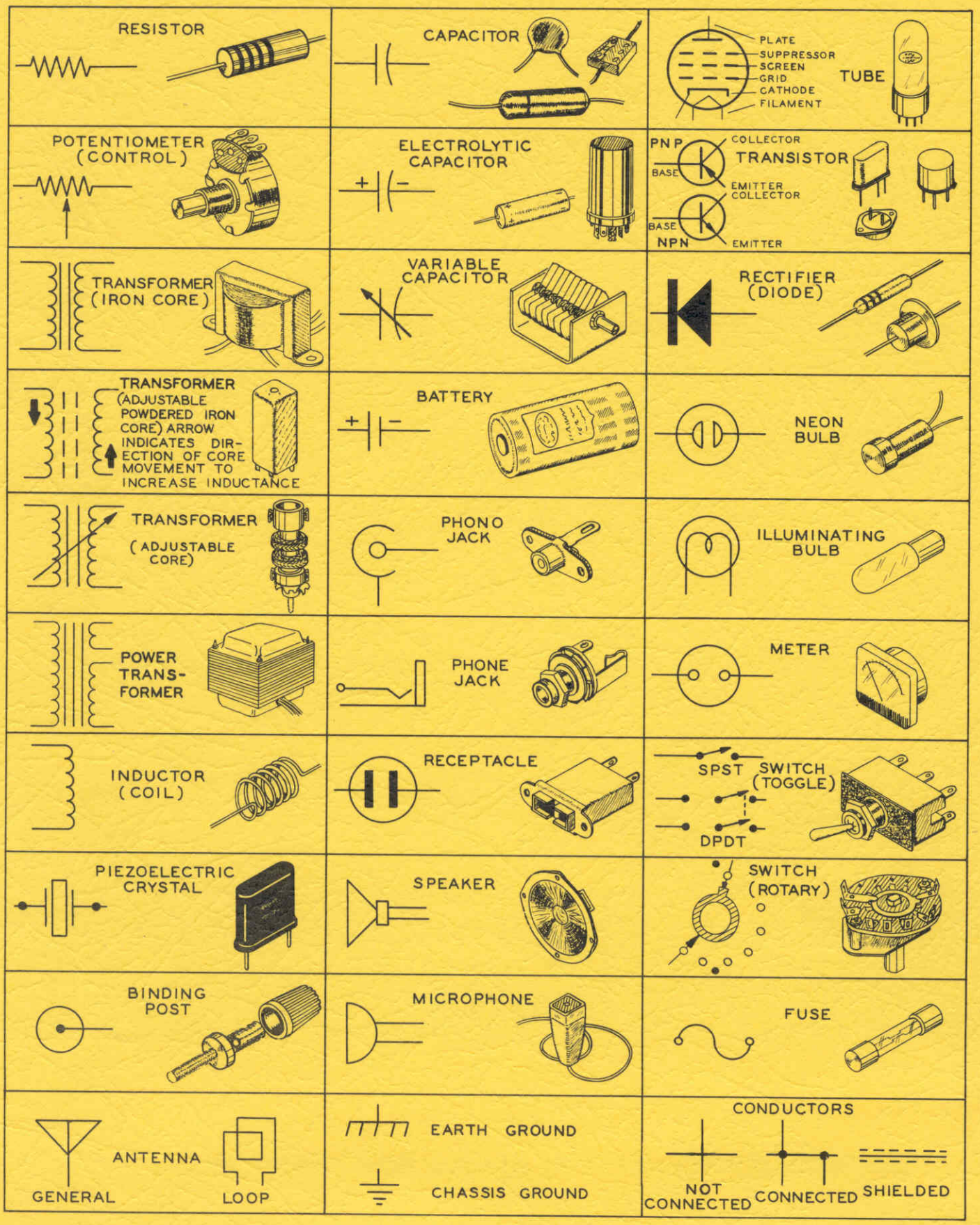
Heath Company warrants that for a period of three months from the date of shipment, all Heathkit parts shall be free of defects in materials and workmanship under normal use and service and that in fulfillment of any breach of such warranty, Heath Company shall replace such defective parts upon the return of the same to its factory. The foregoing warranty shall apply only to the original buyer, and is and shall be in lieu of all other warranties, whether express or implied and of all other obligations or liabilities on the part of Heath Company and in no event shall Heath Company be liable for any anticipated profits, consequential damages, loss of time or other losses incurred by the buyer in connection with the purchase, assembly or operation of Heathkits or components thereof. No replacement shall be made of parts damaged by the buyer in the course of handling or assembling Heathkit equipment.

NOTE: The foregoing warranty is completely void and we will not replace, repair or service instruments or parts thereof in which acid core solder or paste fluxes have been used.

HEATH COMPANY

TYPICAL COMPONENT TYPES

This chart is a guide to commonly used types of electronic components. The symbols and related illustrations should prove helpful in identifying most parts and reading the schematic diagrams.



HEATH COMPANY

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