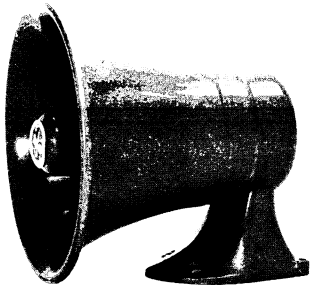
MOBILE RADIO

MAINTENANCE MANUAL

PUBLIC ADDRESS



LOUDSPEAKER – 19B209425P2
SPEAKER CABLE – 19B219826G1

CONTROL UNIT

SPECIFICATIONS *

PUBLIC ADDRESS	
Audio Power	12 Watts (Using Receiver Audio Circuits)
Audio Distortion	Less than 1% at 1 kHz (PA Pre-amplifier only)
Power Requirement	0.030 Amperes @13.8 VDC (Additional current required by Control Unit)
Frequency Response	200 to 5000 Hz (PA Pre-amplifier only)
Preamplifier Output	160 Millivolts (Minimum output with 60 mV input)
Preamplifier Gain	8 dB (minimum)
Input Voltage	13.8 VDC
Regulated Voltage	9.4 ±0.6 VDC @approximately 0.012 Amperes
LOUDSPEAKER	
Impedance	8 ohms ±10%
Power (max.)	25 Watts
Voice Coil Resistance	6.75 ohms ±15%

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

DESCRIPTION

The General Electric Public Address Option consists of a Speaker (19B209425P2), which is designed for external mounting, a Speaker Cable assembly (19B219826G1) and an Option Kit (19A129567G2).

The Option Kit (See Figure 1) is made up of the following components, and is supplied factory installed, or it may be field-installed at a later date:

- Public Address Amplifier Board 19C320401G1
- Control Unit Nameplate NP270753P4
- Option Switch and mounting hardware
- Option Indicator (LED) and retainer clip

An optional noise-cancelling microphone (19C320477G1) is available with the Public Address option for use in areas with high volume background noise.

An optional Extender Board (19C320588G1) is available for servicing the Public address Component board.

MODES OF OPERATION

The Public Address Option allows the operator to send and receive messages as with a standard radio, or by placing the PA switch in the ON position, it allows the radio to be utilized as a public address amplifier. Messages received by the radio in this mode will be heard from the external speaker only.

In addition, placing the PA switch to the ON position; (1) illuminates the Option indicator on the Control Unit, (2) disconnects the microphone PTT circuit from the Control Unit PTT circuit, and (3) switches the receiver audio output from the internal speaker to the external speaker.

Pressing the PTT switch on the Microphone applies the microphone output to the Public Address audio amplifier. The output signal from the amplifier is routed through the receiver audio circuits, enabling the message to be heard only from the external speaker.

Loudness of the amplified microphone signal from the external speaker is controlled by potentiometer R1707, which is located on the Public Address Component board and is accessible from the back of the Control Unit through the opening normally occupied by the Blanker Disable switch. If the Disable switch is utilized, then the Control Unit top cover must be removed to gain access to R1707.

Messages cannot be transmitted in the PA mode of operation, but all incoming messages can be heard from the external speaker. Loudness of the received message is controlled with the VOLUME control on the Control Unit.

INSTALLATION

Control Units equipped with a factory installed Public Address Option are supplied with an external Speaker (19B209425P2) and a Speaker Cable Assembly (19B219826G1).

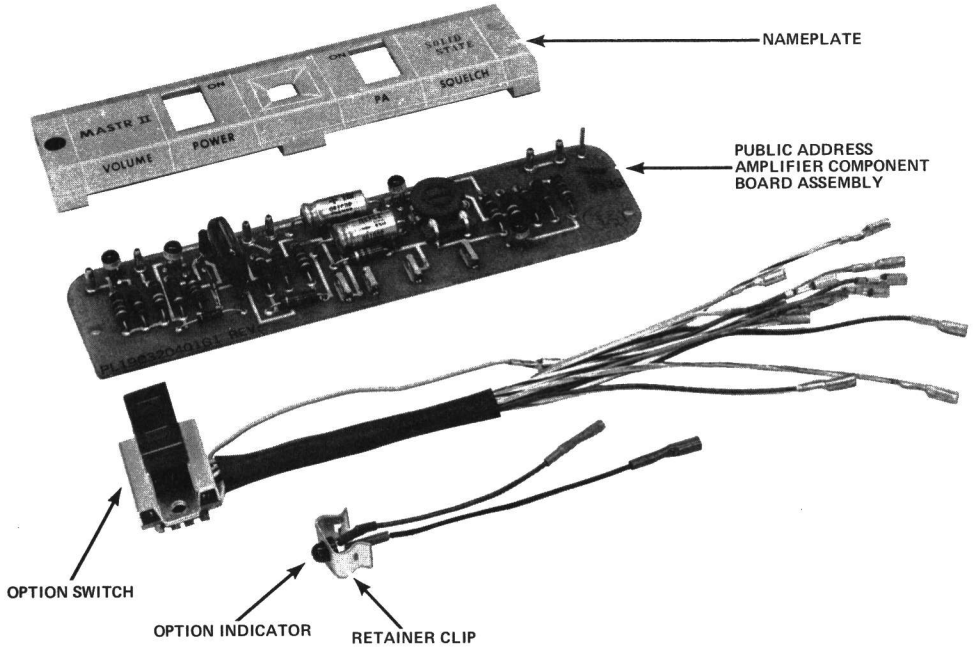


Figure 1 - Public Address Option Kit Components

Mount the external Speaker in the desired location (on vehicle roof, under hood, etc.) Using the cable assembly, make the Speaker electrical connections to the Vehicle System Plug (P701) in accordance with the following:

EXTERNAL SPEAKER MOUNTING

1. Using the backing plate as a template, mark and drill two 13/64-inch holes for the backing plate retaining screws, and four 9/32-inch holes for the speaker mounting screws: Next, drill a 5/8-inch hole for the Speaker Cable and insert rubber grommet in the hole.
2. Attach the backing plate behind the mounting surface with two #8-32 threadforming screws and lockwashers.
3. Route cable from the Control Unit through backing plate (under mounting surface), grommet, and gasket, to the Speaker (see Figure 2).
4. Connect the Speaker Cable leads and and the Speaker leads using the two splice connectors furnished.

CAUTION

Do not ground either side of the External Speaker.

5. Mount the Speaker using four 1/4" x 7/8" screws, and lockwashers supplied.

ELECTRICAL CONNECTION TO VEHICLE SYSTEM PLUG

1. Insert one lead of Speaker Cable assembly (19B219826G1) into P701-2 (Speaker Lo of the Vehicle System Plug).
2. Insert the other lead of the Speaker Cable assembly into P701-19 (External Speaker Hi of the Vehicle System Plug).
3. Strain relieve the Speaker Cable to the Control Unit using a standard cable clamp (not supplied) in order to prevent damage to P701-2 and P701-19.
4. Connect P701 (Vehicle System Plug) to J701 on the control unit.

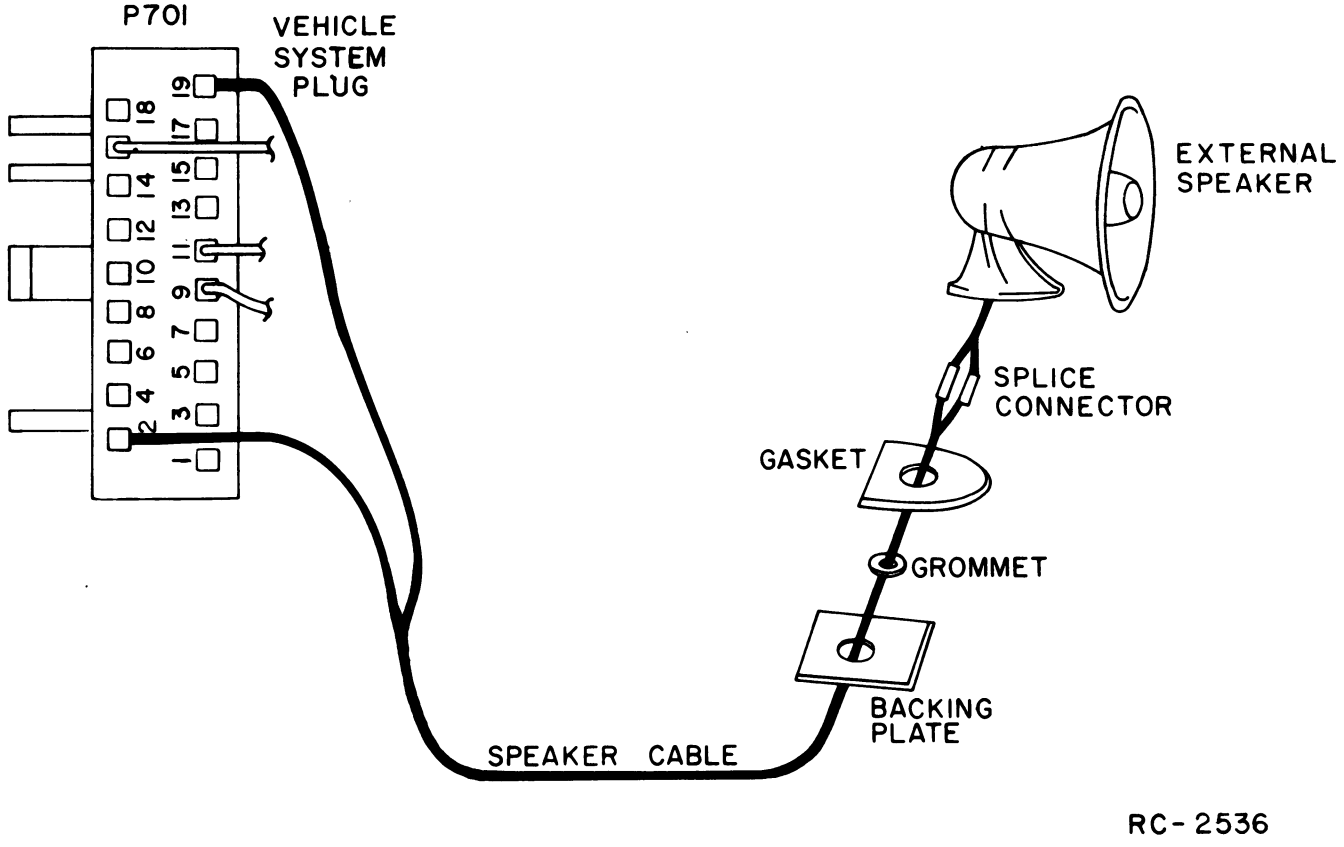


Figure 2 - External Speaker Connections

Prior to operating the Public Address Option in the PA mode, the PA level should be adjusted. Refer to Installation adjustment procedure for details.

ADJUSTMENT

Prior to operating the radio in the Public Address mode, the PA level control (R1707) should be adjusted for the desired loudness from the external speaker, while talking into the microphone at a normal voice level.

To adjust the PA level:

STEP 1: Access to the PA level control (R1707 on PA Component Board) is through the opening on the rear of the Control Unit which is normally occupied by a Noise Blanker Disable Switch. If a Noise Blanker switch is utilized, then the Control Unit top Cover must be removed to gain access to R1707.

STEP 2: Place PA switch on Control Unit to the ON position and depress the microphone PTT switch.

STEP 3: Using a normal voice, speak into the microphone and adjust R1707 for the desired loudness from the external speaker.

FIELD INSTALLATION

The following instructions can be used to install the Public Address Option Kit in a multi-frequency Control Unit that is not equipped with any other option boards.

Control Unit Models:
19A129576G1 (Common Kit)
19A129578G1 (1-thru 8-Freq. Kit)
19A129578G2 (1-thru 12-Freq. Kit)

Installation of the Public Address Option Kit requires that the Control Unit printed wiring board (PWB) be removed from the control unit. This is necessary in order to cut the applicable points on the Control Unit PWB. Disassemble the Control Unit as follows:

a. Remove the two screws on the bottom of the front edge of the Control Unit and lift off the top cover.

b. Remove the two screws securing the microphone jack.

c. Remove the screw between J701 and J702, and the screw between J702 and J703.

d. Remove the screw at each end of the switch and control mounting bracket.

e. Remove the screw securing the Power-On switch (S701) to the Control Unit housing, then swing the board up from the front and lift out.

f. Remove the printed wiring board from the Control Unit and cut the printed wiring run at Points "E" and "J". Refer to the Control Unit Maintenance Manual for the location of the specified points.

g. If the Public Address is used without the External Decoder (Option 1010) or the Handset Hookswitch (Option 1011), cut the printed wiring run at Point "C". If the Public Address is used with Option 1010 or Option 1011, then cut the printed wiring run at Point "D", leaving the run at Point "C" intact.

h. Re-install the board assembly in the Control Unit, but do not replace the top cover at this time.

i. Follow Step 1 through Step 8 to complete the installation.

Control Unit Models:
19D423590G3, 4 & 5

Installation of the Public Address Option Kit in this Control Unit model requires the following:

a. Remove the printed wiring board from the Control Unit and cut DA jumper wires "E" (H59-H60) and "J" (H57-H58). Refer to the Control Unit Maintenance Manual for the location of the specified points.

b. If the Public Address is used without the External Decoder (Option 1010) or the Handset Hookswitch (Option 1011), cut DA jumper wire "C" (H63-H64). If the Public Address is used with Option 1010 or Option 1011, then cut DA jumper wire "D" (H61-H62) leaving the DA jumper wire between H63-H64 intact.

c. Re-install the board assembly in the Control Unit, but do not replace the top cover at this time.

STEP 1: Install a DA jumper from holes H100 to H101 on the System Board in the radio. Refer to Control Unit and System Board Maintenance Manual for location of H100 and H101.

STEP 2: Position the Public Address component board assembly in the guide slots located inside the sides of the Control Unit housing. Gently insert the board assembly into the Control Unit, making sure that the connectors on the board assembly mate correctly with the square pins of the Control Unit printed wire board.

STEP 3: Mount the PA switch (S1701) in the space provided in the Control Unit. Orient the switch as shown on the Outline Diagram. Secure the switch to the switch and control mounting bracket with the 4-40 x 1/4 inch Phillips head POZIDRIV® tap screw provided. Secure the other end of the switch to the Control Unit housing with the 4-40 1/4 inch Phillips head tap screw provided.

STEP 4: Position the LED (CR1703) in the Option indicator slot of the Control Unit housing and secure in place with the spring clip provided.

STEP 5: Make connections as indicated in Connection Chart on the Outline Diagram.

STEP 6: Remove the existing nameplate from the Control Unit top cover and install new Nameplate (NP270753P4) as follows:

a. Viewing the Control Unit from the front, note that there are only three of the plastic Nameplate tabs which lock in place. These are the top left hand tab, the top right hand tab and the bottom center tab. The remaining tabs function only as guide tabs.

b. Release the locking action of the tabs, starting with the top right hand tab, then the top left hand tab. Apply pressure with fingers or use a small flat blade screwdriver to release tabs. Push released tabs up through slots to prevent relocking of tabs.

c. Release the locking action of the bottom center tab and pry the nameplate loose from the top cover. The old nameplate will not be used with Public Address Option.

d. Install the new nameplate (NP270753P4) in place of the old nameplate.

STEP 7: Adjust PA level (R1707) for desired loudness from external speaker (Refer to adjustment procedure for details.)

STEP 8: Replace the Control Unit top cover and secure in position with the two screws previously removed.

CIRCUIT ANALYSIS

SPEAKER SELECTION

The Public Address Option selection is determined by the setting of PA switch S1701. When the PA switch is placed in the "off" position, the radio operates in a conventional manner. Switch 1701 connects the receiver audio (SPKR IN) through contacts 10 and 11 of S1701 to the internal speaker (SPKR HI).

MICROPHONE AND PTT CIRCUIT

The Microphone PTT input (PTT MIKE) is connected through terminals 7 and 8 of S1701 to the Control Unit PTT circuit (PTT Tx). This connection allows normal keying of the transmitter when the microphone PTT switch is depressed. The microphone output (MIKE HI) is connected through terminals 1 and 2 of S1701 to the transmitter exciter (MIKE HI-Tx) audio circuit.

PUBLIC ADDRESS COMPONENT BOARD

The Public Address Component board contains an option indicator switch (Q1705), a Squelch Disable Circuit (CR1702), a DC switch (Q1701), a regulator (Q1702), an audio amplifier (Q1703) and an emitter follower (Q1704).

Option Indicator Switch

When PA switch S1701 is placed in the ON position, A-(MIKE LO) at Terminal 4 of S1701, is removed from the base of option indicator switch Q1705. The base of Q1705 goes positive, turning Q1705 ON, allowing option indicator LED (Light Emitting Diode) CR1703 to conduct. CR1703 when conducting illuminates, indicating the selection of the Public Address mode of operation.

Squelch Disable

The microphone PTT switch, when depressed, applies A-through S1701-9, S1701-8, and J1705 to diode CR1702. A-applied through CR1702 and J1707 to J723 (SQ DISABLE) disables the receiver squelch circuit, enabling the receiver audio circuit to operate. The SQ DISABLE control line connections are made from the Control Unit through the Power/Control cable to the receiver IFAS Board.

DC Switch and Regulator

In the receive mode of operation, DC switch Q1701 and regulator Q1702 are normally turned OFF. When the microphone PTT switch is depressed (PA mode), A- is applied to the base of DC switch Q1701, turning Q1701 ON. With Q1701 ON, the base of Q1702 is clamped at approximately 10 VDC by zener diode CR1701. Regulator Q1702 is turned ON by positive voltage on its base. Regulation is accomplished by the constant 10 VDC applied to the base of Q1702, producing approximately 0.4 VDC on the emitter of Q1702.

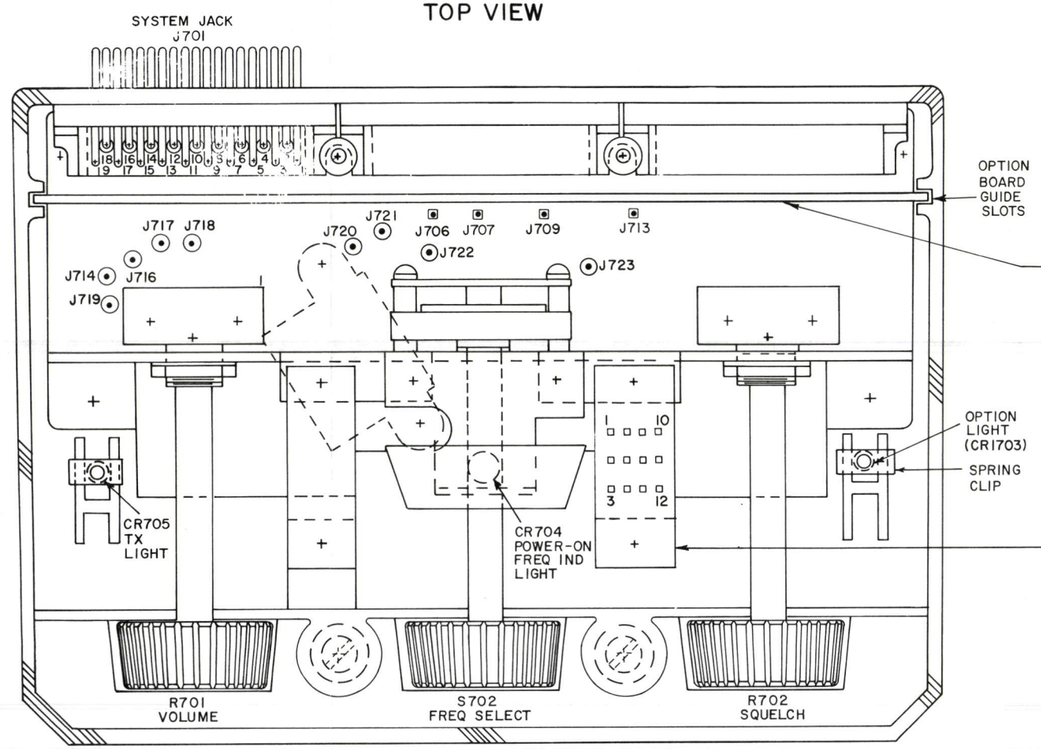
Audio Amplifier and Emitter Follower

The microphone output signal (MIKE HI) is coupled through terminals 2 and 3 of S1701 to J1703 of the component board. The signal is routed from J1703 to the high side of PA level control R1707. The amount of signal level applied to the base of audio amplifier Q1703 is determined by the setting of R1707. The signal is then coupled from the arm of R1707 through C1701 and R1709 to the base of Audio Amplifier Q1703.

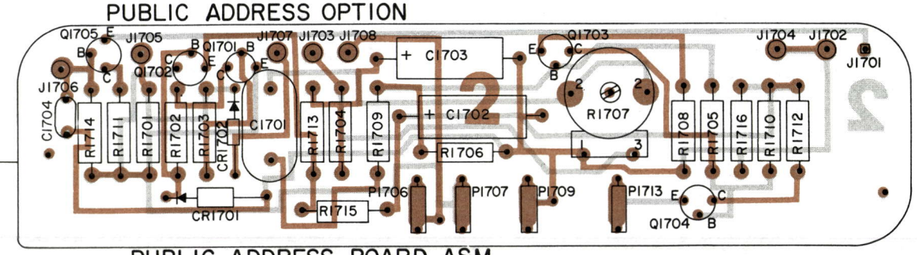
The amplified output from the collector of Q1703 is direct coupled to the base of emitter follower Q1704. The emitter of Q1704 is connected to P1713 of the Component board which mates with J713 of the Control Unit printed wire board. The DC path (RX PA input) for the emitter of Q1704 is through J702-3 of the Control Unit and J702-3 of the Power/Control Cable. Connection is completed through P901-22 of the Power/Control Cable to J901-22 of the System Board. From J901-22, the connection is made through the DA jumper between H101 and H100 to J904 on the System Board. The DA jumper is present only when the Public Address Option is utilized.

The emitter load resistor (4.7 K ohms) for Q1704 is located within receiver audio IC U604 and is connected from Pin 6 of U604 to A-. The DC voltage on the emitter of Q1704 (approximately 5 VDC) is used to back bias an amplifier within U604, eliminating receiver noise from being amplified along with the microphone signal which is coupled through C635 to U604-Pin 7.

CONTROL UNIT
TOP VIEW

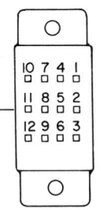


PUBLIC ADDRESS OPTION

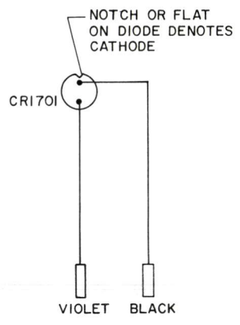


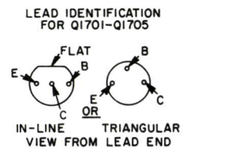
PUBLIC ADDRESS BOARD ASM

(19C320396, Sh. 2, Rev. 2)
(19C320396, Sh. 3, Rev. 2)



S1701
TERMINAL
VIEW





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

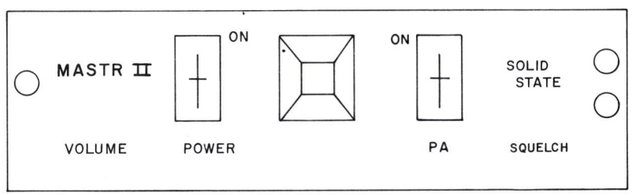
NOTES:
1. WHEN THE PA OPTION IS USED IN CONJUNCTION WITH OPTION 1010 (EXTERNAL DECODER) OR OPTION 1011 (HANDSET HOOKSWITCH), CONNECT P1716 (W-G-O) TO J718 OF THE CONTROL UNIT PWB.

CONNECTION CHARTS

WIRE COLOR	FROM OPTION SWITCH	TO CONTROL UNIT PRINTED WIRE BOARD
P1721-V	S1701-1	J721
P1720-W-V	S1701-2	J720
P1719-BK	S1701-5	J719
P1722-W	S1701-8	J722
P1716-W-G-O	S1701-10	J716 (SEE NOTE 1)
P1717-W-R-BK	S1701-11	J717
P1714-W-BL-O	S1701-12	J714

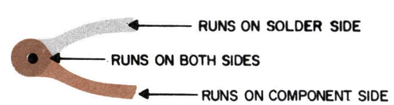
WIRE COLOR	FROM OPTION SWITCH	TO PUBLIC ADDRESS PRINTED WIRE BOARD
P1753-R	S1701-3	J1703
P1754-BR	S1701-6	J1704
P1755-O	S1701-9	J1705
P1756-BL	S1701-4	J1706
P1758-G	S1701-7	J1708

ITEM	FROM	TO
JUMPER-Y	J1707	J723
CR1703-V	——	J1701
CR1703-BK	——	J1702



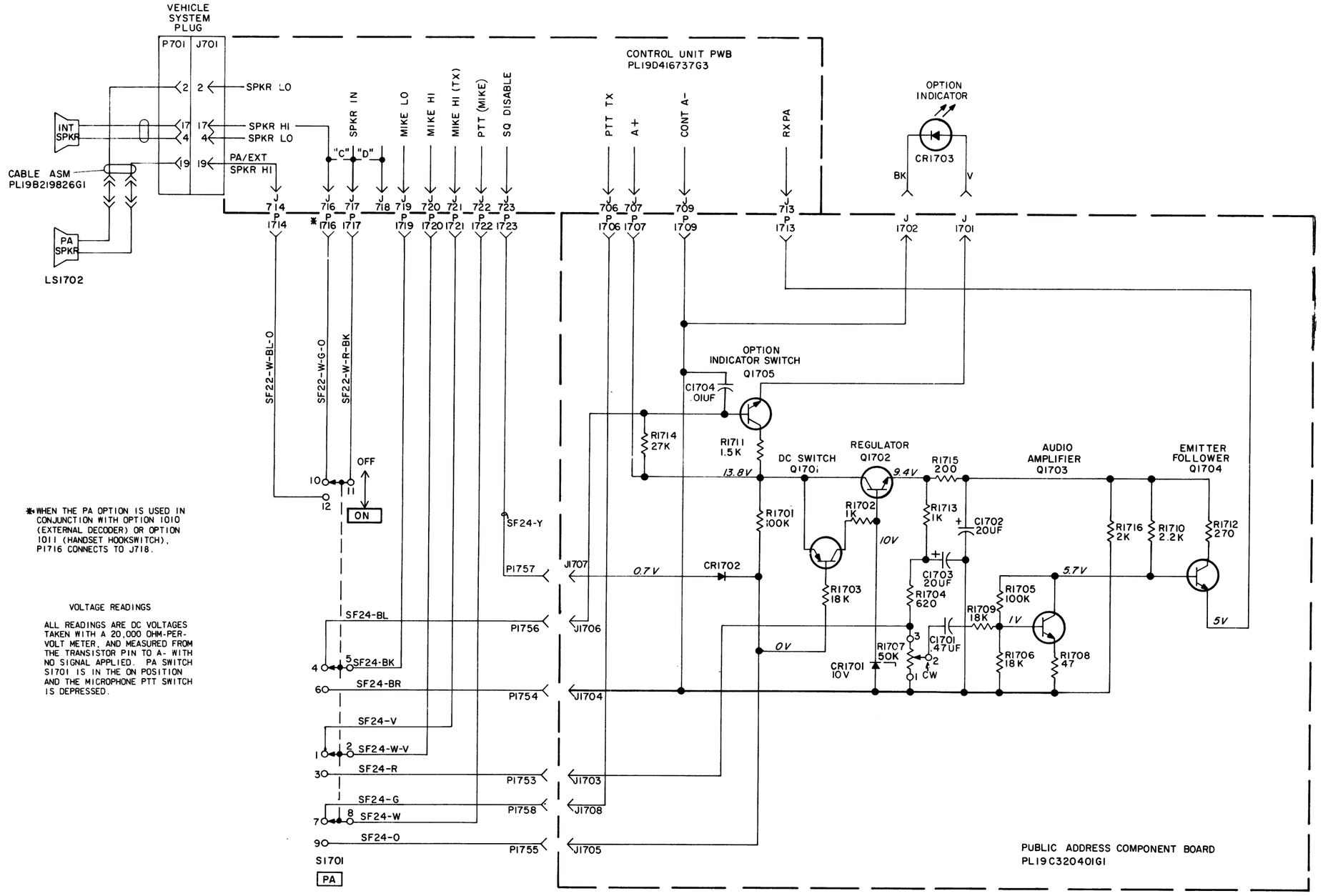
NAMEPLATE

(19D417837, Rev. 1)



OUTLINE DIAGRAM

PUBLIC ADDRESS



*WHEN THE PA OPTION IS USED IN CONJUNCTION WITH OPTION 1010 (EXTERNAL DECODER) OR OPTION 1011 (HANDSET HOOKSWITCH), P1716 CONNECTS TO J718.

VOLTAGE READINGS

ALL READINGS ARE DC VOLTAGES TAKEN WITH A 20,000 OHM-PER-VOLT METER, AND MEASURED FROM THE TRANSISTOR PIN TO A- WITH NO SIGNAL APPLIED. PA SWITCH S1701 IS IN THE ON POSITION AND THE MICROPHONE PTT SWITCH IS DEPRESSED.

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
PL19C320401G1	A

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 ½ 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.

(19D416978, Rev. 6)

SCHEMATIC DIAGRAM

PUBLIC ADDRESS

PARTS LIST

LBI-4648C

PUBLIC ADDRESS OPTION

SYMBOL	GE PART NO.	DESCRIPTION
		CONTROL UNIT MODIFICATION KIT 19A129567G2
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1701	19B219800G2	Diode, light emitting: red.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1701	19B219912G1	Push: 4PDT, 0.5 amp VDC or 3.0 amp at 125 v res max; sim to Switchcraft 11K1043.
		- - - - - - - - - - MISCELLANEOUS - - - - - - -
	NP270753P4	Nameplate.
	19B201074P204	Tap screw, phillips POZIDRIV®: No. 4-40 x 1/4.
	N117P9004C6	Tap screw, phillips: No. 4-40 x 1/4.
	19A116807P1	Clip, spring tension.
		BOARD AND SWITCH ASSEMBLY 19C320401G1
		- - - - - - - - - CAPACITORS - - - - - - - - - -
C1701	19A116080P11	Polyester: 0.47 µf ±20%, 50 VDCW.
C1702 and C1703	19A115680P3	Electrolytic: 20 µf +150% -10%, 25 VDCW; sim to Mallory Type TTX.
C1704*	19A116080P1	Polyester: 0.01 µf ±20%, 50 VDCW. Added by REV A.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1701	4036887P11	Silicon, Zener.
CR1702	19A115250P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1701	19A116779P1	Contact, electrical: sim to Molex 08-50-0404.
J1702 thru J1708	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1706 and P1707	19A116428P3	Contact, electrical: sim to AMP 85487-3 (Strip Form).
P1709	19A116428P3	Contact, electrical: sim to AMP 85487-3 (Strip Form).
P1713	19A116428P3	Contact, electrical: sim to AMP 85487-3 (Strip Form).
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q1701	19A115768P1	Silicon, PNP; sim to Type 2N3702.
Q1702 thru Q1705	19A115889P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1701	3R77P104K	Composition: 0.10 megohm ±10%, 1/2 w.
R1702	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R1703	3R77P183K	Composition: 18,000 ohms ±10%, 1/2 w.
R1704	3R77P621K	Composition: 620 ohms ±10%, 1/2 w.
R1705	3R77P104K	Composition: 0.10 megohm ±10%, 1/2 w.
R1706	3R77P183K	Composition: 18,000 ohms ±10%, 1/2 w.
R1707	19B209358P8	Variable, carbon film: approx 2000 to 50,000 ohms ±20%, 0.25 w; sim to CTS Type U-201.
R1708	3R77P470J	Composition: 47 ohms ±5%, 1/2 w.
R1709	3R77P183K	Composition: 18,000 ohms ±10%, 1/2 w.
R1710	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R1711	3R77P152K	Composition: 1500 ohms ±10%, 1/2 w.
R1712	3R77P271K	Composition: 270 ohms ±10%, 1/2 w.
R1713	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R1714	3R77P273K	Composition: 27,000 ohms ±10%, 1/2 w.
R1715	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
R1716	3R77P202J	Composition: 2000 ohms ±5%, 1/2 w.
		ASSOCIATED ASSEMBLIES
LS1	19B209425P2	Loudspeaker, permanent magnet: 8 ohms ±10% voice coil imp, freq range 300 to 13,000 Hz; sim to Atlas SA-340 M2.
W1	19B219826G2	Speaker cable: 2 conductors, approx 20 feet.
	19B219826G1	Speaker Cable Assembly. (Includes mounting hardware).

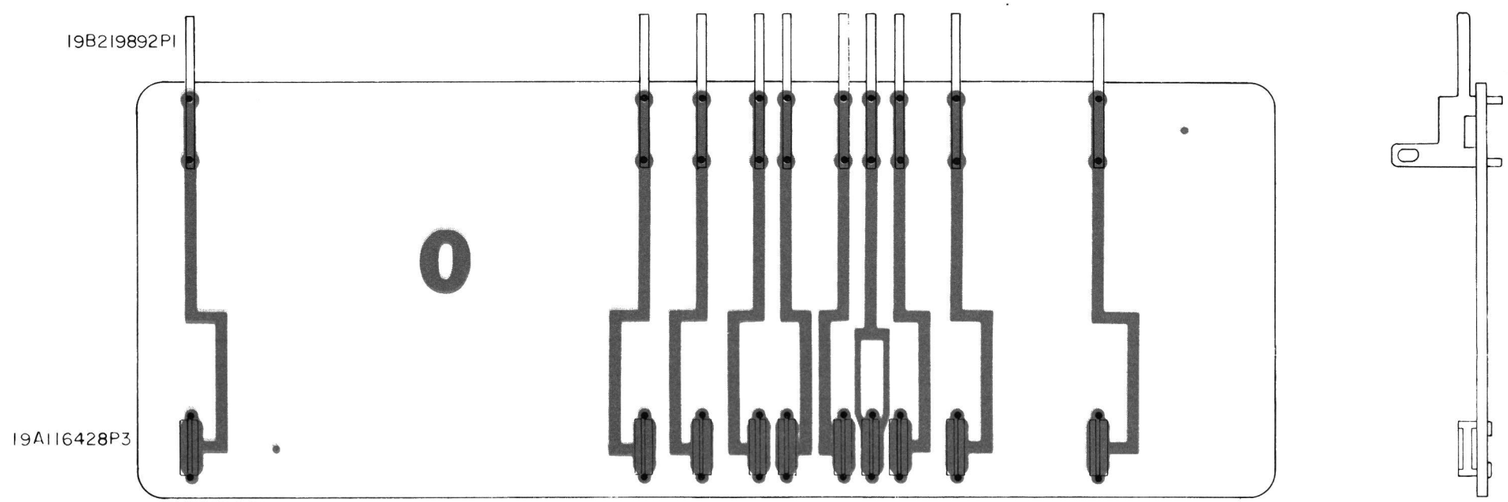
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

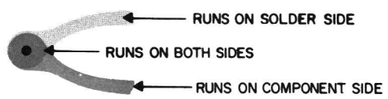
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

COMPONENT BOARD 19C320401G1

REV. A - To prevent indicator (LED) CR1703 from lighting due to presence of strong RF field.
Added C1704.



(19C321356, Rev. 0)
(19C320590, Sh. 2, Rev. 0)
(19C320590, Sh. 3, Rev. 0)



OUTLINE DIAGRAM

Control Unit Extender Board
19C320588G1

ORDERING SERVICE PARTS

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

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

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

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

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

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

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