MOBILE RADIO

MAINTENANCE MANUAL

MOBILE CONTROL UNIT MODELS 4EC59A95-98 WITH 2 FREQUENCY PRIORITY SEARCH LOCK MONITOR (Options 7380-7383)

SPECIFICATIONS *

MODEL NUMBERS	4EC59A95 through 4EC59A98
USED WITH	MASTR Professional Series 4-Frequency Mobile Combinations
CONTROLS	VOLUME Control SQUELCH Control OFF-ON-STBY Switch SEARCH-OFF Switch F1-F4 Selector Switch
OPTIONAL CONTROLS	CHANNEL GUARD Monitor Switch
INDICATORS	Transmitter filament-on light: green Transmit light: red Frequency Select Indicators
PRIORITY SQUELCH SENSITIVITY	20-dB quieting
TEMPERATURE RANGE	-30°C to +60°C

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

EC-59-A

GENERAL ELECTRIC

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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.

DESCRIPTION

MASTR Progress Line Control Units with two-frequency Priority Search-Lock Monitors (Models 4EC59A95-98) are used in three or four frequency MASTR mobile combinations. These control units are compact, highly functional units designed for Trunk Mount installation. A plate is installed on the back of the control unit to hold the connectors. A mounting bracket is supplied for mounting the control unit within convenient reach of the operator. Cable connections are secured to the control unit by means of captive locking screws.

The two-frequency Priority Search-Lock Monitor (PSLM) has the feature of selecting either the priority or the non-priority channel from one of four frequencies by using the frequency selector switch on the control unit. The PSLM assures reception of all signals on the priority channel regardless of signal strength or which channel receives the first signal.

When a signal is received on the priority channel, the PSLM stops searching and locks on the priority channel for the duration of the message. When a signal is received on the non-priority channel, the PSLM stops on that channel but continues to monitor the priority channel. If a signal is then received on the Priority channel the PSLM reverts to the priority channel and locks for the duration of the priority message.

Either the priority or the non-priority channel is pre-selected in the control unit. The second channel to be searched can then be selected from the remaining channels by means of the frequency selector switch on the control unit. If the pre-selected channel is priority, the non-priority channel can be selected with the frequency selector switch from the remaining three or four channels. If the pre-selected channel is non-priority, the priority channel can be selected with the frequency selector switch.

An automatic pilot light dimmer has been incorporated in these control units. This dimmer uses a photo-resistor to sense ambient light and adjust the lamp regulator to provide the proper lamp current to the pilot lamps for the existing ambient light conditions. The intensity of the green power on lamp and the four channel lamps are controlled by this automatic pilot light dimmer. The red transmit lamp intensity is not adjustable. The lamps are extinguished wher the combination is in STANDBY.

The mobile option numbers and the applications of each option are shown in the following chart.

OPTION NUMBER	MODEL NO.	CHANNEL GUARD SWITCH	TONE OPTION JACK
7380	4EC59A95		
7381	4EC59A96	X	
7382	4EC59A97		X
7383	4EC59A98	X	X

NOTE

The PSLM is compatible with receive Channel Guard in the five-Watt MASTR mobile receiver. PSLM is not compatible with two-Watt receivers with Channel Guard. The presence or absence of the correct Channel Guard encode tone will only determine whether audio is or is not heard from the speaker. Priority channel will always be heard. Carrier without Channel Guard will not be heard, but the channel lamp will light and serve as a channel busy indicator.

CIRCUIT ANALYSIS

CONTROLS

In addition to VOLUME and SQUELCH controls, the control units are provided with the controls described in the following paragraphs.

OFF-ON-STBY Switch (S701)

The OFF-ON-STBY (standby) switch determines the operating modes of the transmitter and receiver. With the switch in the OFF position, all power is removed from the Two-Way Radio. Turning the switch to STBY applies power to the receiver only, and the green pilot lamp does not light.

Turning the switch to the ON position applies filament voltage to the transmitter, activates the push-to-talk (PTT) circuits, and lights the green power-on pilot lamp. After a short warm-up time, the PTT button may be pressed to key the transmitter. Pushing the PTT button energizes the system relay which, in turn, activates the power supply, switches the antenna and mutes the receiver. Keying the transmitter also lights the red transmit pilot lamp.

F1-F4 Frequency Selector Switch (S702)

The frequency selector switch selects the desired channel (F1-F4) for both transmitting and receiving. However, frequency selection for the receiver is also determined by the SEARCH-OFF switch S703.

Connecting jumpers on S702-9S through 12S gives combinations of transmit channel (F1-F4) and transmit Channel Guard Encode (see Schematic Diagram 19R621465).

SEARCH-OFF Switch (S703)

When switch S703 is in the SEARCH Position, PSLM operation is selected. This gives priority to the pre-selected channel. The OFF position of S703 disables the PSLM. In this condition, the position of the frequency selector switch determines which channel is monitored.

When the SEARCH-OFF switch is OFF, the frequency selector switch connects +10 Volts to the selected receiver oscillator switching diode and connects the transmitter oscillator switching diode to ground. This permits the unit to operate on the frequency determined by each of the crystal-controlled oscillators.

When SEARCH is selected, the +10 Volts is applied to the pre-selected receiver oscillator from the PSLM circuits. The transmitter oscillator switching diode connected to ground is determined by the position of the frequency selector switch. The position of the frequency selector switch also determines which channel is the non-priority channel to be monitored.

INDICATOR LIGHT CONTROL CIRCUITS (A702)

Turning the OFF-ON-STBY switch to the ON position completes the emitter circuit of series regulator transistor Q701. Conduction of Q701 lights the green power-on lamp. Current through Q701 is controlled by the conduction of Q1, whose base bias is controlled by the setting of adjustable potentiometer R4 and the series resistance of photo-resistor V701. The resistance of V701 is determined by the ambient light falling on its photosensitive surface.

When the receiver is squelched, a positive monitor lock voltage is applied to the base of Q7, turning it on. With Q7 conducting Q6 will not conduct. When a signal is received the monitor lock voltage is removed from the base of Q7 and Q7 is turned off. With Q7 not conducting Q6 will conduct, grounding the emitters of Q2-Q5. Depending on which frequency is being received, +10 Volts is applied to the base of the corresponding lamp control transistor (Q2-Q5), causing the transistor to conduct through its associated frequency indicator lamp and the series regulator circuit.

When the SEARCH-OFF switch is in the OFF position, the +10 Volts is applied to the control transistors through the frequency selector switch.

12-VOLT SYSTEMS

In 12-Volt vehicle systems, the Control Unit may be connected for three different modes of operation, depending on the way the three ignition switch cables are connected in the vehicle system. The black ignition switch cable provides the receiver ground connection. The yellow fused lead provides the receiver hot connections, and the red fused lead provides the hot connections for the transmitter filaments. The three types of operation are:

1. Ignition Switch Standby - For this type of operation, the red fused lead (transmitter filament voltage) is connected to the ACCESSORY or ON terminal of the ignition switch. The yellow fused lead (receiver hot) is connected to the hot side of the ignition switch, and the black lead connects to vehicle ground.

   With the ignition switch OFF, the receiver automatically reverts to STBY, ready to receive messages. Turning the ignition switch to the ON or ACCESSORY position turns on the green pilot light and supplies transmitter filament voltage. Turning the OFF-ON-STBY switch to OFF removes all power to the Two-Way Radio.

2. Ignition Switch Control - For ignition switch control, the yellow and red fused leads are connected to the ACCESSORY or ON terminal of the ignition switch. The transmitter and receiver will operate only when the ignition switch is in the ACCESSORY or ON position. Turning the ignition switch OFF removes all power to the radio.

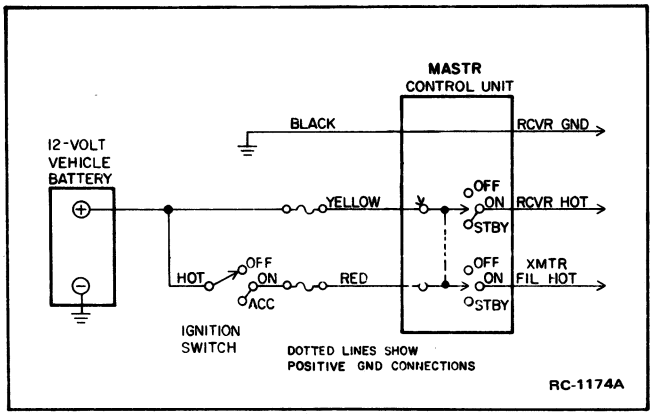


Figure 1 - 12-VDC Connections for Ignition Switch Standby

3. Ignition Switch Bypass - For ignition switch bypass, the yellow and red fused leads connect to the "hot" side of the ignition switch or the vehicle fuse block assembly. Both the transmitter and receiver operate independently of the ignition switch and can be turned on and off only by the OFF-ON-STBY switch on the MASTR Control Unit.

LOGIC CIRCUITS

This section contains a detailed description of all of the logic circuits used in the PSLM board. It is suggested that the serviceman study the following information carefully, as a good understanding of basic logic circuitry is essential for servicing the PSLM.

SOLID STATE SWITCHES

An ideal switch has infinite resistance when open and zero resistance when closed. The transistor and semiconductor diode can be made to approach these conditions while operating at a much higher rate than conventional switches. Logic circuits are primarily switching devices which are either in a state of full conduction (saturated) or turned off. These devices can be switched from one state to the other as rapidly as required by the circuit function.

DIODE SWITCH

A semiconductor diode presents maximum resistance to the circuit when the diode is reverse-biased or there is no difference of potential between the cathode or anode (see Figure 2). Applying a negative potential to the cathode of the diode (with respect to the anode), or a positive potential (with respect to the cathode) to the anode of sufficient amplitude to overcome the series resistance of the diode, forward biases the diode causing it to conduct. The diode now switches from maximum to minimum resistance.

The resulting current flow in the diode circuit increases from near zero to the maximum value allowed by the amplitude of the switching voltage and the series resistance of the circuit.

TRANSISTOR SWITCH & INVERTER

The high value of "off" resistance and the low value of "on" resistance make the transistor invaluable for switching applications. When no base current is applied to the transistor switch shown in Figure 3, and the collector has the proper voltage applied, the open circuit resistance of the transistor approaches several megohms. If sufficient base current is suddenly applied to drive the transistor into saturation (turned ON), the collector-emitter resistance will drop to as low as 1.0 ohm. Voltage across the transistor under these conditions may be only a few tenths of a Volt.

The transistor stage shown in Figure 3 can also be used as an inverter for reversing the polarity of the input signal. A positive signal applied to the base-emitter junction will cause the collector voltage to drop from +6 Volts to near ground potential.

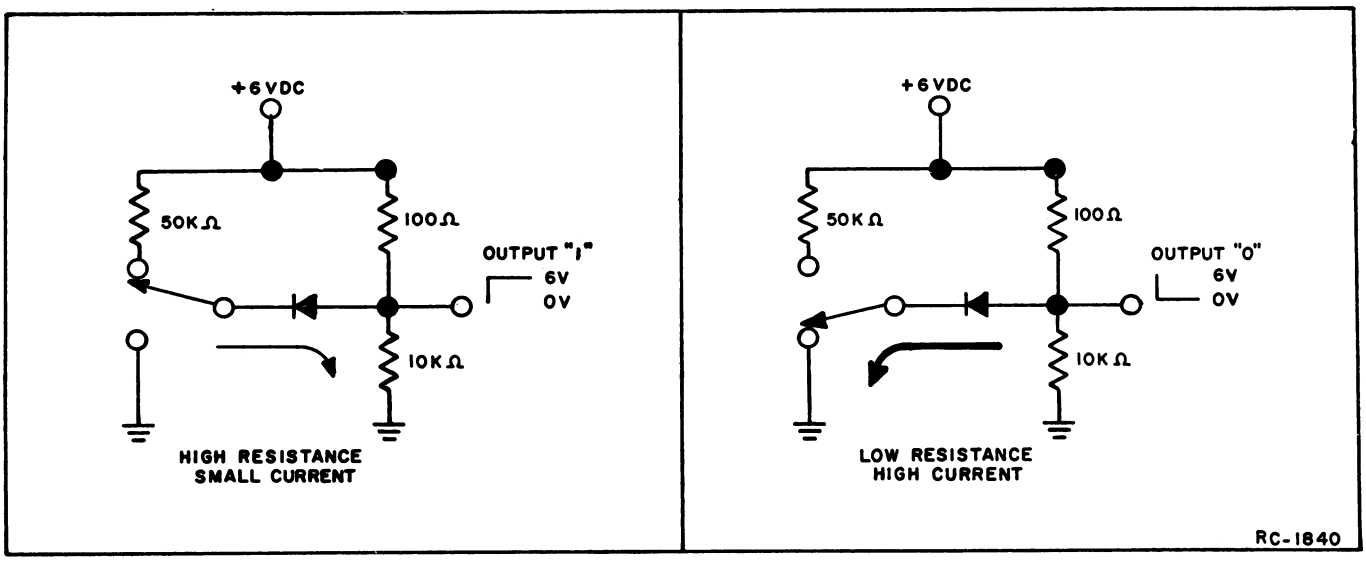


Figure 2 - Diode Switching Circuit

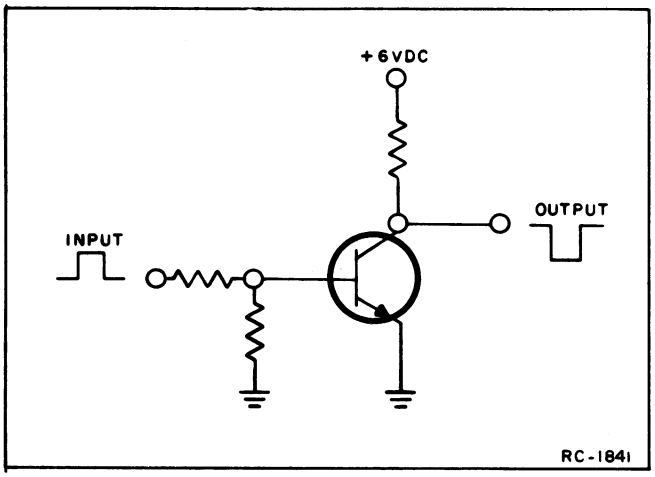


Figure 3 - Transistor Switch & Inverter

GATING CIRCUITS

Formal logic requires that a statement be either true or false; no other condition can exist for the statement. A logic circuit is basically a switch or gate that is either closed or open; no other condition can exist for the circuit. By logical arrangement of these gating circuits, electrical functions can be performed in a pre-determined sequence by opening or closing the gates at the proper time.

A single-pole, single-throw switch is equivalent to a binary device with only two possible operating conditions: either open or closed. If point "C" of Figure 4 is to be made equal to potential V, switches A and B must be closed. It can then be said that A AND B = C. If switches A and B are considered as gates, then potential V is said to be gated to "C" when both gates are closed. By representing the closed state of a switch or gate as "1" and the open state of a switch or gate as "0", then all possible conditions for the AND gate are shown in the Truth Table in Figure 4.

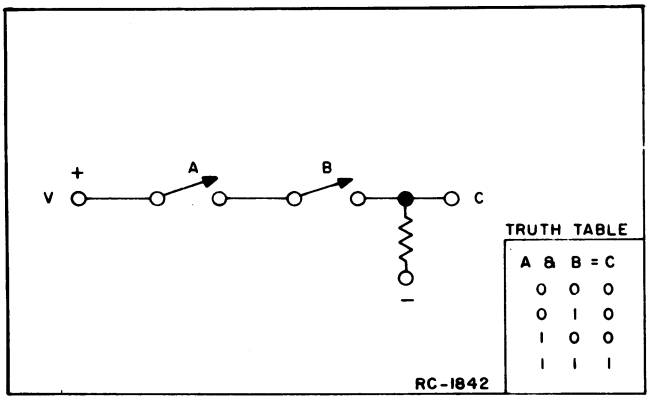


Figure 4 - Simple AND Gate

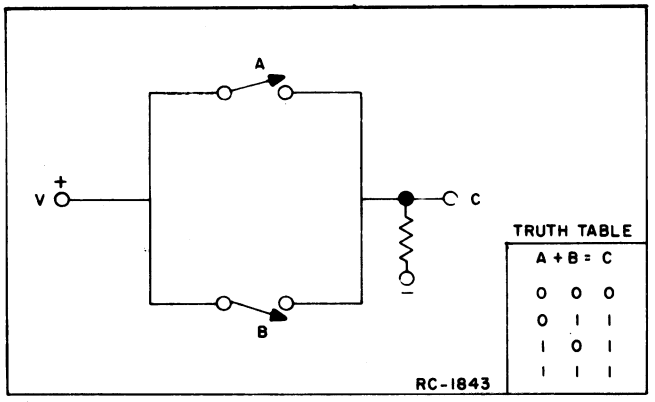


Figure 5 - Simple OR Gate

In Figure 5, if point "C": is to be made equal to potential V, either switch A or B (or both) may be closed. It can then be said A OR B = C. All possible conditions for the OR gate are shown in the Truth Table in Figure 5.

DIODE GATING CIRCUITS

In gating circuits, the desired state of the gate may be represented by either "0" or "1". In this section, "1" will be used to represent a positive potential (approximately +6 Volts) and "0" will be used to represent a low potential (near zero Volts).

Logic Symbols

The use of logic symbols in this manual provides a simple method of showing the function of complicated logic circuits without drawing each diode, resistor and tran-

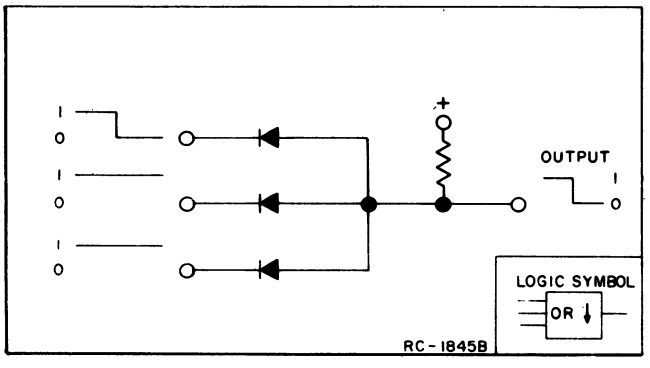


Figure 6 - Diode OR Gate

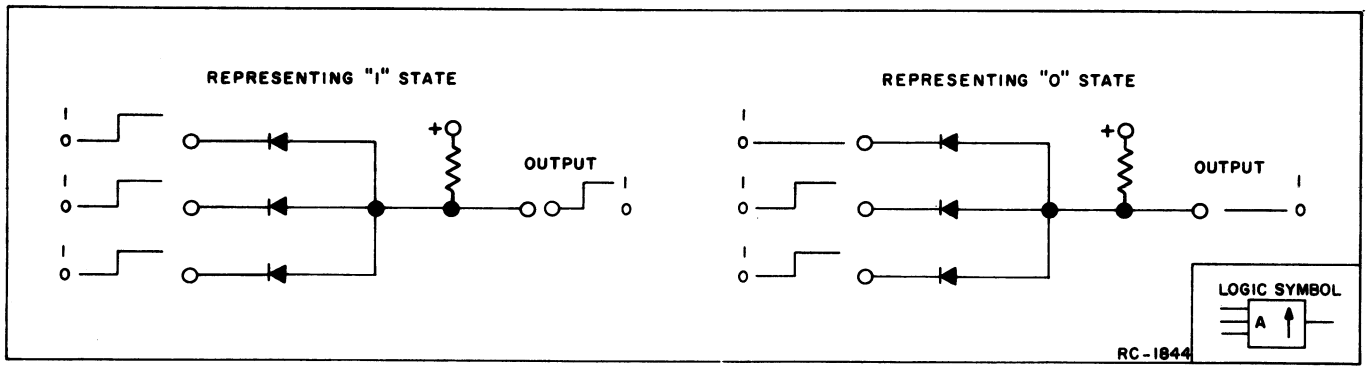


Figure 7 - Diode AND Gate

sistor in the circuit. The individual symbols can be tied together to form a logic diagram of a complete unit. Logic symbols of circuits used in the PSLM are shown in the following simplified diagrams.

OR Gate

A simple diode OR gate is shown in Figure 6. The same conditions exist in this circuit as the switch gate of Figure 5. Application of a positive potential at any of the inputs will result in an output of the same polarity, representing the "1" state.

AND Gate

A simple diode AND gate is shown in Figure 7. The same conditions exist in this circuit as in the switch gate of Figure 4. Application of a positive potential to the diodes at all inputs will result in a positive potential at the output. This represents the "1" state of the gate. Application of a positive potential to one or two terminals will result in no potential developed, representing the "0" state of the gate.

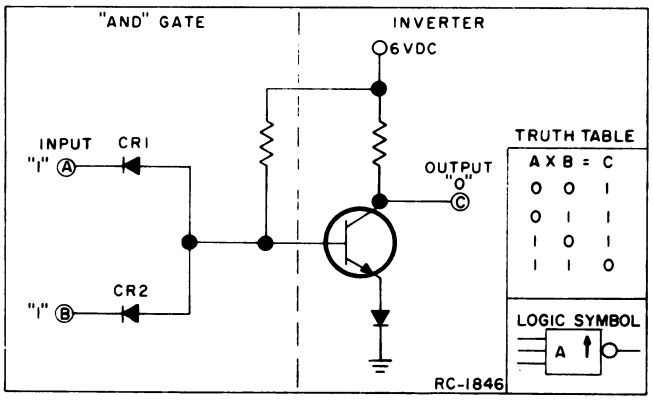


Figure 8 - Simplified NAND Gate

NAND Gate

The basic logic circuitry used in the PSLM is the NAND gate (NOT-AND). A NAND gate is simply an AND gate with a transistor inverter (NOT) stage added (see Figure 8). Applying a positive potential to inputs A and B back biases diodes CR1 and CR2, permitting inverter Q1 to conduct. When conducting, the collector of Q1 drops to near ground potential.

Additional buffer or amplifier stages are usually added to the NAND gate to provide better isolation and increased gain. These additional stages are connected so that the logical output of the inverter is not changed.

NAND Gate One-Shot

Two NAND gates may be connected as shown in Figure 9 to provide virtually the same function as a conventional "one-shot" multivibrator. One of the NAND gates is required to have a direct input (called an expander node).

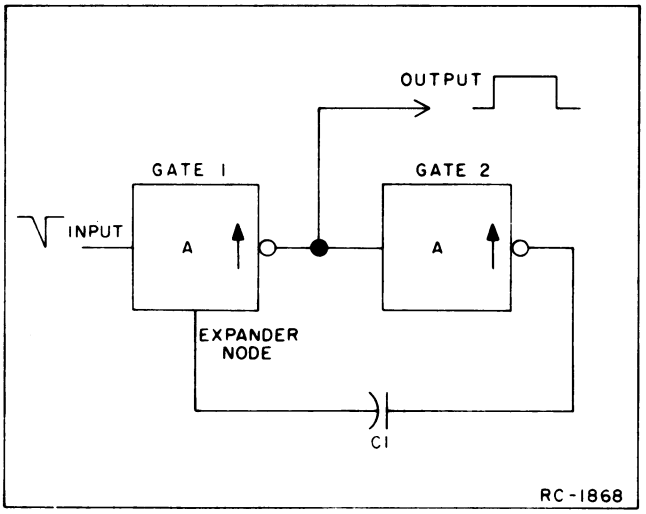


Figure 9 - NAND Gate One-Shot

Assume that the inputs to Gate 1 are positive, making the output near ground potential. This ground is applied to the input of Gate 2, making its output positive so that C1 charges. Applying a negative-going pulse to the input of Gate 1 causes its output to go positive. This positive output is applied to the input of Gate 2, causing its output to drop to ground, discharging capacitor C1. C1 starts charging through the circuitry in Gate 1, keeping the output of Gate 1 positive until the capacitor charges. When C1 is charged, both inputs to Gate 1 are positive, and the output drops to near ground potential. The output of the "one-shot" is a square wave whose pulse width is determined by the value of C1 and the resistance in NAND Gate 1.

FLIP-FLOPS

Two NAND gates connected as shown in Figure 10 will provide the same logic functions as the conventional flip-flop (bistable multivibrator).

Assume that a positive potential is applied to all inputs. Momentarily grounding the cathode of CR4 turns off Q2, causing its collector voltage to rise to approximately +6 Volts. This turns on Q1, causing its collector voltage to drop to near ground potential, keeping Q2 turned off. The flip-flop will remain in this state until CR1 is grounded.

Usually, two or more of the flip-flops are connected in a "master-slave" configuration (one flip-flop driving the other) for additional flexibility. Terminal identification for the flip-flop is shown in Figure 11A. However, the flip-flops used in the PSLM are actually connected as shown in Figure 11B, with external connections from input terminal 3 to output terminal 5, and from input terminal 2 to output terminal 6. This leaves terminal 1 as the input terminal 1 or "Trigger". A flip-flop connected in this manner (J-K connected) will change state each time a pulse is applied to the trigger (terminal 1).

For purposes of simplicity, supply the ground terminals (as well as any unused terminal) are not shown in the logic diagrams.

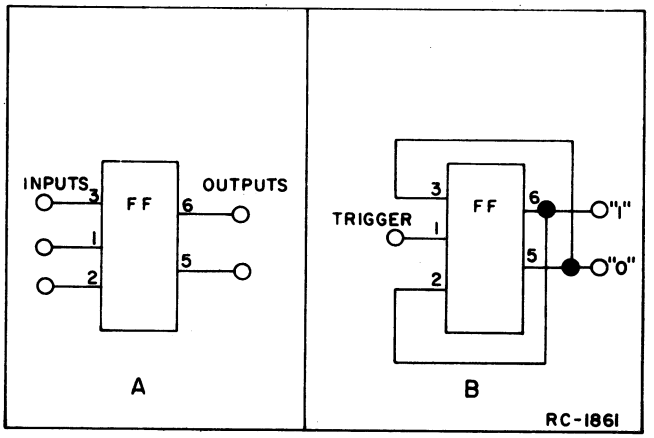


Figure 11 - Flip-Flop Terminal Identification

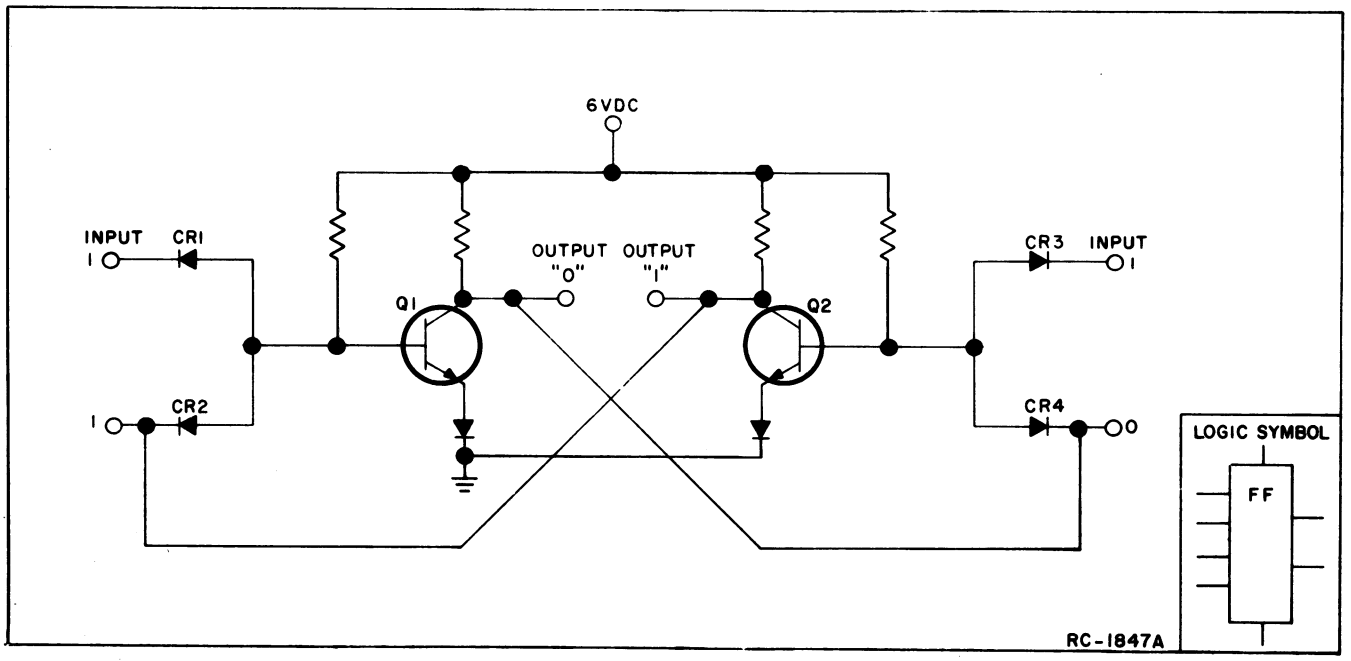


Figure 10 - NAND Gate Flip-Flop

PSLM CIRCUITS (A703)

The Priority Search-Lock Monitor is fully transistorized, using both discrete components and Integrated Circuit modules (IC's). Discrete components are used in the pulse generator, differentiator, driver, audio muting and squelch circuits. The IC's are used in the logic circuitry. Typical schematic and logic diagrams for the IC's are listed in the Table of Contents.

References to symbol numbers mentioned in the following text may be found on the Outline Diagram, Schematic Diagram and Parts List (see Table of Contents).

Supply voltage for the PSLM is provided by the mobile or station 10-Volt regulator. +10 Volts is required for operating the discrete transistor stages. The IC's are supplied by the output of the 5.4-Volt regulator circuit composed of C4, CR2, and R7.

MASTER PULSE GENERATOR

The heart of the PSLM is the Master Pulse Generator. The pulse generator consists of unijunction transistor Q1, resistors R1 through R4 and capacitor C1. When power is applied to the circuit, C1 charges up and causes Q1 to conduct (emitter to base-1). This quickly discharges C1, causing Q1 to stop conducting until C1 charges up again through R1 and R2. This cycle is repeated as long as power is applied to the circuit, and provides a positive output pulse every 125 milliseconds (8 Hz). This output is applied to two different IC's to provide the timing pulses required for the different modes of operation. The PSLM sample rates and times discussed in the different modes of operation were selected to assure the reception of the first syllable of a message received on either channel, and to assure full intelligibility of messages received on the non-priority channel.

MODES OF OPERATION

Operation of the PSLM can be divided into three different modes. The three modes are:

- Receiver squelched
- Receiving priority channel
- Receiving non-priority channel

RECEIVER SQUELCHED

When the receiver is squelched (no signal applied), the PSLM alternately monitors each channel four times per second for a duration of 125 milliseconds. IC output timing waveforms for this mode of operation are shown in Figure 12.

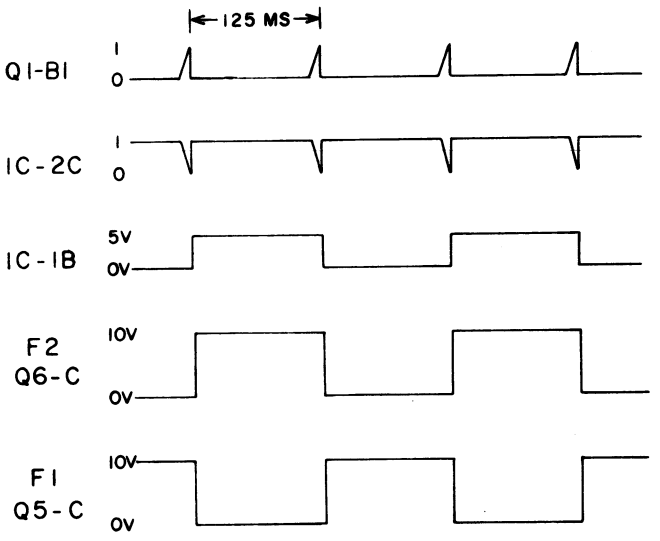


Figure 12 - Receiver Squelched Waveforms

The base of Inverter Q14 is tied to the Mon-Lock input (collector of DC amplifier Q9 in the MASTR Receiver). When the receiver is squelched, approximately 8.5 Volts are applied to the base of Q14, keeping the transistor turned off. When turned off, the emitter of Q14 is at a positive potential (or "1") which is continuously applied to terminal 9 of NAND Gate 1.

When a positive pulse from Master Pulse Generator Q1 is applied to terminal 10, the "1" at both inputs causes output terminal 8 to drop to "0", triggering the Channel Flip-Flop. The flip-flop is triggered every 125 milliseconds by the pulse generator, which alternately turns on the F1 and F2 Drivers, applying +10 Volts to the receiver oscillators. The PSLM will continue switching until a signal unsquelches the receiver.

RECEIVING PRIORITY CHANNEL

When a signal is received on the priority channel, the PSLM locks on that channel for the duration of the message. IC output timing waveforms for this mode of operation are shown in Figure 13.

Assume that F1 is the priority channel. Receiving a signal on the F1 channel unsquelches the receiver and grounds the base of Inverter Q14, turning it on. When turned on, the emitter of Q14 drops to ground potential, applying a "0" to terminal 9 of Gate 1, resulting in a "1" at output terminal 8. The output will remain a "1"

as long as a "0" is applied to the input. This blocks the Master Pulse Generator output and prevents the Channel Flip-Flop from being triggered.

The "0" at terminal 6 of the Channel Flip-Flop keeps F1 Driver Q5 turned on, applying +10 Volts to the F1 receiver oscillator.

The Master Pulse Generator output also drives the Divider Flip-Flop, whose output is applied to the input of Gate 2. When a signal is received on the priority channel, the output of the Priority Selector/Identifier Gates (gates 4, 5 and 6) blocks Gate 2, preventing the timing pulses from being applied to the other IC's and triggering the Channel Flip-Flop.

When F1 is the priority channel, +10 Volts is continuously applied to F1 Priority jack J3. This results in a "1" at terminal 2 of Gate 4. The "0" at terminal 6 of the Channel Flip-Flop is applied to terminal 1 of Gate 4, resulting in a "1" output to Gate 6.

Applying a "1" to both inputs of Gate 6 results in a "0" at the output. This "0" is applied to the input of Gate 2, blocking the gate.

With Gates 1 and 2 blocked, the PSLM remains locked on the F1 channel until the message is completed (receiver squelches).

RECEIVING NON-PRIORITY CHANNEL

When a signal is received on the non-priority channel, the PSLM stops on that channel while monitoring the priority channel four times per second for a duration of six milliseconds. If a signal is received on the priority channel while receiving the non-priority channel, the PSLM will revert from the non-priority channel and lock on the priority channel for the duration of the message. IC output timing waveforms for this mode of operation are shown in Figure 14.

Assume that F2 is the non-priority channel. Receiving a signal on the F2 channel turns on Inverter Q14. This blocks Gate 1 and the Channel Flip-Flop turns on the F2 Driver, applying +10 Volts to the F2 receiver oscillator.

On the non-priority channel, +10 Volts is not applied to the F2 Priority jack (J2) so that both inputs to Gate 5 are "0", resulting in a "1" output to Gate 6. With the Channel Flip-Flop stopped on the F2 channel, both inputs to Gate 4 are "1"s, resulting in a "0" output to Gate 6.

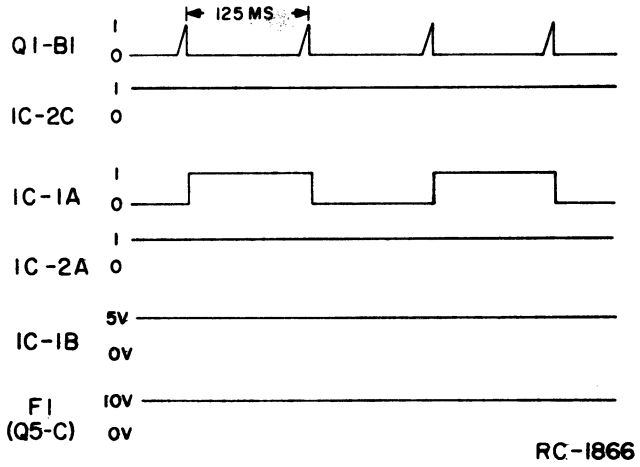


Figure 13 - Priority Channel Waveforms

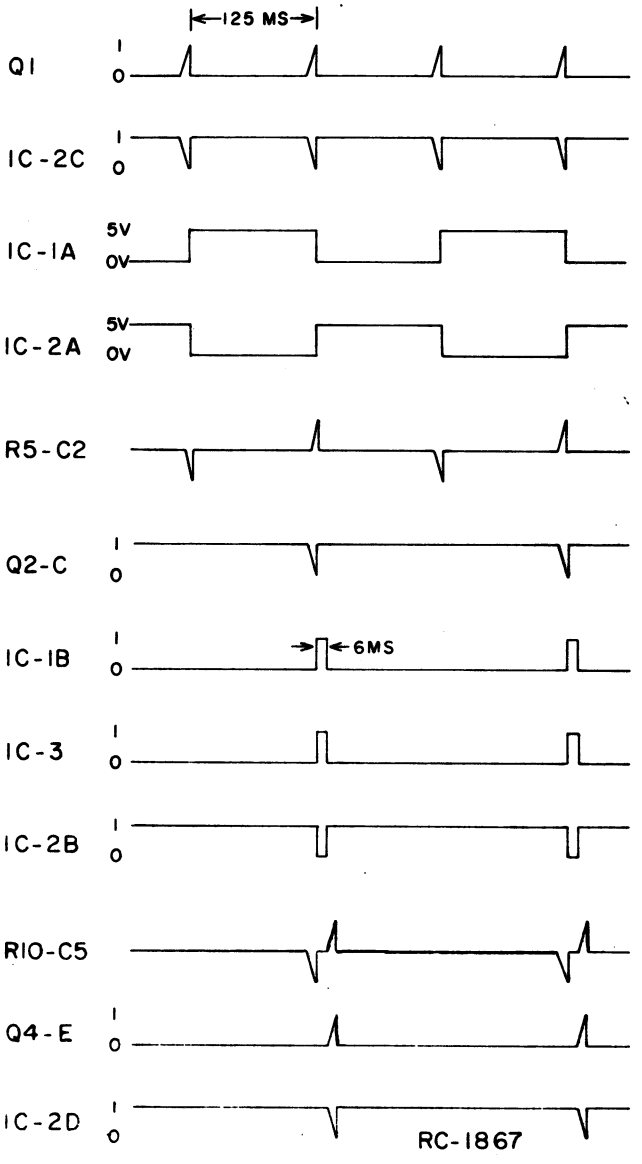


Figure 14 - Non-Priority Channel Waveforms

Applying a "1" and a "0" to the inputs of Gate 6 results in a "1" at the output. The "1" output does not disable Gate 2, so that the timing pulses from the Master Pulse Generator are passed to Differentiator Q2.

The output of Gate 2 is differentiated by C2 and R5 (see Figure 14), and the pulses are applied to the base of Q2. As Q2 is an NPN transistor, only the positive pulses (applied every 250 milliseconds) cause the transistor to conduct. When Q2 conducts, the negative-going output pulse at its collector forward biases CR1 and switches the channel Flip-Flop to the priority channel. The output of Q2 also activates One-Shot Time Delay IC3, which provides a six-millisecond positive output pulse. The output pulse is simultaneously applied to the audio muting circuit and to Inverter IC-2B.

In the audio muting circuit, audio and noise from the emitter of audio-noise amplifier Q5 on the MASTR receiver is connected to J8 on the PSLM board. The audio is normally coupled through C8, R20, C7 and Emitter-Follower Q9, and then connected from J7 to volume high in the mobile or station combination.

The positive pulse from the One-Shot turns on Q7 and then Q8 for a total time of eight milliseconds. When turned on, the collectors of Q7 and Q8 drop to ground potential, shunting the receiver audio path. This prevents an objectionable noise burst from being heard at the speaker each time the priority channel is monitored (every 250 milliseconds).

At the same time the audio is muted, the output of the One-Shot is inverted and applied to the Squelch Muting Transistor Q10 and to Differentiator Q4.

The fast squelch circuit consists of Q10 through Q13. When the priority channel is not being monitored, audio and noise applied to the fast squelch circuit is shunted to ground by normally-on transistor Q10. When the Channel Flip-Flop is switched to the priority channel, the negative-going six millisecond inverter output is applied to the base of Q10, turning the transistor off. While Q10 is turned off, the noise output of the active high-pass noise filter is applied to the base of Noise Amplifier Q12. The filter consists of C9, C10, C12, R25, R26, Squelch Adjust potentiometer R29, and Q11. Instructions for setting R29 are listed in the Table of Contents.

The output of Q12 is rectified by CR7 and CR8, and the resultant negative voltage turns off DC Switch Q13. Turning off Q13 removes the "0" at the input of Gate 3, unlocking the gate.

While Q13 is turned off, the output of Inverter IC-2B is differentiated by C5 and R10 (see Figure 14), and the positive-going pulse turns off PNP transistor Q4. Turning off Q4 applied a "1" to the remaining input of Gate 3, switching the output to a "0". The "0" triggers the Channel Flip-Flop, causing it to switch back to the non-priority channel. The entire cycle is repeated every 250 milliseconds until a signal is received on the priority channel.

If a signal is received on the priority channel during the six millisecond monitor period, the signal quiets the receiver.

With the receiver quieted, there is insufficient noise to operate the fast squelch circuit so that Q13 remains on (its collector at ground potential). The "0" at the collector of Q13 blocks Gate 3, while the output of the Priority Selector/Identifier Gates block Gate 2. With both gates blocked, the Channel Flip-Flop remains locked on the priority channel for the duration of the signal.

SYSTEM MODIFICATION

The following modifications are required for MASTR mobile combinations when the Priority Search Lock Monitor options are installed. The modifications change receivers equipped with standard crystal oscillators (non-ICOM) to reduce the oscillator starting time.

1. On all Receiver and Dual Front End oscillator boards, C5, C6, C7 and C8 were removed. C17, C18, C19 and C20 were replaced with 7pF, NPO ceramic capacitors (GE Part No. 19C300685P95).

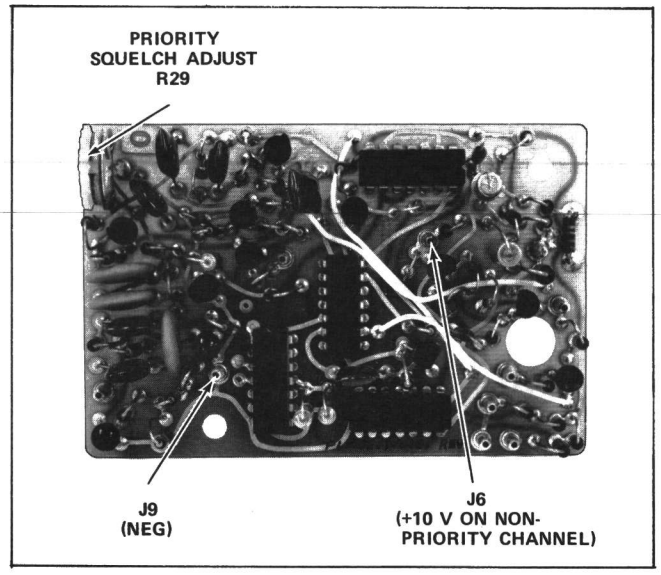
2. On all UHF Receivers and Dual Front End oscillator boards, removed C5, C6, C7 and C8. Replaced C17, C18, C19 and C20 with 7pF, NPO ceramic capacitors (GE Part No. 19C300685P95). Also removed RT9 and C43.

3. Where required added white lead from P443-20 (MON LOCK) to P703-3.

PRIORITY SQUELCH ADJUSTMENT

Priority Squelch Adjust R29 was set at the factory for 20-dB quieting sensitivity on the priority channel, and will normally require no further adjustment. If it should become necessary to set R29, use the following procedure. A signal generator (M560 or equivalent) with a 6-dB pad is required.

Before starting the procedure, make sure that the receiver is properly aligned with the PSLM disabled (SEARCH-OFF switch in the OFF position). Then measure and record the priority channel 20-dB quieting sensitivity.



1. Place the Frequency Selector Switch in a non-priority frequency position and the SEARCH-OFF switch in the SEARCH position.

2. Alternately squelch and unsquelch the receiver until the PSLM stops on the non-priority channel. The PSLM searches when the receiver is squelched and may lock on either the priority or non-priority channel when the receiver is unsquelched. Therefore, several attempts may be required to stop the PSLM on the non-priority channel. Make sure that the PSLM is stopped on the non-priority channel by checking the light on the mobile control unit.

3. Next apply a signal on the priority channel from the signal generator output until the receiver switches to the priority channel. This should be at the 20-dB quieting level as measured previously.

4. If necessary, adjust the Priority Squelch control R29 until the PSLM switches channels at the 20-dB level. Check all channels for this same function.

MAINTENANCE

DISASSEMBLY

Access to the inside of the Control Unit is obtained by removing the four Phillips-head screws in the back of the unit and pulling the back plate away from the housing.

PILOT LAMP REPLACEMENT

The pilot lamps can be replaced by removing the front name plate and removing the two Phillips-head screws holding the lamp bracket in place. The wires attached to the bracket are removed and then the lamps may be replaced.

REINSTALLATION

If it becomes necessary to move the control unit to another vehicle, the 25-pin control cable plug may require disassembly. Refer to Figure 15 for disassembly of the plug.

NOTE

The plug is assembled so that the cable comes out of the top of the plug when connected to the Control Unit. To change the cable so that it comes out the bottom of the plug, remove the remaining two screws and rotate the metal from 180 degrees.

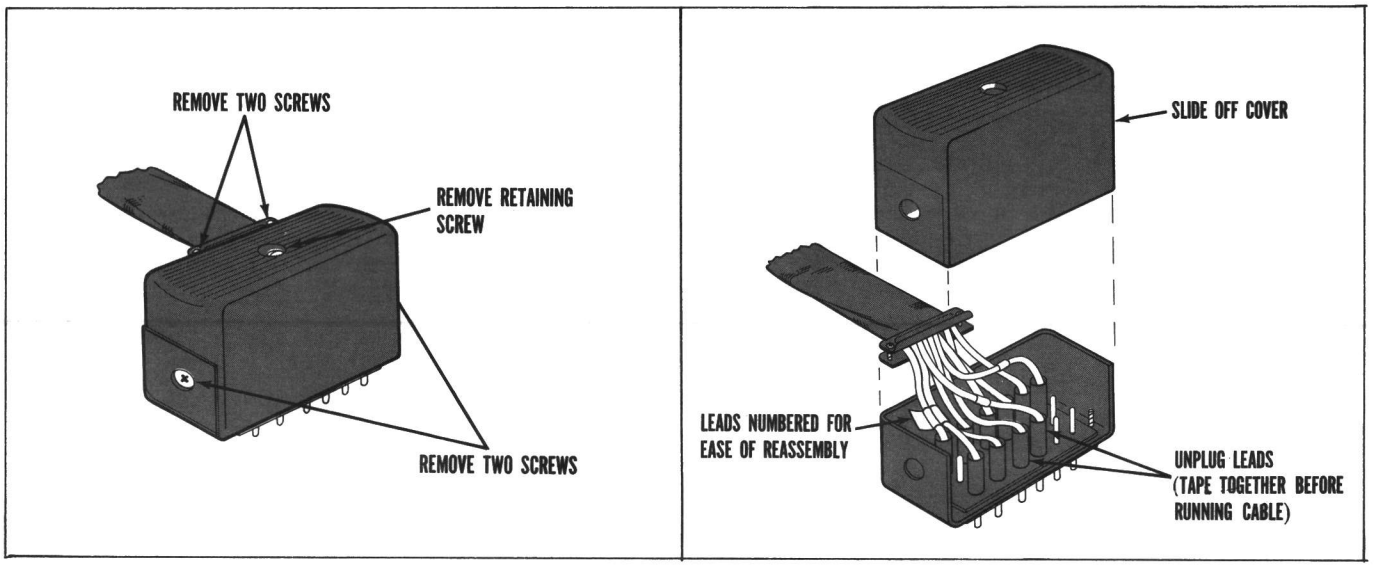
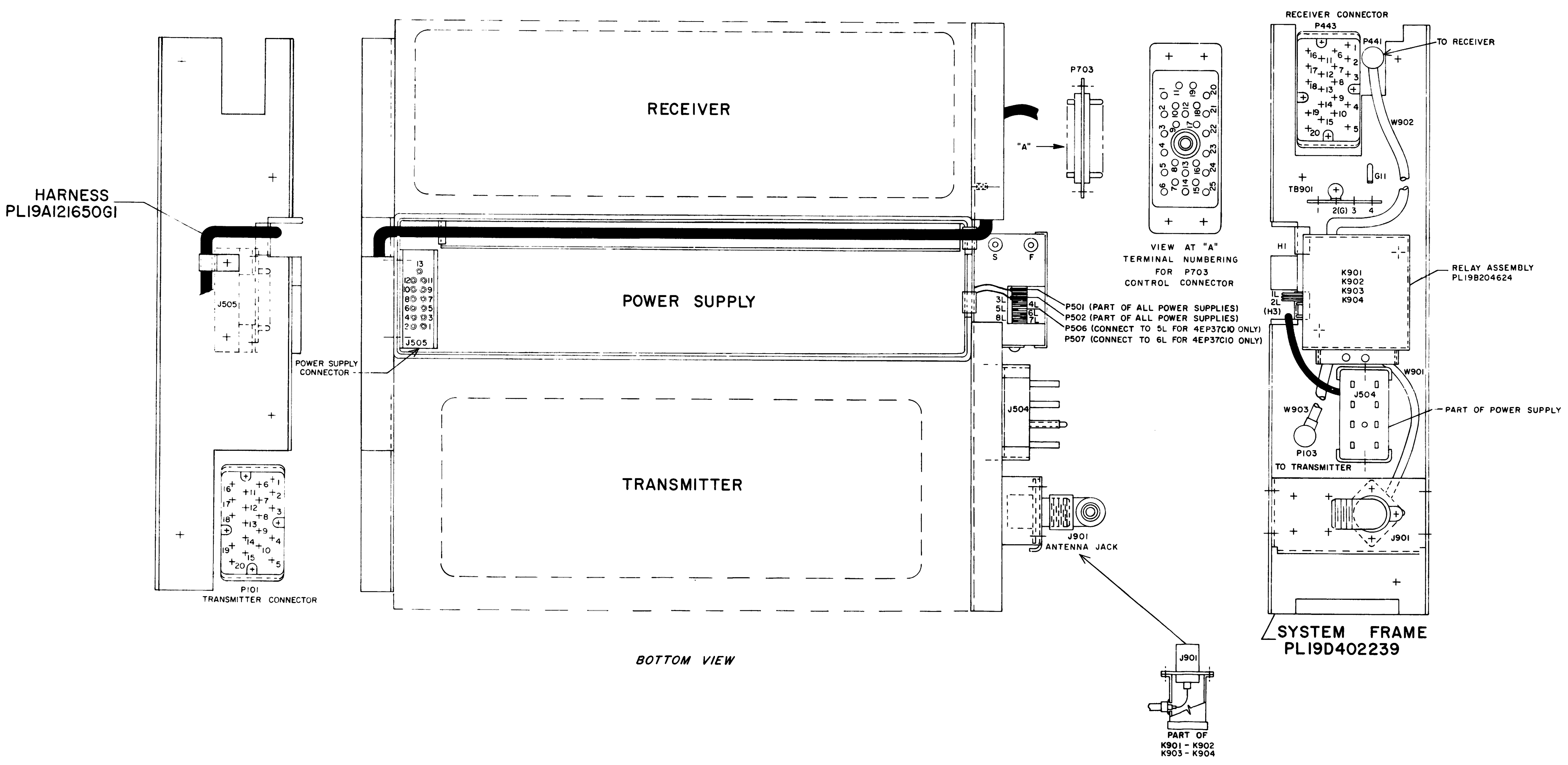
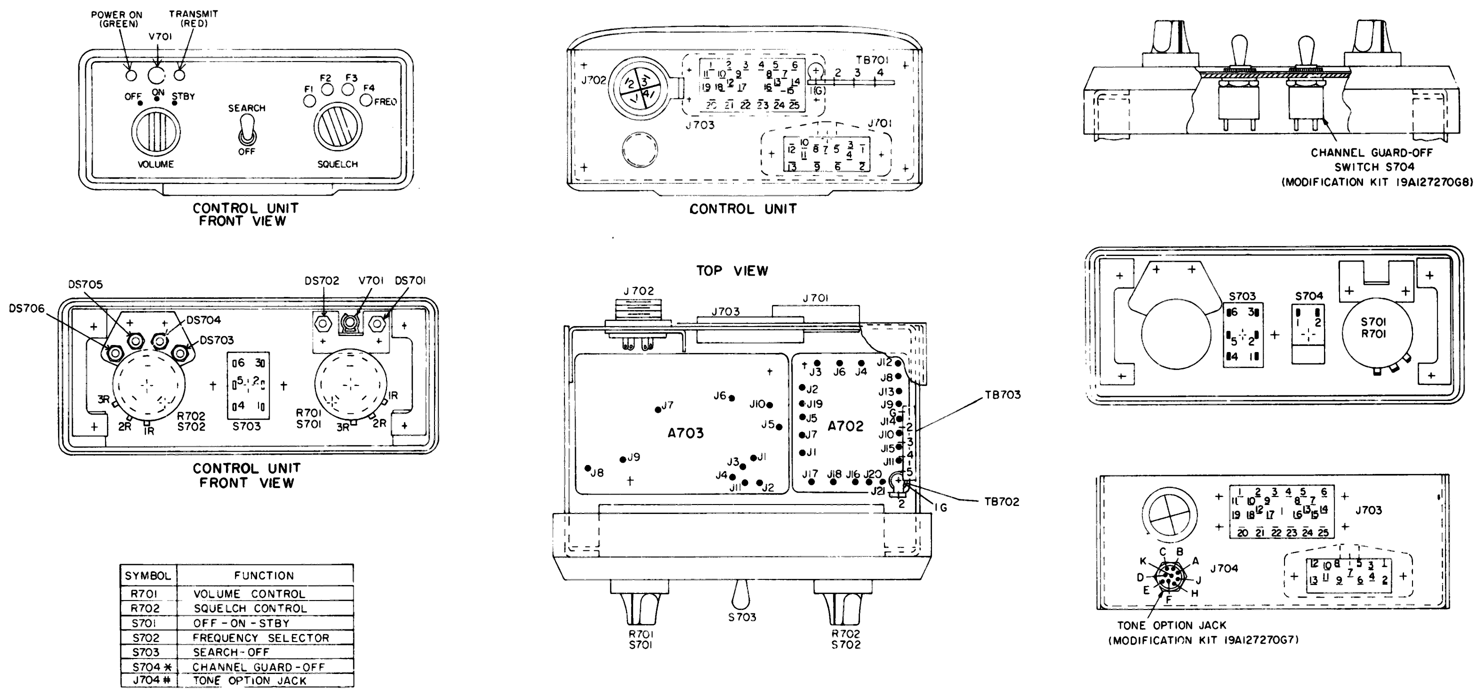


Figure 15 - Disassembly of Control Plug

SYSTEM FRAME AND HARNESS



(19D402582, Rev. 3)



SYMBOL	FUNCTION
R701	VOLUME CONTROL
R702	SQUELCH CONTROL
S701	OFF - ON - STBY
S702	FREQUENCY SELECTOR
S703	SEARCH - OFF
S704 *	CHANNEL GUARD - OFF
J704 #	TONE OPTION JACK

* THIS SWITCH PRESENT IN MODELS 4EC59A96 AND 4EC59A98 ONLY

THIS JACK PRESENT IN MODELS 4EC59A97 AND 4EC59A98 ONLY.

(19D416472, Rev. 2)

OUTLINE DIAGRAM

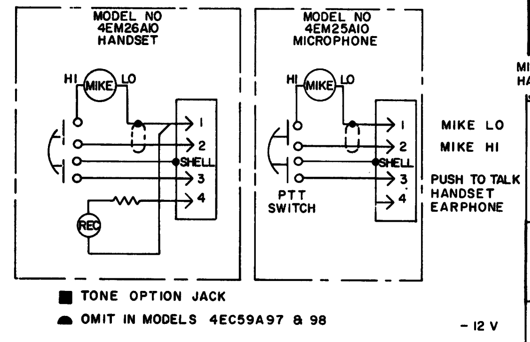
MASTR CONTROL UNIT
MODELS 4EC59A95—98

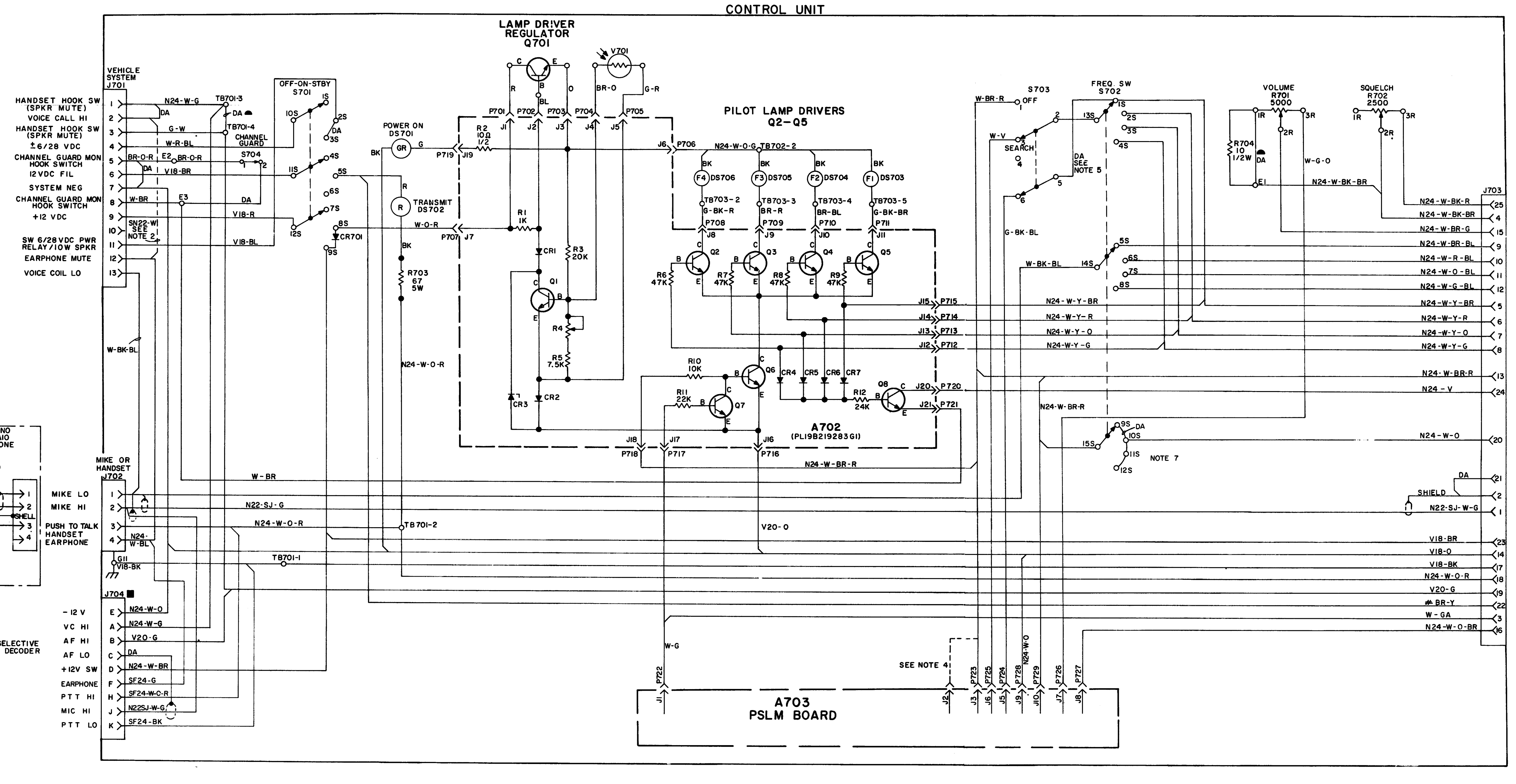
MODEL NUMBER	REV LETTER	NO. OF FREQ	FREQ INDICATOR LIGHTS	CHANNEL GUARD	SEARCH OFF SWITCH	TONE OPTION JACK
4EC59A95	B	2	X		X	
4EC59A96	B	2	X	X	X	
4EC59A97	C	2	X		X	X
4EC59A98	C	2	X	X	X	X

NOTES:

1. ALL WIRE TO BE N22 UNLESS OTHERWISE SPECIFIED.
2. ADD SN22 WHITE WIRE WHEN PL19B204970G1 HOOKSWITCH IS USED.
3. TO DISABLE CHANNEL GUARD ON "F1" REMOVE A702-CR7
   "F2" REMOVE A702-CR6
   "F3" REMOVE A702-CR5
   "F4" REMOVE A702-CR4
4. FOR LOCKED PRIORITY & SELECTABLE NON-PRIORITY ASSEMBLE N24-W-BR-R TO J3. FOR LOCKED NON-PRIORITY & SELECTABLE PRIORITY ASSEMBLE N24-W-BR-R WIRE TO J2.
5. TO SELECT WHICH PRIORITY OR NON-PRIORITY IS LOCKED, MOVE DA WIRE FROM S703-5 TO S702-1S FOR F1
   2S FOR F2
   3S FOR F3
   4S FOR F4
6. ON A702 J1-J21 TO BE A4033513P4.
   P701-P721 TO BE A4029840P4.

   ON A703 J1-J11 TO BE A4033513P4.
   P720-P729 TO BE A4029840P4.
7. TO DISABLE CHANNEL GUARD ENCODE ON F4 CLIP DA WIRE BETWEEN 11S & 12S, ON F3 & F4 CLIP DA WIRE BETWEEN 10S & 11S. ON F1 CLIP DA WIRE BETWEEN 9S & 10S.

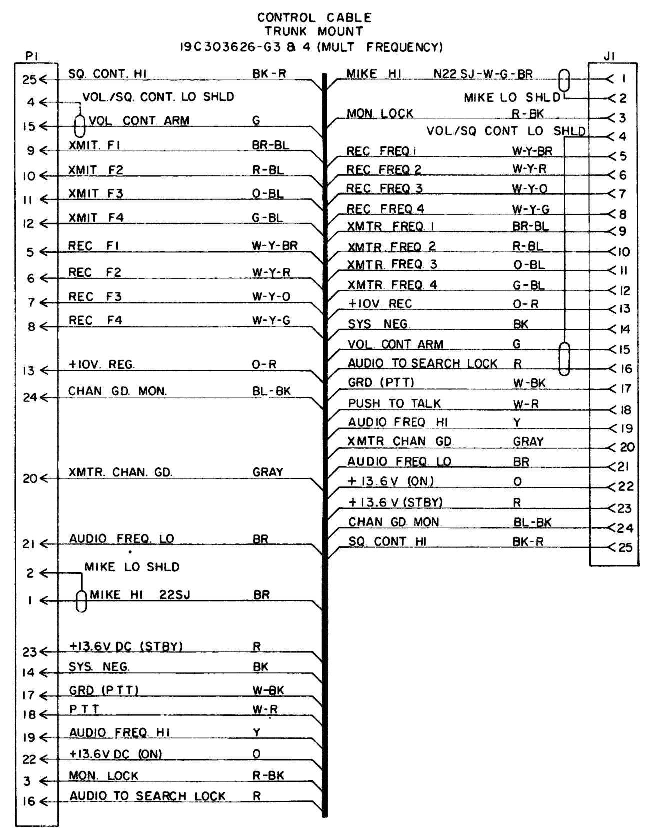


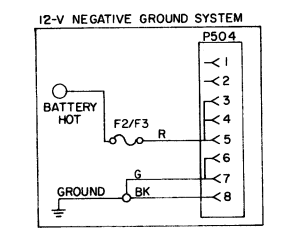


ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

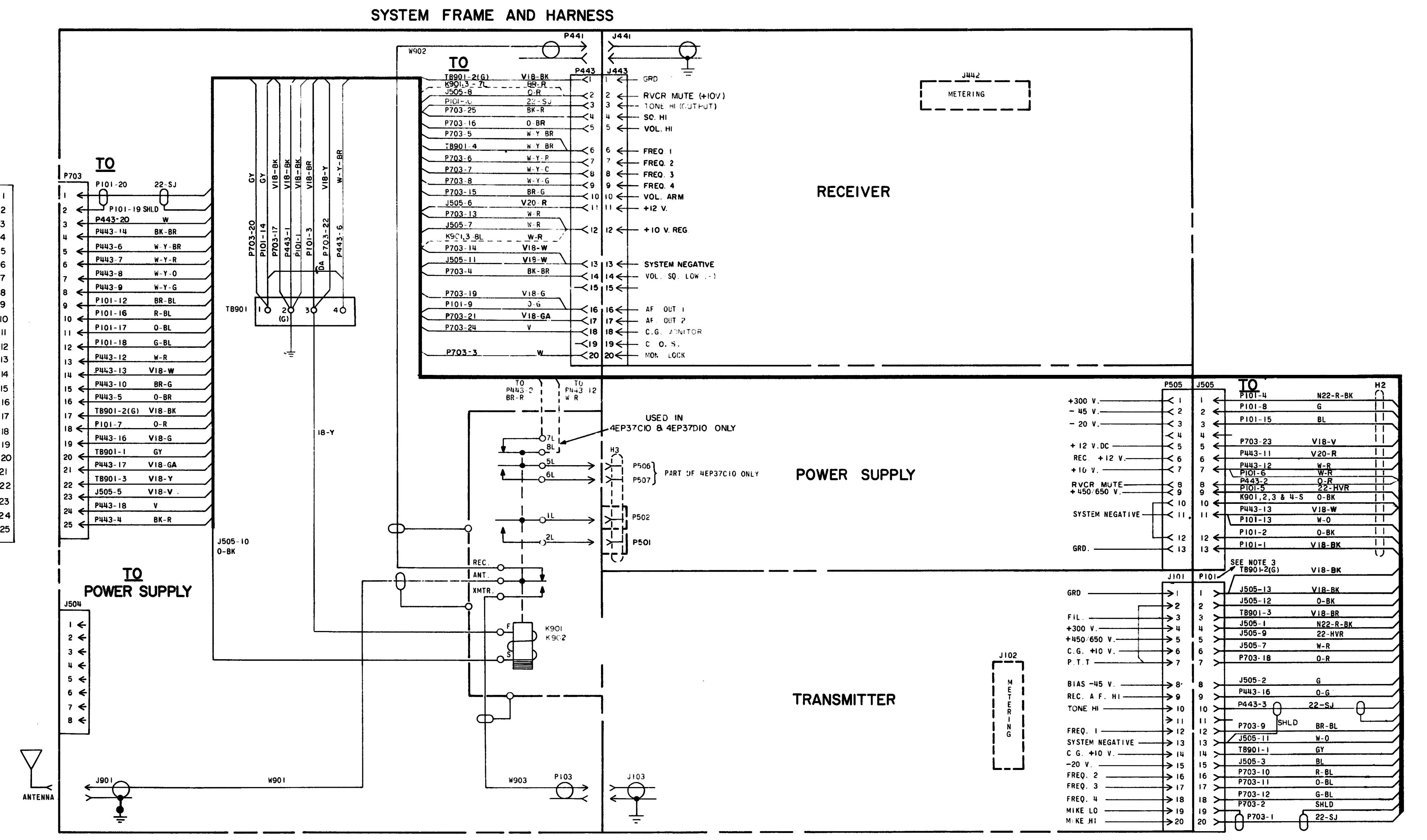
IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

(19B421465, Rev. 11.)





(RC-2242)



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

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

(19D402338, Rev. 23)

NOTES:
1. ALL WIRES ARE SF24 EXCEPT AS OTHERWISE SHOWN.
2. SEE 19D402476 FOR ORIENTATION AND LOCATION OF COMPONENTS AND ROUTING OF CABLE.
3. SEE 19A121837P1 FOR CONNECTIONS OF P101

SCHEMATIC & INTERCONNECTION DIAGRAM

MASTR CONTROL UNIT, MODELS 4EC59A95—98

Issue 3

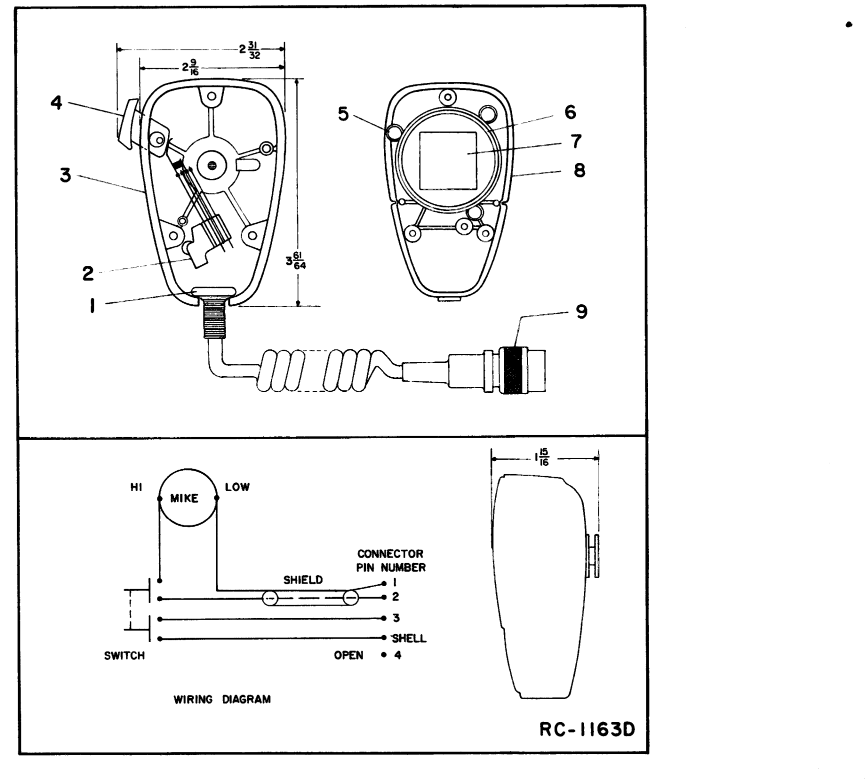
PARTS LIST

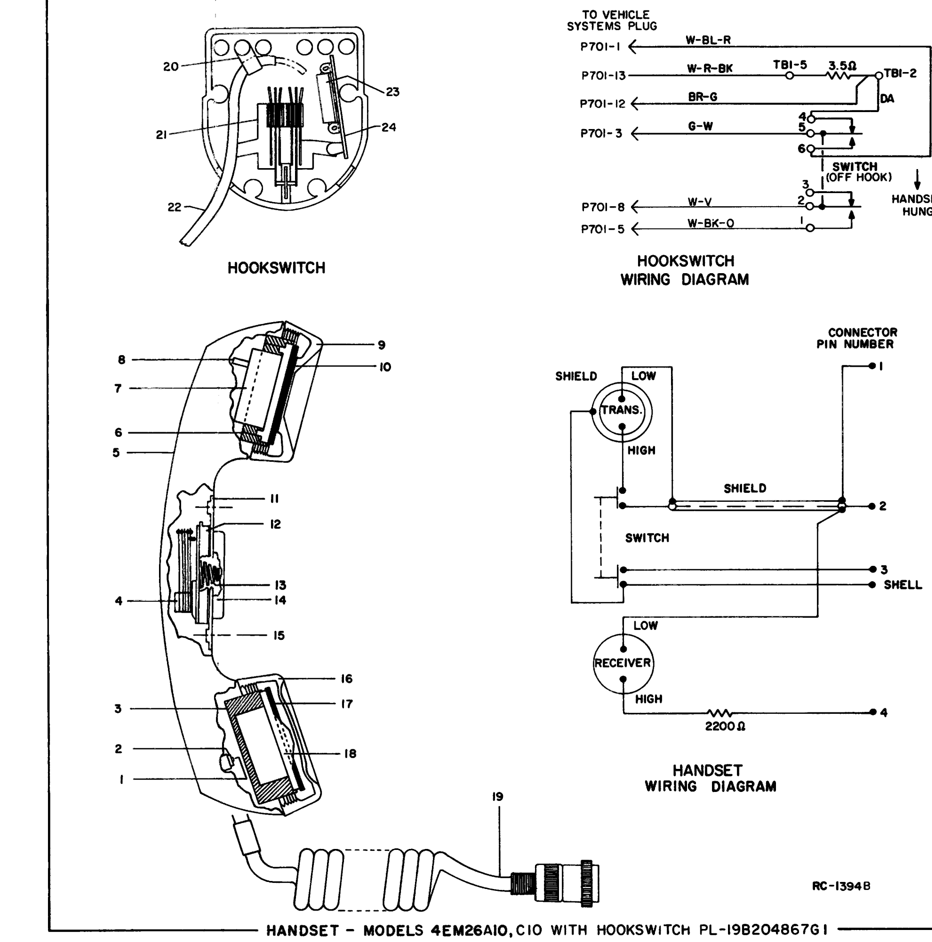
LBI-4317B

CONTROL UNIT
2-FREQUENCY PSLM
MODELS 4EC59A95-98

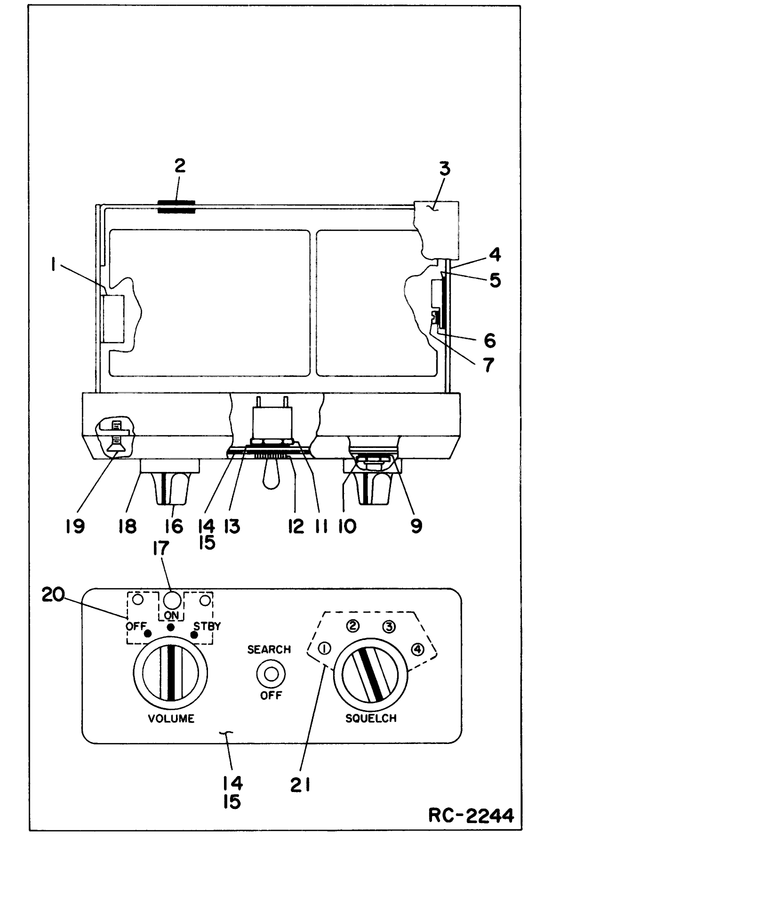
SYMBOL	GE PART NO.	DESCRIPTION
A702		INDICATOR LIGHT CONTROL BOARD 19B219283G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 and CR2	19A115250P1	Silicon.
CR3	4036887P5	Silicon, Zener.
CR5 thru CR7	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J21	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115123P1	Silicon, NPN.
Q2 thru Q6	19A116272P1	Monolithic, integrated circuit: sim to 2N5305.
Q7 and Q8	19A115123P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - -
R1	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R2	3R77P100K	Composition: 10 ohms ±10%, 1/2 w.
R3	3R77P203K	Composition: 20,000 ohms ±10%, 1/2 w.
R4	19B209358P106	Variable, carbon film: approx 75 to 10,000 ohms ±10%, 0.25 w; sim to CTS Type X-201.
R5	3R152P752K	Composition: 7500 ohms ±10%, 1/4 w.
R6 thru R9	3R152P473K	Composition: 47,000 ohms ±10%, 1/4 w.
R10	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R11	3R152P223K	Composition: 22,000 ohms ±10%, 1/4 w.
R12	3R152P243J	Composition: 24,000 ohms ±5%, 1/4 w.
A703	19C317161G1	2 Frequency PSLM board. Refer to LBI-4308.
		- - - - - - - DIODES AND RECTIFIERS - - - - -
CR701	4037822P2	Silicon.
		- - - - - - - - INDICATING DEVICES - - - - - -
DS701	19B209449P6	Light, incandescent: white lens; sim to Drake Mfg 6036-006-804-2.
DS702	19B209449P5	Light, incandescent: red lens; sim to Drake Mfg 6036-006-804-1.
DS703	19B209449P1	Light, incandescent: white lens; sim to Drake 6036-005-844-1.
DS704	19B209449P2	Light, incandescent: white lens; sim to Drake Mfg 6036-005-844-2.
DS705	19B209449P3	Light, incandescent: white lens; sim to Drake Mfg 6036-005-844-3.
DS706	19B209449P4	Light, incandescent: white lens; sim to Drake 6036-005-844-4.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J701	19C303576P1	Receptacle: 13 contacts rated at 5 amps.
J702		Includes:
	19A116061P2	Receptacle: 4 female contacts; sim to Amphenol Type 91-PN4F-1000.
	19A116061P4	Lockwasher.
	19A116061P5	Nut, knurled.
J703	19D402408P1	Receptacle: 25 contacts rated at 5 amps.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P701 thru P715	4029840P2	Contact, electrical: sim to Amp 42827-2.
P716	4029840P1	Contact, electrical: sim to AMP 41854.
P717 thru P729	4029840P2	Contact, electrical: sim to Amp 42827-2.
		- - - - - - - - - TRANSISTORS - - - - - - - -
Q701	19A116203P3	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - -
R701		(Part of S701).
R702		(Part of S702).
R703	5493035P19	Wirewound: 67 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
R704	3R77P100K	Composition: 10 ohms ±10%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - -
S701	19C307089P19	Switch/Resistor: includes Switch, rotary, 3 poles, 3 positions, momentary shorting contacts, 250 ma at 500 VRMS; Resistor (R701), variable, 5000 ohms ±20%, 1/2 w max; sim to Mallory Type LC.
S702	19C307089P21	Switch/Resistor: includes Switch, rotary, 3 pole, 4 positions, momentary shorting contacts, 250 ma at 500 VRMS; Resistor (R702), variable, 2500 ohms ±20%, 1 w max; sim to Mallory Type LC.
S703	5491899P4	Toggle: DPST, 6 amps at 125 VAC/VDC; sim to Cutler-Hammer 8373K8.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - -
TB701	7775500P6	Phen: 4 terminals.
TB702	7775500P44	Phen: 2 terminals.
TB703*	7487424P17	Miniature, phen: 4 terminals. Added to 4EC59A95, 96 by REV A. Added to 4EC59A97, 98 by REV B.
		- - - - - - - - - PHOTO CELLS - - - - - - - - -
V701	19A115994P1	Photoconductive, cell: 60 v, 75 mw at 25°C; sim to Clairex Co CL605L.
		TONE CONNECTOR KIT 19A127270G7
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J704	19B216279G1	Jack assembly: 9 female contacts rated at 5 amps at 900 VRMS; sim to Winchester M9S-LRN.
		CHANNEL GUARD SWITCH KIT 19A127270G8
		- - - - - - - - - - SWITCHES - - - - - - - - -
S704	5491899P5	Toggle: SPST, 3 amps at 250 VAC/VDC; sim to Cutler-Hammer 8280K15.
		RECEIVER OSCILLATOR MODIFICATION KIT 19A129141G1
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C1 thru C4	19C300685P95	Ceramic disc: 7 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM.
		MECHANICAL PARTS (SEE RC-2244)
1	4038930P1	Clip. (Used with R703).
2	N529P18C13	Button plug.
3	19A121891G4	Cover.
4	19C317840G1	Chassis.
5	19A116023P2	Insulator, plate. (Used with Q701).
6	19A115222P3	Insulator, bushing. (Used with Q701).
7	N84P9006C6	Screw: 4-40 x 3/8.
8	19B219310G1	Front cap.
9	7115130P9	Lockwasher: 3/8 inch; sim to Shakeproof 1220-2.
10	7165075P2	Hex nut, brass: No. 3/8-32.
11	7115195P2	Hex nut: 15/32-32.
12	4033394P1	Knurled nut: 15/32-32.
13	7115130P11	Lockwasher: 15/32 inch; sim to Shakeproof 1222-1.
14	NP270521A	Nameplate. (With Channel Guard).
15	NP270521B	Nameplate. (Without Channel Guard).
16	19B204443G1	Knob. (OFF-ON-STBY, 1-2-3-4 Freq).
17	19B204949P2	Lens: white plastic.
18	19C303413P1	Knob. (VOLUME, SQUELCH).
19	19B209209P308	Tap screw, Phillips Pozidriv: 6-32 x 1/2. (Secures cap to chassis).
20	19A129018G1	Support. (Secures DS701 and DS702).
21	19A129016G1	Support. (Secures DS703-DS706).
		ASSOCIATED ASSEMBLIES
	19D402239G1	12 volt vehicles frame.
	19D402239G2	6 and 28 volt vehicles frame.
	19A122444P1	Cover, wire channel (on systems frame).
	19C303452G2	Front casting.
	5491682P2	Lock: Yale and Towne. (Part of Front casting).
	5491682P7	Cam. (Used with lock).
	19A121902G1	Mounting bracket, Control Unit.
		POWER CABLE ASSEMBLY 19C303601G2 (12 VOLT TRUNK MOUNT)
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B209189P1	Connector, phen: 8 contacts rate at 15 amps at 1100 VRMS; sim to Beauchaine and Sons S-5401-76.
	19D402438P1	Cap, connector.
	19A121444P2	Connector retaining screw.
	19A115314P1	Cable: 3 conductor, approx 18 feet long.
		POWER CABLE ASSEMBLY 19C303603G2 (28 VOLT TRUNK MOUNT)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B209189P1	Connector, phen: 8 contacts rate at 15 amps at 1100 VRMS; sim to Beauchaine and Sons S-5401-76.
	19D402438P1	Cap, connector.
	19A121444P2	Connector retaining screw.
	19A115313P1	Cable: 3 conductor, approx 23 feet long.
		POWER CABLE ASSEMBLY (6 VOLT TRUNK MOUNT) 19C303606G1
		- - - - - - - - - - MISCELLANEOUS - - - - - - -
	19B209189P1	Connector, phen: 8 contacts rate at 15 amps at 1100 VRMS; sim to Beauchaine and Sons S-5401-76.
	19A127581P1	Cap, connector.
	19A121444P2	Connector retaining screw.
	7146477P1	Cable: 2 lengths, approx 22 feet long connected to pins 1 and 7.
	7146477P3	Cable: 2 lengths, approx 22 feet long connected to pins 4 and 6.
		CONTROL CABLE ASSEMBLY 19C303626G3, G4 (MULTI-FREQ)
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1	19C303626G5	Plug, male: includes connector 19D402408P3, cap 19C303290P2 and connector retaining screw 19A121444P2.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1	19C303626G6	Plug, female: includes connector 19D402408P1, cap 19C303290P1 and connector retaining screw 19A121444P1.
		- - - - - - - - - MISCELLANEOUS - - - - - - -
	19D402408P1	Connector, female phen: 25 contacts rated at 5 amps max.
	19D402408P3	Connector, male phen: 25 contacts rated at 5 amps max.
	19C303290P1	Cap, connector.
	19C303290P2	Cap, connector.
	7139880P8	Cable: 13 conductors. (When ordering specify length).
		VEHICLE SYSTEM CABLE KIT 19A121454G1 (12 VOLT VEHICLES) 19A121454G2 (6/28 VOLT VEHICLES)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A121324G1	6/28 volt vehicle jumper. (Used in 19A121454G2).
	19A121429P1	Pin: 1/2 inch long.
	19A121441G1	Plug: 13 contacts.
	19C303574P1	Cover.
		FUSED LEAD ASSEMBLY 19A121454G1 - 12 VOLT 19A121454G2 - 6/28 VOLT
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	1R16P8	Cartridge, quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussman MTH-5.
	19A115776P2	Fuseholder.
		INTERCONNECTION HARNESS ASSEMBLY 19A121650G1
		- - - - - - - - JACKS AND RECEPTACLES - - - - -
J505	19B204409G1	Plug, male: 13 pin contacts.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P101	19C303506P1	Connector, phen: 20 contacts.
P443	19C303506P1	Connector, phen: 20 contacts.
P703	19D402408P2	Connector, phen: 25 contacts.
		- - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB901	7775500P10	Phen: 5 terminals.
		12 VOLT RELAY ASSEMBLY 25-470 MHz 19B209445P1
		Includes J901, K901, P103, P441, W901-W903.
		6/12, 12/28 VOLT RELAY ASSEMBLY 25-470 MHz 19B209445P2
		Includes J901, K902, P103, P441, W901-W903.
		FUSE AND RELAY ASSEMBLY 7487952G19 (28 VOLT VEHICLE) 7487952G20 (6 VOLT VEHICLE)
		- - - - - - - - - - FUSES - - - - - - - - - - -
F11	1R11P4	Quick blowing: 15 amps, 250 v; sim to Bussman NON15.
F12	1R11P7	Quick blowing: 30 amps, 250 v; sim to Bussman NON30. (Used in 7487952G20).
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1	7486515P1	Armature, enclosed: 6 VDC nominal, 26 ohms ±8% coil res, 1 form A contact rated at 15 amps; sim to RBM 60-108013-3. (Used in 7487952G20).
K3	7486515P3	Armature, enclosed: 28 VDC nominal, 300 ohms ±10% coil res, 1 form A contact rated at 15 amps. (Used in 7487952G19).
		12 VOLT FUSE ASSEMBLY 19B216021G4 (Fuses must be ordered separately)
		- - - - - - - - - - FUSES - - - - - - - - -
F2	1R11P6	Quick blowing: 25 amps, 250 v; sim to Bussman NON25. (Used with medium power transmitters).
F3	1R11P7	Quick blowing: 30 amps, 250 v; sim to Bussman NON30. (Used with high power transmitters).
		130 - 470 MHz ANTENNA MODEL 4EY12A13 (5490969P13)
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
		Antenna: includes stainless steel whip approx. 20 inches long; ball tip; whip socket; No. 6-32 set screw; rubber mounting gasket; antenna cable; cable adapter; PL-259 coaxial plug; sim to Antenna Specialists ASPD201GE or Danbury-Knudsen Type PA-25.
	5490969P4	Whip: stainless steel, approx 20 inches long; ball tip.
	5490969P5	Socket, whip: with (2) No. 6-32 set screws.
	5490969P6	Whip and whip socket: stainless steel whip approx 20 inches long with ball tip; whip socket with (2) No. 6-32 set screws.
		Cable, antenna: approx 15 feet long. Type RG-58/U. (Used with GE Dwg 2R22P1 and GE Dwg 7105381P1).
	7105381P1	Adapter, cable: approx 1 x 7/16 inches dia. Type UG-175/U. (Used with GE Dwg 2R22P1 and Type RG-58/U cable).
	2R22P1	Plug, coaxial: mica-filled insert, UHF contact. Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 7105381P1 and Type RG-58/U cable).
		25 - 50 MHz ANTENNA
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	7491074P1	Antenna: includes stainless steel rod approx 96-1/2 inches long; ball tip; lockwasher; No. 10-32 hex socket set screw; sim to Antenna Specialists ASPA3BGE.
	7102930P3	Adapter, antenna: approx 2-5/16 inches long. (Used with GE Dwg 7491074P1).
	4033101G1	Antenna package: includes base; adapter spring; cable and plug.
	7472880G5	Antenna base.
	7476632G4	Adapter spring.
	5492239P1	Cable, antenna: includes Type RG-58/U cable approx 15 feet long; PL-259 coaxial plug; mounting clip; ring tongue terminal; sim to Antenna Specialists 15A43.
	2R22P1	Plug, coaxial: mica-filled insert, UHF contact. Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 5492239P1).
	4KY9A1	Coil, loading: 25 to 33 MHz; sim to Antenna Specialists ASPA87.
	19A121577G1	Antenna hook kit.
	7134724P1	Antenna hook.
		HANDSET MODEL 4EM26A10 MODEL 4EM26C10 19B209100G1 (SEE RC-1394)
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	Resistor, 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).
		HOOKSWITCH ASSEMBLY 19B204867G1
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
20	4029851P4	Cable clamp; sim to WEC Kesser 3/16-4.
21	19A121612P1	Holder and switch: thermoplastic case, contact rating 1 amp at 125 v.
22	19A121581G1	Cable: approx 8-1/2 feet long.
23	5493035P10	Resistor, wirewound, ceramic: 3.5 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
24	7775500P55	Terminal board, phen: 5 terminals.
		MILITARY MICROPHONE MODEL 4EM25A10 19B209102G1 (SEE RC-1163)
1		Cable clamp. Shure Brothers 53A532.
2		Switch. Shure Brothers RP26.
3		Case (back) and mounting button: plastic. Shure Brothers RP67.
4		Switch button: red plastic. Shure Brothers RP25.
5		Spring. Shure Brothers 44A113.
6		Shield. Shure Brothers RP23.
7		Magnetic controlled cartridge. Shure Brothers RP13.
8		Case (front): plastic. Shure Brothers RP67.
9		Cable and plug: approx 6 feet long. Shure Brothers RP14.
		5 WATT SPEAKER 19C320302G3 4EZ20A10
LS2	19A116910P1	Permanent magnet: 5 inch, 3.2 ohms ±15% imp, 5 w max operating; sim to Pioneer 002009.
W1	19A121546G1	Cable assembly: approx 48 inches long, includes (2) 19A121429P1 pins.
		MECHANICAL PARTS
	19D416396P3	Speaker housing.
	19C320016P2	Mounting support.
	5490407P3	Neoprene grommet. (Upper)
	19A115470P1	Rubber grommet. (Lower)
	19B219692G3	Grille.
	19A116985P1	Screw, hex head-slotted: double lead thread, with internal tooth washer, No. 13-16 x 3/4. (Secures housing to mounting bracket).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

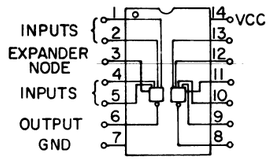




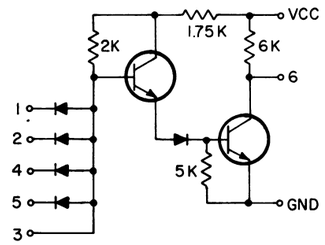
HANDSET - MODELS 4EM26A10,C10 WITH HOOKSWITCH PL-19B204867G1



DUAL 4-INPUT GATES
19A115913-P1

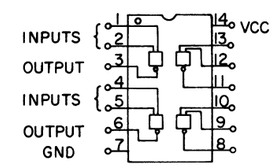


LOGIC DIAGRAM

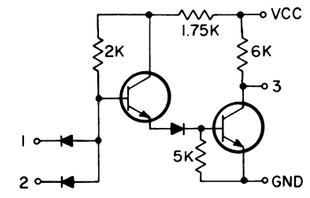


TYPICAL SCHEMATIC DIAGRAM
(ONE GATE ONLY)

QUADRUPLE 2-INPUT GATES
19A115913-P7



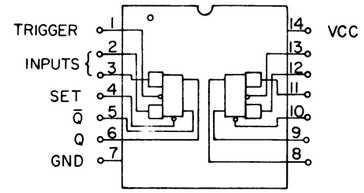
LOGIC DIAGRAM



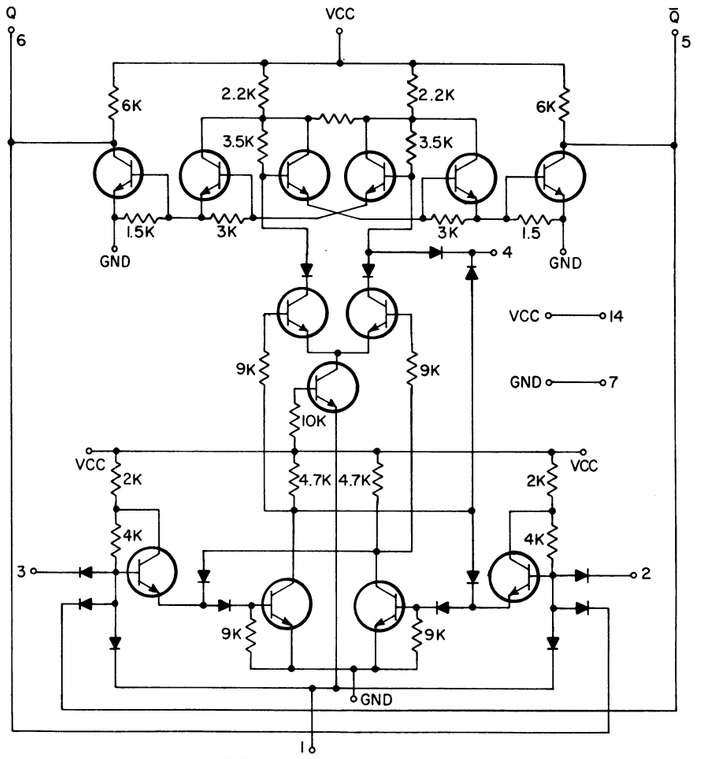
TYPICAL SCHEMATIC DIAGRAM
(ONE GATE ONLY)

RC-1873

MASTER-SLAVE FLIP-FLOP
19A115913-P10



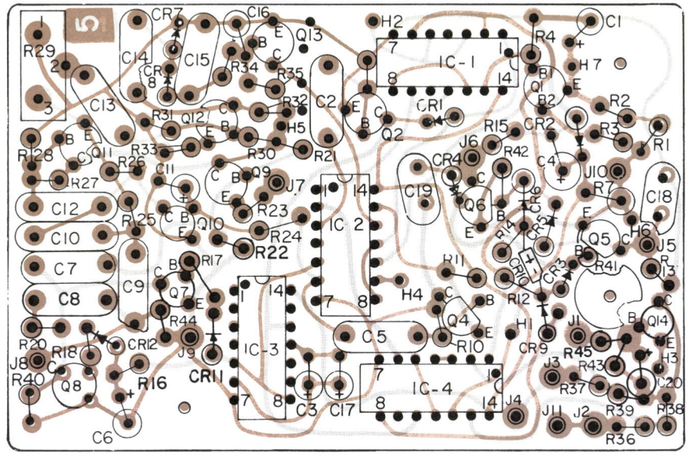
LOGIC DIAGRAM

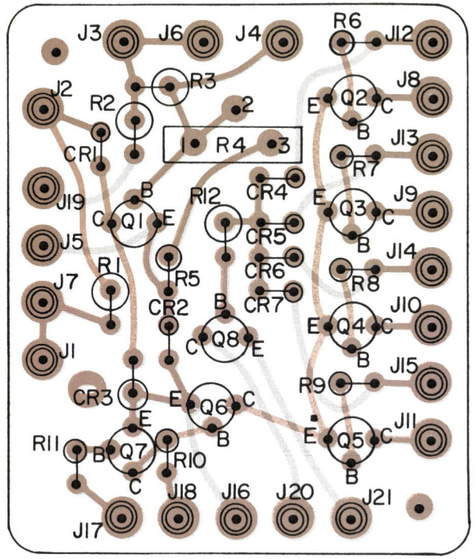


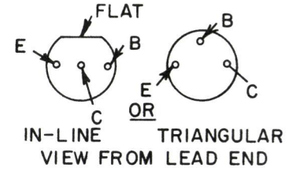
TYPICAL SCHEMATIC DIAGRAM
(ONE FLIP-FLOP ONLY)

LOGIC & SCHEMATIC DIAGRAMS

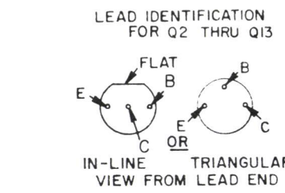
FOR INTERGRATED CIRCUIT MODULES
PRIORITY SEARCH-LOCK MONITOR



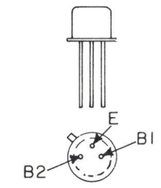




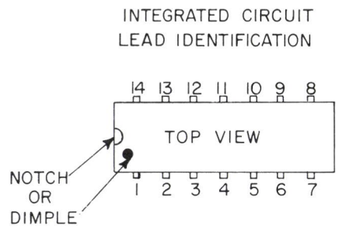
NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION. LEAD IDENTIFICATION FOR Q1 – Q8.

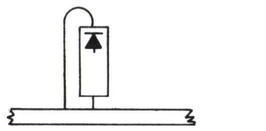


NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.



LEAD IDENTIFICATION FOR Q1

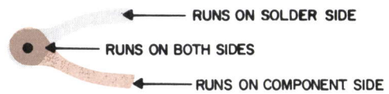




CATHODE IDENTIFICATION FOR ALL DIODES.

(19C317320, Rev. 4)
(19B216562, Sh. 1, Rev. 5)
(19B216562, Sh. 2, Rev. 7)

(19B219458, Rev. 0)
(19B219271, Sh. 1, Rev. 0)
(19B219271, Sh. 2, Rev. 0)

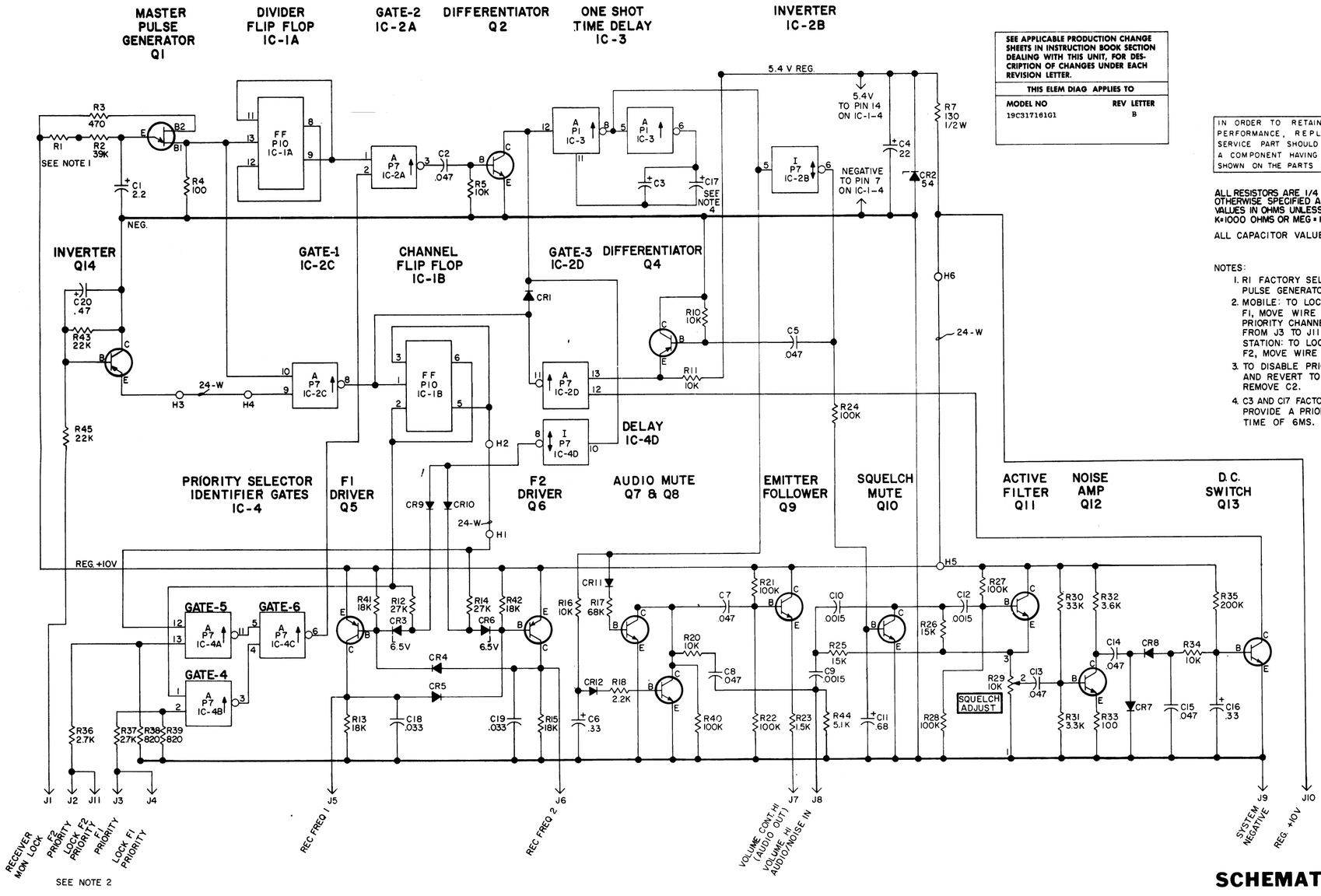


OUTLINE DIAGRAM

PSLM BOARD A703

OUTLINE DIAGRAM

A702 LAMP DIMMER BOARD



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
19C317161G1	B

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 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG = 1,000,000 OHMS.

ALL CAPACITOR VALUES IN UF

NOTES:

1. R1 FACTORY SELECTED TO SET MASTER PULSE GENERATOR OUTPUT RATE AT 8HZ.
2. MOBILE: TO LOCK PRIORITY CHANNEL ON F1, MOVE WIRE FROM J2 TO J4. TO LOCK PRIORITY CHANNEL ON F2 MOVE WIRE FROM J3 TO J11.
   STATION: TO LOCK PRIORITY CHANNEL ON F2, MOVE WIRE FROM J4 TO J11.
3. TO DISABLE PRIORITY FUNCTION OF PSLM AND REVERT TO SEARCH LOCK MONITOR, REMOVE C2.
4. C3 AND C17 FACTORY SELECTED (IF REQUIRED) TO PROVIDE A PRIORITY CHANNEL SAMPLE TIME OF 6MS.

SCHEMATIC DIAGRAM

(19D413287, Rev. 8)

PARTS LIST

LBI-4308A

A703
2-FREQUENCY PSLM BOARD
19C317161G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496267P213	Tantalum: 2.2 µf ±10%, 20 VDCW; sim to Sprague Type 150D.
C2	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C3A	5496267P417	Tantalum: 1.0 µf ±5%, 35 VDCW; sim to Sprague Type 150D.
C3B	19B200240P15	Tantalum: 1.8 µf ±5%, 20 VDCW.
C3C	5496267P413	Tantalum: 2.2 µf ±5%, 20 VDCW; sim to Sprague Type 150D.
C4	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C5	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C6*	5496267P227	Tantalum: 0.33 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
		In REV A and earlier:
	5496267P228	Tantalum: 0.47 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
C7 and C8	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C9 and C10	5494481P124	Ceramic disc: 1500 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C11	5496267P29	Tantalum: 0.68 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C12	5494481P124	Ceramic disc: 1500 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C13 thru C15	19A116080P5	Polyester: 0.047 µf ±20%, 50 VDCW.
C16	5496267P27	Tantalum: 0.33 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C17A	5496267P227	Tantalum: 0.33 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
C17B	5496267P228	Tantalum: 0.47 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
C17C	5496267P229	Tantalum: 0.68 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
C17D	5496267P230	Tantalum: 0.82 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
C17E	5496267P217	Tantalum: 1.0 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
C17F	5496267P226	Tantalum: 0.22 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
C17G	5496267P224	Tantalum: 0.1 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
C18 and C19	19A116080P4	Polyester: 0.033 µf ±20%, 50 VDCW.
C20	5496267P228	Tantalum: 0.47 µf ±10%, 35 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	4038056P1	Germanium.
CR2	4036887P5	Silicon, Zener.
CR3	4036887P48	Silicon, Zener.
CR4 and CR5	19A115250P1	Silicon.
CR6	4036887P48	Silicon, Zener.
CR7 thru CR12	19A115250P1	Silicon.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - INTEGRATED CIRCUITS - - - - - - -
IC1	19A115913P10	Digital, Dual 945 Flip-Flop; sim to Fairchild DTL 093.
IC2	19A115913P7	Digital, Quad 2-Input Gate; sim to Fairchild DTL 946.
IC3	19A115913P1	Digital, Dual 4-Input Gate; sim to Fairchild DTL 930.
IC4	19A115913P7	Digital, Quad 2-Input Gate; sim to Fairchild DTL 946.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J11	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115364P1	Unijunction: N Type; sim to Type 2N2646.
Q2	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q4 thru Q6	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q7 and Q8	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q9 thru Q11	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q12*	19A115362P1	Silicon, NPN; sim to Type 2N2925.
		In REV A and earlier:
	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q13	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q14	19A115768P1	Silicon, PNP; sim to Type 2N3702.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1A	3R152P432J	Composition: 4300 ohms ±5%, 1/4 w.
R1B	3R152P822J	Composition: 8200 ohms ±5%, 1/4 w.
R1C	3R152P123J	Composition: 12,000 ohms ±5%, 1/4 w.
R1D	3R152P163J	Composition: 16,000 ohms ±5%, 1/4 w.
R1E	3R152P203J	Composition: 20,000 ohms ±5%, 1/4 w.
R1F	3R152P243J	Composition: 24,000 ohms ±5%, 1/4 w.
R1G	3R152P273J	Composition: 27,000 ohms ±5%, 1/4 w.
R1H	3R152P303J	Composition: 30,000 ohms ±5%, 1/4 w.
R1I	3R152P333J	Composition: 33,000 ohms ±5%, 1/4 w.
R1J	3R152P363J	Composition: 36,000 ohms ±5%, 1/4 w.
R1K	3R152P393J	Composition: 39,000 ohms ±5%, 1/4 w.
R1L	3R152P433J	Composition: 43,000 ohms ±5%, 1/4 w.
R2	3R152P393J	Composition: 39,000 ohms ±5%, 1/4 w.
R3	3R152P471K	Composition: 470 ohms ±10%, 1/4 w.
R4	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R5	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R7	3R77P131J	Composition: 130 ohms ±5%, 1/2 w.
R10 and R11	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R12	3R152P273K	Composition: 27,000 ohms ±10%, 1/4 w.
R13	3R152P183K	Composition: 18,000 ohms ±10%, 1/4 w.
R14	3R152P273K	Composition: 27,000 ohms ±10%, 1/4 w.
R15	3R152P183K	Composition: 18,000 ohms ±10%, 1/4 w.
R16	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R17	3R152P683K	Composition: 68,000 ohms ±10%, 1/4 w.
R18	3R152P222K	Composition: 2200 ohms ±10%, 1/4 w.
R20	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.

SYMBOL	GE PART NO.	DESCRIPTION
R21 and R22	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R23	3R152P152K	Composition: 1500 ohms ±10%, 1/4 w.
R24	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R25 and R26	3R152P153K	Composition: 15,000 ohms ±10%, 1/4 w.
R27 and R28	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R29	19B209358P106	Variable, carbon film: approx 75 to 10,000 ohms ±10%, 0.25 w; sim to CTS Type X-201.
R30	3R152P333K	Composition: 33,000 ohms ±10%, 1/4 w.
R31	3R152P332K	Composition: 3300 ohms ±10%, 1/4 w.
R32	3R152P362J	Composition: 3600 ohms ±5%, 1/4 w.
R33	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R34	3R152P103K	Composition: 10,000 ohms ±10%, 1/4 w.
R35	3R152P204J	Composition: 0.20 megohm ±5%, 1/4 w.
R36 and R37	3R152P272J	Composition: 2700 ohms ±5%, 1/4 w.
R38 and R39	3R152P821J	Composition: 820 ohms ±5%, 1/4 w.
R40	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R41 and R42	3R152P183K	Composition: 18,000 ohms ±10%, 1/4 w.
R43	3R152P223K	Composition: 22,000 ohms ±10%, 1/4 w.
R44	3R152P512K	Composition: 5100 ohms ±10%, 1/4 w.
R45	3R152P223K	Composition: 22,000 ohms ±10%, 1/4 w.

PRODUCTION CHANGES

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

REV. A - PSLM (19C317161G)

To make PSLM compatible with Channel Guard.
Added R43, R44, R45, C20 and Q14.
Deleted Q3 and changed R33, CR3 and CR6

REV. B - To reduce audio mute time.
Changed C6 and Q12

REV. A - Model 4EC59A97, 98

To add MIKE HI, PTT, EARPHONE and ground to Tone Option Jack J704.

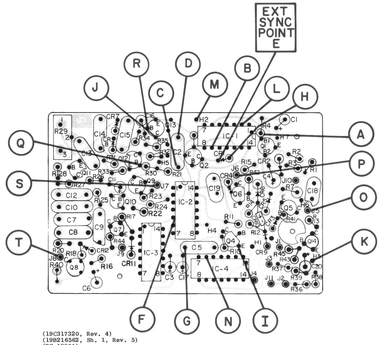
REV. A - Models 4EC59A95, 96
REV. B - Models 4EC59A97, 98

To provide programming for the Channel Guard Encoder.
Added TB703 and hole to chassis.

REV. B - Models 4EC59A95, 96
REV. C - Models 4EC59A97, 98

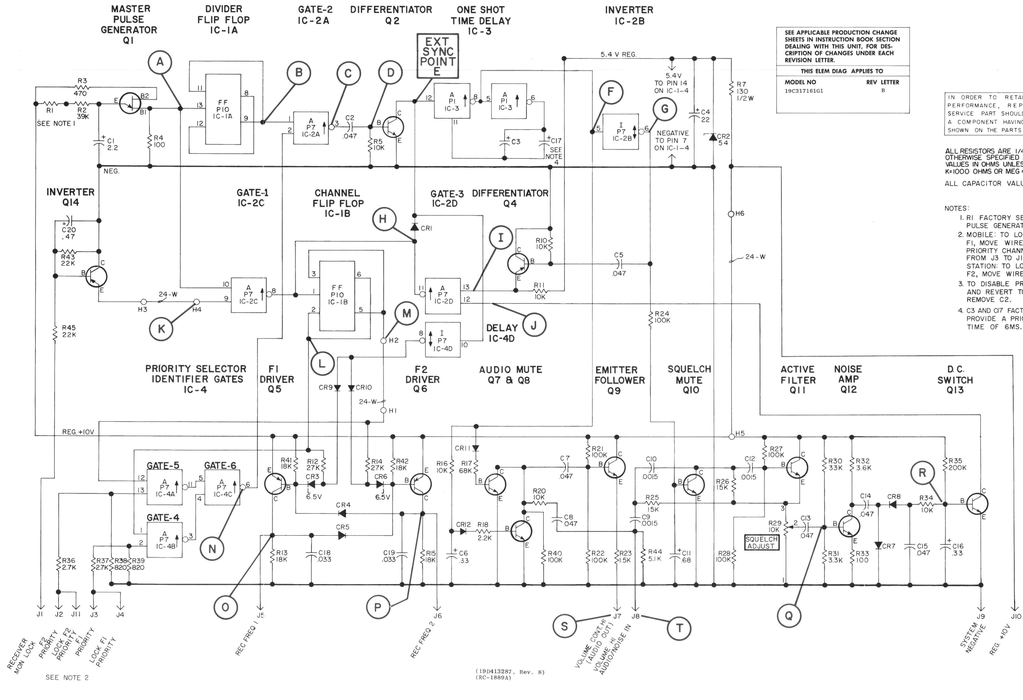
To add means of selecting Channel Guard Encode frequency. Added Jumper to S702.

 *COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



(19C317320, Rev. 4)
(19D216582, Sh. 1, Rev. 5)
(RC-1890A)

Figure A - Chassis Test Points



(19D413287, Rev. 8)
(RC-1888A)

Figure B - Schematic Test Points

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
19C317161G1	B

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 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS.

ALL CAPACITOR VALUES IN UF

NOTES:

1. R1 FACTORY SELECTED TO SET MASTER PULSE GENERATOR OUTPUT RATE AT 8HZ.
2. MOBILE: TO LOCK PRIORITY CHANNEL ON F1, MOVE WIRE FROM J2 TO J4. TO LOCK PRIORITY CHANNEL ON F2 MOVE WIRE FROM J3 TO J11.
   STATION: TO LOCK PRIORITY CHANNEL ON F2, MOVE WIRE FROM J4 TO J11.
3. TO DISABLE PRIORITY FUNCTION OF PSLM AND REVERT TO SEARCH LOCK MONITOR, REMOVE C2.
4. C3 AND C17 FACTORY SELECTED (IF REQUIRED) TO PROVIDE A PRIORITY CHANNEL SAMPLE TIME OF 6MS.

TROUBLESHOOTING PROCEDURE

PRIORITY SEARCH-LOCK MONITOR

TROUBLESHOOTING PROCEDURE

NOTE

The audio quality of the Non-Priority channel can best be checked with an unmodulated carrier or voice modulation. When the PSLM is on the Non-Priority channel, applying a constant tone to the receiver will result in a pulsed sound.

Preliminary Checks

1. Check for a regulated +10 volts DC at J10.
2. Check for +5.4 volts DC at Pin 14 of IC1 thru IC4.

SYMPTOM	PROCEDURE
No receiver audio	1. Check the receiver in a different system (with or without PSLM). 2. Check waveforms at Test Points Ⓢ and Ⓣ.
No 1st oscillator activity	Check waveforms at Test Points Ⓞ and Ⓟ with search mode disabled.
Receiver rapidly alternates between F1 and F2 while trying to receive the Non-Priority channel. - - - OR - - - Obnoxious white noise received on the Non-Priority channel	1. Check the setting of Priority Squelch Adjust R29 (see Table of Contents). 2. Check receiver oscillator modifications (refer to System Modifications as listed in the Table of Contents). 3. Check waveforms at Test Points Ⓢ and Ⓣ. 4. Check system interconnections (refer to Interconnection Diagram in the Maintenance Manual for the Control Unit).
Fails to receive Priority channel	1. Check setting of Priority Squelch Adjust R29 (see Table of Contents). 2. Check voltage readings and waveforms at J2, J3 and Test Points Ⓟ, Ⓜ, Ⓝ, Ⓞ, and Ⓟ.
Incorrect Priority channel	1. Check system interconnections (refer to Interconnection Diagram in the Control Unit Maintenance Manual). 2. Check voltage readings and waveforms at J2, J3 and Test Points Ⓜ, Ⓝ, Ⓞ, and Ⓟ.
Missed syllables on the first part of transmissions	Check waveform at Test Point Ⓐ for incorrect sample rate. Resistor R1 is selected at the factory for an output of 8 Hz (±5%). See Parts List for values of R1.

VOLTAGE READINGS

All voltage readings are DC readings measured with a 20,000 ohm-per-volt VOM with reference to system negative (J9). The readings are taken with the PSLM board connected for F1 priority (see Note 2 on the Schematic Diagram).

NOTE

Readings followed by a (P) are averages of pulsating meter deflections. These readings may vary widely due to the differences in meter ballistics, but may be used to determine that the circuit is operative (or switching) and not at a DC or ground potential.

Preliminary Checks

1. Check for +10 volts at J10.
2. Check for +5.4 volts at Pin 14 of IC1 thru IC4.

Test Point	Reading with Receiver Squelched	Reading with Receiver Unsquelched (on Non-Priority Channel)	Reading with Receiver Unsquelched (on Priority Channel)
A	.35 V	.25 V	.25 V
B	2.5 V (P)	2.5 V (P)	2.5 V (P)
C	5.1 V	2.5 V (P)	5.1 V
D	0 V	0 V	0 V
E	5.0 V (P)	5.0 V (P)	5.0 V
F	.15 V (P)	.15 V (P)	.1 V
G	4.7 V (P)	4.7 V (P)	4.7 V
H	5.0 V (P)	5.0 V (P)	5.1 V
I	0.6 V (P)	0.6 V (P)	0.6 V
J	0.15 V (P)	0.15 V (P)	0.10 V
K	0.5 V	0.15 V	0.15 V
L	2.2 V (P)	0.15 V (P)	0 V
M	2.2 V (P)	4.9 V (P)	5.0 V
N	2.2 V (P)	5.0 V (P)	0.1 V
O (J5)	5.0 V (P)	0.2 V (P)	10.0 V
P (J6)	5.0 V (P)	10.0 V (P)	0 V
Q	0.85 V	0.85 V	0.85 V
R	0.65 V (P)	0.65 V (P)	0.65 V
S (J7)	3.1 V	3.1 V	3.1 V
T (J8)	4.3 V	4.3 V	4.3 V
J1	0 V	3.2 V	3.2 V
J2, J11	0.4 V (P)	0.1 V (P)	0.7 V
J3, J4	10.0 V	10.0 V	10.0 V
IC4-2	2.35 V	2.35 V	2.35 V
IC4-13	0.45 V (P)	0.15 V (P)	0.75 V

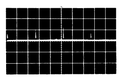
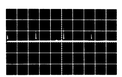
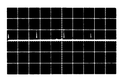
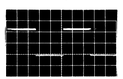
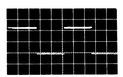
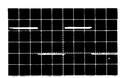
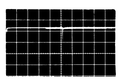
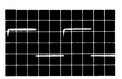
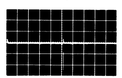
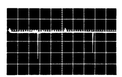
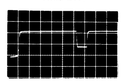
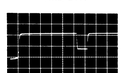
WAVEFORMS

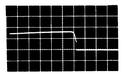
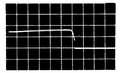
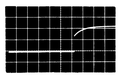
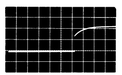
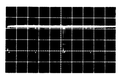
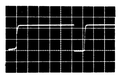
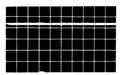
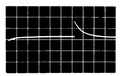
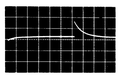
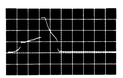
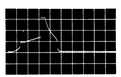
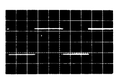
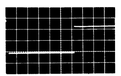
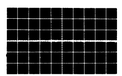
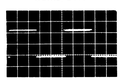
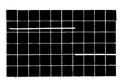
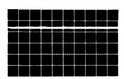
All waveforms are taken at Test Points (A) thru (T) as shown in Figures A and B, and are taken with the PSLM board connected for F1 priority (see note 2 of the Schematic Diagram). When applicable, the waveforms are shown for three different modes of operations as follows:

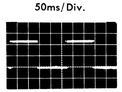
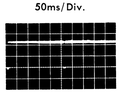
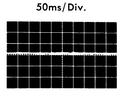
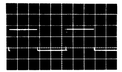
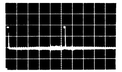
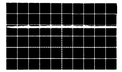
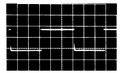
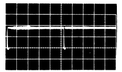
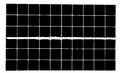
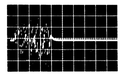
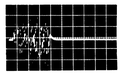
1. Receiver Squelched (PSLM Searching)
2. Receiver Unsquelched (Receiving Non-Priority Channel)
3. Receiver Unsquelched (Receiving Priority Channel)

NOTE

All waveforms are taken using Test Point E as the SYNC SOURCE (Trigger Pulse) except where NOTED.

TEST POINT	RECEIVER SQUELCHED	RECEIVING NON-PRIORITY CHANNEL	RECEIVING PRIORITY CHANNEL
A	 50ms/Div. 4V/Div. NOTE: INTERNAL SYNC	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC
B	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC
C	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC	 50ms/Div. 2V/Div.	
D	 50ms/Div. 2V/Div.	 50ms/Div. 2V/Div.	
E	 1ms/Div. 2V/Div.	 1ms/Div. 2V/Div.	

TEST POINT	RECEIVER SQUELCHED	RECEIVING NON-PRIORITY CHANNEL	RECEIVING PRIORITY CHANNEL
F	 1ms/Div. 2V/Div.	 1ms/Div. 2V/Div.	
G	 1ms/Div. 2V/Div.	 1ms/Div. 2V/Div.	
H	 50ms/Div. 2V/Div.	 1ms/Div. 2V/Div.	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC
I	 1ms/Div. 2V/Div.	 1ms/Div. 2V/Div.	
J	 2ms/Div. 0.5V/Div.	 2ms/Div. 0.5V/Div.	
L	 50ms/Div. 2V/Div.	 1ms/Div. 2V/Div.	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC
M	 50ms/Div. 2V/Div.	 1ms/Div. 2V/Div.	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC

TEST POINT	RECEIVER SQUELCHED	RECEIVING NON-PRIORITY CHANNEL	RECEIVING PRIORITY CHANNEL
N	 50ms/Div. 2V/Div.	 50ms/Div. 2V/Div.	 50ms/Div. 2V/Div. NOTE: INTERNAL SYNC
O	 50ms/Div. 5V/Div.	 50ms/Div. 5V/Div.	 50ms/Div. 5V/Div. NOTE: INTERNAL SYNC
P	 50ms/Div. 5V/Div.	 50ms/Div. 5V/Div.	 50ms/Div. 5V/Div. NOTE: INTERNAL SYNC
Q	 2ms/Div. 0.2V/Div.	 2ms/Div. 0.2V/Div.	
R	2ms/Div. 0.2V/Div.	2ms/Div. 0.2V/Div.	
S	2ms/Div. 0.5V/Div.	2ms/Div. 0.5V/Div.	2ms/Div. 0.5V/Div. NOTE: INTERNAL SYNC
T	2ms/Div. 1V/Div.	2ms/Div. 1V/Div.	2ms/Div. 1V/Div. NOTE: INTERNAL SYNC

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 Communications Equipment Sales Office of the General Electric Company.

DF-4070

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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