Customer_____

G. E. Req. No._____

Customer Order No._____

INSTRUCTIONS

FOR

GENERAL ELECTRIC 100 CALL DISPATCHER

MODEL 4EC40A1

LBI-10094B

DF-5015

TABLE OF CONTENTS

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COMMUNICATION PRODUCTS DEPARTMENT

GENERAL ELECTRIC

LYNCHBURG, VIRGINIA

Printed in U.S.A.

GENERAL ELECTRIC 100 CALL DISPATCHER

Tone Dispatcher, Model 4EC40A1, is a selective signaling unit that provides a means of alerting any one or all of the mobile units in a system by transmitting audio tones at various frequencies corresponding to codes assigned to the mobile units. The 4EC40A1 is a self-contained tone dispatch console capable of signaling up to 100 individual units, one or more groups of units, or all units in a system.

The Tone Dispatcher is a tone generating and switching device permitting the selection of 100 combinations of two simultaneous audio frequency tones, with provision for keying the station radio transmitter which, in turn, transmits the tones for a pre-determined period.

Power is provided by a self-contained AC Power Supply. Provision for connecting a 12 volt battery is included for use in case of emergency. A diode switch in the power supply circuit allows the battery to take over automatically in the event of power line failure.

INSTALLATION

Position the Dispatcher in a convenient location for the operator. Connect the line cord to the nearest 117 volt, 50/60 cps outlet. The 10 foot output cable connects to J1221 and to the station audio input circuit. The microphone cable connects to J1222. The microphone and output jacks on the Dispatcher are compatible with General Electric Progress Line Station Combinations.

The emergency battery may be connected permanently to TB1201. Accidental reversing of the battery leads will cause no damage or blown fuses. No provision is made for charging the battery; thus periodic checks of the battery condition are necessary, and separate facilities for battery charging should be available.

The Dispatcher is supplied with an 'L' pad (R1246 and R1247) in the tone output circuit. This pad limits the tone to the level necessary for driving the EC-28 Remote Control unit or other high gain amplifier. When the tone is fed directly into a transmitter, R1246 should be clipped out of the circuit.

ADJUSTMENT

Tone Level

Each tone generator must be adjusted individually in the Dispatcher to the level necessary to properly modulate the transmitter. These adjustments are made on the basis of applying equal amplitude of each tone to the input terminals of a tone selector (decoder) in

the system. The following chart shows the proper point in the receiver circuit for connecting an audio VTVM for measuring this level.

RECEIVER	VTVM HIGH	VTVM COM
TPL	J305 on Audio Board	J304
Voice Director	DISC Jack	+ BATT
Other Type	Decoder Input	Audio Common

1. The transmitter must be adjusted for full limiting at 5.0 KC (narrow band) and for full limiting at 13 KC (wide band). Refer to the transmitter Instruction Book.

2. Release all push-buttons on the Dispatcher.

3. Depress B9. This will be the highest tone frequency used in the system.

4. Test Switch, S1203, by-passes the timing circuits and permits transmission of the selected tones continuously for these adjustments. The Test Switch should be released periodically while making the adjustments in keeping with the rated duty cycle of the transmitter.

5. Adjust the level potentiometer (R7) on the tone generator to a position 10° of rotation from its minimum position.

6. Place the Test Switch in the TEST position. Adjust the Master Level potentiometer (R1202) to produce a deviation of 3 KC (narrow band) or 6 KC (wide band) as measured with a modulation monitor at the transmitter. Do not exceed this deviation.

7. Note the tone level (in millivolts) at the selector input terminals.

8. Release B9. Select another tone frequency. Adjust the Level potentiometer (R7) on this generator to produce the same level at the input terminals of the selector as obtained previously.

9. Selecting one tone frequency at a time, set R7 on each generator to obtain the same amplitude for each tone as obtained in Step 7.

10. Release S1203. The Dispatcher is now ready for use.

NOTE: The procedure for adjusting the Dispatcher for use with the EC-28 Remote Control unit is the same as outlined above. The EC-28 should be properly adjusted according to instructions in the RC-4 Instruction Book. Once this unit has been adjusted (without tone), none of the level controls in the unit should be changed.

If, at any time, the MIKE GAIN potentiometer in the EC-28 is

changed, the Master Level Control (R1202) in the Dispatcher will have to be readjusted.

OPERATION

The Dispatcher has two vertical rows of push buttons on the front panel. One button in each row must be pushed for each call, as each Function is composed of two simultaneous tones. To signal the unit he is calling, the operator selects the proper combination of buttons indicated by the assigned simultaneous frequencies.

After selecting the proper combination, the operator presses the SEND Switch which automatically transmits the selected tones for one second. Once the SEND Switch has been depressed, the timing circuit takes over the transmission and the duration of holding down the SEND Switch has no effect on the timing of the transmission.

CIRCUIT DESCRIPTION

Tone Generator

The Tone Generator, PL-19B200134, consists of a transistorized oscillator circuit utilizing a vibrating-reed tone governing device that provides the frequency selective component of the oscillator circuit, and also provides feedback for proper oscillator operation.

Energy is coupled from the collector of Q1 to terminals 1 and 2 of the tone governing device, where transformer action between the two coils takes place, returning the energy to the base of Q1. The vibrating reed responds only to the specific frequency to which it is resonant; therefore, only the desired frequency appears at the output Jack, P1. R7 provides an adjustment of the output level.

Twenty Tone Generators, each resonant to a specific audio frequency, are operated continuously when power is applied to the Dispatcher. Selector Switches, S1204 and S1205, are interlocked so that only one Tone Generator may be selected in each bank at one time.

Tone Amplifier

The input level of the selected audio tone is determined by the setting of Master Level Control, R1202. This Control is connected to the base of the Tone Amplifier, Q1201. The output of Q1201 is coupled through a filter (consisting of C1205-C1210, L1201 and L1202) which suppresses harmonics. The tone signals are fed from the filter to the Transmitter Jack, J1221.

Timing Circuit

Once the tone transmission is initiated by closing the momentary contacts of SEND Switch, S1202, a timing circuit controls the duration of the transmission regardless of how long S1202 is held

down.

Timing capacitors C1211 and C1212 are charged through the normally-closed contacts 14 and 15 of Relay K1202 and normally-closed contacts of S1202. Closing contact NO of S1202 provides a discharge path for C1211 and C1212 through Timing Control R1210, permitting Timing Transistor, Q1202, to conduct.

Conduction of Q1202 operates Relay K1201, closing contacts 5 and 7. This operates K1202 and K1203. Contacts 9 and 10 of K1202 close, shorting S1202 and permitting its contacts to revert to NC. Contacts 14 and 15 of K1202 open, removing the charging path to C1211 and C1212. Contacts 11 and 12 of K1202 open, removing the mike from the Transmitter circuit. Contacts 6 and 7 of K1202 close, restoring ground to the Transmitter circuit and thus keying the Transmitter. Contacts 12 and 13 of K1202 close, connecting the tone to the transmitter.

Contacts 6-7, and 9-10, of K1203 close, providing a path for the tone signals from the selected Tone Generators to the Tone Amplifier. Contacts 15 and 16 of K1203 close, extinquishing the White Standby Lamp (DS1202) and turning on the Red Keying Lamp (DS1201). Both of these lamps illuminate the push button of S1202.

At the end of the timing interval, Q1202 ceases conduction and all relays return to normal.

Power Supply

The 117 volt, 50/60 cps line is applied across the primary of T1201, stepped down to a nominal 12 volts across the bridge rectifier (CR1202-CR1205), filtered by C1201, C1202, and R1201, and regulated by CR1206.

If an emergency battery is connected to TB1201, it will supply current to the circuit only if the rectifier voltage drops below the battery voltage. If rectifier voltage drops due to line failure or poor regulation, the battery will automatically supply the necessary current. Accidental reversal of the battery leads will cause no damage because of the protection offered by CR1201.

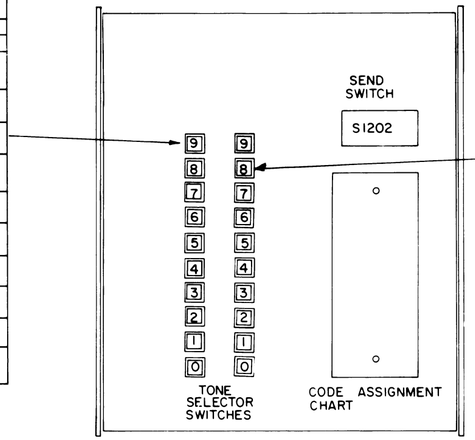
MAINTENANCE

Reference should be made to the Service Outline Drawing and Elementary Diagram when servicing the Dispatcher.

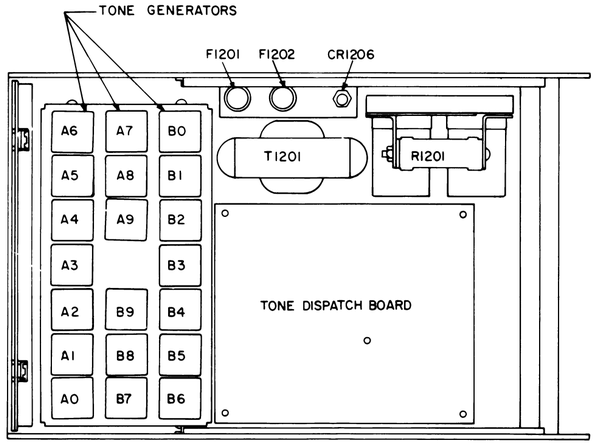
COMMUNICATION PRODUCTS DEPARTMENT
GENERAL ELECTRIC COMPANY
LYNCHBURG, VIRGINIA

Printed in U.S.A.

TONE FREQUENCY CHART			
PUSHBUTTON NO.	P1 SERIES 0	P2 SERIES 1	P3 SERIES 2
A0	892.5	562.5	532.5
A1	877.5	607.5	547.5
A2	862.5	622.5	577.5
A3	847.5	652.5	592.5
A4	832.5	667.5	637.5
A5	817.5	697.5	682.5
A6	802.5	742.5	727.5
A7	787.5	787.5	772.5
A8	772.5	832.5	817.5
A9	757.5	877.5	862.5



TONE FREQUENCY CHART			
PUSHBUTTON NO.	P1 SERIES 0	P2 SERIES 1	P3 SERIES 2
B0	517.5	712.5	712.5
B1	532.5	757.5	757.5
B2	547.5	802.5	802.5
B3	562.5	847.5	847.5
B4	577.5	892.5	892.5
B5	592.5	907.5	907.5
B6	607.5	922.5	922.5
B7	622.5	937.5	937.5
B8	637.5	952.5	952.5
B9	652.5	967.5	967.5



TOP VIEW WITH COVER REMOVED

TO DETERMINE FREQUENCY LISTED IN TONE FREQUENCY CHARTS (ABOVE), CHECK THE TONE GENERATOR FREQUENCIES AS TO THEIR LOCATION ON THE TONE GENERATOR MOUNTING PANEL (AT LEFT).

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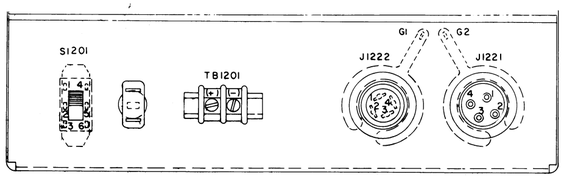
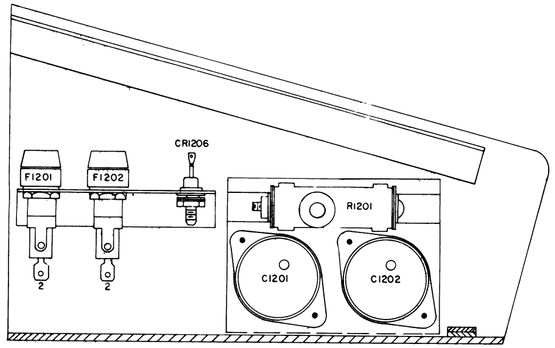
Application Diagram

100 CALL DISPATCHER
MODEL 4EC40A1, REV. C

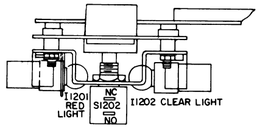
(RC-697D)



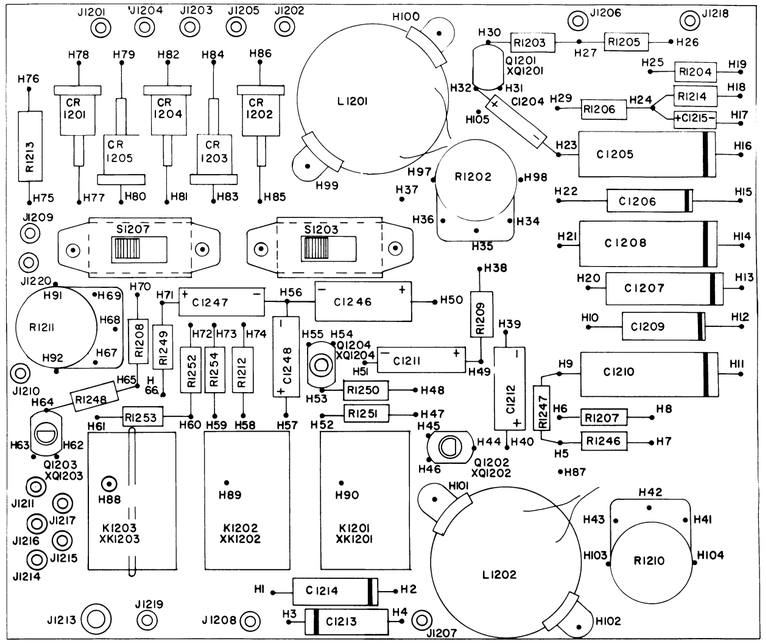
REAR PANEL OF DISPATCHER



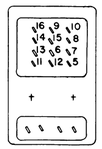
SIDE VIEW OF DISPATCHER COMPONENT



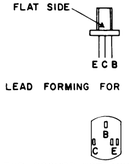
SIDE VIEW OF SEND SWITCH ASSEMBLY



TONE DISPATCHER BOARD PL-19C303306-G1



BOTTOM VIEW OF S1203 & 7



LEAD FORMING FOR Q1202, Q1203, Q1204

TYP SOCKET FOR XQ1202, XQ1203, XQ1204

BOTTOM VIEW OF XK1201-2-3

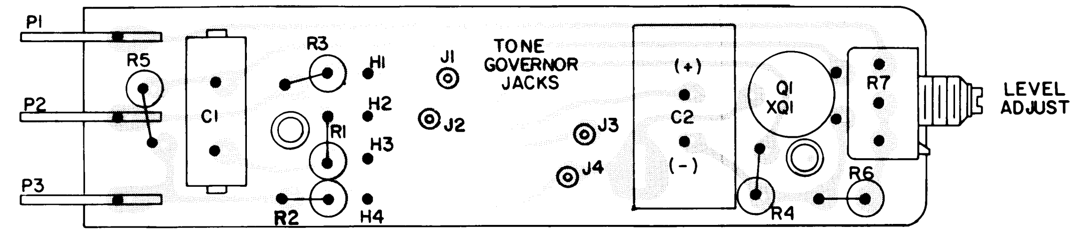
9153

Service Outline

DISPATCHER BOARD
PL-5496988-G1

(RC-698C)

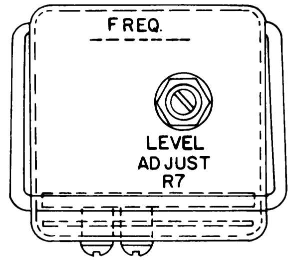
TOP VIEW OF TONE GENERATOR

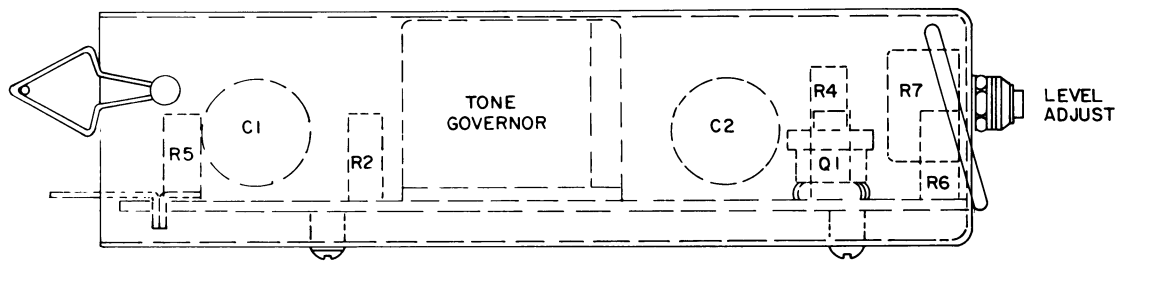


(19B200134)
(19B200118)

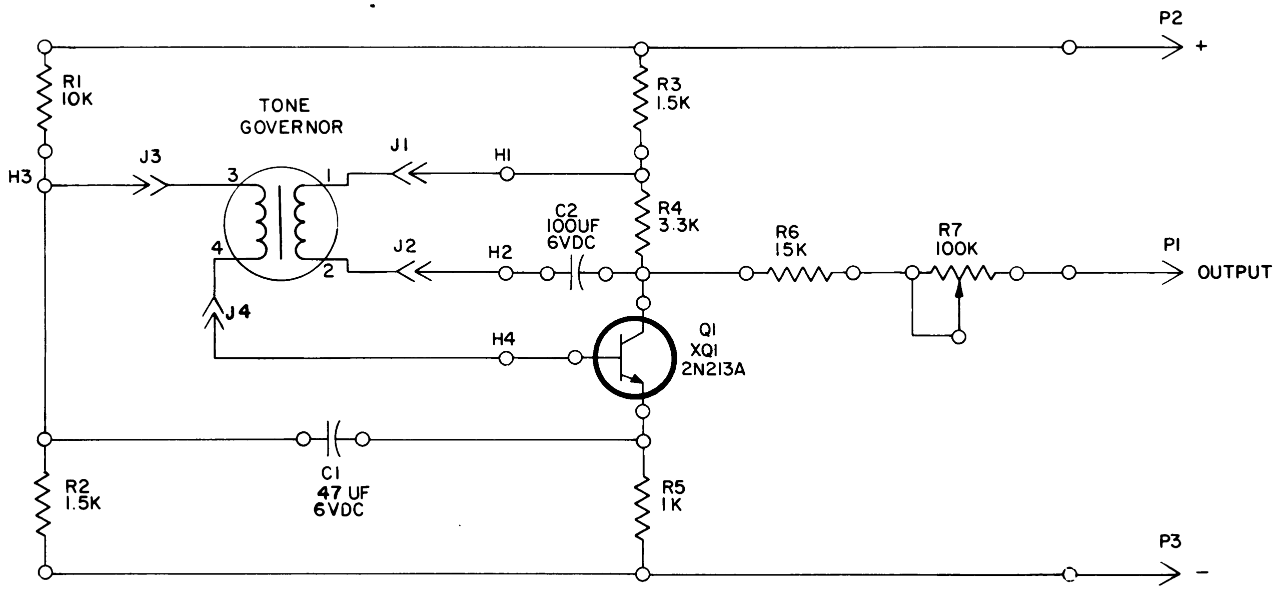
DENOTES SOLDER CIRCUIT

END VIEW





SIDE VIEW OF TONE GENERATOR



(19B200233)

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

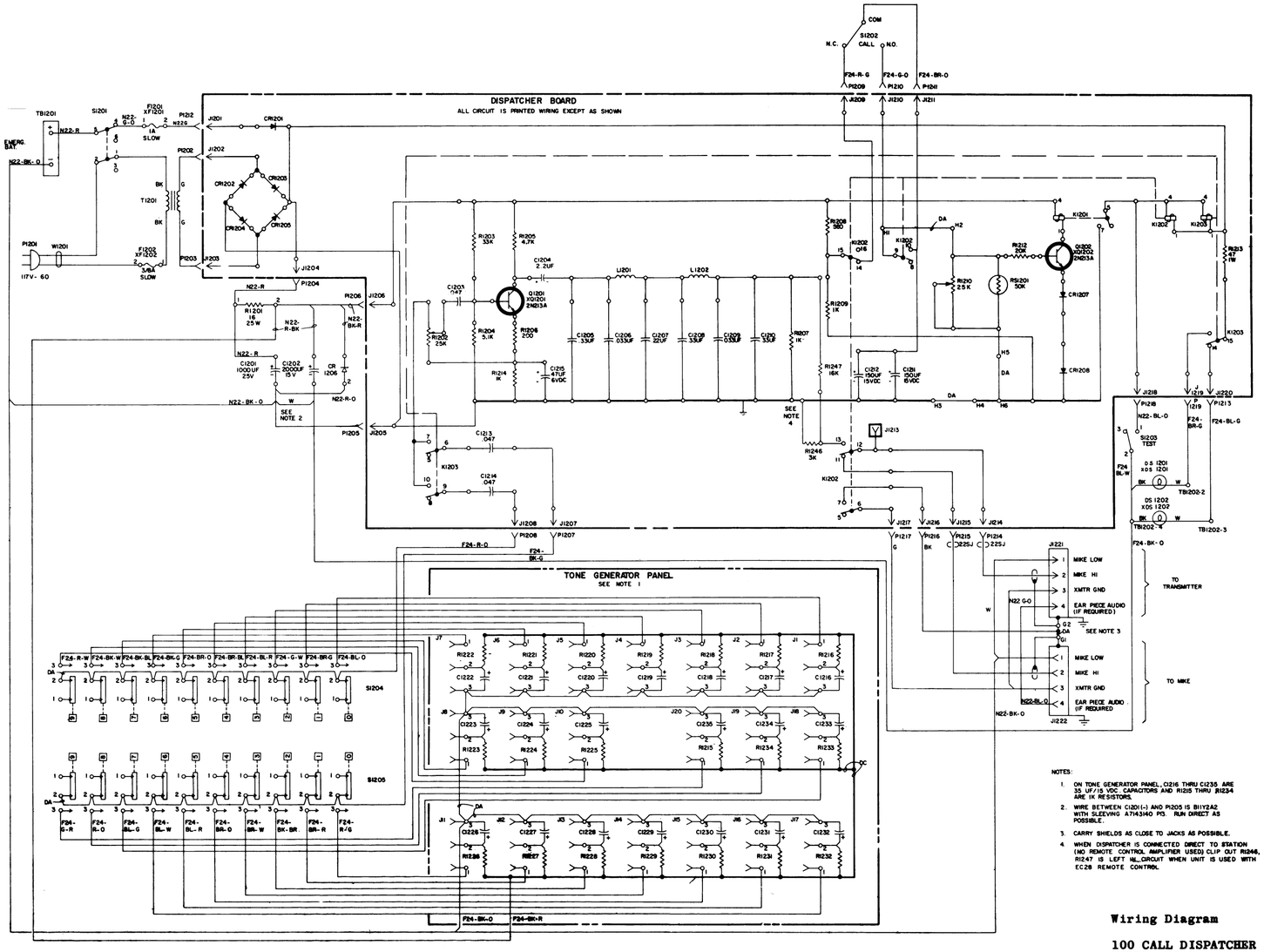
CPD 310A

15183

Service Outline

TONE GENERATOR
PL-19B200236

(RC-835C)



NOTES:

1. ON TONE GENERATOR PANEL, C1216 THRU C1235 ARE 35 UF/15 VDC CAPACITORS AND R1215 THRU R1234 ARE 1K RESISTORS.
2. WIRE BETWEEN C1201(-) AND P1205 IS B11Y2A2 WITH SLEEVING A7143140 P/O. RUN DIRECT AS POSSIBLE.
3. CARRY SHIELDS AS CLOSE TO JACKS AS POSSIBLE.
4. WHEN DISPATCHER IS CONNECTED DIRECT TO STATION (NO REMOTE CONTROL AMPLIFIER USED) CLIP OUT R1246, R1247 IS LEFT IN. CIRCUIT WHEN UNIT IS USED WITH EC28 REMOTE CONTROL.

Wiring Diagram

100 CALL DISPATCHER
MODEL 4EC40A1

(E-5499269, Rev. 7)

PARTS LIST

MODEL 4EC40A1 100 CALL DISPATCHER

PL-5499273-G1
REV. A

SYMBOL	G-E PART NO.	DESCRIPTION
		CAPACITORS
C1201	7476442-P12	Dry electrolytic; 1000 µf +250% -10%, 25 VDCW. Sim to Mallory WP059.
C1202	7770994-P11	Dry electrolytic; 2000 µf +250% -10%, 15 VDCW. Sim to Mallory WP.
C1203-C1215		Part of Dispatcher Board PL-5496988-G1.
C1216-C1235	7489483-P10	Electrolytic; 35 µf +100% -10%, 15 VDCW. Sim to Sprague 30D169A1.
		DIODES
CR1201-CR1205		Part of Dispatcher Board PL-5496988-G1.
CR1206	5495912-P1	Zener: Silicon.
CR1207& CR1208		Part of Dispatcher Board PL-5496988-G1.
		FUSES
F1201	7487942-P5	Slow blowing: 1/4 x 1-1/4 (3AG); 1 amp @ 250 v. Sim to Bussman MDL-1.
F1202	7487942-P2	Slow blowing: 1/4 x 1-1/4 (3AG); 3/8 amp @ 250 v. Sim to Bussman MDL-3/8.
		INDICATORS
DS1201	4036924-P1	Indicator lamp assembly; G-E No. 53 Lamp, colored red.
DS1202		G-E No. 53 Lamp, clear.
		JACKS AND RECEPTACLES
J1201-J1220		Part of Dispatcher Board PL-5496988-G1.
J1221	7117934-P4	Connector, chassis, 4 male contacts, sim to Amphenol 91-PC4M.
J1222	7117934-P2	Connector, chassis, 4 female contacts, sim to Amphenol 91-PC4F.
		RELAYS
K1201-K1203		Part of Dispatcher Board PL-5496988-G1.
		INDUCTORS
L1201& L1202		Part of Dispatcher Board PL-5496988-G1.
		PLUGS
P1201		Part of W1201 Cord Set.
P1202 & P1203	4029840-P1	Receptacle, sim to Amp Inc 41854.
P1204-P1220	4029840-P2	Receptacle, sim to Amp Inc 42827-2.
		RESISTORS
R1201	2R14-P113	Potentiometer, wire wound; 16 ohms ±5%, 35 w. Sim to Ward Leonard K41383.
R1202-R1214		Part of Dispatcher Board PL-5496988-G1.
R1215-R1234	3R77-P102K	Composition, 1000 ohms ±10%, 1/2 w.
R1246-R1247		Part of Dispatcher Board PL-5496988-G1.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	G-E PART NO	DESCRIPTION
		TRANSISTORS
Q1201 & Q1202		Part of Dispatcher Board PL-5496988-G1.
		THERMISTORS
RS1201 & RS1202		Part of Dispatcher Board PL-5496988-G1.
		SWITCHES
S1201	7145098-P1	Slide: DPDT; 0.5 amp @ 125 v. Sim to Stackpole SS-150.
S1202	19B200007-P1	Push-button; snap action; 15 amps @ 0.125-250 VAC. Sim to Cherry Electrical E13-007.
S1203	7145098-P1	Slide: DPDT, 0.5 amp @ 125 v. Sim to Stackpole SS-150.
S1204 & S1205	19C300108-P3	Push-button, single slide; 1 Form C contact, Sim to Oak Type 80.
		TRANSFORMERS
T1201	5493743-P1	Power (filament) single phase. Pri: 117 v, 50/60 cps. Sec: 12.6 v ±3%, 2 amps.
		TERMINAL BOARDS
TB1201	4035303-P2	Block, phenolic; Sim to Curtis EFT-2.
TB1202	7775500-P3	Board, phenolic; 4-terminals.
		CABLES
W1201	4036441-P3	Cord set: 9 ft. No. 18 AWG. Sim to G-E 2073-1.
		SOCKETS
XF1201 & XF1202	7115179-P1	Fuse holder: 1/4 x 1-1/4 inch (3AG); 15 amps @ 250 v. Sim to Bussman HKP.
XDS1201 & XDS1202	4032220-P1	Lamp socket: miniature bayonet base. Sim to Drake N517.
XK1201-XK1203		Part of Dispatcher Board PL-5496988-G1.
XQ1201 & XQ1202		Part of Dispatcher Board PL-5496988-G1.
		DISPATCHER BOARD PL-5496988-G1
		CAPACITORS
C1203	7491930-P108	Mylar®; 0.047 µf ±20%, 100 VDCW. Sim to Good-All 663-UW.
C1204	5496267-P13	Tantalum; 2.2 µf ±20%, 20 VDCW. Sim to Sprague 150D225X0020A2.
C1205	7491930-P11	Mylar®; 0.33 µf ±20%, 100 VDCW. Sim to Good-All 663-UW.
C1206	7491930-P7	Mylar®; 0.033 µf ±20%, 100 VDCW. Sim to Good-All 663-UW.
C1207	7491930-P10	Mylar®; 0.22 µf ±20%, 100 VDCW. Sim to Good-All 663-UW.
C1208	7491930-P11	Mylar®; 0.33 µf ±20%, 100 VDCW. Sim to Good-All 663-UW.
C1209	7491930-P7	Mylar®; 0.033 µf ±20%, 100 VDCW. Sim to Good-All 663-UW.
C1210	7491930-P11	Mylar®; 0.33 µf ±20%, 100 VDCW. Sim to Good-All 663-UW.
C1211 & C1212	5496267-P12	Tantalum; 150 µf ±20%, 15 VDCW. Sim to Sprague 150D225X0020A2.
C1213 & C1214	7491930-P108	Mylar®; 0.047 µf ±20%, 100 VDCW. Sim to Good-All 663-UW.
C1215	5496267-P2	Tantalum; 47 µf ±20%, 6 VDCW. Sim to Sprague 150D476X0006B2.
		DIODES
CR1201-CR1205	5490415-P2	Silicon.
CR1207 & CR1208	5491705-P2	Silicon.

SYMBOL	G-E PART NO	DESCRIPTION
		JACKS AND RECEPTACLES
J1201-J1212	4033513-P4	Contact pin: Sim to Bead Chain L93-3.
J1213	4029830-P4	Test jack; Sim to Raytheon B8436401166-G2.
J1214-J1220	4033513-P4	Contact pin: Sim to Bead Chain L93-3.
		RELAYS
K1201	5491595-P22	1 Form A contact; Sim to Allied Relay T154-0-A.
K1202 & K1203	5491595-P23	4 Form C contacts; Sim to Allied Relay T154-CC-CC.
		INDUCTORS
L1201 & L1202	PL-5493573-G50	Ferrite coil assembly; Turns: 195, 173, 195.
		RESISTORS
R1202	7491365-P103	Potentiometer; 25,000 ohms ±20%, mod. log taper, .05 w. Sim to Chicago Telephone Supply UPE-70.
R1203	3R77-P333J	Composition, 33,000 ohms ±5%, 1/2 w.
R1204	3R77-P512J	Composition, 5100 ohms ±5%, 1/2 w.
R1205	3R77-P472J	Composition, 4700 ohms ±5%, 1/2 w.
R1206	3R77-P201J	Composition, 200 ohms ±5%, 1/2 w.
R1207	3R77-P102J	Composition, 1000 ohms ±5%, 1/2 w.
R1208	3R77-P561J	Composition, 560 ohms ±5%, 1/2 w.
R1209	3R77-P102J	Composition, 1000 ohms ±5%, 1/2 w.
R1210 & R1211	7491365-P103	Potentiometer, 25,000 ohms ±20%, mod log taper, .05 w. Sim to Chicago Tel. Supply UPE-70.
R1212	3R77-P203J	Composition, 20,000 ohms ±5%, 1/2 w.
R1213	3R78-P470J	Composition, 47 ohms ±5%, 1 w.
R1214	3R77-P102J	Composition, 1000 ohms ±5%, 1/2 w.
R1246*	3R77-P302J	Composition, 3000 ohms ±5%, 1/2 w. Added by Rev. A.
R1247*	3R77-P163J	Composition, 16,000 ohms ±5%, 1/2 w. Added by Rev. A.
		THERMISTORS
RS1201 & RS1202	5490828-P11	Thermal resistor; 50,000 ohms ±10% at 25°C. Max. input 1 w. at 40°C; temp coef 4000 ±5%, Sim to Globar 781F.
		TRANSISTORS
Q1201 & Q1202	5492639-P1	Germanium, NPN.
		SOCKETS
XK1201	5491595-P6	Relay socket for printed wiring. Sim to Allied Control 30054-3.
XK1202 & XK1203	5491595-P7	Relay socket for printed wiring. Sim to Allied Control 30054-4.
XQ1201 & XQ1202	5490277-P2	Transistor socket; 4 contacts. Sim to Elco Corp. 3305. (Used with mounting ring, Sim to Elco Corp. 757).
		TONE GENERATOR PL-19B200236-G1-G66
		Tone Generator, PL-19B200236, consists of Tone Generator Board PL-19B200134-G1 and Tone Governor, PL-19C300590. Group No. is determined by frequency.
		TONE GENERATOR BOARD PL-19B200134-G1
		CAPACITORS
C1	5496267-P2	Tantalum; 47 µf ±20%, 6 VDCW. Sim to Sprague 150D476X0006B2.
C2	7489483-P9	Electrolytic, 200 µf +100% -10%, 3 VDCW. Sim to Sprague 30D116A1.

SYMBOL	G-E PART NO	DESCRIPTION
		JACKS AND RECEPTACLES
J1-J4	4036041-P1	Pin, contact.
		PLUGS
P1-P3	4036046-P1	Pin, contact.
P4-P7	4036987-P1	Contact.
		RESISTORS
R1	3R77-P103J	Composition, 10,000 ohms ±5%, 1/2 w.
R2 & R3	3R77-P152J	Composition, 1500 ohms ±5%, 1/2 w.
R4	3R77-P332J	Composition, 3300 ohms ±5%, 1/2 w.
R5	3R77-P102J	Composition, 1000 ohms ±5%, 1/2 w.
R6	3R77-P153J	Composition, 15,000 ohms ±5%, 1/2 w.
R7	19C300124-P2	Potentiometer, 100,000 ohms ±20%, linear taper @ 1/8 w.; mod log taper @ 1/16 w. @ 40°C, 350 VDC max. Sim to Mallory HLC.
		TRANSISTOR
Q1	5492639-P1	Germanium, NPN.
		SOCKET
XQ1	5490277-P2	Transistor socket: 4 contacts .03 ohms max, 1 amp, 400 vrms. Sim to Elco Corp. 3305.

TONE GOVERNOR PL-19C300590

Electromechanical resonant reed subassembly. Group No. determined by multiplying the frequency marked on the generator can by 10. Example: 517.5 cps x 10 equals Group No. 5175.

PL-19C300015-G5325	532.5 cps
PL-19C300015-G5475	547.5 cps
PL-19C300015-G5625	562.5 cps
PL-19C300015-G5775	577.5 cps
PL-19C300015-G5925	592.5 cps
PL-19C300015-G6075	607.5 cps
PL-19C300015-G6225	622.5 cps
PL-19C300015-G6375	637.5 cps
PL-19C300015-G6525	652.5 cps
PL-19C300015-G6675	667.5 cps
PL-19C300015-G6825	682.5 cps
PL-19C300015-G6975	697.5 cps
PL-19C300015-G7125	712.5 cps
PL-19C300015-G7275	727.5 cps
PL-19C300015-G7425	742.5 cps
PL-19C300015-G7575	757.5 cps
PL-19C300015-G7725	772.5 cps
PL-19C300015-G7875	787.5 cps
PL-19C300015-G8025	802.5 cps
PL-19C300015-G8175	817.5 cps
PL-19C300015-G8325	832.5 cps
PL-19C300015-G8475	847.5 cps
PL-19C300015-G8625	862.5 cps
PL-19C300015-G8775	877.5 cps
PL-19C300015-G8925	892.5 cps
PL-19C300015-G9075	907.5 cps
PL-19C300015-G9225	922.5 cps
PL-19C300015-G9375	937.5 cps
PL-19C300015-G9525	952.5 cps
PL-19C300015-G9675	967.5 cps

PRODUCTION CHANGES

REV. A: To improve signal-to-noise ratio and insure compatibility with EC28 Audio Amplifier. Added pad (consisting of R1247 and R1246) and ground lead between case and B- bus on board.