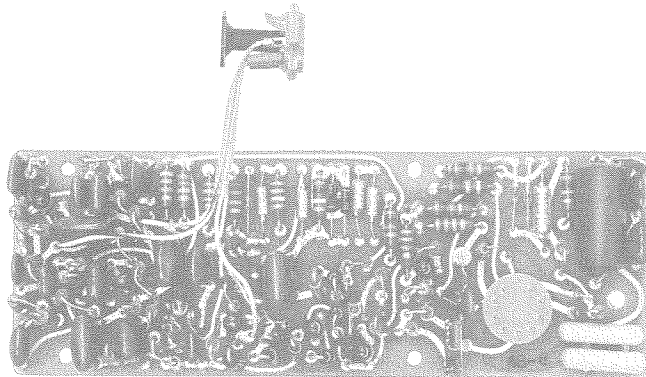


MAINTENANCE MANUAL

CHANNEL GUARD ENCODER/DECODER MODELS 4EK14B10 & 4EK14B11

CHANNEL GUARD DECODE ONLY (OPTION 8026)

TONE REJECT FILTER 19C317355 - G2



SPECIFICATIONS *

Used with 4EK14B10	MASTR [®] Progress Line Executive Series, Royal Executive Mobile and Station Combinations and MASTR Executive II Mobile and Station Combinations
4EK14B11	MASTR Progress Line Custom Executive Mobile Combinations
Tone Frequencies	71.9 to 203.5 Hertz
Encoder Distortion	Less than 3%
Decoder Response	±1.5 dB from 71.9 to 203.5 Hertz (100 Hz Ref.)
Power Requirements	10 VDC @ 50 Milliamperes
Number of Silicon transistors	8
Temperature Range	-30°C to +60°C (-22°F to 144°F)

*These specifications are intended primarily for the use of the serviceman. Refer to the appropriate Specification Sheet for the complete specifications.

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Channel Guard Encoder/Decoder Model 4EK14B10	8
Channel Guard Encoder/Decoder Model 4EK14B11	9

DESCRIPTION

General Electric Channel Guard Models 4EK14B10 and 4EK14B11 are fully transistorized Encoder/Decoder.

The encoder function provides coded tone modulation for the transmitter.

The decoder function is used with the receiver to eliminate all calls that are not tone coded for the channel guard frequency.

The tone frequencies are controlled by plug-in tone networks that are made with precision components for excellent stability and reliability. The channel guard board is located in the option area as shown in Figures 1 and 2.

Tone Reject Filter 19C317355G2 is available for use in a non-Channel Guard mobile or station receiving calls that are tone modulated.

INSTALLATION

To install Channel Guard board in the field, refer to the installation diagrams listed in the Table of Contents. In 25-50 MHz applications only, the transmitter exciter board has to be modified. When the Channel Guard is installed in MASTR Executive II radios, refer to the applicable Combination Manual.

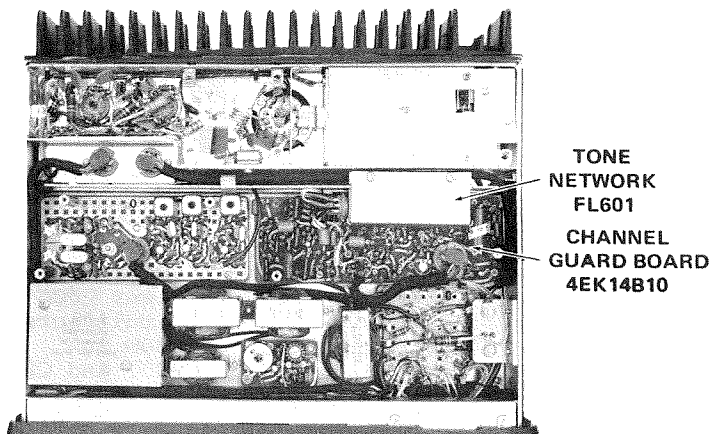


Figure 1 - Executive & Royal Executive

CIRCUIT ANALYSIS

References to symbol numbers mentioned in the following text are found on the Schematic Diagrams, Outline Diagrams and Parts Lists (see Table of Contents). A block diagram of the Channel Guard is shown in Figure 3.

Cable W603 (W604 for Royal) connects the supply voltage, encoder keying voltage and decoder functions for the Channel Guard board to the system terminal board (TB3). The encoder tone output is connected by a white-black shielded lead to the transmitter exciter board.

ENCODER

The encoder tone is provided by Q604 and Q605 which oscillate at a frequency determined by the tone network. Negative feedback, applied thru the tone network to the base of Q604, prevents any gain in the stage except at the operating frequency.

Keying the transmitter applied +10 Volts to the anode of feedback control diode CR605, causing it to conduct. When conducting, the diode shunts R635 which reduces the impedance of the positive feedback loop (R635, R633 and C617). This provides the necessary gain to the base of Q604 to permit oscillation, and the oscillator locks in on the Channel Guard frequency.

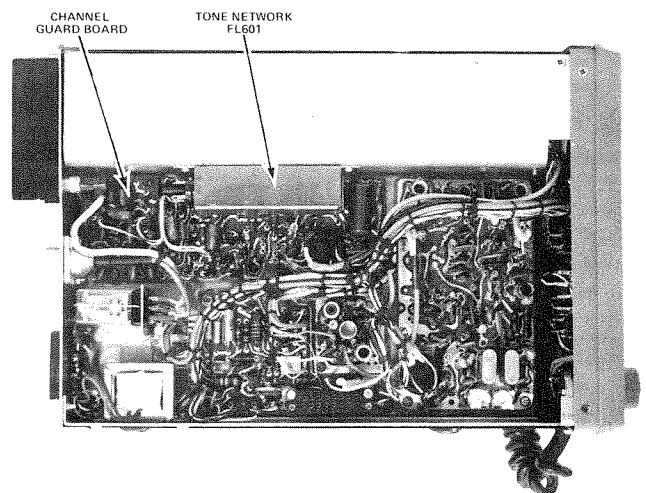


Figure 2 - Custom Executive

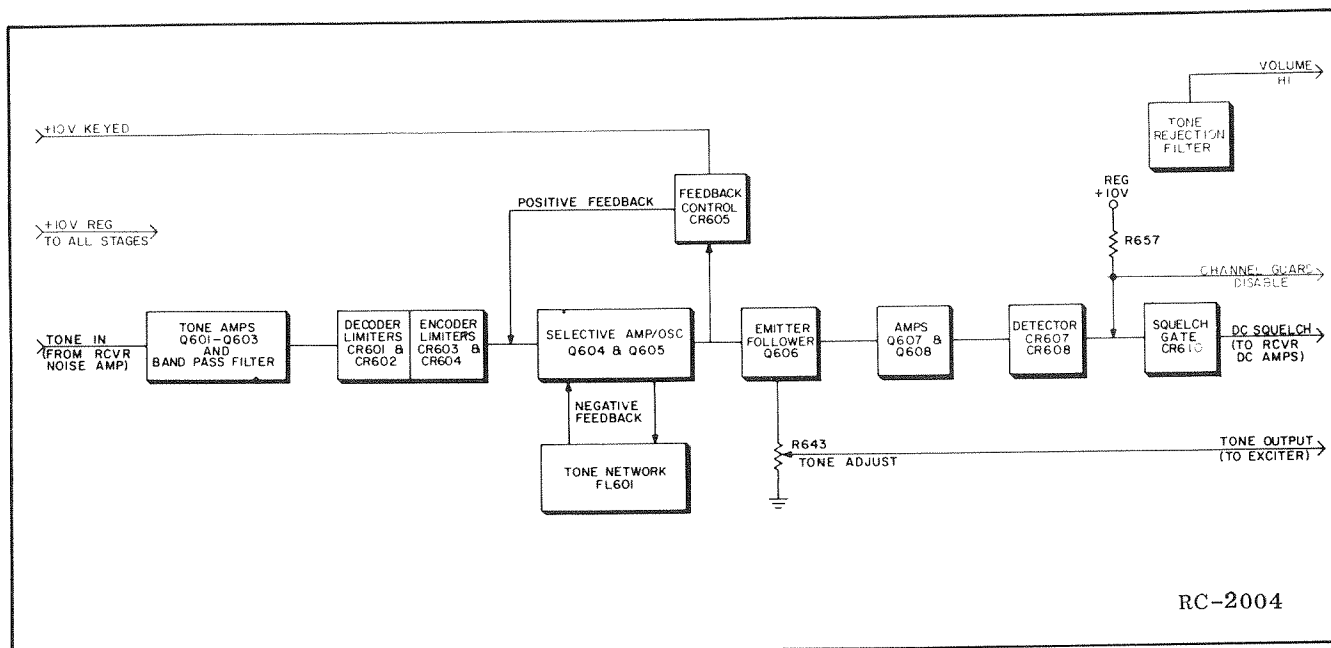


Figure 3 - Channel Guard Block Diagram

An extremely fast starting time for the encoder tone is provided by a starting network consisting of R641, C618, C619 and CR606. This network utilizes a positive pulse from the +10 Volts keying voltage to provide the positive feedback required to start oscillation.

Thermistor-resistor combination R663-RT604 provides temperature compensation for the oscillator output, and limiter diodes CR603 and CR604 keep the amplitude of the tone constant.

The oscillator output is fed to emitter-follower Q606, and then to TONE ADJUST potentiometer R643. This control is normally set for a ± 0.75 kHz deviation as outlined in the Transmitter Modulation Adjustment Procedure.

The encoder tone is applied to the modulator stage on the transmitter exciter board.

DECODER

The decoder function is designed to eliminate all calls that are not tone coded for the Channel Guard Frequency. As long as the MONITOR switch is not depressed, all signals are locked out except those from transmitters that are continuously tone coded for positive identification by the receiver. Pressing the MONITOR switch

instantly disables the Channel Guard and noise squelch circuits so that all calls on the channel can be heard.

Audio, tone and noise are taken from the collector of audio-noise amplifier Q316 in the receiver and is fed thru J601-4 to three tone amplifier and bandpass filter circuits. The filters remove the audio and high-frequency noise from the signal, and the tone amplifiers provide sufficient gain of all Channel Guard tones to insure clipping by limiter diodes CR601 and CR602. The clipping action eliminates variation in the squelch performance due to changes in tone deviation.

The signal is then applied to selective amplifiers Q604 and Q605, which amplify only the tone determined by the tone network.

The output of the selective amplifier is applied through emitter-follower Q606 to the high gain, broad-band tone amplifiers Q607 and Q608. The output of Q608 is rectified by detector diodes CR607 and CR608, and the resulting negative DC voltage controls the squelch gate. Q607 is normally biased for low gain. When the tone is detected by CR607 and CR608, feedback is provided through R655 to quickly change the bias on Q607 for full gain. This ensures a more positive "unsquelching" action.

Squelch gate diode CR610 is normally forward biased by a positive DC voltage (approximately 1.5 Volts) fed through R657. The forward bias causes CR610 to conduct, feeding a DC voltage to the base of noise amplifiers Q320 and Q321 in the receiver. This removes the bias on the receiver audio stages and holds them off.

When the proper tone is applied to the decoder, the negative DC voltage from the detector diodes CR607 & CR608 back-biases squelch gate diode CR610, and cuts off the positive bias to the DC amplifiers. However, the receiver noise squelch circuit continues to operate until a carrier quiets the receiver.

Pressing the MONITOR switch on the control unit grounds the base biasing circuit of the DC amplifiers and disables both the Channel Guard and noise squelch circuits. If the optional hookswitch is provided, removing the microphone from its hanger automatically disables Channel Guard while maintaining normal noise squelch operation.

A tone rejection filter connected in parallel with the VOLUME control bypasses the tone to ground, thereby attenuating the tone level reaching the audio circuits. The filter is composed of L601, C624, C626, C629, C630 and R659.

ADJUSTMENT

The decode function and the tone reject filter function requires no adjustment. To adjust the tone level of the encode function, proceed as follows:

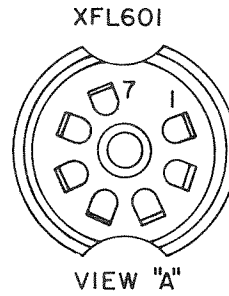
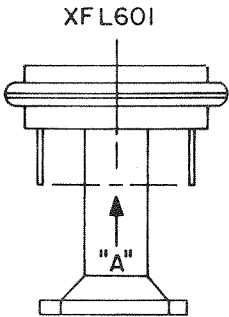
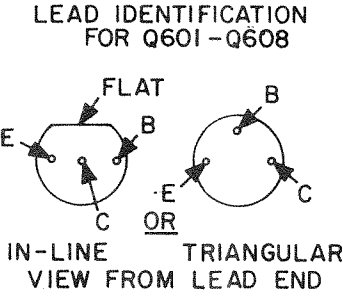
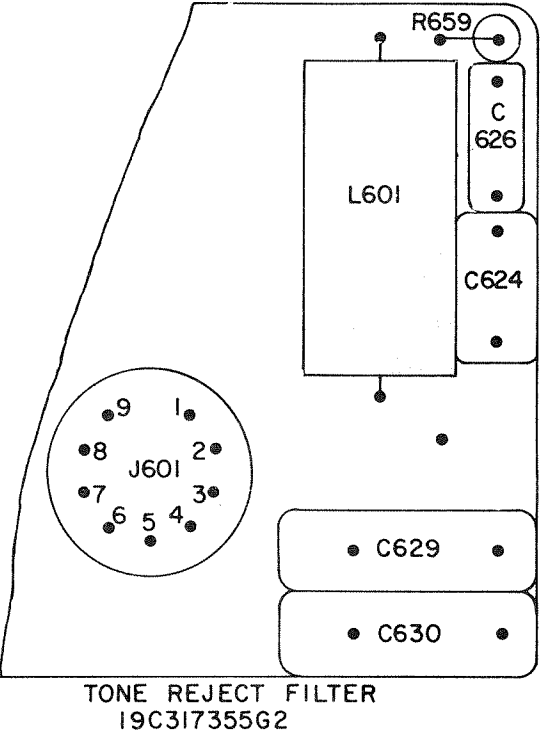
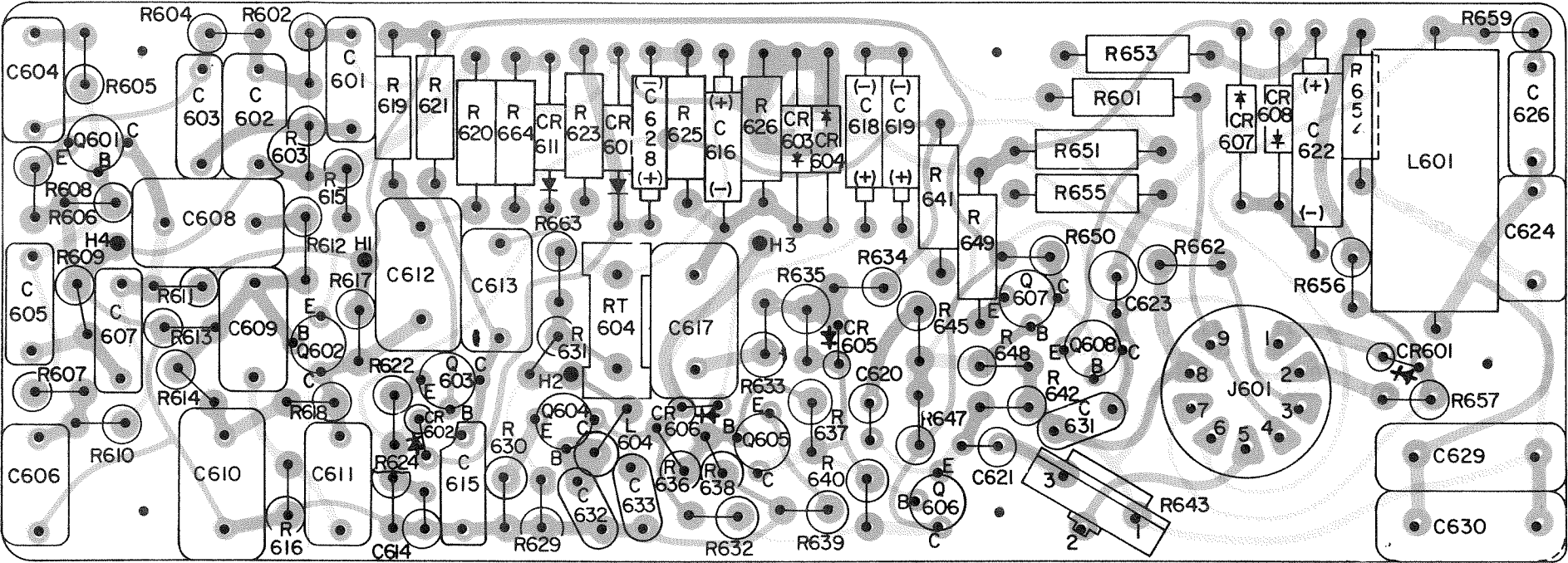
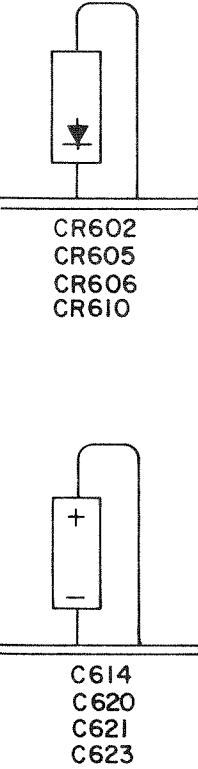
1. Connect a deviation monitor to the transmitter output.
2. Key the transmitter and adjust R643 on the Channel Guard board for ± 0.75 kHz deviation.

DECODE ONLY (MASTR EXECUTIVE II)

In MASTR Executive II Applications where the "decode only" function is desired, clip the W-BK wire connected to P907-6 between the connector body and sleeve.

GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.



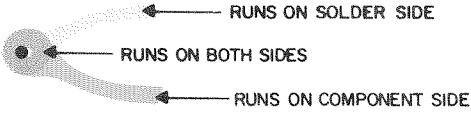


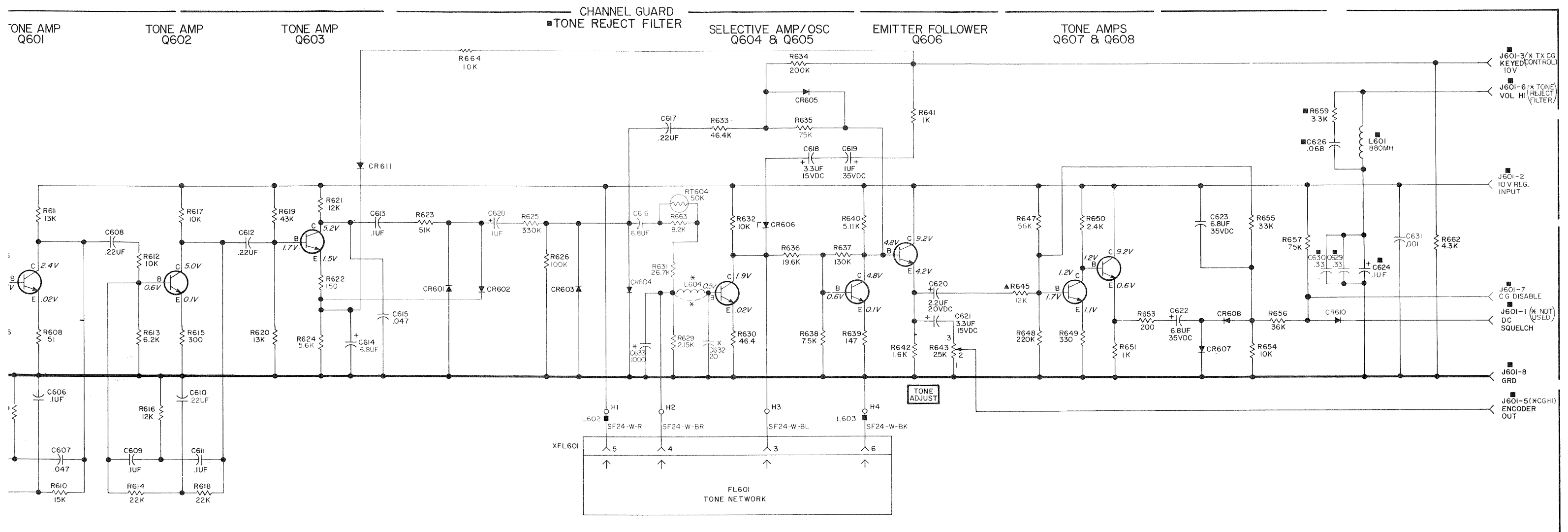
NOTE: LEAD ARRANGEMENT, AND NOT
CASE SHAPE, IS DETERMINING
FACTOR FOR LEAD IDENTIFICATION.

(19C317634, Rev. 4)
(19B216922, Sh. 1, Rev. 4)
(19B216922, Sh. 2, Rev. 3)

OUTLINE DIAGRAM

CHANNEL GUARD ENCODER/DECODER
MODELS 4EK14B10 AND 4EK14B11





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
4EK14B10	C
4EK14B11	B

▲ VALUE OF R645 IS DETERMINED BY TEST (SEE TEST SPECS)
* REPLACE L604 WITH DA WIRE FOR 4EK14B10.
L604, C632, & C633 USED IN 4EK14B11 ONLY.

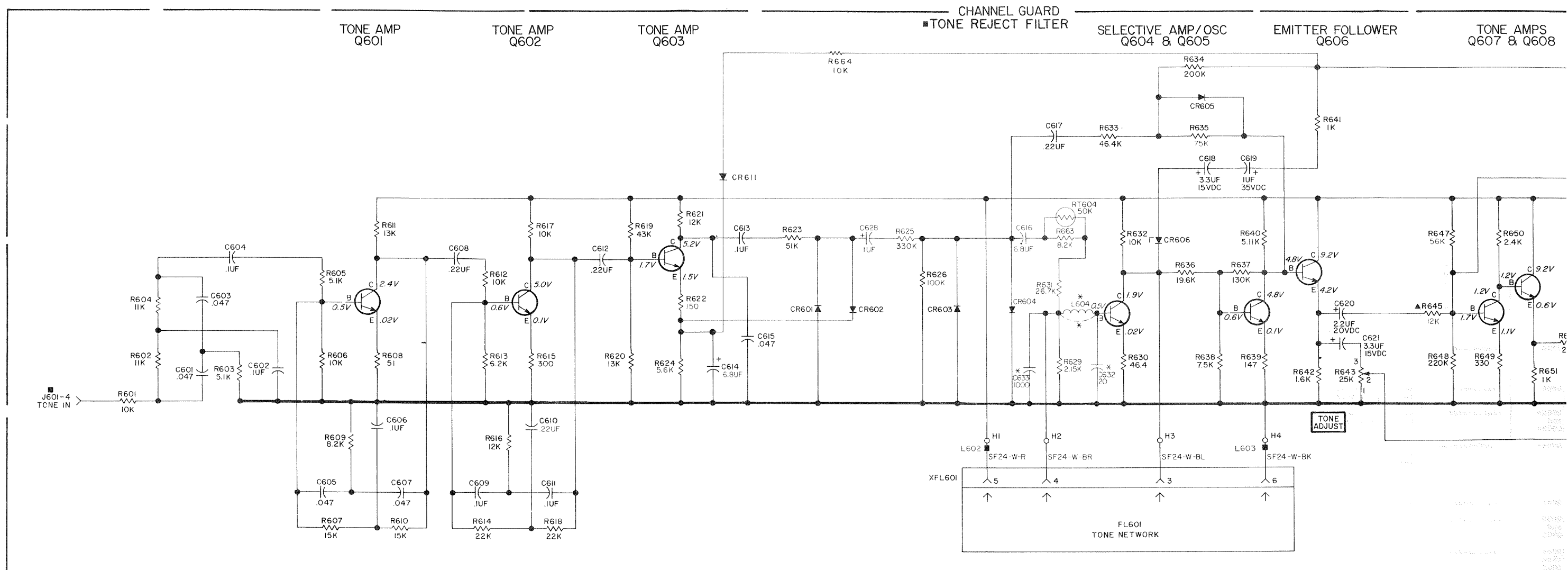
VOLTAGE READINGS
VOLTAGE READINGS ARE TYPICAL READINGS MEASURED FROM TRANSISTOR PIN TO GROUND WITH A 20,000 OHM-PER-VOLT METER, AND WITH NO TONE INPUT AND THE ENCODER NOT KEYED.

■ COMPONENTS THAT ARE COMMON TO CHANNEL GUARD & TONE REJECT FILTER.
* ALTERNATE FUNCTION WHEN USED WITH THE EXECUTIVE II RADIO

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

SCHEMATIC DIAGRAM

CHANNEL GUARD ENCODER/DECODER
MODELS 4EK14B10 AND 4EK14B11



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
4EK14B10	C
4EK14B11	B

▲ VALUE OF R645 IS DETERMINED BY TEST (SEE TEST SPECS)

* REPLACE L604 WITH DA WIRE FOR 4EK14B10.
L604, C632, & C633 USED IN 4EK14B11 ONLY.

VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MEASURED FROM TRANSISTOR PIN TO GROUND WITH A 20,000 OHM-PER-VOLT METER, WITH NO TONE INPUT AND THE ENCODER KEYPED.

- COMPONENTS THAT ARE COMMON TO CHANNEL GUARD & TONE REJECT FILTER.
- * ALTERNATE FUNCTION WHEN USED WITH EXECUTIVE II RADIO

PARTS LIST

LBI-4142C

CHANNEL GUARD ENCODER/DECODER
4EK14B10 (19C317355G1)
4EK14B11 (19C317355G3)

SYMBOL	GE PART NO.	DESCRIPTION
----- CAPACITORS -----		
C601	19A116080P205	Polyester: 0.047 μ f \pm 5%, 50 VDCW.
C602	19A116080P207	Polyester: 0.1 μ f \pm 5%, 50 VDCW.
C603	19A116080P205	Polyester: 0.047 μ f \pm 5%, 50 VDCW.
C604	19A116080P7	Polyester: 0.1 μ f \pm 20%, 50 VDCW.
C605	19A116080P205	Polyester: 0.047 μ f \pm 5%, 50 VDCW.
C606	19A116080P207	Polyester: 0.1 μ f \pm 5%, 50 VDCW.
C607	19A116080P205	Polyester: 0.047 μ f \pm 5%, 50 VDCW.
C608	19A116080P9	Polyester: 0.22 μ f \pm 20%, 50 VDCW.
C609	19A116080P207	Polyester: 0.1 μ f \pm 5%, 50 VDCW.
C610	19A116080P109	Polyester: 0.22 μ f \pm 10%, 50 VDCW.
C611	19A116080P207	Polyester: 0.1 μ f \pm 5%, 50 VDCW.
C612	19A116080P9	Polyester: 0.22 μ f \pm 20%, 50 VDCW.
C613	19A116080P7	Polyester: 0.1 μ f \pm 20%, 50 VDCW.
C614	5496267P1	Tantalum: 6.8 μ f \pm 20%, 6 VDCW; sim to Sprague Type 150D.
C615	19A116080P5	Polyester: 0.047 μ f \pm 20%, 50 VDCW.
C616	5496267P1	Tantalum: 6.8 μ f \pm 20%, 6 VDCW; sim to Sprague Type 150D.
C617	19A116080P9	Polyester: 0.22 μ f \pm 20%, 50 VDCW.
C618	5496267P9	Tantalum: 3.3 μ f \pm 20%, 15 VDCW; sim to Sprague Type 150D.
C619	5496267P17	Tantalum: 1.0 μ f \pm 20%, 35 VDCW; sim to Sprague Type 150D.
C620	5496267P13	Tantalum: 2.2 μ f \pm 20%, 20 VDCW; sim to Sprague Type 150D.
C621	5496267P9	Tantalum: 3.3 μ f \pm 20%, 15 VDCW; sim to Sprague Type 150D.
C622 and C623	5496267P18	Tantalum: 6.8 μ f \pm 20%, 35 VDCW; sim to Sprague Type 150D.
C624	19A116080P107	Polyester: 0.1 μ f \pm 10%, 50 VDCW.
C626	19A116080P206	Polyester: 0.068 μ f \pm 5%, 50 VDCW.
C628	5496267P17	Tantalum: 1.0 μ f \pm 20%, 35 VDCW; sim to Sprague Type 150D.
C629 and C630	19A116080P110	Polyester: 0.33 μ f \pm 10%, 50 VDCW.
C631	5494481P111	Ceramic disc: 1000 pf \pm 20%, 1000 VDCW; sim to RMC Type JF Discap.
C632*	5496218P46	Ceramic disc: 20 pf \pm 5%, 500 VDCW, temp coef 0 PPM. Added by REV A in Model 4EK14B11 only).
C633*	5494481P112	Ceramic disc: 1000 pf \pm 10%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV A in Model 4EK14B11 only).
----- DIODES AND RECTIFIERS -----		
CR601 and CR602	19A115250P1	Silicon.
CR603 and CR604	5494922P1	Silicon, sim to 1N456.
CR605	19A115250P1	Silicon.
CR606	4036887P3	Silicon, Zener.

SYMBOL	GE PART NO.	DESCRIPTION
CR607 and CR608	19A115250P1	Silicon.
CR610	19A115250P1	Silicon.
CR611*	19A115250P1	Silicon. Added to 4EK14B10 by REV C; Added to 4EK14B11 by REV B.
----- TONE NETWORKS -----		
FL601	19B205280	Tone Detector. (Check group numbers for desired frequency).
	G1	71.9 Hz
	G2	77.0 Hz
	G3	82.5 Hz
	G4	88.5 Hz
	G5	94.8 Hz
	G6	100.0 Hz
	G7	103.5 Hz
	G8	107.2 Hz
	G9	110.9 Hz
	G10	114.8 Hz
	G11	118.8 Hz
	G12	123.0 Hz
	G13	127.3 Hz
	G14	131.8 Hz
	G15	136.5 Hz
	G16	141.3 Hz
	G17	146.2 Hz
	G18	151.4 Hz
	G19	156.7 Hz
	G20	162.2 Hz
	G21	167.9 Hz
	G22	173.8 Hz
	G23	179.9 Hz
	G24	186.2 Hz
	G25	192.8 Hz
	G26	203.5 Hz
	G30	74.4 Hz
	G31	79.7 Hz
	G32	85.4 Hz
	G33	91.5 Hz
	G34	97.4 Hz
----- JACKS AND RECEPTACLES -----		
J601	19B209303P1	Plug, phen: 9 pins.
----- INDUCTORS -----		
L601	19A115690P1	Reactor: 880 mh ind, 120 amp \pm 15% DC res; sim to Artted AC5672.
L602* and L603*	19A115700P2	RF Choke: sim to SL207. Added by REV A in Model 4EK14B10 only.
L604*	19B209420P125	Choke, RF: 10.0 μ h \pm 10%, 3.10 ohms DC res max; sim to Jeffers 4446-4. Added by REV A in Model 4EK14B11 only).
----- TRANSISTORS -----		
Q601	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q602 and Q603	19A115123P1	Silicon, NPN.
Q604 thru Q607	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q608	19A115123P1	Silicon, NPN.
----- RESISTORS -----		
R601	3R77P103K	Composition: 10K ohms \pm 10%, 1/2 w.
R602	3R77P113J	Composition: 11K ohms \pm 5%, 1/2 w.
R603	3R77P512J	Composition: 5.1K ohms \pm 5%, 1/2 w.
R604	3R77P113J	Composition: 11K ohms \pm 5%, 1/2 w.
R605	3R77P512J	Composition: 5.1K ohms \pm 5%, 1/2 w.
R606	3R77P103J	Composition: 10K ohms \pm 5%, 1/2 w.
R607	3R77P153J	Composition: 15K ohms \pm 5%, 1/2 w.
R608	3R77P510J	Composition: 51 ohms \pm 5%, 1/2 w.
R609	3R77P822J	Composition: 8.2K ohms \pm 5%, 1/2 w.
R610	3R77P153J	Composition: 15K ohms \pm 5%, 1/2 w.
R611	3R77P133J	Composition: 13K ohms \pm 5%, 1/2 w.
R612	3R77P103J	Composition: 10K ohms \pm 5%, 1/2 w.

SYMBOL	GE PART NO.	DESCRIPTION
R613	3R77P622J	Composition: 6.2K ohms \pm 5%, 1/2 w.
R614	3R77P223J	Composition: 22K ohms \pm 5%, 1/2 w.
R615	3R77P301J	Composition: 300 ohms \pm 5%, 1/2 w.
R616	3R77P123J	Composition: 12K ohms \pm 5%, 1/2 w.
R617	3R77P103J	Composition: 10K ohms \pm 5%, 1/2 w.
R618	3R77P223J	Composition: 22K ohms \pm 5%, 1/2 w.
R619	3R77P433J	Composition: 43K ohms \pm 5%, 1/2 w.
R620	3R77P133J	Composition: 13K ohms \pm 5%, 1/2 w.
R621	3R77P123J	Composition: 12K ohms \pm 5%, 1/2 w.
R622	3R77P151J	Composition: 150 ohms \pm 5%, 1/2 w.
R623	3R77P513J	Composition: 51K ohms \pm 5%, 1/2 w.
R624	3R77P562J	Composition: 5.6K ohms \pm 5%, 1/2 w.
R625	3R77P334J	Composition: 330K ohms \pm 5%, 1/2 w.
R626	3R77P104J	Composition: 100K ohms \pm 5%, 1/2 w.
R629	19A116278P233	Metal film: 2.15K ohms \pm 2%, 1/2 w.
R630	19A116278P65	Metal film: 46.4 ohms \pm 2%, 1/2 w.
R631	19A116278P342	Metal film: 26.70K ohms \pm 2%, 1/2 w.
R632	19A116278P301	Metal film: 100K ohms \pm 2%, 1/2 w.
R633	19A116278P365	Metal film: 46.40K ohms \pm 2%, 1/2 w.
R634	3R77P204J	Composition: 200K ohms \pm 5%, 1/2 w.
R635	19A116278P385	Metal film: 75K ohms \pm 2%, 1/2 w.
R636	19A116278P329	Metal film: 19.60K ohms \pm 2%, 1/2 w.
R637	19A116278P412	Metal film: 130K ohms \pm 2%, 1/2 w.
R638	19A116278P285	Metal film: 7.5K ohms \pm 2%, 1/2 w.
R639	19A116278P117	Metal film: 147 ohms \pm 2%, 1/2 w.
R640	19A116278P269	Metal film: 5.11K ohms \pm 2%, 1/2 w.
R641	3R77P102J	Composition: 1K ohms \pm 5%, 1/2 w.
R642	3R77P162J	Composition: 1.6K ohms \pm 5%, 1/2 w.
R643	19B209358P107	Variable, carbon film: approx 800 to 25K ohms \pm 10%, 0.25 w; sim to CTS Type X-201.
R645A	3R77P822J	Composition: 8.2K ohms \pm 5%, 1/2 w.
R645B	3R77P912J	Composition: 9.1K ohms \pm 5%, 1/2 w.
R645C	3R77P103J	Composition: 10K ohms \pm 5%, 1/2 w.
R645D	3R77P113J	Composition: 11K ohms \pm 5%, 1/2 w.
R645E	3R77P123J	Composition: 12K ohms \pm 5%, 1/2 w.
R645F	3R77P133J	Composition: 13K ohms \pm 5%, 1/2 w.
R645G	3R77P153J	Composition: 15K ohms \pm 5%, 1/2 w.
R645H	3R77P752J	Composition: 7.5K ohms \pm 5%, 1/2 w.
R647	3R77P563J	Composition: 56K ohms \pm 5%, 1/2 w.
R648	3R77P224J	Composition: 220K ohms \pm 5%, 1/2 w.
R649	3R77P331J	Composition: 330 ohms \pm 5%, 1/2 w.
R650	3R77P242J	Composition: 2.4K ohms \pm 5%, 1/2 w.
R651	3R77P102J	Composition: 1K ohms \pm 5%, 1/2 w.
R653	3R77P201J	Composition: 200 ohms \pm 5%, 1/2 w.
R654	3R77P103J	Composition: 10K ohms \pm 5%, 1/2 w.
R655	3R77P333J	Composition: 33K ohms \pm 5%, 1/2 w.
R656	3R77P363J	Composition: 36K ohms \pm 5%, 1/2 w.
R657	3R77P753J	Composition: 75K ohms \pm 5%, 1/2 w.
R659	3R77P332J	Composition: 3.3K ohms \pm 5%, 1/2 w.
R662	3R77P432J	Composition: 4.3K ohms \pm 5%, 1/2 w.
R663	3R77P822J	Composition: 8.2K ohms \pm 5%, 1/2 w.
R664*	3R77P103J	Composition: 10K ohms \pm 5%, 1/2 w. Added to 4EK14B10 by REV C. Added to 4EK14B11 by REV B.

SYMBOL	GE PART NO.	DESCRIPTION
----- THERMISTORS -----		
RT604	5490828P22	Thermistor: 50K ohms \pm 10%, color code yellow; sim to Carborundum type 763H-J4.
----- SOCKETS -----		
XFL601	19B209341P1	Socket, tube: 7 pins; sim to Elco 04-720-XX.
----- MISCELLANEOUS -----		
	19A122138P1	Knob. (Used with XFL601).
	N197P408C13	Wood, screw. (Used with XFL601 in Tubed and Royal Executive only).
	N80P9005C13	Screw, machine. (Mounts printed circuit board).
	N404P11C13	Lockwasher, internal tooth: No. 4. (Mounts printed circuit board in Tubed and Royal Executive only).
	19B201074P304	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1/4. (Mounts 19B205387P1 support in Tubed and Royal Executive only).
	19B205387P1	Support. (Mounts FL601 in Tubed and Royal Executive only).
	4032591P28	Pressure sensitive pad. (Used with 19B205387P1 support in Tubed and Royal Executive only).
	19D416585P5	Support. (Used with XFL601 in Custom Executive).
	19B201074P205	Tap screw, Phillips POZIDRIV®: No. 4-40-5/16. (Secures XFL601 in Custom Executive).
	19B201074P204	Tap, screw, Phillips POZIDRIV®: No. 4-40-1/4. (Secures printed wiring board in Custom Executive).
	19A122213G1	Cover Kit. Includes:
	19B209209P305	Screw, tap: Phillips POZIDRIV®: No. 6-32 x 5/16 (Mounts cover thru the side rail).
	19B201074P305	Screw, tap: Phillips POZIDRIV®: No. 6-32 x 5/16 (Mounts cover to Tone Network).
W601		CABLE ASSEMBLY 19B226872G2
----- PLUGS -----		
P601	19B209341P2	Socket, tube: 9 pins; sim to Elco 04-920-XX.
P907		Connector. Includes:
	19A116659P81	Shell.
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 7).
	19A116781P5	Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0106. (Quantity 1).
	19A134048P1	Wood screw, phillips head: No. 4, 1/2 inch long.
	19A122138P1	Knob.
W603	19B205345G2	Channel Guard Cable, Tubed Executive combinations
W604	19B216090G2	Channel Guard Cable, Royal Executive combinations

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for description of parts affected by these revisions.

REV. A - Model 4EK14B10 only

To eliminate RF interference. Added L602 and L603.

REV. A - Model 4EK14B11 only

REV. B - Model 4EK14B10 only

To eliminate RF interference in Custom Executive applications Added C362, C363 and L604.

REV. C - Model 4EK14B10 only

REV. B - Model 4EK14B11 only

To stabilize encoder frequency. Added CR611 and R664.

SYMBOL	GE PART NO.	DESCRIPTION
CR607 and CR608	19A115250P1	Silicon.
CR610	19A115250P1	Silicon.
CR611*	19A115250P1	Silicon. Added to 4EK14B10 by REV C; Added to 4EK14B11 by REV B.
FL601	19B205280	----- TONE NETWORKS ----- Tone Detector. (Check group numbers for desired frequency). G1 71.9 Hz G2 77.0 Hz G3 82.5 Hz G4 88.5 Hz G5 94.8 Hz G6 100.0 Hz G7 103.5 Hz G8 107.2 Hz G9 110.9 Hz G10 114.8 Hz G11 118.8 Hz G12 123.0 Hz G13 127.3 Hz G14 131.8 Hz G15 136.5 Hz G16 141.3 Hz G17 146.2 Hz G18 151.4 Hz G19 156.7 Hz G20 162.2 Hz G21 167.9 Hz G22 173.8 Hz G23 179.9 Hz G24 186.2 Hz G25 192.8 Hz G26 203.5 Hz G30 74.4 Hz G31 79.7 Hz G32 85.4 Hz G33 91.5 Hz G34 97.4 Hz ----- JACKS AND RECEPTACLES ----- 601 19B209303P1 Plug, phen: 9 pins. ----- INDUCTORS ----- 601 19A115690P1 Reactor: 880 mh ind, 120 amp ±15% DC res; sim to Arttd AC5672. 602* and 603* 19A115700P2 RF Choke: sim to SL207. Added by REV A in Model 4EK14B10 only. 604* 19B209420P125 Choke, RF: 10.0 µh ±10%, 3.10 ohms DC res max; sim to Jeffers 4446-4. Added by REV A in Model 4EK14B11 only). ----- TRANSISTORS ----- 601 19A115362P1 Silicon, NPN; sim to Type 2N2925. 602 and 603 19A115123P1 Silicon, NPN. 604 thru 607 19A115362P1 Silicon, NPN; sim to Type 2N2925. 608 19A115123P1 Silicon, NPN. ----- RESISTORS ----- 601 3R77P103K Composition: 10K ohms ±10%, 1/2 w. 602 3R77P113J Composition: 11K ohms ±5%, 1/2 w. 603 3R77P512J Composition: 5.1K ohms ±5%, 1/2 w. 604 3R77P113J Composition: 11K ohms ±5%, 1/2 w. 605 3R77P512J Composition: 5.1K ohms ±5%, 1/2 w. 606 3R77P103J Composition: 10K ohms ±5%, 1/2 w. 607 3R77P153J Composition: 15K ohms ±5%, 1/2 w. 608 3R77P510J Composition: 51 ohms ±5%, 1/2 w. 609 3R77P822J Composition: 8.2K ohms ±5%, 1/2 w. 610 3R77P153J Composition: 15K ohms ±5%, 1/2 w. 611 3R77P133J Composition: 13K ohms ±5%, 1/2 w. 612 3R77P103J Composition: 10K ohms ±5%, 1/2 w.

SYMBOL	GE PART NO.	DESCRIPTION
R613	3R77P622J	Composition: 6.2K ohms ±5%, 1/2 w.
R614	3R77P223J	Composition: 22K ohms ±5%, 1/2 w.
R615	3R77P301J	Composition: 300 ohms ±5%, 1/2 w.
R616	3R77P123J	Composition: 12K ohms ±5%, 1/2 w.
R617	3R77P103J	Composition: 10K ohms ±5%, 1/2 w.
R618	3R77P223J	Composition: 22K ohms ±5%, 1/2 w.
R619	3R77P433J	Composition: 43K ohms ±5%, 1/2 w.
R620	3R77P133J	Composition: 13K ohms ±5%, 1/2 w.
R621	3R77P123J	Composition: 12K ohms ±5%, 1/2 w.
R622	3R77P151J	Composition: 150 ohms ±5%, 1/2 w.
R623	3R77P513J	Composition: 51K ohms ±5%, 1/2 w.
R624	3R77P562J	Composition: 5.6K ohms ±5%, 1/2 w.
R625	3R77P334J	Composition: 330K ohms ±5%, 1/2 w.
R626	3R77P104J	Composition: 100K ohms ±5%, 1/2 w.
R629	19A116278P233	Metal film: 2.15K ohms ±2%, 1/2 w.
R630	19A116278P65	Metal film: 46.4 ohms ±2%, 1/2 w.
R631	19A116278P342	Metal film: 26.70K ohms ±2%, 1/2 w.
R632	19A116278P301	Metal film: 100K ohms ±2%, 1/2 w.
R633	19A116278P365	Metal film: 46.40K ohms ±2%, 1/2 w.
R634	3R77P204J	Composition: 200K ohms ±5%, 1/2 w.
R635	19A116278P385	Metal film: 75K ohms ±2%, 1/2 w.
R636	19A116278P329	Metal film: 19.60K ohms ±2%, 1/2 w.
R637	19A116278P412	Metal film: 130K ohms ±2%, 1/2 w.
R638	19A116278P285	Metal film: 7.5K ohms ±2%, 1/2 w.
R639	19A116278P117	Metal film: 147 ohms ±2%, 1/2 w.
R640	19A116278P269	Metal film: 5.11K ohms ±2%, 1/2 w.
R641	3R77P102J	Composition: 1K ohms ±5%, 1/2 w.
R642	3R77P162J	Composition: 1.6K ohms ±5%, 1/2 w.
R643	19B209358P107	Variable, carbon film: approx 800 to 25K ohms ±10%, 0.25 w; sim to CTS Type X-201.
R645A	3R77P822J	Composition: 8.2K ohms ±5%, 1/2 w.
R645B	3R77P912J	Composition: 9.1K ohms ±5%, 1/2 w.
R645C	3R77P103J	Composition: 10K ohms ±5%, 1/2 w.
R645D	3R77P113J	Composition: 11K ohms ±5%, 1/2 w.
R645E	3R77P123J	Composition: 12K ohms ±5%, 1/2 w.
R645F	3R77P133J	Composition: 13K ohms ±5%, 1/2 w.
R645G	3R77P153J	Composition: 15K ohms ±5%, 1/2 w.
R645H	3R77P752J	Composition: 7.5K ohms ±5%, 1/2 w.
R647	3R77P563J	Composition: 56K ohms ±5%, 1/2 w.
R648	3R77P224J	Composition: 220K ohms ±5%, 1/2 w.
R649	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R650	3R77P242J	Composition: 2.4K ohms ±5%, 1/2 w.
R651	3R77P102J	Composition: 1K ohms ±5%, 1/2 w.
R653	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
R654	3R77P103J	Composition: 10K ohms ±5%, 1/2 w.
R655	3R77P333J	Composition: 33K ohms ±5%, 1/2 w.
R656	3R77P363J	Composition: 36K ohms ±5%, 1/2 w.
R657	3R77P753J	Composition: 75K ohms ±5%, 1/2 w.
R659	3R77P332J	Composition: 3.3K ohms ±5%, 1/2 w.
R662	3R77P432J	Composition: 4.3K ohms ±5%, 1/2 w.
R663	3R77P822J	Composition: 8.2K ohms ±5%, 1/2 w.
R664*	3R77P103J	Composition: 10K ohms ±5%, 1/2 w. Added to 4EK14B10 by REV C, Added to 4EK14B11 by REV B.

SYMBOL	GE PART NO.	DESCRIPTION
RT604	5490828P22	----- THERMISTORS ----- Thermistor: 50K ohms ±10%, color code yellow; sim to Carborundum type 793H-J4.
XFL601	19B209341P1	----- SOCKETS ----- Socket, tube: 7 pins; sim to Elco 04-720-XX. ----- MISCELLANEOUS ----- 19A122138P1 Knob. (Used with XFL601). N197P408C13 Wood, screw. (Used with XFL601 in Tubed and Royal Executive only). N80P9005C13 Screw, machine. (Mounts printed circuit board). N404P11C13 Lockwasher, internal tooth: No. 4. (Mounts printed circuit board in Tubed and Royal Executive only). 19B201074P304 Tap screw, Phillips POZIDRIV®: No. 6-32 x 1/4. (Mounts 19B205387P1 support in Tubed and Royal Executive only). 19B205387P1 Support. (Mounts FL601 in Tubed and Royal Executive only). 4032591P28 Pressure sensitive pad. (Used with 19B205387P1 support in Tubed and Royal Executive only). 19D416585P5 Support. (Used with XFL601 in Custom Executive). 19B201074P205 Tap screw, Phillips POZIDRIV®: No. 4-40-5/16. (Secures XFL601 in Custom Executive). 19B201074P204 Tap, screw, Phillips POZIDRIV®: No. 4-40-1/4. (Secures printed wiring board in Custom Executive). 19A122213G1 Cover Kit. Includes: 19B209209P305 Screw, tap: Phillips POZIDRIV®: No. 6-32 x 5/16. (Mounts cover thru the side rail). 19B201074P305 Screw, tap: Phillips POZIDRIV®: No. 6-32 x 5/16. (Mounts cover to Tone Network). CABLE ASSEMBLY 19B226872G2 ----- PLUGS ----- P601 19B209341P2 Socket, tube: 9 pins; sim to Elco 04-920-XX. P907 19A116659P81 Connector. Includes: Shell. 19A116781P6 Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 7). 19A116781P5 Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0106. (Quantity 1). 19A134048P1 Wood screw, phillips head: No. 4, 1/2 inch long. 19A122138P1 Knob. W603 19B205345G2 Channel Guard Cable, Tubed Executive combinations. W604 19B216090G2 Channel Guard Cable, Royal Executive combinations.

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for description of parts affected by these revisions.

REV. A - Model 4EK14B10 only

To eliminate RF interference. Added L602 and L603.

REV. A - Model 4EK14B11 only

REV. B - Model 4EK14B10 only

To eliminate RF interference in Custom Executive applications
Added C362, C363 and L604.

REV. C - Model 4EK14B10 only

REV. B - Model 4EK14B11 only

To stabilize encoder frequency.
Added CR611 and R664.

PARTS LIST		
LBI-4171B		
TONE REJECT FILTER 19C317355G2		
SYMBOL	GE PART NO.	DESCRIPTION
C624	19A116080P107	----- CAPACITORS ----- Polyester: 0.1 µf ±10%, 50 VDCW.
C626	19A116080P206	Polyester: 0.068 µf ±5%, 50 VDCW.
C629 and C630	19A116080P110	Polyester: 0.33 µf ±10%, 50 VDCW.
J601	19B209303P1	----- JACKS AND RECEPTACLES ----- Plug, phen: 9 pins. ----- INDUCTORS ----- L601 19A115690P1 Coil, RF: 880 mh ±5%, sim to Arttd AC5672. ----- RESISTORS ----- R659 3R77P332J Composition: 3.3K ohms ±5%, 1/2 w. ----- MISCELLANEOUS ----- N80P9005C13 Screw, machine. (Mounts printed circuit board). N404P11C13 Lockwasher. (Mounts printed circuit board). 19A122213G1 Cover Kit. Includes: 19B209209P305 Screw, tap: Phillips Pozidriv®: No. 6-32 x 5/16. (Mounts cover thru the side rail). 19B201074P305 Screw, tap: Phillips POZIDRIV®: No. 6-32 x 5/16. (Mounts cover to Tone Network).
W601		CABLE ASSEMBLY 19B226872G2 ----- PLUGS ----- P601 19B209341P2 Socket, tube: 9 pins; sim to Elco 04-920-XX. P907 19A116659P81 Connector. Includes: Shell. 19A116781P6 Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 7). 19A116781P5 Contact, electrical: wire range No. 16-20 AWG; sim to Molex 08-50-0106. (Quantity 1). 19A134048P1 Wood screw, phillips head: No. 4, 1/2 inch long. 19A122138P1 Knob. W603 19B205345G2 Channel Guard Cable, Tubed Executive combinations. W604 19B216090G2 Channel Guard Cable, Royal Executive combinations.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PROCEDURE

1. Remove the four screws holding the transmitter exciter. Then remove connections from J101, J102 and J105 and remove the exciter board.
2. Modify the exciter board using appropriate kit (19A122624G1 thru G3) as instructed in Table 1. Component location is shown in Figure 1.

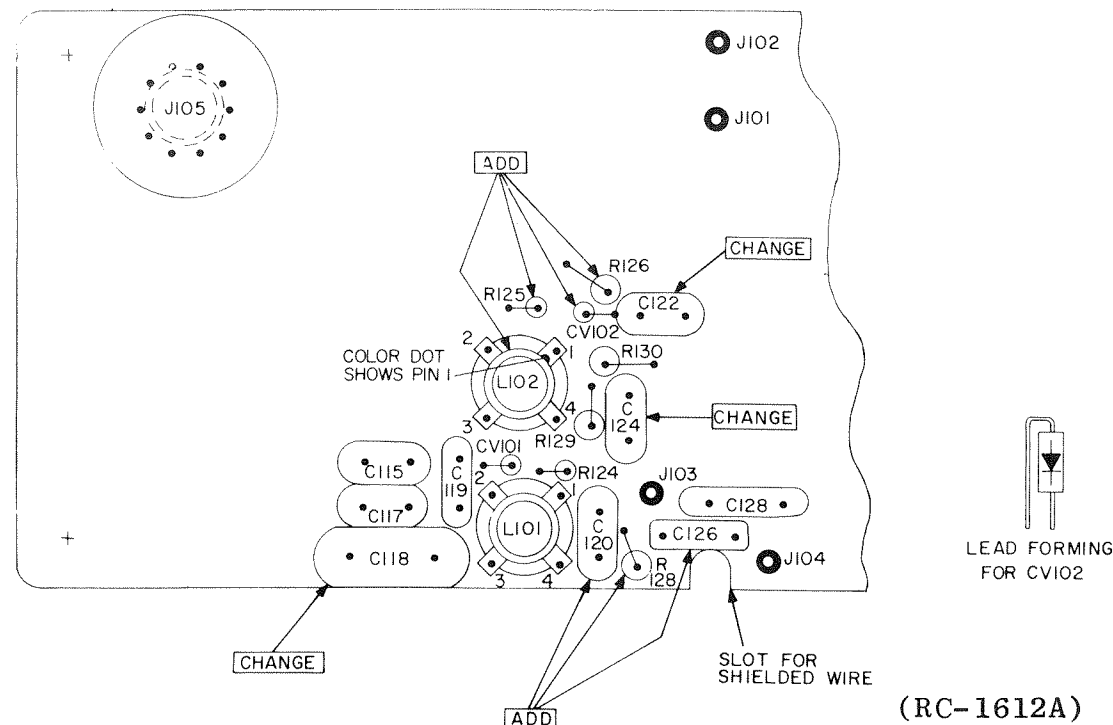


Figure 1 - Component Location (Exciter Board)

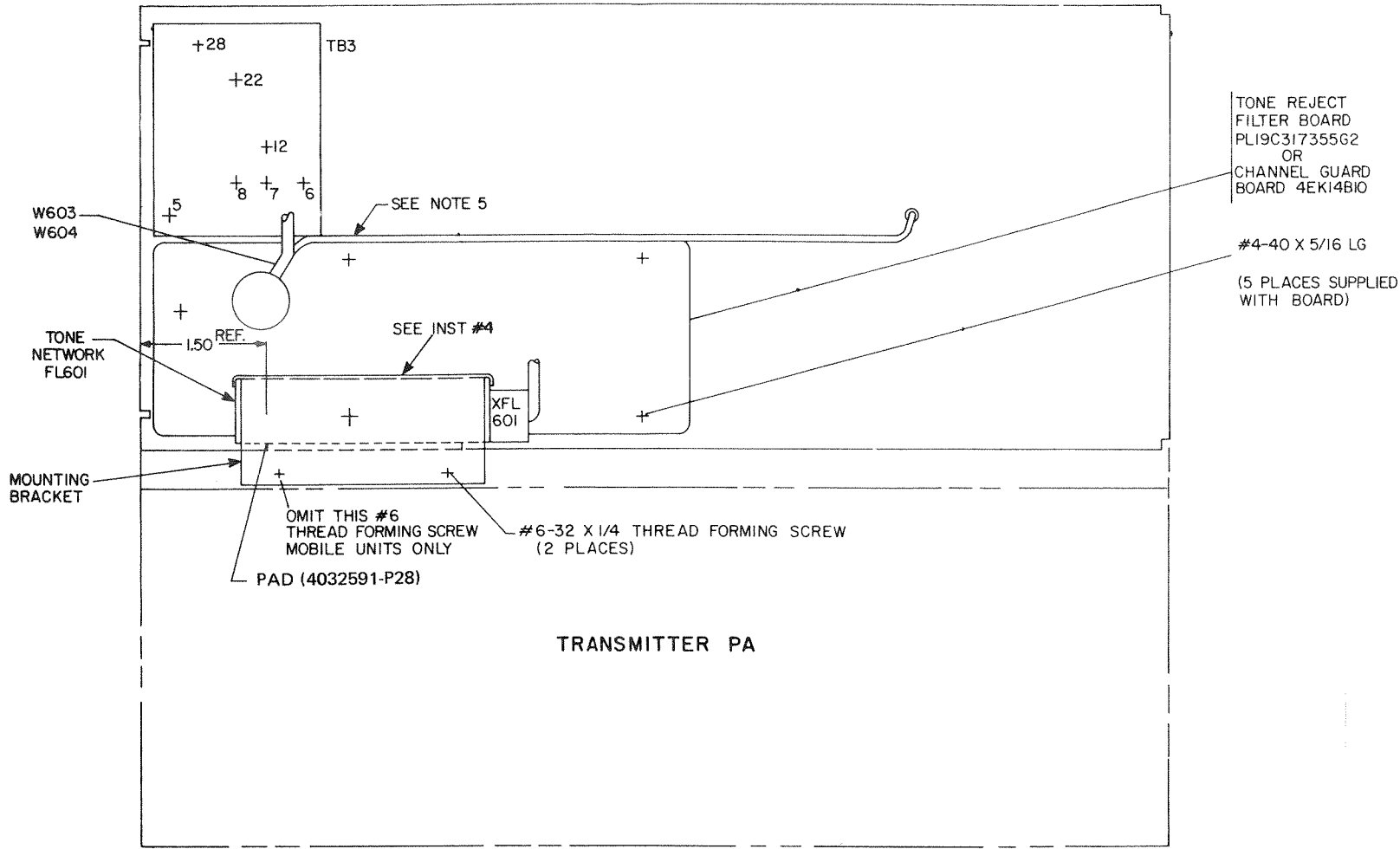
EXCITER MODEL NUMBER	MODIFICATION KIT NUMBER	ADD	REPLACE	CHANGE MODEL NUMBER	
				FROM	TO
4EG21A10 4EG21A12	19A122624-G1 Service Parts Kit #0035	C120 (470 pf, 100 VDCW) C126 (0.01 μ f, 40 VDCW) CV102 L102A R125 A (0.15 megohm, 1/4w) R126 (10,000 ohms, 1/2 w) R128 (15,000 ohms, 1/2 w)	C125 with C118 A (.0015 μ f, 100 VDCW); C121 with C122 A (220 pf, 500 VDCW); and C123 with C124 (150 pf, 100 VDCW)	4EG21A10 4EG21A12	4EG21A11 3EG21A13
4EG21B10 4EG21B12	19A122624-G2 Service Parts Kit #0036	C120 (470 pf, 100 VDCW) C126 (0.01 μ f, 40 VDCW) CV102 L102B R125 B (0.12 megohm, 1/4w) R126 (10,000 ohms, 1/2 w) R128 (15,000 ohms, 1/2 w)	C125 with C118 A (.0015 μ f, 100 VDCW); C121 with C122 A (220 pf, 500 VDCW); and C123 with C124 (150 pf, 100 VDCW)	4EG21B10 4EG21B12	4EG21B11 4EG21B13
4EG21C10 4EG21C12	19A122624-G3 Service Parts Kit #0037	C120 (470 pf, 100 VDCW) C126 (0.01 μ f, 40 VDCW) CV102 L102 C R125 C (0.1 megohm, 1/4w) R126 (10,000 ohms, 1/2 w) R128 (15,000 ohms, 1/2 w)	C125 with C118 A (.001 μ f, 100 VDCW); C121 with C122 B (180 pf, 500 VDCW); and C123 with C124 (150 pf, 100 VDCW)	4EG21C10 4EG21C12	4EG21C11 4EG21C13

Table 1 - Exciter Board Modification

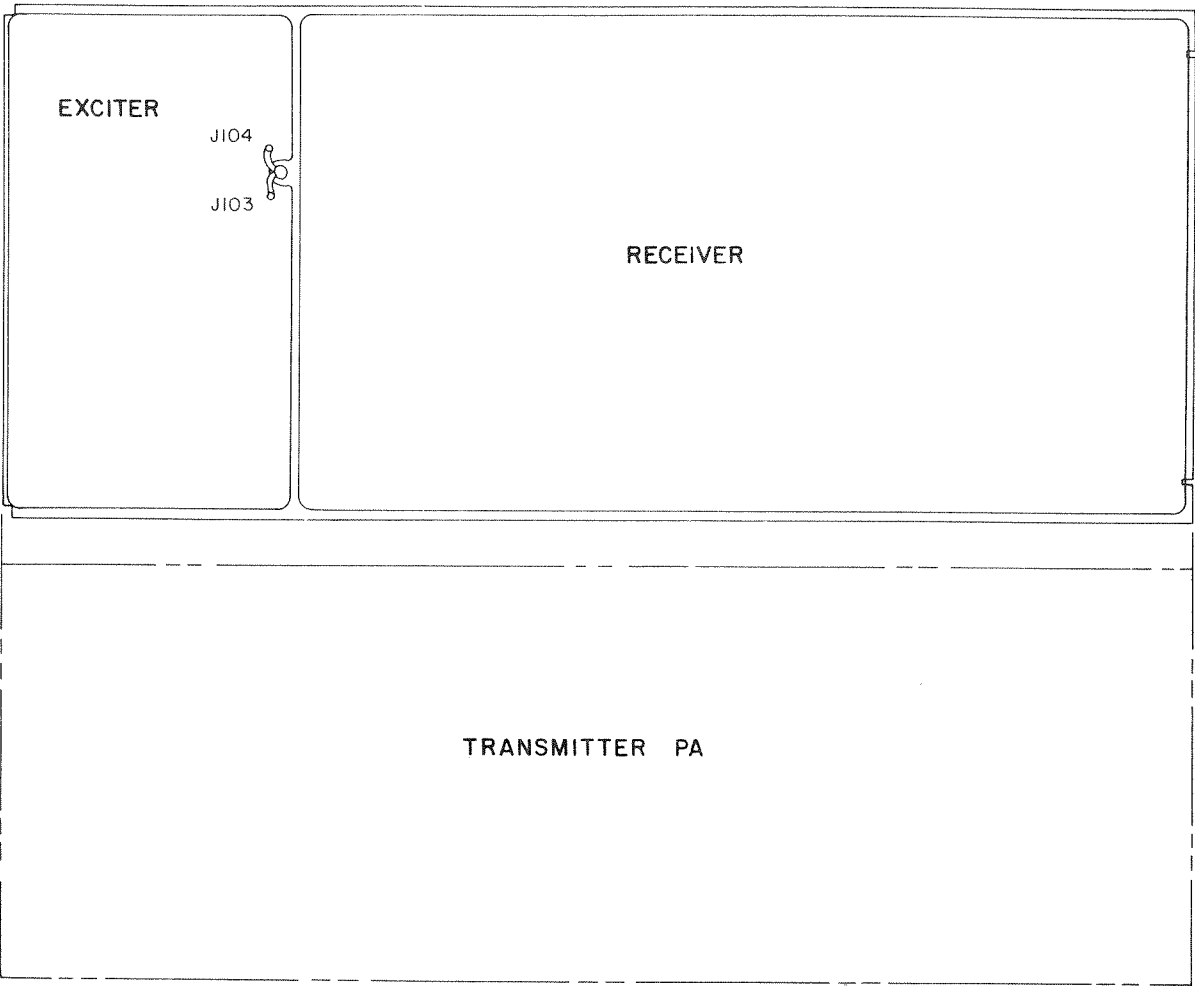
INSTALLATION DIAGRAM

25—50 MHz TRANSMITTER EXCITER MOD.
19A122624G1, G2 & G3
MASTR PROGRESS LINE, EXECUTIVE
AND ROYAL EXECUTIVE MOBILE
AND STATION COMBINATIONS

BOTTOM VIEW



TOP VIEW



INSTALLATION DIAGRAM

CHANNEL GUARD MODEL 4EK14B10
MASTR EXECUTIVE, EXECUTIVE AND
ROYAL EXECUTIVE MOBILE AND
STATION COMBINATIONS

CONNECTIONS CHART FOR MASTR PROGRESS LINE EXECUTIVE SERIES		
FROM	WIRE COLOR	TO
W603	G	STATION TB8-I MOBILE TB3-I7
W603	BR	TB3-23
W603	W-O-R	TB3-6
W603 CENTER CONDUCTOR	W-BL	TB3-7
W603-SHIELD OF ABOVE		TB3-8
W603	BK	TB3-22
W603 CENTER CONDUCTOR	W-BK	EXCITER-J103
W603-SHIELD OF ABOVE		EXCITER-J104
W603	V	TB3-5
W603	W-R-G	TB3-I2

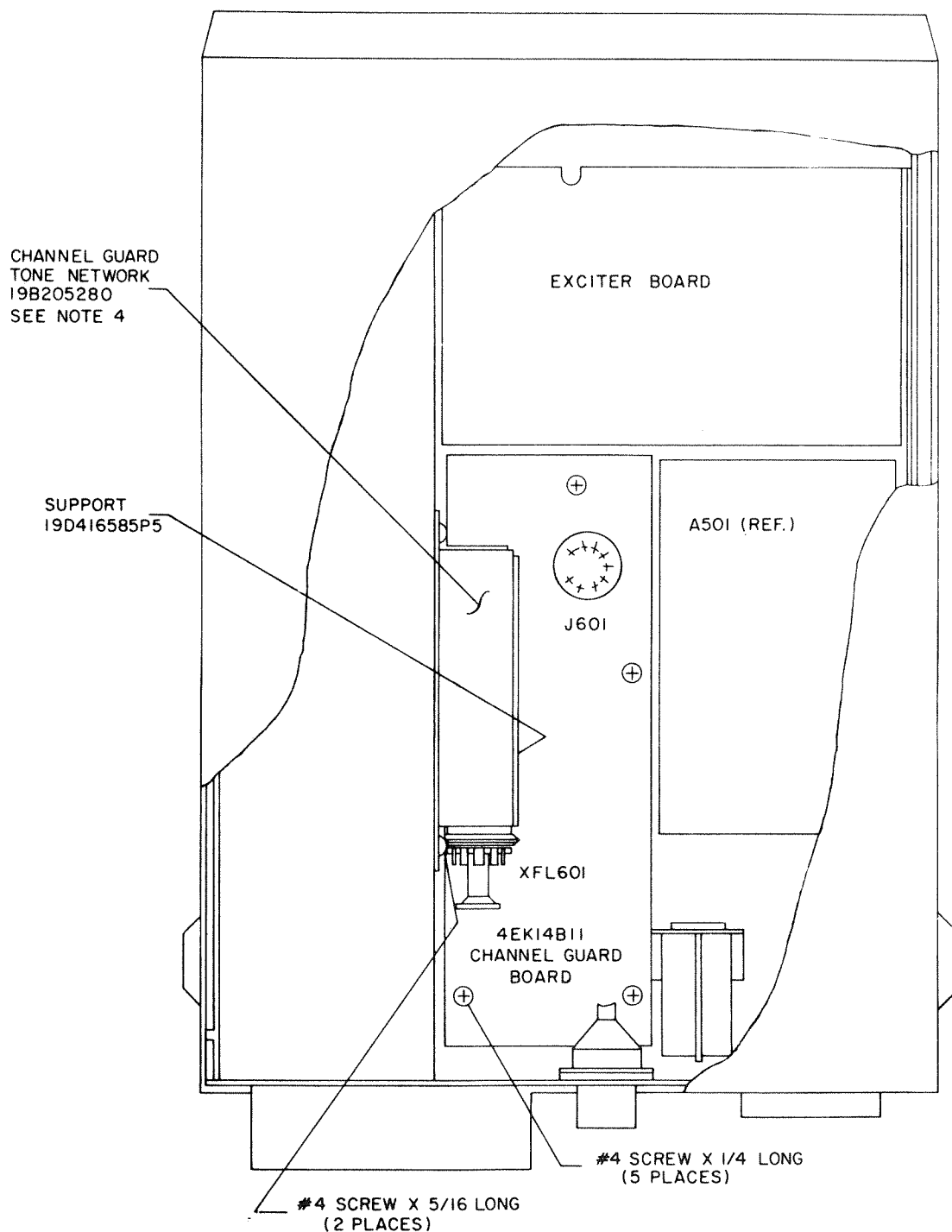
PROCEDURE

1. Mount the Channel Guard board or the Tone Reject Filter board as shown using the five #4-40 screws supplied with the board.
2. Install the cable W603 (W604 for Royal) from the Channel Guard board or the Tone Reject Filter board to TB3 and the Exciter board. Make the connections as shown in the appropriate chart. Remove the Exciter board to feed the shielded cable through the hole in the chassis and the slot in the Exciter board.
3. Insert the tone network into the mounting bracket. Plug the socket XFL601 from the Channel Guard board into the Tone Network. Install the pressure sensitive pad 4032591-P28 on the chassis as shown, approximately 0.3" down from mounting support of Tone Network.
4. Rotate the Tone Network until the marking appears on this surface (see Diagram). Mount the assembly as shown using the two #6-32 thread-forming screws supplied.
5. When the Decode only option (8014) or Tone Reject Filter (19C317355-G2) are used, cut-off and discard the shielded cable connecting the Channel Guard board and the Exciter board.
6. Install the accessory cover with the hardware supplied.

CONNECTION CHART FOR MASTR PROGRESS LINE ROYAL EXECUTIVE		
FROM	WIRE COLOR	TO
W604	W-G-O	TB3-27
W604	BR	TB3-41
W604	W-O-R	TB3-26
W604 CENTER CONDUCTOR	W-BL	TB3-37
SHIELD OF ABOVE		TB3-44
W604 CENTER CONDUCTOR	W-BK	EXCITER-J103
SHIELD OF ABOVE		EXCITER-J104
W604	R	TB3-5
W604	G	TB3-29

NOTES:

1. MOUNT CHANNEL GUARD BOARD ON CHASSIS AS SHOWN.
2. CUT SPOT TIE HOLDING P60I TO HARNESS & PLUG INTO J60I.
3. ASSEMBLE TONE NETWORK INTO MOUNTING BRACKET, PLUG SOCKET (XFL60I) FROM CHANNEL GUARD BOARD INTO TONE NETWORK & MOUNT AS SHOWN.
4. TONE NETWORK TO BE ORIENTED SO MARKING APPEARS ON THIS SURFACE.



INSTALLATION DIAGRAM

CHANNEL GUARD MODEL 4EK14B11
CUSTOM EXECUTIVE MOBILE COMBINATIONS