Customer_____

G. E. Req. No._____

Customer Order No._____

INSTRUCTIONS

for

LOW BAND PROGRESS LINE
RF NOISE BLANKER
MODEL 4EZ15A10,11,12

LBI-3363

2272

GENERAL ELECTRIC

COMMUNICATION PRODUCTS DEPARTMENT
LYNCHBURG, VIRGINIA

Printed in U.S.A.

SPECIFICATIONS

Receiver Frequency	Blanker Frequency	Blanker Model
25-33 MC	29-37 MC	4EZ15A10
33-42 MC	38-48 MC	4EZ15A11
42-54 MC	47-58 MC	4EZ15A12

Blanking time - 10 microseconds

Maximum instantaneous repetition rate - 100 KC

Blanker RF bandwidth - 0.5 MC

Power Input - 12 volts as 0.45 amps or 6 volts at 0.9 amps
200 volts at 16 milliamps

RF impedance - 50 ohms

Dimensions (HWD) - 5" x 3" x 5-1/4"

Weight - 1 lb.

MAINTENANCE INSTRUCTIONS
PROGRESS LINE NOISE BLANKER
MODEL 4EZ15A10, 11, & 12

DESCRIPTION

The General Electric Progress Line Noise Blanker is designed to reduce ignition noise effects and other pulse type noise interference when used with Progress Line receivers operating in the 25-54 megacycle range.

The noise blanker is completely automatic in operation with no manual switching necessary. An automatic switching circuit in the blanker prevents the receiver from becoming disabled if unusually high noise pulse rates should occur. The blanker may be used with any low-band Progress Line receiver except those with dual front end.

When the General Electric Progress Line Noise Blanker is installed in the field, the Progress Line receiver must be modified according to the following instructions:

MODIFICATION INSTRUCTIONS
A-4038806

These instructions cover the installation of Modification Kit A-4038805 for application of Noise Blanker Model 4EZ15A10,11 & 12 to low-band Progress Line receivers.

1. Remove the shield can covering the bottom of transformer T313 (T315) on the receiver chassis. Unsolder the blue-white leads from XV302-7 and XV318-5, and the red lead from TB6-1.

2. Remove the nuts and lockwashers holding transformer T313 (T315) on the receiver chassis and remove and replace the transformer with T1 (T2) supplied in the receiver modification kit. Use the hardware from T313 (T315) to mount T1 (T2).

   If the receiver being modified was already tuned to the desired frequency, preset the slugs and trimmer capacitors of T1 (T2) as closely as possible to the settings of T313 (T315).

3. Solder the blue-white lead from transformer T1 (T2) to XV318-5 and the red lead to TB6-1. Replace the shield can.

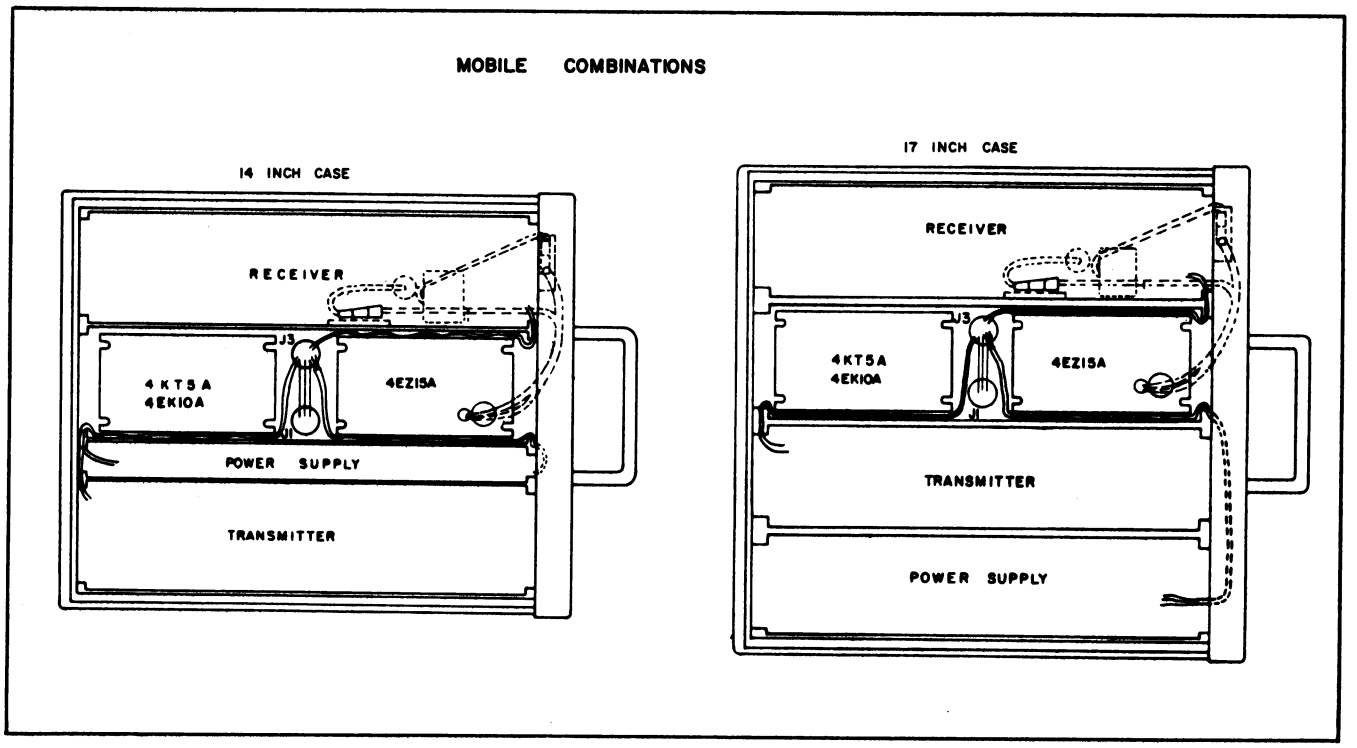
4. The center conductor of cable W2, supplied with the kit, is soldered to XV302-7, and the shield to the center post of XV302. If the receiver is a simultaneous monitoring model, the cable already present on the terminals should be left in place.

5. Before connecting the Noise Blanker to the receiver, plug cable W1 (part of transformer T1 (T2)) into cable W2 and tune the receiver for maximum sensitivity, following normal tuning procedures. The receiver will not meet normal sensitivity specifications when operating in this condition, but the signal required for 20 db quieting should not exceed 1 microvolt.

INSTALLATION

The Noise Blanker is installed in the Progress Line Combination on the tone squelch option panel. The blanker may be installed with or without the tone squelch option. For field installation refer to the instructions below and Service Sheet RC-901.

MOBILE INSTALLATION



RC-866

Fig. 1 Mobile Combinations. Installation of EZ-15-A

Mount the Noise Blanker on the option panel as shown in Figure 1 and plug P2354 into J1 on the option panel. The blue, red, black, brown and orange wires on J3 should be routed through the front channel member to the power supply. Clip the red lead between J3-2 and J1-2 and replace it with the 2200 ohm 2 wire resistor supplied in Hardware Kit A-4038799. Secure all the wires noted above to the bottom cover of the Noise Blanker as illustrated in Figure 2 before connecting them to the power supply as shown in the table below.

POWER SUPPLY	CONNECT BLUE WIRE FROM J3-7 TO	CONNECT RED WIRE FROM J3-2 TO	CONNECT BLACK WIRE FROM J3-3 TO	CONNECT BROWN WIRE FROM J3-4 TO	CONNECT ORANGE WIRE FROM J3-5 TO
4EP2A1	K502-3L	C504-A ☐	TB9-2	TB5-1	TB6-3
4EP2B1	K502-3L	C504-A ☐	TB9-2	TB5-1	TB6-3
4EP2E1	K506-3R	C504-A ☐	TB8-2	TB6-2	TB8-2
4EP2F1	K506-3R	C504-A ☐	TB8-2	TB6-2	TB8-2
4EP2C1	K506-3L	C519-A ☐	C503-G1	TB3-2	TB7-1
4EP2D1	K506-3L	C519-A ☐	C503-G1	TB3-2	TB7-1
4EP2K 1	K506-3L	C519-A ☐	C503-G1	TB3-2	TB7-1
4EP2G1	K502-3L	C504-A ☐	TB9-3	TB5-2	TB4-1
4EP2H1	K506-3L	C504-A ☐	TB9-3	TB9-4	TB4-2
4EP2J1	K506-3L	C504-A ☐	TB9-3	TB9-4	TB4-2
4EP2L1	K502-6L	C519-A ☐	TB9-2	C554 ☐	TB6-3
4EP14A1, B1, C1, D1	TB2-21	TB2-19	C501-G	J502-14	L502-1

Table 1 - Power Supply Connection

Cables W2351 and W2352 from the Noise Blanker connect to cables W2 and W1 respectively on the receiver. The connectors at the junction of W2351-W2 are secured on the flat bracket near XV316 on the receiver. The connectors at the junction of W2352-W1 are secured on the right-angle bracket under the front channel member close to T312 (T314) of the receiver.

Cut off unused wires from J2, J3 and J4.

Connect the antenna cable jumper from the "rec" jack on the transmitter to J2352 on the noise blanker. Cable W2353 from the noise blanker plugs into the antenna jack on the receiver.

STATION INSTALLATION

The EZ-15-A mounts on the tone squelch option panel as shown in Figure 2, and plug P2354 connects into J3 on the panel. If used without tone squelch, connect the black wire from TB2-3 on the option panel to TB501-3 on the power supply chassis, do not use the wires normally connected to TB1-2, 4, 6, and 7, and clip off unused wires from J1-1, 9, 10, and 11.

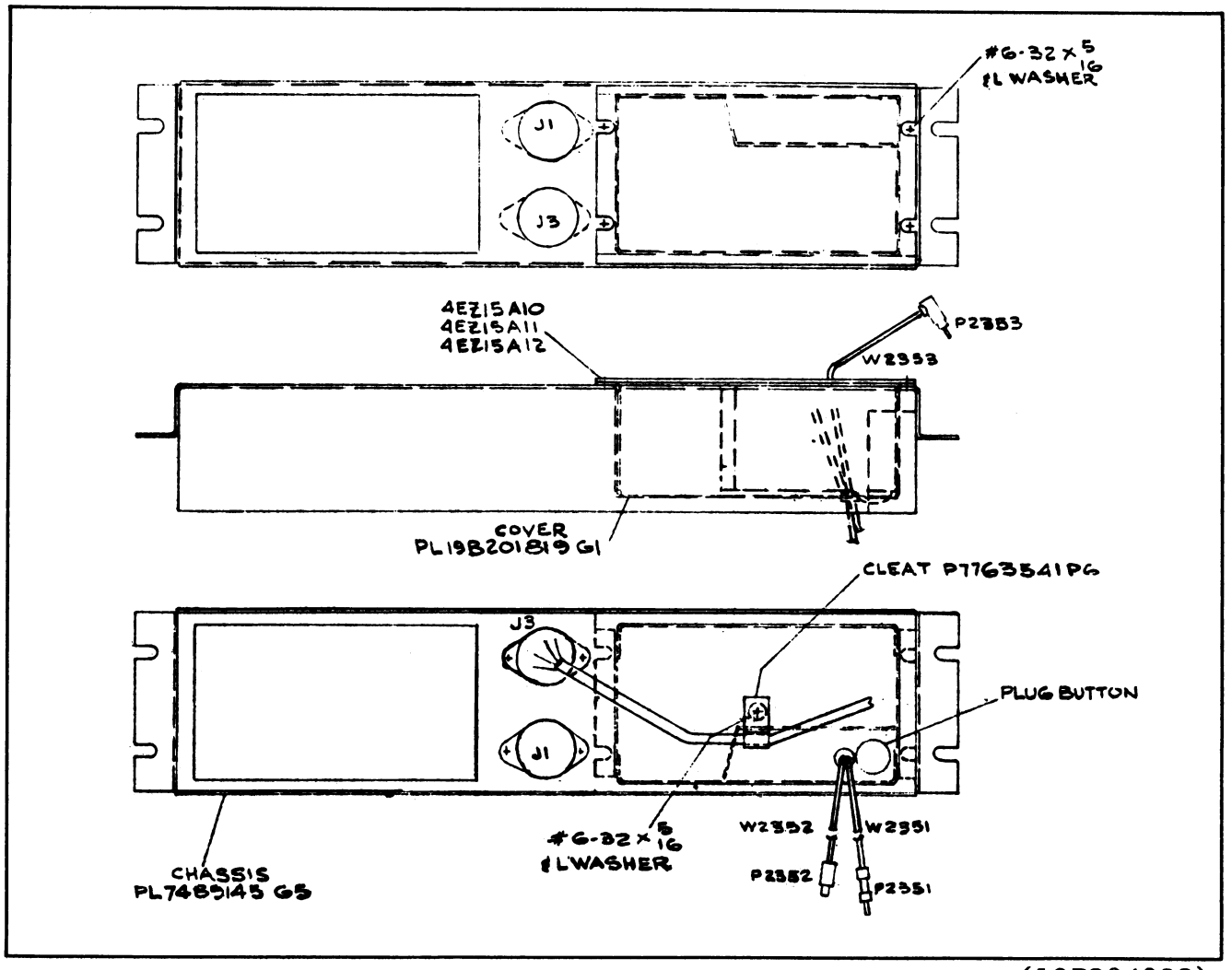


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Fig. 2 Noise Blanker Installation

Plug the RF cable from the power supply antenna jack into J2352 on the blanker chassis. Cable W2353 from the noise blanker plugs into the receiver antenna jack. Cables W2351 and W2352 connect respectively to cables W2 and W1 on the modified receiver. Refer to the receiver modification instructions.

Mount the brackets supplied with the hardware kit to the option chassis near transformers T312 and T313 on the receiver. Secure the cable connectors in the brackets.

Clip the leads between TB2-7 and J3-7 and move the red wire from J3-2 to J3-7. Connect the 2200 ohm, 2-watt, resistor (part of Hardware Kit PL-4038799) between J3-2 and J3-7. Connect TB2-2 on the option panel to TB501-12 on the power supply with the red wire, and TB2-4 to TB501-11 with the brown wire.

CIRCUIT ANALYSIS

The RF signal and noise pulse from the receiver antenna is transformer coupled through a link on the input coil of the blanker channel and on to the normal receiver input. The blanker channel consists of two stages of TRF amplification, normally tuned several megacycles above signal frequency, driving a triode plate detector and followed by two stages of triode pulse amplification.

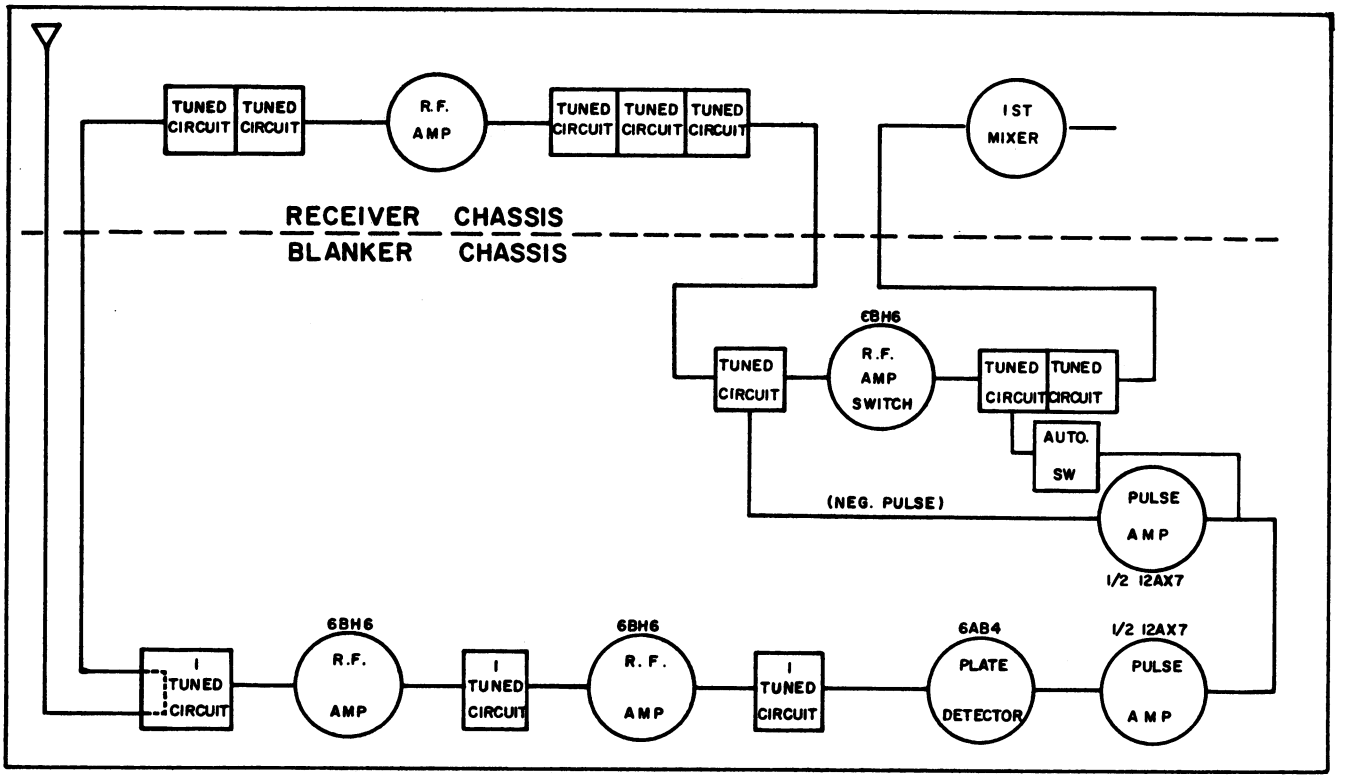

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Fig. 3 Block Diagram, Progress Line RF Noise Blanker

Amplifier tubes V2351 and V2352 raise the level of the noise pulse which is detected by V2353. The amplified pulse is applied to Pulse Amplifier V2354. The output of V2354 is a blanking pulse (negative-going) of approximately 10 microseconds duration. This blanking pulse is fed through Switch S2351 to the control grid of RF amplifier V2355. The blanking pulse cuts off V2355, disabling the receiver for the duration of the noise pulse.

To prevent blanking over periods of time long enough to interfere with normal operation of the receiver, an automatic switch is connected between the Pulse Amplifier V2354 and RF Amplifier V2355. The automatic switching circuit consists of transistor Q2351, capacitor C2366, resistors R2373, R2374, R2375, and neon lights DS2351 and DS2352.

The automatic switch prevents the blanker from continuously shutting off the receiver under conditions of intermodulation within the pass band. For example: without automatic switching, two signals separated by 100 KC or more and within the 0.5 MC pass band could beat together (depending on levels) to produce pulses at a 100 KC or more repetition rate. Without the automatic switch, this would operate the blanker continuously, cutting off the signal to the receiver.

With the automatic switch the blanker will disable itself whenever a high repetition rate condition persists for more than a few cycles. This means that the receiver cannot be shut off by the blanking pulses for a long enough period to keep the desired signal from being heard.

As the noise signal from the antenna is applied to the noise amplifier section of the blanker, the RF signal is applied to the RF amplifier in the receiver. The 5 tuned circuits in the amplifier stage of the receiver and 1 tuned circuit in the blanker provide a time delay circuit for the RF signal. This delay enables the blanking pulse to cut off the RF amplifier V2355 in the blanker before the noisy part of the signal arrives, silencing the receiver for the duration of the noise pulse.

BENCH ALIGNMENT

This section outlines the procedure for completely aligning the Noise Blanker, and should be followed when the unit has been misaligned or modified, or whenever interference is encountered on the blanker frequency. The blanker should be installed in the station or mobile combination as detailed in the installation section of this publication before the alignment is started.

Before proceeding with the blanker alignment, make sure that the Progress Line receiver is operating normally. If it is necessary to realign the receiver refer to the Alignment section of the Receiver instruction book.

EQUIPMENT REQUIRED

1. A non-metallic screwdriver or tuning tool.
2. A 25-60 MC signal generator.
3. A 20,000 ohm-per-volt meter with a 0-3 volt scale.

PROCEDURE

1. Switch S2351 must be in the "BLANKER" position.

2. Set signal generator to blanker channel frequency specified in Table 2 and connect it to the blanker antenna input jack J2352.

3. Connect the meter positive probe to J2351 and the negative probe to ground. (A residual reading of approximately 0.6 volts will exist without any signal applied).

4. Preset slugs of T2351 (T2352, T2353), T2354 (T2355, T2356), and T2357 (T2358, T2359) to approximately the correct position for the specified frequency. The amount of threaded shaft exposed will vary from about 1/8" at the low frequency end of each TRF range to about 1/2" at the high frequency end.

Receiver Frequency	Recommended TRF Frequency	Blanker Model & TRF Range
25-27 MC	30.25 MC	4EZ15A10
27-29.5 MC	32.5 MC	
29.5-31.5 MC	34.5 MC	29-37 MC
31.5-33.0 MC	36.5 MC	
33.0-35.5 MC	38.5 MC	4EZ15A11
35.5-38.5 MC	41.4 MC	
38.5-42.0 MC	46.8 MC	38-48 MC
42.0-46.8 MC	49.8 MC	4EZ15A12
46.8-49.3 MC	52.3 MC	
49.3-54.0 MC	57.0 MC	47-58 MC

Table 2. Frequency Range Chart

5. Tune each slug mentioned above for maximum reading at J2351, reducing the signal generator output as necessary to keep the meter reading below 1.5 volts.

6. Adjust the signal generator output level until the meter reading at J2351 is exactly 1.0 volt.

7. Change signal generator frequency until the reading at J2351 drops to 0.85 volt. The difference between the two frequencies at which the reading drops to 0.85 volt must be at least 300 KC.

8. Change the signal generator frequency to the desired receiver frequency and connect the meter negative probe to the receiver 1st LIM jack, the positive probe to ground.

9. Peak T2360 (T2361, T2362), and top and bottom slugs of T2363 (T2364, T2365), for maximum reading.

10. Reduce signal generator output as necessary to keep meter reading below half scale.

11. Recheck top and bottom slugs of T2362 and L3 and/or C7 on bottom of T313 (T315) in the receiver.

12. When the blanker is correctly aligned, the receiver should meet all normal specifications.

PERFORMANCE CHECK

After completing the Blanker alignment, the following performance check can be made to determine if the Blanker is operating normally.

Equipment Required

1. A noise generator with a 10 KC repetition rate, an adjustable output level, and 50 ohm output impedance.

2. A 25-50 MC signal generator coupled through a 6 db pad.

3. An audio voltmeter (VTVM).

Procedure

1. Set the noise generator for a 10 KC repetition rate.

2. Put switch S2351 in the "TEST" position, and adjust the output level of the noise generator until the receiver sensitivity is degraded by 50 db. For example:

Normal 20 db quieting --	-116 dbm (0.35 mv)
20 db quieting degraded by 50 db	-116 dbm - 50 db
	- 66 dbm (116 mv)

3. With Blanker switch S2351 in the "BLANKER" position, the normal 20 db quieting should be restored to within 10 db.

MAINTENANCE

To assure peak performance of the Noise Blanker, routine mechanical and electrical checks of the vehicle or station, should be made at regular intervals. Electrical checks should include ground connections to the voltage source, as well as inspection of ignition wiring or resistive wiring. A mechanical check should include examination of plugs, nuts, screws, and other parts, to make sure nothing is working loose.

Trouble Shooting

Before attempting to trouble shoot the Noise Blanker, check to see that the receiver is operating normally. Voltage and resistance readings for the Noise Blanker are on Service Sheet RC-901. These readings, and the procedures outlined below, will help the service man to trouble shoot the unit.

TRF Channel

1. Feed carrier to the system antenna jack or to J2352 on the blanker.

2. Connect the meter positive probe to J2351 and the negative probe to ground.

3. Set the signal generator to the frequency of the TRF channel (if unit has not been realigned since factory, this frequency can be determined from knowledge of the receiver frequency and the use of Table 2). With no signal to the TRF the meter reading should idle at approximately 0.6 volts.

4. A 1.0 volt reading at J2351 should be obtainable with 4,000 microvolts, or less, input. With signal generator adjusted to the frequency giving a peak reading at J2351, adjust the signal generator level until the reading at J2351 is exactly 1.0 volt.

5. Detune the signal generator higher and lower in frequency until the voltage mentioned in number 4 drops to exactly 0.85 volt. The difference between the two frequencies should be at least 300 KC.

Inadequate gain (more than 4,000 microvolts required for 1.0 volt test voltage) would indicate one of the following:

1. Bad RF AMP tubes V2351, V2352, or Detector tube V2353.

2. Improper supply voltage to any of the tubes listed above.

3. Transformers T2351 (T2352, T2353), T2354 (T2355, T2356), or T2357 (T2358, T2359) detuned or defective. Tuning each slug should make meter reading go through peak.

Inadequate bandwidth (less than 300 KC between 0.85 volt points) indicates regeneration in TRF channel. Check cathode, screen and plate bypass capacitors on tubes V2351, V2352, and V2353.

Detector and Pulse Amplifier

Assuming the TRF channel has been checked and found satisfactory, an oscilloscope and either an audio generator, or an AM modulated signal generator, covering the TRF frequency range, will be required for the following procedure.

If the AM modulated signal generator is used, set it to the center of the TRF channel (peak reading at J2351), and modulate at as high a percentage as possible with a modulating frequency of 1.0 KC. Set the signal generator for approximately 1.0 volt reading at J2351.

If the audio oscillator is used, connect the output -high side- to XV2353-6, and the low side to ground. Set the audio generator for 1.0 volt output at a frequency of 1.0 KC.

Connect the oscilloscope vertical input to XV2355-1 and ground. (Do not use a shielded lead for this connection as shunt capacity must be held to an absolute minimum). Connect the oscilloscope ground to the blanker ground and use a separate, unshielded lead from the oscilloscope vertical input to XV2355-1.

A series of negative half-cycles should be seen on the oscilloscope; peak negative amplitude should be approximately 20 to 80 volts.

If the pulses are not seen, trouble shoot tubes V2353 and V2354, using conventional techniques for RC coupled audio amplifier stages.

Automatic Repetition-rate Switch

Circuit faults in the blanker or in the system, might, under certain conditions, also cause the automatic switch to function and disable the blanker. (See Circuit Analysis section for function and description).

During normal operation of the blanker, only neon light DS2351 should be operating. If neon light DS2352 is also lit, transistor Q2351 is turned on, shorting tube V2354B grid to cathode and disabling the blanker. This condition could occur because of excessive voltage at the junction of R2373, DS2351 and T2363 (T2364, T2365). If both lights are lit check for the following:

Excessive supply voltage.
Tube V2355 drawing less than normal current (low emission or low filament voltage).
Decrease in value of R2373.

If the blanker is installed with a power supply delivering appreciably more than 200 volts, a 2-watt, 2,200-ohm resistor supplied with the hardware kit should be installed to limit voltage to the blanker to 200 volts nominal. The blanker circuit should function normally at B+ voltage up to about 250 volts. If the supply voltage from the power source goes above this level with normal variations, a limiting resistor should be added to the circuit.

Receiver Sensitivity

The received signal passes through the blanker twice before being fed back to the 1st Mixer in the receiver, therefore, certain blanker malfunctions can affect the receiver sensitivity.

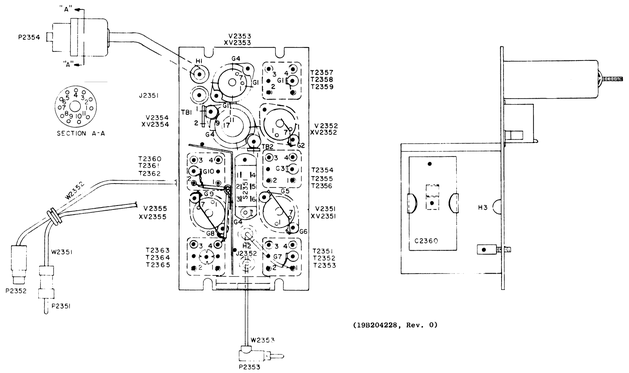
Check the one-turn link in T2351 (T2352, T2353), between plug P2353 and the receiver. If the coaxial cable, or the link, is open, or shorted to ground the signal will be lost.

If transformer T2351 (T2352, T2353), is tuned closer than about two megacycles to the signal frequency, loading effects will decrease sensitivity.

Both conditions noted above can be quickly checked by pugging the antenna directly into the receiver and examing signal condition with the blanker bypassed.

The RF signal from the receiver is coupled through the blanker and to the receiver mixer by coaxial cables W2351 and W2353. Any fault in this path could affect sensitivity.

Disconnect the blanker from the receiver and connect cables W1 and W2 of the receiver together. If sensitivity under these conditions is nearly normal (less than 1 microvolt for 20 db quieting), any loss of sensitivity when the blanker is connected to the system is caused by the blanker or its cables. If sensitivity is poor with receiver cables connected as above, the fault is in the receiver or its cables.



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RESISTANCE READINGS

Conditions of measurement: Blanker power cable unplugged.
Measured to chassis, except (*) indicates measured to TB1-2.

Pin	XV2351	XV2352	XV2353	XV2354	XV2355
1	0.2	10K	(*)103K	(#)103K	(#)220K
2	330	330		2.2meg	220
3				300	
4					
5	(*)1.6K	(*)1.6K			(*)22K
6	(*)58K	(*)58K	10K	(*)47K	(*)30K
7	0	0	3.6K	(#)220K	0
8				2K	

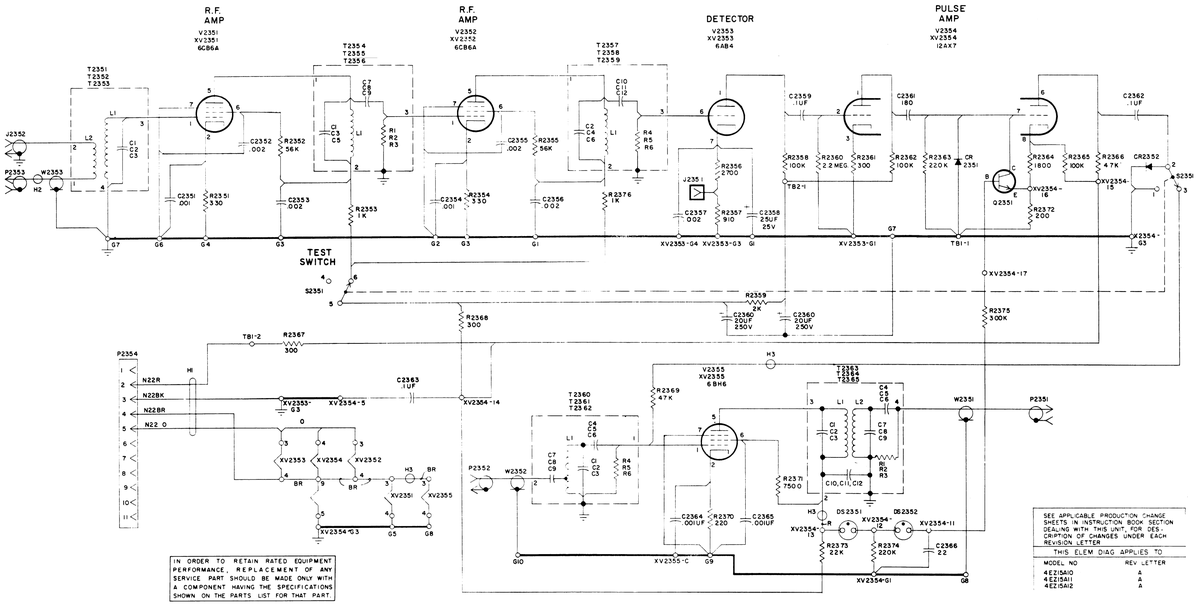
(#) A lower reading will be obtained with improper polarity of ohmmeter leads, due to diode in circuit.

VOLTAGE READINGS

Conditions of measurement: All voltages measured with respect to chassis with VTVM.
Switch S2351 in BLANKER position.
All indicated voltages DC.
Source voltage - 200 VDC.

Pin	XV2351	XV2352	XV2353	XV2354	XV2355	Pin	XV2354*
1	0	0	125	105	0	11	n.m
2	1.6v	1.6	n.c.	0	0.85	12	50
3	htr.	htr.	htr.	0.25	htr.	13	105
4	htr.	htr.	htr.	htr.	htr.	14	195
5	187	187	n.c.	0	105	15	195
6	125	125	0	190	97	16	0.38
7	0	0	2.3	0	0	17	n.m.
8				3.9			
9				htr.			

* Vector socket, starting at color dot.
htr Heater.
n.c. No connection.
n.m. Not meaningful.



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Service Sheet

PROGRESS LINE RF NOISE BLANKER
MODEL 4EZ15A10, 11 & 12; REV. A

(RC-901A)

PARTS LIST

RF NOISE BLANKER
MODELS 4EZ15A10 - 12
PL-198201878-G1 - 3
REV A

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2351	5494481-P12	Fixed ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC+ JF Dicap.
C2353 and C2353	5494481-P14	Fixed ceramic disc: 2000 pf ±10%, 500 VDCW; sim to RMC+ JF Dicap.
C2354	5494481-P12	Fixed ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC+ JF Dicap.
C2355 thru C2357	5494481-P14	Fixed ceramic disc: 2000 pf ±10%, 500 VDCW; sim to RMC+ JF Dicap.
C2358	7774788-P2	Electrolytic tubular: 25 uf +250% -10%, 25 VDCW,
C2359	7488160-P9	Fixed ceramic disc: 0.1 uf +80% -25%, 500 VDCW; sim to Sprague 36C190A.
C2360	5480408-P1	Electrolytic tubular: 20-20 uf +100% -10%, 250-250 VDCW. G-E Type 42F188AB2.
C2361	7488162-P133	Fixed mica: 180 pf ±10%, 500 VDCW; sim to Electro Motive Mfg DM15.
C2362 and C2363	7488160-P9	Fixed ceramic disc: 0.1 uf +80% -25%, 500 VDCW; sim to Sprague 36C190A.
C2364 and C2365	5494481-P12	Fixed ceramic disc: 1000 pf ±10%, 500 VDCW; sim to RMC+ JF Dicap.
C2366	7488162-P111	Fixed mica: 22 pf ±5%, 500 VDCW; sim to Electro Motive Mfg DM15.
		- - - - - - - - - - RECTIFIERS - - - - - - - - - -
CR2351	4036936-P1	Silicon.
CR2352	5491705-P3	Silicon.
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS2351 and DS2352	19A115023-P1	Lamp, neon glow; 1 in. leads, 50-64 v, 0.1 ma; sim to G-E NE-2.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J2351	7150763-P4	Jack, Test point: Nylon, stake in; sim to Alden Products 110MI-green.
J2352	7104841-P4	Connector, phono: Jack; sim to Cinch 14MI3699.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P2351		(Part of Y2351).
P2352		(Part of Y2352).
P2353		(Part of Y2353).
P2354	7478610-P32	Connector: 11-contacts, mica-filled phenolic, with ring; sim to Amphenol 86-CP11 or Cinch 13799.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2351	19C900114-P1	NPN, Silicon.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2351	3877-P331K	Fixed composition: 330 ohms ±10%, 1/2 w.
R2352	3877-P683K	Fixed composition: 68,000 ohms ±10%, 1/2 w.
R2353	3877-P103K	Fixed composition: 1000 ohms ±10%, 1/2 w.
R2354	3877-P331K	Fixed composition: 330 ohms ±10%, 1/2 w.
R2355	3877-P683K	Fixed composition: 68,000 ohms ±10%, 1/2 w.
R2356	3877-P273K	Fixed composition: 2700 ohms ±10%, 1/2 w.
R2357	3877-P911J	Fixed composition: 910 ohms ±5%, 1/2 w
R2358	3877-P104K	Fixed composition: 0.1 megohm ±10%, 1/2 w.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - RESISTORS(Cont'd) - - - - - - - - - -
R2359	3877-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w,
R2360	3877-P225K	Fixed composition: 2.2 megohms ±10%, 1/2 w,
R2361	3877-P301J	Fixed composition: 300 ohms ±5%, 1/2 w.
R2362	3877-P104K	Fixed composition: 0.1 megohm ±10%, 1/2 w.
R2363	3877-P224K	Fixed composition: 0.22 megohm ±10%, 1/2 w,
R2364	3877-P182K	Fixed composition: 1800 ohms ±10%, 1/2 w,
R2365	3877-P104K	Fixed composition: 0.1 megohm ±10%, 1/2 w.
R2366	3877-P473K	Fixed composition: 47,000 ohms ±10%, 1/2 w.
R2367 and R2368	3877-P301J	Fixed composition: 300 ohms ±5%, 1/2 w.
R2369	3877-P473K	Fixed composition: 47,000 ohms ±10%, 1/2 w,
R2370	3877-P221K	Fixed composition: 220 ohms ±10%, 1/2 w,
R2371	3877-P752J	Fixed composition: 7500 ohms ±5%, 1/2 w,
R2372	3877-P201J	Fixed composition: 200 ohms ±5%, 1/2 w,
R2373	3877-P223K	Fixed composition: 22,000 ohms ±10%, 1/2 w,
R2374	3877-P224K	Fixed composition: 0.22 megohm ±10%, 1/2 w,
R2375	3877-P304J	Fixed composition: 0.3 megohm ±5%, 1/2 w,
R2376	3877-P103K	Fixed composition: 1000 ohms ±10%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S2351	18A115004-P1	Slide: DPDT, 200 VDC at 15 ma, 12 VDC at 30 ma; sim to Oak 19K40508.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T2351	PL-198204017-G1	Transformer Assembly. (Used in Model 4EZ15A10 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C1	5496218-P250 Fixed ceramic disc: 30 pf ±5%, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P11 Coil: 8-1/2 turns at 24 turns per in., left hand wound, omit tap.
	L2	198204015-P4 Coil: 1 turn, left hand wound.
T2352	PL-198204017-G2	Transformer Assembly. (Used in Model 4EZ15A11 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C2	5496218-P243 Fixed ceramic disc: 18 pf ±5%, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P1 Coil: 9-1/2 turns at 19 turns per in., left hand wound, omit tap.
	L2	198204015-P4 Coil: 1 turn, left hand wound.
T2353	PL-198204017-G3	Transformer Assembly. (Used in Model 4EZ15A12 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C3	5496218-P247 Fixed ceramic disc: 33 pf ±5%, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P2 Coil: 6 turns at 15 turns per in., right hand wound.
	L2	198204015-P10 Coil: 1 turn, right hand wound.
T2354	PL-198204019-G1	Transformer Assembly. (Used in Model 4EZ15A10 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C1	5496218-P248 Fixed ceramic disc: 24 pf ±5%, 500 VDCW, -80 temp coef.
	C7	5496218-P217 Fixed ceramic disc: 47 pf ±10%, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P11 Coil: 8-1/2 turns at 24 turns per in., left hand wound, omit tap.
	R1	3877-P103K Fixed composition: 10,000 ohms ±10%, 1/2 w.
T2355	PL-198204019-G3	Transformer Assembly. (Used in Model 4EZ15A11 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C3	5496218-P250 Fixed ceramic disc: 30 pf ±5%, 500 VDCW, -80 temp coef.
	C9	5496218-P217 Fixed ceramic disc: 47 pf ±10%, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P7 Coil: 6-1/2 turns at 16 turns per in., left hand wound, omit tap.
	R3	3877-P103K Fixed composition: 10,000 ohms ±10%, 1/2 w.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - TRANSFORMERS(Cont'd) - - - - -
T2356	PL-198204019-G5	Transformer Assembly. (Used in Model 4EZ15A12 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C5	5496218-P249 Fixed ceramic disc: 27 pf ±5%, 500 VDCW, -80 temp coef.
	C11	5496218-P217 Fixed ceramic disc: 47 pf ±10%, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P8 Coil: 5 turns at 15 turns per in., right hand wound.
	R5	3877-P103K Fixed composition: 10,000 ohms ±10%, 1/2 w,
T2357	PL-198204019-G2	Transformer Assembly. (Used in Model 4EZ15A10 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C2	5496218-P248 Fixed ceramic disc: 24 pf ±5%, 500 VDCW, -80 temp coef.
	C8	5496218-P217 Fixed ceramic disc: 47 pf ±10%, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P11 Coil: 8-1/2 turns at 24 turns per in., left hand wound, omit tap.
	R2	3877-P103K Fixed composition: 10,000 ohms ±10%, 1/2 w,
T2358	PL-198204019-G4	Transformer Assembly. (Used in Model 4EZ15A11 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C4	5496218-P249 Fixed ceramic disc: 27 pf ±5%, 500 VDCW, -80 temp coef.
	C10	5496218-P217 Fixed ceramic disc: 47 pf ±10%, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P7 Coil: 6-1/2 turns at 16 turns per in., left hand wound, omit tap.
	R4	3877-P103K Fixed composition: 10,000 ohms ±10%, 1/2 w,
T2359	PL-198204019-G6	Transformer Assembly. (Used in Model 4EZ15A12 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C6	5496218-P249 Fixed ceramic disc: 27 pf ±5%, 500 VDCW, -80 temp coef.
	C12	5496218-P217 Fixed ceramic disc: 47 pf ±10%, 500 VDCW, -80 temp coef.
	L1	198204015-P8 Coil: 5 turns at 15 turns per in., right hand wound.
	R6	3877-P103K Fixed composition: 10,000 ohms ±10%, 1/2 w,
T2360	PL-198204018-G1	Transformer Assembly. (Used in Model 4EZ15A10 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C1	5496218-P284 Fixed ceramic disc: 43 pf ±5%, 500 VDCW, -80 temp coef.
	C4 and C7	5496218-P240 Fixed ceramic disc: 9 pf ±0.25 pf, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P12 Coil: 9-1/2 turns at 24 turns per in., left hand wound, tap 1/4 turn from start.
	R4	3877-P224K Fixed composition: 0.22 megohm ±10%, 1/2 w,
T2361	PL-198204018-G2	Transformer Assembly. (Used in Model 4EZ15A11 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C2	5496218-P254 Fixed ceramic disc: 43 pf ±5%, 500 VDCW, -80 temp coef.
	C5 and C8	5496218-P240 Fixed ceramic disc: 9 pf ±0.25 pf, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P3 Coil: 7-1/2 turns at 19 turns per in., left hand wound, tap 1/4 turn from start.
	R5	3877-P224K Fixed composition: 0.22 megohm ±10%, 1/2 w,
T2362	PL-198204018-G3	Transformer Assembly. (Used in Model 4EZ15A12 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C3	5496218-P249 Fixed ceramic disc: 27 pf ±5%, 500 VDCW, -80 temp coef.
	C6 and C9	5496218-P240 Fixed ceramic disc: 9.0 pf ±0.25 pf, 500 VDCW, -80 temp coef.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P3 Coil: 7-1/2 turns at 19 turns per in., left hand wound, tap 1/4 turn from start.
	R6	3877-P224K Fixed composition: 0.22 megohm ±10%, 1/2 w,

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - TRANSFORMERS(Cont'd) - - - - -
T2363	PL-198204016-G1	Transformer Assembly. (Used in Model 4EZ15A10 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C1	5496218-P260 Fixed ceramic disc: 75 pf ±5%, 500 VDCW, -80 temp coef.
	C4	5496218-P252 Fixed ceramic disc: 36 pf ±5%, 500 VDCW, -80 temp coef.
	C7	5496218-P255 Fixed ceramic disc: 47 pf ±5%, 500 VDCW, -80 temp coef.
	C10	5494481-P11 Fixed ceramic disc: 1000 pf ±20%, 500 VDCW; sim to RMC JF.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P13 Coil: 7-1/2 turns at 19 turns per in., left hand wound, omit tap.
	L2	198204015-P14 Coil: 3-3/4 turns at 19 turns per in., left hand wound.
	R1	3877-P473K Fixed composition: 47,000 ohms ±10%, 1/2 w,
T2364	PL-198204016-G2	Transformer Assembly. (Used in Model 4EZ15A11 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C2	5496218-P256 Fixed ceramic disc: 51 pf ±5%, 500 VDCW, -80 temp coef.
	C5	5496218-P252 Fixed ceramic disc: 36 pf ±5%, 500 VDCW, -80 temp coef.
	C8	5496218-P247 Fixed ceramic disc: 22 pf ±5%, 500 VDCW, -80 temp coef.
	C11	5494481-P11 Fixed ceramic disc: 1000 pf ±20%, 500 VDCW; sim to RMC JF.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P7 Coil: 6-1/2 turns at 16 turns per in., left hand wound, omit tap.
	L2	198204015-P5 Coil: 6-1/2 turns at 16 turns per in., left hand wound.
	R2	3877-P473K Fixed composition: 47,000 ohms ±10%, 1/2 w,
T2365	PL-198204016-G3	Transformer Assembly. (Used in Model 4EZ15A12 only). Includes the following:
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
	C3	5496218-P255 Fixed ceramic disc: 47 pf ±5%, 500 VDCW, -80 temp coef.
	C6	5496218-P252 Fixed ceramic disc: 36 pf ±5%, 500 VDCW, -80 temp coef.
	C9	5496218-P245 Fixed ceramic disc: 18 pf ±5%, 500 VDCW, -80 temp coef.
	C12	5494481-P11 Fixed ceramic disc: 1000 pf ±20%, 500 VDCW; sim to RMC JF.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
	L1	198204015-P9 Coil: 8-1/2 turns at 18 turns per in., left hand wound, omit tap.
	L2	198204015-P6 Coil: 5 turns, right hand wound.
	R3	3877-P473K Fixed composition: 47,000 ohms ±10%, 1/2 w,
TB1	7487424-P1	- - - - - - - - - - TERMINAL BOARDS - - - - - - - - - - Phenolic: 1 terminal.
TB2	7487424-P22	Phenolic: 1 terminal.
V2351* and V2352*		- - - - - - - - - - TUBES - - - - - - - - - - Type 6676 * In Models earlier than Rev A: Type 6681.
V2353		Type 6664.
V2354		Type 6681.
V2355		Type 6661.
W2351	5491689-P40	- - - - - - - - - - CABLES - - - - - - - - - - Cable assm: Includes 15 in. of RG-188/U cable, phono connector molded on one end.
W2352	5491689-P43	Cable assm: Includes 12 in. of RG-188/U cable, phono connector molded on one end.
W2353	7488600-P94	Cable assm: Includes 10 in. of RG-58A/U cable, short phono plug molded on one end.
XV2351 and XV2352	7768887-P9	- - - - - - - - - - SOCKETS - - - - - - - - - - Tube: 7 pin min, mica-filled phenolic; sim to Elco 233 PM-3702.
XV2353	7768887-P14	Tube: 7 pin min, mica-filled phenolic; sim to Elco 305 PM-3702.
XV2354	7484399-P2	Tube, turret, min: 9 pin, mica-filled phenolic, bottom mount, saddle.
XV2355	7768887-P9	Tube: 7 pin min, mica-filled phenolic; sim to Elco 233 PM-3702.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	PL-4038489-G1	Shield Assembly. (Used with T2360 thru T2365 and Y2353).
	7480533-P6	Shield, tube. (Used with Y2354).
	7768887-P11	Shield, tube. (Used with Y2351 thru Y2353 and Y2355).
	7118719-P6	Clip, capacitor. (Used with C2360).
	4029851-P2	Clamp, cable. (Used with above clip).
	5494234-P7	Cap, plug. (Used with P2354).

PARTS LIST

MODIFICATION KIT
PL-4038805-G1, -G2

SYMBOL	G-E PART NO	DESCRIPTION
T1	PL-7488612-G4	RF Transformer - Used in G1 only. Includes the following components with T1 prefix:
T1-C1	7484389-P7	Capacitor: variable, ceramic, 4.75 to 45 mmfd, 500 VDCW, -500 2200 temp coef.
T1-C2	7478981-P4	Capacitor: mica, 2200 mmfd ±10%, 300 VDCW. Sim to RETMA RCM20.
T1-C3	7489162-P15	Capacitor: fixed, silver mica, 33 pf ±5%, 500 VDCW. Sim to Electromotive Mfg. DM15.
T1-C4	7484389-P7	Capacitor: variable, ceramic, 4.75 to 45 mmfd, 500 VDCW, -500 2200 temp coef.
T1-C5	7489162-P19	Capacitor: fixed, silver mica, 47 pf ±5% 500 VDCW. Sim to Electromotive Mfg. DM15.
T1-C6	7130348-P3	Capacitor: molded phenolic, 1.0 mmfd ±0.05 mmfd, 500 VDCW. Sim to Jeffers JN 5/32.
T1-C7	7484389-P7	Capacitor: variable ceramic 4.75 to 47 mmfd, 500 VDCW, -500 2200 temp coef.
T1-C8	7489162-P17	Capacitor: fixed silver mica, 39 pf ±5%, 500 VDCW. Sim to Electromotive Mfg DM15.
T1-C9	30123-P24	Capacitor: silver mica CM15 case, 330 mmfd ±10%, 500 VDCW. Sim to Electromotive Mfg CM-15.
T1-L1 & L2	7145781-P1	Coil
T1-L7	7145781-P3	Coil
T1-R1	3878-P103K	Resistor: composition, 10,000 ohms ±10%, 1 w.
T1-R2	3877-P473K	Resistor: composition, 47,000 ohms ±10%, 1/2 w.
T1-W1	5491689-P41	Cable Assembly. Includes the following: Cable, RG188/U (black), 10 in. long, operating voltage 300 VDC. Connector (left-end) G-E Dwg. & Part No. J-4033904-2.
T2	PL-7488612-G5	RF Transformer. Used in G2 only. Included the following components with T2 prefix:
T2-C1	7484389-P7	Capacitor: variable, ceramic, 4.75 to 47 mmfd, 500 VDCW, -500 2200 temp coef.
T2-C2	7478981-P4	Capacitor: mica, 2200 mmfd ±10%, 300 VDC. Sim to RETMA Type RCM20B.
T2-C4	7484389-P7	Capacitor: variable, ceramic, 4.75 to 45 mmfd, 500 VDCW, -500 2200 temp coef.
T2-C7	7484389-P7	Capacitor: variable, ceramic, 4.75 to 45 mmfd, 500 VDCW, -500 2200 temp coef.
T2-C9	30123-P24	Capacitor: silver mica, CM-15 case 330 mmfd ±5%, 500 VDC. Sim to Electromotive Mfg CM-15.
T2-C10	7489162-P8	Capacitor: fixed, silver mica, dipped phenolic insulation, 15 pf ±5%, 500 VDCW. Sim to Electromotive Mfg DM15.
T2-C11	7489162-P12	Capacitor: fixed silver mica, dipped phenolic insulation, 24 pf ±5% 500 VDCW. Sim to Electromotive Mfg DM15.
T2-C12	7489162-P10	Capacitor: fixed silver mica, dipped phenolic insulation, 20 pf ±5%, 500 VDCW. Sim to Electromotive Mfg DM15.
T2-C16	7130348-P2	Capacitor: molded phenolic 0.75 mmfd ±0.05 mmfd, 500 VDCW. Sim to Jeffers JN 5/32.
T2-L1 & L2	7145781-P1	Coil
T2-L7	7145781-P3	Coil
T2-R1	3878-P103K	Resistor: composition, 10,000 ohms ±10%, 1 w.
T2-R2	3877-P473K	Resistor: composition, 47,000 ohms ±10%, 1/2 w.
T2-W1	5491689-P41	Cable Assembly. Includes the following: Cable, RG188/U (black), 10 in. long, operating voltage 300 VDC. Connector (left-end), G-E Dwg. & Part No. 4033904-2.
W2	5491689-P42	Cable Assembly. Includes the following: Cable, RG188/U, (black), 7 in. long, operating voltage 300 VDC. Connector, (left-end), G-E Dwg. & Part No. 4033904-3.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.