MOBILE RADIO

MAINTENANCE MANUAL

TYPE 99 TONE ENCODER CONSOLES

Models 4EC51A13, 14 & 15

Maintenance Manual LBI-3798A
DF-5615

EC-51-A

SPECIFICATIONS *

Encoder Console Call Capacity	
Model 4EC51A13	100 Call
Model 4EC51A14	400 Call
Model 4EC51A15	900 Call
Tone Frequencies	517.5 to 997.5 Hz
Tone Output Level	Adjustable from 0 to 25 millivolts rms (minimum)
Input Voltage Requirements	117 VAC or 12 VDC
Temperature Range	-30°C to +60°C (22°F to +144°F)
Dimensions (H x W x D)	6-1/2" x 9-3/4" x 16-1/4"

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

GENERAL ELECTRIC

TABLE OF CONTENTS

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.

DESCRIPTION

General Electric Type 99 Tone Encoder Consoles (Models 4EC51A13-15) provide selective calling from base stations to mobiles, personal paging receivers, portable two-way units, or other base stations. The encoders use sequential tone signaling to permit INDIVIDUAL CALL, GROUP CALL, and ALL CALL operation within a single communication system that is properly equipped with appropriate decoders.

NOTE

A suggested method of assigning GROUP CALL and ALL CALL tone codes in Type 99 tone systems is provided in DATAFILE Bulletin 5000-3.

A Model 4EC51A13 Encoder provides up to 100 different combinations of two sequential tones. Model 4EC51A14 provides up to 400 tone combinations, and Model 4EC51A15 provides up to 900 tone combinations. The station transmitter is automatically keyed for a predetermined period during tone signaling operation.

Each encoder has a self contained AC power supply, and provisions for connecting a 12-volt battery for emergency power purposes.

INSTALLATION

Place the encoder in a location that is convenient for the operator and connect the line cord to a 117-volt, 50/60 Hz outlet. Plug the microphone cable connector into J1222. Connect the 10-foot output cable between J1221 and the audio input circuit for the station on EC-71-A transistorized control console. The microphone and output jacks on the encoders are compatable with General Electric MASTR Progress Line Station Combinations.

The encoders are normally used with a desk microphone. Option 5781 adds a 19B209031-P1 gooseneck microphone and a 19B204202-G1 footswitch. Installation instructions for the option are included on the Encoder Application Diagram.

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

The encoders are supplied with an "L" pad (R1246 and R1247) in the tone output circuit. This pad limits the tone to approximately 25 millivolts. R1246 may be clipped out of the circuit if more output is required.

ADJUSTMENT

Before the tone encoder is placed in operation, the following adjustments must be made. Be sure that the station transmitter has been adjusted for full limiting at 5.0 kHz (narrow band) or 13 kHz (wide band) as called for in the transmitter instructions.

Tone Level

1. Release all pushbutton selector switches on the encoder.
2. Select the highest tone frequency in the system by following the steps given on the Encoder Application Diagram.
3. After the highest tone frequency is selected, operate the desired TEST Switch (S1203 or S1207). TEST Switch S1203 by-passes the timing circuits and permits transmission of the first tone continuously, while TEST Switch S1207 permits the transmission of the second tone continuously. A TEST Switch keys the station transmitter so it should be operated in accordance with the rated duty cycle of the transmitter.
4. Adjust the master level potentiometer (R1210) on the encoder to produce a deviation of 3 kHz (narrow band) or 6 kHz (wide band) as measured with a modulation monitor at the transmitter. Do not exceed this deviation.
5. Release the selected tone and TEST Switches.

NOTE

The procedure for adjusting the encoder for use with the EC-71-A Transistorized Control Console is the same as outlined in the preceeding steps. The EC-71-A should be properly adjusted according to instructions in the EC-71-A Instruction Manual. When the tone level has been set as outlined, the MIKE level control in the EC-71-A should not be changed.

Timing

1. Set the tone "ON" time for the first tone to approximately 1 second by adjusting R1202.

2. Set the tone "ON" time for the second tone to approximately 1-1/2 seconds by adjusting R1211.

OPERATION

The encoder has vertical rows of pushbuttons on the front panel. One button in each row must be used for each call, as each function is composed of two sequential tones. To signal the unit he is calling, the operator selects the proper combination of buttons indicated by the assigned tone frequencies.

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

CIRCUIT DESCRIPTION

Tone Generator Board (PL-19D402214-G2)

Up to three Tone Generator Boards are utilized in the encoders. A Tone Generator Board contains ten tone oscillators, each is resonate to a different tone frequency. Each tone oscillator consists of a transistorized circuit controlled by a vibrating-reed tone governing device that provides the frequency-selective component of the circuit and also provides feedback for proper oscillator operation.

Energy is coupled from the collector of the transistor to terminals 1 and 2 of the tone governor where transformer action between the two coils returns the energy to the base of the transistor. The vibrating reed responds only to the specific frequency to which it is resonant; therefore, only the desired frequency appears at the output.

The tone generators are operated continuously when power is applied to the encoder. Two tones are selected sequentially for each code, with a total of ninety individual tone codes available from a single Tone Generator Board. Adding a Diagonal Tone Board permits a possible total of one hundred codes from a single Tone Generator Board. Three Tone Generator Boards plus the Diagonal Tone Board provide a total of nine hundred codes. The pushbutton selector switches are interlocked so that only two tone frequencies may be selected at one time.

Diagonal Tone Board (PL-19D402285-G2)

Diagonal Tone Board A1201 contains a single tone oscillator which is identical to the oscillators on the Tone Generator Board. This oscillator provides the first tone when two selector switches, which normally select the same oscillator on a Tone Generator Board, are pressed for the call function. The switch configurations that require the diagonal tone are explained on the Encoder Application Diagrams.

Tone Amplifier

Tones are fed from the selector switches, through timing relays, to the input of tone amplifier Q1201. The output of Q1201 is connected to a filter (consisting of C1205-C1210, L1201 and L1202) which provides harmonic suppression. Signals from the filter are connected through master level control R1210 to transmitter jack J1221.

Timing Circuit

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

Timing capacitor C1211 is normally charged by the regulated +11 volts from the power supply through contacts 11 and 12 of K1203, normally closed (NC) contacts of S1202, and R1208. When CALL Switch S1202 is operated, the positive charge on C1211 is connected through R1202 to the base of Q1202, turning it on. Q1202 operates K1201 and keeps it energized until C1211 is discharged. R1202 provides adjustment of the circuit time constant.

When K1201 operates, the following events take place:

(a) The regulated +11 volts is connected through contacts K1201-5 and -6, R1251 and R1250 to the base of Q1204. The transistor turns ON and operates K1203.

(b) The first tone is connected through contacts K1201-7 and -8 to the tone amplifier.

(c) C1212 is charged through contacts K1201-13 and -14 and R1212 by the +11 volts from the power supply. The return circuit is completed through contacts S1203-1 and -2.

When K1201 releases, the charge on C1212 is connected through contacts K1201-12 and -13 and R1249 to charge C1247. In approximately 150 milliseconds, C1247 has sufficient charge to turn on Q1203 which operates K1202.

When K1202 operates, the following events take place:

(a) The second tone is connected through K1202-6 and -7 to the tone amplifier.

(b) The +11 volts is connected through K1202-5 and -6 to the base of Q1204. The transistor keeps K1203 energized.

NOTE

C1246, in the base circuit of Q1204, keeps Q1204 conducting and prevents K1203 from de-energizing during the 150 millisecond interval between the releasing of K1201 and the operation of K1202.

(c) The charge on capacitor C1248 is connected to the base of Q1203 through contacts K1202-13 and -14 and R1211 (timing adjustment potentiometer). This provides additional ON time for K1202.

When K1203 is operated, the following take place:

(a) A ground is connected through contacts K1203-6 and -7 to key the radio transmitter.

(b) Contacts K1203-8, -9 and -10 switch the panel lights from white to red, indicating that tone is being transmitted.

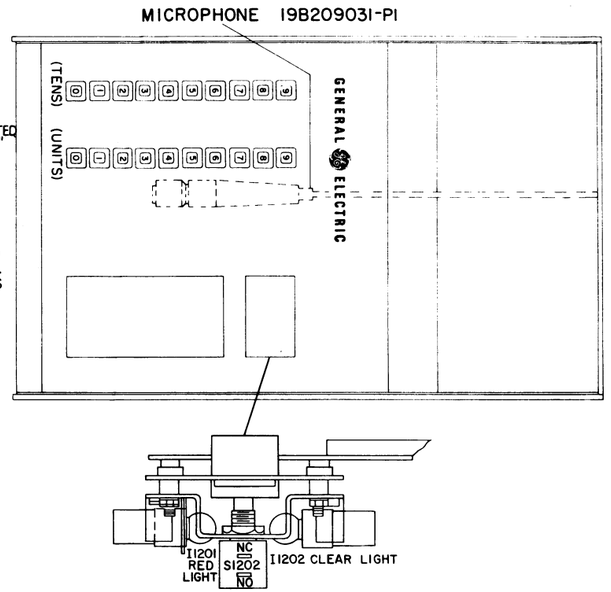
(c) The transmitter input is switched from the microphone to the tone output of the encoder through contacts K1203-14, -15 and -16.

(d) The timing cycle is "locked-in" and the CALL Switch (S1202) is disconnected through contacts K1203-11, -12 and -13 so that the timing of the transmission will not be affected by the manual operation of the CALL Switch.

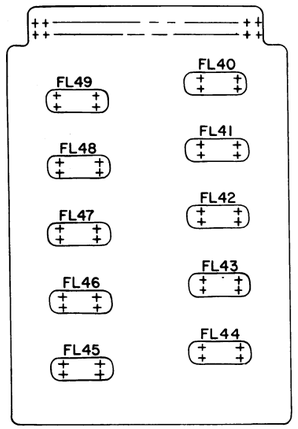
TO DETERMINE ACTUAL FREQUENCIES OF TONE 1 & TONE 2

INSTRUCTIONS:

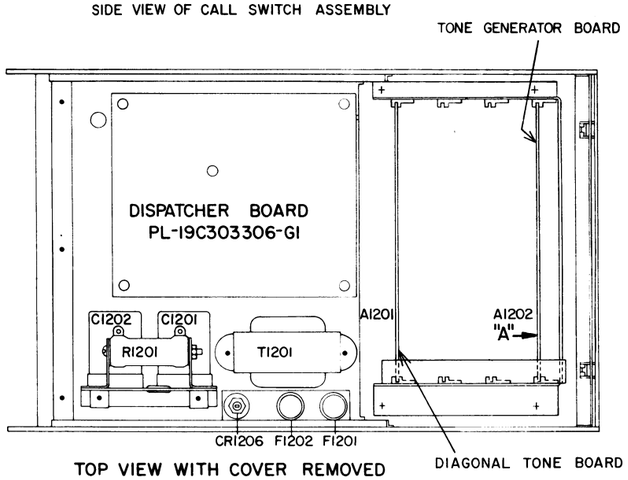
1. "TENS" BUTTONS
   THESE BUTTONS SELECT THE FIRST TONE TO BE TRANSMITTED. THE BUTTON NUMBER CORRESPONDS TO THE "TONE NO." IN CHART 1 EXCEPT IN 3 BELOW.
2. "UNITS" BUTTONS
   THESE BUTTONS SELECT THE SECOND TONE TO BE TRANSMITTED. THE BUTTON NUMBER CORRESPONDS TO THE "TONE NO" IN CHART 1
3. EXCEPTION:
   IF THE SAME NUMBER IS DEPRESSED IN BOTH "TENS" AND "UNITS" ROWS, THE FIRST TONE WILL BE THE DIAGONAL TONE, AND THE SECOND TONE WILL BE DETERMINED AS BEFORE IN 2 ABOVE.



SIDE VIEW OF CALL SWITCH ASSEMBLY

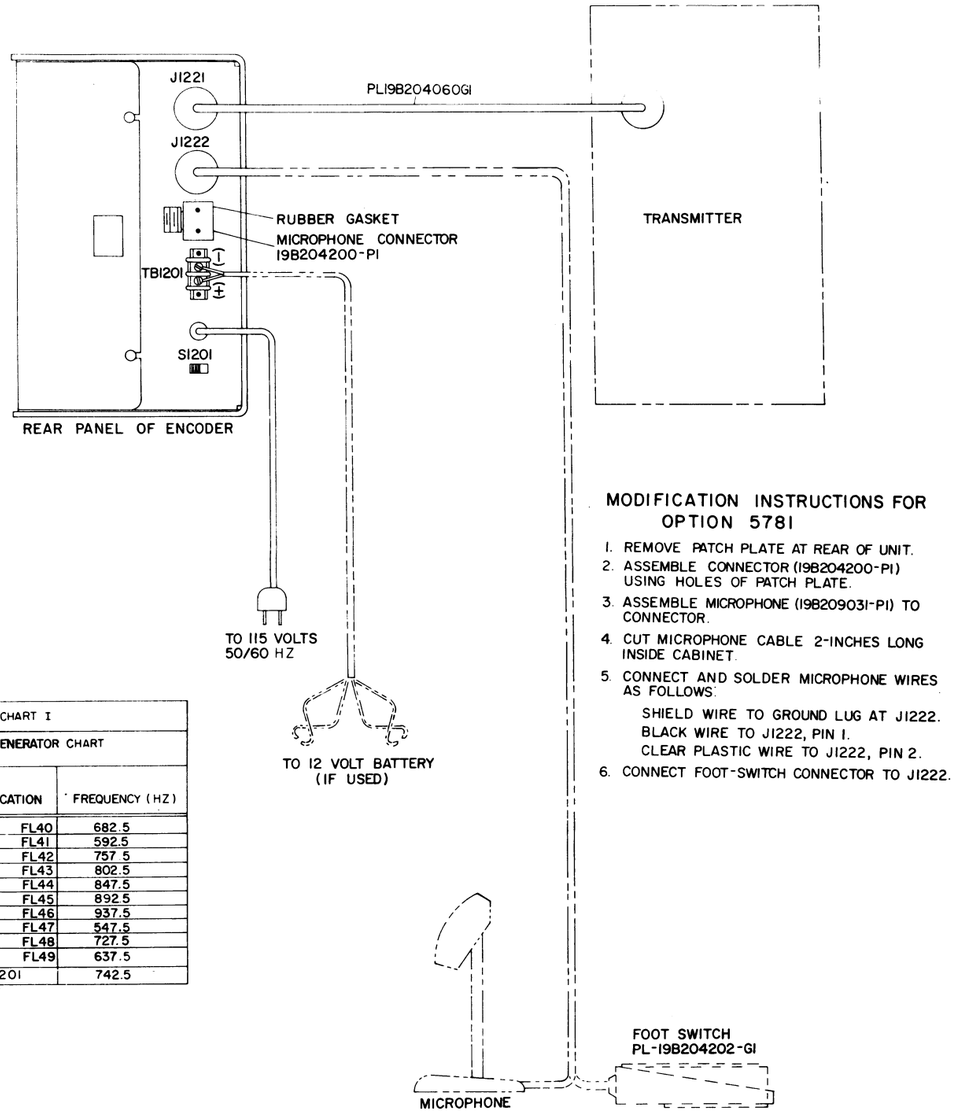


VIEW AT "A"
(A1202)



TOP VIEW WITH COVER REMOVED

CHART I			
TONE GENERATOR CHART			
TONE GROUP	TONE NO	LOCATION	FREQUENCY (HZ)
A	A0	FL40	682.5
	A1	FL41	592.5
	A2	FL42	757.5
	A3	FL43	802.5
	A4	FL44	847.5
	A5	FL45	892.5
	A6	FL46	937.5
	A7	FL47	547.5
	A8	FL48	727.5
	A9	FL49	637.5
DIAGONAL TONE		A1201	742.5



MODIFICATION INSTRUCTIONS FOR OPTION 5781

1. REMOVE PATCH PLATE AT REAR OF UNIT.
2. ASSEMBLE CONNECTOR (19B204200-P1) USING HOLES OF PATCH PLATE.
3. ASSEMBLE MICROPHONE (19B209031-P1) TO CONNECTOR.
4. CUT MICROPHONE CABLE 2-INCHES LONG INSIDE CABINET.
5. CONNECT AND SOLDER MICROPHONE WIRES AS FOLLOWS:
   SHIELD WIRE TO GROUND LUG AT J1222.
   BLACK WIRE TO J1222, PIN 1.
   CLEAR PLASTIC WIRE TO J1222, PIN 2.
6. CONNECT FOOT-SWITCH CONNECTOR TO J1222.

(19D413052, Rev. 1)

APPLICATION DIAGRAM

TYPE 99 TONE ENCODER CONSOLE
MODEL 4EC51A13

CHART I
TO DETERMINE ACTUAL FREQUENCIES OF TONE 1 & TONE 2

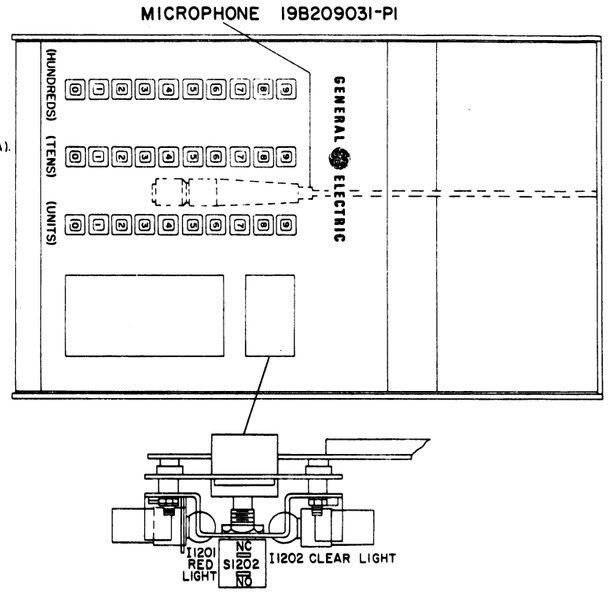
INSTRUCTIONS

1. "HUNDREDS" BUTTONS (TONE GROUP SELECTION)
   THE FIRST AND SECOND TONES ARE SELECTED FROM TONE GROUPS AS SHOWN BELOW, DEPENDING UPON WHICH HUNDREDS BUTTON IS DEPRESSED. (SEE TABLE A).
2. "TENS" BUTTONS (FIRST TONE SELECTION)
   THE TONE NUMBER, WITHIN THE FIRST TONE GROUP SELECTED, CORRESPONDS TO THE NUMBER OF THE BUTTON DEPRESSED IN THE "TENS" ROW.
3. "UNITS" BUTTONS (SECOND TONE SELECTION)
   THE TONE NUMBER, WITHIN THE SECOND TONE GROUP, CORRESPONDS TO THE NUMBER OF THE BUTTON DEPRESSED IN THE "UNITS" ROW.
4. EXCEPTION
   WHEN 0, 2, OR 4 IS DEPRESSED IN THE HUNDREDS ROW AND THE TENS AND UNITS DIGITS ARE THE SAME, THE FOLLOWING APPLIES:
   TONE 1 WILL ALWAYS BE 742.5 HZ (DIAGONAL TONE)
   TONE 2 WILL BE DETERMINED AS ABOVE.

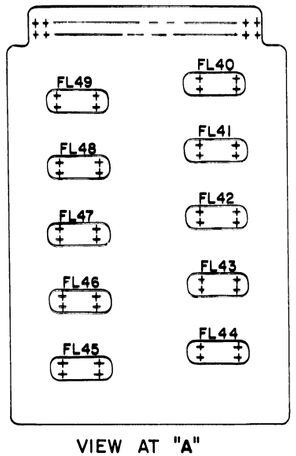
TABLE A

HUNDREDS BUTTON DEPRESSED	TONE 1 SELECTED FROM TONE GP#	TONE 2 SELECTED FROM TONE GP #
0	A	A
1	B	B
2	B	B
3	A	B
4	C	C
5	C	A
6	C	B
7	A	C
8	B	C
9 (NOT USED)	-	-

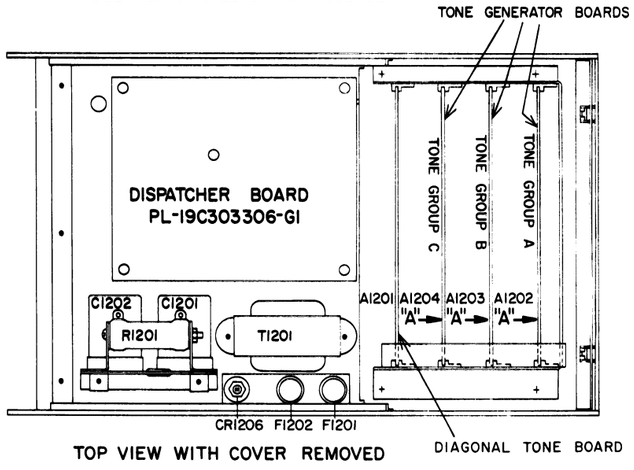
* TONE GROUP BREAKDOWN SHOWN IN CHART II



SIDE VIEW OF CALL SWITCH ASSEMBLY



VIEW AT "A"
(A1202, A1203 & A1204)

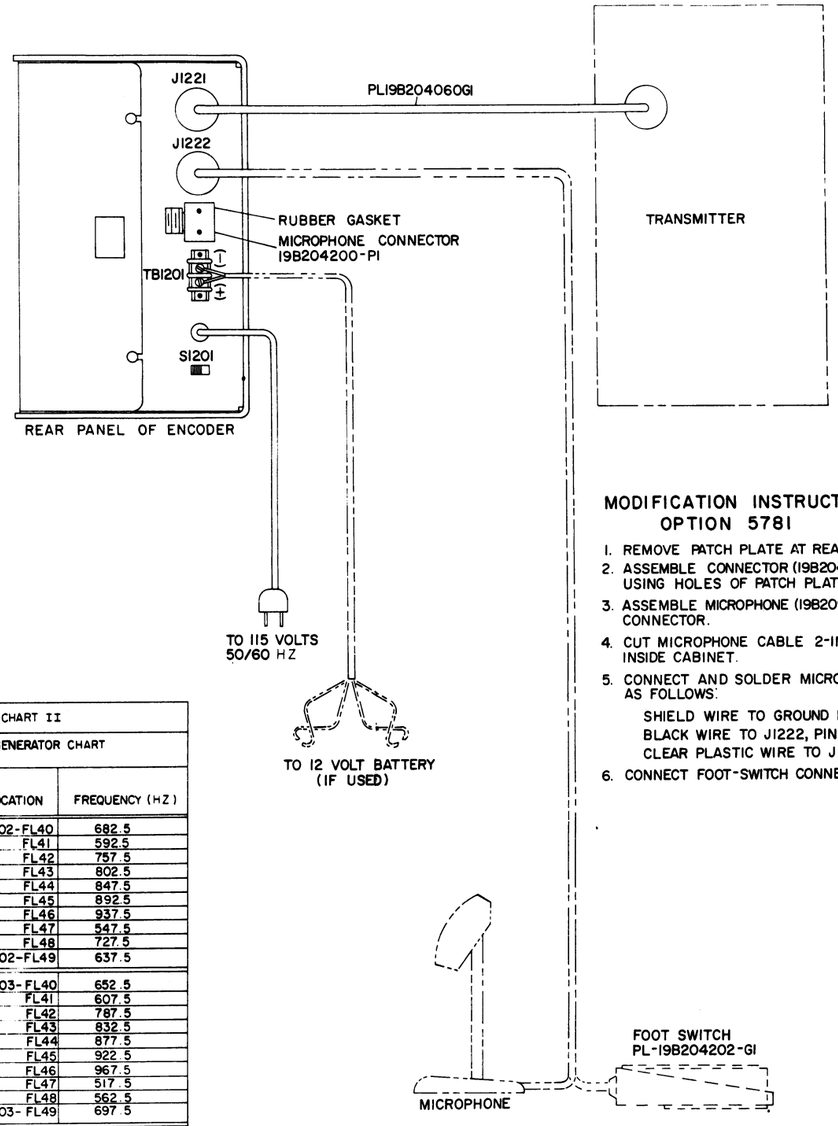


TOP VIEW WITH COVER REMOVED

CHART II

TONE GENERATOR CHART

TONE GROUP	TONE NO.	LOCATION	FREQUENCY (HZ)
A	A0	A1202-FL40	682.5
	A1	FL41	592.5
	A2	FL42	757.5
	A3	FL43	802.5
	A4	FL44	847.5
	A5	FL45	892.5
	A6	FL46	937.5
	A7	FL47	547.5
	A8	FL48	727.5
	A9	A1202-FL49	637.5
B	B0	A1203-FL40	652.5
	B1	FL41	607.5
	B2	FL42	787.5
	B3	FL43	832.5
	B4	FL44	877.5
	B5	FL45	922.5
	B6	FL46	967.5
	B7	FL47	517.5
	B8	FL48	562.5
	B9	A1203-FL49	697.5
C	C0	A1204-FL40	667.5
	C1	FL41	712.5
	C2	FL42	772.5
	C3	FL43	817.5
	C4	FL44	862.5
	C5	FL45	907.5
	C6	FL46	952.5
	C7	FL47	532.5
	C8	FL48	577.5
	C9	A1204-FL49	622.5
DIAGONAL TONE		A1201	742.5



MODIFICATION INSTRUCTIONS FOR OPTION 5781

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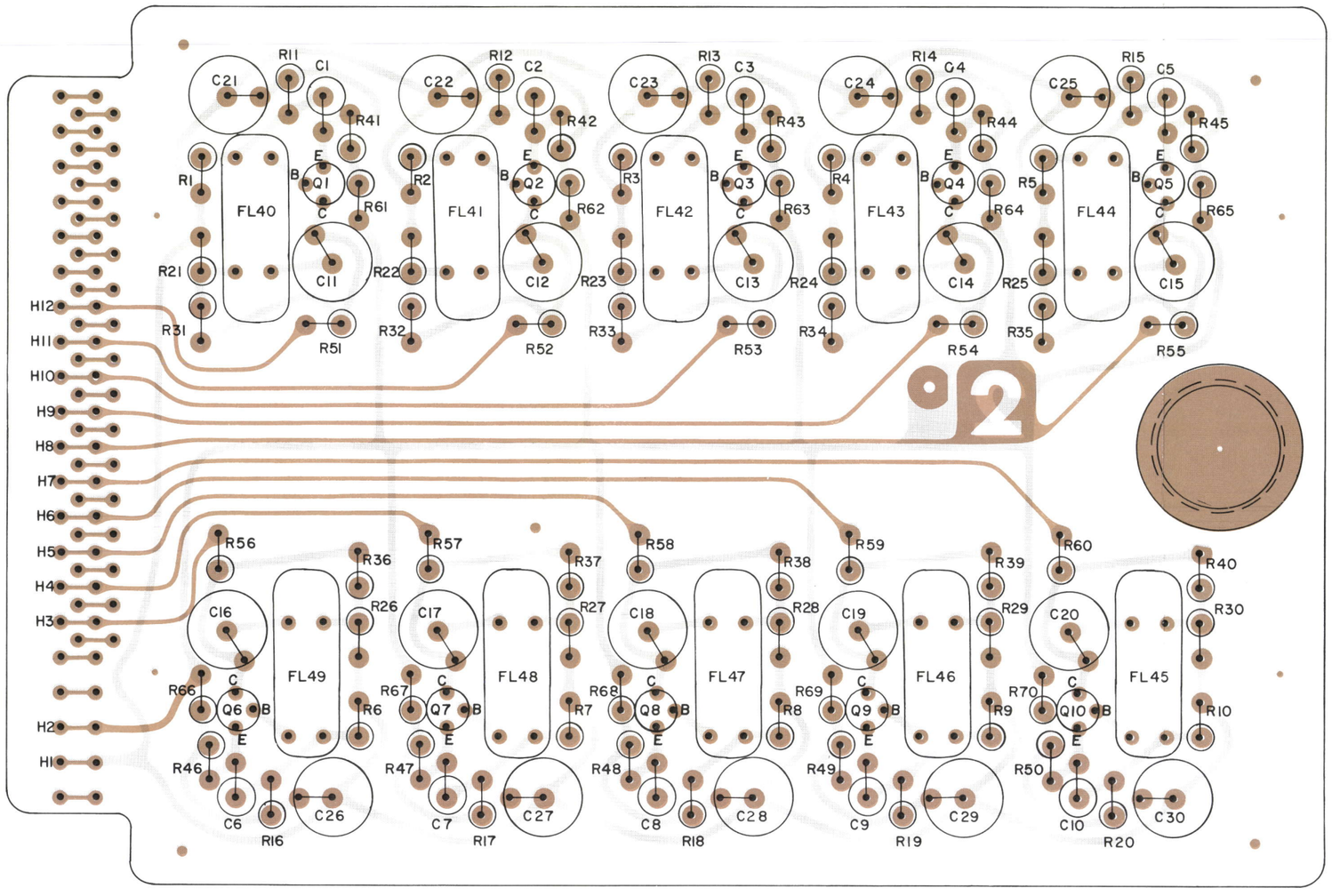
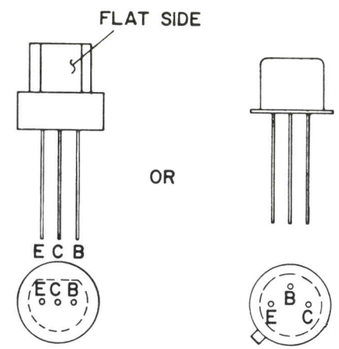
4. CUT MICROPHONE CABLE 2-INCHES LONG INSIDE CABINET.
5. CONNECT AND SOLDER MICROPHONE WIRES AS FOLLOWS:
   SHIELD WIRE TO GROUND LUG AT J1222.
   BLACK WIRE TO J1222, PIN 1.
   CLEAR PLASTIC WIRE TO J1222, PIN 2.
6. CONNECT FOOT-SWITCH CONNECTOR TO J1222.

APPLICATION DIAGRAM

TYPE 99 TONE ENCODER CONSOLES
MODELS 4EC51A14, 15

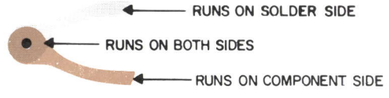
(19D413051, Rev. 1)





LEAD IDENTIFICATION
FOR Q1 - Q10

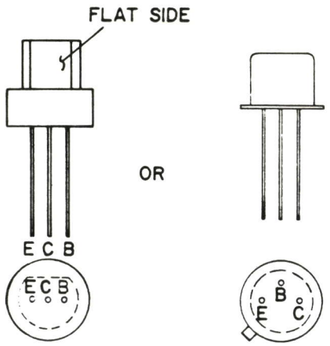
(19D402904, Rev. 0)
(19C303360, Sh. 1, Rev. 2)
(19C303360, Sh. 2, Rev. 2)



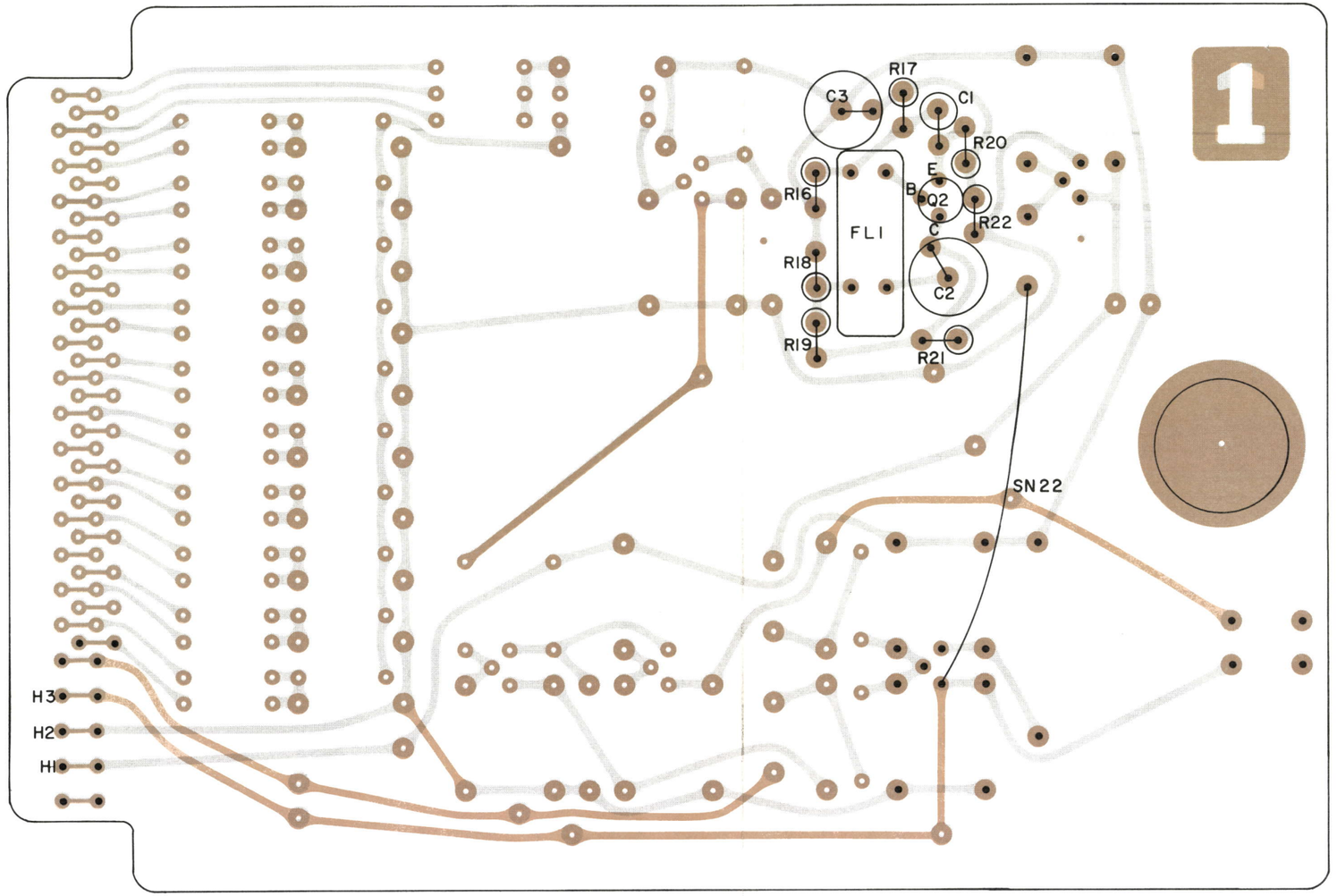
(DF-5015)

OUTLINE DIAGRAM

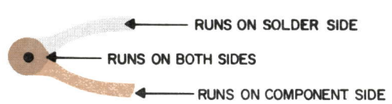
TONE GENERATOR BOARD
PL-19D402214-G2



LEAD IDENTIFICATION
FOR Q2

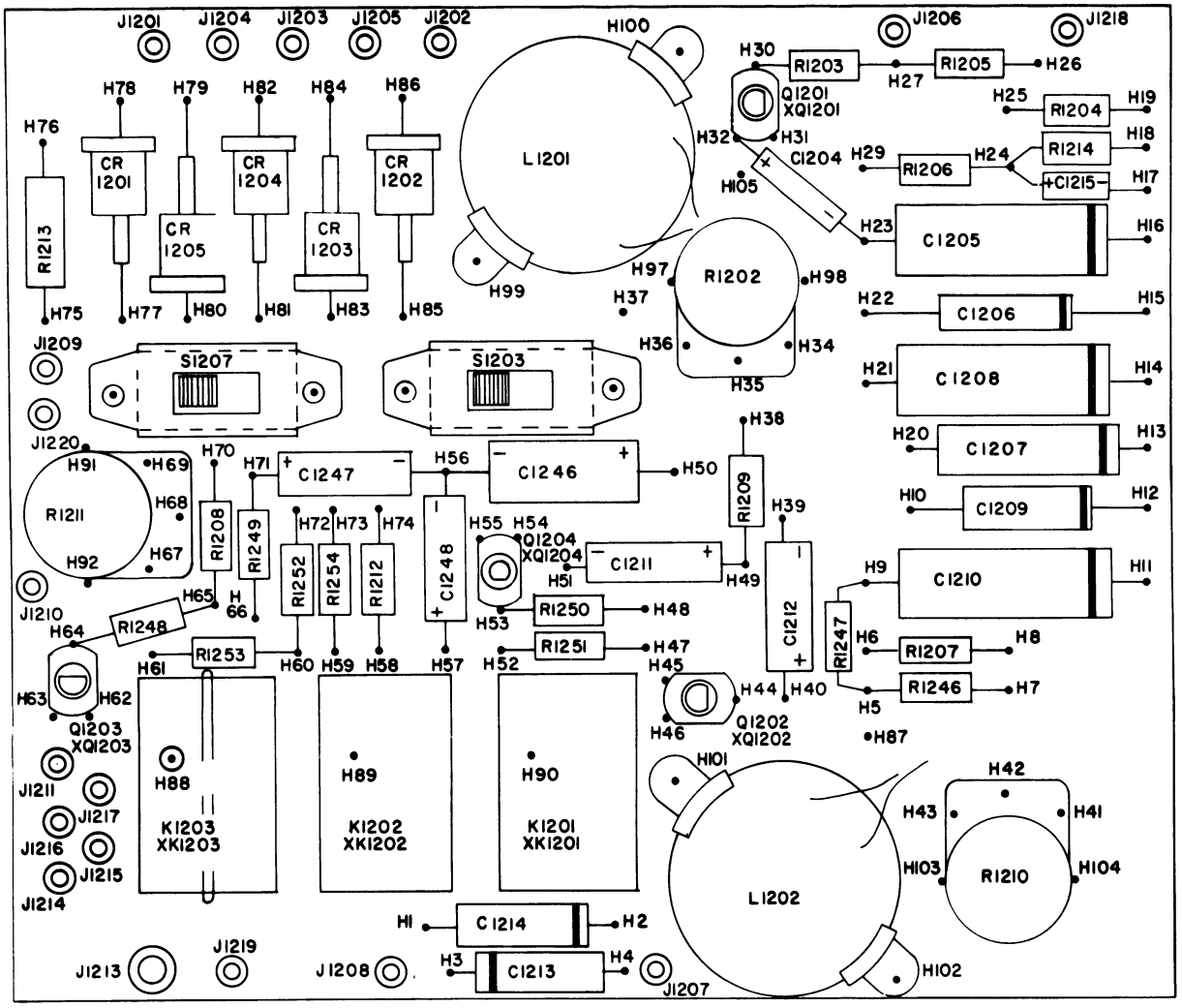


(19D413050, Rev. 0)
(19C303446, Sh. 1, Rev. 1)
(19C303446, Sh. 2, Rev. 1)

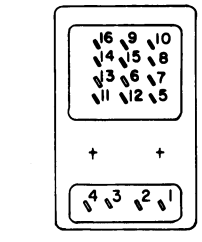


OUTLINE DIAGRAM

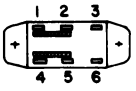
DIAGONAL TONE BOARD
PL-19D402285-G2



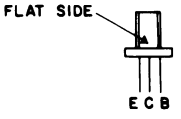
TONE DISPATCHER BOARD PL-19C303306-G1



BOTTOM VIEW OF XK1201-2-3



BOTTOM VIEW OF S1203 & 7



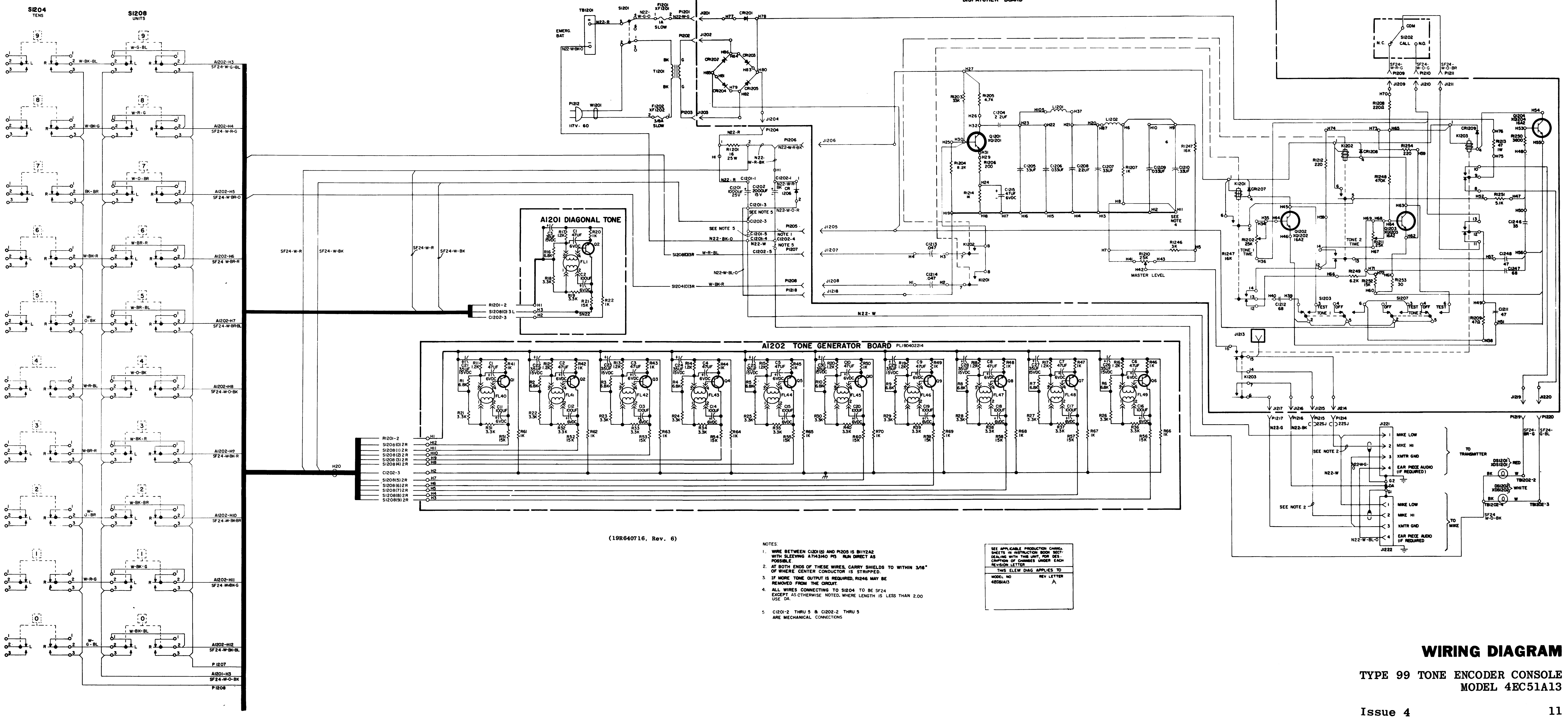
LEAD IDENTIFICATION FOR Q1201 - Q1204

TYP SOCKET FOR XQ1201 - XQ1204

(19D413048, Rev. 0)

OUTLINE DIAGRAM

TONE DISPATCHER BOARD
PL-19C303306-G1



NOTES:

1. WIRE BETWEEN C1201(5) AND P1205 IS B11Y2A2 WITH SLEEVING A7143140 P13 RUN DIRECT AS POSSIBLE.
2. AT BOTH ENDS OF THESE WIRES, CARRY SHIELDS TO WITHIN 3/16" OF WHERE CENTER CONDUCTOR IS STRIPPED.
3. IF MORE TONE OUTPUT IS REQUIRED, R1246 MAY BE REMOVED FROM THE CIRCUIT.
4. ALL WIRES CONNECTING TO S1204 TO BE SF24 EXCEPT AS OTHERWISE NOTED. WHERE LENGTH IS LESS THAN 2.00 USE DA.
5. C1201-2 THRU 5 & C1202-2 THRU 5 ARE MECHANICAL CONNECTIONS

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
4EC51A13	A

(DF-5015)

WIRING DIAGRAM

TYPE 99 TONE ENCODER CONSOLE
MODEL 4EC51A13

Issue 4

PARTS LIST

LBI-3824B

TYPE 99 TONE STATION ENCODER
MODEL 4EC51A13
5499318G3

SYMBOL	GE PART NO.	DESCRIPTION
A1201		COMPONENT BOARD 19D402285G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C2	5495670P7	Electrolytic: 100 µf +75% -10%, 6 VDCW; sim to Sprague 30D.
C3	5495670P9	Electrolytic: 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D.
		- - - - - - - - - FILTERS - - - - - - - - -
FL1	19C300590G16	Tone governor, 742.5 Hz.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q2	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - RESISTORS - - - - - - - - -
R16	3R77P683J	Composition: 6800 ohms ±5%, 1/2 w.
R17	3R77P122J	Composition: 1200 ohms ±5%, 1/2 w.
R18 and R19	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R20	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R21	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R22	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4036040P1	Contact pin. (Used to mount FL1).
A1202		TONE GENERATOR BOARD 19D402214G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 thru C10	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C11 thru C20	5495670P7	Electrolytic: 100 µf +75% -10%, 6 VDCW; sim to Sprague 30D.
C21 thru C30	5495670P9	Electrolytic: 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D.
		- - - - - - - - - FILTERS - - - - - - - - -
FL40 thru FL49		TONE DETECTOR 19C300590
	19C300590G1	517.5 Hz
	19C300590G2	532.5 Hz
	19C300590G3	547.5 Hz
	19C300590G4	562.5 Hz
	19C300590G5	577.5 Hz
	19C300590G6	592.5 Hz
	19C300590G7	607.5 Hz
	19C300590G8	622.5 Hz
	19C300590G9	637.5 Hz
	19C300590G10	652.5 Hz
	19C300590G11	667.5 Hz
	19C300590G12	682.5 Hz
	19C300590G13	697.5 Hz
	19C300590G14	712.5 Hz
	19C300590G15	727.5 Hz
	19C300590G16	742.5 Hz
	19C300590G17	757.5 Hz
	19C300590G18	772.5 Hz

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	GE PART NO.	DESCRIPTION
	19C300590G19	787.5 Hz
	19C300590G20	802.5 Hz
	19C300590G21	817.5 Hz
	19C300590G22	832.5 Hz
	19C300590G23	847.5 Hz
	19C300590G24	862.5 Hz
	19C300590G25	877.5 Hz
	19C300590G26	892.5 Hz
	19C300590G27	907.5 Hz
	19C300590G28	922.5 Hz
	19C300590G29	937.5 Hz
	19C300590G30	952.5 Hz
	19C300590G31	967.5 Hz
	19C300590G32	982.5 Hz
	19C300590G33	997.5 Hz
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 thru Q10	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1 thru R10	3R77P682J	Composition: 6800 ohms ±5%, 1/2 w.
R11 thru R20	3R77P122J	Composition: 1200 ohms ±5%, 1/2 w.
R21 thru R40	3R77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R41 thru R50	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R51 thru R60	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R61 thru R70	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	4036040P1	Contact pin. (Used with FL40 - FL49).
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1201	7476442P12	Electrolytic: 1000 µf +250% -10%, 25 VDCW; sim to Mallory WP059.
C1202	7770994P11	Electrolytic: 2000 µf +250% -10%, 15 VDCW; sim to Mallory WP.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1206*	5495912P1	Silicon, Zener. Deleted by REV A.
CR1209*	5495912P2	Silicon, Zener. Added by REV A.
		- - - - - - - - INDICATING DEVICES - - - - - -
DS1201	4036294G1	Indicator light: Includes red miniature incandescent lamp, 14.5 V ±.01 V; sim to GE 53.
DS1202	19C307037P3	Lamp, incandescent: miniature, 14.5 v ±.01 v; sim to GE 53.
		- - - - - - - - - - FUSES - - - - - - - - - -
F1201	7487942P5	Slow blowing: 1 amp at 250 V; sim to Bussmann MDL-1.
F1202	7487942P2	Slow blowing: 3/8 amp at 250 v; sim to Bussmann MDL-3/8.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1221	7117934P4	Connector, chassis: 4 male contacts; sim to Amphenol 91-PC4M.
J1222	19A116061P1	Connector, chassis: 4 female contacts; sim to Amphenol 91-PC4F.
		- - - - - - - - - PLUGS - - - - - - - - -
P1201	4029840P2	Contact, electrical: sim to Amp 42827-2.
P1202 and P1203	4029840P1	Contact, electrical: sim to Amp 41854.
P1204	4029840P2	Contact, electrical: sim to Amp 42827-2.

SYMBOL	GE PART NO.	DESCRIPTION
P1205	4029840P1	Contact, electrical: sim to Amp 41854.
P1206 thru P1211	4029840P2	Contact, electrical: sim to Amp 42827-2.
P1212		(Part of W1201).
P1214 thru P1220	4029840P2	Contact, electrical: sim to Amp 42827-2.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1201	2R14P113	Wirewound: 16 ohms ±5%, 25 w; sim to Ward Leonard K41383-3.
		- - - - - - - - - SWITCHES - - - - - - - - -
S1201	7145098P1	Slide: DPDT, 0.5 amp at 125 VDC; sim to Stackpole SS-150.
S1202	19B200007P1	Pushbutton, snap action: 15 amps at 0.125 to 250 VAC; sim to Cherry Electric Series E13-23J.
S1204	19C300108P5	Pushbutton: 10 button frame, double side, 2 form C contacts each button (non-shorting); sim to Oak 80.
S1208	19C300108P5	Pushbutton: 10 button frame, double side, 2 form C contacts each button (non-shorting); sim to Oak 80.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1201	5493743P1	Power, filament, single phase: Pri: 117 v, 50/60 Hz. Sec 1: 12.6 v ±5%, 2 amps.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1201	4035303P2	Phen: 2 terminals; sim to Curtis Development EFT-2.
TB1202	7775500P3	Phen: 4 terminals.
		- - - - - - - - - CABLES - - - - - - - - -
W1201	4036441P3	Power: Includes molded plastic plug (P1212), approx 9 feet; sim to GE 2073-1.
		- - - - - - - - - SOCKETS - - - - - - - - -
XDS1201 and XDS1202	4032220P1	Lampholder, miniature: sim to Drake N517.
XF1201 and XF1202	19B209005P1	Fuseholder, post, phen: 15 amps at 250 v; sim to Littelfuse 342012.
		DISPATCHER BOARD 19C303306G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1204	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague 150D.
C1205	7491930P11	Polyester: 0.33 µf ±20%, 100 VDCW; sim to GE 61F.
C1206	7491930P7	Polyester: .033 µf ±20%, 100 VDCW; sim to GE 61F.
C1207	7491930P11	Polyester: 0.33 µf ±20%, 100 VDCW; sim to GE 61F.
C1208	7491930P10	Polyester: 0.22 µf ±20%, 100 VDCW; sim to GE 61F.
C1209	7491930P7	Polyester: .033 µf ±20%, 100 VDCW; sim to GE 61F.
C1210	7491930P11	Polyester: 0.33 µf ±20%, 100 VDCW; sim to GE 61F.
C1211	5496267P15	Tantalum: 47 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C1212	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C1213 and C1214	7491930P8	Polyester: .047 µf ±20%, 100 VDCW; sim to GE 61F.
C1215	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.

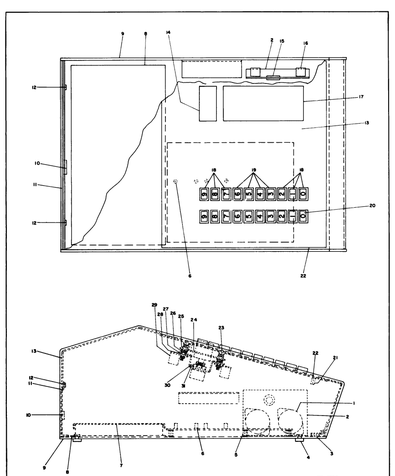
SYMBOL	GE PART NO.	DESCRIPTION
C1246	7489483P10	Electrolytic: 35 µf +75% -10%, 15 VDCW; sim to Sprague Type 30D.
C1247	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C1248	5496267P15	Tantalum: 47 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1201 thru CR1205	4037822P1	Silicon.
CR1207 thru CR1209	4037822P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J1201 thru J1211	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J1213	4037265P1	Jack, tip, stake-in: black phen body; sim to Component Mfg Service A-1128.
J1214 thru J1220	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1201 and K1202	19C307010P4	Armature: 12 VDC, 185 ohms ±10%, 2 form A, 1 form C contacts; sim to Allied Control T1545-410.
K1203	19C300957P2	Miniature, plug-in: 12 VDC, 1.5 w, 185 ohms ±10%, 4 form C contacts; sim to Allied Control T1545-316.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1201 and L1202	19C300501G356	Ferrite coil.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1201	19A115123P1	Silicon, NPN; sim to 2N2712.
Q1202	19A115889P1	Silicon, NPN; sim to 2N2712.
Q1203	19A115123P1	Silicon, NPN; sim to 2N2712.
Q1204	19A115889P1	Silicon, NPN; sim to 2N2712.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1202	7491365P103	Variable, carbon film: 25,000 ohms ±20%, .05 w; sim to CTS UPE-70.
R1203	3R77P333J	Composition: 33,000 ohms ±5%, 1/2 w.
R1204	3R77P823J	Composition: 8200 ohms ±5%, 1/2 w.
R1205	3R77P473J	Composition: 4700 ohms ±5%, 1/2 w.
R1206	3R77P201J	Composition: 200 ohms ±5%, 1/2 w.
R1207	3R77P103J	Composition: 1000 ohms ±5%, 1/2 w.
R1208	3R77P221J	Composition: 220 ohms ±5%, 1/2 w.
R1209	3R77P470J	Composition: 47 ohms ±5%, 1/2 w.
R1210 and R1211	7491365P103	Variable, carbon film: 25,000 ohms ±20%, .05 w; sim to CTS UPE-70.
R1212	3R77P221J	Composition: 220 ohms ±5%, 1/2 w.
R1213	3R78P470J	Composition: 47 ohms ±5%, 1 w.
R1214	3R77P103J	Composition: 1000 ohms ±5%, 1/2 w.
R1246	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w.
R1247	3R77P163J	Composition: 16,000 ohms ±5%, 1/2 w.
R1248	3R77P474J	Composition: 0.47 megohm ±5%, 1/2 w.
R1249	3R77P622J	Composition: 6200 ohms ±5%, 1/2 w.
R1250	3R77P362J	Composition: 3600 ohms ±5%, 1/2 w.
R1251	3R77P513J	Composition: 5100 ohms ±5%, 1/2 w.
R1252	3R77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R1253	3R77P300J	Composition: 30 ohms ±5%, 1/2 w.

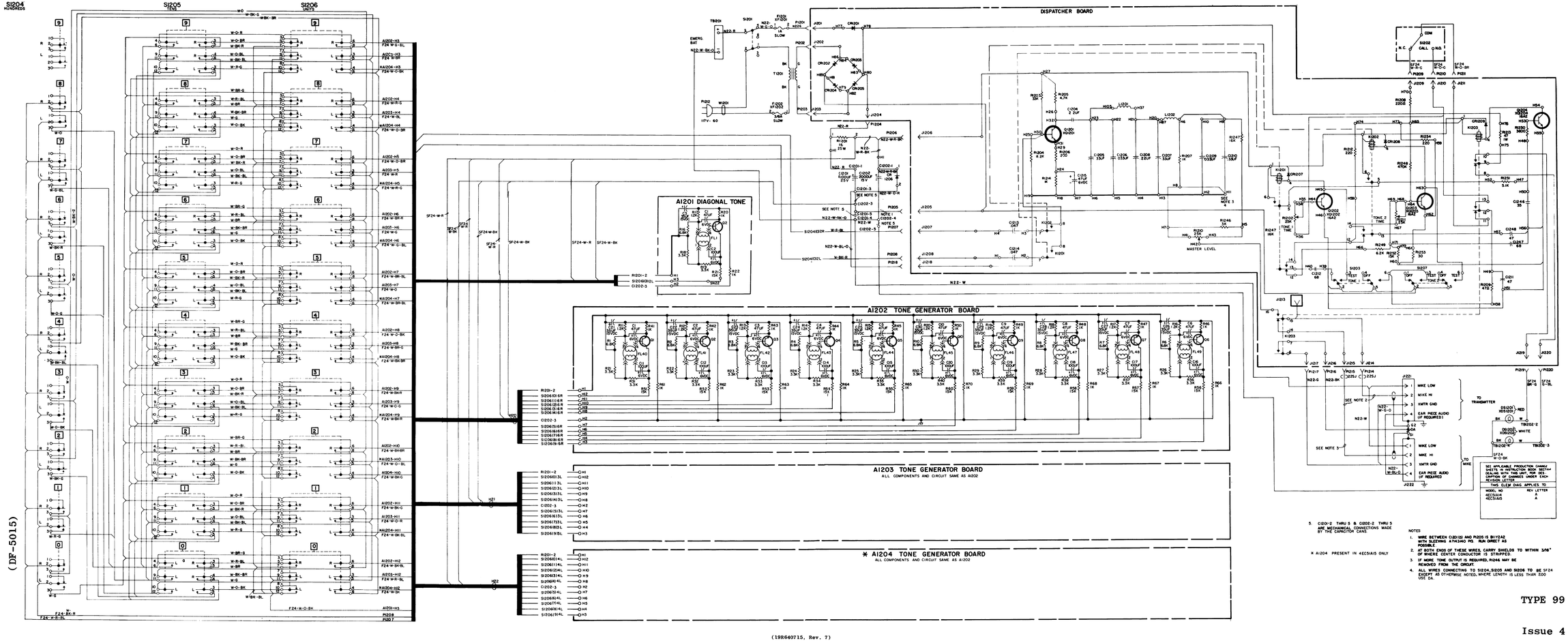
SYMBOL	GE PART NO.	DESCRIPTION
R1254	3R77P221J	Composition: 220 ohms ±5%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1203	7145098P1	Slide: DPDT, 0.5 amp at 125 VDC; sim to Stackpole SS-150.
S1207	7145098P1	Slide: DPDT, 0.5 amp at 125 VDC; sim to Stackpole SS-150.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XK1201 thru XK1203	5491595P5	Relay: 16 contacts; sim to Allied Control 30054-2.
XQ1201 thru XQ1204	5490277P2	Transistor, phen: 4 contacts; sim to Elco 3305.
		GOOSENECK MICROPHONE ASSEMBLY 4039055G1
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B209031P1	Microphone, gooseneck: 60 to 10,000 Hz freq response, 100,000 ohm load imp., includes 12 inch gooseneck; sim to Shure Brothers 425-G12.
	19B204202G1	Footswitch. Includes switch, SPDT, momentary contact, 5 amps at 220 VAC; 8 feet cable, 4 pin cable connector.
	19B204200P1	Connector, adapter: 5/8-27. (Mates with Gooseneck microphone).
		MECHANICAL PARTS (REF EC-1055)
1	7121396P6	Mounting, transistor: phen; sim to Mallory BP-6.
2	4039244P1	Bracket, mounting.
3	4035713P1	Strip.
4	19A115081P2	Bumper, rubber.
5	5491541P201	Spacer, hex: 6-32.
6		(Not Used).
7		(Not Used).
8		(Not Used).
9	19B201338G2	Chassis.
10	4039065P1	Plate.
11	19B201337P1	Panel.
12	403255991	Retainer, nut: 6-32: sim to Tinnerman C3039S-632-31S.
13	19C300958G2	Cover.
14	4037542P2	Pushbutton: plastic; sim to Bradley Industries 2.
15	5490407P4	Grommet.
16	7160861P16	Speednut: sim to Tinnerman C8091-632-157.
17	4039253P1	Plate.
18	4039234P2	Button.
19	4039234P1	Button.
20	NP243322	Nameplate.
21	19A121123P1	Spacer: 4-40 thread.
22	NP243300	Nameplate.
23	N84P13016C13	Screw: 6-32.
24	4035039P1	Plate.
25	4035442P1	Shaft: approx 1/4 inch dia.
26	4035459P1	Spring.
27	4035040P1	Bracket.
28	N402P37C13	Washer: No. 6.
29	4038128G1	Clip.
30	7165075P2	Nut: 3/8-32.
31	7115130P9	Lockwasher: 3/8; sim to Shakeproof 1220-2.

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 insure compability with Dial Page terminal. Deleted CR1206 and added CR1209.





(DF-5015)

(19R640715, Rev. 7)

WIRING DIAGRAM

TYPE 99 TONE ENCODER CONSOLES
MODELS 4EC51A14, 15

PARTS LIST

LBI-3825B

TYPE 99 TONE STATION ENCODER
MODEL 4EC51A14, 15
(549931B04 and G5)

SYMBOL	GE PART NO.	DESCRIPTION
A1201		COMPONENT BOARD 19D402285G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C2	5495670P7	Electrolytic: 100 µf +75% -10%, 6 VDCW; sim to Sprague 30D.
C3	5495670P9	Electrolytic: 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL1	19C300590G16	Tone governor, 742.5 Hz.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R16	3B77P682J	Composition: 6800 ohms ±5%, 1/2 w.
R17	3B77P122J	Composition: 1200 ohms ±5%, 1/2 w.
R18 and R19	3B77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R20	3B77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R21	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R22	3B77P102J	Composition: 1000 ohms ±5%, 1/2 w.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	4036040P1	Contact pin. (Used to mount FL1).
A1202 thru A1204		TONE GENERATOR BOARD 19D402214G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 thru C10	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C11 thru C30	5495670P7	Electrolytic: 100 µf +75% -10%, 6 VDCW; sim to Sprague 30D.
C31 thru C50	5495670P9	Electrolytic: 35 µf +75% -10%, 15 VDCW; sim to Sprague 30D.
		- - - - - - - - - - FILTERS - - - - - - - - - -
FL40 thru FL49		TONE DETECTOR 19C300590
	19C300590G1	517.5 Hz
	19C300590G2	532.5 Hz
	19C300590G3	547.5 Hz
	19C300590G4	562.5 Hz
	19C300590G5	577.5 Hz
	19C300590G6	592.5 Hz
	19C300590G7	607.5 Hz
	19C300590G8	622.5 Hz
	19C300590G9	637.5 Hz
	19C300590G10	652.5 Hz
	19C300590G11	667.5 Hz
	19C300590G12	682.5 Hz
	19C300590G13	697.5 Hz
	19C300590G14	712.5 Hz
	19C300590G15	727.5 Hz
	19C300590G16	742.5 Hz
	19C300590G17	757.5 Hz
	19C300590G18	772.5 Hz

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	GE PART NO.	DESCRIPTION
	19C300590G19	787.5 Hz
	19C300590G20	802.5 Hz
	19C300590G21	817.5 Hz
	19C300590G22	832.5 Hz
	19C300590G23	847.5 Hz
	19C300590G24	862.5 Hz
	19C300590G25	877.5 Hz
	19C300590G26	892.5 Hz
	19C300590G27	907.5 Hz
	19C300590G28	922.5 Hz
	19C300590G29	937.5 Hz
	19C300590G30	952.5 Hz
	19C300590G31	967.5 Hz
	19C300590G32	982.5 Hz
	19C300590G33	997.5 Hz
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 thru Q10	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 thru R10	3B77P682J	Composition: 6800 ohms ±5%, 1/2 w.
R11 thru R30	3B77P122J	Composition: 1200 ohms ±5%, 1/2 w.
R31 thru R40	3B77P332J	Composition: 3300 ohms ±5%, 1/2 w.
R41 thru R50	3B77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R51 thru R60	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w.
R61 thru R70	3B77P102J	Composition: 1000 ohms ±5%, 1/2 w.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	4036040P1	Contact pin. (Used with FL40 - FL49).
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1201	7476442P12	Electrolytic: 1000 µf +250% -10%, 25 VDCW; sim to Mallory WPO59.
C1202	7770994P11	Electrolytic: 2000 µf +250% -10%, 15 VDCW; sim to Mallory WP.
		- - - - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1206*	5495912P1	Silicon, Zener. Deleted by REV A.
CR1209*	5495912P2	Silicon, Zener. Added by REV A.
		- - - - - - - - - - INDICATING DEVICES - - - - - -
DS1201	4036294G1	Indicator light: Includes red miniature incandescent lamp, 14.5 v ±.01 v; sim to GE 53.
DS1202	19C307037P3	Lamp, incandescent: miniature, 14.5 v ±.01 v; sim to GE 53.
		- - - - - - - - - - FUSES - - - - - - - - - -
F1201	7487942P5	Slow blowing: 1 amp at 250 v; sim to Bussmann MDL-1.
F1202	7487942P2	Slow blowing: 3/8 amp at 250 v; sim to Bussmann MDL-3/8.
		- - - - - - - - - - JACKS AND RECEPTACLES - - - - - -
J1221	7117934P4	Connector, chassis: 4 male contacts; sim to Amphenol 91-PC4M.
J1222	19A116061P1	Connector, chassis: 4 female contacts; sim to Ambenol 91-PC4F.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1201	4029840P2	Contact, electrical: sim to Amp 42827-2.
P1202 and P1203	4029840P1	Contact, electrical: sim to Amp 41854.
P1204	4029840P2	Contact, electrical: sim to Amp 42827-2.

SYMBOL	GE PART NO.	DESCRIPTION
P1205	4029840P1	Contact, electrical: sim to Amp 41854.
P1206 thru P1211	4029840P2	Contact, electrical: sim to Amp 42827-2.
P1212		(Part of W1201).
P1214 thru P1220	4029840P2	Contact, electrical: sim to Amp 42827-2.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1201	2B14P113	Wirewound: 16 ohms ±5%, 25 w; sim to Ward Leonard K41383-3.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1201	7145098P1	Slide: DPDT, 0.5 amp at 125 VDC; sim to Stackpole SS-150.
S1202	19B200007P1	Pushbutton, snap action: 15 amps at 0.125 to 250 VAC; sim to Cherry Electric Series E13-23J.
S1204	19C300108P5	Pushbutton: 10 button frame, double side, 2 form C contacts each button (non-shorting); sim to Oak 80.
S1205	7775759P4	Pushbutton: 10 button frame, double side, 6 form A contacts on each button (non-shorting); sim to Oak 232188-130.
S1206	7775759P5	Pushbutton: 10 button frame, double side, 3 form C contacts on each button (non-shorting); sim to Oak 232188-130.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1201	5493743P1	Power, filament, single phase: Pri: 117 v, 50/60 Hz, Sec 1: 12.6 v ±3%, 2 amps.
		- - - - - - - - - - TERMINAL BOARDS - - - - - - - - - -
TB1201	4035303P2	Phen: 2 terminals; sim to Curtis Development EFT-2.
TB1202	7775500P3	Phen: 4 terminals.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1201	4036441P3	Power: Includes molded plastic plug (P1212), approx 9 feet; sim to GE 2073-1.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1201 and XDS1202	4032220P1	Lampholder, miniature: sim to Drake N517.
XF1201 and XF1202	19B209005P1	Fuseholder, post, phen: 15 amps at 250 v; sim to Littelfuse 342012.
		DISPATCHER BOARD 19C303306G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1204	5496267P13	Tantalum: 2.2 µf ±20%, 20 VDCW; sim to Sprague 150D.
C1205	7491930P11	Polyester: 0.33 µf ±20%, 100 VDCW; sim to GE 61F.
C1206	7491930P7	Polyester: .033 µf ±20%, 100 VDCW; sim to GE 61F.
C1207	7491930P11	Polyester: 0.33 µf ±20%, 100 VDCW; sim to GE 61F.
C1208	7491930P10	Polyester: 0.22 µf ±20%, 100 VDCW; sim to GE 61F.
C1209	7491930P7	Polyester: .033 µf ±20%, 100 VDCW; sim to GE 61F.
C1210	7491930P11	Polyester: 0.33 µf ±20%, 100 VDCW; sim to GE 61F.
C1211	5496267P15	Tantalum: 47 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
C1212	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C1213 and C1214	7491930P8	Polyester: .047 µf ±20%, 100 VDCW; sim to GE 61F.

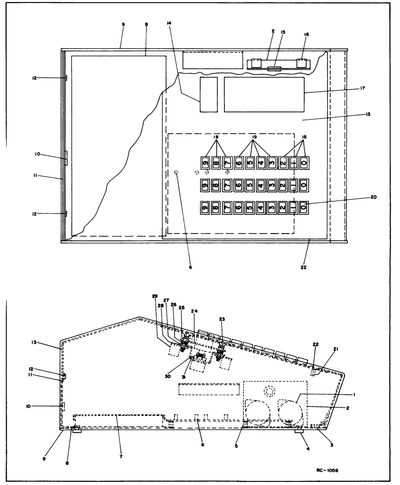
SYMBOL	GE PART NO.	DESCRIPTION
C1215	5496267P2	Tantalum: 47 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C1246	7489483P10	Electrolytic: 35 µf +75% -10%, 15 VDCW; sim to Sprague Type 30D.
C1247	5496267P11	Tantalum: 68 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C1248	5496267P15	Tantalum: 47 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1201 thru CR1205	4037822P1	Silicon.
CR1207 thru CR1209	4037822P1	Silicon.
		- - - - - - - - - - JACKS AND RECEPTACLES - - - - - -
J1201 thru J1211	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J1213	4037265P1	Jack, tip, stake-in: black phen body; sim to Component Mfg Service A-1128.
J1214 thru J1220	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1201 and K1202	19C307010P4	Armature: 12 VDC, 185 ohms ±10%, 2 form A, 1 form C contacts; sim to Allied Control 7154X-410.
K1203	19C300957P2	Miniature, plug-in: 12 VDC, 1.5 w, 185 ohms ±10%, 4 form C contacts; sim to Allied Control 7154X-316.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1201 and L1202	19C300501G356	Ferrite coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1201	19A115123P1	Silicon, NPN; sim to 2N2712.
Q1202	19A115889P1	Silicon, NPN; sim to 2N2712.
Q1203	19A115123P1	Silicon, NPN; sim to 2N2712.
Q1204	19A115889P1	Silicon, NPN; sim to 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1202	7491365P103	Variable, carbon film: 25,000 ohms ±20%, .05 w; sim to CTS UPA-70.
R1203	3B77P333J	Composition: 33,000 ohms ±5%, 1/2 w.
R1204	3B77P822J	Composition: 8200 ohms ±5%, 1/2 w.
R1205	3B77P472J	Composition: 4700 ohms ±5%, 1/2 w.
R1206	3B77P201J	Composition: 200 ohms ±5%, 1/2 w.
R1207	3B77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R1208	3B77P221J	Composition: 220 ohms ±5%, 1/2 w.
R1209	3B77P470J	Composition: 47 ohms ±5%, 1/2 w.
R1210 and R1211	7491365P103	Variable, carbon film: 25,000 ohms ±20%, .05 w; sim to CTS UPA-70.
R1212	3B77P221J	Composition: 220 ohms ±5%, 1/2 w.
R1213	3B78P470J	Composition: 47 ohms ±5%, 1 w.
R1214	3B77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R1246	3B77P302J	Composition: 3000 ohms ±5%, 1/2 w.
R1247	3B77P163J	Composition: 16,000 ohms ±5%, 1/2 w.
R1248	3B77P474J	Composition: 0.47 megohm ±5%, 1/2 w.
R1249	3B77P622J	Composition: 6200 ohms ±5%, 1/2 w.
R1250	3B77P362J	Composition: 3600 ohms ±5%, 1/2 w.
R1251	3B77P512J	Composition: 5100 ohms ±5%, 1/2 w.
R1252	3B77P153J	Composition: 15,000 ohms ±5%, 1/2 w.

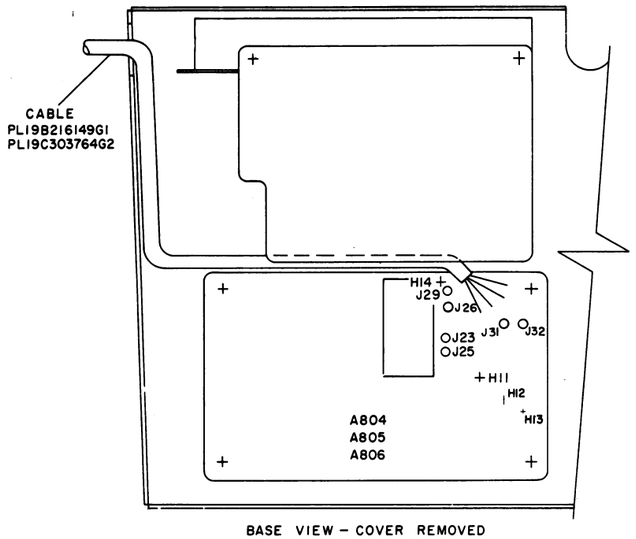
SYMBOL	GE PART NO.	DESCRIPTION
R1253	3B77P300J	Composition: 30 ohms ±5%, 1/2 w.
R1254	3B77P221J	Composition: 220 ohms ±5%, 1/2 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1203	7145098P1	Slide: DPDT, 0.5 amp at 125 VDC; sim to Stackpole SS-150.
S1207	7145098P1	Slide: DPDT, 0.5 amp at 125 VDC; sim to Stackpole SS-150.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XK1201 thru XK1203	5491595P5	Relay: 16 contacts; sim to Allied Control 30054-2.
XQ1201 thru XQ1204	5490277P2	Transistor, phen: 4 contacts; sim to Elco 3305.
		GOOSENECK MICROPHONE ASSEMBLY 4039055G1
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19B209031P1	Microphone, gooseneck: 60 to 10,000 Hz freq response, 100,000 ohm load imp., includes 12 inch gooseneck; sim to Shure Brothers 425-G12.
	19B204202G1	Footswitch. Includes switch, SPDT, momentary contact, 5 amps at 220 VAC; 8 feet cable, 4 pin cable connector.
	19B204200P1	Connector, adapter: 5/8-27. (Mates with Gooseneck microphone).
		MECHANICAL PARTS (SEE RC-1056)
1	7121396P6	Mounting, transistor: phen; sim to Mallory HP-6.
2	4039244P1	Bracket, mounting.
3	4035713P1	Strip.
4	19A115081P2	Bumper, rubber.
5	5491541P201	Spacer, hex: 6-32.
6		(Not Used).
7		(Not Used).
8		(Not Used).
9	19B201338G2	Chassis.
10	4039065P1	Plate.
11	19B201337P1	Panel.
12	4032559P1	Retainer, nut: 6-32: sim to Tinnerman C30395-632-315.
13	19C300958G2	Cover.
14	4037542P2	Pushbutton: plastic; sim to Bradley Industries 2.
15	5490407P4	Grommet.
16	7160861P16	Speednut: sim to Tinnerman C8091-632-157.
17	4039253P1	Plate.
18	4039234P2	Button.
19	4039234P1	Button.
20	NP243322	Nameplate.
21	19A121123P1	Spacer: 4-40 thread.
22	NP243299	Nameplate.
23	N84P13016C13	Screw: 6-32.
24	4035039P1	Plate.
25	4035442P1	Shaft: approx 1/4 inch dia.
26	4035459P1	Spring.
27	4035040P1	Bracket.
28	N402P37C13	Washer: No. 6.
29	4038128G1	Clip.
30	7165075P2	Nut: 3/8-32.
31	7115130P9	Lockwasher: 3/8; sim to Shakeproof 1220-2.

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 insure compability with Dial Page terminal. Deleted CR1206 and added CR1209.





BASE VIEW – COVER REMOVED

FIG. 1

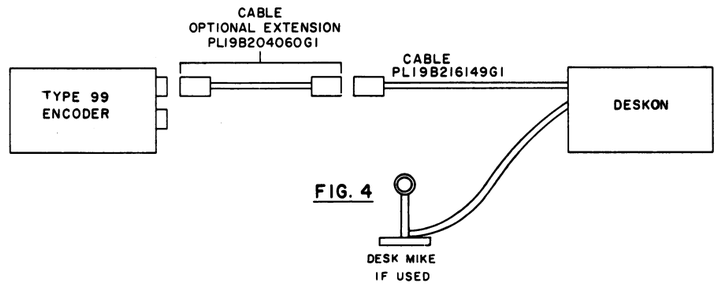


FIG. 4

TYPE 99 ENCODERS

FIG. NO.	FROM	TO	WIRE COLOR
1 & 4	CABLE PLI9B216149G1	A804-A806-J32	WHITE
	↕	A804-A806-H12	SHIELD
	↕	A804-A806-H13	BLACK
	CABLE PLI9B216149G1	A804-A806-J31	RED

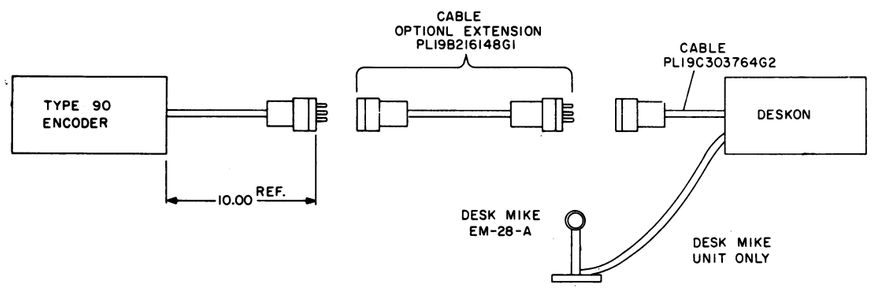


FIG. 2

TYPE 90 ENCODERS
INSTRUCTIONS FOR DESK MIKE DESKON

FIG. NO.	FROM	TO	WIRE COLOR
1 & 2	CABLE PLI9C303764G2	A805-H11	WHITE
	↕	A805-H12	SHIELD
	↕	A805-H13	BROWN
	↕	A805-H14	BLUE
	PLI9C303764G2	CUT BACK	RED

MODIFICATION OF DESK MIKE 4EM28A10

1. CLIP OUT JUMPER ACROSS SWITCH CONTACTS FOR MIKE HI.
2. CLIP OUT CR3 ON THE TONE BURST BOARD (A1302) IF THE TONE ENCODER IS EQUIPPED WITH THE TONE BURST OPTION.

TYPE 90 ENCODERS
INSTRUCTIONS FOR SPEAKER MIKE & HANDSET/SPKR MIKE DESKON

FIG. NO.	FROM	TO	WIRE COLOR
1 & 2	CABLE PLI9C303764G2	A804-A806-H11	WHITE
	↕	A804-A806-H12	SHIELD
	↕	A804-A806-H13	BROWN
	↕	A804-A806-H14	BLUE
	PLI9C303764G2	CUT BACK	RED

1. CLIP OUT CR3 ON THE TONE BURST BOARD (A1302) IF THE TONE ENCODER IS EQUIPPED WITH THE TONE BURST OPTION.

(19D413135, Rev. 5)

APPLICATION DIAGRAM

DESKON REMOTE CONTROL UNIT

ORDERING SERVICE PARTS

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

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

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

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

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

MAINTENANCE MANUAL

LBI-3798

DF-5015

GENERAL ELECTRIC

MOBILE RADIO DEPARTMENT LYNCHBURG, VIRGINIA 24502 CABLE GECOMPROD

(In Canada, Canadian General Electric Company, Ltd., 100 Wingold Ave., Toronto 19. Ontario)

PRINTED IN U.S.A.