ERICSSON

Mobile Communications

150-174 MHz, 110 WATT POWER
AMPLIFIER 19D901865G1

136-174 MHz, 40 WATT POWER
AMPLIFIER 19D901865G2,3

Maintenance Manual

ERICSSON

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LBI-38128

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DESCRIPTION

The PA assembly uses five RF power transistors to provide 110 watts of output power, or 3 RF transistors to provide 40 watts of output power. The output power is adjustable over a range of 55 to 110 watts in the high power PA, and 20 to 40 watts in the medium power PA. Five transistors are used in the power control circuit.

Supply voltage for the PA is connected from power leads on the Transmit-Receive-System (TRS) board through feedthrough capacitors A2-C1 and C2 to hole 11 (A-) and hole 12 (A+) on the PA board. C52, C53, and L23, and L24 prevent RF from getting on the power leads. Diode D5 will cause the main fuse in the fuse assembly to blow if the polarity of the power leads is reversed.

The PA assembly is insulated from vehicle ground by C33 through C44 to permit operation in positive or negative ground vehicles.

PA metering Jack J1 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12 with a cable adaptor. The Test Set meters the RF drive (exciter output), control voltage driver current, PA current and PA voltage.

NOTE

In positive ground vehicles, A- is "hot" with respect to vehicle ground. Shorting the transmitter PA printed wiring board ground pattern to the radio case may cause one of the in-line fuses to blow.

CIRCUIT ANALYSIS

RF AMPLIFIERS

The exciter output is coupled through P101 on the TRS board to PA input jack J3. The RF is coupled through a 50 ohm stripline (Z5) and then through T1, stripline Z6, L1 and Z7 to the base of 1st RF Driver Q1.

Part of the RF is rectified by D1 and applied to RF Switch Q13 to activate the power control circuitry. Part of the DC voltage is applied to voltage dividers R1 and R2 for metering the exciter output at J1.

The RF amplifiers consist of three Class C, common-emitter amplifiers. In 40 watt transmitters, Q3 is the PA stage. R17, L12 and L42 are a stabilizing network in the base of Q3. The output of Q3 is coupled through 50 ohm coaxial cable W6 to the low pass filter and then to the antenna relay.

Driver current is metered at J1 (Driver Current). The reading is taken on the one-volt scale with the High Sensitivity button pressed, and with the meter polarity switch in the minus (-) position. The meter is read as 15 amperes full scale. Jumpers W3, W5 and W7 act as shunt resistors for the metering circuit.

In 110 watt transmitters, the 40 watt output is coupled through jumper W1 to a Wilkinson power splitter consisting of C57, C59, L26, L27 and Z1.

The power amplifier stages consist of two identical paralleled Class C power amplifiers (Q5 and Q6).

L30, L32, R24 and C63 make up a stabilizing network in the base of Q5, while L31, L33, R25 and C68 make up the stabilizing network in the base of Q6. Supply voltage (A+) for Q5 and Q6 is coupled through collector feed networks Z3 and Z4.

Collector current for Q5 and Q6 is measured at J1 (PA Current). The reading is taken on the one-volt scale with the high sensitivity button pressed and the polarity switch in the minus (-) position. The current is read as 30 amperes full scale.

The output of Q5 and Q6 is applied to a Wilkinson power combiner consisting of C78, L40, Z2, L41 and C79. The output of the combiner is coupled through T2 and two 50 ohm striplines (Z16 and Z17) to the low pass filter. The filter output is coupled through 50 ohm stripline to Z18 to the antenna relay (K1).

WARNING

The RF Power Transistors used in the transmitter contain Beryilium Oxide, A TOXIC substance. If the ceramic, or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Use care in replacing transistors of this type.

POWER CONTROL CIRCUIT

The power control circuit provides power leveling as well as thermal protection for the PA.

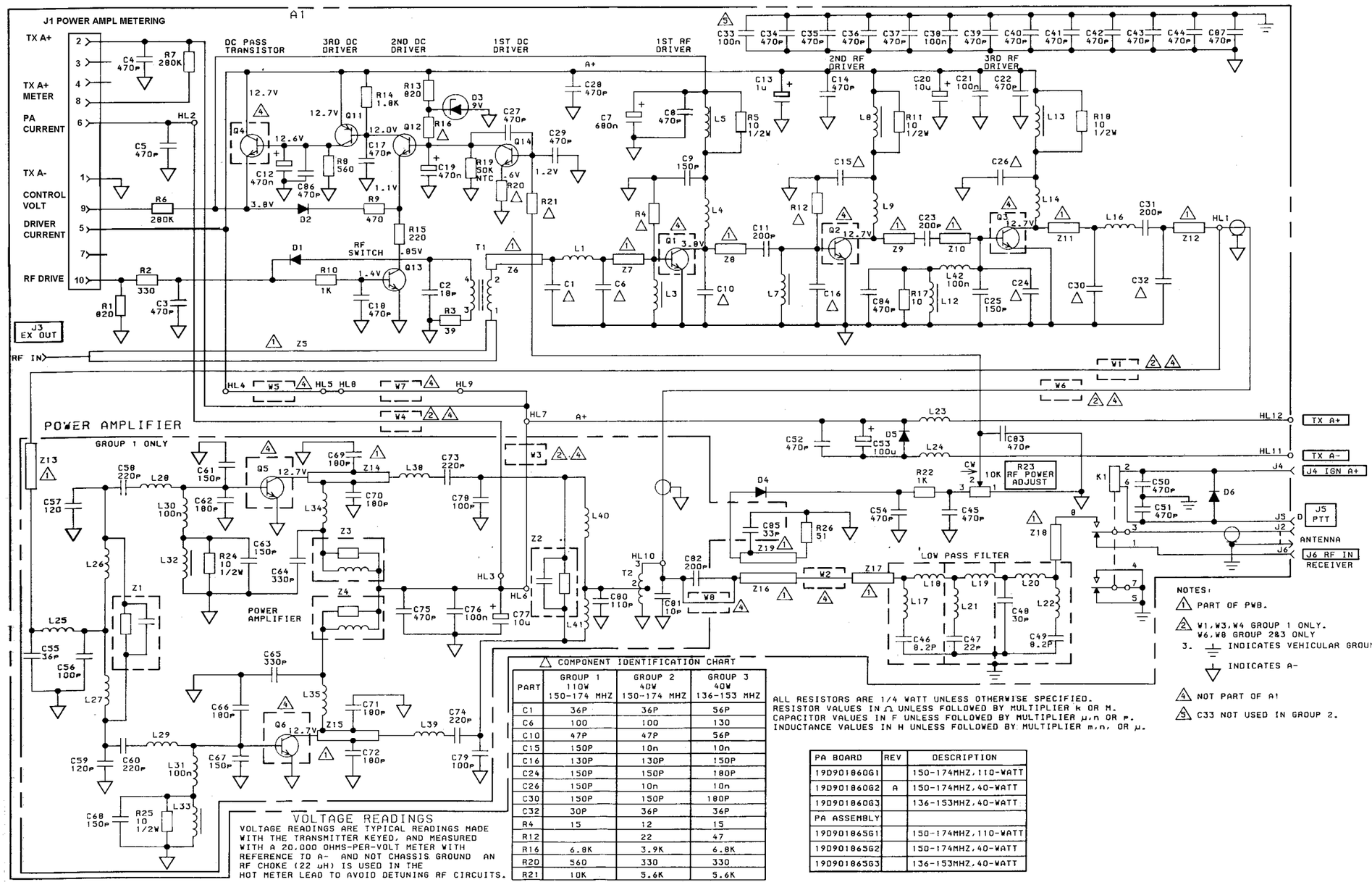
When the transmitter is keyed, RF is rectified by D1. The resulting DC turns on RF switch Q13. This allows Q11, Q12 and pass transistor Q4 to turn on. Turning on Q4 applies collector voltage to 1st RF driver Q1.

If the power output should start to increase above the level set by R23, Q14 will start to conduct. This causes Q12, Q11 and Q13 to conduct less, reducing the collector voltage to the 1st RF driver.

Thermal protection is provided by temperature compensating resistor R19. As the heat sink temperature rises above 70^{o}C, the resistance of R19 decreases. This causes Q3, Q11, and Q12 to conduct less, reducing the power output.

CAUTION

Do not operate the transmitter at levels higher than rated output. Operating at higher than rated output will shorten the life of the RF power transistor.



VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MADE WITH THE TRANSMITTER KEYED, AND MEASURED WITH A 20,000 OHMS-PER-VOLT METER WITH REFERENCE TO A- AND NOT CHASSIS GROUND AN RF CHOKE (22 uH) IS USED IN THE HOT METER LEAD TO AVOID DETUNING RF CIRCUITS.

COMPONENT IDENTIFICATION CHART

PART	GROUP 1 110W 150-174 MHZ	GROUP 2 40W 150-174 MHZ	GROUP 3 40W 136-153 MHZ
C1	36P	36P	56P
C6	100	100	130
C10	47P	47P	56P
C15	150P	10n	10n
C16	130P	130P	150P
C24	150P	150P	180P
C26	150P	10n	10n
C30	150P	150P	180P
C32	30P	36P	36P
R4	15	12	15
R12		22	47
R16	6.8K	3.9K	6.8K
R20	560	330	330
R21	10K	5.6K	5.6K

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,n, OR µ.

PA BOARD	REV	DESCRIPTION
19D901860G1		150-174MHZ,110-WATT
19D901860G2	A	150-174MHZ,40-WATT
19D901860G3		136-153MHZ,40-WATT
PA ASSEMBLY		
19D901865G1		150-174MHZ,110-WATT
19D901865G2		150-174MHZ,40-WATT
19D901865G3		136-153MHZ,40-WATT

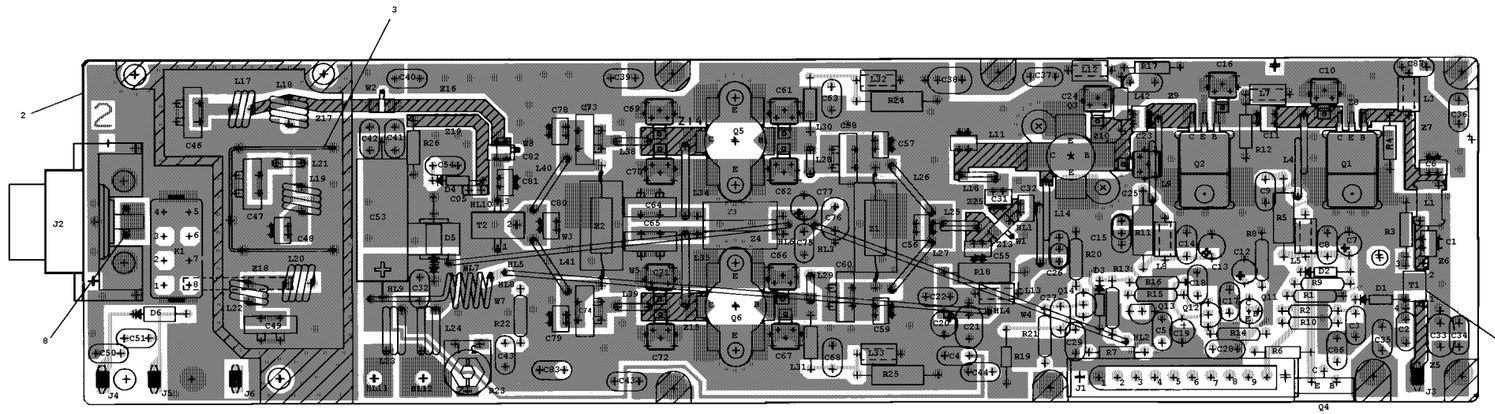
POWER AMPLIFIER

19D901861

LEAD IDENTIFICATION
FOR ALL TRANSISTORS
NOT OTHERWISE IDENTIFIED

IN-LINE
TOP VIEW

NOTE: CASE SHAPE IS DETERMINING
FACTOR FOR LEAD IDENTIFICATION.



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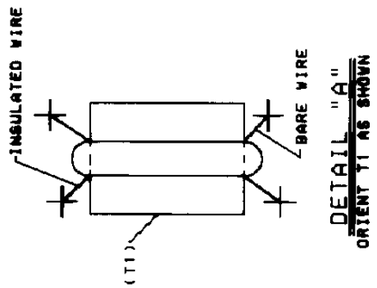
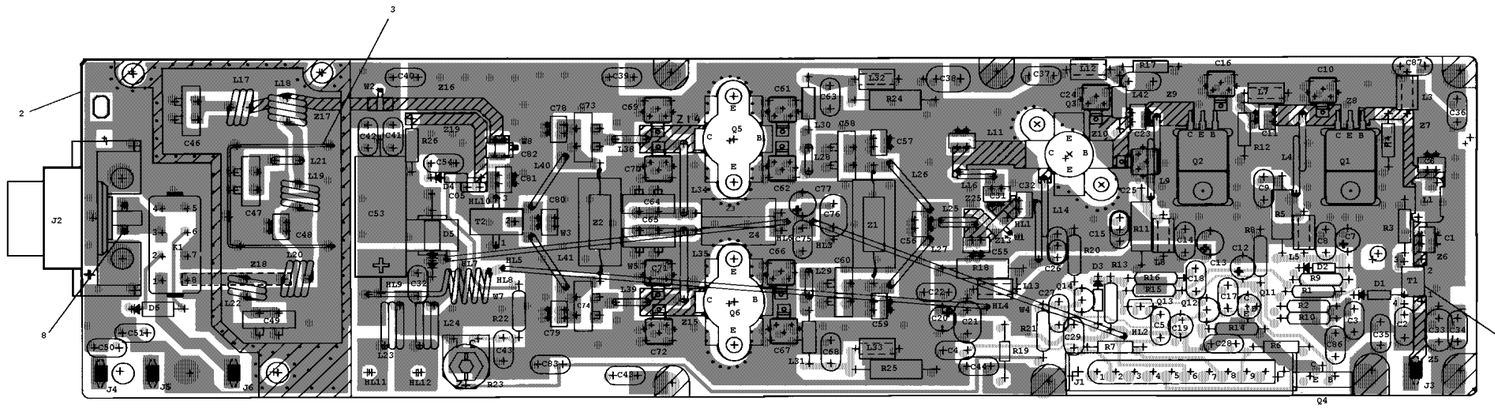


DETAIL "A"
ORIENT T1 AS SHOWN



POWER AMPLIFIER BOARD
19D901860G1-G3

PARTS LIST

POWER AMPLIFIER ASSEMBLY

19D901865G1 150-174 MHz, 110 WATT
19D901865G2 150-174 MHz, 40 WATT
19D901865G3 136-153 MHz, 40 WATT

ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
A1		POWER AMPLIFIER BOARD 19D901860G1 150-174 MHz, 110 WATT 19D901860G2 150-174 MHz, 40 WATT 19D901860G3 136-153 MHz, 40 WATT
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A701413P22	Mica: 36 pF ±5%, 100 VDCW. (Used in G1 and G2).
C1	19A701413P28	Mica: 56 pF ±5%, 100 VDCW. (Used in G3).
C2	19A701624P314	Ceramic, disc: 18 pF ±5%, 500 VDCW, temp coef M220 PPM ±30/°C.
C3 and C4	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C5	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW: sim to JF Discap. (Used in G1).
C6	19A701413P34	Mica: 100 pF ±5%, 100 VDCW. (Used in G1 and G2).
C6	19A701413P37	Mica: 130 pF ±5%, 100 VDCW. (Used in G3).
C7	19A701534P13	Tantalum: .68 uF ±20%, 35 VDCW.
C8	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C9	19A701602P8	Ceramic: 150 pF ±10%, 1000 VDCW.
C10	19A700006P26	Mica: 47 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G1 and G2).
C10	19A700006P28	Mica: 56 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G3).
C11	19A701413P43	Mica: 200 pF ±5%, 100 VDCW.
C12	19A701534P3	Tantalum: 0.47 uF ±20%, 35 VDCW.
C13	19A703314P6	Electrolytic: 1 uF -10+50% tol, 50 VDCW; sim to Panasonic LS Series.
C14	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C15	19A701602P8	Ceramic: 150 pF ±10%, 1000 VDCW. (Used in G1).
C15	19A700121P2	Ceramic: 0.01 uF ±20%, 50 VDCW. (Used in G2 and G3).
C16	19A700006P37	Mica: 130 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G1 and G2).
C16	19A700006P38	Mica: 150 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G3).
C17 and C18	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C19	19A701534P3	Tantalum: 0.47 uF ±20%, 35 VDCW.
C20	19A703314P10	Electrolytic: 10 uF -10+50%, 50 VDCW; sim to Panasonic LS Series.
C21	19A702250P113	Polyester: 0.1 uF ±10%, 50 VDCW.
C22	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C23	19A701413P43	Mica: 200 pF ±5%, 100 VDCW.
C24	19A700006P38	Mica: 150 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G1 and G2).
C24	19A700006P41	Mica: 180 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G3).
C25	19A700006P38	Mica: 150 pF ±5%, 100 VDCW; sim to Underwood 3HS0020.
C26	19A701602P8	Ceramic: 150 pF ±10%, 1000 VDCW. (Used in G1).
C26	19A700121P2	Ceramic: 0.01 uF ±20%, 50 VDCW. (Used in G2 and G3).
C27 thru C29	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C30	19A701413P38	Mica: 150 pF ±5%, 100 VDCW. (Used in G1 and G2).
C30	19A701413P41	Mica: 180 pF ±5%, 100 VDCW. (Used in G3).
C31	19A701413P43	Mica: 200 pF ±5%, 100 VDCW.
C32	19A701413P20	Mica: 30 pF ±5%, 100 VDCW. (Used in G1).
C32	19A701413P22	Mica: 36 pF ±5%, 100 VDCW. (Used in G2 and G3).
C33	19A702250P113	Polyester: 0.1 uF ±10%, 50 VDCW.
C34 thru C37	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C38	19A702250P113	Polyester: 0.1 uF ±10%, 50 VDCW.
C39 thru C45	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C46	19A700015P3	Teflon/Mica: 8.2 pF ±5%, 250 VDCW.
C47	19A700015P12	Teflon/Mica: 22 pF ±5%, 250 VDCW.
C48	19A701413P20	Mica: 30 pF ±5%, 100 VDCW.
C49	19A700015P3	Teflon/Mica: 8.2 pF ±5%, 250 VDCW.
C50 thru C52	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C53	19A700064P4	Electrolytic: 100 uF, -10+150%, 250 VDCW.
C54	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C55	19A701413P22	Mica: 36 pF ±5%, 100 VDCW. (Used in G1).
C56	19A701413P34	Mica: 100 pF ±5%, 100 VDCW. (Used in G1).
C57	19A701413P36	Mica: 120 pF ±5%, 100 VDCW. (Used in G1).
C58	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW. (Used in G1).
C59	19A701413P36	Mica: 120 pF ±5%, 100 VDCW. (Used in G1).
C60	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW. (Used in G1).
C61	19A700006P38	Mica: 150 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G1).
C62	19A700006P41	Mica: 180 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G1).
C63	19A701602P8	Ceramic: 150 pF ±10%, 1000 VDCW. (Used in G1).
C64 and C65	19A700015P41	Teflon/Mica: 330 pF ±5%, 250 VDCW. (Used in G1).
C66	19A700006P41	Mica: 180 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G1).
C67	19A700006P38	Mica: 150 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G1).
C68	19A701602P8	Ceramic: 150 pF ±10%, 1000 VDCW. (Used in G1).
C69 thru C72	19A700006P41	Mica: 180 pF ±5%, 100 VDCW; sim to Underwood 3HS0020. (Used in G1).
C73 and C74	19A700015P37	Teflon/Mica: 220 pF ±5%, 250 VDCW. (Used in G1).
C75	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap. (Used in G1).
C76	19A702250P113	Polyester: 0.1 uF ±10%, 50 VDCW. (Used in G1).
C77	19A703314P10	Electrolytic: 10 uF -10+50%, 50 VDCW; sim to Panasonic LS Series. (Used in G1).
C78 and C79	19A701413P34	Mica: 100 pF ±5%, 100 VDCW. (Used in G1).
C80	19A701413P35	Mica: 110 pF ±5%, 100 VDCW. (Used in G1).
C81	19A701413P6	Mica: 10 pF ±5%, 100 VDCW. (Used in G1).
C82	19A701413P43	Mica: 200 pF ±5%, 100 VDCW. (Used in G1).
C83 and C84	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
C85	19A700219P46	Ceramic: 33 pF ±10%, 100 VDCW, temp coef 0 PPM/°C. (Used in G1).
C86 and C87	19A701602P13	Ceramic: 470 pF ±20%, 1000 VDCW; sim to JF Discap.
		- - - - - - - - - - DIODES - - - - - - - - - -
D1	19A700047P2	Silicon: 100 mW; sim to DO-15.
D2	19A700028P1	Silicon: 75 mA, 75 PIV; sim to 1N4148.
D3	19A700025P16	Silicon, zener: 400 mA max; sim to BZX55-C9V1.
D4	19A700028P1	Silicon: 75 mA, 75 PIV; sim to 1N4148. (Used in G1).
D4	19A700047P2	Silicon: 100 mW; sim to DO-15. (Used in G2 and G3).
D5	19A700082P1	Silicon: Rectifier; sim to MR751. (Used in G1).
D5	T324ADP1041	Silicon: Rectifier; sim to 1N4004. (Used in G2 and G3).
D6	T324ADP1041	Silicon: Rectifier; sim to 1N4004.
		- - - - - - - - - - JACKS - - - - - - - - - -
J1	19B800555G3	Connector: Metering Block. Includes 10 19A700237P1 contacts.
J2	19A701854G1	Coax: sim to Amphenol 83-87601002.
J3 thru J6	19A701883P4	Contact, electrical; sim to AMP 86444-1.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1	19A700061P1	Hermetic sealed: 180 to 341 ohms coil resistance, 8-16.3 Vdc; sim to GE 3SAV1760A2, CP Clare HFM-1201558, or Potter-Brumfield HCM6160.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19J706085P1	Coil, choke: 0.822 uH ±30%; sim to Paul Smith LM-2.
L3	19A701091G1	Coil. Includes 19A700122P1 Torroidal core.
L4	19A701848P1	Coil.
L5	19A701091G1	Coil. Includes 19A700122P1 Torroidal core.
L7 and L8	19A701091G1	Coil. Includes 19A700122P1 Torroidal core.
L9	19A701848P1	Coil.
L12 and L13	19A701091G1	Coil. Includes 19A700122P1 Torroidal core.
L14	19A701848P1	Coil.
L16	19A702201P1	Coil.
L17	19A701418P3	Coil.
L18 thru L20	19A701419P3	Coil.
L21	19A701420P5	Coil.
L22	19A701418P3	Coil.
L23 and L24	19A701849P1	Coil.
L25	19A702201P1	Coil. (Used in G1).
L26 and L27	19A701851P1	Coil. (Used in G1).
L28 and L29	19A701420P3	Coil. (Used in G1).
L30 and L31	19A700024P1	Coil, RF: 100 nH ±10%, 100 v. (Used in G1).
L32 and L33	19A701091G1	Coil. (Used in G1).
L34 and L35	19A701852P1	Coil. (Used in G1).
L38 and L39	19A701420P4	Coil. (Used in G1).
L40 and L41	19A701851P1	Coil. (Used in G1).
L42	19A700024P1	Coil, RF: 100 nH ±10%, 100 v.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A701891P1	Silicon, NPN: VHF Amplifier, 5 watt.
Q2	19A701891P4	Silicon, NPN: VHF Amplifier, 14.5 watt.
Q3	19A704867P1	Silicon, NPN: 50 watt, VHF Amplifier.
Q4	19A700054P1	Silicon, NPN: 60 watt; sim to BD-201.
Q5 and Q6	19A134387P1	Silicon, NPN. (Used in G1).
Q11	19A700020P1	Silicon, PNP: 500 mW; sim to BC558A.
Q12 thru Q14	19A700023P2	Silicon, NPN: sim to 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	H212CRP182C	Deposited carbon: 820 ohms ±5%, 1/4 w.
R2	H212CRP133C	Deposited carbon: 330 ohms ±5%, 1/4 w.
R3	19A700106P29	Composition: 39 ohms ±5%, 1/4 w.
R4*	19A700106P17	Composition: 12 ohms ±5%, 1/4 w. (Used in G2).
R4	19A700106P19	Composition: 15 ohms ±5%, 1/4 w. (Used in G1 and G3).
R5	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
R6 and R7	19A701250P444	Metal film: 280K ohms ±1%, 1/4 w.
R8	H212CRP156C	Deposited carbon: 560 ohms ±5%, 1/4 w.
R9	H212CRP147C	Deposited carbon: 470 ohms ±5%, 1/4 w.
R10	H212CRP210C	Deposited carbon: 1K ohms ±5%, 1/4 w.
R11	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
R12	19A700106P31	Composition: 47 ohms ±5%, 1/4 w. (Used in G3).
R12*	19A700106P23	Composition: 22 ohms ±5%, 1/4 w. (Used in G2).
R13	H212CRP182C	Deposited carbon: 820 ohms ±5%, 1/4 w.
R14	H212CRP218C	Deposited carbon: 1.8K ohms ±5%, 1/4 w.
R15	H212CRP122C	Deposited carbon: 220 ohms ±5%, 1/4 w.
R16	H212CRP268C	Deposited carbon: 6.8K ohms ±5%, 1/4 w. (Used in G1 and G3).
R16	H212CRP239C	Deposited carbon: 3.9K ohms ±5%, 1/4 w. (Used in G2).
R17	19A700106P15	Composition: 10 ohms ±5%, 1/4 w.
R18	19A700113P15	Composition: 10 ohms ±5%, 1/2 w.
R19	19A701864P2	Thermistor: 50K ohms ±10%; sim to Midwest Components 1H-503.
R20	H212CRP156C	Deposited carbon: 560 ohms ±5%, 1/4 w. (Used in G1).
R20	H212CRP133C	Deposited carbon: 330 ohms ±5%, 1/4 w. (Used in G2 and G3).
R21	H212CRP310C	Deposited carbon: 10K ohms ±5%, 1/4 w. (Used in G1).
R21	H212CRP256C	Deposited carbon: 5.6K ohms ±5%, 1/4 w. (Used in G2 and G3).
R22	H212CRP210C	Deposited carbon: 1K ohms ±5%, 1/4 w.
R23	19B800784P108	Variable: 10K ohms ±20%, 1/2 w.
R24 and R25	19A700113P15	Composition: 10 ohms ±5%, 1/2 w. (Used in G1).
R26	19A700106P32	Composition: 51 ohms ±5%, 1/4 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1	19A702009G1	Coil. Includes: 19B800630P2 tuning slug.
T2	19A701878G1	Coil. (Used in G1).
		- - - - - - - - - - CABLES - - - - - - - - - -
W1 thru W8		Part of Printed Wire Board.
W1	19A701093P1	Strap. (Used in G1).
W2	19A701093P1	Strap.
W3	19A701851P2	Jumper. (Used in G1).
W4	19A701851P3	Jumper. (Used in G1).
W5	19A701851P4	Jumper.
W6	19A702075G1	Cable. (Used in G2 and G3).
W7	19A701871P2	Cable.
W8	19A701093P1	Strap. (Used in G2 and G3).
		- - - - - - - - - - FILTERS - - - - - - - - - -
Z1 and Z2	19A702003G1	Load Network. (Used in G1).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
Z3 and Z4	19A701092G4	Filter Assembly. (Used in G1).
Z5 thru Z19		Part of Printed Wire Board.
		- - - - - - - - RF BOARD MISCELLANEOUS - - - - - - -
3	19B800675P1	Shield. (Used around C47, C48, L19, L21).
8	19A701309P1	Terminal. (Used with J2).
A2		**FEED-THRU CAPACITOR ASSEMBLY 19A703218G1**
		HANDLE LOCK ASSEMBLY 19D900349G3 LOW POWER 19D900349G4 HIGH POWER
	19C850627P1	Handle.
	19A700132P818	Dowel pin.
	19A701347P1	Lock pin.
	19A700140P2	Compression spring. (Used with lock pin).
	19C850941P1	Retainer ring. (Secures compression spring).
	19C850699G1	Lock Support.
	19A702362P408	Machine screw: M3.5-0.6 x 8.
	19B800004P5	Lock.
		- - - - - - - - - MISCELLANEOUS - - - - - - - - -
	19A702381P525	Screw, thd. form: No. M3.5-0.6 x 25. (Secures Low-pass filter housing).
	19D900262P1	Low-pass filter housing.
	19A700068P1	Insulator, bushing. (Used with Q4).
	19A700115P3	Insulator, plate. (Used with Q1 and Q2).
	19A704572P1	Eyelet. (Secures A2 to A1).
	19A705469P1	Insulator plate. (Used with Q4).
	19A701400P2	Insulated spacer. (At J4 - J6).
	19A701368P1	Gasket. (Used with J2).
	19A702381P510	Screw, thread forming: TORX DRIVE No. M3.5 - 0.6 x 10. (Secures J2).
	19A701093P4	Strap. (Used wdith Q1 and Q2).
	19A701706P1	Heat sink. (Used with Q1 and Q2).
	19A702381P508	Screw, thd. form: No. 3.5-0.6 x 8. (Secures A2 to frame).
	19A701983P1	Washer. (Used with Q1 and Q2).
	19A702364P208	Machine screw: TORX Drive, M2.5 - 0.45 x 8. (Secures Q3, Q5 and Q6).
	19A702364P210	Machine screw, metric: M2.5-.45 x 10. (Secures Q1 and Q2).
	19A701502P1	Plastic bumper.

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 the descriptions of parts affected by these revisions.

REV. A - POWER AMPLIFIER BOARD 19D901860G2
To improve transmitter stability, changed R4 from 15 ohms (19A700106P19) to 12 ohms (19A700106P17) and changed R12 from 47 ohms (19A700106P31) to 22 ohms (19A700106P23)