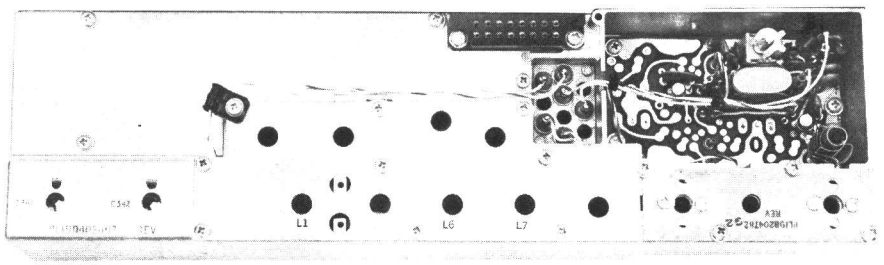
MOBILE RADIO

MASTR Progress Line

25-50 MHZ DUAL FRONT END MODELS 19D402497-G1 THRU G6

Maintenance Manual LBI-3613B
DF 8401



SPECIFICATIONS *

DUAL FRONT END 19D402497-G1 thru -G6

FREQUENCY RANGE	25-50 MHz	
SENSITIVITY	With One Antenna	With Two Antenna
12-dB SINAD	0.30 microvolt	0.25 microvolt
20-dB quieting	0.40 microvolt	0.35 microvolt
INTERMODULATION (EIA)	-60 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"	

DUAL FRONT END 25-50 MHZ

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

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

DESCRIPTION

DUAL FRONT END

General Electric Dual Front End Models 19D402497-G1 through -G6 were designed for operation in the 25-50 megahertz band. The Dual Front End (DFE) is used with MASTR Progress Line Receivers to monitor two frequencies when the channel spacing is greater than 0.4% (±.2%).

The DFE is of single-unit construction, completely housed in an aluminum casting for maximum shielding and rigidity. The unit consists of an RF amplifier, mixer, oscillator and two multiplier stages. The output feeds directly into the receiver 1st mixer stage as shown in Figure 1. The chassis is mounted in a housing on the rear of the mobile frame and adding approximately three inches to the overall length of the mobile unit.

ANTENNA SYSTEMS

The Dual Front End and the receiver may use a common antenna or separate antennas. If the two frequencies are in the 25-50 megahertz range, one antenna will work satisfactorily. For crossband applications where the receiver frequency is in the 132-174 megahertz range and the DFE in the 25-50 megahertz range, two antennas must be used to obtain maximum receiver sensitivity. The frequency range and antenna system used with each model DFE is shown in the following chart.

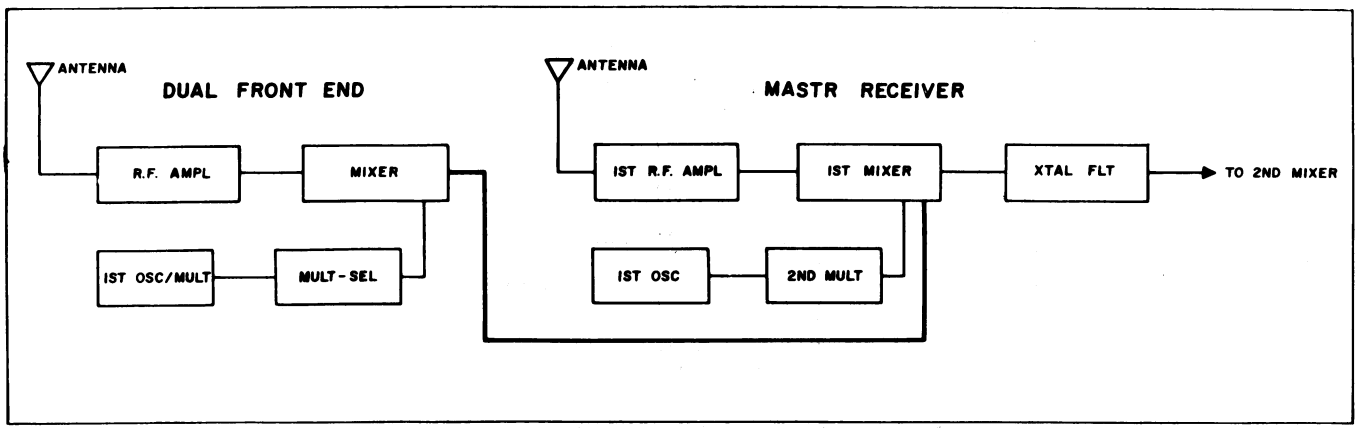
DUAL FRONT END	FREQUENCY RANGE	ANTENNA SYSTEM
19D402497-G1	25-33 MHz	One Antenna
19D402497-G2	25-33 MHz	Two Antennas
19D402497-G3	33-42 MHz	One Antenna
19D402497-G4	33-42 MHz	Two Antennas
19D402497-G5	42-50 MHz	One Antenna
19D402497-G6	42-50 MHz	Two Antennas

Single Antenna System (Figure 2)

In the single antenna system, the antenna connects to jack J901 on the front of the mobile unit. From J901, the antenna connects to the commom terminal of antenna relay K901. The transmitter connects to the normally open contact terminal of the antenna relay. The normally closed contact terminal of K901 is connected to the common terminal of the antenna "T" connector. One cable from the "T" connector goes to J1 on the Dual Front End and the other cable goes to J441 on the receiver.

Dual Antenna System (Figure 3)

When two antennas are used, one antenna is connected through antenna jack J902 on the front of the mobile unit to jack J1 on the DFE. The second antenna is connected through J901 to the common terminal of antenna relay K901. The normally closed relay contact is connected to receiver antenna jack J441, and the normally open contact is connected to the transmitter.



RC-1233

Figure 1 - Dual Front End Block Diagram

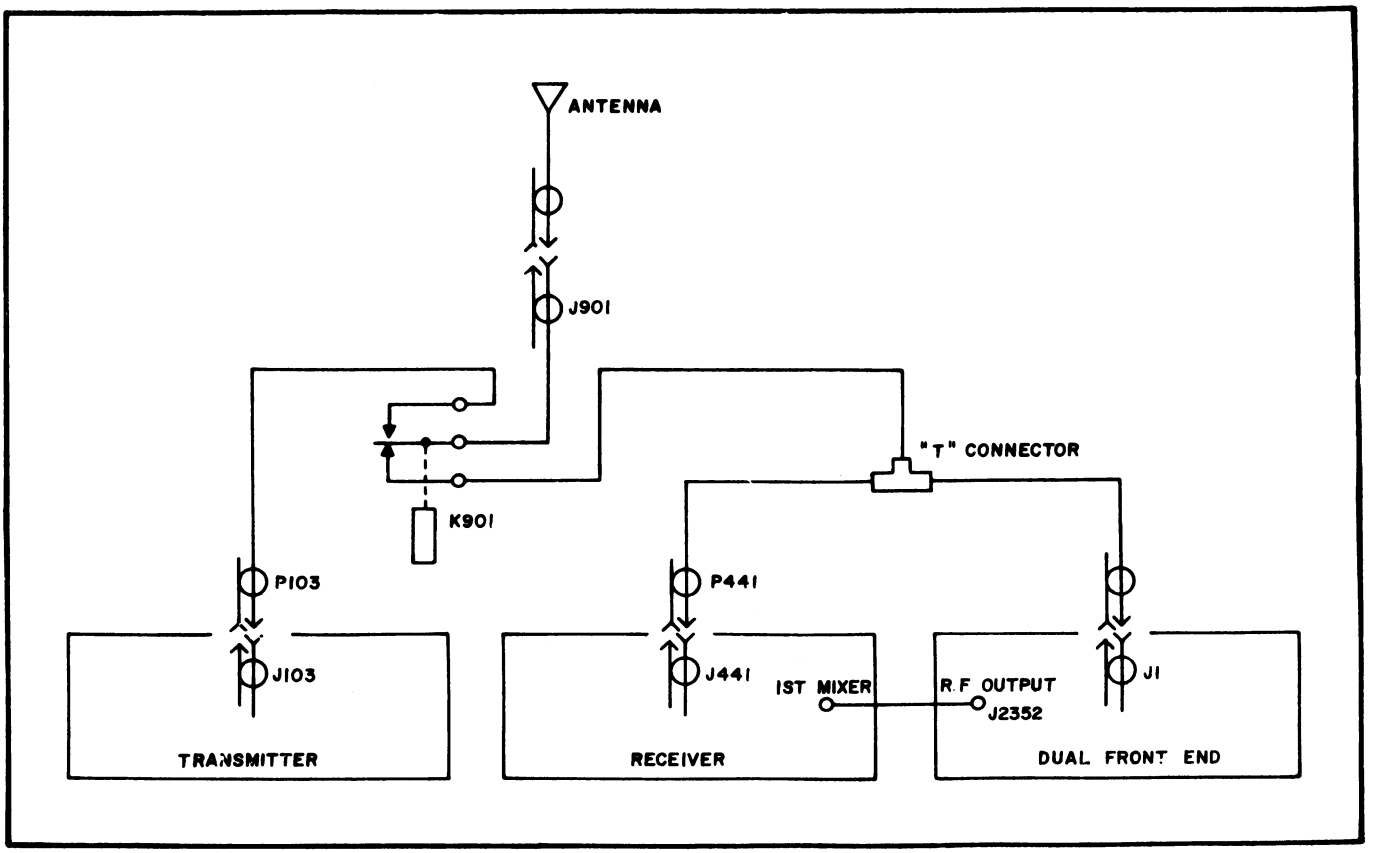


Figure 2 - Single Antenna Block Diagram

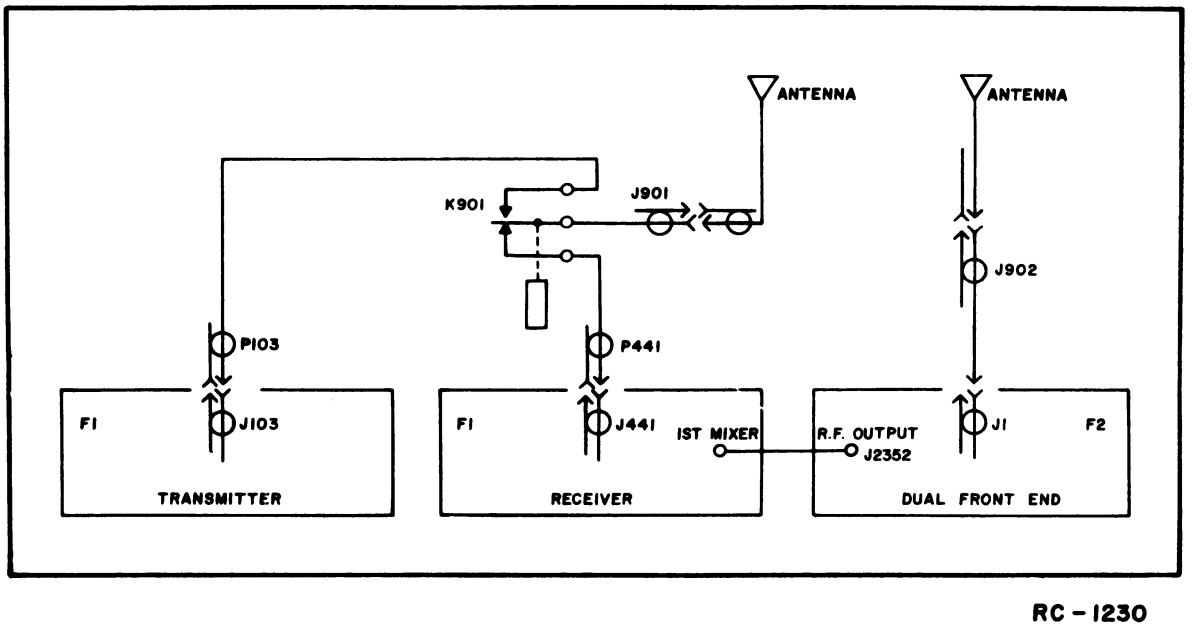


Figure 3 - Dual Antenna Block Diagram

CIRCUIT ANALYSIS

DUAL FRONT END (19D402497-G1 through -G6_

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 the General Electric Test Set EX-3-A for ease of alignment and servicing. The Test Set meters the oscillator, multipliers, and the regulated 10 volts.

RF Amplifier (A2351)

RF Amplifier (A2351) consists of two high-Q helical resonators and an RF amplifier stage (Q1). The RF signal from the antenna is coupled by RF cable W2351 to a tap on L2351/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 the base of RF Amplifier Q1. The coils are tuned to the incoming frequency by air trimmer capacitors C341 and C342. The output of Q1 is coupled through three tuned circuits to the base of the 1st mixer.

1st Oscillator and Multiplier (A2353-A2354)

The receiver 1st oscillator operates in a Transistorized Colpitts oscillator circuit. The oscillator crystal operates in a fundamental mode at a frequency of approximately 10 to 15 megahertz. The crystal is cut to provide temperature compensation at the high end of the temperature range and is thermistor compensated at low temperatures. This provides ±.0005% frequency stability as soon as the receiver is energized--without having to wait for crystal ovens to warm up.

Regulated 10 volts is supplied to the crystal circuit to forward bias diode CR1. Forward biasing the diode reduces its impedance, so that the crystal frequency is applied to the base of oscillator transistor Q1. Feedback for the oscillator is developed across C21/C22. The oscillator output is fed through C24 to the base of the 1st multiplier (Q2).

The output of the 1st multiplier (doubler Q2) is transformer-coupled (T3/T4) to multipler selectivity assembly A2355/A2356. The 1st multiplier tank is tuned to three times the crystal frequency. The 1st multiplier stage is metered at the centralized metering jack J2351-4.

Multiplier Selectivity (A2355/A2356)

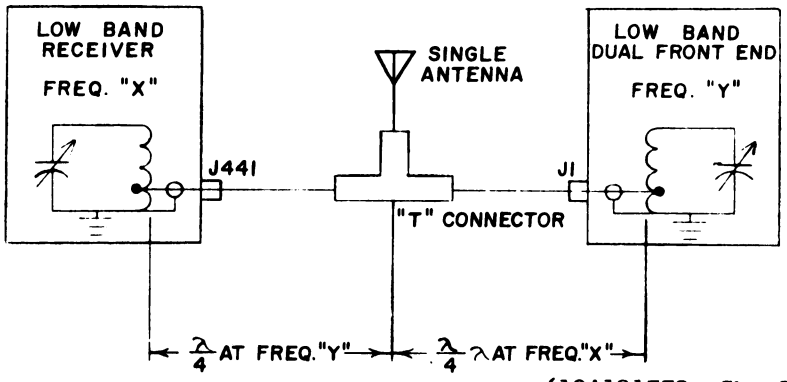
Following the 1st multiplier tank (T3.T4) are three additional tuned circuits (L1, L2, and L3). Capacitor C12/C16 couples the multiplier selectivity output to the base of the 1st mixer.

1st Mixer (A2352)

The RF signal from the RF amplifer and the low-side injection voltage (for high split) and the high-side injection voltage (for low and mid-split) from the multiplier selectivity are applied to the base of 1st Mixer A2352-Q2.

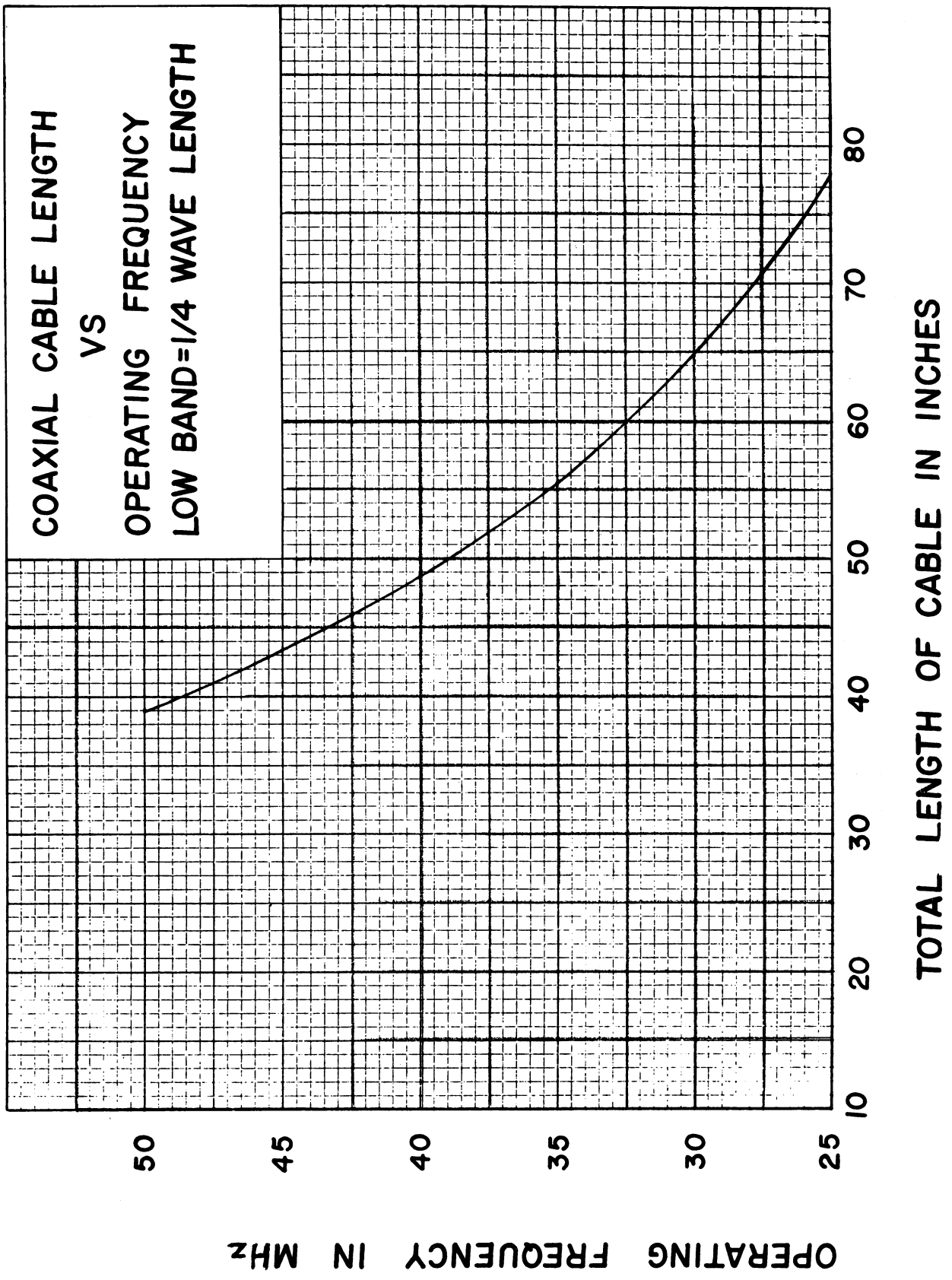
From J2352, the output is connected to the collector of the receiver 1st mixer stage.

Centralized metering jack J2351 is provided for maintenance and alignment of the 1st multiplier. The four leads form the receiver plug P443 supplies the regulated 10 volts for the Dual Front End circuit, crystal switching, system negative, and ground connections.



(19A121772, Sh. 3, Rev. 1)

Figure 4 - Cable Lengths for Single Antenna Systems



(19A121722, Sh. 4, Rev. 2)

Figure 5 - Cable Length Chart

RF CABLE LENGTHS

When changing frequencies or units in single antenna systems, the RF cables form the "T" connector to the receiver and DFE must be cut to the lengths calculated from the "Cable Length Chart" (Figure 5). This is particularly important when F1 and F2 are only a few channels apart.

Procedure

Prepare the one-quarter wavelength coaxial cable to connect the receiver to the "T" connector as follows:

1. From Figure 5, determine the proper length for the receiver cable by using the Dual Front End frequency.
2. Subtract four inches from the length found in Step 1 (for the length of cable inside the receiver). This gives you the cutting length for the cable.
3. Measure the cable as shown in Figure 6 and cut the cable to length.

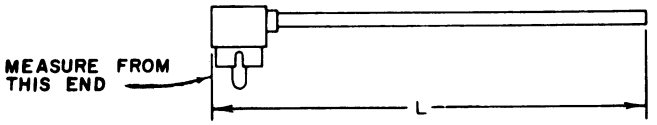


Figure 6 - Receiver Cable Length (1/4-Wavelength at DFE Freq.)

4. Strip the cable as shown in Figure 7 and solder the phonotype connector onto the cable as shown in Figure 8. Be sure that the center conductor is even with the tip of the phono connector.

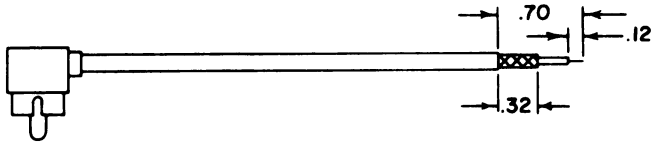


Figure 7 - Stripping Lengths for Receiver Cable

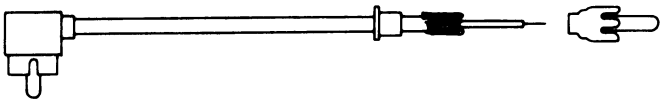


Figure 8 - Assembling Phono Connector on Receiver Cable

5. Plug the cable from J441--on the receiver-- to the "T" connector. Replace the cable beneath the cable clamp.

Prepare the one-quarter wavelength coaxial cable to connect the Dual Front End to the "T" connector as follows:

1. From Figure 5, determine the proper length for the DFE cable by using the receiver frequency. This gives you the cutting length for the Dual Front End cable.
2. Measure the cable as shown in Figure 9 and cut the cable to length.
3. Strip the cable as shown in Figure 10 and solder the phono connector onto the cable as shown in Figure 11. Be sure that the center conductor is even with the tip of the phono conductor.

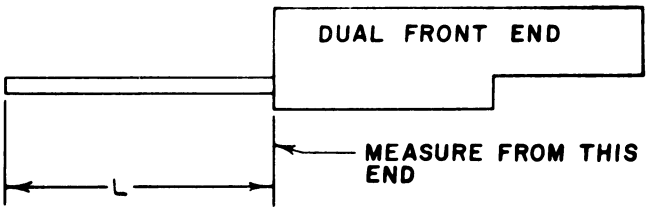


Figure 9 - DFE Cable Length (1/4 Wavelength at Rcvr Freq.)

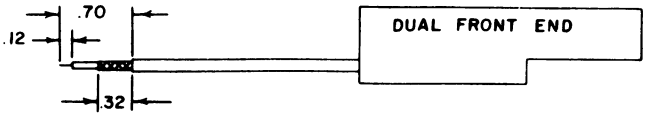


Figure 10 - Stripping Lengths for DFE Cable

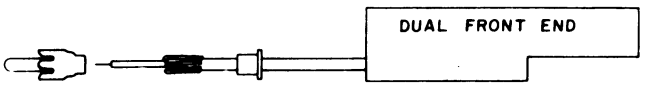


Figure 11 - Assembling Phono Connector on DFE Cable

MAINTENANCE

DISASSEMBLY

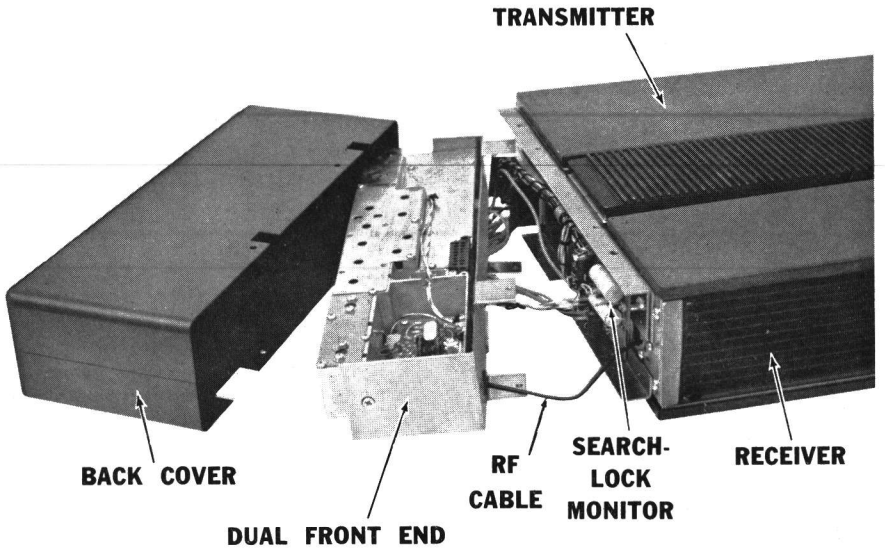


Figure 12 - Dual Front End Disassembly

Removing Dual Front End

1. Pull locking handle down and pull radio out of mounting frame.
2. Remove the four screws holding back cover to system frame. Slide cover back and lift off (see Figure 12).
3. Remove four screws from angle brackets holding Dual Front End to the system frame.
4. Carefully swing Dual Front End chassis out for servicing.

TEST PROCEDURES

SYMPTOM	CHECK
No Signal	1. Connections to P443. 2. Cable from J2352 to receiver mixer board. 3. Antenna terminal connections. 4. Check 10-volt supply with GE test meter at pin 13 on DFE centralized metering jack J2351.
Low Sensitivity	1. DFE alignment. 2. Cable and relay connections. 3. RF Amplifier Q1 voltages. 4. 1st Oscillator Q1 voltages.
Low Sensitivity	1. Oscillator alignment. 2. Voltage readings at 1st Oscillator Q1. 3. Crystal Y1.

DUAL FRONT END ALIGNMENT

EQUIPMENT REQUIRED

1. G-E Test Set Model 4EX3A10 or a 20,000 ohm-per volt multimeter.
2. 455 KHz and 25-50 MHz range Signal Generator. Connect a one-inch piece of insulated wire no larger than .065-inch diameter to generator output probe.

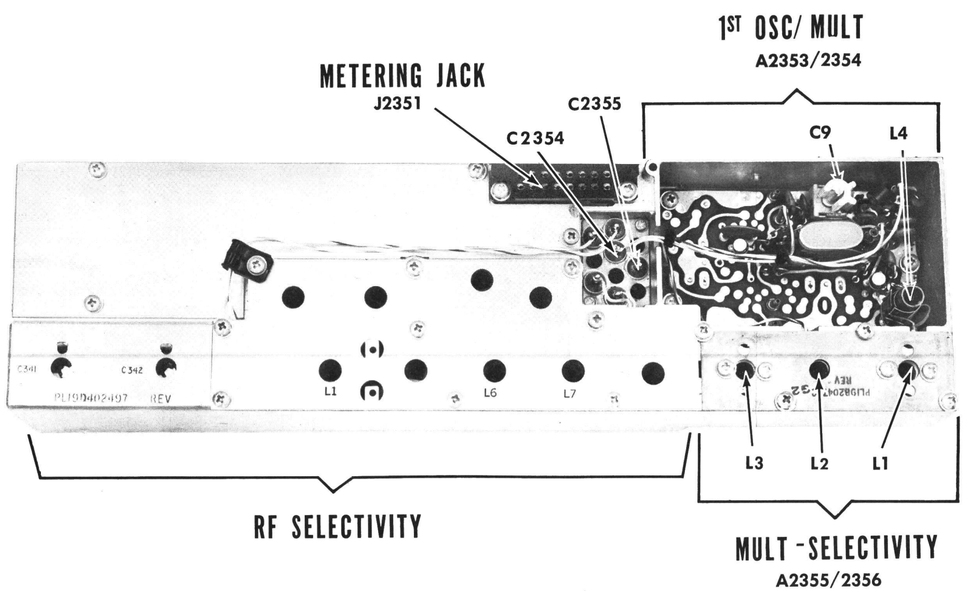
PRELIMINARY CHECKS AND ADJUSTMENTS

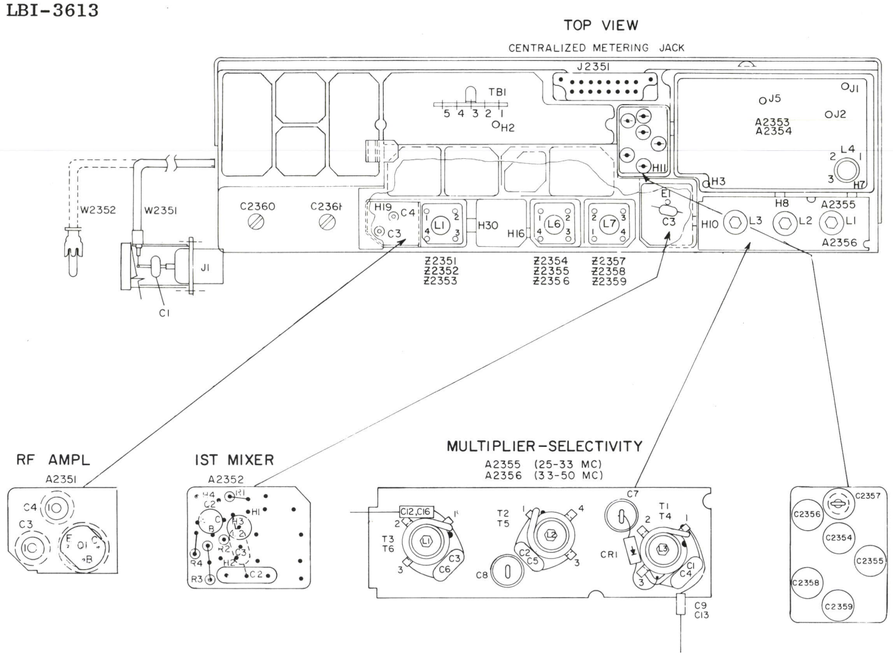
1. With test set in position J, check for regulated 10 volts. If using multimeter, measure between C2354 and C2355.
2. If using multimeter for alignment connect positive lead to J2351-16 (ground).

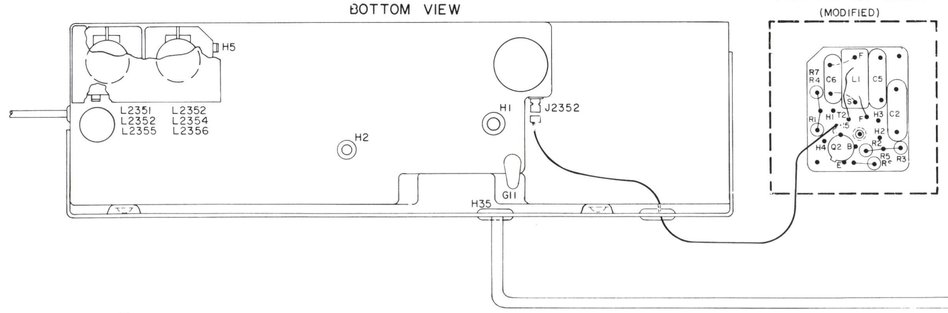
*NOTE: (Single Antenna Installation only)
If the operating frequency of the receiver and Dual Front End is more than 1 MHz apart, connect the signal generator to the antenna input of the matching section (T-connector). If frequency is less than 1 MHz apart, connect the signal generator directly to the DFE antenna input.

Refer to Receiver MAINTENANCE MANUAL for Receiver Mixer and IF Alignment Procedure.

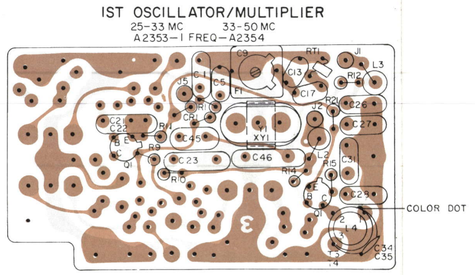
STEP	METERING POSITION: G-E Test Set or Meter Panel	METERING POSITION: Multimeter Minus at J2352	TUNING CONTROL	METER READING	PROCEDURE
			OSCILLATOR AND MULTIPLIER		
1			C9 (1st OSCILLATOR)		Adjust to approximately mid-frequency range.... set selector switch on F2.
2	D	pin 4	L4 (1st OSCILLATOR) L1 (MULT-SELECTIVITY)	Max	Tune for peak reading.
3	D	pin 4	L2 (MULT-SELECTIVITY)	Min	Tune for minimum reading. Change voltage scale if necessary.
4	D	pin 4	L3 (MULT-SELECTIVITY)	Max	Tune for maximum reading.
			*RF CIRCUITS		
5	A	pin 10	Insert signal generator probe into L6 hole.	0	Adjust Signal Generator frequency for deflection on discriminator meter.
6	B	pin 2	L7, L6	Max	Peak L7. Insert generator probe in L1 hole and peak L6.
7			C341, C342 L1 (RF AMP)	Max	Connect generator to Ant input and peak. Reduce signal to keep reading below 0.5 volts.
8			L1, (RF AMP) L6, L7	Max	Retune for maximum reading.
9	B	pin 2	L4 (1st OSCILLATOR) L1, L2, L3 (MULT-SELECTIVITY)	Max	Retune for maximum reading.
10			C341, C342		Tune for best sensitivity.







(19R620751, Rev. 4)



(19B204412, Sh. 1, Rev. 3)
(19B204412, Sh. 2, Rev. 3)

RESISTANCE READINGS

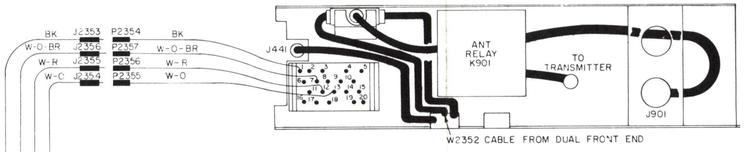
TRANSISTOR		EMITTER		BASE		COLLECTOR	
		+	−	+	−	+	−
R.F. AMPL	Q1	450Ω	270Ω	800Ω	450Ω	350Ω	350Ω
MIXER	Q2	2.7K	2.7K	7.5K	3.8K		
1ST OSC/MULT	Q1	1K	1K	4.5K	2.8K	120Ω	120Ω
1ST OSC/MULT	Q2	55Ω	80Ω	1K	1K	110Ω	110Ω

ALL READINGS ARE TYPICAL. READINGS MEASURED WITH A 20,000 OHM-PER-VOLT METER. WITH SWITCH CABLE DISCONNECTED FROM J443 ON RECEIVER. READINGS ARE MADE WITH A SHORTING JUMPER CONNECTED FROM C2359 (+10V) TO C2358 (−10V) AND ARE TAKEN FROM TRANSISTOR PINS TO C2350. + OR − SIGNS SHOW METER LEAD TO C2350.

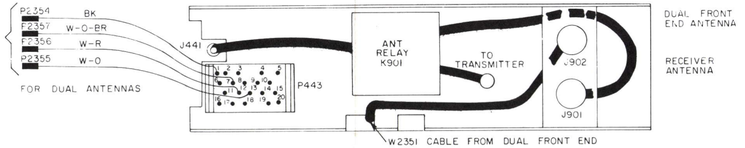
CAUTION

ALWAYS REMOVE THE SHORTING JUMPER AFTER MAKING RESISTANCE READINGS. APPLYING POWER WITH THE SHORTING JUMPER CONNECTED MAY DAMAGE THE UNIT.

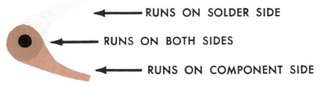
FOR READINGS OF:	USE SCALE:
1-100 Ω	X 1
100-1K Ω	X 10
1K-50K Ω	X 1,000
50K Ω	X 100,000



SINGLE ANTENNA
FRONT VIEW OF SYSTEM FRAME



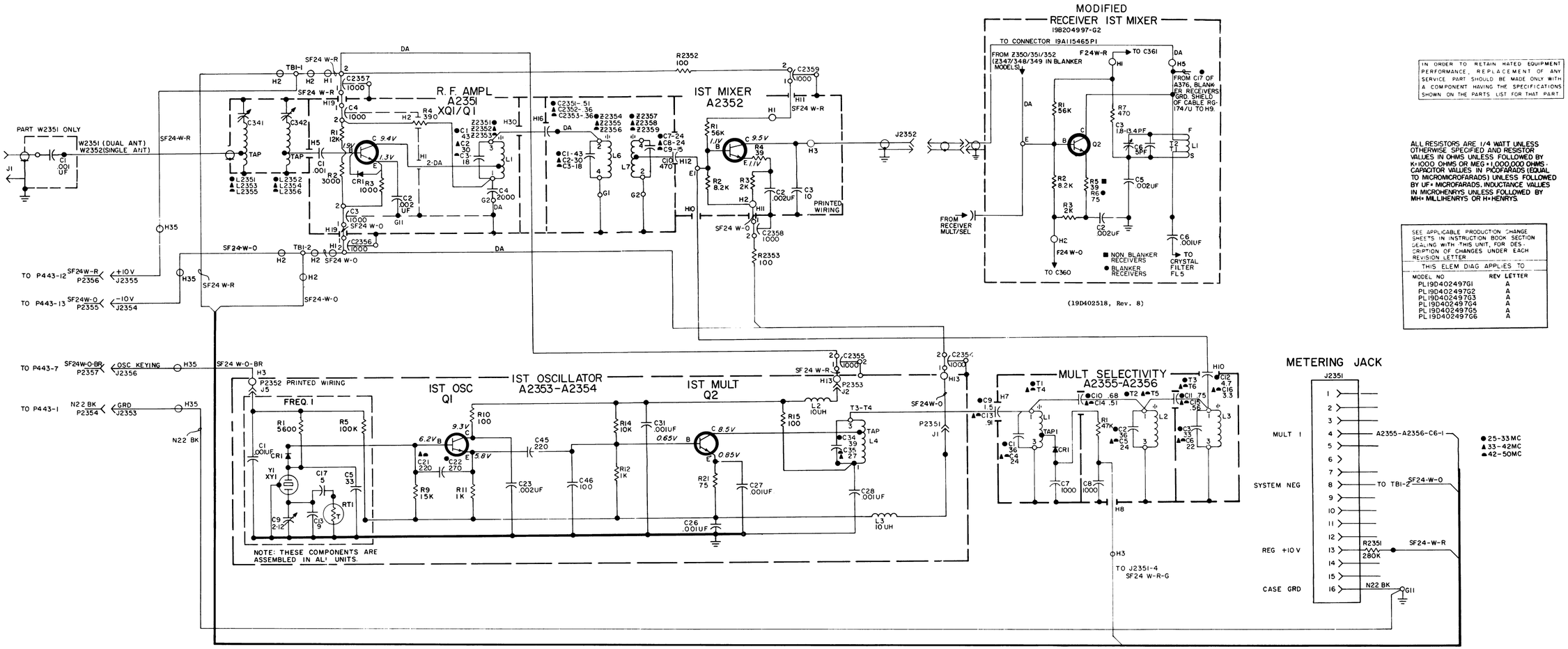
DUAL ANTENNAS
FRONT VIEW OF SYSTEM FRAME



OUTLINE DIAGRAM

DUAL FRONT END, 25—50 MHz
19D402497-G1 thru -G6

SCHEMATIC DIAGRAM



SCHEMATIC DIAGRAM

DUAL FRONT ENC, 25—50 MHz
19D402497-G1 thru -G6

LBI-3613

PARTS LIST

LBI-3643A

25-50 MC DUAL FRONT END
PL-19D402497 G1-6
REV A

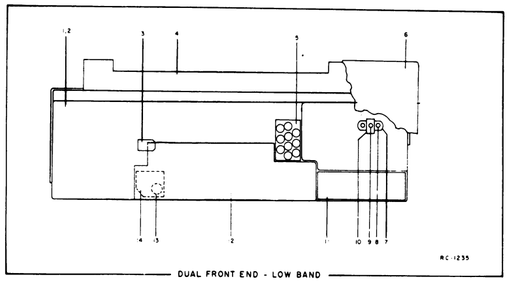
SYMBOL	G-E PART NO.	DESCRIPTION
A2351		RF AMPLIFIER ASSEMBLY PL-19B204772-G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5494481-P12	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C2	5494481-P14	Ceramic disc: .002 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C3 and C4	5493392-P7	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115342-P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P123K	Composition: 12,000 ohms ±10%, 1/4 w.
R2	3R152-P302K	Composition: 3000 ohms ±10%, 1/4 w.
R3	3R152-P102K	Composition: 1000 ohms ±10%, 1/4 w.
R4	3R152-P391K	Composition: 390 ohms ±10%, 1/4 w.
		- - - - - - - - - SOCKETS - - - - - - - - -
XQ1	5490277-P1	Transistor, mica-filled phen: 4 contacts rated at 1 amp at 400 VRMS; sim to Elco 3303.
A2352		FIRST MIXER ASSEMBLY PL-19B204898-G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2	5494481-P14	Ceramic disc: .002 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C3	5496218-P241	Ceramic disc: 10 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - TERMINALS - - - - - - - - -
E1	4038104-P1	Lug: solder dipped brass.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L2	7488079-P18	Choke, RF: 15 µh ±10%, 1.2 ohms DC res; sim to Jeffers 4421-9.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q2	19A115245-P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P563J	Composition: 56,000 ohms ±5%, 1/4 w.
R2	3R152-P822J	Composition: 8200 ohms ±5%, 1/4 w.
R3	3R152-P202J	Composition: 2000 ohms ±5%, 1/4 w.
R4	3R152-P390J	Composition: 39 ohms ±5%, 1/4 w.
A2353 and A2354		FIRST OSCILLATOR ASSEMBLY A2353 19B204419-G13 (19D402497-G1, 2) A2354 19B204419-G16 (19D402497 G3-6)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C5	5496219-P751	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -750 PPM.
C9	5491271-P106	Variable, subminiature: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5.
C13	5496219-P40	Ceramic disc: 9 pf ±0.25 pf, 500 VDCW, temp coef 0 PPM.
C17	19C300685-P93	Ceramic disc: 5 pf ±0.1 pf, 500 VDCW, temp coef 0 PPM.
C21	5496219-P771	Ceramic disc: 220 pf ±5%, 500 VDCW, temp coef -750 PPM.
C22	5496219-P773	Ceramic disc: 270 pf ±5%, 500 VDCW, temp coef -750 PPM.
C23	5494481-P114	Ceramic disc: .002 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C24*	5490008-P31	Silver mica: 150 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. Deleted by Rev A.
C25*	5496219-P467	Ceramic disc: 150 pf ±5%, 500 VDCW, temp coef -220 PPM. Deleted by Rev A.
C26 thru C28	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C31	5494481-P112	Ceramic disc: .001 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C45*	5490008-P35	Silver mica: 220 pf ±5%, 500 VDCW; sim to Electro Motive Type DM-15. Added by REV A.
C46*	5496219-P563	Ceramic disc: 100 pf ±5%, 500 VDCW, temp coef -330 PPM. Added by REV A.
C48*	7491827-P2	Ceramic disc: .01 µf +80% -30%, 50 VDCW; sim to Sprague 19C180. Added by REV A.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR1*	19A115348-P1	Silicon. Deleted by REV A.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J1 and J2	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
J5	4033513-P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L2 and L3	7488079-P16	Choke, RF: 10 µh ±10%, 0.6 ohm DC res; sim to Jeffers 4421-7.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115330-P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P562J	Composition: 5600 ohms ±5%, 1/4 w.
R9	3R152-P153J	Composition: 15,000 ohms ±5%, 1/4 w.
R10	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
R11 and R12	3R152-P102J	Composition: 1000 ohms ±5%, 1/4 w.
R13*	3R152-P151J	Composition: 150 ohms ±5%, 1/4 w. Deleted by Rev A.
R14	3R152-P103J	Composition: 10,000 ohms ±5%, 1/4 w.
R15	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w.
R19*	3R152-P360J	Composition: 36 ohms ±5%, 1/4 w. Added by Rev A.
R21*	3R152-P750J	Composition: 75 ohms ±5%, 1/4 w. Added by Rev A.
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	19B209284-P5	Disc: 43 ohms res nominal at 25°C, color code green.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T3* and T4*		COIL ASSEMBLY Added by REV A T3 19B205416-G1 (19D402497-G1, 2) T4 19B205416-G2 (19D402497 G3-6)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C34	5496218-P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
C35	5496218-P249	Ceramic disc: 27 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L4	19A121464-P2	Coil. Includes tuning slug 5491798-P5.
T3* and T4*		COIL ASSEMBLY T3 19B204763-G1 (19D402497-G1, 2) T4 19B204763-G2 (19D402497 G3-6) Deleted by Rev A
		- - - - - - - - - CAPACITORS - - - - - - - - -
C34	5496218-P253	Ceramic disc: 39 pf ±5%, 500 VDCW, temp coef -80 PPM.
C35	5496218-P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L4	19A121464-P1	Coil. Includes tuning slug 5491798-P5.
		- - - - - - - - - SOCKETS - - - - - - - - -
XY1		Refer to Mechanical Parts (RC-1235).
		- - - - - - - - - CRYSTALS - - - - - - - - -
		When reordering give G-E Part No. and specify exact freq needed.
		25-42 MC crystal freq = (OF +5.30 MC) ÷ 3.
		42-50 MC crystal freq = (OF -5.30 MC) ÷ 3.
Y1	19B206576-P1	Quartz: freq range 10086.666 to 12766.666 KC, temp range -30°C to +85°C. (25-33 MC).
Y1	19B206576-P2	Quartz: freq range 12766.667 to 15766.666 KC, temp range -30°C to +85°C. (33-42 MC).
Y1	19B206576-P3	Quartz: freq range 12233.333 to 16233.333 KC, temp range -30°C to +85°C. (42-50 MC).
A2355* and A2356*		MULTIPLIER SELECTIVITY ASSEMBLY A2355 19B205326-G1 (19D402497-G1, 2) A2356 19B205326-G2 (19D402497 G3-6) Added by Rev A.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 and C2	5496218-P252	Ceramic disc: 36 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218-P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4 and C5	5496218-P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C6	5496218-P247	Ceramic disc: 22 pf ±5%, 500 VDCW, temp coef -80 PPM.
C7 and C8	5493392-P107	Ceramic, stand-off: .001 µf +100% -0%, 500 VDCW; sim to Allen-Bradley Type SS5A.
C9	5491601-P123	Phenolic: 1.5 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C10	5491601-P117	Phenolic: 0.68 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C11	5491601-P118	Phenolic: 0.75 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C12	5491601-P132	Phenolic: 4.7 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C13	5491601-P137	Phenolic: 0.91 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C14	5491601-P114	Phenolic: 0.51 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C15	5491601-P115	Phenolic: 0.56 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C16	5491601-P130	Phenolic: 3.3 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1	4038056-P1	Germanium: sim to G-E Dwg. 44A231600 Rev. 3.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R152-P473K	Composition: 47,000 ohms ±10%, 1/4 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1	PL-19B205325-G2	Coil. Includes L1.
T2	PL-19B205325-G1	Coil. Includes L2.
T3	PL-19B205325-G1	Coil. Includes L3.
T4	PL-19B205325-G2	Coil. Includes L1.
T5	PL-19B205325-G1	Coil. Includes L2.
T6	PL-19B205325-G1	Coil. Includes L3.
A2355* and A2356*		MULTIPLIER SELECTIVITY ASSEMBLY A2355 19B204782-G1 (19D402497-G1, 2) A2356 19B204782-G2 (19D402497 G3-6) Deleted by Rev A.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C5 and C6	5493392-P7	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
C7	5491601-P115	Tubular: 0.56 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C8	5491601-P115	Tubular: 0.56 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C10 and C11	5491601-P117	Tubular: 0.68 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C13 and C14	5491601-P130	Tubular: 3.3 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
		- - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	7777146-P3	Germanium; sim to Type 1N90.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P392K	Composition: 3900 ohms ±10%, 1/4 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1 thru T4		COIL ASSEMBLY T1 19B204780-G1 (19D402497-G1, 2) T2 19B204780-G2 (19D402497-G1, 2) T3 19B204780-G3 (19D402497 G3-6) T4 19B204780-G4 (19D402497 G3-6)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 and C2	5496218-P252	Ceramic disc: 36 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3 and C4	5496218-P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A121510-P1	Coil. Includes tuning slug 5491798-P4.
L2	19A121510-P2	Coil. Includes tuning slug 5491798-P4.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2351	5491601-P114	Tubular: 0.51 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C2352 and C2353	5491601-P110	Tubular: 0.36 pf ±5%, 500 VDCW; sim to Quality Components Type MC.
C2354 thru C2359	5493392-P7	Ceramic, feed-thru: .001 µf +100% -0%, 500 VDCW; sim to Allen-Bradley Type FA5C.
		- - - - - - JACKS AND RECEPTACLES - - - - - -
J2351	P1-19B205689-G2	Connector: 18 pin contacts.
J2352	19A115465-P1	Receptacle, coaxial: 500 v; sim to Micon Electronics Type 1104.
J2353 thru J2356	7147199-P1	Connector, brass: male contact; sim to Winchester Electronics 21803.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L2351 thru L2356		COIL ASSEMBLY L2351 19B204820-G5 (19D402497-G1, 2) L2352 19B204820-G6 (19D402497-G1, 2) L2353 19B204820-G1 (19D402497-G3, 4) L2354 19B204820-G2 (19D402497-G3, 4) L2355 19B204820-G3 (19D402497-G5, 6) L2356 19B204820-G4 (19D402497-G5, 6)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2360	19B209159-P2	Variable, subminiature: approx 1.54-6.9 pf, 750 v peak; sim to EF Johnson 189-3-55.
C2361	19B209159-P2	Variable, subminiature: approx 1.54-6.9 pf, 750 v peak; sim to EF Johnson 189-3-55.
		- - - - - - - - - PLUGS - - - - - - - - -
P2351 thru P2353	4029840-P2	Contact, electrical; sim to Amp 42827-2.
		- - - - - - - - - RESISTORS - - - - - - - - -
R2351	5495948-P444	Deposited carbon: 0.28 megohm ±1%, 1/2 w; sim to Texas Instrument Type CD1/2MR.
R2352* and R2353*	3R152-P101K	Composition: 100 ohms ±10%, 1/4 w. Added by Rev A.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	7487424-P7	Miniature, phen: 4 terminals.
		- - - - - - - - - CABLES - - - - - - - - -
W2351		CONNECTOR ASSEMBLY PL-19B204930-G1 (Used in PL-19D402497-G2, 4, 6)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19B209141-P1	Ceramic disc: .001 µf ±10%, 500 VDCW.
		- - - - - - JACKS AND RECEPTACLES - - - - - - - -
J1	2R22-P3	Receptacle, panel, coaxial: mica-filled insert, UHF contact. Signal Corps SO-239 or sim to Amphenl 83-1R.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19B209044-P19	Cable, RF: 1200 VRMS max, approx 40 inches.
W2352	19B209044-P19	RF: 1200 VRMS max, approx 7 feet.
		- - - - - - - - - TUNED CIRCUITS - - - - - - - - -
Z2351 thru Z2353		COIL ASSEMBLY Z2351 19B204786-G1 (19D402497-G1, 2) Z2352 19B204786-G2 (19D402497-G3, 4) Z2353 19B204786-G3 (19D402497-G5, 6)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218-P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	5496218-P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218-P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
C4	5494481-P14	Ceramic disc: .002 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A121478-P2	Coil.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491798-P1	Tuning slug. (Used with C1).
	5491798-P4	Tuning slug. (Used with C2).
	5491798-P5	Tuning slug. (Used with C3).
Z2354 thru Z2356		COIL ASSEMBLY Z2354 19B204767-G1 (19D402497-G1, 2) Z2355 19B204767-G2 (19D402497-G3, 4) Z2356 19B204767-G3 (19D402497-G5, 6)
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496218-P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C2	5496218-P250	Ceramic disc: 30 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3	5496218-P245	Ceramic disc: 18 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491798-P1	Tuning slug. (Used with C1).
	5491798-P4	Tuning slug. (Used with C2).
	5491798-P5	Tuning slug. (Used with C3).
Z2357* thru Z2359*		COIL ASSEMBLY Z2357 19B204784-G4 (19D402497-G1, 2) Z2358 19B204784-G5 (19D402497-G3, 4) Z2359 19B204784-G6 (19D402497-G5, 6) Added by Rev A.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C7 and C8	5496218-P248	Ceramic disc: 24 pf ±5%, 500 VDCW, temp coef -80 PPM.
C9	5496218-P244	Ceramic disc: 15 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	5491798-P1	Tuning slug. (Used with C7).
	5491798-P4	Tuning slug. (Used with C8).
	5491798-P5	Tuning slug. (Used with C9).
Z2357* thru Z2359*		COIL ASSEMBLY Z2357 19B204784-G1 (19D402497-G1, 2) Z2358 19B204784-G2 (19D402497-G3, 4) Z2359 19B204784-G3 (19D402497-G5, 6) Deleted by Rev A.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1 and C2	5496218-P262	Ceramic disc: 91 pf ±5%, 500 VDCW, temp coef -80 PPM.
C3 and C4	5496218-P254	Ceramic disc: 43 pf ±5%, 500 VDCW, temp coef -80 PPM.
C5 and C6	5496218-P251	Ceramic disc: 33 pf ±5%, 500 VDCW, temp coef -80 PPM.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A121475-P3	Coil. Includes tuning slug 5491798-P4.
		ASSOCIATED EQUIPMENT
		SINGLE ANTENNA MODIFICATION KIT PL-19A121773-G1
		DUAL ANTENNA MODIFICATION KIT PL-19A121773-G2

SYMBOL	G-E PART NO	DESCRIPTION
		- - - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	19A115348-P1	Silicon.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R5	3R152-P104K	Composition: 0.1 megohm ±10%, 1/4 w.
		- - - - - - JACKS AND RECEPTACLES - - - - - - -
	7104941-P11	Plug, phono type, phen: 350 VRMS max; sim to Accurate A10033-8. (Mates with "T" connector). (Single antenna only).
	19A115324-P1	Connector, "T", coaxial: sim to Component Mfg Service A1173. (Mounts on frame). (Single antenna only).
	19A115465-P1	Receptacle, coaxial: 500 v; sim to Micon Electronics Type 1104. (Mounts in receiver casting).
		- - - - - - - - - - CABLES - - - - - - - - - -
	5491689-P63	RF, coaxial: includes phono type plug, 350 VRMS max, approx 80 inches. (Input cable from antenna system). (Single antenna only).
	PL-19B204924-G1	Cable: includes (4) female (P2354-2357) connectors, approx 14-3/4 inches.
	PL-19A121687-G1	Cable: includes (2) push-on plugs, approx 11-1/4 inches. (Connects to receiver mixer stage).
		FIRST MIXER ASSEMBLY PL-19B204997-G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C2	5494481-P14	Ceramic disc: .002 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
C3	5491271-P106	Variable, subminiature: approx 1.98-12.4 pf, 750 v peak; sim to EF Johnson 189-6-5.
C4	5496218-P239	Ceramic disc: 8 pf ±0.25 pf, 500 VDCW, temp coef -80 PPM.
C5	5494481-P14	Ceramic disc: .002 µf ±10%, 500 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	PL-19A121796-G1	Coil.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q2	19A115245-P1	Silicon, NPN.
		- - - - - - - - - RESISTORS - - - - - - - - -
R1	3R152-P563J	Composition: 56,000 ohms ±5%, 1/4 w.
R2	3R152-P822J	Composition: 8200 ohms ±5%, 1/4 w.
R3	3R152-P202J	Composition: 2000 ohms ±5%, 1/4 w.
R4	3R152-P102J	Composition: 1000 ohms ±5%, 1/4 w.
R5	3R152-P390J	Composition: 39 ohms ±5%, 1/4 w.
R6*	3R152-P151J	Composition: 150 ohms ±5%, 1/4 w. Added by Rev A.
R7*	3R152-P471J	Composition: 470 ohms ±5%, 1/4 w. Added by Rev A.
		PLATE ASSEMBLY - TRUNK MOUNT PL-19B205195-G2
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A121759-P1	Thumbscrew: approx 1 inch long, 1/4-20 thread.
	4036436-P2	Nut, push-on: sim to Fastex 8063-21-00.
	19B205194-P2	Plate: approx 11-1/2 x 2-11/16 x 1/8 inches.
		PLATE ASSEMBLY - FRONT MOUNT PL-19B204446-G4
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -

SYMBOL	G-E PART NO	DESCRIPTION
	19A121759-P1	Thumbscrew: approx 1 inch long, 1/4-20 thread.
	4036436-P2	Nut, push-on: sim to Fastex 8063-21-00.
	19B205638-P1	Plate: approx 5-1/4 x 2-11/16 x 1/8 inches.
		ANTENNA LOADING COIL MODEL 4KY9A1
		- - - - - - - - - INDUCTORS - - - - - - - - -
	4039109-P1	Coil: operating freq 25-54 MC; sim to Antenna Specialists ASPA87.
		MECHANICAL PARTS (SEE RC-1235)
1	19E500817-P2	Chassis. (Used in PL-19D402497-G1, 2).
2	19E500817-P1	Chassis. (Used in PL-19D402497 G3-6).
3	4029851-P3	Cable clamp: nylon; sim to Weckesser 1/8-4.
4	19C303649-P1	Support. (Mounts cover).
5	19A121383-P1	Support.
6	19B204383-P1	Cover.
7	19C311172-P1	Crystal socket. (Part of XY1 in A2353, 2354).
8	19A115793-P1	Electrical contact: sim to Methode 752 V (PB). (Part of XY1 in A2353, 2354).
9	19B200525-P9	Rivet. (Part of XY1 in A2353, 2354).
10	4033089-P1	Clip. (Part of XY1 in A2353, 2354).
11	PL-19A121435-G1	Support. (Used in A2355, 2356).
12	19B204672-P1	Cover.
13	7162414-P1	Mounting ring, transistor socket; sim to Elco 757. (Used with Q1 in A2351).
14	19B204917-P1	Support. (Used with A2351).



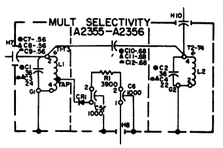
DUAL FRONT END - LOW BAND

PRODUCTION CHANGES

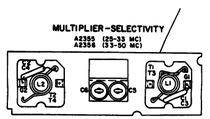
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - To improve spurious rejection.
Replaced C24 with C45, C25 with C46, R13 with R21, and changed T3 and T4 on the First Oscillator Assembly A2353/A2354. Changed C1 on coil assemblies Z2351 and Z2354. Changed core on coil assemblies Z2351, Z2352, Z2354, and Z2355. Changed coil assemblies Z2357, Z2358, and Z2359. Added R2352 and R2353. Changed Multiplier Selectivity Assembly A2355/A2356.

SCHEMATIC WAS



OUTLINE DIAGRAM WAS



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 it 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-3613

Progress Is Our Most Important Product

GENERAL ELECTRIC

MOBILE RADIO DEPARTMENT LYNCHBURG, VIRGINIA 24502

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

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