MOBILE RADIO

MAINTENANCE MANUAL

TRANSISTORIZED CONTROL CONSOLE (TC Series)

MODEL 4EC71A11

SPECIFICATIONS *

Audio Output	
Speaker	3 watts with less than 5% distortion, 117 VAC, ±20% (-20 to +18 dBm).
Line	+18 dBm maximum with less than 3% distortion, with compression, 117 VAC, ±20%.
Compression Range	With audio input increase of 30 dB beyond start of compression, output level increases less than 3 dB.
Frequency Response	±3 dB from 300 to 3000 Hz, reference 1000 Hz.
Impedance	
Transmit	200 ohms (may be modified for 600 ohms).
Receive	600 ohms (may be modified for 150 ohms, or for a high bridging impedance).
Speaker	3.2 ohms.
Power Requirement	65 watts, 117 volts AC, 50/60 Hz.
Dimensions (HxWxD)	5-1/2" x 19-7/8" x 12"

*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

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

COMBINATION NOMENCLATURE

1st Digit	2nd Digit	3rd Digit	4th Digit	5th Digit	6th Digit	7th Digit	8th & 9th Digits
Mechanical Package	Operating Voltage	RF Power Output Range	Channel Spacing	Control	Number of Freq.	Options	Frequency Range
T TRANSIST-ORIZED CONTROL	**C** CONSOLE	**2** STANDARD	**2** STANDARD	**1** STANDARD	**A** 1-FREQUENCY TRANSMITTER & RECEIVER	**S** STANDARD	**11** STANDARD
				2 CHANNEL GUARD	**B** 2-FREQ. TRANS & 1-FREQ. RCVR.		
					C 2-FREQ. TRANS & 2-FREQ. RCVR.		
					D 1-FREQ. TRANS & 2-FREQ. RCVR.		
					R 1-FREQ. TRANS & PRIORITY SEARCH-LOCK MONITOR (OR 2 RECEIVERS)		
					S 2-FREQ. TRANS & PRIORITY SEARCH-LOCK MONITOR (OR 2 RECEIVERS)		

OPTION CHART

5001	Repeater Disable 19A122250-G19	
5003	Pulse Tone Jack 19A122250-G17	
5009	Repeater Disable and Channel Guard Monitor 19A122250-G28	
5014	Footswitch 19B201488P4	
5104	Speaker Muting & Repeater Disable 19A122250-G21	*
5105	Speaker Muting 19A122250-G20	*
5106	Speaker Muting & Channel Guard 19A122250-G22	*
5107	60 Hz, 12-hour clock 19A122250-G11	
5108	60 Hz, 12/24-hour clock 19A122250-G12	
5109	50 Hz, 12-hour clock 19A122250-G26	*
5110	50 Hz, 12/24-hour clock 19A122250-G27	*
5111	VU Meter 19A122250-G10	
5112	Compression meter 19A122250-G9	*
5113	60 Hz, 12-hour clock and VU meter	
5114	60 Hz, 12/24-hour clock and VU meter	
5115	50 Hz, 12-hour clock and VU meter	*
5116	50 Hz, 12/24-hour clock and VU meter	*
5117	60 Hz, 12-hour clock and compression meter	*
5118	60 Hz, 12/24-hour clock and compression meter	*
5119	50 Hz, 12-hour clock and compression meter	*
5120	50 Hz, 12/24-hour clock and compression meter	*
5121	Remote Squelch & 1-Frequency Transmit	*
5122	Remote Squelch & 2-Frequency Transmit	*
5123	Intercom Switch 19A122250-G7	
5169	Line Compensation 19B216906-G1	
5176	Tone Alert Oscillator 19A122250-G8	
5177	Supervisory Control 19A122250-G13	
5178	Tone Alert & Supervisory Control	
5179	230/115-VAC, 50-60 Hz Stepdown Transformer	
5183	Parallel Transmit Indicator 19A122250-G29	
5244	Receiver Voting with Channel Guard	

* Options no longer available.

Figure 1 - Combination Nomenclature and Option Chart

DESCRIPTION

General Electric Transistorized Control Console Model 4EC71A11 was designed for use with Remote Control Panel Model 4KC16A12 to provide up to five remote control functions in two-way radio systems. The Control Console is also compatible with systems using Remote Control Unit EC-28-A and Remote Control Panel KC-7-C. The Console is fully transistorized -- utilizing silicon transistors for added reliability.

The audio section contains a compression-amplifier for equalizing audio output levels over a wide range of microphone or line input signals. When sending messages, the compression-amplifier helps compensate for variations in speech levels. When receiving messages, the compression-amplifier also prevents speaker "blasting" -- large differences in speaker volume resulting from signals arriving at different levels from stations or parallel Consoles. A compression-amplifier accessory is available for use with the KC-16-A Remote Control Panel for simplifying or eliminating line level settings in parallel operations.

The Transistorized Control Console is available with accessory kits and options designed to meet the different requirements of individual two-way radio systems. The accessory kits are described in the Combination Nomenclature Chart (Figure 1).

TELEPHONE LINE CHARACTERISTICS

As a result of propagation conditions, ambient noise levels, space limitations or other conditions, the most advantageous location for the dispatcher may not be the best location to originate or receive transmissions. The Transistorized Control Console permits the dispatcher to transmit, receive, select transmitter and receiver frequencies, etc. over telephone lines (see Figure 2). Control currents applied to the telephone lines from the Control Console are normally translated into the desired operation at the base station by the remote control panel.

The key link in a remote control installation is the telephone pair between Console and the base station. To obtain the most satisfactory service over this link, some general knowledge of the capabilities of such lines is required.

A telephone pair is simply a pair of wires, normally ranging from AWG #19 to AWG #26 in size. These wires, furnished by the local telephone company, pass through overhead cables, underground cables, through junction points, and switchboards. To the user, however, they may be considered a simple pair of wires. Equipment that is designed to operate with such a pair should have nominal impedance of 600 ohms. A telephone pair will normally have a maximum length of about 12 miles before amplification

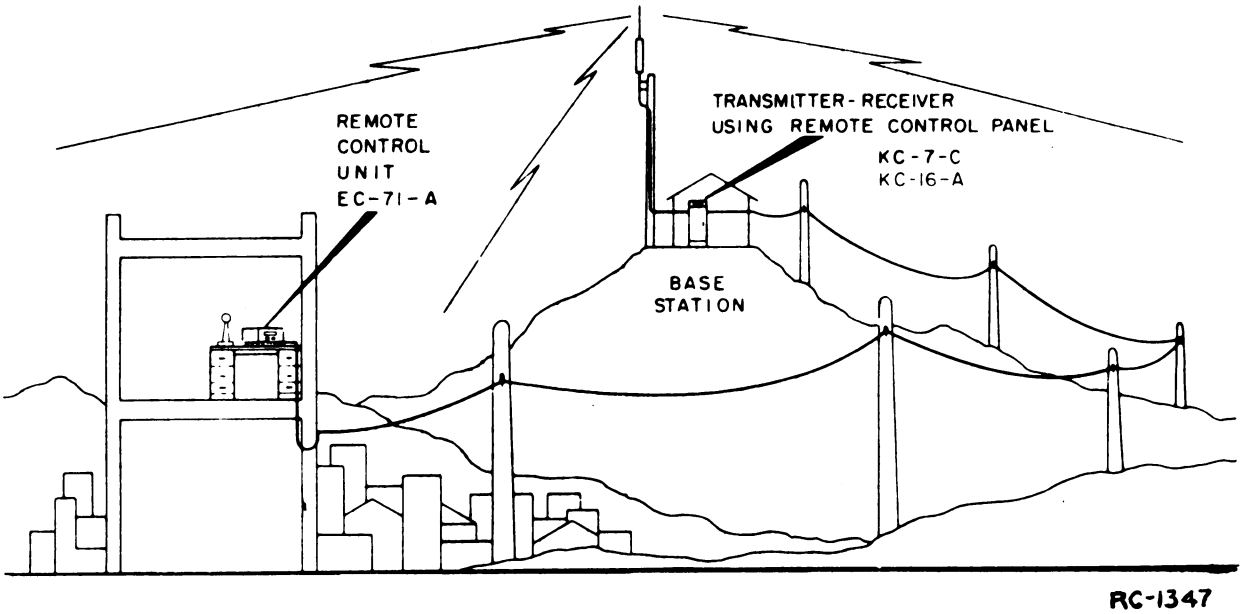


Figure 2 Remote Control of Transmitter and Receiver

is added by the telephone company to make up for line losses. There is an inherent loss in any telephone line installation due to the series inductance and resistance and the shunt capacitance of the wires. This loss is a direct function of the length of the line, and varies with the wire size used. As an example, with AWG #19 wire, a distance of six miles may be covered before one-half the input voltage of a 1,000 Hz tone is lost. With AWG #26 wire, only two and one-quarter miles may be covered before one-half the input voltage is lost. Line losses as high as 30 dB can be tolerated in operating a transmitter from the Control Console, but such high losses should be avoided whenever possible. Although the telephone pair is fairly well balanced, some noise will be induced into the line, expecially if an unshielded run has to be made in a fluorescent-lighted building.

The amount of noise pickup is a function of the length of the line and the environment through which it passes. Assume, for instance, that 0.01 volt of noise is picked up in a particular installation. If the audio output of the Remote Control Unit is 1 volt and the line loss is 10:1, the audio signal at the base station is 0.1 volt, only 10 times (20 dB) higher than the noise.

This relatively high background noise would greatly reduce the intelligibility of the system and, consequently, the maximum working range. Now, consider a short line in which the noise pick-up is only 0.002 volt and the line loss only 2:1. The signal at the receiving end would then be 250 times (48 dB) greater than the noise. For the best signal-to-noise ratio, the shortest, lowest loss line available is desired.

The DC resistance of any telephone pair will affect the control circuits between the Control Unit and the base station. The Control Console normally operates with a total control line loop resistance as great as 2500 ohms. There is a possibility, however, that stray currents, due to leakage, noise, faults, earth currents, etc., may cause faulty operation of the control relays on such long lines.

CONTROL METHODS

For DC Control voltage circuits, the telephone company can supply a pair of wires that will have DC continuity. This type of connection is commonly called a metallic pair. Not every telephone line used for audio work will necessarily be a metallic pair, and, if it is desired to use the audio line for DC control circuits, a metallic pair should be specified. In general, there are three methods of connecting the audio and control circuits to the telephone lines (see Figure 3).

Method 1 - Uses one metallic pair for both audio and control. The control current is simplexed from one line to the other by splitting the output transformer with a capacitor.

Method 2 - Uses one metallic pair for both audio and control and simplexes the control current from the center tap of the output transformer to an earth ground.

Method 3 - Uses two telephone pairs; one for audio and one metallic pair for control.

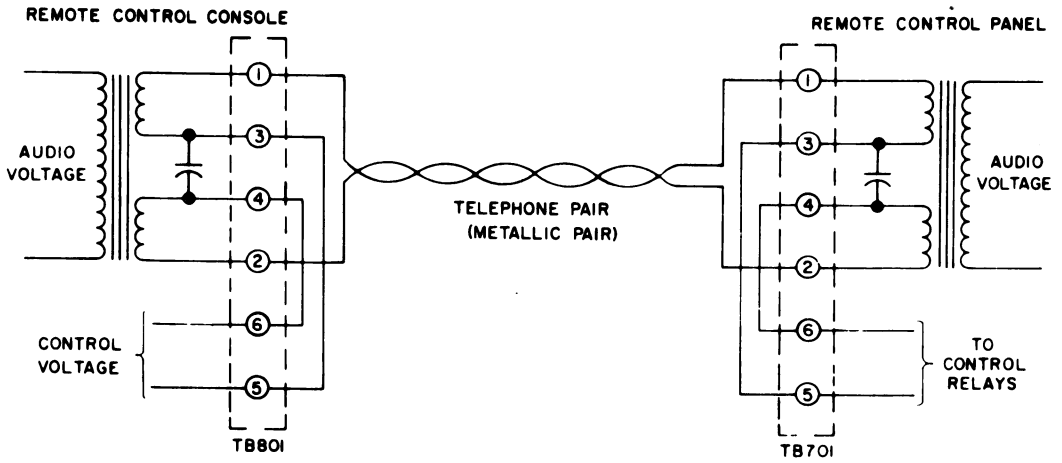
In choosing one of these methods, consider both cost and performance. The relative cost of leasing lines for use of one of the three methods will vary between local telephone companies, but one of the methods will usually have a decidedly lower rate. Method 3 will provide the best performance. Since the control circuits are separate from the audio circuits, parallel unit installations will be free from key clicks caused by the DC control circuits.

Method 2 saves on the number of telephone pairs used, but still minimizes key clicks from the control circuits, since any surge currents are balanced out in the audio transformer. The only disadvantage of this method is the problem of obtaining an earth ground. In installations near power company sub-stations where high potentials and currents are present, earth ground currents may cause false operation of the relays. In most applications, such extreme conditions will not exist.

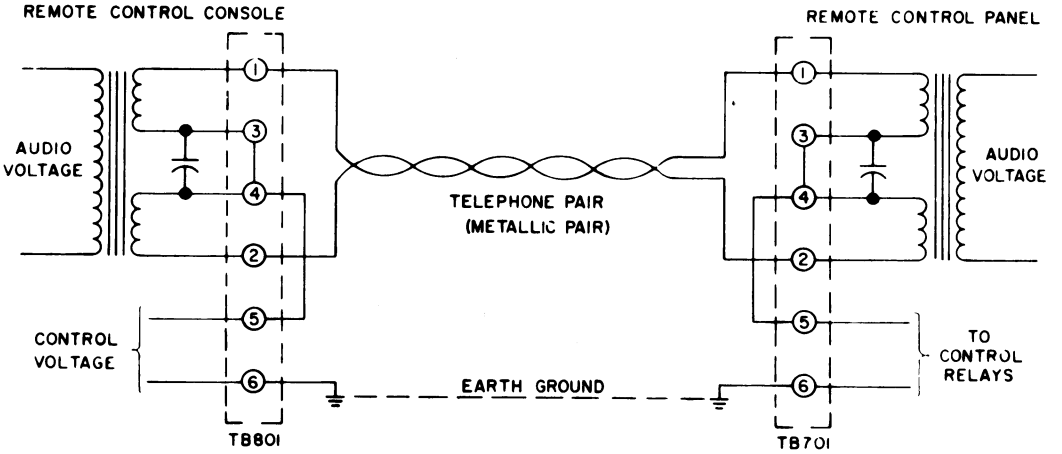
Method 1 provides dependable operation in locations where earth currents may be large. However, key clicks will be heard at all paralleled consoles whenever one console is keyed or unkeyed.

Local telephone companies will sometimes offer no choice of these methods, but will provide an audio pair and one control pair, as in Method 3. This does not necessarily mean that there are two individual pairs of wires between the remote control unit and the transmitter. The two pairs provided may have been simplexed, as in Method 1 or 2, by telephone company circuits. When two pairs are provided in this way, the connections may be considered virtually similar to those under Method 3.

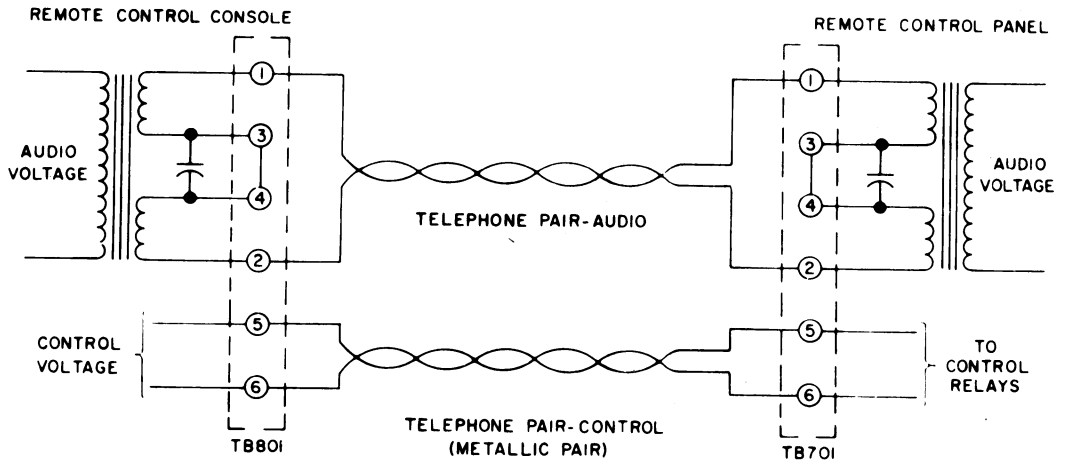
Standards have been set up by the telephone companies for the use of their lines. To minimize cross modulation (i.e., audio being inductively or capacitively coupled from one pair of wires to another pair), a maximum limit is usually set for the level of speech or program material that should be placed on the telephone line. These maximums may vary from one area to the next.



METHOD 1 - SINGLE TELEPHONE PAIR WITH CONTROL SIMPLEXED LINE TO LINE



METHOD 2 - SINGLE TELEPHONE PAIR WITH CONTROL SIMPLEXED BETWEEN CENTER TAP AND GROUND



METHOD 3 - SEPARATE CONTROL AND AUDIO PAIRS

RC-1348A

Figure 3 - Telephone Line Connections

Since VU meters are not common in the field, a second standard for maximum telephone line signals is often used. Speech at a level of +8 VU contains peak values which correspond to the peak value of a sine wave at a signal level of +18 dBm across a 600-ohm line. +18 dBm is equal to 18 dB above 1 milliwatt, or 6.2 volts rms across 600 ohms. In this equipment, the peaks which represent the maximum signal of 100% modulation will be equivalent to the peaks of a sine-wave signal at the +18 dBm level. In adjusting the system, a tone from the Console of up to +18 dBm may be used in establishing the 100% modulation point. In stations however, the maximum output is +11 dBm. If an adequate signal-to-noise ratio can be obtained at lower outputs, the output levels may be reduced to minimize cross-talk.

Limits also exist on the maximum DC voltages that may be applied across telephone lines. These are usually 270 volts from line to line and 135 volts from either line to ground. The maximum current obtainable under short circuit conditions in the line must be less than one ampere. Both limits must be met, even when the telephone line is open or short-circuited.

CONNECTIONS

All connections to the Control Console except microphone and power connections are made at terminal board TB801 on the rear of the chassis. Make the following connections:

1. For proper operation of the control circuits, the polarity of the telephone pair carrying the control voltages must be the same at both the Transistorized Control Console and the Remote Control Panel (KC-16-A). TB801-5 and 6 on the Control Console must be connected by a DC path to TB701-5 and 6 on the KC-16-A, respectively (see Figure 3). To identify the wires at each end of the telephone line, temporarily short one wire of the control pair (disconnected from the equipment) to a good earth ground at the KC-16-A and measure the resistance between each of the two wires and a good earth ground at the Control Console. The ungrounded wire will appear as an open circuit. The grounded wire will show a resistance which will depend upon the size and length of the pair used. Label each end of this wire and remove the ground. Ground the KC-16-A end of the other wire and measure the resistance between the Control Console and of the wire and ground. The resistance should be the same as the resistance of the first wire. Remove the short. Be sure that both of the telephone wires which carry the control currents are connected to corresponding terminals on the Control Console and the KC-16-A remote control panel. Connect the telephone lines to terminal board TB801, using one of the following methods (see Figure 3):

Method 1 - Single Telephone Pair (Control Voltage Simplexed Line to Line)

a. Connect telephone pair to TB801-1 and TB801-2.
b. Connect jumper between TB801-3 and TB801-5.
c. Connect jumper between TB801-4 and TB801-6.

Method 2 - Single Telephone Pair (Control Voltage Simplexed Line to Ground)

a. Connect telephone pair to TB801-1 and TB801-2.
b. Connect jumper between TB801-3 and TB801-4.
c. Connect jumper between TB801-4 and TB801-5.
d. Connect jumper between TB801-6 and TB801-10.

Method 3 - Separate Control and Audio Pair

a. Connect audio pair to TB801-1 and TB801-2.
b. Connect control pair to TB801-5 and TB801-6.
c. Connect jumper between TB801-3 and TB801-4.

2. Connect terminal 10 of terminal board TB801 to a good earth ground, such as a cold water pipe or an electrical conduit. It is essential to have a good ground, regardless of the method of telephone line control used, as a safety measure for the dispatcher.

3. Connect the microphone to microphone jack J801 on the chassis of the control unit.

4. If the Footswitch Option is used, connect it to terminals TB804-1 and TB803-8.

5. Connect the power cable (W801) to a 117-volt 50/60-Hz AC line.

After the necessary connections have been made to the Remote Control Unit, a few adjustments are needed before placing the unit in service. Before applying power to the unit, be sure that the station installation and adjustment have been completed and that the telephone lines have been connected to the Remote Control Panel. All adjustments for the Transistorized Control Console are shown on the Adjustment Procedure (page 13).

CIRCUIT ANALYSIS

The Transistorized Control Console consists of the audio stages mounted on audio board A801, a self-contained power supply, and controls and indicator lights.

Mounted on the audio board are the microphone preamp (Q1), the compressor amplifier (Q2 thru Q7), relay K1 and an audio PA stage (Q8). A second audio PA transistor (Q801) is mounted in a heatsink on the Console chassis.

The power supply provides the control currents for the switching functions, and the supply voltages for the audio stages, relay and indicator lights.

The VOLUME AND SQUELCH controls, pushbutton switches, indicator lights, clocks and meters mount on the front panel of the Console.

For ease of adjustment, the LINE INPUT, LINE OUTPUT and MIC GAIN controls are adjusted through holes in the back panel. Instructions for setting the controls are contained in the Adjustment Procedure (page 13).

AUDIO BOARD A801

Audio board A801 is used as a mike-to-line amplifier in the transmit or intercom mode, and as a line-to-speaker amplifier in the receiver mode. A simplified switching diagram is shown in Figure 4.

TRANSMIT MODE

Keying the microphone energizes relay K1, which mutes the loudspeaker and applies audio from the common-emitter preamp (Q1) through MIKE GAIN control R5 to the compressor-amplifier (Q2 through Q7). The output of the compressor-amplifier is connected by the relay through LINE OUTPUT control R28 to compound-connected audio PA transistors Q8 and Q801. Following the audio PA stage, audio voltage is coupled through line matching transformer T802 to the telephone pair.

RECEIVE MODE

Audio from the telephone pair is coupled through line-matching transformer T802 to audio board A801. The audio input (from J17) is connected through the normally closed relay contact to LINE INPUT control R7, and then to the compressor-amplifier. Following the compressor-amplifier, the audio voltage is connected by the relay through VOLUME control R801 to the audio PA, and then to the secondary of output transformer T803. The audio voltage is then connected to the speaker high lead by means of jumpers on TB801.

COMPRESSOR-AMPLIFIER

The compressor-amplifier circuit consists of gain control stage Q2, high gain audio amplifiers Q3 through Q6, and DC amplifier Q7.

When audio is applied to the compressor-amplifier, resistor R9 and the AC impedance of transistor Q2 act as a voltage divider for the AC input signal. The output of Q2 is amplified by a four stage, direct-coupled amplifier (Q3 through Q6). Both AC and DC feedback in the amplifier circuit provides for extremely stable operation.

One portion of the amplified output is fed through line output control R28 to the

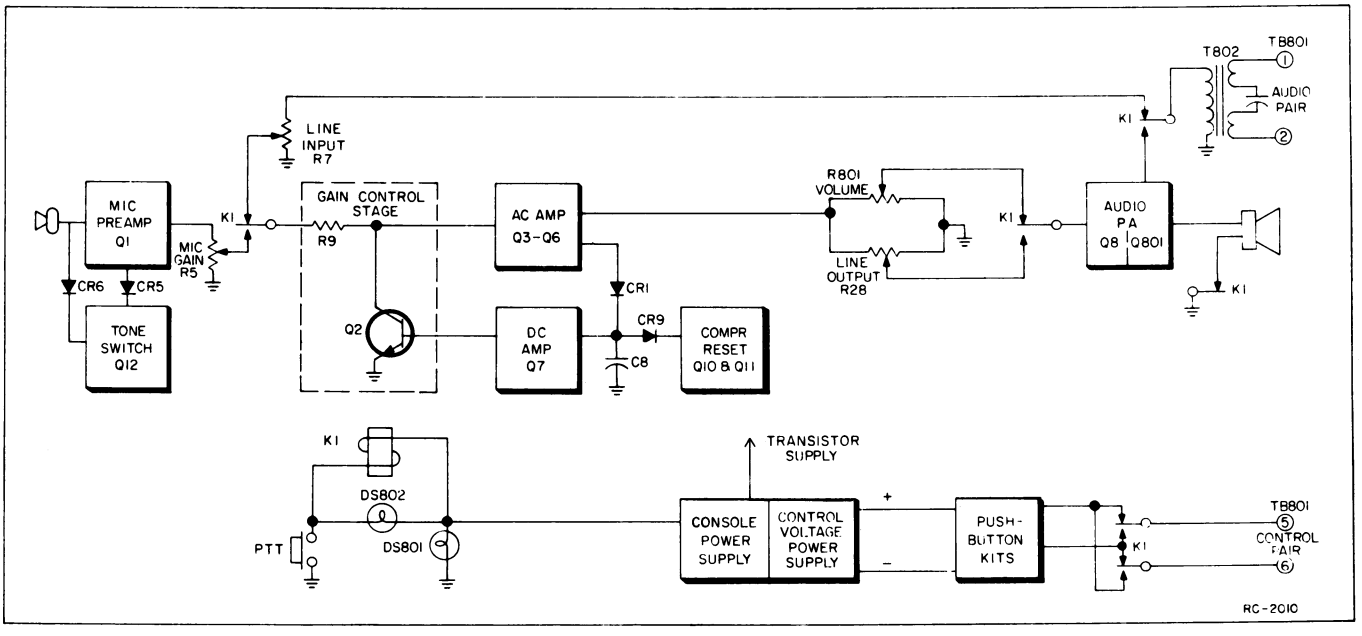


Figure 4 - Block Diagram of Transistorized Control Console

audio PA stage. The remaining portion is rectified by detector CR1, filtered by C8 and amplified by DC current amplifier Q7. This DC output is fed back to the base of gain control transistor Q2.

The amount of DC feedback to the gain control stage determines the AC impedance of Q2. When the input level rises, the AC amplifier output starts to increase. The output is detected, amplified, and fed back to the base Q2. The increase in feedback reduces the AC impedance of Q2 which decreases the audio voltage to the AC amplifier, keeping the amplifier output constant.

When the audio input decreases, the output of the AC amplifier starts to decrease, reducing the feedback to Q2. This raises the AC impedance of Q2 and increases the audio voltage to the AC amplifier, keeping the amplifier output constant.

COMPRESSION RESET

Compression Reset transistors Q10 and Q11 reset the compressor-amplifier when switching from the transmit-to-receive or the receive-to-transmit mode (keying or unkeying the microphone). Resetting the compressor-amplifier prevents losing the first portion of a weak signal due to the compressor release time when a high amount of compression is required.

Pressing the PTT button on the microphone drops the potential at J29 from 24 volts to ground, and applies a negative-going pulse to the cathode of CR4. The negative-going pulse forward biases CR4, turning on Q10 and Q11 for approximately 10 milliseconds. When tured on, the collector of Q11 drops to near ground potential, forward biasing CR9 and discharging capacitor C8 to reset the compressor.

Releasing the PTT button raises the potential at J29 from ground to +24 volts applying a positive-going pulse to the anode of CR3. The positive-going pulse forward biases CR3, turning on Q10 and Q11. Q11 conducts for approximately 10 milliseconds, forward biasing CR9 and discharging C8 to reset the compressor.

FUNCTION	CURRENT AT TB801-5 (relative to TB801-6)				
	0	+6mA	+15mA	-6mA	-15mA
One Frequency Transmit and 1 Frequency Receive (P)	Receive	Transmit			
Two Frequency Transmit and 1 Frequency Receive (P)	Receive	Transmit (Tx - F1)	Transmit (Tx - F2)		
One Frequency Transmit and 2 Frequency Receive	Receive (Rx-F1)	Transmit		Receive (Rx-F2)	
Two Frequency Transmit and 2 Frequency Receive	Receive (Rx-F1)	Transmit (Tx - F1)	Transmit (Tx - F2)	Receive (Rx-F2)	
One Frequency Transmit and PSLM or 2 separate receivers	Receive (Rx-F1 & F2)	Transmit		Receive (Rx-F1)	Receive (Rx-F2)
Two Frequency Transmit and PSLM or 2 separate receivers	Receive (Rx-F1 & F2)	Transmit (Tx - F1)	Transmit (Tx - F2)	Receive (Rx-F1)	Receive (Rx-F2)
One Frequency Transmit and receive with Channel Guard(P)	Channel Guard Receive	Monitor (noise squelch)	Transmit		
Repeater Disable (Option 5001)	Receive	Transmit		Repeater Disable	
Repeater Disable and Channel Guard	Channel Guard Receive	Monitor (noise squelch)	Transmit	Repeater Disable	Repeater Disable and Monitor (noise squelch)

NOTE

Only those functions followed by the symbol (P) can be used in parallel consoles.

Figure 5 - Control Current and Function Chart

TONE SWITCH

Tone Switch Q12 prevents tone from a Type 99 or Digital encoder from being applied to the telephone pair while the microphone is keyed, or audio being applied to the telephone pair while tone is being transmitted.

Keying the microphone at the console grounds the base of Q12, keeping it turned off. This allows the voltage at the junction of R48 and R49 in the collector circuit of Q12 to rise to approximately +10 volts DC. The +10 volts back biases CR5, preventing any tone present at tone input jack J33 from being transmitted.

Activating the external encoder applies tone to tone input jack J33, and grounds encoder transmit jack J34. Grounding J34 forward biases CR7 and CR8, energizing relay K1 and turning on tone switch Q12. Turning on Q12 drops its collector voltage to near ground potential, forward biasing diodes CR5 and CR6.

Forward biasing CR6 grounds the base of mic preamp Q1, disabling the stage. Forward biasing CR5 allows the tone to be coupled through MIC GAIN control R5 to the compressor-amplifier.

POWER SUPPLY

Turning OFF-ON switch S801 to the ON position applies 117 volts AC to the primary of power transformer T801. The primary is fused by F801. The power supply contains two rectifier circuits in the secondary of T801 to provide control and operating voltages for the Console.

Full-wave bridge rectifiers CR801 through CR804 supply the Control current. R806 is a bleeder resistor for filter capacitor C801. The output is connected to TB802 for application of the pushbutton switch kits.

Full-wave rectifiers CR805 and CR806 supply four operating voltages for the transistorized audio stages, indicator lights and switching relay. Two unregulated voltages operate the indicator lights, relay K1, and supply the Audio Driver and PA Collector. Two regulated outputs supply the AC and DC amplifiers, microphone preamp, and base bias to the audio PA. The voltage regulator consists of C804, R804 and zener diode VR801. Bias adjust potentiometer R30 is set at the factory for 0.65 volts (measured across R34), and will normally require no further adjustment.

CONTROL CIRCUITS

Through the use of accessory kits and options, (shown on pages 17 through 29), the Transistorized Control Console can perform a maximum of five different control functions. This is accomplished by applying two different levels and polarities of control current to activate up to four relays on the station remote control panel. The control current required to select each function is listed in Figure 5. Instructions for setting control currents are shown on the Adjustment Procedure Diagram on Page 13.

SINGLE FREQUENCY TRANSMIT AND RECEIVE

When no accessory kits or options are used, the Control Console provides a single, non-regulated DC control output of approximately 6 milliamps into a 7,500 ohm load (the equivalent of a 2,500 ohm line in ser-

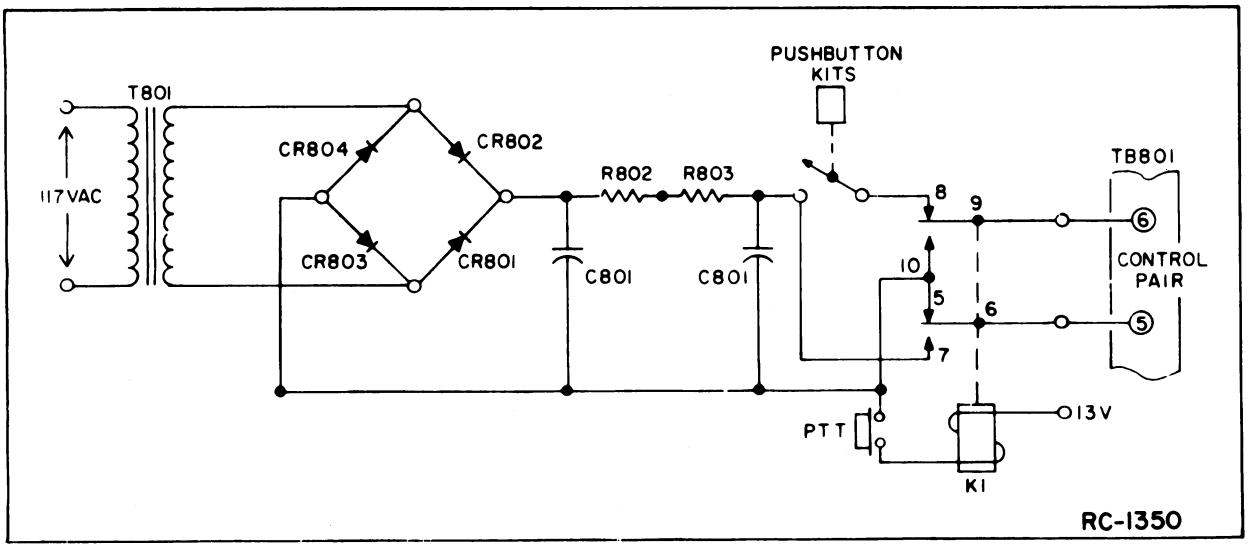


Figure 6 - Simplified Polarity Switching Diagram

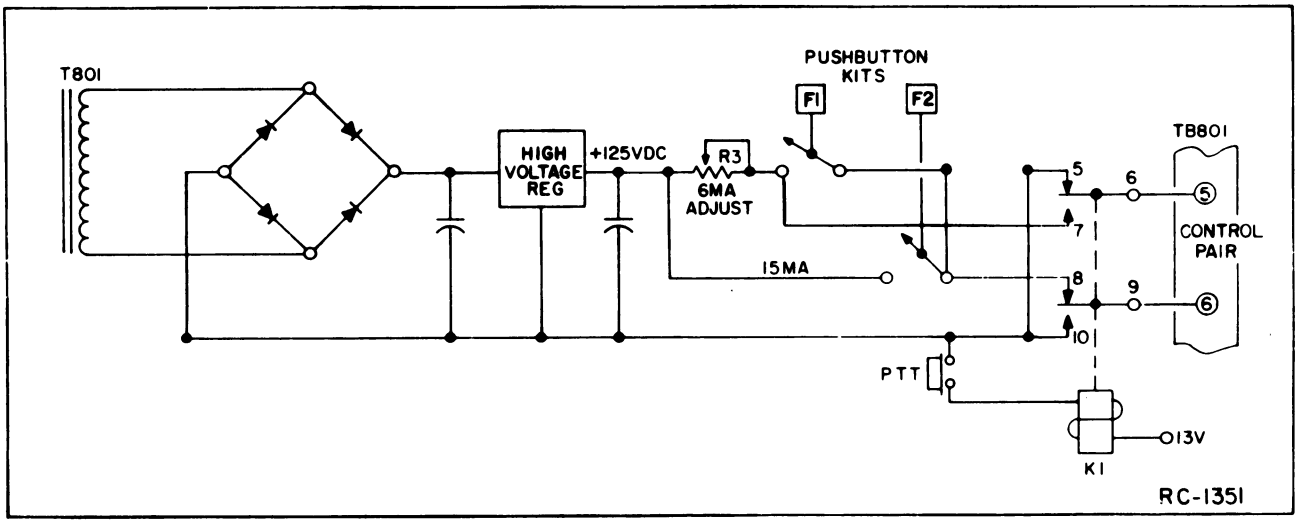


Figure 7 - Simplified Control Current Switching Diagram

ies with a 5,000 ohm station control panel).

MULTI-FREQUENCY SWITCHING

Whenever two polarities are required for switching functions, connections from the power supply to the control pair are transposed by the pushbutton switch kit and relay K1 as shown in Figure 6.

When two levels of the same polarity are required, a high voltage regulator circuit and a variable resistor are provided in the power supply circuit as shown in Figure 7. The high-voltage regulator stabilizes the output of the Control Console at 125 volts DC. This is to comply with telephone company regulations which require a maximum line to ground voltage of 135 volts DC.

The variable resistor is switched into the circuit to set the low level control current for 6 milliamps. This assures proper pickup of the 6-mA relay, as well as the dropout of the 15-mA relay at the station control panel. The high level control current is not adjustable, since the 15-mA relay will operate satisfactorily at levels above 15-mA.

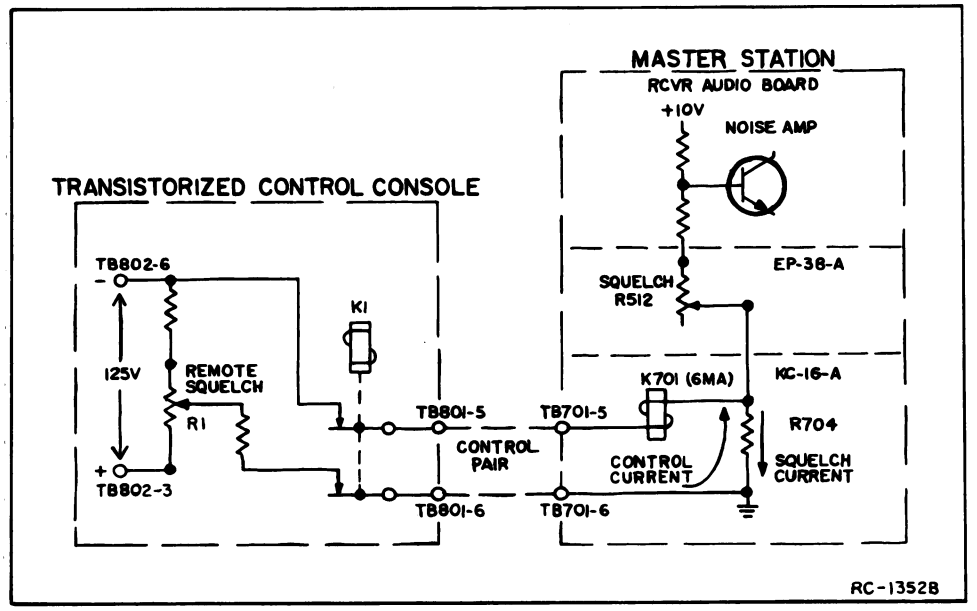


Figure 8 - Simplified Remote Squelch Circuit

REMOTE SQUELCH (Option 5121 & 5122)

Remote squelch operates by varying the bias potential on the base of receiver Noise Amplifier stage. The current through the squelch control (R512) on power supply EP-38-A flows through resistor R704 on the remote control panel to bias the Noise Amplifier. Adjusting the Remote Squelch Control for critical squelch adds an opposing current across R704 which sets the bias to the correct level (See Figure 8).

In the receive mode, the current on the control pair will vary from zero to approximately 2.5 milliamps. Rotating the Squelch control on the Control Console fully clockwise increases the current to maximum. This makes the base of the Noise Amplifier less positive with respect to ground, and fully unsquelches the receiver. This system of remote squelch control operates over a large range of equipment tolerances and telephone line resistances. However, since only one control current at a time may be applied to the line, remote squelch is not compatible with two-frequency receive functions.

CHANNEL GUARD

In standard Channel Guard applications, Channel Guard microphone EM-28-B and a monitor pushbutton (marked MON) located on the front panel are required. In addition, a high voltage regulator and a series current regulator circuit is used. The current regulator is set for 6 milliamps into the line, and prevents current soaring when several Control Consoles are operated in parallel.

When the microphone is unkeyed and the MONITOR pushbutton is not depressed, bias for the series regulator is grounded through pin 4 of microphone jack J801, and no control current is applied to the control pair. This selects Channel Guard operation at the base station, and only those transmissions coded by the proper Channel Guard tone will be heard at the Transistorized Control Console.

Pressing the MONITOR button on the microphone or the front panel, removes the ground on the series regulator, and applies 6 milliamps to the control pair. This disables the station Channel Guard, so that all transmissions on the receiver frequency can be heard. Pressing the TRANSMIT button on the microphone applies 15 milliamps to the control pair to key the transmitter.

Whenever an optional microphone or handset is used, the station can be monitored by pressing the MONITOR pushbutton on the front panel of the Console.

REMOTE/REPEATER CONTROL

In Remote/Repeater applications, the station transmitter may be keyed by either an incoming RF signal (repeater operation), or by a control current from the Transistorized Control Console. Two different methods may be employed to give the dispatcher priority over repeater operations.

Without Repeater Disable Option

When the Repeater Disable option is not used, keying the microphone applies +6 milliamps to the control pair. This energizes the transmit relay on the remote control panel, which opens the ground return of the Carrier Operated Relay on the repeater panel. The station will operate as a remote only as long as the microphone at the Control Console remains keyed.

Repeater Disable (Option 5001)

With the Repeater Disable option, pressing in the pushbutton marked SUPV applies -6 milliamps to the control pair. This energizes an optional relay on the remote control panel, which opens the ground return to the Carrier Operated Relay on the repeater panel. The station will operate as a remote as long as the SUPV pushbutton remains depressed.

Repeater Disable and Channel Guard Monitor (Option 5009)

With the microphone unkeyed and the MONITOR (MON) pushbutton not depressed, Channel Guard relay K1 is energized and no control current is applied to the control pair. This permits Channel Guard operation at the station so that only those transmissions that are tone coded by the proper Channel Guard tone are heard at the console. Pressing the MONITOR button on the microphone or console de-energized Channel Guard relay K1 and applies 6 milliamps to the control pair. This disables the station Channel Guard so that all transmissions on the receiver frequency can be heard. The station will still operate as a repeater whenever a properly tone-coded message is received.

Pressing the SUPERVISORY (SUPV) pushbutton energizes repeater disable relay K2, applying -6 milliamps to the control pair. This energizes a relay at the remote control panel, and removes the ground to the Carrier Operated Switch (COS) on the repeater panel. This disables the COS so that the station will operate as a remote as long as the SUPV pushbutton is depressed.

Pressing in both the MON and SUPV pushbutton applies -15 milliamps to the control pair. This provides Channel Guard monitoring and also disables the COS so that the station will operate as a remote.

Keying the microphone at the console switches both K1 and K2 out of the circuit, and applies +15 milliamps to the control

pair. This disables the repeater function and keys the station transmitter.

OTHER ACCESSORIES AND OPTIONS

SUPERVISORY CONTROL (Option 5177)

According the FCC regulations, if other parallel remote control consoles are employed in the system and their number and location are not specified on the station license, the dispatcher must be able to cut any conversation off the air that he judges unfit for transmission.

Pressing the Supervisory Control pushbutton (marked SUPV) shorts the control pair, terminating the transmission. The dispatcher can use the Intercom (if present) to prevent a recurrence of the unauthorized transmission before releasing the short on the control pair.

TONE ALERT OSCILLATOR (Option 5176)

The Tone Alert Oscillator accessory is used by the dispatcher to transmit an alerting tone to call attention to messages of more than usual importance. The accessory consists of a tone board, pushbutton switch and indicator light. The Tone Oscillator includes a multi-vibrator circuit and a two section RC filter.

Pressing the Tone Alert pushbutton applies a 13.5 volt supply voltage to the tone oscillator, switches relay K1 to the transmit mode, keys the transmitter and lights the red transmit light DS802. The nominal 1000 cps output of the tone oscillator board is connected to J6 and J7 on Audio Board A801, fed to the audio pair and is then transmitted by the station. The tone output is set by R8 on the tone board for 2 volts RMS at the audio pair (TB801-1 and 2).

INTERCOM SWITCH KIT (Option 5123)

The Intercom Switch Kit permits communication between paralleled Control Consoles without keying the transmitter. It also permits intercommunication between the Control Console and the base station when the Remote Control Panel (KC-16-A) has been equipped with the intercom accessory.

Placing the INTERCOM-TRANSMIT in the INTERCOM position energizes relay K1 and the Audio Board, switching the board to the transmit mode. It also opens the control current path and disables the transmit light.

It is not necessary to operate the microphone push-to-talk switch in either the TRANSMIT or INTERCOM position.

HANDSET AND HOOKSWITCH (Options 5002 & 5004)

Handset Model 4EM26A10 can be used in place of Desk Mike 4EM28A10 or 4EM28B10. When the Handset is on hook, audio is connected through the Hookswitch to the loudspeaker of the Control Console. Taking the Handset off hook mutes the speaker and applies audio to the Handset earpiece.

TONE JACK (Option 5003)

Tone Option Jack J1 (mounted on the chassis next to the microphone jack) provides a connection for plugging in a Type 90 or Type 99 Decoder. The Decoders may be equipped with a CALL light, buzzer or external alarm to notify the operator of an incoming call.

VU AND COMPRESSION METERS (Options 5111 & 5112)

The VU meter or compression meter enables the operator to check the line level of the Transistorized Control Console in the transmit, intercom or receive mode.

VU Meter

The VU meter provides a relative indication of the audio levels applied to and received from the audio pair. Audio from the compressor or from the line is coupled through potentiometer R9 to the base of class A amplifier Q1. The output of Q1 drives the meter.

The meter is normally shipped from the factory adjusted to indicate frequent peaks in the -1 to +3 VU range when the operator is talking into the microphone in a normal tone of voice. For this type of operation, the Line Output is set for +11 dBm. If desired, the meter may be set for -1 to +3 VU peaks at lower operating levels. Complete instructions for setting the VU meter are contained in the Adjustment Procedure (see Table of Contents).

The meter is normally connected to operate from the audio pair in the receive mode, and from the compressor-amplifier output in the transmit mode. If 0 VU readings are desired in the receive mode, move the Green-White meter input lead from J17 to J8 on Audio Board A801. The meter will now operate from the compressor-amplifier output in both the transmit and receive mode.

Compression Meter

The dial of the compression meter is not numerically calibrated. The line levels are indicated by red and green areas. The threshold of compression is marked by a red line in the center of the meter. A meter

reading in the red area of the meter indicates undercompression, while a reading anywhere in the green area indicates a proper output level (within 1 dB of normal).

CLOCKS (Options 5107 thru 5110)

An optional 12-hour, 12/24-hour, 50-Hz or 60-Hz electric clock is available for mounting on the Transistorized Control Console. The clocks are connected so that they operate with the power switch ON or OFF. In the event of a power failure, the clocks can be set by removing the top cover of the Console and turning the indicator wheels in either direction until the correct time shows in the window.

SPEAKER MUTING (Option 5104, 5105 & 5106)

The speaker muting option permits the dispatcher to temporarily reduce the volume of incoming calls to a low level for business discussions, telephone calls, etc.

Pressing in the MUTE pushbutton connects two parallel 82K-ohm resistors into the volume high lead, reducing the speaker output approximately 20 dB. If additional muting is desired, clipping out one of the parallel resistors will provide approximately 35-dB muting.

PARALLEL TRANSMIT INDICATOR (Option 5183)

The parallel transmit option is used in systems with parallel consoles to provide a visual indication when any console is in the transmit condition.

Keying the microphone at any console applies a positive voltage to the control pair (TB801-5 and -6). This voltage is dropped through voltage dividers R1 and R2, and applied to the base of Q1 and Q2, turning them on. This turns on Q3, and the positive voltage at the collector of Q3 turns on Q4. When Q4 is conducting its collector voltage drops to ground potential. This completes the ground path for transmit indicator light DS802, turning it on.

In Channel Guard systems where a higher keying voltage is required, the jumper bypassing zener diode VR1 is removed. The diode now prevents Q1 and Q2 from turning on when a low voltage is applied to the control pair.

LINE COMPENSATION (Option 5169)

The line compensation option compensates for high frequency telephone-line losses in the 1000 to 3000 Hertz range. The option consists of a parallel L-C circuit in series with a potentiometer, and should be used when the high frequency attenuation in the 2500 to 3000 Hz range is more than 10 dB below the 400 to 600 Hz level. Complete instructions for setting the line compensation option are contained in the Adjustment Procedure (see Table of Contents).

NOTE

When the line compensation kit is installed at the factory, the kit is shipped with the White lead connected to J1 on the line compensation board to disable the option. After the TCC is installed and all necessary adjustments have been completed, connect the White lead to J5 on compressor-amplifier board A801, and adjust potentiometer R1 as directed in the Adjustment Procedure.

Receiver Voting & Channel Guard (Option 5244)

In receiver voting systems with Channel Guard, a transistor switch is used for keying the remote line switching relay at the Voting Selector (see Figure 9).

When the Channel Guard Monitor pushbutton is not depressed, no control current is applied to the audio/control pair and transistor Q1 is not conducting. When Q1 is off, the remote line switching relay is un-energized, allowing audio from the selected (voted) receiver to be heard at the TCC.

Pressing the Channel Guard Monitor switch applied +6 milliamperes to the Control pair, and turns Q1 on. Turning on Q1 energizes the remote line relay so that the control current is applied to the remote station. Applying the +6 milliamperes to the remote station disables the Channel Guard so that calls on the receiver frequency can be heard.

Pressing the Transmit switch applies +15 milliamps to the control pair and energizes the remote line relay. Energizing the relay applies the 15 milliamps to the remote station control pair to key the station transmitter.

In receiver voting systems, the following connections from the Voting Selector to the Transistorized Control Console (TCC) are required:

1. Connect the ground lead from TB8-1 on the Selector to TB804-3 on the TCC.
2. In Non-Channel Guard Systems, connect the keying lead from TB8-2 on the Selector to TB804-1 on the TCC.
3. Connect the audio/control pair from TB8-3 and TB8-4 on the Selector to TB801-1 and TB801-2 on the TCC.

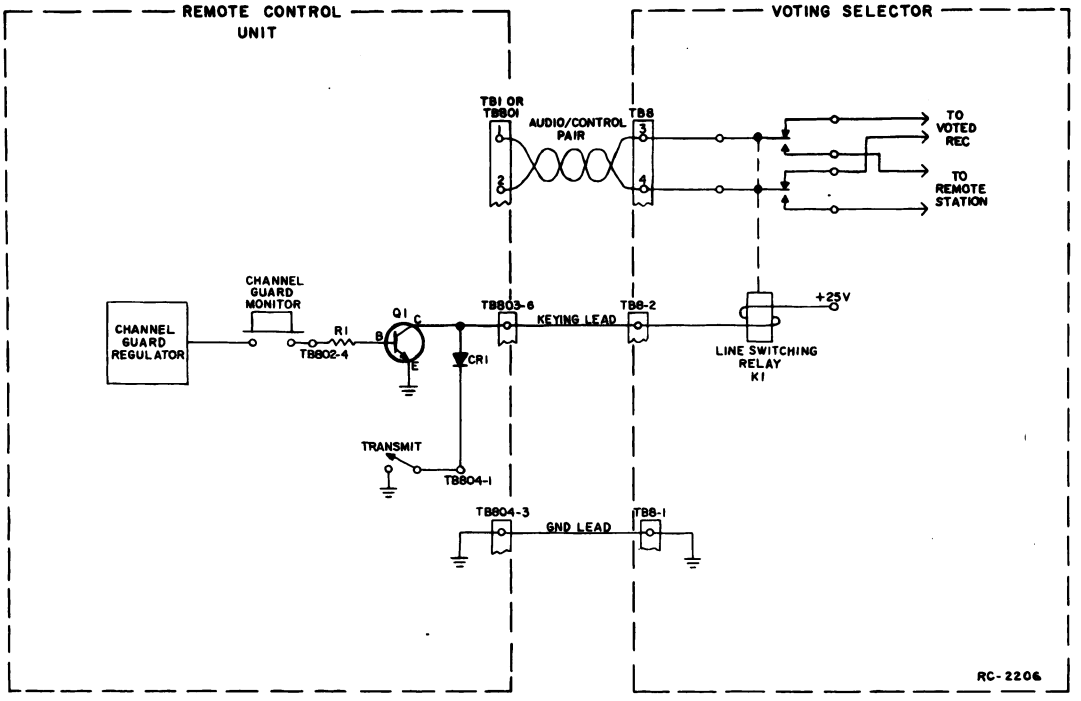


Figure 9 - Simplified Voting Selector Keying Circuit

MAINTENANCE

DISASSEMBLY

To remove the cover, unscrew the two knurled knobs on the back of the Console and lift the cover off of the housing. To gain access to components mounted on the underside of the chassis, first remove all power to the Console. Next, remove the four Phillips-head screws holding the chassis to the frame, and tilt the chassis up towards the front of the Console.

TROUBLESHOOTING PROCEDURE

A step-by-step Troubleshooting Procedure is included to help the serviceman quickly isolate and correct any problem that may arise. Refer to the Troubleshooting Procedure as listed in the Table of Contents.

IMPEDANCE CHANGES

Due to the differences in remote control systems, it may be necessary to change the transmit or receive impedance to improve system operation.

Bridging

In systems with parallel consoles, remove R8 from audio board A801 in all consoles except the supervisory or master console.

600-Ohm Output

To build up the output impedance to 600 ohms, replace the jumper between H9 and H10 on A801 with an 150-ohm, 1/2-watt resistor. Then re-adjust Line Output Control R28 as directed in the Adjustment Procedure (see Table of Contents).

150-Ohm Input

When it is determined that a lower input impedance will improve the frequency response, replace R8 on audio board A801 with a 100-ohm, 1/2-watt resistor. Then readjust Line Input control R7 for 0.4 volt as directed in the Adjustment Procedure (see Table of Contents).

RELEASE TIME ADJUSTMENT

The release time of the compressor-amplifier circuit (on Audio Board A801) is the time required for the unit to restore full gain after an input signal that has driven the unit into compression is removed.

The release time is determined by the value of R25 which was selected at the factory for average operating conditions. When overall system requirements indicate that a shorter release time is needed, R25 may be replaced with a different value resistor as shown in the table.

Reducing the release time, however, will result in an increase in background noise picked up during pauses in transmissions.

Value of R25	Release Time
100K-ohms (Standard)	2 seconds
27K-ohms	1 second
16K-ohms	0.5 second

COMPLETE ADJUSTMENT PROCEDURE

Before adjusting the Transistorized Control Console, make sure that all AC power lines, phone lines and ground connections have been completed at the Control Console and the Base station. Also, the base station should be properly aligned, and the station LINE LEVEL ADJUST (R1501 on Power Supply EP-38-A) set for not more than 2.7 volts RMS (+11 dBm) at audio pair with maximum system deviation at 1000 Hz applied to the base station/receiver antenna jack.

NOTE

Temporarily short the control pair at the remote control panel and measure the loop resistance at the console. If the resistance is greater than 1000 ohms, connect jumpers across the 1 K-ohm resistor between TB806-5 & 6, and across the 1 K-ohm resistor between TB806-5 and TB805-7. These terminal boards are located on the under side of the chassis.

LINE OUTPUT

The Control Console was set at the factory for a line output of 2.7 volts RMS (+11 dBm).

This level may be reduced when required by local telephone company regulations, or whenever line losses and noise pickup permit an adequate signal-to-noise ratio. If necessary, the line output may be adjusted for levels up to +18 dBm.

PROCEDURE:

1. Connect an AC-VTVM across the audio pair (TB801-1 and TB801-2). Use a 0.5 mfd capacitor in series with the meter if a DC voltage is simplexed line-to-line.
2. Turn MIC GAIN control R5 fully clockwise (from the rear of the Console).
3. Apply a 1000 Hz, 30-millivolt signal to pins 1 (GRD) and 2 of Mike Jack J801.
4. Adjust LINE OUTPUT control R28 for 2.7 volts RMS (or as required by local regulations).

MIC GAIN

The MIC GAIN control (R5) was set at the factory according to the microphone ordered with the Console. Setting this control for excessive compression will accent background noise during pauses in transmission.

1. Apply a 1000 Hz signal to pins 1 (GRD) and 2 of Mike Jack J801 at the level indicated in the following chart.

For Microphone Type:	Set Input Level For:
EM-28-A (Desk Mike)	12 millivolts
EM-25-A (Military Mike) or EM-26-A (handset)	60 millivolts
EM-13-A (Boom Mike)	6 millivolts

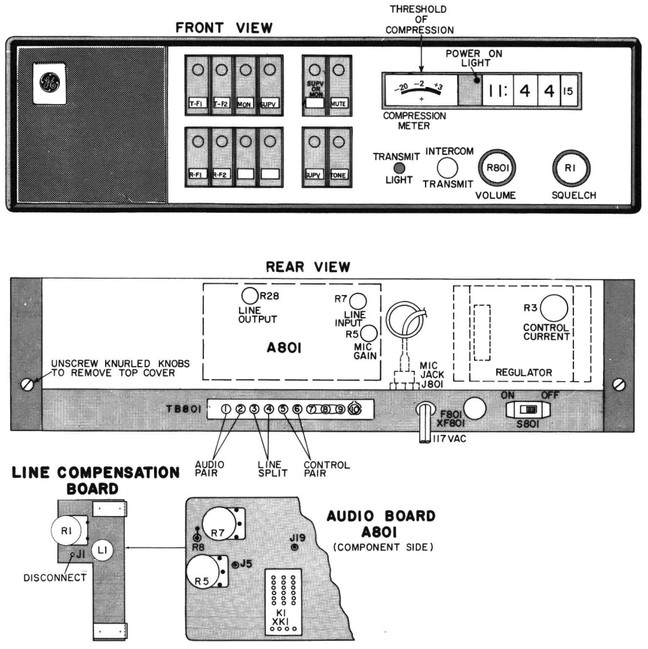
2. Adjust MIC GAIN control R5 for threshold of compression as indicated by the Compression Meter, or by a reading of 0.4 volt DC on a 20,000 ohm-per-volt meter connected from A801-J19 to ground.

LINE INPUT

LINE INPUT control R7 was adjusted at the factory for an input of 180 millivolts RMS (-12 dBm) for threshold of compression. R7 may be set for an input as low as -20 dBm for threshold of compression. Setting the control for excessive compression will accent background and line noise during pauses in transmission.

PROCEDURE:

1. Apply a 1000 Hz signal to the audio pair from the source with the largest line loss (this may be the base station or another Console). Adjust the audio generator for the maximum permissible level).
2. Adjust LINE INPUT control R7 for threshold of compression as indicated by the Compression Meter, or by a reading of 0.4 volt DC on a 20,000 ohm-per-volt meter connected from A801-J19 to ground.



CONTROL VOLTAGES

Two-Frequency Transmit

1. Connect a DC milliammeter in series with control line (positive lead of meter to TB801-5).
2. Push in the TX-F1 pushbutton. Key the transmitter and set CONTROL CURRENT regulator R3 for 6 milliamps.

Two-Separate Receivers or Receiver with Search-Lock Monitor

1. Remove top cover of Console.
2. Connect a DC milliammeter in series with control line (negative lead to TB801-5).
3. Push in RX-F1 pushbutton and set R1 (on back of pushbutton bracket) for 6 milliamps.

Remote Squelch

1. Set SQUELCH control R1 on the Control Consol to mid-range.
2. With no signal to the station receiver, set Squelch control R512 on the EP-38-A for critical squelch. The Console squelch control will now squelch and unsquelch the station-receiver. Note - For paralleled console, remote squelch can be used in only one console.

Channel Guard

1. Connect a DC milliammeter in series with the control line (positive lead to TB801-5).
2. Hold down the MONITOR switch on Microphone EM-28-B, and adjust the CONTROL CURRENT regulator (R3) for 6 milliamps.

TONE ALERT OSCILLATORS

1. Connect an AC-VTVM across the audio pair (TB801-1 and -2).
2. Turn the power OFF. Next, remove the four Phillips-head screws holding the chassis to the frame and tilt the chassis up towards the front of the console.
3. Turn the power ON. Then, hold in the TONE pushbutton and adjust R8 on the Tone Alert Oscillator board for a meter reading of 1 volt RMS (or less when required by local regulations).

LINE COMPENSATION

The Line Compensation kit is shipped from the factory disconnected to prevent interference with normal adjustment of the console (the White wire connected to J1 on the Line Compensation board). After all adjustments to the Console have been completed, activate the kit by disconnecting the White wire from J1 on the Line Compensation board and connecting it to A801-J5.

PROCEDURE:

1. Apply a 3000 Hz signal to the audio pair from the base station. Adjust the audio generator to produce the highest permissible line level.
2. Adjust LINE INPUT control R7 for threshold of compression as indicated by the Compression Meter, or by a reading of 0.4 volt DC as measured from A801-J19 to ground.
3. Remove the 3000 Hz signal and apply a 600 Hz signal to the audio pair from the base station at the same level as the 3000 Hz signal was applied.
4. Adjust R1 on the Line Compensation board for threshold of compression as indicated by the Compression Meter, or by a reading of 0.4 volt DC as measured from A801-J19 to ground.

NOTE

If a reading of 0.4 volt DC cannot be obtained by adjusting R1, re-adjust R7 on the Audio Board for a reading of 0.4 volt DC as measured from A801-J19 to ground.

VU METER

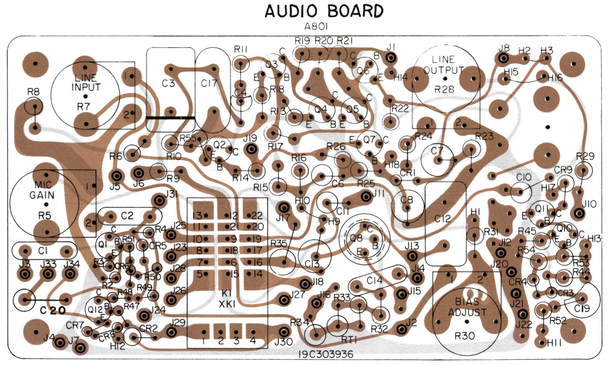
The VU Meter was set at the factory to indicate 0 VU at a +11 dBm line output. If the line output is set for other than +11 dBm, it will be necessary to re-adjust R9 on the VU meter to obtain 0 VU readings at threshold of compression.

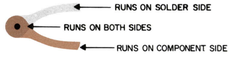
PROCEDURE:

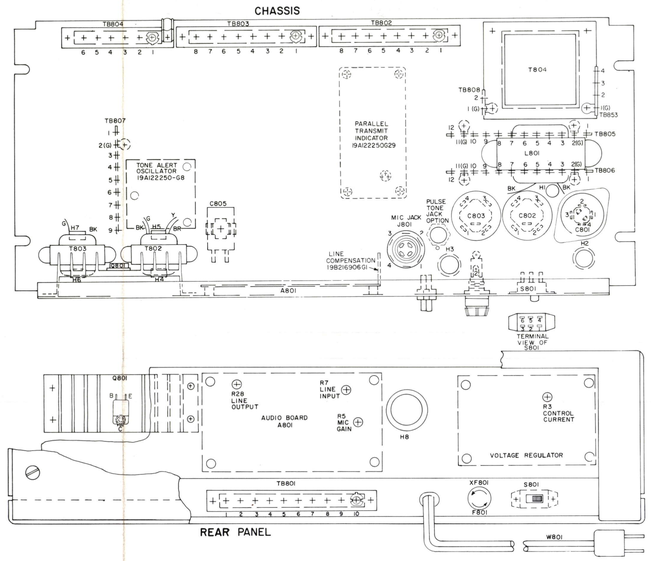
1. Connect an AC-VTVM across the audio pair (TB801-1 and -2). Use a 0.5 mfd capacitor in series with the meter if a DC voltage is simplexed line-to-line.
2. Apply a 1000 Hz signal to pins 1 (GRD) and 2 of J801 at the proper input level for the microphone being used (see chart in MIC GAIN setting).
3. Reduce the signal being applied to J801-1 and -2 until the line level is reduced by 10 dB.
4. Set R9 on the VU Meter for 0 VU. The VU Meter should indicate frequent peaks in the -1 to +3VU range when talking into the microphone in a normal tone of voice.
5. If the meter is connected to indicate 0 VU readings in the receive mode (Green-White lead connected to A801-J8 instead of -J17), apply a 1000 Hz signal as directed in Step 2. Measure the voltage leval at A801-J8 with an AC-VTVM. Then, reduce the input signal until the voltage at J8 is reduced 10 dB, and set R9 on the VU Meter for 0 VU.

ADJUSTMENT PROCEDURE

TRANSISTORIZED CONTROL CONSOLE
MODEL 4EC71A11







(19E500929, Rev. 5)
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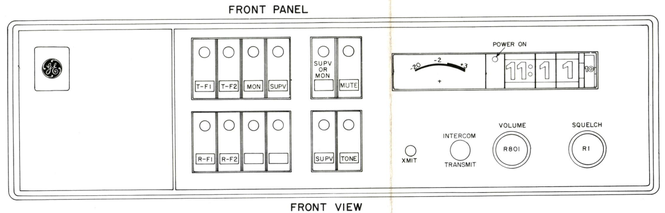
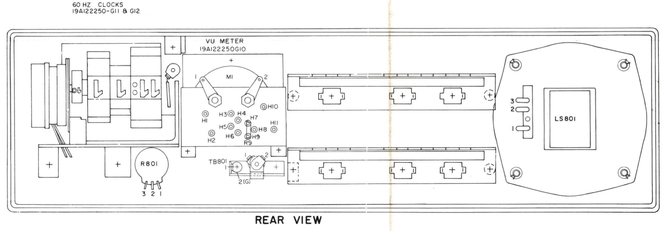
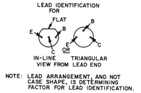
(19C303937, Sh. 2, Rev. 9)



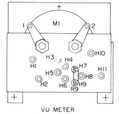
FRONT VIEW

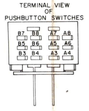


REAR VIEW



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





OUTLINE DIAGRAM

TRANSISTORIZED CONTROL CONSOLE
MODEL 4EC71A11

VOLTAGE READINGS

ALL READINGS ARE DC VOLTAGES TAKEN WITH A 20,000 OHM-PER-VOLT METER, AND MEASURED FROM THE TRANSISTOR PIN TO GROUND WITH NO SIGNAL APPLIED TO THE CONSOLE. READING AT EMITTER OF Q7 INDICATES THRESHOLD OF COMPRESSION.

NOTES:

1. IF THE LOOP RESISTANCE OF THE TELEPHONE PAIR IS 1000 OHMS OR GREATER, CONNECT A JUMPER FROM TB806-5 TO TB806-6 AND TB806-5 TO TB805-7.
2. FOR PARALLEL OPERATION, REMOVE RESISTOR R8 FROM BOARD A801 IN ALL PARALLEL UNITS EXCEPT MASTER UNIT.
3. IF TWO OR MORE UNITS ARE OPERATED IN PARALLEL, REMOTE SQUELCH IS AVAILABLE ON ONLY ONE UNIT.
4. ALL WIRES N22 UNLESS OTHERWISE SPECIFIED.
5. JUMPERS USED ON TB801 AND TB802 ARE A7147217P1 LINK.
6. LEADS FROM GRILL ASM PL19D402859G3 & G48 SWITCH PANEL ASM PL19C311323G1 & G2 GOING TO TB803 & TB804 TO BE TERMINATED WITH 19B209260P103.
7. P804 TERMINAL IS A4029840P1.
8. TERMINATE ALL WIRES GOING TO A801 WITH A4029840P2 EXCEPT AS NOTED IN NOTE 7.

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.

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

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
PL19D402643G1	A
PL19E500826G1	F
PL19C303936G2	D

SCHEMATIC DIAGRAM

TRANSISTORIZED CONTROL CONSOLE
MODEL 4EC71A11

(19R620754, Rev. 23)

PARTS LIST

LBI-4156C

TRANSISTORIZED CONTROL CONSOLE
MODEL 4EC71A11

SYMBOL	GE PART NO.	DESCRIPTION
		REMOTE CONTROL FRONT PANEL 19D402643G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR801*	4037822P2	Silicon. Added by REV A.
		- - - - - - - INDICATING DEVICES - - - - - - -
DS801* and DS802*	19C307037P31	Lamp, incandescent: 6.3 v; sim to GE 1866.
		Earlier than REV A:
	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - LOUDSPEAKERS - - - - - - - -
LS801	19B209422P1	Permanent magnet: 5 inch, 3.2 ohms ±10% imp 2.98 ohms ±15% DC res, 7.5 w max operating.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R801	5496870P11	Variable, carbon film: 5000 ohms ±20%, 0.5 w; sim to Mallory LC(5K).
		- - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB801*	7775500P44	Phen: 2 terminals. Added by REV A.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS801	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
XDS802	19B209342P1	Lampholder: sim to Leecraft 7-04.
		REMOTE CONTROL CHASSIS 19E500826G1
A801		AUDIO BOARD 19C303936G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 and C2	19A116080P5	Polyester: .047 µf ±20%, 50 VDCW.
C3	19A115028P116	Polyester: 0.22 µf ±20%, 200 VDCW.
C4	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C6	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C7	5496267P107	Tantalum: 100 µf ±20%, 10 VDCW; sim to Sprague Type 150D.
C8	5496267P103	Tantalum: 150 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C10	5496267P17	Polyester: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C11	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C12	19A115028P114	Polyester: 0.1 µf ±20%, 200 VDCW.
C13	5496267P19	Tantalum: 22 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C14	5494481P128	Ceramic disc: 2700 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C17	19A115028P107	Polyester: .01 µf ±20%, 200 VDCW.
C19	7491930P10	Polyester: .22 µf ±20%, 100 VDCW; sim to GE Type 61F.
C20*	5496267P18	Tantalum: 6.8 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
		In REV C and earlier:
	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A115250P1	Silicon.
CR2	4037822P1	Silicon.
CR3 thru CR9	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J8	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J10 thru J31	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J33 and J34	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - RELAYS - - - - - - - - - - -
K1	19C307010P14	Armature: 24 VDC nominal, 1.5 w max operating, 430 ohms ±15% coil res, 6 form C contacts; sim to Parelco R10-E250-1.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q2	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q3 and Q4	19A115889P3	Silicon, NPN; sim to Type 2N2712.
Q5 thru Q7	19A115889P1	Silicon, NPN; sim to Type 2N2712.
Q8	19A115300P1	Silicon, NPN; sim to Type 2N3053.
Q10	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q11	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q12	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2	3R77P473J	Composition: 47,000 ohms ±5%, 1/2 w.
R3	3R77P272J	Composition: 2700 ohms ±5%, 1/2 w.
R4	3R77P393J	Composition: 39,000 ohms ±5%, 1/2 w.
R5	19B209358P9	Variable, carbon film: approx 200 to 100,000 ohms ±20%, 0.25 w; sim to CTS Type U-201.
R6	3R77P472K	Composition: 4700 ohms ±10%, 1/2 w.
R7	19B209358P7	Variable, carbon film: approx 75 to 25,000 ohms ±20%, 0.25 w; sim to CTS Type U-201.
R8	3R77P361J	Composition: 360 ohms ±5%, 1/2 w.
R9	3R77P333K	Composition: 33,000 ohms ±10%, 1/2 w.
R10	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R11	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R13	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R14	3R77P101J	Composition: 100 ohms ±5%, 1/2 w.
R15	3R77P333J	Composition: 33,000 ohms ±5%, 1/2 w.
R16	3R77P104J	Composition: 0.1 megohm ±5%, 1/2 w.
R17	3R77P275J	Composition: 2.7 megohms ±5%, 1/2 w.
R18	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R19	3R77P394J	Composition: 0.39 megohm ±5%, 1/2 w.
R20	3R77P623J	Composition: 62,000 ohms ±5%, 1/2 w.
R21	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R22	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R23	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R24	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R25	3R77P104K	Composition: 0.1 megohm ±10%, 1/2 w.
R26	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R28	19B209358P5	Variable, carbon film: approx 75 to 5000 ohms ±20%, 0.25 w; sim to CTS Type U-201.
R29	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R30	19B209358P5	Variable, carbon film: approx 75 to 5000 ohms ±20%, 0.25 w; sim to CTS Type U-201.
R31	3R77P912J	Composition: 9100 ohms ±5%, 1/2 w.
R32	3R77P821K	Composition: 820 ohms ±10%, 1/2 w.
R33	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R34	19B209022P15	Wirweound: 1 ohm ±5%, 2 w; sim to IRC Type BWH.
R35	3R78P270K	Composition: 27 ohms ±10%, 1 w.
R44	3R152P623J	Composition: 62,000 ohms ±5%, 1/4 w.
R45	3R152P393J	Composition: 39,000 ohms ±5%, 1/4 w.
R47	3R152P392J	Composition: 3900 ohms ±5%, 1/4 w.
R48	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R49	3R152P104K	Composition: 0.1 megohm ±10%, 1/4 w.
R50	3R152P393J	Composition: 39,000 ohms ±5%, 1/4 w.
R51	3R152P434J	Composition: 0.43 megohm ±5%, 1/4 w.
R52 and R53	3R152P393J	Composition: 39,000 ohms ±5%, 1/4 w.
R54	3R152P623J	Composition: 62,000 ohms ±5%, 1/4 w.
R55*	3R77P180K	Composition: 18 ohms ±10%, 1/2 w. Added by REV C.
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	19B209143P2	Rod: 4000 ohms ±10%; sim to Globar Type 789F-12.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XK1	19B209172P1	Relay, phen: 22 contacts; sim to Allied Control 30054-24.
		CONTROL PANEL CHASSIS 19E500826G1
		- - - - - - - - - CAPACITORS - - - - - - - -
C801	7772471P42	Electrolytic: 100-200 µf +100% -10%, 300 VDCW; sim to Mallory Type FP.
C802 and C803	7476442P20	Electrolytic: 1600 µf +250% -10%, 50 VDCW; sim to PR Mallory WP-068.
C804	5496267P12	Tantalum: 150 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C805	7486445P1	Electrolytic: 4 µf +100% -10%, 150 VDCW.
C806	5496267P12	Tantalum: 150 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C807	19A115028P49	Polyester: .022 µf ±20%, 400 VDCW.
C855*	19A115680P14	Electrolytic: 300 µf +150% -10%, 7 VDCW; sim to Mallory Type TT. Added by REV E.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR801 thru CR804	4037822P2	Silicon.
CR805 and CR806	4037822P1	Silicon.
CR807* thru CR810*	4037822P2	Silicon. Added by REV E.
		- - - - - - - - - - FUSES - - - - - - - - - -
F801	7487942P5	Slow blowing: 1 amp at 250 v; sim to Bussman MDL-1.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J801		Connector. Includes:
	19A116061P2	Connector: 4 female contacts; sim to Amphenol Type 91-PN4F-1000.
	19A116061P4	Lockwasher.
	19A116061P5	Nut knurled.
		- - - - - - - - - - INDUCTORS - - - - - - - - -
L801	19A115671P1	Reactor: 0.21 h min, 7.5 ohms DC res max, 20 VDC operating.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P801 thru P803	4029840P2	Contact, electrical: sim to AMP 42827-2.
P804	4029840P1	Contact, electrical: sim to AMP 41854.
P810 thru P818	4029840P2	Contact, electrical: sim to AMP 42827-2.
P821 thru P830	4029840P2	Contact, electrical: sim to AMP 42827-2.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q801*	19A116118P3	Silicon, NPN.
		In REV E and earlier:
	19A115527P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R802 and R803	3R79P103K	Composition: 10,000 ohms ±10%, 2 w.
R804	3R79P391K	Composition: 390 ohms ±10%, 2 w.
R805	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
R806	3R77P224J	Composition: 0.22 megohm ±5%, 1/2 w.
R807 and R808	3R78P102K	Composition: 1000 ohms ±10%, 1 w.
R809 and R810	3R77P101J	Composition: 100 ohms ±5%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S801	7145098P1	Slide: DPDT, 0.75 amp at 125 VAC or 0.5 amp at 125 VDC; sim to Stackpole SS-150.
		- - - - - - - - - TRANSFORMERS - - - - - - - -
T801*	19A115677P1	Power, step-down, step-up: Pri: 117 VRMS ±20%, Sec: 5.7/18/24/125 VDC. Deleted by REV E.
T802	19A115672P1	Audio freq: 0.3-6 KHz freq range, Pri: 9 ohms ±15% DC res, Sec 1: 16 ohms ±15% DC res, Sec 2: 16 ohms ±15% DC res.
T803	19A115612P1	Audio freq: 0.3-3 KHz freq range, Pri: 24.5 ohms ±5% imp, 1.38 ohms DC res, Sec: 3.3 ohms imp, 0.18 ohm DC res.
T804*	19A116641P1	Power, step-down and step-up: Pri: 117 VRMS ±20%, 50/60 Hz, Sec 1: 125 VDC ±6.5 v at .020 amp, Sec 2A: 18.0 VDC ±0.9 v at .750 amp, Sec 2B: 5.7 VDC ±0.3 v at .100 amp, Sec 3: 4.4 VDC ±0.2 at 3.0 amp. Added by REV E.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB801	7117710P10	Phen: 10 terminals; sim to Cinch 1799.
TB802 and TB803	7117710P8	Phen: 8 terminals; sim to Cinch 1780.
TB804	7117710P6	Phen: 6 terminals; sim to Cinch 1776.
TB805 thru TB807	7775500P28	Phen: 12 terminals.
TB808	7775500P104	Phen: 2 terminals.
TB853*	7775500P103	Phen: 4 terminals. Added by REV E.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - -
VR801	4036887P10	Silicon, Zener.
		- - - - - - - - - - CABLES - - - - - - - - - -
W801	4036441P7	Cable, power: 2 conductor with 2-contact plug, approx 7 feet long.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF801	19B209005P1	Fuseholder, post type: 15 amps at 250 v; sim to Littelfuse 342012.
		HARNESS ASSEMBLY 19E500826G3 (Includes P801-P804, P810-P812, P817, P818, P821-P825, P827-P830)
		MECHANICAL PARTS
	19B205292P1	Window: clear plastic. (Used in Remote Control Front Panel, 19D402643G1).
	19B204949P2	Jewel: white transparent plastic. (Used in Remote Control Front Panel, 19D042643G1).
	19B204949P1	Jewel: red transparent plastic. (Used with DS802 in Remote Control Front Panel, 19D402643G1).
	19A115679P1	Knob, push-on: black plastic; sim to Rohden 25107.5-7E. (Used with R801 and Dummy button in Remote Control Front Panel, 19D402643G1).
	N529P16D	Button, plug. (Used in Remote Control Panel, 19D402643G1).
	19C307038P6	Nut, push-on: sim to Tinnerman C15226SS-010. (Retains jewels in Remote Control Front Panel, 19D402643G1).
	19B204045P3	Dummy button: gray plastic. (Used in Remote Control Front Panel, 19D402643G1).
	19A115725P1	Bushing, strain relief, cable: natural nylon; sim to Fastex 222-203202-00. (Used with W801 in Remote Control Chassis, 19E500826G1).
	19A122217P1	Heat sink. (Used with Q801 in Remote Control Chassis, 19E500826G1).
	4029851P8	Clip, loop: black nylon; sim to Weckesser 7/16-4-128. (Located at TB804 in Remote Control Chassis, 19E500826G1).
	4035439P1	Heat sink: sim to Birtcher 3AL-635-2R. (Used with Q8 in Component Board, 19C303936G2).
	4036555P1	Insulator, washer: nylon. (Used with Q8 in Component Board, 19C303936G2).
	19A115368P1	Retainer, relay: sim to Allied Control 30040-3. (Used with K1 in Component Board, 19C303936G2).
	19A122161G1	Top Cover. (Used in Transistorized Control Console, Model 4EC71A11).
	19A121759P1	Turn screw: 1/4-20 threads. (Used in Top Cover, 19A122161G1).
	4036436P2	Lockwasher, push-on: sim to Fastex 8063-21-00. (Used in Top Cover, 19A122161G1).
	19B205299G1	Bottom Cover. (Used in Transistorized Control Console, Model 4EC71A11).
	7147214P1	Link jumpers. (Used on TB801 and TB802).
	19B205401G1	Escutcheon (No clock or meter).
	19B205401G2	Escutcheon (Meter and clock).
	19B205401G3	Escutcheon (Clock only).
	19B205401G4	Escutcheon (Meter only).
		ACCESSORY KITS
		VU METER 19A122250G10
		METER ASSEMBLY 19B205370G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C3	5496267P17	Tantalum: 1.0 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C4	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
		- - - - - - - - - - - METERS - - - - - - - - - -
M1	19A115713P1	Audio level, VU: -20 to +3 scale.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115362P1	Silicon, NPN; sim to Type 2N2925.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R7	3R77P562J	Composition: 5600 ohms ±5%, 1/2 w.
R8	3R77P393J	Composition: 39,000 ohms ±5%, 1/2 w.
R9	19B209358P106	Variable, carbon film: approx 75 to 10,000 ohms ±10%, 0.25 w; sim to CTS Type X-201.
R10	3R77P392J	Composition: 3900 ohms ±5%, 1/2 w.
R11	3R77P181J	Composition: 180 ohms ±5%, 1/2 w.
R12	3R77P911J	Composition: 910 ohms ±5%, 1/2 w.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B201074P305	Screw, tap: No. 6-32 x 5/16. (Used to mount plate).
	19A122144P1	Plate.
	19A127758G1	Eyelet Board.
	4038027P1	Terminal, solderless. (Located on back of meter).
		12 HOUR CLOCK 19A122250G11
		CLOCK ASSEMBLY 19B205374G2
		- - - - - - - - - - METERS - - - - - - - - - -
M1	7491080P1	Clock, cyclometer: 110 VAC, 60 Hz; sim to Pennwood Numechron 1P-12H.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B201074P305	Screw, tap: No. 6-32 x 5/16.
	19B205288P1	Support.
		24 HOUR CLOCK 19A122250G12
		CLOCK ASSEMBLY 19B205374G3
		- - - - - - - - - - METERS - - - - - - - - - -
M2	7491080P2	Clock, cyclometer: 110 VAC, 60 Hz; sim to Pennwood Numechron 1P-24H-AM/PM.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B201074P305	Screw, tap: No. 6-32 x 5/16.
	19B205288P1	Support.
		12 HOUR CLOCK 19A122250G26
		CLOCK ASSEMBLY 19B205374G11
		- - - - - - - - - - METERS - - - - - - - - - -
M7	7491080P5	Clock, cyclometer: 110 VAC, 60 Hz; sim to Pennwood Numechron 1P-12H.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B201074P305	Screw, tap: No. 6-32 x 5/16.
	19B205288P1	Support.
		24 HOUR CLOCK 19A122250G27
		CLOCK ASSEMBLY 19B205374G12
		- - - - - - - - - - METERS - - - - - - - - - -
M8	7491080P6	Clock, cyclometer: 110 VAC, 60 Hz; sim to Pennwood Numechron 1P-24H-AM/PM.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B201074P305	Screw, tap: No. 6-32 x 5/16.
	19B205288P1	Support.

*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. D - Remote Control Chassis (19E500826G1)
REV. B - Audio Board (19C303936G2)

These revisions incorporated into initial shipment.

REV. E - Remote Control Chassis (19E500826G1)

To improve pilot lamp life. Replaced T801 with T804 and added TB853, C855, and CR807 through CR810.

REV. C - Audio Board (19C303936G2)

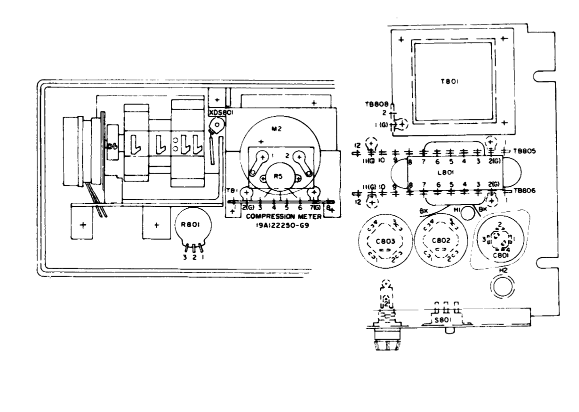
To improve low frequency recovery time of the compressor-amplifier. Added R55.

REV. A - Front Panel (19D402643G1)

To improve pilot lamp life by incorporating 6-volt lamps. Changed DS801 and DS802.

The pilot lamps have been changed to 6-volt lamps in all options using pilot lamps.

Outline Diagram Was:



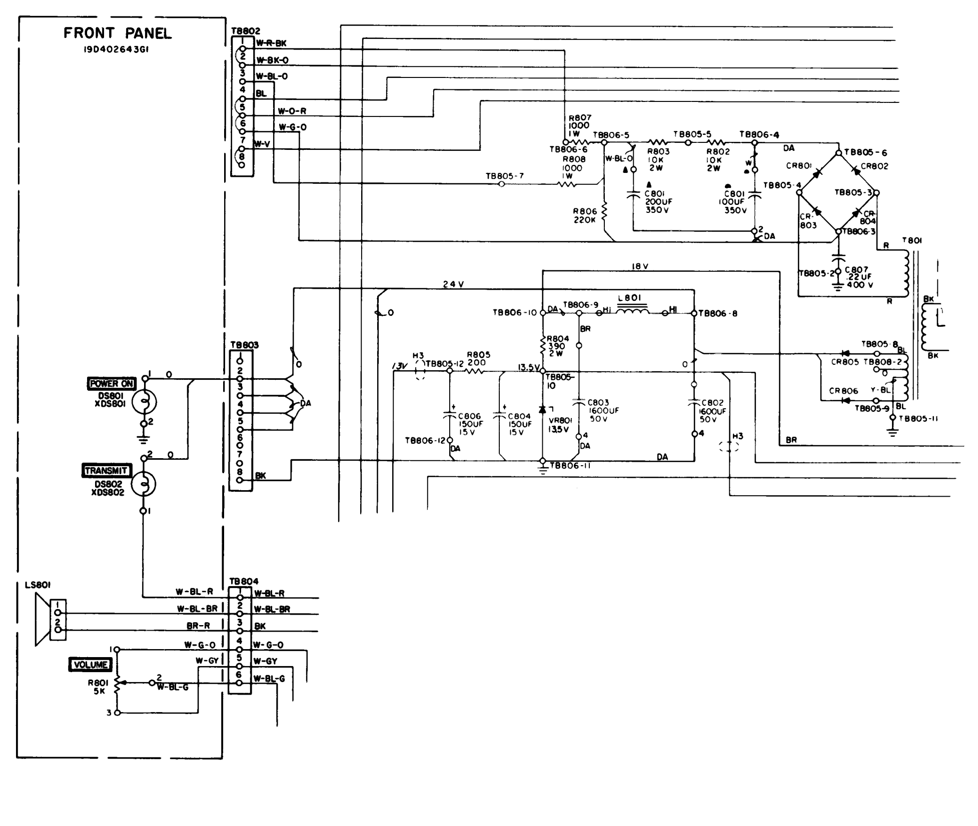
REV. D - Audio Board (19C303936G2)

To improve frequency response. Changed C20.

REV. F - Remote Control Chassis (19E500826G1)

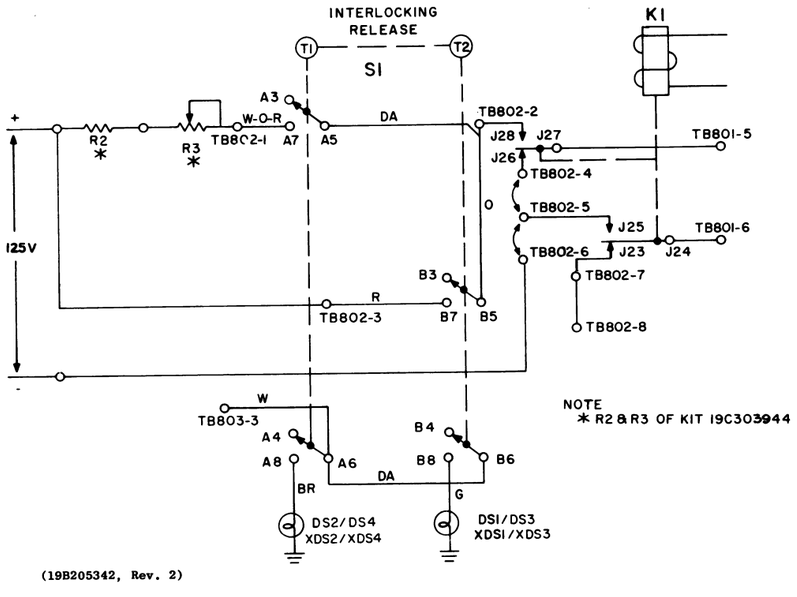
To incorporate improved transistor. Changed Q801.

Schematic Diagram Was:



2 FREQ TRANSMIT – 1 FREQ RECEIVE
19A122250G1 (28 VOLT LAMPS)
19A122250G42 (6 VOLT LAMPS)

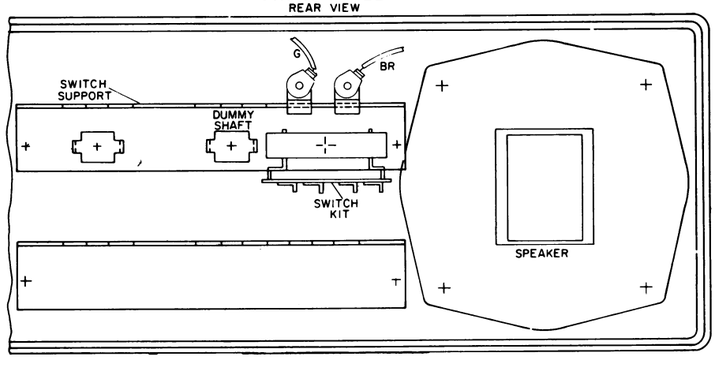
SCHEMATIC DIAGRAM



NOTE
* R2 & R3 OF KIT 19C303944

(19B205342, Rev. 2)

OUTLINE DIAGRAM



(19C303949, Rev. 2)

PARTS LIST

2 FREQUENCY TRANSMIT, 1 FREQUENCY RECEIVE
19A122250G1
19A122250G42

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19A122205G1	Button Assembly (T-F1).
	19A122205G2	Button Assembly (T-F2).
		SWITCH ASSEMBLY 19B205339G2
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS1 and DS2	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P9	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247197-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1 and XDS2	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205339G4
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS3 and DS4	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P9	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247197-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS3 and XDS4	19B209342P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

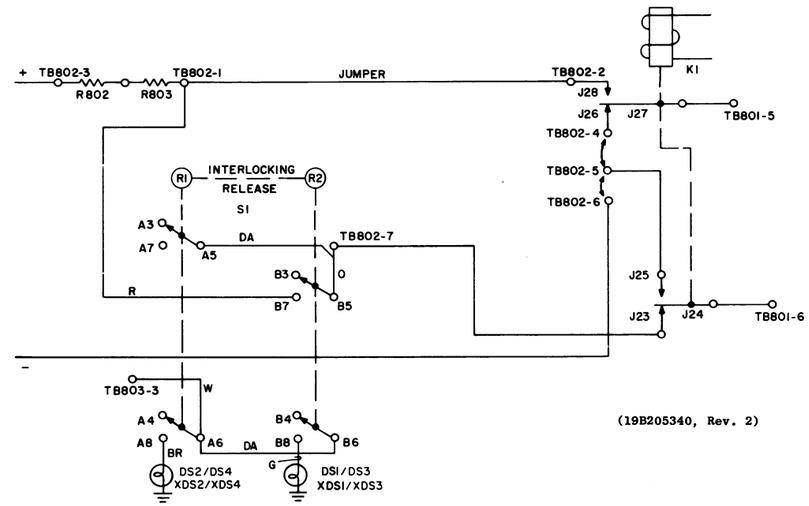
1 FREQUENCY TRANSMIT, 2 FREQUENCY RECEIVE
19A122250G2
19A122250G44

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19A122205G1	Button Assembly (T-F1).
	19A122205G2	Button Assembly (T-F2).
	19A122205G5	Button Assembly (R-F1).
	19A122205G6	Button Assembly (R-F2).
		SWITCH ASSEMBLY 19B205339G1
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS1 and DS2	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P9	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247197-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1 and XDS2	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205339G4, G5
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS3 and DS4	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P9	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247197-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS3 and XDS4	19B209342P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

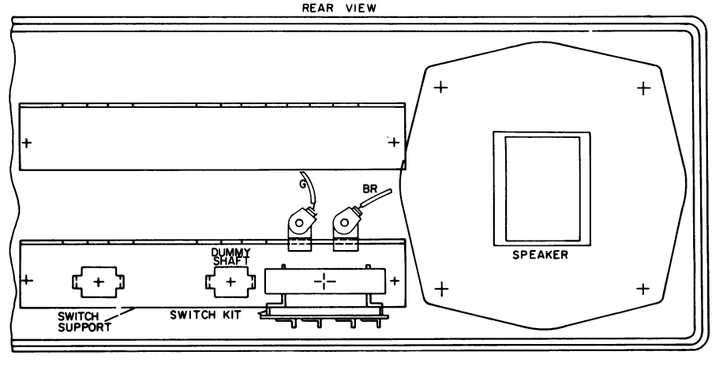
1 FREQ TRANSMIT – 2 FREQ RECEIVE
19A122250G2 (28 VOLT LAMPS)
19A122250G44 (6 VOLT LAMPS)

SCHEMATIC DIAGRAM



(19B205340, Rev. 2)

OUTLINE DIAGRAM



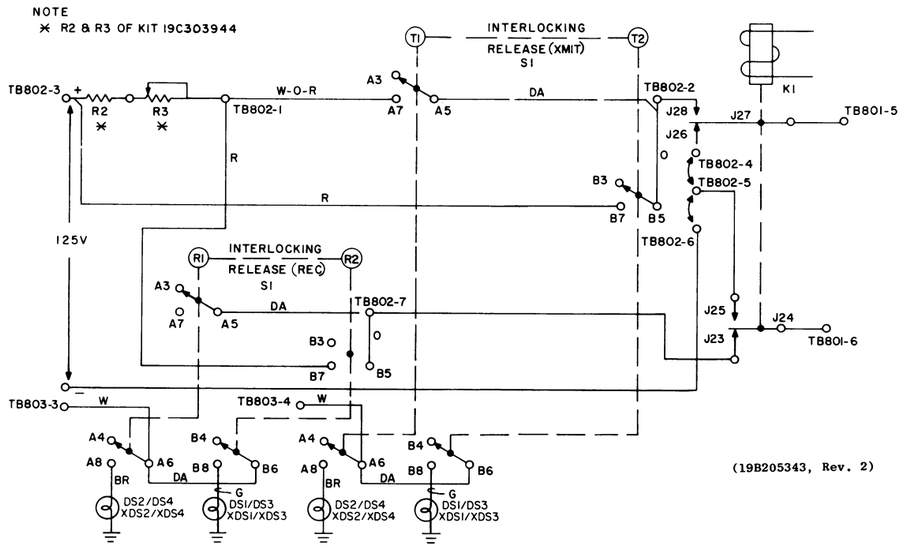
(19C303948, Rev. 1)

SERVICE SHEET

2-FREQ TRANSMIT & 1-FREQ RECEIVE AND 1-FREQ TRANSMIT & 2-FREQ RECEIVE

2 FREQ TRANSMIT-2 FREQ RECEIVE
19A122250G3 (28 VOLT LAMPS)
19A122250G43 (6 VOLT LAMPS)

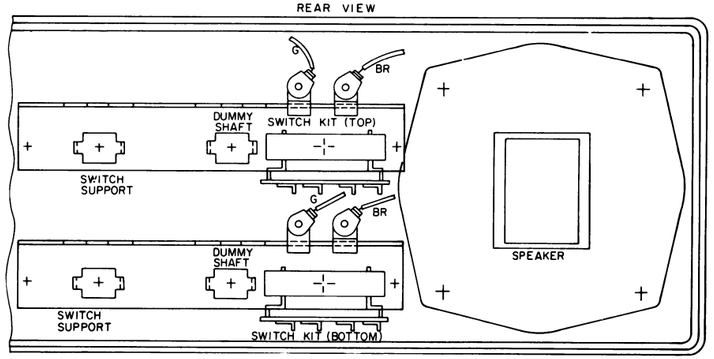
SCHEMATIC DIAGRAM



(19B205343, Rev. 2)

OUTLINE DIAGRAM

FRONT PANEL
REAR VIEW



(19C303950, Rev. 1)

SERVICE SHEET

2-FREQ TRANSMIT & 2-FREQ RECEIVE AND
1-FREQ TRANSMIT & 2 RECEIVERS (OR PSLM)

PARTS LIST

2 FREQUENCY TRANSMIT, 2 FREQUENCY RECEIVE
19A122250G3
19A122250G43

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A122205G1	Button Assembly (T-F1).
	19A122205G2	Button Assembly (T-F2).
	19A122205G5	Button Assembly (R-F1).
	19A122205G6	Button Assembly (R-F2).
		SWITCH ASSEMBLY 19B205339G1, G2
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS1 and DS2	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - SWITCHES - - - - - - - - -
S1	7775759P9	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247197-130.
		- - - - - - - - - SOCKETS - - - - - - - - -
XDS1 and XDS2	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205339G5
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS3 and DS4	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - SWITCHES - - - - - - - - -
S1	7775759P9	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247197-130.
		- - - - - - - - - SOCKETS - - - - - - - - -
XDS3 and XDS4	19B209342P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

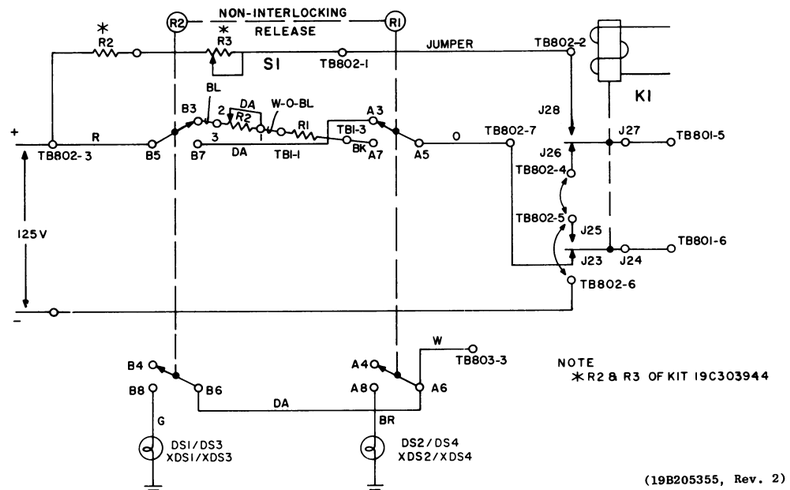
1 FREQUENCY TRANSMIT, 2 SEPARATE RECEIVERS (OR SLM)
19A122250G4
19A122250G45

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - RESISTORS - - - - - - - - -
R2	19B209244P2	Variable, wirewound: 5000 ohms ±20%, 2 w; sim to CTS Type 117.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A122205G5	Button Assembly (R-F1).
	19A122205G6	Button Assembly (R-F2).
		SWITCH ASSEMBLY 19B205353G1
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS1 and DS2	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R79P103K	Composition: 10,000 ohms ±10%, 2 w.
		- - - - - - - - - SWITCHES - - - - - - - - -
S1	7775759P8	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7775500P7	Phen: 3 terminals.
		- - - - - - - - - SOCKETS - - - - - - - - -
XDS1 and XDS2	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205353G2
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS3 and DS4	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R79P103K	Composition: 10,000 ohms ±10%, 2 w.
		- - - - - - - - - SWITCHES - - - - - - - - -
S1	7775759P8	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7775500P7	Phen: 3 terminals.
		- - - - - - - - - SOCKETS - - - - - - - - -
XDS3 and XDS4	19B209342P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

1 FREQ TRANSMIT-2 RECEIVERS (OR PSLM)
19A122250G4 (28 VOLT LAMPS)
19A122250G45 (6 VOLT LAMPS)

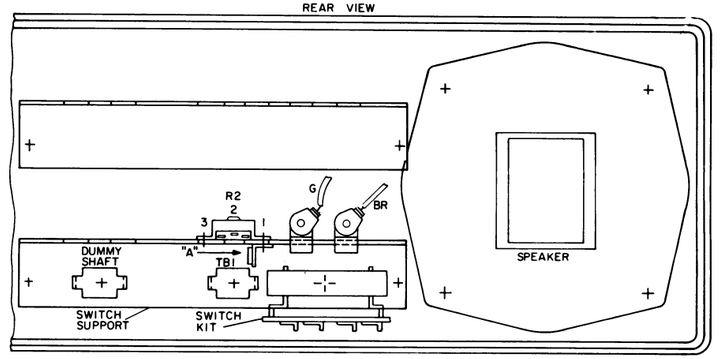
SCHEMATIC DIAGRAM



(19B205355, Rev. 2)

OUTLINE DIAGRAM

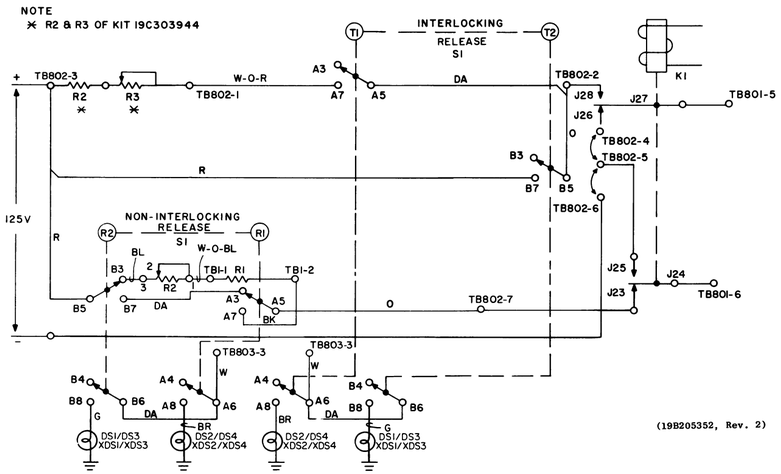
FRONT PANEL
REAR VIEW



(19D303953, Rev. 1)

2 FREQ TRANSMIT - 2 RECEIVERS (OR PSLM)
19A122250G5 (28 VOLT LAMPS)
19A122250G46 (6 VOLT LAMPS)

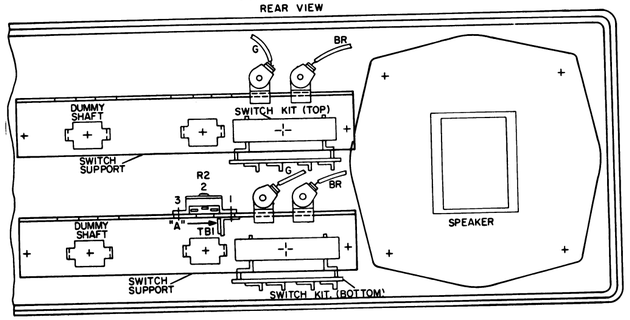
SCHEMATIC DIAGRAM



(19B205352, Rev. 2)

OUTLINE DIAGRAM

FRONT PANEL
REAR VIEW



(19C303951, Rev. 1)

VIEW AT "A"

PARTS LIST

2 FREQUENCY TRANSMIT, 2 SEPARATE RECEIVERS (OR SLM)
19A122250G5
19A122250G34

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2	19B209244P2	Variable, wirewound: 5000 ohms ±20%, 2 w; sim to CTS Type 117.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19A122205G1	Button Assembly (T-F1).
	19A122205G2	Button Assembly (T-F2).
	19A122205G5	Button Assembly (R-F1).
	19A122205G6	Button Assembly (R-F2).
	19A122205G13	Button Assembly (SUPV).
		SWITCH ASSEMBLY 19B205353G1
		- - - - - - - - - - INDICATING DEVICES - - - - - - - - - -
DS1 and DS2	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R79P103K	Composition: 10,000 ohms ±10%, 2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P8	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - - TERMINAL BOARDS - - - - - - - - - -
TB1	7775500P7	Phen: 3 terminals.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1 and XDS2	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205339G2
		- - - - - - - - - - INDICATING DEVICES - - - - - - - - - -
DS1 and DS2	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P9	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247197-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1 and XDS2	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205356G9
		- - - - - - - - - - INDICATING DEVICES - - - - - - - - - -
DS3	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P8	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS3	19B209342P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

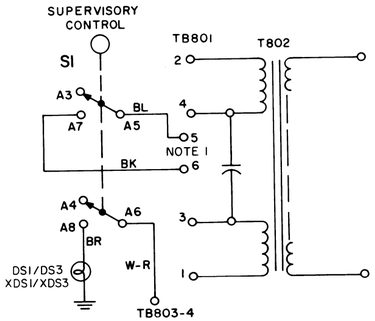
SUPERVISORY CONTROL
19A122250G13
19A122250G34

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19A122205G13	Button Assembly (SUPV).
		SWITCH ASSEMBLY 19B205356G1
		- - - - - - - - - - INDICATING DEVICES - - - - - - - - - -
DS1	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P8	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205356G9
		- - - - - - - - - - INDICATING DEVICES - - - - - - - - - -
DS3	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P8	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS3	19B209342P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SUPERVISORY CONTROL OPTION 5177
19A122250G13 (28 VOLT LAMP)
19A122250G34 (6 VOLT LAMP)

SCHEMATIC DIAGRAM



(19A122214, Rev. 4)

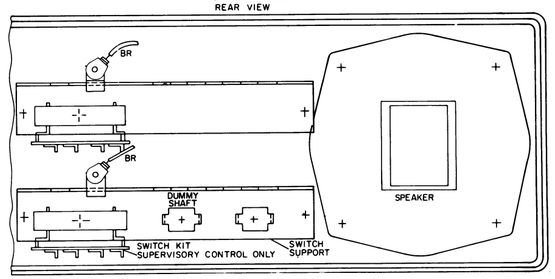
NOTE:
1. IF AC KEYING IS USED THE BLUE WIRE GOES TO TB801-1 AND THE BLACK WIRE GOES TO TB801-2. FOR DC KEYING OR AC/DC KEYING, WIRE PER DRAWING.

FIELD INSTRUCTION ONLY

FOR PULSE ON-PULSE OFF KEYING CONNECT BK WIRE TO TB807-2 AND BL WIRE TO THE 330 Hz KEYING BOARD A8-J11.

OUTLINE DIAGRAM

FRONT PANEL
REAR VIEW



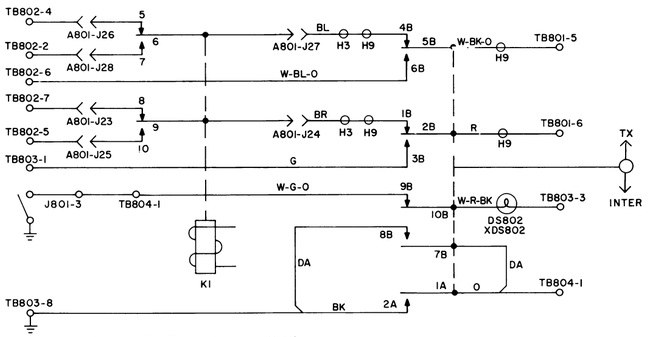
(19C303961, Rev. 5)

SERVICE SHEET

2-FREQ TRANSMIT & 2 RECEIVERS (OR PSLM) AND SUPERVISORY CONTROL (OPTION 5177)

INTERCOM
OPTION 5123
19A122250G7

SCHEMATIC DIAGRAM

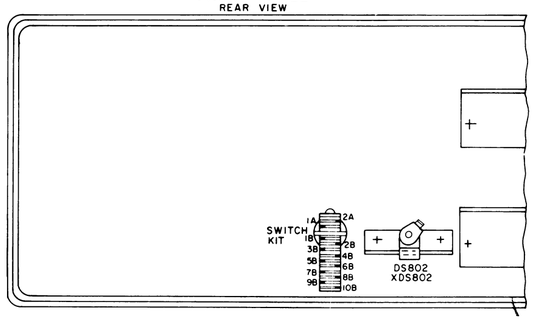


NOTE: IF REMOTE SQUELCH IS NOT DESIRED REMOVE JUMPER BETWEEN TB802-7 & TB802-8. IF REMOTE SQUELCH IS NOT DESIRED IN "INTERCOM" POSITION REMOVE JUMPER BETWEEN TB802-8 & TB803-1.

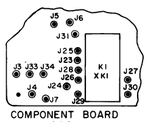
(19B205379, Rev. 2)

OUTLINE DIAGRAM

FRONT PANEL
REAR VIEW



(19C303977, Rev. 3)



COMPONENT BOARD
A801
(PARTIAL VIEW)

SERVICE SHEET

TONE ALERT OSCILLATOR AND INTERCOM (OPTIONS 5123 & 5176)

PARTS LIST

INTERCOM
19A122250G7

SYMBOL	GE PART NO.	DESCRIPTION
		SWITCH ASSEMBLY 19B205335G1
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19B209139P2	Lever: 3 amps at 120 VAC, Position C (up): 1 form A, 1 form B and 2 form C contacts, momentary; Position O (center): no contacts; Position D (down): 1 form A contact, momentary; sim to Switchcraft Series 28000 (208-1004).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

TONE ALERT OSCILLATOR
19A122250G8
19A122250G33

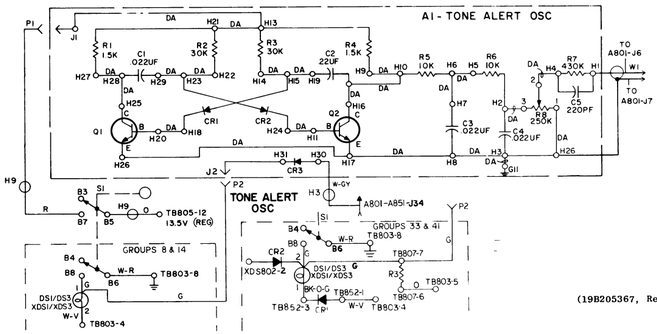
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A122205G12	Button Assembly (TONE).
		SWITCH ASSEMBLY 19B205362G1
		- - - - - - - - INDICATING DEVICES - - - - - - - -
DS1	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 and P2	4029840P2	Contact, electrical: sim to AMP 42827-2.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19A122211P1	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130 (modified).
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1	19B209342P1	Lampholder: sim to Leecraft 7-04.
		COMPONENT BOARD ASSEMBLY 19B205373G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 thru C4	19A115028P109	Polyester: .022 µf ±20%, 200 VDCW.
C5	7489162P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR3	19A115250P1	Silicon.
		- - - - - - - - JACKS AND RECEPTACLES - - - - -
J1 and J2	4033513P2	Contact, electrical; sim to Bead Chain L93-2.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P152K	Composition: 1500 ohms ±10%, 1/2 w.
R2 and R3	3R77P303K	Composition: 30,000 ohms ±10%, 1/2 w.
R4	3R77P152K	Composition: 1500 ohms ±10%, 1/2 w.
R5 and R6	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R7	3R77P434J	Composition: 0.43 megohms ±5%, 1/2 w.
R8	19B209358P110	Variable, carbon film: approx 1000 to 250,000 ohms ±20%, 0.25 w; sim to CTS Type X-201.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1	19A122228G1	RF: includes 1 contact, approx 15 inches long.
		SWITCH ASSEMBLY 19B205362G2
		- - - - - - - - INDICATING DEVICES - - - - - - - -
DS2	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 and P2	4029840P2	Contact, electrical: sim to AMP 42827-2.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19A122211P1	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130 (modified).
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS2	19B209342P1	Lampholder: sim to Leecraft 7-04.
		- - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1 and CR2	4037822P2	Silicon.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R3	3R77P243J	Composition: 24,000 ohms ±5%, 1/2 w.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB852	7775500P7	Phen: 3 terminals.

TONE ALERT OSC
OPTION 5176
19A122250G8 (28 VOLT LAMP)
19A122250G33 (6 VOLT LAMP)

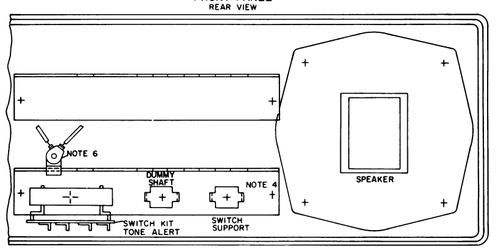
SCHEMATIC DIAGRAM



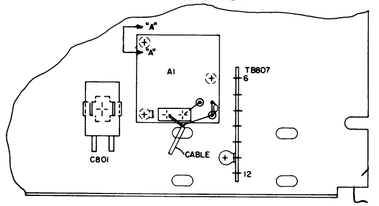
(19B205367, Rev. 5)

OUTLINE DIAGRAM

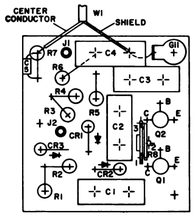
FRONT PANEL
REAR VIEW

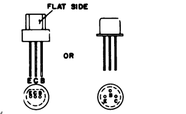


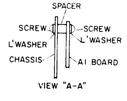
CHASSIS
BOTTOM VIEW



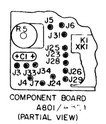
(19C303965, Rev. 5)







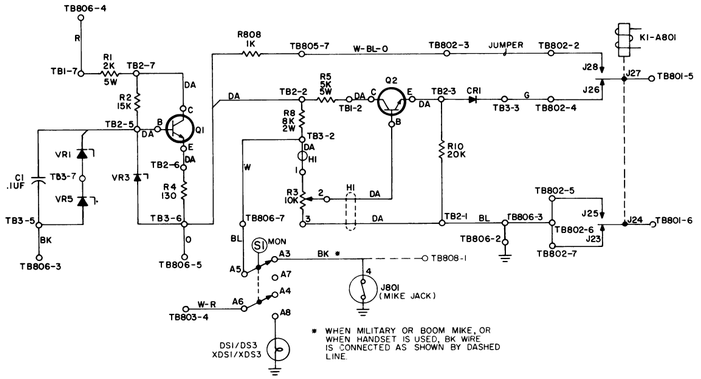
(19B205610, Rev. 1)



COMPONENT BOARD
A801
(PARTIAL VIEW)

CHANNEL GUARD REGULATOR
19A122737G5 (28 VOLT LAMP)
19A122737G8 (6 VOLT LAMP)

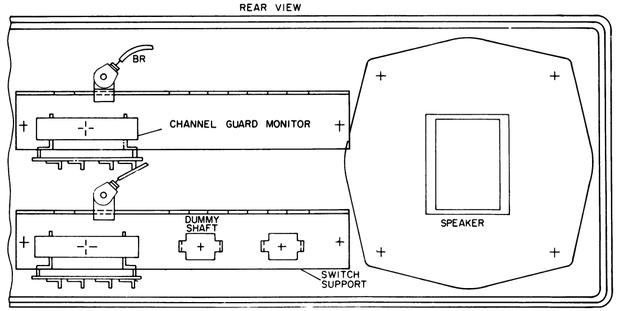
SCHEMATIC DIAGRAM



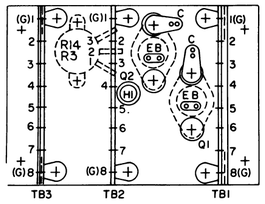
(19B205841, Rev. 5)

OUTLINE DIAGRAM

FRONT PANEL
REAR VIEW



(19C303961, Rev. 5)



(19A127532, Rev. 1)

INSTALLATION INSTRUCTIONS
FOR
CHANNEL GUARD REGULATOR 19A122737G5

1. Before installing the regulator, connect a jumper wire between TB2-2 and TB3-6 and remove wire connected to TB2-2. Remove one of orange wires from TB3-6.
2. Assemble the regulator as shown in Figure 1 with hardware supplied in the kit.
3. Remove and save the 4 screws that mount chassis to the case.
4. Lift the chassis as needed to install the option.
5. Remove resistor R802 between TB805-5 and TB806-4.
6. Thread the black, red, orange, blue, green, & white wires from the regulator through hole 2 (H2) and solder as shown in the connections chart below:

CONNECTIONS CHART		
FROM	TO	WIRE COLOR
REGULATOR	TB806-3	BLACK
REGULATOR	TB806-4	RED
REGULATOR	TB806-5	ORANGE
REGULATOR	TB806-3	BLUE
REGULATOR	TB802-4	GREEN
REGULATOR	TB806-7	WHITE

7. Cut approximately 2 inches from the black wire supplied and solder between TB806-2 and TB806-3.
8. Disconnect the white-red wire from J801-4 to TB801-8.
9. Remove and save the 5 screws that mount the front panel to the case. (1 on each side and 3 on the bottom).
10. Remove the front panel from the case and lay it face down.
11. Remove and save the 2 screws that mount the switch support. Remove the switch support.
12. Replace the dummy shaft with switch-kit using the hardware supplied in the kit. Replace the appropriate blank button with the button supplied in kit and discard the dummy shaft.
13. Assemble the light socket as shown in the outline diagram.
14. Remove the 4 screws that mount the chassis to the case. Tip the chassis up for installation of this option.
15. Insert the black & blue wires through H9 on front flange of chassis and solder to TB801 as shown in the connections chart below:

NOTE

If AC keying is used, connect the black wire to TB801-2 and the blue wire to TB801-1. For AC/DC keying or DC keying, make connections as shown in the chart.

CONNECTIONS CHART		
FROM	TO	WIRE COLOR
SWITCH	J801-4	BLACK
SWITCH	TB806-7	BLUE
SWITCH	TB803-4	WHITE-RED

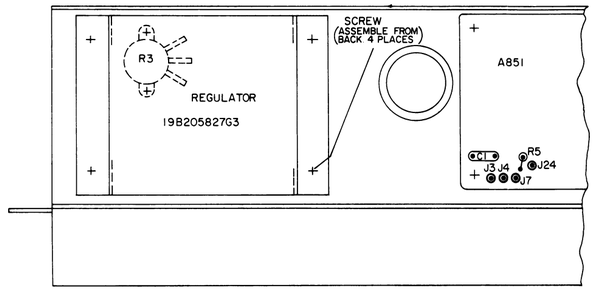
16. Reassemble the chassis to the case.
17. Connect the white and red wire to TB803-4.
18. Reassemble the switch support.
19. Reassemble the front panel to case.
20. Remove the jumper wire between TB806-5 and TB806-6.
21. Remove and save jumper between TB802-1 and TB802-2 and between TB802-4 and TB802-5.
22. Connect the jumper removed in Step 20 between TB802-2 and TB802-3 and between TB802-6 and TB802-7.
23. Reassemble the chassis to the case.

PARTS LIST

CHANNEL GUARD REGULATOR
19A122737G5
19A122737G8

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A122205G16	Button Assembly (MCM).
		REGULATOR BOARD 19B205827G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A115038P14	Polyester: 0.1 µf ±20%, 300 VDCW.
		- - - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1	403782P1	Silicon.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115783P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	7478711P34	Wirewound: 2000 ohms ±5%, 7 w; sim to Sprague Type 434E.
R2	3877P153E	Composition: 15,000 ohms ±10%, 1/2 w.
R3	19B209244P3	Variable, wirewound: 10,000 ohms ±20%, 2 w; sim to CTS Type 117.
R4	3877P131J	Composition: 130 ohms ±5%, 1/2 w.
R5	7478711P38	Wirewound: 5000 ohms ±5%, 7 w; sim to Sprague Type 434E.
R8	3879P822E	Composition: 8200 ohms ±10%, 2 w.
R10	3877P203J	Composition: 20,000 ohms ±5%, 1/2 w.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1 thru TB3	7775500P18	Phen: 8 terminals.
		- - - - - - - - - VOLTAGE REGULATORS - - - - - -
VR1	19A115528P28	Silicon, Zener.
VR3	403688?P5	Silicon, Zener.
VR5	19A115528P4	Silicon, Zener.
		SWITCH ASSEMBLY 19B205356G3
		- - - - - - - - - INDICATING DEVICES - - - - - -
DS1	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - SWITCHES - - - - - - - - -
	7775759P8	Push: latching (non-interlocked), 2 form C non-shorting contacts, .015 amp at 125 VAC; sim to Oak 347198-130.
		- - - - - - - - - SOCKETS - - - - - - - - -
XDS1	19B209343P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205356G11
		- - - - - - - - - INDICATING DEVICES - - - - - -
DS3	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - SWITCHES - - - - - - - - -
S1	7775759P8	Push: latching (non-interlocked), 2 form C non-shorting contacts, .015 amp at 125 VAC; sim to Oak 347198-130.
		- - - - - - - - - SOCKETS - - - - - - - - -
XDS3	19B209343P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



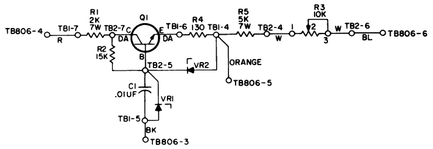
(19C311641, Rev. 3)

Figure 1 - Installation Diagram

HIGH VOLTAGE REGULATOR
19A122737-G1

SCHEMATIC DIAGRAM

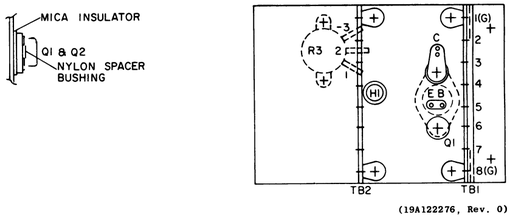
ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS, OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF = MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS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

(19B216277, Rev. 0)

OUTLINE DIAGRAM



(19A122276, Rev. 0)

PARTS LIST

HIGH VOLTAGE REGULATOR
19A122737G1

SYMBOL	GE PART NO.	DESCRIPTION
		REGULATOR BOARD 19B205827G1
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A115028P14	Polyester: 0.1 µf ±20%, 200 VDCW.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115783P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	7478711P34	Wirewound: 2000 ohms ±5%, 7 w; sim to Sprague Type 454E.
R2	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R3	19B209244P3	Variable, wirewound: 10,000 ohms ±20%, 2 w; sim to CTS Type 117.
R4	3R77P131J	Composition: 130 ohms ±5%, 1/2 w.
R5	7478711P38	Wirewound: 5000 ohms ±5%, 7 w; sim to Sprague Type 454E.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1 and TB2	7775500P18	Phen: 8 terminals.
		- - - - - - - - - VOLTAGE REGULATORS - - - - - -
VR1	19A115528P28	Silicon, Zener.
VR2	4036887P3	Silicon, Zener.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

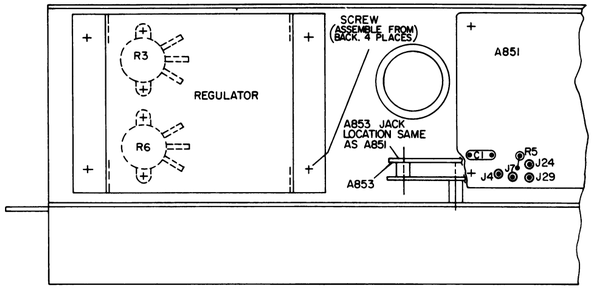


Figure 1 - Installation Diagram

INSTALLATION INSTRUCTIONS
FOR
HIGH VOLTAGE REGULATOR 19A122737-G1

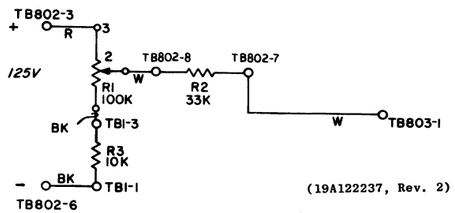
1. Install the High Voltage Regulator as shown in Figure 1 with the hardware supplied with the kit.
2. Remove and save the 4 screws that mount the chassis to the case.
3. Lift the chassis as required to install this option.
4. Remove R807 a 1000 ohms 1 watt resistor between TB806-5 and TB806-6.
5. Remove R802 a 10K ohm 2 watt resistor between TB805-5 and TB806-4.
6. Thread the black, red, orange, and blue wires from the regulator through hole 2 (H2) and solder as shown in the connection chart below:

CONNECTIONS CHART		
FROM	TO	WIRE COLOR
REGULATOR	TB806-3	BLACK
REGULATOR	TB806-4	RED
REGULATOR	TB806-5	ORANGE
REGULATOR	TB806-6	BLUE

7. Reassemble the chassis to the case.

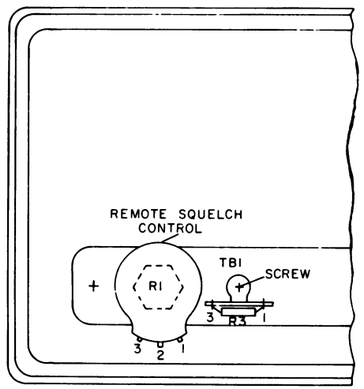
REMOTE SQUELCH
OPTIONS 5121 & 5122
19A122250G16

SCHEMATIC DIAGRAM



(19A122237, Rev. 2)

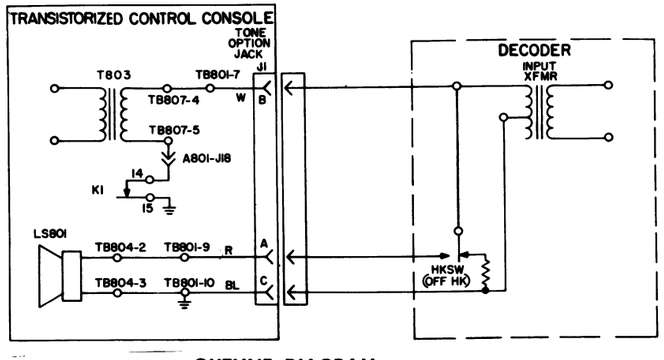
OUTLINE DIAGRAM



(19B205407, Rev. 1)

PULSE TONE OPTION JACK
(OPTION 5003)
19A122250-G17

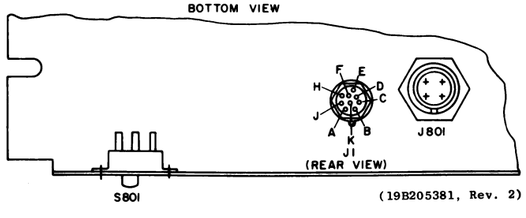
SCHEMATIC DIAGRAM



(19B205380, Rev. 2)

OUTLINE DIAGRAM

CHASSIS
BOTTOM VIEW



(19B205381, Rev. 2)

PARTS LIST

REPEATER DISABLE
19A122250G19
19A122250G35

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A122205G13	Button Assembly (SUPV).
		SWITCH ASSEMBLY 19B205356G2
		- - - - - - - - - INDICATING DEVICES - - - - - -
DS1	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P8	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205356G10
		- - - - - - - - - INDICATING DEVICES - - - - - -
DS3	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P8	Two pushbutton: 2 form C contacts, 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS3	19B209342P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

REMOTE SQUELCH
19A122250G16

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	7141971G8	Resistor kit: includes composition, 33,000 ohms ±10%, 1/2 w resistor with 2 terminals.
	19A122239G1	Lead Assembly: includes 2 terminals, approx 5-1/2 inches long.
	19A122239G2	Lead Assembly: Includes 2 terminals, approx 3-1/2 inches long.
		RESISTOR ASSEMBLY 19A122238G1
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	5496870P12	Variable, carbon film: 100,000 ohms ±20%, 1 w; sim to Mallory LC(100K).
R3	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
		- - - - - - - - - TERMINALS BOARDS - - - - - - - - -
TB1	7775500P7	Phen: 3 terminals.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

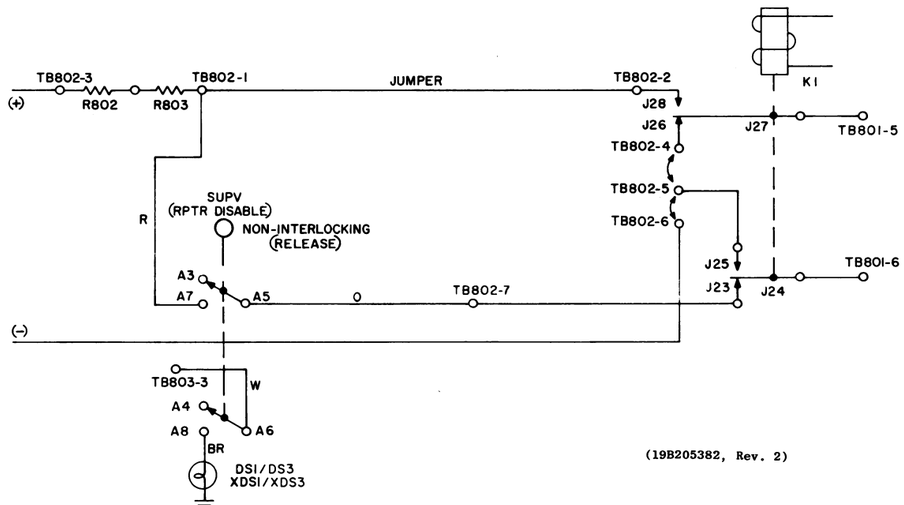
PULSE TONE OPTION JACK
19A122250G17

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P270J	Composition: 27 ohms ±5%, 1/2 w.
		JACK ASSEMBLY 19A122232G1
		- - - - - - - - JACKS AND RECEPTACLES - - - - - -
J1	7489183P5	Socket: 9 contacts; sim to Winchester M9S-LRN (modified).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

REPEATER DISABLE
OPTION 5001
19A122250G19 (28 VOLT LAMP)
19A122250G35 (6 VOLT LAMP)

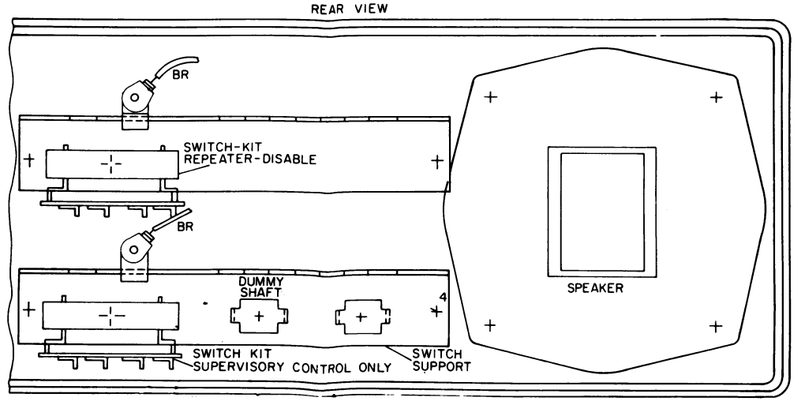
SCHEMATIC DIAGRAM



(19B205382, Rev. 2)

OUTLINE DIAGRAM

FRONT PANEL
REAR VIEW



(19C303961, Rev. 5)

SERVICE SHEET

REMOTE SQUELCH, REPEATER DISABLE & PULSE TONE OPTION JACK (OPTIONS 5001, 5003, 5121 & 5122)

PARTS LIST

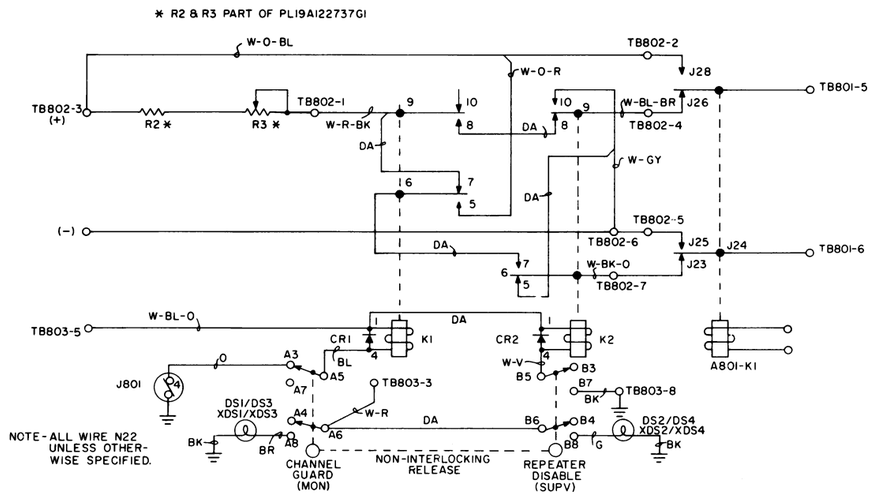
CHANNEL GUARD AND REPEATER DISABLE
19A122250G28
19A122250G40

SYMBOL	GE PART NO.	DESCRIPTION
	19A122205G13	Nameplate, button.
	19A122205G16	Button.
		RELAY ASSEMBLY 19B216075G1
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	4037822P1	Silicon.
		- - - - - - - - - - - RELAYS - - - - - - - - - -
K1 and K2	5491595P3	Armature: 1.5 w operating, 700 ohms ±15% coil res, 2 form C contacts; sim to Allied Control T154-X-101.
		- - - - - - - - - - - SOCKETS - - - - - - - - - -
XK1 and XK2	5491595P4	Relay: 10 contacts; sim to Allied Control 30054-1.
		- - - - - - - - - - - MISCELLANEOUS - - - - - - - -
	5491595P8	Retainer. (Used with K1 and K2).
	5491595P10	Clip. (Used with XK1 and XK2).
		SWITCH ASSEMBLY 19B205356G8
		- - - - - - - - INDICATING DEVICES - - - - - - - -
DS1 and DS2	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - - SWITCHES - - - - - - - - -
S1	7775759P8	Push: latching(non-interlocked), 2 form C non-shorting contacts, .015 amps at 125 VAC; sim to Oak 247198-130.
		- - - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1 and XDS2	19B209342P2	Lampholder; sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205356G16
		- - - - - - - - INDICATING DEVICES - - - - - - - -
DS3 and DS4	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - - - SWITCHES - - - - - - - - -
S1	7775759P8	Push: latching(non-interlocked), 2 form C non-shorting contacts, .015 amps at 125 VAC; sim to Oak 247198-130.
		- - - - - - - - - - - SOCKETS - - - - - - - - - -
XDS3 and XDS4	19B209342P2	Lampholder; sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

REPEATER DISABLE AND CHANNEL GUARD MONITOR OPTION 5009
19A122250G28 (28 VOLT LAMP)
19A122250G40 (6 VOLT LAMP)

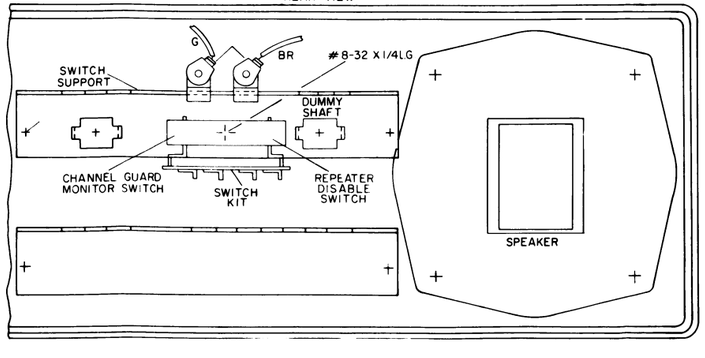
SCHEMATIC DIAGRAM

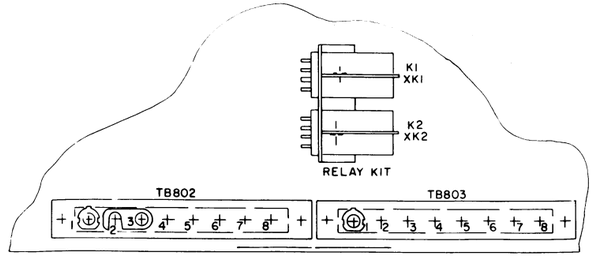


(19B216074, Rev. 3)

OUTLINE DIAGRAM

FRONT PANEL
REAR VIEW





(19C311751, Rev. 0)

PARTS LIST

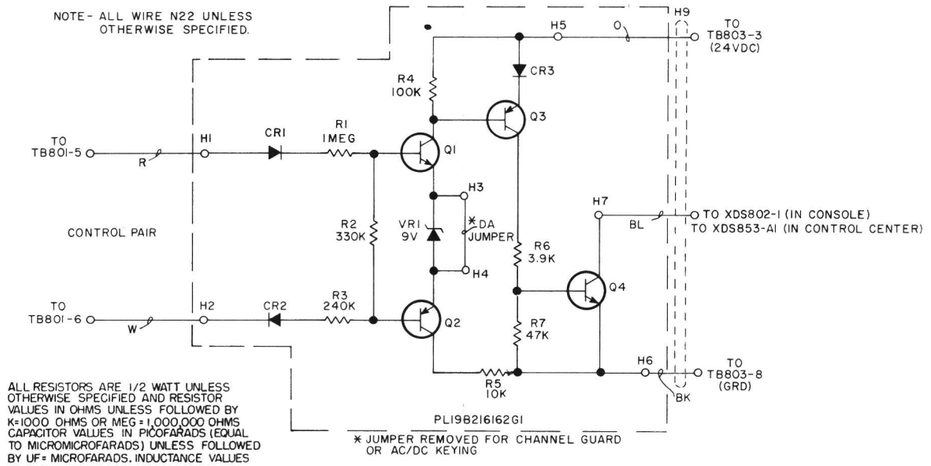
PARALLEL TRANSMIT INDICATOR
19A122250G29

SYMBOL	GE PART NO.	DESCRIPTION
		COMPONENT BOARD 19B216162G1
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1 and CR2	4037822P1	Silicon.
CR3	19A115250P1	Silicon.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q2 and Q3	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q4	19A115300P1	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P105J	Composition: 1 megohm ±5%, 1/2 w.
R2	3R77P304J	Composition: 0.30 megohm ±5%, 1/2 w.
R3	3R77P244J	Composition: .24 megohm ±5%, 1/2 w.
R4	3R77P104J	Composition: .10 megohm ±5%, 1/2 w.
R5	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R6	3R77P393J	Composition: 3900 ohms ±5%, 1/2 w.
R7	3R77P473J	Composition: 47,000 ohms ±5%, 1/2 w.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	4036887P1	Silicon, Zener.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4036555P1	Insulator disc. (Used with Q4).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

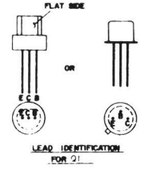
PARALLEL TRANSMIT INDICATOR OPTION 5183 19A1222G29

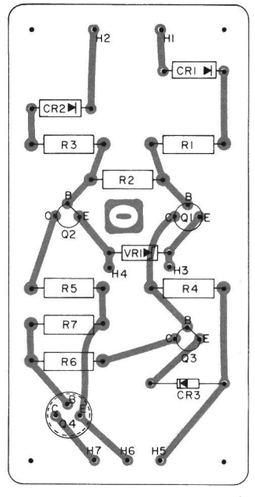
SCHEMATIC DIAGRAM



(19B216167, Rev. 2)

OUTLINE DIAGRAM





(19B216278, Rev. 0)
(19B216156, Sh. 1, Rev. 0)
(19B216156, Sh. 2, Rev. 0)

RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

SERVICE SHEET

PARALLEL TRANSMIT INDICATOR
PL-19A122250-G29
OPTION 5183

SPEAKER MUTING
OPTIONS 5104, 5105, & 5106)
19A122250G20, 21 & 22 (28 VOLT LAMP)
19A122250G34, 36 & 38 (6 VOLT LAMP)

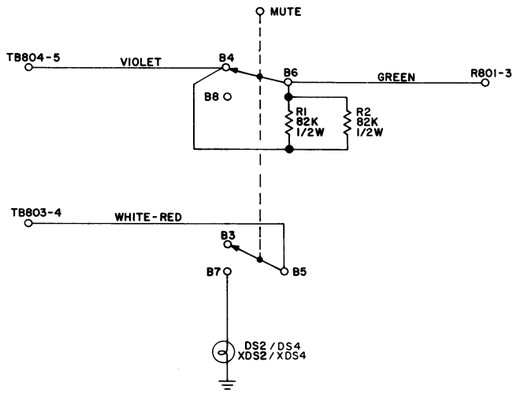
PARTS LIST

SPEAKER MUTING
19A122250G20-22
19A122250G34,36,38

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A122205G17	Button Assembly (MUTE).
		SWITCH ASSEMBLY 19B205356G4 19B205356G5 19B205356G6
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS1 and DS2	19C307037P20	Lamp, incandescent: 28 v; sim to GE 757.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R77P823K	Composition: 82,000 ohms ±10%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P8	Pushbutton (two): 2 form C contacts (non-shorting), 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1 and XDS2	19B209342P2	Lampholder: sim to Leecraft 7-04-1.
		SWITCH ASSEMBLY 19B205356G9 19B205356G12 19B205356G14
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS3 and DS4	19C307037P31	Lamp, incandescent: 6.30 v; sim to GE 1866.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R77P823K	Composition: 82,000 ohms ±10%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7775759P8	Pushbutton (two): 2 form C contacts (non-shorting), 2 amps at 28 VDC or 1 amp at 110 VAC; sim to Oak 247198-130.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS3 and XDS4	19B209342P2	Lampholder: sim to Leecraft 7-04-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

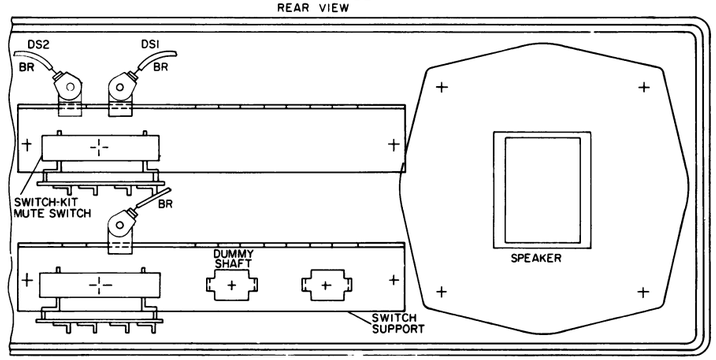
SCHEMATIC DIAGRAM



(19B205688, Rev. 3)

OUTLINE DIAGRAM

FRONT PANEL
REAR VIEW



(19C303961, Rev. 5)

SERVICE SHEET

SPEAKER MUTING
(OPTIONS 5104, 5105 & 5106)

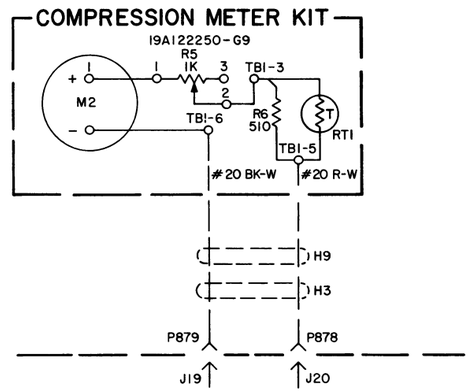
PARTS LIST

COMPRESSION METER
19A122250G9

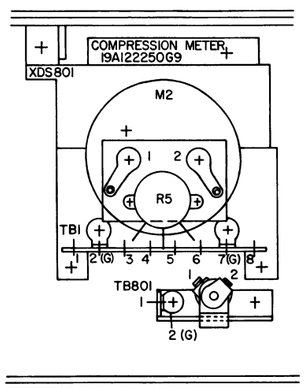
METER ASSEMBLY
19B205370G2

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - METERS - - - - - - - - - -
M2	19A115695P1	Panel, DC: 1 ma mechanism.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R6	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT1	5490828P33	Rod: 2200 ohms ±10%; sim to Globar Type 0325F.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7775500P24	Phen: 8 terminals.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B201074P305	Screw, tap: No. 6-32 x 5/16. (Used to mount plate).
	19A122216G1	Plate.
	4029840P1	Contact, electrical: sim to AMP 41854. (Located on loose ends of TB1-5 and TB1-6 wires).
	19A122260G1	Resistor board.
	4038027P1	Terminal, solderless. (Located on back of Meter).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.



AUDIO BOARD
A801



RC-2378

LINE COMPENSATION
OPTION 5169
19B216906G1

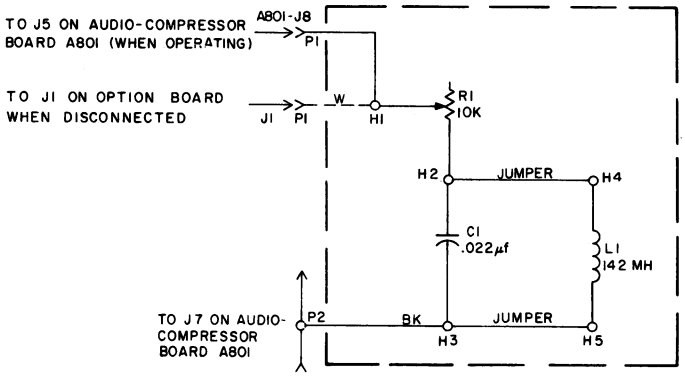
PARTS LIST

LINE COMPENSATOR
19B216906G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A116080P103	Polyester: 0.022 µf ±10%, 50 VDCW.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19B209405P1	Reactor, audio freq: 142 mh ±5%, at 0.1 v thru 0.27 v; sim to Aladdin 405-101.
		- - - - - - - - - - - PLUGS - - - - - - - - - -
P1	4029840P2	Contact, electrical: sim to Amp 42827-2.
P2	4033348P1	Contact, electrical: sim to Bead Chain M 125-34.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19B209358P6	Variable, carbon film: approx 75 to 10,000 ohms ±20%, 0.25 w; sim to CTS Type U-201.

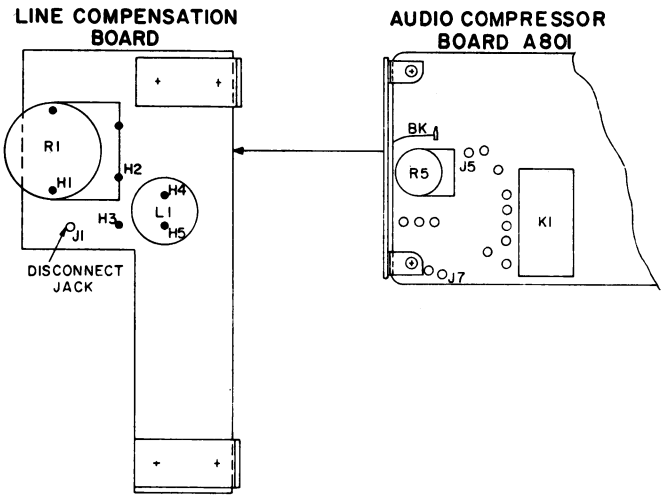
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SCHEMATIC DIAGRAM



(19C317615, Rev. 0)

OUTLINE DIAGRAM



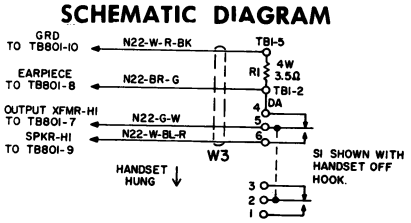
(19C317615, Rev. 0)

SERVICE SHEET

LINE COMPENSATION
(OPTION 5169)

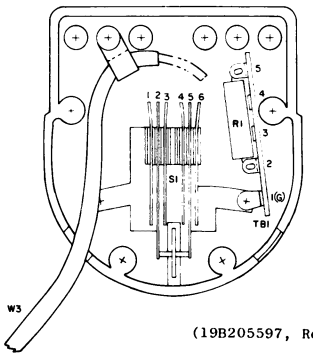
HOOKSWITCH 19A122250-G18

SCHEMATIC DIAGRAM



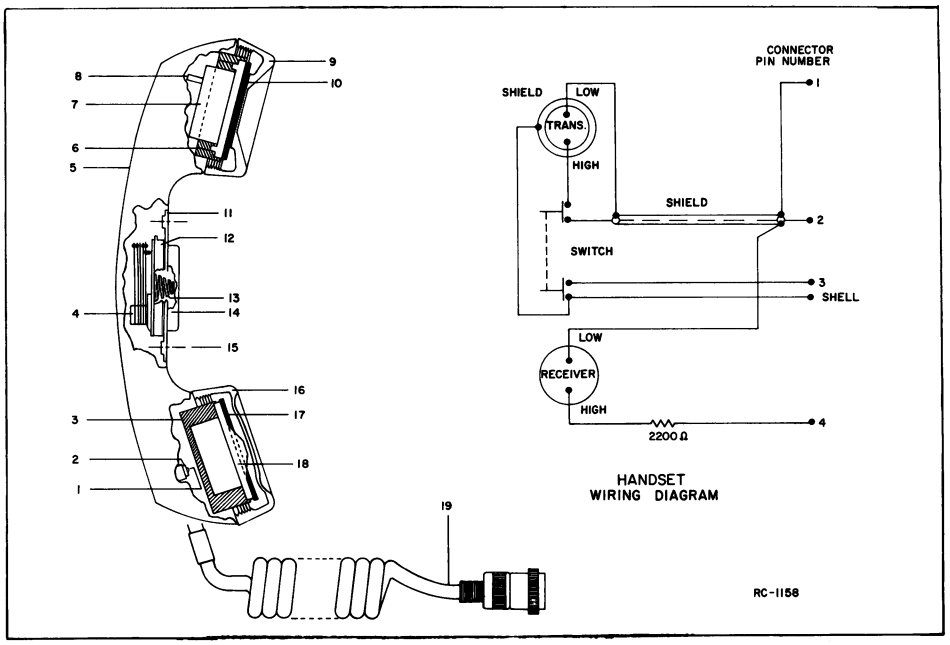
(19A122235, Rev. 1)

OUTLINE DIAGRAM



(19B205597, Rev. 0)

HANDSET MODEL 4EM26A10,C10



PARTS LIST

HANDSET HOOKSWITCH 19A122250G18

SYMBOL	GE PART NO.	DESCRIPTION
		HANDSET HOOKSWITCH ASSEMBLY 19B204867G3
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	5493035P10	Wirewound: 3.5 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19A121612P1	Holder and switch: black thermoplastic case, 2 form C contacts, 1 amp at 125 v; sim to Telephone Compnents Brook-Tel 1010S (modified).
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - - -
TB1	7775500P55	Phen: 5 terminals.
		- - - - - - - - - - - CABLES - - - - - - - - - -
W3	19A121720G2	Cable: approx 9 feet long.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

HANDSET
MODEL 4EM26A10
MODEL 4EM26C10
19B209100G1

SYMBOL	GE PART NO.	DESCRIPTION
		(REFER TO RC-1158)
1		Self tap screw, bind head: No. 4 x 5/16. Shure Brothers 30C640C.
2		Cable clamp. Shure Brothers 53A532.
3		Shield. Shure Brothers RP19.
4		Switch. Shure Brothers RP81.
5		Case. Shure Brothers RP49. (Used in 4EM26A10).
		Case. Shure Brothers 21RP899F. (Used in 4EM26C10).
6		Adapter. Shure Brothers 65A230.
7		Magnetic controlled cartridge. Shure Brothers RP41.
8	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
9		Receiver cap. (Part of item 5).
10		Washer. Shure Brothers 34A321.
11		Escutcheon. Shure Brothers 53A536A.
12		Actuator. Shure Brothers 53A556.
13		Spring. Shure Brothers 44A140.
14		Plunger bar. Shure Brothers RP82.
15		Flat head screw, socket cap: No. 4-40 x 1/4. Shure Brothers 30C557B.
16		Transmitter cap. (Part of RP49).
17		Washer. Shure Brothers 34A309.
18		Magnetic controlled cartridge. Shure Brothers RP13.
19		Cable and plug. Shure Brothers RP48. (Used in 4EM26A10).
		Cable and plug. Shure Brothers 21RP738F. (Used in 4EM26C10).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SERVICE SHEET

HANDSET & HOOKSWITCH
(OPTIONS 5002 & 5004)

PARTS LIST

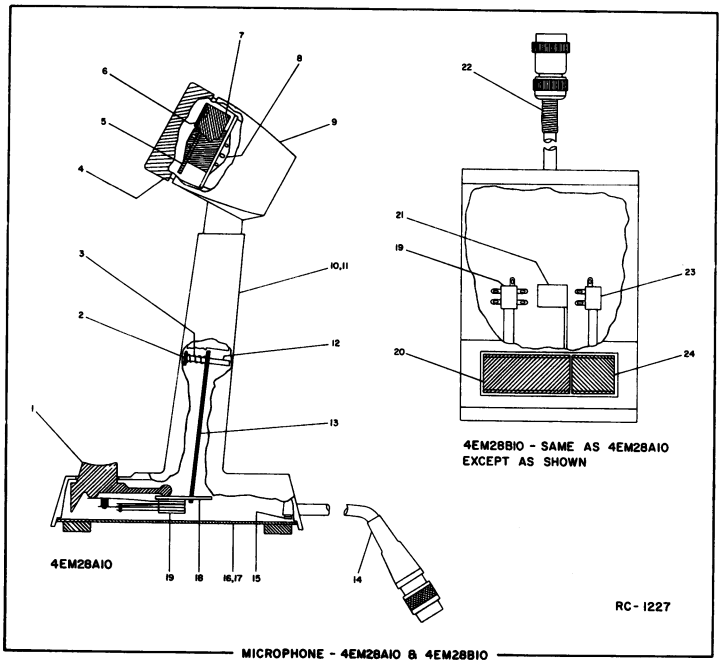
LBI-3623B

MAGNETIC CONTROLLED DESK MICROPHONE

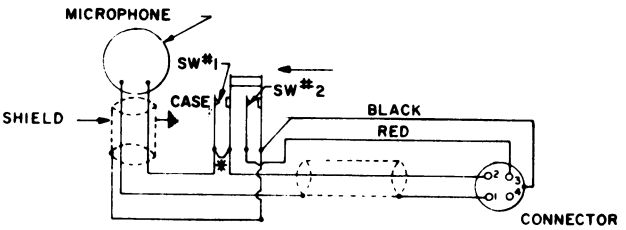
MODEL 4EM28A10 (19C307105-P1)
MODEL 4EM28B10 (19C307106-P1)
(SEE RC-1227)

SYMBOL	G-E PART NO.	DESCRIPTION
		MECHANICAL PARTS
		MODEL 4EM28A10
1		Pushbutton. Shure Brothers RP-68.
2		Washer. Shure Brothers 30A697.
3		Spring. Shure Brothers 44A149.
4		Cap and grille. Shure Brothers RP-72.
5		Magnetic controlled cartridge. Shure Brothers RP-13.
6		Washer. Shure Brothers 34A223.
7		Shield. Shure Brothers 53A528.
8		Damping pad. Shure Brothers 20B33.
9		Housing. (Part of item 4).
10		Base. (Part of item 4).
11		(Not used).
12		Pin. Shure Brothers 31A848.
13		Bracket. Shure Brothers 53A637.
14		Cable and plug. Shure Brothers RP-65.
15		Cable clamp. Shure Brothers 53A532.
16		Bottom plate. Shure Brothers 90A1015.
17		(Not used).
18		Mounting bracket. Shure Brothers 53A633.
19		Switch. Shure Brothers RP-70.
		MODEL 4EM28B10
1		(Not used).
2		Washer. Shure Brothers 30A697.
3		Spring. Shure Brothers 44A149.
4		Cap and grille. Shure Brothers RP-72.
5		Magnetic controlled cartridge. Shure Brothers RP-13.
6		Washer. Shure Brothers 34A223.
7		Shield. Shure Brothers 53A528.
8		Damping pad. Shure Brothers 20B33.
9		Housing. (Part of item 4).
10		(Not used).
11		Base. (Part of item 4).
12		Pin. Shure Brothers 31A848.
13		Bracket. Shure Brothers 53A637.
14		(Not used).
15		Cable clamp. Shure Brothers 53A532.
16		(Not used).
17		Bottom plate. Shure Brothers 90B1015.
18		Mounting bracket. Shure Brothers 53A633.
19		Switch. Shure Brothers RP-71.
20		Pushbutton (Transmit). Shure Brothers RP-69.
21		Locking arm. Shure Brothers 53A667.
22		Cable and plug. Shure Brothers RP-66.
23		Switch. (Part of item 19).
24		Pushbutton (Monitor). (Part of item 20).

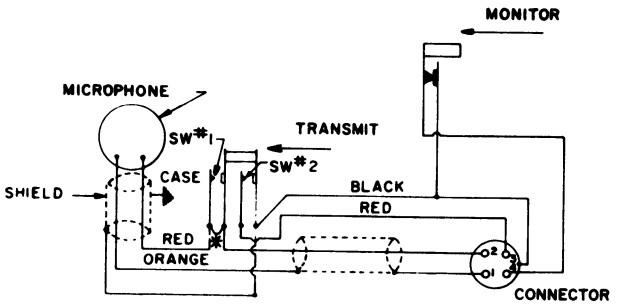
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.



MICROPHONE - 4EM28A10 & 4EM28B10



CIRCUIT DIAGRAM
4EM28A10



CIRCUIT DIAGRAM
4EM28B10

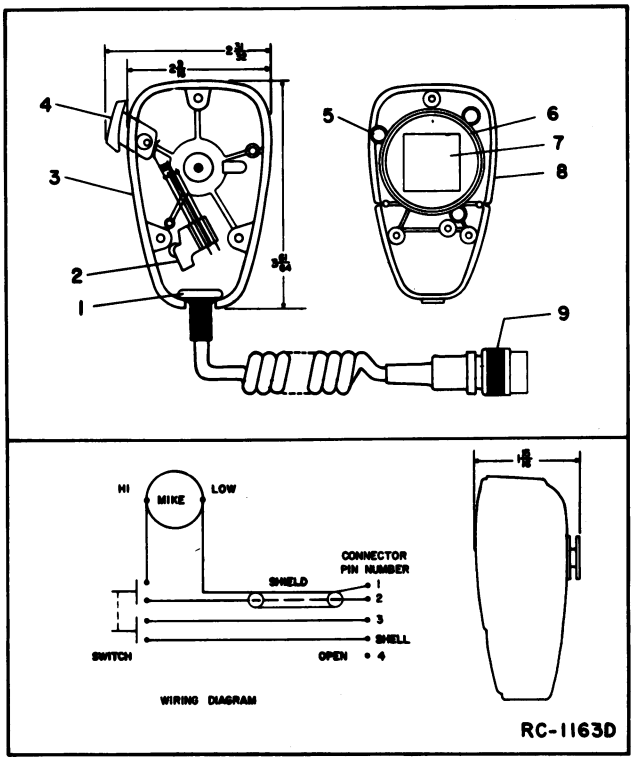
* JUMPER MAY BE REMOVED FOR PARALLEL OR SPECIAL OPERATION

NOTES:

1. SWITCH #1 OF THE MICROPHONE CIRCUIT MUST CLOSE FIRST AND OPEN LAST.
2. MONITOR AND TRANSMIT BUTTONS ARE MECHANICALLY INTERLOCKED, MAKING IT NECESSARY TO PRESS MONITOR BUTTON BEFORE TRANSMITTING. TO MONITOR CONTINUOUSLY, PRESS MONITOR BUTTON DOWN AND SLIDE FORWARD TO "LOCK" POSITION. PRESS AND PUSH BACK BUTTON TO RELEASE. TO OPERATE MONITOR AND TRANSMIT FUNCTIONS INDEPENDENTLY, REMOVE LOCKING ARM BRACKET (PART 21 SHOWN ABOVE AND IN PARTS LIST).

SERVICE SHEET

DESK MICROPHONES
MODELS 4EM28A10 & B10



PARTS LIST

LBI-3558B

MILITARY MICROPHONE
MODEL 4EM25A10
(PL-19B209102-G1)
(SEE RC-1163)

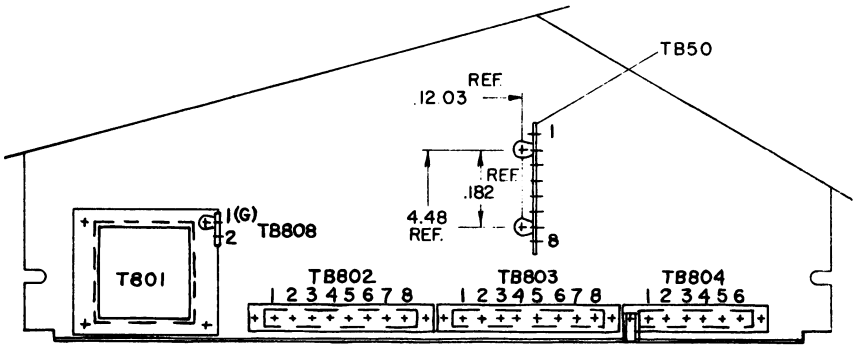
SYMBOL	G-E PART NO.	DESCRIPTION
		MECHANICAL PARTS
		MODEL 4EM25A10
1		Cable clamp. Shure Brothers RP-16.
2		Switch. Shure Brothers RP26.
3		Case (back) and mounting button: plastic. Shure Brothers RP-67.
4		Switch button: red plastic. Shure Brothers RP-25.
5		Spring. Shure Brothers RP-1.
6		Shield. Shure Brothers RP-23.
7		Magnetic controlled cartridge. Shure Brothers RP-13.
8		Case (front) plastic. (Part of item 3).
9		Cable and plug: approx 6 feet long. Shure Brothers RP-14.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SERVICE SHEET

MILITARY MIKE - 19B209102-P1
(OPTIONS 5008 & 7705)

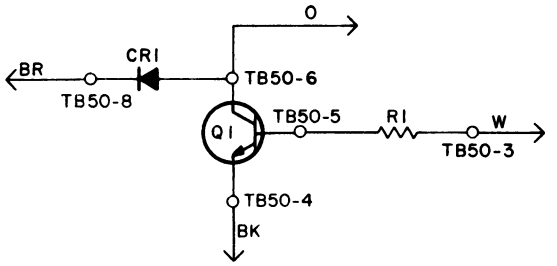
OUTLINE DIAGRAM



CONNECTION CHART		
FROM	TO	WIRE COLOR
TB50-8	TB804-1	BR
TB50-3	TB804-2	W
TB50-6	TB803-6	O
TB50-4	TB804-4	BK

(19C317832, Rev. 1)

SCHEMATIC DIAGRAM



(19C317832, Rev. 1)

PARTS LIST

RECEIVER VOTING AND CHANNEL GUARD
MODIFICATION KIT
19A129026G1

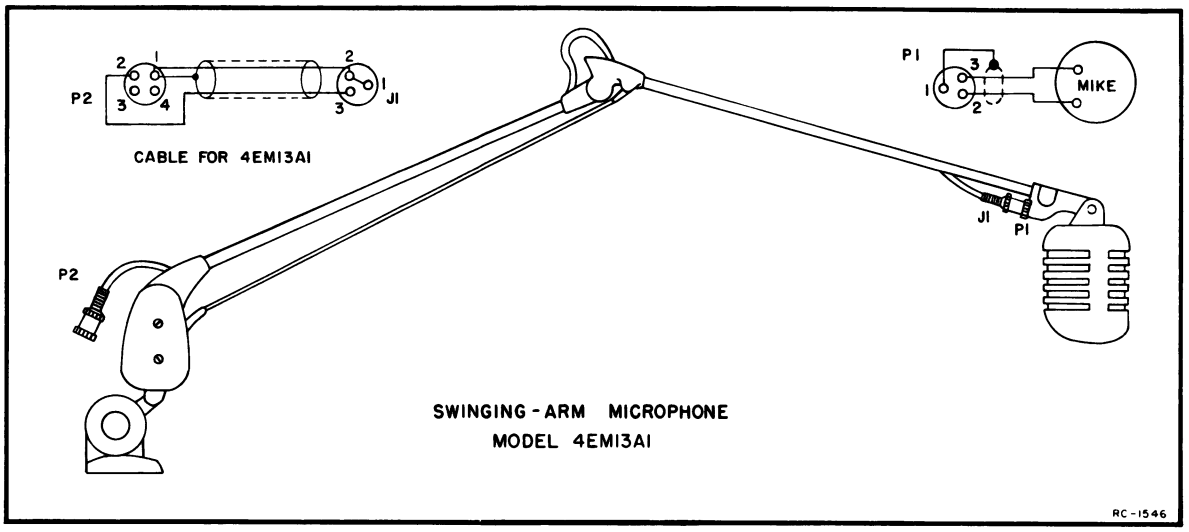
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1	4037822P1	Silicon.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115300P3	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - - RESISTORS - - - - - - - -
R1	3R77P303J	Composition: 30,000 ohms ±5%, 1/2 w.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB50	7775500P24	Phen: 8 terminals.
		- - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B209260P103	Terminal, solderless; sim to AMP 60495-1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SERVICE SHEET

RECEIVER VOTING
WITH CHANNEL GUARD

SWINGING - ARM MIKE MODEL 4EM13A1
(OPTIONS 5005 & 5006)
(Mtg Kit 7774934-P2)



PARTS LIST

SWINGING ARM MICROPHONE
MODEL 4EM13A1

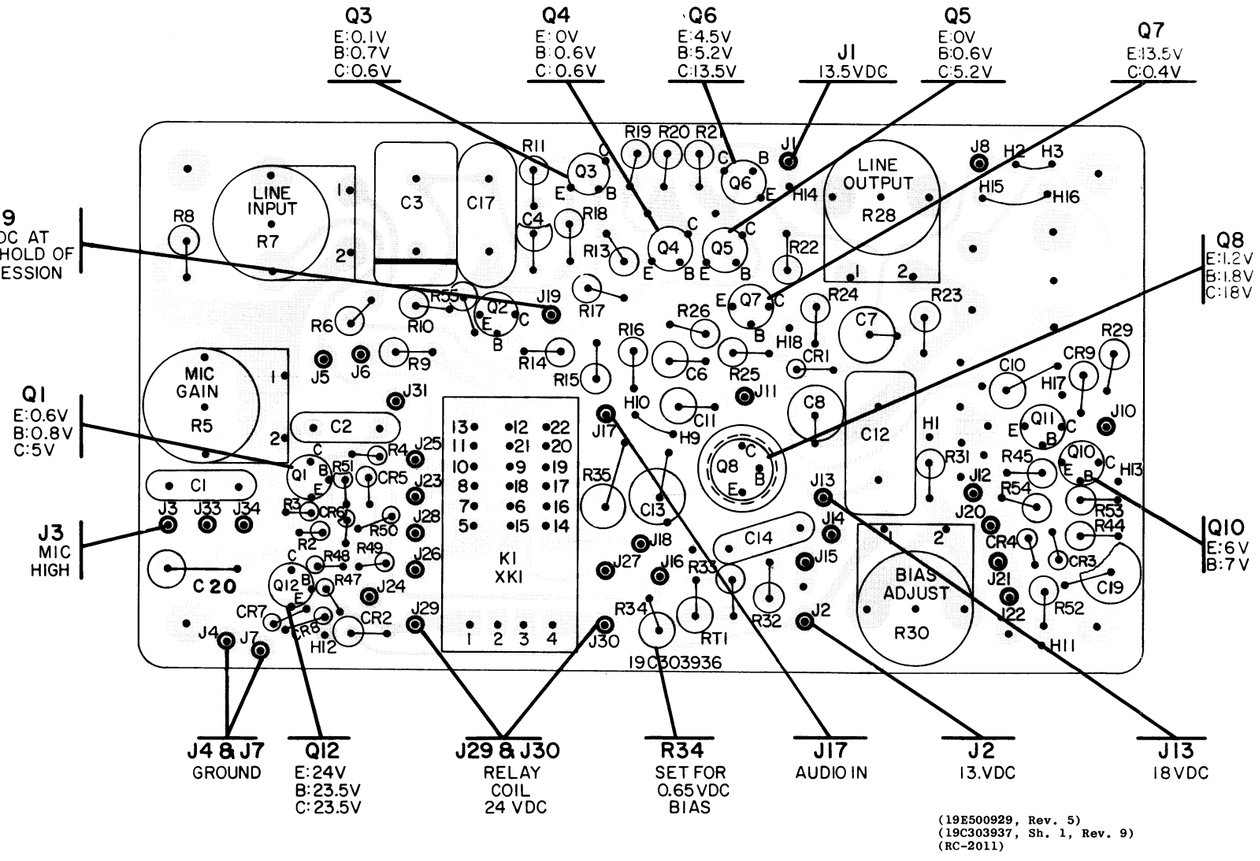
SYMBOL	G-E PART NO.	DESCRIPTION
	7487533-P1	Dynamic microphone, multi-impedance: moving coil, 1000 cps response, 0-80° swivel adjustment; sim to Shure Brothers 55S. Includes:
P1	7478726-P2	Connector, cable: 4 female contacts; sim to Amphenol 91-MC4F.
	7774934-P2	Microphone bracket: 24 inch reach, shielded 2 conductor rubber or polyvinyl jacket. Includes:
J1	7478726-P5	Connector, cable: 3 male contacts; sim to Amphenol Type 91-MC3M.
P2	7478726-P6	Connector, cable: 4 male contacts; sim to Amphenol Type 91-MC4M.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SERVICE SHEET

SWINGING-ARM MICROPHONE MODEL 4EM13A1
(OPTIONS 5005 & 5006)

AUDIO BOARD
A801



(19E500929, Rev. 5)
(19C303937, Sh. 1, Rev. 9)
(RC-2011)

TROUBLESHOOTING PROCEDURE

TRANSISTORIZED CONTROL CONSOLE
MODEL 4EC71A11

TROUBLESHOOTING VOLTAGE READINGS...

TROUBLESHOOTING PROCEDURE

Voltage readings are DC readings measured with a 20,000 ohm-per-volt meter measured from the point indicated to ground, and with no signal applied.

NOTE

Reading at the emitter of Q7 indicates threshold of compression.

SYMPTOM	PROCEDURE
No audio from the speaker.	1. Check the audio input with an AC-VTVM across TB801-1 & -2. 2. Make sure that VOLUME control R801 is not set at minimum (fully counterclockwise). 3. Check to see that the Console is not in the transmit mode (red Transmit light on). If the lightis on, check for a short in the push-to-talk circuit. 4. Check the audio input with an AC-VTVM at A801-J17. If no audio, check T802 and C805. 5. Check the setting of LINE INPUT control R7 (refer to the Adjustment Procedure). If R7 cannot be adjusted for the correct reading, check relay contacts K1-11, -12 and -13. 6. Check supply voltages at J1, J2, and J14 on A801 as shown on the Troubleshooting Diagram. 7. Check Bias Adjust R30 for a setting of 0.65 volt DC measured across R34 on A801. If R30 cannot be adjusted for the correct reading, check Q8, Q801, T803 and relay contacts K1-14, -15 and -16. 8. Check the DC voltages on Q3 thru Q6 as shown.
No audio on the line when the microphone is keyed.	1. Check the microphone leads, and relay contacts K1-11 thru -22. 2. Check the setting of MIC GAIN R5 and LINE OUTPUT R28 (refer to the Adjustment Procedure). 3. Key the microphone and check the DC voltages on Q1 as shown. 4. Check capacitor C13 on A801.
No control current at the control pair. Refer to Figure 5 for control currents and functions.	1. Check to see that relay K1 picks up when the microphone is keyed. If the relay doesn't pick up, check for 24 volts DC at A801-J30. If 24 volts is present, check continuity between J801-3 and J29, and check for an open between J29 and J30 (relay coil). 2. With the microphone unkeyed, check for a reading of 150 to 200 volts DC between TB802-3 and TB802-6. 3. Check the jumper connections on TB801 and TB802 (refer to the Schematic Diagram and to the applicable Service Sheet for accessory kits and options).

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-4150

DF-4077

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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