Customer_____

G. E. Req. No._____

Customer Order No._____

INSTRUCTIONS

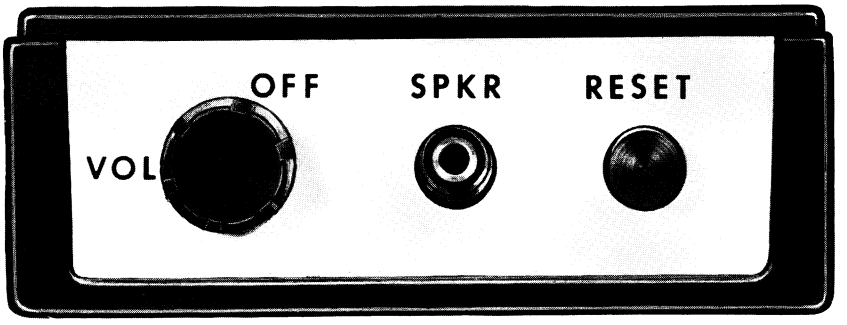
FOR

VOICE DIRECTOR SELECTIVE SIGNALING UNIT

MODELS 4EA15A10 & 4EA15A11

OPTIONS 5921 & 5923

LBI-3328B



COMMUNICATION PRODUCTS DEPARTMENT

GENERAL ELECTRIC

LYNCHBURG, VIRGINIA

5093

Printed in U.S.A.

TABLE OF CONTENTS

SPECIFICATIONS

Temperature Range ..... -20° to +45°C

Input..... 6 volts DC

Standby..... 2.5-ma

Operate.....20-ma. 50-mw output

Signal .....0.2-vrms 3-KC dev.

Dimensions

Width ..... 2.625 inches

Height ..... 0.75 inches

Length ..... 1.875 inches

VOICE DIRECTOR SELECTIVE SIGNALING UNIT
MODELS 4EA15A10 & 4EA15A11

The Voice Director Selective Signaling Unit replaces the standard Audio and Squelch Board of the Voice Director Pocket Receiver. Selective signaling provides selective voice paging by activating the audio stages of the receiver only after correctly coded tones are received.

Two models of the Selective Signaling Unit are available. Model 4EA15A10 provides Individual Call only. Model 4EA15A11 provides All Call and Group Call as well as Individual Call. Miniature electromechanical (reed) decoders and associated drive circuits are utilized in each unit. Two reeds are required for the Model 4EA15A10 and four reeds for the 4EA15A11.

Installation instructions for modifying the Voice Director in the field are provided on Installation Diagram, RC-829. Service Sheet, RC-830, provides all necessary meter readings and information for servicing the Selective Signaling Options.

OPERATION

The speaker or earpiece is plugged into J1401. Turning the receiver ON by advancing the Volume Control permits the audio circuits to operate and produce noise in the speaker or earpiece. This results in a fundamental check of the battery condition and function of audio and reset circuits. The RESET Switch, S1402, is then pressed to turn off the audio circuits; only the reception of the proper combination of tones will now open the audio circuits and permit paging.

At any time the operator wishes to check the condition of operation of the battery, audio and reset circuits, the Volume Control of the battery, audio and reset circuits, the Volume Control is turned to the OFF position and, after allowing a few seconds for multivibrator capacitor C1413 to discharge, turn the receiver back ON to open the audio circuits.

CIRCUIT ANALYSIS

AUDIO AMPLIFIER BOARD

Audio is coupled from the discriminator to the input of the Audio Amplifier Board at P1401, through coupling capacitor C1401, to the base of the audio pre-amplifier, Q1401. Bias for the pre-amplifier is provided by R1403 and R1404. Thermistor RT1403 provides temperature stability for this stage.

The audio is divided at the collector of Q1401 and coupled to the input of the Squelch Control Board, with a portion coupled to the Volume Control (R1401). The signal selected at R1401 is coupled through C1402 to the base of the audio driver, Q1402. Bias is provided for this stage by R1409 and R1410. Temperature stability is provided by RT1401.

The audio driver stage is transformer-coupled by T1401 to a 50 milliwatt Class B output stage consisting of Q1403 and Q1404. The cross-over bias required for the Class B stage is picked up at the junction of RT1402 and R1413. Thermistor RT1402 reduces cross-over distortion in the audio output stage at extreme temperatures. The required audio de-emphasis is provided by C1404 and C1405. DC collector voltage for the audio output stage is supplied through the center-tapped choke coil, L1401. The output of the Class B stage drives the speaker or earpiece connected at J1401.

SQUELCH CONTROL BOARD

CR1401 and CR1402 form a diode limiter circuit that limits the audio to the proper level for the amplifier/driver stage, Q1405. The output of Q1405 is transformer-coupled by T1402 to the reed decoders (FL1401 and FL1402) which respond only to the proper combination of simultaneous or sequential tones to which they are resonant. In the Model 4EA15A11, the audio is coupled through an additional transformer (T1403) to reed decoders FL1403 and FL1404.

Closing of the contacts of FL1401 and FL1402 applies a voltage from the RC network (R1419 and C1411) to the timing network (R1420 and C1412) which turns on the multivibrator circuit when a certain potential is reached. CR1403 prevents feedback from the timing circuit when the additional reeds are used. This diode also prevents false tripping of the multivibrator circuit due to noise pulses that may operate the reed decoders. CR1405 performs the same protective functions in Model 4EA15A11.

With the squelch control multivibrator turned off, the bias supplied to the driver (Q1402) on the Audio Amplifier Board keeps the latter stage cut off. When the proper voltage level is developed to permit CR1403 (or CR1405) to conduct, Q1406 is turned on which, in turn, cuts on Q1407. This action reduces the bias of Q1402 to permit the audio circuits to function normally. Closing RESET Switch, S1402, grounds the squelch control circuit, returning the audio circuits to the cut-off condition.

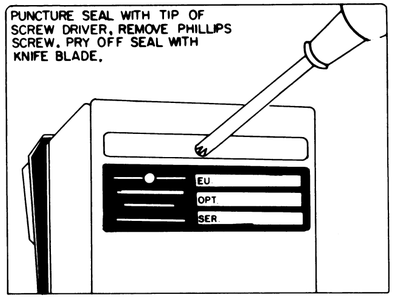
FOLLOW THE PROCEDURE OUTLINED BELOW
TO INSTALL THE MODEL 4EA15A10,11
SELECTIVE SIGNALLING UNIT

1

REMOVE FRONT COVER
FROM RECEIVER CASE

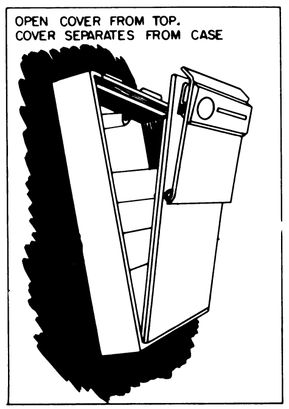
(A)

PUNCTURE SEAL WITH TIP OF
SCREW DRIVER. REMOVE PHILLIPS
SCREW. PRY OFF SEAL WITH
KNIFE BLADE.



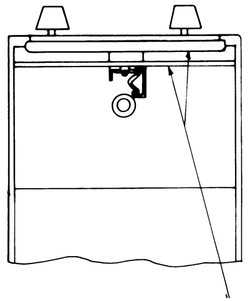
(B)

OPEN COVER FROM TOP.
COVER SEPARATES FROM CASE



2

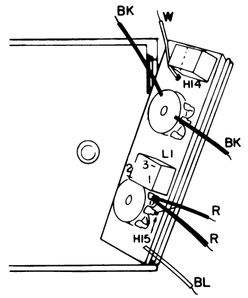
PULL KNOBS FROM AUDIO
AND SQUELCH CONTROLS



3

SLIDE AUDIO MODULE (4EA13A10,11)
AND CONTROL PANEL OUT OF
RETAINING SLOTS IN RECEIVER CASE

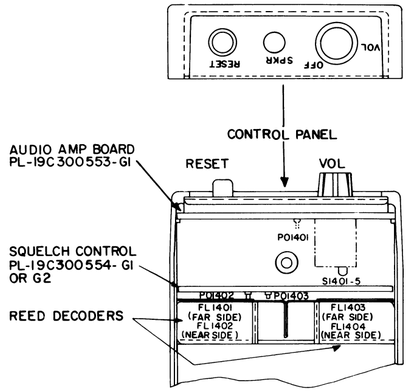
4



UNSOLDER ALL SIX INTERCONNECTING
WIRES FROM AUDIO MODULE. CLIP OUT
BLUE WIRE AND DISCARD.

5

SOLDER INTERCONNECTING
WIRES TO SELECTIVE SIGNALING
MODULE (4EA15A10,11) AS
OUTLINED BELOW. PLACE
NEW CONTROL PANEL OVER
MODULE AND SLIDE UNITS
INTO TOP GROOVES OF CASE.
PUSH KNOB ON VOLUME CONTROL
AND REPLACE COVER.



INTERCONNECTION TABLE

WIRE	FROM	TO
RED	H8 ON DISC BOARD	P01402
RED	BATTERY (+)	P01402
BLACK	H9 ON DISC BOARD	P01403
BLACK	BATTERY (–)	S1401-5
WHITE	H7 ON DISC BOARD	P01401

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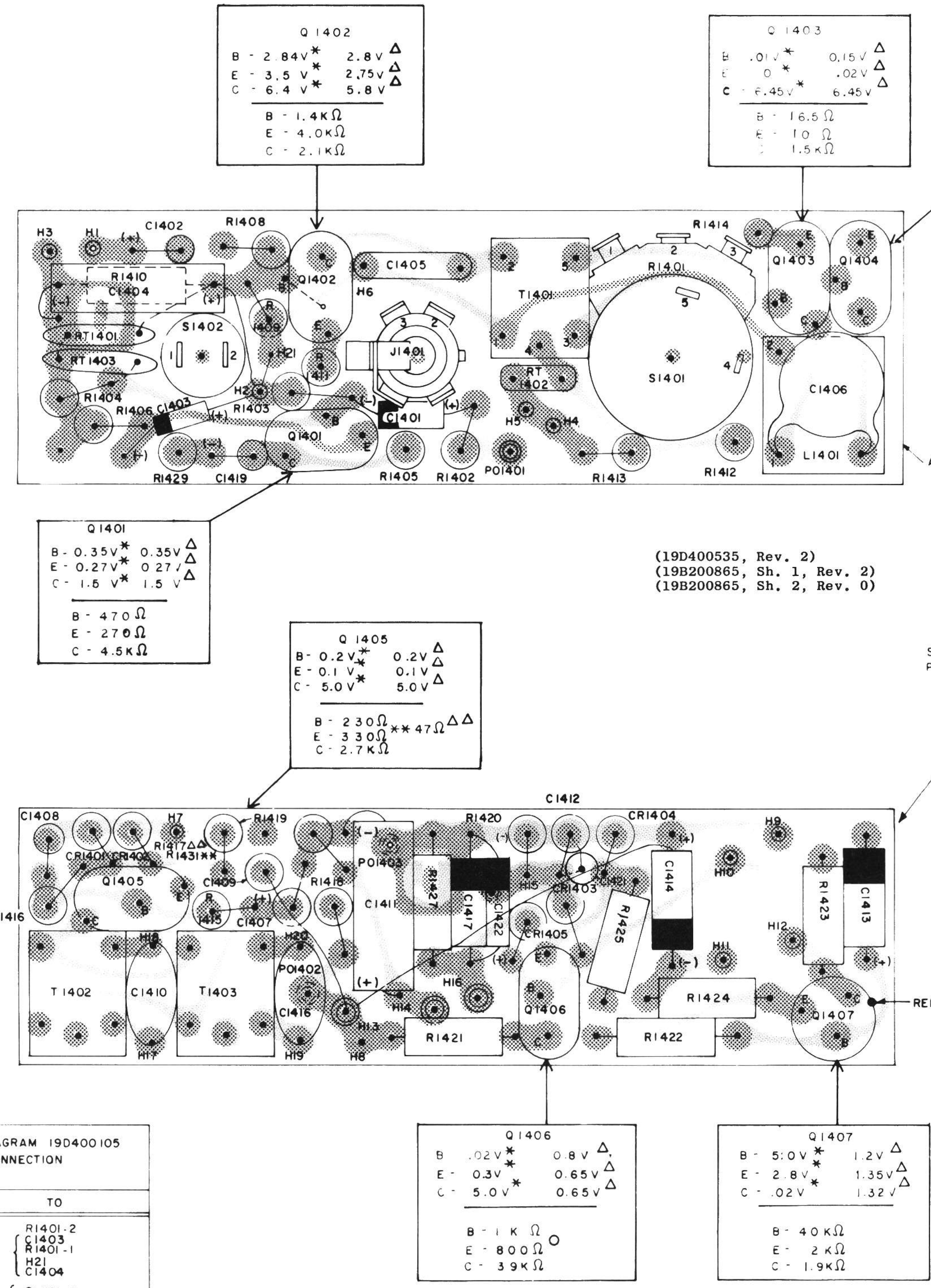
Installation Diagram

VOICE DIRECTOR
SELECTIVE SIGNALING UNITS,
MODELS 4EA15A10,11

(RC-829A)



(19D400535, Rev. 2)
(19B200865, Sh. 1, Rev. 2)
(19B200865, Sh. 2, Rev. 0)

(19D400535, Rev. 2)
(19B200866, Sh. 1, Rev. 1)
(19B200866, Sh. 2, Rev. 0)

REFER TO WIRING DIAGRAM 19D400105 FOR THE FOLLOWING CONNECTION

FROM	TO
H1	R1401-2
H2	C1403, R1401-1, H21, C1404
H3	S1401-4, S1402-1
H4	H9
H5	S1401-4
H6	C1405, H8
L1401-1	C1406, J1401-3
L1401-3	C1406, J1401-1
R1406	Q1401-E
T1401-1	L1401-2
S1402-2	H7

* MUTED, NO SIGNAL
Δ UNMUTED, NO SIGNAL
** MODEL 4EA15A10
ΔΔ MODEL 4EA15A11
O THIS READING VARIES WITH OHMMETER SCALE USED

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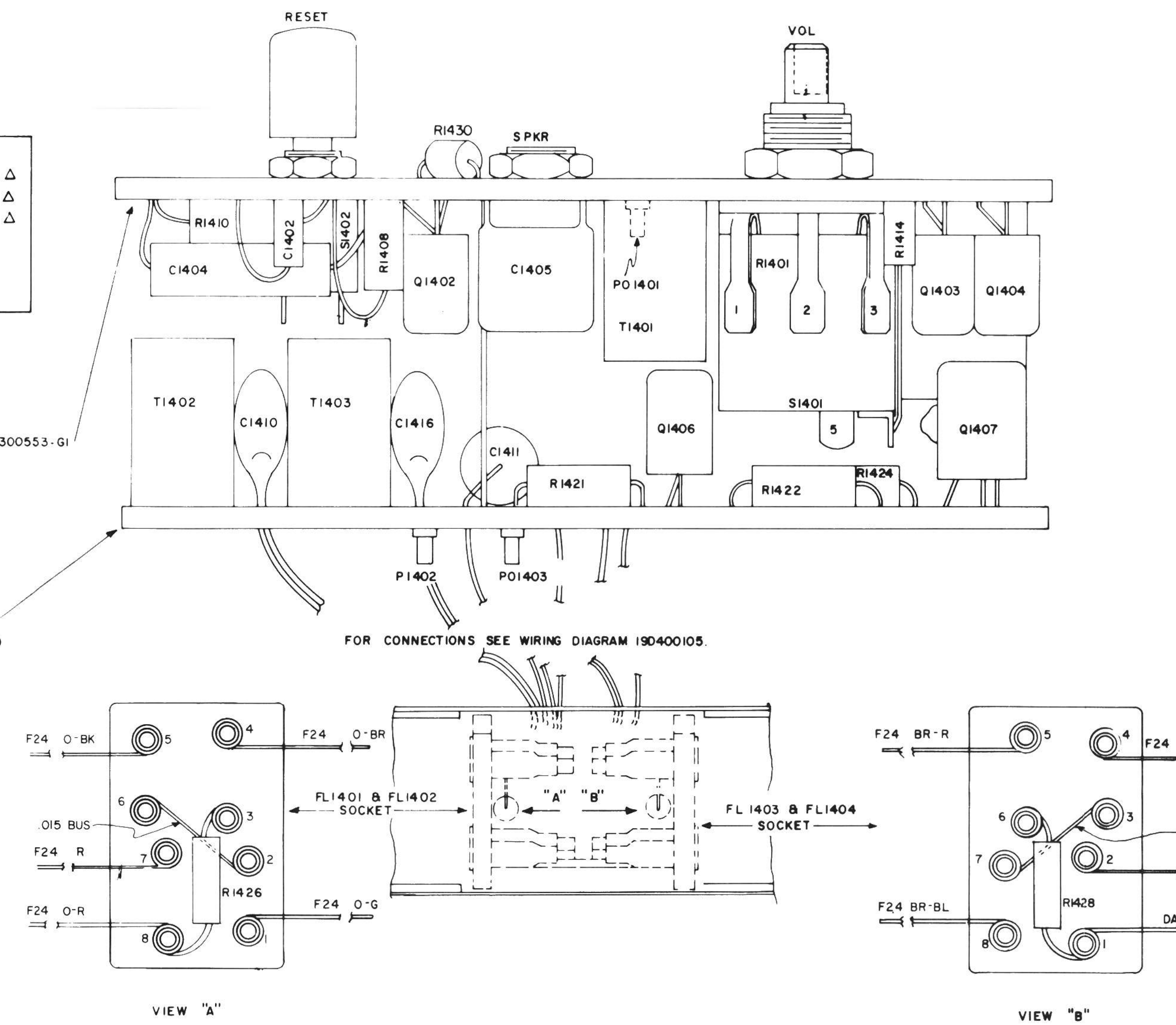
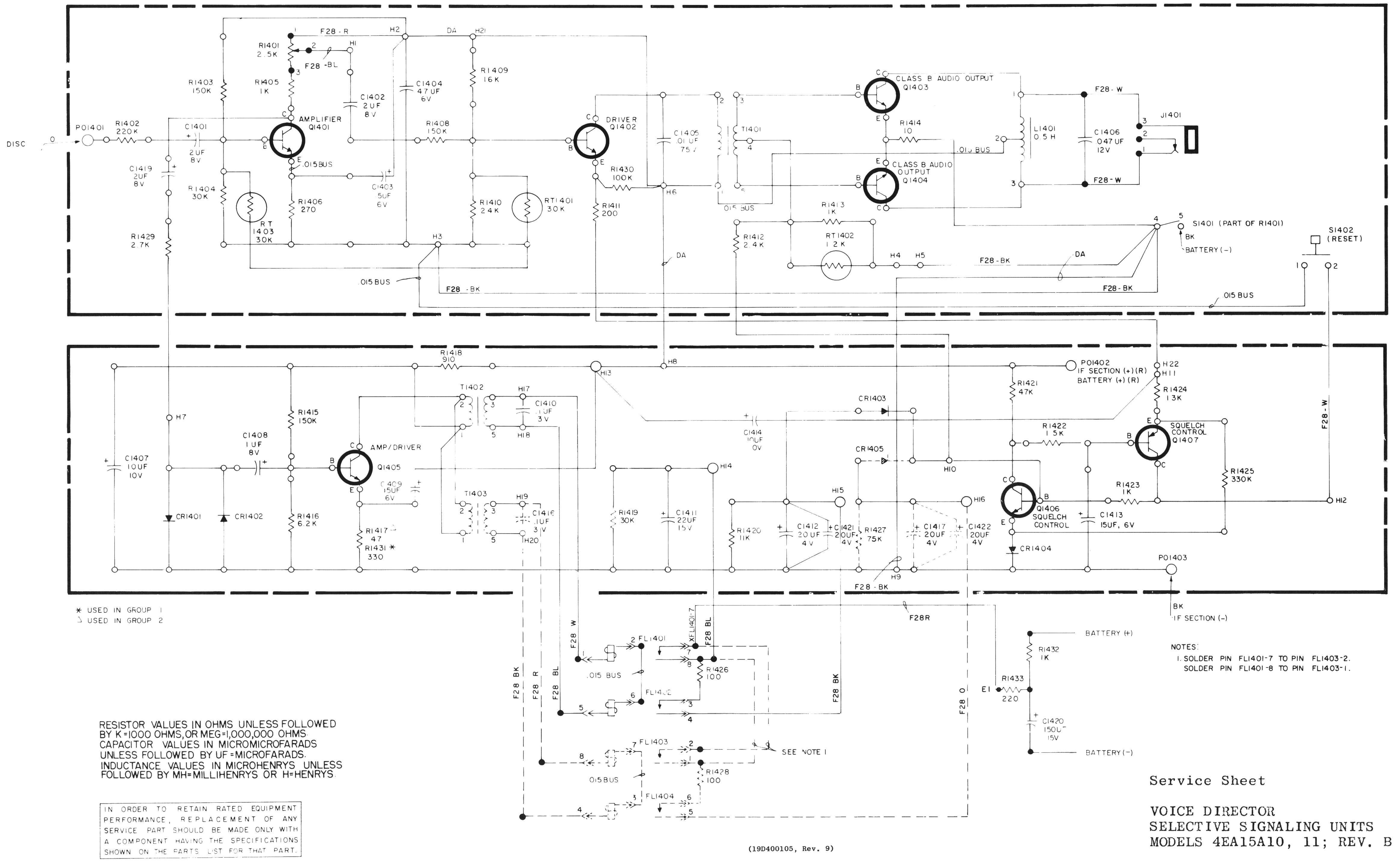
Denotes Component Side

Deontes Solder Side



REED DECODER ASSEMBLY

CONDITIONS OF MEASUREMENT: DC VOLTAGE READINGS TAKEN WITH A 20,000 OHMS/VOLT VOLTMETER
SUPPLY VOLTAGE: 6.5V ALL READINGS TAKEN WITH RESPECT TO COMMON NEGATIVE
RESISTANCE READINGS TAKEN WITH A 20,000 OHMS/VOLT VOLTMETER. NEG. PROBE TO COMMON NEGATIVE (−)



RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS, OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN 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.

(19D400105, Rev. 9)

NOTES:
1. SOLDER PIN FL1401-7 TO PIN FL1403-2. SOLDER PIN FL1401-8 TO PIN FL1403-1.

Service Sheet

VOICE DIRECTOR
SELECTIVE SIGNALING UNITS
MODELS 4EA15A10, 11; REV. B

(RC-830B)

PARTS LIST

VOICE DIRECTOR SELECTIVE SIGNALING UNITS

MODELS 4EA15A10 & A11, REV R

PL-19C300553-G1 & G2

SYMBOL	G-E PART NO.	DESCRIPTION
		Consists of Audio Amplifier Board PL-19C300553-G1 and Squelch Control Board PL-19C300554-G1 and G2.
		AUDIO AMPLIFIER BOARD PL-19C300553-G1
		CAPACITORS
C1401 and C1402	3491647-P8	Tantalum, 65°C: 2 µf +50% -20%, 8 VDCW, sim to Sprague 160D20.
C1402*	3491674-P10	Tantalum: 15 µf -50% -20%, 6 VDCW; sim to Sprague 564935. Changed by Rev. A. In Rev. 0:
	3491674-P9	Tantalum, 65°C, 20 µf +50% -20%, 8 VDCW; sim to Sprague 564937.
C1404	3496267-P2	
C1405	3493223-P15	Ceramic, high dielectric, subminiature: .01 µf -100% -0%, 75 VDCW.
C1406	3492638-P6	Ceramic disc: (Ultra-high capacitance): .047 µf -80% -20%, 12 VDCW, sim to Sprague 40C225.
C1419	3491671-P8	Tantalum: 65°C: 2 µf +50% -20%, 8 VDCW, sim to Sprague 160D20.
		JACK
J1401	3496634-P1	Ultraminiature; sim to Switchcraft TR-2A.
		INDUCTOR
L1401	19C300295-P1	Molded epoxy, DC res 35 ohms max, 300 to 4000 cps. 30 VADC with 2 VADC max unbalance.
		TRANSISTORS
Q1401 thru Q1404	3492639-P1	Germanium, NPN, sim to Sylvania 2N213A.
		RESISTORS
R1401	19C300097-P3	Potentiometer, Carbon Film, 2500 ohms ±20%, 1/4 watt, SPST Switch included for 2 amp at 125 VAC.
R1402	3R152-P224J	Fixed composition, 220,000 ohms ±5%, 1/4 w.
R1403	3R152-P154J	Fixed composition, 150,000 ohms ±5%, 1/4 w.
R1404	3R152-P303J	Fixed composition, 30,000 ohms ±5%, 1/4 w.
R1405	3R152-P102J	Fixed composition, 1000 ohms ±5%, 1/4 w.
R1406	3R152-P271J	Fixed composition, 270 ohms ±5%, 1/4 w.
R1407*		Deleted by Rev. A. In Rev. 0:
	3R152-P103J	Fixed composition, 10,000 ohms ±5%, 1/4 w.
R1408	3R152-P154J	Fixed composition, 150,000 ohms ±5%, 1/4 w.
R1409	3R152-P163J	Fixed composition, 16,000 ohms ±5%, 1/4 w.
R1410	3R152-P243J	Fixed composition, 24,000 ohms ±5%, 1/4 w.
R1411	3R152-P201J	Fixed composition, 200 ohms ±5%, 1/4 w.
R1412	3R152-P242J	Fixed composition, 2400 ohms ±5%, 1/4 w.
R1413	3R152-P102J	Fixed composition, 1000 ohms ±5%, 1/4 w.
R1418	3R151-P100J	Fixed composition, 10 ohms ±5%, 1/4 w.
R1429	3R152-P272J	Fixed composition, 2700 ohms ±5%, 1/4 w.
R1430	3R152-P104J	Fixed composition, 100,000 ohms ±5%, 1/4 w.
R1432*	3R152-P102J	Fixed composition: 1000 ohms ±5%, 1/4 w. Changed by Rev. B.
		In Rev. A:
	3R152-P470J	Fixed composition: 47 ohms ±5%, 1/4 w.
R1433*	3R152-P221J	Fixed composition: 220 ohms ±5%, 1/4 w. Added by Rev. B.
		SWITCHES
S1401		Part of R1401.
S1402	4037134-P,	Push Button, SPST, Momentarily normally open, 10 amp, 115 VAC, sim to Grayhill 30-1 X.O.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

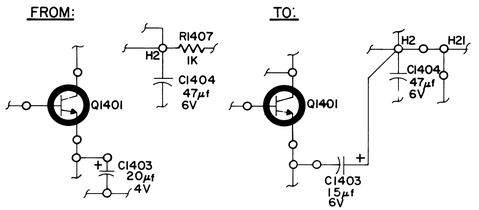
SYMBOL	G-E PART NO	DESCRIPTION
		TRANSFORMER
T1401	19C300331-P1	Audio: DC res Pri: 660 ohms, Sec 300 ohms, 500 to 2000 cps ±1.0 db. Pri imp 3000 ohms ±10%. Sec imp 2000 ohms.
		THERMISTORS
RT1401	3496841-P4	Res at 25°C, 30,000 ohms ±10%, Temp Coef 3900 ±55, % change 4.4% per °C at 25°C. Sim to Glenaire 43T02.
RT1402	3496841-P3	Res at 25°C, 1200 ohms ±10%, Temp Coef 3400 ±80, % change 4.9% per °C at 25°C. Sim to Glenaire 31.2TE2.
RT1403	3496841-P4	Res at 25°C, 30,000 ohms ±10%, Temp Coef 3900 ±55, % change 4.4% per °C at 25°C. Sim to Glenaire 43T02.
		SQUELCH CONTROL BOARD PL-19C300554-G1 & G2
		CAPACITORS
C1407	3491674-P2	Tantalum: 65°C: 10 uf +50% -20%, 10 VDCW. Sim to Sprague 564936.
C1408	3491674-P1	Tantalum: 65°C: 1.0 uf +50% -20%, 8 VDCW. Sim to Sprague 160D25.
C1409*	3491674-P10	Tantalum: 15 uf +50% -20%, 6 VDCW; sim to Sprague 564935. Changed by Rev. A. In Rev. 0:
	3491674-P9	Tantalum: 20 uf +50% -20%, 8 VDCW; sim to Sprague 564937.
C1410	3492638-P1	Ceramic disc: (Ultra-high capacitance): .10 uf -100% -0%, 3 VDCW. Sim to Sprague 54C23.
C1411	3496267-P10	Fixed tantalum: Dry solid, 22 uf ±20%, 15 VDCW; sim to Sprague 150D226X0015B2.
C1412	3491674-P9	Tantalum: 65°C: 20 uf +50% -20%, 4 VDCW. Sim to Sprague 564937.
C1413	3491674-P10	Tantalum: 65°C: 15 uf +50% -20%, 6 VDCW. Sim to Sprague 564935.
C1414	3491674-P2	Tantalum: 65°C: 10 uf +50% -20%, 10 VDCW. Sim to Sprague 564936.
C1416	3492638-P1	Ceramic disc: (Ultra-high capacitance): .10 uf -100% -0%, 3 VDCW. Sim to Sprague 54C23. Used in G2 only.
C1417	3491674-P9	Tantalum: 65°C: 20 uf +50% -20%, 4 VDCW. Sim to Sprague 564937. Used in G2 only.
C1420*	3496267-P12	Fixed tantalum: Dry solid, 150 uf ±20%, 15 VDCW; sim to Sprague 150D226X0015B2. Changed by Rev. A. In Rev. 0:
	3496267-P10	Fixed tantalum: Dry solid, 22 uf ±20%, 15 VDCW; sim to Sprague 150D226X0015B2.
C1421* and C1422*	3491674-P9	Tantalum: 20 uf +50% -20%, 4-VDCW; Sim to Sprague 564937. Added by Rev. B.
		DIODES
CR1401 and CR1402	3492262-P1	Germanium, sim to Transitron S-320G.
CR1403- CR1405	3491705-P2	Silicon, sim to Hughes HD 6225. CR1405 used in G2 only.
		TRANSISTORS
Q1405 and Q1406	3492639-P1	Germanium, NPN, Sylvania 2N213A.
Q1407	3496839-P1	Germanium, PNP, Sim to RCA 2N408.
		RESISTORS
R1415	3R152-P154J	Fixed composition, 150,000 ohms ±5%, 1/4 w.
R1416	3R152-P622J	Fixed composition, 6200 ohms ±5%, 1/4 w.
R1417	3R152-P470J	Fixed composition, 47 ohms ±5%, 1/4 w. Used in G2 only.
R1418	3R152-P911J	Fixed composition, 910 ohms ±5%, 1/4 w.
R1419*	3R152-P103J	Fixed composition: 30,000 ohms ±5%, 1/4 w. Changed by Rev. B.
		In Rev. A:
	3R152-P102J	Fixed composition: 1,000 ohms ±5%, 1/4 w.
R1420*	3R152-P113J	Fixed composition: 11,000 ohms ±5%, 1/4 w. Changed by Rev. B
		In Rev. A:
	3R152-P753J	Fixed composition: 75,000 ohms ±5%, 1/4 w.
R1421	3R152-P473J	Fixed composition, 47,000 ±5%, 1/4 w.
R1422	3R152-P152J	Fixed composition, 1500 ohms ±5%, 1/4 w.
R1423	3R152-P102J	Fixed composition, 1000 ohms ±5%, 1/4 w.
R1424	3R152-P122J	Fixed composition, 1200 ohms ±5%, 1/4 w.
R1425	3R152-P334J	Fixed composition, 330,000 ohms ±5%, 1/4 w.
R1427	3R152-P753J	Fixed composition, 75,000 ohms ±5%, 1/4 w. Used in G2 only.
R1431	3R152-P331J	Fixed composition, 330 ohms ±5%, 1/4 w. Used in G1 only.

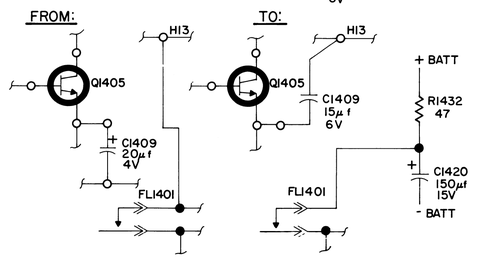
SYMBOL	G-E PART NO	DESCRIPTION
		TRANSFORMERS
T1402 and T1403	19C300331-P1	Audio: DC res Pri: 660 ohms Sec 300 ohms, 500 to 2000 cps ±1.0 db. Pri imp 3000 ohms ±10%. Sec imp 2000 ohms. T1402 used in G2 only.
		MISCELLANEOUS
	PL-4037065-G1	Socket: for FL1401 and FL1402, consists of C1415 and R1426.
C1415*	3491674-P1	Deleted by Rev. B. In Rev. A:
	3491674-P1	Tantalum: 65°C: 1.0 uf +50% -20%, 8 VDCW. Sim to Sprague 160D25.
R1426	3R152-P133J	Fixed composition, 13,000 ohms ±5%, 1/4 w.
	PL-4037065-G2	Socket: for FL1403 and FL1404, includes C1418 and R1428.
C1418-		Deleted by Rev. B. -50% -20%, 8 VDCW. Sim In Rev. A
	3491674-P1	Tantalum: 65°C: 1.0 uf ±50% -20%, 8-VDCW. Sim to Sprague 160D25.
R1426*	3R152-P103J	Fixed composition; 100 ohms ±5%, 1/4 w. Changed by Rev. B.
		In Rev. A:
	3R152-P133J	Fixed composition; 13,000 ohms ±5%, 1/4 w.
		RELAYS
FL1401- FL1404	19C300016	Electromechanical Detector Group No. is determined by frequency marked on case multiplied by 10. For example: 547.5 cps x 10=Group No. 5475. Must be coordinated with Dispatcher.
	19C300016-G5173	517.5 cps
	19C300016-G5325	532.5 cps
	19C300016-G5475	547.5 cps
	19C300016-G5625	562.5 cps
	19C300016-G5775	577.5 cps
	19C300016-G5925	592.5 cps
	19C300016-G6075	607.5 cps
	19C300016-G6225	622.5 cps
	19C300016-G6373	637.5 cps
	19C300016-G6523	652.5 cps
	19C300016-G6675	667.5 cps
	19C300016-G6823	682.5 cps
	19C300016-G6973	697.5 cps
	19C300016-G7123	712.5 cps
	19C300016-G7275	727.5 cps
	19C300016-G7423	742.5 cps
	19C300016-G7573	757.5 cps
	19C300016-G7725	772.5 cps
	19C300016-G6873	687.5 cps
	19C300016-G8025	802.5 cps
	19C300016-G8175	817.5 cps
	19C300016-G8325	832.5 cps
	19C300016-G8473	847.5 cps
	19C300016-G8623	862.5 cps
	19C300016-G8773	877.5 cps
	19C300016-G8923	892.5 cps
	19C300016-G9075	907.5 cps
	19C300016-G9225	922.5 cps
	19C300016-G9373	937.5 cps
	19C300016-G9525	952.5 cps
	19C300016-G9675	967.5 cps
	19C300016-G9825	982.5 cps
	19C300016-G9973	997.5 cps

PRODUCTION CHANGES

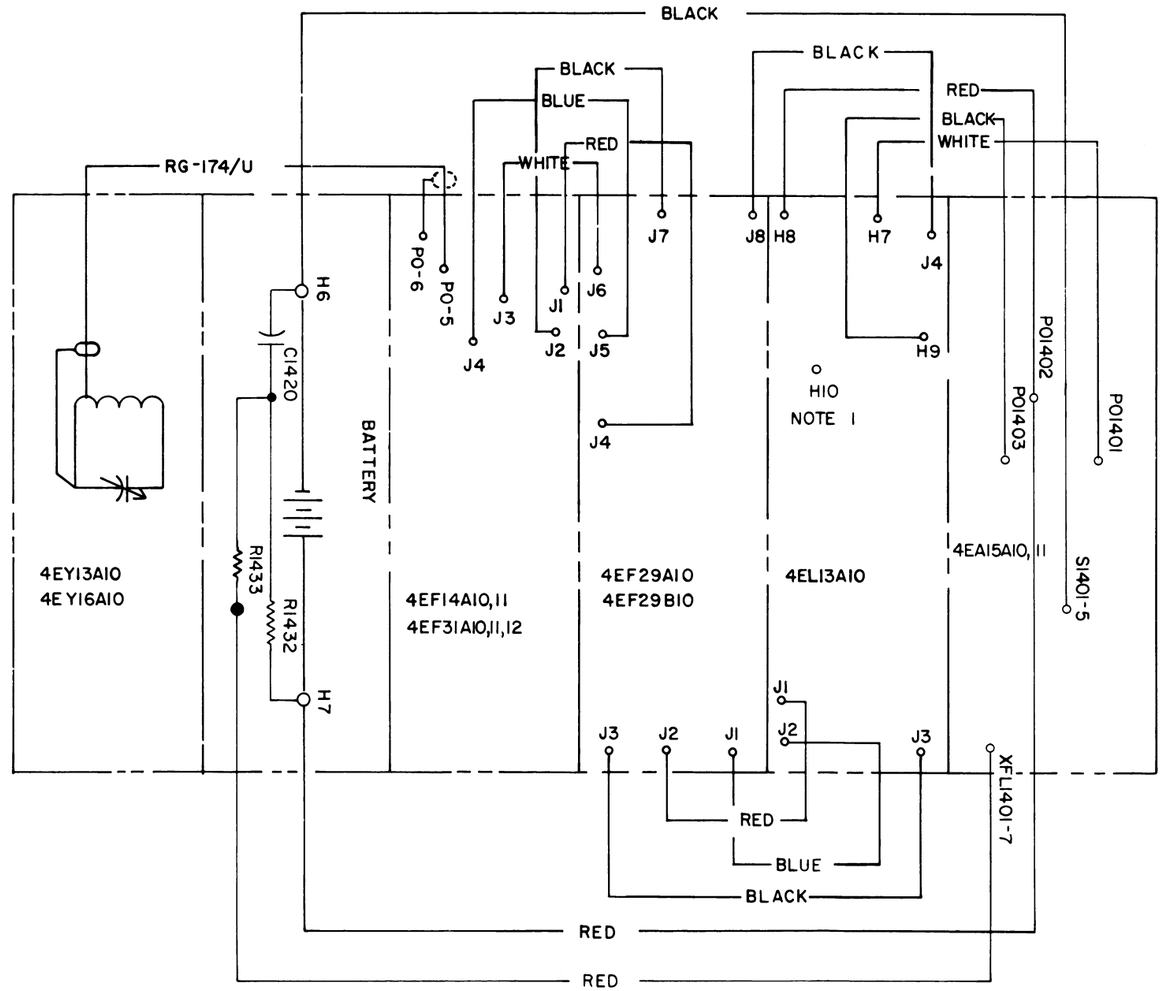
REV. A - To eleminate audio disturbances caused by variations in battery voltage due to added load of Selective Calling Option. Changed values of C1403, C1409 and C1420. Deleted R1407. Added R1432. See Parts List for new values.

Elementary Diagram Changes:





REV. B - To provide simultaneous and sequential selective calling. See Parts List for new values.



NOTE 1. REMOVE BLUE WIRE FROM H10.

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Interconnection Diagram

VOICE DIRECTOR
SELECTIVE SIGNALING UNITS,
MODELS 4EA15A10, 11

(19B204044, Sh. 2, Rev. 1)