communications

MAINTENANCE MANUAL

General Electric
Universal Selective - Calling Decoders
Models 4EJ12A10-A13

LBI-3495B
DF-5021

10304

COMMUNICATION PRODUCTS DEPARTMENT

GENERAL ELECTRIC

LYNCHBURG, VIRGINIA

PRINTED IN U.S.A.

GENERAL ELECTRIC
UNIVERSAL SELECTIVE-CALLING DECODERS

SPECIFICATIONS

General

DC Version: Approximately 3-inches high x 6-1/4-inches wide x 4-inches long. Weight: 1-1/2 pounds.

AC Version: Approximately 3-3/8-inches high x 6-1/4-inches wide x 7-11/32-inches long. Weight: 4-1/4 pounds.

Power Input Requirements

DC Version: 10.8 to 16.3 volts DC.

AC Version: 105.3 to 128.7 (117 ±10%) volts AC, 50/60 cps.

Idling current of DC version with nominal car battery of 13.6 VDC: approximately 22 ma.

With a call being received, relay K1402 locked-up and CALL lamp on, current drain of DC version with nominal car battery of 13.6 VDC: approximately 250 ma.

Power required for AC version at 117 VAC, 60 cps: approximately 13 watts.

Tone Input Requirements

Decoders will operate with a tone input from 20 millivolts to 6 volts, rms.

Temperature Range

-30°C to +60°C.

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TABLE OF CONTENTS

EQUIPMENT INDEX

DC Decoder (2-reeds)	Model 4EJ12A10
DC Decoder (4-reeds)	Model 4EJ12A11
AC Decoder (2-reeds)	Model 4EJ12A12
AC Decoder (4-reeds)	Model 4EJ12A13
Mounting Bracket (for DC Decoders)	4035674-P2
Mounting Support (for AC Decoders)	19B204707-P1
Housing (for DC Decoders)	PL-19A121600-G1
Housing (for AC Decoders)	PL-19A121600-G2
Mounting Hardware Kit	PL-19A121488-G1 or G2
Hookswitch Modification Kit (Option 4092)	PL-19A121571-G1
Buzzer and Relay Modification Kit (Option 4091)	PL-19A121579-G1
Buzzer (Part of Option 4091)	PL-19A121580-G1
Relay (Part of Option 4091)	19C300957-P2
Relay Spring (Part of Option 4091)	5491595-P9
Application Kits	
Progress Line Mobile Front Mount (Option 4922)	PL-19A121863-G1
Progress Line Mobile Trunk Mount (Option 4921)	PL-19A121840-G1
Progress Line Table Stations (Option 4923)	PL-19A121855-G1
Progress Line DO Station (Option 4932)	PL-19A121914-G1
TPL Front Mount (Option 4924)	PL-19A121841-G1
TPL Split Mount (Option 4925)	PL-19A121845-G1
G-E Pacer Mobile (Option 4928)	PL-19A121861-G1
G-E Pacer Station (Option 4931)	PL-19A121903-G1
Accent 450 Mobile (Option 4926)	PL-19A121874-G1
Accent 450 Station (Option 4927)	PL-19A121864-G1
RC4 (4EC28A1) (Option 4933)	PL-19A121908-G1
MASTR Application Kit (Option 7711)	PL-19B204996-G1

GENERAL ELECTRIC
UNIVERSAL SELECTIVE-CALLING DECODERS
MODELS 4EJ12A10-A13

INSTRUCTIONS

The General Electric Universal Selective-Calling Decoders provide a unit for use with virtually any make or model of 12-volt mobile radio or 117-VAC station receiver. The decoders will respond to most tone dispatchers generating two-tone sequential signaling. These include the General Electric 100 and 900 Call Dispatchers (Models 4EC51A11 and 4EC51A12), the General Electric Command Terminal and Dial-Paging Terminal.

Two models of the decoders (4EJ12A10 and A11) are designed for installation in 12-VDC mobile combinations. Models 4EJ12A12 and A13 are designed for use with 117-volt station installations. Models 4EJ12A10 and A12 are two-reed decoders, permitting individual call only. Models 4EJ12A11 and A13 are four-reed decoders, permitting individual call and group call or all call. A jumper added to the four-reed decoders permits individual call, group call AND all call.

The basic decoder is supplied with one output relay (K1401). This relay locks-up when operated, turning on the CALL lamp on the front panel of the decoder. An extra set of contacts on this relay permit operating an external alarm when desired. A RESET button on the front panel will unlock the relay when the button is depressed. This relay may also be connected for timed operation (3 to 5 seconds). The dry contacts on the relay are compatible with either positive or negative ground systems.

An additional relay (K1402; see Installation Instruction RC-1091) may be provided when both timed and locked operation is desired. This relay simply plugs into a socket provided on the circuit board of the decoder. A hookswitch (See RC-1090) may be used with a military microphone to provide off-hook monitoring and reset. A buzzer is available (Option 4091; see Installation Instruction RC-1091) which may be activated by the timed relay when a call is received. No provision is made for monitoring base station installations when speaker muting is used.

OPERATION

When a signal modulated by the proper sequential tone coding is received, the CALL lamp on the front panel of the decoder is illuminated. This lamp normally remains on until the RESET button is depressed. The external alarm is actuated and may be timed for 3 to 5 seconds or locked on until the RESET button is operated. If a hookswitch is provided, the operation of the CALL lamp and external alarm may be controlled by the hookswitch, by the RESET button or both, depending on the option used. (See Option Chart on Service Sheet RC-1092). The LIGHT-OFF-HORN switch position determines which external alarm is operated.

INSTALLATION

Instructions for installing the decoders are provided on RC-1088. An Option Chart (19B204844) is provided on Service Sheet RC-1092, giving the jumper connections required for the basic installation and the available options. Modification Instructions for installing the Application Kits in field installations are given on RC-1149 thru 1152. Installation instructions for PL-19C303571-G1 Hookswitch are given on RC-1090 and for PL-19A121579-G1 Buzzer and Relay Kit on RC-1091. RC-1202 provides instructions for MASTR mobile applications and MASTR Desk Mate Application Kit PL-19B204996-G1.

CIRCUIT DESCRIPTION

Audio from the output transformer of the mobile or station receiver is passed through T1401 (which provides DC isolation and voltage gain between the receiver output and the input circuit of the decoder) to a pair of clipping diodes CR1404 and CR1405. These diodes limit the input to the reed drive amplifiers (Q1401 and Q1402) to approximately 300 millivolts. A Zener regulator (CR1406) holds the supply voltage constant to the amplifier. Thus a constant drive voltage is applied across the reeds. If speaker muting is employed, the radio receiver output transformer is loaded by R1401 when the speaker is disconnected from the transformer.

When the first tone of a two-tone sequential call is received, reed FL1401 responds. The reed is an electromechanical device resonant only to the desired first tone of the selective-calling code. The contacts of FL1401 close, charging C1401 from the positive supply voltage through R1403.

When the second tone is received, reed FL1402 responds. The reed contacts close, permitting the current from C1401 to charge C1402 through R1405. As the voltage rises across C1402, current flows from the capacitor through CR1401, R1407 and through the base-emitter junction of Q1403. When Q1403 conducts, a heavy base current flows in the base-emitter junction of Q1404. This current overcomes the back-bias provided by CR1403, CR1409 and R1428, permitting Q1404 to conduct. The resulting collector current of Q1404 operates relay K1401.

K1401 normally locks up through its own contacts 9 and 10. K1401 contacts 12 and 13 close to turn on CALL lamp DS1401. RESET switch S1402 must be depressed momentarily to unlock K1401. If the PL-19C303571-G1 Hookswitch is used, K1401 may be locked-up under the control of the hookswitch, S1402 or both.

K1401 may also be timed for a 3 to 5 second interval. In this case, C1404 discharges into the base of Q1403 through R1411. Q1403 conducts, causing Q1404 to conduct for the timing period.

If K1402 is used, contacts 15 and 16 of K1401 close the path to K1402, permitting this relay to operate. K1402 is always wired for locked operation. K1401 will always be wired for timed operation under these conditions. K1402 may be locked under the control of S1402, the hookswitch or both.

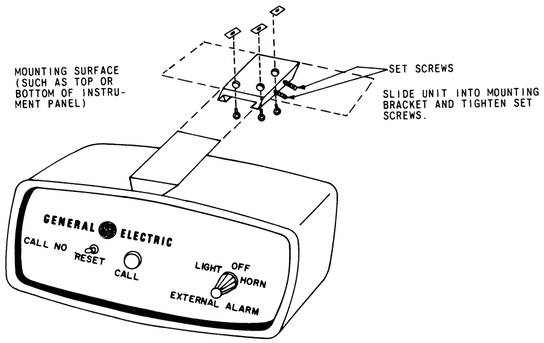
Switch S1401 determines which external alarm will be operated. Contacts on K1401, K1402 or both may be used for external alarm, depending on jumper connections. Refer to the Option Chart 19B204844 to determine the connections used. A momentary closure is used for external horn while a locked closure is used for external light.

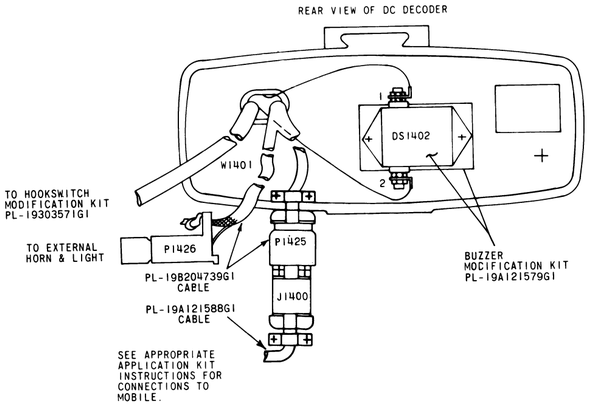
Models 4EJ12A12 and A13 contain the AC power supply. A full-wave bridge (CR501-CR504) rectifies the 117-volts AC applied across T501. Filtering is accomplished by the dual-section capacitor (C501) and R501. Zener diode CR505 provides a regulated 11-volts DC at the output terminals. An unregulated tap at R501-2 provides 15-VDC for operating the CALL lamp, buzzer and K1402.

MOBILE DECODER MODELS 4EJ12A10 & A11

MOBILE DECODER INSTALLATION

DRILL MOUNTING HOLES WITH A #36(7/64-INCH) DRILL. ATTACH BRACKET TO MOUNTING SURFACE WITH THREE #6 SELF-TAPPING SCREWS AND SPEED NUTS.



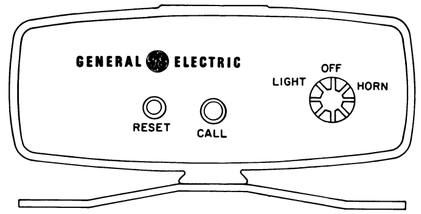


STATION DECODER MODELS 4EJ12A12 & A13

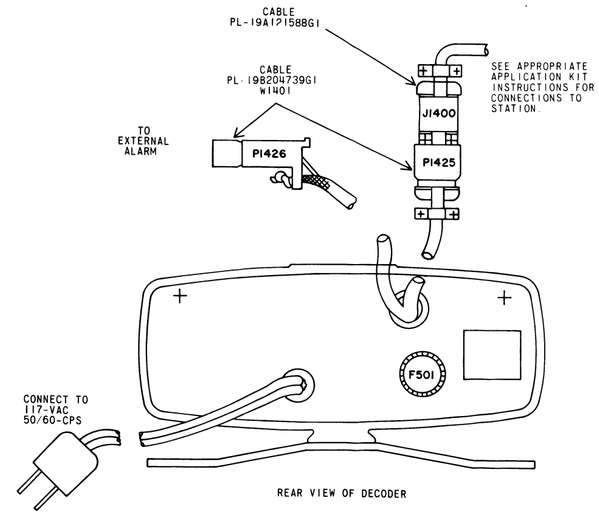
AC DECODER INSTALLATION

LOCATE THE DECODER IN A POSITION CONVENIENT TO THE OPERATOR.

CONNECT THE AC POWER PLUG TO A 117 VAC. 50 60 CPS SOURCE



FRONT VIEW OF DECODER



REAR VIEW OF DECODER

5214

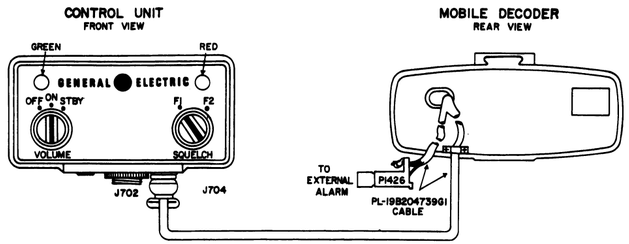
Installation Diagram

UNIVERSAL SELECTIVE-CALLING DECODERS MODELS 4EJ12A10-A13

(RC-1088A)

MASTR APPLICATIONS

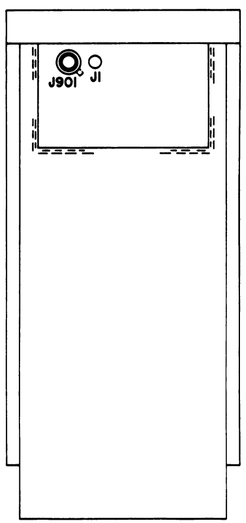
MOBILE APPLICATION

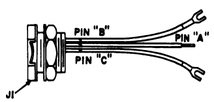


CONNECT PL19B204739G1 CABLE TO TONE SELECTIVE CALL JACK J704 ON MASTR CONTROL UNIT.

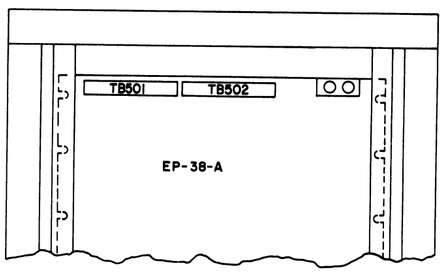
DESK-MATE APPLICATION KIT PL19B204996G1

REAR VIEW OF DESK-MATE





SIDE VIEW OF DESK-MATE



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 SELECTIVE-CALLING CABLE PL19B204739G1 TO J1.

RC-1202

10304

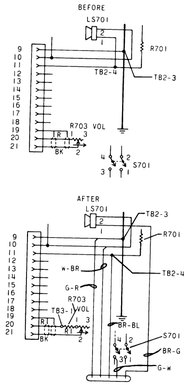
Installation Instructions

UNIVERSAL SELECTIVE-CALLING APPLICATION KITS FOR MASTR

(RC-1202)

MOBILE APPLICATION KITS

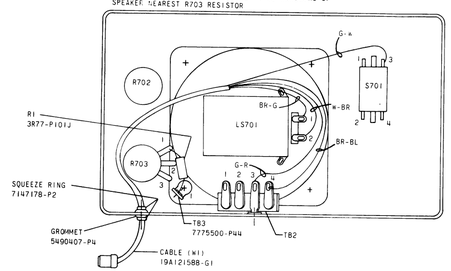
FRONT-MOUNT APPLICATION KIT
PL-19A121863-G1
(MODEL 4EC29A2 CONTROL UNIT)



STEP 1: REMOVE EXISTING GROMMET FROM HOLE JUST BEHIND POWER CABLE HOLE ON CONTROL UNIT. ASSEMBLE GROMMET FROM KIT INTO THIS HOLE AND INSERT CABLE (W1) 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.

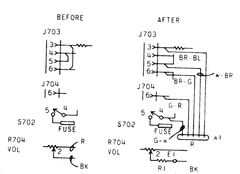
STEP 3: ASSEMBLE TB3 TO SPEAKER, USING 4-40 HARDWARE OF SPEAKER NEAREST R703 RESISTOR



STEP 4: UNSOLDER RED WIRE AT R703-1 AND SOLDER TO TB3-1. SOLDER R1 (100Ω) FROM TB3-1 TO R703-1. REMOVE BLACK WIRE BETWEEN TB2-4 & LS701-1.

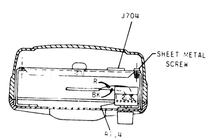
STEP 5: SOLDER ALL WIRES FROM CABLE W1 AND MAKE ALL OTHER CONNECTIONS AS SHOWN IN DIAGRAM AT LEFT.

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

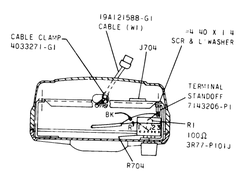


STEP 1: REMOVE SHEET METAL SCREW NEAREST J704-3, USING #4-40 X 1/4 SCREW & LOCKWASHER MOUNT TERMINAL STANDOFF IN HOLE VACATED BY SHEET METAL SCREW.

STEP 2: UNSOLDER BLACK WIRE FROM TERMINAL 2 OF R704 AND SOLDER TO TERMINAL STANDOFF. SOLDER R1 (100Ω) 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.

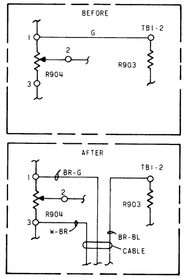


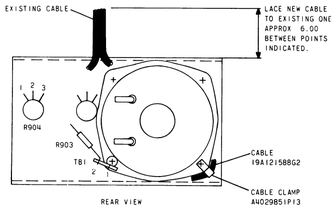
STEP 4: REMOVE JUMPER WIRE BETWEEN J703-3 & J703-6 AND SOLDER WIRES FROM #1 AS SHOWN IN DIAGRAM AT LEFT.

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.

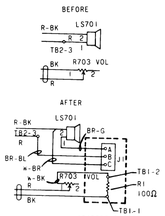


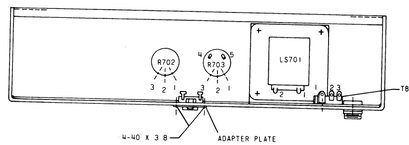


STEP 2: SOLDER CONNECTIONS AS FOLLOWS (SEE DIAGRAM AT LEFT)
BR-G WIRE TO R904-1
BR-BL WIRE TO TB1-2
W-BR WIRE TO R904-3
REMOVE GREEN WIRE BETWEEN R904-1 & TB1-2.

TI STATION APPLICATION KIT
PL-19A121855-G1
(MODEL 4EC39AIO 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.

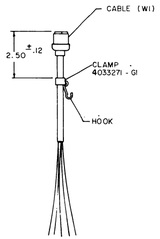
Installation Instructions

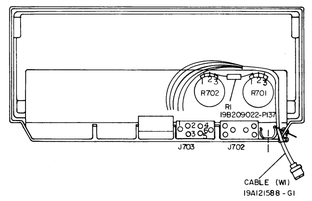
UNIVERSAL SELECTIVE CALL APPLICATION KITS FOR PROGRESS LINE

(RC-1150)

5184

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





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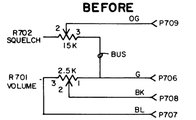

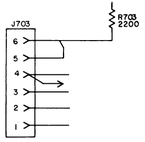

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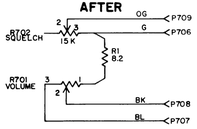
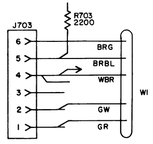




STEP 1: PREPARE CABLE (W1) BY ASSEMBLING CLAMP TO IT AS SHOWN.

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

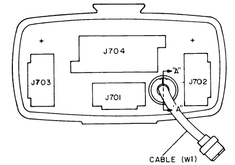
STEP 3: ROUTE CABLE AROUND R701 & R702 AS INDICATED AND SOLDER WIRES TO J703 AS SHOWN BY WIRING DIAGRAM.

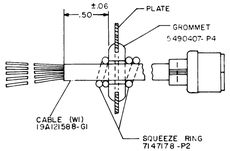
STEP 4: REMOVE JUMPER BETWEEN R701-1 & R702-3 AND TRANSFER GREEN WIRE FROM R701-1 TO R702-3. SOLDER RI (8.2 Ω) FROM R701-1 TO R702-3.

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.

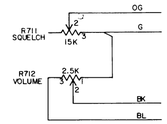
TPL TRUCK - MOUNT APPLICATION KIT
PL-19A121845 - G1

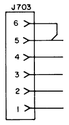




SECTION "A-A" * (ENLARGED)

BEFORE





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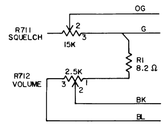
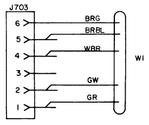




STEP 1: REMOVE PLUG BUTTON FROM HOLE (WHERE CABLE IS NOW SHOWN) AND DISCARD. PLACE GROMMET IN HOLE VACATED BY BUTTON. INSERT CABLE THROUGH GROMMET AND ATTACH SQUEEZE RINGS FOR MINIMUM PLAY ON EITHER SIDE OF GROMMET. OVERLAY ENDS OF RINGS TO INSURE TIGHT FIT.

STEP 2: REMOVE JUMP WIRE BETWEEN R711-3 & R712-1 AND SOLDER RI (8.2 Ω) RESISTOR IN ITS PLACE AS SHOWN IN WRING 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
UNIVERSAL SELECTIVE CALL APPLICATION KITS FOR TRANSISTORIZED PROGRESS LINE

RC-1151

5214

Installation Instructions

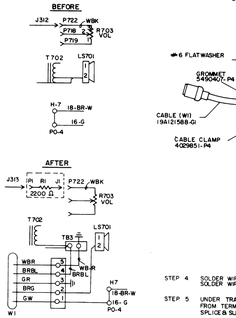
UNIVERSAL SELECTIVE-CALLING APPLICATION KITS FOR TPL

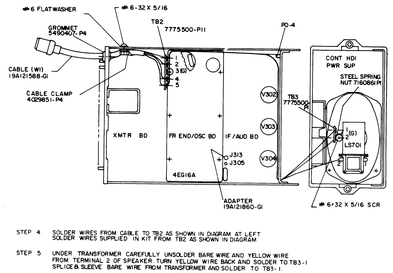
(RC-1151)

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.

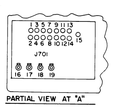
STEP 2. PLACE STEEL SPRING NUT ON LUG OF SPEAKER LS701 AND MOUNT TB3 TO LUG WITH 6-32 HARDWARE AS SHOWN

STEP 3 ASSEMBLE GROMMET 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

ACCENT 450 MOBILE APPLICATION KIT
PL-19A121874-G1



PARTIAL VIEW AT "A"

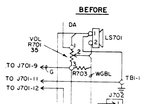
STEP 1 UNSOLDER ALL WIRES FROM J702 AND REMOVE JACK FROM CONTROL UNIT ASSEMBLE ADAPTER PLATE (G1) IN PLACE OF J702 USING #4-40 HARDWARE AS SHOWN.

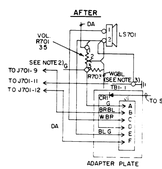
STEP 2 UNSOLDER GREEN WIRE FROM J701-9 AND TAPE BACK

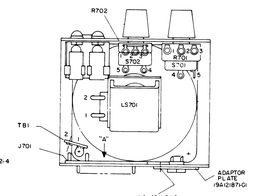
STEP 3 UNSOLDER WG-BL WIRE FROM R701-2 AND TAPE BACK

STEP 4 SOLDER DIODE (CR1) BETWEEN ADAPTER PLATE & ST02-4

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

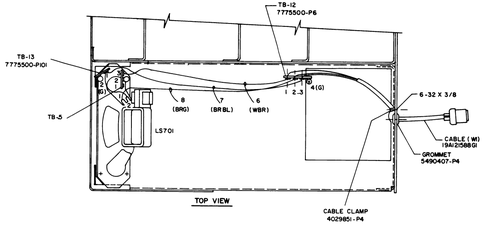




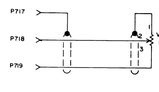


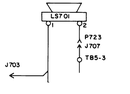
STATION APPLICATION KITS

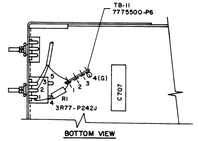
PACER STATION APPLICATION KIT
PL-19A121903-G1



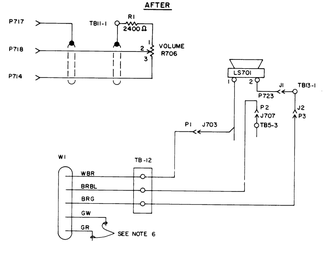
TOP VIEW







BOTTOM VIEW



STEP 1 ON BOTTOM SIDE OF POWER SUPPLY DIRECTLY IN FRONT OF C707 INSTALL TB11 USING #6-32 HARDWARE THAT MOUNTS J707. MOUNT TB11 SO THAT TERMINAL 1 IS NEAR VOLUME CONTROL R706.

STEP 2 UNSOLDER SHIELD FROM TERMINAL LUG OF R706 AND SOLDER TO TB11-1. SOLDER RI (2400Ω) FROM TB11-1 TO R706-1.

STEP 3 LOOKING AT BACK PANEL, INSERT GROMMET INTO 6TH HOLE FROM LEFT. INSERT CABLE W1 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 TB12 IN POSITION AS SHOWN USING #6 SCREW THAT MOUNTS PLATE

STEP 5 ROUTE CABLE AROUND EDGE OF POWER SUPPLY AND SOLDER CONNECTIONS TO TB2 AS SHOWN IN DIAGRAM.

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

STEP 7 USING UPPER 8-32 HARDWARE OF SPEAKER DIRECTLY BEHIND TB13 MOUNT TB13 WITH #8-32 SCREW PARTIALLY. ANGLE SOLDER 2 PIECES OF DB WIRE APPROXIMATELY 0.75 INCHES LONG TO TB13-1

STEP 8 DISCONNECT GREEN WIRE FROM LS701-2 AND CONNECT TO DB WIRE AT TB13-1.

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

ACCENT 450 STATION APPLICATION KIT
PL-19A121864-G1

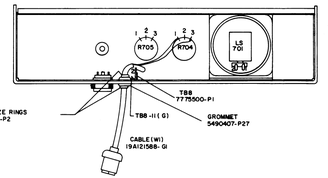
STEP 1 REMOVE PLUG BUTTON FROM HOLE LOCATED NEAR CONNECTOR J703. ASSEMBLE GROMMET INTO THE HOLE AND INSERT CABLE W1 THRU GROMMET LEAVING APPROXIMATELY 6.00 INCHES BETWEEN END OF PLUG AND GROMMET.

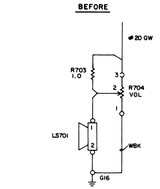
STEP 2 ATTACH SQUEEZE RINGS ON EITHER SIDE OF GROMMET FOR MINIMUM PLAY. OVERLAP ENDS OF RINGS TO INSURE TIGHT FIT.

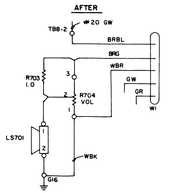
STEP 3 MOUNT TB8 USING #6-32 HARDWARE(NEAR SQUELCH CONTROL R705) THAT MOUNTS GRILLE TO FRAME.

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

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







Installation Instructions

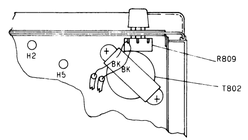
UNIVERSAL SELECTIVE-CALLING APPLICATION KITS FOR G-E PACER & ACCENT 450

(RC-1152)

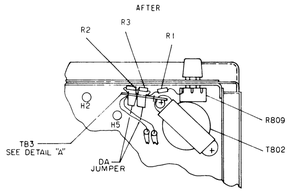
5214

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

BEFORE



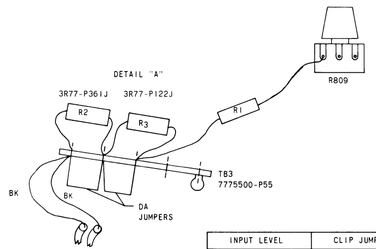
AFTER



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).

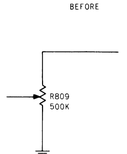
STEP 2: DISCONNECT BLACK WIRE (2) FROM VOLUME CONTROL (R809) AND ATTACH TO TOP TERMINAL OF BOARD (TB3).

DETAIL "A"

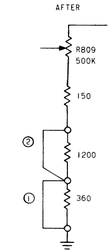


INPUT LEVEL	CLIP JUMPER
+ 10 & ABOVE	NONE
0 TO + 10	①
-12 TO 0	①&②

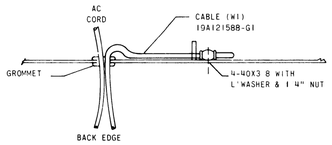
BEFORE



AFTER

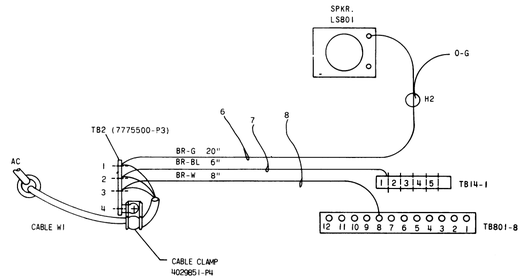


STEP 3: RUN CABLE THRU GROMMET WITH AC WIRE.



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 TB1N-1 & THE BR-W WIRE TO TB801-8.



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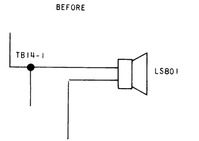

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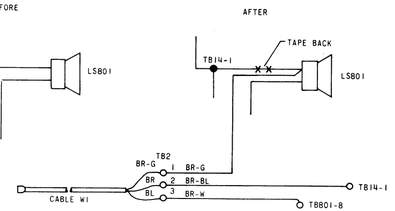


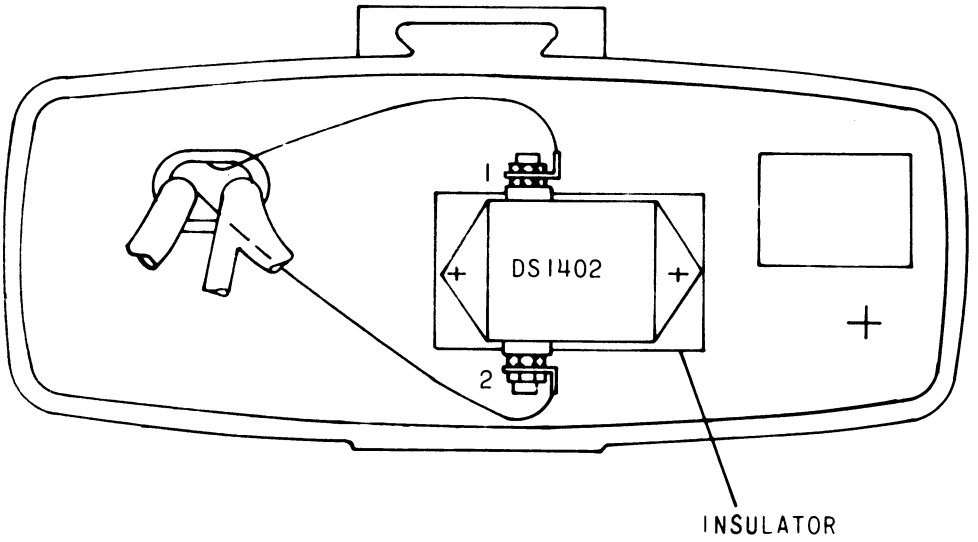
5184

Installation Instructions

UNIVERSAL SELECTIVE CALLING APPLICATION KIT PL-19A121908-G1

(RC-1149)

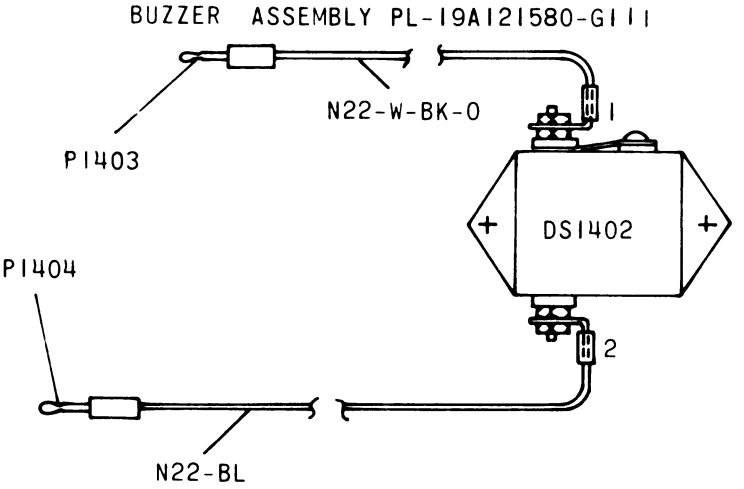
REAR VIEW OF DC DECODER



1. MOUNT INSULATOR AND BUZZER ASSEMBLY AS SHOWN USING HARDWARE FROM KIT.

2. CONNECT P1403 TO H24. CONNECT P1404 TO H23 ON DECODER ASSEMBLY.

3. PLUG K1402 INTO SOCKET PROVIDED. CLIP SPRING OVER RELAY AND INTO SOCKET.



5094

Modification Instructions

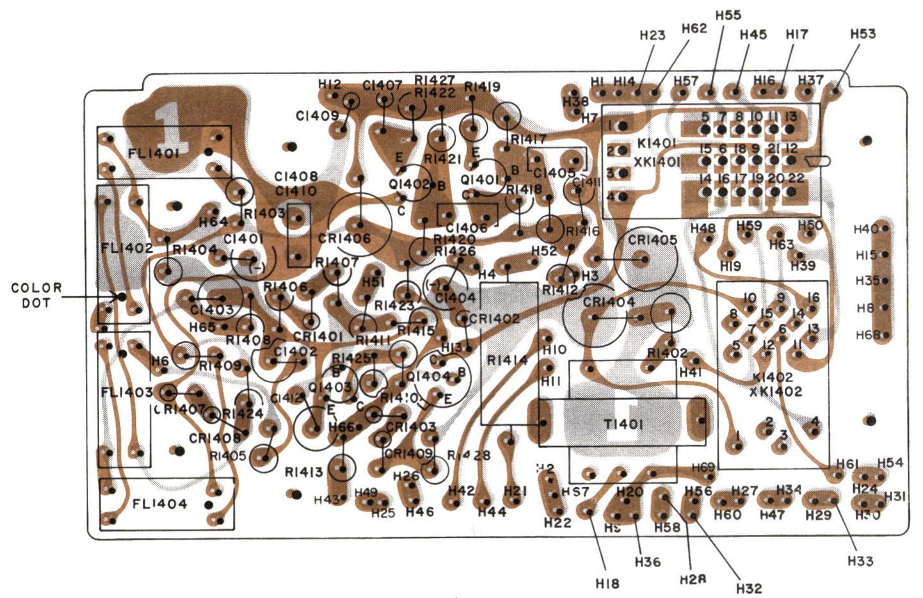
BUZZER AND RELAY MODIFICATION KIT PL-19A121579-G1

(RC-1091)

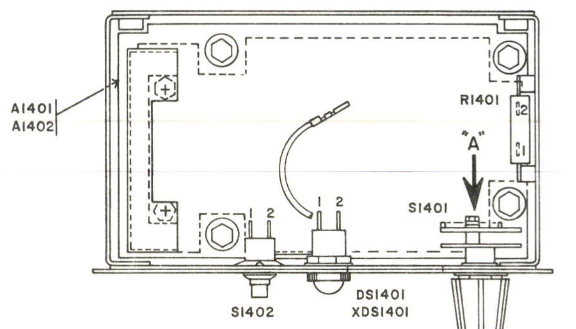
CHART		
OPTION	DESCRIPTION	JUMPERS
Basic Unit (Mobile)	No Speaker Muting	H35-H36
	One Relay (K1401), locked to reset button	H49-H43, H46-H45
	Internal call light	H52-H53
	External call light	H55-H60, H57-H47
Basic Unit (AC)	No speaker muting	H35-H36
	K1401 timed	H50-H51
	K1402 locked to reset button	H61-H49, H46-H62
	Timed buzzer	H54-H53
	External momentary alarm	H55-H56, H57-H58
	Internal call light	H63-H52
	External call light	H59-H60, H48-H47
Option 4096 Only	No Speaker muting	H35-H36
	K1401 Timed	H50-H51
	K1402 locked to reset button	H61-H49, H46-H62
	Timed buzzer	H54-H53
	External horn	H55-H56, H57-H58
	Internal call light	H63-H52
	External call light	H59-H60, H48-H47
Option 4092 Only	Speaker unmuted by Mil. hookswitch or K1401	H39-H40, H37-H38
	K1401 locked to Mil. hookswitch or reset button	H42-H43, H44-H49, H45-H46
	External call light	H55-H60, H57-H47
	Internal call light	H52-H53
Options 4096 & 4092	Speaker unmuted by Mil. hookswitch or K1402	H39-H40, H41-H38
	K1401 timed	H50-H51
	K1402 locked to H.S. or reset button	H61-H44, H42-H46, H49-H62
	Timed buzzer	H54-H53
	External call light	H59-H60, H48-H47
	Internal call light	H63-H52
	External horn	H55-H56, H57-H58
Option 4093 Only	Extension Cable option (19A121588G1)	If no other options are included, jumper for basic unit.
Option 4094 Only	Speaker unmuted by Handset Hookswitch or K1401	H39-H40, H37-H38
	K1401 locked to handset Hookswitch or Reset Button	H42-H43, H44-H49, H45-H46
	External call light	H55-H60, H57-H47
	Internal call light	H52-H53
	Remove P1413 from H19 and insert in H36	

(19B204844, Sh. 1, Rev. 5)
(19B204844, Sh. 2, Rev. 0)

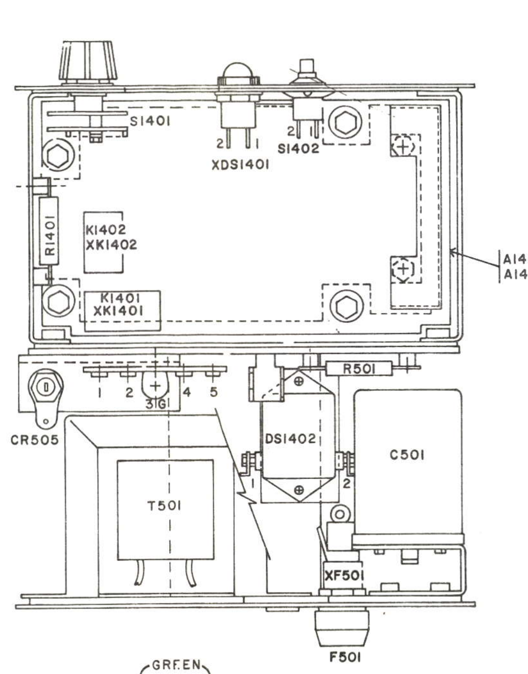
A1401 & A1402 PL-19D402399-G1 & G2

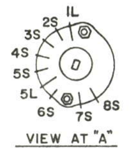


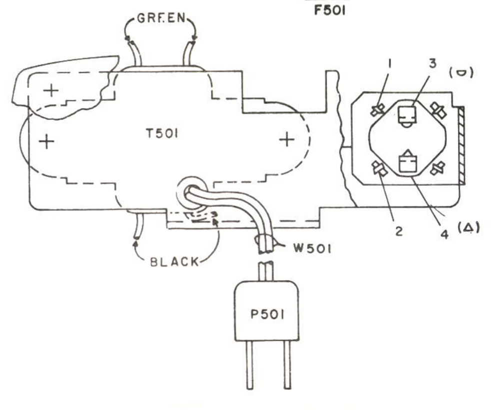
DC MOBILE DECODER PL-19C303570-G1 & G2

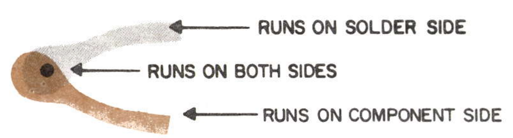


AC MOBILE DECODER PL-19C303631-G1 & G2

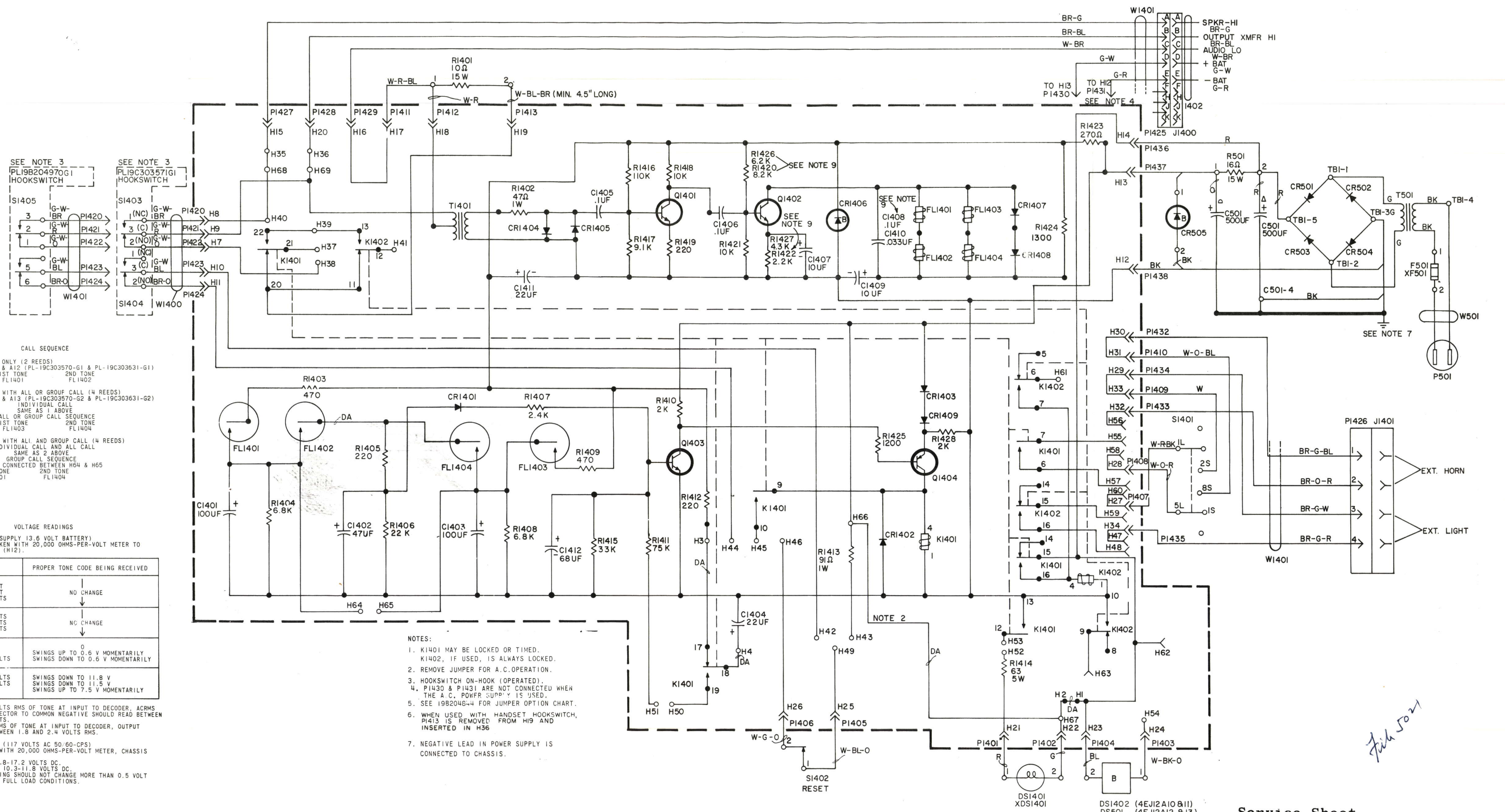








(19D402517, Rev. 1)
(19C303555, Sh. 1, Rev. 1)
(19C303555, Sh. 2, Rev. 1)



CALL SEQUENCE

1. INDIVIDUAL CALL ONLY (2 REEDS)
   MODELS 4EJ12A10 & A12 (PL-19C303570-G1 & PL-19C303631-G1)
   1ST TONE FL1401 — 2ND TONE FL1402

2. INDIVIDUAL CALL WITH ALL OR GROUP CALL (4 REEDS)
   MODELS 4EJ12A11 & A13 (PL-19C303570-G2 & PL-19C303631-G2)
   INDIVIDUAL CALL
   SAME AS 1 ABOVE
   ALL OR GROUP CALL SEQUENCE
   1ST TONE FL1403 — 2ND TONE FL1404

3. INDIVIDUAL CALL WITH ALL AND GROUP CALL (4 REEDS)
   INDIVIDUAL CALL AND ALL CALL
   SAME AS 2 ABOVE
   GROUP CALL SEQUENCE
   WITH JUMPER CONNECTED BETWEEN H64 & H65
   1ST TONE FL1401 — 2ND TONE FL1404

VOLTAGE READINGS

1. DECODER (POWER SUPPLY 13.6 VOLT BATTERY)
   ALL READINGS TAKEN WITH 20,000 OHMS-PER-VOLT METER TO NEGATIVE COMMON (H12).

NO TONE	PROPER TONE CODE BEING RECEIVED
Q1401 E-0.1 VOLT B-0.6 VOLT C-5.2 VOLTS	NO CHANGE
Q1402 E-5.0 VOLTS B-5.5 VOLTS C-7.7 VOLTS	NO CHANGE
Q1403 E-0 B-0 C-13.6 VOLTS	0 SWINGS UP TO 0.6 V MOMENTARILY SWINGS DOWN TO 0.6 V MOMENTARILY
Q1404 E-12.4 VOLTS B-13.6 VOLTS C-0	SWINGS DOWN TO 11.8 V SWINGS DOWN TO 11.5 V SWINGS UP TO 7.5 V MOMENTARILY

WITH 20 MILLIVOLTS RMS OF TONE AT INPUT TO DECODER, ACRMS FROM Q1402 COLLECTOR TO COMMON NEGATIVE SHOULD READ BETWEEN 1.8 AND 2.4 VOLTS.
WITH 1.0 VOLT RMS OF TONE AT INPUT TO DECODER, OUTPUT SHOULD READ BETWEEN 1.8 AND 2.4 VOLTS RMS.

2. AC POWER SUPPLY (117 VOLTS AC 50/60-CPS)
   READINGS TAKEN WITH 20,000 OHMS-PER-VOLT METER, CHASSIS COMMON.
   R501-2 (RED) 14.8-17.2 VOLTS DC.
   R501-1 (ORANGE) 10.3-11.8 VOLTS DC.
   THE LATTER READING SHOULD NOT CHANGE MORE THAN 0.5 VOLT FROM NO LOAD TO FULL LOAD CONDITIONS.

NOTES:

1. K1401 MAY BE LOCKED OR TIMED.
   K1402, IF USED, IS ALWAYS LOCKED.
2. REMOVE JUMPER FOR A.C. OPERATION.
3. HOOKSWITCH ON-HOOK (OPERATED).
4. P1430 & P1431 ARE NOT CONNECTED WHEN THE A.C. POWER SUPPLY IS USED.
5. SEE 19B204844 FOR JUMPER OPTION CHART.
6. WHEN USED WITH HANDSET HOOKSWITCH, P1413 IS REMOVED FROM H19 AND INSERTED IN H36
7. NEGATIVE LEAD IN POWER SUPPLY IS CONNECTED TO CHASSIS.

(19R620715, Rev. 4)

Service Sheet

TYPE 99 TONE DECODER
MODELS 4EJ12A10-13, REV. C

(RC-1092C)

PARTS LIST

TYPE 99 TONE DECODER

MODEL 4EJ12A10 (PL-19C300570-G1) 2-Reeds
MODEL 4EJ12A11 (PL-19C300570-G2) 4-Reeds

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - SUBASSEMBLIES - - - - - - - - -
A1401 and A1402		COMPONENT BOARD ASSEMBLY A1401 PL-19D402399-G1 (MODEL 4EJ12A10) A1403 PL-19D402399-G2 (MODEL 4EJ12A11)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1401*	5496267-P7	Tubular, hermetically sealed, tantalum: 100 µf ±20%, 10 VDCW; sim to Sprague 150D. In Models earlier than REV. B:
	5496267-P15	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 47 µf ±20%, 20 VDCW; sim to Sprague 150D.
C1402	5496267-P15	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 47 µf ±20%, 20 VDCW; sim to Sprague 150D.
C1403*	5496267-P7	Tubular, hermetically sealed, tantalum: 100 µf ±20%, 10 VDCW; sim to Sprague 150D. In Models earlier than REV. B:
	5496267-P15	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 47 µf ±20%, 20 VDCW; sim to Sprague 150D.
C1404	5496267-P10	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 22 µf ±20%, 15 VDCW; sim to Sprague 150D.
C1405 and C1406	5492638-P107	Ceramic disc: radial leads, 0.1 µf +80% -20%, 12 VDCW; sim to Sprague 20C302.
C1407	5491674-P2	Tubular, tantalum: axial leads, 10 µf +50% -20%, 10 VDCW; sim to Sprague 364936.
C1408	5492638-P107	Ceramic disc: radial leads, 0.1 µf +80% -20%, 12 VDCW; sim to Sprague 20C302. (Used in Model 4EJ12A11 only).
C1409	5491674-P2	Tubular, tantalum: axial leads, 10 µf +50% -20%, 10 VDCW; sim to Sprague 364936.
C1410	7491930-P7	Tubular, Mylars dielectric: axial leads, .033 µf ±20%, 100 VDCW; sim to G-E Type 61F. (Used in Model 4EJ12A10 only).
C1411*	5496267-P10	Tubular, hermetically sealed, tantalum, dry solid: axial leads, 22 µf ±20%, 15 VDCW; sim to Sprague 150D.
C1412*	5496267-P11	Tubular, hermetically sealed, tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague 150D.
		- - - - - - - - - - RECTIFIERS - - - - - - - - - -
CR1401	7777146-P3	Germanium; sim to Type 1N90.
CR1402 and CR1403	4037822-P1	Silicon.
CR1404 and CR1405	5495920-P1	Germanium; sim to Type 1N91.
CR1406	19A115008-P15	Silicon, Zenere.
CR1407 and CR1408	5491705-P2	Silicon.
CR1409	4037822-P1	Silicon.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL1401 thru FL1404		TONE DETECTOR PL-19C300580 FL1401 and FL1402 (MODEL 4EJ12A10) FL1401 thru FL1404 (MODEL 4EJ12A11)
	PL-19C300580-G1	517.5 cps
	PL-19C300580-G2	532.5 cps
	PL-19C300580-G3	547.5 cps
	PL-19C300580-G4	562.5 cps
	PL-19C300580-G5	577.5 cps
	PL-19C300580-G6	592.5 cps
	PL-19C300580-G7	607.5 cps
	PL-19C300580-G8	622.5 cps
	PL-19C300580-G9	637.5 cps
	PL-19C300580-G10	652.5 cps
	PL-19C300580-G11	667.5 cps
	PL-19C300580-G12	682.5 cps
	PL-19C300580-G13	697.5 cps
	PL-19C300580-G14	712.5 cps
	PL-19C300580-G15	727.5 cps
	PL-19C300580-G16	742.5 cps
	PL-19C300580-G17	757.5 cps
	PL-19C300580-G18	772.5 cps
	PL-19C300580-G19	787.5 cps
	PL-19C300580-G20	802.5 cps
	PL-19C300580-G21	817.5 cps
	PL-19C300580-G22	832.5 cps
	PL-19C300580-G23	847.5 cps
	PL-19C300580-G24	862.5 cps
	PL-19C300580-G25	877.5 cps
	PL-19C300580-G26	892.5 cps
	PL-19C300580-G27	907.5 cps
	PL-19C300580-G28	922.5 cps
	PL-19C300580-G29	937.5 cps
	PL-19C300580-G30	952.5 cps
	PL-19C300580-G31	967.5 cps
	PL-19C300580-G32	982.5 cps
	PL-19C300580-G33	997.5 cps
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1401	19C307010-P7	Armature: 11 VDC operating, 90 ohms ±10% coil res, 3 form A and 3 form C contacts rated at 1 amp; sim to Allied Control T154X-458.
K1402	19C300957-P2	Miniature, plug-in: 12 VDC operating, 185 ohms ±10% coil res, 4 form C contacts rated at 2 amps; sim to Allied Control T154X-316.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1401 thru Q1403	19A115123-P1	Silicon, NPN; sim to Type 2N2712.
Q1404	19C300073-P2	Germanium, PNP; sim to Type 2N1414.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1402	3R78-P470J	Fixed composition: 47 ohms ±5%, 1 w.
R1403*	3R77-P821K 3R77-P221J	Fixed composition: 820 ohms ±10%, 1/2 w. In Models earlier than REV. B: Fixed composition: 220 ohms ±5%, 1/2 w.
R1404*	3R77-P682K 3R77-P103J	Fixed composition: 6800 ohms ±10%, 1/2 w. In Models earlier than REV. B: Fixed composition: 10,000 ohms ±5%, 1/2 w.
R1405*	3R77-P561K 3R77-P101J	Fixed composition: 560 ohms ±10%, 1/2 w. In Models earlier than REV. B: Fixed composition: 100 ohms ±5%, 1/2 w.
R1406	3R77-P223J	Fixed composition: 22,000 ohms ±5%, 1/2 w.
R1407*	3R77-P242J 3R77-P331J	Fixed composition: 2400 ohms ±5%, 1/2 w. In Models earlier than REV. B: Fixed composition: 330 ohms ±5%, 1/2 w.
		- - - - - - - - - SUBASSEMBLIES(Cont'd) - - - - - - - - -
		- - - - - - - - - -FILTERS(Cont'd) - - - - - - - - - -
R1408*	3R77-P682K 3R77-P103J	Fixed composition: 6800 ohms ±10%, 1/2 w. In Models earlier than REV. B: Fixed composition: 10,000 ohms ±5%, 1/2 w.
R1409*	3R77-P821K 3R77-P221J	Fixed composition: 820 ohms ±10%, 1/2 w. In Models earlier than REV. B: Fixed composition: 220 ohms ±5%, 1/2 w.
R1410	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
R1411	3R77-P753J	Fixed composition: 75,000 ohms ±5%, 1/2 w.
R1412	3R77-P221J	Fixed composition: 220 ohms ±5%, 1/2 w.
R1413	3R76-P910J	Fixed composition: 91 ohms ±5%, 1 w.
R1414	5493035-P17	Wirewound: 63 ohms ±5%, 5 w; sim to Tru-Ohm Type X-60.
R1415*	3R152-P333K 3R77-P753J	Fixed composition, 33,000 ohms ±10%, 1/4 w. In Models earlier than REV. B: Fixed composition: 75,000 ohms ±5%, 1/2 w.
R1416	3R77-P114J	Fixed composition: 0.11 megohm ±5%, 1/2 w.
R1417	3R77-P912J	Fixed composition: 9100 ohms ±5%, 1/2 w.
R1418	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R1419	3R77-P221J	Fixed composition: 220 ohms ±5%, 1/2 w.
R1420	3R77-P822J	Fixed composition: 8200 ohms ±5%, 1/2 w. (Used in Model 4EJ12A11 only).
R1421	3R77-P103J	Fixed composition: 10,000 ohms ±5%, 1/2 w.
R1422	3R77-P222J	Fixed composition: 2200 ohms ±5%, 1/2 w. (Used in Model 4EJ12A11 only).
R1423	3R77-P271J	Fixed composition: 270 ohms ±5%, 1/2 w.
R1424*	3R77-P132J 3R77-P821J	Fixed composition: 1300 ohms ±5%, 1/2 w. In Models earlier than REV. A: Fixed composition: 820 ohms ±5%, 1/2 w.
R1425	3R77-P122J	Fixed composition: 1200 ohms ±5%, 1/2 w.
R1426	3R77-P622J	Fixed composition: 6200 ohms ±5%, 1/2 w. (Used in Model 4EJ12A10 only).
R1427	3R77-P432J	Fixed composition: 4300 ohms ±5%, 1/2 w. (Used in Model 4EJ12A10 only).
R1428	3R77-P202J	Fixed composition: 2000 ohms ±5%, 1/2 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1401	5491609-P1	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 - - - - - - - - -
XK1401	19B209172-P1	Relay, phen: 22 contacts; sim to Allied Control 30054-24.
XK1402	5491595-P7	Relay: 10 contacts; sim to Allied Control 30054-4.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4036040-P1	Pin, contact: sim to American Brass 724. (Used with FL1401, FL1402, FL1403 and FL1404).
	4036555-P1	Insulator, washer: nylon. (Used with Q1404).
	19A115368-P1	Retainer, spring: sim to Allied Control 30040-3. (Used with K1401).
	5491595-P9	Retainer, spring: sim to Allied Control 30040-2. (Used with K1402).
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS1401	19B201122-P1	Light, indicator: miniature, 6 v at 0.2 amp; sim to G-E Type 1768.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1401* and P1402*	4036634-P2 19A115386-P1	Contact, electrical: sim to Amp 42429-2. In Models earlier than REV. C: Contact, electrical: sim to Amp 42335-3.
P1405* thru P1413*	4036634-P2 19A115386-P1	Contact, electrical: sim to Amp 42429-2. In Models earlier than REV. C: Contact, electrical: sim to Amp 42335-3.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1401	5495941-P21	Wirewound: 10 ohms ±5%, 15 w; sim to Tru-Ohm Type MOR-15.
		- - - - - - - - - SWITCHES - - - - - - - - -
S1401	5495454-P4	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.
S1402	7481654-P7	Pushbutton: single pole, normally closed, 1/10 amp at 115 VAC; sim to Grayhill 30-2.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1401		CABLE ASSEMBLY PL-19B204739-G1
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1401	5492497-P24	Shell, connector: 4 circuits; sim to Amp 480134-1.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1425	7489183-P10	Connector, miniature, melamine: 9 contacts rated at 5 amps at 900 VRMS; sim to Winchester MRP-LSH-19C.
P1426	5492497-P14	Shell, connector: 4 circuits; sim to Amp 480135-1.
P1427* thru P1435*	4036634-P2 19A115386-P1	Contact, electrical: sim to Amp 42429-2. In Models earlier than REV. C: Contact, electrical: sim to Amp 42335-3.
	5492497-P1	Contact, crimp: with lock spring; sim to Amp 42485-1. (Used with J1401).
		Cable: 63 inches max length. Type AWG 22.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1401	19B201122-P2	Lamp, miniature: sim to Drake Series 121.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	KP243427	Nameplate: approx 6 x 2-1/4 x 1/32 inches, etched aluminum.
	PL-4039182-G3	Knob Assembly. (Used with S1401).
	19B201122-P11	Cap, lens: yellow nylon, 7/16 inch diameter. (Used with DS1401).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PARTS LIST

TYPE 99 TONE DECODER

MODEL 4EJ12A12 (PL-19C303631-G1) 2-Reeds
MODEL 4EJ12A13 (PL-19C303631-G2) 4-Reeds

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1402	19C300957-P2	Miniature, plug-in: 12 VDC operating, 185 ohms ±10% coil res, 4 form C contacts rated at 2 amps; sim to Allied Control T154X-316.
	5491595-P9	Retainer, spring: sim to Allied Control 30040-2. (Used with K1402).
		- - - - - - - - - SUBASSEMBLIES - - - - - - - - -
	PL-19C303570-G1	Universal Selective-Calling. (Refer to LBI-3496). (Used in Model 4EJ12A12 only).
	PL-19C303570-G2	Universal Selective-Calling. (Refer to LBI-3496). (Used in Model 4EJ12A13 only).
		AC POWER SUPPLY ASSEMBLY PL-19C303579-G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C501	7770994-P28	Tubular, twist-prong, dry electrolytic: polarized, 500-500 µf +250% -10%, 25-25 VDCW; sim to Mallory Type WP.
		- - - - - - - - - - RECTIFIERS - - - - - - - - - -
CR501 thru CR504	4037822-P1	Silicon.
CR505	5495912-P1	Silicon, Zenere.
		- - - - - - - - - INDICATING DEVICES - - - - - - - - -
DS501	19B200788-P2	Buzzer: 12 VDC +3.6% -1.0%; sim to Line Electric Series BD-0.
		- - - - - - - - - - - FUSES - - - - - - - - - - -
F501	7487942-P1	Cartridge, slow blowing: 1/4 amp at 250 v; sim to Bussmann MDL-1/4.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P501		(Part of W501).
P1403* and P1404*	4036634-P2 19A115386-P1	Contact, electrical: sim to Amp 42429-2. In Models earlier than REV. C: Contact, electrical: sim to Amp 42335-3.
P1436* thru P1438*	4936634-P2 19A115386-P1	Contact, electrical: sim to Amp 42429-2. In Models earlier than REV. C: Contact, electrical: sim to Amp 42335-3.
		- - - - - - - - - RESISTORS - - - - - - - - -
R501	5496941-P23	Wirewound: 16 ohms ±5%, 15 w; sim to Tru-Ohm Type MOR-15.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T501	5493743-P1	Power: filament, single phase, Pri: 117 v, 50/60 cy, Sec 1: 12.6 v ±2%, 2 amps.
		- - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7775500-P11	Phen: 5 terminals.
		- - - - - - - - - - CABLES - - - - - - - - - -
W501	4036441-P8	Cable assembly, power: 2 conductor, with 2 contact molded plastic (P601) Plug.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF501	7115179-P1	Fuseholder: 15 amps at 250 v; sim to Bussmann Type HKP.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PRODUCTION CHANGES

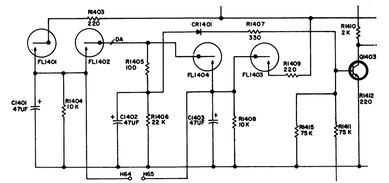
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - To reduce voice falsing. Changed R1424.

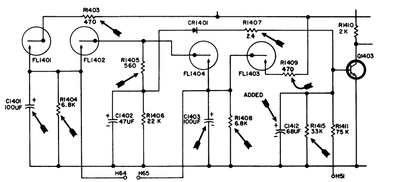
REV. B - To reduce voice and vibration falsing. Changed R1403, R1404, R1405, R1407, R1408, R1409, R1415, C1401 and C1403. Added C1411 and C1412.

Elementary Diagram Changes:

Was:



Changed To:



REV. C - To provide better connections to the component board. Added 4033513-P7 jacks to all "H" numbered holes except H2, H4, H5, H6, H66, and H67; added 4036634-P2 connectors to all cables and leads connecting to the component board.