2-WAY MOBILE RADIO

MAINTENANCE MANUAL
FOR
TRANSISTORIZED PROGRESS LINE DUAL FRONT END
HIGH BAND

Model
4EF27A10/11

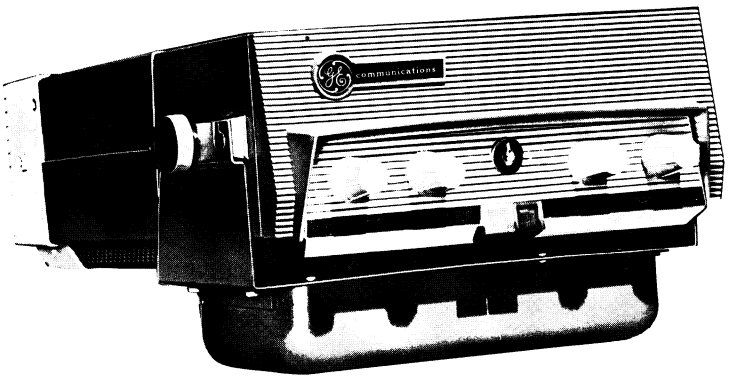
SPECIFICATIONS

Type Number	EF-27-A High Band
Frequency Range	130 - 174 MC
Input Voltage	12 vdc
Current Drain	0.010 amps
Frequency Stability	Within 0.0005% of assigned center frequency over specified temperature range (25°C reference).
Spurious	-60 db to -30 db when operating simultaneously (dependent on frequency separation). 85 db when monitoring individual channels.
Antennas	Same antennas may be used. For optimum performance - recommend separate antennas, especially for closely spaced channels.
Size	1 1/2" H x 8" W x 5 1/2" D.
Weight	1 1/2 lbs.

2331

TABLE OF CONTENTS

GENERAL ELECTRIC
TRANSISTORIZED PROGRESS LINE
HIGH BAND DUAL FRONT END
MODEL 4EF27A10,11



DESCRIPTION

The General Electric High Band Dual Front End, for use with Transistorized Progress Line radio, is designed for high band application only. The Dual Front End allows TPL units to monitor two frequencies, separately or simultaneously, over a single receiver.

Normal receiver sensitivity will not be degraded more than 6 db with the receiver and the dual front end assembly operating with one channel separation or more. For most high band combinations a single antenna will be adequate. With closely spaced channels separate antennas are recommended for optimum performance.

With front mounted TPL units, the Dual Front End is operated by a special switch mounted on the TPL control unit in the ACCESSORY position. When the TPL is rear mounted, the Dual Front End is controlled by an option control head. The Dual Front End uses the same cover and support for both front mounted or rear mounted TPL.

INSTALLATION

When the high band Dual Front End is used with a high band TPL receiver some modification of the receiver R.F. board is necessary. Cable W374, supplied with Support Assembly PLA-4036082-G1, is attached to the R.F. board of the receiver according to Modification Instruction A-4036173.

In certain cases it may be necessary to replace capacitor C2 in the HI/IF strip of the receiver with capacitor C16, 82 pf, supplied with Modification Kit PLA-4036179-G2. Instructions for removal and replacement of C2 are found in Modification Instructions A-4036173.

A special switch is installed in the Accessory position on the TPL control panel when the Dual Front End is used with a front mount TPL. The nameplate, switch assembly, and other parts needed for the installation are provided in Dual Frequency Control Kit PLA-4036087-G1. Installation instructions are given in drawing 19C300698.

For rear mount application the Dual Front End is controlled by a three position switch mounted on Control Head PL-19C300275-G2. The wiring procedure for mounting the switch is on Installation Instruction 19C300697.

MAINTENANCE

The Dual Front End is suspended from the TPL mounting brackets by a support assembly. The same method is used for both rear mount or front mount installations. In rear mount applications, a deeper "U" frame is provided, to insure floor clearance of the Dual Front End.

For maintenance or repair remove the four screws which hold the cover on the Dual Front End, and take off the cover, exposing the RF assembly. Refer to the Service Outline, RC-762, for information on components and wiring.

ALIGNMENT PROCEDURE

Using the standard alignment procedure given in the Maintenance Manual for the TPL receiver, align the RF assembly of the Dual Front End, the antenna coil in the receiver, and the 1st High IF coil in the receiver (L1-A361 or L4-A362). Be sure to have both collectors of the first converters connected together when aligning the 1st High IF transformer. The collector coil must tune through resonance to enable the receiver to be phase tuned. (To check for resonance, two resonance points should be observed as the IF collector padder is turned through 360 degrees.)

When the same antenna is used for both the Dual Front End and the receiver; and the frequency separation is greater than 1 MC; connect the antenna coils in parallel and tune the antenna transformer.

For frequency separation smaller than 1 MC, the best sensitivity will be obtained by connecting the signal generator to each receiver individually and aligning the antenna transformer. Then connect both receiver inputs in parallel, but do not retune the antenna transformers.

CIRCUIT ANALYSIS

RF Amplifier - A366-367

The RF Amplifier section is a compartmentized casting which contains three helical cavities and an RF amplifier. Each cavity consists of a coil mounted in a shielded compartment. One end of the coil is connected to the shield, the other end to a small, mechanically made tuning capacitor. The tuning capacitor consists of a fixed disc mounted on one end of the coil, directly above a movable disc mounted on a stud threaded through the wall of the shield.

RF input from the antenna is coupled to a tap on the first coil, L1 (L4), through the RF cable W1. The tap is positioned to insure the proper impedance match to the antenna. Coupling between the coils is accomplished by port openings in the shield walls. The signal from the end coil, L3 (L6), is coupled through C4 to the base of the RF amplifier transistor Q1. The collector of Q1 is directly coupled to the tank circuit L7, C8, and C9 (C10). The output of the RF amplifier is from a tap on L7 to the base of the mixer through C11. The tap on L7 is adjusted to match the input impedance of the mixer transistor.

Oscillator Multiplier and Mixer - A368-369

The oscillator collector tank circuit is formed by C1, C2 (C3), and L1. The tank is tuned to the high side of the crystal frequency in order to place an inductive load on the oscillator transistor collector. This practice improves oscillator stability. The oscillator activity is metered from J1 to J2 through the multiplier diode CR1.

Coupling from the oscillator collector tank is through L2 to the anode of the multiplier diode CR1. Two resonant LC circuits follow CR1 and are tuned to three times the crystal frequency. The multiplier output is applied to the emitter of the first mixer Q1 through C14. The mixer output from the collector of Q1 is fed to the input of the high IF transformer. The high IF frequency output from the mixer is 8.7 mc.

Oscillator Model 4EG12A12

The first oscillator and crystal are located in an enclosed box which is warmed when the temperature in the box drops below 32 degrees F. Crystal warmer HR1 is controlled by thermostat S1.

The oscillator uses a mode crystal cut in the 45-55 mc region. The crystal is connected in series with C1, a frequency adjusting trimmer, and the base of Q1, a PNP transistor.

The first oscillator is a Miller circuit with feedback supplied by C9. If two operating frequencies are used, a second oscillator is connected with its collector parallel to the first oscillator.

CABLE KIT

Cable Kit PLA-4036169-G1 is provided for use with high band combinations where one antenna will be adequate. Instruction A-4036725, furnished with the cable kit, should be carefully followed when cutting matching cables. Special care should be taken when cutting cables for installations which have closely spaced channels.

Cable connections for single and double antenna applications are shown on Diagram 19D400439.

PARTS LIST

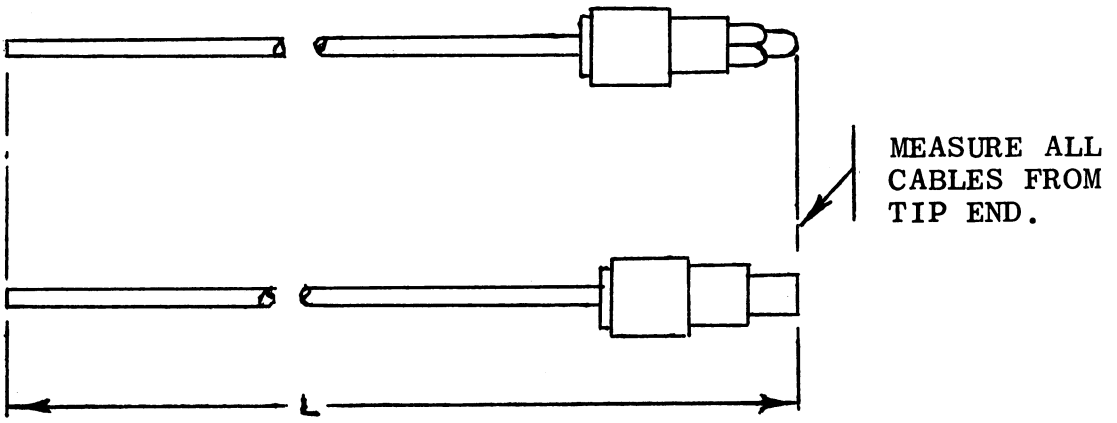
CABLE KIT
PL-A-4036169-G1

G.E. DRAWING & PART NO.	DESCRIPTION
A-4036363-P1	"T" Connector. Three way. Black molded plastic coating over shield. Solid center conductor. Similar to Components Mfg. Service.
B-5491689-P36	Cable assembly consisting of: Cable, RG174/U, black, 66 inches long. Connector, phono, molded on termination on coaxial cable, two contacts. G.E. Dwg. No. A-4032504-P5
K-7104941-P11	Phono connector, phenolic insulation, brass shell, brass contact. Max. operation voltage 350 vrms, 500 vdc. Similar to Accurate Mfg. Co. Cat. No. A-10033-8.

These instructions cover the exact length the two unterminated cables shall be cut before adding the phono connectors supplied with cable kit A4036169. Also, the proper method of measuring and assembling these cables is specified.

A. DETERMINING CABLE LENGTH

In measuring cables, the following method must be followed explicitly to assure obtaining the exact length of cable required for proper functioning of the equipment. This requirement is particularily true in closely spaced channels.



B. PROCEDURE

Measure existing cable length on the main RF board in the receiver and the dual front end as follows:

1. Measure total length of existing cable on each unit from eyelet (where cable enters can or cavity) for the particular unit.
   4EF13A10,11 - High band receiver RF boards.
   4EF16A10 - Low band receiver RF board.
   4EF27A10,11 - High band dual front end RF boards.
   4EF28A10 - Low band dual front end RF board.
   4EF13B10,11 - High band receiver RF boards.

   Caution: Each unit should be measured per the above procedure as the production units vary in cable length and the cable length has been changed on certain models.

Installation Instructions

FOR CABLE KIT
PL-4036169
MODELS 4EF27A10, 11
MODEL 4EF28A10

(A-4036725, Sh. 1, Rev. 0)

2. The following length must be added to the length measured in step B1. This allows for cable from outside of can to coil tap inside the can or cavity, length of tee connector and overlap of connectors. This length has not varied in production units enough to require measuring each individual unit.

MODEL	4EF13A10, 11	4EF16A10 4EF28A10	4EF13B10, 11 4EF27A10, 11
Length to add	2.32 inches	1.00 inches	1.15 inches

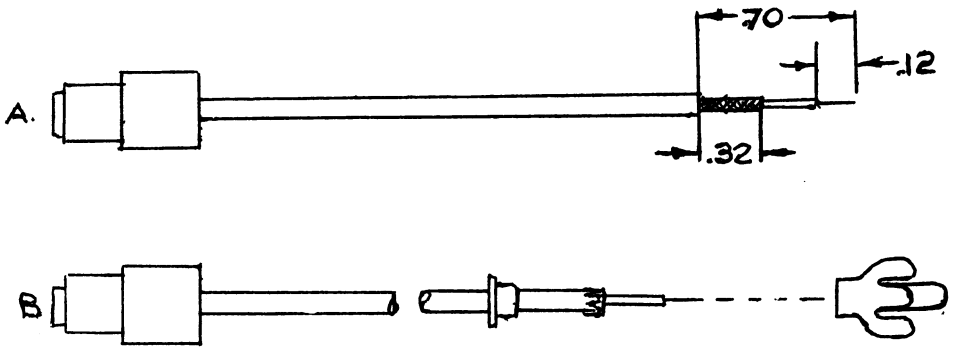
3. Determine total connected length of cable from curve for a specific operating frequency. Subtract sum of lengths determined in steps B1 and B2 from this total connected length. The resultant calculated length of cable is length to cut cable.

4. A sample problem will illustrate the method. Assume we are cutting cable for 4EF13A10 RF board for 165 MC. Total connected length of cable is 33.3 inches.

Length of cable outside of can (step B1) = 9.50
Length of cable (step B2) = 2.32
Total length of existing cable =11.82

Length needed = 33.30 - 11.80 = 21.50 inches
Cut cable to a length of 21.50 inches.

5. Strip cable to dimensions shown:

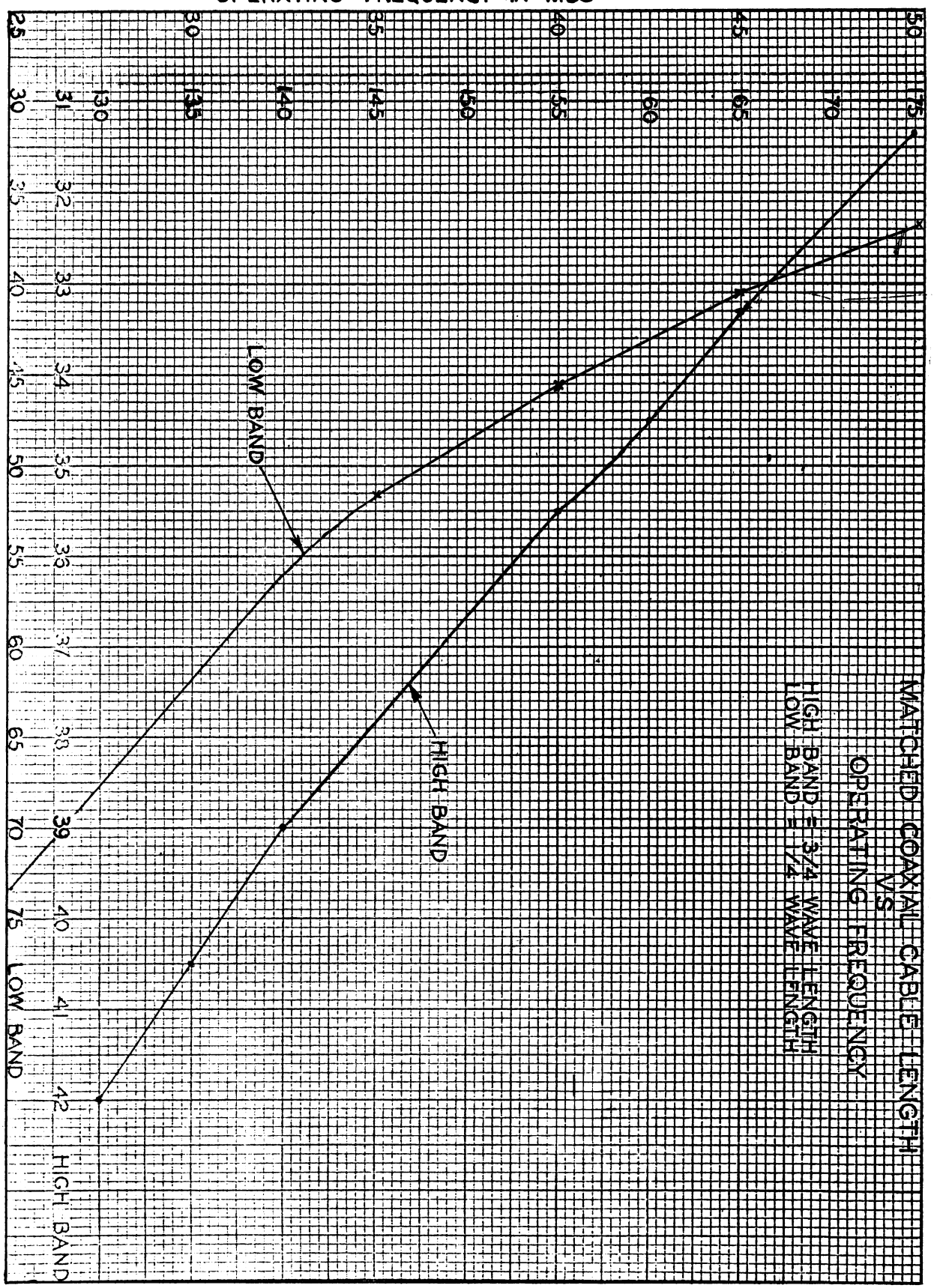


Slide eyelet onto cable as shown, then spread braid back evenly all around as shown. Slide eyelet forward and under turned-back braid to end of cut-off of outer jacket. Slide phone connector onto cable against braid and eyelet and solder all around. The center connector should be even with the tip of the phono connector. Care should be exercised in not using excessive heat, then solder tip.

Installation Instructions

FOR CABLE KIT
PL-4036169
MODELS 4EF27A10, 11
MODEL 4EF28A10

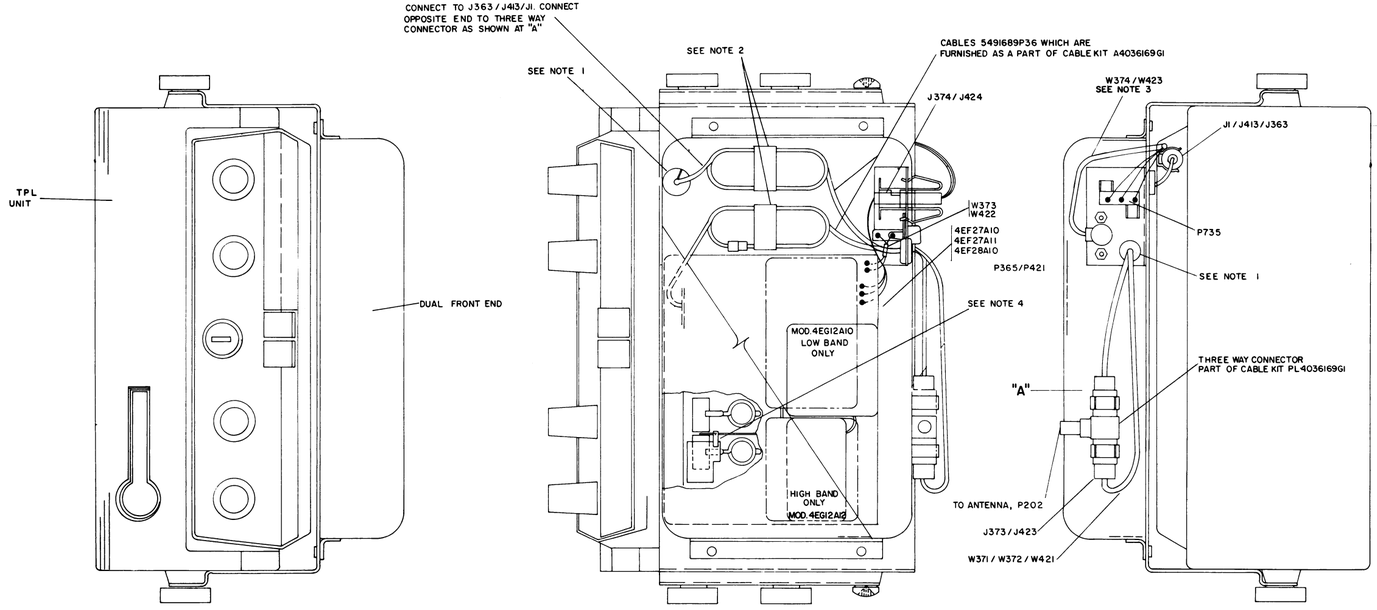
(A-4036725, Sh. 2, Rev. 1)

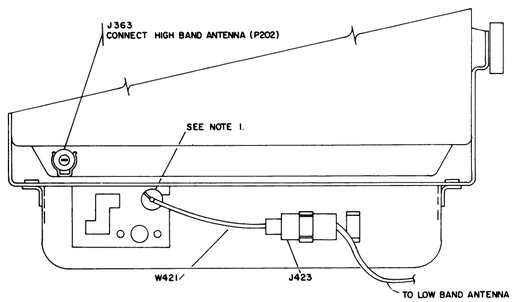


Installation Instructions

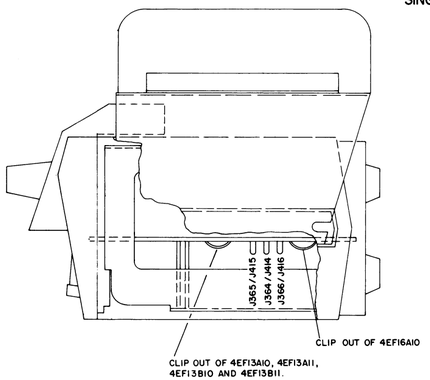
FOR CABLE KIT
PL-4036169
MODELS 4EF27A10, 11
MODEL 4EF28A10

(A-4036725, Sh. 3, Rev. 0)





BACK VIEW
FOR ALL APPLICATIONS USING TWO ANTENNAS



DUAL FRONT END

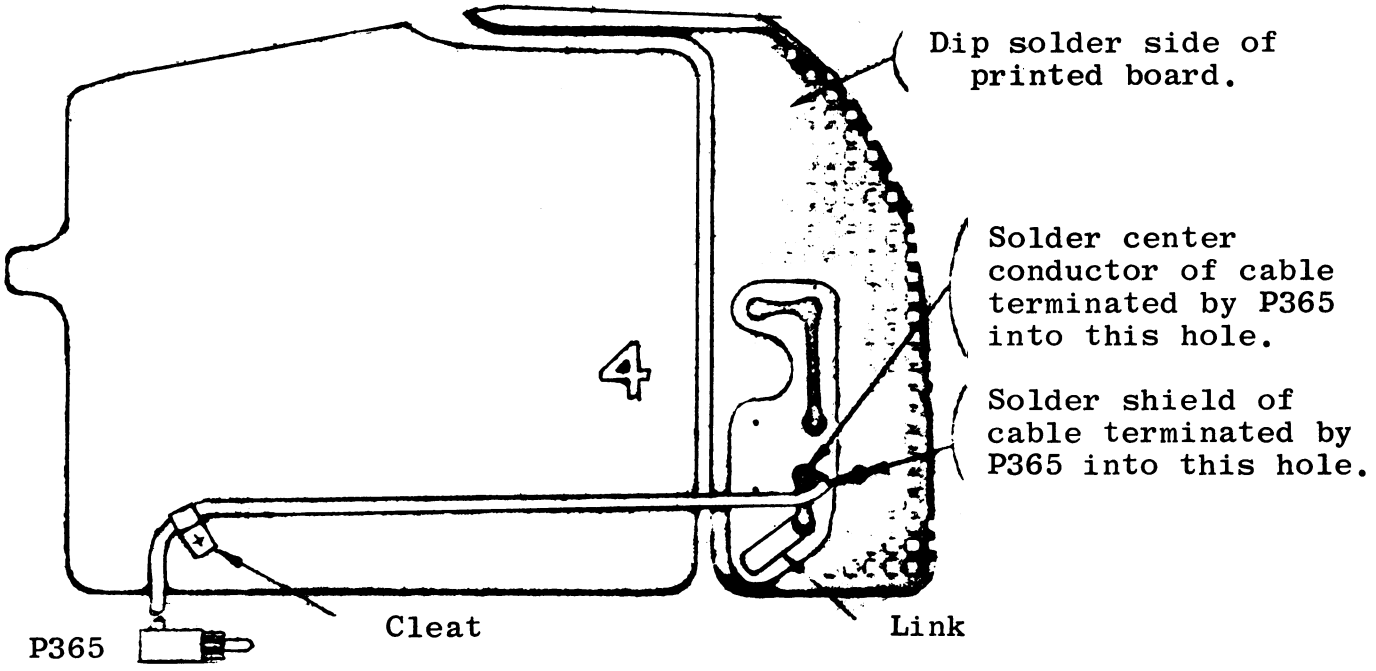
1. SLIT GROMMET, THEN INSERT APPLICABLE CABLE OR CABLES AND ROTATE GROMMET. SO SLIT IS NOT ALIGNED WITH CUTOUT.
2. COIL EXCESS CABLE AND TAPE COIL OF CABLE WITH TAPE AS REQUIRED.
3. THIS CABLE TERMINATED BY P365 OR P421 IS SUPPLIED AS A PART OF SUPPORT ASSEMBLY.
4. FOR LOW BAND 4EF28A10, WHEN FREQ RANGE MODIFICATION KIT IS NOT USED, CLIP OUT STRAP SHOWN.

Cable Connection Diagram

FOR HIGH & LOW BAND DUAL FRONT END

(19D400439, Rev. 0)

1. Cable terminated by P365, which is a part of part 8 of A4036082G1, shall be attached to 4EF13A10, or 4EF13A11, 4EF13B10, 11 as shown below:



2. A. Remove hex head screw from hole in position where cleat is shown.

   B. Using hex head screw removed in step 2A, install cable and cleat as shown. (Cleat is part one of Hardware Kit PLA4036170G1).

   C. Some printed boards do not have holes for inserting leads of the cable. In this case solder the proper lead directly to the link or pattern so that indicated connections will result.

   D. The stripped ends of the coaxial cable should be short so that the possibility of the shield shorting will be eliminated.

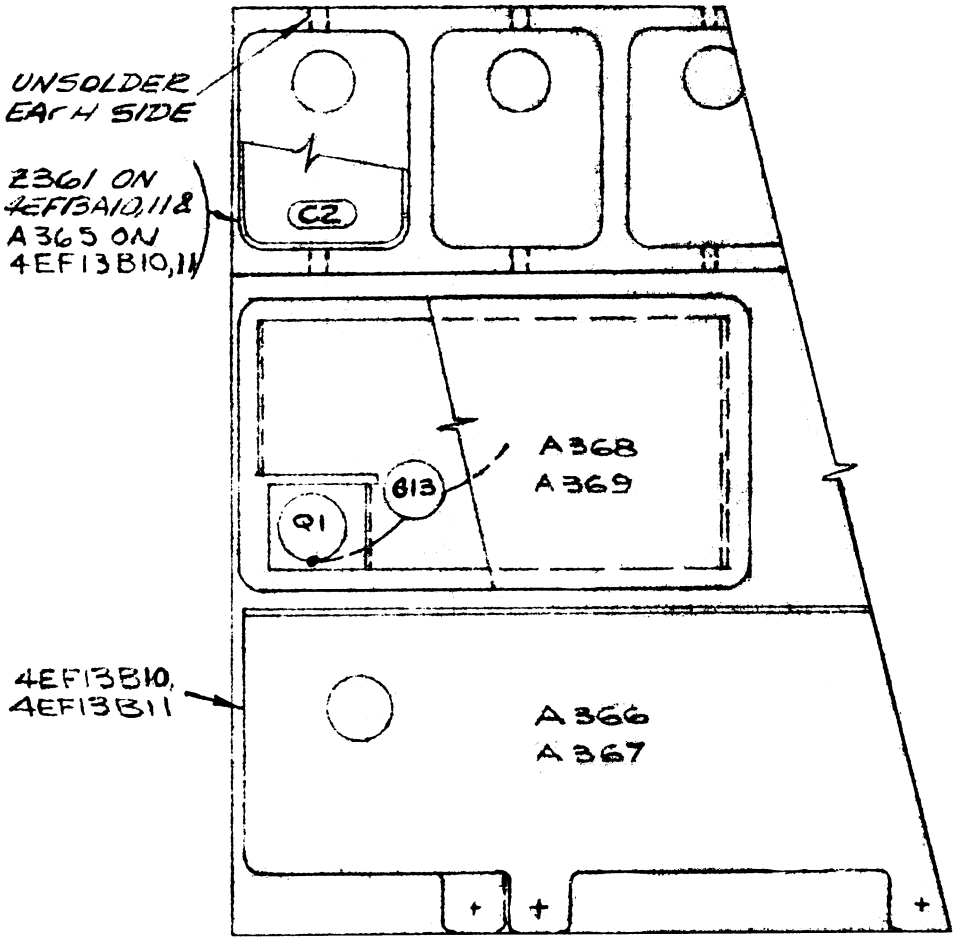
   E. When these instructions are to be applied to field modified units, package cleat (P7763541P1) of PLA4036170G1 Hardware Kit with the Dual Front End Unit.

3. A. Further instructions for 4EF13B10,11. Paragraph 1 & 2 applies except a Phillips head screw is used instead of a hex head. Also remove C13 of A368/A369 as shown on Sheet #2.

Modification Instructions

R.F. BOARD HIGH BAND
MODEL 4EF13A10, 11

(A-4036173, Sh. 1, Rev. 2)



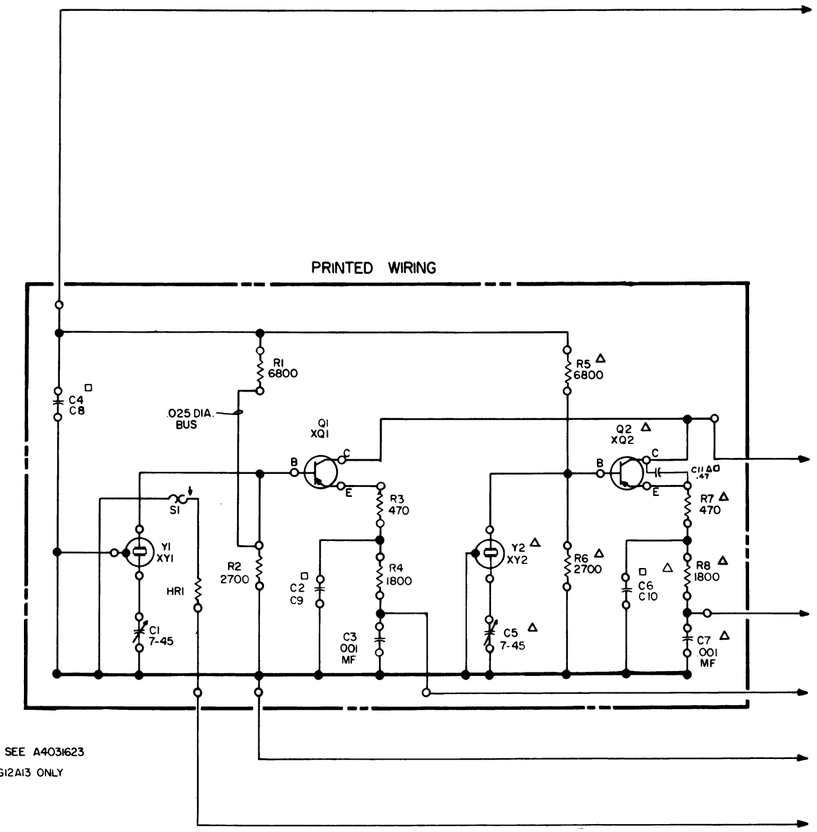
4. This step may have to be performed on some units (High Band Receivers containing 4EF13A10,11 or 4EF13B10,11). To prevent possible unnecessary assembly and disassembly of the complete package, it is desirable to make all connections up to this point and bench check out the unit.
If the first coil in the High IF Transformer in the receiver, located in the High IF strip Z361, does not resonate after all connections are made with the check-out mentioned above the following procedure must be followed:
Remove the HI/IF strip (Z361) from the main RF Board by unsoldering the seven links from the main board. Then unsolder the shield can covering C2 as shown in the above sketch. Remove Capacitor C2 and replace with C16, 82pf, Capacitor B5494210P361 included as a part of this kit. Then Re-assemble parts removed in reverse order.

5. When the Low Band Dual Front is applied in cross band operations, the High Band Receiver Sensitivity in some units will be degraded. If this occurs, Capacitor C434, coupling Capacitor, on 4EF28A10 will have to be replaced with C18 Capacitor, 18 pf, supplied as a part of this kit. Refer to instruction book elsewhere for location of C434. After the exchange of capacitors mentioned above retune the first High I.F. Transformer and Mixer of 4EF28A10 (Dual Front End).

Modification Instructions

R.F. BOARD HIGH BAND
MODEL 4EF13A10, 11

(A-4036173, Sh. 2, Rev. 3)
(A-4036173, Sh. 3, Rev. 0)



FOR WIRING INSTRUCTIONS SEE A4031623

△ PARTS FOR 4EG12A11, 4EG12A13 ONLY

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

□

4EG12A10	4EG12A11	4EG12A12	4EG12A13
C2 = 7	C2 = 7	C9 = 15	C9 = 15
C4 = .001MF	C4 = .001MF	C8 = .01MF	C8 = .01MF
	C6 = 7		C10 = 15
			C11 = .47

ALL RESISTORS ARE IN OHMS AND ARE HALF WATT UNLESS OTHERWISE SHOWN

K = 1000 OHMS

MEG = 1,000,000 OHMS

ALL CAPACITORS ARE IN MICRO MICRO FARADS UNLESS OTHERWISE SHOWN

MF = MICRO FARAD.

(C-5495636, Rev. 5)

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EG12A10	C
4EG12A11	C
4EG12A12	B
4EG12A13	C

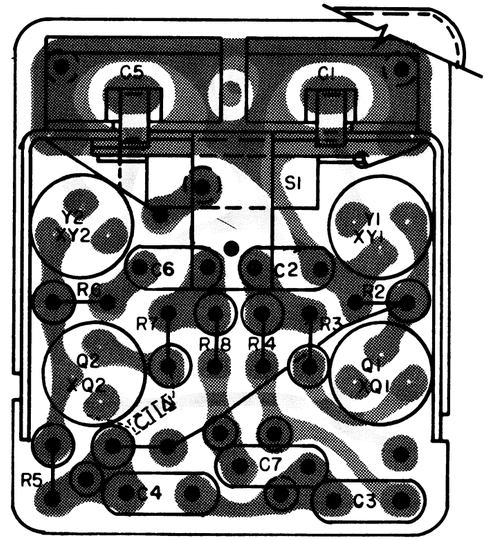
Service Sheet

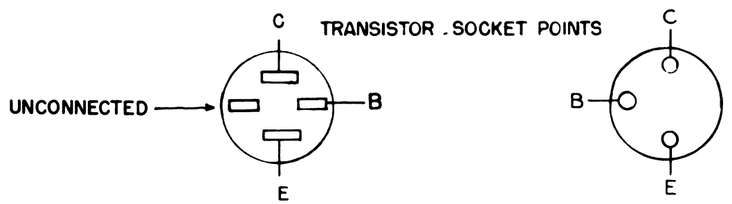
OSCILLATOR
MODEL 4EG12A10, REV. C
MODEL 4EG12A11, REV. C
MODEL 4EG12A12, REV. B
MODEL 4EG12A13, REV. C

(RC-812)

▒ Denotes Component Side

▒ Denotes Solder Side





(B-5492232, Rev. 2)
(B-5491781, Sh. 1, Rev. 0)
(B-5491781, Sh. 2, Rev. 0)

△ Located on Dip Solder Side of 4EG12A13 only.

VOLTAGE READINGS

SYMBOL NUMBER	TRANSISTOR		
	E	B	C
Q1	-3.1	-3.3	-12.5
Q2	-3.1	-3.3	-12.5

RESISTANCE READINGS

SYMBOL NUMBER	TRANSISTOR		
	E	B	C
Q1	2300 NOTE 5	2K	0
Q2	2300 NOTE 5	2K	0

CONDITIONS OF MEASURMENTS.

VOLTAGE :

1. READINGS TAKE WITH A 20,000 OHM - PER - VOLT METER - POSITIVE PROBE TO J304 REF. BUS.
2. INPUT VOLTAGE - 13.8 V D-C
3. READINGS TAKEN WITH RECEIVER TERMINATED INTO 2 - WATT SPKR/AMP.
4. READINGS TAKEN FROM BOTTON OF TRANSISTOR SOCKETS ARE APPROX. ± 10%

RESISTANCE

1. OSCILLATOR CONNECTED TO RF BOARD.
2. TRANSISTOR REMOVED FROM SOCKET UNDER TEST.
3. 4EF13A11 - P361 CONNECTS TO REF. BUS. J363.
4. READINGS TAKFN FROM TOP OF TRANSISTOR SOCKET TO REFERENCE BUS. ARE WITHIN ± 20 %
5. RESISTANCE WILL BE INF. ON CHANNEL NOT SELECTED

PRODUCTION CHANGES

(Refer to Parts List for description of parts affected by these revisions.)

REV. A (Models 4EG12A10, 4EG12A11 only.)

To assure more uniform operation of oscillator. Decrease tolerance on components R1, R2, R4, R5, R6 and R8.

REV. A (Model 4EG12A13 only)

To improve 2-frequency receiver operation. Add capacitor C11 to solder side of 4EG12A13 board.

REV. A (Model 4EG12A12 only)
REV. B (Model 4EG12A10, 11, 13 only)

To employ transistors with more uniform characteristics. Q1 of 4EG12A10 & 4EG12A12 changed. Q1 and Q2 of 4EG12A11 and 4EG12A13 changed.

REV. B (Model 4EG12A12 only)
REV. C (Model 4EG12A10,11,13 only)

To provide for mounting of transistor with 4 leads, (one lead is dummy). XQ1 and XQ2 changed.

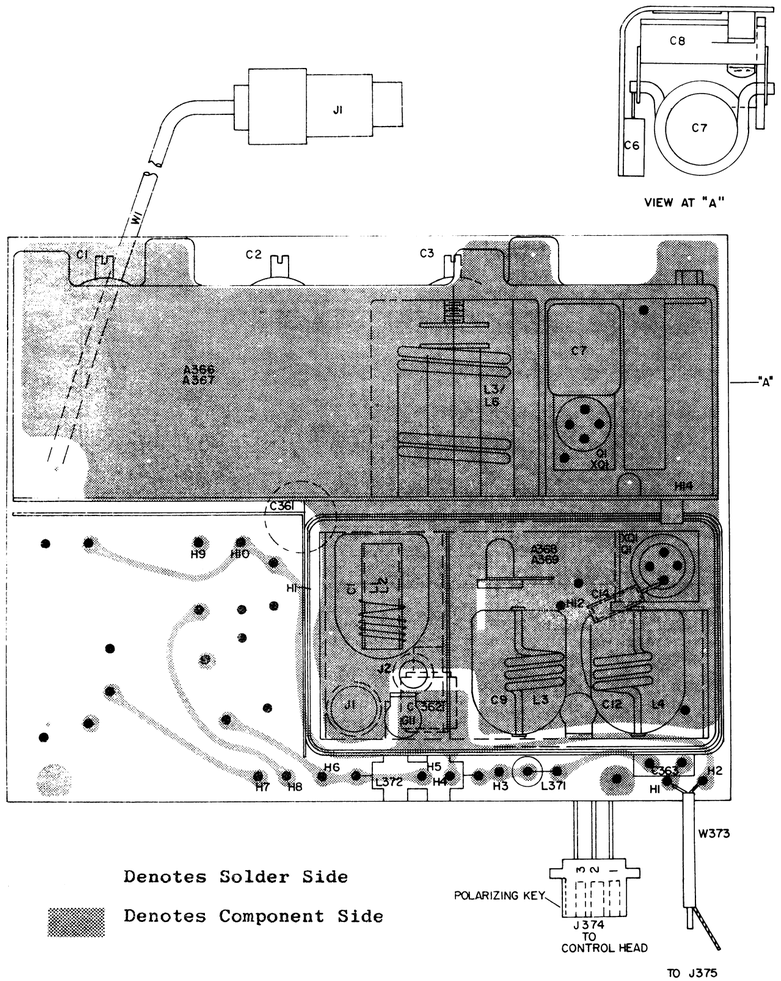
PARTS LIST

1st OSCILLATOR

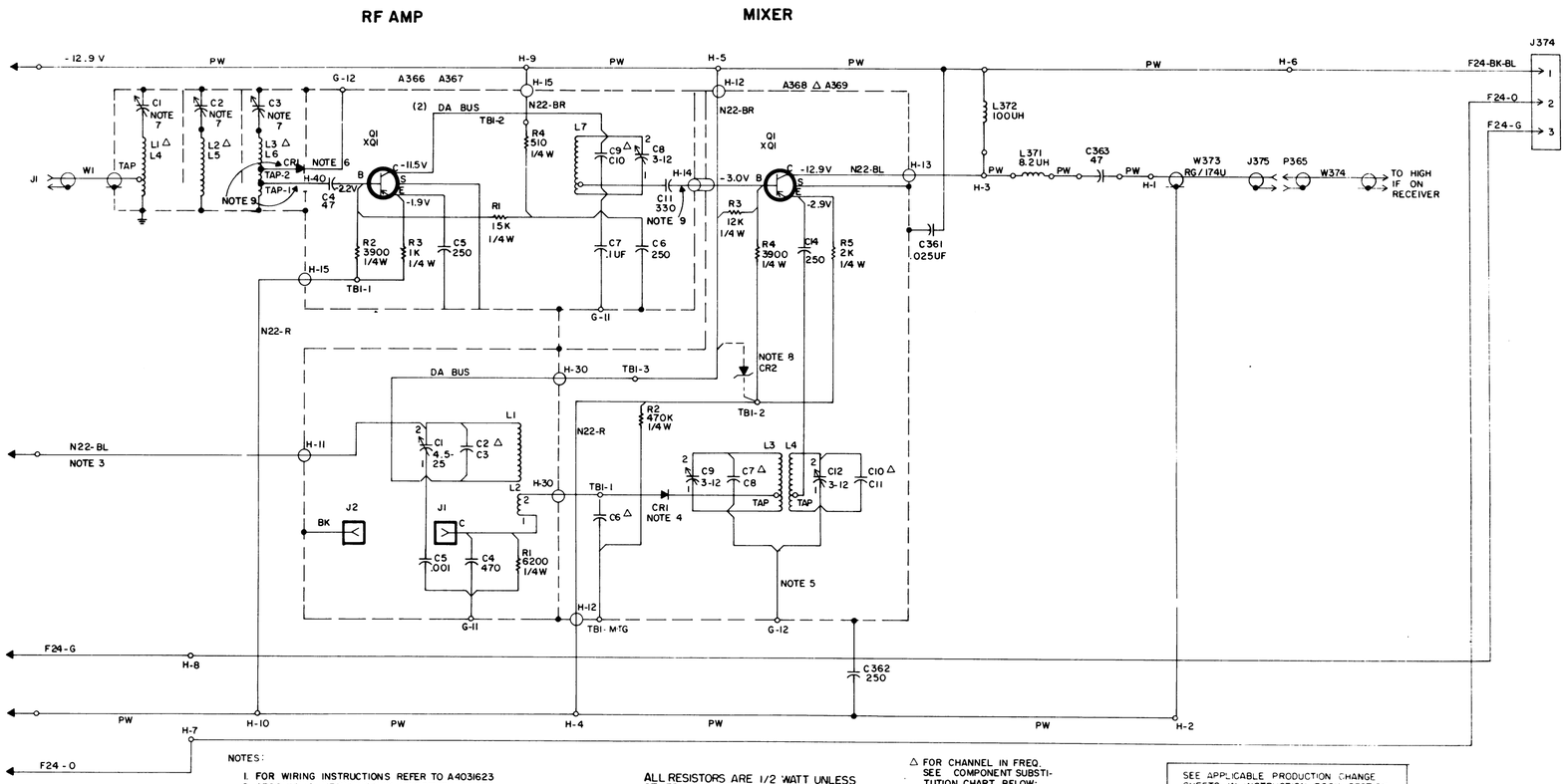
MODEL 4EG12A10 (1-FREQ) REV. C
MODEL 4EG12A11 (2-FREQ) REV. C
MODEL 4EG12A12 (1-FREQ) REV. B
MODEL 4EG12A13 (2-FREQ) REV. C
PL-5491299-G1,2,3,4

SYMBOL	DESCRIPTION	G-E DRAWING & PART NO.
	CAPACITORS	
C1	Ceramic; variable; 7 uufd to 45 uufd, 500 vdcw, stator terminal straight out, rotor terminal bent. Similar to Erie Type TS2A-N500.	M-7484389-P66
C2	Ceramic disc, insulated, temp. compensating; 7.0 uufd ±5%, 500 vdcw. Used in Models 4EG12A10, 11 only.	C-5494210-P38
C3	Ceramic disc, insulated, 1000 uufd ±10%, 500 vdcw, RMC Corp. Type JF Discap.	C-5494481-P112
C4	Ceramic disc, insulated; 1000 uufd ±10%, 500 vdcw. RMC Corp. Type JF Discap. Used in Models 4EG-12A10, 11 only.	C-5494481-P112
C5	Ceramic, variable; 7 uuf to 45 uufd, 500 vdcw, stator terminal straight out, rotor terminal bent. Similar to Erie Type TS2A-N500. Used in Models 4EG12A11, 13 only.	M-7484389-P66
C6	Ceramic disc, insulated, temp. compensating; 7.0 uufd ±5%, 500 vdcw. Used in Model 4EG12A11 only.	C-5494210-P38
C7	Ceramic disc, insulated; 1000 uufd ±10%, 500 vdcw, RMC. Corp. Type JF Discap. Used in Models 4EG-12A11, 13 only.	C-5494481-P112
C8	*Mylar-dielectric; 0.01 uf ±20%, 50 vdcw. Good-All Type 601PE. Used in Models 4EG12A12, 13 only.	B-5491189-P101
C9	Ceramic disc, insulated, temp compensating; 15 uufd ±5%, 500 vdcw. Used in Models 4EG12A12, 13 only.	C-5494210-P44
C10	Ceramic disc, insulated, temp compensating; 15 uufd ±5%, 500 vdcw. Used in Model 4EG12A13 only.	C-5494210-P44
C11#	Moulded Type, 0.47 mmfd, ±10%, 500 VDCW 4EG12A13 only. Added by REV. A	C-5491601P13
	HEATER	
HR1	Heater and bracket assembly.	A-4031390-G1
	TRANSISTORS	
Q1#	Transistor, Germanium: PNP; hermetically sealed, metallic case with glass seal. Similar to Type 2N1744. In Models 4EG12A10, 4EG12A11 and 4EG12A13 of Rev A or earlier: In Model 4EG12A12 earlier than Rev A: Transistor, Germanium: MADT, PNP; hermetically sealed in metallic case with glass seal. Similar to Type 2N502.	A-4036830-P2 19B200130-P2
Q2#	Transistor, Germanium: PNP; hermetically sealed, metallic case with glass seal. Similar to Type 2N1744. (Used in Models 4EG12A11 and 4EG12A13 only). In Models of Rev A or earlier: Transistor, Germanium: MADT, PNP; hermetically sealed in metallic case with glass seal. Similar to Type 2N502. (Used in Models 4EG12A11 and 4EG12A13 only).	A-4036830-P2 19B200130-P2
	RESISTORS	
R1#	Composition, 6,800 ohms ± 5%, 1/2 w. Added by Rev. A.	C-3R77-P682J
	Composition, 6,800 ohms ± 10%, 1/2 w. Deleted by Rev. A.	C-3R77-P682K
R2#	Composition, 2,700 ohms ± 5%, 1/2 w. Added by Rev. A.	C-3R77-P272J
	Composition, 2,700 ohms ±10%, 1/2 w. Deleted by Rev. A.	C-3R77-P272K
R3	Composition, 470 ohms ±10%, 1/2 w.	C-3R77-P471K
R4#	Composition, 1,800 ohms ±5%, 1/2 w. Added by Rev. A.	C-3R77-P182J
	Composition, 1,800 ohms ±10%, 1/2 w. Deleted by Rev. A.	C-3R77-P182K
R5#	Composition, 6,800 ohms ±5%, 1/2 w. Used in Models 4EG12A11,13 only. Added by Rev. A in Model 4EG12A11.	C-3R77-P682J
	Composition, 6,800 ohms ±10%, 1/2 w. Used in Model 4EG12A11 only. Deleted by Rev. A.	C-3R77-P682K

SYMBOL	DESCRIPTION	G-E DRAWING & PART NO.
	RESISTORS (CONT'D)	
R6#	Composition, 2,700 ohms ±5%, 1/2 w. Used in Models 4EG12A11, 13 only. Added by Rev. A in Model 4EG12A11.	C-3R77-P272J
	Composition, 2,700 ohms ±10%, 1/2 w. Used in Model 4EG12A11 only. Deleted by Rev. A.	C-3R77-P272K
R7	Composition, 470 ohms ±10%, 1/2 w. Used in Models 4EG12A11, 13 only.	C-3R77-P471K
R8#	Composition, 1800 ohms ±5%, 1/2 w. Used in Models 4EG12A11, 13 only. Added by Rev. A in Model 4EG12A11.	C-3R77-P182J
	Composition, 1,800 ohms ±10%, 1/2 w. Used in Model 4EG12A11 only. Deleted by Rev. A.	C-3R77-P182K
	SWITCH	
S1	Thermostat, snap-acting, non-adjustable; semi-enclosed type; closes at 30^{0} $\pm5^{0}$, opens at 65^{0} $\pm7^{0}$. Stevens Mfg Co. Cat. No. M-262.	A-4033082-P1
	SOCKETS	
XQ1#	Socket, Transistor: PW (Stand-off); low loss mica filled phenolic insulation, 3-pins (beryllium copper), current rating 1 amp, contact resistance 0.30 ohms maximum (per contact). Similar to Elco Corp Part No. 3308.	A-4036353-P2
	In Models of Rev. B or earlier: Socket, Transistor: 4-contacts, low loss mica filled phenolic; contact resistance 0.03 ohms max., 1 amp. Similar to Elco Corp Part No.3303.	B-5490277-P1
XQ2#	Socket, Transistor: PW (Stand-off); low loss mica filled phenolic insulation, 3-pins (beryllium copper), current rating 1 amp, contact resistance 0.30 ohms maximum (per contact). Similar to Elco Corp Part No. 3308. Used in Model 4EG12A11, 13 only.	A-4036353-P2
	In Models of Rev. B or earlier: Socket, Transistor: 4-contacts, low loss mica filled phenolic: contact resistance 0.30 ohms max., 1 amp. Similar to Elco Corp Part No. 3303.	B-5490277-P1
XY1	4-contacts, low loss, mica-filled phenolic; contact resistance .03 ohms max. 1 amp. Elco Cat. #3303.	B-5490277-P1
XY2	4-contacts, low loss mica-filled phenolic; contact resistance .03 ohm max. 1 amp. Elco Cat. #3303. Used in Model 4EG12A11,13 only.	B-5490277-P1
	CRYSTALS	
Y1	Quartz, anti-resonance, freq. range: 20 to 55.5 MC. When reordering give G-E dwg. and part no. and specify exact frequency needed. 150-170 MC operation: Crystal frequency - (Operating frequency -8.7) ÷ 3. 25-50 MC operation: Crystal frequency - 4.7.	A-4033466-P1
Y2	Quartz, anti-resonance, freq. range: 20 to 55.5 MC. When reordering give G-E dwg. and part no. and specify exact frequency needed. 150-170 MC operation: Crystal frequency - (Operating frequency -8.7) ÷ 3. 25-50 MC operation: Crystal frequency - 4.7. Used in Model 4EG12A11, 13 only.	A-4033466-P1



(19C300798, Rev. 2)
(19C300007, Sh. 1, Rev. 1)
(19C300007, Sh. 2, Rev. 1)



NOTES:

1. FOR WIRING INSTRUCTIONS REFER TO A4031623
2. A366-W1 IS MECHANICALLY GROUNDED.
3. LET HANG FROM C1-2
4. A368, TBI-1 ⟵ CR1 ⟶ A363, L3-TAP
5. STRAP B11B3C9, .005 THK. X.125 X1.25.
6. A366, L3 OR L6-TAP-2 ⟵ CR1 ⟶ G-12
7. A366, C1, C2 & C3 ARE MECHANICALLY MADE.
8. TO BE INCLUDED ONLY WHEN RECEIVER IS USED WITH HIGH POWER TRANSMITTERS. MODIFICATION KIT A4038460
9. USE TEFLON SLEEVING A4038593P6.

DESIGNATES REFERENCE BUS (POSITIVE SUPPLY VOLTAGES) AND IS NOT NECESSARILY GROUNDED.

ALL VOLTAGES READINGS MEASURED WITH A 20,000 OHM-PER-VOLT METER ± 20% FROM THE INDICATED POINT TO THE POSITIVE SUPPLY BUS.

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

Δ FOR CHANNEL IN FREQ. SEE COMPONENT SUBSTITUTION CHART BELOW:

4EF27A11 150-174 MC	4EF27A10 130-150 MC
A366	A367
L1	L4
L2	L5
L3	L6
C9-7	C10-13
A368	A369
C2-15	C3-30
C7-7	C8-11
C10-7	C11 11
NONE	C6-10

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EF27A10	B
4EF27A11	B

(19D400159, Rev. 5)

5244

Service Sheet

DUAL FRONT END - HIGH BAND
MODEL 4EF27A10/11; REV. A

(RC-762B)

Jul 8 78

PARTS LIST

DUAL FRONT END (HIGH BAND)
MODEL 4EF27A10/11, REV. A
PL-4EF27A10-12

SYMBOL	DESCRIPTION	G-E DRAWING & PART NO.
A366/7	R.F. Amplifier - Consisting of the following components with an A366 or A367 prefix.	PL-19C300428
A366/7-C1 thru C3	Capacitor, part of mechanical construction.	
A366/7-C4	Capacitor, silver mica; 47 pf ±10%, 500 VDCW. Electromotive Mfg. Co. Type DM15.	B-7489162-P119
A366/7-C5	Capacitor Asm. Included the following components: Capacitor, mica; 250 pf ±10%, 500 VDCW. G.E.Dwg. No. M-7484398-P3 Lwg., Terminal: Copper, G.E. Dwg. No. A-7878455-P2.	A-7146331-G3
A366/7-C6	Capacitor, mica; 250 pf ±10%, 500 VDCW. Sim to Underwood J-1-HF.	M-7484398-P3
A366/7-C7	Capacitor, Mylar®, dielectric. Straight leads, 0.10 µf ±20%, 50 VDCW. Sim. to Good-All Electric Mfg. Co. Type 601PE.	B-5491189-P6
A366/7-C8	Capacitor, variable. 3 to 12 pf, +50% -100%, 500 VDCW, 0° Temp coef. Sim. to Erie Resistor Co. Type.	M-7484389-P2
A366/7-C9	Capacitor, fixed ceramic disc, temp. compensating 7.0 pf ±0.25 pf 500 VDCW, -80 temp. coef. Model 4EF27A11 only.	C-5496218-P238
A366/7-C10	Capacitor, fixed ceramic disc, temp compensating. 13 pf ±5%, 500 VDCW. Temp coef -220, Model 4EF27A10 only.	C-5496218-P243
A366/7-C11	Capacitor, fixed silver mica: DM-15-dipped phenolic insulation; 330 pf ±10%, 500 VDCW. Sim. to Electromotive Mfg. Co. Type DM-15.	B-7489162-P139
A366/7-CR1	Diode, hermetically sealed in glass body. Sim to Radio Receptor Co. Type DR-385.	A-4034827-P1
A366/7-L1	Coil, assembly consisting of Coil 19B200616-P1 and strap K-7119771-P1. Model 4EF27A11 only.	A-4036878-G1
A366/7-L2	Coil, 7 turns at 9 1/2 turns per inch, left hand wound. Model 4EF27A11 only.	19B200616-P1
A366/7-L3	Coil assembly, consisting of coil 19B200616-P1 and strap K-7119771-P1. Model 4EF27A11 only.	A-4036878-G2
A366/7-L4	Coil assembly, consisting of Coil 19B200616-P2 and strap K-7119771-P1. Model 4EF27A10 only.	A-4036878-G3
A366/7-L5	Coil, 8 turns at 9 1/2 turns per inch, left hand wound. Model 4EF27A10 only.	19B200616-P2
A366/7-L6	Coil assembly, consisting of coil 19B200616-P2, and strap K-7119771-P1. Model 4EF27A10 only.	A-4036878-G4
A366/7-L7	Coil assembly, consisting of Coil A-7141042-P2 and strap K-7119771-P1.	A-4036880-G1
A366/7-Q1*	Transistor, germanium, PNP: sim to Type 2N2996. In Models earlier than REV. B. Transistor, germanium, PNP:	19A115413-P1 19C300037-P4
A366/7-R1	Resistor, Fixed composition, 15 K ohms ±10%, 1/4 w	C-3R152-P153K
A366/7-R2	Resistor, fixed composition, 3900 ohms ±10%, 1/4 w	C-3R152-P392K
A366/7-R3	Resistor, fixed composition, 1 K ohms ±10%,1/4 w.	C-3R152-P102K
A366/7-R4	Resistor, fixed composition, 510 ohms ±5%,1/4 w.	C-3R152-P511J
A366/7-W1	Cable, Assembly: Includes the following components Cable, black, max. operating voltage 350 VRMS, 500 VDC. Sim. to Type RG-174/4. Connector phono type. G.E. Dwg. and Part No.A-4032504-P5.	B-5491689-P14
A366/7-XQ1*	Socket, Transistor: PW (stand off); low loss mica filled phenolic insulation, 4-pins (beryllium copper), current rating 1 amp, contact resi 0.30 ohms maxi (per contact). Sim to Elco Corp. 3308. In Models earlier than Rev. A: Socket, Transistor: PW (stand off); low loss mica filled phenolic insulation, 4-pins (beryllium copper), current rating 1 amp; contact resi 0.30 ohms maxi (per contact). Sim to Elco Corp. 3308.	A-4038139-P1 A-4036353-P1
A368/9	Multiplier - Mixer. Consisting of the following components with an A368 or A369 prefix:	PL-19C300425
A368/9-C1	Capacitor, variable: Ceramic Trimmer; 4.5 to 25 pf +50% -100%, 500 VDCW, 0° Temp. coef. Sim to Erie Type TS2A-NPO.	M-7484389-P9
A368/9-C2	Capacitor, fixed ceramic disc: 15 pf ±5%, 500 VDCW -80 temp coef. Model 4EF27A11 only.	C-5496218-P244
A368/9-C3	Capacitor, fixed ceramic disc: 30 pf ±5%, 500 VDCW -80 temp coef. Model 4EF27A10 only.	C-5496218-P250
A368/9-C4	Capacitor, fixed, silver mica, 470 pf ±5%, 300 Electromotive Type DM-15.	B-7489162-P43
A368/9-C5	Capacitor, high dielectric; ceramic disc, 1,000 pf ±10%, 500 VDCW. Similar to RMC Type JF Discap.	C-5494481-P12
A368/9-C6	Capacitor, fixed ceramic disc; 10 pf ±5% 500 VDCW -80 temp coef. Model 4EF27A10 only.	C-5496218-P241
A368/9-C7	Capacitor, fixed ceramic disc: 7 pf ±0.25 pf. 500 VDCW, -80 temp. coef. Model 4EF27A11 only.	C-5496218-P238
A368/9-C8	Capacitor, fixed ceramic, 11 pf ±5%, 500 VDCW. Similar to Erie Type 331. Model 4EF27A10 only.	B-7473485-P13
A368/9-C9	Capacitor, variable: (Ceramic trimmer) 3 to 12 pf +50% -100%, 500 VDCW, 0° temp. coef. Similar to Erie type TS2A-NPO.	M-7484389-P2
A368/9-C10	Capacitor, fixed ceramic disc: 7 pf ±0.25 pf, 500 VDCW -80 temp coef. Model 4EF27A11 only.	C-5496218-P238
A368/9-C11	Capacitor, fixed ceramic, 11 pf ±5%, 500 VDCW. Similar to Erie Type 331. Model 4EF27A10 only.	B-7473485-P13
A368/9-C12	Capacitor, variable: (Ceramic trimmer) 3 to 12 pf +50% -100%, 500 VDCW, 0° temp. coef. Similar to Erie type TS2A-NPO.	M-7484389-P2
A368/9-C14	Capacitor, uncased mica 250 pf, ±10%, 500 VDCW. Similar to Underwood Type J-1-HF.	B-5492056-P3
A368/9-CR1	Diode, silicon varactor (multiplier, 3 x range 40 to 54 MC).	A-4036900-P1
A368/9-J1	Test jack: Molded nylon body, beryllium copper contact, max. op. voltage 600 vrms, max. op. temp. 105°C. Sim. to Alden Part No. 110-SM1.	A-4033567-P4
A368/9-J2	Test jack, (printed circuit type) nylon body, beryllium copper contacts. Alden Part No. 110PC1-black.	A-4033568-P1
A368/9-L1 and L2	R.F. transformer: Includes L1 and L2.	A-4036877-G1
A368/9-L3	Coil assembly consisting of coil A-4036881-P1 and link A-4029894-P1.	A-4036879-G1
A368/9-L4	Coil assembly consisting of coil A-4036881-P1 and link A-4029894-P1.	A-4036879-G2
A368/9-Q1*	Transistor, germanium, PNP: Sim to Type 2N2996. In Models earlier than REV. B. Transistor, germanium, PNP:	19A115413-P1 19B200131-P1
A368/9-R1	Resistor, fixed composition, 6.2 K ohms, ±10%, 1/4 watt.	C-3R152-P622K
A368/9-R2	Resistor, fixed composition, 0147 megohm ±10%, 1/4 watt.	C-3R152-P474K
A368/9-R3	Resistor, fixed composition, 12 K ohms, ±10%, 1/4 watt.	C-3R152-P123K
A368/9-R4	Resistor, fixed composition, 3.9K ohms, ±10%,1/4 w	C-3R152-P392K
A368/9-R5	Resistor, fixed composition, 2 K ohms ±5%, 1/4 w.	C-3R152-P202J
A368/9-XQ1*	Socket, transistor: PW (stand off); low - loss mica filled phenolic insulation, 4-pins, current rating 1 amp, contact resi 0.30 ohms. Sim to Elco 3308. In Models earlier than Rev. A: Socket, Transistor: PW (stand off); low loss mica filled phenolic insulation, 4-pins (beryllium copper), current rating 1 amp, contact resi 0.30 ohms maxi (per contact). Sim to Elco Corp. 3308.	A-4038139-P1 A-4036353-P1
C361	Capacitor, disc; 0.025 uf +80% -20%, 50 VDCW. Sim. to Sprague 29C187.	B-7491827-P6
C362	Capacitor, fixed mica, uncased; 250 pf ±10%, 500 VDCW. Sim. to Underwood J-1-HF.	M-7484398-P3
C363	Capacitor, fixed, silver mica: 47 pf ±5%, 500 VDCW. Sim. to Electromotive DM15.	B-5490008-P19
J374	Connector, receptacle: Phenolic, 3-circuits. Sim. to Molex 10SSR3.	C-5496809-P2
L371	Coil, RF; Ind. 100 uh ±10%, res. 6 ohms max. Sim. to National R33.	A-7127925-P4
L372	Coil, RF choke: Ind. 8.20 uh ±10%, DC res 0.45 ohms max. Sim. to Jeffers 10102-30.	B-7488079-P15
W373	Cable, RG174/4, 2 inches long.	

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PRODUCTION CHANGES

(Refer to Parts List for description of parts affected by these revisions.)

REV. A - To provide standard Transistor Sockets. Changed A366/7-XQ1 and A368/9-XQ1.

REV. B - To provide greater protection against burn-out under R.F. overload. Changed A366/7-Q1 and A368/9-Q1.

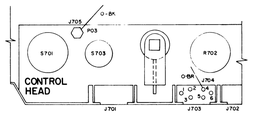


FIG. 1

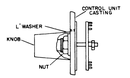


FIG. 2

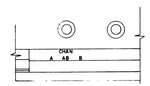


FIG. 3

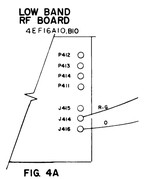


FIG. 4A

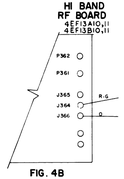


FIG. 4B

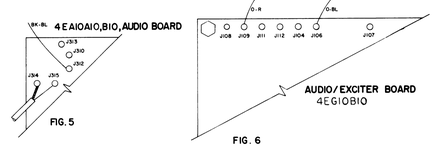


FIG. 5

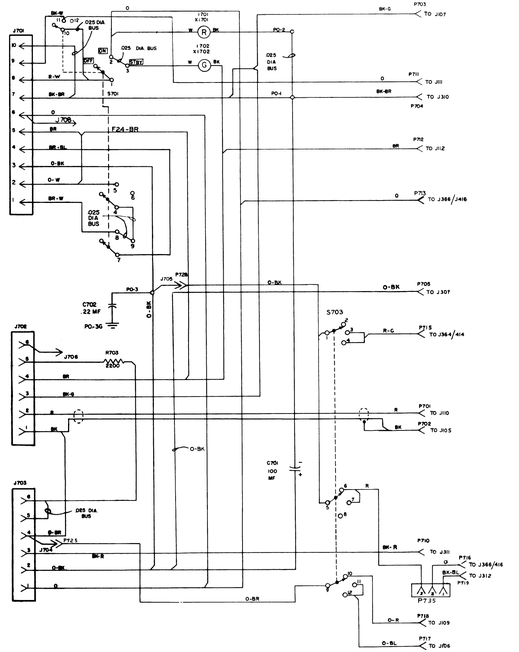
FIG. 6

WIRING TABLE

CONNECT	FROM	TO	FIG
BK-BL	P735-1	J302	5
O	P735-2	J366/J416	4
R-G	S703-3,4	J364/J414	4
O-BK	S703-1,5	J705	1
O-BL	S703-11,12	J106	6
O-R	S703-10	J109	6
O-BR	S703-9	J704	1

1. REMOVE KNOB AND SHAFT FROM ACCESSORY POSITION ON CONTROL UNIT
2. MOUNT SWITCH ASSEMBLY IN ACCESSORY POSITION AS SHOWN IN PART 1.
3. IF UNIT IS EQUIPPED FOR ONLY RECEIVER IS ADDED TO TWO FREQUENCY USE CASE AND REMOVE UNUSED WIRES FROM S703
4. WIRE ACCORDING TO WIRING TABLE.

(19C300698, Rev. 1)

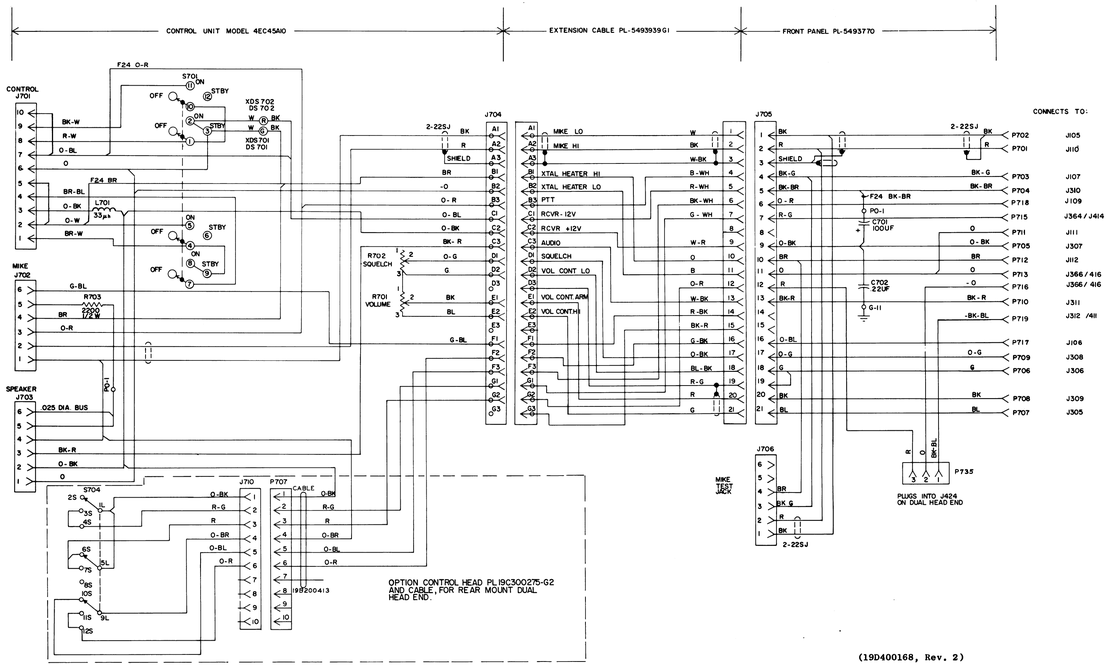


(D-5499797, Rev. 2)

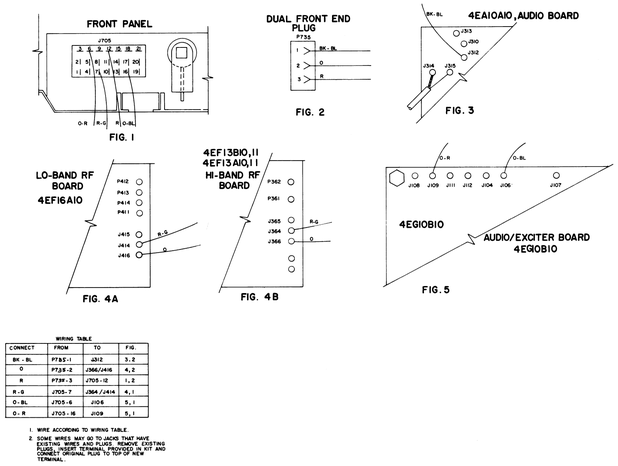
IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

Front Mount Installation
FOR DUAL FRONT END
(RC-740E)

5244



(19D400168, Rev. 2)

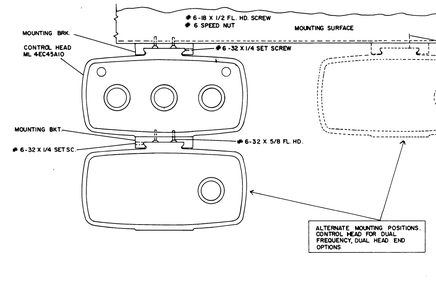


WIRING TABLE

CONNECT	FROM	TO	FIG.
BK - BL	P735-1	J312	3, 2
O	P735-2	J366/J416	4, 2
R	P735-3	J705 - 12	1, 2
R - G	J705 - 7	J364 / J414	4, 1
O - BL	J705 - 6	J106	5, 1
O - R	J705 - 16	J109	5, 1

1. WIRE ACCORDING TO WIRING TABLE.
2. SOME WIRES MAY GO TO JACKS THAT HAVE EXISTING WIRES AND PLUGS. REMOVE EXISTING WIRE FROM TERMINAL, UNSOLDER OR NIT AND CONNECT ORIGINAL PLUG TO TOP OF NEW TERMINAL.

(19C300697, Rev. 2)



(19C300689, Rev. 0)

Front Mount Installation

FOR DUAL FRONT END-REAR MOUNT

(RC-741B)