

instruction manual revision

for
Manual No. 68P02977G10 and IMR177
Service Manual
MaxTrac®900 Series

This revision outlines changes that have occurred since the printing of your manual or previous revisions. Use this information to supplement your manual. Installation of these changes in earlier equipment is not necessary except as recommended in Motorola Service and Repair Notes (SRN's).

6802977G10 Page 4, Table 1 Fasteners, Tools and Torques

<u>Part No.</u>	<u>Description</u>	<u>Location</u>	<u>Quantity</u>	<u>Driver Size</u>	<u>Input Torque</u>	<u>Repair Torque</u>
0980131M01	Antenna Connector & Hex Nut	Antenna Connector	1	---	32 in. lbs	32 in. lbs

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Transmitter FM Hum and Noise has been changed to 35 dB for normal operation and 30 dB for talkaround

IMR177 Page 1 affects revisions B and C of manual 68P02977G10.

IMR177 Page 7, Performance Specifications. Transmitter spurious and harmonics should be 58 dB below carrier.

IMR177 Page 16, FLN5067A PA Hardware, 30 W, 900 MHz. The part number for reference symbol J1 should be 3002823C01.

instruction manual revision

GENERAL

This revision outlines changes that have occurred since the printing of your service manual. Use this information to update your service manual.

INSTRUCTION MANUAL AFFECTED

68P02977G10-C MaxTrac® 900 Series, Trunked Two-Way FM Radio,
12 Watt RF Power, 900 MHz

REVISION DETAILS

NOTE

The following pages contain additional information covering new kits. No pages in your existing manual should be discarded.

- 1) **FLF1018A 30 Watt RF Power Amplifier (PA).** This revision contains the schematic circuit board diagrams and parts lists for the PA. The FLF1018A consists of the FLF5519A PA Board (30 Watt, 896-902 MHz, 935-941 MHz talk-around), the FLN5067A Heatsink Hardware, and the HLF6022A Harmonic Filter. A model chart and specifications are included for the MaxTrac 30 Watt, 900 MHz trunked mobile radios, Privacy Plus and Smartnet, in which this PA is used.
- 2) **Power Amplifier Disassembly & Board Removal.** Follow the procedures given in your service manual, with the following exceptions:

TO REMOVE THE POWER AMPLIFIER HEATSINK:

- (1) Disconnect the transmit and receive coaxial cables from the RF board.
- (2) Disconnect the 5-pin connector P7 from its mating connector J7 on the Feedthru Capacitor board.

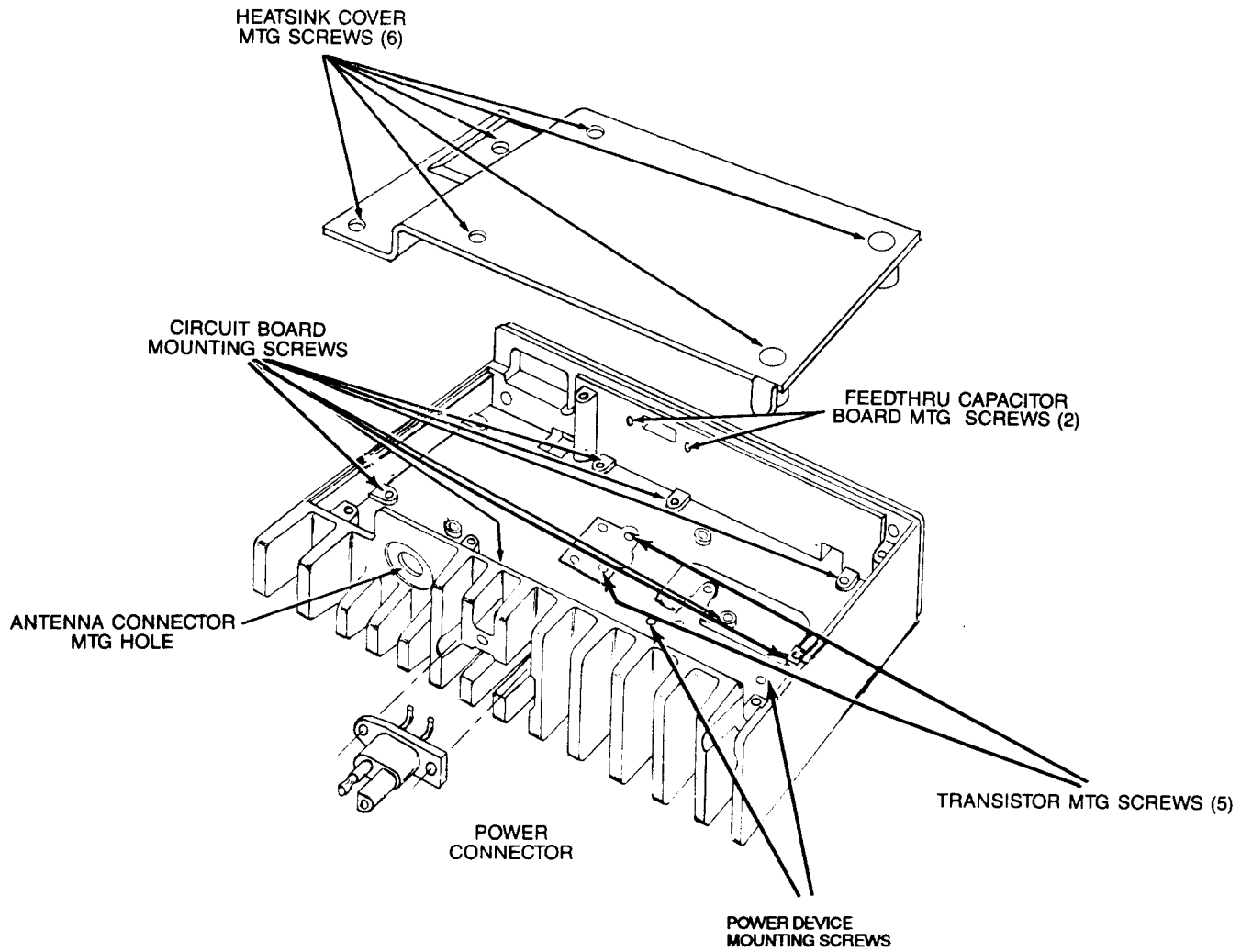
- (3) Remove six screws securing the heatsink cover to the heat-sink. Remove heatsink cover (see Figure 1).
- (4) Remove the four heatsink mounting screws that secure the heatsink to the radio chassis. Separate heatsink from chassis while carefully feeding the transmit and receive coaxial cables through their respective holes in the chassis.

TO REMOVE THE POWER AMPLIFIER CIRCUIT BOARD

- (1) Remove two screws securing Feedthru Capacitor board to heatsink wall. Separate Feedthru Capacitor board from heatsink wall.
- (2) Remove nut and lockwasher securing antenna connector J1 to heatsink.
- (3) Remove two power device mounting screws.
- (4) Remove two transistor mounting screws and seven circuit board mounting screws.
- (5) Unsolder the (+) lead of power connector J2 for the circuit board. (Do not remove the screws securing J2 to the heatsink.)
- (6) Apply heat from the soldering iron to the (-) lead of the power connector while simultaneously lifting the board upward at an angle until the antenna connector clears the hole in the heatsink.

TO REASSEMBLE

- (1) Set the circuit board into the heatsink.
- (2) Reinstall lockwasher and nut securing antenna connector J1 and tighten.
- (3) Reinstall two transistor mounting screws and tighten.
- (4) Reinstall two power device mounting screws and tighten.
- (5) Reinstall seven circuit board mounting screws and tighten. Note that one hole is secured by one of the heatsink cover mounting screws, so do not install a board mounting screw in this hole.
- (6) Reinstall Feedthru Capacitor board to heatsink wall using two screws.
- (7) Reassemble heatsink to radio chassis and secure with four heatsink mounting screws.
- (8) Reconnect 5-pin connector P7 to J7 on Feedthru Capacitor board, and reconnect two coaxial cables to RF board.
- (9) Replace heatsink cover and secure with six cover mounting screws.



69A02089G04-O

Figure 1. PA Disassembly and Reassembly

VER=VERSION
 SYS=SYSTEM
 SUB=SUBFLEET
 CON=CONVENTIONAL

MODEL	VER	SYS	SUB	CON	ITEM		DESCRIPTION
					VER	SYS	
D37MQA5GB2-K	B2	2	2	0			MaxTrac® 900 Series 900 MHz Trunked Mobile Radio Privacy Plus 30 Watt RF Power (Half-Duplex)
D37MQA5GB3-K	B3	2	1	1			
D37MWA5GB6-K	B6	6	6	2			
D37MWA5GB7-K	B7	10	10	10			
					FUF1015A	UNIFIED CHASSIS KIT:	
					FLF5298A	RF BOARD	
					FRN5529A	LOGIC BOARD	
					FLN6216A	CHASSIS HWR	
					FLF1018A	PA 30 WATT	
					FLF1018A	PA 30 WATT (See Note):	
					FLF5519A	30 W PA BOARD	
					FLN5067A	30 W HEATSINK HWR	
					HLF6022A	HARMONIC FILTER	
					FCN1604A	FRONT PANEL B2, B3 KIT:	
					FLN5174A	FRONT PANEL DISPLAY BOARD	
					HLN5273A	FRONT PANEL HARDWARE	
					FLN5064A	FRONT PANEL SWITCH BOARD	
					FCN1614A	FRONT PANEL B6 KIT:	
					HLN5175A	FRONT PANEL DISPLAY BOARD	
					FLN6207A	FRONT PANEL HARDWARE	
					FLN5064A	FRONT PANEL SWITCH BOARD	
					FCN1603A	FRONT PANEL B7 KIT:	
					HLN5175A	FRONT PANEL DISPLAY BOARD	
					HLN5186A	FRONT PANEL HARDWARE	
					FLN5064A	FRONT PANEL SWITCH BOARD	
					HLN5319A	ESCUTCHEON B2	
					FLN6239A	ESCUTCHEON B3	
					FLN6240A	ESCUTCHEON B6	
					HLN9536A	ESCUTCHEON B7	
					HKN9402A	POWER CABLE KIT	
					HMN1056C	COMPACT MICROPHONE KIT	
					HLN9073A	MICROPHONE HANG-UP CLIP	
					FHN5586A	HOUSING KIT	
					HLN9404A	INSTALLATION HARDWARE KIT	
					RRA4935A	ANTENNA KIT	
					HBN9403A	PACKING KIT	
					FLN6209A	LABEL-MaxTrac 900	
					FRN4007A	ROM KIT	

NOTE:FLF1018A IS PART OF FUF1015A

69A02986G17-O

VER=VERSION
 SYS=SYSTEM
 SUB=SUBFLEET
 CON=CONVENTIONAL

MODEL	VER	SYS	SUB	COM	<p style="text-align: center;"> MaxTrac® 900 Series 900 MHz Trunked Mobile Radio SMARTNET 30 Watt RF Power (Half-Duplex) </p>	
D37MWA5GC3-K	C3	8	8	8	ITEM	DESCRIPTION
D37MWA5GC5-K	C5	8	8	8	● ●	FUF1015A UNIFIED CHASSIS KIT:
						FLF5298A RF BOARD
						FRN5529A LOGIC BOARD
						FLF6216A CHASSIS HWR
						FLF1018A PA 30 WATT
					● ●	FLF1018A PA 30 WATT (See Note):
						FLF5519A 30 W PA BOARD
						FLN5067A 30 W HEAT SINK HWR
						HLF6022A HARMONIC FILTER
					● ●	FCN1603A FRONT PANEL C3, C5 KIT:
						HLN5175A FRONT PANEL DISPLAY BOARD
						HLN5186A FRONT PANEL HARDWARE
						HLN5064A FRONT PANEL SWITCH BOARD
					●	HLN9386A ESCUTCHEON C3
					●	HLN9384A ESCUTCHEON C5
					● ●	HKN9402A POWER CABLE KIT
					● ●	HMN1056C COMPACT MICROPHONE KIT
					● ●	HLN9073A MICROPHONE HANG-UP CLIP
					● ●	FHN5586A HOUSING KIT
					● ●	HLN9404A INSTALLATION HARDWARE KIT
					● ●	RRA4935A ANTENNA KIT
					● ●	HBN9403A PACKING KIT
					● ●	FLN6209A LABEL-MaxTrac 900
					● ●	FRN4007A ROM KIT

NOTE: FLF1018 IS PART OF FUF1015A

69A02986G16-0

PERFORMANCE SPECIFICATIONS

GENERAL

Model series	MaxTrac 900 D37MQA "B2", "B3" D37MWA "B6", "B7", "C3", "C5"
No. of frequencies	Up to 20 trunked channels
Systems/subfleets	Up to 10/10, model dependent
Frequencies	Transmit: 896-902 MHz 935-941 MHz (Talk-Around) Receive: 935-941 MHz
Dimensions	2x7x9.9" (50.8x178x251mm)
Weight	76 oz. (2.16 kg)
Typical RF output (into 50 ohm load @ 13.6 V)	30 W @ 896-902 MHz 20 W @ 935-941 MHz
Maximum current drain	Receive (5 W): 1.5 A Transmit: 14 A Standby: 500 mA
FCC Designation	ABZ89FT5726
Metering	All adjustments and alignments are performed electronically using an IBM personal computer, a Radio Interface Box (RIB) and field maintenance software.
Operation	12 V dc negative ground

TRANSMITTER

Output impedance	50 ohms
Spurious and harmonics	55 dB below carrier (for EIA Spec RS 152B)
Frequency stability	±0.00015%
Modulation	10K0F1D, 11K0F2D, 11K0F3E
Maximum frequency separation	6 MHz within each of two groups, 896-902 and 935-941 MHz
Audio distortion	5% measured per EIA

Audio frequency response	+1 to -3 dB from 6 dB per octave pre-emphasis characteristic from 300 to 3000 Hz
Modulation sensitivity	50-130 mV rms for 60% maximum deviation at 1000 Hz

RECEIVER

Channel spacing	12.5 kHz
Sensitivity 12 dB SINAD	0.40 uV
Selectivity (EIA SINAD)	65 dB
Intermodulation (EIA SINAD)	65 dB
Spurious and image rejection	70 dB
Input impedance	50 ohms
Audio output	3 W @ less than 5% distortion
Maximum frequency separation	6 MHz
Frequency stability	±0.00015%

OPTIONAL SPEAKER ACCESSORY

Speaker impedance	2 ohms
Audio output	5 watts
Dimensions	5x5x2.5" (127x127x63mm), excluding mounting bracket

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

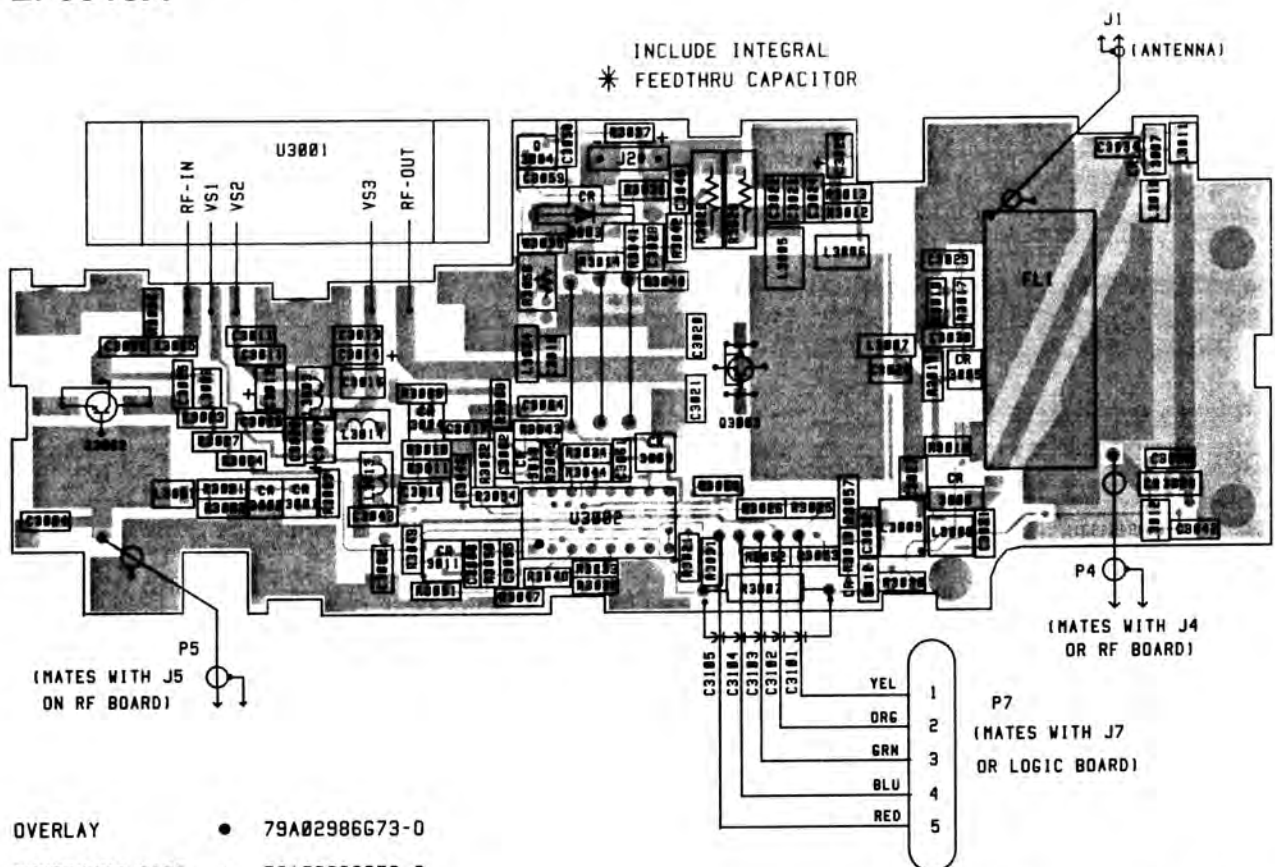
FCC INFORMATION

Applicable part of Rules : : : : : : : : 90
Authorized Emission : : : : : : : : 11K0F3E, 11K0F2D, 10K0F1D

Model Series	Transmitter Power Output	Type Acceptance Number
D37MQA D37MWA	12 to 35 Watts continuously variable	ABZ89FT5726

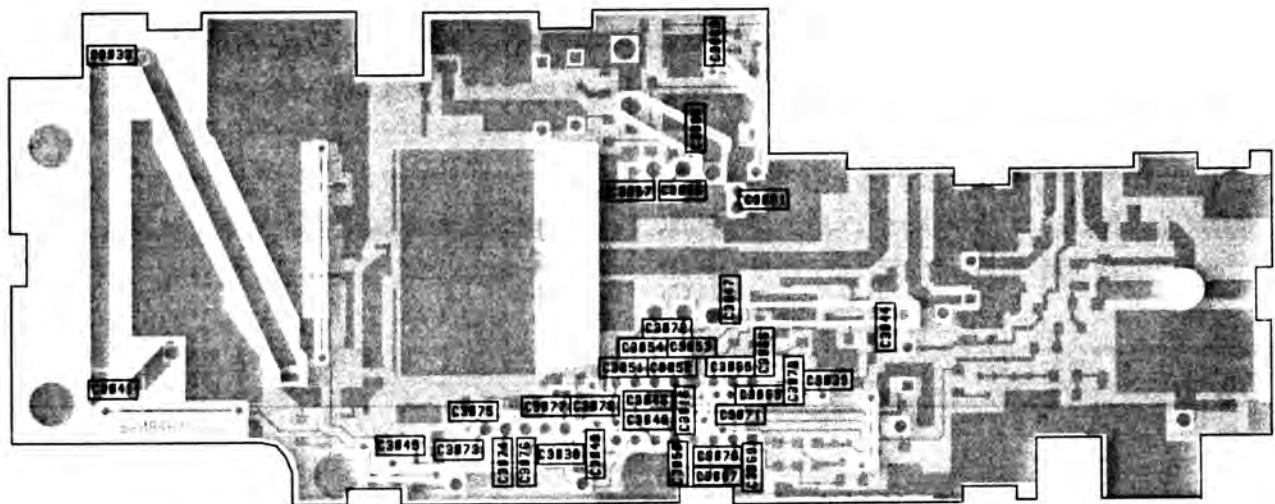
POWER AMPLIFIER

FLF5519A



- OVERLAY • 79A02986G73-0
- COMPONENT SIDE • 79A02986G76-0
- SOLDER SIDE 79A02986G77-0

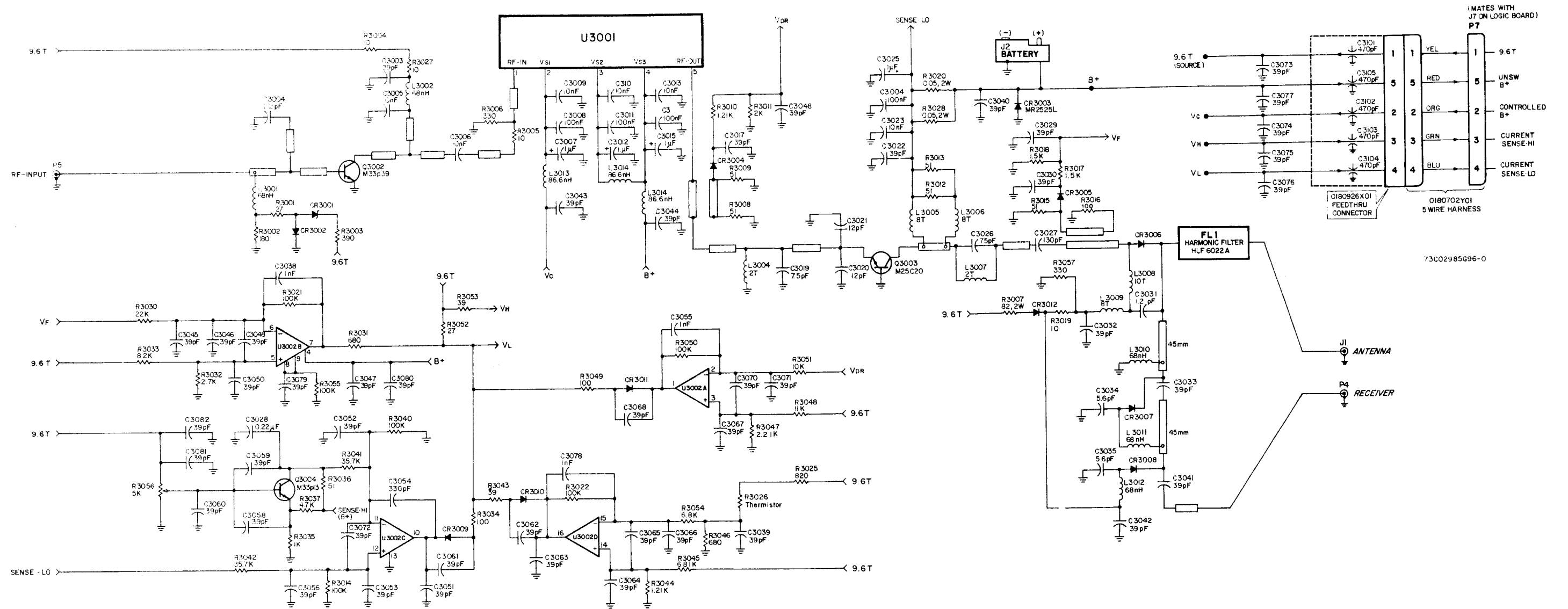
SHOWN FROM COMPONENT SIDE



SHOWN FROM SOLDER SIDE

- OVERLAY • 79A02986G74-0
- COMPONENT SIDE 79A02986G76-0
- SOLDER SIDE • 79A02986G77-0

POWER AMPLIFIER FLF5519A



73C02985G96-0

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
		Capacitors:
C3003	2113740B39	39pF
C3004	2113740B09	2.2pf
C3005-3006	2113741B45	10nF
C3007	2311049A08	1uF, tantalum
C3008	2113741B69	0.1uF
C3009-3010	2113741B45	10nF
C3011	2113741B69	0.1uF
C3012	2311049A08	1uF, tantalum
C3013	2113741B45	10nF
C3014	2113741B69	0.1uF
C3015	2311049A08	1uF, tantalum
C3017-3018	2113740B39	39pF
C3019	2111078B10	7.5pF
C3022	2113740B39	39pF
C3023	2113741B45	10nF
C3024	2113741B69	0.1uF
C3025	2311049A08	1uF, tantalum
C3026	2111078B10	7.5pF
C3027	2111078B45	130pF
C3028	2111032B15	0.22uF
C3029-3030	2113740B39	39pF
C3031	2113740B03	1.2pF
C3032-3033	2113740B39	39pF
C3034-3035	2113740B19	5.6pF
C3038	2113741B21	1nF
C3039-3053	2113740B39	39pF
C3054	2113740B61	330pF
C3055	2113741B21	1nF
C3056-3077	2113740B39	39pF
C3078	2113741B21	1nF
C3079-3082	2113740B39	39pF
		Diodes: (See Note)
CR3001	4880140L09	MMBZ5234B, ZENER 6.2V
CR3002	4802385L01	MMBD914
CR3003	4880236E07	MR2525L, transient
CR3004-3005	4880236E05	SCHOTTKEY
CR3006-3008	4805746G08	UM9604, PIN
CR3009-3011	4802385L01	MMBD914
CR3012	4880066M01	RLS4148
		Coils:
L3001-3002	2411087A12	68nH
L3003	2411030D06	86.6nH, VIOLET
L3004	2484331M22	2T, AIRWOUND
L3005	2480090G05	8T, AIRWOUND

L3006	2484331M27	8T, AIRWOUND
L3007	2484331M22	2T, AIRWOUND
L3008	2484331M12	10T, AIRWOUND
L3009	2484331M27	8T, AIRWOUND
L3010-3012	2411087A12	68nH
L3013-3014	2411030D06	86.6nH, VIOLET

P4-5	3008426S04	Plugs: Cable coax 111mm
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Q3002	4882233P39	Transistors: (See Note) NPN, type M33P39
Q3004	4882233P13	NPN, type MMBT3904

		Resistors: 1/8W, 5%, unless otherwise specified
R3001	0611077A36	27
R3002	0611077A56	180
R3003	0611077A64	390
R3004-3005	0611077A26	10
R3006	0611077A62	330
R3007	0611086C33	82, FMO, 2W
R3008-3009	0611077A43	51
R3010	0611077F03	1.21k, 1%
R3011	0611077F24	2k, 1%
R3012-3013	0611077A43	51
R3014	0611077G88	100k, 1%
R3015	0611077A43	51
R3016	0611077A50	100
R3017-3018	0611077A78	1.5k
R3019	0611077A26	10
R3020	0680147M01	0.05, FMF, 10%, 2W
R3021-3022	0611077G88	100k, 1%
R3025	0611077A72	820
R3026	0680149M02	THERMISTOR
R3027	0611077A26	10
R3028	0680147M01	0.05, FMF, 10%, 2W
R3030	0611077B07	22k
R3031	0611077A70	680
R3032	0611077A84	2.7k
R3033	0611077A96	8.2k
R3034	0611077A50	100
R3035	0611077A74	1k
R3036	0611077A43	51
R3037	0611077A90	4.7k
R3040	0611077G88	100k, 1%
R3041-3042	0611077G45	35.7k, 1%
R3043	0611077A40	39
R3044	0611077F03	1.21k, 1%
R3045	0611077F75	6.81k, 1%
R3046	0611077A70	680
R3047	0611077F28	2.21k, 1%

R3048	0611077F95	11k, 1%
R3049	0611077A50	100
R3050	0611077G88	100k, 1%
R3051	0611077F91	10k, 1%
R3052	0611077A36	27
R3053	0611077A40	39
R3054	0611077A94	6.8k
R3055	0611077G88	100k, 1%
R3056	1802467C32	5k, 10%, potentiometer
R3057	0611077A62	330

Integrated Circuits:
(See Note)

U3002	5184621K23	MC14573
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Qty

2	3602140C01	Non-referenced Items:
3	3180912W01	Polarizing key
		Conductive strip

Note:

For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.

FLN5067A PA Hardware, 30W,
Half-Duplex, 900MHz

PL-2072-O

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
C3020-3021	2111078B15	Capacitors: 12pF
J1	3008984S01	Connectors, Receptacles: Mini UHF coaxial assembly Power (includes feedthru) Feedthru bracket assembly
J2	0980255E02	
P7	0180926X01	
U3001	5180110E03	Integrated Circuit: (see Note) RF power, 900MHz
Q3003	4880225C20	Transistors: NPN, M25C20, 45W
	0180702Y01	Non-referenced Items: Feedthru cable assembly
	0310943M10	Screw, M3x5x8, 7 used
	0380043101	Screw, M3x5x10, 7 used
	0310943M57	Screw, M3x5x13, 6 used
	0310943R55	Screw, M3x5x8, 2 used
	0310908B01	Screw, 2 used
	0400131974	Flat washer, 2 used
	0400009777	Washer, 2 used
	2608900S01	Heatsink, machined
	1580902V01	Cover
	0708862S01	Plate for heatsink
	2680013M01	Shield, PA module
	0180702Y01	Feedthru cable assembly
	3208446S01	Gasket
	4280985T01	Clip, grounding coaxial, 2 used

Note:

For optimum performance, diodes, transistors and integrated circuits must be ordered by MOTOROLA part numbers.

REFERENCE SYMBOL	MOTOROLA PART NO.	DESCRIPTION
L9901	2480091G40	Coils: 2 TURNS, AIRWOUND
L9902	2480091G21	4 TURNS, AIRWOUND
L9903	2480091G40	2 TURNS, AIRWOUND
<u>Qty</u>		Non-referenced Item:
1	0780299L01	Frame lead, J strap

END OF DOCUMENT