

EICO

1030/Regulated Power Supply



OPERATING MANUAL

GENERAL DESCRIPTION

A highly flexible and useful instrument, invaluable for testing, development and servicing. Incorporates a well-regulated B+ power supply, variable by a front panel control from 0 to 400VDC and monitored by a panel voltmeter. Load current is simultaneously monitored by a panel milliammeter. Also provides an independent regulated bias voltage supply, variable by another front panel control from 0 to -150VDC, again monitored by the panel voltmeter. Both supplies can be used simultaneously, with the voltmeter function selected by a front panel slide switch. In addition, two isolated 6.3VAC transformer windings are brought to the front panel, one center-tapped. Series connection of these windings provides 12.6VAC.

SPECIFICATIONS

REGULATED B+ POWER SUPPLY:

Voltage Range: 0 to 400VDC continuously variable

Current Range: 0 to 100ma continuous from 0-200VDC
0 to 125ma intermittent from 0-200VDC
0-150ma continuous from 200 to 400VDC

Load Regulation: varies less than 1/3% or 0.3V (whichever is greater) from 0 to 100ma

Line Regulation: varies less than 0.4% or 0.5V (whichever is greater) for $\pm 10V$ line variation

Ripple: less than 3mv rms

Output Impedance: less than 10 ohms from dc to 1mc

REGULATED BIAS VOLTAGE SUPPLY:

Voltage Range: 0 to -150VDC continuously variable

Current Range: 0 to 2ma

Line Regulation: varies less than 0.4% or 0.5V (whichever is greater) for $\pm 10V$ line variation

Ripple: less than 3mv rms

AC FILAMENT SUPPLIES:

6.3 volts AC at 3 amperes and 6.3 volts AC at 3 amperes, center-tapped

12.6 volts AC at 3 amperes by series connection of two 6.3 volt windings

6.3 volts AC at 6 amperes by parallel connection of two 6.3 volt windings

METERING:

Double-jewelled D'Arsonval voltmeter with switched ranges of 0-400 volts DC (Regulated B+ Supply) and 0-200 volts DC (Regulated Bias Supply)

Double-jewelled D'Arsonval milliammeter with 0-200ma scale for monitoring (Regulated B+ Supply)

POWER LINE REQUIREMENTS: 120 volts AC, 50/60 cycles; draws approximately 160 watts

SIZE (HWD): 8-1/2" x 12-1/2" x 9". WEIGHT: 21 lbs.

UNPACKING

This equipment has been thoroughly tested and inspected before packing. If you find visible damage upon unpacking, notify the dealer at once. If the unit was shipped to you from the dealer, you must file a claim with the carrier, since only you can recover for shipping damages. Your dealer and EICO will cooperate.

VENTILATION

Do not block the holes provided in the cabinet for circulation. Blocking these holes will cause an excessive temperature rise resulting in serious component damage.

CIRCUIT DESCRIPTION

REGULATED B+ POWER SUPPLY

The regulated 0 to 400 volt B+ power supply consists of full wave rectifier V1 and filter (operated from the 440-0-440 volt center-tapped winding of transformer T1); a series electronic regulator in the B+ lead consisting of parallel-connected tubes V2 and V3 and a regulator control tube V4; plus a final output filter. The center-tap of the 440-0-440 volt winding is both the negative return of the regulated B+ power supply and the positive return of the negative bias voltage supply.

Screen grid voltage for regulator tubes V2 and V3 is obtained from a separate half-wave rectifier supply consisting of CR1 and filter. V2 and V3 are operated as Class A amplifiers providing the total current drawn from the supply. In effect, these tubes behave as a variable resistance which changes with applied negative grid voltage (resistance increasing as control grid voltage is made more negative) obtained from the plate of control tube V4.

The grid of V4 is connected to the arm of REGULATED OUTPUT panel control R9 (0-400 volt range), which is part of a voltage divider running from the regulated B+ output lead (V2-V3 cathodes) to the full negative voltage end of the bias supply bleeder. This voltage divider consists of R10, R8, R9, R13 and R14. The bias supply bleeder network, R17 and R16, may also be considered part of the voltage divider in that it connects to the common return point for both supplies.

This voltage divider accomplishes a double purpose. It provides an adjustable range of negative grid bias for control tube V4, to permit control of the output voltage of the regulated B+ supply. It also allows any change of the output of the B+ supply, arising from any cause whatsoever, to appear as a proportional fractional change of the V4 bias. This change is amplified and applied in the opposite polarity to the V2-V3 control grids to oppose the variation and maintain a constant output voltage. The "0 CAL" internal adjust R8, and the "400V CAL" internal adjust R13, are inter-dependent adjustments that are set so that the range of the REGULATED OUTPUT control R9 is from 0 to 400 volts (read on the panel voltmeter).

The REG. VOLTAGE toggle switch S2 disconnects the 0-400 volt supply from the REG. OUTPUT terminals (and the milliammeter) at the OFF position to provide the convenience of standby operation. The VOLTMETER SEL. slide switch S3 connects the voltmeter, with appropriate multiplier R25 for the 0 to 400 volt range, across the 0 to 400 volt supply at the REG. VOLTAGE position.

REGULATED BIAS VOLTAGE SUPPLY

The regulated 0 to -150 volts bias voltage supply consist of half-wave rectifier V5, connected across the center-tap and one end of the 440-0-440 winding of transformer T1 used to operate the regulated B+ supply; a pi-type RC filter; VR glow tubes V6 and V7 connected in series across the output to provide voltage regulation; and BIAS VOLTAGE control R16 (on the panel) in a bleeder network. The BIAS VOLTAGE control R16 is used to set the desired negative bias voltage read on the 0 to 200 volt range of the voltmeter. The VOLTMETER SEL. slide switch S3 connects the voltmeter, with appropriate multiplier R15 for the 0-200 volt range, across the 0 to -150 volt supply at the BIAS VOLTAGE position.

AC FILAMENT VOLTAGE SUPPLIES

As described in the specifications.

OPERATION

WARNING

LETHAL HIGH VOLTAGES ARE PRESENT ON THE PANEL TERMINALS OF THIS EQUIPMENT. IN OPERATION, BE VERY CAREFUL TO AVOID CONTACT WITH THESE HIGH VOLTAGES. IN GENERAL, SET THE POWER SWITCH AT OFF FOR SAFETY WHILE CHANGING CONNECTIONS.

USING REGULATED B+ POWER SUPPLY

1. Set controls as follows: POWER switch to OFF, REG. VOLTAGE switch to OFF, REGULATED OUTPUT control to "0", VOLTMETER SEL. switch to REG. VOLTAGE.
2. Connect load across (+) and (-) REGULATED OUTPUT terminals. For B+ supply use, connect jumper between (-) and GND. terminals for minimum hum. For B- supply use, omit jumper.
3. Set POWER switch at ON and allow a minute or so for the equipment to warm up and reach a steady condition.
4. Set REG. VOLTAGE switch at ON and rotate REGULATED OUTPUT control clockwise until required operating voltage is read on the 0-400 volts dc voltmeter scale. Read load current on the 0-200ma dc milliammeter. Maximum load current is limited to 100ma for output voltage from 0 to 200 volts, or 150ma for output voltage from 200 to 400 volts. Up to 125ma load current is permissible in the 0 to 200 volt range if the use is not continuous.
5. Set both POWER and REG. VOLTAGE switches at OFF before removing or changing load connections, both to avoid shock hazard and the risk of accidentally shorting the supply terminals.

IMPORTANT

To simply disconnect the REGULATED OUTPUT terminals from the internal regulated supply for standby operation, set the REG. VOLTAGE switch at OFF. There will be no warm-up delay when the switch is returned to ON.

USING REGULATED BIAS VOLTAGE SUPPLY

1. Set controls as follows: POWER switch to OFF, BIAS VOLTAGE control to "0", VOLTMETER SEL. switch to BIAS VOLTAGE.
2. Connect a load that will not draw more than 2ma from the supply across the (+) and (-) BIAS VOLTAGE terminals. Note that the (+) BIAS VOLTAGE terminal and the (-) REGULATED OUTPUT terminal are both internally connected to the common return for both supplies, namely the center-tap of the high voltage transformer winding. The (+) BIAS VOLTAGE terminal is normally connected to chassis or B- of the equipment being operated. The (-) BIAS VOLTAGE terminal is connected to the point where it is desired to apply negative bias.
3. Set the POWER switch at ON, and allow a minute or so for the equipment to warm up and reach a steady condition.
4. Rotate the BIAS VOLTAGE control clockwise until the required bias voltage is read on the 0-200 volt dc voltmeter scale. Note that the current drawn from the bias supply is not indicated on the dc milliammeter.

5. Set the BIAS VOLTAGE control fully counter-clockwise to 0, and the POWER switch at OFF, before removing or changing load connections, both to avoid shock hazard and the risk of accidentally shorting the bias supply terminals.

USING THE FILAMENT SUPPLIES

1. Set the POWER switch at OFF, before making connections, to avoid the risk of accidentally shorting the filament supply terminals.

2. The two-terminal and three terminal 6.3VAC outputs are each rated at 3 amperes maximum and are taken from separate windings of the power transformer. The center terminal of the three-terminal set is the winding center-tap; 3.15VAC at 3 amperes maximum is available between this center-tap terminal and either of the adjacent terminals.

3. When 12.6VAC is required, strap the right terminal of the two-terminal 6.3VAC output to the left terminal of the three-terminal 6.3VAC output. When this is done, the outside terminals, linked by the dashed line on the panel, will provide 12.6VAC at 3 amperes maximum.

4. When 6.3VAC at 3 to 6 amperes is required, strap the left terminal of the two-terminal 6.3VAC output to the left terminal of the three-terminal 6.3VAC output; also, strap the right terminal of the two-terminal 6.3VAC output to the right terminal of the three-terminal 6.3VAC output. Each strapped pair of terminals now constitutes one terminal of a 6.3VAC source rated at 6 amperes maximum.

MAINTENANCE — GENERAL

Little service should be required except for normal tube replacement. Do not substitute for the tube types used. Factory-wired instruments have the internal 0 and 400 volt limit adjustments in the regulated B+ supply adjusted at the factory. Units built from the kit require these adjustments to be made as described below.

CABINET REMOVAL

To remove the instrument from the cabinet, first unplug the line cord, and then remove two #6 sheet metal screws at the rear. The instrument can be removed from the front of the cabinet.

WARNING

LETHAL HIGH VOLTAGES ARE PRESENT WITHIN THIS EQUIPMENT. BE VERY CAREFUL TO AVOID CONTACT WITH THESE HIGH VOLTAGES IF FOR ANY REASON THE EQUIPMENT IS OPERATED OUTSIDE OF ITS CABINET.

INTERNAL ADJUSTMENTS

The 0 to 400 volt range limits of the REGULATED OUTPUT control R9 on the panel must be set by adjustment of the "0 CAL" pot R8 and the "400V CAL" pot R13. R8 and R13 are accessible when the cabinet is removed and are located in Fig. 1.

For these adjustments, no other equipment is required and no connections are made to the panel terminals. The procedure must be performed exactly as given below, as otherwise there is danger of damaging filter capacitor C3 by application of excessive voltage.

1. Turn "0 CAL" pot R8 fully counter-clockwise.
2. Turn "400V CAL" pot R13 fully clockwise.
3. Plug line cord into 120 VAC line outlet.
4. Throw POWER and REG. VOLTAGE switches both to ON, and set VOLTMETER SEL switch at REG. VOLTAGE.
5. Allow equipment to warm up.
6. Turn REGULATED OUTPUT control R9 fully clockwise.
7. Turn "0 CAL" pot R8 clockwise until the meter reads exactly 400 volts (full scale)
8. Turn REGULATED OUTPUT control R9 fully counter-clockwise.
9. Turn "0 CAL" pot R8 counter-clockwise until meter reads exactly zero.
10. Turn REGULATED OUTPUT control R9 fully clockwise.
11. Turn "400V CAL" pot R13 until the meter reads exactly 400 volts (full scale). This completes the adjustments.

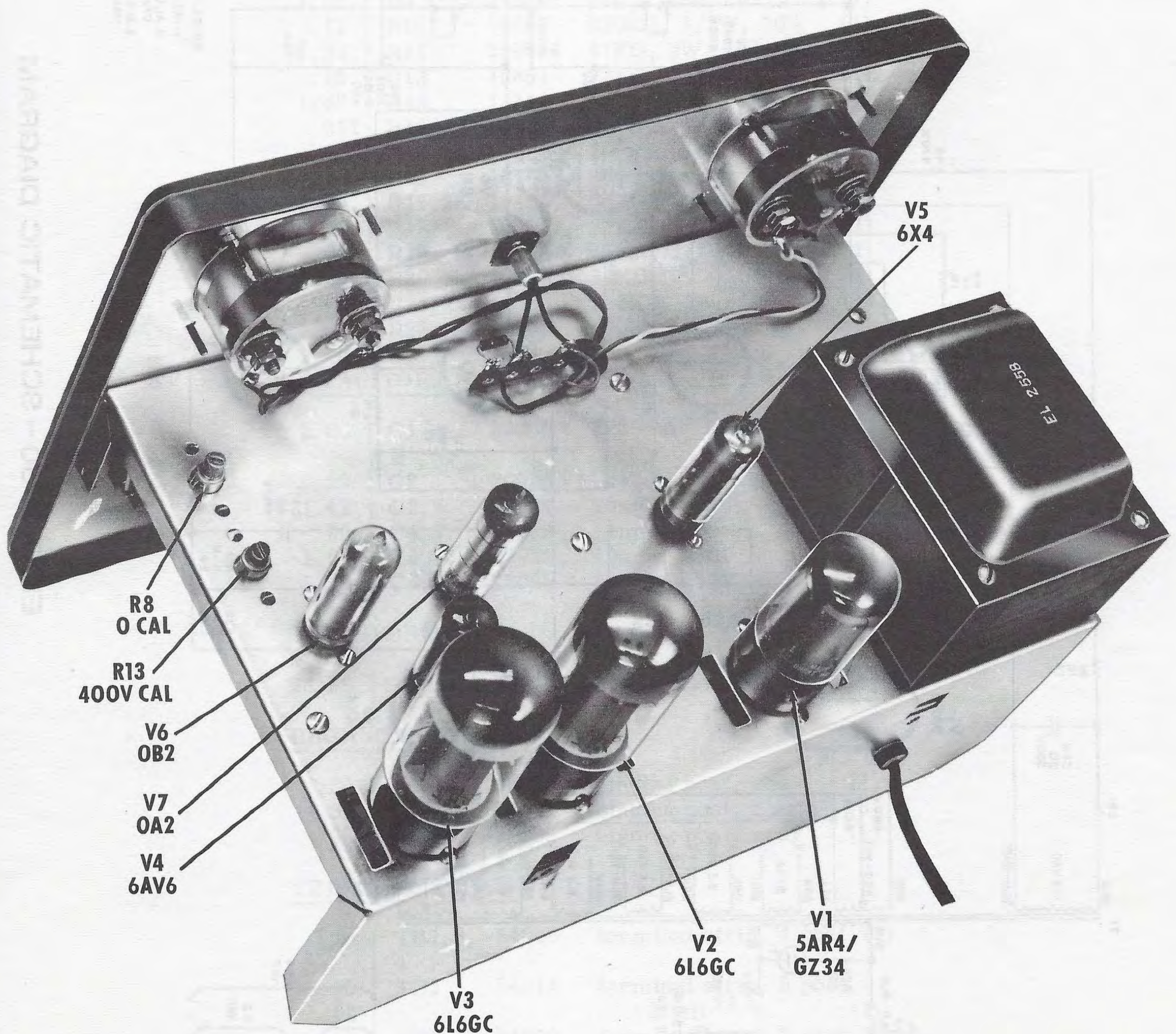
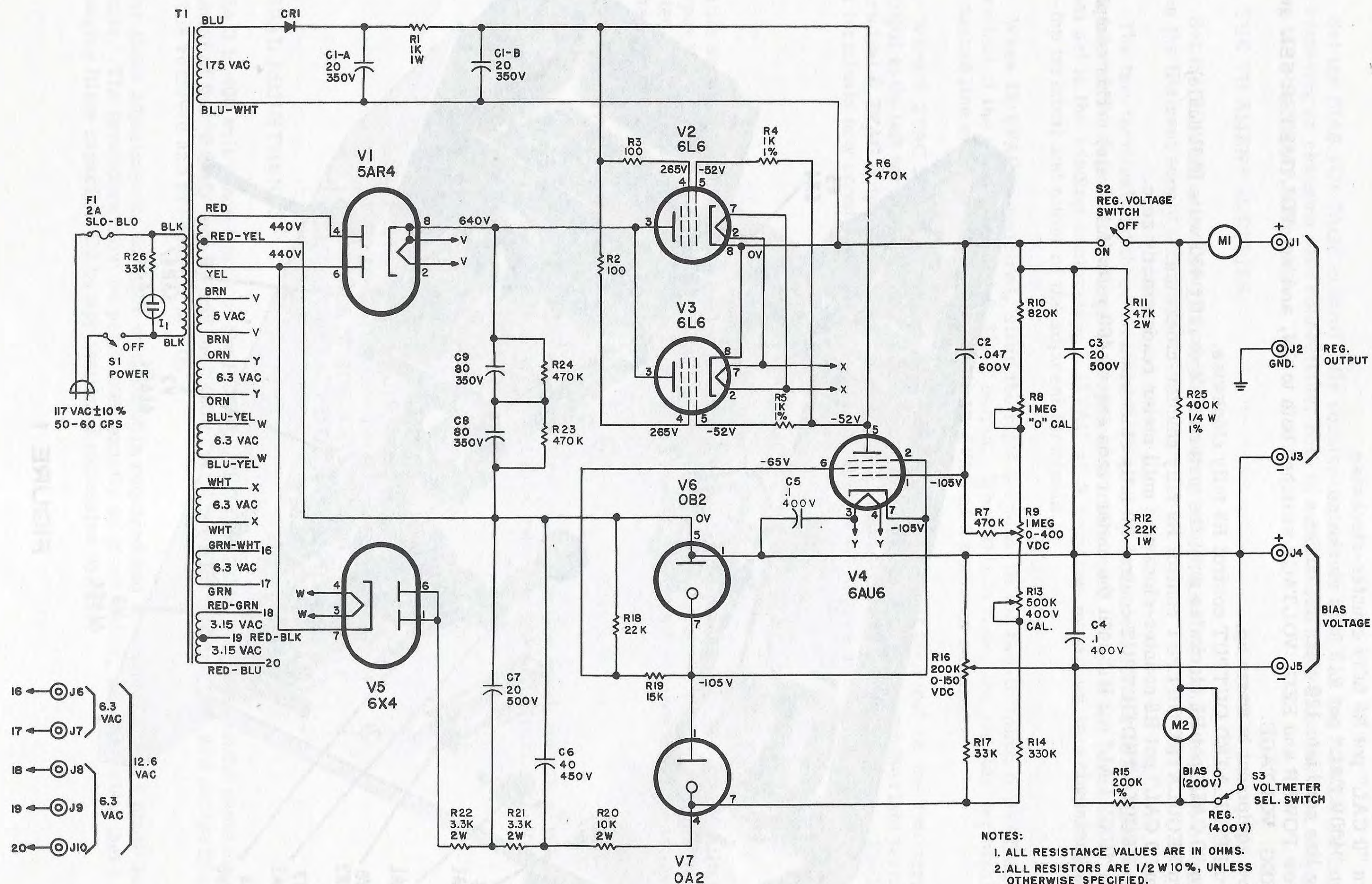


FIGURE 1



EICO 1030 - SCHEMATIC DIAGRAM

PARTS LIST

PRICE EACH	SYM. #	STOCK#	DESCRIPTION
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RESISTORS

.14	R1	10802	1K Ω , 1W, 10% (1)
.11	R2, 3	10439	100 Ω , 1/2W, 10% (2)
.47	R4, 5	11080	1K Ω , 1/2W, 1% (2)
.08	R6, 7, 23, 24	10431	470K Ω , 1/2W, 10% (4)
1.37	R8	18030	pot., 1M Ω , snap-in (1)
1.22	R9	16006	pot., 1M Ω , lin. (1)
.11	R10	10466	820K Ω , 1/2W, 10% (1)
.34	R11	10955	47K Ω , 2W, 10% (1)
.15	R12	10851	22K Ω , 1W, 10% (1)
1.48	R13	18116	pot., 500K Ω , snap-in (1)
.011	R14	10412	330K Ω , 1/2W, 10% (1)
.44	R15	11026	200K Ω , 1/4W, 1% (1)
1.19	R16	18165	pot., 200K Ω , lin. (1)
.09	R17, 26	10426	33K Ω , 1/2W, 10% (2)
.11	R18	10424	22K Ω , 1/2W, 10% (1)
.08	R19	10416	15K Ω , 1/2W, 10% (1)
.34	R20	10956	10K Ω , 2W, 10% (1)
.32	R21, 22	10963	3.3K Ω , 2W, 10% (2)
.44	R25	11029	400K Ω , 1/4W, 1% (1)

CAPACITORS

2.06	C1-A- B	23086	2x20mfd, 350V (1)
.29	C2	20026	.047mfd, 600V (1)
1.42	C3, 7	23084	20mfd, 500V (2)
.29	C4, 5	20039	.1mfd, 400V (2)
1.61	C6	23021	40mfd, 450V (1)
1.88	C8, 9	23085	80mfd, 350V (2)

TRANSFORMERS

23.68	T1	30077	power transformer (1)
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BINDING POSTS

.39	J1, 4	52002	binding post, red (2)
.39	J2, 3, 5	52001	binding post, black (3)
.38	J6-10	52005	binding post, gray (5)

TERMINAL STRIPS

.10	TB1, 3, 4	54008	terminal strip, 4 post (3)
.10	TB2	54014	terminal strip, 3 post, 2 left (1)
.10	TB5	54003	terminal strip, 2 post (1)
.10	TB6	54006	terminal strip, 3 post, 2 right (1)

PRICE EACH	SYM. #	STOCK#	DESCRIPTION	
<u>SWITCHES</u>				
1.02	S1, 2	61006	toggle switch, SPST	(2)
.45	S3	62028	slide switch; DPDT	(1)
<u>METERS</u>				
14.60	M1	71009	ammeter, 0-200ma	(1)
14.60	M2	71010	voltmeter, 0-400V	(1)
<u>TUBES & DIODES</u>				
3.44	V1	90044	tube, 5AR4/GZ34	(1)
4.32	V2, 3	90031	tube, 6L6GC	(2)
2.08	V4	90020	tube, 6AU6	(1)
3.08	V5	90070	tube, OB2	(1)
3.15	V6	90071	tube, OA2	(1)
1.72	V7	90036	tube, 6X4	(1)
3.80	CR1	93006	silicon diode, 800 PIV, 750ma	(1)
<u>TUBE SOCKETS</u>				
.18	XV1, 2, 3	97003	socket, 8 pin octal	(3)
.19	XV4, 5, 6, 7	97034	socket, 7 pin min.	(4)
.50	F1	91014	fuse, 1.5 Amp, Slo Blo	(1)
.54	I1	97715	neon indicator	(1)
.96	XF1	97800	fuseholder	(1)
<u>MISCELLANEOUS COMPONENTS & HARDWARE</u>				
.01	40000		nut, hex, #6-32	(12)
.02	40001		nut, hex, #3/8-32	(2)
.01	40007		nut, hex, #4-40	(10)
.01	40008		nut, hex, #8-32	(4)
.07	40016		nut, hex, 1/2-24	(1)
.02	40045		nut, hex, #8-32	(20)
.01	40026		nut, #8 Tinnerman, Type J	(2)
.01	41000		screw, 6/32 x 1/4, B. H.	(12)
.01	41003		screw, 8/32 x 3/8, B. H.	(2)
.01	41016		screw, 4/40 x 1/4	(8)
.01	41091		screw, 4/40 x 1/4, F. H.	(2)
.02	41140		screw, 6/32 x 3/16, P. K., P. H.	(10)
.02	42000		washer, lock, 3/8"	(2)
.01	42001		washer, flat, 3/8"	(2)

PRICE EACH	STOCK#	DESCRIPTION	
.01	42002	washer, lock, #6	(12)
.01	42007	washer, lock, #4	(10)
.01	42008	washer, lock, #8	(4)
.03	42029	washer, rubber, 1/2"	(1)
.01	42032	washer, flat, #8	(4)
.05	42043	washer, shoulder, bakelite, black	(3)
.02	42044	washer, bakelite, black	(7)
.04	42045	washer, brass, 1/8" thick	(1)
.04	42056	washer, shoulder, bakelite, gray	(5)
.01	42061	washer, flat, #8	(10)
.01	42062	washer, split, #8	(10)
.01	42508	washer, shoulder, bakelite, red	(2)
.04	42509	washer, bakelite, red	(2)
.02	42511	retainer for I1 (97715)	(1)
.02	43019	lug, ground, #8	(10)
.02	43003	lug, meter	(4)
<u>MISCELLANEOUS</u>			
.03	46000	grommet, 3/8"	(1)
.08	46016	plastic feet	(4)
.53	53036	knob, gray	(2)
.54	57004	line cord, gray	(1)
5.85	80186	panel, decorative	(1)
5.25	81478	chassis	(1)
1.92	86007	frame	(1)
1.08	87007	handle	(1)
9.85	88124	cabinet	(1)
.10	82101	strain relief	(1)
.10	89679	handle mounting bracket	(2)
.20	89680	plate for 89679	(2)
1.50	66172	Operating Manual	(1)
1.50	66405	Assembly Manual	(1)
	89359	label, nomenclature	(1)

To order replacement parts, specify description and part number. Remittance must be made with order, and include \$1.00 for mailing and handling with each order (\$1.50 for each transformer if order includes 1 or more output or power transformers). Prices subject to change without notice.

MODEL 1030 ADDENDUM

Please make the following corrections to your Operating Manual:

Page 5, "Internal Adjustments":

(Steps 1 thru 6 remain unchanged)

Steps 7 thru 11 are to be revised as follows:

7. Turn "0 CAL" pot R8 clockwise for maximum reading on voltmeter.
8. Turn "400 V CAL" pot R13 until meter reads 400V.
9. Turn REGULATED OUTPUT control R9 fully counter-clockwise
10. Adjust "0 CAL" pot R8 until meter reads zero volts.
11. Turn REGULATED OUTPUT control R9 fully clockwise and readjust R13 until meter reads 400 volts.

Add Step 12:

12. Repeat steps 9 to 11 until REGULATED OUTPUT control R9 will adjust from zero volts to 400 volts.

Page 5, Fig. 1:

Change V4 6AV6 to V4 6AU6

Replacement Parts List, Page 8:

Change Stock # of V6-Tube, OA2 from 90071 to 90074

If you have a kit, please make the following corrections to your Assembly Manual:

Page 9, Fig. 2, Step 10, at the end of the step, add:

"(Omit the ground lug)".

Page 9, Fig. 2, Step 11, next to last sentence: Change

"Do not mount No. 8....." to "Mount No. 8....."

Page 11, Fig. 5, Step 9: Change complete step to:

- "9. () Strip 1 inch of insulation from a 3-1/2 inch BROWN wire. Pass this end through SOCKET XV4-2 (S1). Put a piece of tubing 3/8 inch long on the end that came through XV4-2 and connect to XV4-7 (S1). Connect the other end to SOCKET XV7-1 (C)".

Page 12, Fig. 5, Step 27: Change "SEPERATE" to "SEPARATE".

MODEL 1030 ADDENDUM (Cont'd.)

Page 13, Fig. 7, Step 2: Change CAPACITOR C10 to C8. Change TB1-1 (S3) to TB1-2 (S2).

Page 13, Fig. 7, Step 8: Change TB2-3 (C) to TB2-3 (S2).

Page 14, Fig. 7, Step 12: " TB5-2 (S2) to TB5-1 (S2).

Page 14, Fig. 7, Step 13: " TB5-1 (S2) to TB5-2 (S2).

Page 14, Fig. 7, Step 16: " SILICONE to SILICON.

" TB3-2 (S2) to TB3-3 (S2).

Page 14, Fig. 7, Step 19: " SOCKET XV4-5 to XV4-5 (C).

Page 16, Fig. 8, Step 5, at the end of the Step, add:

"It is best to test and calibrate the unit after this step.
Please refer to pages 4 and 5 of your Operating Manual."

Construction Fig. 7: Change numbering on TB5: 1 becomes 2 and 2 becomes 1.

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EICO

Service Policy

PARTS REPLACEMENT

If it appears that a component is defective, and you desire a replacement, contact your EICO Distributor, the nearest EICO Authorized Service Agency or our Customer Service Department.

If you are claiming the right to a no-charge replacement under the terms and conditions of the warranty, it is required that you shall have sent in the registration card within 10 days of the date of purchase, and that you send back the defective part transportation prepaid. In claiming warranty service or parts, please send or show your original sales slip plus the IBM card from the carton. EICO or its authorized agency will make the necessary replacement at no charge for parts eligible under the terms and conditions of the warranty. In returning tubes, pack them very carefully to avoid breakage in shipment. Broken tubes will not be replaced. Please read the warranty on the subject of parts eligible for replacement.

Further information required on a part returned for a no-charge replacement under the terms and conditions of the warranty is as follows:

- a) Model number and serial number, if any, of unit. Also any code numbers in red under the words INSTRUCTION MANUAL on the cover of the book supplied with the unit or Revision number, such as Rev. 1, Rev. 2, etc.
- b) Stock number and description of part as given on the parts list. If the part is not listed (of itself) in the parts list, it means that the part is integral with a sub-assembly, which we consider replaceable only as an entity. Parts integral with a sub-assembly may be listed in the parts list, so identified, if we consider that some or all of the parts may be individually replaced in the field under appropriate circumstances. If your unit is out of warranty, you are generally advised to order a replacement sub-assembly.
- c) Describe as completely as possible the nature of the defect, or reason for requiring replacement.

REPAIR SERVICE

EICO maintains a national network of authorized service agencies, in addition to repair facilities at the factory, for in-warranty or out-of-warranty repair of EICO equipment. It is intended to serve those customers who are not sufficiently familiar with electronics to make use of the EICO Service Consultation facilities, or whose difficulties cannot be solved by correspondence.

For all out-of-warranty units repaired at the factory there is a minimum labor and handling fee. Charges for parts replaced are additional to the minimum fee.

For in-warranty completed kit units repaired at the factory there is a minimum labor and handling fee. There is no charge for a replaced defective part provided that the terms and conditions of the warranty for no charge replacement are not violated in the judgement of EICO.

For in-warranty factory-wired units, there is no charge for labor or parts if the unit complies with the terms and conditions of the warranty in the judgement of EICO. However, if the terms and conditions of the warranty are violated there will be a charge for labor plus parts.

In all cases, the unit must be sent to the factory or service agency transportation prepaid, and the unit will be returned to the customer transportation collect.

On kits, the services rendered for the minimum labor and handling fee by the factory are the correction of any minor wiring errors (not extensive corrections or rewiring), the labor involved in replacing defective parts, and any adjustments, alignment, or calibration procedures that would normally be performed on a factory-wired unit. Units not wired according to instructions, or modified in any way, or showing evidence of the use of acid core solder, will not be serviced and will be returned to the customer forthwith.

SEE SCHEDULE OF FACTORY SERVICE CHARGES

Units requiring extensive corrections or rewiring will incur an additional labor charge. An advance estimate will be submitted.

Please note: minimum labor and handling fees and service charges are subject to revision at any time.

LOCAL REPAIR FACILITIES

A list of authorized service stations is provided with your manual. The roster of stations may change from time to time, and if considerable time has elapsed since you purchased your unit, you are advised to contact the station you choose before sending the unit to them for repair. Use of a local service station will often result in faster service, and, usually, lower transportation costs.

It is necessary that you comply with the Shipping Instructions that follow when sending in a unit for service.

SHIPPING INSTRUCTIONS

You are strongly advised to retain the original shipping carton and inserts should reshipment be required for service or any other purpose. The carton may be collapsed for storage in as small a space as possible. In very many cases, the same carton is used for kit and factory-wired units so that the kit carton will serve for reshipment of the completed kit.

When sending a unit for service pack the unit very carefully, preferably in the original shipping carton with the original inserts. Be sure to place the bottom plate, cover, and supporting bracket, if any, on the unit before shipping.

If this is not possible, use a strong oversize carton, preferably wood, and using at least 3 inches of resilient packing material such as shredded paper or excelsior inserted between all sides of the unit and the carton. Seal the carton with strong gummed paper tape or strong twine or both. Attach a tag to the instrument on which is printed your name and address and brief reference to the trouble experienced. Affix "FRAGILE" or "HANDLE WITH CARE" labels to at least four sides of the carton or print these words large and clear with a bright color crayon. Ship prepaid.

Include your name and address on the outside of the carton. Return shipment will be made transportation charges collect. Note that a carrier cannot be held liable for damage in transit, if packing, IN HIS OPINION, is insufficient.



THE EICO WARRANTY



The Electronic Instrument Company, Inc., hereafter referred to as EICO, warrants that, for a period of 90 days from the date of purchase, any EICO kit will be free of defects in parts, and that any EICO factory-wired unit will be free of defects in parts and workmanship. For an EICO kit, EICO's obligation is limited to those parts which are returned transportation prepaid to the factory or authorized service agency without further damage, and in the judgement of EICO are either originally defective or have become defective in normal use. EICO's obligation does not include any labor required to locate trouble in or repair a kit. For an EICO factory-wired unit, EICO's obligation is limited to replacement or repair, at EICO's option, of those parts, sections, or entire units returned transportation prepaid to the factory or authorized service agency without further damage, and in the judgement of EICO are either originally defective or have become defective in normal use.

The warranty does not apply to any parts damaged in the course of handling, assembling, or wiring by the customer, or damaged due to abnormal usage or in violation of instructions or reasonable practice, or further damaged to a consequential degree in return shipment. Furthermore, the foregoing warranty is made only to the original customer, and is and shall be in lieu of all other warranties, whether expressed or implied, and of all other obligations or liabilities on the part of EICO, and in no event shall EICO be liable for any anticipated profits, consequential damages, loss of time, or other losses incurred by the customer in connection with the purchase or operation of EICO products or components thereof.

The registration card, which accompanies each EICO kit or factory-wired unit, must be filled in and returned to the company within 10 days after the date of purchase. This warranty applies only to registered units.

SCHEDULE OF FACTORY SERVICE CHARGES

(Consult your local EICO authorized service agency for THEIR charges.)

1. Same prices for wired units or completed kits.
2. Charges are based on the schedule of minimum charges above. Some exceptions are noted below.
3. If the published rate is \$5.00 - \$6.00, this covers up to 1 hour of labor time (minimum \$5.00).
If the published rate is \$6.50 - \$8.00, this covers up to 1½ hours.
If the published rate is \$9.00 - \$10.00, this covers up to 2 hours.
If the published rate is \$11.00 - \$14.50, this covers up to 2½ hours.
If the published rate is \$15.00 - \$20.00, this covers up to 3½ hours.
If the published rate is \$25.00, this covers up to 5 hours.
4. Time required in excess of these minimum charges is calculated at \$5.00 per hour.
5. Above prices are for labor only. Parts are additional.
6. Miscellaneous prices not published in manuals are:
Probes \$2.00
CRA & CRU \$3.00
Printed circuit board assemblies \$5.00
7. ESTIMATES: An estimate for repairs will be given before repairs are made where repairs will exceed stated minimum charges. If you choose not to have your unit repaired, a charge of \$3.00 for estimating time will be made.
8. All prices are subject to change without notice.

MINIMUM LABOR AND HANDLING FEES

AF4	\$ 7.50	488	\$ 5.00
RA6	5.00	495	5.00
HF12	7.50	526	5.00
HF14	5.00	536	5.00
HF20	10.00	540	5.00
HF22	5.00	555	5.00
HF30	5.00	556	5.00
HF32	9.50	565	5.00
HF35	5.00	566	5.00
ST40	15.00	567	5.00
HF50	5.00	584	5.00
HF52	10.00	610	5.00
HF60	5.00	612	5.00
HF61	6.00	615	5.00
HF61A	6.00	625	6.00
HF65	6.50	628	7.00
HF65A	6.50	630	5.00
ST70	15.00	632	7.00
HF81	13.50	636	5.00
ST84	10.00	666	10.00
HF85	8.00	667	10.00
HF86	9.00	680	6.00
HF87	9.00	706	5.00
HF89	9.00	710	5.00
HFT90	7.50	711	7.00
HFT92	9.00	712	10.00
HFT94	7.50	715	5.00
ST96	13.50	720	13.50
ST97	13.50	722	9.00
MX99	7.50	723	10.00
RP100*	*	730	10.00
Playback Amp only	5.00	740	9.00
Power Supply only	5.00	751	11.00
Record Amp only	5.00	752	11.00
Head Alignment		753	25.00
only	10.00	760	9.00
145	5.00	761	9.00
145A	5.00	762	9.00
147	5.00	770	12.00
214	6.00	771-2	12.00
221	6.00	777	20.00
222	7.00	779, A	17.00
232	6.00	790	20.00
235	6.50	791	5.00
249	6.00	803	5.00
250	7.00	888	6.00
255	7.00	902	25.00
260/261	7.00	944	5.00
315	6.00	950	5.00
320	5.00	955	6.00
322	5.00	965	15.00
324	5.00	1020	5.00
342	15.00	1030	10.00
352	5.00	1050	5.00
360	5.00	1055	5.00
368	12.50	1060	5.00
369	12.50	1064	6.00
377	6.00	1073	5.00
378	7.00	1078	5.00
380	16.00	1100	5.00
425	6.00	1120	5.00
427	12.50	1140	5.00
430	12.50	1171	5.00
435	15.00	1180	5.00
460	15.00	2036	13.50
470	15.00	2050	13.50
		2080	13.50
		2200	10.00
		2400*	*
		2510	12.00
		2536	17.50
		2715/16	10.00
		3070	12.00
		3200	12.00
		3566	25.00
		4000	20.00
		7923	19.00

* Model RP100 and Model 2400 will be billed on the basis of \$10.00 for the first hour and \$5.00 each additional hour, with a maximum unauthorized repair of \$50.00 for the kit and \$25.00 for a wired unit.

EICO ELECTRONIC INSTRUMENT CO., INC.
131-01 39th Ave., Flushing, N.Y. 11354
AUTHORIZED WARRANTY SERVICE AGENCIES

ALABAMA

Birmingham
Nelco Service Co.
2900 - 4th Ave. S.

Mobile
Universal Electronics & Instr. Svce.
3058 Brookline Dr. W.

Montgomery
Audio Service Center
319 Fleming Rd.

ARIZONA

Phoenix
Hi-Fi Stereo Specialists
1042 East Camelback Rd.
(Hi-Fi Only)

Tucson
Park Music Shop
1702 E. Speedway

CALIFORNIA

Anaheim
United Sound & TV Co.
2010 W. Lincoln Ave.

Barstow
Roy's Communications Svce.
615 E. Main St.

Los Angeles
Electronic Instruments Service
8921 S. Vermont Ave.
United Sound & TV Co.
5036 Venice Blvd.

San Diego
Lewton's Radio & TV
4251 University Ave.
(High Fidelity Only)

San Francisco
Prompt Radio & TV Co.
3143 Mission St.
(Hi-Fi & Tape Recorders only)

COLORADO

Colorado Springs
Clyde N. Still
2630 W. Kiowa St.

Denver
A. B. & K. Service, Inc.
1459 South Pearl St.

CONNECTICUT

Groton
Francis Electronics, Inc.
565 Long Hill Rd.

West Hartford Center
Herbert Electronics
959 $\frac{1}{2}$ Farmington Ave.

New Haven
Baltimore Electronics
546 Whalley Ave.
(Hi-Fi Only)

CONNECTICUT (cont'd)

Norwich
La Course Radio-Electric Svce.
184 Franklin St.

FLORIDA

Miami
Spire Audio-Visual Co.
24 N. W. 36th St.

North Miami Beach
Southeastern Communications, Inc.
2055 N. E. 151st St.

Orlando
Electronic Service Labs.
1024 N. Mills
Electro-Tech., Inc.
307-27th St.
(Instruments Only)

Tampa
Maurice Wood
7016 N. Armenia Ave.

GEORGIA

Hapeville
Electro-Tech, Inc.
3020 Commerce Way
(Instruments Only)

HAWAII

Honolulu
CAATEX Corp.
1223 Hopaka St.

IDAHO

Twin Falls
TV Tuner Service
P. O. Box 793

ILLINOIS

Oak Park
B & S Electronics, Inc.
6326 W. Roosevelt Rd.

Chicago
Electronic Engineers, Inc.
5615 W. Division St.

Springfield
Stelte Communication Engineers
1700 East Jackson St.

INDIANA

Indianapolis
Component Electronics
319 W. Maryland St.

IOWA

Cedar Rapids
Gene's Radio & TV
503-8th Ave. S. E.

Sioux City
Mar-Bon, Inc.
Route 2, Box 138
(CB & Ham Only)

KENTUCKY

Louisville
Maury's Fluorescent & Appl. Svce
962 South 3rd St.

LOUISIANA

Kenner
Coastal Electronics
2114 Williams Blvd.

Lake Charles
TEK Service, Inc.
212 Ridge View Drive
(Instruments Only)

New Orleans
Transistor Electronics Svce. Co.
Room 5, Bldg. 17
Foreign Trade Zone

MAINE

Portland
Bartlett Radio Co.
181 Brackett St.

MARYLAND

Baltimore
Clayton Electronics, Inc.
5940 York Rd.

Bethesda
American Technical Services
4961 Bethesda Ave.

MASSACHUSETTS

Boston
Park Armature Co.
1218-30 Columbus Ave.

Pembroke
South Shore Instrument Labs.
20 Chapel St.
(Instruments Only)

Somerville
Electronic Repair Svce.
206-208 Highland Ave.

Worcester
Audio-Visual Associates
8 Boylston St.

MICHIGAN

Detroit
McNichols Electronic Svce.
13725 W. McNichols

MINNESOTA

Minneapolis
Andersen Audio Laboratory
4145 Minnehaha Ave. South

MISSOURI

Kansas City
Carroll Electronics
2410 Grand Ave.

(continued on reverse side)

MISSOURI (continued)

St. Louis
Scherrer Instruments
5449 Delmar Blvd.
A. A. Kelley Radio & Elect. Svce.
4181 Manchester

NEBRASKA

Lincoln
Northland Electronics
1601 "P" St.

Omaha
Hi-Pix Stereo Service
3427 S. 42nd St.

NEW HAMPSHIRE

Manchester
Roland Demers Svce. Co.
436 Maple St.
Wholesale Electronics Corp.
40 Bridge St.

NEW JERSEY

Jamesburg
Universal Television Svce.
39 E. Railroad Ave.

Newark
Associated Electronics
464 Orange St.
(Hi-Fi & Tape Recorders Only)

Riverside
Dixey-Bonas TV
52 Scott St.

Singac
Hosica Laboratories
715 Main St.

NEW YORK

Albany
Baker Electronics
514 Second St.

Binghamton
Ross' Radio & TV Service
116 Main St.

Hastings on the Hudson
(Westchester County)
Central TV & HI-FI Service
543 Warburton Ave.

Huntington Station
Suffolk Sound Repair, Inc.
1671 New York Ave.

New Hyde Park
Ethical Electronic Service
3330 Hillside Ave.

New York City
Manhattan
Winters' Radio Laboratory
11 Warren St.

Brooklyn
G. M. T. V.
252 Prospect Park West

Queens
Great Northern Tronics, Inc.
145-04 Jamaica Ave.

Syracuse
Radio & Electronic Svce.
401 N. Townsend St. at Willow
Vestal
Compton Industries, Inc.
333 Vestal P'kway East

West Hempstead
Audotronic, Inc.
96 Hempstead Turnpike

NORTH CAROLINA

Charlotte
Electro-Tech, Inc.
3107 Cullman Ave.
(Instruments Only)

Tryon Repair Service
3125 Tuckaseegee Rd.

Raleigh
Speed Instrument Co.
3028 E. Rothgeb Dr.
(For Instruments Only)

OHIO

Cleveland
Electronic Instrument Labs. Corp.
3617 Detroit Ave.
(Instr. & Test Eqpt. Only)

Bob Whitlow Radio & TV
13914 St. Clair Ave.

Dayton
Audio Labs.
59 Oxford Ave.

Toledo
Don's Electronics
1682 Belmont Ave.
(Hi-Fi & Tape Recorders Only)

OREGON

Lebanon
Lines Communications
RR Box 226X
(C-B Only)

PENNSYLVANIA

Delmont
Eltron Electronics
P. O. Box 99

Havertown
Michael's TV & Radio Service
1127 West Chester Pike

Philadelphia
Electronic Servicenter
13 S. 21st St.

Transistor Eqpt. Service Ctr.
2212 Glendale St.

Woodlyn
(Suburban Philadelphia)
Altron Electronics Co.
1309 Jefferson Ave.

RHODE ISLAND

Pawtucket
Unique Radio Co.
736 Central Ave.

TENNESSEE

Chattanooga
Edwin Bohr/ Electronics
5880 Dayton Blvd.
(Instr. & Test Eqpt. Only)

TEXAS

Austin
Park Forest TV
2601 South First

Dallas
Hoblit Electronics
9549 Vinewood

El Paso
Test Equipment Co.
5319 Harlan Dr.

Ft. Worth
Knight's TV
2505 Earl Lane

La Feria
La Feria Radio & TV Service

San Antonio
Electronics Unlimited
4404 San Pedro

Texas City
Ham's Communication Svce.
3001 Somerset Ave.

U T A H

Bountiful
Anderton Electronic Lab.
129 E. 1800 South

Provo
Brickey Electronics Lab.
446 North 500 West

Salt Lake City
Radio Electronics TV Svce.
1876 E. 2990 South
(CB & Ham Only)

VIRGINIA

Arlington
Washington Electronic Service Co.
122 South Wayne St.

Virginia Beach
Hi-Fi Clinic
242 First Colonial Rd.

WASHINGTON

Seattle
Ron Merritt Co.
1320 Prospect St.

C A N A D A

Toronto, Ontario
John R. Tilton, Ltd.
51 McCormack St.

NEW ZEALAND

Auckland
John Gilbert & Co., Ltd.
Anzac Ave.

Since 1945, EICO has been recognized as a leader in the design and manufacture of electronic products in kit form. The wide range of equipment that EICO has made available covers nearly every phase of electronics—High Fidelity (Receivers, Amplifiers, Tuners and Speakers); tape recorders; test instruments, Citizen Band and Amateur Radio and Transistor Radios.

There is virtually no area of our every day life where EICO Products do not make a contribution. For there are more than 3,000,000 EICO Electronic Products in use in American homes, industry, military as well as in Federal, State and local Government. In the Nation's schools, EICO Test Instruments and training aids make it easier for students to learn about electricity and electronics.

EICO's 20 years of growth is a matter of public record. Responsible for this growth is the company's strict adherence to its policies of top quality products at reasonable prices. The Company's recent move to a modern 110,000 square foot plant marks the beginning of another era in EICO product development and contribution to the Nation's economy.

