MOBILE RADIO

MAINTENANCE MANUAL

DUAL CONTROL ASSEMBLY 19D417155G1

Maintenance Manual LBI4933C
DATAFILE FOLDER - DF4093

DUAL CONTROL ASSEMBLY 19D417155G1

SPECIFICATIONS *

DUAL CONTROL ASSEMBLY

Dimensions (H X W X D)	2-3/4" x 8-1/4" x 8-1/4"
Input Voltage	13.8 Volts DC
Regulated Voltages	5.0 Volts DC
	10.0 Volts DC
Current Drain	0.050 Amperes

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

GENERAL ELECTRIC

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ILLUSTRATIONS

WARNING

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

High-level RF energy in the transmitter Power Amplifier assembly can cause RF burns. KEEP AWAY FROM THESE CIRCUITS WHEN THE TRANSMITTER IS ENERGIZED!

DESCRIPTION

The General Electric Dual Control Assembly allows one radio (MASTR II or MASTR Executive II) to be operated by either of two remotely located control units. Compatible control units include the General Electric C-500, C-700, C-800, and C-900.

The Dual Control Assembly may be equipped to provide parallel or switched audio. When parallel operation is provided, the audio output power is divided between the front and rear speaker with one-half the full audio output available at each speaker. A magnetic switching relay, K1901, is required for switched audio.

When switched audio output power is available at the controlling station, the Dual Control Assembly with switched audio may be modified for parallel audio operation if desired. Refer to Installation section and to Schematic Diagram for details.

In C-500 and C-700 control unit applications, the Dual Control option is not compatible with other exclusive control unit operations such as Type 90 and Type 99 Tone Encode/Decode, Priority Search Lock Monitor, Internal/External Speaker, Squelch Operated Relay and the Public Address System.

The Dual Control Assembly contains a printed wire board (PWB) and three jacks to interconnect the radio with the two control units. All solid state components are used to provide maximum reliability. One integrated circuit (IC), wired as a flip-flop, is used to control the switching circuitry to transfer switched functions from one control unit to the other.

Three standard control cables are used to interconnect the Dual Control Assembly with the length and number of conductors of each cable determined by the users requirements. The two power control cables interconnecting the Dual Control Assembly with the control units must be a 30 or 38 conductor cable with a length of 9, 20, or 27 feet. A third cable interconnects the Dual Control Assembly with the radio. This cable may be 18, 30 or 38 conductor cable depending on the frequency capability of the radio. Refer to the appropriate Control Unit Maintenance Manual to identify the power control cables.

Since all DC voltages are either paralleled or switched, power may be applied to either control unit. Applying power to both control units is not necessary but will increase reliability.

All functions, switched and non-switched, are interconnected via the Dual Control Assembly. Operator functions such as volume and squelch control, PTT, control A- (frequency select), and receiver channel guard disable are transferred between control units. Other functions such as microphone leads, blanker disable, DC Converter Control, CAS and squelch disable are not switched but are connected in parallel to both control units.

OPERATION

When power is turned on initially control unit "A" assumes control. From then on control may be transfered between control units by depressing the momentary CONTROL switch on the control unit where control is desired. This operates the switching circuits, transfers control and turns on the control indicator. (A lighted indicator indicates control). Simultaneously, an identical indicator on the second control unit "B" is turned off. Full control of volume, squelch, Channel Guard monitoring, frequency selection, and PTT is available at the selected control unit. If the audio switching option is not present, audio is heard at both control units; otherwise, audio is heard only at the selected control unit. The power on/frequency indicator and channel busy indicator (when installed) operate simultaneously on both control units. The transmit indicator turns on at the selected control unit when the transmitter is keyed.

CIRCUIT ANALYSIS

References to symbol numbers mentioned in the following text may be found on the Block Diagram, Schematic Diagram, Outline Diagram or Parts List (see Table of Contents). Figure 1 is a block diagram of the Dual Control Assembly.

When power is first turned on capacitor C1904 momentarily holds pin 1 of FF U1901 at A- causing it to select control unit "A" and assume the state where pin 2 is at 5V and pin 4 is at A-. The 5V at pin 2 turns on the "A" control indicator driver transistor Q1915, enables "A" push-to-talk switch Q1918 and Q1919 and turns on "B" disable transistor Q1902. Q1902 applies A- to the "B" function switching network consisting of transistors Q1904 thru Q1908. These transistors open the switched circuits to control unit "B". A- on pin 4 of FF U1901 turns off "B" indicator driver Q1914 and disables "B" push-to-talk switch Q1916 and Q1917. A- is also applied to the base of "A" disable transistor Q1903, turning it off. With Q1903 off A- is removed from the "A" function switching network consisting of transistors Q1912 thru Q1916. These transistors now turn on due to the presence of a positive voltage from "A/B" en-

able transistor Q1901. All circuits to control unit "A" are now complete and all switched circuits to control unit "B" are open.

Transfer to Control Unit B

A static condition is provied by "A/B" enable transistor Q1901 which always provides a positve voltage to the function switching network for both control units. A- from "A" disable transistor Q1903 or "B" disable transistor Q1902 is always present at one function switching network and overrides the positive enable voltage to prevent both control units from being turned on simultaneously.

Pressing CONTROL switch S1701 on control unit "B" momentarily applies A- to FF U1901-3. The FF changes state so that 5V is present at U1901-4 and A- is present at U1901-2.

The positive voltage from U1901-4 is applied to the base of "A" disable transistor Q1903, "B" push-to-talk transistor switch Q1916 and Q1917 and to control indicator driver Q1914. "A" disable transistor Q1903 turns on and applies A- to control unit "A" function switching network transistors Q1909 thru Q1913 turning them off. This opens the frequency select (control A-), volume, squelch and receiver channel guard disable circuits to control unit "A", effectively removing it from control of the radio. "B" push-to-talk transistor switch Q1916 is now enabled. Simultaneously, indicator driver transistor Q1914 turns on and applies A+ to CONT indicator CR1701 in control unit "B" causing the indicator to light.

A- from U1901-2 is applied to "B" disable transistor Q1902, "A" push-to-talk transistor switch Q1918 and Q1919 and to control indicator driver Q1915. "B" disable transistor Q1902 turns off, removing A- from function switching transistors Q1904 thru Q1908. This allows the positive enable voltage from "A/B" enable transistor Q1901 to turn on function switching transistors Q1904 thru Q1908. This completes the circuit for frequency select (control A-), volume, squelch, and receiver Channel Guard disable functions to control unit "B". Push-to-talk transistor switch Q1918 and Q1919 is disabled, opening the PTT circuit to control unit "A". Simultaneously control indicator driver Q1915 turns off and removes A+ from the control indicator in control unit "A" causing it to go out. With this, the transfer of control from control unit "A" to control unit "B" is completed. The table below identifies each transistor in the Dual Control Assembly and the switched function(s) associated with it.

The switched functions are received from the radio via jacks J1902 and J1903, applied to the function switching networks and the PTT and the indicator driver circuits. When the CONT switch is momentarily pressed, the circuits for the switched functions are completed and control is transferred to control unit "A" via J1901 or to control unit "B" via J1904.

TABLE 2

SWITCHED FUNCTIONS		
SWITCHED FUNCTIONS	CONTROL UNIT A	CONTROL UNIT B
Frequency Select	Q1909	Q1908
Control Indicator	Q1915	Q1414
Push-to-Talk	Q1918, Q1919	Q1916, Q1917
Squelch Arm	Q1910	Q1904
Volume Squelch HI	Q1911	Q1906
Volume Arm	Q1912	Q1905
RX CG Disable	Q1913	Q1907

Non-switched functions are connected in parallel and are listed below:

TABLE 3

NON-SWITCHED FUNCTIONS	
Receiver Mute	Volume Squelch Lo
Mic Hi	Receiver PA In
Mic Lo	Speaker Lo
F1-F12	A+
Blanker Disable	A-
Ignition Switch	DC Converter Control
CAS	Squelch Disable
Speaker Hi	

Voltage Regulator

A voltage regulator consisting of VR1901 and VR1902 provide +10V to "A/B" enable transistor Q1901 and +5V to U1901 respectively.

FREQUENCY SELECT

Normally, the frequency select function is transferred automatically between control units "A" and "B" along with other switched functions; however, transfer of the frequency select function may be eliminated, if desirable. This is accomplished by the

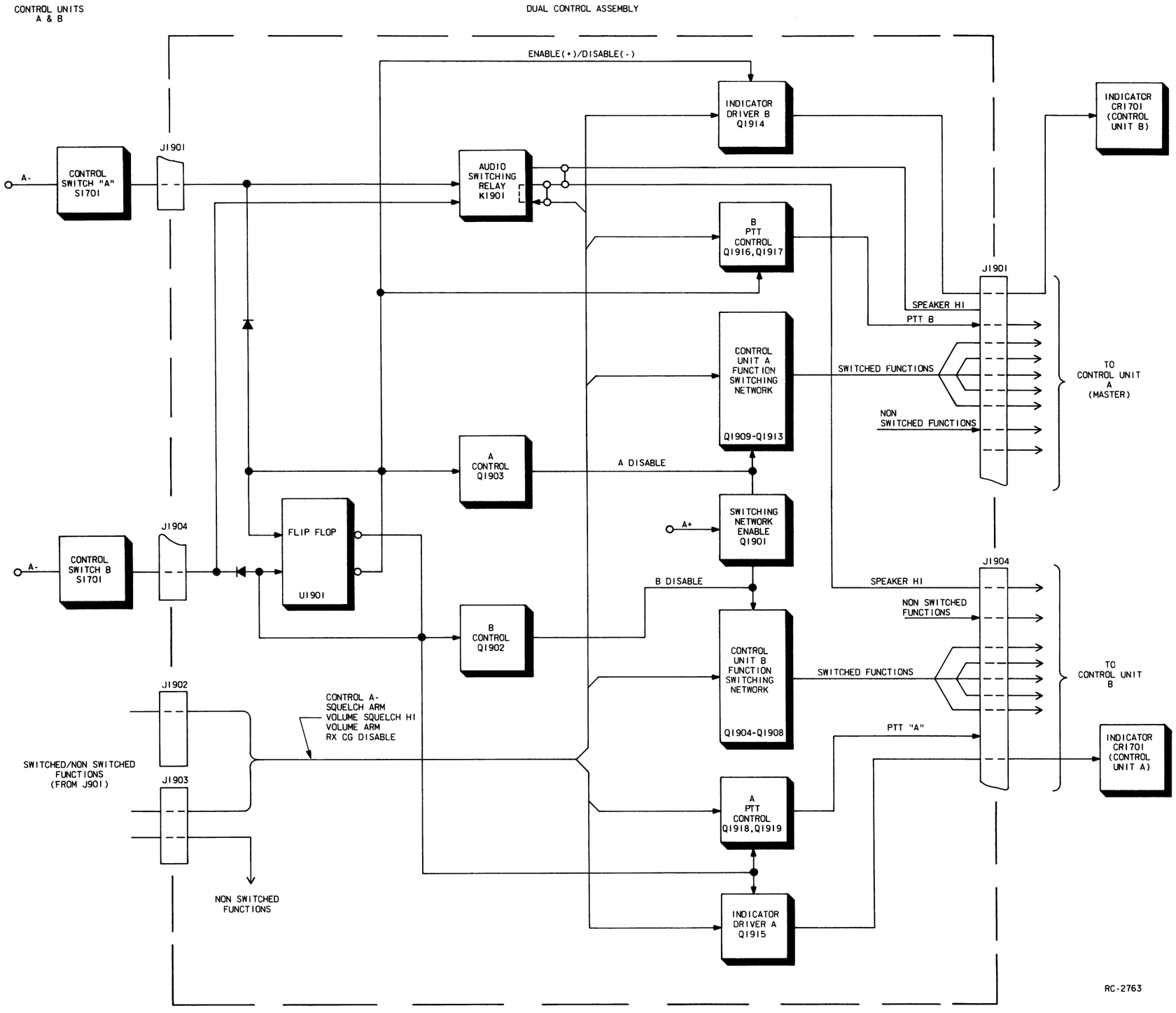


FIGURE 1 - BLOCK DIAGRAM

addition of two jumper wires connected between H16-H17 and H18-H19. These jumper wires short frequency select transistors Q1908 and Q1909.

CAUTION

With these jumpers connected control A- is applied to both control units, therefore, when single frequency control units are used the DA jumper wire connected between H9 and H10 must be removed. When an eight frequency control unit is used, the frequency select common lead from the frequency selector switch must be cut and the frequency selector switch locked in position 1. Refer to the control unit manual to locate the frequency select common lead and stop setting procedure.

AUDIO SWITCHING OPTION

The audio switching option includes a magnetic latching relay to permit switching audio between control units simultaneously with other switched functions. A negative pulse with a duration of 10 to 100 milliseconds is required to operate the relay. Momentarily pressing CONT switch S1701 on control unit "A" applies a negative pulse to the reset side of the relay. The relay operates and completes the speaker high circuit to control unit "A" while opening the circuit to control unit "B". Conversely, a negative pulse from CONT switch S1701 on control unit "B" applied to the "operate" coil of the magnetic latching relay will cause the relay to return to the alternate state and complete the speaker HI circuit to control unit "B" while opening the circuit to control unit "A".

NOTE

Jumpers connected between H1-H2 and H3-H4 are removed when the audio switching option is present. Conversely, they are connected for parallel audio.

MAINTENANCE

A troubleshooting chart is provided as an aid in isolating defective components. Since the Dual Control Assembly is a switching device, defectice components can quickly be isolated by determining which function or functions do not transfer. For example, if an entire bank of functions fail to transfer the FF would be suspect; if a parallel bank of functions fail to transfer, one of the primary control transistors Q1902 or Q1903 would be suspected. With the exception of the PTT circuit, all switched circuits are completed by individual transistors. The PTT circuit utilizes a separate control transistor to turn on a transistor switch to complete a circuit.

NOTE

If it becomes desirable to stop transferring a specific function remove that switching transistor from the circuit.

When troubleshooting the Dual Control Assembly always check the two regulated voltages: +5V at pin 14 of U1901 and +10V at the base of Q1901. There are no adjustments to be made on this assembly.

REMOVING INTEGRATED CIRCUITS

Removing IC's can easily be accomplished by using a de-soldering tool such as a SOLDA-PULLT® or equivalent. To remove an IC, heat each lead separately on the solder side and remove the old solder with the de-soldering tool.

An alternate method is to heat all pins simultaneously using a special soldering tip.

INSTALLATION

Field Installation of the Dual Control Assembly consists of modifying the existing control unit(s) as well as locating and mounting the Dual Control Assembly. For control units other than the C-500 Series, refer to the applicable Control Unit Maintenance Manual.

CONTROL UNIT MODIFICATION - C-500 SERIES

The following procedures modify the C-500 Series Control Unit by installing CONTROL switch S1701 and control indicator LED CR1701 in the control unit(s).

NOTE

This option is not compatible with other exclusive options such as Type 90 Encode/Decode, Priority Search Lock Monitor, Internal/External Speaker, Public Address system, Squelch Operated Relay and Type 99 Encoder/Decoder.

PROCEDURE

1. Remove the two screws on the bottom front edge of the control unit and remove the top cover.

2. Mount CONTROL switch S1701 in the space provided in the control unit. Position the switch as shown on the Outline Diagram. Secure the switch to the 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 X 1/4 inch Phillips head screw provided.

3. Position the LED indicator CR1701 in the rear option indicator slot of the

control unit housing and secure in place with the spring clip provided.

4. Connect the LED and CONTROL switch as shown on the Outline Diagram.

5. Remove the existing nameplate from the control unit top cover and install new nameplate NP270753P6 as follows:

   a. Viewing the control unit from the front, note that there are three of the plastic nameplate tabs which lock in place. These are the top left hand tab, the top right 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 and 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 is not used.

   d. Install the new nameplate.

6. Replace the top cover on the control unit and secure in position with the two screws previously removed.

7. Connect power leads to control unit as shown in control unit manual. Note: It is not necessary to provide power connections to both control units.

NOTE

The transmit power leads from the Dual Control Assembly to the two control units are not used (part of power/control cable). These leads should be taped out of the way in an inconspicuous place or cut off.

DUAL CONTROL ASSEMBLY

The Dual Control Assembly should be conveniently located between the two control units and the radio and where it is accessible for servicing.

Before determining the exact location of the Dual Control Assembly it is suggested that all cable runs be made. Be sure to leave enough slack in each cable to permit removal of the Dual Control Assembly for servicing. Use the cable straps and screws provided to secure the cables.

Try to route the cables away from locations where they would be exposed to heat, battery acid, sharp edges or mechanical damage or where they will be a nuisance to the driver, mechanics or passengers. Keep wiring away from ignition circuits to help prevent noise pickup in the radio equipment.

In addition, try to use existing holes and channels for cable runs. After running the cables and determining the exact location for the Dual Control Assembly proceed as follows:

1. Remove the three 6-32 retaining screws from the top cover and remove cover.

2. Remove two retaining screws securing cable retaining plate to Dual Control Assembly and remove cable retaining plate and rubber grommet.

3. Using the Dual Control Assembly as a template, mark the location for the four mounting holes. Refer to Figure 2.

4. Drill four holes marked above using a 3/16 inch drill.

5. Mount Dual Control Assembly using four tap screws provided. Use the washers and spacers to level the box to the mounting surface. Connect the two control unit cables to Dual Control Assembly as follows:

   Control Unit A - J1901
   Control Unit B - J1904

6. Connect power control cable from radio to J1903. Install rubber grommet and cable retaining plate removed in Step 2.

7. Replace cover.

8. Secure the two control unit cables, as necessary, using the eight nylon ties and screws provided.

Audio Switching Option

1. Remove the three 6-32 retaining screws from the top cover of the Dual Control Assembly and remove cover.

2. Install the audio switching relay and retainer strap.

3. Cut or remove DA jumper wire between H1-H2 and H3-H4. Refer to Outline Diagram for jumper location. NOTE: These jumpers are used in parallel audio applications only.

4. Replace top cover.

SYMPTOM	PROBABLE CAUSE
1. All switched functions fail to transfer. Control remains with previously selected control unit.	U1901, S1701 NOTE: Always check VR1902 when replacing U1901.
2. Switched functions (*) fail to transfer from "A" to "B" and are no longer controlled by "A". "B" indicator on; "A" indicator out.	Q1902 shorted (emitter to collector).
3. Same as above except functions fail to transfer from "B" to "A".	Q1903 shorted (emitter to collector).
4. "A" retains control of switched functions*.	Q1903 open.
5. "B" retains control of switched functions*.	Q1902 open.
6. "A" PTT switch always operates.	Q1918 shorted.
7. "B" PTT switch always operates.	Q1916 shorted.
8. Switched functions (*) do not operate for either control unit.	Q1901 open, VR1901 shorted.
9. Audio does not switch or reset.	K1901.
10. Control unit "A" indicator does not operate.	CR1701, Q1915.
11. Control unit "B" indicator does not operate.	CR1701, Q1914.

* Volume, Squelch, Frequency Select, RX CG Disable

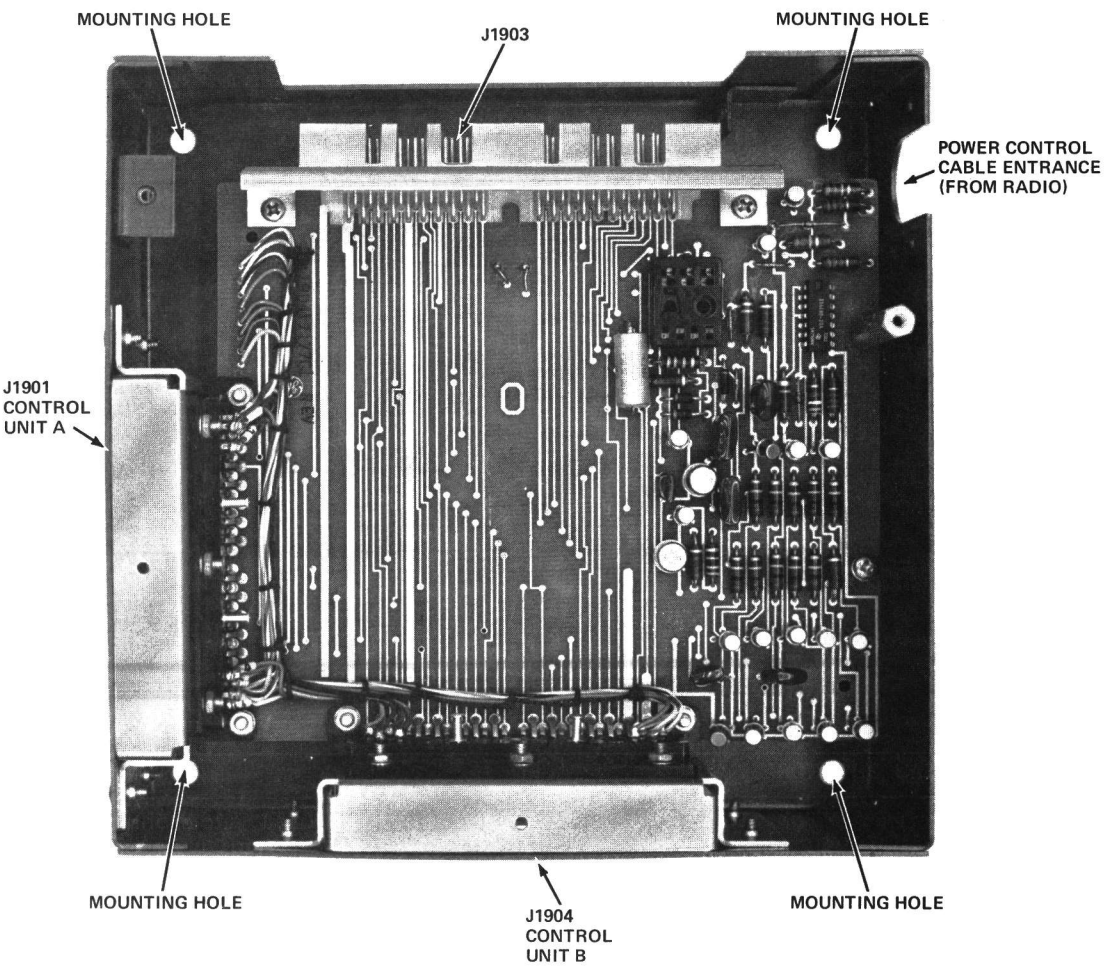
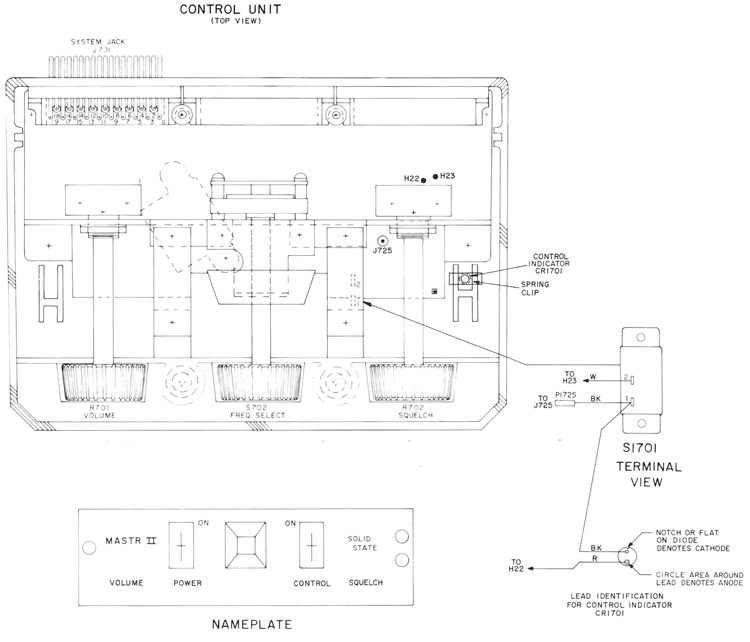
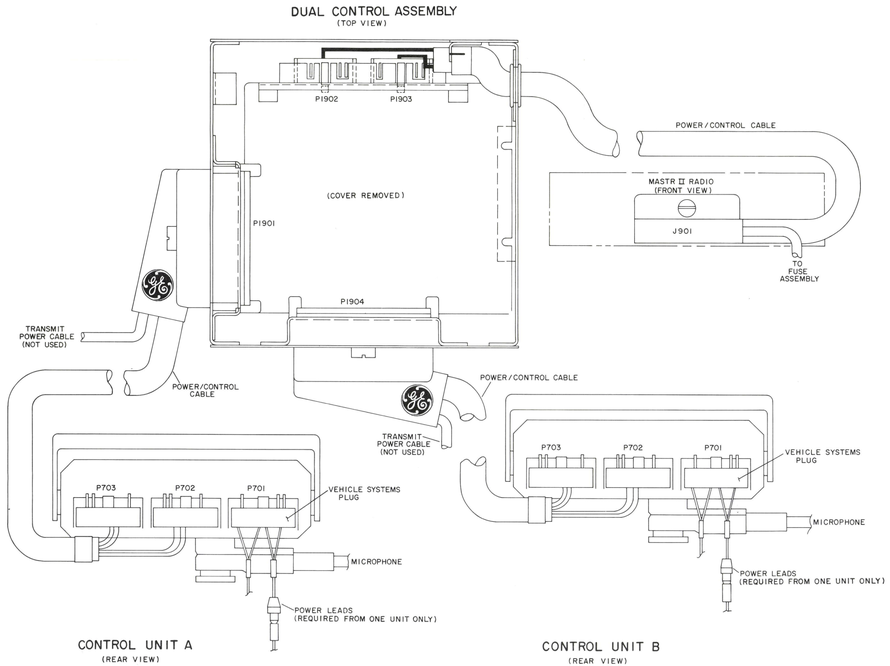
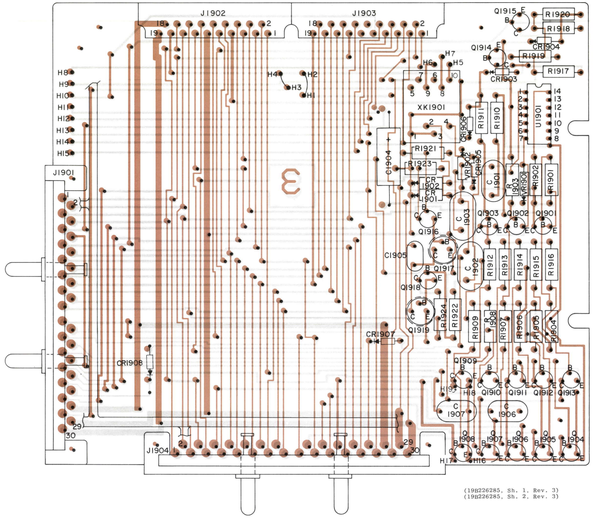


 Figure 2 - Dual Control Assembly





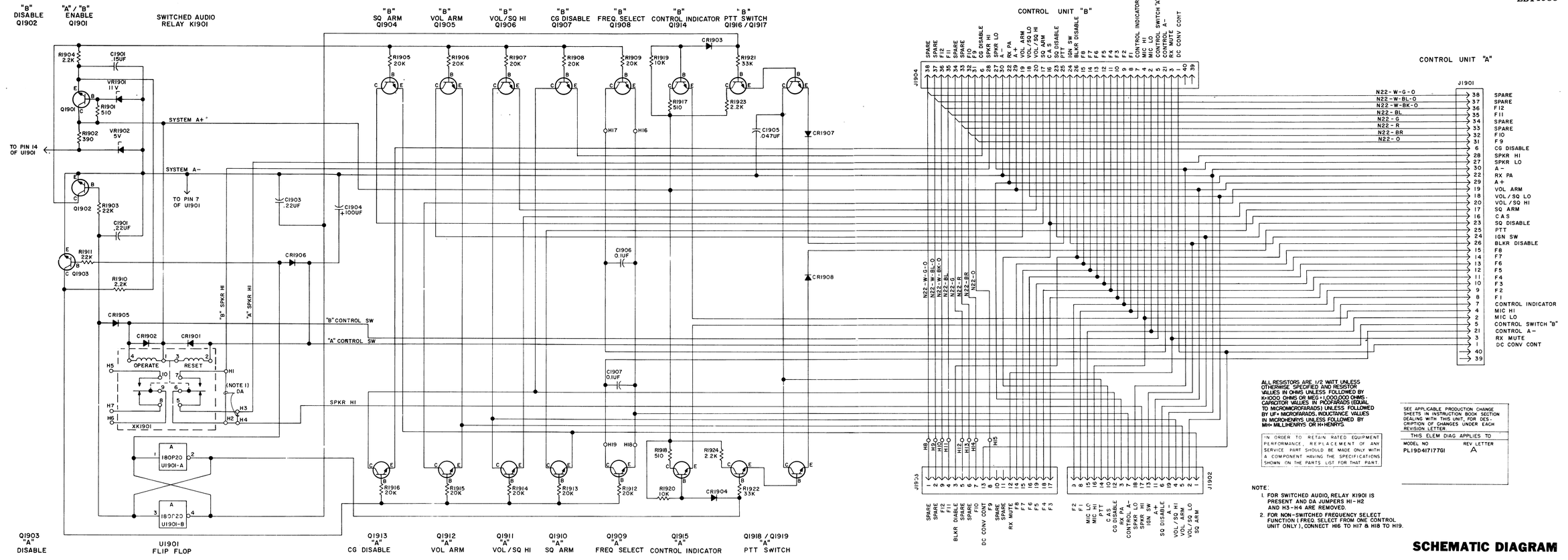


(19B226285, Sh. 1, Rev. 3)
(19B226285, Sh. 2, Rev. 3)

(19B622184, Rev. 3)

OUTLINE DIAGRAM

DUAL CONTROL ASSEMBLY



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

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

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
PLI9041717G1	A

NOTE:
1. FOR SWITCHED AUDIO, RELAY K1901 IS PRESENT AND DA JUMPERS H1-H2 AND H3-H4 ARE REMOVED.
2. FOR NON-SWITCHED FREQUENCY SELECT FUNCTION (FREQ. SELECT FROM ONE CONTROL UNIT ONLY), CONNECT H16 TO H17 & H18 TO H19.

SCHEMATIC DIAGRAM

DUAL CONTROL ASSEMBLY

Issue 3

(19R621987, Rev. 5)

PARTS LIST

LBI4934C

DUAL CONTROL ASSEMBLY 19D417155G1
AND
CONTROL UNIT MODIFICATION KIT 19A129567G8

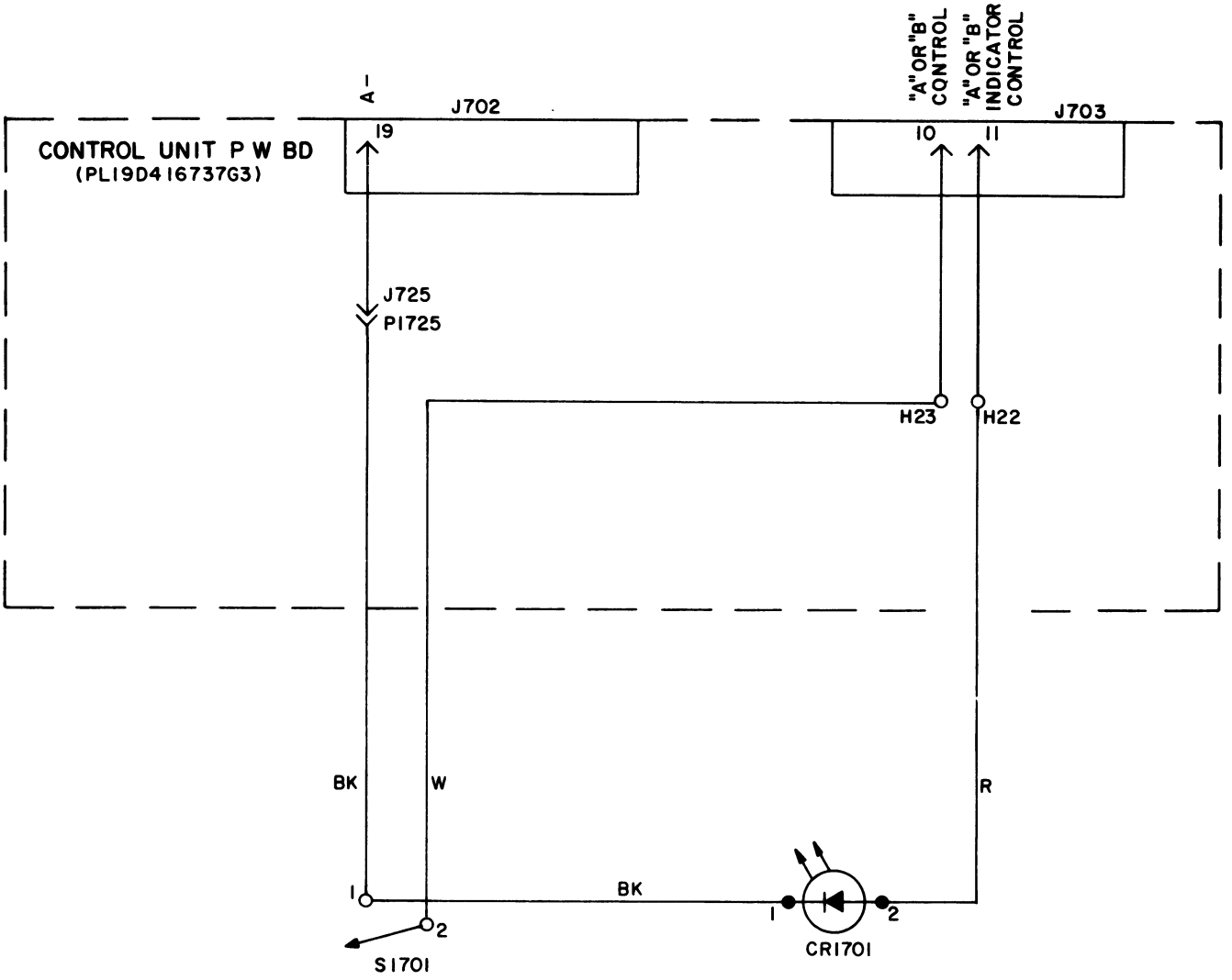
SYMBOL	GE PART NO.	DESCRIPTION
		DUAL CONTOL ASSEMBLY 19D417155G1
		COMPONENT BOARD 19D417177G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1901	19A116080P8	Polyester: 0.15 µf ±20%, 50 VDCW.
C1902 and C1903	19A116080P9	Polyester: 0.22 µf ±20%, 50 VDCW.
C1904	5496267P16	Tantalum: 100 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C1905	19A116080P105	Polyester: 0.047 µf ±10%, 50 VDCW.
C1906 and C1907	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1901 and CR1902	4037822P21	Silicon, 1000 mA, 400 PIV.
CR1903 thru CR1906	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
CR1907* and CR1908*	4037822P21	Silicon, 1000 mA, 400 PIV. Added by REV A.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1901	19D416398G2	Connector. Includes:
	19A116669P1	Contact, electrical; sim to Malco 2262.
J1902 and J1903	19C320257P2	Connector, printed wiring-two part.
J1904	19D416398G2	Connector. Includes:
	19A116669P1	Contact, electrical; sim to Malco 2262.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1901 thru Q1916	19A115720P1	Silicon, NPN; sim to Type 2N2222.
Q1917	19A115300P2	Silicon, NPN; sim to Type 2N3053.
Q1918	19A115720P1	Silicon, NPN; sim to Type 2N2222.
Q1919	19A115100P2	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1901	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R1902	7R77P391J	Composition: 390 ohms ±5%, 1/2 w.
R1903	3R77P223K	Composition: 22K ohms ±10%, 1/2 w.
R1904	3R77P222K	Composition: 2.2K ohms ±10%, 1/2 w.
R1905 thru R1909	3R77P203J	Composition: 20K ohms ±5%, 1/2 w.
R1910	3R77P222K	Composition: 2.2K ohms ±10%, 1/2 w.
R1911	3R77P223K	Composition: 22K ohms ±10%, 1/2 w.
R1912 thru R1916	3R77P203J	Composition: 20K ohms ±5%, 1/2 w.
R1917 and R1918	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R1919 and R1920	3R77P103K	Composition: 10K ohms ±10%, 1/2 w.
R1921 and R1922	3R77P333K	Composition: 33K ohms ±10%, 1/2 w.
R1923 and R1924	3R77P222K	Composition: 2.2K ohms ±10%, 1/2 w.
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
U1901	19A116180P20	Digital, Hex Inverter: Identification No. 7404.
		- - - - - - - VOLTAGE REGULATORS - - - - - - -
VR1901	4036887P8	Zener: 500 mW, 11.0 v. nominal.
VR1902	4036887P56	Zener: 500 mW, 5.0 v. nominal.
		- - - - - - - - - - SOCKETS - - - - - - - - -
XK1901	5491595P6	Relay: 10 contacts; sim to Allied Control 30054-3.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	4036555P1	Insulator, washer: nylon. (Used with Q1917, Q1919).
	19B219394P1	Contact. (Used with J1901, J1904).
	7109043P1	Retaining ring. (Used with J1901, J1904 contact).
	19C320610P1	Polarity tab. (Used with J1902, J1903).
	19C320609P1	Top cover.
	19A129772G1	Support. (Mounts J1901, J1904).
	19B201074P305	Tap screw, Phillips POZIDRIV®: No. 6-32 x 5/16. (Secures J1901, J1904 supports).
		CONTROL UNIT MODIFICATION KIT 19A129567G8
		SWITCH ASSEMBLY 19A129790G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1701	19A134354P5	Diode, optoelectronic: red; sim to Hewlett-Packard 5032-4693.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1725	4029840P2	Contact, electrical: sim to Amp 42827-2.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1701	19A116622P7	Push: SPST (spring return), normally open, 3 amp at VAC or 0.5 amp VDC at 125 v; sim to Switchcraft 11K1042.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B201074P204	Tap screw, Phillips POZIDRIV®: No. 4-40 x 1/4. (Secures S1701).
	N117P9004C6	Tap screw, phillips: No. 4-40 x 1/4. (Secures S1701).
	19A116807P1	Clip, spring tension. (Secures CR1701).
	NP270753P6	Nameplate, plastic. (FUNCTION).
		ASSOCIATED ASSEMBLIES
		RELAY KIT 19A130103G1
	19B209487P1	Relay, enclosed: 13.6 VDC nominal operating, 134 ohms ±10%, 2 form C contact; sim to Allied Control T351-2-34.
	549159SP8	Retainer: spring; sim to Allied Control 30040-1.
		POWER/CONTROL CABLE 38 CONDUCTOR 19D423424G14
		- - - - - - - - - - PLUGS - - - - - - - - - -
P702		Connector. Includes:
	19B226516P1	Shell.
	19A116781P5	Contact, electrical: wire size No. 18-24 AWG; sim to Molex 08-50-0106. (Quantity 4).
	19A116781P6	Contact, electrical: wire size No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 15).
P703		Connector. Includes:
	19B226516P2	Shell.
	19A116781P6	Contact, electrical: wire size No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 19).
P901		Connector, special purpose. Includes:
	19C307162P1	Shell.
	19A134240P1	Contact, electrical: sim to AMP 350657-1. (Quantity 34).
	19A134240P2	Contact, electrical: sim to AMP 350656-1. (Quantity 4).
	19A134240P3	Contact, electrical: sim to AMP 350655-1. (Quantity 2).
	19A134241P1	Jackscrew.
	7139880P16	Cable: 38 conductor, 20 feet.
	7142878G1	Clip loop (strain relief).
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	5490407P17	Grommet, rubber. (Insulate cable holes in firewall).
	N130P2410C6	Tap screw: No. 1/4-14 x 5/8. (Mounts Control Box-short screw).
	N130P2416C6	Tap screw: No. 1/4-14 x 1. (Mounts Control Box-long screw).
	7150186P407	Spacer. (Levels Control Box to floor or wall).
	N402P71C13	Flatwasher, steel. (Levels Control Box to floor or wall).
	19A115185P1	Retaining strap. (Secures control cables to vehicle).
	N130P1412C6	Tap screw: No. 8-18 x 3/4. (Secures control cables to vehicle).
	19A130781G1	Cable. (Spare wire & terminal).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PRODUCTION CHANGES

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

REV. A - To prevent the transmit LED from lighting on the control unit that is not keyed. Added CR1907 and CR1908.



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.

(19C320622, Rev. 1)

INTERCONNECTION DIAGRAM

DUAL CONTROL UNIT

DUAL CONTROL WITH ONE PSLM OPTION
C800/C900 CONTROL UNIT

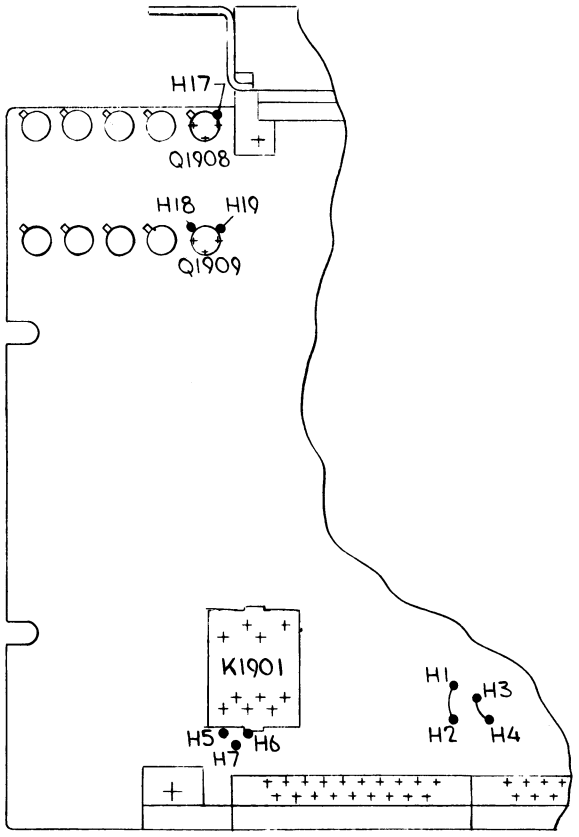


FIG. 1

THIS MODIFICATION IS APPLIED TO THE DUAL CONTROL JUNCTION BOX 19D417155G1 TO ALLOW PROPER OPERATION (MODIFIES CONTROL A-) WITH ONE PSLM OPTION MODULE IN A DUAL CONTROL SYSTEM. CONTROL A- WILL BE SWITCHED BY K1901 CONTACTS INSTEAD OF Q1908 AND Q1909. IF THE JUNCTION BOX IS NOT SET UP FOR SWITCHED AUDIO, THEN RELAY KIT 19A130103G1 WILL BE REQUIRED.

INSTRUCTIONS:

REMOVE THE TOP COVER FROM THE JUNCTION BOX AND PERFORM THE FOLLOWING FUNCTIONS:
(REFER TO FIG. 1 FOR COMPONENT AND HOLE LOCATIONS).

1. REMOVE Q1908 AND Q1909 BY CLIPPING LEADS.
2. MAKE THE FOLLOWING CONNECTIONS USING #22 OR #24 HOOKUP WIRE.
   - H5 TO H17
   - H6 TO H18
   - H7 TO H19
3. PLUG IN RELAY (K1901) IF NOT PRESENT AND SECURE WITH MOUNTING CLIP.
4. IF SWITCHED SPEAKER AUDIO IS DESIRED, REMOVE THE FOLLOWING JUMPERS BETWEEN:
   - H1 AND H2
   - H3 AND H4

(19B232292, Rev. 0)

MODIFICATION INSTRUCTIONS

PSLM