MOBILE RADIO

MAINTENANCE MANUAL

TYPE 90 TONE DECODER

MODELS 4EJ15A10 AND 4EJ15A11 (and Option 7639)

Maintenance Manual LBI-3684J
DF-5031

EJ-15-A

SPECIFICATIONS *

Combination and Model Numbers	Comb. No.	Model No.
±12-Volt Mobile	T20	4EJ15A10
120 VAC, 50/60 Hz Station	T40	4EJ15A11
Tone Frequencies	1050 to 2400 Hz	
Channel Spacing	150 Hertz	
Center Frequency Stability	±0.3%	
Tone Input	20 millivolts to 6 volts RMS	
Standby Drain	18 milliamperes	
Temperature Range	-30°C to +60°C	
Response Time	200 to 500 milliseconds	

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

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ILLUSTRATIONS

DESCRIPTION

General Electric Type 90 Tone Decoder Model 4EJ15A10 and 11 are completely transistorized pulse tone decoders for mobile and station applications. The decoders utilize tone selective networks that are made up of precision components for excellent stability and reliability. No electromechanical devices are used.

The Type 90 Tone Decoders will operate with virtually any pulse tone encoder in the 1050 to 2400 Hz range. This includes the GE Single-Tone Encoder Models 4EH14A10, 11 and the Five-Tone Encoder Models 4EH14A12 thru 15.

Mobil Decoder Model 4EJ15A10 is supplied in a compact housing equipped with a mounting bracket for installation in 12-volt vehicles. Station Decoder Model 4EJ15A11 is supplied with a larger housing to contain a 120-VAC power supply. For MASTR Progress Line Repeater Stations, Option 7639 provides the decoder component board and mounting bracket for mounting on the station repeater control panel.

INSTALLATION

MOBILE DECODER

Install the Mobile Decoder where it will be within convenient reach of the operation of the vehicle. Use the mounting bracket as a template, and drill pilot holes with a #29 (9/64-inch) drill. Attach the bracket to the mounting surface with the two #10 x 5/8-inch self tapping screws provided.

Connections for different mobile installations are shown on the appropriate Application Kit as listed in the Table of Contents.

STATION DECODER

The Station Decoder should be located near a 120 VAC, 50/60 Hz source, and where the control cable will reach the station. Connections for the different station installations are shown on the appropriate Application Kit as listed in the Table of Contents.

For MASTR Repeater Station Option 7639, refer to the appropriate Application Kit as listed in the Table of Contents.

BUZZER AND HOOKSWITCH OPTIONS

Instructions for installing and connecting the buzzer of hookswitch options are shown on the Outline and Schematic Diagram for the Decoder.

JUMPER CONNECTIONS

Refer to the Jumper Option Chart on Page 4 for a description of the options and the proper jumper connections.

OPERATION

Operating controls for the decoder are located on the front panel. The controls include a RESET button, a CALL lamp and an EXTERNAL ALARM switch marked LIGHT-OFF-HORN.

MOBILE DECODER MODEL 4EJ15A10

The basic mobile decoder is supplied with one output relay (K1). When a signal that is modulated by the proper tone is received, relay K1 locks up and the CALL lamp lights. Pressing the RESET button unlocks the relay and cuts off the CALL lamp. If desired, one set of contacts on K1 can be used to activate an external alarm. The position of the EXTERNAL ALARM switch position determines which external alarm (LIGHT or HORN) will operate.

An optional relay (K2) can be plugged into the socket provided on the circuit board. The optional relay permits relay K1 to be connected for timed operation (3 to 5 seconds), and K2 to operate locked to the reset button. Other options include a hookswitch for either a handset or military microphone for off-hook monitoring and reset, and a buzzer that is activated by the timed relay.

STATION DECODER MODEL 4EJ15A11

The basic station decoder is supplied with both relays, a timer buzzer, an internal CALL light, and provision for an external alarm (LIGHT or HORN). Options include the microphone or handset hookswitch for off-hook monitoring and reset. No provision is made for monitoring the base station when speaker muting is used.

REPEATER OPTION 7639

In repeater stations, the decoder is

supplied with output relay K1. A signal modulated by the proper tone frequency momentarily activates K1, which locks up the 5-second delay timer (or relay) and keys the station transmitter. The delay kit relay remains locked up until the transmissions are completed, or until there is a five second delay in transmission.

CIRCUIT ANALYSIS

AMPLIFIER-LIMITER

Audio from the receiver is coupled through isolation transformer T1 to an amplifier-limiter stage consisting of Amplifier Q1 and clipping diodes CR2 and CR3. The diodes limit the input to the tone filter to approximately 0.5 volt to provide a constant drive voltage.

TONE FILTER & Q MULTIPLIER

Tone Filter FL1701 and the Q Multiplier (Q2) act together to form a very selective band-pass filter for attenuating all frequencies except the tone frequency. The filter is set on the center frequency by trimmer capacitor C2. The procedure for checking and adjusting the tone frequency is contained in the MAINTENANCE section.

TONE AMPLIFIER-RECTIFIER

Tone Amplifier Q3 follows the tone filter. Diodes CR5 and CR6 rectify the output of Q3 to provide a DC control voltage for the switching circuit.

The normal decoder response time (200 to 500 milliseconds) is determined by R18 and C7. If a response time of more than three seconds is desired, C7 may be changed from 6.8 µF (15 µF REV. B or later) to 68 µF.

DC SWITCH

The DC switch consists of Threshold Detector Q4, DC Driver Q5 and a feedback loop. The Threshold Detector (Q4) is back biased by zener diode CR8 in the emitter circuit, keeping the stage turned off. A DC control voltage applied to the base of Q4 turns the stage on. When Q4 conducts, the collector voltage drops to a low value, and is applied to the base of DC Driver Q5. This low voltage forward biases the PNP driver, turning the stage on. When Q5 conducts, the resultant collector current operates relay K1. Feedback through R27 causes a faster more positive switching action.

RELAY CONTROL FUNCTIONS

Relay K1 normally locks up through latching contacts 9 and 10. Contacts 12 and 13 close to turn on CALL lamp DS1701. One set of contacts can be connected to activate an external alarm. Pressing the RESET button unlocks the relay (K1) and cuts off the CALL lamp. It also cuts off any external alarm connected to it. When used with either hookswitch, K1 may be connected to unlock when the microphone or handset is removed, when the RESET button is pushed, or by both methods.

If relay K1 is connected for timed operation, capacitor C12 discharges through contacts 18 and 19 to the base of Q4, causing it to conduct. This turns on Q5, which activates K1 for the duration of the timing cycle.

When optional relay K2 is used, contacts 15 and 16 of K1 activate relay K2. K2 is always connected for locked operation, and K1 is always connected for timed operation. Under these conditions, K2 may be controlled by K1, by one of the hookswitches, or by both. While EXTERNAL ALARM switch S1701 determines which external alarm will be operated, K1 or K2, or both relays may be connected to activate the alarm.

In repeater applications using the 4KC19A10, decoder relay K1 is connected in series with drop-out delay timer A703 and carrier-operated switch (COS) A702 on the repeater panel (see RC-1664). When the proper tone is applied to the decoder, relay K1 is energized. This grounds the emitter of A703-Q1, turning it on. Turning on A703-Q1 causes A703-Q4 to turn on, which applies +10 volts to the base of A702-Q4 on the COS. The +10 volts turns on A702-Q4, keying the station transmitter.

At the end of the tone transmission, the +10 volts from A703-Q4 keeps the threshold detector (Q4) on the decoder board turned on. This keeps relay K1 energized and the transmitter keyed until the incoming carrier is turned off for a period exceeding the timeing cycle of the delay timer. After the timing cycle of A703 is completed, A703-Q4 turns off. This unkeys the transmitter and de-energizes relay K1.

In repeater applications using the 4KC15A10, decoder relay K1 is connected in series with the carrier operated relay contacts and the coil of the 5-second delay kit. Contacts 6 and 7 of the decoder relay are connected in parallel with one set of contacts on the 5-second delay kit relay. The proper tone activates the decoder relay which energizes the relay on the 5-second delay kit, keying the station transmitter. At the end of the tone transmission the decoder relay is de-energized, but the 5-second delay kit relay remains locked up by its own contacts. This keeps the transmitter keyed until the carrier is cut off for more than five seconds.

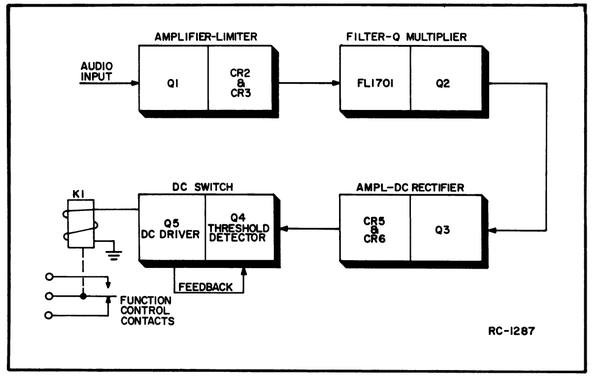

Figure 1. Type 90 Tone Decoder Block Diagram

MOBILE VOLTAGE REGULATOR

In Mobile Decoder Model 4EJ15A10, a regulated 11 volts is provided for all stages except the DC switch. The regulator circuit consists of C8, CR7 and RT1.

AC POWER SUPPLY

Station Decoder Model 4EJ15A11 has a self-contained power supply for operating the decoder from a 117-VAC, 50/60 Hz source. The power supply consists of a full-wave bridge (CR1701 thru CR1704) for rectifying the 117 volts applied across T1701. The output is filtered by a pi filter consisting of a dual-section capacitor (C1701) and a 15-watt resistor (R1702). Zener diode CR1705 provides a regulated 11-volts DC for all stages except the DC Switch. An unregulated tap provides 15 volts for operating the CALL lamp, buzzer and relay.

ADJUSTMENT

To maintain maximum system performance, trimmer C2 has been provided for ease of setting the decoder on the exact frequency. It is recommended that the frequency be checked twice a year, and whenever the tone filter is changed. Use steps 1 thru 5 in the following procedure to set the decoder on frequency. If the component board, or any component on the board that affects the response time of the decoder has to be changed, use the complete procedure steps (1 thru 10).

1. Connect an Audio Signal Generator between Hole 51 and H53 on Component Board A1701. Adjust the output level for 1 volt RMS.
2. Connect a Frequency Counter in parallel with the Signal Generator.
3. Connect an AC-VTVM from top of resistor R11 to ground on Component Board A1701. Adjust R32 to mid range.
4. Set the Signal Generator within ± one Hz of the tone network frequency.
5. Adjust trimmer C2 for a peak reading on the AC-VTVM. Record this heading in dB.
6. Move the Signal Generator off frequency and very slowly approach the network frequency from the low side until the relay picks up.
7. Check that the pickup frequency is at least 0.7% but not more than 3.0% away from center frequency. If less than 0.7% is obtained, see note 1.
8. Check that the VTVM reading is at least 4 dB but not more than 7 dB below the level recorded in step 5.
9. Move the Signal Generator off frequency and approach the network frequency from the high side until the relay picks up. Repeat step 7.
10. If the VTVM reading (Step 8) is less than 4 dB or greater than 7 dB, adjust R32 for a reading of approximately 6 dB.

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NOTE 1

If the pickup frequency on the low side is less than 0.7% perform the following steps:

A. Subtract the low pickup frequency from the high pickup frequency.

Example: 1515 High pickup
-1490 Low pickup
25 Hertz

B. Divide the result by 2.
$\frac{25}{2}$ =12.5 Hertz

C. Subtract the number obtained in "B" from the center frequency.

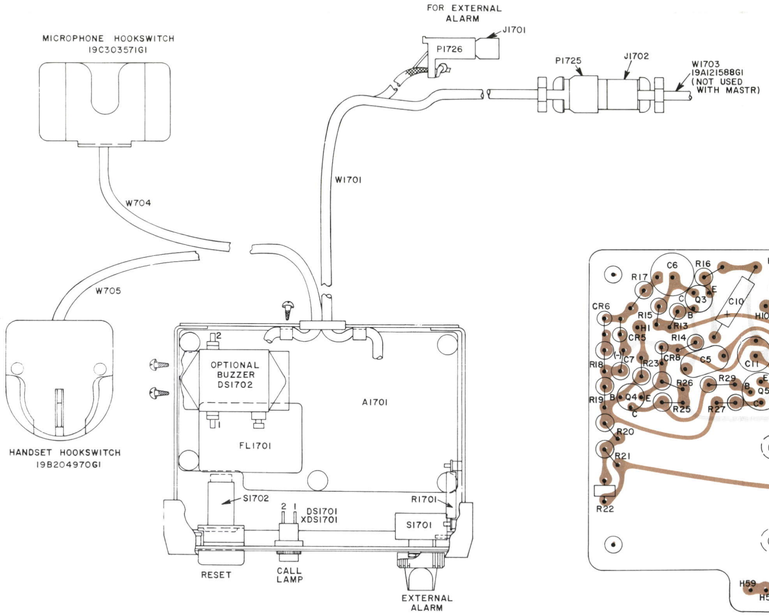
1500.0
- 12.5
1487.5 Hertz

D. Set the Signal Generator to the frequency obtained in "C". (1487.5 Hertz)

E. Adjust C2 clockwise until the relay just picks up. Bandwidth should now be equally spaced about center frequency.

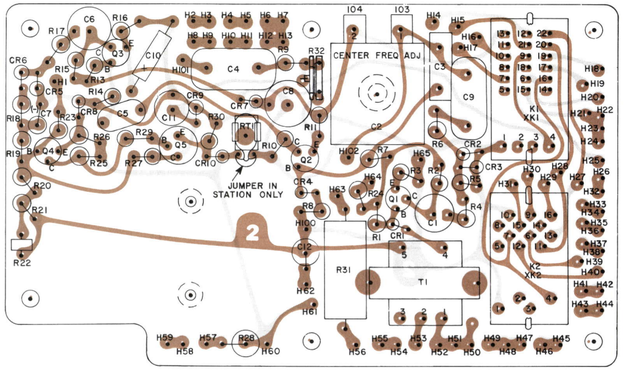
MAINTENANCE

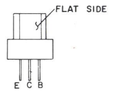
To remove the chassis for servicing, remove the four screws in the back of the decoder and pull the chassis out of the housing. Refer to the voltage readings on the Schematic Diagram for troubleshooting the unit.



MOBILE DECODER
MODEL 4EJ15A10

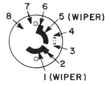
COMPONENT BOARD
A1701



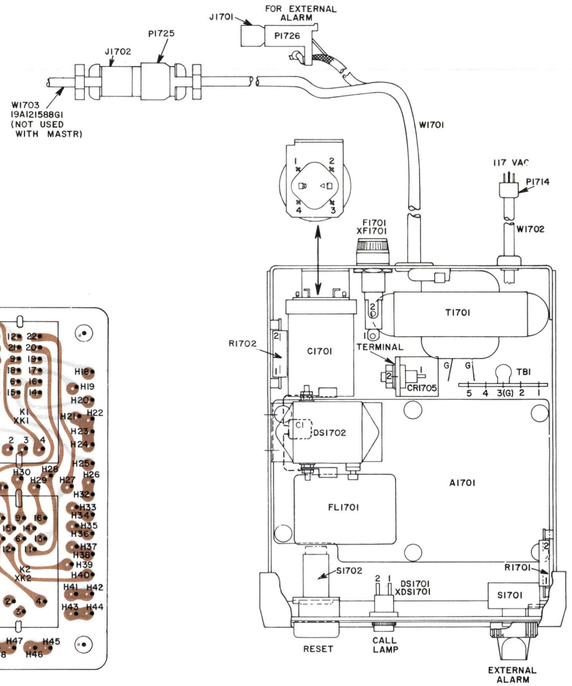


LEAD IDENTIFICATION
Q1 THRU Q4

S1702
TERMINAL VIEW



S1701
TERMINAL VIEW

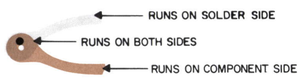


STATION DECODER
MODEL 4EJ15A11

CHART		
OPTION	DESCRIPTION	JUMPERS
Basic Unit (Mobile)	No Speaker muting One Relay (K1 locked to reset button) Internal call light External call light	H12-H50 H59-H57, H54-H16 H63-H14 H17-H43, H20-H34
Basic Unit (AC)	No speaker muting K1 timed K2 locked to reset button Timed buzzer External momentary alarm (TIMED) Internal call light External call light	H12-H50 H18-H1 H39-H59, H54-H22 H36-H14 H17-H26, H20-H46 H30-H63 H31-H43, H29-H34
Option 4096 Only	No speaker muting K1 Timed K2 locked to reset button Timed buzzer External horn Internal call light External call light	H12-H50 H18-H1 H39-H59, H54-H22 H36-H14 H17-H26, H20-H46 H30-H63 H31-H43, H29-H34
Option 4092 Only	Speaker unmuted by Mil. hookswitch or K1 K1 Locked to Mil. hookswitch or reset button External call light Internal call light	H27-H13, H15-H5 H3-H57, H9-H59, H16-H54 H17-H43, H20-H34 H63-H14
Options 4092 & 4096	Speaker unmuted by Mil. hookswitch or K2 K1 timed K2 locked to H.S. or reset button Timed buzzer External call light Internal call light External horn (TIMED)	H27-H13, H40-H5 H18-H1 H39-H9, H3-H54, H59-H22 H36-H14 H31-H43, H29-H34 H30-H63 H17-H26, H20-H46
Option 4093 Only	Adaptor cable option (19A121588G1)	If no other options are included jumper for basic unit.
Option 4094 Only	Handset Hookswitch	Remove P1713 from H28 and install in H50 if no other options are included, jumper for basic unit

Note: When used with Handset Hookswitch, P1713 is removed from H28 and inserted in H50.

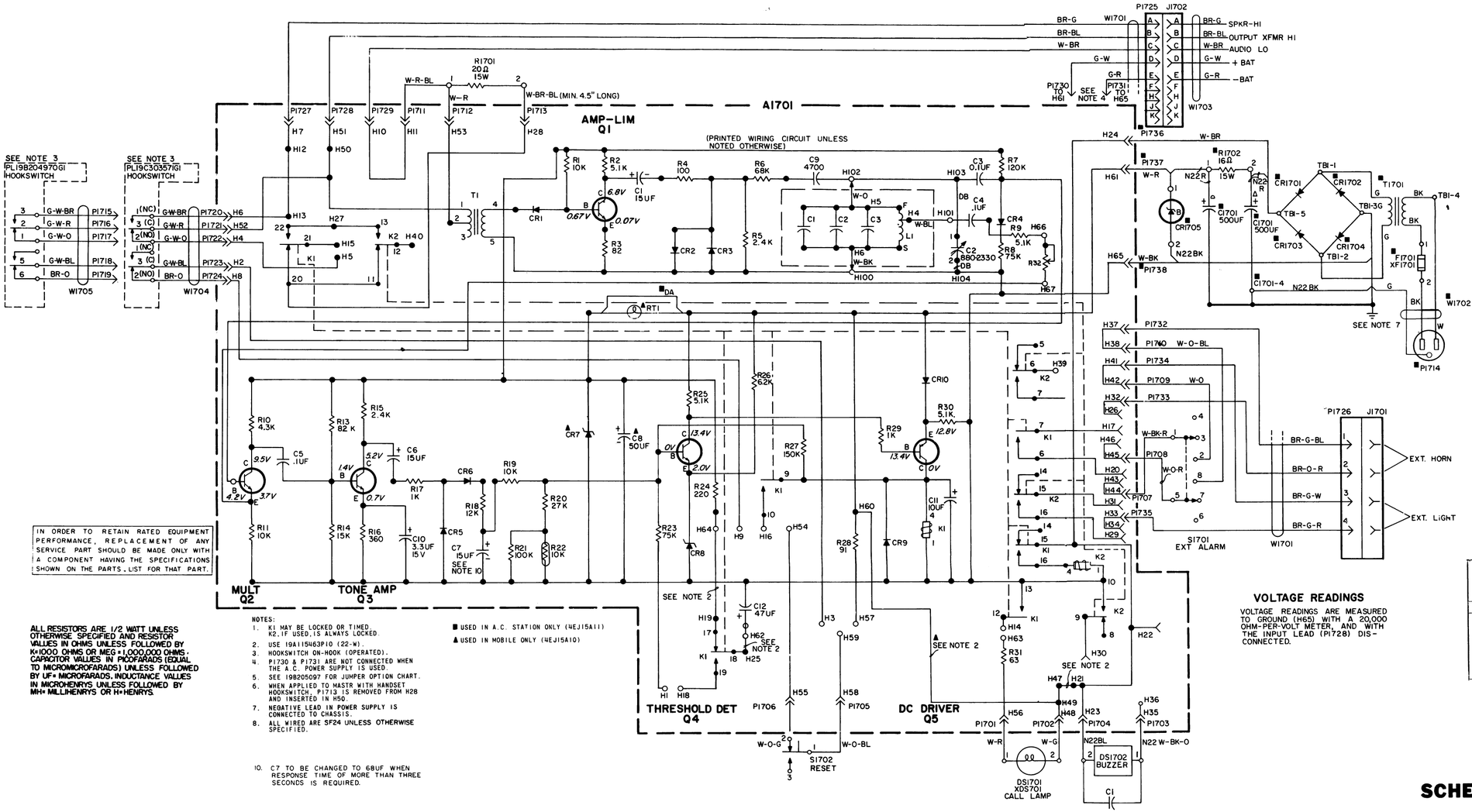
(19D402705, Rev. 4)
(19C303774, Sh. 1, Rev. 2)
(19C303774, Sh. 2, Rev. 2)



(19B205097, Rev. 2)

OUTLINE DIAGRAM

TYPE 90 PULSE TONE DECODER
MODELS 4EJ15A10 & 11



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

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

NOTES:
1. K1 MAY BE LOCKED OR TIMED. K2, IF USED, IS ALWAYS LOCKED.
2. USE 19A115463P10 (22-W).
3. HOOKSWITCH ON-HOOK (OPERATED).
4. P1730 & P1731 ARE NOT CONNECTED WHEN THE A.C. POWER SUPPLY IS USED.
5. SEE 19B205097 FOR JUMPER OPTION CHART.
6. WHEN APPLIED TO MASTR WITH HANDSET HOOKSWITCH, P1713 IS REMOVED FROM H28 AND INSERTED IN H50.
7. NEGATIVE LEAD IN POWER SUPPLY IS CONNECTED TO CHASSIS.
8. ALL WIRED ARE SF24 UNLESS OTHERWISE SPECIFIED.
10. C7 TO BE CHANGED TO 68UF WHEN RESPONSE TIME OF MORE THAN THREE SECONDS IS REQUIRED.

■ USED IN A.C. STATION ONLY (4EJ15A11)
▲ USED IN MOBILE ONLY (4EJ15A10)

VOLTAGE READINGS

VOLTAGE READINGS ARE MEASURED TO GROUND (H65) WITH A 20,000 OHM-PER-VOLT METER, AND WITH THE INPUT LEAD (P1728) DISCONNECTED.

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
4EJ15A10	C
4EJ15A11	D

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(19R620734, Rev. 15)

SCHEMATIC DIAGRAM

TYPE 90 PULSE TONE DECODER
MODELS 4EJ15A10 & 11

PARTS LIST

LBI-3667E

TYPE 90
PULSE TONE DECODER
MODEL 4EJ15A10 19D402565G1 MOBILE
MODEL 4EJ15A11 19D402566G1 STATION

SYMBOL	GE PART NO.	DESCRIPTION
A1701		COMPONENT BOARD 19C303730G1 4EJ15A10 19C303730G2 4EJ15A11
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5495670P16	Electrolytic: 15 µf +75% -10%, 25 VDCW; sim to Sprague 30D.
C2	7121300P7	Variable, mica: approx 880-2330 pf, 250 VDCW; sim to El Menco Type 30.
C3	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C4	19A115028P514	Polyester: 0.1 µf ±5%, 200 VDCW.
C5	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
C6	5495670P16	Electrolytic: 15 µf +75% -10%, 25 VDCW; sim to Sprague 30D.
C7*	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		In Models earlier than REV B:
	5496267P18	Tantalum: 6.8 µf ±20%, 35 VDCW; sim to Sprague Type 150D.
C8	5495670P18	Electrolytic: 50 µf +75% -10%, 25 VDCW; sim to Sprague 30D.
C9	19A115028P504	Polyester: 0.0047 µf ±20%, 200 VDCW.
C10*	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
		In Models earlier than REV A:
	5491188P9	Polyester: 0.33 µf ±20%, 50 VDCW.
C11	5495670P15	Electrolytic: 10 µf +75% -10%, 25 VDCW; sim to Sprague 30D.
C12	5496267P115	Tantalum: 47 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR6	19A115250P1	Silicon.
CR7	4036887P8	Silicon, Zener.
CR8	4036887P1	Silicon, Zener.
CR9	19A115250P1	Silicon.
CR10	4037822P1	Silicon.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1	19C307010P7	Armature: 11 VDC nominal, 1.5 w max operating, 90 ohms coil res, 3 form A and 3 form C contacts; sim to Allied Control T154-X-458.
K2	19C300957P2	Miniature, plug-in: 12 VDC nominal, 1.5 w max operating, 185 ohms ±10% coil res, 4 form C contacts; sim to Allied Control T154X-316.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 thru Q4	19A115123P1	Silicon, NPN.
Q5	19C300073P2	Germanium, PNP; sim to Type 2N1414.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R2	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R3	3R77P820K	Composition: 82 ohms ±10%, 1/2 w.
R4	3R77P101K	Composition: 100 ohms ±10%, 1/2 w.
R5	3R77P242J	Composition: 2400 ohms ±5%, 1/2 w.
R6	3R77P683J	Composition: 68,000 ohms ±5%, 1/2 w.
R7	3R77P124K	Composition: 0.12 megohm ±10%, 1/2 w.
R8	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R9*	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
		In Models earlier than REV A:
	5495948P277	Deposited carbon: 6190 ohms ±1%, 1/2 w; sim to Texas Instrument Type CDL/2MR.
R10	3R77P432J	Composition: 4300 ohms ±5%, 1/2 w.
R11	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R13	3R77P823K	Composition: 82,000 ohms ±10%, 1/2 w.
R14	3R77P153K	Composition: 15,000 ohms ±10%, 1/2 w.
R15	3R77P242J	Composition: 2,400 ohms ±5%, 1/2 w.
R16	3R77P361J	Composition: 360 ohms ±5%, 1/2 w.
R17	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R18*	3R77P123J	Composition: 12,000 ohms ±5%, 1/2 w.
		In Models earlier than REV A:
	3R77P432K	Composition: 4300 ohms ±10%, 1/2 w.
R19	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R20	3R77P273K	Composition: 27,000 ohms ±10%, 1/2 w.
R21	3R77P104K	Composition: 0.1 megohm ±10%, 1/2 w.
R22	5490828P9	Disc: 10,000 ohms ±10%, 0.25 w; sim to Globar Type 551H-8.
R23	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R24	3R77P221K	Composition: 220 ohms ±10%, 1/2 w.
R25	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R26	3R77P622J	Composition: 6200 ohms ±5%, 1/2 w.
R27	3R77P154K	Composition: 0.15 megohm ±10%, 1/2 w.
R28	3R77P910J	Composition: 91 ohms ±5%, 1/2 w.
R29	3R77P102K	Composition: 1,000 ohms ±10%, 1/2 w.
R30	3R77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R31	5493035P17	Wirewound: 63 ohms ±5%, 5 w, 0.283 amps max; sim to Tru-Ohm Type X-60.
R32	19B209358P105	Variable, carbon film: approx 200 to 5000 ohms ±10%, 0.25 w; sim to CTS Type X-201.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT1	4034664P1	Lamp, incandescent: 28 v; sim to GE2148.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1	5491609P1	Audio: 6 VDC operating. Pri: 500 ohms ±10% imp CT, 29 ohms ±10% DC res, Sec: 500 ohms ±10% imp, 22 ohms ±10% DC res.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XK1	19B209172P1	Relay, phen: 22 contacts; sim to Allied Control 30054-24.
XK2	5491595P7	Relay: 10 contacts; sim to Allied Control 30054-4.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1701	7770994P28	Electrolytic, twist prong: 500-500 µf +250%-10%, 25-25 VDCW; sim to Mallory Type WP.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1701 thru CR1704	4037822P1	Silicon.
CR1705	5495912P1	Silicon, Zener.
DS1701	19B201122P1	- - - - - - - - INDICATING DEVICES - - - - - - - - Light, indicator: 6 v; sim to GE Type 1768.
		BUZZER ASSEMBLY 19A121997G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19B209370P108	Polyester: 0.22 µf ±10%, 50 VDCW; sim to TRW Type 601 PE.
		- - - - - - - - INDICATING DEVICES - - - - - - - -
DS1702	19B200788P3	Buzzer: 12 VDC or 12-16 VAC, 25 ohms dc res; sim to Line Electric BD-1.
		- - - - - - - - - - FUSES - - - - - - - - - - - -
F1701	7487942P1	Slow blowing: 1/4 amp at 250 v; sim to Bussmann MDL-1/4.
FL1701		FREQUENCY NETWORK 19C303746
		G11 2400 Hz G12 2250 Hz G13 2100 Hz G14 1950 Hz G15 1800 Hz G16 1650 Hz G17 1500 Hz G18 1350 Hz G19 1200 Hz G20 1050 Hz
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1701 thru P1713	4036634P1	Contact, electrical: sim to AMP 42428-2.
P1736 thru P1738	4036634P1	Contact, electrical: sim to AMP 42428-2.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1701*	5496941P24	Wirewound: 20 ohms ±5%, 15 w; sim to Tru-Ohm Type MOR-15.
		In REV B and earlier:
	5496941P21	Wirewound: 10 ohms ±5%, 15 w; sim to Tru-Ohm Type MOR-15.
R1702	5496941P23	Wirewound: 16 ohms ±5%, 15 w; sim to Tru-Ohm Type MOR-15.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1701	5495454P23	Rotary: 2 poles, 3 positions, non-shorting contacts, 2 amps at 25 VDC or 1 amp at 110 VAC; sim to Oak Type A or Centralab Series 100.
S1702	19B209292P2	Pushbutton: SPDT, 10 amps at 250 VAC; sim to Micro Switch 13SM1-B1.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1701	5493743P1	Power: step down. Pri: 117 v, 50/60 Hz, Sec: 12.6 v ±3%, 2 amps.
		- - - - - - - - - - TERMINAL BOARDS - - - - - - - - - -
TB1	7775500P11	Phen: 5 terminals.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1701		CABLE ASSEMBLY 19B204729G1 (Used in 19D402565G1)
J1401		Includes the following housing and contacts:
	5492497P24	Housing, connector: 4 circuits: sim to AMP 480134-1.
	5492497P1	Contact, crimp: with lock spring: sim to AMP 42485-1.
P1425	7489183P10	Plug, general purpose: 9 contacts, with hood; sim to Winchester MSP-LS-H19C.
P1426	5492497P14	Housing, connector: 4 circuits; sim to AMP 480135-1.
P1427 thru P1435	4036634P1	Contact, electrical; sim to AMP 42429-2.
W1701		CABLE ASSEMBLY 19B205144G1 (Used in 19D402566G1)
J1701		Includes the following housing and 4 contacts:
	5492497P24	Housing, connector: 4 circuits.
	5492497P1	Contact, crimp: with lock spring: sim to AMP 42485-1.
P1725	7489183P10	Plug, general purpose: 9 contacts, with hood; sim to Winchester MSP-LS-H19C.
P1726		Includes the following housing and 4 contacts:
	5492497P14	Housing, connector: 4 circuits; sim to AMP 480135-1.
	5492497P1	Contact, crimp: with lock spring; sim to AMP 42485-1.
P1727 thru P1735	4036634P1	Contact, electrical: sim to AMP 42429-2.
W1702*	19A116740P2	Power: approx 8 feet long; sim to Belden 17239.
		In REV C and earlier:
	4036441P8	Power cable: approx 8 feet long; sim to Ripcord UL Type.
W1703		CABLE ASSEMBLY 19A121588G1
J1702	7489183P7	Socket, general purpose: 9 contacts, with hood; sim to Winchester MSS-LR-H19C.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF1701	19B209005P1	Fuseholder, post type, phen: 15 amps at 250 v; sim to Littelfuse 342012.
XDS1701	19B201122P2	Lamp, miniature: sim to Drake Series 121.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
		MICROPHONE HOOKSWITCH 19C303571G1
		- - - - - - - - - - SWITCHES - - - - - - - - - -
	19B209099P1	Pressure sensitive: SPDT, 10.1 amp at 125 VAC; sim to Cherry Electrical Products E62-10A.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1704	19B204731G1	Cable: approx 50 inches long.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1720 thru P1724	4036634P2	Contact, electrical: sim to AMP 42429-2.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B204721P1	Actuator spring.
	19A121419P1	Spacer.
	19A121418P1	Insulator.
		HANDSET HOOKSWITCH 19B204970G1
		- - - - - - - - - - SWITCHES - - - - - - - - - -
	19A121612P1	Hookswitch.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1705	19B204731G1	Cable: approx 50 inches long.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1715 thru P1719	4036634P2	Contact, electrical: sim to AMP 42429-2.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4029851P4	Cable clamp.
		MECHANICAL PARTS
	19B205063G2	Chassis. (Used in 19D402565G1).
	19B205063G1	Chassis. (Used in 19D402566G1).
	19B205054P1	Frame cap.
	NP248788P1	Nameplate.
	19B205111G1	Knob: (Used with S1701).
	5490407P6	Grommet, rubber: (Used with W1701 in 19D402566G1).
	5490407P8	Grommet, rubber: (Used with W1701 in 19D402565G1).
	19A121921P1	Support: (Used with CR1705 in 19D402566G1).
	19B201122P6	Lens, panel light: (Used with DS1701).
	7763541P4	Clip, spring tension: (Used with W1701).
	19A116768P8	Bushing, strain relief; sim to Heyco SR-5P-4. (Used with W1702 in 19D402566G1).
	4035711P4	Clip, spring tension: (Used with RT1 in 19C303730G1).
	4036555P1	Insulator, washer: nylon. (Used with Q5 in 19C303730G1, G2).

PRODUCTION CHANGES

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

REV. A - To prevent noise falsing of decoder. Changed C10, R9 and R18.

REV. B - To optimize decoder bandwidth and time response in relation to tone frequency. Changed C7 and R18.

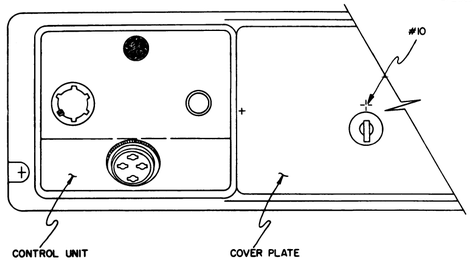
REV. C - To make decoders operable with increased audio power. Changed R1701.

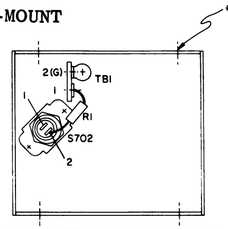
REV. D - Model 4EJ15A11
To incorporate a new three wire AC Power Cord. Changed W1702.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

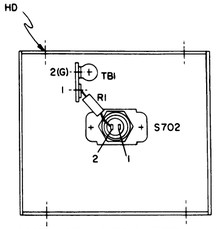
MASTR EXECUTIVE SERIES
MOBILE APPLICATION KIT 19A122352-G2

TRUNK-MOUNT





BACK VIEW OF CONTROL UNIT
4EC68A10



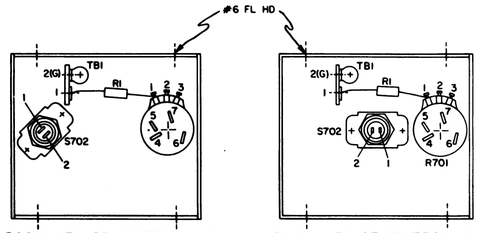
BACK VIEW OF CONTROL UNIT
4EC68A11 & A12

INSTRUCTIONS FOR WEC68A10-12:

1. REMOVE COVER PLATE.
2. REMOVE #10 SCREW & REMOVE FRONT CASTING FROM FRAME.
3. REMOVE CONTROL UNIT & SWING TOWARD OUTSIDE TO EXPOSE BACK SIDE.
4. CLIP OUT DA JUMPER BETWEEN TB1-1 & S702-2 AND SOLDER R1 (22Ω) RESISTOR IN ITS PLACE.
5. REASSEMBLE CONTROL UNIT.
6. REASSEMBLE FRONT CASTING.
7. REASSEMBLE COVER PLATE.
8. ASSEMBLE ADAPTER CABLE (PLI98205H14G1) BETWEEN SPEAKER & SPEAKER JACK ON UNIT.
9. PLUG TONE DECODER INTO ADAPTER CABLE.

INSTRUCTIONS FOR WEC68B10-12:

1. STEPS 1-3 ABOVE.
2. REMOVE W22 BK WIRE FROM R701-1 TO TB1-1 SOLDER R1 BETWEEN THESE POINTS.
3. STEPS 5-9 ABOVE.

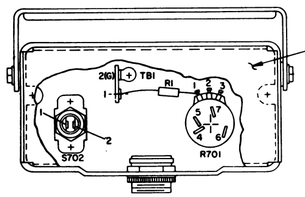


BACK VIEW OF CONTROL UNIT
4EC68B10

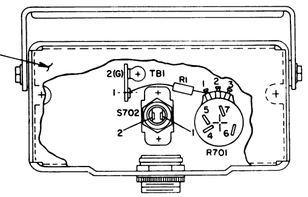
BACK VIEW OF CONTROL UNIT
4EC68B11 & B12

(19C311064, Rev. 3)

FRONT-MOUNT

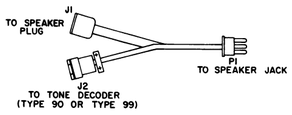


BACK VIEW OF CONTROL UNIT
4EC67A10



BACK VIEW OF CONTROL UNIT
4EC67A11 & A12

(19C311065, Rev. 3)



ADAPTER CABLE (PLI98205414)

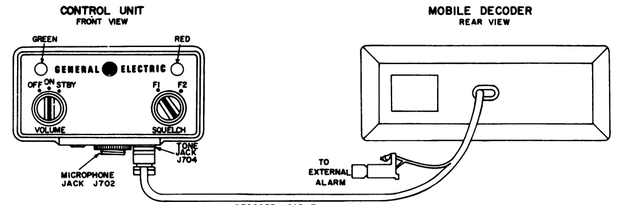
INSTRUCTIONS.

1. REMOVE BACK PLATE FROM CONTROL UNIT TO GAIN ACCESS TO TB1 & S702.
2. DISCONNECT SHIELD OF TWISTED PAIR CABLE FROM R701-1 AND CONNECT TO TB1-1.
3. SOLDER R1 (22Ω) FROM R701-1 TO TB1-1.
4. REASSEMBLE BACK PLATE.
5. ASSEMBLE ADAPTER CABLE (PLI98205H14G1) BETWEEN SPEAKER & SPEAKER JACK ON CONTROL UNIT.
6. PLUG TONE DECODER INTO ADAPTER CABLE.

(DF-5031)

MASTR PROFESSIONAL SERIES

MOBILE APPLICATION



CONNECT PLUG ON DECODER CABLE TO TONE JACK J704 ON MASTR CONTROL UNIT.

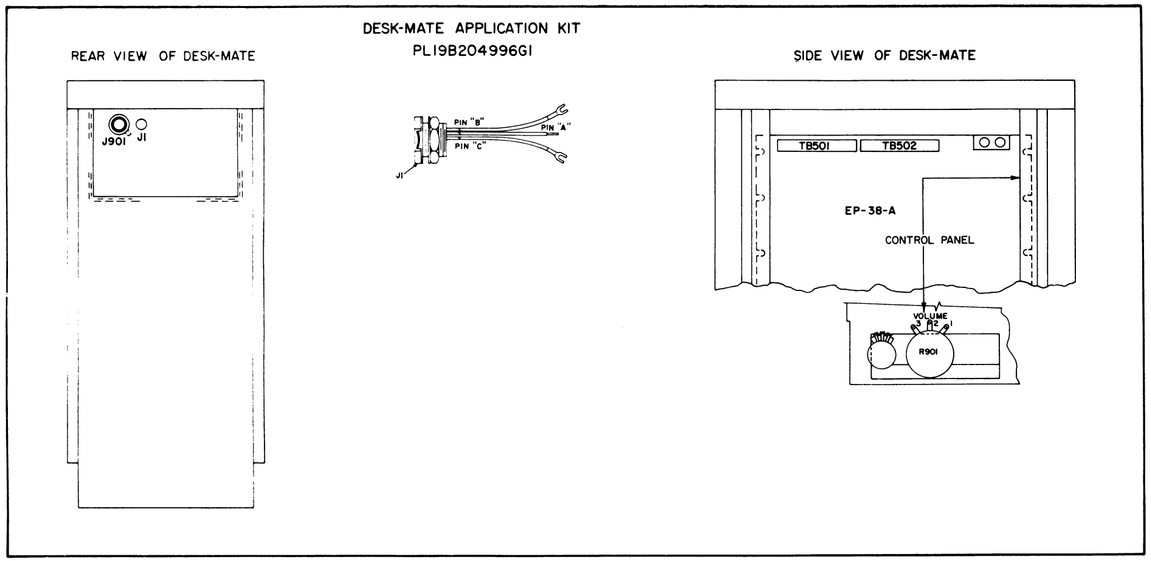
INSTALLATION INSTRUCTIONS

TONE APPLICATION KITS FOR
MASTR PROGRESS LINE MOBILES
PROFESSIONAL & EXECUTIVE SERIES

(RC-1285D)

LBI-3684

MASTR DESK MATE
APPLICATION KIT 19B204996-G1



DM AND DT LOCAL CONTROL STATIONS

STEP 1 Mount J1 in cutout beside mike jack (J901) in the cabinet rear grill using hardware furnished.

STEP 2 Remove harness wire 20 between TB502-5 on EP-38A and R901-1 on Control Panel.

STEP 3 Connect green-white wire (from Pin B on J1) to TB502-5 on EP-38-A.

STEP 4 Solder brown-white wire (from Pin A on J1) to R901-1 on Control Panel.

STEP 5 Connect black-white wire (from Pin C on J1) to TB501-12 on EP-38-A.

STEP 6 Dress these wires alongside existing harness and spot tie as required for neat cable dress.

STEP 7 Connect cable from Decoder to J1.

DM LOCAL/REMOTE STATIONS

STEP 1 Mount J1 in cutout beside mike jack (J901) in the cabinet rear grill using hardware furnished.

STEP 2 Remove harness wire 59 between TB701-7 on the KC-16-A and R901-1 on Control Panel.

STEP 3 Connect the green-white wire (from Pin B on J1) to TB701-7 on the KC-16-A.

STEP 4 Solder brown-white wire (from Pin A on J1) to R901-1 on Control Panel.

STEP 5 Connect black-white wire (from Pin C on J1) to TB501-12 on EP-38-A.

STEP 6 Dress these wires alongside existing harness and spot tie as required for neat cable dress.

STEP 7 Connect cable from Decoder to J1.

DT LOCAL/REMOTE STATIONS

STEP 1 Mount J1 in cutout beside mike jack (J901) in the cabinet rear grill using hardware furnished.

STEP 2 Remove harness wire 59 between P902-7 of the station harness and R901-1 on Control Panel.

STEP 3 Install terminal 5496809P17 on the green-white wire (from Pin B on J1) and insert terminal into P902-7 in the same location that wire 59 was previously located.

STEP 4 Solder brown-white wire (from Pin A on J1) to R901-1 on Control Panel.

STEP 5 Connect black-white wire (from Pin C on J1) to TB501-12 on EP-38-A.

STEP 6 Dress these wires adjacent to existing harness and spot tie as required for next cable dress.

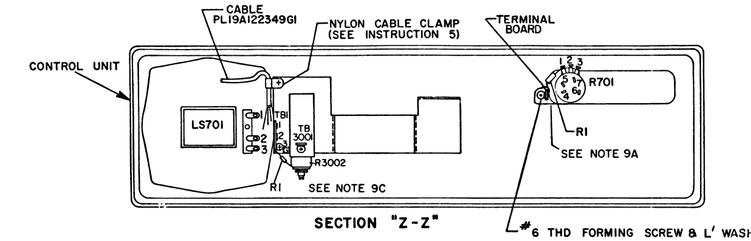
STEP 7 Connect cable from Decoder to J.

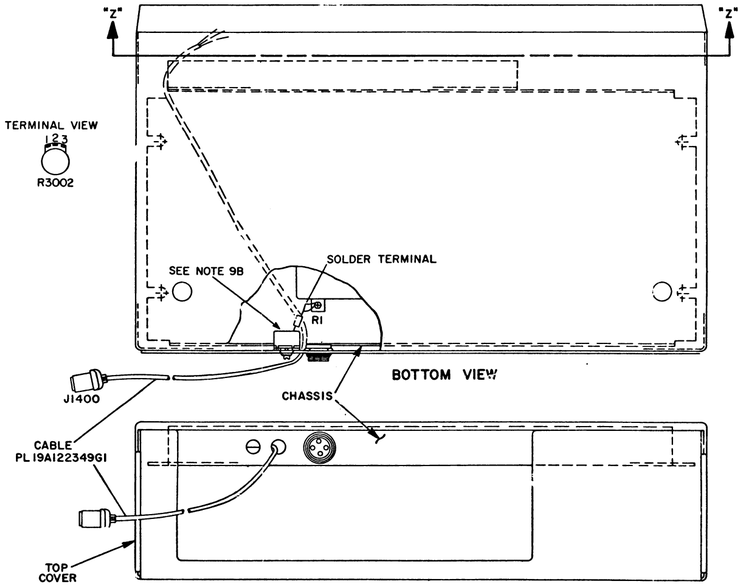
INSTALLATION INSTRUCTIONS

TONE APPLICATION KIT FOR
MASTR PROGRESS LINE
DESK MATE & DESK TOP STATIONS

(RC-1286F)

MASTR DESK TOP
APPLICATION KIT 19A122352-G1





(19C311066, Rev. 7)

(1) INSTRUCTIONS FOR TONE DECODER OPTION:

1. REMOVE TOP COVER.
2. REMOVE CONTROL UNIT FROM BOTTOM COVER (5 SCREWS) & LAY FACE DOWN.
3. REMOVE CHASSIS MOUNTING HARDWARE.
4. INSERT CABLE THROUGH HOLE IN REAR OF CHASSIS & RAISE CHASSIS SO THAT CABLE CAN BE ROUTED UNDER BOTTOM SIDE & UP TO CONTROL UNIT AS SHOWN.
5. ASSEMBLE CABLE CLAMP TO CABLE & MOUNT CLAMP UNDER HARDWARE THAT MOUNTS SUPPORT AS SHOWN.
6. REASSEMBLE CHASSIS.
7. IN CONTROL UNIT REMOVE DA JUMPER BETWEEN LS701-2 & LS701-3 WHEN HOOKSWITCH MUTE IS DESIRED.
8. FROM CABLE (PL19A122349G1): SOLDER RED WIRE TO LS701-3; SOLDER BLACK WIRE TO LS701-2; AND SOLDER SHIELD WIRE TO LS701-1.

9A. FOR LOCAL CONTROL ONLY (FM__L____OR FK__L____) IN CONTROL UNIT DISCONNECT SHIELD WIRE & N22-G-W-R WIRE FROM R701-1 & CONNECT TO TERMINAL BOARD (WHICH IS TO BE ASSEMBLED AS SHOWN). SOLDER R1 (22Ω) RESISTOR FROM TERMINAL BOARD TO R701-1 AS SHOWN (N22 G-W-R WIRE IS IN TUBED STATION ONLY).

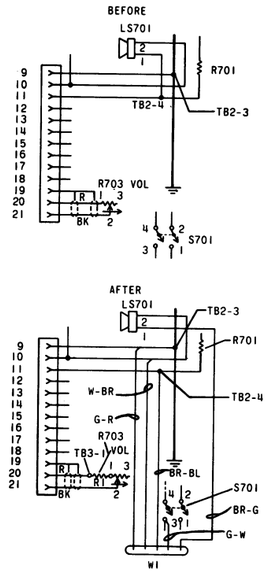
9B. FOR TUBE REMOTE ONLY (FM__R____) IN POWER SUPPLY MOUNT SOLDER TERMINAL UNDER NUT HOLDING PRE AMP AS SHOWN. DISCONNECT SHIELD FROM R3002-1 AND CONNECT TO SOLDER TERMINAL. CONNECT R1 (22Ω) FROM R3002-1 TO SOLDER TERMINAL.

9C. FOR ROYAL REMOTE CONTROL ONLY (FK__R____) IN CONTROL UNIT DISCONNECT SHIELD AND CONNECT TO TB1-3 (G). CONNECT R1 (22Ω) FROM R3002-1 TO TB1-3 (G).

10. REASSEMBLE CONTROL UNIT TO BOTTOM COVER.
11. REASSEMBLE TOP COVER.
12. PLUG TONE DECODER INTO CABLE.

PROGRESS LINE APPLICATIONS

FRONT-MOUNT APPLICATION KIT
PL-19A121863-G1
(MODEL 4EC29A2 CONTROL UNIT)

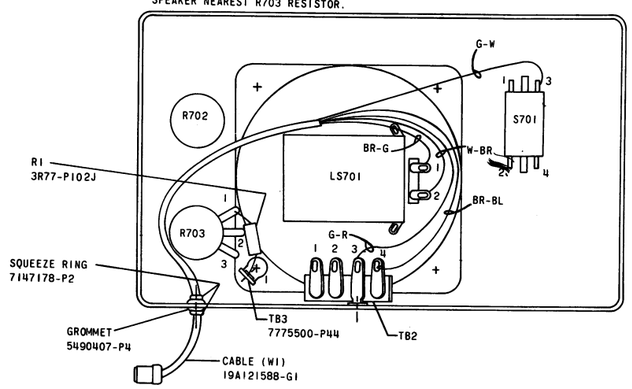


MOBILE APPLICATION KITS

STEP 1: REMOVE EXISTING GROMMENT FROM HOLE JUST BEHIND POWER CABLE HOLE ON CONTROL UNIT. ASSEMBLE GROMMET FROM KIT INTO THIS HOLE AND INSERT CABLE (WI) THRU GROMMET LEAVING APPROXIMATELY 2.5 INCHES BETWEEN END OF PLUG & GROMMET.

STEP 2: ATTACH SQUEEZE RINGS ON EITHER SIDE OF GROMMET FOR MINIMUM PLAY. OVERLAP ENDS OF RINGS TO INSURE TIGHT FIT.

STEP 3: ASSEMBLE TB3 TO SPEAKER, USING #4-40 HARDWARE OF SPEAKER NEAREST R703 RESISTOR.



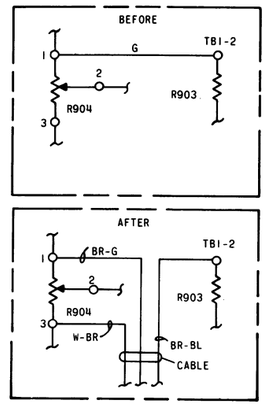
STEP 4: UNSOLDER RED WIRE AT R703-1 AND SOLDER TO TB3-1. SOLDER R1 (1000Ω) FROM TB3-1 TO R703-1. REMOVE BLACK WIRE BETWEEN TB2-4 & LS701-1.

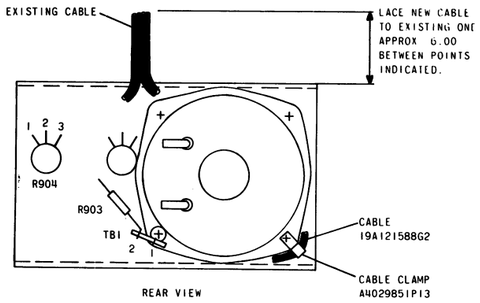
STEP 5: SOLDER ALL WIRES FROM CABLE W1 AND MAKE ALL OTHER CONNECTIONS AS SHOWN IN DIAGRAM AT LEFT.

STATION APPLICATION KITS

DO STATION APPLICATION KIT
PL-19A121914-G1

STEP 1: MOUNT CABLE CLAMP UNDER BOLT HOLDING SPEAKER AND INSERT CABLE 12 INCHES FROM WIRE ENDS.





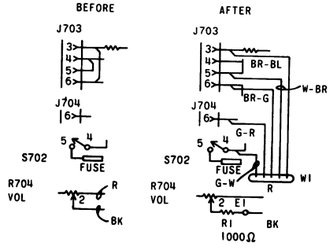
STEP 2: SOLDER CONNECTIONS AS FOLLOWS (SEE DIAGRAM AT LEFT)
BR-G WIRE TO R904-1
BR-BL WIRE TO TB1-2
W-BR WIRE TO R904-3
REMOVE GREEN WIRE BETWEEN R904-1 & TB1-2.

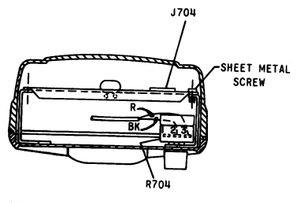
TRUNK-MOUNT APPLICATION KIT
PL-19A121840-G1
(MODEL 4EC27A CONTROL UNIT)

STEP 1: REMOVE SHEET METAL SCREW NEAREST J704-3, USING #4/40 X 1/4 SCREW & LOCKWASHER MOUNT TERMINAL STANDOFF IN HOLE VACATED BY SHEET METAL SCREW.

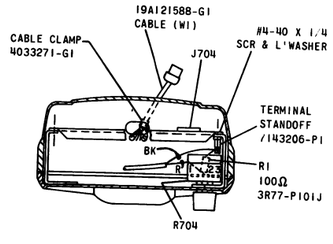
STEP 2: UNSOLDER BLACK WIRE FROM TERMINAL #2 OF R704 AND SOLDER TO TERMINAL STANDOFF. SOLDER R1 (1000Ω) BETWEEN TERMINAL #2 OF R704 AND TERMINAL STANDOFF.

STEP 3: ATTACH CABLE CLAMP TO CABLE W1 AT END OF BRAIDED AREA. RUN W1 THRU CABLE-ENTRANCE HOLE IN CASE AND ATTACH CABLE-CLAMP HOOK THRU SMALL HOLE.



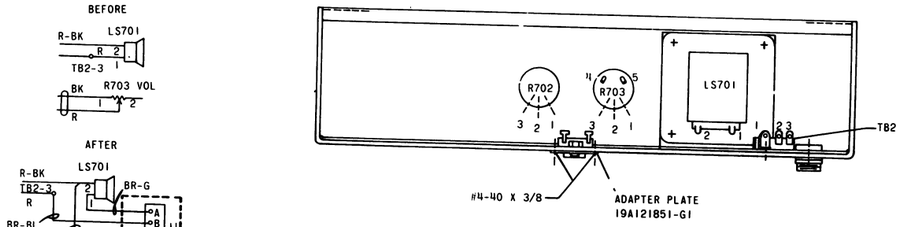


STEP 4: REMOVE JUMPER WIRE BETWEEN J703-3 & J703-6 AND SOLDER WIRES FROM W1 AS SHOWN IN DIAGRAM AT LEFT.



TI STATION APPLICATION KIT
PL-19A121855-G1
(MODEL 4EC39A10 CONTROL UNIT)

STEP 1: PLACE ADAPTER PLATE OVER RECTANGULAR CUTOUT NEAR CENTER BOTTOM OF CONTROL UNIT. WITH TERMINAL STRIP TB1 TO REAR OF UNIT AND ASSEMBLE WITH #4-40 HARDWARE AS SHOWN.



STEP 2: REMOVE RED WIRE BETWEEN LS701-1 & TB2-3.

STEP 3: UNSOLDER BLACK WIRE FROM R703-1 AND SOLDER TO TB1-1 OF ADAPTOR PLATE.

STEP 4: SOLDER ALL WIRES FROM ADAPTER PLATE AS SHOWN IN DIAGRAM AT LEFT.

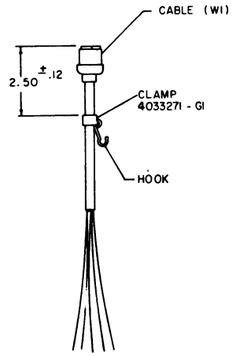
INSTALLATION INSTRUCTIONS

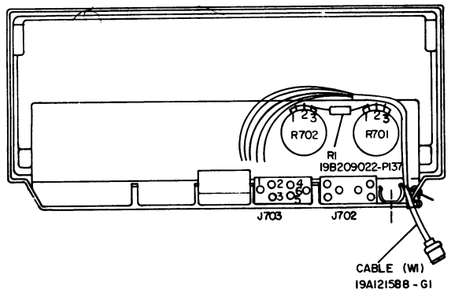
TONE APPLICATION KITS FOR PROGRESS LINE

(RC-1150A)

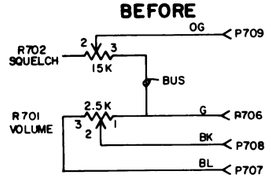
(DF-5031)

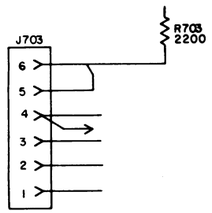
TPL- FRONT - MOUNT APPLICATION KIT
PL-19A121841 - G1





BEFORE





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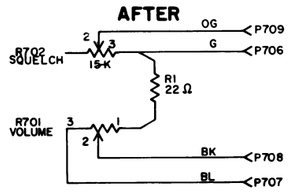
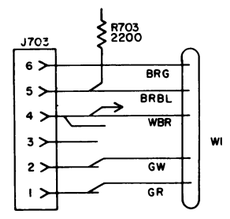




STEP 1: PREPARE CABLE (W1) BY ASSEMBLING CLAMP TO IT AS SHOWN.

STEP 2: ATTACH CABLE TO CONTROL UNIT BY INSERTING HOOK (FROM INSIDE) THROUGH SMALL HOLE IN UNIT.

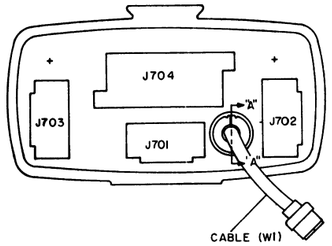
STEP 3: ROUTE CABLE AROUND R701 & R702 AS INDICATED AND SOLDER WIRES TO J703 AS SHOWN BY WIRING DIAGRAM.

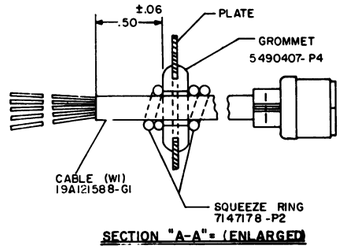
STEP 4: REMOVE JUMPER BETWEEN R701-1 & R702-3 AND TRANSFER GREEN WIRE FROM R701-1 TO R702-3. SOLDER R1 (22Ω) FROM R701-1 TO R702-3.

STEP 5: REMOVE JUMPER BETWEEN J703-5 & J703-6. UNSOLDER R703 FROM J703-6 & SOLDER TO J703-5.

STEP 6: MAKE ALL OTHER WIRING CHANGES AS SHOWN BY WIRING DIAGRAM. SOLDER ALL ELECTRICAL CONNECTIONS.

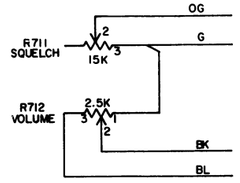
TPL TRUCK - MOUNT APPLICATION KIT
PL-19A121845 - G1

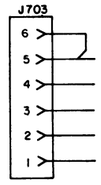




SECTION "A-A" (ENLARGED)

BEFORE





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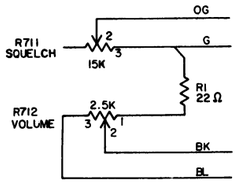
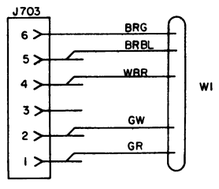




STEP 1: REMOVE PLUG BUTTON FROM HOLE (WHERE CABLE IS NOW SHOWN) AND DISCARD PLACE GROMMET IN HOLE VACATED BY BUTTON. INSERT CABLE THROUGH GROMMET AND ATTACH SQUEEZE RINGS FOR MINIMUM PLAY ON EITHER SIDE OF GROMMET. OVERLAY ENDS OF RINGS TO INSURE TIGHT FIT.

STEP 2: REMOVE JUMP WIRE BETWEEN R711-3 & R712-1 AND SOLDER R1 (22Ω) RESISTOR IN ITS PLACE AS SHOWN IN WIRING DIAGRAM.

STEP 3: REMOVE JUMPER BETWEEN J703-5 & J703-6 AND SOLDER WIRES OF CABLE (W1) TO J703 AS SHOWN BY WIRING DIAGRAM.

INSTALLATION INSTRUCTIONS

TONE APPLICATION KITS FOR TPL

(RC-1151A)

PACER & ACCENT 450 APPLICATIONS

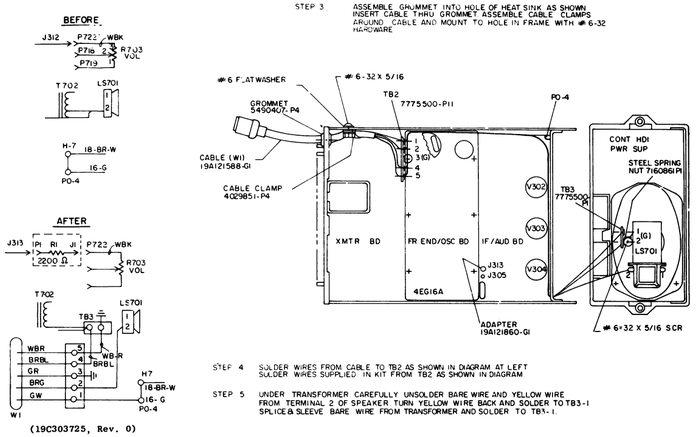
MOBILE APPLICATION KITS

PACER MOBILE APPLICATION KIT
PL-19A121861-G1

STEP 1 MOUNT TB2 TO OSCILLATOR BOARD IN POSITION SHOWN BELOW WITH SCREW THAT IS USED TO MOUNT BOARD TO THE FRAME.

STEP 2 PLACE STEEL SPRING NUT ON LUG OF SPEAKER LS701 AND MOUNT TB3 TO LUG WITH 6-32 HARDWARE AS SHOWN

STEP 3 ASSEMBLE GRUMMET INTO HOLE OF HEAT SINK AS SHOWN INSERT CABLE THRU GROMMET ASSEMBLE CABLE CLAMPS AROUND CABLE AND MOUNT TO HOLE IN FRAME WITH #6-32 HARDWARE

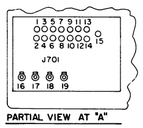


STEP 4 SOLDER WIRES FROM CABLE TO TB2 AS SHOWN IN DIAGRAM AT LEFT SOLDER WIRES SUPPLIED IN KIT FROM TB2 AS SHOWN IN DIAGRAM

STEP 5 UNDER TRANSFORMER CAREFULLY UNSOLDER BARE WIRE AND YELLOW WIRE FROM TERMINAL 2 OF SPEAKER TURN YELLOW WIRE BACK AND SOLDER TO TB3-1 SPLICE & SLEEVE BARE WIRE FROM TRANSFORMER AND SOLDER TO TB3-1.

(19C303725, Rev. 0)

ACCENT 450 MOBILE APPLICATION KIT
PL-19A121874-G1



PARTIAL VIEW AT "A"

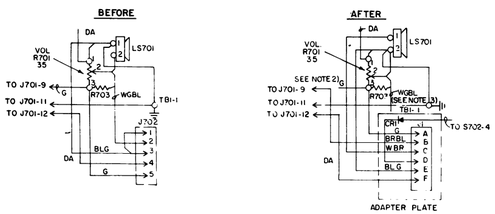
STEP 1 UNSOLDER ALL WIRES FROM J702 AND REMOVE JACK FROM CONTROL UNIT. ASSEMBLE ADAPTER PLATE (J1) IN PLACE OF J702 USING #4-40 HARDWARE AS SHOWN.

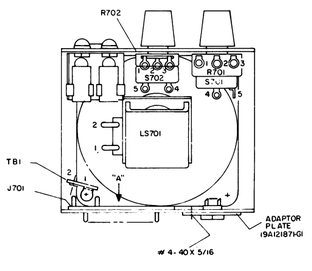
STEP 2 UNSOLDER GREEN WIRE FROM J701-9 AND TAPE BACK.

STEP 3 UNSOLDER WG-BL WIRE FROM R701-2 AND TAPE BACK.

STEP 4 SOLDER DIODE (CR1) BETWEEN ADAPTER PLATE & S702-4.

STEP 5 MAKE ALL OTHER WIRING CONNECTIONS AS SHOWN IN DIAGRAM BELOW. SOLDER ALL CONNECTIONS.

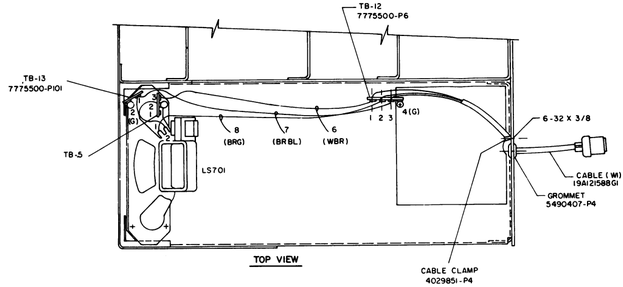


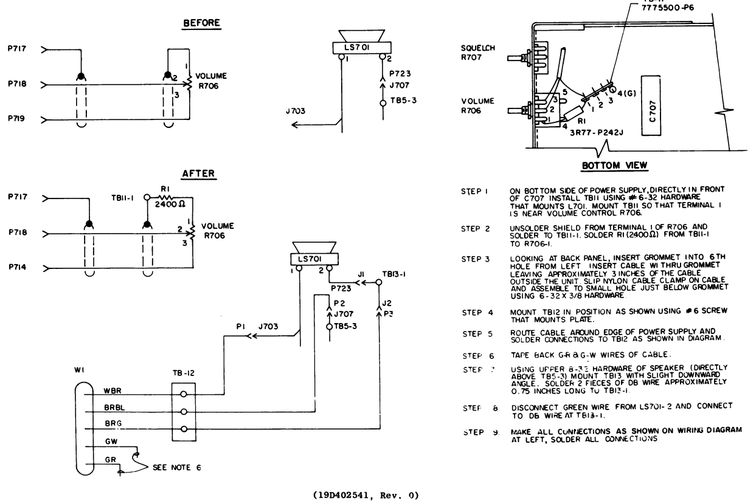


(19C303734, Rev. 1)

STATION APPLICATION KITS

PACER STATION APPLICATION KIT
PL-19A121903-G1





STEP 1 ON BOTTOM SIDE OF POWER SUPPLY, DIRECTLY IN FRONT OF C707 INSTALL TBII USING #6-32 HARDWARE THAT MOUNTS L701. MOUNT TBII SO THAT TERMINAL 1 IS NEAR VOLUME CONTROL R706.

STEP 2 UNSOLDER SHIELD FROM TERMINAL 1 OF R706 AND SOLDER TO TBII-1. SOLDER RI (2400Ω) FROM TBII-1 TO R706-1.

STEP 3 LOOKING AT BACK PANEL, INSERT GROMMET INTO 6TH HOLE FROM LEFT. INSERT CABLE W/ THRU GROMMET LEAVING APPROXIMATELY 3 INCHES OF THE CABLE OUTSIDE THE UNIT. SLIP NYLON CABLE CLAMP ON CABLE AND ASSEMBLE TO SMALL HOLE JUST BELOW GROMMET USING 6-32 X 3/8 HARDWARE.

STEP 4 MOUNT TBI2 IN POSITION AS SHOWN USING #6 SCREW THAT MOUNTS PLATE.

STEP 5 ROUTE CABLE AROUND EDGE OF POWER SUPPLY AND SOLDER CONNECTIONS TO TBI2 AS SHOWN IN DIAGRAM.

STEP 6 TAPE BACK G-R & G-W WIRES OF CABLE.

STEP 7 USING UPPER 6-32 HARDWARE OF SPEAKER (DIRECTLY ABOVE TB5-1) MOUNT TBI3 WITH SLIGHT DOWNWARD ANGLE. SOLDER 2 PIECES OF DB WIRE APPROXIMATELY 0.75 INCHES LONG TO TBI3-1.

STEP 8 DISCONNECT GREEN WIRE FROM LS701-2 AND CONNECT TO DB WIRE AT TBI3-1.

STEP 9 MAKE ALL CONNECTIONS AS SHOWN ON WIRING DIAGRAM AT LEFT, SOLDER ALL CONNECTIONS

(19D402541, Rev. 0)

ACCENT 450 STATION APPLICATION KIT
PL-19A121864-G1

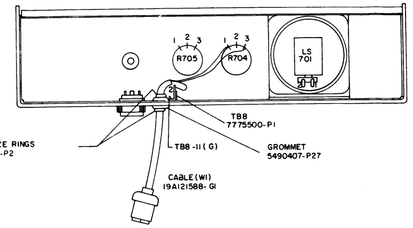
STEP 1 REMOVE PLUG BUTTON FROM HOLE LOCATED NEAR CONNECTOR J703. ASSEMBLE GROMMET INTO THIS HOLE AND INSERT CABLE W/ THRU GROMMET LEAVING APPROXIMATELY 6.00 INCHES BETWEEN END OF PLUG AND GROMMET.

STEP 2 ATTACH SQUEEZE RINGS ON EITHER SIDE OF GROMMET FOR MINIMUM PLAY. OVERLAP ENDS OF RINGS TO INSURE TIGHT FIT.

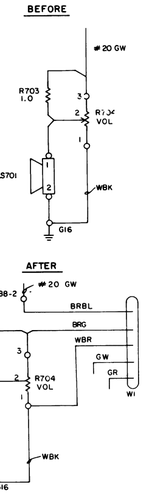
STEP 3 MOUNT TB8 USING #6-32 HARDWARE (NEAR SQUELCH CONTROL R705) THAT MOUNTS GRILLE TO FRAME.

STEP 4 SOLDER BR-BL, BR-G & W-BR WIRES FROM CABLE AS SHOWN IN DIAGRAM TIE BACK & TAPE G-W & G-R WIRES.

STEP 5 UNSOLDER #20 G-W WIRE FROM R704-3 AND SOLDER TO TB8-2



(19C303731, Rev. 1)



(DF-5031)

INSTALLATION INSTRUCTIONS

TONE APPLICATION KITS FOR
GE PACER & ACCENT 450

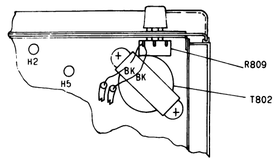
(RC-1152B)

LBI-3684

RC4 APPLICATION KIT
PL-19A121908-G1
(REMOTE CONTROL UNIT MODEL 4EC28A1)

STEP 1: ASSEMBLE TERMINAL BOARD TB3 AND RESISTORS R1, R2 AND R3 INSTALL WITH JUMPERS ON THE OUTSIDE UNDER SCREW HOLDING TRANSFORMER T802 (NEAR VOLUME CONTROL)

BEFORE



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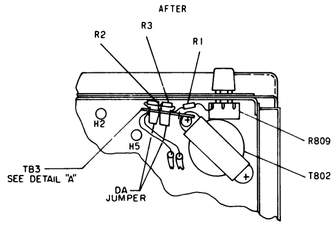
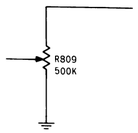
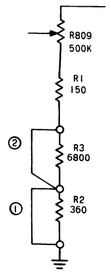


STEP 2: DISCONNECT BLACK WIRE (2) FROM VOLUME CONTROL (R809) AND ATTACH TO TOP TERMINAL OF BOARD (TB3).

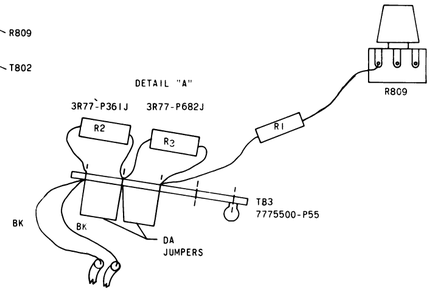
BEFORE



AFTER

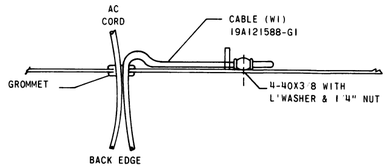


DETAIL "A"

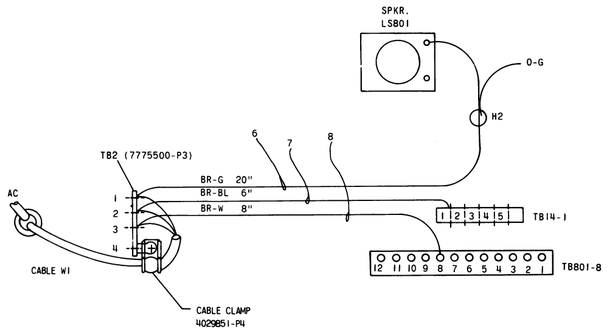


INPUT LEVEL	CLIP JUMPER
+ 10 & ABOVE	NONE
0 TO + 10	①
-12 TO 0	①&②

STEP 3: RUN CABLE THRU GROMMET WITH AC WIRE.

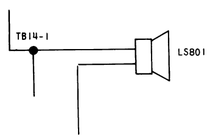


STEP 4: REMOVE SCREW NEAREST GROMMET AND INSTALL TERMINAL BOARD TB2 AND CABLE CLAMP. INSERT END OF BRAIDED PORTION IN CLAMP AND TIGHTEN. CUT WIRE TO LENGTH, FOLDING AND TAPING REMAINING WIRE.



STEP 5: ATTACH WIRE TO TERMINAL OF BOARD TB2 AS SHOWN. ATTACH SAME COLOR WIRE TO APPROPRIATE TERMINAL. DISCONNECT ORANGE AND BLUE WIRE AT SPEAKER TERMINAL AND TAPE BACK. TO THIS TERMINAL ON SPEAKER SOLDER THE BR-G WIRE. CONNECT THE BR-BL WIRE TO TB14-1 & THE BR-W WIRE TO TB801-8.

BEFORE



AFTER

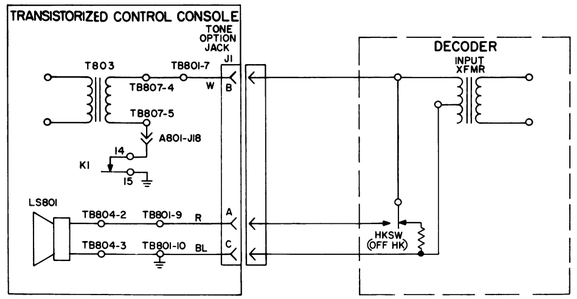
(19D402545, Rev. 2)

INSTALLATION INSTRUCTIONS

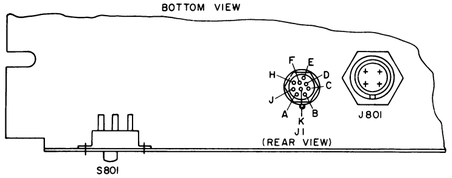
TONE APPLICATION KIT FOR TCC & RC4

(RC-1149B)

TRANSISTORIZED CONTROL CONSOLE APPLICATION KIT PL-19A122250-G17
(MODEL 4EC71A10)



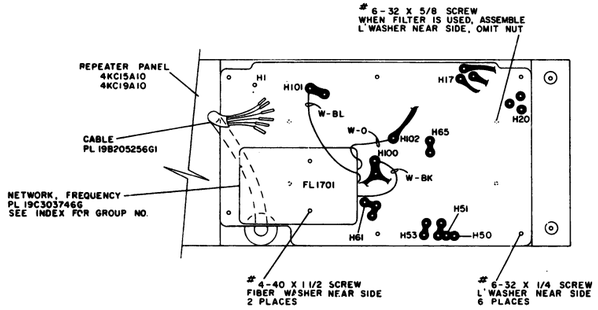
(19B205380, Rev. 2)

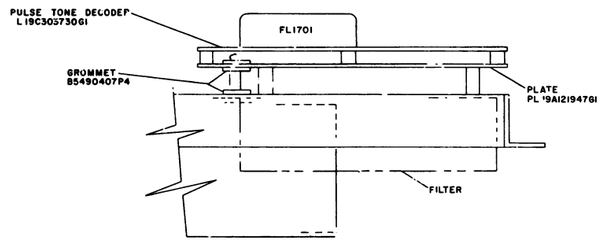


CONNECTIONS CHART		
FROM	TO	LEAD COLOR
J1	TB801-7	WHITE
J1	TB801-9	RED
J1	TB801-10	BLUE

(19B205381, Rev. 2,

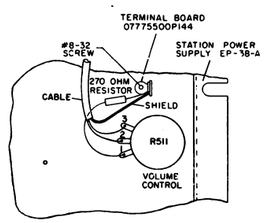
STEP I. MOUNT DECODER AS SHOWN BELOW.





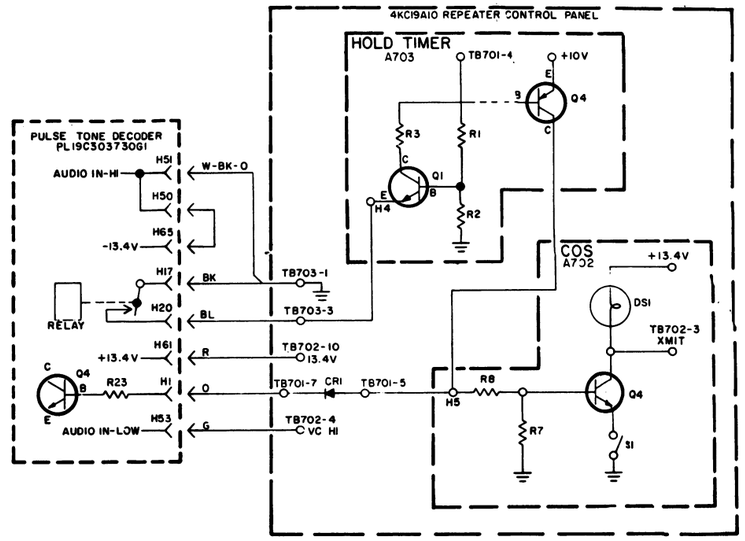
STEP 2. MODIFY STATION POWER SUPPLY AS FOLLOWS:

MOUNT TERMINAL BOARD UNDER 8-32 SCREW HOLDING RECEIVER MOUNTING BRACKET IN PLACE AS SHOWN BELOW. REMOVE CABLE SHIELD FROM R511-1 TO TERMINAL BOARD & CONNECT 270 OHM RESISTOR BETWEEN TERMINAL BOARD & R511-1.

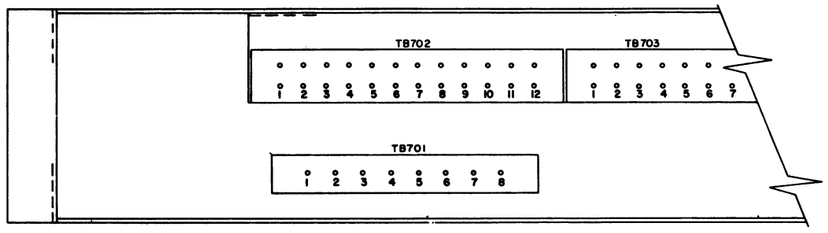


STEP 3. MAKE CONNECTIONS AS FOLLOWS:

A. CONNECT CABLE 19B205256G1 AS SHOWN.
B. CONNECT GREEN WIRE FROM TB702-4 ON KC-19-A TO TB902-5 ON EP-38-A AND SPOT TIE TO CABINET HARNESS.
C. REMOVE JUMPER FROM TB703-3 TO TB703-1.
D. ADD JUMPER FROM H50 TO H65.
E. ADD CR1 (19A115250P1) FROM TB701-5 TO TB701-7. SLEEVE CR1 WITH 7143140P2 SLEEVING.



BACK VIEW OF 4KC19A10



(19C303895, Sh. 1, Rev. 5)

(19C308895, Sh. 3, Rev. 1)

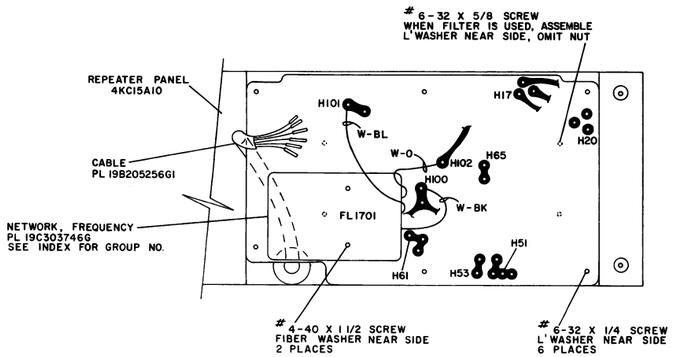
(DF-5031)

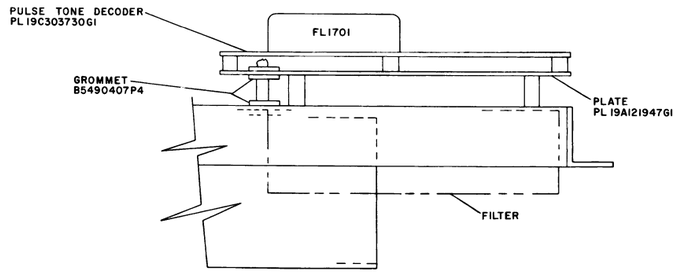
INSTALLATION INSTRUCTION

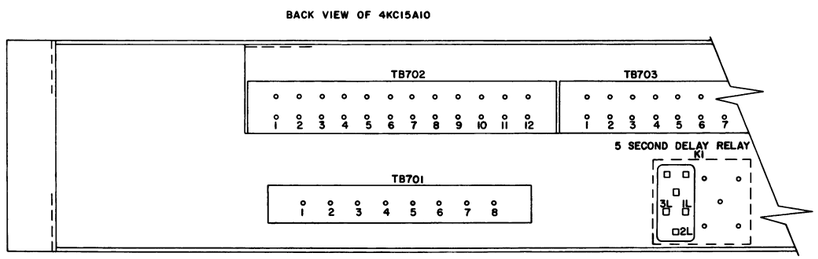
TONE APPLICATION KIT FOR
MASTR REPEATER STATION WITH 4KC19A10
(OPTION 7639)

RC-1664B

STEP 1. MOUNT DECODER AS SHOWN BELOW.

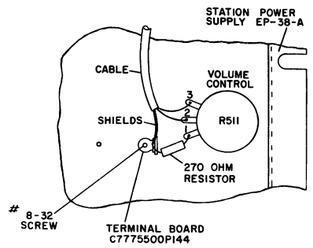






STEP 2. MODIFY STATION POWER SUPPLY AS FOLLOWS:

MOUNT TERMINAL BOARD UNDER #8-32 SCREW HOLDING RECEIVER MOUNTING BRACKET IN PLACE AS SHOWN BELOW. REMOVE BOTH CABLE SHIELDS FROM R511-1 TO TERMINAL BOARD & CONNECT 270 OHM RESISTOR BETWEEN TERMINAL BOARD & R511-1.



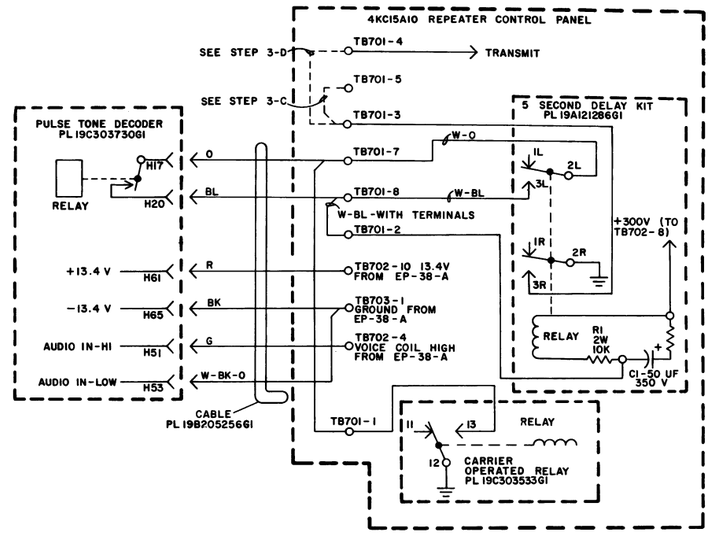
STEP 3. MAKE CONNECTIONS AS FOLLOWS:

A. CONNECT W-BL JUMPER AND CABLE 19B205256G1 AS SHOWN. CONNECT W-O AND W-BL WIRES FROM TB701-7 & 8 TO K1 OF 5 SECOND DELAY KIT AS SHOWN.

B. CONNECT GREEN WIRE FROM TB702-4 ON KC-15-A TO TB502-5 ON EP-38-A AND SPOT TIE TO CABINET HARNESS.

C. FOR OPERATION OF PULSE TONE DECODER WITH 3 MIN. TIMER KIT, JUMPER FROM TB701-3 TO TB701-5 WITH W-BR LEAD.

D. FOR OPERATION OF PULSE TONE DECODER WITHOUT 3 MIN. TIMER KIT, JUMPER FROM TB701-3 TO TB701-4 WITH W-BR LEAD.

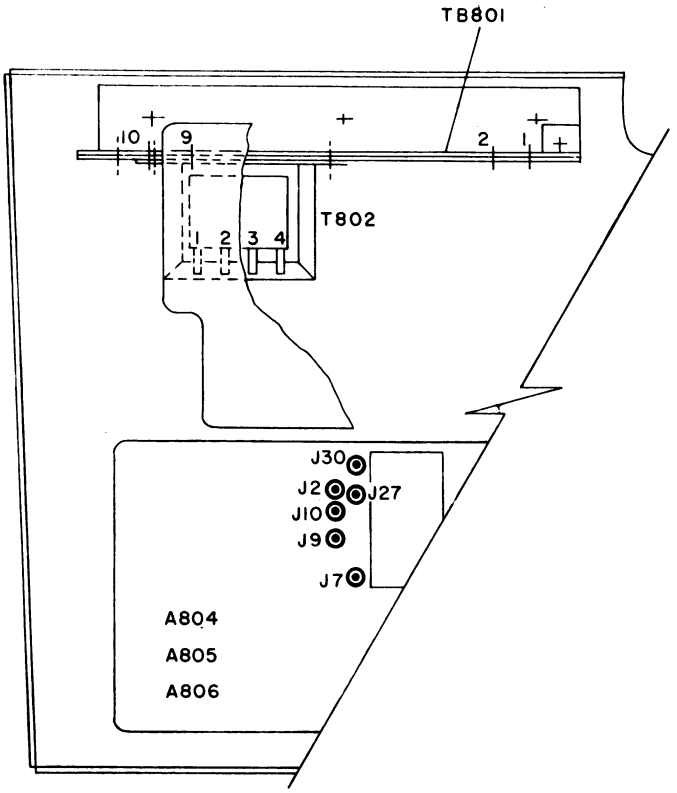


INSTALLATION INSTRUCTIONS

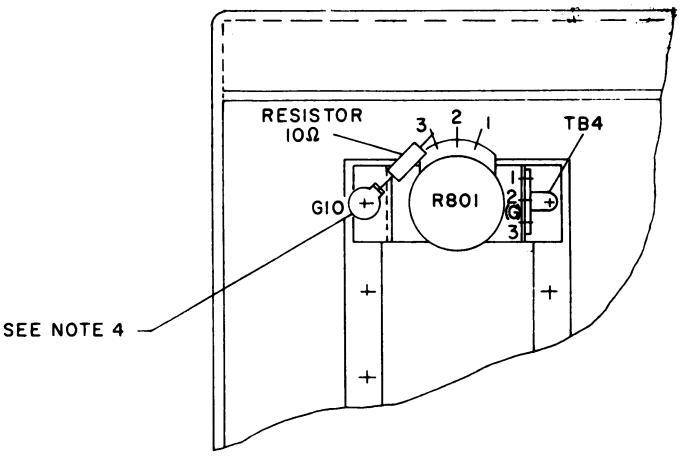
TONE APPLICATION KIT FOR
MASTR PROGRESS LINE REPEATER STATION
(OPTION 7639)

(RC-1484)

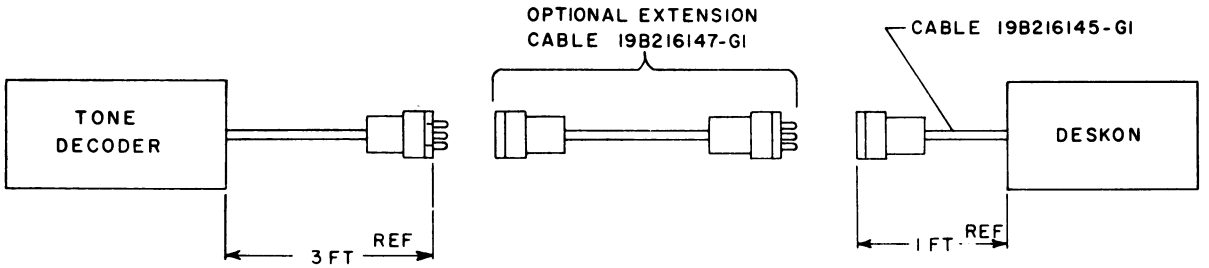
DESKON REMOTE CONTROL UNIT
TONE APPLICATION KIT 19A127156-G1



BASE VIEW – HOUSING REMOVED
(PARTIAL)



INSIDE VIEW OF HOUSING
(PARTIAL)



INSTRUCTIONS:

1. CLIP OUT WHITE-BLACK WIRE BETWEEN TB801-10 AND T802-2.
2. ASSEMBLE WHITE-BLACK WIRE (19A127155G1) FROM TB801-10 TO A804-A805-A806-J10.
3. ASSEMBLE CABLE (19B216145G1) RED LEAD TO TB801-7 AND BLACK LEAD TO TB801-10.
4. ASSEMBLE G10 (A4036835P4) AS SHOWN.
5. REMOVE SHIELD FROM R801 (VOLUME CONTROL) AND CONNECT TO G10.
6. ASSEMBLE 10Ω RESISTOR (C3R77P100K) BETWEEN G10 AND R801-3 (VOLUME CONTROL).
7. RE-ASSEMBLE HOUSING TO BASE & ROUTE CABLE THRU SLOT AT REAR OR END OF HOUSING.

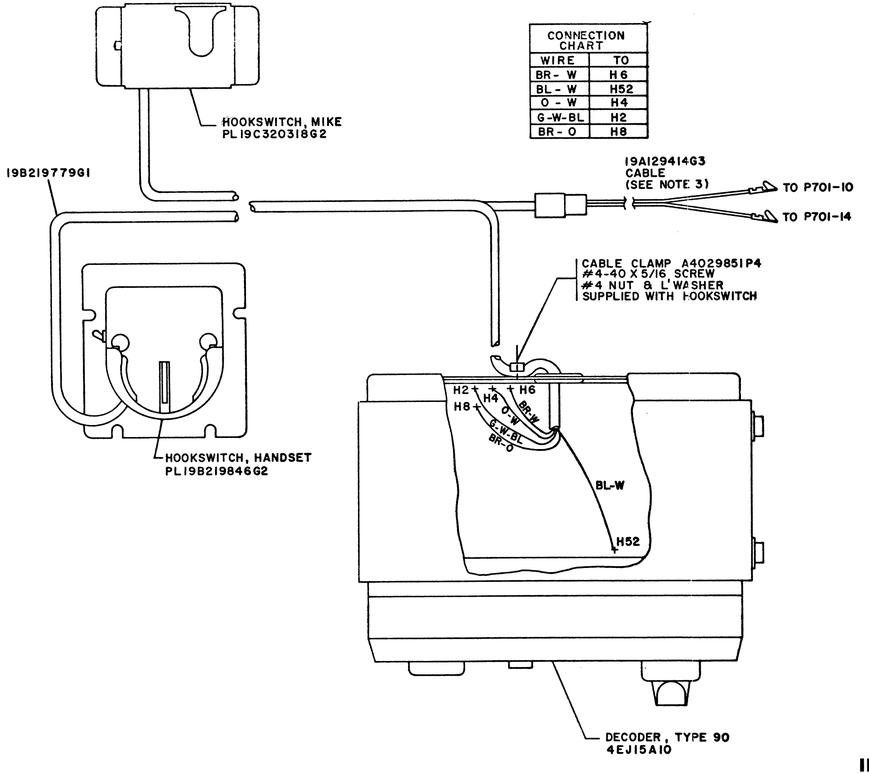
(19C311814, Rev. 5)

(DF-5031)

INSTALLATION INSTRUCTIONS

DESKON REMOTE CONTROL UNIT

RC-1833A



CONNECTION CHART	
WIRE	TO
BR - W	H6
BL - W	H52
O - W	H4
G-W-BL	H2
BR - O	H8

INSTALLATION INSTRUCTIONS:

1. REMOVE DECODER FROM CASE.
2. ROUTE CABLE AS SHOWN AND CONNECT AS DIRECTED IN CHART.
3. USE 19A129414G3 CABLE SUPPLIED WHEN REQUIRED FOR CG DISABLE. CONNECT TO P701-10 & P701-14 ON MASTR II CONTROL UNIT.

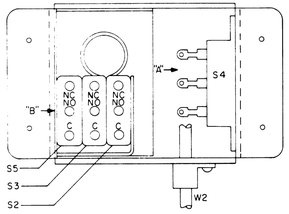
(19C320494, Sh. 2, Rev. 1)

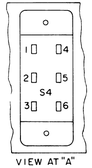
INSTALLATION INSTRUCTIONS

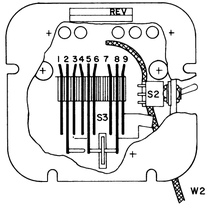
MASTR II MICROPHONE HANDSET/HOOKSWITCH

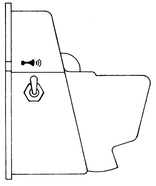
RC-2672

OUTLINE DIAGRAM

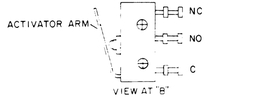








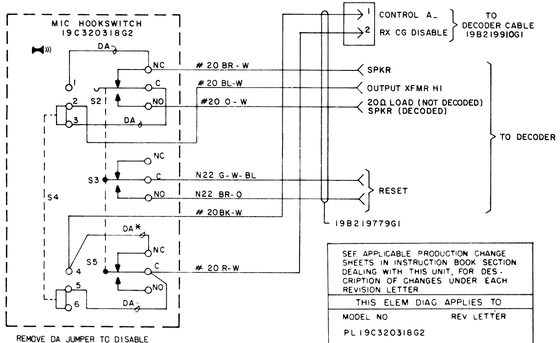
(19B226656, Rev. 0)



ORIENTATION OF S2, S3 & S5

(19B226125, Rev. 1)

SCHEMATIC DIAGRAM



SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO

MODEL NO	REV LETTER
PL19C320318G2	

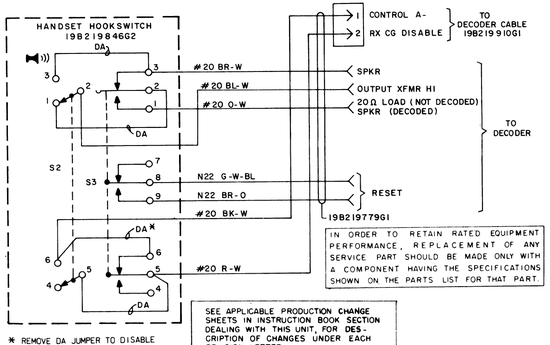
REMOVE DA JUMPER TO DISABLE AUTOMATIC CHANNEL GUARD MONITOR.

S2, S3, S5 SHOWN OFF HOOK
S4 SHOWN OFF MONITOR

NOTE 1.
CUT PRINTED WIRE RUNS C AND H IN CONTROL UNIT.

(19B219897, Rev. 1)

SCHEMATIC DIAGRAM



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.

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
PL19B219846G2	

* REMOVE DA JUMPER TO DISABLE AUTOMATIC CHANNEL GUARD MONITOR.

S3 SHOWN OFF HOOK
S2 SHOWN OFF MONITOR

NOTE 1.
CUT PRINTED WIRE RUNS C AND H IN CONTROL UNIT.

(19B219843, Rev. 1)

PARTS LIST

LBI-4741

MICROPHONE HOOKSWITCH
19C320318G2

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S2 and S3	19A116676P1	Switch, sensitive: SPDT, 5 amp at 24 VDC or 5 amp at 250 VRMS; sim to Microswitch 11SM1-T2.
S4	19B219698G2	Slide: DPDT, 3 amp at 125 VAC, 2.2 amp at 14 VAC; sim to Switchcraft 46206LB. (S1 includes switch and housing).
S5	19A116676P1	Switch, sensitive: SPDT, 5 amp at 24 VDC or 5 amp at 250 VRMS; sim to Microswitch 11SM1-T2.
		- - - - - - - - - - CABLES - - - - - - - - - -
W2	19B219779G1	Cable: approx 50 inches long. Includes (5) 4036634P1 electrical contacts.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19B219694P1	Base plate.
	N193P1410C	Tap screw: No. 8-18 x 5/8. (Secures base plate to mounting surface).
	7147223P2	Clip, loop. (External strain relief).
	19B201074P304	Tap screw, Phillips PDZ1DR1VF: No. 6-32 x 1/4. (Secures external strain relief).
	4029851P4	Cable clip; sim to Weckesser Co. 3/16-4-128. (Strain relief for W2).
	N80P9005C6	Machine screw: No. 4-40 x 5/16. (Secures cable clip).
	N404P11C6	Lockwasher: No. 4. (Used with internal cable clip).
	7141225P2	Hexnut: No. 4-40. (Used with internal cable clip).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

LBI-4742

HANDSET HOOKSWITCH
19B219846G2

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S2	19A116877P6	Toggle: DPDT, 1 ma at 6 VDC; sim to C and K Components Series Type 7201G. (CHANNEL GUARD DISABLE).
S3	19A129585P2	Hookswitch, Handset: black, 3 form C contacts.
		- - - - - - - - - - CABLES - - - - - - - - - -
W2	19B219779G1	Cable: approx 50 inches long. Includes (5) 4036634P1 electrical contacts.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	N190P1312C	Tap screw, Phillips PDZ1DR1V: No. 6 x 3/4. (Secures lower housing to base plate).
	N84P13014C6	Machine screw, phillips: No. 6-32 x 7/8. (Secures upper housing to base plate).
	N8413016C6	Machine screw, phillips: No. 8-32 x 7/8. (Secures bumper).
	N101P1510P	Tap screw, phillips head: No. 8-15 x 5/8. (Secures plate to mounting surface).
	19B219852P1	Base plate.
	19A129586P1	Bumper, rubber.
	4029851P4	Cable clip: sim to Weckewwer Co. 3/16-4-128. (Strain relief for W2).
	N80P9005C6	Machine screw: No. 4-40 x 5/16. (Secures cable clip).
	N404P11C6	Lockwasher: No. 4. (Used with cable clip).
	7141225P2	Hex nut: No. 4-40. (Used with cable clip).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SERVICE SHEET

MASTR II MICROPHONE HANDSET/HOOKSWITCH

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-3684

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

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(DF-5031)