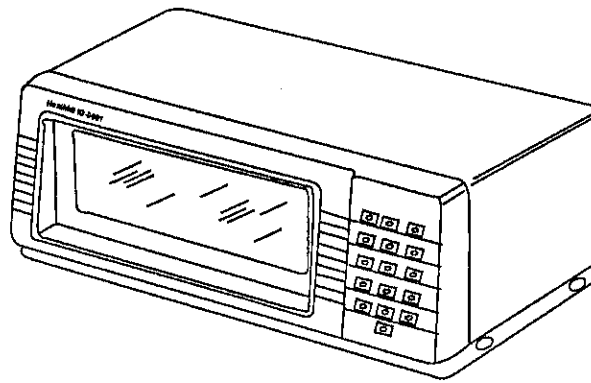


# ADVANCED WEATHER COMPUTER

Model ID-5001B

ASSEMBLY

595-4408



**HEATH COMPANY**  
BENTON HARBOR, MICHIGAN 49022

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## INTRODUCTION

Your Heathkit Model ID-5001B Advanced Weather Computer is a microprocessor-based meteorological unit that measures and displays all of those weather variables that are so useful to boaters, pilots, farmers, amateur radio operators, meteorologists, climatologists, and general consumers.

You can set all of the display functions from the front panel keypad. A 6-digit clock displays the time in either a 12- or 24-hour format. Day and date are shown in a separate, 4-digit format. Automatic leap-year correction is provided, and auto daylight saving time adjustment is also selectable.

Two digits display the wind speed, while one of 16 indicators show the wind direction by compass point. The keypad allows you to select wind speed in miles-per-hour, knots, or kilometers-per-hour, which is then shown in the display. Instantaneous or average wind speed is keyboard selectable and displayed. The high or low wind speed that occurred since the memory was cleared can be recalled and is displayed with time and date of occurrence.

Indoor and outdoor temperatures are displayed continuously. You can select a temperature unit display in either Celsius or Fahrenheit and the readout will show the high and low temperatures with time and date. Wind chill temperature display is another keypad selection.

Barometric pressure is displayed in four digits. You can also have the display show the date and time of minimum or maximum pressure in either inches of mercury or millibars.

You can clear specific minimum or maximum values by pressing the CLEAR key while the high or low value to be cleared is displayed. You can clear both minimum

and maximum indoor and outdoor values by depressing the appropriate key along with the CLEAR key.

Rate arrows, consisting of an arrow head to show increase or decrease, and three tails to indicate greater rates, are located to the right of the displayed values.

The word ALERT with one bar or ALERT-WARN with two bars is displayed if the rate exceeds a predetermined level.

ALERT-WARN and arrow segment rates are individually keyboard selectable.

You can adjust the display brightness at the highest and lowest expected level. The brightness will then automatically change for ambient light levels in between.

Battery backup is provided by a 9-volt battery that you can install either inside or outside the cabinet.

Indoor/outdoor humidity sensors, a rain gauge, and an RS-232C serial interface are also available as optional accessories. Humidity or rain legends are not displayed if the particular option is not installed.

Your Advanced Weather Computer will provide a vast amount of valuable weather information, and its handsome styling will be attractive in any decor.

**NOTE:** You will need to purchase the 8-wire cable to connect between the Weather Computer and the boom assembly. The following lengths of 8-wire cable are available from Heath Company:

50' Cable, Model IDA-1290-1  
100' Cable, Model IDA-1290-2  
150' Cable, Model IDA-1290-3

**BATTERY INFORMATION**

We recommend that you obtain a 9-volt rectangular battery to use as a backup for your Weather Computer's memory in case of power failure. A battery clip and connector have been provided with your kit for this purpose. This battery will provide the necessary backup power for approximately 18 hours.

Although you may use any battery that supplies from 6 to 9 volts at 30 milliamperes, we recommend a 9-volt alkaline battery. (Useful battery life ends when the battery voltage drops to 4.2 volts.) Representative manufacturers and their type numbers are listed below. We suggest that you purchase a battery before you complete your kit so you will have it for testing.

NEDA	#1604A
Duracell	#MN1604
Eveready	#522
Mallory	#MN1604
Ray-O-Vac	#A-1604

# SPECIFICATIONS

## DIGITAL CLOCK / 4-YEAR CALENDAR

Displays ..... 6-digit, 12- or 24-hour format time readout; 6-digit date readout. AM-PM indicator in 12-hour format.

Time Accuracy ..... Determined by the accuracy of the AC line frequency. No accumulative error; .003% error with battery-backed clock during power failure.

## WIND SPEED\*

Displays ..... Two significant digits. Separate indicators show if the display is in miles-per-hour, knots, or kilometers-per-hour.

Gust Mode ..... Instantaneous peak wind speed; memory - date, time, and magnitude of minimum and maximum gusts.

Average Mode ..... One minute wind speed average; memory - date, time and magnitude of minimum or maximum average wind speed.

Memory ..... Date, time, and magnitude of minimum or maximum gust. Average wind speed changes in last hour or last 24 hours.

Accuracy .....  $\pm 5\%$  or better.

\*In conformance with the National Weather Service Federal Meteorological Handbook #9, Aviation Weather Observation, Chapter A8, Sections 3 & 3.5, Specifications for Supplementary Aviation Weather Reporting Stations.

**WIND DIRECTION\***

Display .....	32 points of resolution. One of 16 indicators arranged in a circular compass configuration. Identified by compass points and radial degrees.
Gust Mode .....	1 second averaging.
Average Mode .....	60 second averaging.
"Wind" Mode .....	60 second averaging of displays to nearest 10°.
Memory .....	Average direction when minimum or maximum average wind speed occurred.

**THERMOMETER**

Displays .....	Indicates indoor and outdoor temperature 2-1/2-digit readout with "-" sign outdoor indicator, Fahrenheit-Celsius indicators, and rising/falling indicators. Rate of change per hour.
Temperature .....	-40° C to +70° C (Celsius). -40° F to +158° F (Fahrenheit).
Accuracy .....	±1° from -40° C to +70° C. ±2° from -40° F to +158° F.
Memory .....	Date, time, and magnitude of maximum and minimum temperatures since cleared; change in the last 24 hours.

**BAROMETER**

Displays .....	4-digit readout. Separate indicators show if pressure is rising or falling and if display is in inches of mercury or millibars. Rate of change per hour.
Pressure Range .....	28.00 to 32.00 in. Hg (inches of mercury), 948 to 1083 millibars.
Accuracy of Reading .....	29.00 to 31.00 in. Hg (inches of mercury) ±.25% plus ±.033%/°C (±.075 in. Hg plus ±.01 in. Hg/°C).
Memory .....	Date, time, and magnitude of maximum and minimum pressure since memory was cleared; change in the last 24 hours.

\*In conformance with the National Weather Service Federal Meteorological Handbook #9, Aviation Weather Observation, Chapter A8, Sections 3 & 3.5, Specifications for Supplementary Aviation Weather Reporting Stations.

## RAIN GAUGE

Displays .....	4 digit.
Units .....	Inches to 99.9, centimeters to 250, with automatic decimal point adjust.
Repeatability .....	±1 count in 10 for a 1-inch-per-hour rain fall.
Memory .....	Change in last hour or 24 hours.
Operating Temperature .....	Rain unit 0°C to 50°C (32°F to 122°F).
Dimensions.....	Rain unit 9.0" diameter x 9.6" high .
Weight .....	Rain unit 1.6 lbs. (.7 kg).

## RELATIVE HUMIDITY

Displays .....	Indicates indoor & outdoor relative humidity, 2-digit readout and rising and falling indicators. Rate of change per hour.
Measurement Range.....	10% - 90% relative humidity.
Accuracy @ 25°C (77°F) .....	±10 counts.
Response Time to 90% value at 25°C/77°F ..	From 10% to 43% relative humidity in less than 3 minutes. ..... From 43% to 90% relative humidity in less than 5 minutes.
Memory .....	High and low since cleared, change in last 24 hours.
Operating Temperature Range .....	0°C to 50°C (32°F to 122°F).

## GENERAL

Power Requirements .....	120/240 VAC, 50/60 Hz; approximately 19 watts. Provision for connection to an external 6- to 9-volt battery which can supply approximately 30 mA to retain memory contents and maintain clock and rain gauge operation during power interruptions. (This feature suspends all other functions during the interruption and draws current from the battery only during the interruption.)
--------------------------	---

Operating Temperature Range . . . . . 15° C to 35° C (59° F to 95° F).

Dimensions (overall) . . . . . 15-3/4" wide x 8-3/4" deep x 6" high  
. . . . . (40 x 22.2 x 15.2 cm).

Weight . . . . . 9.8 lbs. (4.5 kg).

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The Heath Company reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.

## UNPACKING INSTRUCTIONS

The "Pack Index Sheet" that is inside the carton identifies the location of each parts pack in your kit. Packs 1, 2, and 3 are in separate compartments and contain the circuit board parts. The remaining parts will be referred to as the "Final Pack Parts."

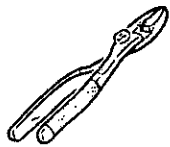
This Assembly Manual has four Parts Lists, one for each pack. Each Parts List has its own unpacking instructions that you should read carefully. **Do not unpack more than one pack at a time.**



## ASSEMBLY NOTES

### TOOLS

You will need these tools to assemble your kit.



PLIERS



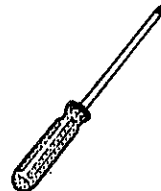
LONG-NOSED  
PLIERS



DIAGONAL  
CUTTERS



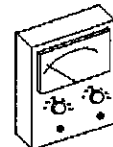
WIRE  
STRIPPERS



PHILLIPS  
SCREWDRIVER



SCREWDRIVER

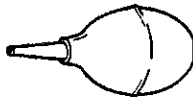


VOM, VTVM,  
OR DMM

### OTHER HELPFUL TOOLS



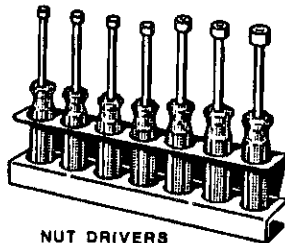
NUT STARTER  
(MAY BE SUPPLIED  
WITH KIT)



DESOLDERING  
BULB

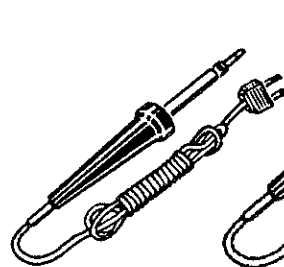


DESOLDERING  
BRAID\*

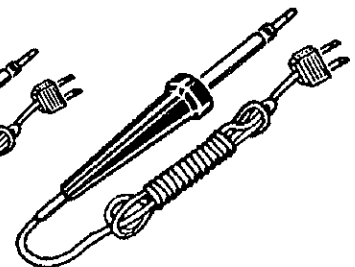


NUT DRIVERS

\*To Remove Solder from Circuit Connections



SOLDERING IRON  
(22 to 25 WATTS)



SOLDERING IRON  
(70 TO 90 WATTS)

### ASSEMBLY

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

6. Each circuit part in an electronic kit has its own component number (R2, C2, etc.). Use these numbers when you want to identify the same part in the various sections of the Manual. These numbers, which are especially useful if a part has to be replaced, appear:
  - In the Parts List,
  - At the beginning of each step where a component is installed,
  - In some illustrations,
  - In the Schematic,
  - In the section at the rear of the Manual.
7. When you are instructed to cut something to a particular length, use the scales (rulers) provided at the bottom of the Manual pages.

**SAFETY WARNINGS:**

1. **Avoid eye injury when you cut off excessive lead lengths. Hold the leads so they cannot fly toward your eyes.**
2. **Solder contains lead, which can be harmful to your health. Try to avoid breathing in the fumes while you are soldering, and wash your hands with soap and water after handling the solder.**

**SOLDERING**

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

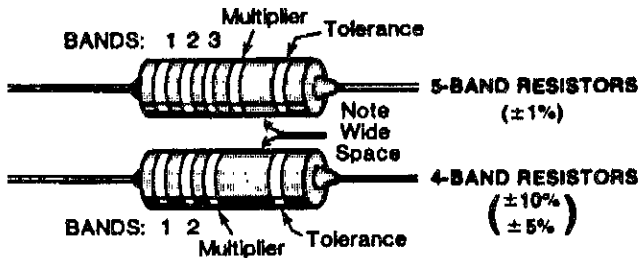
It is easy to make a good solder connection if you follow a few simple rules:

1. Use the proper type of soldering iron. A 22- to 25-watt pencil soldering iron with a 1/8" or 3/16" chisel or pyramid tip works best.
2. Keep the soldering iron tip clean. Wipe it often on a wet sponge or cloth; then apply solder to the tip to give the entire tip a wet look. This process is called "tinning," and it will protect the tip and enable you to make good connections. When the solder tends to "ball" or does not stick to the tip, the tip needs to be cleaned and retinned.

**NOTE:** Always use rosin core, radio-type solder (60:40 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 flux has been used.

## RESISTORS

Resistors are identified in Parts Lists and steps by their resistance value in  $\Omega$  (ohms),  $k\Omega$  (kilohms), or  $M\Omega$  (megohms). They are usually identified by a color code of four or five color bands, where each color represents a number. See the "Resistor Color Code" chart. These colors are given in the steps in their proper order (except the last band, which indicates a resistor's "tolerance"; see the "Resistor Tolerance Chart"). You do not need to memorize the color codes.



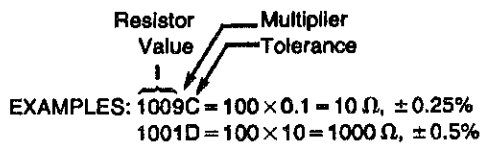
Occasionally, a "precision" or "power" resistor may have the value stamped on it. The letter R, K, or M may also be used at times to signify a decimal point, as in:

$$2R2 = 2.2 \Omega$$

$$2K2 = 2.2 k\Omega, \text{ or } 2200 \Omega$$

$$2M2 = 2.2 M\Omega$$

Precision resistors may also be marked as shown in the following examples. The values of the multipliers are shown in the "Multiplier Chart," and the tolerance values are shown in the "Resistor Tolerance" chart.



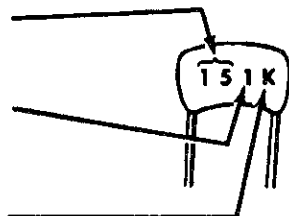
## CAPACITORS

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

First and second digits of capacitor's value: 15

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

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



## RESISTOR COLOR CODE

	Band 1	Band 2 (if used)	Band 3	Multiplier
Color	1st Digit	2nd Digit	3rd Digit	
Black	0	0	0	1
Brown	1	1	1	10
Red	2	2	2	100
Orange	3	3	3	1,000
Yellow	4	4	4	10,000
Green	5	5	5	100,000
Blue	6	6	6	1,000,000
Violet	7	7	7	10,000,000
Gray	8	8	8	100,000,000
White	9	9	9	—
Silver	—	—	—	.01
Gold	—	—	—	.1

## RESISTOR TOLERANCE

	COLOR OR LETTER	
$\pm 10\%$	SILVER	
$\pm 5\%$	GOLD	J
$\pm 2\%$	RED	G
$\pm 1\%$	BROWN	F
$\pm 0.5\%$	GREEN	D
$\pm 0.25\%$	BLUE	C
$\pm 0.1\%$	VIOLET	B
$\pm 0.05\%$	GRAY	

## MULTIPLIER CHART

FOR THE NUMBER:	MULTIPLY BY:	FOR THE NUMBER:	MULTIPLY BY:
0	1	4	10,000
1	10	5	100,000
2	100	8	0.01
3	1000	9	0.1

## CAPACITOR TOLERANCE

LETTER	10 pF OR LESS	OVER 10 pF
B	$\pm 0.1 pF$	
C	$\pm 0.25 pF$	
D	$\pm 0.5 pF$	
F	$\pm 1.0 pF$	$\pm 1\%$
G	$\pm 2.0 pF$	$\pm 2\%$
H		$\pm 3\%$
J		$\pm 5\%$
K		$\pm 10\%$
M		$\pm 20\%$

EXAMPLES:  $151 K = 15 \times 10 = 150 pF$   
 $759 = 75 \times 0.1 = 7.5 pF$

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



# DISPLAY CIRCUIT BOARD

## PARTS LIST

Remove the parts from Pack 1 and check each part against the following list. The key numbers correspond to the numbers on the "Display Circuit Board Parts Pictorial." Return any part that is in an individual envelope back into the envelope after you have identified it until that part is called for in a step. Do not throw away any packing material until you account for all the parts.

Note the "bold type" in the Parts List below. These parts require special handling. Refer to the Parts Pictorial for the areas you are not to touch when you remove them from their packaging.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of this Manual.

A replacement part may look slightly different than the original part, or may have different printing on it. In any case, the performance of the replacement part will meet or exceed the requirements of the original part. For example: A 15-volt capacitor (10  $\mu$ F, 15 V) may be replaced with a 25-volt capacitor 10  $\mu$ F, 25 V).

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

A1	432-1606	1	36-pin	
A2	432-1351	2	62-pin	

### MISCELLANEOUS

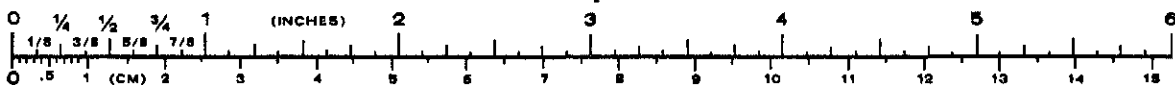
B1	9-67	1	Photo resistor	R102
B2	6-471-12	1	470 $\Omega$ , 5%, 1/4-watt resistor (yel-viol-brn)	R101
B3	412-657	1	LED (HLMP-504)	D101
B4	432-1607	2	Conductive rubber strip <b>(Do not touch the black conductive strip)</b>	
	73-250	2	1/8" x 10" gasket strip	
	346-1	2-1/2"	Black fiber sleeving	
B5	490-185	1	Desoldering braid	
			Solder	

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### PARTS FROM FINAL PACK

	85-3155	1	Display circuit board <b>(Do not touch the conductive pads on the board)</b>	
C1	411-879	1	LCD (liquid crystal display) LCD101 <b>(Do not touch the conductive surfaces of the display)</b>	
	446-763	1	White diffuser (9-13/16" x 3-1/64")	
C2	204-2993	1	LCD mounting bracket	
C3	390-2941	1	Fuse label*	
C4	390-1872	1	FCC label*	
C5	390-3382	1	Model identification label*	
	597-260	1	Parts Order Form*	
		1	Assembly Manual (see Page 1 for the part number)	
		1	Operation Manual (see Page 1 for the part number)	

\* May be packed inside the Assembly Manual. Set them aside for use later.



<u>KEY</u>	<u>HEATH</u>	<u>QTY.</u>	<u>DESCRIPTION</u>	<u>CIRCUIT</u>	<u>KEY</u>	<u>HEATH</u>	<u>QTY.</u>	<u>DESCRIPTION</u>	<u>CIRCUIT</u>
<u>No.</u>	<u>Part No.</u>			<u>Comp. No.</u>	<u>No.</u>	<u>Part No.</u>			<u>Comp. No.</u>
<b>Binder Parts (Previously assembled)</b>									
	597-4460	2	Binder cover			485-70	4	Binder fastener	
	701-233	2	3-ring assembly						

## STEP-BY-STEP ASSEMBLY

Refer to Pictorial 1-4 for the following steps.

- (✓) Lay a soft cloth on your work surface.
- (✓) Position the LCD frame on the cloth with the locator hole to the left and the tabs facing up.

NOTE: Use a small bladed knife, (an X-acto® knife would work well) to install and position the gasket and conductive rubber strips in the following steps.

- (✓) Refer to inset drawing #1 and remove the backing paper from one 1/8" x 10" gasket strip. Press the adhesive side of the gasket along the top edge of the LCD frame. Keep the gasket as close to the top flange as possible. Try not to stretch the gasket. When you have installed the gasket strip, cut off the excess length so it is even with the outside edge of the frame.
- (✓) Similarly, install the other 1/8" x 10" gasket strip along the bottom edge of the LCD frame and cut off the excess length.

**CAUTION:** The LCD (liquid crystal display) is a very fragile electronic component. Be careful when you handle it that you do not bump or drop it. Also, be careful not to touch the conductive surfaces along the edges of the display.

- (✓) Unpack the LCD, handling it by the edges, and set the bubble pack aside for use later.
- (✓) Remove the protective covering from both sides of the LCD.
- (✓) Position the LCD with the index mark (small glass bulge) to the left with the flat side of the glass against the cloth (notched edges up).
- (✓) Carefully place the top edge of the LCD firmly against the top gasket strip. Then lower the bottom edge of the LCD so that it fits inside (not over) the lower gasket strip. The LCD should fit between the gasket strips, which help center it in the frame. Use a knife blade to position the gasket as necessary.

- (✓) Slide the LCD over so the left edge is aligned with the edge of the locator hole, but not covering it.

NOTE: Do not touch the edges of black conductive rubber when you handle the conductive rubber strips in the following steps.

- (✓) Position a conductive rubber strip so the black conductive strip is perpendicular to your work surface. Tuck the strip between the top of the LCD frame gasket and the lip of the LCD as shown in inset drawing #2. Keep the gasket parallel with the edge of the flange as shown in the inset.
- (✓) Using a flat, thin-bladed device, compress the frame gasket towards the metal to allow the conductive rubber strip to seat fully against the display. Use a pair of tweezers to press the strip into place, starting at one end and working towards the other end.
- (✓) Similarly install the remaining conductive rubber strip along the bottom edge of the LCD frame between the gasket strip and the lip of the LCD.
- (✓) Place the white diffuser over the LCD surface so the top and bottom edges align with the LCD and the left end of the diffuser is even with the edge of the LCD.
- (✓) Position the display circuit board over the LCD assembly with the corner cutout and the small notch as shown. Then lower the board over the frame so the frame tabs fit into the circuit board holes. Make sure the diffuser and conductive rubber strips remain positioned properly as you mount the circuit board.
- (✓) Straighten one lead of the 470  $\Omega$  (yel-viol-brn-gld) resistor and insert the lead through both the LCD frame and circuit board locator holes.
- (✓) Slide the diffuser against the resistor lead (you will see the resistor move when the diffuser contacts the lead). Make sure that the diffuser contacts the lead. Then remove the resistor and set it aside.

- (✓) Press firmly against the center of the circuit board and then twist the top center LCD frame tab around 90° so it **faces toward the display** and is over the indicated foil pad as shown in inset drawing #3.
- (✓) Similarly twist the bottom center tab 90° **so it faces the LCD.**
- (✓) Starting at the top and bottom center tabs and working outward in both directions, alternately twist the remaining top, bottom, and end tabs 90° **toward the display.** Press down firmly on the board as you go.

Refer to Pictorial 1-2 for the following steps.

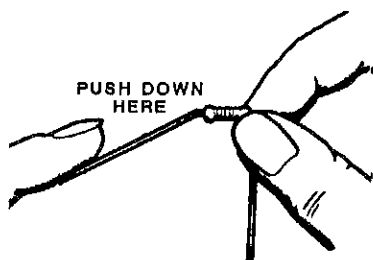
#### NOTES:

The display circuit board has foil patterns and component (part) outlines on both sides. The side that you install the components on in the following steps will be called the "component side." The other side opposite will be called the "foil side."

In the following steps, you will be given detailed instructions on how to install and solder the first component on the circuit board. Read and perform each step carefully. Then use the same procedure to install similar components on the remaining circuit boards.

In general, solder instructions are given only at the end of a series of similar steps. You may solder more often if you wish.

- (✓) Turn the circuit board over and position it with the component outlines as shown in Pictorial 1-2. Then use the following procedure to install and solder the first component.
- (✓) Hold the 470  $\Omega$  (yel-viol-bm) resistor by the body as shown and bend the leads straight down with your finger to fit the circuit board hole spacing.

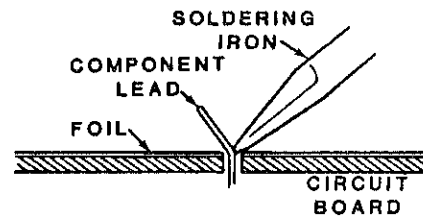


- (✓) R101: Start the resistor leads into their circuit board holes at the indicated location.
- (✓) Press the resistor body against the circuit board and bend the leads outward slightly to hold it in place.

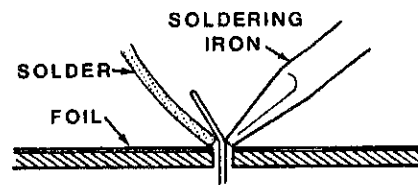


Solder the resistor leads to the circuit board as follows:

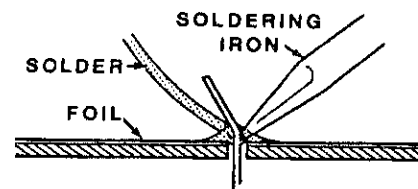
1. Push the soldering iron tip against both the lead and the circuit board foil. Heat both for both for two or three seconds.



2. 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.



**NOTE:** If you should accidentally fill a circuit board hole with solder and wish to clear it, use the desoldering braid supplied with your kit for this purpose. The instructions are on the package.

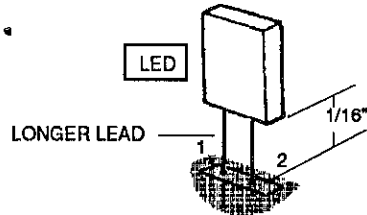
- (✓) Cut off the excess lead lengths close to the connection. **WARNING:** Clip the leads so the ends will not fly toward your eyes.



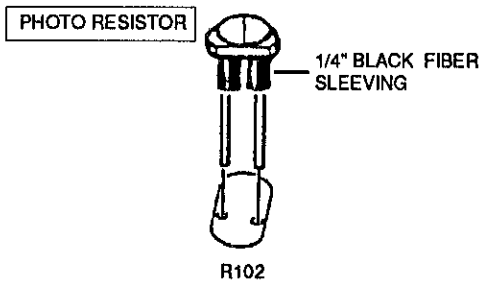
- (✓) Check each solder connection and compare it to Detail 1-1A. After you have checked the connections, proceed with the assembly. Use the same soldering procedure for each component.

**IMPORTANT:** Make sure you installed the first component at R101 before you proceed.

- ( ) D101: Insert the longer LED lead into hole 1 and the shorter lead in hole 2. Position the LED body 1/16" above the circuit board and solder the leads to the foil. Cut off the excess lead lengths.



- (✓) Cut two 1/4" pieces of black fiber sleeving and then set the remaining sleeving aside for use later.
- (✓) R102: Slide the two 1/4" pieces of black fiber sleeving over the photo resistor leads until they are against the body. Then insert the leads into the circuit board holes until the sleeving is against both the photo resistor body and the circuit board. Make sure the photo resistor body is parallel to the board, then solder the leads to the foil and cut off the excess lead lengths.

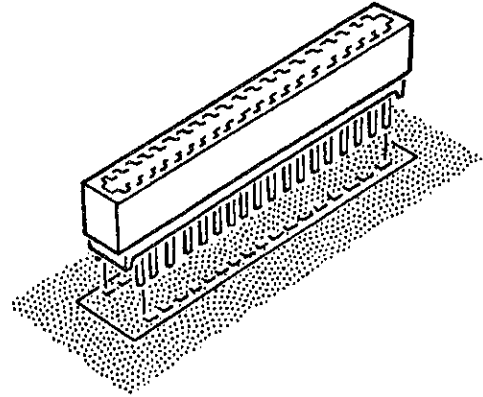


Refer again to Pictorial 1-1 for the following steps.

- (✓) Carefully position the LCD assembly face down on the cloth. Mount the following connectors on the **opposite side from the LCD.**

Install circuit board connectors on the circuit board as follows. Straighten any bent connector pins and then install the pins into the circuit board holes at the indicated connector location. Solder two diagonally

opposite pins to the foil; then make sure the connector is flat against the board. If it is not, reheat the pins as you press the connector against the board, then solder the remaining pins to the circuit board foils. You can install the connectors in either direction on the board.



Install circuit board connectors at the following locations:

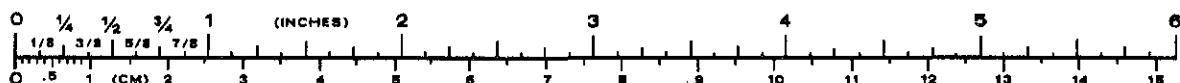
- (✓) 36-pin connector at S103.
- (✓) 62-pin connector at S102.
- (✓) 62-pin connector at S101.

## CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following possible problems:

- (✓) Unsoldered connections.
- (✓) Poor solder connections.
- (✓) Solder bridges between foil patterns. **NOTE:** Refer to the "X-Ray Views" if you are uncertain and want to see the correct foil patterns.
- (✓) Protruding leads which could touch together or short to the chassis when the circuit board is mounted later.
- (✓) Place the LCD assembly on the protective packaging that you set aside earlier and set the assembly in a safe place until it is called for later.

This completes the display circuit board assembly.





# POWER SUPPLY CIRCUIT BOARD

## PARTS LIST

Remove the parts from Pack 2 and check each part against the following list. The key numbers correspond to the numbers on the "Power Supply Circuit Board Parts Pictorial." Do not remove components that are supplied on a tape from the tape until you use them in a step. Return any part that is in an individual envelope back into the envelope after you have identified it, until that part is called for in a step. Do not throw away any packing material until you account for all the parts.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of this Manual.

A replacement part may look slightly different than the original part, or may have different printing on it. In any case, the performance of the replacement part will meet or exceed the requirements of the original part. For example: A 15-volt capacitor (10  $\mu$ F, 15 V) may be replaced with a 25-volt capacitor 10  $\mu$ F, 25 V).

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

A1	6-682-1	2	6800 $\Omega$ , 1-watt (blu-gry-red)	R341, R342
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### CAPACITORS

#### Electrolytic

B1	25-917	4	10 $\mu$ F	C310, C311, C320, C321
B1	25-928-1	1	33 $\mu$ F	C315
B1	25-951	1	1000 $\mu$ F, 25V	C303
B1	25-893	1	1000 $\mu$ F, 35V	C318
B1	25-963	3	2200 $\mu$ F	C316, C317, C323

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

B2	27-106	2	.01 $\mu$ F (103)	C304, C305
B2	27-249	2	.022 $\mu$ F (223)	C306, C307

### TRANSFORMERS

C1	51-211	1	Resonator	T302
C1	51-212	1	Input	T301

### DIODE

D1	56-695	2	LM 385Z-2.5	D323, D324
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KEY HEATH No. Part No.	QTY. DESCRIPTION	CIRCUIT Comp. No.
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### TRANSISTORS — INTEGRATED CIRCUITS (ICs)

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

1. Part number.
2. Type number. (For integrated circuits, this refers only to the numbers and letters shown in **BOLD** print. Disregard any other numbers or letters shown on the IC.)
3. Part number and type number.
4. Part number with a type number other than the one shown.

D2	417-195	2	MJE340	Q309, Q311
D1	417-235	2	2N4121	Q303, Q317
D1	417-801	7	MPSA20	Q301, Q312, Q313, Q314, Q315, Q316, Q318
D3	417-856	1	MJE5979	Q307
D1	417-864	2	MPSA05	Q302, Q304
D1	417-885	1	MPSA65	Q319
D3	117-17	1	D44H10 (matched pair)	Q305, Q306
D4	442-24	1	LM376N	U301
D3	442-54	1	UA7805	U304
D3	442-63	1	UA7815	U302
D3	442-613	1	MC7915	U305
D1	442-787	1	LP2950C	U303

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

NOTE: Hardware is shown full size in the Parts Pictorial so you can place any screw, nut, etc., you are uncertain about over the illustration. The hardware may be packed in more than one envelope. Open all of the hardware envelopes before you check the screws, nuts, lockwashers, etc. against the Parts List.

E1	250-1412	2	4-40 x 3/8" screw
E2	250-1280	2	6-32 x 3/8" screw
E3	252-2	2	4-40 nut
E4	252-3	2	6-32 nut
E5	254-9	2	#4 lockwasher
E6	254-1	2	#6 lockwasher
E7	253-198	1	Nylon shoulder washer

### PLUGS — SOCKET

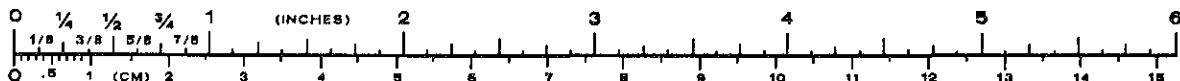
F1	432-1171	1	2-pin plug
F2	432-1182	1	5-pin plug
F3	432-828	1	7-pin plug
F4	432-1073	1	10-pin plug
F5	434-230	1	8-pin IC socket

### MISCELLANEOUS

	73-92	1	Double-stick foam tape
G1	75-204	1	Transistor insulator
G2	204-3101	2	Mounting bracket
G3	352-13	1	Silicone grease
G4	490-5	1	Nut starter
	340-8	12"	Bare wire

### PART FROM FINAL PACK

	85-3236	1	Power supply circuit board
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## TAPED COMPONENTS

The remaining parts are supplied on taped strips. It is not necessary to check them against the following list.

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

All 5% resistors have four color bands (last band gold). The last band is a tolerance band and will not be called out.

All 1% resistors have five color bands (last band brown). The brown band is a tolerance band set apart from the other bands and will not be called out.

All resistors are rated at 1/4-watt unless specified otherwise.

6-109-12	3	1 Ω (brn-blk-gld)	R301A, R301B, R301C
6-1829-12	4	18.2 Ω, 1% (brn-gry-red-gld)	R314A, R314B, R315A, R315B
6-680-12	1	68 Ω (blu-gry-blk)	R306
6-121-12	2	120 Ω (brn-red-brn)	R323, R324
6-471-12	3	470 Ω (yel-viol-brn)	R308, R310, R311
6-102-12	1	1000 Ω (brn-blk-red)	R335
6-152-12	1	1500 Ω (brn-grn-red)	R317
6-2261-12	1	2260 Ω, 1% (red-red-blu-brn)	R309
6-272-12	2	2700 Ω (red-viol-red)	R320, R321
6-472-12	1	4700 Ω (yel-viol-red)	R334
6-682-12	1	6800 Ω (blu-gry-red)	R305
6-103-12	2	10 kΩ (brn-blk-org)	R325, R333
6-153-12	2	15 kΩ (brn-grn-org)	R332, R338
6-2052-12	1	20.5 kΩ, 1% (red-blk-grn-red)	R304
6-473-12	1	47 kΩ (yel-viol-org)	R336

HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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6-683-12	1	68 kΩ (blu-gry-org)	R328
6-753-12	1	75 kΩ (viol-grn-org)	R340
6-104-12	3	100 kΩ (brn-blk-yel)	R326, R337, R339
6-224-12	1	220 kΩ (red-red-yel)	R327
6-334-12	1	330 kΩ (org-org-yel)	R329

### CAPACITORS

#### Ceramic

21-773	1	470 pF (471)	C302
21-786	8	.1 μF (104)	C301, C308, C309, C312, C313, C314, C319, C322

### DIODES

56-56	8	1N4149	D307, D308, D309, D311, D312, D313, D314, D320
56-613	1	1N5231B zener	D322
56-659	1	1N5998B 8.2 V zener	D310
57-27	2	1N5397	D305, D306, D302, D304, D315 - D319, D321, D325, D326
57-65	10	1N4002	

## STEP-BY-STEP ASSEMBLY

Refer to Pictorial 2-1 for the following notes and steps.

### NOTES:

1. Many circuit board drawings, such as the one shown in Pictorial 2-1, are divided into sections. You will be working on each of these sections in a specific series of steps.
  2. In each series of steps, you will install parts in a left-to-right, top-to-bottom, sequence. In some cases, you may be directed to install parts out of sequence due to their various heights. You will install the lower height parts first.
  3. Check off each step as you perform it. You may also wish to place a check mark near each component on the Pictorial as you install it.
  4. In general, solder instructions are given only at the end of a series of similar steps; you may solder more often if you wish.
  5. The circuit boards have foil on both sides, but only one side has component (parts) outlines shown on it. This is called the "component side," while the other side is called the "foil side."
- (-) Position the circuit board as shown in the Pictorial with the component side up. Always install components on the component side of the circuit board and solder the leads to the foil on the other side, unless a step directs you otherwise.
- (-) Remove the "Taped Components Chart" from the last pages (A1 through A8) of the Manual. Make sure you read the instructions at the top of the chart before you use it. Note that it is divided into numbered sections which correspond to the numbered sections on the circuit board pictorial.

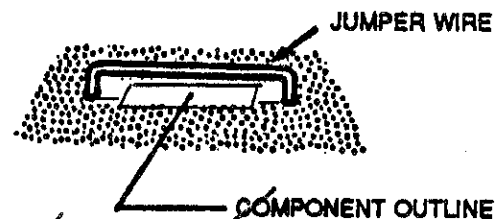
**IMPORTANT:** The components are in assembly sequence. Make sure that you do not install a component out-of-sequence; otherwise, the remaining components could also be out-of-sequence.

### Section 1

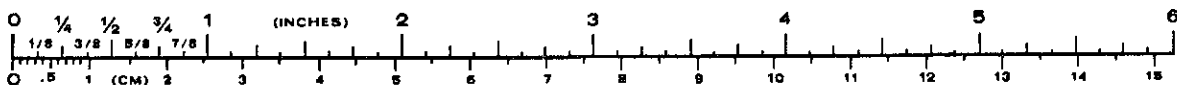
- (-) C301: .1  $\mu$ F (104) axial-lead ceramic capacitor.
- (-) C302: 470 pF (471) axial-lead ceramic capacitor.
- (-) R306: 68  $\Omega$  (blu-gry-blk) resistor.

**NOTE:** In the following step, you will install a jumper wire. To do this:

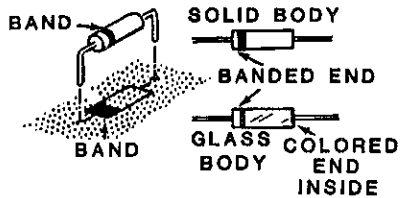
1. Cut a piece of the bare wire to the length indicated in the step (i.e. 1" jumper wire).
2. Bend the wire ends down to fit the component outline hole spacing.
3. Insert the jumper wire ends into the indicated component outline holes and bend the ends out slightly to hold the wire in place.



- (-) R307: 1" jumper wire.
- (-) R310: 470  $\Omega$  (yel-viol-brn) resistor.
- (-) R311: 470  $\Omega$  (yel-viol-brn) resistor.
- (-) D303: 1" jumper wire.



NOTE: When you install a diode, always match the band on the diode with the band mark on the circuit board. The circuit will not work properly if a diode is installed backwards.



CAUTION: ALWAYS POSITION THE BANDED END OF A DIODE AS SHOWN ON THE CIRCUIT BOARD.

If your diode has a solid body, the band is clearly defined. If your diode has a glass body, do not mistake the colored end inside the diode for the banded end. Look for a band painted on the outside of the glass.

- ( ) D304: 1N4002 (#57-65) diode.
- ( ) R302: 1-1/2" jumper wire.
- ( ) R304: 20.5 kΩ, 1% (red-blk-grn-red) resistor.
- ( ) R309: 2260 Ω, 1% (red-red-blu-brn) resistor.
- ( ) R305: 6800 Ω (blu-gry-red) resistor.
- ( ) R308: 470 Ω (yel-viol-brn) resistor.
- ( ) D301: 1" jumper wire.
- ( ) D302: 1N4002 (#57-65) diode.
- ( ) Solder the leads to the foil and cut off the excess lead lengths.

## Section 2

- ( ) D305: 1N5397 (#57-27) diode.
- ( ) D306: 1N5397 (#57-27) diode.
- ( ) R324: 120 Ω (brn-red-brn) resistor.
- ( ) R325: 10 kΩ (brn-blk-org) resistor.
- ( ) R320: 2700 Ω (red-viol-red) resistor.
- ( ) R323: 120 Ω (brn-red-brn) resistor.

- ( ) R329: 330 kΩ (org-org-yel) resistor.
- ( ) R317: 1500 Ω (brn-grn-red) resistor.
- ( ) R321: 2700 Ω (red-viol-red) resistor.
- ( ) R326: 100 kΩ (brn-blk-yel) resistor.
- ( ) R327: 220 kΩ (red-red-yel) resistor.
- ( ) R328: 68 kΩ (blu-gry-org) resistor.
- ( ) C308: .1 μF (104) axial-lead ceramic capacitor.
- ( ) C309: .1 μF (104) axial-lead ceramic capacitor.
- ( ) Solder the leads to the foil and cut off the excess lead lengths.

## Section 3

- ( ) R332: 15 kΩ (brn-grn-org) resistor.
- ( ) D308: 1N4149 (#56-56) diode.
- ( ) C313: .1 μF (104) axial-lead ceramic capacitor.
- ( ) R337: 100 kΩ (brn-blk-yel) resistor.
- ( ) R338: 15 kΩ (brn-grn-org) resistor.
- ( ) R339: 100 kΩ (brn-blk-yel) resistor.
- ( ) C314: .1 μF (104) axial-lead ceramic capacitor.
- ( ) D322: 1N5231B (#56-613) zener diode.
- ( ) D307: 1N4149 (#56-56) diode.
- ( ) R333: 10 kΩ (brn-blk-org) resistor.
- ( ) R334: 4700 Ω (yel-viol-red) resistor.
- ( ) R335: 1000 Ω (brn-blk-red) resistor.
- ( ) C312: .1 μF (104) axial-lead ceramic capacitor.
- ( ) R336: 47 kΩ (yel-viol-org) resistor.
- ( ) D309: 1N4149 (#56-56) diode.

19210  
1-251

- (✓) D310: 1N5998B (#56-659) 8.2 V zener diode.
- (✓) R340: 75 kΩ (viol-gm-org) resistor.
- (✓) Solder the leads to the foil and cut off the excess lead lengths.

**Section 4**

Install 1N4149 diodes (#56-56) at the following four locations:

- (✓) D311.
- (✓) D312.
- (✓) D314.
- (✓) D313.
- (✓) C319: .1 μF (104) axial-lead ceramic capacitor.

Install 1N4002 diodes (#57-65) at the following five locations:

- (✓) D315.
- (✓) D316.
- (✓) D317.
- (✓) D318.
- (✓) D319.

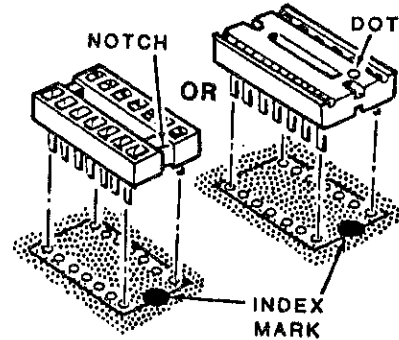
- (✓) D320: 1N4149 (#56-56) diode.
- (✓) D321: 1N4002 (#57-65) diode.
- (✓) C322: .1 μF (104) axial-lead ceramic capacitor.
- (✓) Solder the leads to the foil and cut off the excess lead lengths.

Refer to Pictorial 2-2 for the following steps.

NOTE: During the remaining assembly, you will move from section-to-section installing various height parts in an ascending order.

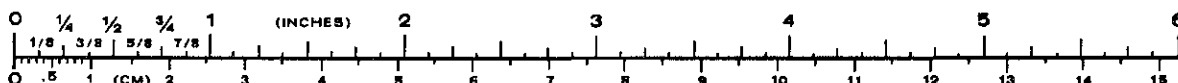
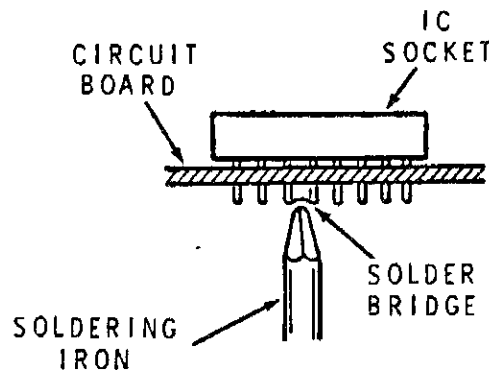
NOTE: Before you install an IC socket, make sure the pins are straight. If there is any kind of identification mark (notch, dot, arrowhead, etc.) at or near

one end of the socket, place this marked end toward the index mark on the circuit board (this index mark should still be visible after you install the socket). Then start the pins into the circuit board holes.



Hold the socket in place while you turn the board over and lay it on top of the socket on your work surface. The board will hold the socket in place. At first, solder only two pins at diagonally opposite corners of the socket. When the solder cools, check to make sure the socket is tight against the circuit board. If not, reheat the pins while you press against the socket to reseal it. Then solder the remaining pins to the foil.

NOTE: A solder bridge may occur when you make solder connections at closely spaced foils. Therefore, after each solder step, carefully inspect the foil for solder bridges and remove any that have formed. To remove a solder bridge, hold the circuit board foil-side-down as shown, and hold the soldering iron tip between the two points that are bridged. The solder will flow down the soldering iron tip to clear the bridge.

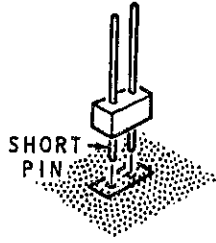




## Section 1

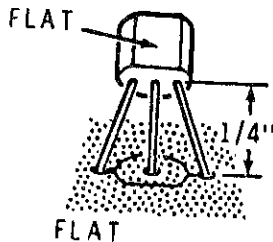
- ( ) U301: 8-pin IC socket.

NOTE: When you install the type of circuit board plug shown below, as in the following step, insert the shorter pins into the circuit board holes at the indicated location and position the plug pins perpendicular to the board. Then solder the pins to the foil.



- ( ) S301: 2-pin plug.

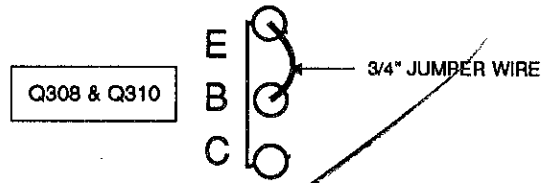
NOTE: Whenever you install a transistor, as in the following step, position it so the flat side is over the flat of the outline on the circuit board, as shown. Then insert the leads into their circuit board holes and position the bottom of the case 1/4" above the board. Bend the transistor leads out slightly on the foil side of the board to hold it in place. Solder the leads to the foil and cut off the excess lead lengths.



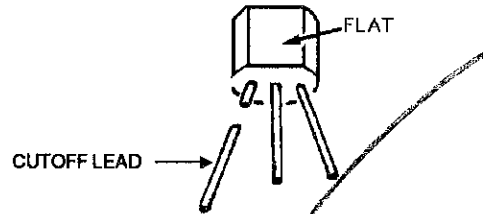
- ( ) Q301: MPSA20 (#417-801) transistor.
- ( ) Q302: MPSA05 (#417-864) transistor.
- ( ) Q303: 2N4121 (#417-235) transistor.
- ( ) Q304: MPSA05 (#417-864) transistor.

## Section 2

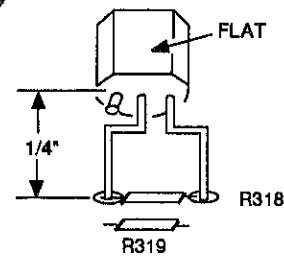
- ( ) Q308: Cut a 3/4" jumper wire and insert the wire between the B and E holes at Q308. Solder the wire to the foils and cut off the excess wire lengths.



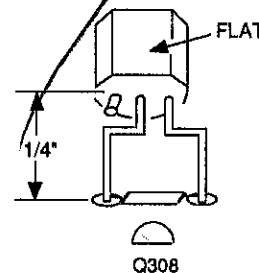
- ( ) Q310: Cut another 3/4" jumper wire and insert the wire between the B and E holes at Q310.
- ( ) Locate both LM385Z-2.5 (#56-695 diodes and position each on with the flat facing you. Then cut off the left pin of each diode as close to the body as possible. Set one of the prepared diodes aside for use later.



- ( ) R318/D323: Position one of the LM385Z-2.5 (#56-695) diodes with the flat facing R319 as shown and form the leads to fit the hole spacing at R318. Then insert the leads into the holes as shown and solder them to the foil. Cut off the excess lead lengths.



- ( ) R316/D324: Position the other LM385Z-2.5 (#56-695) that you cut the lead off earlier and position it with the flat facing Q308 as shown. Bend the leads to fit the hole spacing at R316 and insert them into the holes. Solder the leads to the foil and cut off the excess lead lengths.

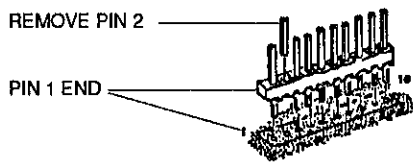


Install MPSA20 transistors (#417-801) at the following seven locations:

- Q312.
- Q313.
- Q315.
- Q314.
- Q316.
- Q317: 2N4121 (#417-235) transistor.

Locate the 10-pin plug and, starting at either end of the plug, remove and discard pin 2 to make a 9-pin plug.

S303: Position the 9-pin plug with the pin 1 end next to the "1" shown on the circuit board and install the shorter plug pins into the board holes.

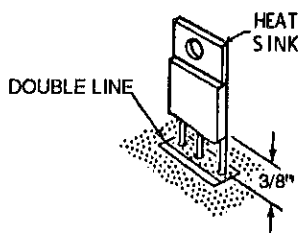


**Section 3**

- Q318: MPSA20 (#417-801) transistor.
- Q319: MPSA65 (#417-885) transistor.
- U303: LP2950C IC (#442-787).

**Section 1**

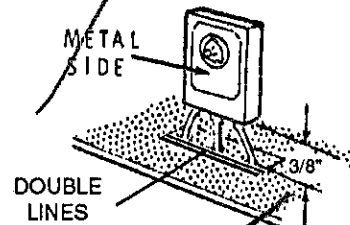
NOTE: When you install the next two transistors, position them so the bare metal heat sink side is opposite the double lines on the circuit board outline as shown. Then insert the leads into their circuit board holes with the bottom of the case 3/8" above the board, and solder the leads to the foil. Do not cut off the excess lead lengths, as you will connect other components to them later.



- Q305: D44H10 (#117-17) matched transistor.
- Q306: D44H10 (#117-17) matched transistor.

**Section 2**

Q309: MJE340 (#417-195) transistor. Position this and the following transistor with the heat sink toward the double lines on the circuit board outline as shown. Then insert the leads into their circuit board holes with the bottom of the case 3/8" above the board, and solder the leads to the foil.



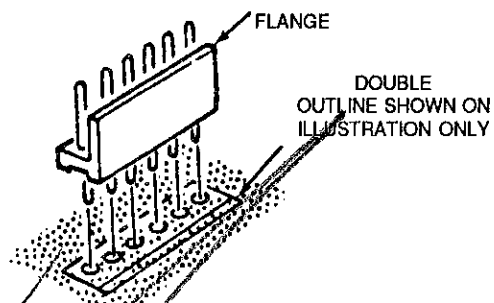
- Q311: MJE340 (#417-195) transistor.

**Section 3**

NOTE: When you install the next two ICs, position them so the bare metal heat sink side is toward the double lines on the circuit board outline

- U305: MC7915 IC (#442-613).
- U304: UA7805 IC (#442-54).

NOTE: When you install the following plugs, position the flanges over the double line as shown in the Illustration Booklet Pictorial. The lines are not shown on the circuit board so be careful not to install them backwards. Press the plug body flat against the board and solder the pins to the foil.

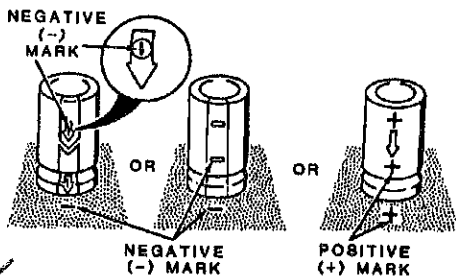


- S302: 5-pin plug in Section 2.

## Section 3

(-) S304: 7-pin plug.

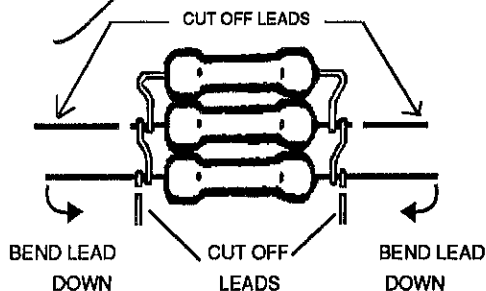
NOTE: Before you install an electrolytic capacitor, look at it and identify the leads. One lead will have either a negative (-) mark or a positive (+) mark near it on the side of the capacitor. (The marking for a negative lead may look like an oblong bar, sometimes with a circle around it, inside an arrow.) . . . Be sure to install the the negative lead in the negative-marked hole, and the positive lead in the positive-marked hole.



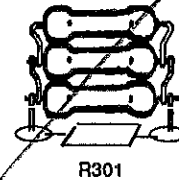
- (-) C310: 10  $\mu$ F electrolytic capacitor.
- (-) C311: 10  $\mu$ F electrolytic capacitor.
- ( ) C315: 33  $\mu$ F electrolytic capacitor.
- ( ) C320: 10  $\mu$ F electrolytic capacitor.
- ( ) C321: 10  $\mu$ F electrolytic capacitor.
- (-) Solder the leads to the foil and cut off the excess lead lengths.

Refer to Pictorial 2-3 for the following steps.

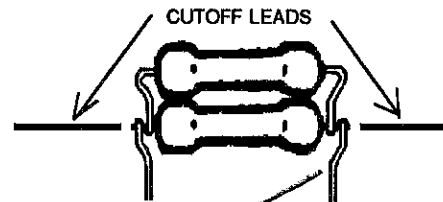
- ( ) Remove three 1  $\Omega$  (brn-blk-gld) resistors from the taped strip and position them with their bodies together as shown. Then wrap the leads of the top resistor around the center and bottom resistor leads, keeping the wrapped leads approximately 1/8" from the ends of the resistor bodies.



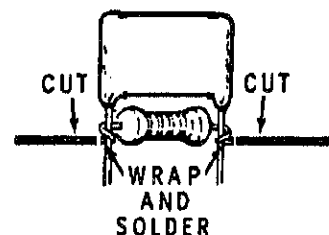
- ( ) Solder the top resistor leads to the center and bottom resistor leads, using only enough heat to make a good connection. Then cut off the excess lead lengths from the top and center resistors only. Bend the bottom resistor leads down as shown.
- ( ) R301A, B, C: Three 1 $\Omega$  resistor assembly.



- ( ) Remove two 18.2  $\Omega$ , 1% (brn-gry-red-gld) resistors from the taped strip and position them with their bodies together. Then wrap the leads of the top resistor around the leads of the bottom resistor, keeping the leads approximately 1/8" from the ends of the resistor bodies, and solder them together. Cut off the leads of the top resistor.

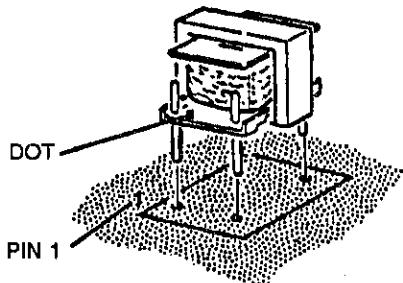


- ( ) R314A & B: Mount the two 18.2  $\Omega$ , 1% resistor assembly at R314.
- ( ) Similarly connect and solder the leads of the remaining two 18.2  $\Omega$ , 1% resistors together.
- ( ) R315A & B: Mount the two 18.2  $\Omega$ , 1% resistor assembly at R315.
- ( ) Wrap the leads of a 6800  $\Omega$ , 1-watt (blu-gry-red) resistor around the leads of a .01  $\mu$ F Mylar capacitor and solder the connections. Then cut off the excess lead lengths as shown.



- ( ) Similarly prepare another .01  $\mu$ F Mylar capacitor and a 6800  $\Omega$ , 1-watt resistor.
- ( ) C305/R342: .01  $\mu$ F/6800  $\Omega$ , 1-watt capacitor/resistor combination at C305.
- ( ) C304/R341: .01  $\mu$ F/6800  $\Omega$ , 1-watt capacitor/resistor combination at C304.
- ( ) C307: .022  $\mu$ F Mylar capacitor.
- ( ) C306: .022  $\mu$ F Mylar capacitor.

NOTE: When you install the following transformers, position them with the dot on the body at the pin 1 hole marked on the circuit board as shown in the illustration at the top of the next column. Insert the pins into the circuit board holes and press the body flat against the board. Then solder the pins to the foil and cut off any excess pin lengths.



- ( ) T301: Input transformer (#51-212).
- ( ) T302: Resonance transformer (#51-211).
- ( ) C303: 1000  $\mu$ F, 25 V electrolytic capacitor.
- ( ) C318: 1000  $\mu$ F, 35 V electrolytic capacitor.
- ( ) C317: 2200  $\mu$ F electrolytic capacitor. DO NOT CUT OFF THE EXCESS LEAD LENGTHS.
- ( ) C316: 2200  $\mu$ F electrolytic capacitor.
- ( ) Solder the leads to the foil. Then, EXCEPT for capacitor C317, cut off the excess lead lengths.
- ( ) Refer to inset drawing #1 in Pictorial 2-3 and open the silicone grease pod.

NOTE: The silicone grease you will use in the following steps is not caustic. However, make sure you do not get any in your eyes, on your clothing, or on any of your furniture. If you should get any of the grease in your eyes, flush them immediately with water. If you get any on your hands, wash them immediately after you have completed using the grease.

Refer to inset drawing #2 for the following steps.

- ( ) Locate one of the mounting brackets and position it as shown. Spread a small amount of silicone grease on one side of the transistor insulator and position it as shown. Then press the silicone grease side onto the mounting bracket at the indicated location so the holes align.

NOTE: Use the nut starter to hold and start 4-40 and 6-32 nuts on screws.

- ( ) Spread a small amount of silicone grease on the bare metal side of transistor MJE5979 (#417-856). Then mount the transistor over the insulator to the mounting bracket finger tight with a 4-40 x 3/8" screw, a nylon shoulder washer, a #4 lockwasher, and a 4-40 nut. Make sure the shoulder of the washer seats properly into the mounting bracket hole and that the transistor is positioned as shown.
- ( ) Q307: Position the mounting bracket assembly onto the circuit board so the transistor leads enter their respective holes at Q307 and secure the bracket with a 6-32 x 3/8" screw, a #6 lockwasher, and a 6-32 nut. Make sure the bracket is not twisted so that the transistor leads do not become stressed, and then tighten the 4-40 transistor hardware.
- ( ) Solder the leads of transistor Q307 to the foil and cut off the excess lead lengths.
- ( ) Locate the remaining mounting bracket and position it as shown. Then spread a small amount of silicone grease on the bare metal side of IC UA7815 (#442-63) and mount it to the mounting bracket finger tight with a 4-40 x 3/8" screw, a #4 lockwasher, and a 4-40 nut. Make sure that you position the IC as shown.

U302: Position the mounting bracket assembly onto the circuit board so the IC leads enter their respective holes at U302 and secure the bracket with a 6-32 x 3/8" screw, a #6 lockwasher, and a 6-32 nut. Make sure the bracket is not twisted so that the IC leads become stressed, and then tighten the 4-40 IC hardware.

Solder the leads of IC U302 to the foil and cut off the excess lead lengths.

Discard the remaining silicone grease.

Turn the circuit board over so the foil side faces up.

Cut a 1" piece of double-stick foam tape.

Remove the paper backing from one side of the 1" double-stick foam tape and press the tape onto the foil side of the board in the heavy dashed line area shown in the Pictorial. Then remove the remaining backing paper from the foam tape.

C323: Refer to inset drawing #3 and, from the foil side of the circuit board, position a 2200  $\mu$ F electrolytic capacitor with the positive (+) and negative (-) leads across the same polarity leads of capacitor C317 as shown. Then press the capacitor body against the 1" double-stick foam tape. Solder the leads together at the connection points and then cut off the excess lead lengths. Make sure the connections are securely soldered.

D325: Refer to inset drawing #4. Position a 1N4002 (#57-65) diode (from the taped strip) with the banded end toward the collector (C) of transistor Q305 as shown. Wrap the diode leads around the protruding collector (C) and emitter (E) leads of the transistor and then solder the connections. Cut off the excess diode and transistor lead lengths.

D326: Refer to inset drawing #4. Position a 1N4002 (#57-65) diode (from the taped strip) with the banded end toward the collector (C) of transistor Q306 as shown. Wrap the diode leads around the protruding collector (C) and emitter

(E) leads of the transistor and then solder the connections. Cut off the excess diode and transistor leads.

Reposition the circuit board with the component side up.

This completes the circuit board assembly. There should not be any components installed at the following circuit board locations:

R303.

R312.

R313.

R319.

R322.

If there are parts installed at any of these locations, go back over the assembly steps and find out why.

## CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following possible problems:

Unsoldered connections.

Poor solder connections.

Solder bridges between foil patterns. NOTE: Refer to the "X-Ray Views" in your Operation Manual if you are uncertain and want to see the correct foil patterns.

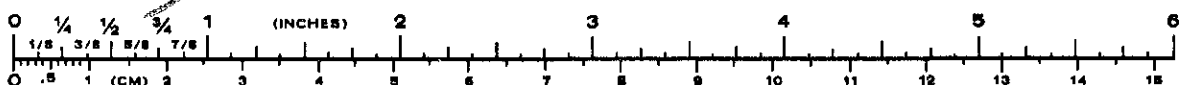
Protruding leads which could touch together or short to the chassis when the circuit board is mounted later.

Refer to the illustrations where the parts were installed as you make the following visual checks:

Transistors for the proper type and installation.

Diodes for the proper type and positioning of the banded end.

Electrolytic capacitors for the correct position of the positive (+) or negative (-) markings.

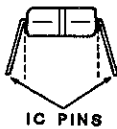


## IC INSTALLATION

**CAUTION:** Integrated circuits (ICs) are complex electrical devices that perform many complicated operations in a circuit. Read all of the following information before you install the ICs.

Some of the ICs used in this kit may be MOS (metal-oxide semiconductor) devices; these ICs are shipped in a foam pad to protect them. These are rugged and reliable devices. However, if you do not handle them properly when you remove them from the protective foam pad and install them, they can be damaged by static electricity. Other ICs may be of a type that are not susceptible to static electricity. Nevertheless, treat all ICs as if they were MOS, and this will help insure that no ICs will be damaged.

The pins on the IC may be bent out at an angle and thus will not line up with the holes in the IC socket. Do not try to install the IC without first bending the pins as described on the following page. This may damage the IC pins or the socket, causing intermittent contact.

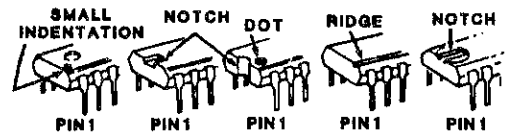


Remove the IC from its protective foam pad, but do not let go of it until it is installed in its socket. Hold the IC in one hand and place your other hand on your work surface before you touch the IC to your work surface. This will equalize the static electricity between the work surface and the IC.

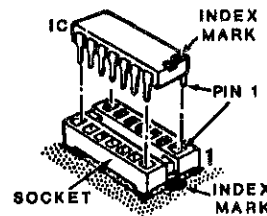
Very carefully roll the IC toward the pins to bend the lower pins into line. Then turn the IC over and bend the pins on the other side in the same manner.



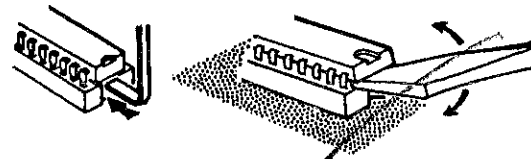
Compare the IC to the drawing shown below. Then determine which end of the IC is the pin 1 end.



Hold the IC in one hand and the circuit board in the other. Then position the pin 1 end of the IC over the index mark on the circuit board and start the pins into the socket. Make sure that all of the pins are started; then push the IC down firmly. NOTE: An IC pin can become bent under the IC and it will look as though it is correctly installed in the socket.



If it is ever necessary to remove an IC from its socket, use an IC lifter (if one was supplied with your kit) or a small-blade screwdriver as shown. Push it between the IC and the socket and carefully lift the IC free. If any IC pins become bent, carefully straighten them.



- ( ) U301: LM376N IC (#442-24).
- ( ) Check all of the ICs for the proper type and installation.

Set the power supply assembly aside until it is called for later.

## MAIN CIRCUIT BOARD

### PARTS LIST

Remove the parts from Pack 3 and check each part against the following list. The key numbers correspond to the numbers on the "Main Circuit Board Parts Pictorial." Return any part that is in an individual envelope back into the envelope after you have identified it until that part is called for in a step. Do not throw away any packing material until you account for all the parts.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of this Manual.

A replacement part may look slightly different than the original part, or may have different printing on it. In any case, the performance of the replacement part will meet or exceed the requirements of the original part. For example: A 15-volt capacitor (10  $\mu$ F, 15 V) may be replaced with a 25-volt capacitor 10  $\mu$ F, 25 V).

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

##### Ceramic (disc)

A1	21-3	1	10 pF (10K, or 100)	C418
A1	21-36	1	.002 $\mu$ F (201)	C444

##### Electrolytic

A2	25-900	1	1 $\mu$ F	C407
A2	25-879	5	4.7 $\mu$ F	C409, C410, C411, C413, C414
A2	25-917	1	10 $\mu$ F	C415
A2	25-927	1	22 $\mu$ F	C420
A3	25-984	1	1 $\mu$ F (105) tantalum	C408

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

A4	27-129	1	.047 $\mu$ F (473)	C406
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##### Polystyrene

A5	29-67	1	.01 $\mu$ F (103)	C401
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#### RESISTOR PACKS — CONTROLS

B1	9-128	1	10 k $\Omega$ (103) resistor pack	RP402
B2	9-185	1	150 k $\Omega$ (154) resistor pack	RP401
B3	10-1153	1	1000 $\Omega$ , 1/2-watt control	R414
B4	10-1141	3	1000 (1K) $\Omega$ , 3/4-watt control	R407, R425, R424
B4	10-1138	6	10 k $\Omega$ control	R433, R434, R435, R456, R457, R458
B3	10-1200	1	50 k $\Omega$ , 1/2-watt control	R413

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### TRANSISTORS — INTEGRATED CIRCUITS (ICs)

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

1. Part number.
2. Type number. (For integrated circuits this refers only to the numbers and letters shown in **BOLD** print. Disregard any other numbers or letters shown on the IC.)
3. Part number and type number.
4. Part number with a type number other than the one shown.

**CAUTION:** Some of the integrated circuits can be easily damaged by static electricity. DO NOT remove ICs that are installed in conductive foam pads until you

C2	417-235	2	2N4121	Q401, Q415
C2	417-801	12	MPSA20	Q402, Q403, Q405 - Q414
C2	417-885	1	MPSA65	Q404
C3	442-602	2	LM324N	U404, U402
C3	442-707	1	LF353N	U403
C3	442-744	2	CD4066	U405, U407
C3	442-801	1	TLC555	U401
C3	443-818	1	74LS05	U406
C3	443-1308	1	74HC04	U408
C3	443-1311	1	74HC138	U417
C3	443-1319	1	74HC139	U419
C3	443-1362	2	74HC377	U410, U411

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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C3	443-1390	1	74HC365	U421
C3	443-1391	1	74HC366	U409
C3	443-1392	1	84C00	U420
C3	443-1393	1	84C30	U412
C3	443-1422	1	5565PL-15	U416
C3	444-475	1	Available only from Heath	U418

### PLUGS — SOCKETS

D1	432-1171	2	2-pin plug
D2	432-1102	2	3-pin plug
D3	432-1281	1	7-pin plug
D4	432-1268	1	8-pin plug
D5	432-1073	2	10-pin plug
D6	432-1074	2	10-hole right-angle connector
D7	434-230	2	8-pin IC socket
D7	434-298	6	14-pin IC socket
D7	434-299	4	16-pin IC socket
D7	434-311	2	20-pin IC socket
D7	434-312	3	28-pin IC socket
D7	434-253	1	40-pin IC socket

### MISCELLANEOUS

E1	150-262	1	2.4576 MHz crystal oscillator	Y401
E2	473-29	1	Speaker	L401
E3	442-786	1	Pressure transducer	A401
E4	9-165	1	Thermistor	R412B

### PART FROM FINAL PACK

85-3113	1	Main circuit board
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## TAPED COMPONENTS

The remaining parts are supplied on taped strips. It is not necessary to check them against the following list.

HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
<b>RESISTORS</b>			
All 5% resistors have four color bands (last band gold). The fourth band is a tolerance band and will not be called out.			
All 1/4% and 1% resistors have five color bands. The fifth band is a tolerance band set apart from the other bands and will not be called out.			
All resistors are rated at 1/4-watt unless specified otherwise.			
6-229-12	1	2.2 Ω (red-red-gld)	R498
6-470-12	1	47 Ω (yel-viol-blk)	R499
6-101-12	1	100 Ω (brn-blk-brn)	R463
6-1500-12	1	150 Ω, 1% (brn-grn-blk-blk)	R426
6-181-12	1	180 Ω (brn-gry-brn)	R489
6-271	1	270 Ω, 1/2-watt (red-viol-brn)	R427
6-331-12	1	330 Ω (org-org-brn)	R401
6-391	1	390 Ω, 1/2-watt (org-wht-brn)	R477
6-4990-12	1	499 Ω, 1% (yel-wht-wht-blk)	R412A
6-8060-12	3	806 Ω, 1% (gry-blk-blu-blk)	R405A, R421, R422
6-102-12	5	1000 Ω (brn-blk-red)	R402, R459, R464, R465, R484
6-152-12	1	1500 Ω (brn-grn-red)	R462
6-2001-12	1	2000 Ω, 1% (red-blk-blk-brn)	R405C
6-222-12	2	2200 Ω (red-red-red)	R466, R503
6-242-12	1	2400 Ω (red-yel-red)	R469
6-2551-12	1	2550 Ω, 1% (red-grn-grn-brn)	R408
6-3011-12	1	3010 Ω, 1% (org-blk-brn-brn)	R412C
6-332-12	2	3300 Ω (org-org-red)	R460, R461
6-3831-12	1	3830 Ω, 1% (org-gry-org-brn)	R405B
6-472-12	6	4700 Ω (yel-viol-red)	R493, R495, R497, R491, R501, R502
6-512-12	1	5100 Ω (gm-brn-red)	R487
6-622-12	2	6200 Ω (blu-red-red)	R428, R430
6-822-12	1	8200 Ω (gry-red-red)	R442
6-9091-12	1	9090 Ω, 1% (wht-blk-wht-brn)	R475
6-912-12	2	9100 Ω (wht-brn-red)	R429, R431
6-103-12	15	10 kΩ (brn-blk-org)	R419, R432, R467, R480, R481, R482, R483, R492, R494, R496, R504, R505, R506, R507, R508

HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
6-1212-12	4	12.1 kΩ, 1% (brn-red-brn-red)	R440, R448, R449, R454
6-153-12	2	15 kΩ (brn-grn-org)	R443, R468
6-1502-12	1	15 kΩ, 1% (brn-grn-blk-red)	R406
6-1542-12	6	15.4 kΩ, 1% (brn-grn-yel-red)	R403, R404, R415 - R418
6-2002-12	2	20 kΩ, 1% (red-blk-blk-red)	R438, R453
6-2102-12	2	21 kΩ, 1% (red-brn-blk-red)	R444, R446
6-2372-12	5	23.7 kΩ, 1% (red-org-viol-red)	R436, R437, R451, R452, R472
6-3162-12	1	31.6 kΩ, 1% (org-brn-blu-red)	R471
6-3832-12	3	38.3 kΩ, 1% (org-gry-org-red)	R423, R445, R447
6-5622-12	1	56.2 kΩ, 1% (gm-blu-red-red)	R470
6-823-12	1	82 kΩ (gry-red-org)	R500
6-104-12	2	100 kΩ (brn-blk-yel)	R485, R490
6-204-12	3	200 kΩ (red-blk-yel)	R455, R476, R479
2-767-12	4	250 kΩ, 1/4% (red-grn-blk-org)	R409, R410, R411, R420
6-225-12	1	2.2 MΩ (red-red-grn)	R488
6-106-12	2	10 MΩ (brn-blk-blu)	R439, R441

## CAPACITORS

### Axial-Lead Ceramic

21-773	4	470 pF (471)	C447 - C450
21-786	28	.1 μF (104)	C402 - C405, C412, C416, C417, C419, C421 - C428, C434 - C443, C445, C446

## DIODES

56-56	2	1N4149	D404, D405
56-91	1	1N823A	D401
57-65	1	1N4002	D402

## STEP-BY-STEP ASSEMBLY

Refer to Pictorial 3-1 for the following steps.

- ( ) Position the main circuit board with the component side as shown.
- ( ) Tape the component strips onto the "Main Circuit Board" sections of the Taped Components Chart.

### Section 1

NOTE: You will install a resistor at R412 later on.

Install 250 k $\Omega$ , 1/4% (red-grn-blk-org) resistors at the following three locations:

- ( ) R411.
- ( ) R410.
- ( ) R409.
- ( ) R408: 2550  $\Omega$ , 1% (red-grn-grn-brn) resistor.
- ( ) R406: 15 k $\Omega$ , 1% (brn-grn-blk-red) resistor.

NOTE: You will install R405 later.

- ( ) R404: 15.4 k $\Omega$ , 1% (brn-grn-yel-red) resistor.
- ( ) R403: 15.4 k $\Omega$ , 1% (brn-grn-yel-red) resistor.
- ( ) R402: 1000  $\Omega$  (brn-blk-red) resistor.
- ( ) R401: 330  $\Omega$  (org-org-brn) resistor.

Install .1  $\mu$ F (104) axial-lead ceramic capacitors at the following four locations:

- ( ) C405.
- ( ) C404.
- ( ) C403.
- ( ) C402.
- ( ) R427: 270  $\Omega$ , 1/2-watt (red-viol-brn) resistor.
- ( ) R426: 150  $\Omega$ , 1% (brn-grn-blk-blk) resistor.
- ( ) R423: 38.3 k $\Omega$ , 1% (org-gry-org-red) resistor.

- ( ) R422: 806  $\Omega$ , 1% (gry-blk-blu-blk) resistor.
- ( ) R421: 806  $\Omega$ , 1% (gry-blk-blu-blk) resistor.
- ( ) R420: 250 k $\Omega$ , 1/4% (red-grn-blk-org) resistor.
- ( ) R419: 10 k $\Omega$  (brn-blk-org) resistor.

Install 15.4  $\Omega$ , 1% (brn-grm-yel-red) resistors at the following four locations:

- ( ) R418.
- ( ) R417.
- ( ) R416.
- ( ) R415.
- ( ) Solder the leads to the foil and cut off the excess lead lengths.

### Section 2

- ( ) D401: 1N823A (#56-91) diode.
- ( ) R432: 10 k $\Omega$  (brn-blk-org) resistor.
- ( ) R431: 9100  $\Omega$  (wht-brn-red) resistor.
- ( ) R430: 6200  $\Omega$  (blu-red-red) resistor.
- ( ) R429: 9100  $\Omega$  (wht-brn-red) resistor.
- ( ) R428: 6200  $\Omega$  (blu-red-red) resistor.
- ( ) D403: Cut a 1" bare wire and install it here.
- ( ) R449: 12.1 k $\Omega$ , 1% (brn-red-brn-red) resistor.
- ( ) R448: 12.1 k $\Omega$ , 1% (brn-red-brn-red) resistor.
- ( ) R447: 38.3 k $\Omega$ , 1% (org-gry-org-red) resistor.
- ( ) R446: 21 k $\Omega$ , 1% (red-brn-blk-red) resistor.
- ( ) R445: 38.3 k $\Omega$ , 1% (org-gry-org-red) resistor.
- ( ) R444: 21 k $\Omega$ , 1% (red-brn-blk-red) resistor.

- ( ) D402: 1N4002 (#57-65) diode.
  - ( ) C412: .1  $\mu$ F (104) axial-lead ceramic capacitor.
  - ( ) R443: 15 k $\Omega$  (brn-grn-org) resistor.
  - ( ) R442: 8200  $\Omega$  (gry-red-red) resistor.
  - ( ) R441: 10 M $\Omega$  (brn-blk-blu) resistor.
  - ( ) R440: 12.1 k $\Omega$ , 1% (brn-red-brn-red) resistor.
  - ( ) R439: 10 M $\Omega$  (brn-blk-blu) resistor.
  - ( ) R438: 20 k $\Omega$ , 1% (red-blk-blk-red) resistor.
  - ( ) R437: 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor.
  - ( ) R436: 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor.
  - ( ) R455: 200 k $\Omega$  (red-blk-yel) resistor.
  - ( ) R454: 12.1 k $\Omega$ , 1% (brn-red-brn-red) resistor.
  - ( ) R453: 20 k $\Omega$ , 1% (red-blk-blk-red) resistor.
  - ( ) R452: 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor.
  - ( ) R451: 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor.
  - ( ) R464: 1000  $\Omega$  (brn-blk-red) resistor.
  - ( ) R463: 100  $\Omega$  (brn-blk-brn) resistor.
  - ( ) R462: 1500  $\Omega$  (brn-grn-red) resistor.
  - ( ) R461: 3300  $\Omega$  (org-org-red) resistor.
  - ( ) R460: 3300  $\Omega$  (org-org-red) resistor.
  - ( ) Solder the leads to the foil and cut off the excess lead lengths.
  - ( ) C421: .1  $\mu$ F (104) axial-lead ceramic capacitor.
  - ( ) R468: 15 k $\Omega$  (brn-grn-org) resistor.
  - ( ) R467: 10 k $\Omega$  (brn-blk-org) resistor.
  - ( ) R466: 2200  $\Omega$  (red-red-red) resistor.
  - ( ) R465: 1000  $\Omega$  (brn-blk-red) resistor.
- Install .1  $\mu$ F (104) axial-lead ceramic capacitors at the following four locations:
- ( ) C419.
  - ( ) C424.
  - ( ) C423.
  - ( ) C422.
  - ( ) R469: 2400  $\Omega$  (red-yel-red) resistor.
  - ( ) C426: .1  $\mu$ F (104) axial-lead ceramic capacitor.
  - ( ) R472: 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor.
  - ( ) R471: 31.6 k $\Omega$ , 1% (org-brn-blu-red) resistor.
  - ( ) R470: 56.2 k $\Omega$ , 1% (grn-blu-red-red) resistor.
  - ( ) C425: .1  $\mu$ F (104) axial-lead ceramic capacitor.
  - ( ) Solder the leads to the foil and cut off the excess lead lengths.

### Section 3

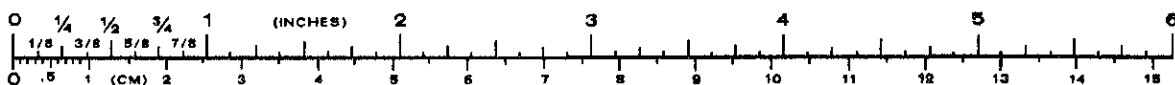
- ( ) C417: .1  $\mu$ F (104) axial-lead ceramic capacitor.
- ( ) C416: .1  $\mu$ F (104) axial-lead ceramic capacitor.
- ( ) R459: 1000  $\Omega$  (brn-blk-red) resistor.

### Section 4

- ( ) R476: 200 k $\Omega$  (red-blk-yel) resistor.
- ( ) R475: 9090  $\Omega$ , 1% (wht-blk-wht-brn) resistor.
- ( ) D405: 1N4149 (#56-56) diode.
- ( ) D404: 1N4149 (#56-56) diode.

Install .1  $\mu$ F axial-lead ceramic capacitors at the following seven locations:

- ( ) C427. Make sure you use the correct mounting holes.
- ( ) C428.
- ( ) C435.



- ( ) C434.
- ( ) C438.
- ( ) C437.
- ( ) C436.
- ( ) R477: 390  $\Omega$ , 1/2-watt (org-wht-brn) resistor.

NOTE: If you purchased the optional RS-232 accessory, you will install the optional parts within the dotted-in area later on.

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

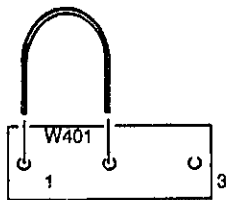
### Section 5

Install .1  $\mu$ F axial-lead ceramic capacitors at the following four locations:

- ( ) C440.
- ( ) C439.
- ( ) C441.
- ( ) C442.

Install 10 k $\Omega$  (brn-blk-org) resistors at the following four locations:

- ( ) R483.
- ( ) R482.
- ( ) R481.
- ( ) R480.
- ( ) C443: .1  $\mu$ F (104) axial-lead ceramic capacitor.
- ( ) R479: 200 k $\Omega$  (red-blk-yel) resistor.
- ( ) Cut two 1" pieces of bare wire and use them where bare wires are called for in the following steps.
- ( ) W401: Form a "U" in a bare wire to fit the hole spacing between hole 1 and the center hole as shown.
- ( ) C445: .1  $\mu$ F (104) axial-lead ceramic capacitor.



- ( ) R490: 100 k $\Omega$  (brn-blk-yel) resistor.
- ( ) R489: 180  $\Omega$  (brn-gry-brn) resistor.
- ( ) R488: 2.2 M $\Omega$  (red-red-gm) resistor.
- ( ) R487: 5100  $\Omega$  (gm-brn-red) resistor.
- ( ) R486: Use the other bare wire at this location.
- ( ) R485: 100 k $\Omega$  (brn-blk-yel) resistor.
- ( ) R484: 1000  $\Omega$  (brn-blk-red) resistor.
- ( ) Solder the leads to the foil and cut off the excess lead lengths. NOTE: Do not forget to solder the two bare wires to the foil.

### Section 6

- ( ) C446: .1  $\mu$ F (104) axial-lead ceramic capacitor.
- ( ) R503: 2200  $\Omega$  (red-red-red) resistor.
- ( ) R502: 4700  $\Omega$  (yel-viol-red) resistor.
- ( ) R501: 4700  $\Omega$  (yel-viol-red) resistor.
- ( ) R500: 82 k $\Omega$  (gry-red-org) resistor.
- ( ) R499: 47  $\Omega$  (yel-viol-blk) resistor.
- ( ) R498: 2.2  $\Omega$  (red-red-gld) resistor.
- ( ) R497: 4700  $\Omega$  (yel-viol-red) resistor.
- ( ) R496: 10 k $\Omega$  (brn-blk-org) resistor.
- ( ) R495: 4700  $\Omega$  (yel-viol-red) resistor.
- ( ) R494: 10 k $\Omega$  (brn-blk-org) resistor.
- ( ) R493: 4700  $\Omega$  (yel-viol-red) resistor.
- ( ) R492: 10 k $\Omega$  (brn-blk-org) resistor.
- ( ) R491: 4700  $\Omega$  (yel-viol-red) resistor.



- ( ) R504: 10 kΩ (brn-blk-org) resistor.
- ( ) R508: 10 kΩ (brn-blk-org) resistor.
- ( ) C450: 470 pF (471) axial-lead ceramic capacitor.
- ( ) R507: 10 kΩ (brn-blk-org) resistor.
- ( ) C449: 470 pF (471) axial-lead ceramic capacitor.
- ( ) R506: 10 kΩ (brn-blk-org) resistor.
- ( ) C448: 470 pF (471) axial-lead ceramic capacitor.
- ( ) R505: 10 kΩ (brn-blk-org) resistor.
- ( ) C447: 470 pF (471) axial-lead ceramic capacitor.
- ( ) Solder the leads to the foil and cut off the excess lead lengths.

Refer to Pictorial 3-2 for the following steps.

### Section 1

Install IC sockets at the following locations. After you install a socket, solder the pins to the foil as you did on the previous power supply circuit board.

- ( ) 8-pin IC socket at U403.
- ( ) 14-pin IC socket at U402.
- ( ) 8-pin IC socket at U401.

### Section 2

- ( ) 14-pin IC socket at U406.
- ( ) 16-pin IC socket at U409.
- ( ) 20-pin IC socket at U411.

Install 14-pin IC sockets at the following four locations:

- ( ) U408.
- ( ) U404.
- ( ) U405.
- ( ) U407.

- ( ) 20-pin IC socket at U410.

### Section 3

- ( ) 28-pin IC socket at U412.

NOTE: U414 is an optional part and will not be installed at this time.

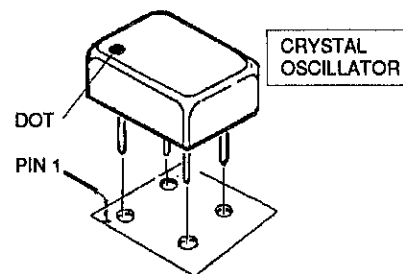
- ( ) 28-pin IC socket at U416.
- ( ) 28-pin IC socket at U418.
- ( ) 40-pin IC socket at U420.

Install 16-pin IC sockets at the following three locations:

- ( ) U421.
- ( ) U417.
- ( ) U419.

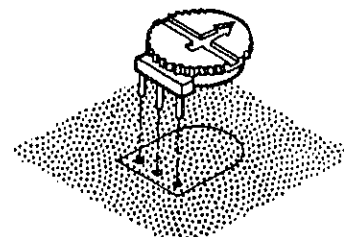
NOTE: IC sockets U413 and U415 are optional parts and are not installed at this time.

- ( ) Y401: Install the 2.4576 MHz crystal oscillator with the dot on the case top at the pin "1" location shown on the circuit board.



### Section 1

NOTE: When you install each of the following controls, insert the pins into the holes and press the body flat against the circuit board. Then solder the pins to the foil and cut off the excess lead lengths.



Install 1000 Ω (1K) controls at the following three locations:

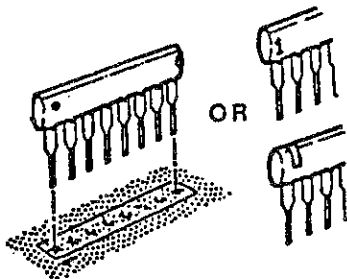
- ( ) R407.
- ( ) R425.
- ( ) R424.

Install 10 kΩ controls at the following six locations:

- ( ) R435.
- ( ) R434.
- ( ) R433.
- ( ) R458.
- ( ) R457.
- ( ) R456.

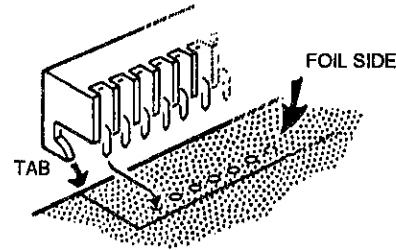
**Section 2**

NOTE: When you install a resistor pack, always position the index mark (dot, line, or number) at the end of the body towards the number "1" shown on the circuit board. Solder each resistor pack to the foil after you install it.



- ( ) RP402: 10 kΩ (103) resistor pack.
- ( ) RP401: 150 kΩ (154) resistor pack.
- ( ) Turn the circuit board over so the foil side faces up with socket outlines at S401 and S402 facing the bottom.

NOTE: When you mount the following 10-pin edge connector sockets, hook the socket tabs over the end of the circuit board and press down carefully on the body to fully seat the pins into their holes on the **FOIL SIDE** of the board. Then solder the pins to the foil on the component side.

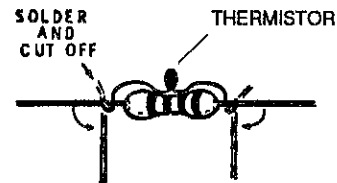


- ( ) S401: 10-pin edge connector socket.
- ( ) S402: 10-pin edge connector socket in Section 3.

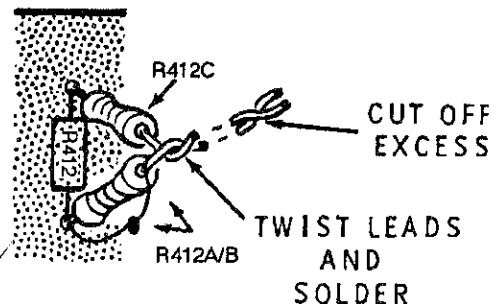
Refer to Pictorial 3-3 for the following steps.

**Section 1**

- ( ) Turn the circuit board over and position it as shown.
- ( ) Locate the thermistor (#9-165) and bend the leads around the leads of a 499Ω, 1% (yel-wht-wht-blk) resistor, keeping the thermistor body against the resistor body as shown. Then solder the leads together and cut off the excess thermistor leads as shown. Save one of the cutoff leads for use later.



- ( ) Wrap one lead of the 3010 Ω, 1% (org-blk-brn-brn) resistor around one lead of the 499 Ω resistor/thermistor combination as shown and solder the leads together.

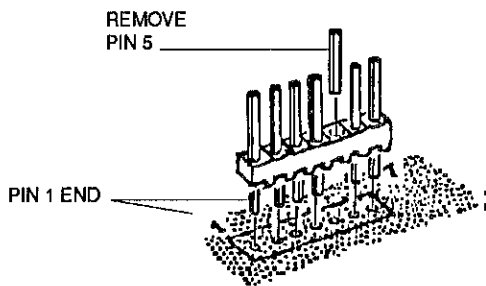


- ( ) R412A/B/C: Insert the 499Ω resistor/thermistor combination lead and the 3010 Ω resistor lead into the circuit board holes at R412 as shown.

- ( ) C401: .01  $\mu$ F (103) polystyrene capacitor.

NOTE: Install the following plugs with the shorter pins in the circuit board holes and the body flat against the board. Solder the pins to the foil after you install each plug.

- ( ) P401: 2-pin plug.
- ( ) P404: 3-pin plug.
- ( ) P403: 3-pin plug.
- ( ) P402: 2-pin plug.
- ( ) Locate a 7-pin plug and, starting at either end, remove pin 5 from the body to make a 6-pin plug. Discard the pin.

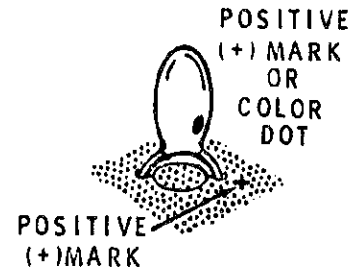


- ( ) P405: 6-pin plug. Make sure to position the pin 1 end next to the "1" shown on the board.

NOTE: Be sure to position each control as directed in each step and as shown in the illustration. Keep the controls flat against the board and solder the pins to the foil after you install each one. Then cut off the excess pin lengths.

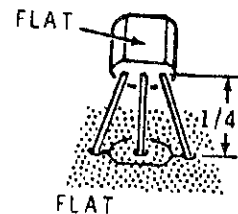
- ( ) R413: 50  $k\Omega$  control. Install the control with the screw toward the top of the board.
- ( ) R414: 1000  $\Omega$  control. Install the control with the screw positioned as shown.
- ( ) C406: .047  $\mu$ F Mylar capacitor.
- ( ) C409: 4.7  $\mu$ F electrolytic capacitor. Remember to install the negative lead in the negative-marked hole, and the positive lead in the positive-marked hole.

NOTE: Before you install the following tantalum electrolytic capacitor, look at it and identify the leads. One lead will have a positive (+) mark or a color dot near it on the side of the capacitor. Be sure to install the the lead with the positive mark near it in the positive-marked circuit board hole.



- ( ) C408: 1  $\mu$ F tantalum electrolytic capacitor (#25-984).
- ( ) C407: 1  $\mu$ F electrolytic capacitor (#25-900).
- ( ) C410: 4.7  $\mu$ F electrolytic capacitor.
- ( ) C411: 4.7  $\mu$ F electrolytic capacitor.
- ( ) Solder the leads to the foil and cut off the excess lead lengths.

NOTE: Whenever you install a transistor, as in the following step, position it so the flat side is over the flat of the outline on the circuit board, as shown. Then insert the leads into their circuit board holes and position the bottom of the case 1/4" above the board. Bend the transistor leads out slightly on the foil side of the board to hold it in place. Solder the leads to the foil and cut off the excess lead lengths.

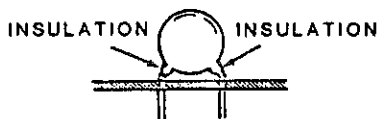


- ( ) Q401: 2N4121 (#417-235) transistor.
- ( ) Q402: MPSA20 (#417-801) transistor.
- ( ) Q403: MPSA20 (#417-801) transistor.
- ( ) Q404: MPSA65 (#417-885) transistor.

## Section 2

- ( ) Locate a 10-pin plug and remove pin 2 at either end to make a 9-pin plug.
- ( ) P406: 9-pin plug. Make sure to position the pin 1 end next to the "1" shown on the board.
- ( ) P407: 8-pin plug.

NOTE: When you mount ceramic capacitors in the following steps, do not push the leads all the way through the circuit board holes. The leads have a coating of insulation that may keep you from making a good solder connection.



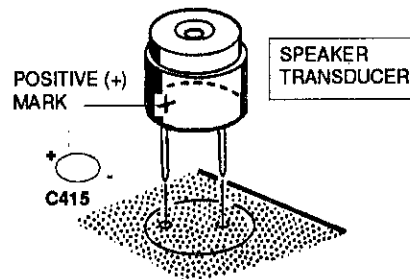
- ( ) C418: 10 pF (10K) disk ceramic capacitor.
- ( ) Q405: MPSA20 (#417-801) transistor.
- ( ) Q406: MPSA20 (#417-801) transistor.
- ( ) C415: 10  $\mu$ F electrolytic capacitor.
- ( ) C414: 4.7  $\mu$ F electrolytic capacitor.
- ( ) C413: 4.7  $\mu$ F electrolytic capacitor.
- ( ) C420: 22  $\mu$ F electrolytic capacitor. Make sure you use the correct mounting holes.
- ( ) Q407: MPSA20 (#417-801) transistor.
- ( ) Q408: MPSA20 (#417-801) transistor.
- ( ) Solder the leads to the foil and cut off the excess lead lengths.

## Section 3

- ( ) Q410: MPSA20 (#417-801) transistor.
- ( ) Q409: MPSA20 (#417-801) transistor.
- ( ) C444: .002  $\mu$ F disk ceramic capacitor.
- ( ) Q415: 2N4121 (#417-235) transistor.

Install MPSA20 (#417-801) transistors at the following four locations:

- ( ) Q414.
- ( ) Q413.
- ( ) Q412.
- ( ) Q411.
- ( ) Locate a 10-pin plug and remove pin 4 at either end of the body to make a 9-pin plug.
- ( ) P409: 9-pin plug. Position the pin 1 end next to the "1" shown on the board.
- ( ) L401: Mount the speaker transducer in Section 2 with the positive (+) marking on the body next to capacitor C415. Insert the pins into the circuit board holes and solder them to the foil. Cut off any excess pin lengths.



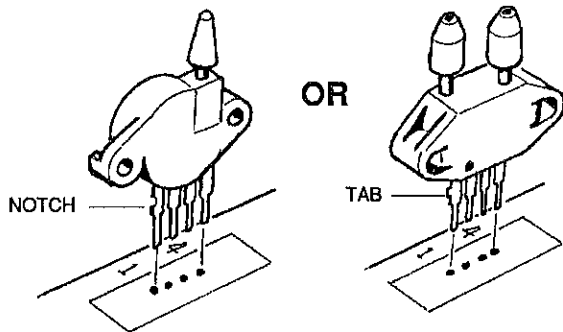
- ( ) If protective foil has been installed on the top of the speaker transducer, peel it off.

## Section 1

- ( ) Refer to the inset drawing and connect and solder the leads of the 806  $\Omega$ , 1% (gry-blk-blu-blk) resistor, a 3830  $\Omega$ , 1%, (org-gry-org-brn) resistor, and a 2000  $\Omega$ , 1% (red-blk-blk-brn) resistor together in the order shown. Cut off only the indicated leads once the solder cools.
- ( ) Refer again to the inset drawing and connect and solder the ends of the cutoff thermistor lead you set aside earlier to the 806  $\Omega$  resistor leads as shown.
- ( ) R405A/B/C: Refer again to the inset drawing and install the leads of the 3-resistor assembly at R405 as shown.



- ( ) A401: Mount the pressure transducer (#442-786) to the circuit board so the notched or tabbed pin (depending on your type of transducer) is at the "1" location shown on the circuit board. Insert the pins into the circuit board holes as far as they will go and solder them to the foil. Cut off the excess pin lengths. Keep the transducer body perpendicular to the board.



## CIRCUIT BOARD CHECKOUT

Carefully inspect the circuit board for the following possible problems:

- ( ) Unsoldered connections.
- ( ) Poor solder connections.
- ( ) Solder bridges between foil patterns. NOTE: Refer to the "X-Ray Views" if you are uncertain and want to see the correct foil patterns.
- ( ) Protruding leads which could touch together or short to the chassis when the circuit board is mounted later.

Refer to the illustrations where the parts were installed as you make the following visual checks:

- ( ) Transistors for the proper type and installation.
- ( ) Diodes for the proper type and positioning of the banded end.
- ( ) Electrolytic capacitors for the correct position of the positive (+) or negative (-) markings.

## IC INSTALLATION

Refer to Pictorial 3-4 for the following steps.

### Section 1

Install ICs at the following circuit board IC socket locations. If necessary, refer back to the IC installation procedure on Pages 2-6 and 2-7 before you install the ICs.

- ( ) U403: LF353N IC (#442-707).
- ( ) U402: LM324N IC (#442-602).
- ( ) U401: TLC555 IC (#442-801).
- ( ) U406: 74LS05 IC (#443-818).
- ( ) U409: 74HC366 IC (#443-1391).
- ( ) U411: 74HC377 IC (#443-1362).
- ( ) U408: 74HC04 IC (#443-1308).
- ( ) U404: LM324N IC (#442-602).
- ( ) U405: CD4066 IC (#442-744).
- ( ) U407: CD4066 IC (#442-744).
- ( ) U410: 74HC377 IC (#443-1362).

### Section 2

- ( ) U412: 84C30 IC (#443-1393).

NOTE: U414 is an optional part and will not be installed at this time.

- ( ) U416: 5565PL-15 IC (#443-1422).
- ( ) U418: #444-475 programmed ROM IC (available only from Heath).
- ( ) U420: 84C00 IC (#443-1392).
- ( ) U421: 74HC365 IC (#443-1390).

NOTE: U413 and U415 are optional parts and will not be installed at this time.

( ) U417: **74HC138** IC (#443-1311).

( ) U419: **74HC139** IC (#443-1319).

( ) Recheck each IC for the proper type and installation.

This completes the circuit board assembly. If you have purchased the RS-232 option with the Weather Computer, refer to the manual for that kit and install it at this time. When you complete the assembly, return to this Manual. If you did not purchase the option, set the circuit board assembly aside until it is called for later.

## CHASSIS

### PARTS LIST

Remove the remaining parts from the carton and check each part against the following list. The key numbers correspond to the numbers on the "Chassis Parts Pictorial." Return any part that is in an individual envelope back into the envelope after you have identified it until that part is called for in a step. Do not throw away any packing material until you account for all the parts.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit. If a Parts Order Form is not available, refer to "Replacement Parts" inside the rear cover of this Manual.

A replacement part may look slightly different than the original part, or may have different printing on it. In any case, the performance of the replacement part will meet or exceed the requirements of the original part. For example: A 15-volt capacitor (10  $\mu$ F, 15 V) may be replaced with a 25-volt capacitor 10  $\mu$ F, 25 V).

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

A1	6-102-12	1	1000 $\Omega$ , 1/4-watt, 5% (brn-blk-red) resistor	R2
A1	6-224-12	1	220 k $\Omega$ , 1/4-watt, 5% (red-red-yel) resistor	Test
A2	6-225	1	2.2 M $\Omega$ , 1/2-watt, 5% (red-red-grn) resistor	R1
A3	21-71	2	.001 $\mu$ F (102K), 1.4KV ceramic capacitor	C2, C3
A4	21-769	1	.01 $\mu$ F (103) axial-lead ceramic capacitor	C11
A4	21-786	12	.1 $\mu$ F (104) axial-lead ceramic capacitor	C4 - C9, C12 - C15, C17, C18
A4	21-811	2	.33 $\mu$ F (334) axial-lead ceramic capacitor	C10, C16
A5	27-236	1	.068 $\mu$ F (683) Mylar capacitor	C1

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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#### LIGHT EMITTING DIODE (LED) — TRANSISTOR

A6	412-635	5	Infrared LED	D601 - D605
A6	417-919	5	TIL-78 transistor	Q601 - Q605

#### CHOKES — TRANSFORMER

B1	45-611	1	RF choke	LX1
B2	54-1059	1	Power transformer	T1

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### CIRCUIT BOARDS — ASSEMBLY

85-3235	1	Keyboard circuit board
85-1982-1	4	Wind sensor circuit board
150-324	1	Display driver assembly - circuit board #85-3177-01

### HARDWARE

Hardware is shown full size in the Parts Pictorial so you can place any screw, nut, etc., you are uncertain about over the illustration. The hardware may be packed in more than one envelope. Open all of the hardware envelopes before you check the screws, nuts, lock-washers, etc. against the Parts List.

Some hardware envelopes may be marked "SSTL," which means that it is a special stainless steel type. Make sure you place these parts back in their envelope when you finish checking them and do not mix them with any other hardware.

#### #4 Hardware

C1	250-1411	5	4-40 x 1/4" screw
C2	250-1489	2	4-40 x 1/4" flat-head screw
C3	250-1168	6	#4 x 1" stainless steel self-tapping screw
C4	252-2	5	4-40 nut
C5	254-9	7	#4 lockwasher

#### #6 Hardware

D1	250-1325	27	6-32 x 1/4" screw
D2	250-1428	8	6-32 x 1/4" stainless steel screw
D3	250-1280	21	6-32 x 3/8" screw
D4	250-1432	2	#6-AB x 3/8" self-tapping screw
D5	252-3	13	6-32 nut
D6	252-77	2	6-32 stainless steel nut
D7	252-80	1	6-32 cap nut
D8	253-96	2	#6 stainless steel flat washer
D9	253-35	2	#6 fiber flat washer
D10	253-127	4	#6 flat washer
D11	253-2	2	#6 fiber shoulder washer
D12	254-1	18	#6 lockwasher
D13	254-25	10	#6 stainless steel lockwasher
D14	255-735	8	6-32 x 9/16" spacer
D15	255-83	2	6-32 x 11/16" spacer
D16	255-129	4	6-32 x 1-1/2" spacer
D17	259-1	13	#6 solder lug

#### #8 Hardware

E1	250-1485	2	8-32 x 1/4" setscrew
E2	250-328	1	8-32 x 3/8" stainless steel screw

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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E3	250-1436	2	8-32 x 3/8" screw
E4	250-1405	2	8-18 x 1-1/2" screw
E5	252-4	2	8-32 nut
E6	254-2	2	#8 lockwasher
E7	253-42	2	#8 x 1/2" flat washer

### Other Hardware

F1	252-146	4	Push-on nut
F2	253-712	4	C-ring
F3	259-11	19	Spade lug

### TERMINAL STRIPS — CONNECTORS

G1	431-44	1	4-lug terminal strip
G2	431-7	4	6-lug screw-type terminal strip
G3	431-609	1	5-lug terminal strip w/fuse clips
G4	432-753	13	Large spring connector (includes one extra)
G5	432-1142	40	Small spring connector (includes one extra)
G6	432-1041	2	2-hole jumper connector
G7	432-1030	1	2-hole connector shell
G8	432-1183	1	5-hole connector shell
G9	432-1304	1	Small 7-hole connector shell
G10	432-822	1	Large 7-hole connector shell
G11	432-1150	1	8-hole connector shell
G12	432-958	3	10-hole connector shell
G13	432-798	1	Battery connector
G14	434-328	2	Lamp socket assembly

### WIRE — TUBING

340-8	4-3/4"	Bare wire
344-90	24"	Black wire
344-91	24"	Brown wire
344-92	27"	Red wire
344-93	24"	Orange wire
344-94	20-1/2"	Yellow wire
344-95	24"	Green wire
344-96	31-1/4"	Blue wire
344-97	20-1/2"	Violet wire
344-98	20-1/2"	Gray wire
344-99	9"	White wire
344-114	38-1/2"	White-brown wire
344-115	38-1/2"	White-red wire
344-116	38-1/2"	White-orange wire
344-158	6"	White-yellow wire
346-2	5"	Small clear tubing
346-90	10"	Medium clear tubing
346-60	1-1/2"	Large clear tubing

### WIND SENSOR PARTS

H1	142-737	1	Boom
H2	214-208-1	2	Top housing
H3	214-209-1	2	Bottom housing
H4	266-930	1	Wind vane



KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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### WIND SENSOR PARTS (Cont'd.)

H5	266-939	1	Wind cup	
H6	266-1200	1	Wind vane cap	
H7	266-943	1	Counterweight	
H8	266-1263-1	2	Encoder disc	
H9	453-282	2	1/8" x 3" shaft	
H10	455-643	4	Bearing	
H11	305-128	1	U-bracket assembly package consisting of:	
		1	U-bolt	
		2	Nuts	
		2	Brackets	
		2	End caps	

### SHEET METAL PARTS

J1	90-1400	1	Cabinet top	
J2	200-1570-1	1	Chassis	
J3	204-3192	1	Left support bracket	
J4	204-3193	1	Right support bracket	
J5	205-1823	1	29" x 1" metal strip	
J6	206-1537-1	1	Light shield	
J7	206-1538-1	1	Light shield cover	

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

K1	64-954	1	Keypad	
K2	73-53	2	Rubber grommet	
	73-92	1	3/4" x 5" double-stick foam tape	
K3	253-713	1	Neoprene rubber washer	
K4	73-43	1	Plastic grommet	
K5	75-736	1	Strain relief	
K6	89-54	1	Line cord	
K7	100-1728	1	10' indoor temperature probe assembly	A1
K7	100-1727	1	70' outdoor temperature probe assembly	A2
K8	208-48	1	Battery holder	
K9	260-92	3	Fuse clip	
K10	261-49	4	Foot	
K11	203-2385	1	Front panel	
K12	354-5	3	Cable tie	
K13	406-650	1	Thermometer	
K14	412-670	2	Fluorescent lamp*	LP1
K15	421-33	1	1/4-ampere slow-blow fuse	F1
K16	438-55	4	Polarizing plug	
K17	475-15	15	Small RF core	
K18	475-35	1	Large RF core	
K19	485-42	1	Rectangular plastic plug	
K20	490-6	1	Allen wrench	
	75-824	1	Insulating paper	

\* Heath Company supplies high quality parts with its products. The fluorescent lamp in your ID/IDW-5001 should last about 10 months if operated at full brightness. Not all fluorescent lamps available to you locally are of this high quality. Therefore, an extra lamp has been supplied with your kit.

(→) Loosely mount 6-32 x 11/16" spacers at N and O with 6-32 x 3/8" hardware. Whenever you install spacers, make sure you position the lockwashers between the spacer and the chassis as shown. You will tighten these spacers later.

(→) Remove a total of 2-3/4" of outer insulation from the lead end of the line cord. Be careful when you remove the outer insulation that you do not cut into the insulation of the three inner leads.

NOTE: When you are instructed to prepare a wire (or lead), as in the following step, cut it to the indicated length and remove the indicated length of insulation from the end(s). Then twist the fine wire strands tightly together and apply a small amount of solder to them (called "tinning") to hold them together.

(→) Cut the black line cord lead to 1-1/2" and prepare the end for 3/8".

(→) Prepare the wire ends of the other two line cord leads for 3/8".

(→) Position a strain relief 3" from the end of the two longer prepared line cord leads and clamp it over the wire with a pair of pliers. Then insert the lead end of the line cord into hole F from the outside of the chassis and press the strain relief into the hole until it seats against the shoulder.

## CHASSIS WIRING

Refer to Pictorial 4-2 for the following steps.

NOTE: In the following steps, (NS) means not to solder because other wires will be added later. "S-" with a number following it, such as (S-3), means to solder the connection. The number "-3" tells you that there are three wires and/or leads in the connection. This will allow you to check your work as you go.

Whenever you make a connection, soldered or not, always crimp the lead or wire around the lug to insure a good contact point, and then cut off the excess lead/wire lengths. You will not be instructed to do this each time you make a connection.

Connect one lead of a .1  $\mu$ F (104) axial-lead capacitor to each of the indicated lugs of terminal strip C in the following steps. Remember not to solder a lead unless you are instructed to do so in a step.

(→) C15: One lead to lug 6 (NS) and the other lead to solder lug K (NS).

(→) C14: One lead to lug 5 (NS) and the other lead to solder lug K (NS).

(→) C13: One lead to lug 4 (NS) and the other lead to solder lug K (NS).

(→) C12: One lead to lug 3 (NS) and the other lead to solder lug K (NS).

(→) C11: One lead of a .01  $\mu$ F (103) axial-lead ceramic capacitor to lug 2 (NS) and the other lead to solder lug K (S-5). NOTE: Make sure you solder all five leads to the solder lug.

(→) C10: Form the leads of a .33  $\mu$ F (334) axial-lead ceramic capacitor into a "U" and install the capacitor between terminal strip C lug 1 (NS) and the indicated solder lug (S-1).

(→) Refer to the inset drawing and solder lug 1 of terminal strip B to the adjacent solder lug. Use enough heat to make a good solder connection at both lugs and do not get any solder in the terminal strip lug hole.

(→) Similarly, solder lug 6 of terminal strip B to the adjacent solder lug.

Connect the following components to terminal strip B:

(→) C16: One lead of a .33  $\mu$ F (334) axial-lead ceramic capacitor to lug 1 (NS) and the other lead to lug 2 (NS).

(→) R2: One lead of a 1000  $\Omega$  (brn-blk-red) resistor to lug 1 (S-2) and the other lead to lug 3 (S-1).

(→) C18: One lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor to lug 5 (NS) and the other lead to lug 6 (NS).

(→) C17: One lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor to lug 4 (NS) and the other lead to lug 6 (NS).

- (✓) Solder lug 1 of terminal strip E to the adjacent solder lug. Do not get any solder in the terminal strip lug hole.
- (✓) Similarly, solder lug 6 of terminal strip E to the adjacent solder lug.

Connect the following components to terminal strip E:

- (✓) C9: One lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor to lug 1 (NS) and the other lead to lug 2 (NS).
- (✓) C8: One lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor to lug 1 (S-2) and the other lead to lug 3 (NS).
- (✓) C6: One lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor to lug 5 (NS) and the other lead to lug 6 (NS).
- (✓) C7: One lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor to lug 4 (NS) and the other lead to lug 6 (S-2).
- (✓) Solder lug 1 of terminal strip D to the adjacent solder lug. Do not get any solder in the terminal strip lug hole.
- (✓) Similarly, solder lug 6 of terminal strip D to the adjacent solder lug.

Connect the following components to terminal strip D:

- (✓) C4: One lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor to lug 1 (S-1) and the other lead to lug 2 (NS).
- (✓) C5: One lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor to lug 5 (NS) and the other lead to lug 6 (S-1).

Refer to Pictorial 4-3 for the following steps.

- ( ) Prepare the following lengths of wire. Remove 1/4" of insulation from one end and 1/8" of insulation from the other end and then tin the bare ends.

4" black  
5" brown  
5" red  
5" orange  
4" yellow  
4" green  
3" blue  
3" white

- (✓) Refer to inset drawing #1 and crimp and solder a small spring connector on the 1/8" end of each of the eight prepared wires. Use only a small amount of solder and do not allow solder to flow onto the spring portion of the connector.

Position 10-hole socket S409 with the slots facing up as shown, and insert the eight prepared wire spring connectors into the socket as instructed in the following steps. Be sure to position the connector tabs as shown in inset drawing #2. Push each connector into the socket hole until you hear a faint latching "click." Then gently pull on the wire to make sure the connector is locked in place.

NOTE: If it becomes necessary to remove a spring connector from the socket, insert a small screwdriver blade through the socket slot, press the tab on the connector down, and pull the wire and connector out of the socket hole.

- (✓) Black wire in hole 1.
- (✓) White wire in hole 2.
- (✓) Blue wire in hole 3.

NOTE: Holes 4 and 5 are not used.

- (✓) 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.
- (✓) Insert a polarizing plug into socket hole 4 with the small tab facing up as shown in the Pictorial.
- ( ) Slide a small RF core over the free end of each socket assembly wire.

Connect the free ends of the socket assembly wires to terminal strip C as follows. Form a small hook in the bare wire ends and then crimp the hooked end in the lug to hold the wire in place.

- (✓) Blue wire to lug 1 (NS).
- (✓) Green wire to lug 2 (S-2).
- (✓) Yellow wire to lug 3 (S-2).
- (✓) Orange wire to lug 4 (S-2).
- (✓) Red wire to lug 5 (S-2).
- ( ) Brown wire to lug 6 (S-2).

Connect the remaining socket assembly wires to terminal strip B as follows:

- (✓) White wire to lug 2 (S-2).
- (✓) Black wire to lug 4 (S-2).
- (✓) Cut a 9" blue wire and remove 1/4" of insulation from one end and 5/8" of insulation from the other.
- (✓) Connect the 1/4" prepared end of the 9" blue wire to terminal strip C lug 1 (S-3). Route the wire along the bottom of the chassis to terminal strip D and insert the end of the wire through lug 3 (S-2) to lug 4 (S-1).

NOTE: If you intend to mount the battery holder on the outside of the chassis, skip the next two steps. Otherwise, perform them.

Connect the battery connector wires to terminal strip B as follows:

- (✓) Red wire to lug 5 (NS).
- (✓) Black wire to lug 6 (S-3).
- (✓) If you intend to install the battery holder on the outside of the chassis, solder the two connections at lug 6 of terminal strip B.
- (✓) Prepare an 8" red wire in the same manner as you did for the previous eight socket assembly wires.
- (✓) Crimp and solder a small spring connector on the 1/8" prepared end of the 8" red wire.
- (✓) Position a 2-hole socket with the slots facing up and insert the connector on the 8" red wire into hole 2.
- (✓) Slide a small RF core over the free end of the 8" red wire.
- (✓) Connect the free end of the 8" red wire to terminal strip B lug 5 (S-3)(S-2 if you skipped the battery connector steps).
- (✓) Push the RF cores toward the terminal strips away from the socket. Then position the socket wires and the battery connector wires (if installed inside the unit) as shown and install a cable tie around them at a point 1" from the edge of the socket. Cut off the excess cable tie.
- (✓) Cut the following wires to 2-1/2" and prepare the ends for 1/4" and 1/8" as before:
  - Brown
  - Red
  - Yellow
  - Green
  - Blue
  - Violet
- (✓) Crimp and solder a small spring connector on the 1/8" prepared end of each wire.



Position 7-hole socket S405 with the slots facing up and insert the prepared wires into the holes as follows:

( ) ✓ Brown wire in hole 1.

( ) ✓ Red wire in hole 2.

NOTE: Hole 3 is not used.

( ) ✓ Yellow wire in hole 4.

( ) ✓ Green wire in hole 5.

( ) ✓ Blue wire in hole 6.

( ) ✓ Violet wire in hole 7.

( ) ✓ Insert a polarizing plug in hole 3 of the 7-hole socket.

( ) ✓ Slide a small RF core over the free end of each of the 7-hole socket assembly wires.

Connect the 7-hole socket assembly wires to terminal strip E as follows:

( ) ✓ Blue wire to lug 2 (S-2).

( ) ✓ Violet wire to lug 3 (S-2).

( ) ✓ Green wire to lug 4 (S-2).

( ) ✓ Yellow wire to lug 5 (S-2).

Connect the remaining socket assembly wires to terminal strip D as follows:

( ) ✓ Brown wire to lug 2 (S-2).

( ) ✓ Red wire to lug 5 (S-2).

( ) ✓ Move the RF cores near the terminal connections.

( ) ✓ Check the lugs at terminal strips B, C, D, and E and make sure that all of the connections are properly soldered. There should be no unsoldered connections.

NOTE: When you connect component leads to terminal strips G and H, make mechanically secure connections (see inset drawing #4). To make a connection

mechanically secure, form a hook in the bare end of the lead; then hook the bare end through the lug and crimp it securely in place.

( ) ✓ Connect the green line cord lead to solder lug J (S-1).

( ) ✓ Connect the black line cord lead to terminal strip G lug 1 (S-1).

( ) ✓ Connect the white line cord lead to terminal strip G lug 4 (NS).

( ) ✓ Position power transformer T1 with the black leads facing to the right as shown.

NOTE: Two sets of line voltage wiring instructions are given below, one for 120 VAC and the other for 240 VAC. In the U.S.A., 120 VAC is more common. **USE ONLY THE INSTRUCTIONS THAT AGREE WITH THE LINE VOLTAGE IN YOUR AREA.**

### 120 VAC Wiring

Refer to Detail 4-3A for the following steps.

( ) ✓ Connect the black and black-green leads to the bottom eyelet of lug 4 of terminal strip H (S-2) as shown in the inset drawing. Form a small loop in the bare wire ends to make a mechanical connection.

( ) ✓ Similarly, connect the black-yellow and black-red leads to the bottom eyelet of lug 2 (S-2) of terminal strip H. Make sure the bare wires do not contact the terminal strip mounting hardware.

### 240 VAC Wiring

Refer to Detail 4-3B for the following steps.

( ) ✓ Connect the black transformer lead to the bottom eyelet of lug 4 (S-1) of terminal strip H. Form a small loop in the bare wire end to make a mechanical connection as shown in the inset drawing.

- ( ) Connect the black-red transformer lead to the bottom eyelet of lug 2 (S-1) of terminal strip H. Make sure the bare wire does not contact the terminal strip hardware.
- ( ) Similarly, twist the black-green and black-yellow transformer leads together and connect them to terminal strip H lug 1 (S-2).

NOTE: Skip hole 4 for now.

- ( ) T1: Mount power transformer T1 to the chassis at T1 with 8-32 x 3/8" hardware.
- ( ) C1: Connect one lead of a .068  $\mu$ F Mylar capacitor to terminal strip G lug 3 (NS) and the other lead to lug 4 (NS).
- ( ) R1: Connect one lead of a 2.2 M $\Omega$ , 1/2-watt (red-red-grn) resistor to terminal strip G lug 4 (NS) and the other lead to solder lug I (S-1).
- ( ) C2: Connect one lead of a .01  $\mu$ F (102K), 1.4 kV ceramic capacitor to terminal strip H lug 2 (NS) and the other lead to lug 3 (NS).
- ( ) C3: Connect one lead of a .01  $\mu$ F (102K), 1.4 kV ceramic capacitor to terminal strip H lug 4 (NS) and the other lead to lug 3 (S-2).
- ( ) Cut the bare wire ends on the six red and green secondary transformer leads to 1/8".
- ( ) Refer to inset drawing #3 and crimp and solder a large spring connector on the end of each transformer lead.

- ( ) Either green lead in hole 3.
- ( ) Other green lead in hole 2.
- ( ) Green-yellow lead in hole 1.
- ( ) Cut a 5" black wire and prepare one end for 1/8" and the other for 1/4".
- ( ) Crimp and solder a large spring connector on the 1/8" end of the 5" black wire and connect and solder a #6 solder lug on other end.
- ( ) Insert the large spring connector on the end of the 5" black wire assembly into hole 4 of the secondary transformer socket S304. NOTE: You will mount the solder lug later.
- ( ) Refer to Detail 4-3C and note that there are two sets of white and yellow leads coming from the RF choke. Measure the leads from where they leave the choke body as shown and cut each one to 1"; then remove 1/4" of insulation from the lead ends.

NOTE: Make sure that you do not interchange the white and yellow choke leads in the following steps. Crimp each lead around the lug to make a mechanically secure connection.

Position large 7-hole socket S304 with the slots facing up as shown. Then insert the secondary transformer leads into the socket as follows. Note that the numbering is reversed from the other sockets.

- ( ) Red-yellow lead in hole 7.
- ( ) Either red lead in hole 6.
- ( ) Other red lead in hole 5.

- ( ) Connect the white wire from one set of choke leads to terminal strip G lug 3 (S-2) and the yellow lead to lug 4 (S-4). NOTE: Make sure that you solder all four leads at lug 4.
- ( ) Connect the yellow wire from the other set of choke leads to terminal strip H lug 4 (S-2) and the white wire to lug 2 (S-2). NOTE: The connections to the bottom eyelets of lugs 1 and 3 do not count in the solder steps.
- ( ) Refer to Part A of Detail 4-3D and prepare a 1-1/2" piece of large clear tubing as shown.



- ( ) F1: If you wired your unit for 120 VAC, insert the supplied 1/4-ampere slow-blow fuse into the sleeving as shown in Part B of Detail 4-3D and install it in the fuse clips on terminal strip G. If you wired your unit for 240 VAC, use a 1/8-ampere slow-blow fuse (not supplied). Make sure you support the terminal strip as you push the fuse into the clips.
- ( ) Locate the fuse replacement label (#390-2941). Write: "1/4-ampere slow-blow fuse" or "1/8-ampere slow-blow fuse" (whichever fuse you used) on the label.
- ( ) Remove the backing paper from the fuse replacement label and press the label onto the inside of the back panel at the indicated location.
- ( ) If you do not intend to install the optional RS-232 accessory, snap the rectangular plastic plug into the chassis back panel cutout. If you have purchased the optional RS-232 accessory kit, refer to that manual and mount the connector assembly to the back panel. When you have completed the mounting instructions, return to this Manual and proceed with the assembly.

Refer to Pictorial 4-4 for the following steps.

- ( ) Remove the display driver circuit board assembly from its protective bag. NOTE: Be careful when you handle the driver board, as static electricity could damage it.

NOTE: It will be easier and perhaps safer to have another person help you mount the display driver circuit board to the display circuit board in the following step. Be careful not to drop or bump the display.

- ( ) Refer to Detail 4-4A and position the display circuit board with the connectors over the edge of a table as shown. Use a piece of cardboard or something similar to protect the table surface. Start the three display driver circuit board tabs into the connectors and then press down firmly, first at one end, then the other, rocking back and forth until the tabs seat fully into the connectors. Be careful not to bend the driver board as you seat the tabs or you could break the connectors or crack the board.

Temporarily set the front panel/display assembly aside in a safe place.

- ( ) Locate one of the lamp socket assemblies. Cut the leads to 6" and prepare the ends for 1/4".
- ( ) Crimp and solder large spring connectors on the lamp socket assembly leads.
- ( ) Cut the remaining lamp socket assembly leads to 9" and prepare the ends for 1/4".
- ( ) Crimp and solder large spring connectors on the lamp socket assembly leads.

Refer to Detail 4-4B for the following steps.

- ( ) Position the light shield as shown and mount the prepared lamp socket assembly with 6" leads to the right side of the shield with a 6-32 x 1/4" screw and a #6 lockwasher. Keep the socket bracket toward the outside of the shield as far as possible and parallel to the shield cutout edges.
- ( ) Mount the other lamp socket assembly to the left side of the shield with a 6-32 x 1/4" screw and a #6 solder lug. Position the solder lug as shown with the socket positioned as in a previous step.
- ( ) Locate a 5-hole socket and position it with the slots facing up as shown.
- ( ) Insert either left lamp socket assembly lead in socket hole 5 and the other lead in hole 4.
- ( ) Insert either right lamp socket assembly lead in socket hole 1 and the other lead in hole 2.
- ( ) Cut an 8" black wire and remove 1/8" of insulation from one end and 1/4" from the other end.
- ( ) Crimp and solder a large spring connector on the 1/8" end of the prepared 8" black wire.
- ( ) Insert the spring connector on the end of the 8" black wire into hole 3 of the 5-hole lamp socket.
- ( ) Connect the free end of the 8" black wire to the left lamp socket solder lug (S-1).
- ( ) Mount the display assembly to the light shield assembly with four 6-32 x 1/4" screws and #6 lock-washers as shown.

Refer to Pictorial 4-4 for the following steps.

- ( ) Position the chassis assembly as shown.
- ( ) Mount the display driver assembly to spacers N and O with 6-32 x 3/8" screws and #6 lockwashers.
- ( ) Loosely mount the light shield to the chassis at P and Q with 6-32 x 3/8" screws. You will tighten the screws later.

Refer to Pictorial 4-5 for the following steps.

- ( ) Loosely mount 6-32 x 1-1/2" spacers to the chassis at R, S, and T with 6-32 x 3/8" hardware. Position the lockwashers at R, S, and T as shown.
- ( ) Loosely mount a 6-32 x 1-1/2" spacer at U with a 6-32 x 3/8" screw and the solder lug on the end of the black wire coming from the power transformer socket. Position the solder lug as shown.
- ( ) Mount the power supply circuit board to spacers R and S with 6-32 x 1/4" screws. Position the power transformer leads and other cables out of the way before you mount the board.
- ( ) Loosely mount the left support bracket to the power supply at T with a 6-32 x 3/8" screw, #6 fiber flat washer, and #6 fiber shoulder washer. Position the flat fiber washer between the bracket and the circuit board, and the shoulder washer between the screw and the bracket with the shoulder seated in the bracket hole.
- ( ) Similarly, loosely mount the right support bracket to the power supply at U with a 6-32 x 3/8" screw, a #6 fiber flat washer, and a #6 fiber shoulder washer. Make sure to seat the shoulder in the bracket hole.
- ( ) Move the rear panel cables out of the way. Then position the main circuit board as shown and, as you support the bottom of the driver board, insert

sockets S401 and S402 over their corresponding driver circuit board plugs. Secure the main circuit board to the left and right support brackets with 4-40 x 1/4" hardware.

- ( ) Temporarily position the unit on its right side and tighten the four power supply spacer screws. Then position the unit as shown again and tighten the two bracket screws at T and U securely. Do not overtighten the screws.

Connect the following sockets to the main circuit board plugs:

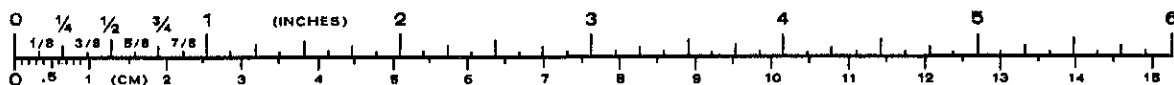
- ( ) Socket S409 to plug P409 with the slots facing up.
- ( ) Socket S405 to plug P405 with the slots facing down.

NOTE: If you have installed the optional RS-232 connector, connect the socket S408 to main circuit board plug P408.

Refer to Pictorial 4-6 for the following steps.

Connect the following sockets to the power supply plugs. The sockets are polarized to fit only one way.

- ( ) Power transformer socket to plug P304.
- ( ) Fluorescent lamp socket to plug S302.
- ( ) 2-hole socket coming from terminal strip B to socket S301. Route the plug wire as shown and position the plug with the wire at pin 2.
- ( ) Recheck the wiring around terminal strips G and H for unsoldered or loose connections.
- ( ) Cut the insulating paper to 2-1/2" x 4-3/4".
- ( ) Remove the white 2" x 2-1/2" piece of backing paper from the insulating paper along the scored line. Then align the adhesive end of the paper with the front edge of the power transformer and press the adhesive side onto the top.



- ( ) Cut the following wires to 10-1/2" and prepare one end for 1/8" and the other end for 1/4":

Brown  
Red  
Orange  
Yellow  
Green  
Blue  
Violet  
Gray

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

Refer to Detail 4-6A for the following steps.

Position the 8-hole socket with the slots facing up and insert the wires into the holes as follows.

- ( ) Brown wire in hole 1.
- ( ) Red wire in hole 2.
- ( ) Orange wire in hole 3.
- ( ) Yellow wire in hole 4.
- ( ) Green wire in hole 5.
- ( ) Blue wire in hole 6.
- ( ) Violet wire in hole 7.
- ( ) Gray wire in hole 8.
- ( ) Position the keyboard circuit board with the indicated foil traces positioned as shown.

Insert the free end of the prepared wires into the indicated holes of the circuit board as follows. Refer to the illustration for the hole number callouts. Disregard any numbers shown on the circuit board. Solder each wire to the foil after you connect it and cut off the excess wire length.

- ( ) Brown wire to hole 1.
- ( ) Red wire to hole 2.
- ( ) Orange wire to hole 3.

- ( ) Yellow wire to hole 4.
- ( ) Green wire to hole 5.
- ( ) Blue wire to hole 6.
- ( ) Violet wire to hole 7.
- ( ) Gray wire to hole 8.

Refer to Detail 4-6B for the following steps.

- ( ) Position the front panel as shown.
- ( ) Mount the keypad on the front panel so the keys fit through their cutouts.
- ( ) Place the keyboard circuit board over the keypad with the cable facing as shown. Align the rubber bosses on the keypad with the circuit board holes and align the keypads with their cutouts. Then refer to the inset drawing and pinch the tabs of a push-on nut together with a pair of long-nosed pliers and slide it over one of the front panel bosses until it is firmly against the circuit board.
- ( ) Similarly mount the remaining three push-on nuts over the other three front panel bosses. Make sure that all four of the nuts are firmly against the circuit board.
- ( ) Refer to Detail 4-6C and position the chassis as shown.
- ( ) Mount the front panel to the display assembly at V and W with two 6-32 x 3/8" screws. Make sure that the photo resistor and LED on the display circuit board fit into the front panel openings as you slide it over the chassis bottom. Position them as necessary. Do not overtighten the two screws.
- ( ) Refer to Detail 4-6C and mount the front panel to the chassis with four 6-32 x 3/8" screws and #6 flat washers. Push the front panel onto the chassis as far as it will go as you tighten the screws.
- ( ) Slide the display assembly forward until the display face is flat against the front panel. Then tighten the light shield and display driver board assembly spacer screws securely.

- ( ) Refer to Pictorial 4-6 and connect the keyboard cable socket to main circuit board plug P407 with the slots facing up as shown. Make sure that all of the pins enter their socket holes.
- ( ) Install cable ties at the locations indicated in the Pictorial. Cut off the excess cable ties after you install them.
- ( ) Refer back to Pictorial 4-4 and hold the fluorescent lamp near the ends and insert the pins into the lamp socket slots. Then rotate the lamp in either direction until it locks into place.

Refer to Detail 4-6D for the following three steps.

- ( ) Position the shield under the power supply support brackets and the row of display LCD tabs. Mount the light shield cover to the light shield with #6 x 3/8" AB (pointed end) self-tapping screws.
- ( ) Mount the power supply support brackets to the light shield cover with 6-32 x 1/4" hardware.
- ( ) If the identification on the back of the unit is labeled "ID-5001," then remove the backing paper from the Model Identification label (ID-5001B) and press it onto the rear panel over the old model identification screen. Otherwise, discard the label.

Refer to Detail 4-6E for the following steps.

- ( ) Cut the following wires to 5-1/2" and prepare the ends for 1/8":

Black  
Brown  
Orange  
Green  
Blue  
Violet  
Gray  
White

- ( ) Crimp and solder small spring connectors on both ends of the prepared 5-1/2" wires.

NOTE: Several of the following steps have two sets of check spaces. Perform these steps once, using the first row of spaces, then return to the first step with the double spaces, when directed, and perform the steps once more using the second row of spaces.

- ( ) ( ) Position a 10-hole socket with the slots facing up and insert the connectors at one end of each 5-1/2" prepared wire into the holes as follows.

- ( ) ( ) Brown wire in hole 1.

NOTE: There is no wire at hole 2.

- ( ) ( ) Orange wire in hole 3.

NOTE: There is no wire at hole 4.

- ( ) ( ) Green wire at hole 5.

- ( ) ( ) Blue wire at hole 6.

- ( ) ( ) Violet wire at hole 7.

- ( ) ( ) Gray wire at hole 8.

- ( ) ( ) White wire at hole 9.

- ( ) ( ) Black wire at hole 10.

- ( ) ( ) Insert a polarizing plug into socket hole 2.

- ( ) Slide a large RF core over the free ends of the eight wires and slide it back toward the socket you just installed.

Refer to Detail 4-6E and return to the first step with the double check spaces and install the second 10-hole socket on the other end of each cable wire. If you have completed the installation, proceed with the next step.

- ( ) Connect either of the 10-hole sockets on the 10-wire cable over the plug pins of S303 on the power supply circuit board. The socket is polarized to fit only one way.

- ( ) Connect the other 10-hole socket on the 10-wire cable over the plug pins of S406 on the main circuit board. The socket is polarized to fit only one way.



- ( ) Install the FCC label on the chassis bottom.

NOTE: If you wish to mount the battery holder on the outside of the back panel, perform the next three steps, otherwise, skip them.

- ( ) Cut the battery clip leads to 4-1/2" and prepare the ends for 3/8"
- ( ) Mount the battery holder to the outside of the back panel with #4 flat-head hardware as shown in the inset drawing on Page 15 of the Illustration Booklet.

- ( ) Connect the red battery clip wire to terminal screw EXT 9V (+) and the black wire to terminal EXT 9V (-).

- ( ) Make sure that all of the RF cores are against the terminal strip lugs. Bend the wires up slightly to hold them in place.

This completes the "Chassis Assembly." Set it aside for now and proceed to "Boom Assembly."

## BOOM ASSEMBLY

### SENSOR CIRCUIT BOARDS

Refer to Pictorial 4-7 Part A for the following steps.

- ( ) Locate one of the sensor circuit boards and position it with the white printed side facing up as shown.
- ( ) Note the rectangular area near the top of the board. Write the letters **WVB** (wind vane bottom) in this area with a ball point pen. You will use these letters later in the assembly as a reference to install the board in its housing.

Install each of the following **transistors and LEDs** in the following manner:

1. Refer to inset drawing #1 and insert the leads into the slot with the short lead near the outline of the flat on the board. The short lead **must** be next to the flat or the device will not work.
2. Insert the leads **all the way so the part is flush against the board. Do not bend the leads**, but hold the part firmly against the board for soldering.
3. Solder the leads to the foil. Be careful not to use too much heat. Then clip off the excess lead lengths and proceed to the next step. Check to make sure you did not solder bridge the foil gap between the leads. See inset drawing #2.

Remove the five TIL-78 transistors (#417-919) from the envelope and install them in the following steps. **Make sure you use the component locations with the letter "Q" and not the letter "D"** for the following parts:

- ( ) Q605.
- ( ) Q602.
- ( ) Q603.
- ( ) Q604.
- ( ) Cut and install a 1" bare wire at jumper wire J. Solder the wire to the foil and cut off the excess lengths. Make sure the wire is flush against the board.

Set the circuit board aside.

Refer to Pictorial 4-7 Part B for the following steps.

- ( ) Locate another sensor circuit board and write the letters **WCB** (wind cup bottom) in the rectangle.
- ( ) Q601: TIL-78 transistor (#417-919).
- ( ) Cut and install a 1" bare wire at J.
- ( ) Solder the wire to the foil and cut off the excess lead lengths.

Set the circuit board aside.

Refer to Pictorial 4-7 Part C for the following steps.

- ( ) Locate another sensor circuit board and write the letters **WVT** (wind vane top) in the rectangle.
- ( ) Locate the bare wire. Place 1/4" of the bare wire end across the foils at D601 as shown in inset drawing #3 and solder it to the foils. Cut off the excess wire and set it aside.

Install TIL-32 (#412-635) LEDs with the dot or flat on the case toward the flat shown on the circuit board outline, at the following four locations. Form the leads as necessary to fit the circuit board hole spacing:

- ( ) D605.
- ( ) D602.
- ( ) D603.
- ( ) D604.

Set the circuit board aside.

Refer to Pictorial 4-7 Part D for the following steps.

- ( ) Write the letters **WCT** (wind cup top) in the rectangle on the remaining sensor circuit board.
- ( ) D601: TIL-32 LED (#412-635). Position the green dot or flat on the LED case toward the flat shown on the circuit board outline.
- ( ) Connect a 1-3/8" bare wire on the component side of the board between the indicated foil of D602 and hole G. See inset drawing #4. Solder the wire to the foil and cut off the excess lengths.

## CIRCUIT BOARD CHECKOUT

Carefully inspect the four sensor circuit boards for the following possible problems:

- ( ) Unsoldered connections.
- ( ) Poor solder connections.
- ( ) Solder bridges between foil patterns. **NOTE:** Refer to the "X-Ray Views" in the "Operation Manual" if you are uncertain and want to see the correct foil patterns.
- ( ) Protruding leads which could touch together or short to the chassis when the circuit board is mounted later.

Refer to the illustrations where the parts were installed as you make the following visual checks:

- ( ) Transistors for the proper installation.
- ( ) LEDs for the proper positioning of the case flat.

Set the circuit boards and the remaining wire aside until they are called for later.





## WIND SENSORS ASSEMBLY

**NOTE:** Locate the 8-wire cable that you purchased. Then, before you prepare the ends of the cable, turn to the "Installation" section in your Operation Manual (Page 4-1) and read the information under ("Wind Sensors Assembly" and "Cable Routing." After you determine how long the cable should be, prepare it to its proper length and then proceed with the following steps.

Refer to Pictorial 4-8 for the following steps.

**BE CAREFUL:** When you remove the outer insulation in the following step, be very careful that you do not cut into the insulation on the colored inner cable wires.

- ( ) Remove 2" of outer insulation from one end of the cable.
- ( ) Prepare the ends of each wire by removing 1/4" of insulation, twisting the fine strands of wire together, and applying a small amount of solder to the strands to hold them together.
- ( ) Refer to inset drawing #2 and make sure you position the plastic grommet as shown. Then insert the other end of the 8-wire cable through both halves of the grommet. Slide the grommet about 36" onto the cable and leave it there temporarily.
- ( ) Using a pen make a mark around the cable 19" from the end.

Set the cable aside temporarily.

## BOOM PARTS MOUNTING

- ( ) Cut the following lengths of wire to 38" and prepare the ends for 1/4":

White-orange  
White brown  
White-red

Refer to Part A of Pictorial 4-9 for the following steps.

**NOTE:** Before you proceed with the following steps, remove any burrs from around the holes in the boom with a file or sandpaper.

- ( ) Position the boom so the two large holes near each end are up, and hole AA that is closer to one end is toward the left.
- ( ) Tape one end of the three wires together that you just prepared. Route this end through one large hole and through the boom to the other large hole. Center the wires so the same amount protrudes at each end. Then remove the tape.

Refer to Part B of Pictorial 4-9 for the following steps.

- ( ) Route the unprepared end of the 8-wire cable through hole AA and the indicated large hole in the boom. Pull the cable through to the 19" mark.
- ( ) Tie a knot at the mark and pull it tight so it can fit through the top hole.
- ( ) Refer to Detail 4-9A and remove 5" of the outer insulation from the length of cable that protrudes from the top hole. Then prepare the ends of each wire for 1/4".
- ( ) Pull the cable back through hole AA to the knot.
- ( ) Slide the plastic grommet along the cable and insert the first part into hole AA. Then insert the second part of the grommet into the first part.

Refer to Pictorial 4-10 for the following steps.

**NOTE:** Before you install the U-bolt assembly on the boom in the following step, determine which side is more practical when you mount the boom to your TV tower or other location later.

- ( ) Mount the U-bolt, U-bolt grip plate, and the U-bolt housing to the boom with the two nuts. Do not tighten the nuts all the way. **NOTE:** When you insert the U-bolt through the boom be careful that none of the wires get in the way.

**NOTE:** If you have facilities, fasten the boom to a vertical pipe or similar object at your work area. This will make it easier to work with the boom assembly in the next steps.

- ( ) Position both bottom housings as shown.

**NOTE:** When you route the wires through the bottom housings in the following steps, use the slotted holes.

- ( ) Route the eleven wires at one end of the boom through one of the bottom housings. Then, mount the housing on the boom with an 8-18 x 1-1/2" screw and a #8 x 1/2" flat washer. Make sure the housing seats properly in the boom and do not block the screw holes with the boom.
- ( ) Route the three wires at the other end of the boom through the remaining bottom housing.
- ( ) Similarly mount the other bottom housing on the other end of the boom with an 8-18 x 1-1/2" screw and a #8 x 1/2" flat washer.

## TOP HOUSING ASSEMBLY

Refer to Pictorial 4-11 for the following steps.

Perform the following steps twice, once for each top housing. Two sets of step marks are supplied for this purpose.

- ( ) ( ) Position a top housing as shown and place a bearing in the bottom hole.
- ( ) ( ) Position the housing shaft so the flat is as shown. Then insert a C-ring around the bottom groove in the shaft and push the shaft through the bearing.
- ( ) ( ) Hold the shaft in place and turn the housing over. Slide another bearing over the shaft and into the top hole. Install a C-ring in the top groove around the shaft.

Set the housings aside temporarily.

## WIND CUP WIRING

Refer to Pictorial 4-12 for the following steps.

In the following steps, you will connect the wires coming from the wind cup side of the boom to the sensor circuit boards. As you connect the wires, solder them to the foil and cut off the excess wire lengths.

**NOTE:** In the following steps, use the end of the boom with the three wires coming from the housing.

- ( ) Locate the two sensor circuit boards that are marked WCT and WCB.

### WCT Circuit Board

- ( ) Prepare the ends of a 5" white/yellow wire for 1/4".

Position the WCT board as shown and connect the wires in the following steps.

- ( ) White/brown to hole E.
- ( ) One end of the 5" white/yellow wire to hole F.

### WCB Circuit Board

Position the WCB board as shown and connect the wires in the following steps.

- ( ) Other end of the 5" white/yellow wire to hole K.
- ( ) White/orange wire to hole J.
- ( ) White/red wire to hole W.
- ( ) Refer to inset drawing #1 and press a rubber grommet over Q601 on the WCB circuit board.
- ( ) Similarly, install a rubber grommet over D601 on the WCT circuit board as shown in inset drawing #2.



Refer to Pictorial 4-13 for the following steps.

In the following steps, you will mount the wind cup circuit boards in one of the top housings.

- ( ) Place one of the top housings upside down next to the bottom housing.
- ( ) Place the **WCT** board in the housing component side up. Then fasten the board with four 6-32 x 9/16" spacers and four #6 SSTL lockwashers. Use a pair of pliers to tighten the spacers.
- ( ) Position an encoder disc with the painted side down and mount it on the shaft with a 6-32 SSTL nut, a #6 SSTL lockwasher, and a #6 SSTL flat washer. Hold the slotted end of the shaft with a pair of pliers while you tighten the nut. Be careful not to damage the flat end of the shaft with the pliers and make sure that the #6 flat washer is flat against the shaft step.
- ( ) Place the **WCB** circuit board component side down and with Q601 opposite D601 on the WTC board. Then fasten the board with four 6-32 x 1/4" SSTL screws.

Refer to Pictorial 4-14 for the following steps.

- ( ) Check the wires coming from each board to make sure they are not touching the disc. Then turn the top housing right side up and place it on the bottom housing. Make sure none of the wires are pinched between the two housings. Now, rotate the top housing until the notch lines up with the tab on the bottom housing.
- ( ) Spin the shaft with your finger to check for any noise of wires rubbing on the disc. Then fasten the housings together with three #4 x 1" SSTL self-tapping screws.
- ( ) Position the wind cup as shown. Then line up the flat in the cup with the flat on the shaft and install the cup. Fasten it with a #6 rubber washer and a 6-32 cap nut.
- ( ) Place the end cap with the hole pointing down and push it on the end of the boom.

## WIND VANE WIRING

Refer to Pictorial 4-15 for the following steps.

Locate the two sensor circuit boards that are marked WVT and WVB.

### WVT Circuit Board

Position the WVT board as shown and connect the wires in the following steps.

- ( ) White to hole E.
- ( ) Black to hole F.
- ( ) White/red to hole G.
- ( ) White/brown to hole L.

### WVB Circuit Board

Position the WVB board as shown and connect the wires in the following steps.

- ( ) Red to hole B.
- ( ) Brown to hole A.
- ( ) Blue to hole H.
- ( ) Yellow to hole D.
- ( ) Orange to hole C.
- ( ) Green to hole W.
- ( ) White/orange to hole K.

Refer to Pictorial 4-16 for the following steps.

In the following steps, you will mount these two circuit boards in the remaining top housing.

- ( ) Place the top housing upside down next to the bottom housing.

- ( ) Place the WVT board in the housing component-side-up. Then fasten the board with four 6-32 x 9/16" spacers and four #6 SSTL lockwashers.
- ( ) Position the remaining encoder disc with the painted side down and mount it on the shaft with a 6-32 SSTL nut, a #6 lockwasher, and a #6 SSTL flat washer. Make sure that the #6 SSTL flat washer is flat against the shaft step.
- ( ) Place the WVB circuit board component-side-down with the wires coming out on the same side as the other board. Then fasten the board with four 6-32 x 1/4" SSTL screws.

Refer to Pictorial 4-17 for the following steps.

- ( ) Check the wires coming from each board to make sure they are not touching the disc. Then turn the top housing right-side-up and place it on the bottom housing. Make sure none of the wires are pinched between the two housings. Now rotate the top housing until the notch lines up with the tab on the bottom housing.
- ( ) Spin the shaft with your finger to check for any noise of wires rubbing on the disc. Then fasten the housings together with three #4 x 1" SSTL self-tapping screws.
- ( ) Place the end cap with the hole pointing down and push it on the end of the boom.
- ( ) Start an 8-32 x 1/4" setscrew in the wind vane cap. Line up the setscrew with the flat on the housing shaft, place the wind vane cap on the shaft and tighten the setscrew.
- ( ) Start an 8-32 x 3/8" SSTL screw at the end of the wind vane cap.

Refer to Pictorial 4-18 for the following steps.

- ( ) Place the boom in a vertical position so the end of the boom (not the cups) is resting on the edge of your work bench.
- ( ) Insert the wind vane shaft through the wind vane cap. Make sure the fin is opposite the wind vane cap setscrew as shown.
- ( ) Start an 8-32 x 1/4" setscrew into the counterweight.
- ( ) Insert the counterweight onto the end of the wind vane shaft as far as it will go. Position the setscrew so it faces down and tighten the setscrew.
- ( ) Turn the cap screw in until it is just against the shaft.
- ( ) Position the fin so it is perpendicular to the boom. Then slide the shaft in the wind vane cap until the fin and counterweight are balanced horizontally. Make sure the fin is still perpendicular to the boom and tighten the cap screw.

## PRESSURE SENSOR CALIBRATION ASSEMBLY

Refer to Pictorial 4-19 for the following steps.

- ( ) Locate the 29" x 1" metal strip and position it as shown.
- ( ) Mount a clip at the three indicated locations with 4-40 x 1/4" hardware. Position the clips as shown.
- ( ) Remove the paper backing from one side of the 5" x 1/2" double-stick tape and press the tape onto the indicated side of the metal strip at its center.

NOTE: You will have a 220 kΩ resistor left over which you will use in the Initial Tests. This completes the assembly of your Advanced Weather Computer. Set the remaining parts aside and proceed to "Initial Tests" in your Operation Manual.





## STEP-BY-STEP-ASSEMBLY

### CHASSIS PARTS MOUNTING

Refer to Pictorial 4-1 for the following steps.

- Place a cloth on your work surface so that, when you work with assemblies that are painted, they will not get scratched.
- Position the chassis with the bottom facing up.
- Remove the backing paper from the rubber feet and place a foot at each corner of the chassis bottom as shown.
- Reposition the chassis as shown in the Pictorial.

**NOTES:**

1. Use the nut starter supplied with this kit to hold and start 4-40 and 6-32 nuts on screws.
2. When a step calls for hardware, only the screw size will be given. For example, if a step calls for "4-40 x 1/4" flat-head hardware," it means you should use 4-40 x 1/4" flat-head screws, one or more #4 lockwashers (in some cases, you will use solder lugs in place of the lockwashers), and 4-40 nuts at the indicated locations. Refer to the illustration (Pictorial or Detail) for the proper number and placement of each hardware item.
3. When you are instructed to mount a part, always position it as shown in the Pictorial or Detail before you tighten it.
4. Use stainless steel hardware only when "SSTL" is noted in the step.

**NOTE:** You can mount the battery holder on the inside or the outside of the back panel. Mounting it on the outside will offer easy access to the battery for replacement. However, the unit's appearance will be more appealing with the holder inside if the back of the unit is exposed. **If you wish to mount the holder outside the unit, skip the next step.**

- Mount a battery holder on the inside of the back panel at A with 4-40 x 1/4" flat-head hardware as shown.

**NOTE:** When you mount the following screw-type terminal strips, position them on the outside of the chassis back panel with the lugs toward the top as shown in the Pictorial.

Mount 6-lug screw-type terminal strips at the following four back panel locations with 6-32 x 1/4" hardware. Make sure you position the solder lugs as indicated in each step and as shown in the Pictorial.

- C. Position the two solder lugs straight up.
- B. Position the two solder lugs against lugs 1 and 6.
- E. Position the two solder lugs against lugs 1 and 6.
- D. Position the two solder lugs against lugs 1 and 6.
- Position the 5-lug terminal strip w/fuse clips at G as shown and cut off the lug 1 section to make a 4-lug terminal strip w/fuse clips.
- Mount the 4-lug terminal strip w/fuse clips at G with 6-32 x 1/4" hardware. Position the lockwashers above and below the terminal strip as shown.
- Mount the 4-lug terminal strip at H with 6-32 x 1/4" hardware. Position both lockwashers as shown.

Mount a #6 solder lug with 6-32 x 3/8" hardware at the following three locations:

- I.
- J.
- K.

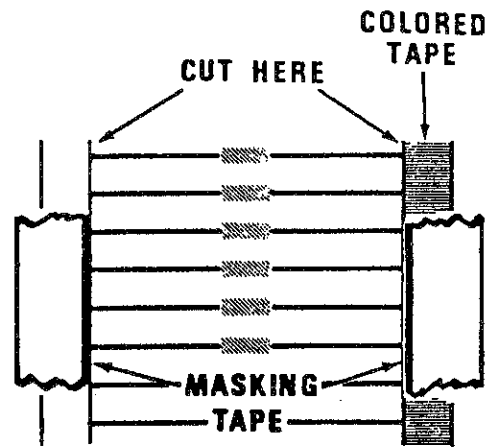


## TAPED COMPONENTS CHART

**Read and Follow These Instructions  
Before You Install The First Component.**

Use masking tape, as shown in the Taping Detail, to secure the component strips over the component drawings. Make sure that each component matches the color bands or part number next to its illustration. Cut the tapes, as necessary, so that you can properly align the components in each section. Do not remove any components from the strip until they are called for in the assembly instructions.

**NOTE:** Never attempt to pull the components from the tape unless you are instructed to do so in a step; gum residue from the tape could cause an intermittent solder connection. Use diagonal cutters to remove each part as it is called for in the assembly instructions. Cut the leads at the inside edge of the tape as shown.

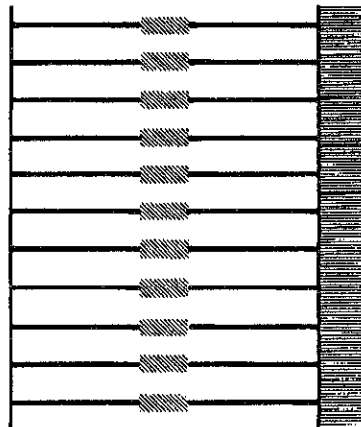


**Taping Detail**

### POWER SUPPLY CIRCUIT BOARD

#### Section 1

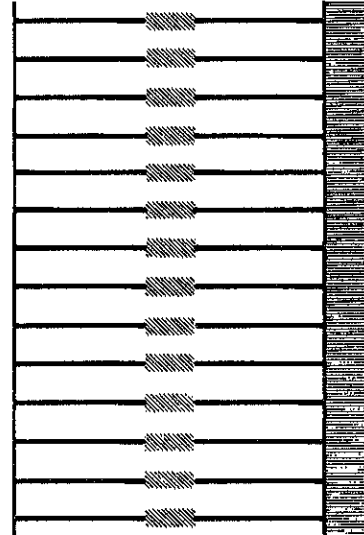
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- 470  $\mu$ F (471) axial-lead ceramic capacitor \_\_\_\_\_
- 68  $\Omega$  (blu-gry-blk) resistor \_\_\_\_\_
- 470  $\Omega$  (yel-viol-brn) resistor \_\_\_\_\_
- 470  $\Omega$  (yel-viol-brn) resistor \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- 20.5 k $\Omega$ , 1% (red-blk-grn-red) resistor \_\_\_\_\_
- 2260  $\Omega$ , 1% (red-red-blu-brn) resistor \_\_\_\_\_
- 6800  $\Omega$  (blu-gry-red) resistor \_\_\_\_\_
- 470  $\Omega$  (yel-viol-brn) resistor \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_



## POWER SUPPLY CIRCUIT BOARD (Cont'd.)

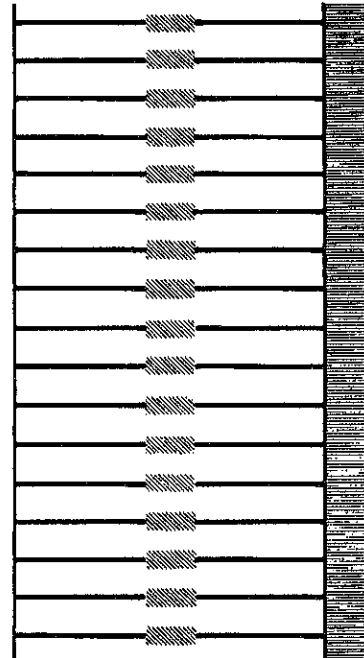
## Section 2

1N5397 (#57-27) diode \_\_\_\_\_  
 1N5397 (#57-27) diode \_\_\_\_\_  
 120  $\Omega$  (brn-red-brn) resistor \_\_\_\_\_  
 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_  
 2700  $\Omega$  (red-viol-red) resistor \_\_\_\_\_  
 120  $\Omega$  (brn-red-brn) resistor \_\_\_\_\_  
 330 k $\Omega$  (org-org-yel) resistor \_\_\_\_\_  
 1500  $\Omega$  (brn-grn-red) resistor \_\_\_\_\_  
 2700  $\Omega$  (red-viol-red) resistor \_\_\_\_\_  
 100 k $\Omega$  (brn-blk-yel) resistor \_\_\_\_\_  
 220 k $\Omega$  (red-red-yel) resistor \_\_\_\_\_  
 68 k $\Omega$  (blu-gry-org) resistor \_\_\_\_\_  
 .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_  
 .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_



## Section 3

15 k $\Omega$  (brn-grn-org) resistor \_\_\_\_\_  
 1N4149 (#56-56) diode \_\_\_\_\_  
 .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_  
 100 k $\Omega$  (brn-blk-yel) resistor \_\_\_\_\_  
 15 k $\Omega$  (brn-grn-org) resistor \_\_\_\_\_  
 100 k $\Omega$  (brn-blk-yel) resistor \_\_\_\_\_  
 .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_  
 1N5231B (#56-613) zener diode \_\_\_\_\_  
 1N4149 (#56-56) diode \_\_\_\_\_  
 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_  
 4700  $\Omega$  (yel-viol-red) resistor \_\_\_\_\_  
 1000  $\Omega$  (brn-blk-red) resistor \_\_\_\_\_  
 .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_  
 47 k $\Omega$  (yel-viol-org) resistor \_\_\_\_\_  
 1N4149 (#56-56) diode \_\_\_\_\_  
 8.2 V (#56-659) zener diode \_\_\_\_\_  
 75 k $\Omega$  (viol-grn-org) resistor \_\_\_\_\_

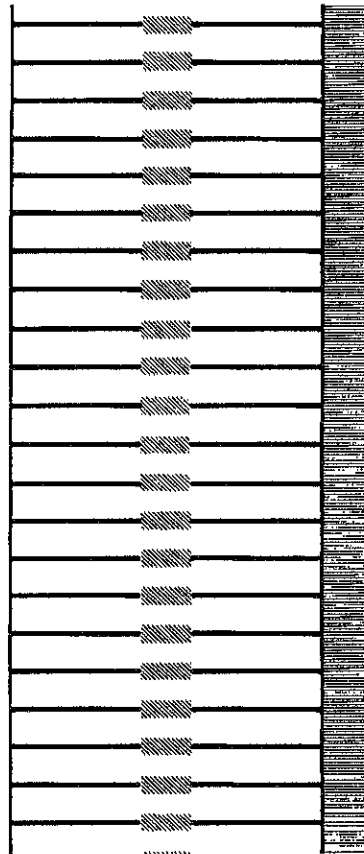




## POWER SUPPLY CIRCUIT BOARD (Cont'd.)

### Section 4

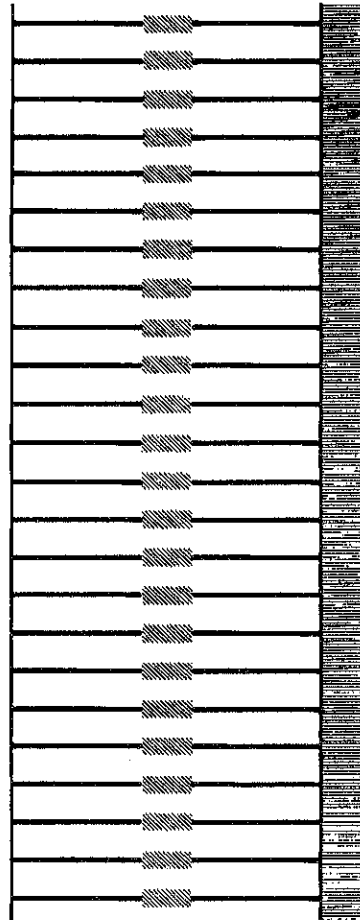
- 1N4149 (#56-56) diode \_\_\_\_\_
- 1N4149 (#56-56) diode \_\_\_\_\_
- 1N4149 (#56-56) diode \_\_\_\_\_
- 1N4149 (#56-56) diode \_\_\_\_\_
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- 1N4149 (#56-56) diode \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- 1  $\Omega$  (brn-blk-gld) resistor \_\_\_\_\_
- 1  $\Omega$  (brn-blk-gld) resistor \_\_\_\_\_
- 1  $\Omega$  (brn-blk-gld) resistor \_\_\_\_\_
- 18.2  $\Omega$ , 1% (brn-gry-red-gld) resistor \_\_\_\_\_
- 18.2  $\Omega$ , 1% (brn-gry-red-gld) resistor \_\_\_\_\_
- 18.2  $\Omega$ , 1% (brn-gry-red-gld) resistor \_\_\_\_\_
- 18.2  $\Omega$ , 1% (brn-gry-red-gld) resistor \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_



**MAIN CIRCUIT BOARD**

**Section 1**

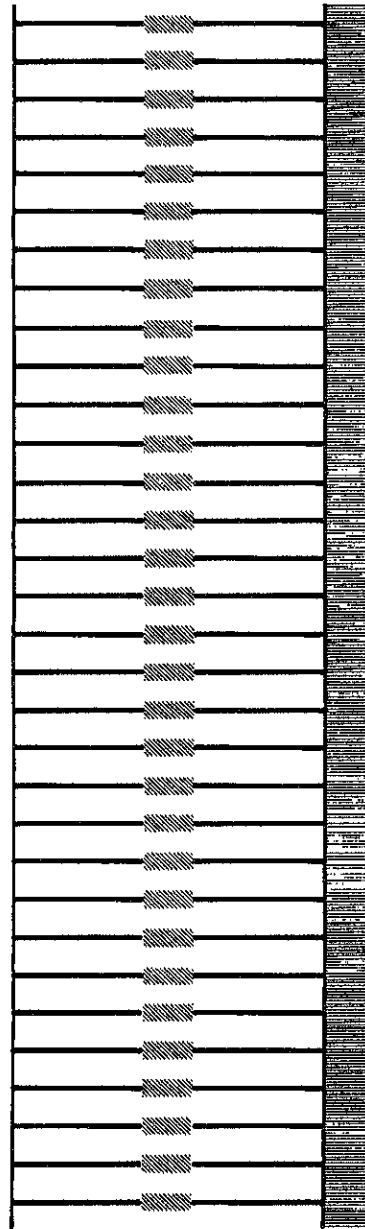
- 250 kΩ, 1/4% (red-grn-blk-org) resistor \_\_\_\_\_
- 250 kΩ, 1/4% (red-grn-blk-org) resistor \_\_\_\_\_
- 250 kΩ, 1/4% (red-grn-blk-org) resistor \_\_\_\_\_
- 2550 Ω, 1% (red-grn-grn-brn) resistor \_\_\_\_\_
- 15 kΩ, 1% (brn-grn-blk-red) resistor \_\_\_\_\_
- 15.4 kΩ, 1% (brn-grn-yel-red) resistor \_\_\_\_\_
- 15.4 kΩ, 1% (brn-grn-yel-red) resistor \_\_\_\_\_
- 1000 Ω (brn-blk-red) resistor \_\_\_\_\_
- 330 Ω (org-org-brn) resistor \_\_\_\_\_
- .1 μF (104) axial-lead ceramic capacitor \_\_\_\_\_
- .1 μF (104) axial-lead ceramic capacitor \_\_\_\_\_
- .1 μF (104) axial-lead ceramic capacitor \_\_\_\_\_
- .1 μF (104) axial-lead ceramic capacitor \_\_\_\_\_
- 270 Ω, 1/2-watt (red-viol-brn) resistor \_\_\_\_\_
- 150 Ω, 1% (brn-grn-blk-blk) resistor \_\_\_\_\_
- 38.3 kΩ, 1% (org-gry-org-red) resistor \_\_\_\_\_
- 806 Ω, 1% (gry-blk-blu-blk) resistor \_\_\_\_\_
- 806 Ω, 1% (gry-blk-blu-blk) resistor \_\_\_\_\_
- 250 kΩ, 1/4% (red-grn-blk-org) resistor \_\_\_\_\_
- 10 kΩ (brn-blk-org) resistor \_\_\_\_\_
- 15.4 kΩ, 1% (brn-grn-yel-red) resistor \_\_\_\_\_
- 15.4 kΩ, 1% (brn-grn-yel-red) resistor \_\_\_\_\_
- 15.4 kΩ, 1% (brn-grn-yel-red) resistor \_\_\_\_\_
- 15.4 kΩ, 1% (brn-grn-yel-red) resistor \_\_\_\_\_



## MAIN CIRCUIT BOARD (Cont'd.)

### Section 2

- 1N823A (#56-91) diode \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 9100  $\Omega$  (wht-brn-red) resistor \_\_\_\_\_
- 6200  $\Omega$  (blu-red-red) resistor \_\_\_\_\_
- 9100  $\Omega$  (wht-brn-red) resistor \_\_\_\_\_
- 6200  $\Omega$  (blu-red-red) resistor \_\_\_\_\_
- 12.1 k $\Omega$ , 1% (brn-red-brn-red) resistor \_\_\_\_\_
- 12.1 k $\Omega$ , 1% (brn-red-brn-red) resistor \_\_\_\_\_
- 38.3 k $\Omega$ , 1% (org-gry-org-red) resistor \_\_\_\_\_
- 21 k $\Omega$ , 1% (red-brn-blk-red) resistor \_\_\_\_\_
- 38.3 k $\Omega$ , 1% (org-gry-org-red) resistor \_\_\_\_\_
- 21 k $\Omega$ , 1% (red-brn-blk-red) resistor \_\_\_\_\_
- 1N4002 (#57-65) diode \_\_\_\_\_
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- 15 k $\Omega$  (brn-grn-org) resistor \_\_\_\_\_
- 8200  $\Omega$  (gry-red-red) resistor \_\_\_\_\_
- 10 M $\Omega$  (brn-blk-blu) resistor \_\_\_\_\_
- 12.1 k $\Omega$ , 1% (brn-red-brn-red) resistor \_\_\_\_\_
- 10 M $\Omega$  (brn-blk-blu) resistor \_\_\_\_\_
- 20 k $\Omega$ , 1% (red-blk-blk-red) resistor \_\_\_\_\_
- 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor \_\_\_\_\_
- 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor \_\_\_\_\_
- 200 k $\Omega$  (red-blk-yel) resistor \_\_\_\_\_
- 12.1 k $\Omega$ , 1% (brn-red-brn-red) resistor \_\_\_\_\_
- 20 k $\Omega$ , 1% (red-blk-blk-red) resistor \_\_\_\_\_
- 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor \_\_\_\_\_
- 23.7 k $\Omega$ , 1% (red-org-viol-red) resistor \_\_\_\_\_
- 1000  $\Omega$  (brn-blk-red) resistor \_\_\_\_\_
- 100  $\Omega$  (brn-blk-brn) resistor \_\_\_\_\_
- 1500  $\Omega$  (brn-grn-red) resistor \_\_\_\_\_
- 3300  $\Omega$  (org-org-red) resistor \_\_\_\_\_
- 3300  $\Omega$  (org-org-red) resistor \_\_\_\_\_

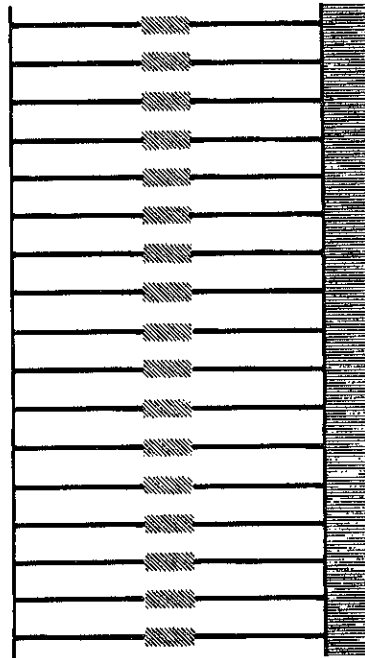




## MAIN CIRCUIT BOARD (Cont'd.)

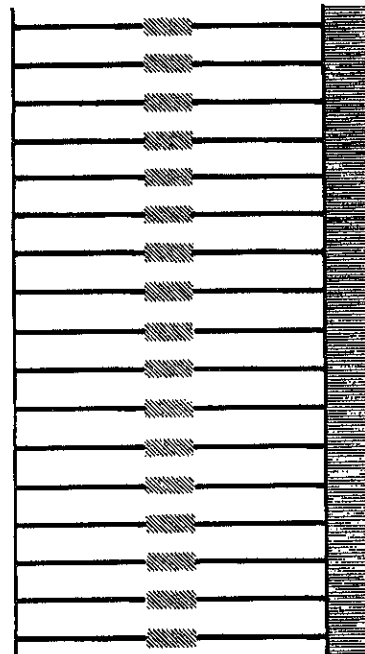
### Section 5

- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- 200 k $\Omega$  (red-blk-yel) resistor \_\_\_\_\_
- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- 100 k $\Omega$  (brn-blk-yel) resistor \_\_\_\_\_
- 180  $\Omega$  (brn-gry-brn) resistor \_\_\_\_\_
- 2.2 M $\Omega$  (red-red-grn) resistor \_\_\_\_\_
- 5100  $\Omega$  (grn-brn-red) resistor \_\_\_\_\_
- 100 k $\Omega$  (brn-blk-yel) resistor \_\_\_\_\_
- 1000  $\Omega$  (brn-blk-red) resistor \_\_\_\_\_



### Section 6

- .1  $\mu$ F (104) axial-lead ceramic capacitor \_\_\_\_\_
- 2200  $\Omega$  (red-red-red) resistor \_\_\_\_\_
- 4700  $\Omega$  (yel-viol-red) resistor \_\_\_\_\_
- 4700  $\Omega$  (yel-viol-red) resistor \_\_\_\_\_
- 82 k $\Omega$  (gry-red-org) resistor \_\_\_\_\_
- 47  $\Omega$  (yel-viol-blk) resistor \_\_\_\_\_
- 2.2  $\Omega$  (red-red-gld) resistor \_\_\_\_\_
- 4700  $\Omega$  (yel-viol-red) resistor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 4700  $\Omega$  (yel-viol-red) resistor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 4700  $\Omega$  (yel-viol-red) resistor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 4700  $\Omega$  (yel-viol-red) resistor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 470 pF (471) axial-lead ceramic capacitor \_\_\_\_\_



**MAIN CIRCUIT BOARD (Cont'd.)**

**Section 6 (Cont'd.)**

- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 470 pF (471) axial-lead ceramic capacitor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 470 pF (471) axial-lead ceramic capacitor \_\_\_\_\_
- 10 k $\Omega$  (brn-blk-org) resistor \_\_\_\_\_
- 470 pF (471) axial-lead ceramic capacitor \_\_\_\_\_
- 499  $\Omega$ , 1% (yel-wht-wht-blk) resistor \_\_\_\_\_
- 3010  $\Omega$ , 1% (org-blk-brn-brn) resistor \_\_\_\_\_
- 806  $\Omega$ , 1% (gry-blk-blu-blk) resistor \_\_\_\_\_
- 3830  $\Omega$ , 1% (org-gry-org-brn) resistor \_\_\_\_\_
- 2000  $\Omega$ , 1% (red-blk-blk-brn) resistor \_\_\_\_\_

