instructions

FOR THE

HEATHKIT

BATTERY CHARGER/ ELIMINATOR ACCESSORY

Model IMA-4180-1

The Battery Charger/Eliminator Accessory was designed to charge nickel-cadmium batteries if you choose to use them as a power source in your FM Deviation Meter, or to provide a power source for the Deviation Meter and thus eliminate a need for batteries. It is suggested that you assemble your Deviation Meter first.

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Rec 5-30-80
Completed 5-30-80
ck OK. 14.37 VDC OUTPUT

595-2175

PARTS LIST

Check each part against the following list. Return any part that is packed in an individual envelope, with the part number on it, back in the envelope after you identify it until that part is called for in a step.

To order a replacement part, always include the PART NUMBER. Use a Parts Order Form or, if one is not available, refer to "Replacement Parts" inside the rear cover of your Manual. For prices, refer to the separate "Heath Parts Price List."

NOTE: The circuit component numbers refer to the component numbers in your Manual and on the Schematic.

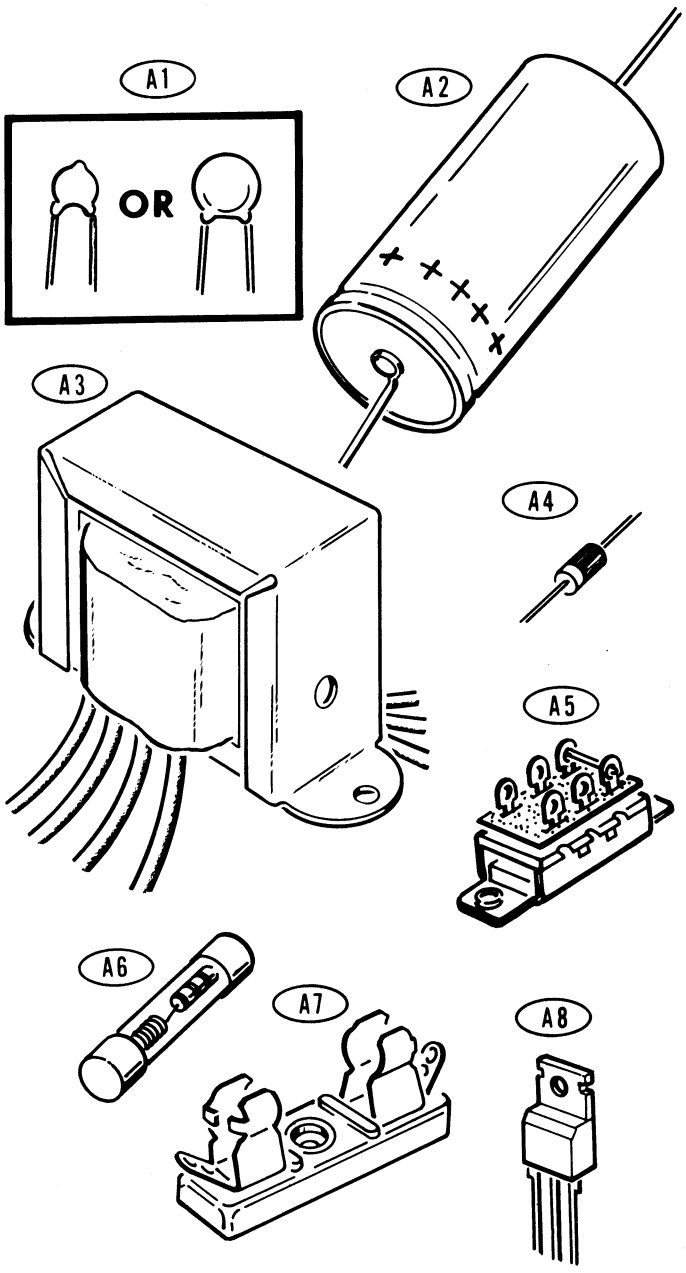
ELECTRONIC PARTS

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
A1	21-143	1	.05 μF ceramic capacitor	C2
A2	25-154	1	2500 μF electrolytic capacitor	C1
A3	54-961	1	Power transformer	T1
A4	57-65	3	1N4002 diode	D1, D2
A5	60-54	1	Slide switch	SW1
	89-54	1	Line cord	
	343-12	4'	Shielded cable	
A6	421-26	1	1/8-ampere slow-blow fuse	F1
A7	422-1	1	Fuseholder	

NOTE: The integrated circuit may be marked for identification in any of the following four ways:

1. Part number.
2. Type number. (This refers to only the numbers in bold type. Disregard any other numbers or letters on the IC.)
3. Part number and type number.
4. Part number with a type number other than the one listed.

A8	442-667	1	MC**78M15**CP integrated circuit	U1



HEATHKIT®

KEY No.	HEATH Part No.	QTY.	DESCRIPTION

HARDWARE

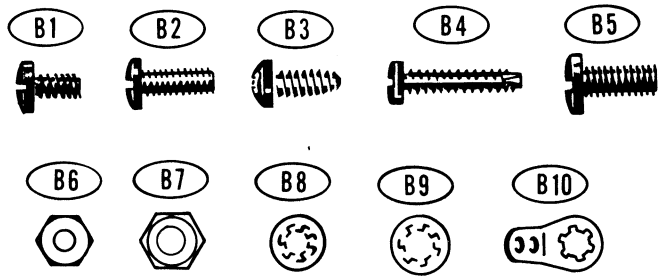
B1	250-452	4	6-32 × 1/4″ black screw
B2	250-381	3	6-32 × 3/8″ black screw
B3	250-1263	4	6-32 × 3/8″ black phillips self-tapping screw
B4	250-1275	1	#6 × 5/8″ black self-tapping screw
B5	250-1186	2	8-32 × 3/8″ black screw
B6	252-3	6	6-32 nut
B7	252-4	2	8-32 nut
B8	254-1	6	#6 lockwasher
B9	254-2	2	#8 lockwasher
B10	259-1	2	#6 solder lug

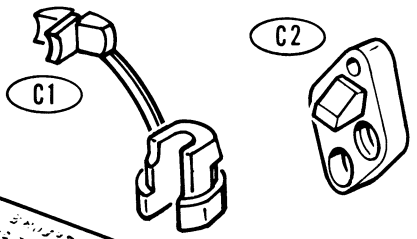
MISCELLANEOUS

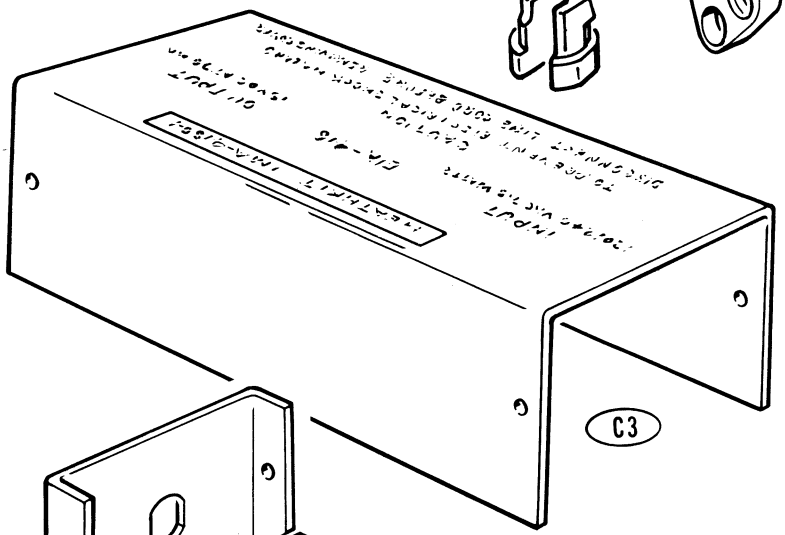
C1	75-107	1	Shielded cable strain relief
C2	75-754	1	Line cord strain relief
	75-741	1	Paper insulator
C3	90-1234-1	1	Cover
C4	200-1332-1	1	Chassis
C5	208-6	1	Capacitor clip
C6	261-49	4	Foot
	346-1	6″	Small sleeving
C7	431-55	1	6-lug terminal strip
C8	438-52	1	Small plug
			Solder

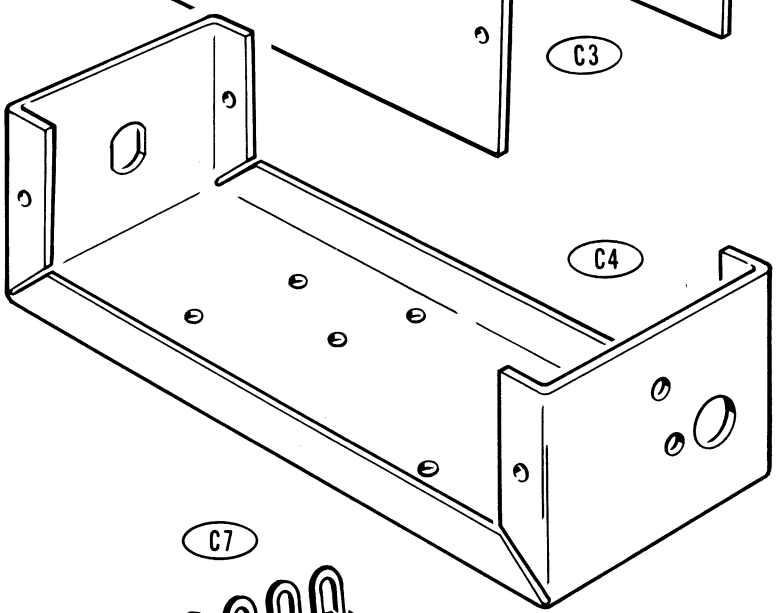
PRINTED MATERIAL

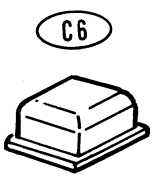
390-1255	1	Fuse label
391-34	1	Blue and white label
597-260	1	Parts Order Form
	1	Assembly Manual (See front page for part number.)

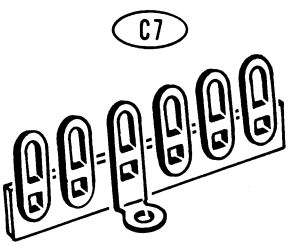


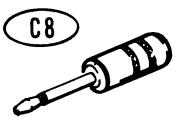




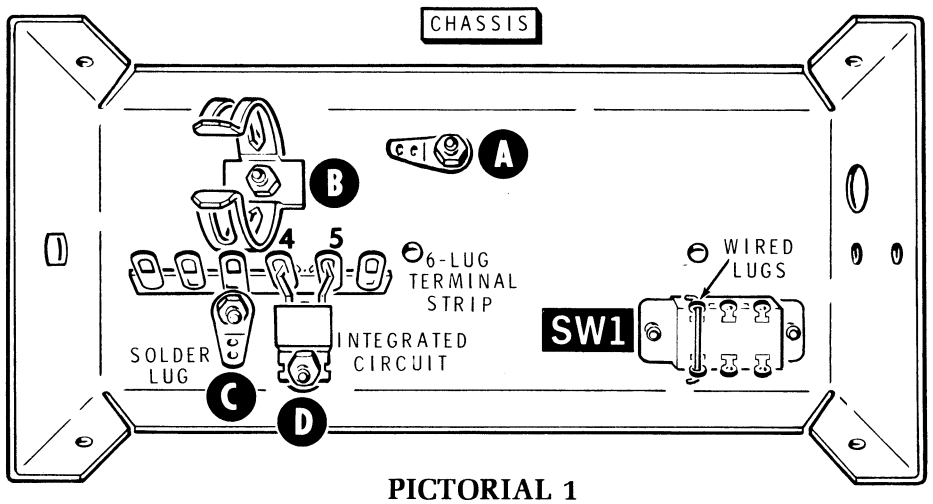








STEP-BY-STEP ASSEMBLY



PICTORIAL 1

(✓) With a knife or other sharp tool, scrape any paint overspray from around A, C, and D on the inside of the chassis.

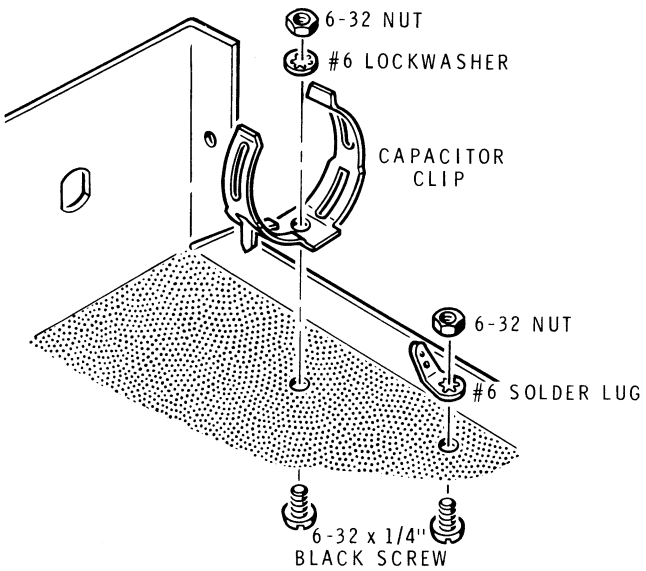
Refer to Pictorial 1 for the following steps.

(✓) Position the chassis on a soft cloth on your work area as shown.

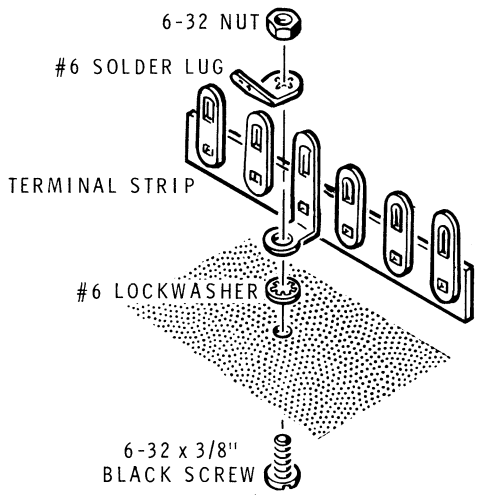
(✓) Refer to Detail 1A and mount a solder lug at A. Use a 6-32 × 1/4" black screw and a 6-32 nut. Position the solder lug as shown in the Pictorial.

(✓) Refer to Detail 1A and mount a capacitor clip at B. Use a 1/4" black screw, a #6 lockwasher, and a 6-32 nut. Position the clip as shown in the Pictorial.

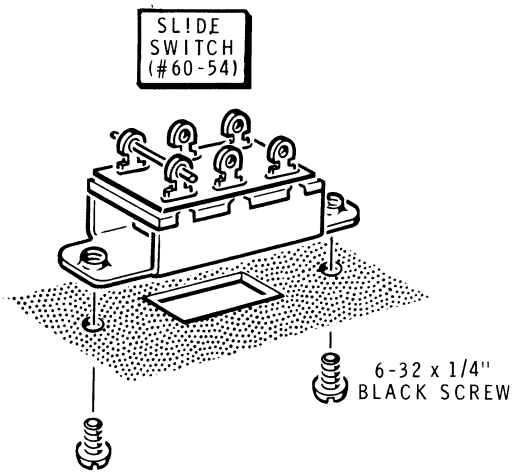
(✓) Refer to Detail 1B and mount a 6-lug terminal strip at C. Use a 6-32 × 3/8" black screw, a #6 lockwasher, a #6 solder lug and a 6-32 nut. Position the terminal strip and the solder lug as shown in the Pictorial.



Detail 1A



Detail 1B



Detail 1C

(✓) Refer to Detail 1C and mount the slide switch at SW1 with two 6-32 × 1/4" black screws as shown. Be sure to position the two wired lugs as shown in the Pictorial. With a screwdriver blade, set the switch slide to "120" or to "240," the AC line voltage your kit is being wired to operate on.

Refer to Detail 1D for the next two steps.

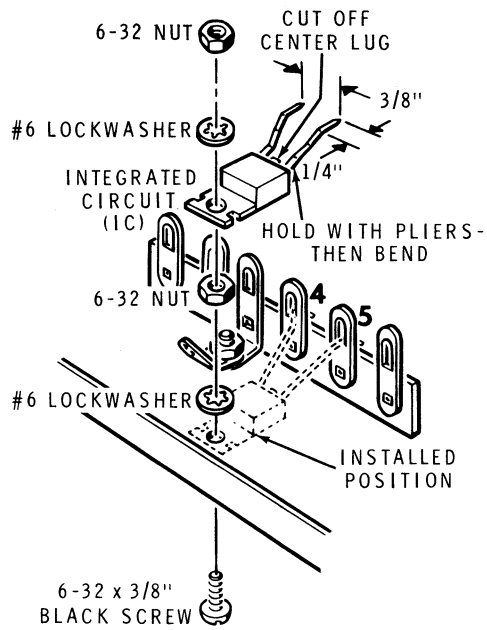
(✓) Cut the center lug from the IC as shown. Hold the remaining leads close to the IC case with needle-nose pliers; then, using your finger bend the leads sharply upward. Bend the leads outward 1/4" from the ends as shown. At the top bend, spread the two leads 3/8" apart.

(✓) Mount the IC as follows:

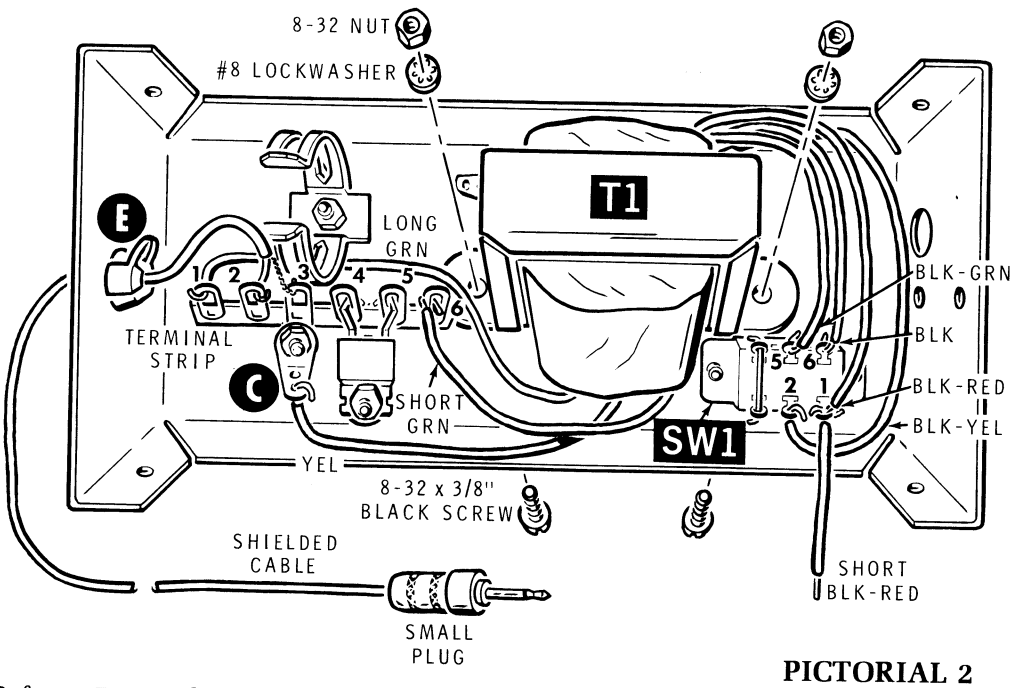
1. Push a 6-32 × 3/8" screw with a #6 lockwasher up through chassis hole D. Secure the screw with a 6-32 nut.

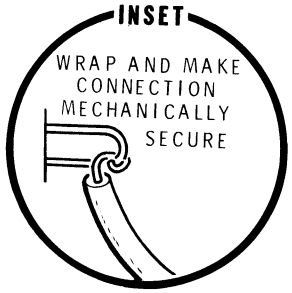
2. Position the IC leads into terminal strip C lugs 4 and 5 as shown; then lower the IC onto the top of the previously installed nut.

3. Using long-nose pliers, secure the IC with a #6 lockwasher and a 6-32 nut.



Detail 1D

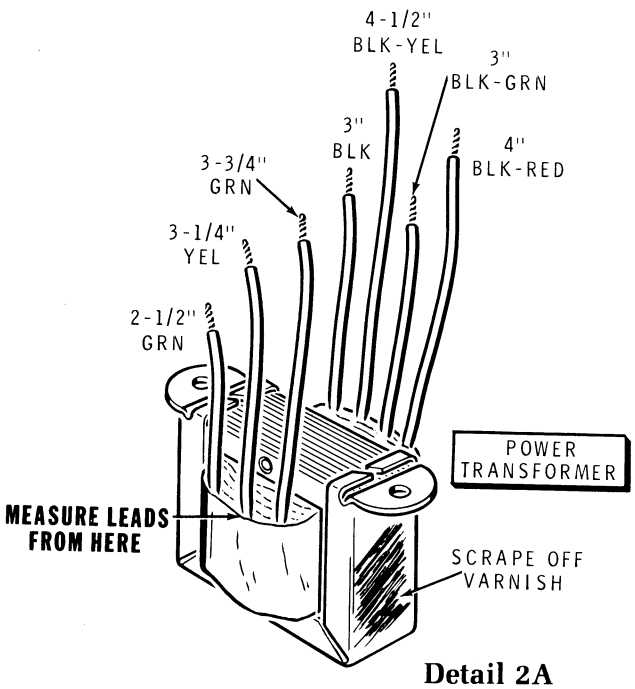




PICTORIAL 2

Refer to Pictorial 2 for the following steps.

( ) Refer to Detail 2A and cut the power transformer leads as shown. Save the cutoff black-red lead for use later. NOTE: Be sure to cut each green lead exactly as shown in the Detail; that is, the longer lead on the right, the shorter on the left as the transformer is positioned in the drawing.



Detail 2A

( ) Using care not to nick the transformer leads, remove 1/4" of insulation from each lead end and add a small amount of solder to hold the fine strands together.

( ) Scrape the varnish from the indicated side of the transformer.

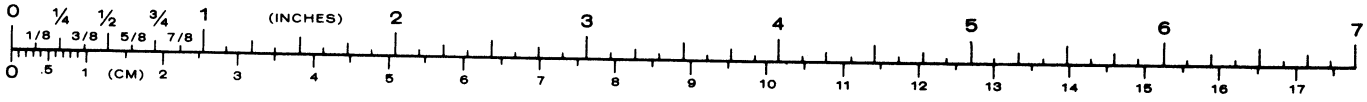
( ) T1: Mount the transformer into the chassis with two 8-32 × 3/8" screws, two #8 lockwashers, and two 8-32 nuts. Be sure to position the transformer so the leads emerge as shown in the Pictorial.

NOTES:

1. In the following steps, to make a mechanically secure connection, wrap the lead or wire end securely around the indicated lug and crimp it tightly with pliers. (See the inset drawing on Pictorial 2.)

2. Route all wires and leads exactly as shown in the drawings.

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



( ) Connect the longer green transformer lead to terminal strip lug 1 (NS).

( ) Connect the yellow transformer lead to solder lug C (NS).

( ) Connect the shorter transformer lead to terminal strip lug 6 (NS).

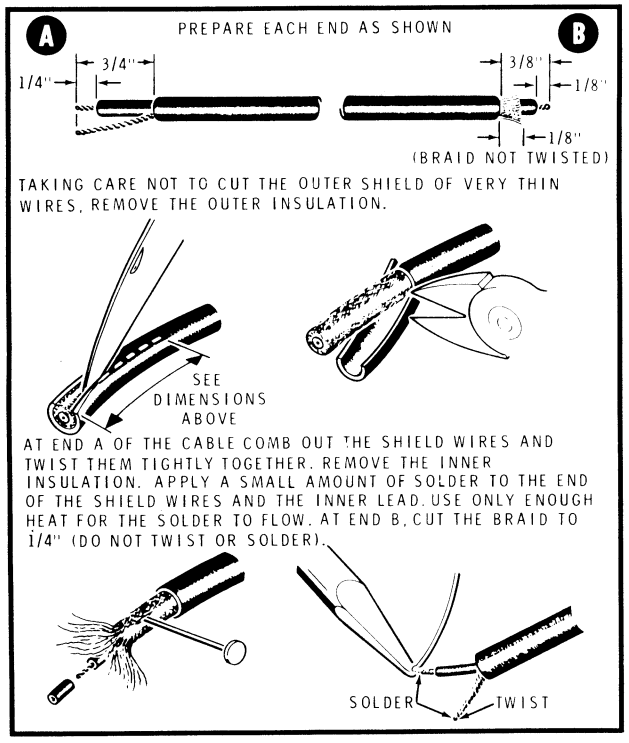
( ) Connect the black-yellow transformer lead to switch SW1 lug 2 (S-1). Make a mechanically secure connection.

( ) Connect the black-red transformer lead to switch SW1 lug 1 (NS). Make a mechanically secure connection.

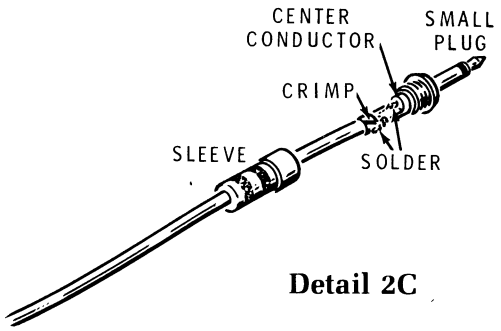
( ) Cut the short black-red cutoff transformer lead to 1-1/2".

( ) Prepare both ends of the short black-red lead. Connect one end of the black-red lead to switch SW1 lug 1 (S-2). Make a mechanically secure connection. NOTE: The free wire end will be connected later.

( ) Connect the black-green transformer lead to switch SW1 lug 5 (S-1). Make a mechanically secure connection.



Detail 2B



Detail 2C

( ) Connect the end of the black transformer lead to switch SW1 lug 6 (NS). Make a mechanically secure connection.

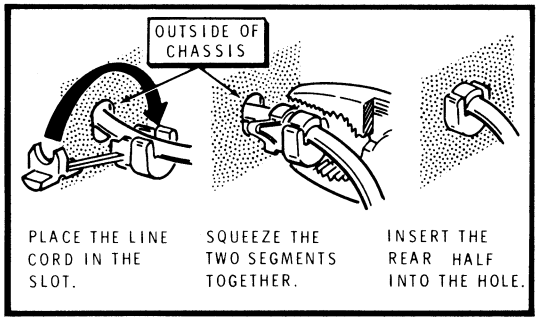
( ) Refer to Detail 2B and prepare the ends of the shielded cable as shown.

NOTE: In the following step, as you install the small plug onto the end of the shielded cable, use solder and heat sparingly to avoid shorting the plug connections.

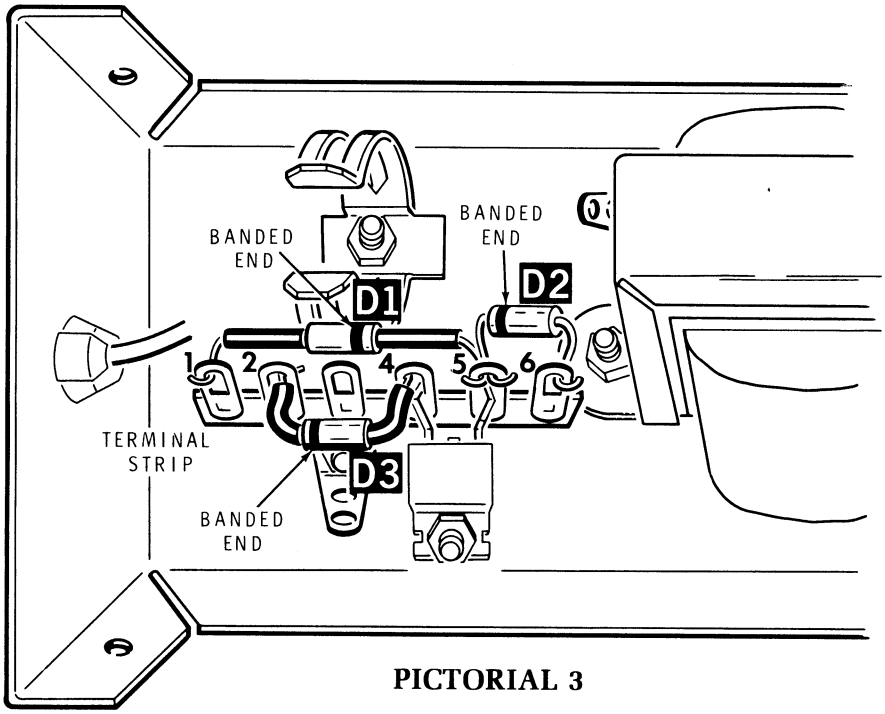
( ) Refer to Detail 2C. Remove the plug sleeve from the plug and slide the sleeve onto end B of the shielded cable. Solder the cable inner lead to the center conductor of the plug. Then crimp the plug tabs around the cable shield and add a small amount of solder to the shield connection. Be very careful not to melt the center conductor. Screw the plug sleeve onto the plug.

( ) Refer to Detail 2D and, at end A of the shielded cable, place the shielded cable strain relief onto the cable 1-3/4" from the end. Push the end of the cable and then the strain relief into chassis hole E.

( ) Refer to the Pictorial and connect the inner shielded cable lead to terminal strip lug 2 (NS) and the shield lead to lug 3 (S-1).



Detail 2D



PICTORIAL 3

Refer to Pictorial 3 and to Detail 3A for the following steps.

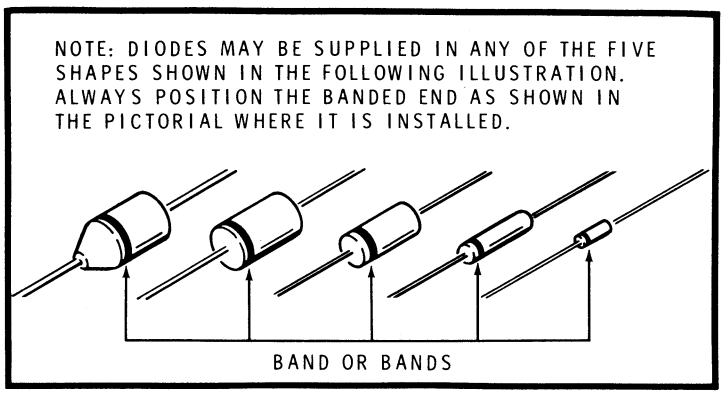
(✓) D2: Cut the leads of a 1N4002 diode (#57-65) to 1/2". Connect the diode between terminal strip lugs 5 (NS) and 6 (S-2). IMPORTANT: Be sure to position the banded end of the diode as shown in the Pictorial.

(✓) Cut two 1/4" pieces of small sleeving.

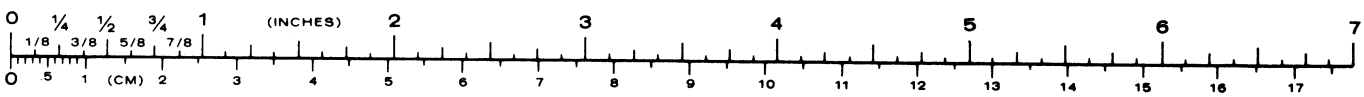
(✓) D3: Cut both leads of another 1N4002 diode to 1/2". Place a 1/4" of sleeving on each diode lead. Then connect the diode between terminal strip lugs 2 (S-2) and 4 (NS). Be sure to position the banded end as shown in the Pictorial.

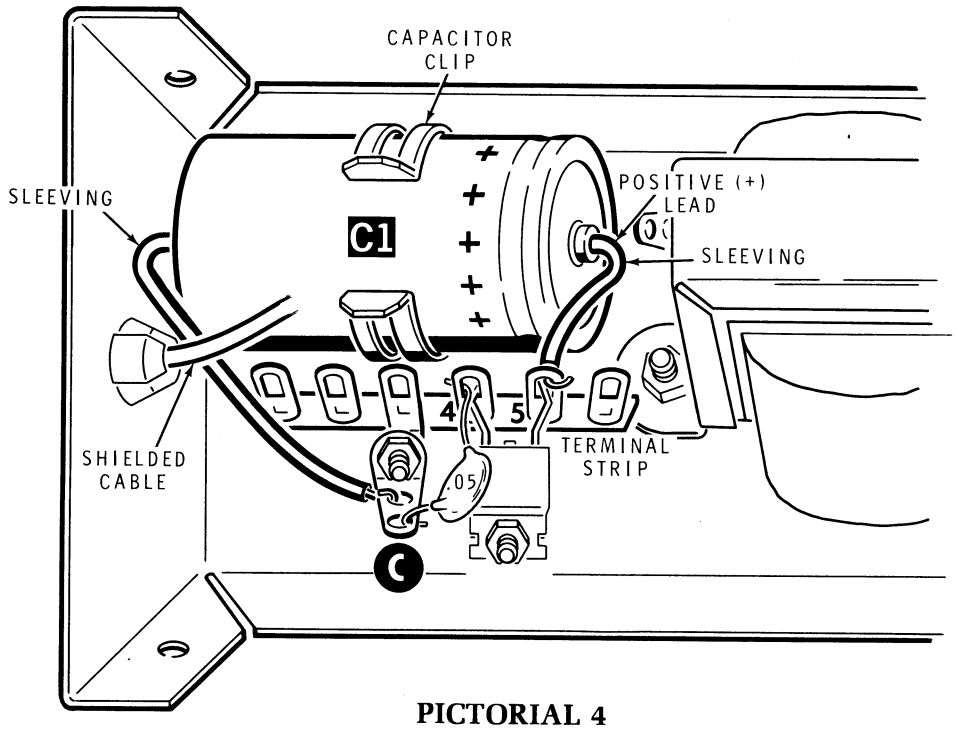
(✓) Cut two 1/2" pieces of small sleeving.

(✓) D1: Place a 1/2" piece of sleeving on each lead of the remaining 1N4002 diode. Connect the diode between terminal strip lugs 1 (S-2) and 5 (NS).



Detail 3A



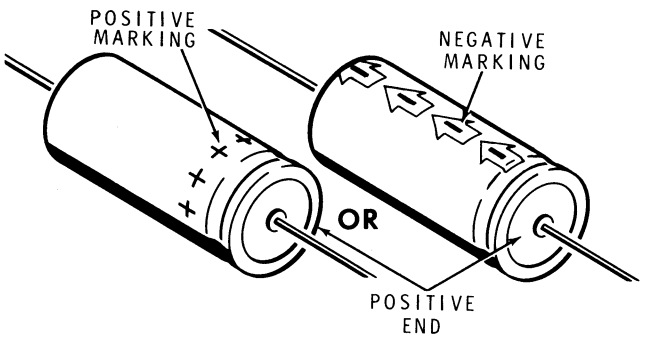


PICTORIAL 4

Refer to Pictorial 4 for the following steps.

(✓) Cut a 1-1/4" and a 2" piece of small sleeving.

NOTE: Before you install the electrolytic capacitor in the following steps, note the polarity (+ or −) of the identified lead as shown in Detail 4A. Be sure you connect the positive (+) lead exactly as shown in Pictorial 4 and as directed in the next step.



Detail 4A

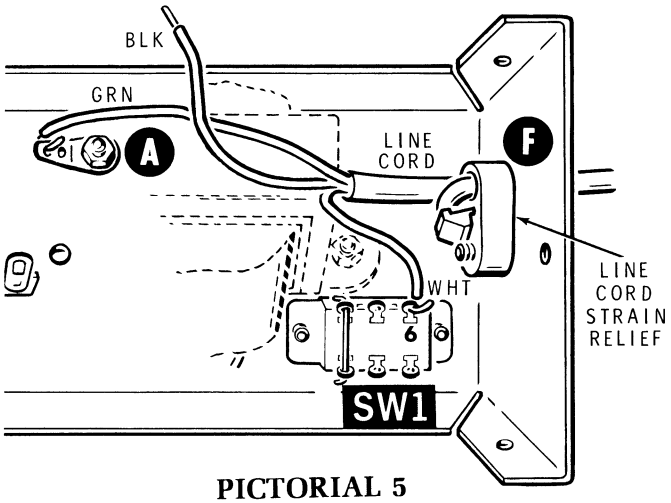
(✓) Position the positive (+) end of the 2500 μF electrolytic as shown in the Pictorial.

(✓) Cut the positive capacitor lead to 1-1/2" and the negative lead to 2-1/4".

(✓) Place a 1-1/4" sleeve on the positive capacitor lead and the 2" sleeve on the negative lead.

(✓) C1: Pass the end of the negative capacitor lead under the shielded cable as shown in the Pictorial and connect it to solder lug C (NS). Push the capacitor down firmly into the capacitor clip. Connect the positive lead to terminal strip lug 5 (S-4).

(✓) C2: Cut the leads of a .05 μF ceramic capacitor to 1/2". Connect one capacitor lead to solder lug C (S-3) and the other lead to terminal strip lug 4 (S-3).



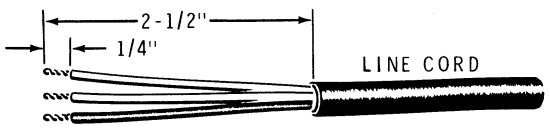
PICTORIAL 5

Refer to Pictorial 5 for the following steps.

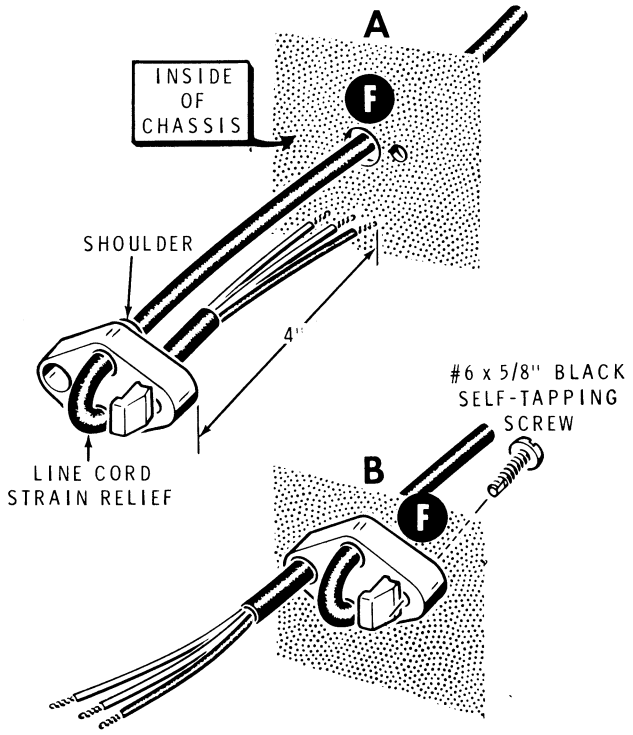
( ) Refer to Detail 5A and prepare the end of the line cord as shown. Tightly twist each wire end and add a small amount of solder to hold the fine strands together.

( ) Pass the free end of the line cord through hole F in the end of the chassis.

( ) Refer to Part A of Detail 5B and thread the end of the line cord first through the line cord strain relief hole with a shoulder, and then back through the other center strain relief hole as shown. Pull the end of the line cord through until 4" of the end of the cord is exposed from the back of the strain relief. Then pull the long end of the cord back through the strain relief hole with the shoulder to remove excess slack.



Detail 5A

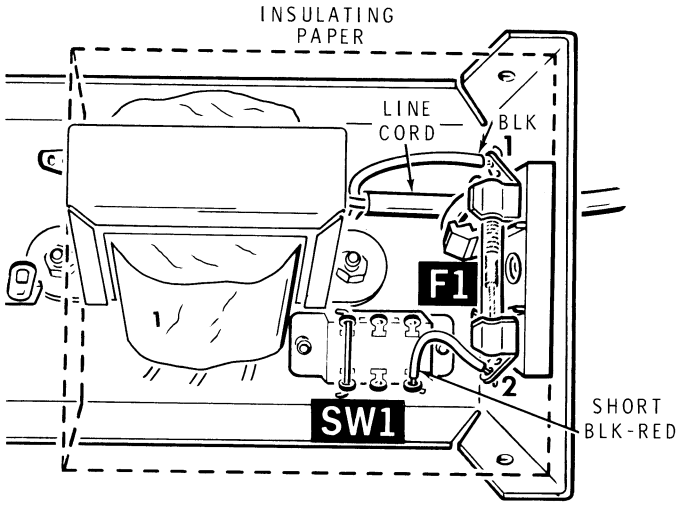


Detail 5B

( ) Refer to Part B of Detail 5B and pass the free end of the line cord back through the remaining strain relief hole as shown. Pull the end through as far as possible. Pull the longer end of the line cord back through chassis hole F, position the shoulder of the strain relief into hole F and secure the strain relief to the chassis with a #6 × 5/8" black self-tapping screw.

( ) Connect the green line cord lead to solder lug A (S-1). Make a mechanically secure connection.

( ) Connect the white line cord lead to switch SW1 lug 6 (S-2). Make a mechanically secure connection.



PICTORIAL 6

Refer to Pictorial 6 for the following steps.

( ) Refer to Detail 6A and mount the fuseholder into the chassis at F1 in the manner shown. Use a 6-32 × 3/8" screw, two #6 lockwashers, and a 6-32 nut. Position the fuseholder as shown in the Pictorial.

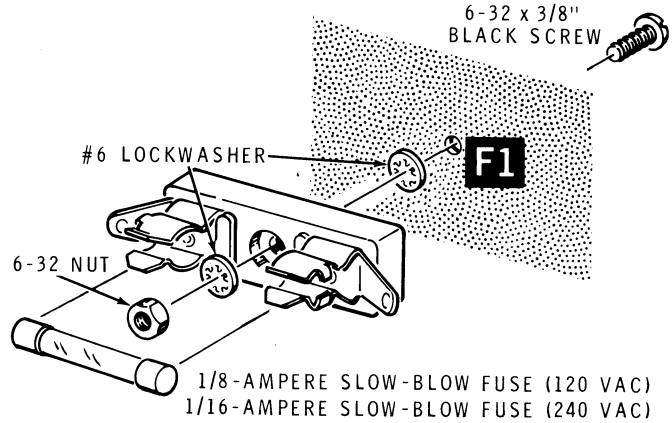
NOTE: In the following step, use the 1/8-ampere fuse supplied with your kit if your local power is 120-volts AC. If it is 240-volts AC, you must use a 1/16-ampere fuse (not supplied).

( ) F1: Push the fuse into the fuseholder.

( ) Connect the black line cord lead to fuseholder F1 lug 1 (S-1). Make a mechanically secure connection.

( ) Connect the free end of the short black-red wire coming from switch SW1 to fuseholder F1 lug 2 (S-1). Make a mechanically secure connection.

( ) Carefully check the inside of the chassis to make sure there are no loose wire ends, bits of solder, etc., that could cause problems later. Check to make sure all connections are soldered and that there are no protruding wire ends that could touch together. Make sure all the hardware is secure.



Detail 6A

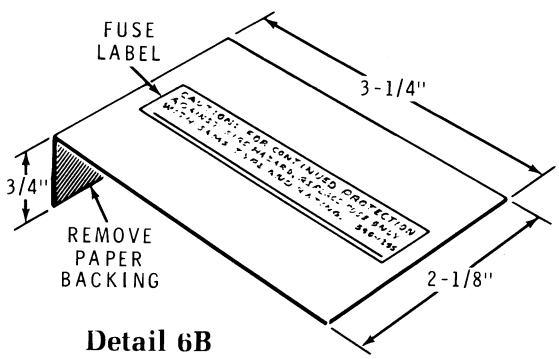
( ) Cut the paper insulator to 2-1/8" × 4".

( ) In the space provided on the bottom of the fuse label write: "1/8-ampere 3AG Slow-Blow," if the power in your area is 120 VAC. If the power is 240 VAC, write "1/16-ampere 3AG Slow-Blow."

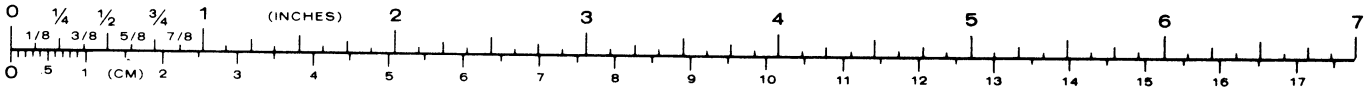
( ) Remove the backing from the fuse label and press the label in place on the top of the paper insulator as shown in Detail 6B.

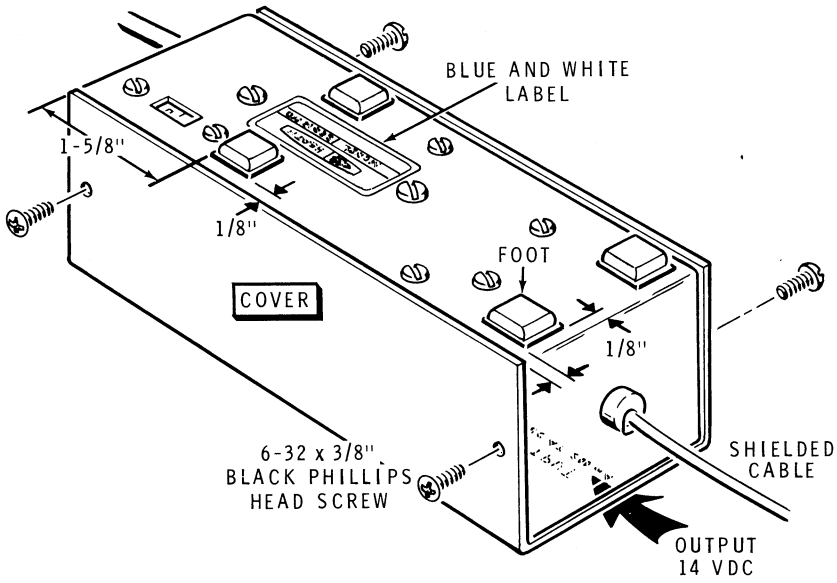
( ) Refer to Detail 6B and, on the white waxy side of the paper insulator, score and cut through the white paper 3/4" across one end as shown. Bend the insulator 90 degrees upward on the scored line; then remove the 3/4" strip of white paper backing.

( ) Refer to the Pictorial and press the sticky part of the paper insulator onto the scraped side of the power transformer as shown. Be sure the other end of the paper insulator fits into the chassis over the top of the fuseholder as shown.



Detail 6B





PICTORIAL 7

Refer to Pictorial 7 for the following steps.

NOTE: The top of the cover is screened with "Input" and "Output" callouts. The "Input" refers to the line cord end of the chassis, and the "Output" is the shielded cable end.

(✓) Position the cover top-side down as shown in the Pictorial with the "Output" end to your right. NOTE: Place a soft cloth on your work area to avoid scratching the cover.

(✓) Holding the chassis assembly upside down with the shielded cable to your right, lower the chassis into the cover as shown. Then secure the cover to the cabinet with four 6-32 × 3/8" black phillips head screws.

(✓) One at a time, remove the paper backing from the four feet and press each of them in place on the bottom of the chassis as shown in the Pictorial.

(✓) Remove the paper backing from the blue and white label and press the label in place on the underside of the chassis as shown in the Pictorial. NOTE: Be sure to refer to the Series and Model numbers on the blue and white label in any correspondence you have with the Heath Company about your kit.

This completes the "Step-by-Step Assembly" of your Battery Charger/Eliminator kit.

5-30-80

INITIAL TESTS

NOTE: If you do not have an ohmmeter or a voltmeter, you can skip this section of the Manual and proceed to "Operation" on Page 12. In the following steps, if you do not get the desired results, refer to "In Case of Difficulty."

RESISTANCE CHECKS

( ) Connect one lead of an ohmmeter to the round line cord (ground) prong. Connect the other ohmmeter lead first to one flat prong and then the other. Ohmmeter readings should be near infinity in both cases.

( ) Set the AC slide switch at "120." Connect one ohmmeter lead to one line cord flat prong, and the other lead to the remaining flat prong. You should get an ohmmeter reading of approximately 180 ohms.

( ) Connect one ohmmeter lead to the metal plug sleeve on the shielded cable. Connect the other ohmmeter lead to the tip of the plug. Your ohmmeter should not indicate a short (less than one ohm).

This completes the "Resistance Checks."

( ) If necessary, return the AC slide switch to its original setting.

VOLTAGE CHECK

( ) Set the voltmeter to measure +15 volts DC.

( ) Connect the voltmeter common lead to the shielded cable plug sleeve and the positive lead to the shielded cable plug tip.

( ) Plug the line cord into an AC receptacle. Check the voltmeter for a reading of 13.2 to 14.8 volts DC.

( ) Disconnect the line cord from the wall outlet. Remove the voltmeter test leads from the shielded cable plug.

This completes the "Initial Tests." Proceed to "Operation."

OPERATION

The operation of your Battery Charger/Eliminator Accessory is simple. Plug the shielded cable plug into the +15V jack on the rear of your FM Deviation Meter and the line cord into a nearby AC receptacle.

If you wish to use your power supply as a Battery Charger, along with the rechargeable batteries in your Deviation Meter you should allow approximately 15 hours for the batteries to become fully charged. You may then either disconnect the Battery Charger to permit you to use the Deviation Meter in portable applications, or you may leave the power supply connected to provide a constant "trickle-charge" for the batteries.

You may elect to power the Deviation Meter with only the Battery Eliminator feature. In this case, just plug the two units together and plug the power supply line cord into an AC outlet.

IN CASE OF DIFFICULTY

1. Carefully recheck all wiring and for the correct installation of parts, especially diodes. Refer to the steps where parts were installed to make sure they were correctly mounted. Be sure all wire and lead ends have been cut off; that none are protruding where they can touch one another.

2. Make sure all connections are well soldered, especially where there may be more than one connection on a switch or terminal strip lug. If you are in doubt, reheat the connection and melt a little more solder onto the connection.

3. Make sure the IC is correctly installed.

4. Be sure the large electrolytic capacitor positive (+) lead is connected as shown in the assembly steps.

5. Be sure all ground hardware (solder lugs and terminal strip) is tight.

6. Recheck the connections on the shielded cable plug to be sure they are not accidentally shorted.

NOTE: In an extreme case, where you are unable to correct a difficulty, refer to the "Customer Service" information inside the rear cover of your FM Deviation Meter Manual. Your Warranty is located inside the front cover of the Meter Manual.

SPECIFICATIONS

Output Voltage	13.2 to 14.8 volts DC at 200 mA.
Operating Temperature	0-50° C.
Line Voltage	105-135 VAC or 210-270 VAC.
Dimensions	6-1/2" long × 2-1/2" wide × 2-1/4" high. (16.5 × 6.4 × 5.7 cm).
Net Weight	1.6 lbs. (0.73 kg).

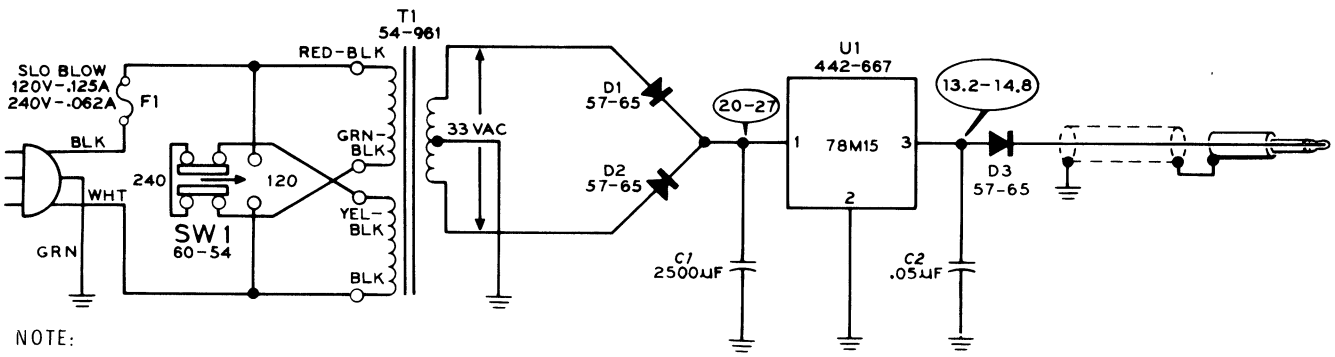
The Heath Company reserves the right to discontinue products and to change specifications at any time without incurring any obligation to incorporate new features in products previously sold.

CIRCUIT DESCRIPTION

NOTE: Refer to the Schematic Diagram as you read this "Circuit Description."

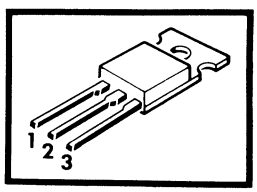
Either 120 VAC or 240 VAC (nominal) line voltage is routed through fuse F1, through 120 or 240 VAC contacts in switch SW1, and into the primary winding of transformer T1. The secondary voltage of the transformer is rectified by diodes D1 and D2 and is filtered by capacitor C1 and regulated by U1. The 14-volt DC from U1 is additionally filtered by capacitor C2 and is routed to the output cable of the Charger/Eliminator through diode D3, a reverse-current protection device.

SCHEMATIC OF THE HEATHKIT® BATTERY CHARGER/ELIMINATOR ACCESSORY MODEL IMA-4180-1



NOTE:

THIS SYMBOL INDICATES A POSITIVE DC VOLTAGE MEASURED WITH A HIGH-IMPEDANCE INPUT VOLTMETER FROM THE POINT INDICATED TO CHASSIS GROUND UNDER NO-LOAD CONDITIONS.



INTEGRATED CIRCUIT U1
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