MAINTENANCE MANUAL
EXCITER/POWER AMPLIFIER
CAH-280
FOR
MLSL160 & MLSL260
TWO-WAY MOBILE RADIO COMBINATIONS

TABLE OF CONTENTS

DESCRIPTION

Exciter/PA Board CAH-280 (A803) for the MLS Low Band mobile radio combination provides 60 Watts of RF power in the 29.7 MHz to 42 MHz and 42 MHz to 50 MHz frequency ranges and mounts in the back and bottom of the radio frame assembly as shown in Figure 1. Circuit Board CAH-280A is for the 29.7 MHz to 42 MHz frequency range and Circuit Board CAH-280B is for the 42 MHz to 50 MHz frequency range. This Exciter/PA Board consists of an exciter circuit, a power amplifier circuit, antenna relay K1, a low pass filter, Automatic Power Control circuitry (APC), a voltage regulator and a 9-Volt transmitter switch circuit (refer to Figure 2 - Block Diagram).

CIRCUIT ANALYSIS

The transmitter consists of the frequency synthesizer and modulation circuits located on System Control/ Frequency Synthesizer Board CMC-385 plus the exciter/PA circuits, antenna relay, a low pass filter and a power control circuit located on the Exciter/PA Board (CAH-280). Supply voltage for the exciter is provided by EX9-Volts regulator IC101, also part of the Exciter/PA Board.

9-Volt Regulator

The 9-Volt regulator operates from the switched A+ line (13.6 volts). The regulator circuit consists of 9-volt regulator IC101 and EX9-Volt switch TR104. Switches are controlled by the TX ENB lead from the logic board.

When the TX ENB lead is activated (PTT keyed), transistor switch TR105 turns on and applies the regulated output of IC101 to exciter amplifier transistors TR101 and TR104.

Exciter

The exciter is a three stage RF amplifier consisting of an attenuator at the input, amplifier transistors TR101, TR102 and TR103 and a low pass filter on the output. The modulated RF signal from the System Control/Frequency Synthesizer Board is applied to the input of the attenuator circuit at P101. The attenuator circuit (R101 through R103) provides approximately 10 dB attenuation to the RF signal before it is applied to the base circuit of transistor TR101 (AMPL-1). The RF input is amplified to provide 100 milliwatts drive to Pre-Driver transistor TR1 of the 60 Watt power amplifier circuit.

60-Watt PA

The exciter output is coupled through coaxial cable P102 to PA input jack J1. The RF is coupled through an attenuator pad (R1, R2 and R3), impedance matching transformer T1 and frequency compensator circuit capacitor C2 and resistor R4 to the base of Pre- Driver transistor TR1. Inductor L1, resistors R5 and R6, and diode CD1 set the bias voltage for TR1. Capacitor C3 and resistor R5 provide negative feed back to improve the stability of TR1. Collector voltage on TR1 is controlled by the Power Control Circuit and is applied through a decoupling network consisting of capacitors C11, C12, C13 and inductor L2.

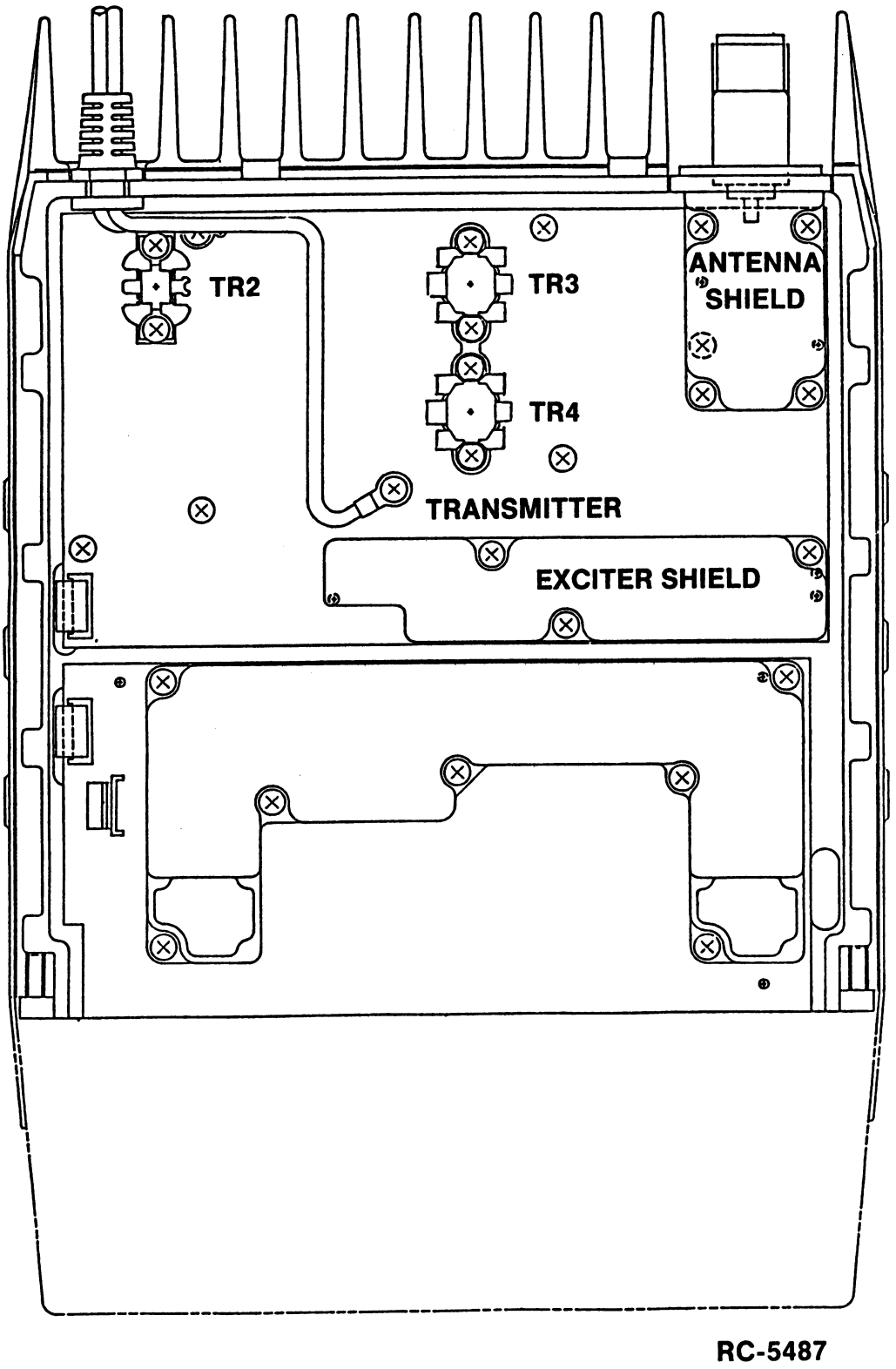

Figure 1 - Exciter/PA Location (Bottom View)

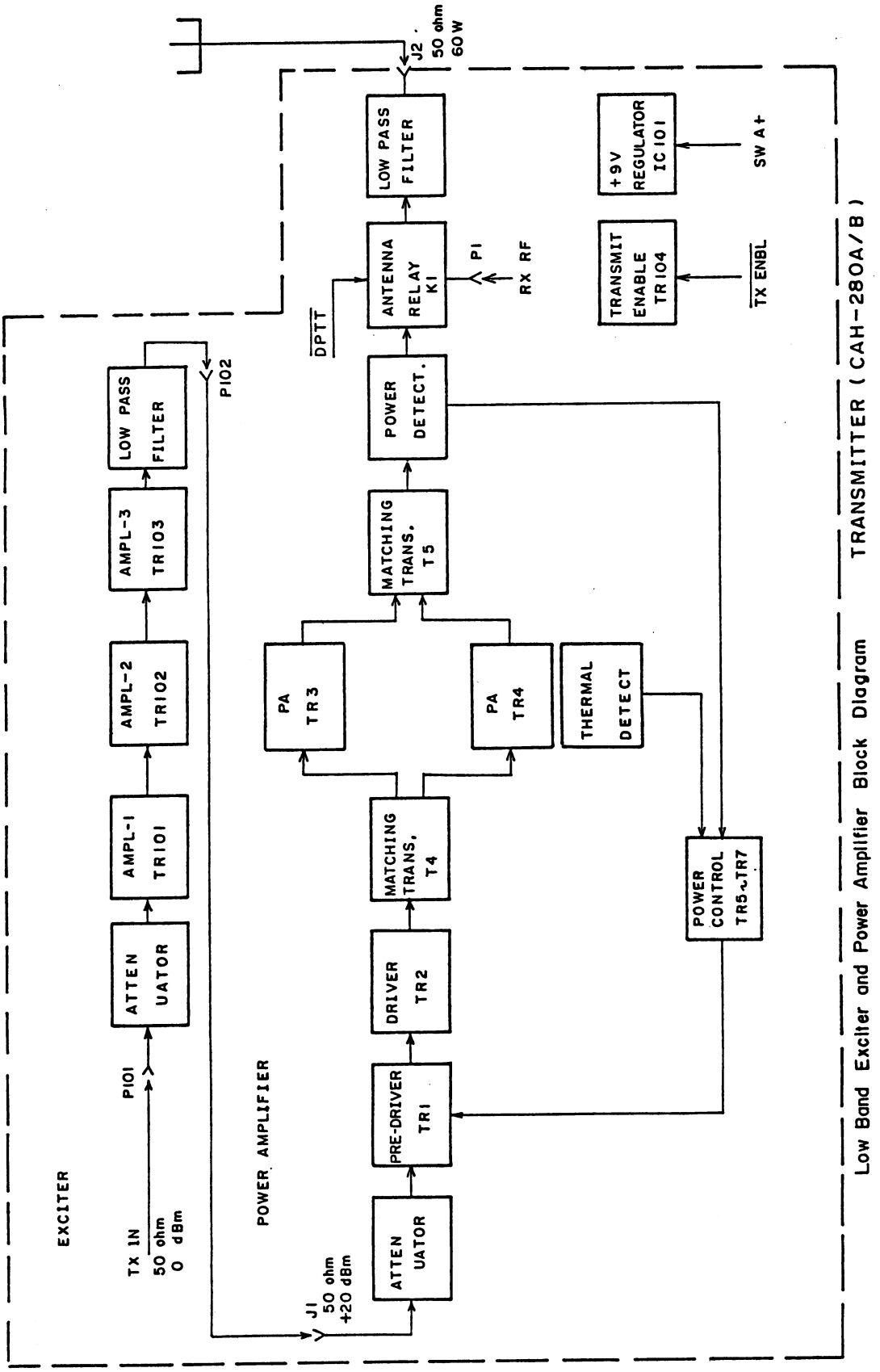

Figure 2 - Block Diagram

The output of TR1 is coupled to the base of driver transistor TR2 through impedance matching transformer T2 and stabilizing resistors R7 and R8. Capacitors C7 and C8 provide impedance matching between T2 and the base of transistor TR2. Capacitor C9 and resistor R9 provides negative feed back and resistor R10 improves the stability of TR2.

Collector voltage to driver transistor TR2 is supplied through a decoupling network consisting of capacitors C15, C16, C29 and inductor L3.

The RF output from TR2 passes through impedance matching transformer T3 and capacitor C10. **NOTE: This is a 50 ohm point and may be used for checking power levels.** From transformer T3, RF passes through stabilizing resistor R11 to the input of transformer T4 which has a 4:1 turns ratio.

The final power amplifier circuit consisting of transistors TR3 and TR4 and transformers T4 and T5 functions as a class-C push-pull power amplifier. Transformer T4 provides impedance matching and power splitting to the base circuits of TR3 and TR4. Capacitor C19 and capacitor C20 provide impedance matching to T4. Resistors R13 and R14 provide the base loading to TR3 and TR4. Capcitors C21 and C23 and resistors R12 and R15 provide negative feed back to improve the stability of TR3 and TR4. Transformer T5 provides impedance matching and power combining from the collector circuits of TR3 and TR4. Capacitors C22 and C24 provide impedance matching from the collector circuits.

Operating voltage for the power amplifier is supplied from the DC input through T5 and decoupling network consisting of capacitors C27, C28, C29 and inductor L4.

The output of the power amplifier passes through T5 to the low pass filter network (LPF) consisting of capacitors C32, C33, C34 and inductor L10. **NOTE: This is a 50 ohm point and may be used for checking power levels.** The RF power passes through 50 ohm microstrip Z2 and Z3, directional coupler T6 and associated components and transmit/receive relay K1 to the low pass filter.

Antenna Relay

Antenna Relay K1 is controlled by the delayed PTT (DPTT) output of the System Control/Synthesizer Board through J101. When the DPTT output goes low, Antenna Relay K1 picks up and couples the PA output through the low pass filter to Antenna Connector J2.

Automatic Power Control

The Automatic Power Control (APC) circuit protects the transmitter PA from damage due to excessive output power, reflected power or temperature by providing closed-loop RF power leveling and power turndown when it senses high VSWR load conditions. The output power control circuit allows the RF output power to be set at the rated output by power adjust control RV1.

The APC circuitry consists of 9-Volt switch/TRANSMIT ENABLE transistor TR104, power detect diode CD3, THERMAL DETECT transistor TR5, DC AMPlifier transistor TR6, DC DRIVER transistor TR8 and DC PASS transistor TR7.

When the transmitter is keyed, TRANSMIT ENABLE transistor TR104 turns on and supplies current to zener diode CD9, which provides a constant control reference voltage.

Transistors TR6, TR7 and TR8 serve as DC amplifiers to supply voltage to the collector of TR1. The setting of variable resistor RV1 determines the current supplied to the base of TR6. As the detected RF power increases, the current to the base of TR6 increases causing TR6 to pull current away from the base of TR8. This cuts back the drive to TR7 and in turn to TR8 which reduces voltage to the collector of TR1, decreasing RF power output.

RF power is sensed by directional coupler T6 and its associated components. Forward power is sensed by diode CD3 and reflected power is sensed by diode CD2. Forward power is determined by the setting of RV1. Diodes CD4, CD5 and CD10 set the level of reflected RF power at which the control circuit reduces the RF output.

Thermal protection is provided by "posistor" R22 (PTH487A01BE222TS) and its associated components. A "posistor" is a thermister type device with a positive temperature coefficient. Posistor R22 is thermally connected to the body of power transistor TR4. As the temperature of TR4 increases above 90°C, the resistance of R22 increases and TR5 turns on. This diverts emitter current from TR6 to R23, which lowers the voltage at the collector of TR1, 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 transistors.

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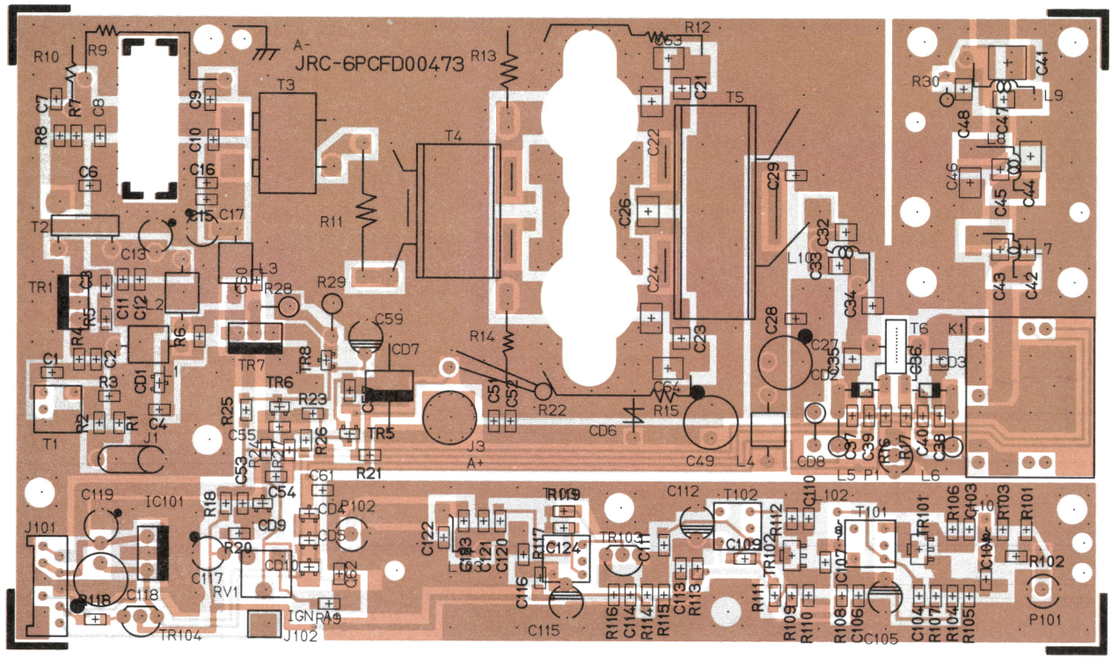


(JRC-PCFD00473)

RUNS ON SOLDER SIDE

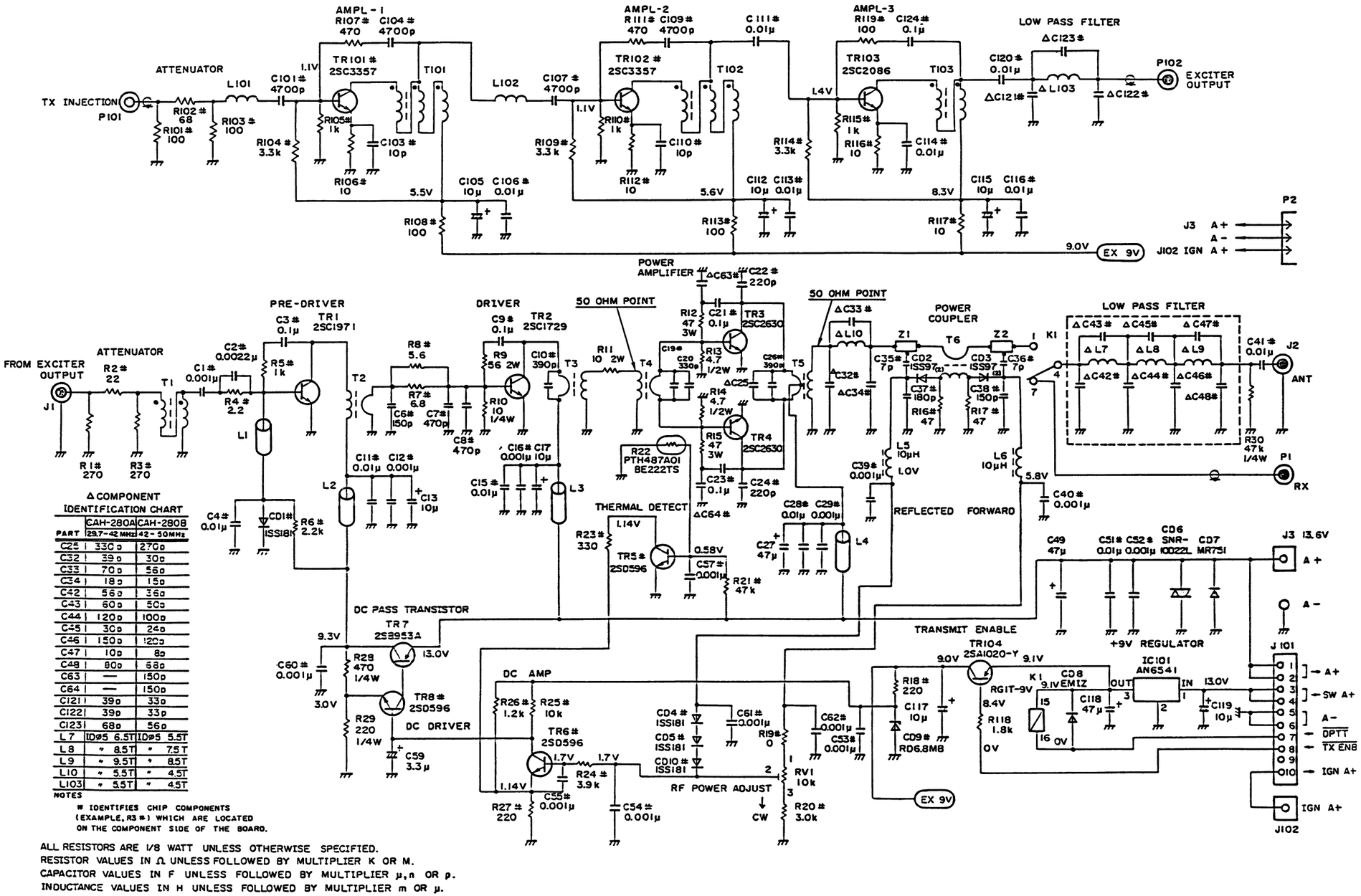
RUNS ON BOTH SIDES

RUNS ON COMPONENT SIDE

OUTLINE DIAGRAM

29.7-50 MHz
60 Watts
Exciter/PA Board
DD00-CAH-280A/B

Issue 1



△COMPONENT IDENTIFICATION CHART

PART	CAH-280A 29.7-42 MHz	CAH-280B 42-50 MHz
C25	330p	270p
C32	39p	30p
C33	70p	56p
C34	18p	15p
C42	56p	36p
C43	60p	50p
C44	120p	100p
C45	30p	24p
C46	150p	120p
C47	10p	8p
C48	80p	68p
C63	—	150p
C64	—	150p
C121	39p	33p
C122	39p	33p
C123	68p	56p
L7	ID#5 6.5T	ID#5 5.5T
L8	" 8.5T	" 7.5T
L9	" 9.5T	" 8.5T
L10	" 5.5T	" 4.5T
L103	" 5.5T	" 4.5T

NOTES

IDENTIFIES CHIP COMPONENTS (EXAMPLE, R3 #) WHICH ARE LOCATED ON THE COMPONENT SIDE OF THE BOARD.

ALL RESISTORS ARE 1/8 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.

SCHEMATIC DIAGRAM

29.7-50 MHz 60W
Transmitter
DD00-CAH-280A/B

PARTS LIST

EXCITER/PA BOARD
CAH-280A/B

ISSUE 1

SYMBOL	PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	JRC/5CAAD00782	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C2	JRC/5CAAD00792	Ceramic: 2200 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C3	JRC/5CAAD01056	Ceramic: 0.1 uF +80 -20%, 50 VDCW, temp coef +30 -80%.
C4	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C6	JRC/5CAAD00870	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
C7 and C8	JRC/5CAAD00797	Ceramic: 470 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
C9	JRC/5CAAD01056	Ceramic: 0.1 uF +80 -20%, 50 VDCW, temp coef +30 -80%.
C10	JRC/5CAAD00786	Ceramic: 390 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
C11	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C12	JRC/5CAAD00782	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C13	JRC/5CEAA02184	Electrolytic: 10 uF ±20%, 50 VDCW.
C15	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C16	JRC/5CAAD00782	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C17	JRC/5CEAA02184	Electrolytic: 10 uF ±20%, 50 VDCW.
C20	JRC/5CMAB00139	Mica: 330 pF ±5%, 500 VDCW.
C21	JRC/5CAAA02558	Ceramic: 0.1 uF ±20%, 50 VDCW.
C22	JRC/5CMAB01450	Mica: 220 pF ±5%, 500 VDCW.
C23	JRC/5CAAA02558	Ceramic: 0.1 uF ±20%, 50 VDCW.
C24	JRC/5CMAB01450	Mica: 220 pF ±5%, 500 VDCW.
C25	JRC/5CMAB00139	Mica: 330 pF ±5%, 500 VDCW. (Used in A).
C25	JRC/5CMAB00138	Mica: 270 pF ±5%, 500 VDCW. (Used in B).
C26	JRC/5CMAB01469	Mica: 390 pF ±5%, 500 VDCW.
C27	JRC/5CEAA01817	Electrolytic: 47 uF ±20%, 50 VDCW.
C28	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C29	JRC/5CAAD00782	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C32	JRC/5CMAB01430	Mica: 39 pF ±5%, 500 VDCW. (Used in A).
C32	JRC/5CMAB01466	Mica: 30 pF ±5%, 500 VDCW. (Used in B).
C33	JRC/5CMAB01281	Mica: 70 pF ±5%, 500 VDCW. (Used in A).
C33	JRC/5CMAB01431	Mica: 56 pF ±5%, 500 VDCW. (Used in B).
C34	JRC/5CMAB01117	Mica: 18 pF ±5%, 500 VDCW. (Used in A).
C34	JRC/5CMAB01351	Mica: 15 pF ±5%, 500 VDCW. (Used in B).
C35 and C36	JRC/5CMAB01328	Mica: 7 pF ±0.5 pF, 500 VDCW.
C37	JRC/5CAAD01065	Ceramic: 180 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
C38	JRC/5CAAD00870	Ceramic: 150 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
C39 and C40	JRC/5CAAD00782	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C41	JRC/5CBAB02003	Ceramic: 0.01 uF ±5%, 50 VDCW.
C42	JRC/5CMAB01431	Mica: 56 pF ±5%, 500 VDCW. (Used in A).
C42	JRC/5CMAB01442	Mica: 36 pF ±5%, 500 VDCW. (Used in B).
C43	JRC/5CMAB01282	Mica: 60 pF ±5%, 500 VDCW. (Used in A).
C43	JRC/5CMAB01502	Mica: 50 pF ±5%, 500 VDCW. (Used in B).
C44	JRC/5CMAB01439	Mica: 120 pF ±5%, 500 VDCW. (Used in A).
C44	JRC/5CMAB01425	Mica: 100 pF ±5%, 500 VDCW. (Used in B).
C45	JRC/5CMAB01466	Mica: 30 pF ±5%, 500 VDCW. (Used in A).
C45	JRC/5CMAB01119	Mica: 24 pF ±5%, 500 VDCW. (Used in B).
C46	JRC/5CMAB01471	Mica: 150 pF ±5%, 500 VDCW. (Used in A).
C46	JRC/5CMAB01439	Mica: 120 pF ±5%, 500 VDCW. (Used in B).
C47	JRC/5CMAB01091	Mica: 10 pF ±0.5 pF, 500 VDCW. (Used in A).
C47	JRC/5CMAB01131	Mica: 8 pF ±5%, 500 VDCW. (Used in B).
C48	JRC/5CMAB01526	Mica: 80 pF ±5%, 500 VDCW. (Used in A).
C48	JRC/5CMAB01506	Mica: 68 pF ±5%, 500 VDCW. (Used in B).
C49	JRC/5CEAA01817	Electrolytic: 47 uF ±20%, 50 VDCW.
C51	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C52 thru C55	JRC/5CAAD00782	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C57	JRC/5CAAD00782	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C59	JRC/5CSAC01180	Tantalum: 3.3 uF ±20%, 25 VDCW.
C60 thru C62	JRC/5CAAD00782	Ceramic: 1000 pF ±5%, 50 VDCW, temp coef +350 -1000 PPM.
C63 and C64	JRC/5CMAB01471	Mica: 150 pF ±5%, 500 VDCW. (Used in B).
C101	JRC/5CAAD00783	Ceramic: 4700 pF ±10%, 50 VDCW, temp coef ±10%.
C103	JRC/5CAAD00785	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
C104	JRC/5CAAD00783	Ceramic: 4700 pF ±10%, 50 VDCW, temp coef ±10%.
C105	JRC/5CSAC00932	Tantalum: 10 uF ±20%, 16 VDCW.
C106	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C107	JRC/5CAAD00783	Ceramic: 4700 pF ±10%, 50 VDCW, temp coef ±10%.
C109	JRC/5CAAD00783	Ceramic: 4700 pF ±10%, 50 VDCW, temp coef ±10%.
C110	JRC/5CAAD00785	Ceramic: 10 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM.
C111	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C112	JRC/5CSAC00932	Tantalum: 10 uF ±20%, 16 VDCW.
C113 and C114	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C115	JRC/5CSAC00932	Tantalum: 10 UF ±20%, 16 VDCW.
C116	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C117	JRC/5CEAA01864	Electrolytic: 10 uF ±20%, 25 VDCW.
C118	JRC/5CEAA01816	Electrolytic: 47 uF ±20%, 25 VDCW.
C119	JRC/5CEAA01864	Electrolytic: 10 uF ±20%, 25 VDCW.
C120	JRC/5CAAD00789	Ceramic: 0.01 uF ±10%, 50 VDCW, temp coef ±10%.
C121	JRC/5CAAD00875	Ceramic: 39 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM. (Used in A).
C121	JRC/5CAAD00794	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM. (Used in B).
C122	JRC/5CAAD00875	Ceramic: 39 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM. (Used in A).
C122	JRC/5CAAD00794	Ceramic: 33 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM. (Used in B).
C123	JRC/5CAAD00929	Ceramic: 68 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM. (Used in A).
C123	JRC/5CAAD00863	Ceramic: 56 pF ±5%, 50 VDCW, temp coef 0 ±60 PPM. (Used in B).
C124	JRC/5CAAD00919	Ceramic: 0.1 uF ±20%, 25 VDCW, temp coef +20 -30%.
		- - - - - - - - - - DIODES - - - - - - - - - -
CD1	JRC/5TXAD00356	Silicon (Schottky Barrier): sim to TOSHIBA 1SS181 TE85L.
CD2 and CD3	JRC/5TXAA00313	Silicon (Schottky Barrier): sim to NEC 1SS97.
CD4	JRC/5TXAD00356	Silicon (Schottky Barrier): sim to TOSHIBA 1SS181 TE85L.
CD5	JRC/5TXAD00452	Silicon (Schottky Barrier): sim to TOSHIBA 1SS181 TE85R.
CD6	JRC/5TXAA00045	Ceramic Varistor, Limit voltage 38 to 135V: sim to SANKEN SNR-10D22L.
CD7	JRC/5TXAM00019	Silicon: FWD current 3A 200 PIV; sim to MOTOROLA MR751.
CD8	JRC/5TXAN00061	Silicon: 200V 1A; sim to SANKEN EM1Z.
CD9	JRC/5TXAA00402	Zener: 6.8V, 200 mW; sim to NEC RD6.8MB-T1.
CD10	JRC/5TXAD00349	Silicon (Schottky Barrier): sim to TOSHIBA 1SS191.
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
IC101	JRC/5DAAR00021	Linear: positive voltage regulator; sim to MATSUSHITA AN6541.
		- - - - - - - - - - PLUGS - - - - - - - - - -
J1	JRC/5JWCL00045	Connector, RF.
J2	JRC/6JAFD00002	Connector, RF: H-6JAFD00002.
J3	JRC/5JTCW00060	Connector, power source: PB-1-S L=10.
J101	JRC/5JWBS00178	Connector: 10 pins; FH3-10S-1.25DSA(G).
J102	JRC/5JDAS00001	Connector: WP22-1W.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1	JRC/5KLAD00625	Relay: 9 VDC, ARG335.
		- - - - - - - - - - COILS - - - - - - - - - -
L1 thru L4	JRC/6LAFD01129	Coil, RF.
L5 and L6	JRC/5LCAA00191	Choke coil: 10 uH ±10%.
L7	JRC/6LAFD01308	Coil, RF.
L8	JRC/6LAFD01303	Coil, RF. (Used in A).
L8	JRC/6LAFD01307	Coil, RF. (Used in B).
L9	JRC/6LAFD01304	Coil, RF. (Used in A).
L9	JRC/6LAFD01303	Coil, RF. (Used in B).
L10	JRC/6LAFD01132	Coil, RF. (Used in A).
L10	JRC/6LAFD01285	Coil, RF. (Used in B).
L101 and L102	JRC/6LAFD01150	Coil, RF.
L103	JRC/6LAFD01132	Coil, RF.
		- - - - - - - - - - CABLES - - - - - - - - - -
P1	JRC/6JJFD00047	Coaxial cable: L=160mm.
P2	JRC/6ZCFD00165	Power cable.
P101	JRC/6JJFD00047	Coaxial cable: L=160mm.
P102	JRC/6JJFD00072	Coaxial cable: L=50 mm.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	JRC/5REAG00622	Metal film: 270 ohms ±5%, 200 VDCW, 1/8 W.
R2	JRC/5REAG00619	Metal film: 22 ohms ±5%, 200 VDCW, 1/8 W.
R3	JRC/5REAG00622	Metal film: 270 ohms ±5%, 200 VDCW, 1/8 W.
R4	JRC/5REAG00613	Metal film: 2.2 ohms ±10%, 200 VDCW, 1/8 W.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	PART NO.	DESCRIPTION
R5	JRC/5REAG00572	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 W.
R6	JRC/5REAG00575	Metal film: 2.2K ohms ±5%, 200 VDCW, 1/8 W.
R7	JRC/5REAG00616	Metal film: 6.8 ohms ±10%, 200 VDCW, 1/8 W.
R8	JRC/5REAG00595	Metal film: 5.6 ohms ±10%, 200 VDCW, 1/8 W.
R9	JRC/5REAG00080	Carbon film: 56 ohms ±5%, 350 VDCW, 2 W.
R10	JRC/5RDAA01178	Carbon film: 10 ohms ±5%, 500 VDCW, 1/4 W.
R11	JRC/5REAG00048	Carbon film: 10 ohms ±5%, 350 VDCW, 2 W.
R12	JRC/5REAG01412	Carbon film: 47 ohms ±5%, 1000 VDCW, 3 W.
R13 and R14	JRC/5RDAA00910	Carbon film: 4.7 ohms ±5%, 700 VDCW, 1/2 W.
R15	JRC/5REAG01412	Carbon film: 47 ohms ±5%, 1000 VDCW, 3 W.
R16 and R17	JRC/5REAG00580	Metal film: 47 ohms ±5%, 200 VDCW, 1/8 W.
R18	JRC/5REAG00594	Metal film: 220 ohms ±5%, 200 VDCW, 1/8 W.
R19	JRC/5REAG01151	Metal film: 0 ohm, 1/8 W.
R20	JRC/5RDAA01573	Metal film: 3K ohms ±5%, 200 VDCW, 1/8 W.
R21	JRC/5REAG00578	Metal film: 47K ohms ±5%, 200 VDCW, 1/8 W.
R22	JRC/5RXAE00028	Posistor: 2.2K ohms.
R23	JRC/5REAG00597	Metal film: 330 ohms ±5%, 200 VDCW, 1/8 W.
R24	JRC/5REAG00624	Metal film: 3.9K ohms ±5%, 200 VDCW, 1/8 W.
R25	JRC/5REAG00576	Metal film: 10K ohms ±5%, 200 VDCW, 1/8 W.
R26	JRC/5REAG00585	Metal film: 1.2K ohms ±5%, 200 VDCW, 1/8 W.
R27	JRC/5REAG00594	Metal film: 220 ohms ±5%, 200 VDCW, 1/8 W.
R28	JRC/5RDAA01541	Carbon film: 470 ohms ±5%, 500 VDCW, 1/4 W.
R29	JRC/5RDAA01543	Carbon film: 220 ohms ±5%, 500 VDCW, 1/4 W.
R30	JRC/5RDAA01385	Carbon film: 47K ohms ±5%, 500 VDCW, 1/4 W.
R101	JRC/5REAG00586	Metal film: 100 ohms ±5%, 200 VDCW, 1/8 W.
R102	JRC/5REAG00621	Metal film: 68 ohms ±5%, 200 VDCW, 1/8 W.
R103	JRC/5REAG00586	Metal film: 100 ohms ±5%, 200 VDCW, 1/8 W.
R104	JRC/5REAG00589	Metal film: 3.3K ohms ±5%, 200 VDCW, 1/8 W.
R105	JRC/5REAG00572	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 W.
R106	JRC/5REAG00617	Metal film: 10 ohms ±5%, 200 VDCW, 1/8 W.
R107	JRC/5REAG00579	Metal film: 470 ohms ±5%, 200 VDCW, 1/8 W.
R108	JRC/5REAG00586	Metal film: 100 ohms ±5%, 200 VDCW, 1/8 W.
R109	JRC/5REAG00589	Metal film: 3.3K ohms ±5%, 200 VDCW, 1/8 W.
R110	JRC/5REAG00572	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 W.
R111	JRC/5REAG00579	Metal film: 470 ohms ±5%, 200 VDCW, 1/8 W.
R112	JRC/5REAG00617	Metal film: 10 ohms ±5%, 200 VDCW, 1/8 W.
R113	JRC/5REAG00586	Metal film: 100 ohms ±5%, 200 VDCW, 1/8 W.
R114	JRC/5REAG00589	Metal film: 3.3K ohms ±5%, 200 VDCW, 1/8 W.
R115	JRC/5REAG00572	Metal film: 1K ohms ±5%, 200 VDCW, 1/8 W.
R116 and R117	JRC/5REAG00617	Metal film: 10 ohms ±5%, 200 VDCW, 1/8 W.
R118	JRC/5REAG00582	Metal film: 1.8K ohms ±5%, 200 VDCW, 1/8 W.
R119	JRC/5REAG00586	Metal film: 100 ohms ±5%, 200 VDCW, 1/8 W.
RV1	JRC/5RVAB00279	Variable: 10K ohms ±30%, 0.1 W.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1	JRC/6LHFD00006	RF Transformer.
T2	JRC/6LHFD00005	RF Transformer.
T3	JRC/6LHFD00004	RF Transformer.
T4	JRC/6LHFD00011	RF Transformer.
T5	JRC/6LHLD00001	RF Transformer.
T6	JRC/6LHFD00014	RF Transformer.

SYMBOL	PART NO.	DESCRIPTION
T101 and T102	JRC/6LAFD01136	RF Transformer.
T103	JRC/6LHFD00006	RF Transformer.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
TR1	JRC/5TCAD00040	Silicon, NPN: sim to MITSUBISHI 2SC1971.
TR2	JRC/5TCAD00097	Silicon, NPN: sim to MITSUBISHI 2SC1729.
TR3 and TR4	JRC/5TCAD00099	Silicon, NPN: sim to MITSUBISHI 2SC2630.
TR5 and TR6	JRC/5TDAB00078	Silicon, NPN: sim to NEC 2SD596-T1 (DV3).
TR7	JRC/5TBAR00001	Silicon, PNP: sim to MATSUSHITA 2SB953A.
TR8	JRC/5TDAB00078	Silicon, NPN: sim to NEC 2SD596-T1 (DV3).
TR101 and TR102	JRC/5TCAB00287	Silicon, NPN: sim to NEC 2SC3357-T1.
TR103	JRC/5TCAD00098	Silicon, NPN: sim to MITSUBISHI 2SC2086.
TR104	JRC/5TAAG00093	Silicon, PNP: sim to TOSHIBA 2SA1020-Y.

PARTS LIST CHANGES

The prefix of Service Parts replacement part numbers listed in the various Parts Lists included in this maintenance manual have been changed from "JRC/" to "B19/". All other characters remain the same as displayed. When this manual is next reprinted, all replacement parts lists will show only the "B19/" prefix.

When ordering replacement parts listed in this manual from the GE Mobile Communications Service Parts Operation, please use only the "B19/" prefix. The "B19/" prefix will be the only one shown in any future SERVICE PARTS PRICE LIST.