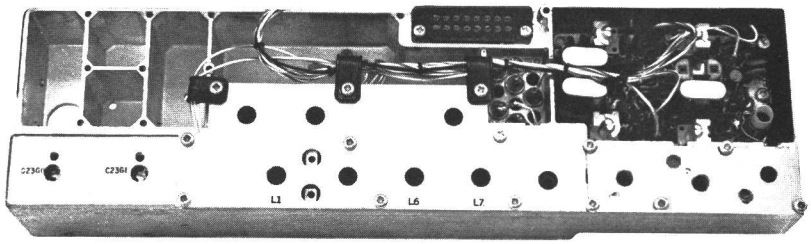
MOBILE RADIO

MASTR PROGRESS LINE

33-50 MHz DUAL FRONT END MODELS 19D413530-G3 & G4



SPECIFICATIONS *

DUAL FRONT END 19D413530G3: 33-42 MHz
DUAL FRONT END 19D413530G4: 42-50 MHz

FREQUENCY RANGE	33-50 MHz
SENSITIVITY (DFE & RECEIVER)	
12-dB SINAD	0.5 μV
20-dB Quieting	0.6 μV
INTERMODULATION (EIA)	-75 dB
INPUT POWER	.010 Amps at 10 volts
FREQUENCY STABILITY	.0005% (-30°C to +60°C)
TRANSISTORS	4
DIMENSIONS (HxWxD)	2-1/4" x 11-3/4" x 4-3/8"

OPTIONS

7351: 1-Freq. Standard
7352: 2-Freq. Standard
7353: 3-Freq. Standard

DUAL FRONT END (33-50 MHz)

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

GENERAL ELECTRIC

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ILLUSTRATIONS

DESCRIPTION

General Electric Dual Front End Models 19D413530-G3 & G4 were designed for operation in the 33 to 50 megahertz band. The Dual Front End (DFE) is used with MASTR Progress Line Receivers to monitor up to four frequencies when the channel spacing is greater than 0.4% (±.2%). The standard DFE can also be used with 150.8 - 174 MHz receivers for cross-band application.

The DFE is of single-unit construction, completely housed in an aluminum casting for maximum shielding and rigidity. The standard unit consists of two helical resonators, 1st mixer, oscillator and two multiplier stages, and a high IF amplifier.

The chassis is mounted in a housing on the rear of the mobile frame, adding approximately three inches to the overall length of the mobile unit. A block diagram of the DFE is shown in Figure 1.

ANTENNA SYSTEM

The Dual Front End and the receiver use a common antenna. A power splitter mounted on the front of the system frame provides approximately 20-dB separation for the two to four receive channels. Due to

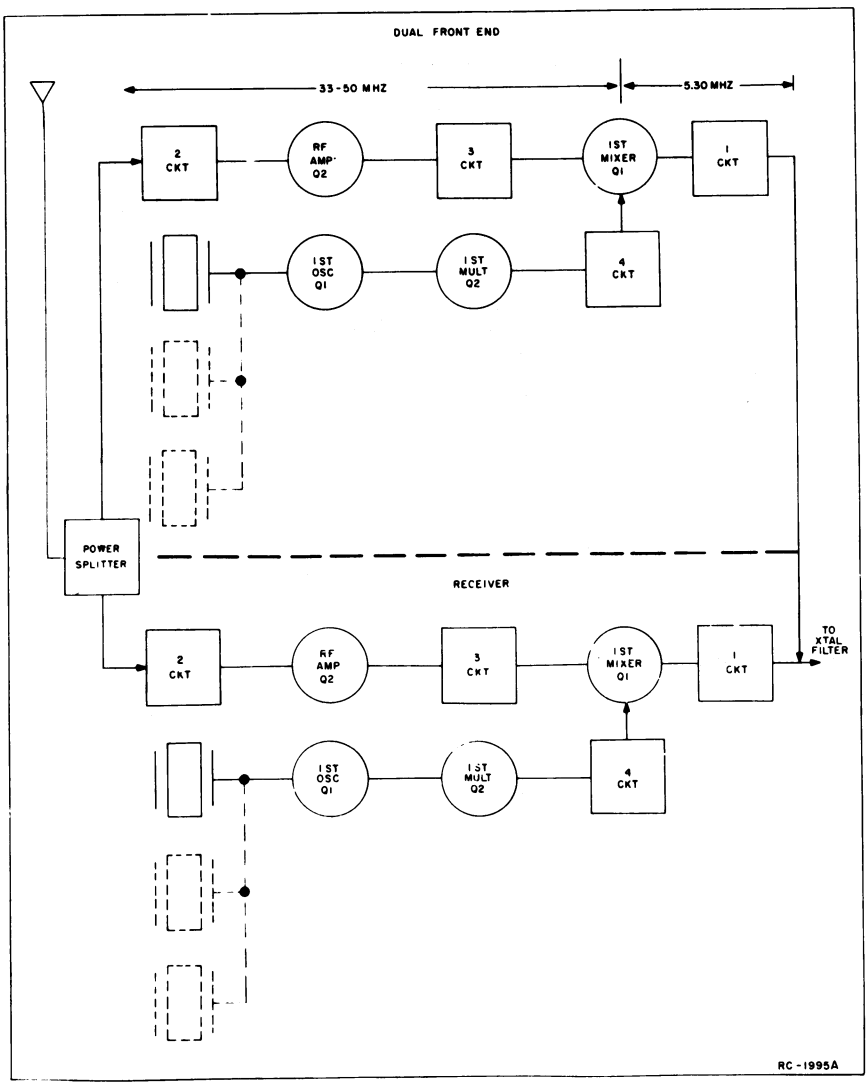


Figure 1 - Dual Front End Block Diagram

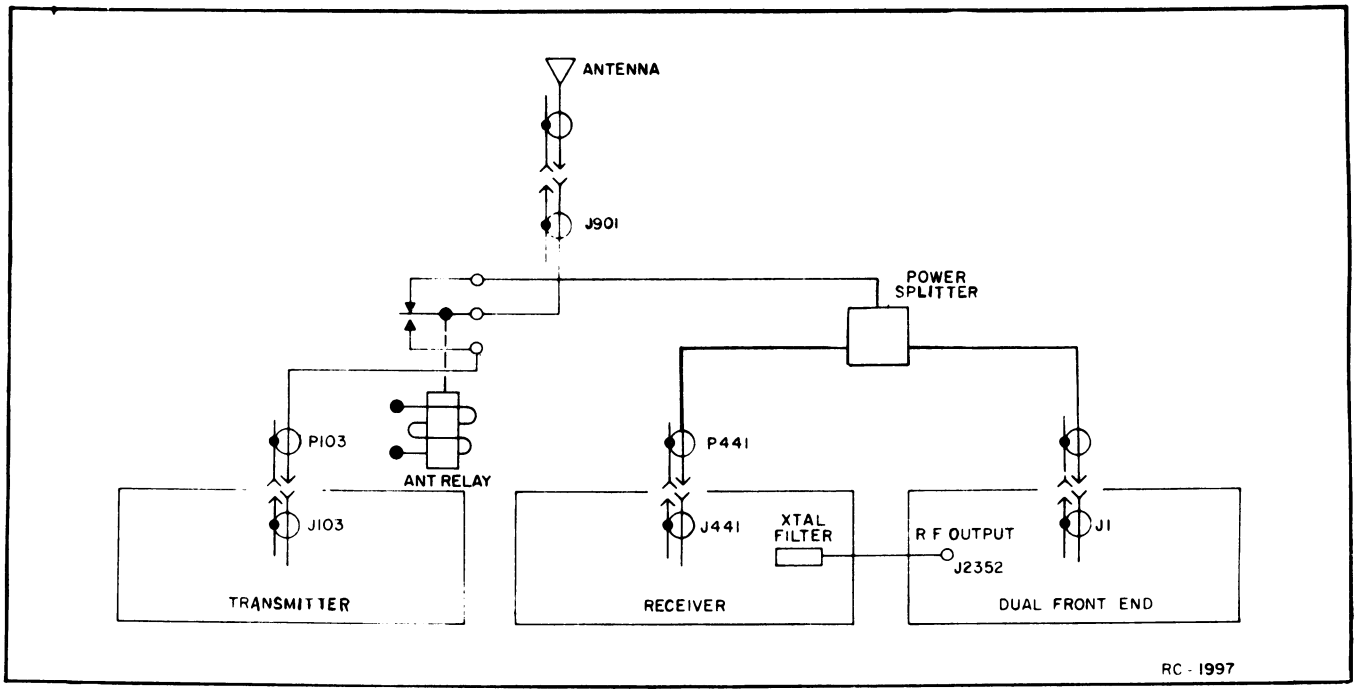


Figure 2 - Single Antenna Block Diagram

the isolation provided by the power splitter, cable lengths to the DFE and the receiver are not critical.

In standard applications, the antenna connects to J901 on the front of the mobile unit. From J901, the antenna connects to the common terminal of the antenna relay (see Figure 2). The transmitter connects to the normally-open contact on the antenna relay, while the normally-closed contact is connected to input jack J3 on the power splitter.

One cable from the power splitter connects to DFE input jack J1, and the other cable connects to J441 on the receiver.

CIRCUIT ANALYSIS

The MASTR Progress Line Dual Front End is completely transistorized, using four silicon transistors. A regulated 10 volts is used for all stages of the Dual Front End.

Centralized metering jack J2351 is provided for use with GE Test Set Models 4EX3A10 and 4EX8K11 for ease of alignment and servicing. The Test Set meters the oscillator, multipliers, and the regulated 10 volts.

The regulated 10 volts, oscillator keying voltage, system negative, and ground connections are supplied by the two cables from receiver plug P443.

RF AMPLIFIER (A2351)

RF Amplifier A2351 consists of two high-Q helical resonators and an RF amplifier stage. The RF signal from the antenna is coupled by RF cable W2352 to a tap on L2353/L2355. The tap is positioned to insure the proper impedance match to the antenna. RF energy is coupled through the two coils by an opening in the shield wall to RF Amplifier Q2. The coils are tuned to the incoming frequency by air trimmer capacitors C341 and C342.

The amplifier uses a Field-Effect Transistor (FET) as the active device. The FET may be considered a semiconductor current path (or channel) whose resistance is varied by a voltage applied between the "gate" and "source" terminals. Lead identification for the FET is shown in Figure 3. The FET has voltage-controlled characteristics, and may be compared to a vacuum tube in operation (see Figure 3).

RF from the antenna is applied to the "source" terminal of FET Q2. Q2 operates as a grounded-gate amplifier. This method of operation provides a low impedance input to the amplifier. The amplifier output is taken from the "drain" terminal and coupled through three tuned circuits (L1, L6 and L7) to the input of the 1st mixer.

1ST OSCILLATOR AND MULTIPLIER

The receiver 1st oscillator operates in a Transistorized Colpitts oscillator

DUAL FRONT END ALIGNMENTS

Refer to Receiver MAINTENANCE MANUAL for Receiver IF Alignment Procedure.

EQUIPMENT REQUIRED

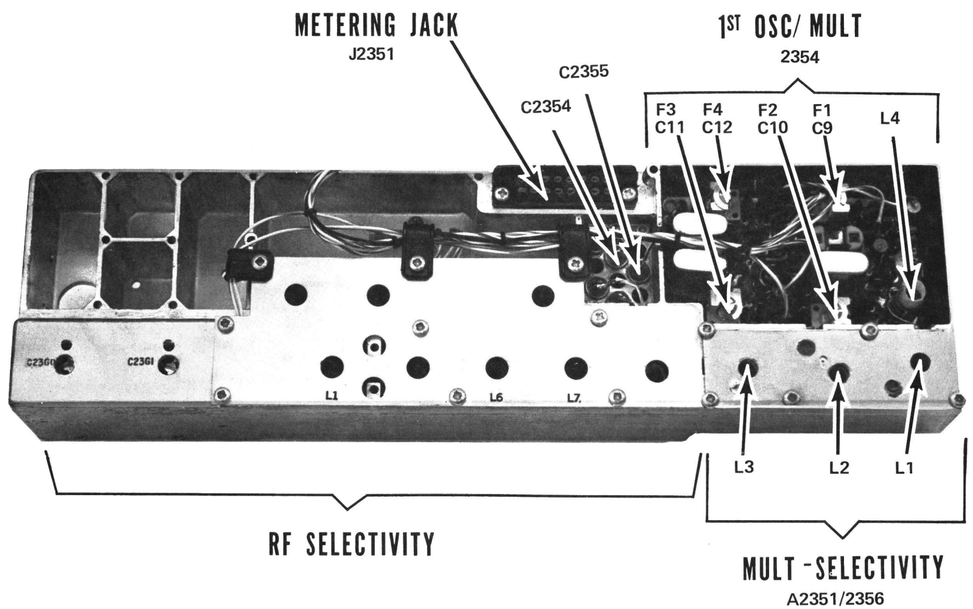
1. GE Test Set Models 4EX3A10 or 4EX8K11 (or a 20,000 ohm-per-volt multimeter).
2. Signal Generator (33-50 MHz range). Connect a one-inch piece of insulated wire no larger than .065-inch diameter to generator output probe.

PRELIMINARY CHECKS AND ADJUSTMENTS

1. Plug Test Set cable into metering jack J2351. With Test Set in position J, check for regulated +10 volts. If using multimeter, measure at metering jack J2351-13 and -16.
2. If using Multimeter for alignment, connect positive lead to J2351-16 (ground).
3. Set the frequency selector switch on the control unit to select the center frequency of the multi-frequency DFE.
4. For a large change in frequency or a badly mis-aligned DFE, set crystal trimmers C9, C10, C11 and C12 on 1st Osc/Mult board to mid-capacity.

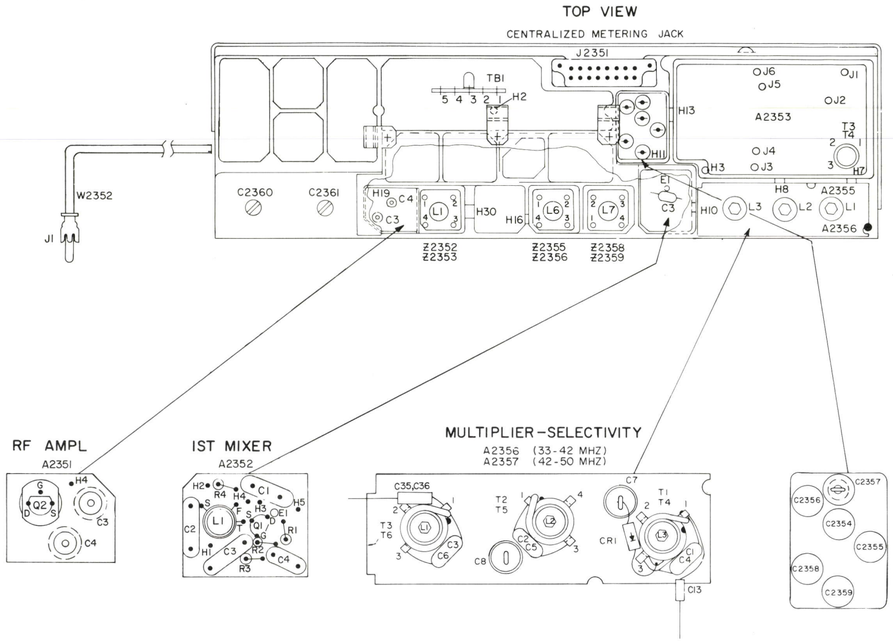
NOTE

If Receiver and Dual Front End operating frequencies are less than 1 MHz apart, connect the signal generator directly into the Dual Front End antenna connector, not into the connector.

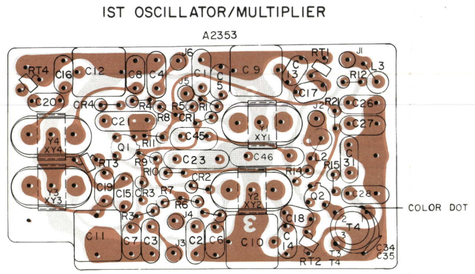


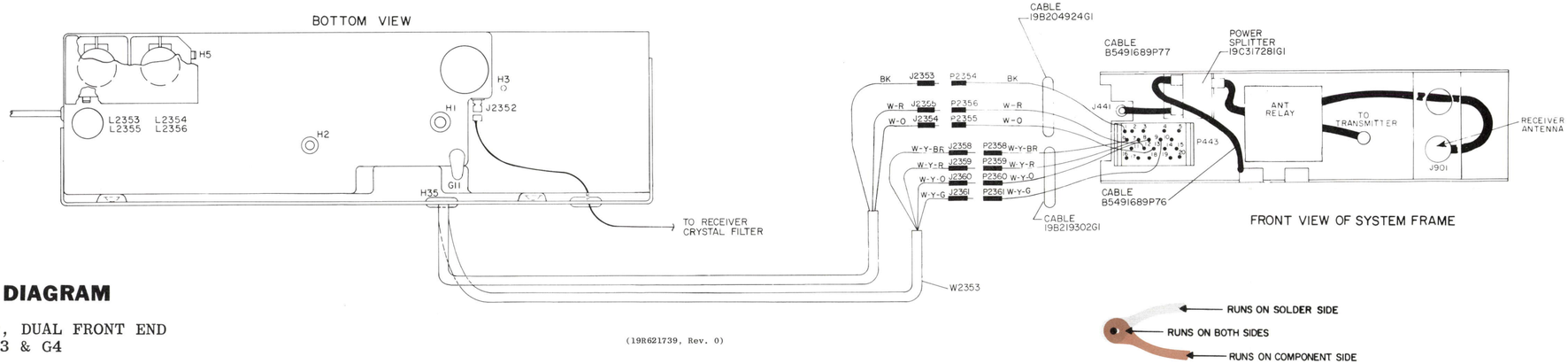
ALIGNMENT PROCEDURE

STEP	METERING POSITION: GE Test Set	METERING POSITION: Multimeter Minus at J2351	TUNING CONTROL	METER READING	PROCEDURE
		OSCILLATOR AND MULTIPLIER			
1	D (Mult 1)	Pin 4	L4 (1st OSCILLATOR) L1 (MULT-SELECTIVITY)	Max	Tune L4 and L1 for maximum meter.
2	D (Mult 1)	Pin 4	L2 (MULT-SELECTIVITY)	Min	Tune L2 for minimum reading. Change voltage scale if necessary.
3	D (Mult 1)	Pin 4	L3 (MULT-SELECTIVITY)	Max	Tune L3 for maximum meter reading.
4	D (Mult 1)	Pin 4	See Procedure		Repeat Steps 1 and 2 to assure maximum injection voltage.
		RF CIRCUITS			
5	A (Receiver Disc)	Pin 10		Zero	Connect Test Set to Receiver metering jack J442. Insert signal generator probe into L6 hole, and adjust Signal Generator for discriminator zero.
6	B (2nd IF Amp on Receiver)	Pin 2	L7, L6	Max	Tune L7 for maximum meter reading. Insert generator probe in L1 hole and tune L6 for maximum meter reading.
7	B (2nd IF Amp on Receiver)		C2360, C2361, L1 (RF AMP)	Max	Connect generator to the DFE antenna jack and tune C2360, C2361 and L1 for maximum meter reading. Reduce signal to keep reading below 0.5 volts.
8	B (2nd IF Amp on Receiver)		L1, (RF AMP L6, L7	Max	Retune L1, L6 and L7 for maximum meter reading.
9	B (2nd IF Amp on Receiver)	Pin 2	L4 (1st OSCILLATOR) L1, L2, L3 (MULT-SELECTIVITY)	Max	Retune L4, L1, L2 and L3 for maximum meter reading.
10	B (2nd IF Amp on Receiver)		C2360, C2361		Retune C2360 and C2361 for maximum quieting.
		FREQUENCY ADJUSTMENT			
11	A (Receiver Disc)	Pin 10	C9 (on 1st OSC/MULT) (C10, C11, or C12 for multi-frequency)	Zero	Apply an on-frequency signal to the DFE Antenna jack. Tune C9 for zero discriminator reading. In multi-frequency units, tune C10, C11 or C12 as required. NOTE For proper frequency control of the receiver, it is recommended that all frequency adjustments be made when the equipment is at a temperature of approximately 75°F. In no case should frequency adjustments be made when the equipment is outside the temperature range of 50° to 90° F.



(19R204412, Sh. 1, Rev. 3)
(19R204412, Sh. 2, Rev. 3)



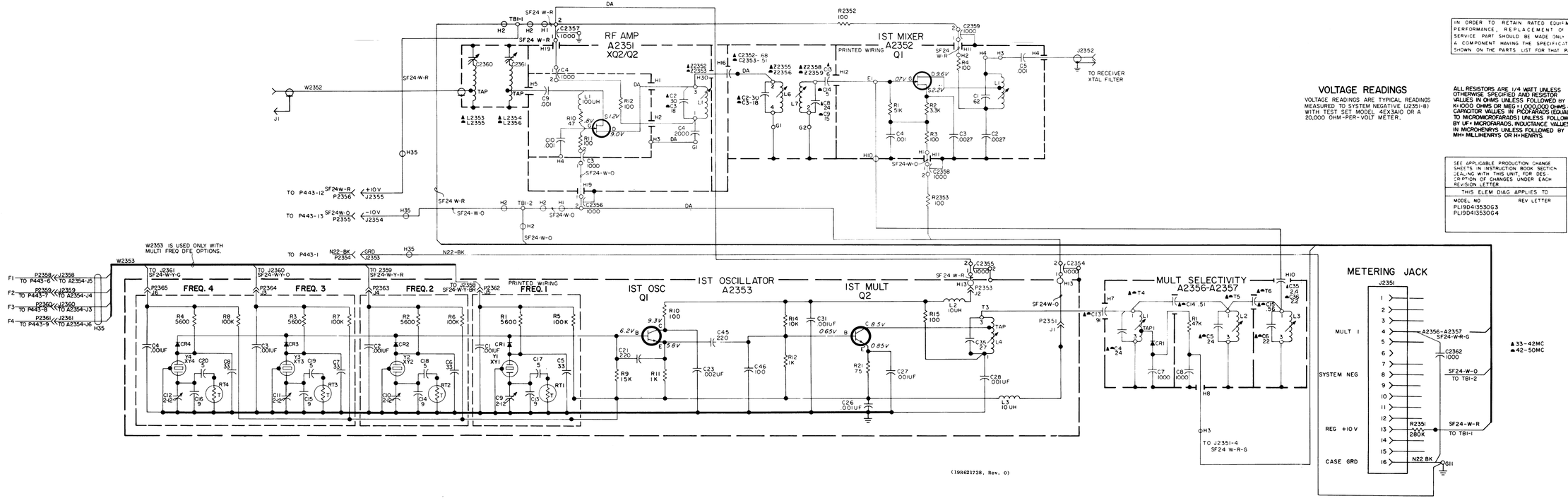


(19R621739, Rev. 0)

RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

OUTLINE DIAGRAM

33—50 MHz, DUAL FRONT END
19D413530G3 & G4



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

VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MEASURED TO SYSTEM NEGATIVE (J2351-8) WITH TEST SET MODEL 4EX3AIO OR A 20,000 OHM-PER-VOLT METER.

ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG =1,000,000 OHMS. CAPACITOR VALUES IN MICROFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS

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
PLI9D413530G3	
PLI9D413530G4	

SCHEMATIC DIAGRAM

33—50 MHz, DUAL FORNT END
WITH STANDARD OSCILLATOR
19D413530G3 & G4

PARTS LIST

LBI-4244A

DUAL FRONT END
33-50 MHz
19D413530G3 33-42 MHz
19D413530G4 42-50 MHz

SYMBOL	GE PART NO.	DESCRIPTION
A2351		RF AMPLIFIER 19B204772G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C3 and C4	5493392P7	Ceramic, feed-thru: .001 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C9 and C10	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C46	5496219P563	Ceramic disc: 100 pf ±5%, 500 VDCW, temp coef -330 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	7491382P101	Coil, RF: 100 mh ±10%, 4 ohms DC res max; sim to Delevan 3500 Series.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q2	19A115953P1	N Channel; sim to T1S34.
		- - - - - - - - - RESISTORS - - - - - - - - -
R10	3R152P470J	Composition: 47 ohms ±5%, 1/4 w.
R11 and R12	3R152P101J	Composition: 100 ohms ±5%, 1/4 w.
		- - - - - - - - - SOCKETS - - - - - - - - -
XQ2	5490277P1	Transistor: 4 contacts rated at 1 amp at 400 VRMS; sim to Elco 3303.
A2352		FIRST MIXER 19B216867G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496219P258	Ceramic disc: 62 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2 and C3	5494481P27	Ceramic disc: 2700 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C5	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19B216880G1	Coil.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152P513J	Composition: 51,000 ohms ±5%, 1/4 w.
R2	3R152P332K	Composition: 3300 ohms ±10%, 1/4 w.
R3 and R4	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115953P1	N Channel; sim to T1S34.
A2354		FIRST OSCILLATOR 19B204419G18
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 thru C4	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C5 thru C8	5496219P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.

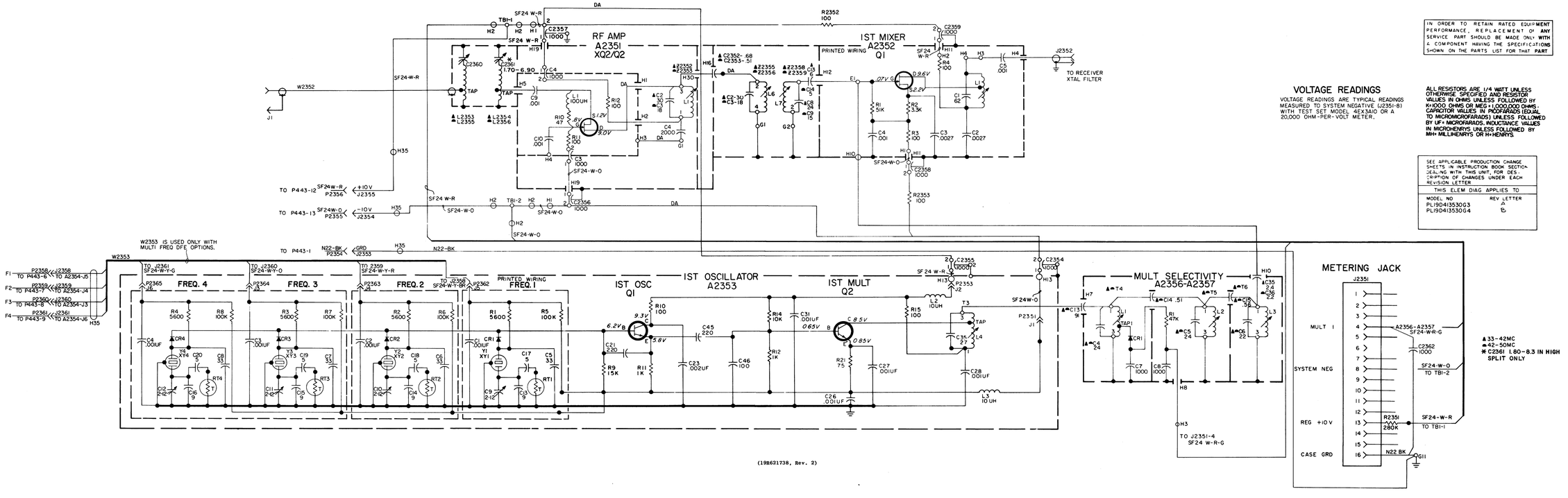
SYMBOL	GE PART NO.	DESCRIPTION
C9 thru C12	5491271P106	Variable, subminiature: approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C13 thru C16	5496219P40	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C17 thru C20	19C300685P93	Ceramic disc: 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM.
C21	5496219P771	Ceramic disc: 220 pf ±5%, 500 VDCW, temp coef -750 PPM.
C23	5494481P114	Ceramic disc: .002 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C26 thru C28	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C31	5494481P112	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C45	5490008P35	Silver mica: 220 pf ±5%, 500 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR4	19A115603P1	Silicon.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J6	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1 and L2	7488079P16	Choke, RF: 10 uh ±10% ind at 640 ma, 0.6 ohm DC res; sim to Jeffers 4421-7K.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115330P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1 thru R4	3R152P562J	Composition: 5600 ohms ±5%, 1/4 w.
R5 thru R8	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R9	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R11 and R12	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R14	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R21	3R152P750J	Composition: 75 ohms ±5%, 1/4 w.
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1 thru RT4	19B209284P5	Disc: 43 ohms res nominal at 25°C, color code green.
		- - - - - - - - - TRANSFORMERS - - - - - - - -
T4		COIL ASSEMBLY 19B205416G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C34	5496218P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
C35	5496218P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - - SOCKETS - - - - - - - - -
XY1 thru XY4		Refer to Miscellaneous.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CRYSTALS - - - - - - - - - -
		When reordering give GE Part No. and specify exact freq needed.
		33-42 MHz crystal freq = (OF ÷5.30 MHz) ÷ 3.
		42-50 MHz crystal freq = (OF ÷5.30 MHz) ÷ 3.
Y1 thru Y4	19B206576P2	Quartz: freq range 13766.667 to 15766.666 KHz, temp range -30°C to +85°C. (33-42 MHz).
Y1 thru Y4	19B206576P3	Quartz: freq range 12233.333 to 16233.333 KHz, temp range -30°C to +85°C. (42-54 MHz).
A2356 and A2357		MULTIPLIER SELECTIVITY ASSEMBLY A2356 19B205326G7 A2357 19B205326G8
		- - - - - - - - - CAPACITORS - - - - - - - - -
C4 and C5	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C6	5496218P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C7 and C8	5493392P107	Ceramic feed-thru: 470 pf +100% - 0%, 500 VDCW.
C13	5491601P137	Tubular: 0.91 pf ±5%, 500 VDCW.
C14	5491601P114	Tubular: 0.51 pf ±5%, 500 VDCW.
C15	5491601P115	Tubular: 0.56 pf ±5%, 500 VDCW.
C35	5491601P127	Phenolic: 2.4 pf ±5%, 500 VDCW.
C36	5491601P126	Phenolic: 2.2 pf ±5%, 500 VDCW.
		- - - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1	4038056P1	Germanium.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152P473K	Composition: 47,000 ohms ±10%, 1/4 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - -
T4 L1	19B205325G2 5491798P4	Coil. Tuning slug.
T5 and T6	19B205325G1	Coil.
L2 and L3	5491798P4	Tuning slug.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2352	5491601P117	Tubular: 0.68 pf ±5%, 500 VDCW.
C2353	5491601P114	Tubular: 0.51 pf ±5%, 500 VDCW.
C2354 thru C2359	5493392P7	Ceramic feed-thru: .001 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C2362	5494481P12	Ceramic disc: .001 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J2351	19B205689G2	Connector: 18 contacts rated at 5 amps min at 1000 VDC max.
J2352	19A115465P1	Connector, coaxial: sim to Wicon Electronics Inc Type 1104.
J2353 thru J2356	7147199P1	Connector: male contact; sim to Winchester Electronics 21803.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L2353 thru L2356		COIL ASSEMBLY L2353 19B204820G1 L2354 19B204820G2 L2355 19B204820G3 L2356 19B204820G4
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2361 and C2362	19B209159P3	Variable, subminiature: approx 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - INDICATING DEVICES - - - - - -
DS301	19B209067P1	Lamp, glow: 0.3 ma; sim to GE NE-2T.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P2351 thru P2353	4029840P2	Contact, electrical; sim to Amp 42827-2.
		- - - - - - - - - RESISTORS - - - - - - - - -
R2351	19A116278P444	Metal film: 0.28 megohm ±2%, 1/2 w.
R2352 and R2353	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	7487424P7	Miniature, phen: 4 terminals.
		- - - - - - - - - - CABLES - - - - - - - - - -
W2352	19A122563G2	Cable, RF: approx 31 inches long.
W2353	19B219304G1	Cable, RF: approx 15-1/4 inches long.
		- - - - - - - - TUNED CIRCUITS - - - - - - - -
Z2352 and Z2353		COIL ASSEMBLY Z2352 19B204786G5 Z2353 19B204786G6
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4	5494481P14	Ceramic disc: .002 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P1	Tuning slug. (Used in Z2352).
	5491798P4	Tuning slug. (Used in Z2353).
Z2355 and Z2356		COIL ASSEMBLY Z2355 19B204767G2 Z2356 19B204767G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - MISCELLANEOUS - - - - - - -
	5491798P1	Tuning slug. (Used in Z2355).
	5491798P4	Tuning slug. (Used in Z2356).
Z2358 and Z2359		COIL ASSEMBLY Z2358 19B204784G8 Z2359 19B204784G10
		- - - - - - - - - CAPACITORS - - - - - - - - -
C7	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C9	5496218P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
C13	5496218P237	Ceramic disc: 6.0 pf ±5%, 500 VDCW, temp coef -80 PPM.
C14	5496218P236	Ceramic disc: 5.0 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P1	Tuning slug. (Used in Z2358).
	5491798P4	Tuning slug. (Used in Z2359).

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	7162414P1	Transistor, socket. (Used with Q2 in A2351).
	19B204917P1	Support. (Used with Q2 in A2351).
	4033089P1	Clip (Part of XY1).
	19B200525P9	Rivet (Part of XY1).
	19A115793P1	Contact (Part of XY1).
	4039307P1	Crystal socket (Part of XY1).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



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

VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MEASURED TO SYSTEM NEGATIVE (J2351-8) WITH TEST SET MODEL 4EX3AIO OR A 20,000 OHM-PER-VOLT METER.

ALL RESISTORS ARE 1/4 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.

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
PL19D413530G3	A
PL19D413530G4	B

▲33-42MC
▲42-50MC
* C2361 1.80-8.3 IN HIGH SPLIT ONLY

(DF-8401)

SCHEMATIC DIAGRAM

33—50 MHz, DUAL FRONT END WITH STANDARD OSCILLATOR
19D413530G3 & G4

PARTS LIST

LBI-4244B

DUAL FRONT END
33-50 MHz
19D413530G3 33-42 MHz
19D413530G4 42-50 MHz

SYMBOL	GE PART NO.	DESCRIPTION
A2351		RF AMPLIFIER 19B204772G3
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C3 and C4	5493392P7	Ceramic, feed-thru: 1000 pf +100%-0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C9 and C10	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	7491382P101	Coil, RF: 100 µh ±10%, 4 ohms DC res max; sim to Delevan 3500 Series.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2*	19A116960P1	N Type, field effect; sim to Type 2N4416.
		Earlier than REV A:
	19A115953P1	N Channel; sim to T1334.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R10	3R152P470J	Composition: 47 ohms ±5%, 1/4 w.
R11 and R12	3R152P101J	Composition: 100 ohms ±5%, 1/4 w.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XQ2	549027?P5	Transistor: 3 contacts rated at 1 amp at 400 VRMS; sim to Alcon 12131L2.
A2352		FIRST MIXER 19B216867G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5496218P258	Ceramic disc: 62 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2 and C3	5494481P127	Ceramic disc: 2700 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C4	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C5	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19B216880G1	Coil.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1*	19A116960P1	N Type, field effect; sim to Type 2N4416.
		Earlier than REV A:
	19A115953P1	N Type, field effect.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P513J	Composition: 51,000 ohms ±5%, 1/4 w.
R2	3R152P332K	Composition: 3300 ohms ±10%, 1/4 w.
R3 and R4	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.

SYMBOL	GE PART NO.	DESCRIPTION
A2353		FIRST OSCILLATOR 19B204419G18
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1 thru C4	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C5 thru C8	5496219P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C9 thru C12	5491271P106	Variable, subminiature; approx 2.1-12.7 pf, 750 v peak; sim to EF Johnson 189.
C13 thru C16	5496219P40	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C17 thru C20	19C300685P93	Ceramic disc: 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM.
C21	5496219P771	Ceramic disc: 220 pf ±5%, 500 VDCW, temp coef -750 PPM.
C23	5494481P114	Ceramic disc: 2000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C26 thru C28	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C31	5494481P112	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C45	5490008P35	Silver mica: 220 pf ±5%, 500 VDCW.
C46	5496219P563	Ceramic disc: 100 pf ±5%, 500 VDCW, temp coef -330 PPM.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR4	19A115603P1	Silicon.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J1 thru J6	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1 and L2	7488079P16	Choke, RF: 10 µh ±10% ind at 640 ma, 0.6 ohm DC res; sim to Jeffers 4421-7K.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1 and Q2	19A115330P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 thru R4	3R152P562J	Composition: 5600 ohms ±5%, 1/4 w.
R5 thru R8	3R152P104K	Composition: 0.10 megohm ±10%, 1/4 w.
R9	3R152P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R11 and R12	3R152P102J	Composition: 1000 ohms ±5%, 1/4 w.
R14	3R152P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
R21	3R152P750J	Composition: 75 ohms ±5%, 1/4 w.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT1 thru RT4	19B209284P5	Disc: 43 ohms res nominal at 25°C, color code green.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T3		COIL ASSEMBLY 19B205416G2
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C35	5496218P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
L4	19A121464P2	Coil.
	5491798P5	Tuning slug.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XY1 thru XY4		Refer to Miscellaneous.
		- - - - - - - - - - CRYSTALS - - - - - - - - - -
		NOTE: When reordering give GE Part No. and specify exact freq needed.
		33-42 MHz crystal freq = (OF ±5.30 MHz) / 3
		42-50 MHz crystal freq = (OF -5.30 MHz) / 3
Y1 thru Y4	19B206576P2	Quartz: freq range 12766.667 to 15766.666 KHz, temp range -30°C to +85°C. (33-42 MHz).
Y1 thru Y4	19B206576P3	Quartz: freq range 12233.333 to 16233.333 KHz, temp range -30°C to +85°C. (42-54 MHz).
A2356 and A2357		MULTIPLIER SELECTIVITY ASSEMBLY A2356 19B205326G7 A2357 19B205326G8
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C4 and C5	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C6	5496218P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C7 and C8	5493392P107	Ceramic feed-thru: 470 pf +100% - 0%, 500 VDCW.
C13	5491601P137	Phenolic: 0.91 pf ±5%, 500 VDCW.
C14	5491601P114	Phenolic: 0.51 pf ±5%, 500 VDCW.
C15	5491601P115	Phenolic: 0.56 pf ±5%, 500 VDCW.
C35	5491601P127	Phenolic: 2.4 pf ±5%, 500 VDCW.
C36	5491601P126	Phenolic: 2.2 pf ±5%, 500 VDCW.
		- - - - - - - - DIODES AND RECTIFIERS - - - - -
CR1	4038056P1	Germanium.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152P473K	Composition: 47,000 ohms ±10%, 1/4 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T4 L1	19B205325G2 5491798P4	Coil. Tuning slug.
T5 and T6 L2 and L3	19B205325G1	Coil.
	5491798P4	Tuning slug.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2352	5491601P117	Phenolic: 0.68 pf ±5%, 500 VDCW.
C2353	5491601P114	Phenolic: 0.51 pf ±5%, 500 VDCW.
C2354 thru C2359	5493392P7	Ceramic feed-thru: 1000 pf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C2362	5494481P12	Ceramic disc: 1000 pf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J2351	19B205689G2	Connector: 18 contacts rated at 5 amps min at 1000 VDC max.
J2352	19A115465P1	Connector, coaxial: sim to Micon Electronics Inc. Type 1104.
J2353 thru J2355	7147199P1	Connector: male contact; sim to Winchester Electronics 21803.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L2353 thru L2355		COIL ASSEMBLY L2353 19B204820G1 L2354 19B204820G2 L2355 19B204820G3
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2360 and C2361	19B209159P3	Variable, subminiature: approx 1.70-6.9 pf, 750 v peak; sim to EF Johnson 189.

SYMBOL	GE PART NO.	DESCRIPTION
L2356		COIL ASSEMBLY 19B204820G4
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2361*	19B209159P4	Variable, air, sub-miniature: 1.80-8.30 pf, 650 v peak; sim to EF Johnson 189.
		In 19D413530G4 of REV A and earlier:
	19B209159P3	Variable, air, sub-miniature: 1.70-6.90 pf, 750 v peak; sim to EF Johnson 189.
		- - - - - - - - - INDICATING DEVICES - - - - - -
DS301	19B209067P1	Lamp, glow: 0.3 ma; sim to GE NE-27.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P2351 thru P2353	4029840P2	Contact, electrical; sim to Amp 42827-2.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2351	19A116278P444	Metal film: 0.28 megohm ±2%, 1/2 w.
R2352 and R2353	3R152P101K	Composition: 100 ohms ±10%, 1/4 w.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	7487424P7	Miniature, phen: 4 terminals.
		- - - - - - - - - - CABLES - - - - - - - - - -
W2352	19A122563G2	Cable, RF: approx 31 inches long.
W2353	19B219304G1	Cable, RF: approx 15-1/4 inches long.
		- - - - - - - - TUNED CIRCUITS - - - - - - - -
Z2352 and Z2353		COIL ASSEMBLY Z2352 19B204786G5 Z2353 19B204786G6
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4	5494481P14	Ceramic disc: 2000 pf ±10%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19B204786P10	Coil.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P4	Tuning slug. (Used in Z2352).
	5491798P5	Tuning slug. (Used in Z2353).
Z2355 and Z2356		COIL ASSEMBLY Z2355 19B204767G2 Z2356 19B204767G3
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2	5496218P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P4	Tuning slug. (Used in Z2355).
	5491798P5	Tuning slug. (Used in Z2356).
Z2358 and Z2359		COIL ASSEMBLY Z2358 19B204784G9 Z2359 19B204784G10
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C7	5496218P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C9	5496218P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
C13	5496218P237	Ceramic disc: 6.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C14	5496218P236	Ceramic disc: 5.0 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	5491798P4	Tuning slug. (Used in Z2358).
	5491798P5	Tuning slug. (Used in Z2359).
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	7162414P1	Transistor, socket. (Used with Q2 in A2351).
	19B204917P1	Support. (Used with Q2 in A2351).
	4033089P1	Clip. (Part of XY1).
	19B200525P9	Rivet. (Part of XY1).
	19A115793P1	Contact. (Part of XY1).
	4039307P1	Crystal socket. (Part of XY1).

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.

Dual Front End 19D413530G3,4

REV. A - To incorporate new transistor. Changed Q2

Dual Front End 19D413530G4

REV. B - To improve tuning range of second RF stage. Changed C2361.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

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 of 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-4243

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

DF-8401

PRINTED IN U.S.A.