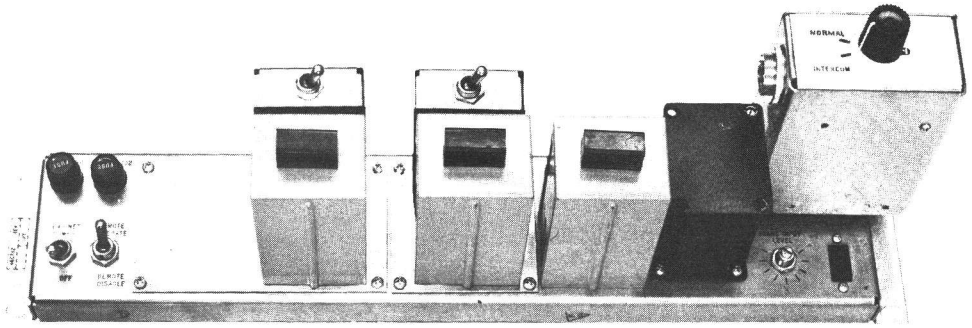
communications

MASTR Progress Line

BASE STATION REMOTE CONTROL PANEL 4KC7C1



SPECIFICATIONS *

Input Voltage Requirement:	117 volts AC ±10%, 50/60 cycles
Dimensions:	19" x 3-1/2" x 8" (4-3/8" in front of mounting surface and 3-1/8" in back of mounting surface)
Weight:	6 lbs. (panel less options)
Temperature Range:	-30°C to +60°C (-22° F to +140°F)
Nominal Frequency Range:	200 to 5000 cps ±3 db
Input Characteristics for signals from telephone line to transmitter:	
Input impedance from line to panel:	600 ohms ±10%
Output impedance from panel to transmitter:	600 ohms ±10%
Insertion Loss:	3 db
Minimum Signal for 70% Modulation:	-12 dbm
Input Characteristics for signals from receiver(s) to telephone line:	
Input impedance from receiver to panel:	600 ohms ±10%
Output impedance from panel to line:	600 ohms ±10%
Insertion Loss:	3 db

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

KC-7-C

GENERAL ELECTRIC

TABLE OF CONTENTS

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.

DESCRIPTION

The General Electric Remote Control Panel, Model 4KC7C1, has been designed for local/remote and remote operations of MASTR Stations.

The Control Panel serves as a termination point for the system connections and contains the MASTR power switch (S702) for supplying power to all units in the station cabinet.

The panel is normally mounted to the standard RETMA rack below the Transmitter/Receiver Shared Power Supply in the station cabinet.

The panel contains components and circuitry for remotely switching a single-frequency station from receive to transmit. Control of more than one transmitter or receiver frequency requires the adding of modification kits to the panel. Refer to the Modification Diagram for an outline of each available modification and function.

The Control Panel contains the following circuitry:

* AC switch and fuses for control of the unregulated and regulated (if voltage regulator option is used) 117 VAC voltages.

* Transmitter input line adjustment control.

* REMOTE OPERATE - REMOTE DISABLE switch.

* Jack for connection to Intercom Kit.

* Transmit relay.

* Line matching transformer

* Telephone line connecting terminals for local/remote and remote operations.

The Remote Control Panel sorts the electrical information channeled to it over telephone lines by the Remote Control Unit and translates this information into the desired action. A control current of 6 ma (@ approximately 40 volts) is required for single-frequency base station control. A second control current, 13 ma (@ approximately 105 volts), is required for controlling a secondary function. An Intercom Kit and a carbon handset will be required when intercommunication between the station and the Remote Control Unit is desired. The circuit of the basic Remote Control Panel and the intercom option is shown on the schematic Diagram.

CIRCUIT ANALYSIS

AC CONTROL CIRCUIT

One section of the MASTR power control switch (S702) opens and closes the unregulated 117-volt AC line and the other section of the switch is used in the regulated (if regulator option is used) 117-volt AC line. Each line contains a 20-ampere fuse to protect all connected circuits. A convenience outlet is connected across the unregulated 117-VAC input terminals.

The power applied to the Control Panel terminal board TB706-1-2 supplies all units in the MASTR station and is controlled by the power switch S702 in the Control Panel.

AUDIO CIRCUITS

The audio signals for remote operation which travel over a telephone line audio pair are to be terminated by the use of the proper primary winding of the line matching transformer (T702) to the Remote Panel terminal board TB701. Other impedances may be matched by making the changes prescribed below:

With 600 ohms connected from A to F, and C joined to D, the primary impedance at 1000 cps is as follows:

Impedance	Line Connected To	Join
33 ohms ±10%	1 and 6	1 to 5 and 2 to 6
200 ohms ±10%	1 and 6	1 to 3 and 4 to 6

The mode of remote control operation and path of audio signal is dependent upon the operation of selection relay K703. When relay K703 is de-energized, the secondary winding of the line matching transformer is connected to the station receiver(s) through contacts 1R and 2R of relay K703, thus feeding the station receiver(s) output to the telephone line audio pair and Remote Control Unit. Energizing relay K703 transfers the secondary winding to the transmitter modulation input circuit through a 600-ohm T-pad. This circuit is completed through contacts K703-2R and 3R. The T-pad provides control over the transmitter input level, while maintaining a constant impedance load on the telephone pair.

Audio Voltage

10-volts regulated B-plus from TB702-9 is filtered by R718 and C705. Series resistor R719 and relay contacts 4R and 5R provide the DC bias for the diode CR518 in the mike audio circuit on the shared power supply. R719 is also the AC load for the T-pad R709. C706 is a DC bias blocking capacitor but passes the modulated audio signal from the telephone line input terminals on TB701 to the modulation input terminal TB702-2.

TELEPHONE LINE CHARACTERISTICS

The key link in any remote control installation is the telephone pair from the Remote Control Unit to the Remote Control Panel. In order

to obtain the most satisfactory service over this link, some general knowledge of line capabilities and control methods is essential. A brief description follows:

A telephone pair is simply a pair of wires, ranging normally from wire size AWG #19 to AWG# 26. These wires, installed by the local telephone company, pass through overhead cables, underground cables, through junction points and switchboards. To the user of the wires, they can be represented by a simple pair of wires. The usual telephone line is constructed to have a characteristic impedance of 600 ohms (stated normally at a frequency of 1000 cycles). Any equipment that is designed to operate into (or from) such a pair, shall have a nominal output/input impedance of 600 ohms. Normally any single telephone pair will have a maximum length of 12 miles before amplification 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, resistance and shunt capacitance of the wires. This loss is a direct function of the length of the line, and varies with the size wire used. As an example, with wire size AWG #19, a distance of six miles may be covered before one-half the input voltage of a 1000-cps tone has been lost. With wire size AWG #26, only two and one-quarter miles may be covered before one-half the input voltage is lost. Line losses as high as 10:1 can be tolerated in operating a transmitter from this Remote Control Unit, but they should be avoided if possible. Although the telephone pair is fairly well shielded, there will be some noise pick-up, especially if an unshielded run has to be made in a fluorescent-lighted building to the control unit or transmitter.

The amount of noise picked up in any one location is a function of the length of line and the environment through which it passes. Assume, for instance, that 0.01 volts 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, let us consider a short line on which the noise pickup is only 0.002 volt and the line loss only 2:1. Then the signal at the receiving end would be 250 times (48 db) greater than the noise. For best signal-to-noise ratio, the shortest, lowest loss line available is desired.

Another inherent characteristic of any telephone line is that the line loss is greatest at the highest audio frequencies. Assuming that the range of voice frequencies is approximately 400 to 3500 cps, then the loss at 3500 cps will be about 2-1/2 times that at 400 cps. This means that, in the case of a long telephone line where the total loss is high, the high frequencies will be attenuated considerably, rendering a bassy quality to the transmissions. In the case of a short line, where the total loss is low, the difference between the high and low frequencies will not be great enough to be audible. If, on a particular installation, the resulting quality is too bassy for good intelligibility, steps can be taken to improve the quality.

There is, of course, as mentioned before, a DC resistance in any telephone pair. This resistance plays an important part in the control circuits and will effect the relay currents obtained. The equipment will operate with a total control line loop resistance of 2500 ohms (when the panel is modified with additional relay(s) for more control functions). If the telephone company cannot supply lines with less than 2500-ohms loop resistance on a particular application, then a slight change can be made. (See the section on MODIFICATIONS.)

CONTROL METHODS

For DC control voltage circuits, the telephone company can supply a pair of wires that will definitely 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 both audio and control circuits to the telephone lines (see Figure 1).

Method 1 — Uses two telephone pair: one for audio and one for control (metallic pair).

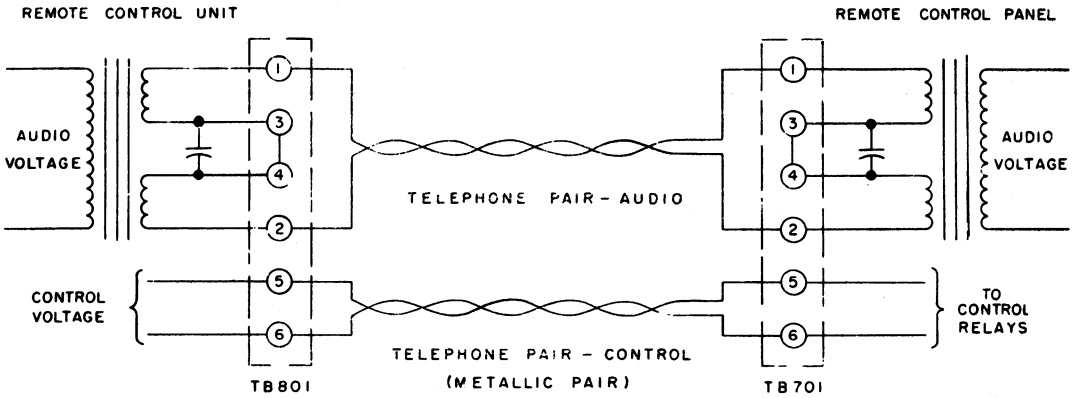
Method 2 — Uses one metallic pair for both audio and control, and simplex the control voltage from the center tap of the output transformer to earth ground.

Method 3 — Uses one metallic pair for both audio and control, and the control voltage is simplexed from one line to the other splitting the output transformer with a capacitor.

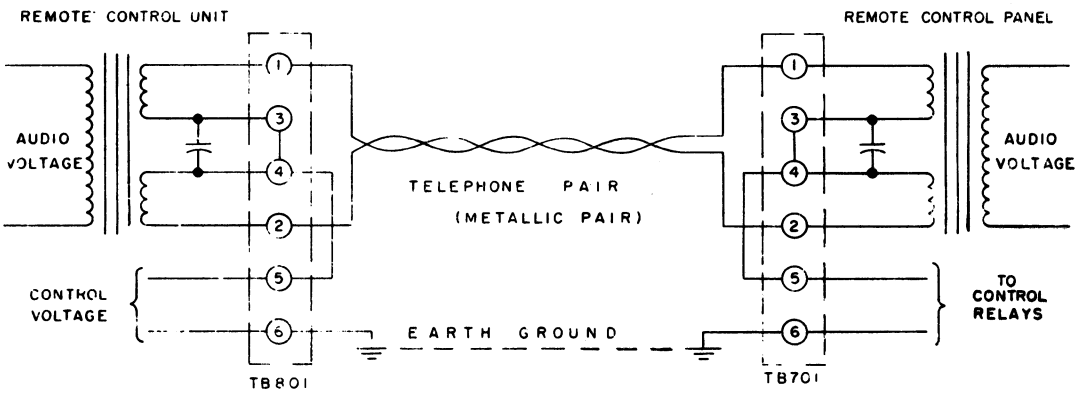
In choosing one of the above methods, consider both cost and performance. The relative cost of leasing lines for use under any one of the three methods will vary between local telephone companies, but one of the methods will usually have a decidely lower rate. Method 1 will provide the best performance. Since the control circuits are separate from the audio circuits, parallel unit installations will be completely free from key clicks caused by the DC control circuits.

Method 2 saves on the number of telephone pairs used, but still minimizes the problem of key clicks from the control circuits, since any surge currents are balanced out in the audio transformer. The only disadvantage in this method is the requirement for an earth ground. In installations near power company sub-stations, where high potentials and currents are present, earth ground currents may occur (especially when there is a fault) causing false operation of the relays. In most applications, such extreme conditions do not response, unless the service engineer adds high-frequency boosting within the circuits of the Remote Control Unit. As to how this can be done, refer to the notes under MODIFICATIONS.

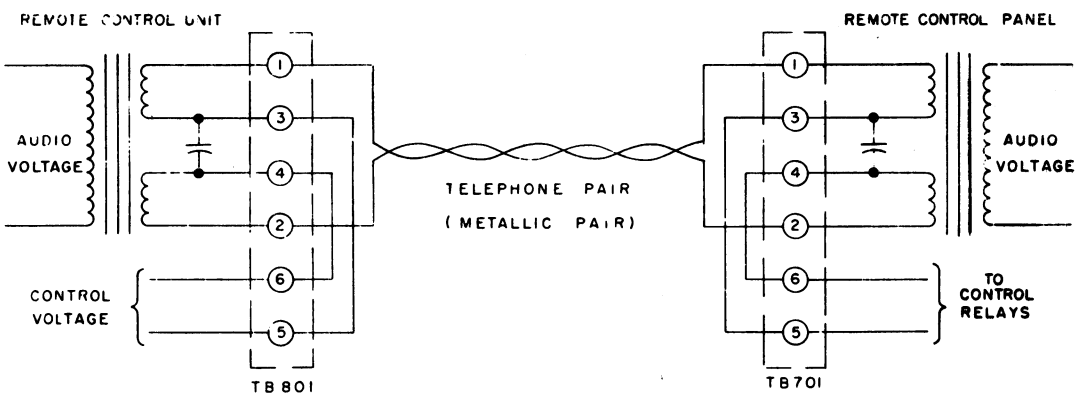
Method 3 provides dependable operation in locations where earth currents may be large and where some compensation for the bassy response of a long line is required. Since the control voltage is applied line-to-line, slight key clicks have been minimized by making C1 and C2 as small as possible, while maintaining a relatively flat response from 400 to 3500 cps.



METHOD 1 - SEPARATE CONTROL AND AUDIO PAIRS



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



METHOD 3 - SINGLE TELEPHONE PAIR WITH CONTROL SIMPLEXED LINE TO LINE

FIG. 1 CONTROL METHODS

Local telephone companies will sometimes offer no choice of these methods, but will provide one audio pair and one control pair, as in Method 1. 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 2 or 3, by telephone company circuits. When two pairs are provided in this way, the connections may be considered virtually similar to those under Method 1.

Standards have been set up by the telephone companies on the use of their lines. In order to minimize cross modulation (i.e., audio being picked up by one pair of wires from another pair), a limit of +8 VU has been set as the maximum level of voice signal that can be placed on the telephone line. VU is the abbreviation for volume units, as read on a VU meter connected across a 600-ohm line.

Since VU meters are not common in the field, a second standard for maximum telephone line signals is often used. It has been found that speech at a voice level of +8 VU contains peak values which correspond to the peak value of a sine wave at a signal level of +18 dbm on a 600-ohm line. +18 dbm is equal to 18 db above 1 milliwatt or 6.2 volts 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 of no more than +18 dbm may be used in establishing the 100% modulation point.

Limits also exist on the maximum DC voltages that may be applied across the telephone lines. These are 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.

TRANSMIT AND INTERCOM TRANSMISSIONS

A Microphone is used to transmit from local or remote locations. If the intercom option is used, a carbon handset is used to communicate with remote points.

1. To transmit a message:

   A. Place the rotary switch on NORMAL (when the panel incorporates the intercom option).

   B. Remove the mike from the hanger.

   C. Press the push-to-talk button and speak into the mike in a normal voice.

   D. Release the push-to-talk button and listen to the test speaker for a reply.

   E. When finished, replace the mike on its hanger.

2. To communicate with intercom option to remote point:

   A. Place the rotary switch on INTERCOM.

   B. Speak into the handset while pressing the push-to-talk button on the handset.

   C. Release the button and wait for a reply (listen to handset earpiece). Remember that the remote operator can not talk and listen simultaniously, so do not interrupt his message,

   D. When finished, replace the handset on its hanger.

   E. Return the rotary switch to NORMAL so that normal remote operation will be possible.

NOTE

In communicating with the remote control point, it is not necessary that the AC power be on at the station, since the two dry cells on the Remote Control Panel provides the polarizing current for the handset. The intercom kit is designed for emergency and testing use, hence, the reduced line level.

3. To service the equipment:

   A. Place the toggle switch in the REMOTE DISABLE position. This disables the transmitter keying circuit, preventing the application of high voltage to the transmitter from the remote point.

   B. Return the toggle switch to REMOTE OPERATE so that normal remote operation will be possible.

INITIAL ADJUSTMENT

The TRANS INPUT LEVEL adjustment (R709) on the Remote Control Panel should be adjusted as follows: (Before making the adjustment below, the transmitter modulation control and the Remote Control Unit adjustments should have been made, following the method prescribed in their respective instruction books). When making the adjustments on a panel employing the intercom option, S1 must be set to the NORMAL position.

If the Remote Control Unit is used without the tone alert oscillator or tone transmitter options, feed a 1000-cps tone into the microphone input of the Control Unit, press the TRANSMIT key on the Control Unit and adjust the 1000-cps source (without changing any remote control adjustments) to obtain a +18-dbm output from the Remote Control Unit. Then adjust the TRANS INPUT LEVEL (R709) on the Remote Control Panel until the swing is ±3.3 kilocycles, as indicated on a suitable monitor.

NOTE

If DC is being simplexed line-to-line, use a 0.5-mfd condenser in series with the AC voltmeter to block the DC.

NOTE

When paralleled Remote Control Units are used with a station combination, it is important that the line level adjustment of the Remote Control Unit farthest from the station combinations (one with the greatest line loss) be made first and then the TRANS INPUT LEVEL on the Control Panel be adjusted according to the above instructions. It will then be necessary to adjust the remaining Remote Control Unit line level adjustments to produce the same level at the transmitter as the farthest Remote Control Unit produced.

If a frequency modulation monitor is not available, the correct setting of the remote level adjustment may be determined by applying the tone at the Remote Control Unit as described above and adjusting the TRANS INPUT LEVEL on the Remote Control Panel for an RMS reading of approximately 0.12-0.2 volt across terminals 1 and 2 of terminal board TB702 on the Remote Control Panel.

If a 1000-cycle tone is not readily available, R709 may be set approximately by speech-modulating the transmitter from the remote point and then setting the TRANS INPUT LEVEL adjustment at the station, so that the peak swing never exceeds ±5 KC. Of course, in order to perform this step, the controls within the Remote Control Unit used should first be adjusted, following the methods outlined in the Remote Control Unit Instruction Book.

MODIFICATIONS

In some installations, the Remote Control Unit may be operating under adverse conditions (with reference to the length of telephone lines). When this is the case, some modifications can be made to utilize the remote dispatching unit to its fullest capabilities, as indicated in the paragraphs below:

Very long lines

When operating with very long lines, three problems arise:

A. Poor signal-to-noise ratio.

B. Bassy quality of signals heard.

C. Improper operation of relay control circuits.

Problem A above can occur not only when the lines are long but also when they are located in a particularly noisy area. The noise on a telephone line increases with its length. As the noise voltage at the receiving end of a telephone pair is relatively constant, the obvious method of obtaining a better signal-to-noise ratio is to increase the signal voltage. Unfortunately, this cannot be done on most telephone lines, as the maximum voltage is set by the telephone company. Where the lines are privately owned, however, higher signals may be permitted and can be of advantage in improving the signal-to-noise ratio. The signal placed on the line by the receivers can be increased by advancing the VOLUME control in the receiver.

Problem B is due to the shunt capacitance of long lines, which attenuates the higher frequencies. The high-frequency response of the Remote Control Unit can be increased according to the individual instruction books. The telephone line can be compensated to attenuate the low frequencies by replacing C702 (4 mfd) by a 0.5-mfd capacitor for line-to-line operation. The telephone line does, however, become unbalanced at low frequencies when remote squelch is used.

Problem C occurs when the total DC resistances of the telephone line loop exceed 2500 ohms. Resistances of this order are not normally encountered, except in installations where very long telephone lines are used.

When this is the case, the two-frequency relay on the Remote Control Panel may fail to pick up when the 105-volt control voltage is applied at the remote end. This can be corrected by shorting out R707 on the Remote Control Panel. (Operating with the DC control voltage simplexed line to ground essentially halves the DC resistance, meaning that longer lines may be used with this method than the other two.)

REMOTE CONTROL CIRCUITS 7143269-G1 thru -G5

The standard panel contains components and circuitry for remotely switching a single-frequency Station Combination from receive to transmit (Function 1 on Modification Diagram). Control of more than one transmitter or receiver frequency (Functions 2-7) requires the addition of modification kits to the panel (See Modification Diagrams for circuitry and description of each remote control circuit).

CONTROL CIRCUITS

When the Remote Control Unit applies no control voltage to the telephone line, the Remote Control Panel selects the operation listed in Table I under "0". Keying the Control Unit applies a nominal +40 volts to the control pair which picks up the 6-ma relay (K703) on the Remote Control Panel, putting the transmitter on the air. The exact voltage applied to the control pair will vary between different installations, since it is adjusted for the resistance of the particular telephone line over which it must operate.

When the Remote Control functions shown in figure numbers 1 and 2 on the Modification Diagram provide remote squelch control, the voltage

on the control pair may vary between approximately 0 and -20 volts (TB701-6 to TB701-5) on receive. As the voltage is decreased to zero, by rotating the SQUELCH control on the Remote Control Unit fully clockwise, the base of the squelch transistors is made more positive (with respect to ground), fully unsquelching the receiver. The SQUELCH control on the receiver adds positive voltage to the base potential of the squelch transistors, whereas the SQUELCH control on the Remote Control Unit adds negative voltage. This system of squelch control increases the range of equipment tolerances and telephone line resistances over which the remote squelch control will operate. Since only one control voltage may be applied to the telephone line at a time, receiver frequency selection and receiver squelch adjustment cannot both normally be controlled from the Remote Control Unit in the same installation.

Figure Numbers 2, 4, 5, 6 and 7 on the Modification Diagram must have a 13-ma relay (K1) connected in series with the 6-ma relay (K703). This relay is furnished as a part of one of the Control Panel modification kits. When 40 volts is applied to the control pair, only the 6-ma relay picks up, selecting the function listed in Table I under "+40 volts." The application of 105 volts to the control pair picks up both relays, selecting the functions listed in Table I under "+105 volts".

The function shown in Figure Number 4 requires a third relay (K2) and Figure Numbers 3, 5 and 6 require a third and a fourth relay (K2 and K3) on the Remote Control Panel. Relays K703 and K1 are connected in series with a rectifier, so as to pick up only when positive voltages of 40 volts (nominal) and 105 volts (nominal), respectively, are applied to TB801-5 (in relation to TB801-6) on the Remote Control Unit. K2 and K3 are connected in series with another rectifier so as to pick up only on negative voltages of 40 volts (nominal) and 105 volts (nominal), respectively. The operation which is selected, and the relay(s) energized by each control voltage are shown in Table I.

RELAY-POLARIZING KIT, 7145278-G1 (Option)

The Relay-Polarizing Kit 7145278-G1 modifies the Control Panel Model 4KC7C1 relay circuit so that the relay will pick up on either a positive or a negative control voltage, depending on the polarity of the kit rectifier in the circuit.

The red wire of CR2 is connected to TB705-8 and the black wire from CR2 is connected to TB705-10. Resistor R708 is connected across TB705-9 & 10.

INTERCOM KIT, 7488796-G2 (Option)

Intercom Kit 7488796-G2 is designed for use with Remote Control Panel 4KC7C1 to provide communication between the base station and the Remote Control point. The kit consists of a 6-pole, 2-position rotary switch; a 4-pin microphone receptacle; and an 11-pin phenolic plug, assembled in a 1-13/16" x 3-3/8" x 4-3/4" housing having a removable top plate.

TABLE I - Operations Selected by Control Voltages
Nominal voltage at TB701-5 (with respect to TB701-6)

TYPE OF OPERATION (See Mod. Diagram)	CONTROL VOLTAGE				
	0VDC	+40 VDC (6 ma)	+105 VDC (13 ma)	-40 VDC (6 ma)	-105 VDC (13 ma)
	No relays energized	Energizes K703	Energizes K1 and K703	Energizes K2	Energizes K2 and K3
No. 1	RECEIVE *	TRANSMIT			
No. 2	RECEIVE *	T1	T2		
No. 3	R1 & R2	TRANSMIT		R1	R2
No. 4	R1	T1	T2	R2	
No. 5 & 6	R1 & R2	T1	T2	R1	R2
No. 7	Channel Guard	Noise Squelch	TRANSMIT		

* The control voltage may be between 0 and -20 volts if the remote control unit is used for remote squelch adjustment.

Intercommunication between the base station and the Remote Control point is maintained by two standard "D" size flashlight cells, which mount in battery holders inside the housing. Since a carbon microphone must be used for intercom, a carbon telephone handset is normally supplied with the Intercom Kit.

In communicating with the Remote Control point, it is not necessary that the AC power be "on", since the two dry cells provide the polarizing current for the carbon telephone handset. The cells should have a life of at least a year in normal usage of a few messages a week. The primary reason for failure of these cells should be age.

NOTE

If, for any reason, the INTERCOM switch is not returned to NORMAL at the end of a call to the Remote Control point, the dry cells will fail in a relatively short time.

To Install The Intercom

Remove the top plate of the assembly housing and insert two dry cells before mounting the kit to the panel. To install the Intercom Kit, plug the assembly into the 11-pin phenolic socket (J703) on the Remote Control Panel, and lock it in place by securing the assembly to the panel with the #8 screw and lockwasher supplied with the kit. Insert the screw through the mounting hole from the rear of the panel and screw it into the 1/4-inch by 1-inch block on the bottom of the assembly. The Schematic Diagram for the Intercom Kit is included in the Schematic Diagram for the Remote Control Panel.

To Service The Intercom

Place the REMOTE OPERATE - REMOTE DISABLE switch in the REMOTE DISABLE position. This will disable the transmitter keying circuit, thus preventing the possibility of applying high voltage to the transmitter from the Remote Control point.

Return the switch to REMOTE OPERATE, after servicing, so that normal remote operation will be possible.

MAINTENANCE

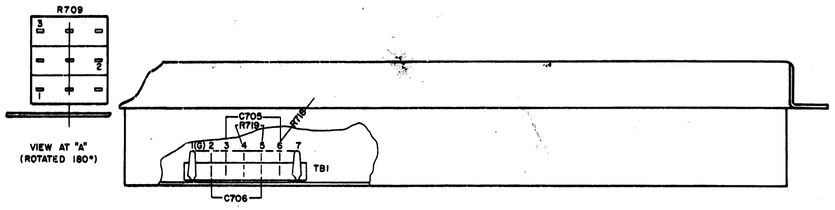
All the parts are designed for durability and require a minimum of maintenance. The dry cells required for intercommunication are not furnished with the equipment.

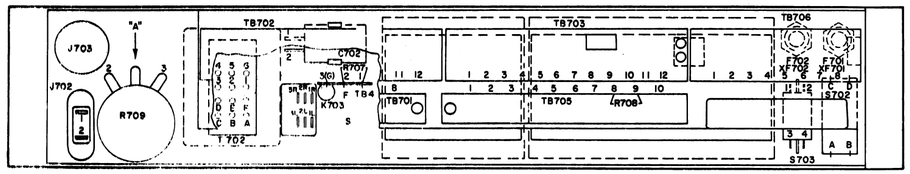
The collection of dust on the relay contacts may result in intermittent operation. This dust problem has been greatly decreased by the use of relay dust covers, but if it should occur, the relays should be blown out with compressed air. Should an oily film form on the contacts, it may be removed by cleaning with a burnishing tool. Care should be taken not to bend the springs. The residual screw and armature adjustments have been set at the factory to operate the relays on a certain range of currents. Do not tamper with these adjustments.

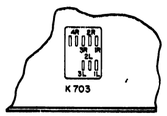
The two dry cells of the intercom option kit should have a life of at least a year in normal "INTERCOM" usage of a few messages a week. The primary reason for the failure of these cells will be age. After two years of "shelf life", they begin to deteriorate. In replacing these dry cells, any brand of standard flashlight batteries can be used. To remove the old cells, simply loosen the screw at the right end and remove the old cells. Insert the new cells with the positive terminal to the left and tighten the screw until the cells are held tightly.

When service is required on the panel, first turn the REMOTE OPERATE - REMOTE DISABLE toggle switch to the REMOTE DISABLE position; the transmitter keying circuit will be disabled, preventing the application of high voltage to the transmitter from a remote point.

Refer to Schematic Diagram for wiring and to Modification Diagram, Sheets 1 and 2 for control modifications and accessory kits. Refer to Outline Diagram for location of components.





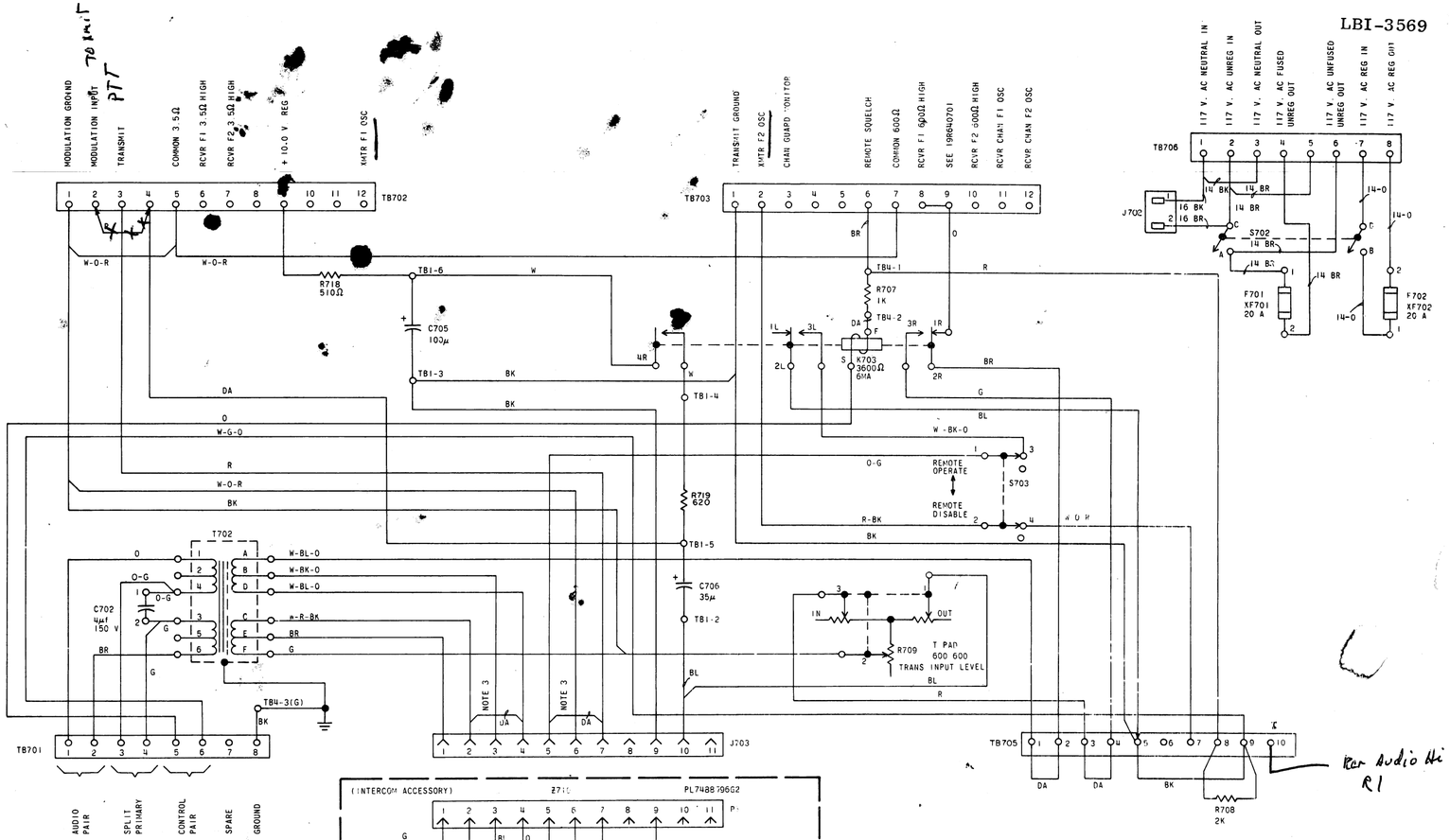


RESISTANCE READINGS

FROM	TO	RESISTANCE Ω
TB701-6	TB703-6	2000
TB701-1	TB702-5	0
TB701-5	TB703-7	0
TB702-5	J703-6	0
TB706-1	J702-1	0
TB706-2	J702-2	0
TB706-5	TB706-4	0
TB706-2	TB706-6	0
TB706-7	TB706-8	0
TB705-1	TB706-3	0
TB705-2	TB706-5	0

CLOSE S702

(19C303727, Rev. 1)

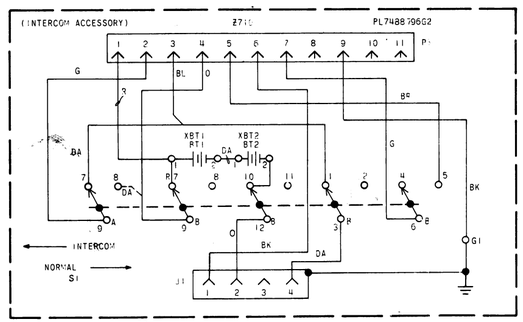


NOTES:

1. CONNECT TB701-8 TO EARTH GROUND.
2. TB706-1 MUST BE CONNECTED TO GROUND OR NEUTRAL OF BUILDING WIRING
3. WHEN USING THE INTERCOM ACCESSORY, CLIP JUMPER WIRES ON J703-2 TO 4 AND J703-5 TO 7.

FOR TELEPHONE LINE CONNECTIONS

1. SINGLE PAIR, DC SIMPLEXED LINE TO LINE.
   (A) CONNECT TELEPHONE PAIR TO TB701-1 & 2.
   (B) JUMPER TB701-3 TO 5 AND TB701-4 TO 6.
2. SINGLE PAIR, DC SIMPLEXED LINE TO GROUND.
   (A) CONNECT TELEPHONE PAIR TO TB701-1 & 2.
   (B) JUMPER TB701-3 TO 4 TO 5 AND TB701-6 TO 8
   (C) CHECK THAT TB701-8 IS CONNECTED TO EARTH GROUND.
3. TWO PAIR, ONE PAIR AUDIO AND ONE PAIR CONTROL.
   (A) CONNECT AUDIO PAIR TO TB701-1 & 2.
   (B) CONNECT CONTROL PAIR TO TB701-5 & 6.
   (C) CONNECT JUMPER BETWEEN TB701-3 & 4.



(19D402369, Rev. 2)

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.

SCHEMATIC & OUTLINE DIAGRAMS

BASE STATION REMOTE CONTROL PANEL
MODEL 4KC7C1

Issue 1

PARTS LIST

LBI-3555

CONTROL PANEL
MODEL 4EC7C1
(PL-7145027-G10)

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - -
C702	7486445-P1	Tubular, electrolytic: non-polarized, 4 µf +100% -10%, 150 VDCW.
C705	7489483-P16	Tubular, hermetically sealed, electrolytic: axial leads, 100 µf +75% -10%, 15 VDCW; sim to Sprague 30D172A1.
C706	7489483-P10	Tubular, hermetically sealed, electrolytic: axial leads, 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D169A1.
		- - - - - - - - - - FUSES - - - - - - - - -
F701 and F702	7484390-P6	Cartridge, quick blowing: 20 amps at 250 v; sim to Bussmann ABC-20 or Littelfuse 314020.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J702	7128081-P1	Connector, phen: 2 contacts rated at 10 amps at 250 v or 15 amps at 125 v; sim to Cinch 54A12844.
J703	7140824-P2	Electron tube, mica-filled phen: 11 contacts; sim to Amphenol 78-S11TM-G2l-1.
		- - - - - - - - - - RELAYS - - - - - - - - -
K703	19C301473-P2	Armature, sensitive, dust covered: 8 MADC nominal, 3 w max operating, 3600 ohms ±10% coil res, 1 form A and 2 form C contacts rated at 3 amps at 135 v; sim to CP Clare A369708.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R707	3R77-P102K	Fixed composition: 1000 ohms ±10%, 1/2 w.
R708	PL-7141971-G6	Resistor kit: includes fixed composition, 2000-ohm ±5%, 2 w resistor with 2 spade tongue terminals.
R709	7772843-P19	Atten, T-pad, variable, audio: 600 ohms imp, 4 w, 40 db min total attenuation, 294° 23° rotation; sim to Mallory Type T600.
R718	3R77-P511J	Fixed composition: 510 ohms ±5%, 1/2 w.
R719	3R77-P621J	Fixed composition: 620 ohms ±5%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - -
S702	7109677-P1	Toggle: DPST, 6 amps at 250 v or 12 amps at 125 v; sim to Arrow-Hart and Hegeman 82143-V.
S703	7478623-P2	Toggle: DPST, 1 amp at 250 VDC or 3 amps at 125 VDC; sim to Arrow-Hart and Hegeman 20902-BJC.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - -
T702	7775504-P1	Audio freq, line to line: freq range 0.1-5 KC. Pri: 33/200/250/800 ohms ±10% imp at 1 KC. Sec: 33/200/250/800 ohms ±10% imp at 1 KC; sim to Kenyon Transformer T-26.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7775500-P17	Phen: 7 terminals.
TB4	7775500-P102	Phen: 3 terminals.
TB701	7117710-P8	Phen: 8 terminals; sim to Cinch 1780.
TB702 and TB703	19C301086-P8	Feed-thru, phen: 12 terminals, 15 amps at 1200 VRMS; sim to G-E CR151D75412AB.
TB705	7117710-P10	Phen: 10 terminals; sim to Cinch 1799.
TB706	19C301086-P6	Feed-thru, phen: 8 terminals, 15 amps at 1200 VRMS; sim to G-E CR151D75408AB.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF701 and XF702	7115179-P1	Fuseholder: 15 amps at 250 v; sim to Bussmann Type HEP.
		- - - - - - - - - SUBASSEMBLIES - - - - - - - - -
Z704		2-FREQ TRANSMITTER CONTROL KIT PL-7143269-G1
		- - - - - - - - - - - RELAYS - - - - - - - - - - -
K1	7773760-P15	Armature, quick acting, DC: 2000 ohms ±10% coil res, 1 form A, 1 form C and 1 form D contacts rated at 3 amps at 150 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7478633-P11	Toggle: SPDT, momentary contact, 10 amps at 250 VAC or 15 amps at 125 VAC, 1/2 hp at 115 VAC or 230 VAC; sim to Cutler-Hammer 8906-K201.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	PL-7145271-G1	Bracket: approx 3-3/4 x 2-1/8 x 7/8 inches. (Used with S1).
Z705		1-FREQ RECEIVER CONTROL KIT PL-7143269-G2
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A115145-P2	Silicon.
		- - - - - - - - - - - RELAYS - - - - - - - - - - -
K2	7773760-P11	Armature, quick acting, DC: 3600 ohms ±10% coil res, 2 form C contacts rated at 3 amps at 150 w.
K3	7773760-P15	Armature, quick acting, DC: 2000 ohms ±10% coil res, 1 form A, 1 form C and 1 form D contacts rated at 3 amps at 150 w.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77-P102K	Fixed composition: 1000 ohms ±10%, 1/2 w.
R3 and R4	3R79-P621J	Fixed composition: 620 ohms ±5%, 2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7478633-P11	Toggle: SPDT, momentary contact, 10 amps at 250 VAC or 15 amps at 125 VAC, 1/2 hp at 115 VAC or 230 VAC; sim to Cutler-Hammer 8906-K201.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB4	7775500-P7	Phen: 3 terminals.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	PL-7145271-G1	Bracket: approx 3-3/4 x 2-1/8 x 7/8 inches. (Used with S1).
Z706		2-FREQ RECEIVER CONTROL KIT PL-7143269-G3
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A115145-P2	Silicon.
		- - - - - - - - - - - RELAYS - - - - - - - - - - -
K2	7773760-P11	Armature, quick acting, DC: 3600 ohms ±10% coil res, 2 form C contacts rated at 3 amps at 150 w.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2	3R79-P302K	Fixed composition: 3000 ohms ±10%, 2 w.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - SUBASSEMBLIES(Cont'd) - - - -
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7478633-P11	Toggle: SPDT, momentary contact, 10 amps at 250 VAC or 15 amps at 125 VAC, 1/2 hp at 115 VAC or 230 VAC; sim to Cutler-Hammer 8906-K201.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB3	7775500-P1	Phen: 2 terminals.
TB4	7775500-P7	Phen: 3 terminals.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	PL-7145271-G1	Bracket: approx 3-3/4 x 2-1/8 x 7/8 inches. (Used with S1).
Z708		RELAY POLARIZING KIT PL-7145278-G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR2	4037822-P1	Silicon.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	7775500-P7	Terminal board, phen: 3 terminals.
	19B209260-P103	Terminal: spade tongue; sim to Amp 60495-1.
Z710		INTERCOM CONNECTOR KIT PL-7488796-G2
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1	7117934-P2	Connector, chassis: 4 female contacts; sim to Amphenol Type 91-PC4F.
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1	7478610-P8	Connector, phen: 11 contacts; sim to Amphenol 86-CP11-02 or Cinch 204-51-08-001.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7774158-P2	Rotary: 6 poles, 2 positions, 2 sections, non-shorting contacts; sim to Oak Type "F".
		BATTERY HOLDER ASSEMBLY PL-7146013-G1 (Used in PL-7488796-G2)
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XBT1 and XBT2	7136204-P1	Retainer, battery: 2 terminals, used with size "D" dry cell flashlight battery.
		TONE SQUELCH CONTROL KIT PL-7143269-G4
		- - - - - - - - - - - RELAYS - - - - - - - - - - -
K1	7773760-P15	Armature, quick acting, DC: 2000 ohms ±10% coil res, 1 form A, 1 form C and 1 form D contacts rated at 3 amps at 150 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7478633-P11	Toggle: SPDT, momentary contact, 10 amps at 250 VAC or 15 amps at 125 VAC, 1/2 hp at 115 VAC or 230 VAC; sim to Cutler-Hammer 8906-K201.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	PL-7145271-G1	Bracket: approx 3-3/4 x 2-1/8 x 7/8 inches. (Used with S1).

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - - SUBASSEMBLIES(Cont'd) - - -
		2-FREQ TRANSMITTER AND RECEIVER SEARCH LOCK MONITOR KIT PL-7143269-G5
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A115145-P2	Silicon.
		- - - - - - - - - - - RELAYS - - - - - - - - - - -
K2	7773760-P11	Armature, quick acting, DC: 3600 ohms ±10% coil res, 2 form C contacts rated at 3 amps at 150 w.
K3	7773760-P15	Armature, quick acting, DC: 2000 ohms ±10% coil res, 1 form A, 1 form C and 1 form D contacts rated at 3 amps at 150 w.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77-P102K	Fixed composition: 1000 ohms ±10%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	7478633-P11	Toggle: SPDT, momentary contact, 10 amps at 250 VAC or 15 amps at 125 VAC, 1/2 hp at 115 VAC or 230 VAC; sim to Cutler-Hammer 8906-K201.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB4	7775500-P7	Phen: 3 terminals.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	PL-7145271-G1	Bracket: approx 3-3/4 x 2-1/8 x 7/8 inches. (Used with S1).
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	7146300-P2	Plate: approx 2-7/8 x 3-7/8 x 11/32 inches. (Used in PL-7488796-G2).
	7146298-P1	Cover: approx 3-5/16 x 4-3/4 x 1/16 inches. (Used in PL-7488796-G2).
	7146296-P1	Spacer: 1 inch. (Used in PL-7488796-G2).
	PL-4039182-G2	Knob. (Used with S1 in PL-7488796-G2).
	N70P1504C13	Set screw: hex socket, No. 8, 1/4 inch long. (Used with S1 in PL-7488796-G2).
	PL-7488793-G2	Box: approx 4-5/8 x 3-3/16 x 5/8 inches. (Used in PL-7488796-G2).
	7143961-P1	Jumper: sim to Kulka 600. (Connects terminals 8 and 9 of TB703 in PL-7145027-G10).
	7774194-P1	Chassis: approx 19 x 3-1/2 x 1 inches. (Used in PL-7145027-G10).
	7118719-P4	Mounting clip: sim to Prestole E-50005-038. (Used with C702 in PL-7145027-G10).
	PL-5494583-G1	Bracket: approx 14-1/8 x 2-1/2 x 1/16 inches. (Mounts TB701, TB702, TB703, TB705 and TB706 in PL-7145027-G10).
	7141414-G3	HANDSET HOLDER CARBON HANDSET Model 4EM11A1
	7486451-P1	Telephone handset, with carbon transmitter. Includes Transmitter unit. Sim to Western Electric F-1 or Roanwell 10037 Receiver unit. Roanwell 10164. Cable: 5 conductor coiled tinsel cord with tangent ends, one Amphinol 91-MC4M. (Model 4EM11A1 only).
	7486451-P2	Telephone handset, with carbon transmitter. Includes Transmitter unit. Sim to Western Electric F-1. Receiver Unit: Roanwell No. RA1. Switch: Roanwell No. 10164. Cable: 5 conductor stranded cord, one Amphenol plug 91-MC4M. (Model 4EM11A1 only).
	7101608-P4	Handset holder. Sim to WE KS-10080.

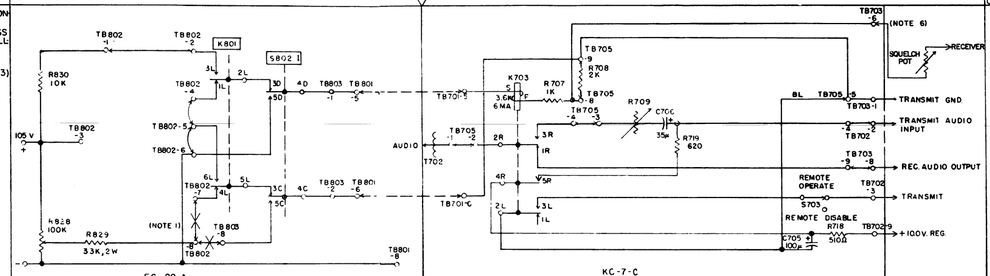
FIGURE NO	REMOTE CONTROL OF	EC-28-A INSTALL KIT	EC-28-A KIT ELEMENTARY DIAG.	EC-28-A KIT CONNECTIONS WIRE COLOR	EC-28-A KIT CONNECTIONS TERM.	EC-28-A INTERNAL CONNECTIONS JUMPERS REMOVED	EC-28-A INTERNAL CONNECTIONS JUMPERS ADDED	EC-28-A MAY BE PARALLELED	EC-28-A REM SQUELCH
1	A SINGLE-FREQUENCY TRANSMITTER AND A SINGLE-FREQUENCY RECEIVER (PROVIDED BY THE BASIC EC-28-A AND KC-7-C	NONE	NONE	NONE		NONE	NONE	YES EXCEPT FOR REM SQUELCH	OPTIONAL UNLESS PARALLELED (SEE NOTE 3)
2	A TWO-FREQ. TRANSMITTER AND A SINGLE-FREQUENCY RECEIVER.	PL 7150211G1	PL7150211G1	R-O RED ORANGE	TB802-1 3 2	TB802-1 TO TB802-2	NONE	YES EXCEPT FOR REM SQUELCH	OPTIONAL UNLESS PARALLELED (SEE NOTE 3)
3	A SINGLE-FREQUENCY TRANSMITTER AND TWO SINGLE-FREQUENCY RECEIVERS WITH SELECTION OF EITHER OR BOTH RECEIVERS	PL 7150211G2	PL7150211G2	R ORANGE	TB802-3 TB802-7	TB802-7 TO TB802-8 TB802-8 TO TB803-8 TB801-8 TO TB801-9	NONE	NO	NO
4	A TWO FREQUENCY TRANSMITTER AND A TWO-FREQUENCY RECEIVER	TWO PL 7150211G1	PL7150211G1 SEE FIGURE 2	S2 (XMIT) R R-O ORANGE S2 (REC.) R-O R ORANGE	TB802-3 TB802-1 TB802-2 CUT OFF TB802-1 TB802-7	TB802-1 TO TB802-2 TB802-7 TO TB802-8 TB802-8 TO TB803-8 TB801-8 TO TB801-9	NONE	NO	NO

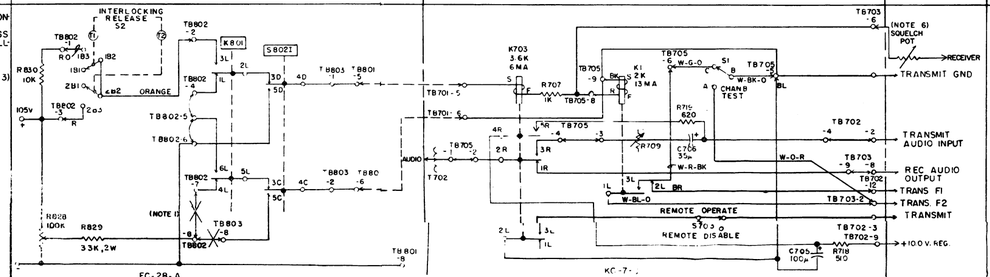
THIS IS A CONTROL CIRCUIT OPERATIONAL DIAGRAM OF THE FOLLOWING REMOTE CONTROL UNITS: MODEL 4EC28A1

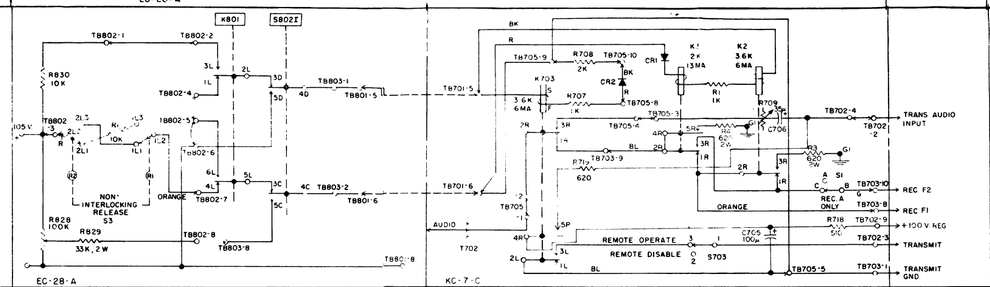
TELEPHONE LINE USER ONLY

MODEL 4KC7C1

THIS IS A CONTROL CIRCUIT OPERATIONAL DIAGRAM OF THE FOLLOWING REMOTE CONTROL PANELS:







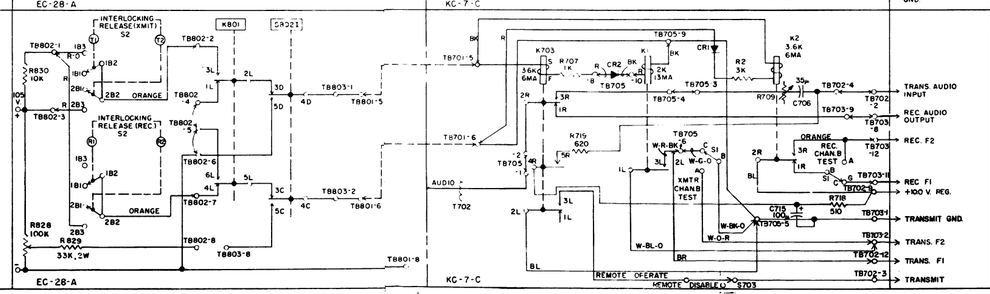


FIGURE NO	CONTROL LINE VOLTAGE AT TB701-5 RELATIVE TO TB701-6 IN KC-7-C +40 VDC	+105 VDC	-40 VDC	-105 VDC	KC-7-C INSTALL KIT	KC-7-C KIT ELEMENTARY DIAGRAM	KC-7-C KIT CONNECTIONS WIRE COLOR	KC-7-C KIT CONNECTIONS TERM.	KC-7-C INTERNAL CONNECTIONS JUMPERS REMOVED	KC-7-C INTERNAL CONNECTIONS JUMPERS ADDED	REMOTE CONT. OF	FIGURE NO.
1	REC. TRANS.				NONE	NONE	NONE		NONE	NONE	A SINGLE-FREQUENCY TRANSMITTER AND A SINGLE-FREQUENCY REC. (PROVIDED BY THE BASIC EC-28-A AND KC-7-C	1
2	REC	TRANS	TRANS		PL7143269G1		RED BLACK W-R-BK BR W-BL-O W-BK-O W-O-R W-BK-O W-G-O G O BL	TB705-6 " -9 TB705-6 TB702-12 TB703-2 TB705-5 " -2 " -6 CUT OFF	R708 FROM TB705-8 & TB705-9	NONE	A TWO-FREQUENCY TRANSMITTER AND A SINGLE-FREQUENCY RECEIVER	2
3	REC F1 & F2	TRANS.	REC F1	REC F2	PL7143269G2 & PL7145278G1 SEE A7145316 FOR INSTALLATION OF PL7145278G1	PL7143269G2 PL7145278G1	PL7143269G2 R BK O G BL (NOTE 4)	TB701-6 TB701-5 TB703-8 TB703-10 TB703-9	TB703-8 TO TB703-9 DISCONNECT END OF R708 FROM TB705-8 AND CONNECT TO TB705-10 CONNECT WIRE TB501-14 ON EP-38-A TO TB703-1 ON KC-7-C	NONE	A SINGLE-FREQUENCY TRANSMITTER AND TWO SINGLE-FREQUENCY RECEIVER WITH SELECTION OF EITHER OR BOTH RECEIVERS	3
4	REC F1	TRANS F1	TRANS F2	REC. F2	PL7143269G3 PL7145278G1 SEE FIGURE 3 PL7143269G1 SEE FIGURE 2	PL7143269G3 PL7145278G1	PL7143269G1 R BK O G BL BR W-BL-O W-BK-O W-O-R W-R-BK W-G-O PL7143269G3 R BK O BL G PL7145278G1 R BK	TB705-10 TB705-9 CUT OFF TB702-12 TB703-2 TB705-5 TB703-2 TB705-6 TB705-6 TB701-6 TB701-5 TB703-12 TB703-11 TB705-8 TB705-10	R708 FROM TB705-8 AND TB705-9 CONNECT WIRE TB501-14 ON EP-38-A TO TB703-1 ON KC-7-C	NONE	A TWO-FREQUENCY TRANSMITTER AND A TWO-FREQUENCY RECEIVER	4

NOTES:

1. BROKEN LINE SHOWS CONNECTION ADDED, "X'S" SHOW CONNECTIONS DELETED FOR PARALLEL OPERATION.
2. ARROWHEADS ON WIRES AT TERMINAL BOARD POINTS INDICATE LUG CONNECTIONS.
3. IF TWO OR MORE UNITS ARE OPERATED IN PARALLEL, REMOTE SQUELCH CAN BE AVAILABLE ON ONLY ONE UNIT.
4. CONNECT R3 BETWEEN K2-3R AND G1
   CONNECT R4 BETWEEN K3-5R AND G1
   CONNECT D WIRE BETWEEN K3-2R AND K3-4R
5. IF REMOTE SQUELCH IS NOT DESIRED, REMOVE SQUELCH POT WIRE FROM TB703-6 AND CONNECT TO TB703-1

KITS FOR AND CONNECTIONS BETWEEN CONTROL PANEL KC-7-C AND REMOTE CONTROL UNIT EC-28-A TO PROVIDE MULTIPLE XMTR, REC, FREQ, OPERATION.

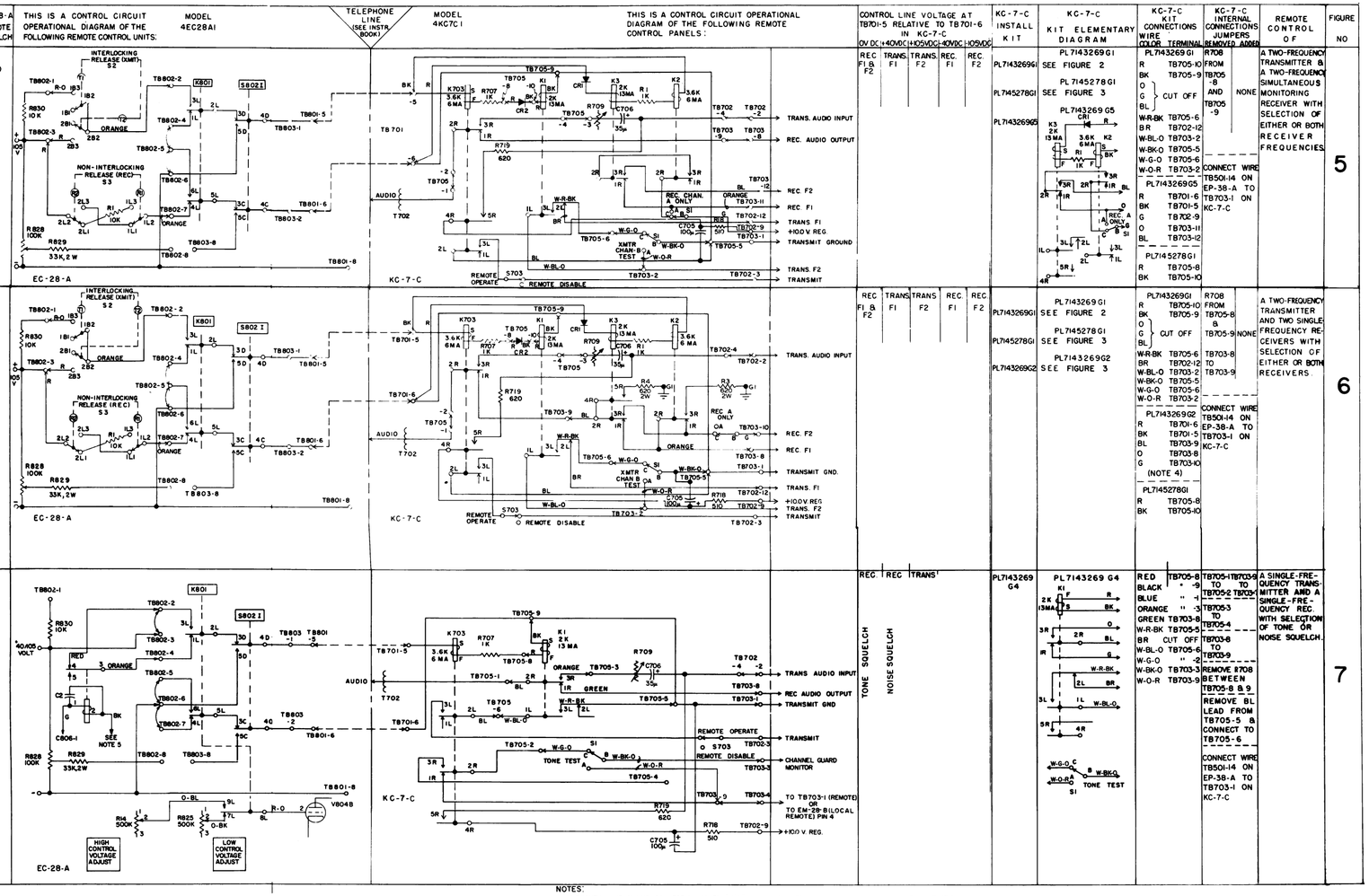
MODIFICATION DIAGRA...

BASE STATION REMOTE CONTROL PANEL
MODEL 4KC7C1

Issue 1

(19R640701, Sh. 1, Rev. 0)

FIGURE NO.	REMOTE CONTROL OF	EC-28-A INSTALL KIT	EC-28-A KIT ELEMENTARY DIAGRAM	EC 28 A KIT CONNECTIONS WIRE COLOR	EC 28 A KIT CONNECTIONS TERMINAL	EC-28-A INTERNAL CONNECTIONS JUMPERS REMOVED, ADDED	EC-28-A MAY BE PARALLELED	EC-28-A REMOTE SQUELCH
5	A TWO-FREQUENCY TRANSMITTER & A TWO-FREQUENCY SIMULTANEOUS MONITORING RECEIVER WITH THE SELECTION OF EITHER OR BOTH RECEIVER FREQUENCIES.	PL-715021IG1 & PL-715021IG2	PL 715021IG1 SEE FIGURE 2 PL 715021IG2 SEE FIGURE 3	S2 R ORANGE R-O ORANGE S3 R ORANGE	TB802-3 TB802-1 TB802-2 TB802-3 TB802-7	TB802-1 TO TB802-2 TB802-7 TO TB802-8 TB802-8 TO TB803-8 TB801-8 TO TB801-9	NO	NO
6	A TWO-FREQUENCY TRANSMITTER AND TWO SINGLE-FREQUENCY RECEIVERS WITH SELECTION OF EITHER OR BOTH RECEIVERS	PL-715021IG1 & PL-715021IG2	PL715021IG1 SEE FIGURE 2 PL715021IG2 SEE FIGURE 3	SEE FIGURE 5		SEE FIGURE 5	NO	NO
7	A SINGLE FREQUENCY TRANSMITTER AND A SINGLE FREQUENCY RECEIVER WITH SELECTION OF TONE OR NOISE SQUELCH	PL715021IG20	PL715021IG20	R832 R826 DA (BUS) R827 1804 ADD K1- GREEN K1-ORANGE K1- RED K1- BLACK VR1- CATH VR1-ANODE R12 R13 R14-1 (6) R14-2(D-BL) R14-3(O) R825-3(DA) R825-2(D-BK) XV804-2(R-O)	{TB6-1 \ R825-1 {TB7-4 \ R825-3 {R825-2 \ XV804-2 {TB7-3 \ TB6-1 {TB7-3 \ TB7-4 C806-1 TB802-4 TB802-2 SEE NOTE 4 TB7-3 TB7-4 TB7-3 XV804-8 TB6-1 R825-1 R825-1 K801-9L TB7-4 TB7-4 K801-7L K801-8L	TB802-1 TO TB802-2 TB802-2 TO TB802-3 TB802-4 TO TB802-6 TB802-5 TO TB802-7 TB802-7 TO TB802-8 TB802-8 TO TB803-8 (SEE NOTE 5)	YES	NO



CONTROL LINE VOLTAGE AT TB701-5 RELATIVE TO TB701-6 IN KC-7-C					
0V DC	+40VDC	+105VDC	-40VDC	-105VDC	
REC F1 & F2	TRANS. F1	TRANS. F2	REC. F1	REC. F2	
REC F1 & F2	TRANS F1	TRANS F2	REC. F1	REC. F2	
REC	TRANS	TRANS	REC.	REC.	

KC-7-C INSTALL KIT	KC-7-C KIT ELEMENTARY DIAGRAM	KC-7-C KIT CONNECTIONS WIRE COLOR	KC-7-C KIT CONNECTIONS TERMINAL	KC-7-C INTERNAL CONNECTIONS JUMPERS REMOVED ADDED	REMOTE CONTROL OF	FIGURE NO
PL7143269G1 PL7145278G1 PL7143269G5	PL7143269 G1 SEE FIGURE 2 PL 7145278 G1 SEE FIGURE 3 PL7143269 G5	R BK O G BL W-R-BK BR W-BL-O W-BK-O W-G-O W-O-R PL7143269G5 R BK G O BL PL7145278G1 R BK	TB705-10 TB705-9 CUT OFF TB705-6 TB702-12 TB703-2 TB705-5 TB705-6 TB703-2 TB701-6 TB701-5 TB702-9 TB703-11 TB703-12 TB705-8 TB705-10	R708 FROM TB705-8 AND TB705-9 NONE CONNECT WIRE TB501-14 ON EP-38-A TO TB703-1 ON KC-7-C	A TWO-FREQUENCY TRANSMITTER & A TWO-FREQUENCY SIMULTANEOUS MONITORING RECEIVER WITH SELECTION OF EITHER OR BOTH RECEIVER FREQUENCIES.	5
PL7143269G1 PL7145278G1 PL7143269G2	PL7143269G1 SEE FIGURE 2 PL7145278G1 SEE FIGURE 3 PL7143269G2 SEE FIGURE 3	PL7143269G1 R BK O G BL W-R-BK BR W-BL-O W-BK-O W-G-O W-O-R PL7143269G2 R BK BL O G (NOTE 4) PL7145278G1 R BK	TB705-10 TB705-9 CUT OFF TB702-12 TB703-2 TB705-5 TB705-6 TB703-2 TB701-6 TB701-5 TB703-9 TB703-8 TB703-10 TB705-8 TB705-10	R708 FROM TB705-8 & TB705-9 NONE CONNECT WIRE TB501-14 ON EP-38-A TO TB703-1 ON KC-7-C	A TWO-FREQUENCY TRANSMITTER AND TWO SINGLE-FREQUENCY RECEIVERS WITH SELECTION OF EITHER OR BOTH RECEIVERS.	6
PL7143269 G4	PL7143269 G4	RED BLACK BLUE ORANGE GREEN W-R-BK BR W-BL-O W-G-O W-BK-O W-O-R	TB705-8 TB705-9 TB705-1 TB705-3 TB703-8 TB705-5 CUT OFF TB705-6 TB703-3 TB703-9	TB705-1 TB703-8 TO TB705-2 TB705-3 TO TB705-4 TB703-8 TO TB703-9 REMOVE R708 BETWEEN TB705-8 & 9 REMOVE BL LEAD FROM TB705-5 & CONNECT TO TB705-6 CONNECT WIRE TB501-14 ON EP-38-A TO TB703-1 ON KC-7-C	A SINGLE-FREQUENCY TRANSMITTER AND A SINGLE-FREQUENCY REC. WITH SELECTION OF TONE OR NOISE SQUELCH.	7

NOTES:
1. BROKEN LINE SHOWS CONNECTION ADDED, "X'S" SHOW CONNECTIONS DELETED FOR PARALLEL OPERATION.
2. ARROWHEADS ON WIRES AT TERMINAL BOARD POINTS INDICATE LUG CONNECTIONS.
3. IF TWO OR MORE UNITS ARE OPERATED IN PARALLEL, REMOTE SQUELCH CAN BE AVAILABLE ON ONLY ONE UNIT.
4. CONNECT R3 BETWEEN K2-3R AND GI
   CONNECT R4 BETWEEN K3-5R AND GI
   CONNECT DA WIRE BETWEEN K3-2R AND K3-4R
5. CONNECT BK WIRE FROM K1-2 AS FOLLOWS:

MICROPHONE	CONNECT TO
EM-3-C, EM-28-8	J801-6
ALL OTHER	TB801-12

REMOVE G WIRE FROM J801-4 TO TB4-2 OR TB801-12 TO TB804-1

KITS FOR, AND CONNECTIONS BETWEEN CONTROL PANEL KC-7-C AND REMOTE CONTROL UNIT EC-28-A TO PROVIDE MULTIPLE XMTR, REC FREQ., OPERATION.

(19R640701, Sh. 2, Rev. 1)

MODIFICATION DIAGRAM

BASE STATION REMOTE CONTROL PANEL MODEL 4KC7C1

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 G-E Part Number.

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

1. G-E 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-3569

DF-4071

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