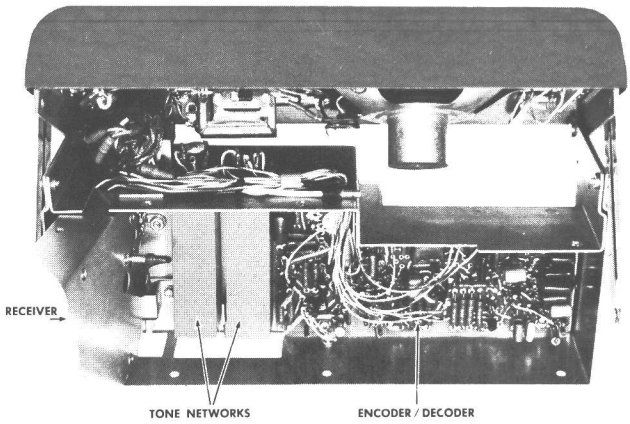
MOBILE RADIO

MAINTENANCE MANUAL

SOLID-STATE CHANNEL GUARD

(Encoder Model 4EH16A10 and Encoder/Decoder Models 4EK15A10 & 11)



SPECIFICATIONS *

Encoder	Model 4EH16A10
Encoder/Decoder	Models 4EK15A10 and 11
Tone Frequencies	71.9 to 203.5 Hz
Tone Input	100 millivolts minimum
Power Requirements	
Standby	12 milliamps
Receiving Call	25 milliamps maximum
Encode	30 milliamps maximum
Supply Voltage	13.8 volts DC ±20%
Temperature Range	-30°C to +70°C

EH-16-A & EK-15-A

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

GENERAL ELECTRIC

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ILLUSTRATIONS

DESCRIPTION

General Electric Encoder Model 4EH16A10 and Encoder/Decoder Models 4EK15A10 and 11 are fully transistorized units designed for use with GE PORTA-MOBIL, Motorcycle Radio, or Monitor Receivers. The tone frequencies are controlled by tone selective networks that are made with precision components for excellent stability and reliability. The tone frequencies range from 71.9 to 203.5 Hz. The same tone frequency is used for both channels in two-frequency combinations.

The function and number of tone networks for each model is shown in the following chart.

MODEL NO.	FUNCTION	NO.OF TONE NETWORKS
4EH16A10	Encoder only	1
4EK15A10	Encoder/Decoder	1
4EK15A11	Encoder and Decoder	2

OPERATION

PORTA-MOBIL RADIO

When the microphone of the PORTA•MOBIL Combination is on the hangup bracket, the tone-squelch circuit keeps the audio circuits squelched until a signal modulated by the proper tone coding is received. The cut-off bias on the PORTA•MOBIL receiver DC amplifier is then removed to permit the audio circuits to operate.

When a call is initiated, the operator lifts the microphone from the hang-up bracket. The PORTA•MOBIL receiver reverts to the standard squelch circuit automatically. (If the handset is used, the Channel Guard switch on the control unit must be operated to the MONITOR position.) The channel may then be monitored. If the operator finds the channel clear, the call is made in the usual manner. The proper tone for unsquelching the receiver of the called unit will be transmitted automatically.

MOTORCYCLE RADIO

To monitor the channels before sending a message, place the NORMAL-MONITOR switch in the MONITOR position to disable the channel guard.

MONITOR RECEIVER

The operating control for the Channel Guard Decoder consists of a RESET-MONITOR switch located on the front panel. The decoder keeps all signals on the channel locked out of the Monitor Receiver except those that are continuously tone coded for positive identification by the decoder.

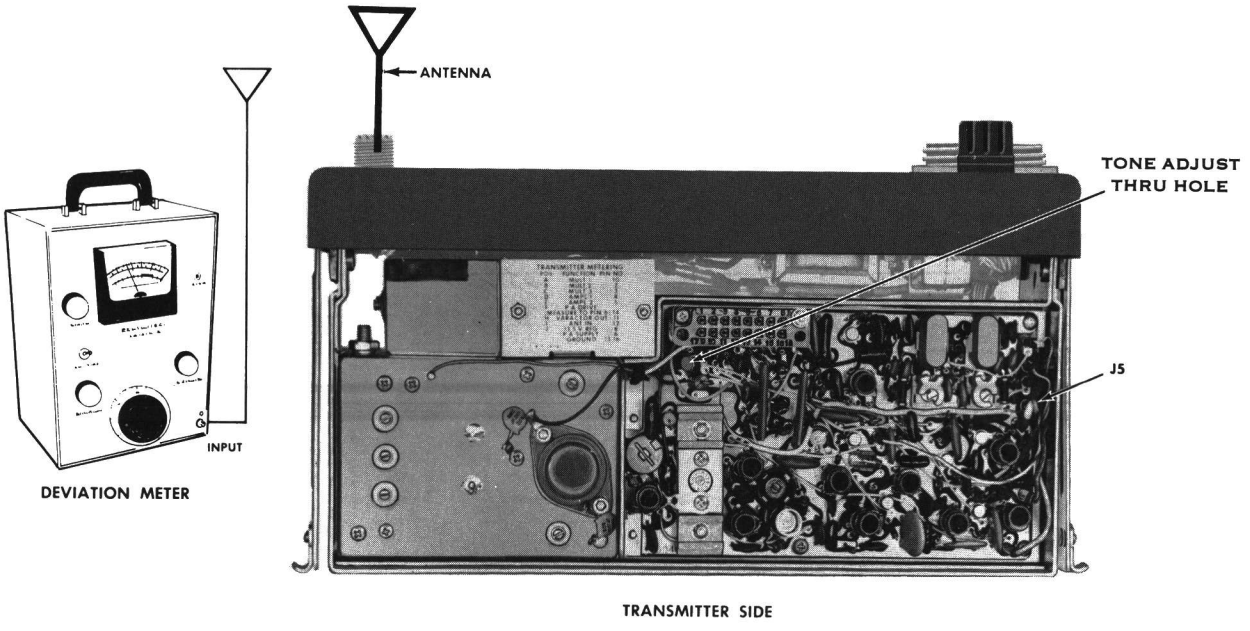


Figure 1 - Channel Guard Tone Deviation Adjustment

When a signal that is modulated by the proper tone code is received, the receiver audio circuits operate. Placing the RESET-MONITOR switch in the MONITOR position disables the Channel Guard Decoder, and permits all calls on the channel to be heard.

ADJUSTMENT

Only one adjustment is required on the channel guard encoders. This adjustment is made at the factory and should require no further adjustment unless the tone network frequency is changed.

If the tone network is changed, reset the TONE ADJUST control as shown below.

1. Set up the deviation meter to monitor the transmitter as shown in Figure 1.

2. Unplug the Mike Hi plug from J5 on the transmitter exciter board.

3. Key the transmitter and set the TONE ADJUST control for a reading of ±0.75 KHz (narrow band).

If it is necessary to reset the transmitter modulation, refer to the Modulation Adjustment on the Transmitter Alignment Procedure in the applicable Maintenance Manual.

CIRCUIT ANALYSIS

ENCODER/DECODER MODEL 4EK15A10 (Figure 2)

Encoder/Decoder Model 4EK15A10 uses one tone network for the encode and decode function.

Encode Function

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 applies +12 volts to the anode of feedback control diode CR605, causing it to conduct. When conducting, the diode shunts R634 which reduces the impedance of the positive feedback loop (R632, R634 and C618). This provides the necessary gain to the base of Q604 to permit oscillation, and the oscillator locks in on the channel guard frequency.

An extremely fast starting time for the encoder tone is provided by a starting network consisting of R640, C620, C621 and CR606. This network utilizes a positive pulse from the +12 volt keying voltage to provide the positive feedback required to start oscillation.

Thermistor-resistor combination R627 RT601 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 R667. This control is normally set for a ±0.75 KHz deviation as out-

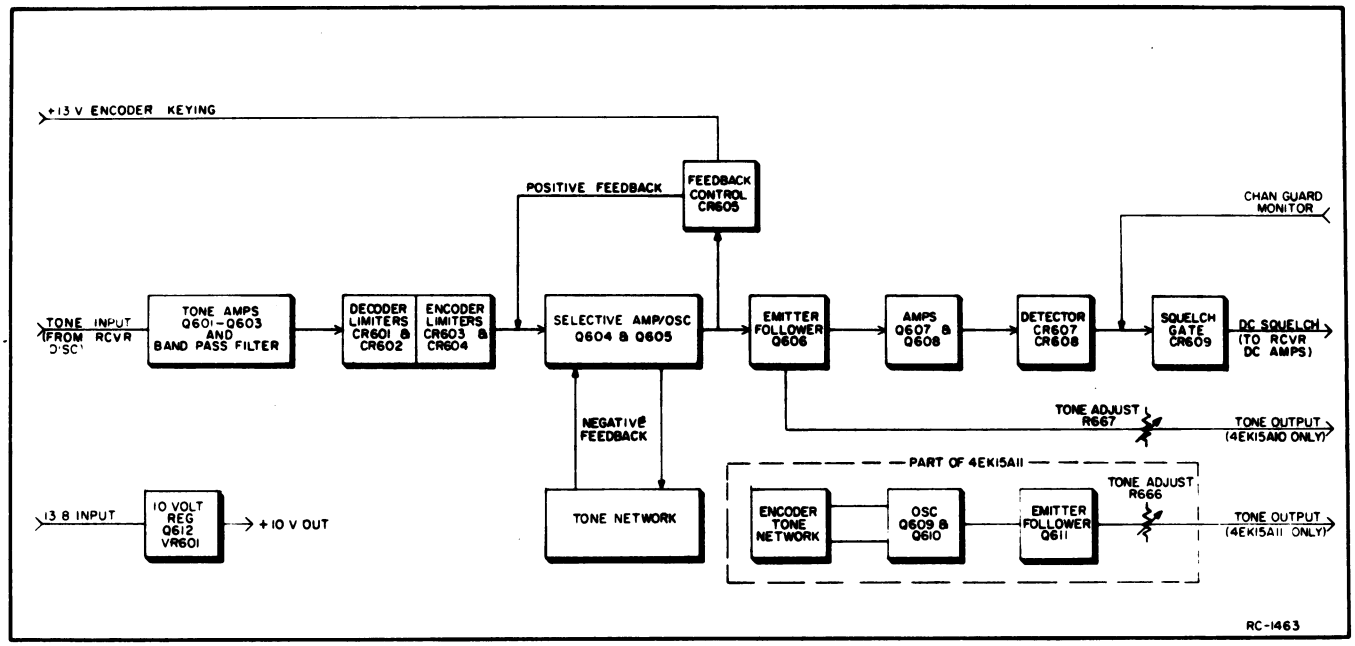


Figure 2 - Encoder/Decoder Block Diagram

lined in the Adjustment Section. The encoder tone is applied to the modulator stage on the transmitter exciter board.

Decode Function

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 in the NORMAL position, all signals are locked out except those from transmitters that are continuously tone-coded for positive identification by the receiver. Placing the monitor switch in the MONITOR position instantly disables the channel guard circuit, and the receiver operates on noise squelch only.

Audio, tone and noise are taken from the collector of the audio-noise amplifier and is fed thru E604 to three tone amplifier and band-pass filter circuits. The filters remove the audio and high-frequency noise from the signal, and the tone amplifiers provide sufficient gain to insure clipping of the desired tone frequency 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 amplifiers 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 R649 to quickly change the bias on Q607 for full gain. This ensures a more positive "unsquelching" action.

With the MONITOR switch in the NORMAL position, a monitor voltage of approximately 12 volts is applied to E607 on the channel guard board. This voltage is dropped to approximately 2.2 volts by R670 and R652, and forward biases squelch gate diode CR609. This forward bias causes CR609 to conduct, feeding a DC voltage of approximately 1.7 volts to the base of DC amplifier Q314 in the receiver. This removes the bias on the receiver audio stage, keeping it turned off. Zener diode VR602 provides regulation for the bias voltage.

When the proper tone is applied to the decoder, the negative DC voltage from the detector diodes CR607 and CR608 back-biases squelch gate diode CR609. This cuts off the positive bias to the DC amplifier. However, the receiver noise squelch continues to operate until a carrier quiets the receiver.

Placing the MONITOR switch in the MONITOR position opens the 12-volt monitor voltage line. This disables the channel guard so that the receiver operates on noise squelch.

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 to L601, C626, C627, C628 and R653.

Series regulator Q612 supplies a regulated 10 volts to the transistor stages.

ENCODER/DECODER MODEL 4EK15A11 (Figure 2)

Encoder/Decoder Model 4EK15A11 consists of the basic 4EK15A10 with a separate encoder (including oscillator Q609 and Q610, and emitter-follower Q611) and a second tone network. The encoder portion of the 4EK15A11 operates exactly the same as the 4EH16A10 as described in the following paragraphs. The remaining stages of the 4EK15A11 (Q601 through Q608) operate as a decoder only. The two tone networks provide different encoder and decoder frequencies.

ENCODER MODEL 4EH16A10 (Figure 3)

The encoder tone is provided by Q601 and Q602 which oscillate at a frequency determined by the tone network. Negative feedback is applied through the tone network to the base of Q601, and prevents any gain in the stage except at the operating frequency.

Keying the transmitter applies +12 volts to series regulator Q604, causing it to conduct. The regulated +10 volt output is applied to the transistor stages, causing them to operate.

Thermistor-resistor combination R602 and RT601 provides temperature compensation for the oscillator output. Limiter diodes CR601 and CR602 control the amount of positive feedback to keep the tone amplitude constant.

The oscillator output is fed to emitter-follower Q603, and then to TONE ADJUST potentiometer R612. This control is normally set for +0.75 kHz deviation as stated in the Adjustment Section. The encoder tone is then applied to the modulator stage on the transmitter exciter board.

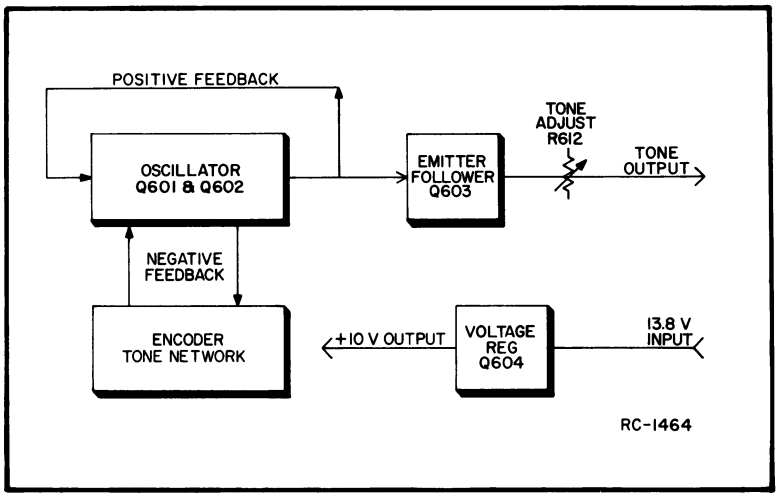


Figure 3 - Encoder Block Diagram

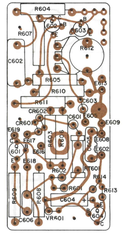
TROUBLESHOOTING PROCEDURE

SYMPTOM	CHECK FOR
Encoder and decoder	1. +12 volts DC at E601. 2. +9.2 volts DC at the emitter of voltage regulator stage. 3. Tone network properly plugged into socket. 4. Defective transistors in the selective amplifier and emitter-follower stages.
Decoder only not operating (make checks while receiving a tone)	1. 100 millivolts (minimum) tone level being received at E604. 2. 2-volt peak-to-peak signal across CR602. 3. Tone network properly plugged into socket. 4. 1.5-volts rms at the emitter of Q606. 5. Reverse bias on CR609 (forward biased with no tone input).
Encoder only not operating	1. 1.5 volts output at E605 with the transmitter keyed and the TONE ADJUST control turned fully clockwise. 2. Proper adjustment of TONE ADJUST control (refer to the Adjustment Section on page 1). 3. 12 volts DC at E603 with the transmitter keyed (4EK15A11 only). 4. 1.5 volts rms at the emitter of emitter-follower stage (CR605 jumpered in the 4EK15A10). 5. Tone network properly plugged into socket. 6. Defective transistors in selective amplifier and emitter-follower stages.

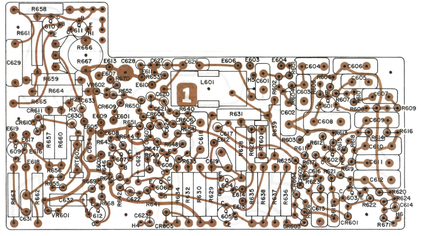
MODEL 4EH16A10

MODELS 4EK15A10 & 11

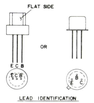
OUTLINE DIAGRAM



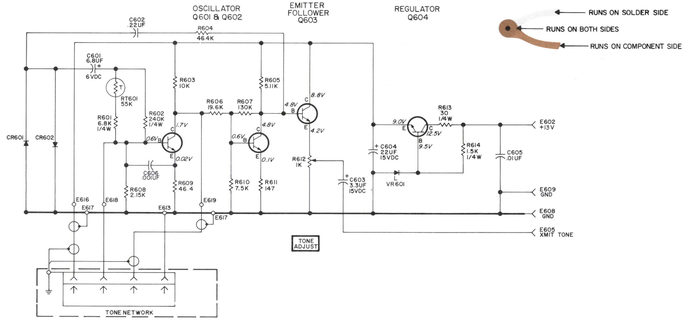
(19D402835, Rev. 1)
(19B203531, Sh. 1, Rev. 0)
(19B203531, Sh. 2, Rev. 0)



(19D402835, Rev. 1)
(19C303934, Sh. 1, Rev. 1)
(19C303934, Sh. 2, Rev. 2)



MODEL 4EH16A10 SCHEMATIC DIAGRAM

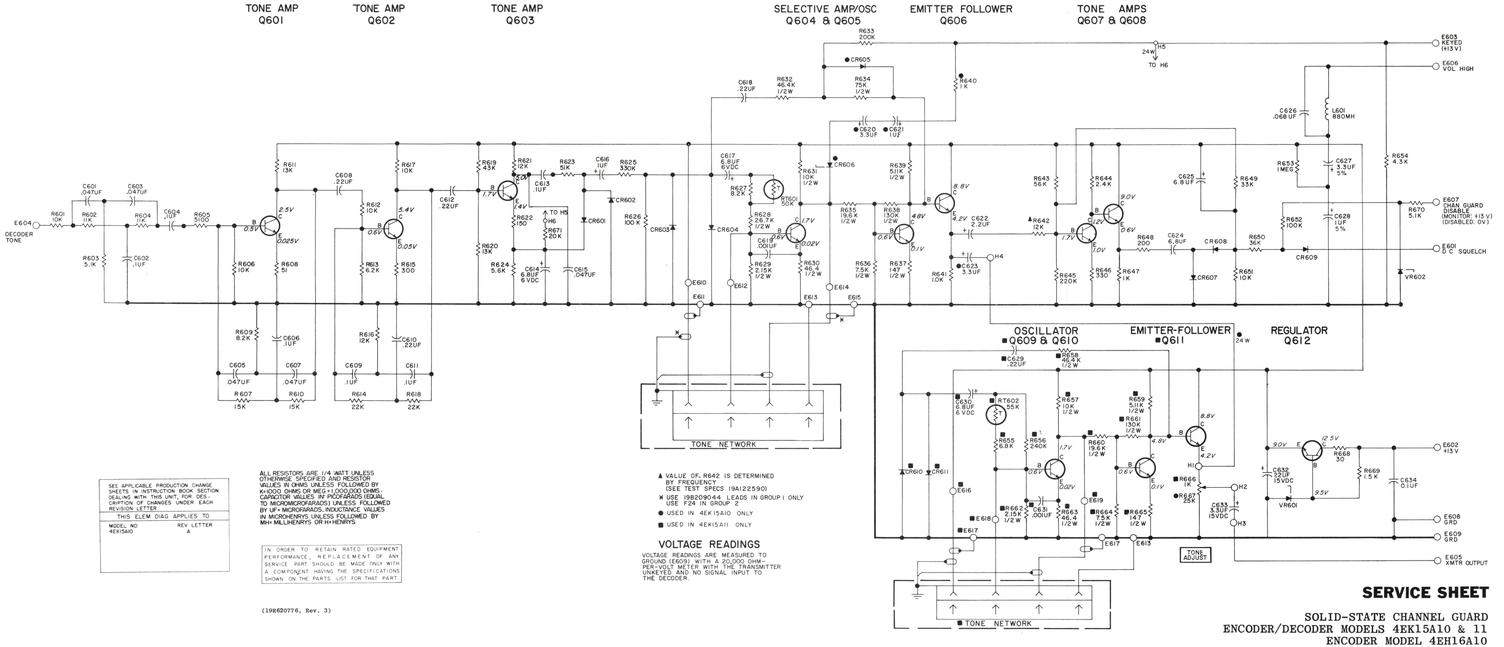


ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR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

(19C311108, Rev. 1)

MODELS 4EK15A10 & 11 SCHEMATIC DIAGRAM



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
4EK15A10	A

ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS (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.

(19B620776, Rev. 3)

▲ VALUE OF R642 IS DETERMINED BY FREQUENCY (SEE TEST SPECS 19A225590)

✖ USE (19D209044, LEADS IN GROUP I ONLY USE F24 IN GROUP 2

● USED IN 4EK15A10 ONLY

■ USED IN 4EK15A11 ONLY

VOLTAGE READINGS

VOLTAGE READINGS ARE MEASURED TO GROUND (E603) WITH A 20,000 OHM-PER-VOLT METER, WITH THE TRANSMITTER UNKEYED AND NO SIGNAL INPUT TO THE DECODER.

SERVICE SHEET

SOLID-STATE CHANNEL GUARD
ENCODER/DECODER MODELS 4EK15A10 & 11
ENCODER MODEL 4EH16A10

PARTS LIST

LBI-3780B

PORTA-MOBIL CHANNEL GUARD

MODEL 4EK15A10 19C311106-G1 ENCODER
MODEL 4EK15A10 19C311170-G1 ENCODER-DECODER
MODEL 4EK15A11 19C311170-G2 ENCODER-DECODER

SYMBOL	GE PART NO.	DESCRIPTION
		4EK16A10 ENCODER 19C311106-G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C601	5490267-P1	Tantalum: 6.8 µF ±20%, 6 VDCW; sim to Sprague Type 150D.
C602	19B209243-P115	Polyester: 0.22 µF ±10%, 250 VDCW.
C603	5490267-P9	Tantalum: 3.3 µF ±20%, 15 VDCW; sim to Sprague Type 150D.
C604	5490267-P10	Tantalum: 22 µF ±20%, 15 VDCW; sim to Sprague Type 150D.
C605	19B209243-P1	Polyester: .01 µF ±20%, 40 VDCW.
C606	5494481-P111	Ceramic disc: .001 µF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR601 thru CR602	5494922-P1	Silicon; sim to Type 1N456.
YR601	4036887-P11	Silicon, Zener.
		- - - - - - - - - - TERMINALS - - - - - - - - - -
E602	4038104-P1	Lug: solder dipped brass.
E605	4038104-P1	Lug: solder dipped brass.
E608 and E609	4038104-P1	Lug: solder dipped brass.
E613	4038104-P1	Lug: solder dipped brass.
E616 thru E619	4038104-P1	Lug: solder dipped brass.
		- - - - - - - - TRANSISTORS - - - - - - - - -
Q601 thru Q603	19A115362-P1	Silicon, NPN; sim to Type 2N2925.
Q604	19A115720-P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R601	3R152-P683J	Composition: 6800 ohms ±5%, 1/4 w.
R602	3R152-P244J	Composition: 0.24 megohms ±5%, 1/4 w.
R603	5495948-P301	Deposited carbon: 10,000 ohms ±1%,1/2 w; sim to Texas Instrument Type CDI/2MB.
R604	5495948-P365	Deposited carbon: 46,400 ohms ±1%, 1/2 w; sim to Texas Instrument Type CDI/2MB.
R605	5495948-P269	Deposited carbon: 5110 ohms ±1%, 1/2 w; sim to Texas Instrument Type CDI/2MB.
R606	5495948-P329	Deposited carbon: 19,600 ohms ±1%, 1/2 w; sim to Texas Instrument Type CDI/2MB.
R607	19A116278-P412	Metal film: 130,000 ohms ±2%, 1/2 w.
R608	19A116278-P233	Metal film: 2150 ohms ±2%, 1/2 w.
R609	19A116278-P65	Metal film: 46.4 ohms ±2%, 1/2 w.
R610	19A116278-P285	Metal film: 7500 ohms ±2%, 1/2 w.
R611	19A116278-P117	Metal film: 147 ohms ±2%, 1/2 w.
R612	19C300124-P18	Variable: 1,000 ohms ±20%, 1/8 w, sim to PR Mallory MLC.

SYMBOL	GE PART NO.	DESCRIPTION
R613	3R152-P300J	Composition: 30 ohms ±5%, 1/4 w.
R614	3R152-P152J	Composition: 1500 ohms ±5%, 1/4 w.
		- - - - - - - - - - THERMISTORS - - - - - - - - -
RT601	5490828-P26	Rod: 55,000 ohms ±10%, 1 w max; sim to Global Type 723-B.
		ENCODER-DECODER 4EK15A10 19C311170-G1 4EK15A11 19C311170-G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C601	5491189-P204	Polyester: .047 µF ±5%, 50 VDCW.
C602	5491189-P206	Polyester: 0.1 µF ±5%, 50 VDCW.
C603	5491189-P204	Polyester: .047 µF ±5%, 50 VDCW.
C604	5491189-P206	Polyester: 0.1 µF ±20%, 250 VDCW.
C605	5491189-P204	Polyester: .047 µF ±5%, 50 VDCW.
C606	5491189-P206	Polyester: 0.1 µF ±5%, 50 VDCW.
C607	5491189-P204	Polyester: .047 µF ±5%, 50 VDCW.
C608	19B209243-P17	Polyester: 0.22 µF ±20%, 250 VDCW.
C609	5491189-P206	Polyester: 0.1 µF ±5%, 50 VDCW.
C610	19B209243-P117	Polyester: 0.22 µF ±10%, 250 VDCW.
C611	5491189-P206	Polyester: 0.1 µF ±5%, 50 VDCW.
C612	19B209243-P17	Polyester: 0.22 µF ±20%, 250 VDCW.
C613	19B209243-P7	Polyester: 0.1 µF ±20%, 250 VDCW.
C614	5496267-P1	Tantalum: 6.8 µF ±20%, 6 VDCW; sim to Sprague Type 150D.
C615	19B209243-P5	Polyester: .047 µF ±20%, 40 VDCW.
C616	5496267-P417	Tantalum: 1.0 µF ±5%, 35 VDCW; sim to Sprague Type 150D.
C617	5496267-P1	Tantalum: 6.8 µF ±20%, 6 VDCW; sim to Sprague Type 150D.
C618	19B209243-P117	Polyester: 0.22 µF ±10%, 250 VDCW.
C619	5494481-P111	Ceramic disc: .001 µF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C620	5496267-P9	Tantalum: 3.3 µF ±20%, 15 VDCW; sim to Sprague Type 150D.
C621	5496267-P17	Tantalum: 1.0 µF ±20%, 35 VDCW; sim to Sprague Type 150D.
C622	5496267-P13	Tantalum: 2.2 µF ±20%, 20 VDCW; sim to Sprague Type 150D.
C623	5496267-P9	Tantalum: 3.3 µF ±20%, 15 VDCW; sim to Sprague Type 150D.
C624	5496267-P1	Tantalum: 6.8 µF ±20%, 6 VDCW; sim to Sprague Type 150D.
C625	5496267-P18	Tantalum: 6.8 µF ±20%, 35VDCW; sim to Sprague Type 150D.
C626	5491189-P205	Polyester: .068 µF ±5%, 50 VDCW.
C627	5496267-P409	Tantalum: 3.3 µF ±5%, 15VDCW; sim to Sprague Type 150D.
C628	5496267-P417	Tantalum: 1.0 µF ±5%, 35 VDCW; sim to Sprague Type 150D.
C629	19B209243-P15	Polyester: 0.22 µF ±20%, 250 VDCW.
C630	5496267-P1	Tantalum: 6.8 µF ±20%, 6 VDCW; sim to Sprague Type 150D.
C631	5494481-P111	Ceramic disc: .001 µF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C632	5496267-P10	Tantalum: 22 µF ±20%, 15 VDCW; sim to Sprague Type 150D.
C633	5496267-P9	Tantalum: 3.3 µF ±20%, 15 VDCW; sim to Sprague Type 150D.
C634	19B209243-P13	Polyester: 0.1 µF ±20%, 250 VDCW.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR601 and CR602	19A115250-P1	Silicon.
CR603 and CR604	5494922-P1	Silicon; sim to Type 1N456.
CR605	19A115250-P1	Silicon.
CR606	6036887-P3	Silicon, Zener.
CR607 thru CR609	19A115250-P1	Silicon.
CR610 and CR611	5494922-P1	Silicon; sim to Type 1N456.
YR601	6033887-P11	Silicon, Zener.
YR602	6033887-P7	Silicon, Zener.
		- - - - - - - - - - TERMINALS - - - - - - - - - -
E601 thru E619	4038104-P1	Lug: solder dipped brass.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L601	19A115690-P1	Coil, RF: 880 MH ±5%, sim to Arrted AC5672.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q601	19A115362-P1	Silicon, NPN; sim to Type 2N2925.
Q602 and Q603	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q604 thru Q606	19A115362-P1	Silicon, NPN; sim to Type 2N2925.
Q607 and Q608	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q609 thru Q611	19A115362-P1	Silicon, NPN; sim to Type 2N2925.
Q612	19A115720-P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R601	3R152-P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R602	3R152-P113J	Composition: 11,000 ohms ±5%, 1/4 w.
R603	3R152-P51J	Composition: 5100 ohms ±5%, 1/4 w.
R604	3R152-P113J	Composition: 11,000 ohms ±5%, 1/4 w.
R605	3R152-P512J	Composition: 5100 ohms ±5%, 1/4 w.
R606	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R607	3R152-P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R608	3R152-P510J	Composition: 51 ohms ±5%, 1/4 w.
R609	3R152-P823J	Composition: 8200 ohms ±5%, 1/4 w.
R610	3R152-P153J	Composition: 15,000 ohms ±5%,1/4 w.
R611	3R152-P133J	Composition: 13,000 ohms ±5%, 1/4 w.
R612	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R613	3R152-P632J	Composition: 6300 ohms ±5%, 1/4 w.
R614	3R152-P223J	Composition: 22,000 ohms ±5%, 1/4 w.
R615	3R152-P301J	Composition: 300 ohms ±5%, 1/4 w.
R616	3R152-P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R617	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R618	3R152-P223J	Composition: 22,000 ohms ±5%, 1/4 w.
R619	3R152-P433J	Composition: 43,000 ohms ±5%, 1/4 w.
R620	3R152-P133J	Composition: 13,000 ohms ±5%, 1/4 w.
R621	3R152-P123J	Composition: 12,000 ohms ±5%, 1/4 w.

SYMBOL	GE PART NO.	DESCRIPTION
R622	3R152-P151J	Composition: 150 ohms ±5%, 1/4 w.
R623	3R152-P513J	Composition: 51,000 ohms ±5%, 1/4 w.
R624	3R152-P562J	Composition: 5600 ohms ±5%, 1/4 w.
R625	3R152-P334J	Composition: 0.33 megohms ±5%, 1/4 w.
R626	3R152-P104J	Composition: 0.1 megohm ±5%, 1/4 w.
R627	3R152-P822J	Composition: 8200 ohms ±5%, 1/4 w.
R628	19A116278-P342	Metal film: 26,700 ohms ±2%, 1/2 w.
R629	19A116278-P233	Metal film: 2150 ohms ±2%, 1/2 w.
R630	19A116278-P65	Metal film: 46.4 ohms ±2%, 1/2 w.
R631	19A116278-301	Metal film: 10,000 ohms ±2%, 1/2 w.
R632	19A116278-P365	Metal film: 46,400 ohms ±2%, 1/2 w.
R633	3R152-P204J	Composition: 0.20 megohm ±5%, 1/4 w.
R634	19A116278-P385	Metal film: 75,000 ohms ±2%, 1/2 w.
R635	19A116278-P329	Metal film: 19,600 ohms ±2%, 1/2 w.
R636	19A116278-P285	Metal film: 7500 ohms ±2%, 1/2 w.
R637	19A116278-P117	Metal film: 147 ohms ±2%, 1/2 w.
R638	19A116278-P412	Metal film: 130,000 ohms ±2%, 1/2 w.
R639	19A116278-P269	Metal film: 5110 ohms ±2%, 1/2 w.
R640 and R641	3R152-P103J	Composition: 1000 ohms ±5%, 1/4 w.
R642A	3R152-P822J	Composition: 8200 ohms ±5%, 1/4 w.
R642B	3R152-P912J	Composition: 9100 ohms ±5%, 1/4 w.
R642C	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R642D	3R152-P113J	Composition: 11,000 ohms ±5%, 1/4 w.
R642E	3R152-P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R642F	3R152-P133J	Composition: 13,000 ohms ±5%, 1/4 w.
R642G	3R152-P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R642H	3R152-P752J	Composition: 7500 ohms ±5%, 1/4 w.
R643	3R152-P563J	Composition: 56,000 ohms ±5%, 1/4 w.
R644	3R152-P243J	Composition: 2400 ohms ±5%, 1/4 w.
R645	3R153-P224J	Composition: 0.22 megohm ±5%, 1/4 w.
R646	3R152-P331J	Composition: 330 ohms ±5%, 1/4 w.
R647	3R152-P103J	Composition: 1000 ohms ±5%, 1/4 w.
R648	3R152-P201J	Composition: 200 ohms ±5%, 1/4 w.
R649	3R152-P333J	Composition: 33,000 ohms ±5%, 1/4 w.
R650	3R152-P363J	Composition: 36,000 ohms ±5%, 1/4 w.
R651	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R652	3R152-P104J	Composition: 0.1 megohm ±5%, 1/4 w.
R653	3R152-P105J	Composition: 1 megohm ±5%, 1/4 w.
R654	3R152-P433J	Composition: 4300 ohms ±5%, 1/4 w.
R655	3R152-P682J	Composition: 6800 ohms ±5%, 1/4 w.
R656	3R152-P244J	Composition: 0.24 megohm ±5%, 1/4 w.
R657	19A116278-P301	Metal film: 10,000 ohms ±2%,1/2 w.
R658	19A116278-P365	Metal film: 46,400 ohms ±2%, 1/2 w.

SYMBOL	GE PART NO.	DESCRIPTION
R659	19A116278-P269	Metal film: 5110 ohms ±2%, 1/2 w.
R660	19A116278-P329	Metal film: 19,600 ohms ±2%, 1/2 w.
R661	19A116278-P412	Metal film: 130,000 ohms ±2%, 1/2 w.
R662	19A116278-P233	Metal film: 2150 ohms ±2%, 1/2 w.
R663	19A116278-P65	Metal film: 46.4 ohms ±2%, 1/2 w.
R664	19A116278-P285	Metal film: 7500 ohms ±2%, 1/2 w.
R665	19A116278-P117	Metal film: 147 ohms ±2%, 1/2 w.
R661	19C300134-P18	Variable: 1,000 ohms ±20%, 1/8 w, sim to PR Mallory MLC.
R667	19C300134-P19	Variable: 25,000 ohms ±20%, 1/8 w, sim to PR Mallory MLC.
R668	3R152-P300J	Composition: 30 ohms ±5%, 1/4 w.
R669	3R152-P153J	Composition: 1500 ohms ±5%, 1/4 w.
R670	3R152-P512E	Composition: 5100 ohms ±10%, 1/4 w.
R671	3R153-P303J	Composition: 30,000 ohms ±5%, 1/4 w.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT601	5490828-P22	Rod: 50,000 ohms ±10%, 1 w max; sim to Global Type 763 H.
RT602	5490828-P26	Rod: 55,000 ohms ±10%, 1 w max; sim to Global Type 723-B.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	4035711-P1	Clip, spring tension. sim to Augat Brothers 6003-38CC. (Used With L601).

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 descriptions of parts affected by these revisions.

REV. A - Channel Guard Encoder/Decoder Model 4EK15A10

To prevent tone adjustment from shifting RF Oscillator Frequency. Added C633.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

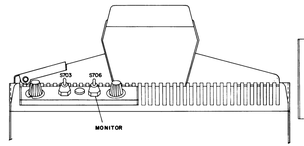
TYPE EC-60-A

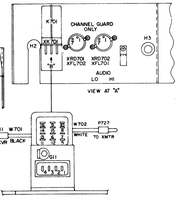
MODELS 4EC60A28 & 29

MODELS 4EC60A32 & 33

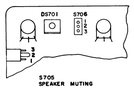
OUTLINE DIAGRAM

MODELS 4EC60AI7, 4EC60A20, 4EC60A32 & 4EC60A33

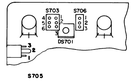


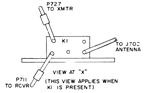


MODEL 4EC60AI7 & 4EC60A32 1 FREQ WITH CHANNEL GUARD

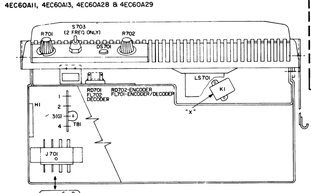


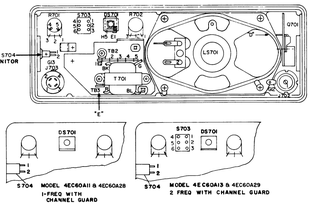
MODEL 4EC60A20 & 4EC60A33 2 FREQ WITH CHANNEL GUARD





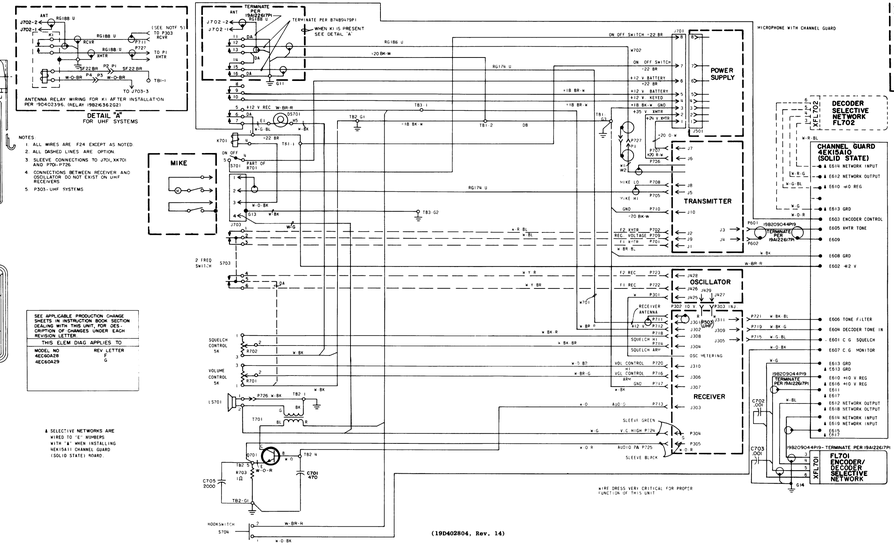
MODELS 4EC60AII, 4EC60AI3, 4EC60A28 & 4EC60A29





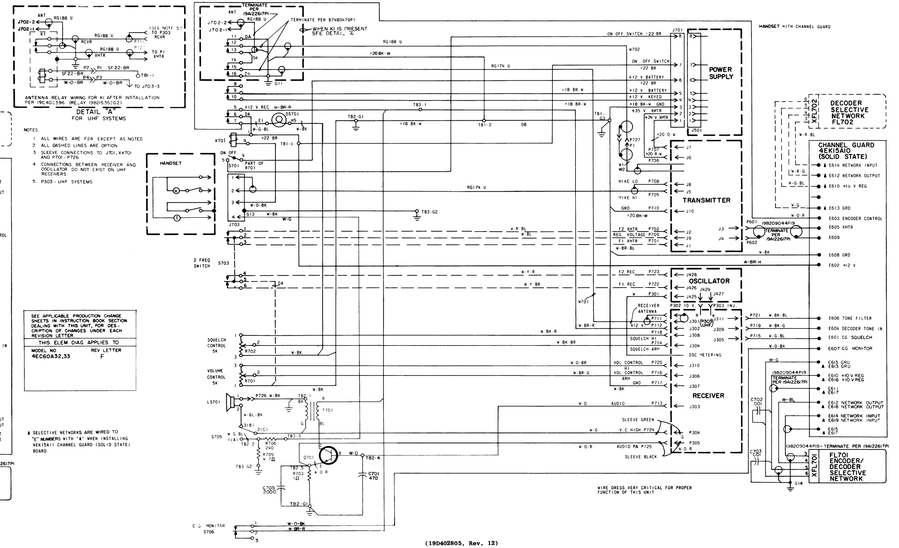
(19D402511, Rev. 7)

SCHEMATIC DIAGRAM



(19D402804, Rev. 14)

SCHEMATIC DIAGRAM



(19D402805, Rev. 12)

(DF-5024)

SERVICE SHEET

CONTROL UNIT
MODELS 4EC60A28,29,32 & 33

Issue 4

PARTS LIST

LBI-3983B

CONTROL UNIT
MODEL 4EC60A28 19D402279G19 (Single Frequency)
MODEL 4EC60A29 19D402279G20 (Two Frequency)
MODEL 4EC60A32 19D402279G23 (Single Frequency)
MODEL 4EC60A33 19D402279G24 (Two Frequency)

SYMBOL	GE PART NO.	DESCRIPTION
		CONTROL UNIT
		- - - - - - - - - - -CAPACITORS - - - - - - - - -
C701	5494481P7	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C702 and C703	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C705	5494481P14	Ceramic disc: 2000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - INDICATING DEVICES - - - - - - -
DS701	4034664P1	Lamp, incandescent: 28 v, .04 amp; sim to GE 2148.
		- - - - - - - - - -TONE NETWORKS- - - - - - - - - -
FL701 and FL702	19B205280G	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
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - -
J701	7473192P31	Connector: 8 terminals, phenolic; sim to HB Jones 261-31-02-000.
J702	19A116550P1	Connector, coaxial: sim to Gold Line GLC-88.
J703	19B209201P1	Connector: 4 contacts; sim to Switchcraft 3C-1088.
J704	7489183P5	Connector: 8 contacts. (Accessory Jack Option).
		- - - - - - - - - - - - - RELAYS - - - - - - - - - -
K701	19C307010P18	Armature: 12 VDC nominal, 130 ohms res ±10%, 4 form C contacts; sim to Allied Control T154X-96A.
		- - - - - - - - - - LOUDSPEAKERS - - - - - - - - -
LS701	19C307094P1	Permanent magnet: 3.2 ohms ±10% voice coil imp, 3 w input, 325 ±50 Hz resonance, paper dust cap; sim to Oaktron S7473.
		- - - - - - - - - - - - - PLUGS - - - - - - - - - -
P701 and P702	4029840P2	Contact, electrical; sim to Amp 42827-2.
P705	4029840P2	Contact, electrical; sim to Amp 42827-2.
P706 thru P708	4029840P1	Contact, electrical; sim to Amp 41854.
P709	4029840P2	Contact, electrical; sim to Amp 42827-2.
P710	4029840P1	Contact, electrical; sim to Amp 41854.
P712 thru P723	4029840P2	Contact, electrical; sim to Amp 42827-2.
P724 and P725	7147199P2	Connector: 1 female contact; sim to Winchester Electronics 21804.
P726	4036634P1	Receptacle: sim to Amp 42428-2.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q701*	19A116118P3	Silicon, NPN.
		In 4EC60A28, A29 of REV E and earlier: In 4EC60A32, A33 of REV D and earlier:
	19A115527P1	Silicon, NPN.
		- - - - - - - - - - - RESISTORS - - - - - - - - -
R701	19C300097P10	Resistor/switch: includes Resistor, variable, carbon film, 5000 ohms ±20%, 1/8 w; (S701) Switch, 2 amps at 125 VAC; sim to Mallory Type MLC.
R702	19C300097P9	Variable, carbon film: 5000 ohms ±20%, 1/4 w; sim to Mallory Type MLC.
R703	19B209022P115	Wirewound, phen: 1 ohm ±10%, 2 w; sim to IRC Type BWH.
R704*	19B209022P135	Wirewound, phen: 6.8 ohms ±10%, 2 w; sim to IRC Type BWH.
		Deleted in Models 4EC60A28,29 by REV E. Deleted in Models 4EC60A32,33 by REV D.
R705	19B209022P131	Wirewound, phen: 4.7 ohms ±10%, 2 w; sim to IRC Type BWH.
R706	3R77P241J	Composition: 240 ohms ±5%, 1/2 w.
		- - - - - - - - - - - SWITCHES - - - - - - - - - -
S701		(Part of R701).
S702*	19B209040P1	Slide: DPDT, 0.5 amp at 125 v; sim to Continental Wirt 126.
		Deleted in Models 4EC60A28,29 by REV E. Deleted in Models 4EC60A32,33 by REV D.
S703*	19A116877P6	Toggle: DPDT, 1 ma at 6 VDC; sim to C and K Components Series 7201G.
		In 4EC60A29 of REV F and earlier: In 4EC60A33 of REV E and earlier:
	4036949P2	Toggle: DPDT, 100 µa at 5 VDC; sim to Arrow-Hart and Hegeman TS-6.
S704	7481654P10	Pushbutton (red): SPNO, 1 amp at 115 VAC.
S705	19B209239P1	Pushbutton (red): SPDT, 250 ma at 115 VAC or 25 VDC; sim to Switchcraft 923.
S706*	19A116877P1	Toggle: SPDT, 1 ma at 6 VDC; sim to C and K Components Series 7101G.
		In 4EC60A32, A33 of REV E and earlier:
	4036949P1	Toggle: SPDT, 100 µa at 5 VDC; sim to Arrow-Hart and Hegeman TS3.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T701	19B209079P1	Audio frequency: freq range 0.3-3 KHz, Pri 1: 55 ohms ±10% imp at 1 w, 0.895 ohm ±10% DC res, Sec 1: 3.2 ohms ±10% at 1 w, 0.168 ohm max DC res.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7775500P8	Phen: 4 terminals.
TB2	7775500P55	Phen: 5 terminals.
TB3	7775500P44	Phen: 2 terminals. (Used in 4EC60A28, A29).
TB3	7775500P7	Phen: 3 terminals. (Used in 4EC60A32, A33).
		- - - - - - - - - - - - CABLES - - - - - - - - -
W701		CABLE ASSEMBLY 19A121176G1
		- - - - - - - - - - - - PLUGS - - - - - - - - - - -
P711	5496078P1	Connector, push-on: Teflon; sim to FRX 27-1.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B209044P11	Cable, RF: 5.75 inches long. Type RG-174/U.
W702		CABLE ASSEMBLY 19A121176G2
		- - - - - - - - - - - - PLUGS - - - - - - - - - -
P727	5496078P2	Connector, push-on: Teflon; sim to FXR 27-2.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B209044P13	Cable, RF: 4 inches long. Type RG-188/U.
		- - - - - - - - - - - SOCKETS - - - - - - - - - - -
XFL701 and XFL702	19B209065P2	Tube: 7 contacts, molded phenolic; sim to Alcon Metal Products 524M-2.
XK701	5491595P5	Relay, nylon: 16 contacts; sim to Allied Control 30054-2.
		HARNESS ASSEMBLY 19D402279G43 (4EC60A28) 19D402279G44 (4EC60A29) 19D402279G47 (4EC60A32) 19D402279G48 (4EC60A33) Includes C701, C705, J701, J704, P701, P702, P705, P706-P708, P709, P710, P712-P726, R701, R702, R703, S702, S706, TB1-TB3, W701, W702, XK701.
		ASSOCIATED ASSEMBLIES
		DC CHARGING CABLE 19B204993G1
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	7160478P1	Cable: 2 conductor, 50 inches; sim to Birnbach 789.
	4034405P1	Plug, general purpose: 4 contacts, polarized, 10 amps at 133 VRMS; sim to Cannon XLR-4-11C.
	19A115513P1	Connector, cigarette lighter: 12 VDC; sim to Cole-Hersse 1624.
		DC CHARGING CABLE 19B204993G2
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	7160478P1	Cable: 2 conductor, 50 inches; sim to Birnbach 789.
	4034405P5	Plug, general purpose: 5 contacts, polarized, 10 amps at 133 VRMS; sim to Cannon XLR-5-11C.
	19A115513P1	Connector, cigarette lighter: 12 VDC; sim to Cole-Hersse 1624.
		POWER SUPPLY EXTENSION CABLE 19B204289G1
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	7473192P19	Socket, phenolic: 8 terminals, cable clamp in cap; sim to HB Jones 261-32-08-030.
	7473192P26	Plug, phenolic: 8 terminals, cable clamp in cap; sim to HB Jones 261-31-08-030.
	7162441P23	Tubing, flexible, plastic: 3 feet long.
		AUTO GUTTER MOUNT ANTENNA MODEL 4EY20A10 (High Band)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19C303620P1	Antenna Assembly. Includes: plastic ball tip; 19.5 ±0.25 inch stainless steel whip; socket; insulators; adapter; RG-58A/U cable; PL-259 plug; clip; 2-set screws; rubber pad; sim to Antenna Specialists ASP157.
	19C303620P2	Replacement Whip Assembly. Includes: plastic ball tip; 19.5 ±0.25 inch stainless steel whip; socket; insulators; sim to Antenna Specialists 19A904-1.
		MICROPHONE MODEL 4EM33C10 (19B209306P1)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
		Switch. Shure Brothers RP33.
		Cable and plug: approx 5 feet. Shure Brothers RP35.
		Button: red plastic. Shure Brothers RP34.
		Cartridge, magnetic controlled. Shure Brothers RP32.
		Case, mounting button and nameplate; plastic. Shure Brothers RP40.
		Shield. Shure Brothers RP36.
		MICROPHONE MODEL 4EM33D10 (19B209199P1)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
		Switch: moisture proof. Shure Brothers RP33.
		Cable and Plug Assembly. Approx 5 feet. Shure Brothers RP35.
		Button, switch: red plastic. Shure Brothers RP34.
		Cartridge, transmitter: controlled magnetic. Shure Brothers RP32.
		Case, Mounting button and Nameplate: plastic. Shure Brothers RP31.
		Shield. Shure Brothers RP36.
		HANDSET MODEL 4EM34A10 (19B209198P1)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
		Cartridge, transmitter: controlled magnetic. Shure Brothers RP13.
		Cartridge, receiver: 3 w max power. Shure Brothers RP41.
		Switch: with mounting plate. Shure Brothers RP81.
		Cable and Plug Assembly. Includes: 4 conductor tinsel coiled cord, neoprene jacket, extended length approx 5 feet, molded on weather proof 4-pin plug. Shure Brothers RP47.
		Handle Assembly. phenolic, weather proof construction. Shure Brothers RP49.
		Cap, transmitter: phenolic. Shure Brothers RP49.
		Cap, receiver: phenolic. Shure Brothers RP49.
		PORTABLE ANTENNA MODELS 4EY18A10-15 (Low Band)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19C303707P1	Model 4EY19A10, 25-29 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-431-GE.
	19C303707P2	Model 4EY19A11, 29-33 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-431-GE.
	19C303707P3	Model 4EY18A12, 33-36 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-B431-GE.
	19C303707P4	Model 4EY18A13, 36-42 MHz Antenna. Includes 38 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-C431-GE.
	19C303707P5	Model 4EY18A14, 42-48 MHz Antenna. Includes 38 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-D431-GE.
	19C303707P6	Model 4EY18A15, 48-54 MHz Antenna. Includes 38 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-E431-GE.
	2R22P2	Adapter, UHF: right angle. Signal Corps M-359; sim to Amphenol 83-1AP. (Used in Models 4EY18A10-15).
		PORTABLE ANTENNA MODELS 4EY19C10-15 Model 4EY19C10 130-150.8 MHz Model 4EY19C11 150.8-162 MHz Model 4EY19C12 162-166 MHz Model 4EY19C13 166-174 MHz Model 4EY19C14 406-420 MHz Model 4EY19C15 450-470 MHz
		MECHANICAL PARTS (SEE RC-1087)
1	19A121154P1	Support. (Used with Q701).
2	19B204532G1	Chassis Assembly.
3	19B204527P1	Diaphragm.
5	7763541P5	Clip.
6	5491595P9	Spring, retainer; sim to Allied Control 30040-2. (Used with K701).
7	7142162P98	Spacer. (Used with R702).
8	19A121174G1	Chassis Assembly.
9	19A121178P1	Support. (Used with J701).
10	19A121199P1	Clip.
11	19A121215P1	Spring. (Used in Models 4EC60A28 and 29 only).
12	19B204639G2	Knob Assembly.
13	19C303537G1	Handle Assembly: (Includes items 15, 22, 27, 28, 29 and 36). (Used in Models 4EC60A28 and 29).
14	19B204949P1	Jewel: red plastic; sim to Rohm and Haas 2444.
15	19B204492P1	Extrusion. (Part of Handle Assembly, 19C303537G1)
16	NP243498	Nameplate: etched aluminum. (Used in Model 4EC60A28 only).
17	5490135P3	Boot, dust and moisture seal: silicon rubber; sim to AMP-Hexseal N-5032-B. (Used in Models 4EC60A29, 32 and 33 only).
18	NP243497	Nameplate: etched aluminum. (Used in Model 4EC60A29 only).
19	19B204639G1	Knob Assembly. (Used with R702).
20	NP243615	Nameplate: etched aluminum. (Used in Model 4EC60A33 only).
24	NP243617	Nameplate: etched aluminum. (Used in Model 4EC60A32 only).
26	19C303538P1	Handle. (Part of Handle Assembly, 19C303537G1).
27	19A121363P1	Spring. (Part of Handle Assembly, 19C303537G1).
28	19A121173P1	Retainer. (Part of Handle Assembly, 19C303537G1).
29	N533P1308	Pin, dowel. (Part of Handle Assembly, 19C303537-G1).
30	4031053P7	Nut, speed; sim to Tinnerman C12046-012-67.
31	4035711P4	Clip, spring tension; sim to Augat Brothers 6007.
32	7150727P116	Sleeving, insulation: 30 inches long.
33	19A121730P1	Bracket.
34	4034512P3	Terminal, feed-thru: sim to Sealectro RST-MM-10.
35	7142162P96	Spacer.
36	19A121343G1	Support Assembly. (Part of Handle Assembly, 19C303537G1).
37	19C303427P1	Casting. (Used in Models 4EC60A28 and 29 only).
40	19C303457P2	Casting. (Used in Model 4EC60A28 only).
41	19C303457P4	Casting. (Used in Models 4EC60A29 and 32 only).
42	19C303457P6	Casting. (Used in Model 4EC60A33 only).
43	19A121169G1	Support Assembly.
44	19B204501G1	Case Assembly.
45	4029994P1	Strike.
46	N509P1914C	Pin, dowel. (Used in Models 4EC60A32 and 33).
47	19A121741P1	Spring. (Used in Models 4EC60A32 and 33 only).
48	19B204963P1	Lever.
49	19C303679P1	Casting. (Used in Models 4EC60A32 and 33 only).
50	19A127584G1	Handle Assembly.
51	19C303679P2	Casting. (Used in Models 4EC60A32,33 only).
52	N648P9004	Screw, cap. (Used for mounting handle).
53	19A115700P2	Ferrite bead. (Not shown on RC-1087, hung in wiring between E603 and K701).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

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 descriptions of parts affected by these revisions.

REV. C - Control Unit Models 4EC60A28, 29
REV. B - Control Units Models 4EC60A32, 33

Incorporated into initial shipment.

REV. D - Control Units Models 4EC60A28, 29
REV. C - Control Units Models 4EC60A32, 33

To eliminate RF interference with proper operation of Channel Guard. Added two Ferrite cores to the White-Orange-Red wire connected to E603 of Channel Guard board.

REV. E - Control Units Models 4EC60A28, 29
REV. D - Control Units Models 4EC60A32, 33

To eliminate the Audio Lo switch. Deleted S702 and R704.

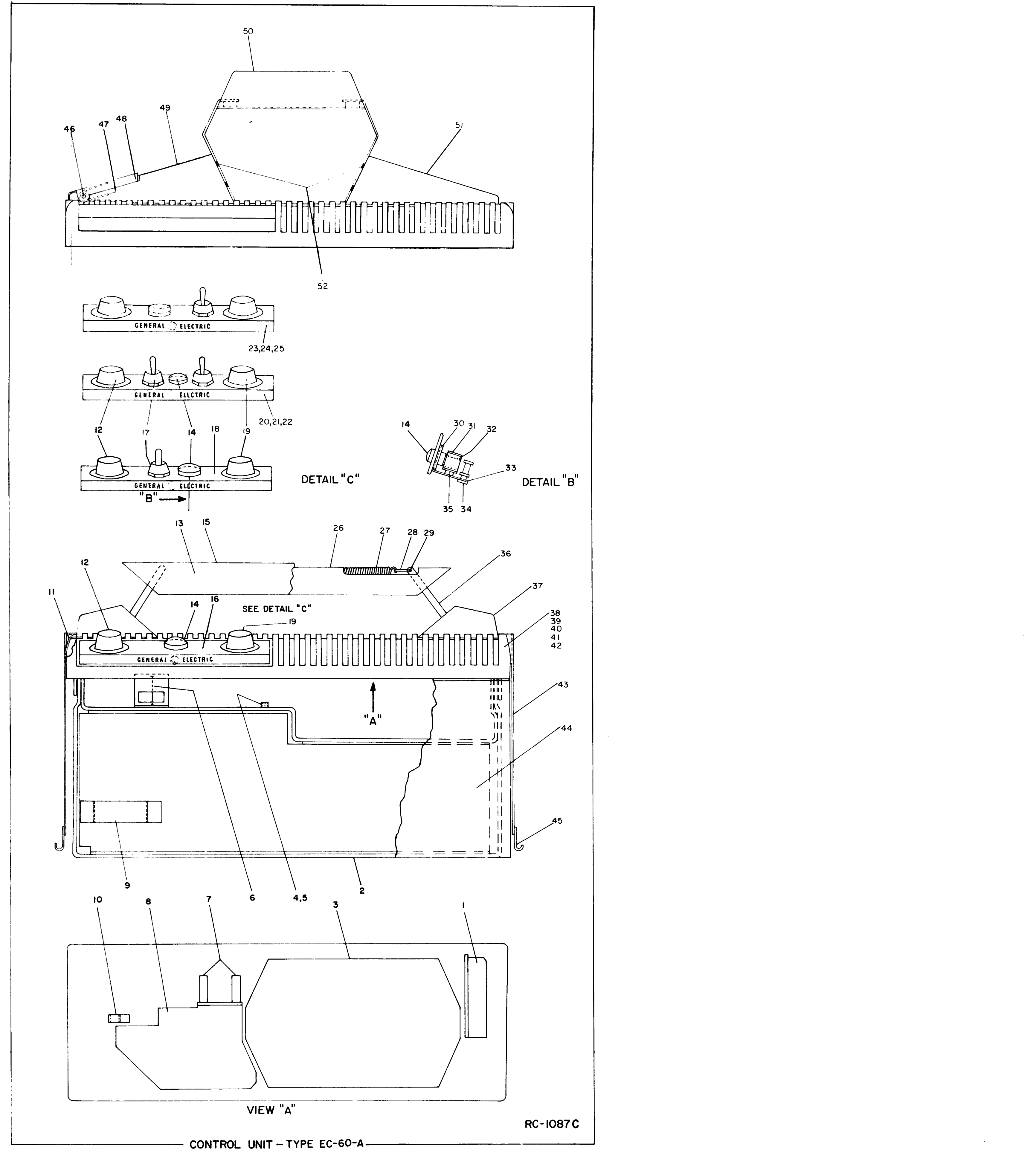
REV. F - Control Units 4EC60A28, 29
REV. E - Control Units 4EC60A32, 33

To incorporate a new transistor. Changed Q701.

REV. G - Control Unit 4EC60A29

REV. F - Control Units 4EC60A32, 33

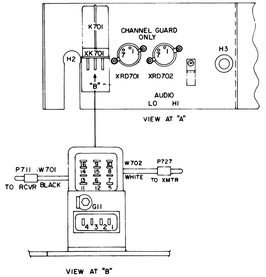
To incorporate new switches. Changed S703 and S706.

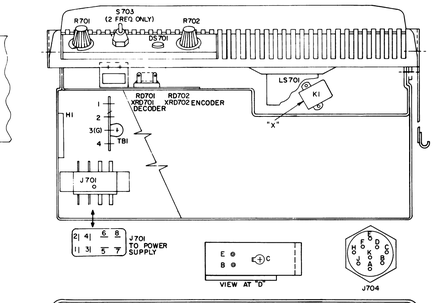


CONTROL UNIT – TYPE EC-60-A

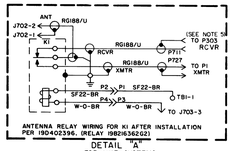
MODELS 4EC60A30 & 31

OUTLINE DIAGRAM





(190402197, Rev. 4)

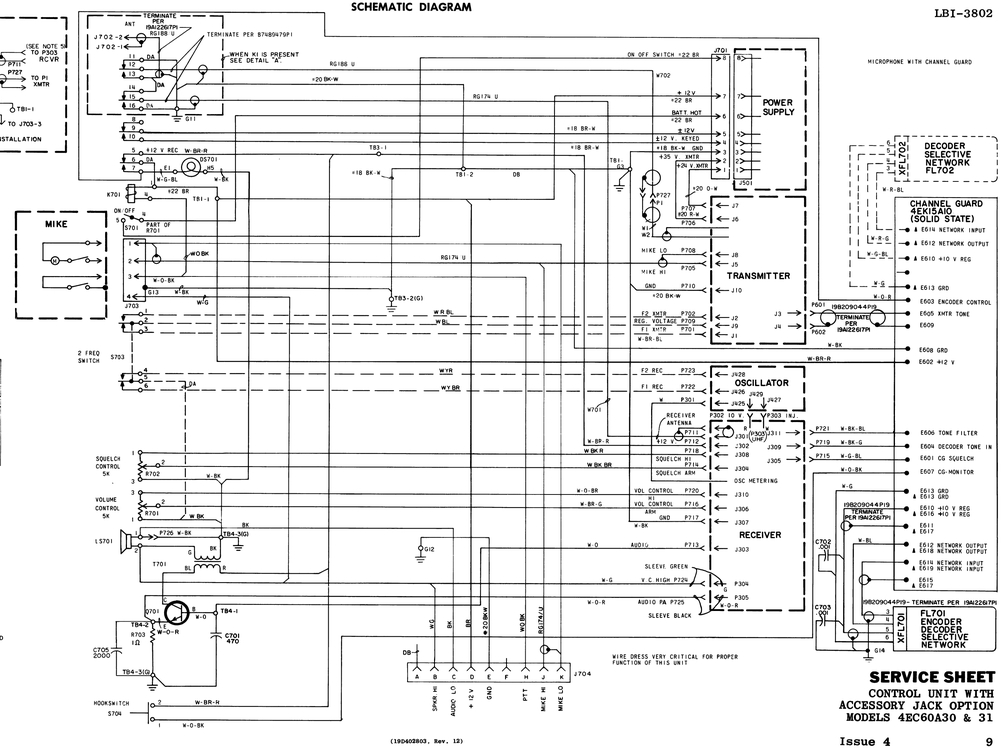


SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.	
THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EC60A30	G
4EC60A31	H

▲ SELECTIVE NETWORKS ARE WIRED TO "E" NUMBERS WITH "A" WHEN INSTALLING 4EK15AII CHANNEL GUARD (SOLID STATE) BOARD.

NOTES:
1. ALL WIRES ARE #2N EXCEPT AS NOTED.
2. ALL DASHED LINES ARE OPTION.
3. SLEEVE CONNECTIONS TO J701, KK701, XFL701 & XFL702 AND P701-P726.
4. CONNECTIONS BETWEEN RECEIVER AND OSCILLATOR DO NOT EXIST ON UHF RECEIVERS.
5. P303 - UHF SYSTEMS

SCHEMATIC DIAGRAM



(190402803, Rev. 12)

SERVICE SHEET

CONTROL UNIT WITH ACCESSORY JACK OPTION
MODELS 4EC60A30 & 31

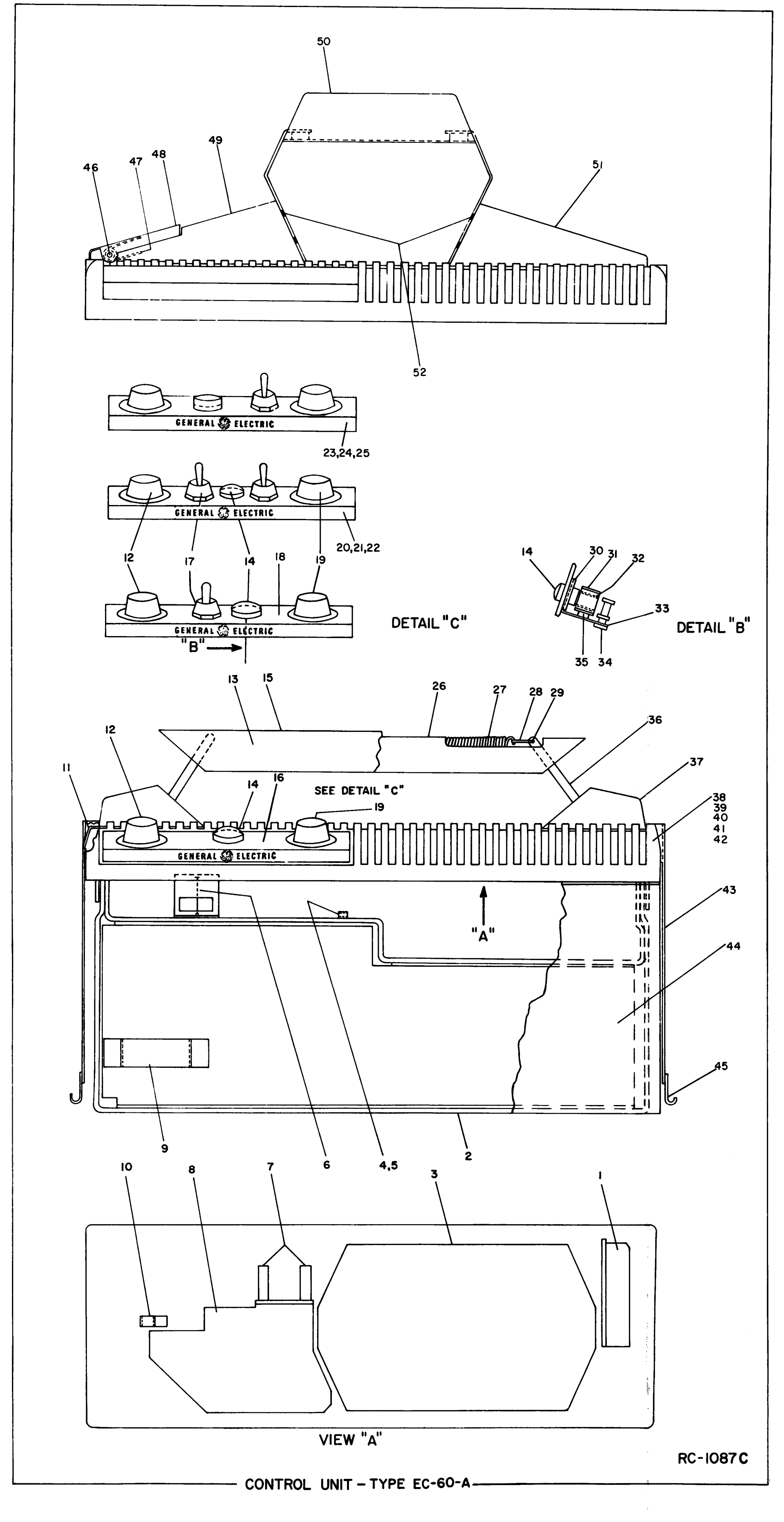
PARTS LIST

LBI-4026B

CONTROL UNIT
MODEL 4EC60A30 19D402279G21 (Single Frequency)
MODEL 4EC60A31 19D402279G22 (Two Frequency)

SYMBOL	GE PART NO.	DESCRIPTION
		CONTROL UNIT
		- - - - - - - - - - - CAPACITORS - - - - - - - - -
C701	5494481P7	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C702 and C703	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C705	5494481P14	Ceramic disc: 2000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - INDICATING DEVICES - - - - - - - -
DS701	4034664P1	Lamp, incandescent: 28 v, .04 amp; sim to GE 2148.
		- - - - - - - - - - TONE NETWORKS - - - - - - - -
FL701 and FL702	19B205280G	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
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J701	7473192P31	Connector: 8 terminals, phenolic; sim to HB Jones 261-31-02-000.
J702	19A116550P1	Connector, coaxial: sim to Gold Line GLC-88.
J703	19B209201P1	Connector: 4 contacts; sim to Switchcraft 3C-1088.
J704	7489183P5	Connector: 8 contacts. (Accessory Jack Option).
		- - - - - - - - - - - - RELAYS - - - - - - - - -
K701	19C307010P18	Armature: 12 VDC nominal, 130 ohms res ±10%, 4 form C contacts; sim to Allied Control T154X-96A.
		- - - - - - - - - - LOUDSPEAKERS - - - - - - - -
LS701	19C307094P1	Permanent magnet: 3.2 ohms ±10% voice coil imp, 3 w input, 325 ±50 Hz resonance, paper dust cap; sim to Oaktron S7473.
		- - - - - - - - - - - - PLUGS - - - - - - - - - -
P701 and P702	4029840P2	Contact, electrical; sim to Amp 42827-2.
P705	4029840P2	Contact, electrical; sim to Amp 42827-2.
P706 thru P708	4029840P1	Contact, electrical; sim to Amp 41854.
P709	4029840P2	Contact, electrical; sim to Amp 42827-2.
P710	4029840P1	Contact, electrical; sim to Amp 41854.
P712 thru P723	4029840P2	Contact, electrical; sim to Amp 42827-2.
P724 and P725	7147199P2	Connector: 1 female contact; sim to Winchester Electronics 21804.
P726	4036634P1	Receptacle: sim to Amp 42428-2.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q701*	19A116118P3	Silicon, NPN.
		In REV E and earlier:
	19A115527P1	Silicon, NPN.
		- - - - - - - - - - - RESISTORS - - - - - - - - -
R701	19C300097P10	Resistor/switch: includes Resistor, variable, carbon film, 5000 ohms ±20%, 1/8 w; (S701) Switch, 2 amps at 125 VAC; sim to Mallory Type MLC.
R702	19C300097P9	Variable, carbon film: 5000 ohms ±20%, 1/4 w; sim to Mallory Type MLC.
R703	19B209022P115	Wirewound, phen: 1 ohm ±10%, 2 w; sim to IRC Type BWH.
R704*	19B209022P135	Wirewound, phen: 6.8 ohms ±10%, 2 w; sim to IRC Type BWH.
		Deleted in Models 4EC60A30, 31 by REV E.
		- - - - - - - - - - - SWITCHES - - - - - - - - - -
S701		(Part of R701).
S702*	19B209040P1	Slide: DPDT, 0.5 amp at 125 v; sim to Continental Wirt 126.
		Deleted in Models 4EC60A30, 31 by REV E.
S703*	19A116877P6	Toggle: DPDT, 1 ma at 6 VDC; sim to C and K Components Series 7201G.
		In 4EC60A31 of REV F and earlier:
	4036949P2	Toggle: DPDT, 100 μa at 5 VDC; sim to Arrow-Hart and Hegeman TS-6.
S704	7481654P10	Pushbutton (red): SPNO, 1 amp at 115 VAC.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - -
T701	19B209079P1	Audio frequency: freq range 0.3-3 KHz, Pri 1: 55 ohms ±10% imp at 1 w, 0.895 ohm ±10% DC res, Sec 1: 3.2 ohms ±10% at 1 w, 0.168 ohm max DC res.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7775500P8	Phen: 4 terminals.
TB3	7775500P44	Phen: 2 terminals.
TB4	7775500P11	Phen: 5 terminals.
		- - - - - - - - - - - - CABLES - - - - - - - - -
W701		CABLE ASSEMBLY 19A121176G1
		- - - - - - - - - - - - PLUGS - - - - - - - - - -
P711	5496078P1	Connector, push-on: Teflon; sim to FRX 27-1.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B209044P11	Cable, RF: 5.75 inches long. Type RG-174/U.
W702		CABLE ASSEMBLY 19A121176G2
		- - - - - - - - - - - - PLUGS - - - - - - - - - -
P727	5496078P2	Connector, push-on: Teflon; sim to FXR 27-2.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B209044P13	Cable, RF: 4 inches long. Type RG-188/U.
		- - - - - - - - - - - SOCKETS - - - - - - - - - - -
XFL701 and XFL702	19B209065P2	Tube: 7 contacts, molded phenolic; sim to Alcon Metal Products 524M-2.
XK701	5491595P5	Relay, nylon: 16 contacts; sim to Allied Control 30054-2.
		HARNESS ASSEMBLY 19D402279G45 (4EC60A30) 19D402279G46 (4EC60A31) Includes C701, C705, J701, P701, P702, P705, P706-P710, P712-P726, R701-R704, S702, S703, TB1-TB3, W701, W702, XK701.
		ASSOCIATED ASSEMBLIES
		DC CHARGING CABLE 19B204993G1
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	7160478P1	Cable: 2 conductor, 50 inches; sim to Birnbach 789.
	4034405P1	Plug, general purpose: 4 contacts, polarized, 10 amps at 133 VRMS; sim to Cannon XLR-4-11C.
	19A115513P1	Connector, cigarette lighter: 12 VDC; sim to Cole-Hersse 1624.
		DC CHARGING CABLE 19B204993G2
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	7160478P1	Cable: 2 conductor, 50 inches; sim to Birnbach 789.
	4034405P5	Plug, general purpose: 5 contacts, polarized, 10 amps at 133 VRMS; sim to Cannon XLR-5-11C.
		POWER SUPPLY EXTENSION CABLE 19B204289G1
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	7473192P19	Socket, phenolic: 8 terminals, cable clamp in cap; sim to HB Jones 261-32-08-030.
	7473192P26	Plug, phenolic: 8 terminals, cable clamp in cap; sim to HB Jones 261-31-08-030.
	7162441P23	Tubing, flexible, plastic: 3 feet long.
		AUTO GUTTER MOUNT ANTENNA MODEL 4EY20A10 (High Band)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19C303620P1	Antenna Assembly. Includes: plastic ball tip; 19.5 ±0.25 inch stainless steel whip; socket; insulators; adapter; RG-58A/U cable; PL-259 plug; clip; 2-set screws; rubber pad; sim to Antenna Specialists ASP157.
	19C303620P2	Replacement Whip Assembly. Includes: plastic ball tip; 19.5 ±0.25 inch stainless steel whip; socket; insulators; sim to Antenna Specialists 19A904-1.
		MICROPHONE MODEL 4EM33C10 (19B209306P1)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
		Switch. Shure Brothers RP33.
		Cable and plug: approx 5 feet. Shure Brothers RP35.
		Button: red plastic. Shure Brothers RP34.
		Cartridge, magnetic controlled. Shure Brothers RP32.
		Case, mounting button and nameplate; plastic. Shure Brothers RP40.
		Shield. Shure Brothers RP36.
		MICROPHONE MODEL 4EM33D10 (19B209199P1)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
		Switch: moisture proof. Shure Brothers RP33.
		Cable and Plug Assembly. Approx 5 feet. Shure Brothers RP35.
		Button, switch: red plastic. Shure Brothers RP34.
		Cartridge, transmitter: controlled magnetic. Shure Brothers RP32.
		Case, Mounting button and Nameplate: plastic. Shure Brothers RP31.
		Shield. Shure Brothers RP36.
		HANDSET MODEL 4EM34A10 (19B209198P1)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
		Cartridge, transmitter: controlled magnetic. Shure Brothers RP13.
		Cartridge, receiver: 3 w max power. Shure Brothers RP41.
		Switch: with mounting plate. Shure Brothers RP81.
		Cable and Plug Assembly. Includes: 4 conductor tinsel coiled cord, neoprene jacket, extended length approx 5 feet, molded on weather proof 4-pin plug. Shure Brothers RP47.
		Handle Assembly. phenolic, weather proof construction. Shure Brothers RP49.
		Cap, transmitter: phenolic. Shure Brothers RP49.
		Cap, receiver: phenolic. Shure Brothers RP49.
		PORTABLE ANTENNA MODELS 4EY18A10-15 (Low Band)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19C303707P1	Model 4EY19A10, 25-29 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-431-GE.
	19C303707P2	Model 4EY19A11, 29-33 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-431-GE.
	19C303707P3	Model 4EY18A12, 33-36 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-B431-GE.
	19C303707P4	Model 4EY18A13, 36-42 MHz Antenna. Includes 38 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-C431-GE.
	19C303707P5	Model 4EY18A14, 42-48 MHz Antenna. Includes 38 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-D431-GE.
	19C303707P6	Model 4EY18A15, 48-54 MHz Antenna. Includes 38 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-E431-GE.
	2R22P2	Adapter, UHF: right angle. Signal Corps M-359; sim to Amphenol 83-1AP. (Used in Models 4EY18A10-15).
		PORTABLE ANTENNA MODELS 4EY19C10-15 Model 4EY19C10 130-150.8 MHz Model 4EY19C11 150.8-162 MHz Model 4EY19C12 162-166 MHz Model 4EY19C13 166-174 MHz Model 4EY19C14 406-420 MHz Model 4EY19C15 450-470 MHz
		MECHANICAL PARTS (SEE RC-1087)
2	19B204532G1	Chassis Assembly.
3	19B204527P1	Diaphragm.
5	7763541P5	Clip.
6	5491595P9	Spring, retainer; sim to Allied Control 30040-2. (Used with K701).
7	7142162P96	Spacer. (Used with R702).
9	19A121178P1	Support. (Used with J701).
10	19A121199P1	Clip.
11	19A121215P1	Spring.
12	19B204639G2	Knob Assembly.
13	19C303537G1	Handle Assembly: (Includes items 15, 22, 27, 28, 29 and 36).
14	19B204949P1	Jewel: red plastic; sim to Rohm and Haas 2444.
15	19B204492P1	Extrusion. (Part of Handle Assembly, 19C303537G1)
16	NP243498	Nameplate: etched aluminum.
17	5490135P3	Boot, dust and moisture seal: silicon rubber; sim to AMP-Hexseal N-5032-B.
18	NP243497	Nameplate: etched aluminum.
19	19B204639G1	Knob Assembly. (Used with R702).
26	19C303538P1	Handle. (Part of Handle Assembly, 19C303537G1).
27	19A121363P1	Spring. (Part of Handle Assembly, 19C303537G1).
28	19A121173P1	Retainer. (Part of Handle Assembly, 19C303537G1).
29	N533P1308	Pin, dowel. (Part of Handle Assembly, 19C303537G1).
30	4031053P7	Nut, speed; sim to Tinnerman C12046017-67.
31	4035711P4	Clip, spring tension; sim to Augat Brothers 6007.
32	7150727P116	Sleeving, insulation: 30 inches long.
33	19A121730P1	Bracket.
34	4034512P3	Terminal, feed-thru.
35	7142162P96	Spacer.
36	19A121343G1	Support Assembly. (Part of Handle Assembly, 19C303537G1).
37	19C303427P1	Casting.
40	19C303457P8	Casting.
41	19C303457P10	Casting.
43	19A121169G1	Support Assembly.
44	19B204501G1	Case Assembly.
45	4029994P1	Strike.
46	19A115700P2	Ferrite bead. (Not shown on RC-1087, hung in wiring between E603 and K701).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



CONTROL UNIT - TYPE EC-60-A

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 descriptions of parts affected by these revisions.

REV. C - <u>Control Unit Models 4EC60A30, 31</u>

Incorporated into initial shipment.

REV. D - To eliminate RF interference with proper operation of Channel Guard. Added two Ferrite cores to the White-Orange-Red wire connected to E603 of Channel Guard Board.

REV. E - To eliminate Audio Lo switch. Deleted S702 and R704.

REV. F - To incorporate a new transistor. Changed Q701.

REV. G - <u>Control Unit 4EC60A31</u>

To incorporate new switches. Changed S703 and S706.

REV. H - To standardize connections to tone option jack. Deleted #20 BR-W, wire from J701-6 to J704-F.

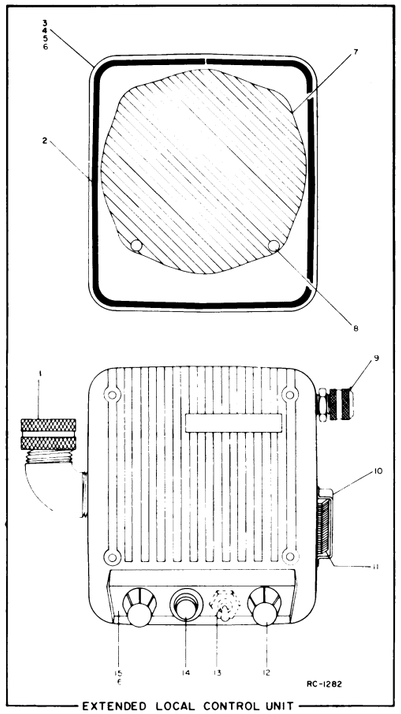
REV. G - <u>Control Unit 4EC60A30</u>

To standardize connections to tone option jack. Deleted #20 BR-W, wire from S701-6 to J704-F.

PARTS LIST

LBI-3788C
CONTROL UNIT WITH CHANNEL GUARD
MODEL 4EC66A12 (19D402603G3) (1 Frequency)
MODEL 4EC66A13 (19D402603G4) (2 Frequency)
MODEL 4EC66A16 (19D402603G7) (1 Frequency with ACCESSORY JACK OPTION)
MODEL 4EC66A17 (19D402603G8) (2 Frequency with ACCESSORY JACK OPTION)
TRANSMITTER-RECEIVER TOP PANEL 19D402599G7
AND ASSOCIATED ASSEMBLIES

SYMBOL	GE PART NO.	DESCRIPTION
		CONTROL UNIT
		- - - - - - - - INDICATING DEVICES - - - - - - - -
DS701	19C307037P4	Lamp, incandescent: 14 v; sim to GE 1815.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J701	7489183P5	Connector: 9 contacts: sim to Winchester M9S-LRN.
		- - - - - - - - - LOUDSPEAKERS - - - - - - - - -
LS701	5491260P7	Permanent magnet, 5-inch: 3.2 ohms ±10% voice coil imp, 15 w max operating, 385 Hz ±15% resonance, paper dust cap; sim to Jensen Model P5-VAS12761.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R701	19B209256P2	Resistor/switch: includes Resistor, variable, 5000 ohms ±20%, 0.25 w; Switch (S701), rotary, SPST, 15 amps at 10 v; sim to CTS Series 45.
R702	19B209256P1	Variable, carbon film: 5000 ohms ±20%, 0.5 w; sim to CTS Series 45.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S701		(Part of R701).
S702	5491899P6	Toggle: DPDT, 3 amps at 250 v; sim to Cutler-Hammer 8363K7.
S703	5491899P7	Toggle: SPST, 3 amps at 125 VAC; sim to Cutler-Hammer 8280K16.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB701	19B205152G1	Terminal board: 25 contacts.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS701	7141855P15	Lamp: sim to Dialight 95-410-975 (modified).
		HARNESS ASSEMBLY 19D402603G11 (19D402603G3) 19D402603G12 (19D402603G4) 19D402603G15 (19D402603G7) 19D402603G16 (19D402603G8) (Includes TB701)
		MECHANICAL PARTS (SEE RC-1282)
1	19A122065P1	Bushing: 3/4-14; sim to Pyle-National DB-1191690 (modified).
2	4032574P2	Gasket, cover, neoprene: approx 27-3/4 inches.
3	19D402601P3	Casting. (Used in Model 4EC66A12).
4	19D402601P4	Casting. (Used in Model 4EC66A13).
5	19D402601P7	Casting. (Used in Model 4EC66A16).
6	19D402601P8	Casting. (Used in Model 4EC66A17).
7	19B205162P1	Diaphragm.
8	19A121990P1	Spacer: 3/4 inch hex. (Used with TB701).
9	19A122066P1	Bushing: 1/4-18; sim to Pyle-National DB-44516 (modified).
10	4031457P1	Support. (Used with microphone).
11	4031458P1	Spring. (Used with microphone).



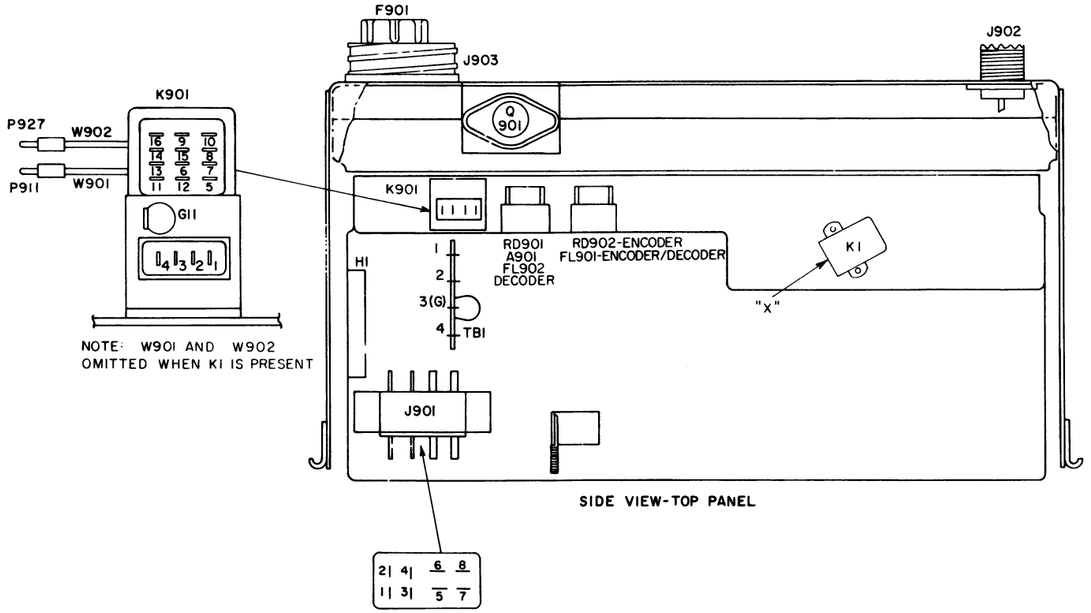
EXTENDED LOCAL CONTROL UNIT

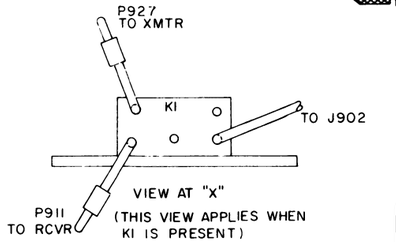
SYMBOL	GE PART NO.	DESCRIPTION
12	4039182G1	Knob. (Used with R701, 702).
13	5490135P4	Boot: sim to APM-Hexseal N-1030-B. (Used with S702).
14	19A115040P9	Lens, panel light: red lens; sim to Dialight 81-331. (Used with DS701).
15	NP248843	Nameplate. (Used in Models 4EC66A12, 16).
16	NP248844	Nameplate. (Used in Models 4EC66A13, 17).
		TRANSMITTER-RECEIVER TOP PANEL
		- - - - - - - - - CAPACITORS - - - - - - - - - -
C901	7489162P39	Silver mica: 330 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
C902	5494481P7	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C903 and C904	5494481P11	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - - FUSES - - - - - - - - - - -
F901	7102673P2	Quick blowing: 15 amps at 32 v; sim to Littelfuse 311015 or Bussmann AGC-15.
		- - - - - - - - - TONE NETWORKS - - - - - - - - -
FL901	19B205280G	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
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J901	7473192P31	Connector, phen: 8 terminals; sim to HB Jones 261-31-08-000.
J902	2R22P3	Receptacle, panel, coaxial. Signal Corps SO-239 or sim to Amphenol 83-1R.
J903	19B200010P2	Receptacle: 23 contacts; sim to Cannon Electric NK-L23-32S.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K901*	19C307010P18	Armature: 12 VDC nominal, 1.5 w max operating, 130 ohms ±10% coil res, 4 form C contacts; sim to Allied Control T154-X-96A.
		In Models of REV A and earlier:
	19C307010P5	Armature: 12 VDC nominal, 130 ohms ±10% coil res, 4 form C contacts; sim to Allied Control T154-X-413.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P901 and P902	4029840P2	Contact, electrical: sim to AMP 42827-2.
P905	4029840P2	Contact, electrical: sim to AMP 42827-2.
P906 thru P908	4029840P1	Contact, electrical: sim to AMP 41854.

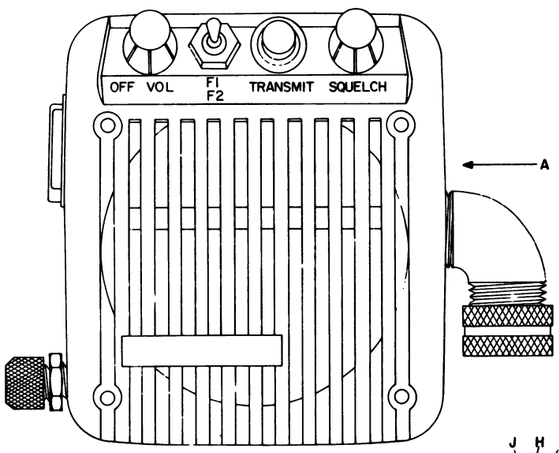
SYMBOL	GE PART NO.	DESCRIPTION
P909	4029840P2	Contact, electrical: sim to AMP 42827-2.
P910	4029840P1	Contact, electrical: sim to AMP 41854.
P911		(Part of W901).
P912 thru P914	4029840P2	Contact, electrical: sim to AMP 42827-2.
P916 thru P918	4029840P2	Contact, electrical: sim to AMP 42827-2.
P920	4029840P2	Contact, electrical: sim to AMP 42827-2.
P922 and P923	4029840P2	Contact, electrical: sim to AMP 42827-2.
P924 and P925	7147199P2	Connector: female contact; sim to Winchester Electronics 21804.
P926	4029840P2	Contact, electrical: sim to AMP 42827-2.
P927		(Part of W902).
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q901*	19A116118P3	Silicon, NPN.
		In REV B and earlier:
	19A115527P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R901	19B209022P115	Wirewound: 1 ohm ±10%, 2 w; sim to IRC Type BWH.
R902	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T901	19B209079P1	Audio freq: 0.3-3 KHz freq range, Pri: 55 ohms ±10% imp, 0.895 ohm ±10% DC res, Sec: 3.2 ohms imp, 0.168 ohm DC res.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	7775500P8	Phen: 4 terminals.
TB2	7775500P11	Phen: 5 terminals.
TB3	7775500P7	Phen: 3 terminals.
		- - - - - - - - - - CABLES - - - - - - - - - -
W901		CABLE 19A121176G1
		- - - - - - - - - - PLUGS - - - - - - - - - -
P911	5496078P1	Push-on, coaxial: Teflon sim to FXR 27-1.
	19B209044P21	Cable, RF: approx 6 inches; sim to Amphenol 21-598.
W902		CABLE 19A121176G2
		- - - - - - - - - - PLUGS - - - - - - - - - -
P927	5496078P2	Jack, coaxial: Teflon; sim to FXR 27-2.
	19B209044P13	Cable, RF: approx 4 inches; sim to Amphenol 421-105.
		- - - - - - - - - SOCKETS - - - - - - - - -
XF901	19B209265P3	Fuseholder: Phenolic; sim to Littelfuse 342006.
XK901	5491595P5	Relay: 16 contacts; sim to Allied Control 30054-2.
XFL901	19B209065P2	Tube, phen: 7 pins; sim to Alcon Metal Products 524M-2.
		HARNESS ASSEMBLY 19D402599G15 (19D402599G7) (Includes C901, J901, J903, P901, P902, P905-P914, P916-P918, P920, P922-P927, R902, TB1, W901, W902, XK901).
		MECHANICAL PARTS
	19B205129G1	Cover. (Mounts J902, 903).
	19B205127P1	Support: (Mounts locking latch).

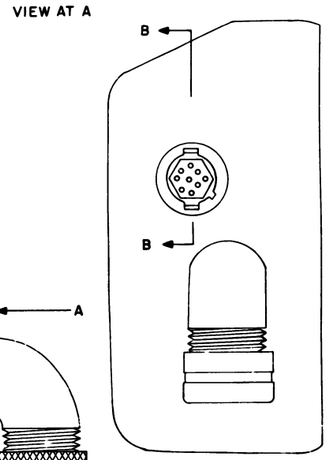
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

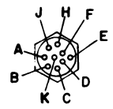
OUTLINE DIAGRAM

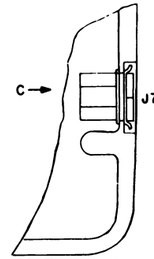




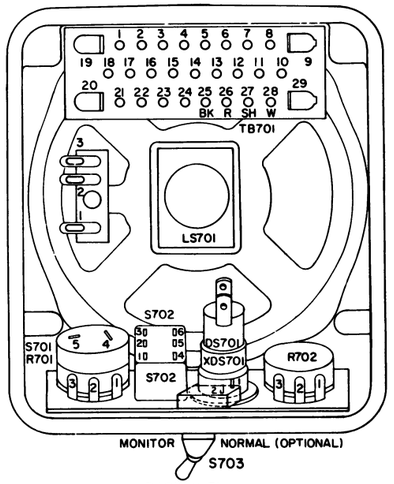




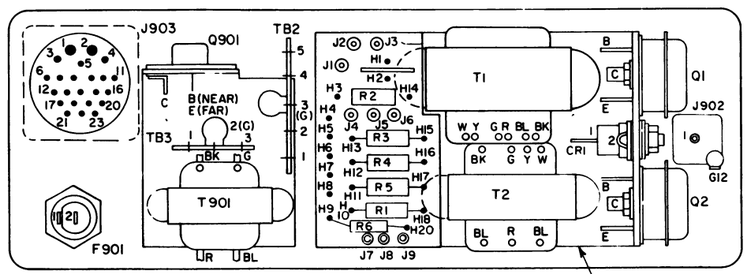




NOTES:
1. S703 USED ONLY IN MODELS 4EC66A12,13.
2. S702 USED ONLY IN MODELS 4EC66A11,13.
3. J701 USED ONLY IN MODELS 4EC66A14-17.

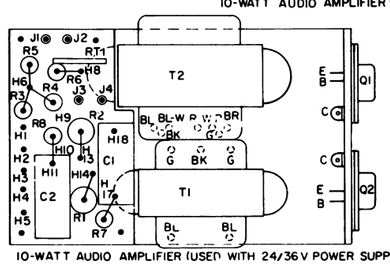


EXTENDED LOCAL CONTROL UNIT



COMPONENT VIEW-TOP COVER PANEL

10-WATT AUDIO AMPLIFIER (USED WITH 6/12 V POWER SUPPLY)



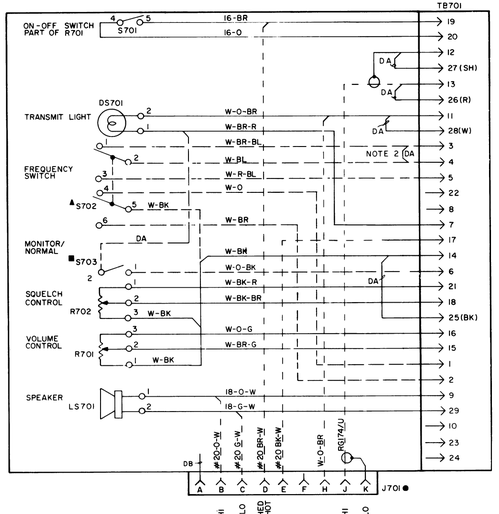
10-WATT AUDIO AMPLIFIER (USED WITH 24/36 V POWER SUPPLY)

SERVICE SHEET

EXTENDED LOCAL CONTROL UNIT
MODELS 4EC66A12,13,16 & 17
TRANSMITTER-RECEIVER TOP PANEL PL-19D402599-G7
(Used with 6 & 12-Volt Power Supplies)

(19D402695, Rev. 6)

EXTENDED LOCAL CONTROL UNIT



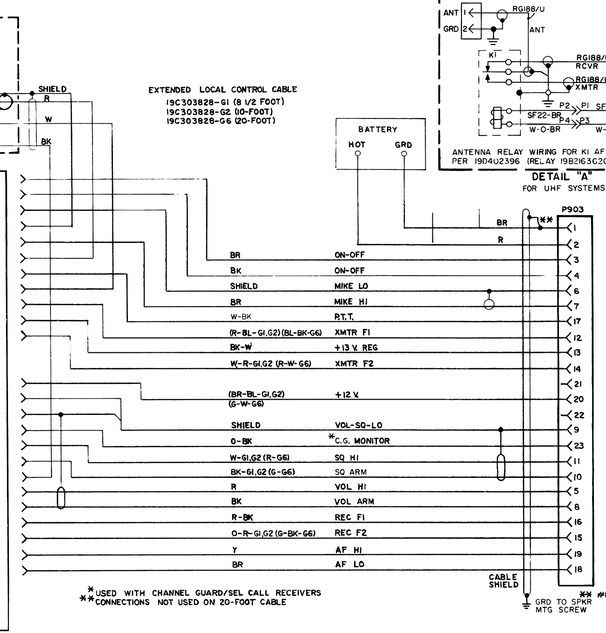
(19C303826, Rev. 5)

* MICROPHONE CONNECTIONS
TB701-28 PTT (W)
TB701-27 MIKE LO (SH)
TB701-26 MIKE HI (R)
TB701-21 GROUND (BK)

▲S702 USED ONLY IN MODELS 4EC66A11,13,15 & 17
●S703 USED ONLY IN MODELS 4EC66A12,13,16 & 17
✱R702 USED ONLY IN MODELS 4EC66AA-, 11, 16, 17

NOTES:
1. ALL WIRES SF24 UNLESS OTHERWISE SPECIFIED
2. DELETE IN MODELS 4EC66A11,13,15 &17

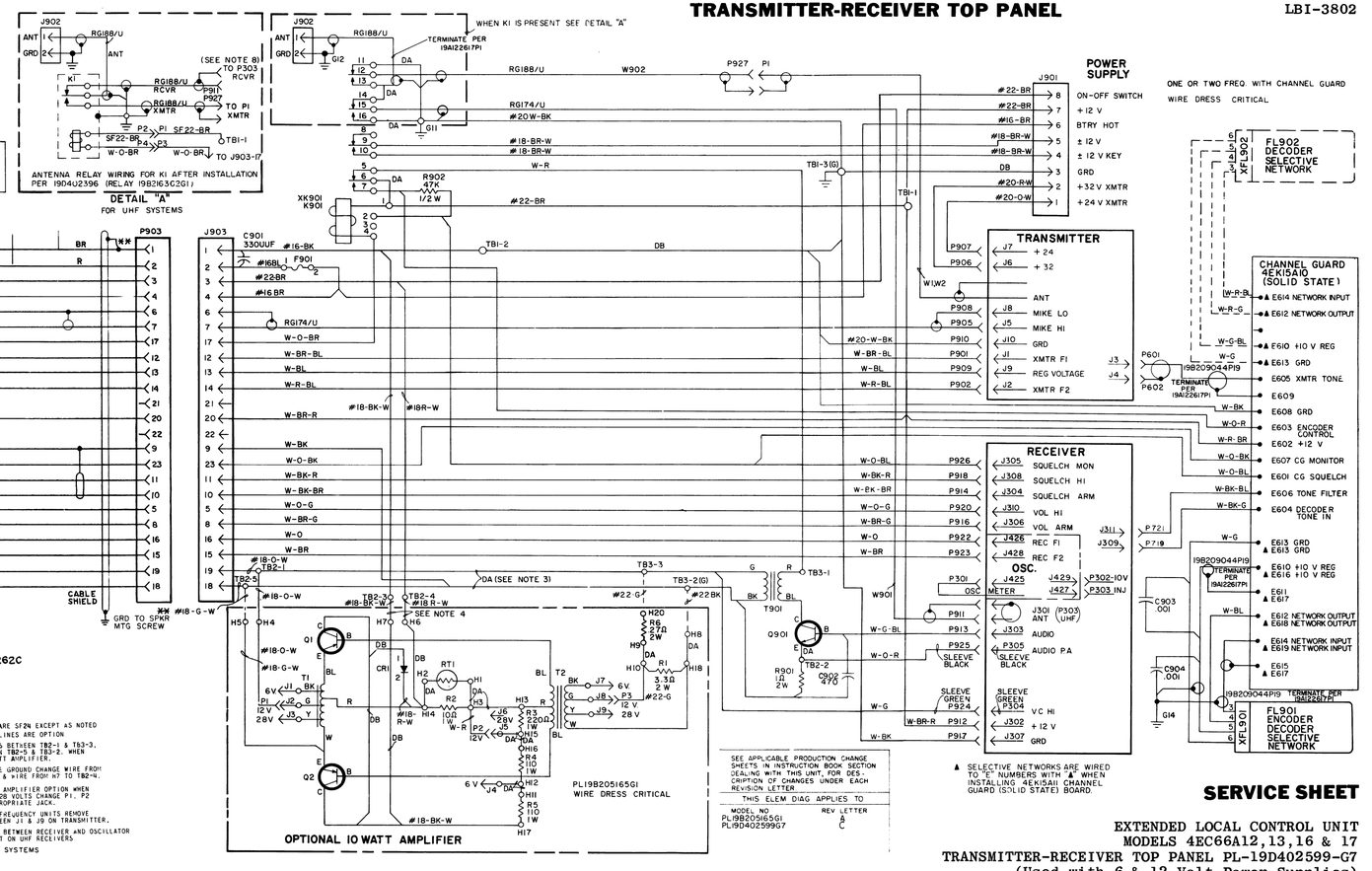
EXTENDED LOCAL CONTROL CABLE



RC-1262C

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.

TRANSMITTER-RECEIVER TOP PANEL



NOTES:
1. ALL WIRES ARE SF24 EXCEPT AS NOTED
2. ALL DASHED LINES ARE OPTION
3. DELETE WIRES BETWEEN TB2-1 & TB3-3, ALSO BETWEEN TB2-5 & TB3-2. WHEN USING 10 WATT AMPLIFIER.
4. FOR POSITIVE GROUND CHANGE WIRE FROM H6 TO TB2-3 & WIRE FROM H7 TO TB2-4.
5. FOR 10 WATT AMPLIFIER OPTION WHEN USING 6 OR 28 VOLTS CHANGE P1, P2 & P3 TO APPROPRIATE JACK.
6. FOR SINGLE FREQUENCY UNITS REMOVE JUMPER BETWEEN J1 & J9 ON TRANSMITTER.
7. CONNECTIONS BETWEEN RECEIVER AND OSCILLATOR DO NOT EXIST ON UHF RECEIVERS.
8. P303 - UHF SYSTEMS

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
PL19B205165G1	B
PL19D402599G7	C

▲ SELECTIVE NETWORKS ARE WIRED TO "E" NUMBERS WITH "A" WHEN INSTALLING 4EK15A1I CHANNEL GUARD (SOLID STATE) BOARD.

(19D402807, Rev. 13)

SERVICE SHEET

EXTENDED LOCAL CONTROL UNIT
MODELS 4EC66A12,13,16 & 17
TRANSMITTER-RECEIVER TOP PANEL PL-19D402599-G7
(Used with 6 & 12-Volt Power Supplies)

(LBI-3788) (Cont'd from page 11)

SYMBOL	GE PART NO.	DESCRIPTION
	4029994P1	Catch, pull-down. (Mates with catch on power supply to keep unit intact).
	4037158P7	Channel, rubber: approx 1-3/8 inches; sim to Atlantic India Rubber X661. (Located above J901).
	19A121981G1	Chassis. (Mounts T901, TR2, 3).
	7763541P5	Clip, cable. (Located by J903 and K901).
	19A121178P1	Support. (Used with J901).
	5491595P9	Clip, relay; sim to Allied Control 30040-2. (Used with K901).
	19B204532G1	Chassis.
	19A122071P2	Grommet: approx 1-1/4 inches. (Located by K901).
	19A115700P2	Ferrite bead. (Located on white-orange-red wire between E603 and K701).
	7147306P2	Insulated bushing. (Used with Q901).
	19A116023P1	Insulated plate. (Used with Q901).
		- - - - - - - ASSOCIATED ASSEMBLIES - - - - - -
	19A122010G2	Control Mounting Kit.
		25-50 MHz ANTENNA (LOW BAND)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	7491074P1	Antenna: includes 96-1/2 inch stainless steel rod; sim to Antenna Specialists ASPA3BGE.
	7102930P3	Adapter, antenna: 2-5/16 inches. (Used with GE Dwg 749107491).
	4033101G1	Antenna package: includes base, adapter spring, cable and plug.
	7472880G5	Antenna base. (Used in 4033101G1).
	7476632G4	Adapter spring. (Used in 4033101G1).
	5492239P1	Cable, antenna: includes Type RG-58/U cable approx 15 feet, PL-259 plug, termial; sim to Antenna Specialists 15A43. (Used in 4033101G1).
	2R22P1	Plug, coaxial: Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 5492239P1 in 4033101G1).
	4KY9A1	Coil, loading: 25-33 MHz; sim to Antenna Specialists ASPA87.
	19A121577G1	Antenna hook kit.
	7134724P1	Antenna hook. (Used in 19A121577G1).
		PORTABLE ANTENNAS MODELS 4EY18A10-15 (LOW BAND)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19C303707P1	Model 4EY18A10, 25-29 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-431-GE.
	19C303707P2	Model 4EY18A11, 29-33 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-A431-GE.
	19C303707P3	Model 4EY18A12, 33-36 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-B431-GE.
	19C303707P4	Model 4EY18A13, 36-42 MHz Antenna. Includes 38-inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-C431-GE.
	19C303707P5	Model 4EY18A14, 42-48 MHz Antenna. Includes 38-inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-D431-GE.
	19C303707P6	Model 4EY18A15, 48-54 MHz Antenna. Includes 38-inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-E431-GE.

SYMBOL	GE PART NO.	DESCRIPTION
	2R22P2	Adapter, UHF: right angle. Signal Corps M-359; sim to Amphenol 83-1AP. (Used in Models 4EY18A10-15).
		132-174, 406-470 MHz ANTENNA MODEL 4EY12A13 (5490969P13)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
		Antenna: includes 20-inch stainless steel whip, whip socket, antenna cable, cable adapter, PL-259 plug; sim to Antenna Specialists ASPD201GE or Danbury-Knudsen Type PA-25.
	5490969P4	Whip: 20-inch stainless steel.
	5490969P5	Socket, whip.
	5490969P6	Whip and whip socket: 20-inch stainless steel whip, whip socket.
		Cable, antenna: approx 15 feet. Type RG-58/U, (Used with GE Dwg 2R22P1 and GE Dwg 7105381P1).
	7105381P1	Adapter, cable: 1 X 7/16 inches dia. Type UG-175/U. (Used with GE Dwg 2R22P1 and Type RG-58/U cable).
	2R22P1	Plug, coaxial: Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 7105381P1 and Type RG-58/U cable).
		PORTABLE ANTENNA MODELS 4EY19C10-15
		MODEL 4EY19C10 130-150.8 MHz MODEL 4EY19C11 150.8-162 MHz MODEL 4EY19C12 162-166 MHz MODEL 4EY19C13 166-174 MHz MODEL 4EY19C14 406-420 MHz MODEL 4EY19C15 450-470 MHz
		AUTO GUTTER MOUNT ANTENNA MODEL 4EY20A10 (HIGH BAND)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19C303620P1	Antenna. Includes 19-1/2 inch stainless steel whip, socket, insulators, adapter, RG-58A/U cable, PL-259 plug, clip; sim to Antenna Specialists ASP-157.
	19C303620P2	Replacement whip. Includes 19-1/2 inch stainless steel whip, socket, insulators; sim to Antenna Specialists 19A9044-1.
		150-174, 450-470 MHz ANTENNA MODEL 4EY21A11
	19C311127P1	Antenna (motorcycle): includes 18-1/4 inch stainless steel rod, adapter, and whip assembly (sim to Antenna Specialists ASPA487GE.
		132-150, 406-420 MHz ANTENNA MODEL 4EY21A12
	19C311881P1	Antenna (motorcycle): includes 20 inch stainless steel rod, adapter, and whip assembly (sim to Antenna Specialists ASPA487GE).
		25-50 MHz ANTENNA MODELS 4EY22A10-17
	19C311006P1	Antenna (2 and 3 wheel motorcycle): 4EY22A10, 25-29 MHz; sim to Antenna Specialists ASP-494GE.
	19C311006P1	Antenna (2 and 3 wheel motorcycle): 4EY22A11, 29-33 MHz; sim to Antenna Specialists ASP-494GE.
	19C311006P3	Antenna (2 wheel motorcycle): 4EY22A12, 33-36 MHz; sim to Antenna Specialists ASPB-494GE.
	19C311006P4	Antenna (2 wheel motorcycle): 4EY22A13, 36-42 MHz; sim to Antenna Specialists ASPC-494GE.
	19C311006P5	Antenna (2 wheel motorcycle): 4EY22A14, 42-50 MHz; sim to Antenna Specialists ASPD-494GE.
	19C311006P6	Antenna (3 wheel motorcycle): 4EY22A15, 33-39 MHz; sim to Antenna Specialists ASPE-494GE.
	19C311006P7	Antenna (3 wheel motorcycle): 4EY22A16, 39-45 MHz; sim to Antenna Specialists ASPF-494-GE.
	19C311006P8	Antenna (3 wheel motorcycle): 4EY22A17, 45-50 MHz; sim to Antenna Specialists ASPG-494GE.

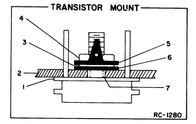
SYMBOL	GE PART NO.	DESCRIPTION
		150-174 MHz ANTENNA 4EY23A10
	19C311007P1	Antenna (motorcycle). Sim to Antenna Specialists ASP429-GE.
		MICROPHONE MODEL 4EW25C10
1		Cable clamp. Shure Brothers RP21. (Includes parts 3 and 8).
2		Switch. Shure Brothers RP26.
3		Case (back) and mounting button: plastic. Shure Brothers RP21. (Includes parts 1 and 8).
4		Switch button: red plastic. Shure Brothers RP25.
5		Spring. Shure Brothers RP16. (Includes miscellaneous hardware).
6		Shield. Shure Brothers RP23.
7		Cartridge, magnetic controlled.
8		Case (front): plastic. Shure Brothers RP21. (Includes parts 1 and 3).
9		Cable: approx 6 feet.
		POWER CONTROL CABLE 19C303828G1
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A115067P1	Cable, 2-conductor: approx 6 feet; sim to Belden 31713.
	19B200010P3	Plug: 23 contacts; sim to Cannon Electric NK-L23-23C-3/4.
		POWER CONTROL CABLE 19C303828G2
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A115067P1	Cable, 2-conductor: approx 10 feet; sim to Belden 31713.
	19B200010P3	Plug: 23 contacts; sim to Cannon Electric NK-L23-23C-3/4.
		POWER CONTROL CABLE 19C303824G6
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A115067P3	Cable, 2-conductor: approx 23 feet; sim to Belden 7721.
	19B200010P3	Plug: 23 contacts; sim to Cannon Electric NK-L23-23C-3/4.
		POWER CABLE - 12 VOLT 19C303640G3
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	4034405P3	Plug: 3 sockets; sim to Cannon Electric XLR-3-11C.
	19A115067P1	Cable: 2-conductor: approx 10 feet: sim to Belden 31713.
	7124109P3	Fuseholder: sim to Bussman Type HDJ-B (modified).
	7484390P4	Fuse, quick blowing: 8 amps at 250 v; sim to Bussman ABC-8 or Littelfuse 314008.
		POWER CABLE - 6 VOLT 19C303640G4
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	4034405P3	Plug: 3 sockets: sim to Cannon Electric XLR-3-11C.
	19A115067P1	Cable: 2-conductor: approx 10 feet: sim to Belden 31713.
	7124109P3	Fuseholder: sim to Bussman Type HDJ-B (modified).
	7484390P3	Fuse, quick blowing: 15 amps at 250 v; sim to Bussman ABC-15 or Littelfuse 314015.

SYMBOL	GE PART NO.	DESCRIPTION
		POWER SUPPLY EXTENSION CABLE 19B204289G1
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	7473192P19	Receptacle: 8 terminals; sim to HB Jones 261-32-08-030.
	7473192P26	Plug: 8 terminals; sim to HB Jones 261-31-08-030.
	7162441P23	Sleeving, electrical: approx 7/16 inch dia.

PARTS LIST

10-WATT AUDIO AMPLIFIER
19B205165-G1
REV A

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A115617-P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J9	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P3	4029840-P2	Contact, electrical: sim to AMP 42827-2.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	5490810-P1	Germanium, PNP.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1*	19B209022-P27	Wirewound, phen: 3.3 ohms ±5%, 2 w; sim to IRC Type BWH. In Models earlier than Rev A: Wirewound: 8.2 ohms ±10%, 2 w; sim to IRC BWH.
	19B209022-P137	
R2	3R78-P100J	Composition: 10 ohms ±5%, 1 w.
R3	3R78-P221J	Composition: 220 ohms ±5%, 1 w.
R4 and R5	3R78-P111J	Composition: 110 ohms ±5%, 1 w.
R6*	19B209022-P1	Wirewound: 0.27 ohms ±5%, 2 w; sim to IRC Type BWH. (Added by REV A).
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	19C300048-P3	Disc: 1 ohm ±10% res at 25°C.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1	19B209218-P1	Audio freq: 0.3-3 KHz freq range nominal, 0.3 ohm DC res max.
T2	19B209220-P1	Audio freq: 0.3-3 KHz freq range nominal, Pri: 0.17 ohm DC res max, Sec: 5.5 ohms DC res max.
		MECHANICAL PARTS (SEE RC-1280)
1	4031291-P1	Insulator, disc.
2	19B205142-G1	Chassis.
3	4034225-P1	Flat washer. (For 10-32 screw).
4	4032596-P1	Nut: 10-32.
5	4036835-P1	Terminal, solder: sim to Shakeproof 2118-10-01-2520S.
6	19A115221-P3	Washer, mica.
7	4034215-P1	Bushing.



*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

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 descriptions of parts affected by these revisions.

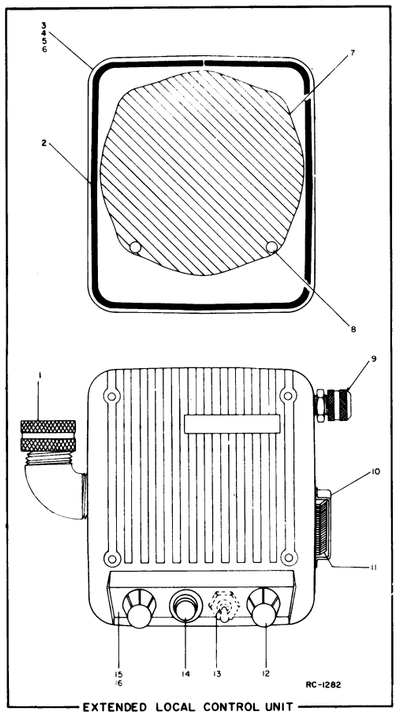
REV. A - To improve audio response. Changed R1 and added R6 on 10-Watt Audio Amplifier.

REV. B - Top Panel 19D402599G7
To incorporate a new transistor. Changed Q901.

PARTS LIST

LBI-3981B
CONTROL UNIT WITH CHANNEL GUARD
MODEL 4EC66A12 (19D402603G3) (1 Frequency)
MODEL 4EC66A13 (19D402603G4) (2 Frequency)
MODEL 4EC66A16 (19D402603G7) (1 Frequency with ACCESSORY JACK OPTION)
MODEL 4EC66A17 (19D402603G8) (2 Frequency with ACCESSORY JACK OPTION)
TRANSMITTER-RECEIVER TOP PANEL 19D402599G8
AND ASSOCIATED ASSEMBLIES

SYMBOL	GE PART NO.	DESCRIPTION
		CONTROL UNIT
		- - - - - - - - INDICATING DEVICES - - - - - - -
DS701	19C307037P4	Lamp, incandescent: 14 v; sim to GE 1815.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J701	7489183P5	Connector: 9 contacts; sim to Winchester M9S-LRN.
		- - - - - - - - - LOUDSPEAKERS - - - - - - - - -
LS701	5491260P7	Permanent magnet, 5-inch: 3.2 ohms ±10% voice coil imp, 15 w max operating, 385 Hz ±15% resonance, paper dust cap; sim to Jensen Model P5-VAS12761.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R701	19B209256P2	Resistor/switch: includes Resistor, variable, 5000 ohms ±20%, 0.25 w; Switch (S701), rotary, SPST, 15 amps at 10 v; sim to CTS Series 45.
R702	19B209256P1	Variable, carbon film: 5000 ohms ±20%, 0.5 w; sim to CTS Series 45.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S701		(Part of R701).
S702	5491899P6	Toggle: DPDT, 3 amps at 250 v; sim to Cutler-Hammer 8363K7.
S703	5491899P7	Toggle: SPST, 3 amps at 125 VAC; sim to Cutler-Hammer 8280K16.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB701	19B205152G1	Terminal board: 25 contacts.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS701	7141855P15	Lamp: sim to Dialight 95-410-975 (modified).
		HARNESS ASSEMBLY 19D402603G11 (19D402603G3) 19D402603G12 (19D402603G4) 19D402603G15 (19D402603G7) 19D402603G16 (19D402603G8) (Includes TB701)
		MECHANICAL PARTS (SEE RC-1282)
1	19A122065P1	Bushing: 3/4-14; sim to Pyle-National DB-1191690 (modified).
2	4032574P2	Gasket, cover, neoprene: approx 27-3/4 inches.
3	19D402601P3	Casting. (Used in Model 4EC66A12).
4	19D402601P4	Casting. (Used in Model 4EC66A13).
5	19D402601P7	Casting. (Used in Model 4EC66A16).
6	19D402601P8	Casting. (Used in Model 4EC66A17).
7	19B205162P1	Diaphragm.
8	19A121990P1	Spacer: 3/4 inch hex. (Used with TB701).
9	19A122066P1	Bushing: 1/4-18; sim to Pyle-National DB-44516 (modified).
10	4031457P1	Support. (Used with microphone).
11	4031458P1	Spring. (Used with microphone).



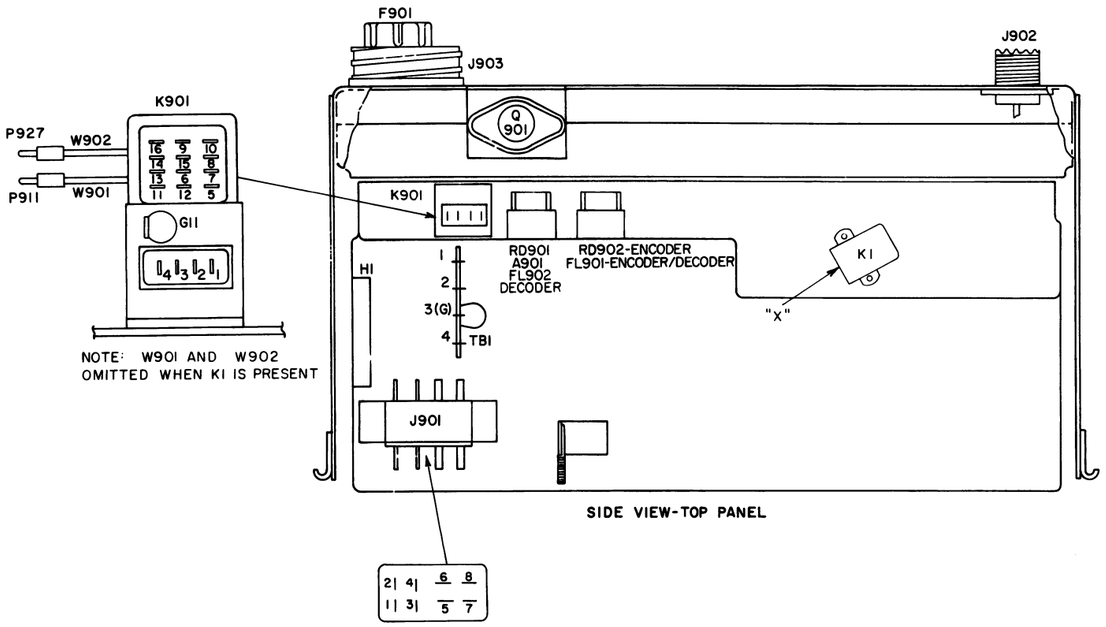
EXTENDED LOCAL CONTROL UNIT

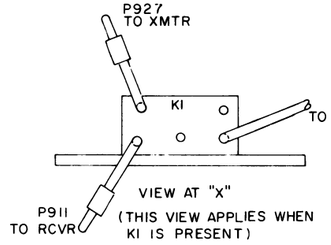
SYMBOL	GE PART NO.	DESCRIPTION
12	4039182G1	Knob. (Used with R701, 702).
13	5490135P4	Boot: sim to APM-Hexseal N-1030-B. (Used with S702).
14	19A115040P9	Lens, panel light: red lens; sim to Dialight 81-331. (Used with DS701).
15	NP248843	Nameplate. (Used in Models 4EC66A12, 16).
16	NP248844	Nameplate. (Used in Models 4EC66A13, 17).
		TRANSMITTER-RECEIVER TOP PANEL
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C902	5494481P7	Ceramic disc: 470 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C903 and C904	5494481P11	Ceramic disc: .001 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - - FUSES - - - - - - - - - - -
F901	7102673P2	Quick blowing: 15 amps at 32 v; sim to Littelfuse 311015 or Bussmann AGC-15.
		- - - - - - - - - - TONE NETWORKS - - - - - - - - -
FL901	19B205280G	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
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J901	7473192P31	Connector, phen: 8 terminals; sim to HB Jones 261-31-08-000.
J902	2R22P3	Receptacle, panel, coaxial. Signal Corps SO-239 or sim to Amphenol 83-1R.
J903	19B200010P2	Receptacle: 23 contacts; sim to Cannon Electric NK-L23-32S.
		- - - - - - - - - - RELAYS - - - - - - - - - - -
K901	19C307010P18	Armature: 12 VDC nominal, 1.5 w max operating, 130 ohms ±10% coil res, 4 form C contacts; sim to Allied Control T154-X-96A.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P901 and P902	4029840P2	Contact, electrical: sim to AMP 42827-2.
P905	4029840P2	Contact, electrical: sim to AMP 42827-2.
P906 thru P908	4029840P1	Contact, electrical: sim to AMP 41854.
P909	4029840P2	Contact, electrical: sim to AMP 42827-2.
P910	4029840P1	Contact, electrical: sim to AMP 41854.
P911		(Part of W901).
P912 thru P914	4029840P2	Contact, electrical: sim to AMP 42827-2.
P916 thru P918	4029840P2	Contact, electrical: sim to AMP 42827-2.

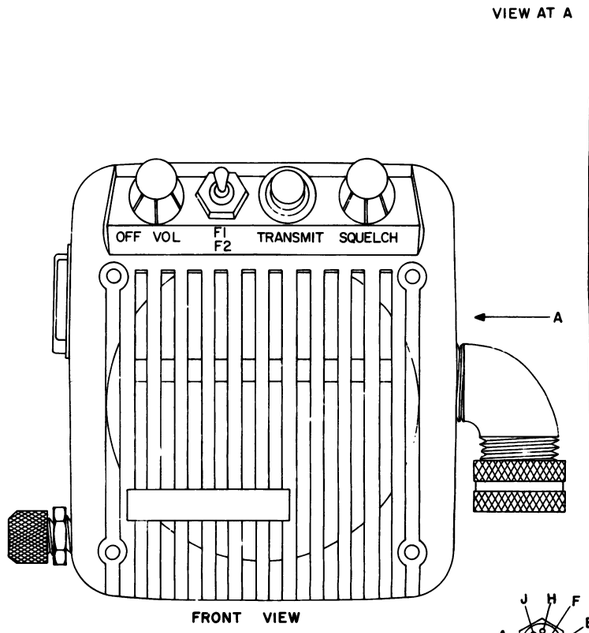
SYMBOL	GE PART NO.	DESCRIPTION
P920	4029840P2	Contact, electrical: sim to AMP 42827-2.
P922 and P923	4029840P2	Contact, electrical: sim to AMP 42827-2.
P924 and P925	7147199P2	Connector: female contact; sim to Winchester Electronics 21804.
P926	4029840P2	Contact, electrical: sim to AMP 42827-2.
P927		(Part of W902).
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q901*	19A116118P3	Silicon, NPN.
		In REV B and earlier:
	19A115527P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R901	19B209022P115	Wirewound: 1 ohm ±10%, 2 w; sim to IRC Type BWH.
R902	3R77P473K	Composition: 47,000 ohms ±10%, 1/2 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T901	19B209079P1	Audio freq: 0.3-3 KHz freq range, Pri: 55 ohms ±10% imp, 0.895 ohm ±10% DC res, Sec: 3.2 ohms imp, 0.168 ohm DC res.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	7775500P8	Phen: 4 terminals.
TB2	7775500P11	Phen: 5 terminals.
TB3	7775500P7	Phen: 3 terminals.
		- - - - - - - - - - CABLES - - - - - - - - - -
W901		CABLE 19A121176G1
		- - - - - - - - - - PLUGS - - - - - - - - - -
P911	5496078P1	Push-on, coaxial: Teflon sim to FXR 27-1.
	19B209044P21	Cable, RF: approx 6 inches; sim to Amphenol 21-598.
W902		CABLE 19A121176G2
		- - - - - - - - - - PLUGS - - - - - - - - - -
P927	5496078P2	Jack, coaxial: Teflon; sim to FXR 27-2.
	19B209044P13	Cable, RF: approx 4 inches; sim to Amphenol 421-105.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XK901	5491595P5	Relay: 16 contacts; sim to Allied Control 30054-2.
XFL901	19B209065P2	Tube, phen: 7 pins; sim to Alcon Metal Products 524M-2.
		HARNESS ASSEMBLY 19D402599G16 (19D402599G8) (Includes J901, J903, P901, P902, P905-P914, P916-P918, P920, P922-P927, R902, TB1, W901, W902, XK901).
		MECHANICAL PARTS
	19B205129G1	Cover. (Mounts J902, 903).
	19B205127P1	Support: (Mounts locking latch).
	4029994P1	Catch, pull-down. (Mates with catch on power supply to keep unit intact).
	4037158P7	Channel, rubber: approx 1-3/8 inches; sim to Atlantic India Rubber X661. (Located above J901).
	19A121981G1	Chassis. (Mounts T901, TB2, 3).
	7763541P5	Clip, cable. (Located by J903 and K901).
	19A121178P1	Support. (Used with J901).

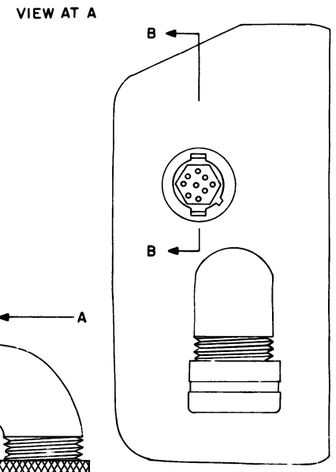
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

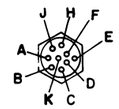
OUTLINE DIAGRAM

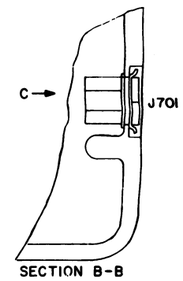




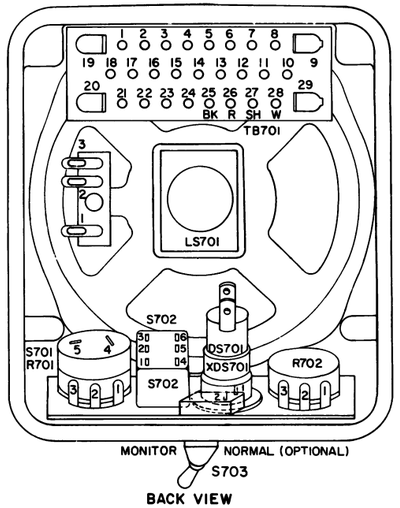




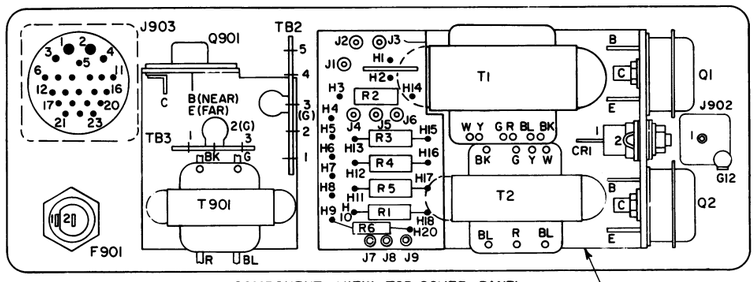




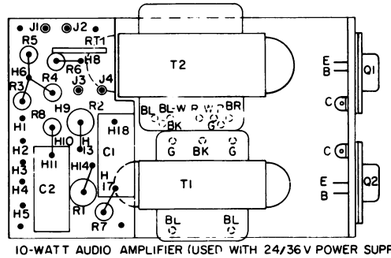
NOTES:
1. S703 USED ONLY IN MODELS 4EC66A12,13.
2. S702 USED ONLY IN MODELS 4EC66A11,13.
3. J701 USED ONLY IN MODELS 4EC66A14-17.



EXTENDED LOCAL CONTROL UNIT



10-WATT AUDIO AMPLIFIER (USED WITH 6/12 V POWER SUPPLY)

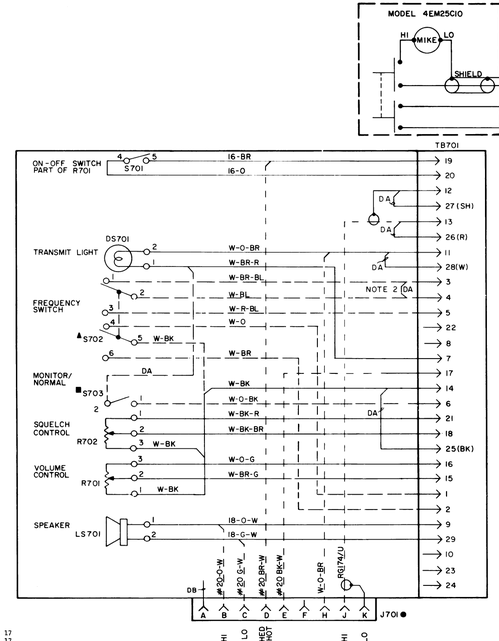


SERVICE SHEET

EXTENDED LOCAL CONTROL UNIT
MODELS 4EC66A12,13,16 & 17
TRANSMITTER-RECEIVER TOP PANEL PL-19D402599-G8
(Used with 24/36-Volt Power Supply)

(19D402695, Rev. 6)

EXTENDED LOCAL CONTROL UNIT



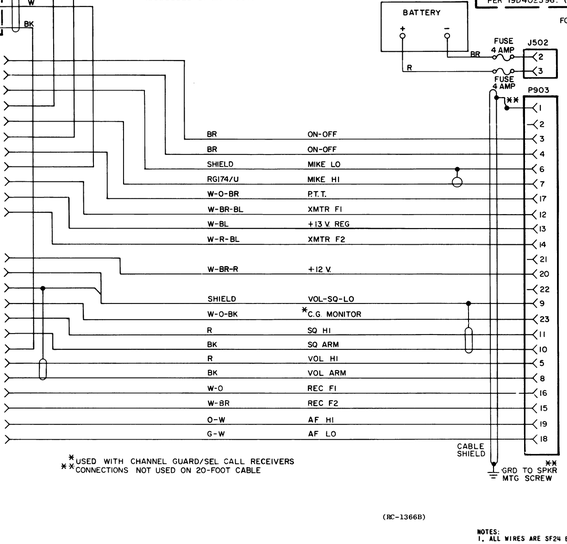
* MICROPHONE CONNECTIONS
TB701-28 PTT (W)
TB701-27 MIKE LO (SH)
TB701-26 MIKE HI (R)
TB701-23 GROUND (BK)

▲S702 USED ONLY IN MODELS 4EC66A11,13,15 & 17
●S703 USED ONLY IN MODELS 4EC66A12,13,16 & 17
◆J701 USED ONLY IN MODELS 4EC66A11, 15, 16, 17
NOTES:
1. ALL WIRES SF24 UNLESS OTHERWISE SPECIFIED.
2. DELETE IN MODELS 4EC66A11,13,15 &17

(19C303826, Rev. 5)

EXTENDED LOCAL CONTROL CABLE

EXTENDED LOCAL CONTROL CABLE
19C303828-G4 (10-FOOT)
19C303828-G7 (20-FOOT)

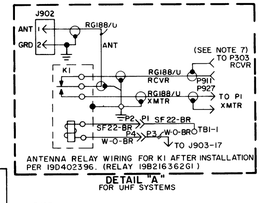


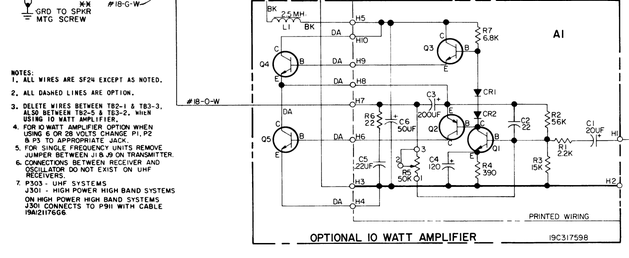
*USED WITH CHANNEL GUARD/SEL CALL RECEIVERS
**CONNECTIONS NOT USED ON 20-FOOT CABLE

(RC-1366B)

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.

TRANSMITTER-RECEIVER TOP PANEL

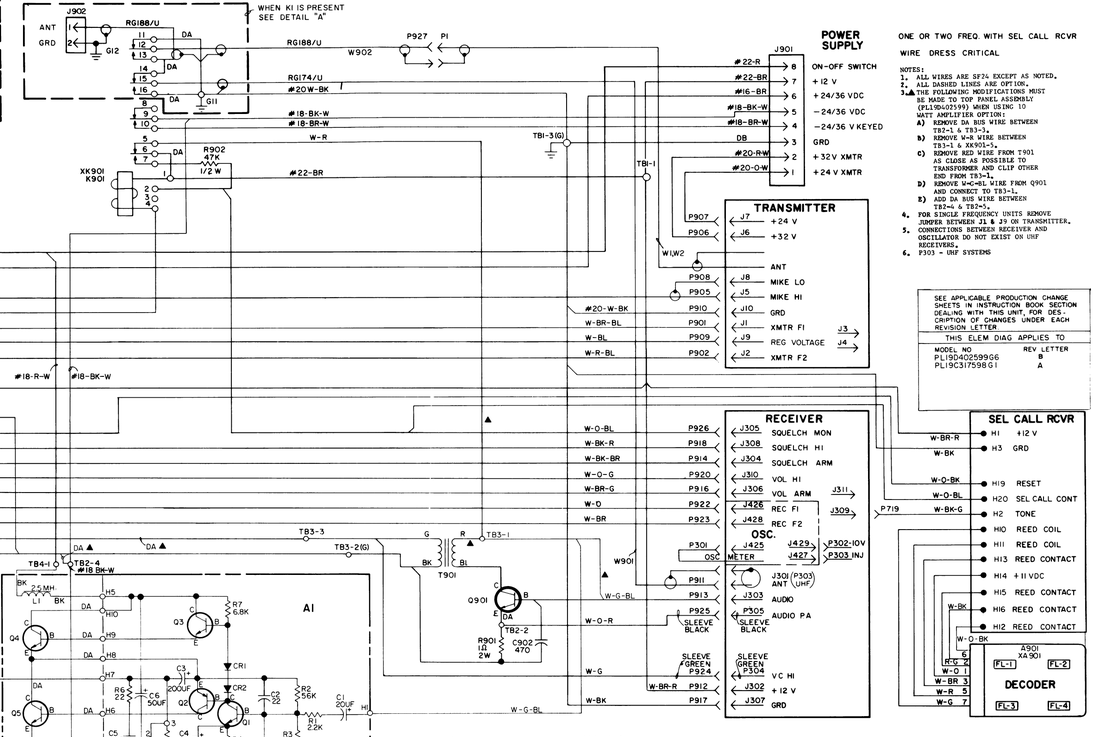




NOTES:
1. ALL WIRES ARE SF24 EXCEPT AS NOTED.
2. ALL DASHED LINES ARE OPTION.
3. DELETE WIRES BETWEEN TB2-1 & TB3-3, ALSO BETWEEN TB2-5 & TB3-2, WHEN USING 10 WATT AMPLIFIER.
4. FOR IO WATT AMPLIFIER OPTION WHEN USING 6 OR 28 VOLTS CHANGE P1, P2 & P3 TO APPROPRIATE JACK.
5. FOR SINGLE FREQUENCY UNITS REMOVE JUMPER BETWEEN J18 & J9 ON TRANSMITTER.
6. CONNECTIONS BETWEEN RECEIVER AND OSCILLATOR DO NOT EXIST ON UHF RECEIVERS.
7. P303 - UHF SYSTEMS
   J301 - HIGH POWER HIGH BAND SYSTEMS
   J301 CONNECTS TO P911 WITH CABLE 19A12117G6

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.

(19D413762, Rev. 2)



ONE OR TWO FREQ. WITH SEL CALL RCVR
WIRE DRESS CRITICAL

NOTES:
1. ALL WIRES ARE SF24 EXCEPT AS NOTED.
2. ALL DASHED LINES ARE OPTION.
3. ▲THE FOLLOWING MODIFICATIONS MUST BE MADE TO TOP PANEL ASSEMBLY (PL19D402599) WHEN USING 10 WATT AMPLIFIER OPTION:
   a) REMOVE DA BUS WIRE BETWEEN TB2-1 & TB3-3.
   b) REMOVE W-R WIRE BETWEEN TB3-1 & XK901-1.
   c) REMOVE RED WIRE FROM T901 AS CLOSE AS POSSIBLE TO TRANSFORMER AND CLIP OTHER END FROM TB3-1.
   d) REMOVE W-G-BL WIRE FROM Q901 AND CONNECT TO TB3-1.
   e) ADD DA BUS WIRE BETWEEN TB2-4 & TB2-1.
4. FOR SINGLE FREQUENCY UNITS REMOVE JUMPER BETWEEN J1 & J9 ON TRANSMITTER.
5. CONNECTIONS BETWEEN RECEIVER AND OSCILLATOR DO NOT EXIST ON UHF RECEIVERS.
6. P303 - UHF SYSTEMS

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
PL19D402599G6	B
PL19C317598G1	A

SERVICE SHEET

EXTENDED LOCAL CONTROL UNIT
MODELS 4EC66A12,13,16 & 17
TRANSMITTER-RECEIVER TOP PANEL PL-19D402599-G8
(Used with 24/36-Volt Power Supply)

(LBI-3981) (Cont'd from page 15)

SYMBOL	GE PART NO.	DESCRIPTION
	5491595P9	Clip, relay; sim to Allied Control 30640-2. (Used with K901).
	198204532G1	Chassis.
	19A122071P2	Grommet: approx 1-1/4 inches. (Located by K901)
	19A115700P2	Ferrite bead. (Located on white-orange-red wire between E603 and K701).
	7147306P2	Insulated bushing. (Used with Q901).
	19A116023P1	Insulated plate. (Used with Q901).
		- - - - - - - ASSOCIATED ASSEMBLIES - - - - - - -
	19A122010G2	Control Mounting Kit.
		25-50 MHz ANTENNA (LOW BAND)
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	7491074P1	Antenna: includes 96-1/2 inch stainless steel rod; sim to Antenna Specialists ASPA39GE.
	7102930P3	Adapter, antenna: 2-5/16 inches. (Used with GE Dwg 7491074P1).
	4033101G1	Antenna package: includes base, adapter spring, cable and plug.
	7472880G5	Antenna base. (Used in 4033101G1).
	7476632G4	Adapter spring. (Used in 4033101G1).
	5492239P1	Cable, antenna: includes Type RG-58/U cable approx 15 feet, PL-259 plug, terminal; sim to Antenna Specialists 15A43. (Used in 4033101G1).
	2B22P1	Plug, coaxial: Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 5492239P1 in 4033101G1).
	4KT9A1	Coil, loading: 25-33 MHz; sim to Antenna Specialists ASPA87.
	19A121577G1	Antenna hook kit.
	7134724P1	Antenna hook. (Used in 19A121577G1).
		PORTABLE ANTENNAS MODELS 4KT18A10-15 (LOW BAND)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19C303707P1	Model 4KT18A10, 25-29 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-431-GE.
	19C303707P2	Model 4KT18A11, 29-33 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-A431-GE.
	19C303707P3	Model 4KT18A12, 33-36 MHz Antenna. Includes 48-1/4 inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-B431-GE.
	19C303707P4	Model 4KT18A13, 36-42 MHz Antenna. Includes 38-inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-C431-GE.
	19C303707P5	Model 4KT18A14, 42-48 MHz Antenna. Includes 38-inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-D431-GE.
	19C303707P6	Model 4KT18A15, 48-54 MHz Antenna. Includes 38-inch stainless steel rod, tuning screw, rubber O-ring weather seal; sim to Antenna Specialists ASP-E431-GE.
	2B22P2	Adapter, UHF: right angle, Signal Corps M-359; sim to Amphenol 83-1AP. (Used in Models 4KT18A10-15).
		132-174, 406-470 MHz ANTENNA MODEL 4KT12A13 (5490969P13)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
		Antenna: includes 20-inch stainless steel whip, whip socket, antenna cable, cable adapter, PL-259 plug; sim to Antenna Specialists ASPD201GE or Danbury-Knudsen Type PA-25.

SYMBOL	GE PART NO.	DESCRIPTION
	5490969P4	Whip: 20-inch stainless steel.
	5490969P5	Socket, whip.
	5490969P6	Whip and whip socket; 20-inch stainless steel whip, whip socket.
	7105381P1	Cable, antenna; approx 15 feet. Type RG-58/U. (Used with GE Dwg 2B22P1 and GE Dwg 7105381P1).
	2B22P1	Adapter, cable: 1 x 7/16 inches dia. Type UG-175/U. (Used with GE Dwg 2B22P1 and Type RG-58/U cable).
		Plug, coaxial: Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 7105381P1 and Type RG-58/U cable).
		PORTABLE ANTENNA MODELS 4EY19C10-15
		MODEL 4EY19C10 130-150.8 MHz MODEL 4EY19C11 150.8-162 MHz MODEL 4EY19C12 162-166 MHz MODEL 4EY19C13 166-174 MHz MODEL 4EY19C14 406-420 MHz MODEL 4EY19C15 450-470 MHz
		AUTO GUTTER MOUNT ANTENNA MODEL 4EY20A10, 132-174 MHz (HIGH BAND)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19C303620P1	Antenna. Includes 19-1/2 inch stainless steel whip, socket, insulators, adapter, RG-58A/U cable, PL-259 plug, clip; sim to Antenna Specialists ASP-157.
	19C303620P2	Replacement whip. Includes 19-1/2 inch stainless steel whip, socket, insulators; sim to Antenna Specialists 19A904-1.
		MICROPHONE MODEL 4EM25C10
1		Cable clamp. Shure Brothers RP21. (Includes parts 3 and 8).
2		Switch. Shure Brothers RP26.
3		Case (back) and mounting button: plastic. Shure Brothers RP21. (Includes parts 1 and 8).
4		Switch button: red plastic. Shure Brothers RP25.
5		Spring. Shure Brothers RP16. (Includes miscellaneous hardware).
6		Shield. Shure Brothers RP23.
7		Cartridge, magnetic controlled.
8		Case (front): plastic, Shure Brothers RP21. (Includes parts 1 and 3).
9		Cable: approx 6 feet.
		POWER CONTROL CABLE 19C303828G4
	19B200010P3	Plug: 23 contacts; sim to Cannon Electric NK-L23-23C-3/4.
		POWER CONTROL CABLE 19C303828G7
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	7139880P10	Cable, 17 conductors.
	19B200010P3	Plug: 23 contacts; sim to Cannon Electric NK-L23-23C-3/4.
		POWER CABLE 19B204522G1
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A115067P1	Cable, 2-conductor: approx 10 feet; sim to Belden 31713.
	19A115776P2	Fuseholder, phen: sim to Bussman Type HHJ.
	1A16P7	Cartridge, quick blowing: 4 amps at 250 v; sim to Littelfuse 312004 or Bussman MTH-4.

SYMBOL	GE PART NO.	DESCRIPTION
	4034405P3	Plug: 3 sockets; sim to Cannon Electric XLR-3-11C.
		POWER CABLE 19B204522G2
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A115067P1	Cable, 2-conductor: approx 23 feet; sim to Belden 31713.
	19A115776P2	Fuseholder, phen: sim to Bussman Type HHJ.
	1A16P7	Cartridge, quick blowing: 4 amps at 250 v; sim to Littelfuse 312004 or Bussman MTH-4.
	4034405P3	Plug: 3 sockets; sim to Cannon Electric XLR-3-11C.
		POWER SUPPLY EXTENSION CABLE 19B204289G1
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	7473192P19	Receptacle: 8 terminals; sim to HB Jones 261-32-08-030.
	7473192P26	Plug: 8 terminals; sim to HB Jones 261-31-08-030.
	7162441P23	Sleeving, electrical; approx 7/16 inch dia.

PARTS LIST

LBI-4187B

10-WATT AMPLIFIER 19C317598G1

SYMBOL	GE PART NO.	DESCRIPTION
A1		AMPLIFIER BOARD 19B219085G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A115680P3	Electrolytic: 20 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C2	5496219P47	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef 0 PPM.
C3	19A115680P10	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TT.
C4	19A115680P9	Electrolytic: 120 µf +150% -10%, 26 VDCW; sim to Mallory Type TT.
C5	19A115680P109	Electrolytic: 120 µf +150% -10%, 26 VDCW; sim to Mallory Type TT.
C6*	19A115680P6	Electrolytic: 50 µf +150% -10%, 50 VDCW; sim to Mallory Type TT. Added by REV A.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	4037822P1	Silicon.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R2	3R77P563K	Composition: 56,000 ohms ±10%, 1/2 w.
R3	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R4	3R77P391K	Composition: 390 ohms ±10%, 1/2 w.
R5	19B209358P8	Variable, carbon film: approx 100 to 50,000 ohms ±20%, 0.25 w; sim to CTS Type U-201.
R6	3R77P220K	Composition: 22 ohms ±10%, 1/2 w.
R7	3R77P682K	Composition: 6800 ohms ±10%, 1/2 w.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115300P1	Silicon, NPN; sim to Type 2N3053.
Q2	19A115562P1	Silicon, PNP.
Q3	19A115300P1	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1*	19A115686P1	Reactor: 2.5 mh ind, 0.5 ohm DC res max, 20 VDC operating. Added by REV A.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q4 and Q5	19A116203P3	Silicon, NPN.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A115222P3	Insulator, bushing. (Used with Q4 and Q5).
	19A116023P2	Insulator, plate. (Used with Q4 and Q5).
	4036555P1	Insulator, disc: nylon. (Used with Q1-Q3).
	4035439P1	Heat Sink. (Used with Q3).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

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 descriptions of parts affected by these revisions.

REV. A - Extended Local Control Unit Models 4KC66A12, 13, 16 and 17.

To eliminate noise in receiver at low Volume control settings. Deleted jumper between TB701-14 and TB701-17 and TB701-1 and TB701-17.

REV. B - Top Panel 19D402599-G8

Incorporated into initial shipment.

REV. C - To incorporate a new transistor. Changed Q901.

REV. A - 10 WATT AMPLIFIER BOARD 19C317598G1

To add filtering. Added C6 and L1.

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service Parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

MAINTENANCE MANUAL

LBI-3802

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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