

MAINTENANCE MANUAL

136-174 MHz 40-WATT WIDEBAND TRANSMIT/RECEIVE BOARD 19D901002G2, 4-6

(PHOENIX-SX)

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DESCRIPTION

The transmit/receiver board for the Phoenix-SX radio combination contains the receiver, exciter and power amplifier. The audio processor circuitry for the transmit (microphone) audio is included on the synthesizer/interconnect board. Transmit/receiver RF frequency injection (5-15 milliwatts) is provided by a common VCO on the synthesizer/interconnect board. There are no multipliers in the exciter since the RF injection frequency from the synthesizer VCO is the transmit frequency or the receiver mixer injection frequency.

The transmit/receiver board (Tx/Rx) is located on the bottom of the radio. A block diagram of the Tx/Rx board is shown in Figure 1.

CIRCUIT ANALYSIS

Exciter

The exciter consists of amplifiers Q101-Q104 and operates over the 136-174 MHz frequency range. This wide band exciter requires no tuning.

RF injection from the synthesizer/interconnect board is applied to the base of Class A Ampl Q101 through J151, a 3 dB attenuator pad, and an impedance matching network consisting of C101, C102 and L101. This network matches the base of Q101 to 50 ohms. The 3 dB attenuator pad (R101-R103) provides a constant load for the VCO output when switching to or from the transmit mode to maintain frequency stability. Continuous 8.5V is applied to Q101 through a collector feed network consisting of L102, R106, R109, and C104-C106. Base bias is set by R104 and R105. Continuous 8.5 volts is also

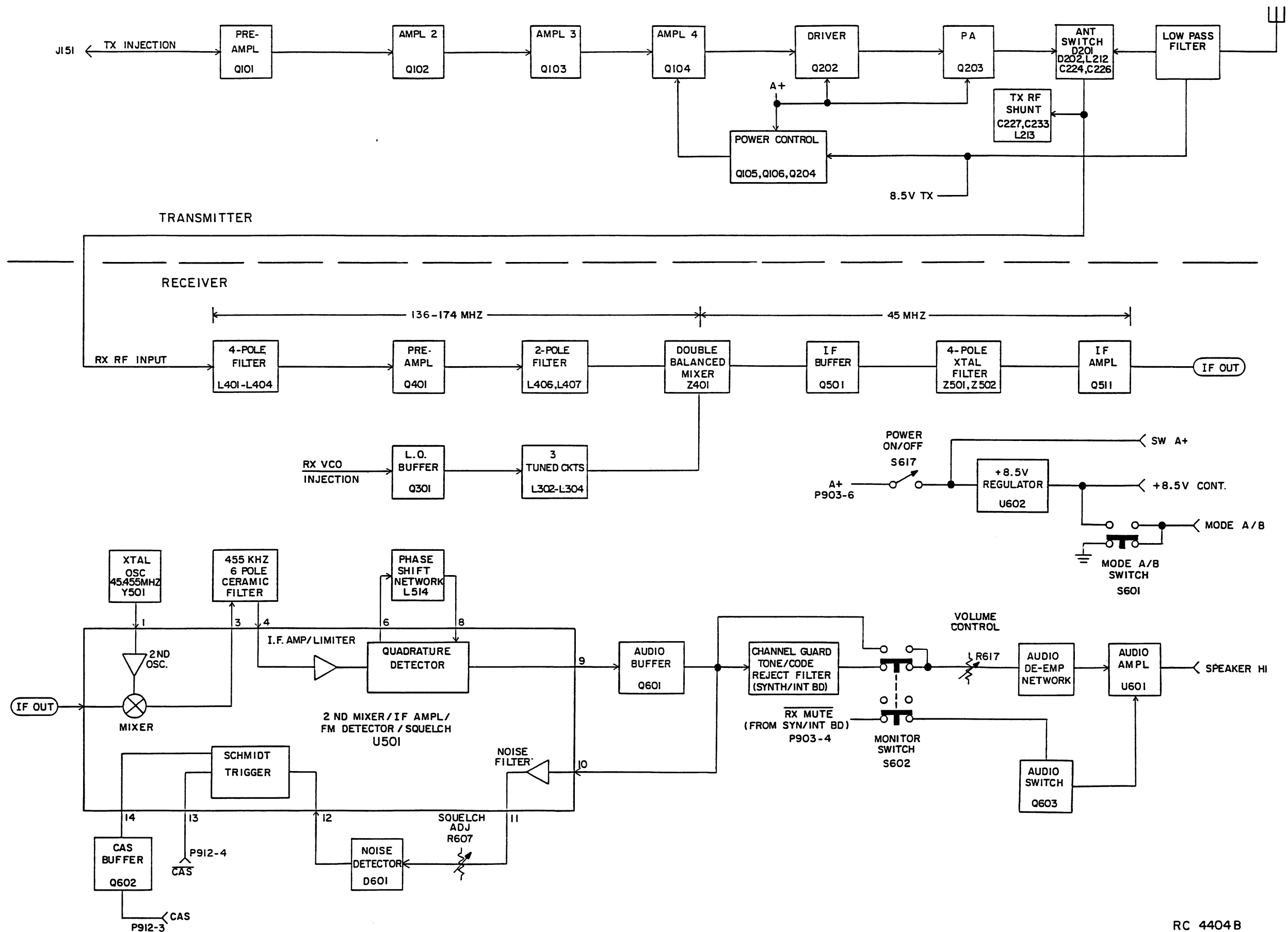
supplied to Q103. Metering for Q101 is provided by TP101 in the emitter circuit.

The output of Q101 is coupled to the base of Class B amplifier, AMPL 2 (Q102), through impedance matching network consisting of C108, C109 and L103. Tx switched 8.5V is provided through a collector feed network consisting of L104, R112, R113, and C110-C112. This switched voltage provides Tx/Rx isolation, preventing Rx VCO frequencies from passing through the exciter. Q202 is turned on only in the transmit mode. Decoupling for the switched 8.5V line is provided by C107, C113 and C122.

The output of Q102 is further amplified by a 2nd Class B amplifier, AMPL 3 (Q103) and applied to the base of the exciter final amplifier Q104. An impedance matching network consisting of L107, L108, C118-C121, and C126 matches the collector circuit of Q103 to the base of Q104. Q104 provides a minimum of 2 watts across the 136-174 MHz band to the PA. The output is coupled through interconnection/test jack J201. J201 can be used when troubleshooting the exciter/PA. It allows the technician to monitor the exciter output or to inject RF frequencies into the power amplifier by removing P201 and installing a test plug into J201-1, 3 or J201-2, 4.

Power Control

The power control circuit allows output power adjustment from 20 to 40 watts and provides overvoltage protection to automatically reduce the output power when the battery voltage exceeds 13 volts. The power control circuit consists of D101, Q105, Q106 and Q204. Q204 controls the collector voltage to exciter final amplifier Q104 which provides RF drive to the power amplifier.



RC 4404B

Figure 1 - Transmit/Receive Board Block Diagram

Should the battery voltage exceed 12 volts, D101 will fire and apply base voltage to Q106. (An additional 0.7 volts is required to turn Q106 on.) As Q106 turns on a parallel path is provided around R120, reducing the base voltage of Q105. Q105 decreases the base voltage applied to Q204, causing Q204 to reduce the collector voltage to exciter final amplifier Q104. Reducing the collector voltage to Q104 decreases the RF drive applied to the power amplifier, maintaining near constant RF output power.

When battery voltage is between 12 and 16 volts the RF output power will remain near rated power. Should the battery voltage exceed 16 volts output power is drastically reduced. R120 is set to provide rated output power with battery voltage at 13.6 volts DC.

POWER AMPLIFIER

The power amplifier consists of two Class C broadband, fixed tuned transistor amplifiers that amplify the two watt RF input from the exciter and provide 40 watts RF output power. No tuning is required.

The exciter output from J201 is applied to the base of driver Q202 through a 50 ohm impedance matching network consisting of C201-C203, L201, L202, and R201. The output of Q202 is taken from the collector and applied to power amplifier Q203 through an impedance matching network. This network, consisting of L205, L206, C210-C213, and R203 matches the collector impedance of Q202 to the base of PA Q203.

A+ is supplied to the driver and PA through collector feed networks consisting of C204, L203, L204 and R202 (Q202) and L207, L208, C214 and R104 (Q203). C205-C207 provide decoupling for any transient noises that may be on the line.

In the transmit mode 8.5V Tx switched voltage is applied to Tx/Rx antenna switch by Tx 8.5V switch Q604, turning pin diodes D201 and D202 on. (Q604 is controlled by DPTT.) The PA output is then coupled through impedance matching network L209, L210, C215-C219 and coupling capacitors C220 and C229 and forward bias pin diode D201 to the low pass filter and then to the antenna through J601.

L212, C224, C226, and forward biased pin diode D202 create a 1/4 wave stub across the 136-174 MHz band, presenting an open circuit to the receiver at these RF frequencies, thus directing output power through the low pass filter and out of the antenna.

In the receive mode D201 and D202 are turned off, the AC short is removed and the 1/4 wave stub now presents a 50 ohm impedance to the receiver, allowing the received RF to pass through the low pass filter to the receiver. Pin diode D201 prevents the receive signal from getting into the transmitter.

RECEIVER

The receiver is a dual conversion, superheterodyne FM receiver designed for operation in the 136-174 MHz frequency range. Regulated 8.5 volts is used to power all receiver stages except for the audio PA IC, which operates from the A+ supply.

The receiver has intermediate frequencies of 45 MHz and 455 MHz. Adjacent channel selectivity is obtained by using two tuned circuits, a 4-pole 45 MHz crystal filter and a 455 MHz ceramic filter.

All receiver circuitry except the synthesizer is located on the transmitter/receiver board. The receiver consists of:

- Receiver Front End
- L.O. Buffer and Filter
- 45 MHz 1st Mixer
- IF Buffer and Amplifier
- 2nd Mixer and Oscillator
- 455 kHz 2nd IF circuitry with FM Detector and Squelch
- Audio PA Circuitry

RECEIVER FRONT END

An RF signal from the antenna is coupled through J601, Tx low pass filter, transmit T/R switch, a 4-pole bandpass filter (L401-L404) to gate 1 of RF pre-amplifier Q401. Q401 is a high gain low noise dual gate FET. The output of Q401 is coupled through an additional 2-pole filter (L406, L407), to the input of first mixer Z401. Front end selectivity is provided by these six tuned circuits.

1st MIXER

The 1st mixer is a doubly balanced diode mixer relatively free of inter-modulation products. RF from the pre-amplifier and tuned filters is applied to pin 1 of mixer Z401.

RF injection (181-219 MHz) from the synthesizer VCO is applied to L.O. Buffer Q301 through J351. The input level at J351 is typically +8 dBm (+6 dBm minimum)

at a frequency 45 MHz above the channel receive frequency., R301-R303 and C301 matches the source impedance of Q301 to the VCO output transmit/receive switching circuitry on the synthesizer/interconnect board. The output of the L.O. Buffer is coupled to the mixer through a 3-pole band pass filter (L302-L304) to the 1st mixer L.O. input, Z401-8.

The 45 MHz output of the mixer is coupled to the source input of IF buffer Q501. The output of buffer Q501 is coupled through an impedance matching network (C503, C504, R503 and L503) to a 45 MHz 4-pole crystal filter (Z501 and Z502). The highly-selective crystal filter provides the first portion of the receiver IF selectivity. The output of the crystal filter is direct coupled to G1 of IF amplifier Q511. L512 and R511 matches the output of the crystal filter. The biasing on Gate 2 and the drain load determines the gain of the stage. The amplifier provides approximately 20 dB of IF gain. The output of Q511 is coupled to the input of IC U501 through an impedance matching network comprised of L515, R521, C514 and C515. Diodes D501 and D502 provide limiting for the 45 MHz signal (1.4 Vpp) to prevent high level overload of U501.

U501 and associated circuitry consists of the 2nd converter/mixer, IF amplifier, FM detector, and squelch circuit. The 45 MHz IF input is applied to pin 16 of U501 and mixed with a 45.455 MHz frequency supplied by crystal oscillator Y501. L513 sets the frequency of Y501. High side injection is used. The output of the internal mixer is amplified and applied to a 6-pole ceramic filter, Z503, which provides the 455 kHz selectivity. The output of the 455 kHz filter is reapplied to U501-5. The 2nd IF signal is amplified/limited and the audio detected by an internal FM quadrature detector. L514 is the quadrature detector coil which controls the phase shift to allow audio detection.

AUDIO AND SQUELCH CIRCUITS

The audio output of U501 is applied to the base of audio buffer Q601. The output of the audio buffer is applied to the Channel Guard Tone/Code Reject filter on the synthesizer/interconnect board, then to audio amplifier U601 through the MONITOR switch, and to the squelch input U501-10.

Squelch Circuit

The squelch circuit operates on the noise components contained in the FM detector audio output. The detected audio is applied to the squelch high pass filter. This filter is formed with the

internal operational amplifier and feedback circuit. Thus the filtered noise in the 6-8 kHz frequency band is applied to the squelch detector consisting of squelch adjust R607, R629, R608, C606, C607, C621 and diode D601. As the noise increases in magnitude in a negative direction, negative spikes cause D601 to conduct, providing a noise level controlled DC input to the internal squelch circuitry of U501. The charge on C607 varies with the average noise level through D601. This output is reapplied to the Schmidt trigger in U501. The Schmidt trigger output controls CAS buffer Q602. About 4 dB of hysteresis is present in the Schmidt trigger to prevent chatter due to weak signals. Q602 provides drive to operate an optional channel busy light or external relay control. Squelch sensitivity is adjusted by R607 while R629 provides temperature compensation.

Audio Circuits

Detected audio from audio buffer Q601 is applied to the Channel Guard Tone/Code Reject filter on the synthesizer/interconnect board and returned as filtered volume squelch high through P903-7. Filtered audio is then applied to audio amplifier U601 through MONITOR switch S602 and VOLUME control R617. R618 and C615 provide de-emphasis. A+ is applied to U601 through S617. The RX MUTE line is high when a message is received and accompanied by a correct Channel Guard Tone/Code, keeping audio switch Q603 turned off. This enables audio amplifier U601 which provides up to 3 watts of audio output power into a 4 ohm speaker. The feedback loop consisting of R615, R616, and C611 determine the amplifier closed loop gain. R614 and C612 provide the high audio frequency roll-off above 6 kHz.

The audio amplifier is muted (switched off) when RX MUTE is low. When this occurs (no messages being received) audio switch Q603 is turned on, applying approximately 2 volts to the reference input of audio amplifier U601. This turns Q601 off causing it's output to be grounded.

Monitor

When the MONITOR switch is pressed, detected audio from audio buffer Q601 is applied directly to the audio amplifier through S602-5 and R617, bypassing the Channel Guard Tone/Code Reject Filter. S602 also opens the RX MUTE line to Q603, causing it to be turned off and allowing audio amplifier U601 to operate. The detected audio is amplified and applied to the speaker. Channel Guard Codes/Tones may be audible when present.

MODE A/B

Mode A/B Switch S601 doubles the channel selection capability of the radio by controlling the 8.5V CONT line applied to the Mode A/B input of the microcomputer. 8.5V CONT is applied to the microcomputer thru P912 in Mode B and removed in Mode A. Mode B is indicated

on the 7 segment display by an illuminated decimal point.

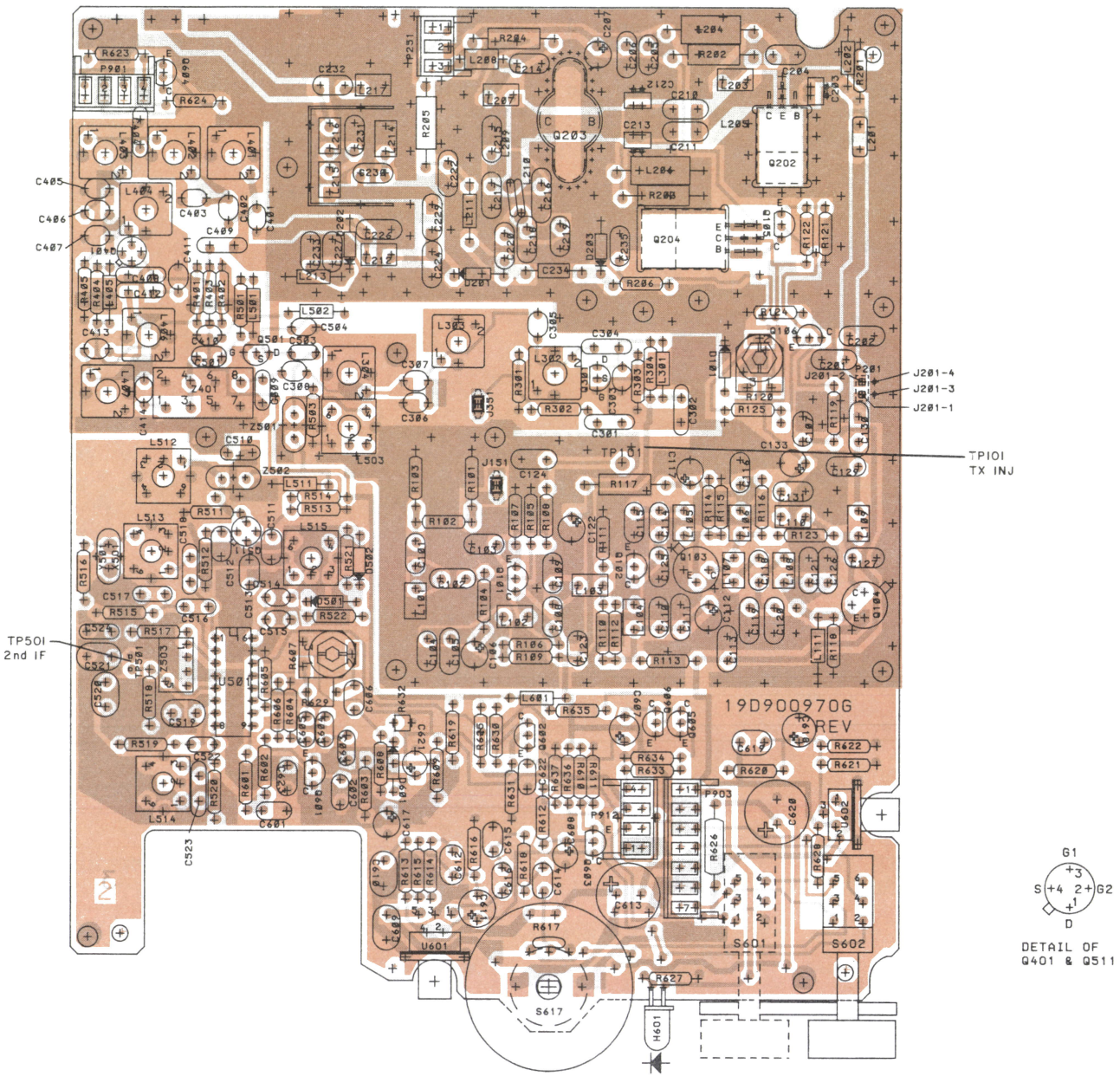
8.5 VOLT REGULATOR

8.5 Volt regulator U602 receives switched A+ from S617 and P903-6 and provides regulated 8.5 Volts to the radio. Switched A+ is available from S617.

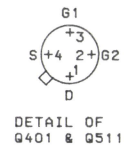
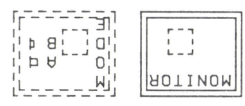
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← RUNS ON SOLDER SIDE
 ● RUNS ON BOTH SIDES
 ← RUNS ON COMPONENT SIDE



OUTLINE DIAGRAM

150—174 MHz, 40 WATT WIDEBAND TRANSMIT/RECEIVE BOARD

(19D900972, Rev. 6)
 (19A703234, Sh. 1, Rev. 2)
 (19A703234, Sh. 2, Rev. 3)

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2ND IF 500	
AUDIO/SQUELCH/SYSTEM 600	

NOTES:

- ⚠ PART OF PWB.
- ⚠ VALUE OF R621 DEPENDS ON COLOR CODE ON U602.

U602 COLOR CODE	R621 VALUE
BROWN	OMIT R621
RED	270
ORANGE	100
YELLOW	47
GREEN	22
BLUE	6.8

- ⚠ SWITCH PRESENT ON 002G4,G6 ONLY.

⚠ VOLTAGE READINGS:

ALL VOLTAGES ARE TYPICAL. VOLTAGES ARE MEASURED WITH A 20,000 OHM PER VOLT METER, REFERENCE TO A-, UNLESS OTHERWISE INDICATED.

SHEET 2:

ALL VOLTAGES ARE DC
ALL VOLTAGES ARE IN THE TRANSMIT CONDITION.

SHEET 3:

ALL VOLTAGES ARE DC

SHEET 4:

ALL VOLTAGES ARE DC
VOLTAGES AT U501 AND U601 ARE MEASURED WITH 1 M OHM DC VOLTMETER.
DIFFERENCE IN VOLTAGE READINGS AT U501-5 & 6 SHOULD BE LESS THAN 6 MVDC.
S - SQUELCHED RECEIVER
US - UNSQUELCHED RECEIVER

- ⚠ CALLED FOR AT HIGHER ASM.

Δ COMPONENT IDENTIFICATION CHART

PART	970G1	970G3
	150-174 MHZ	136-153 MHZ
C119	18p	27p
C120	22p	27p
C129	12p	18p
C130	39p	100p
C201	18p	24p
C202	18p	24p
C203	180p	220p
C210	56p	75p
C211	56p	75p
C213	150p	220p
C219	15p	20p
C231	24p	27p
C232	10p	8p
C303	3.3p	4.7p
C306	4.7p	5.6p
C307	1.5p	1.0p
C308	5.6p	8.2p
C309	22p	5.6p
C403	6.8p	10p
C404	56p	68p
C405	5.6p	10p
C406	2.7p	1.8p
C407	1.5p	3.3p
C411	2.2p	5.6p
C412	150p	27p
C414	6.8p	5.6p
R118	15	10

MODEL NO.	REV. LETTER	FREQ RANGE
PL19D900970G1	A	150-174 MHZ
PL19D901002G2		
PL19D901002G4		
PL19D900970G3	A	136-153 MHZ
PL19D901002G5		
PL19D901002G6		

ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.
RESISTOR VALUES IN Ω UNLESS FOLLOWED BY MULTIPLIER K OR M.
CAPACITOR VALUES IN F UNLESS FOLLOWED BY MULTIPLIER μ, n OR p.
INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m OR μ.

(19D900974, Sh. 1, Rev. 6)

SCHEMATIC DIAGRAM NOTES

136-174 MHz TRANSMIT/RECEIVE BOARD

Issue 2

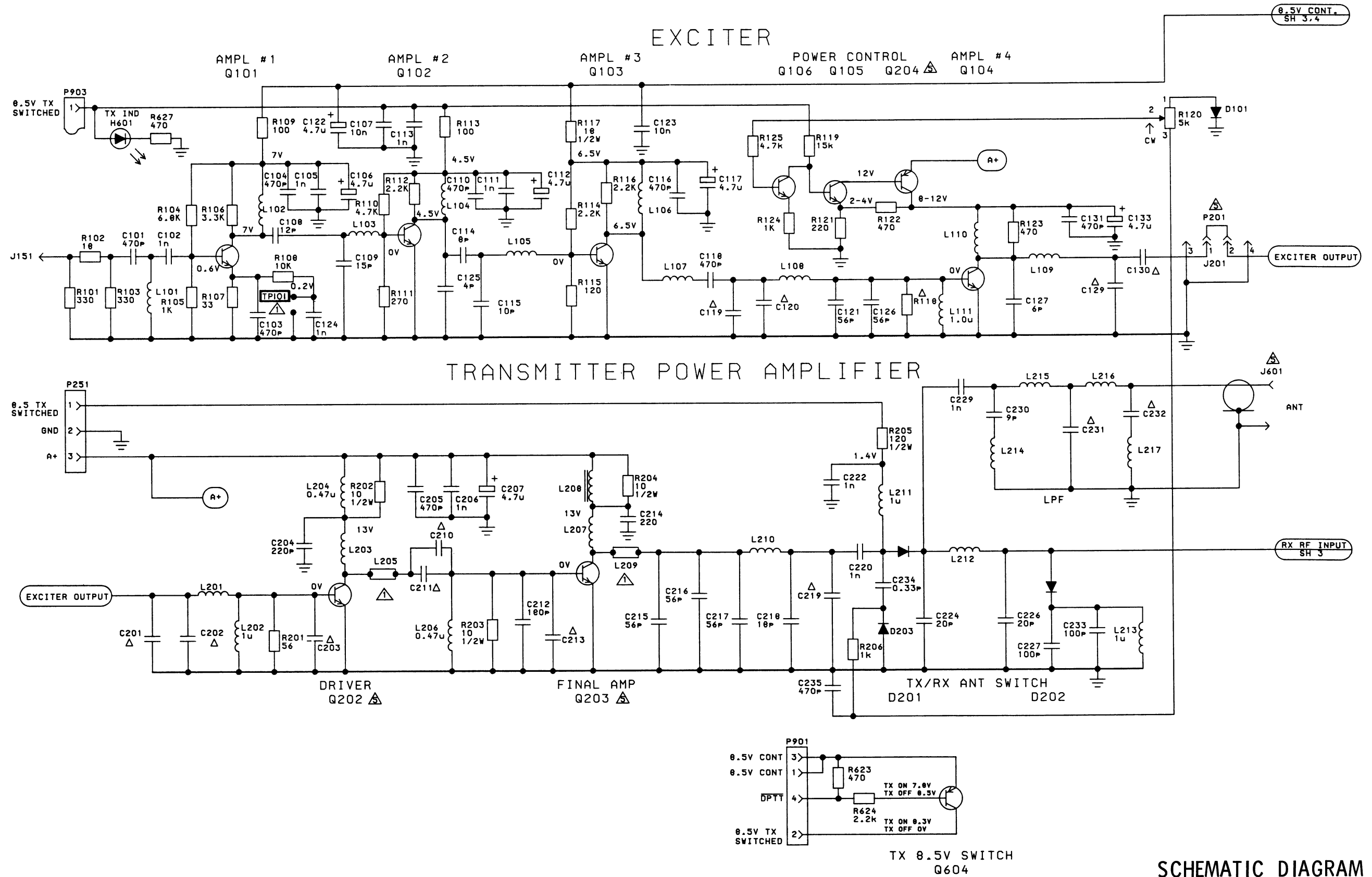
PARTS LIST

136-174 MHz
40 WATT TRANSMIT/RECEIVE ASSEMBLY
(WIDEBAND)
19D901002G2 STD 150-174 MHz
19D901002G4 MODE SWITCH 150-174 MHz
19D901002G5 STD 136-153 MHz
19D901002G6 MODE SWITCH 136-153 MHz
ISSUE 3

SYMBOL	GE PART NO.	DESCRIPTION
A1		TRANSMIT/RECEIVE BOARD 19D90970G1 STD - REV A 19D90970G3 MODE SWITCH - REV A EXCITER ----- CAPACITORS -----
C101	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C102	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C103 and C104	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C105	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C106	19A703314P9	Electrolytic: 4.7 uF -10+50% tol, 50 VDCW; sim to Panasonic LS Series.
C107	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C108	19A701624P10	Ceramic, disc: 12 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C109	19A701624P12	Ceramic, disc: 15 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C110	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C111	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C112	19A703314P9	Electrolytic: 4.7 uF -10+50% tol, 50 VDCW; sim to Panasonic LS Series.
C113	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C114	19A701624P6	Ceramic, disc: 8 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM ±60.
C115	19A701624P8	Ceramic, disc: 10 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM ±30.
C116	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C117	19A703314P9	Electrolytic: 4.7 uF -10+50% tol, 50 VDCW; sim to Panasonic LS Series.
C118	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C119A	19A701624P14	Ceramic disc: 18 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G1).
C119B	19A701624P18	Ceramic disc: 27 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G3).
C120A	19A701624P16	Ceramic, disc: 22 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C120B	19A701624P18	Ceramic, disc: 27 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C121	19A701624P326	Ceramic, disc: 56 pF ±5%, 50 VDCW, temp coef N220 PPM ±30.
C122	19A703314P9	Electrolytic: 4.7 uF -10+50% tol, 50 VDCW; sim to Panasonic LS Series.
C123	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C124	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C125	19A701624P2	Ceramic, disc: 4 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM ±60.
C126	19A701624P326	Ceramic, disc: 56 pF ±5%, 50 VDCW, temp coef N220 PPM ±30.
C127	19A701624P4	Ceramic, disc: 6 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM ±60.
C129	19A701624P10	Ceramic, disc: 12 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G1).

SYMBOL	GE PART NO.	DESCRIPTION
C129	19A701624P14	Ceramic, disc: 18 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G3).
C130	19A701624P22	Ceramic, disc: 39 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G1).
C130	19A701602P4	Ceramic: 100 pF ±10%, 1000 VDCW; sim to Radio Materials Type JF Discaps. (Used in G3).
C131	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C133	19A703314P9	Electrolytic: 4.7 uF -10+50% tol, 50 VDCW; sim to Panasonic LS Series.
----- DIODES -----		
D101	19A700028P1	Silicon, fast recovery: fwd current 75mA, 75 PIV; sim to Type 1N4148.
----- JACKS -----		
J151	19A701883P4	Contact, electrical; sim to AMP 86444-1.
----- COILS -----		
L101	19B800891P5	Coil, RF: .064 uH; sim to Paul Smith SK-890-1.
L102	19B800891P6	Coil, RF: .084 uH; sim to Paul Smith SK-890-1.
L103	19B800891P5	Coil, RF: .064 uH; sim to Paul Smith SK-890-1.
L104	19B800891P6	Coil, RF: .084 uH; sim to Paul Smith SK-890-1.
L105	19B800891P5	Coil, RF: .064 uH; sim to Paul Smith SK-890-1.
L106	19B800891P6	Coil, RF: .084 uH; sim to Paul Smith SK-890-1.
L107	19B800890P3	Coil, RF: 11.7 uH ±5%, sim to Paul Smith SK-896-1.
L108	19B800891P1	Coil, RF Choke: sim to Paul Smith SK-890-1.
L109	19B800891P3	Coil, RF Choke; sim to Paul Smith SK890-1.
L110	19B800891P6	Coil, RF: .084 uH; sim to Paul Smith SK-890-1.
L111	19A700024P13	Coil, RF: 1.0 uH ±10%.
----- TRANSISTORS -----		
Q101 and Q102	19A702084P1	Silicon, NPN; sim to MPS 2369.
Q103	19A116868P1	Silicon, NPN; sim to Type 2N4427.
Q104	19A700063P1	Silicon, NPN.
Q105 and Q106	19A700023P2	Silicon, NPN; sim to Type 2N3904.
----- RESISTORS -----		
R101	19A700019P31	Deposited carbon: 330 ohms ±5%, 1/4 w.
R102	19A700019P16	Deposited carbon: 18 ohms ±5%, 1/4 w.
R103	19A700019P31	Deposited carbon: 330 ohms ±5%, 1/4 w.
R104	19A700019P47	Deposited carbon: 6.8K ohms ±5%, 1/4 w.
R105	19A700019P37	Deposited carbon: 1K ohms ±5%, 1/4 w.
R106	19A700019P43	Deposited carbon: 3.3K ohms ±5%, 1/4 w.
R107	19A700019P19	Deposited carbon: 33 ohms ±5%, 1/4 w.
R108	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R109	19A700019P25	Deposited carbon: 100 ohms ±5%, 1/4 w.
R110	19A700019P45	Deposited carbon: 4.7K ohms ±5%, 1/4 w.
R111	19A700019P30	Deposited carbon: 270 ohms ±5%, 1/4 w.
R112	19A700019P41	Deposited carbon: 2.2K ohms ±5%, 1/4 w.
R113	19A700019P25	Deposited carbon: 100 ohms ±5%, 1/4 w.
R114	19A700019P41	Deposited carbon: 2.2K ohms ±5%, 1/4 w.
R115	19A700019P26	Deposited carbon: 120 ohms ±5%, 1/4 w.
R116	19A700019P41	Deposited carbon: 2.2K ohms ±5%, 1/4 w.
R117	19A700113P21	Composition: 18 ohms ±5%, 1/2 w.
R118	19A700019P15	Deposited carbon: 15 ohms ±5%, 1/4 w. (Used in G1).

SYMBOL	GE PART NO.	DESCRIPTION
R118	19A700019P13	Deposited carbon: 10 ohms ±5%, 1/4 w. (Used in G3).
R119	19A700019P51	Deposited carbon: 15K ohms ±5%, 1/4 w.
R120	19B800784P106	Variable: 5K ohms ±20%, 1/2 w.
R121	19A700019P29	Deposited carbon: 220 ohms ±5%, 1/4 w.
R122 and R123	19A700019P33	Deposited carbon: 470 ohms ±5%, 1/4 w.
R124	19A700019P37	Deposited carbon: 1K ohms ±5%, 1/4 w.
R125	19A700019P45	Deposited carbon: 4.7K ohms ±5%, 1/4 w.
----- TEST POINTS -----		
TP101		Part of printed board 19D900969P1.
POWER AMPLIFIER		
----- CAPACITORS -----		
C201A	19A701624P14	Ceramic, disc: 18 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C201B	19A701624P17	Ceramic, disc: 24 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C202A	19A701624P14	Ceramic, disc: 18 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C202B	19A701624P17	Ceramic, disc: 24 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C203	19A701413P41	Mica: 180 pF ±5%, 100 VDCW. (Used in G1).
C203	19A701413P44	Mica: 220 pF ±5%, 100 VDCW. (Used in G3).
C204	19A701602P10	Ceramic: 220 pF ±10%, 1000 VDCW.
C205	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C206	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C207	19A703314P9	Electrolytic: 4.7 uF -10+50% tol, 50 VDCW; sim to Panasonic LS Series.
C210 and C211	19A701624P326	Ceramic, disc: 56 pF ±5%, 50 VDCW, temp coef N220 PPM ±30. (Used in G1).
C210 and C211	19A701624P529	Ceramic, disc: 75 pF ±5%, 500 VDCW, temp coef N470 PPM ±60. (Used in G3).
C212	19A701413P41	Mica: 180 pF ±5%, 100 VDCW.
C213	19A701413P38	Mica: 150 pF ±5%, 100 VDCW. (Used in G1).
C213	19A701413P44	Mica: 220 pF ±5%, 100 VDCW. (Used in G3).
C214	19A701602P10	Ceramic: 220 pF ±10%, 1000 VDCW.
C215 thru C217	19A701624P326	Ceramic, disc: 56 pF ±5%, 50 VDCW, temp coef N220 PPM ±30.
C218	19A701624P14	Ceramic disc: 18 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C219	19A701624P12	Ceramic, disc: 15 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G1).
C219	19A701624P15	Ceramic disc: 20 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G3).
C220	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C222	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C224	19A701624P15	Ceramic, disc: 20 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C226	19A701624P15	Ceramic, disc: 20 pF ±5%, 500 VDCW, temp coef 0 PPM ±30.
C227	19A701602P4	Ceramic: 100 pF ±10%, 1000 VDCW; sim to Radio Materials Type JF Discaps.
C229	19A701602P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C230	19A701624P7	Ceramic, disc: 9 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM ±60 PPM.
C231	19A701624P17	Ceramic, disc: 24 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G1).
C231	19A701624P18	Ceramic, disc: 27 pF ±5%, 500 VDCW, temp coef 0 PPM ±30. (Used in G3).



SCHEMATIC DIAGRAM

136-174 MHz, 40 WATT WIDEBAND TRANSMITTER BOARD

SYMBOL	GE PART NO.	DESCRIPTION
C232	19A701624P8	Ceramic, disc: 10 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM ±30. (Used in G1).
C232	19A701624P6	Ceramic, disc: 8 pF ±5%, 500 VDCW, temp coef 0 PPM ±60. (Used in G3).
C233	19A701602P4	Ceramic: 100 pF ±10%, 1000 VDCW; sim to Radio Materials Type JF Discaps.
C234	19A700013P7	Phenolic: 0.33 pF ±5%, 500 VDCW.
C235	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to Type JF Discap.
----- DIODES -----		
D201 and D202	19J706892P2	Silicon.
D203	19A700047P3	Silicon: 100 mW; sim to 1N6263.
----- JACKS -----		
J201	19A703248P1	Contact, electrical. (Quantity 4).
----- COILS -----		
L201	19B800890P6	Coil, RF: 14.7 nH ±5%, sim to Paul Smith SK-891-1.
L202	19A700024P13	Coil, RF: 1.0 uH ±10%.
L203	19B800891P3	Coil, RF Choke; sim to Paul Smith SK890-1.
L204	19A700000P8	Coil, RF: 470 nH ±12%; sim to Jeffers 4411-4K.
L205		Part of Printed Board 19D900969P1.
L206	19A700000P8	Coil, RF: 470 nH ±12%; sim to Jeffers 4411-4K.
L207	19B800891P2	Coil, RF Choke: sim to Paul Smith SK-890-1.
L208	19A701091G1	Coil.
L209		Part of Printed Board 19D900969P1.
L210	19A701421P6	Coil. (Used in G1).
L210	19A701421P2	Coil. (Used in G3).
L211	19A700024P13	Coil, RF: 1.0 uH ±10%.
L212	19B800891P4	Coil, RF Choke: sim to Paul Smith SK-890-1. (Used in G1).
L212	19B800891P5	Coil, RF: 0.64 uH; sim to Paul Smith SK-890-1. (Used in G3).
L213	19A700024P13	Coil, RF: 1.0 uH ±10%.
L214	19B800891P2	Coil, RF Choke: sim to Paul Smith SK-890-1. (Used in G1).
L214	19B800891P3	Coil, RF Choke: sim to Paul Smith SK-890-1. (Used in G3).
L215 and L216	19B800891P5	Coil, RF: .064 uH; sim to Paul Smith SK-890-1.
L217	19B800891P2	Coil, RF Choke: sim to Paul Smith SK-890-1. (Used in G1).
L217	19B800891P3	Coil, RF Choke: sim to Paul Smith Sk-890-1. (Used in G3).
----- PLUGS -----		
P201	19A702104P1	Receptacle: 2 position, shorting, rated at 3 amps; sim to Berg 65474-002.
P251	19A116659P1	Connector, printed wiring: 3 contacts rated at 5 amps; sim to Molex 09-52-3032.
----- RESISTORS -----		
R201	19A700019P22	Deposited carbon: 56 ohms ±5%, 1/4 w.
R202 thru R204	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
R205	19A700113P41	Composition: 120 ohms ±5%, 1/2 w.
R206	19A700019P37	Deposited carbon: 1K ohms ±5%, 1/4 w.

SYMBOL	GE PART NO.	DESCRIPTION
RECEIVER VCO INJECTION		
----- CAPACITORS -----		
C301 and C302	19A700235P27	Ceramic: 150 pF ±5%, 50 VDCW.
C303	19A700235P7	Ceramic: 3.3 pF +0.25 pF, 50 VDCW, temp coef N150 PPM. (Used in G1).
C303	19A700235P9	Ceramic: 4.7 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM. (Used in G3).
C304	19A700235P27	Ceramic: 150 pF ±5%, 50 VDCW.
C305	19A700235P3	Ceramic: 1.5 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM.
C306	19A700235P9	Ceramic: 4.7 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM. (Used in G1).
C306	19A700235P10	Ceramic: 5.6 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM. (Used in G3).
C307	19A700235P3	Ceramic: 1.5 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM. (Used in G1).
C307	19A700235P1	Ceramic: 1 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM. (Used in G3).
C308	19A700235P10	Ceramic: 5.6 pF ±0.25 pF, 50 VDCW. (Used in G1)
C308	19A700235P12	Ceramic: 8.2 pF ±0.25 pF, 50 VDCW. (Used in G3)
C309	19A700235P17	Ceramic: 22 pF ±5%, 50 VDCW. (Used in G1).
C309	19A700235P10	Ceramic: 5.6 pF ±0.25 pF, 50 VDCW. (Used in G3)
----- JACKS -----		
J351	19A701883P4	Contact, electrical; sim to AMP 86444-1.
----- COILS -----		
L301	19A700024P13	Coil, RF: 1.0 uH ±10%.
L302 thru L304	19B800965P323	Coil, RF: variable; sim to Paul Smith SK-767-2.
----- TRANSISTORS -----		
Q301	19A700060P2	N Type, field effect.
----- RESISTORS -----		
R301	19A700019P28	Deposited carbon: 180 ohms ±5%, 1/4 w.
R302	19A700019P15	Deposited carbon: 15 ohms ±5%, 1/4 w.
R303	19A700019P28	Deposited carbon: 180 ohms ±5%, 1/4 w.
R304	19A700019P40	Deposited carbon: 1.8K ohms ±5%, 1/4 w.
RECEIVER FRONT END		
----- CAPACITORS -----		
C401	19A700235P12	Ceramic: 8.2 pF ±0.25 pF, 50 VDCW.
C402	19A700235P5	Ceramic: 2.2 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM.
C403	19A700235P11	Ceramic: 6.8 pF ±5%, 50 VDCW. (Used in G1).
C403	19A700235P13	Ceramic: 10 pF ±5%, 50 VDCW. (Used in G3).
C404	19A700235P22	Ceramic: 56 pF ±5%, 50 VDCW. (Used in G1).
C404	19A700235P23	Ceramic: 68 pF ±5%, 50 VDCW. (Used in G3).
C405	19A700235P10	Ceramic: 5.6 pF ±0.25 pF, 50 VDCW. (Used in G1)
C405	19A700235P13	Ceramic: 10 pF ±5%, 50 VDCW. (Used in G3).
C406	19A700235P6	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef N150 PPM. (Used in G1).
C406	19A700235P4	Ceramic: 1.8 pF ±0.25 pF, 50 VDCW, temp coef N150 PPM. (Used in G3).
C407	19A700235P3	Ceramic: 1.5 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM. (Used in G1).
C407	19A700235P7	Ceramic: 3.3 pF ±0.25 pF, 50 VDCW, temp coef N150 PPM. (Used in G3).
C408 and C409	19A700235P27	Ceramic: 150 pF ±5%, 50 VDCW.

SYMBOL	GE PART NO.	DESCRIPTION
C410	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C411	19A700235P5	Ceramic: 2.2 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM. (Used in G1).
C411	19A700235P10	Ceramic: 5.6 pF ±0.25 pF, 50 VDCW, temp coef -150 PPM. (Used in G3).
C412	19A700235P27	Ceramic: 150 pF ±5%, 50 VDCW. (Used in G1).
C412	19A700235P18	Ceramic: 27 pF ±5%, 50 VDCW. (Used in G3).
C413	19A700235P6	Ceramic: 2.7 pF ±0.25 pF, 50 VDCW, temp coef N150 PPM.
C414	19A700235P11	Ceramic: 6.8 pF ±0.25 pF, 50 VDCW. (Used in G1).
C414	19A700235P10	Ceramic: 5.6 pF ±0.25 pF, 50 VDCW, temp coef N150 PPM. (Used in G3).
----- COILS -----		
L401 thru L404	19B800965P323	Coil, RF: variable; sim to Paul Smith SK-767-2.
L405	19A700024P13	Coil, RF: 1.0 uH ±10%.
L406 and L407	19B800965P323	Coil, RF: variable; sim to Paul Smith SK-767-2.
----- TRANSISTORS -----		
Q401	19A700075P1	N-CHANNEL, field effect. (MOS DUAL GATE).
----- RESISTORS -----		
R401	19A700019P51	Deposited carbon: 15K ohms ±5%, 1/4 w.
R402	19A700019P53	Deposited carbon: 22K ohms ±5%, 1/4 w.
R403	19A700019P17	Deposited carbon: 22 ohms ±5%, 1/4 w.
R404	19A700019P35	Deposited carbon: 680 ohms ±5%, 1/4 w.
R405	19A700019P17	Deposited carbon: 22 ohms ±5%, 1/4 w.
----- NETWORKS -----		
Z401	19B801025P1	Balanced Mixer (Double); sim to Mini-Circuits SBL-1.
IF		
----- CAPACITORS -----		
C501	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C503	19A700235P14	Ceramic, disc: 12 pF ±5%, 50 VDCW.
C504	19A700235P11	Ceramic: 6.8 pF ±0.25 pF, 50 VDCW.
C510	19A700235P16	Ceramic: 18 pF ±5%, 50 VDCW.
C511 thru C513	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C514	19A700235P11	Ceramic: 6.8 pF ±0.25 pF, 50 VDCW.
C515	19A700235P12	Ceramic: 8.2 pF ±0.25 pF, 50 VDCW.
C516 and C517	19A700235P19	Ceramic: 33 pF ±5%, temp coef -150 PPM.
C518	19A700235P21	Ceramic: 47 pF ±5%, 50 VDCW.
C519 thru C521	19A702250P113	Polyester: .1 uF ±10%, 50 VDCW.
C522	19A700235P15	Ceramic: 15 pF ±5%, 50 VDCW.
C523	19A700235P30	Ceramic: 270 pF ±5%, 50 VDCW.
C524	19A700235P18	Ceramic, disc: 27 pF ±5%, 50 VDCW.
----- DIODES -----		
D501 and D502	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
----- COILS -----		
L501 and L502	19A700024P25	Coil, RF: 10.0 uH ±10%, 3.70 ohms DC res max.

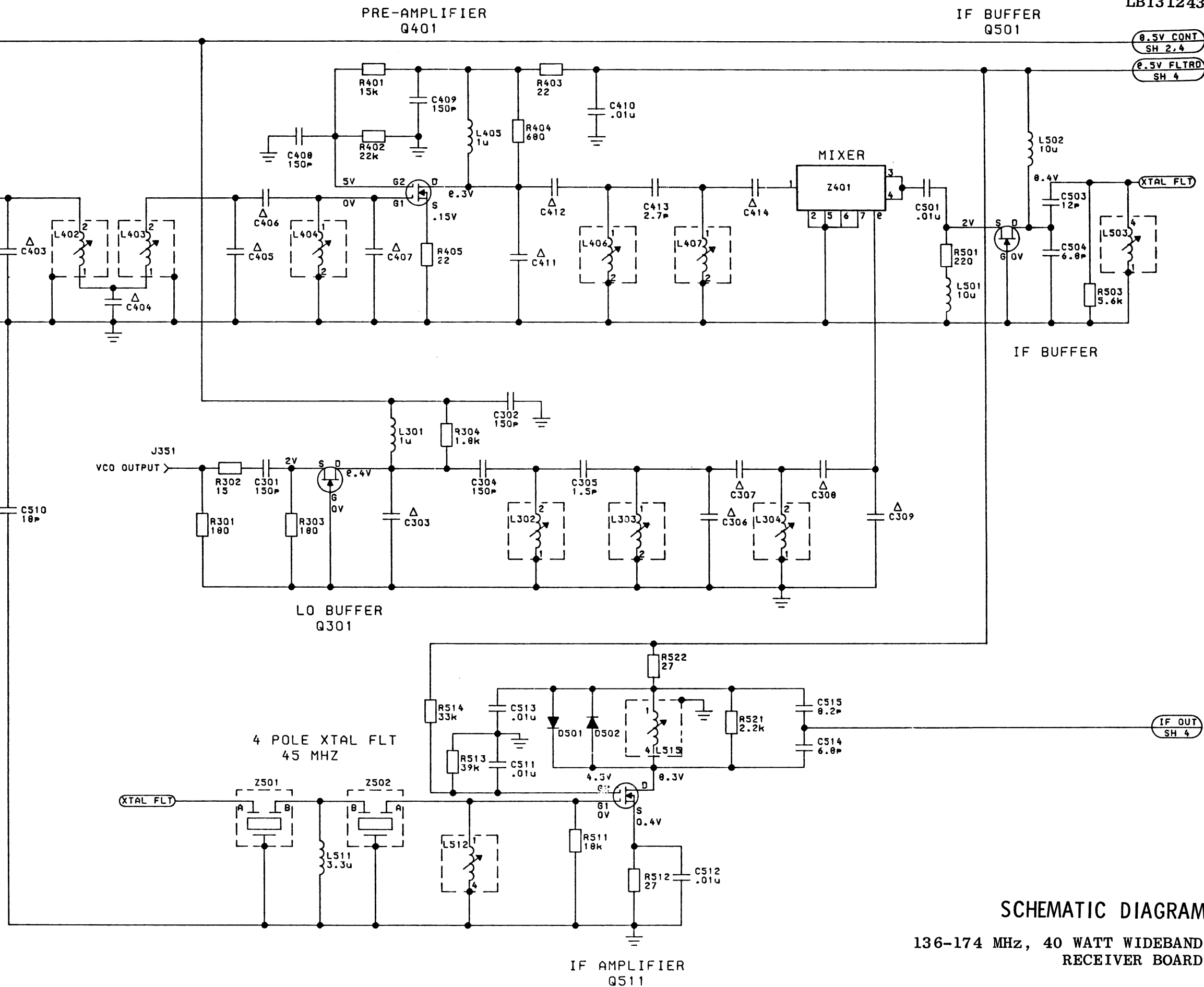
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SH 2,4

0.5V CONT
SH 2,4

0.5V FLTRD
SH 4

RX RF INPUT
SH 2

IF OUT
SH 4



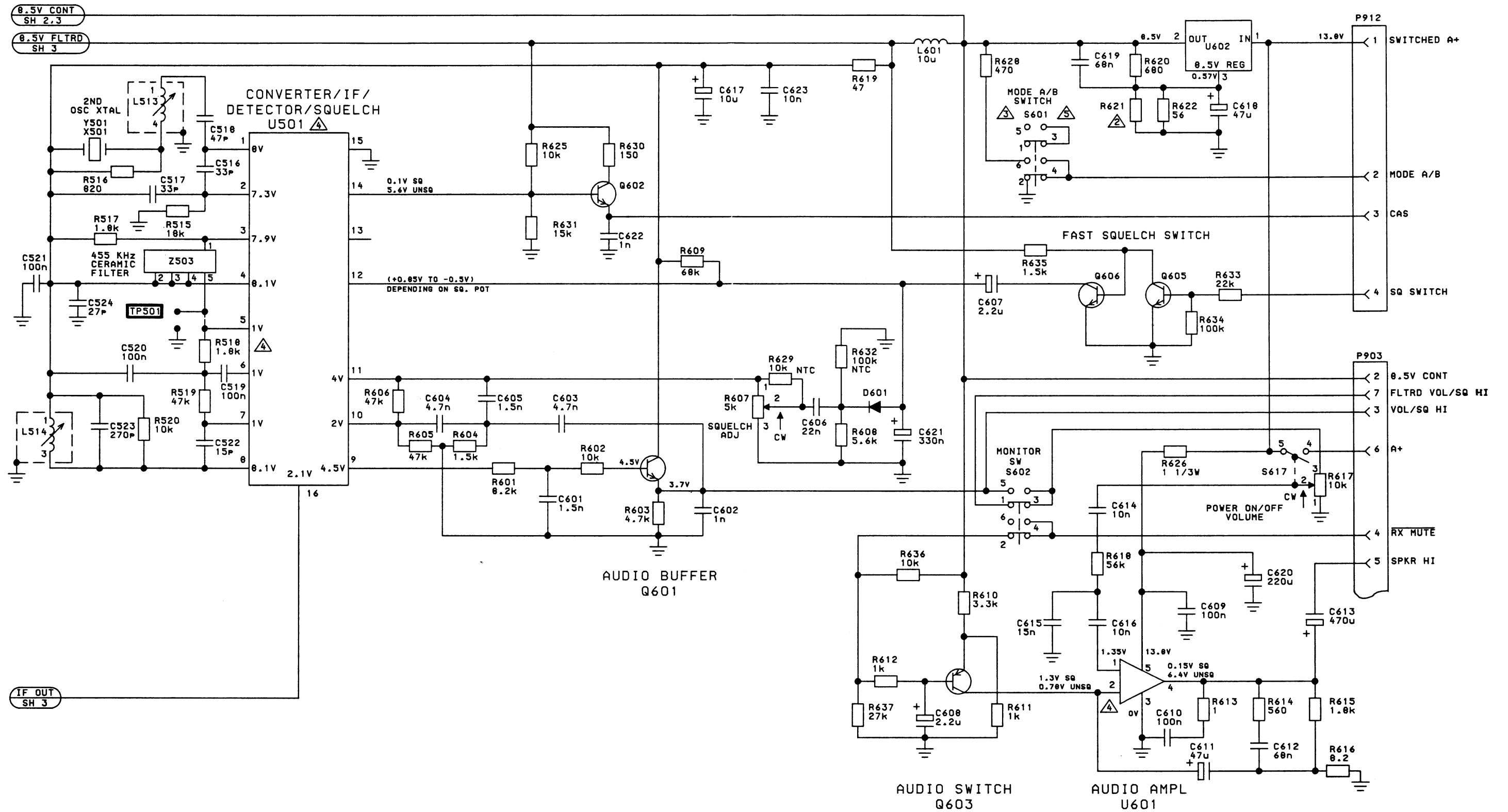
SCHEMATIC DIAGRAM

136-174 MHz, 40 WATT WIDEBAND
RECEIVER BOARD

SYMBOL	GE PART NO.	DESCRIPTION
L503	19A703311P2	Coil, RF: sim to TOKO AMERICA KON-K6672BA.
L511	19A700024P19	Coil, RF: 3.3 uH ±10%.
L512	19A703311P2	Coil, RF: sim to TOKO AMERICA KON-K6672BA.
L513	19A703311P1	Coil, RF: sim to TOKO AMERICAN KON-K6572BA.
L514	19B801023P1	Coil, RF: 450 uH ±6%, sim to TOKO AMERICAN 124LN-A064HM.
L515	19A703311P1	Coil, RF: sim to TOKO AMERICAN KON-K6572BA.
----- TRANSISTORS -----		
Q501	19A700060P2	N Type, field effect.
Q511	19A700075P1	N-CHANNEL, field effect. (MOS DUAL GATE).
----- RESISTORS -----		
R501	19A700019P29	Deposited carbon: 220 ohms ±5%, 1/4 w.
R503	19A700019P46	Deposited carbon: 5.6K ohms ±5%, 1/4 w.
R511	19A700019P52	Deposited carbon: 18K ohms ±5%, 1/4 w.
R512	19A700019P18	Deposited carbon: 27 ohms ±5%, 1/4 w.
R513	19A700019P56	Deposited carbon: 39K ohms ±5%, 1/4 w.
R514	19A700019P55	Deposited carbon: 33K ohms ±5%, 1/4 w.
R515	19A700019P52	Deposited carbon: 18K ohms ±5%, 1/4 w.
R516	19A700019P36	Deposited carbon: 820 ohms ±5%, 1/4 w.
R517 and R518	19A700019P40	Deposited carbon: 1.8K ohms ±5%, 1/4 w.
R519	19A700019P57	Deposited carbon: 47K ohms ±5%, 1/4 w.
R520	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R521	19A700019P41	Deposited carbon: 2.2K ohms ±5%, 1/4 w.
R522	19A700019P18	Deposited carbon: 27 ohms ±5%, 1/4 w.
----- INTEGRATED CIRCUITS -----		
U501	19A701780P1	Linear: IF AMPLIFIER AND DETECTOR.
----- SOCKETS -----		
X501	19A702742P1	Crystal socket (Quantity 2).
----- CRYSTALS -----		
Y501	19B233066G8	Crystal: freq range 44 to 58 MHz.
----- NETWORKS -----		
Z501A	19A702166G2	Crystal pair, quartz: 45 MHz reference frequency
Z501B		(Part of Z501A).
Z503	19B801021P2	Bandpass filter: 455 kHz ±1.5; sim to Murata CFW-455E.
RECEIVE AUDIO		
----- CAPACITORS -----		
C601	19A700234P2	Polyester: 1500 pF ±10%, 50 VDCW.
C602	19A700234P1	Polyester: 1000 pF ±10%, 50 VDCW.
C603 and C604	19A700234P5	Polyester: 4700 pF ±10%, 50 VDCW.
C605	19A700234P2	Polyester: 1500 pF ±10%, 50 VDCW.
C606	19A700234P9	Polyester: 0.022 uF ±10%, 50 VDCW.
C607 and C608	19A701534P5	Tantalum: 2.2 uF ±20%, 35 VDCW.
C609 and C610	19A702250P113	Polyester: .1 uF ±10%, 50 VDCW.
C611	19A701534P9	Tantalum: 47 uF ±20%, 6.3 VDCW.
C612	19A702250P112	Polyester: .068 uF ±10%, 50 VDCW; sim to NISSEI TYPE AMZ.

SYMBOL	GE PART NO.	DESCRIPTION
C613	19A701225P8	Electrolytic: 470 uF -10+75%, 16 VDCW; sim to Sprague 5002D477-G016DGC.
C614	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C615	19A700234P8	Polyester: .015 uF ±10%, 50 VDCW; sim to NISSEI AMXV or AMZV.
C616	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C617	19A703314P10	Electrolytic: 10 uF -10+50% tol, 50 VDCW; sim to Panasonic LS Series.
C618	19A703314P4	Electrolytic: 47 uF -10+50% tol, 16 VDCW; sim to Panasonic LS Series.
C619	19A702250P112	Polyester: .068 uF ±10%, 50 VDCW; sim to NISSEI TYPE AMZ.
C620	19A701225P3	Electrolytic: 220 uF, -10+50%, 25 VDCW.
C621	19A701534P12	Tantalum: .33 uF ±20%, 35 VDCW.
C622	19A700234P1	Polyester: 1000 pF ±10%, 50 VDCW.
C623	19A700234P7	Polyester: 0.01 uF ±10%, 50 VDCW.
----- DIODES -----		
D601	19A700028P1	Silicon, fast recovery: fwd current 75 mA, 75 PIV; sim to Type 1N4148.
----- INDICATORS -----		
H601	19A134354P1	Diode, optoelectronic: red; sim to Hewlett Packard 5082-4655.
----- COILS -----		
L601	19A700024P25	Coil, RF: 10.0 uH ±10%.
----- TRANSISTORS -----		
Q601 and Q602	19A700023P2	Silicon, NPN; sim to Type 2N3904.
Q603	19A700022P2	Silicon, PNP; sim to Type 2N3906.
Q604	19A134960P1	Silicon, PNP; sim to Type 2N4403.
Q605 and Q606	19A700023P2	Silicon, PNP; sim to Type 2N3906.
----- RESISTORS -----		
R601	19A700019P48	Deposited carbon: 8.2K ohms ±5%, 1/4 w.
R602	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R603	19A700019P45	Deposited carbon: 4.7K ohms ±5%, 1/4 w.
R604	19A700019P39	Deposited carbon: 1.5K ohms ±5%, 1/4 w.
R605 and R606	19A700019P57	Deposited carbon: 47K ohms ±5%, 1/4 w.
R607	19B800784P106	Variable: 5K ohms ±20%, 1/2 w.
R608	19A700019P46	Deposited carbon: 5.6K ohms ±5%, 1/4 w.
R609	19A700019P59	Deposited carbon: 68K ohms ±5%, 1/4 w.
R610	19A700019P43	Deposited carbon: 3.3K ohms ±5%, 1/4 w.
R611 and R612	19A700019P37	Deposited carbon: 1K ohms ±5%, 1/4 w.
R613	19A700019P1	Deposited carbon: 1 ohms ±5%, 1/4 w.
R614	19A700019P34	Deposited carbon: 560 ohms ±5%, 1/4 w.
R615	19A700019P40	Deposited carbon: 1.8K ohms ±5%, 1/4 w.
R616	19A700019P12	Deposited carbon: 8.2 ohms ±5%, 1/4 w.
R617	19A703313P1	Variable: 10K ohms ±20%, .1 watt.
R618	19A700019P58	Deposited carbon: 56K ohms ±5%, 1/4 w.
R619	19A700019P21	Deposited carbon: 47 ohms ±5%, 1/4 w.
R620	19A700019P35	Deposited carbon: 680 ohms ±5%, 1/4 w.
R621A	19A700019P30	Deposited carbon: 270 ohms ±5%, 1/4 w.
R621B	19A700019P25	Deposited carbon: 100 ohms ±5%, 1/4 w.

SYMBOL	GE PART NO.	DESCRIPTION
R621C	19A700019P21	Deposited carbon: 47 ohms ±5%, 1/4 w.
R621D	19A700019P17	Deposited carbon: 22 ohms ±5%, 1/4 w.
R621E	19A700019P11	Deposited carbon: 6.8 ohms ±5%, 1/4 w.
R622	19A700019P22	Deposited carbon: 56 ohms ±5%, 1/4 w.
R623	19A700019P33	Deposited carbon: 470 ohms ±5%, 1/4 w.
R624	19A700019P41	Deposited carbon: 2.2K ohms ±5%, 1/4 w.
R625	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R626	19A700019P1	Deposited carbon: 1 ohm ±5%, 1/3 w.
R627 and R628	19A700019P33	Deposited carbon: 470 ohms ±5%, 1/4 w.
R629	5490828P9	Thermal: 10K ohms ±10%; sim to Carborundum 551J-8.
R630	19A700019P27	Deposited carbon: 150 ohms ±5%, 1/4 w.
R631	19A700019P51	Deposited carbon: 15K ohms ±5%, 1/4 w.
R632	19A702161P2	Composition: 12K ohms ±5%, 1/4 w.
R633	19A700019P53	Deposited carbon: 22K ohms ±5%, 1/4 w.
R634	19A700019P61	Deposited carbon: 0.1M ohms ±5%, 1/4 w.
R635	19A700019P39	Deposited carbon: 1.5K ohms ±5%, 1/4 w.
R636	19A700019P49	Deposited carbon: 10K ohms ±5%, 1/4 w.
R637	19A700019P54	Deposited carbon: 27K ohms ±5%, 1/4 w.
----- SWITCHES -----		
S602	19B800563P3	Push: DPDT, contacts rated 15 mA at 130 VDC; sim to IEEE/SCHADOW 51203.
S617		(Part of R617).
----- INTEGRATED CIRCUITS -----		
U601	19A701830P1	Linear, Audio AMPLIFIER; sim to TDA 2003.
U602	19A138414G1	Regulator: 8.5 V.
INTERCONNECT		
----- PLUGS -----		
P901	19A116659P15	Connector, printed wiring: 4 contacts rated at 5 amps; sim to Molex 09-52-3042.
P903	19A116659P83	Connector, printed wiring: 7 contacts rated at 5 amps; sim to Molex 09-52-3072 SPECIAL.
P912	19A116659P15	Connector, printed wiring: 4 contacts rated at 5 amps; sim to Molex 09-52-3042.
----- PLUGS -----		
P201	19A702104P1	Receptacle: 2 positions, shorting, rated @ 3 amps; sim to Berg 65474-002.
----- TRANSISTORS -----		
Q202	19A701891P2	Silicon, NPN, UHF Amplifier: 15 watt, 12.5 v.
Q203	19A134340P4	Silicon, NPN, UHF Amplifier: 45 watt.
Q204	19A116375P1	Silicon, NPN.
----- SWITCHES -----		
S601	19B800563P1	Push, DPDT, 1 station, alternate action; sim to IEEE/Schadow 51281 (F2UEE).
----- MISCELLANEOUS -----		
19B800853P1		Shield, filter. (Located at L216).
19A701332P4		Insulator, washer: nylon. (Used with Q103).
19B232901P1		Support. (Mounts U601 & U602).
19A700115P3		Insulator, plate. (Used with Q204 and U602).
19A700068P1		Insulator, bushing. (Used with U602).
19A701743P1		Pad. (Located behind S601 & S602 knobs).
19C328587P1		Pushbutton. (Used with S602).



SCHEMATIC DIAGRAM

136-174 MHz, 40 WATT WIDEBAND RECEIVER BOARD

(19D900974, Sh. 4, Rev. 7)

SYMBOL	GE PART NO.	DESCRIPTION
	NP280878P17	Nameplate. (MONITOR).
	NP280878P15	Nameplate. (MODE A-B).
	19A700032P1	Lockwasher, internal tooth: No. 2. (Secures R617).
	19A701312P2	Flatwasher, metric: steel. (Secures R617).
	19C851075P1	Knob. (R617).
	19A703313P2	Screw. (Secures R617 knob).
	19A701516P2	Insulator, plate. (Quantity 2 - Used with Z501).
	19A116022P1	Insulator, plate. (Used with Q204).
	19A701093P4	Strap. (Located on Q202 mounting screw).
	19A701706P1	Heat sink. (Q202).

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. - 136-174 MHz Wideband-Transmit/Receive Board 19D900970G1,3

To improve operation of the Power Control Circuit, to incorporate squelch switch circuit, to assure compatibility with dual priority scan, to improve operation of audio amplifier, and to facilitate manufacturing. The following components were changed: C120, C231B, C232B, C234, C235, C606-C608, C610, C621, D101, L210A, R119, R125, R126, R512, R608, R609, R611, R612, R633, R635, Q105, Q106 and Q601-Q603. The following components were added: C510, C524, D203, L214B, L217B, Q605, Q606, R206 and R632-R637. R127 was deleted.

Part numbers for the changed components were:

C120 was: 19A701624P14 - Ceramic disc: 18 pF $\pm 5\%$, 500 VDCW, temp coef 0 PPM ± 30 . (Used in G1).

C231B was: 19A701624P19 - Ceramic, disc: 30 pF $\pm 5\%$, 500 VDCW, temp coef 0 PPM ± 30 . (Used in G1).

C232B was: 19A701624P11 - Ceramic, disc: 13 pF $\pm 5\%$, 500 VDCW, temp coef 0 PPM ± 30 . (Used in G3).

C606 was: 19A700234P8 - Polyester: 0.15 uF $\pm 10\%$, 50 VDCW; sim to NISSEI AMXV or AMZV.

C607 was: 19A701534P4 - Tantalum: 1 uF $\pm 20\%$, 35 VDCW.

C610 was: 19A701534P3 - Tantalum: 0.47 uF $\pm 20\%$, 35 VDCW.

C621 was: 19A701534P13 - Tantalum: .68 uF $\pm 20\%$, 35 VDCW.

D101 was: 19A700025P11 - Silicon, Zener: 400 mW max; sim to BZX55-C12.

L210A was: 19A701421P3 - Coil. (Used in G1).

Q105/Q106/Q601/Q602 was: 19A700023P1 - Silicon, NPN; sim to Type 2N3904.

Q603 was: 19A700022P1 - Silicon, PNP; sim to Type 2N3906.

R119 was: 19A700019P37 - Deposited carbon: 1K ohms $\pm 5\%$, 1/4 w.

R125 was: 19A700019P49 - Deposited carbon: 10K ohms $\pm 5\%$, 1/4 w.

R126 was: 19A700019P37 - Deposited carbon: 1K ohm $\pm 5\%$, 1/4 w.

R127 was: 19A700019P51 - Deposited carbon: 15K ohms $\pm 5\%$, 1/4 w.

R512 was: 19A700019P25 - Deposited carbon: 100 ohms $\pm 5\%$, 1/4 w.

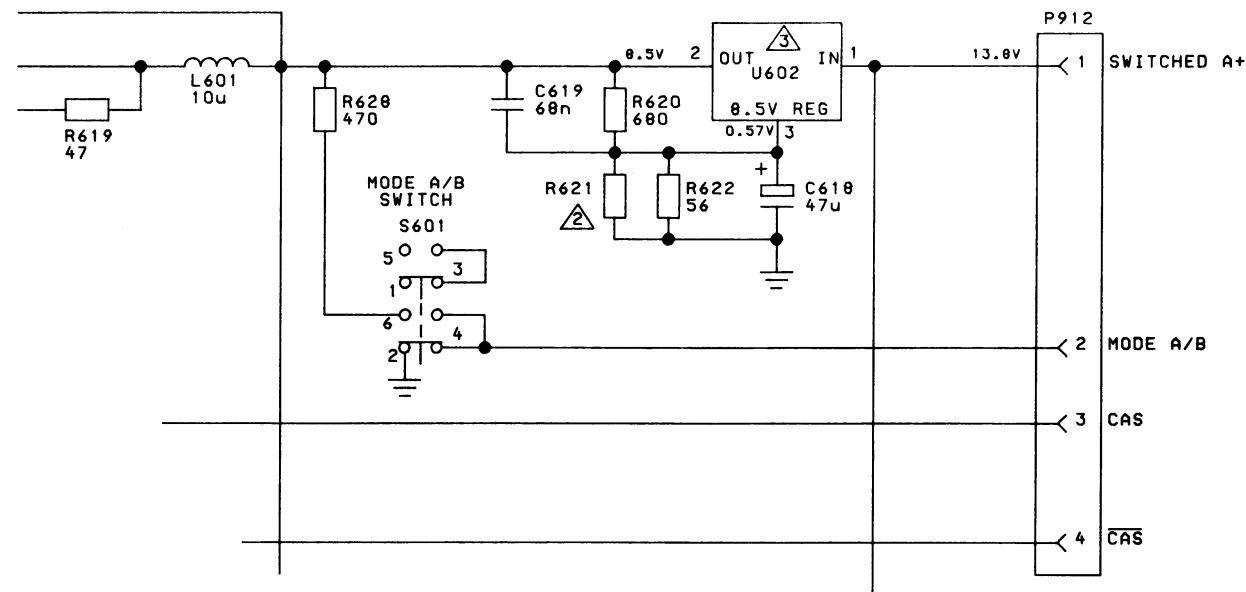
R608 was: 19A700019P47 - Deposited carbon: 6.8K ohms $\pm 5\%$, 1/4 w.

R609 was: 19A700019P60 - Deposited carbon: 82K ohms $\pm 5\%$, 1/4 w.

R611 was: 19A700019P44 - Deposited carbon: 3.9K ohms $\pm 5\%$, 1/4 w.

R612 was: 19A700019P29 - Deposited carbon: 220 ohms $\pm 5\%$, 1/4 w.

Old Schematic Diagram was:



ADDENDUM NO.1 TO LBI31243B

This addendum describes Revision Letter changes that are not yet included in the publication.

REV.B- 136-174 MHZ 40 WATT TRANSMIT/RECEIVE BOARD 19D900970G1

To increase RF Power output. Changed C216. The new part number for C216 is:
C216- 19A701624P22; Ceramic disc: 39pF +5%, 500vdcw., temp coef 0 ppm +30.

ADDENDUM NO.2 TO LBI31243B

This addendum describes Revision Letter changes that are not yet included in the publication.

REV.B- 136-174 MHZ 40 WATT TRANSMIT/RECEIVE BOARD 19D900470G3

REV.C- 136-174 MHZ 40 WATT TRANSMIT/RECEIVE BOARD 19D900470G1

To improve transmitter operation when operating under reduced power.
Changed C129A to 18pF in group 1 boards and C235 to 0.1uF in group 3 boards.

New part numbers are:

C129A- 19A701624P14- Ceramic disc: 12 pF +5%, 500vdcw, temp coef. 0 ppm +30
(used in group 1).

C235- 19A7022509113- Polyester: 0.1uF +10%, 50 vdcw.