MAINTENANCE MANUAL
ORION™
POWER AMPLIFIER BOARD

B19/CAH-505AL	**60 WATTS**	**29-42 MHz**
B19/CAH-505BL	**60 WATTS**	**35-50 MHz**
B19/CAH-505AH	**110 WATTS**	**29-42 MHz**
B19/CAH-505BH	**110 WATTS**	**35-50 MHz**

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COMPONENT IDENTIFICATION CHART

SYMBOL	CAH-0505ALK	CAH-0505ALK	CAH-0505ALK	CAH-0505ALK
C16	--	--	470pF	390pF
C17	--	--	--	470 pF
C18	330 pF	330 pF	390 pF	470 pF
C23	220 pF	220 pF	470 pF	330 pF
C31	39 pF	27 pF	36 pF	27 pF
C32	47 pF	33 pF	39 pF	33 pF
C33	100 pF	39 pF	43 pF	39 pF
C34	36 pF	24 pF	30 pF	24 pF
C35	100 pF	47 pF	43 pF	47 pF
C36	30 pF	24 pF	30 pF	24 pF
C37	91 pF	82 pF	91 pF	82 pF
C38	24 pF	24 pF	27 pF	24 pF
C63	--	39 pF	47 pF	39 pF
C64	--	47 pF	47 pF	47 pF
C72	15 pF	33 pF	30 pF	33 pF
C73	100 pF	43 pF	68 pF	43 pF
C74	82 pF	82 pF	100 pF	82 pF
C75	--	22 pF	20 pF	22 pF
C76	39 pF	47 pF	62 pF	47 pF
C163	56 pF	47 pF	56 pF	47 pF
C164	100 pF	82 pF	100 pF	82 pF
C165	27 pF	22 pF	27 pF	22 pF
C166	68 pF	47 pF	68 pF	47 pF
C167	39 pF	33 pF	39 pF	33 pF
L8	4.5T (R)	3.5T (R)	4.5T (R)	3.5T (R)
L9	5.5T (R)	4.5T (R)	5.5T (R)	4.5T (R)
L10	5.5T (R)	4.5T (R)	5.5T (R	4.5T (R)
L11	5.5T (L)	4.5T (L)	5.5T (L)	4.5T (L)
L18	2.5T (R)	3.5T (R)	2.5T (R)	3.5T (R)
L19	5.5T (R)	4.5T (R)	5.5T (R)	4.5T (R)
L153	120 nH	100 nH	120 nH	100 nH
L154	180 nH	150 nH	180 nH	150 nH
T5	H-6LHLD00011	H-6LHLD00011	H-6LHLD00012	H-6LHLD00012
TR3, TR4	2SC2540	2SC2540	2SC2695	2SC2695

(DDOO-CAH-505 2/2)

ERICSSON

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DESCRIPTION

The RF Power Amplifiers for the Ericsson ORION low band mobile radio is available in two power levels and two frequencies ranges designated as:

- 29-42 MHz , 60 Watts
- 35-50 MHz , 60 Watts
- 29-42 MHz , 110 Watts
- 35-50 MHz , 110 Watts

The circuitry on the Power Amplifier Board consists of an Exciter circuit, an RF Power Amplifier circuit, a Power Control circuit, an Antenna Switch and Limiter Circuit (see Figure 1 - Block Diagram). The Exciter circuit consists of two wide band amplifier stages operating over a frequency range of 29-50 MHz without any tuning. This circuit amplifies the one milliwatt input signal from the Voltage Controlled Oscillator, on the Synthesizer/IF board, to 300 milliwatts to drive the Power Amplifier.

The Power Amplifier circuit uses a driver and three RF power transistors to provide rated output power. The output power is adjustable over a range of 55 to 110 and 30 to 60 watts for the two power versions. Two transistors and three IC's are used in the power control circuit.

Supply voltage for the PA is provided by power leads from the power cable connector J1002 to J3 (A+) and (A-) on the Power Amplifier board.

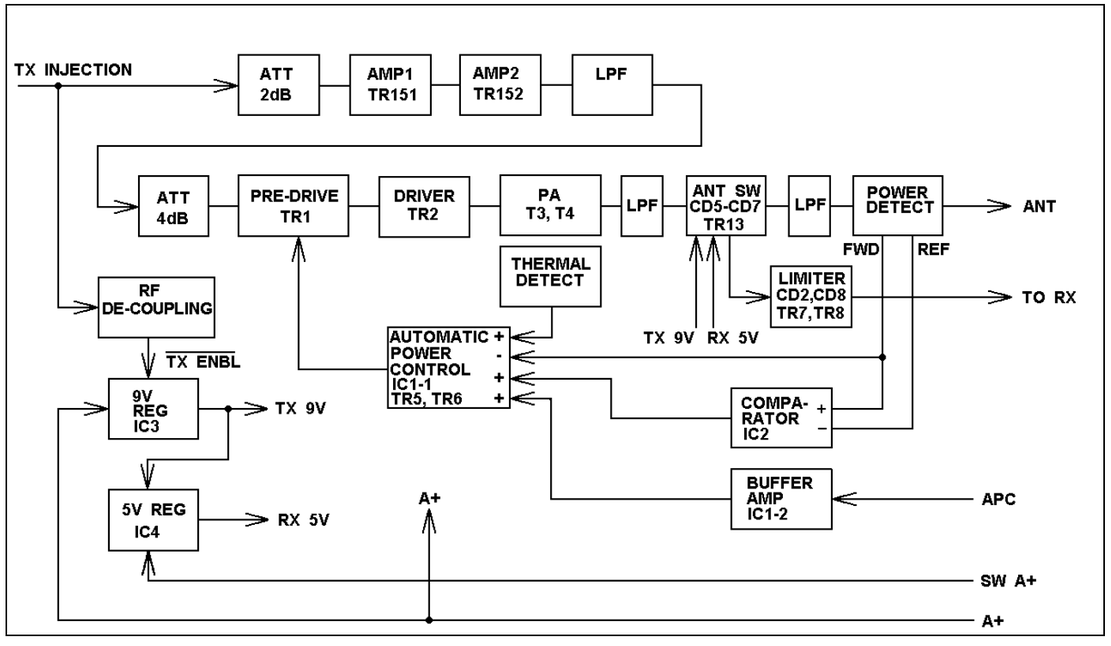


Figure 1 - Block Diagram Low Band Power Amplifier

CIRCUIT ANALYSIS

EXCITER

The 29-50 MHz Tx injection input from the Tx VCO is applied to **AMPLIFIER-1** transistor TR151 through an **ATTENUATOR** pad consisting of resistors R151, R152 and R153. Vcc voltage (+9 Vdc) is applied through a Vcc feed network consisting of resistor R158 and transformer T151. Capacitor C156 is used to bypass the supply line. The +9 Vdc is supplied by 3-terminal voltage regulator IC3.

The output of TR151 drives **AMPLIFIER-2** transistor TR152 through impedance matching components consisting of transformers T151 and T152, coupling capacitors C157 and C158. Resistors R152, R154 and diode CD151 set the bias voltage for TR152.

Collector voltage (+9 Vdc) of TR152 is applied through collector feed network resistor R165 and inductor L152. Capacitors C160 and C161 are bypass capacitors.

The output of TR152 is coupled to **EX OUT** through the **LOW-PASS FILTER** consisting of capacitors C163 through C167, and inductors L153 and L154. Resistor R163 provides negative feedback for TR152 through capacitor C159. Transistor TR152 amplifies the 15 milliwatts input level to 300 milliwatts.

A+, supplied from the J1003 connector through transistor TR11 and the Tx Power Switch is regulated to 9 Vdc by voltage regulator IC3. Vcc (+9 Vdc) is applied to TR151 and TR152. When **TX ENBL** is high (receive mode), +9 Vdc is not applied.

The exciter is energized by pressing the PTT switch. Regulated +9 Vdc is present on all exciter stages when the radio is turned on.

POWER AMPLIFIER BOARD

The four power amplifiers which cover the frequency ranges of 29-42 MHz and 35-50 MHz and power levels of 60 watts and 110 watts, are very similar in construction and operation. The only differences are in the transistor types and some component values. The following description applies to all four versions.

RF Amplifiers

The Exciter RF output (EX OUT) is coupled to the PA input. The RF is then coupled through an **ATTENUATOR** pad consisting of resistors R1, R2 and R3, impedance matching transformer T1 and decoupling capacitor C1 to the base of **PRE-AMPLIFIER** transistor TR1. Inductor L1, diode CD1 and resistor R5 set the bias of TR1. Capacitor C4 and resistors R4 and R45 provide negative feedback 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 C5, C6 and C7.

The output of TR1 is coupled to the base of **DRIVER AMPLIFIER** transistor TR2 through impedance matching transformer T2 and a frequency compensator consisting of capacitor C9 and resistor R6. Capacitor C8 provides matching between T2 and the base of TR2. Capacitor C10 and resistor R7 provide negative feedback and R8 and R46 maintains stability of TR2.

Collector voltage to driver amplifier TR2 is supplied through a decoupling network consisting of capacitors C12 to C14 and inductor L4.

The RF output from TR2 is coupled to **POWER AMPLIFIER** transistors TR3 and TR4 through impedance matching transformer T4 and capacitors C17 and C56.

Power Amplifier

The **POWER AMPLIFIER**, consisting of transistors TR3 and TR4, and transformers T4 and T5 is a class-c push-pull power amplifier. Transformer T4 provides impedance-matching and power splitting to the bases of TR3 and TR4. Capacitors C17 and C56 provide impedance-matching elements to T4. Resistors R10 and R11 provide the base loading to TR3 and TR4. Capacitors C19 and C21, and resistors R9 and R12 are negative feedback elements to maintain the stability of TR3 and TR4. Transformer T5 provides impedance-matching and power combining for the collectors of TR3 and TR4. Capacitors C16 and C23 provide matching elements to T5. Capacitors C20 and C22 provide impedance matching elements to the collector of TR3 and TR4.

Operating voltage for the power amplifier is supplied from the DC input through transformer T5 and a decoupling network consisting of capacitors C24 through C26 and inductor L5.

The output of the **POWER AMPLIFIER** passes through T5 to the **LOW-PASS FILTER** consisting of capacitors C72 though C76, and inductors L18 and L19.

NOTE

This is a 50 ohm point and may be used for checking power levels.

The RF power passes through a 50 ohm microstrip and transmit/receive **ANTENNA SWITCH** diode CD5 to the **LOW-PASS FILTER**

Power Control

When high VSWR load conditions are sensed the **POWER CONTROL** circuit provides closed-loop RF power leveling and power turndown.

When the transmitter is keyed, Tx 9V turns on and supplies current to a **DC AMPLIFIER** consisting of transistors TR5, TR6 and IC1-1. This amplifier supplies voltage to the collector of TR1. The setting of RV1 determines the current supplied to the negative input of IC1-1. As the detected RF power increases, the current to the negative input of IC1-1 increases causing IC1-1 to pull current away from the base of TR5. This cuts back the drive to TR5 and TR6, which reduces

the voltage at the collector of TR1, decreasing RF output power.

RF power is sensed by directional **POWER COUPLER** T6 and associated elements. Forward power is sensed by diode CD9 and reflected power by diode CD10. Forward power is determined by the setting of RV1. Resistors R21 and R22 set the level of reflected RF power at which the control circuit reduces the RF output.

Thermal protection is provided by **"posistor"** R41 and associated elements. Posistor R41 is thermally connected to the body of transistor TR3. As the temperature of TR3 rises above 100-degrees Centigrade, the resistance of R41 increases and TR9 turns on. This diverts output current of IC102 from R27 to TR9, 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.

Antenna Switch

The **ANTENNA SWITCH** consists of PIN diodes CD5, CD6 and CD7 and associated components. When the transmitter is keyed, **Tx 9V** switch TR11 and the **Tx 9V** regulator IC3 turn on. **Rx 5V** (Rx bias) turns off and **Tx 9V** provides forward-bias to CD5. This results in low impedance on CD5 and high impedance on CD6 and CD7 isolating the transmitted power from the receiver.

Limiter

The limiter on the PA board consists of diode CD2, transistors TR6, TR7 and the associated components. During Rx if the receiving signal level exceeds +10 dBm, the rectified currents of the CD2 can provide the forward-bias to TR6, TR7 and CD8 proportionally to the receiving signal level. This causes a tap-down circuit (CD6, CD7 and CD8) to turn on when the receiving signal exceeds +10 dBm and protects the receiver from excessively high receiving signal levels.

In the Rx mode, signals from the antenna are coupled through this limiter to the receiver input.

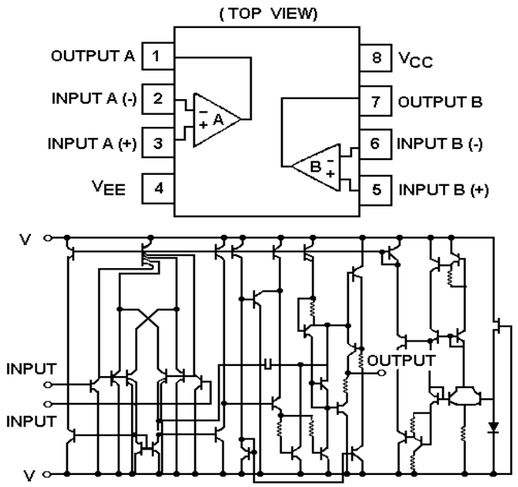
POWER AMPLIFIER BOARD
CAH-505AL(Used in P1),CAH-505AL(Used in P2)
CAH-505AH(Used in P3),CAH-505BH(Used in P4)

Issue 1

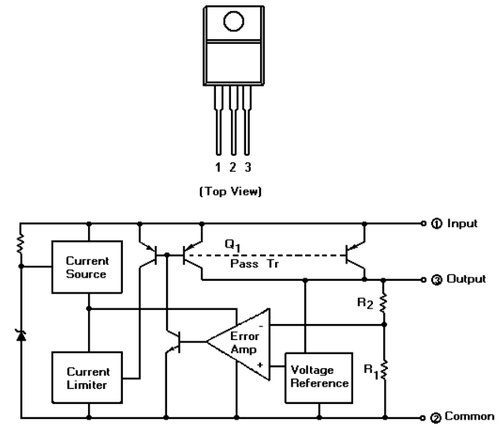
SYMBOL	PART NO.	DESCRIPTION
		----------CAPACITOR----------
C1		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C2		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C3		Ceramic: 0.1 µF +80,-20% 25 VDCW, temp coef +30,-80%.
C4		Ceramic: 0.1 µF +80,-20% 25 VDCW, temp coef +30,-80%.
C5		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C6		Ceramic: 0.1 µF +80,-20% 25 VDCW, temp coef +30,-80%.
C7		Polly Film: 0.1 µF % 25 VDCW, temp coef ±10%.
C8		Ceramic: 150 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C9		Ceramic: 2200 pF ±10% 50 VDCW, temp coef ±10 %.
C10		ceramic; 0.1 µF ±10% 50 VDCW temp coef 0±10%.
C12		Electrolytic: 10 µF ±20% 50 VDCW.
C13		Ceramic: 0.1 µF +80,-20% 25 VDCW, temp coef +30,-80%.
C14		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C15		Ceramic: 33 pF ±5% 500 VDCW, temp coef 0±60 PPM.
C16		Ceramic: 120 pF ±5% 500 VDCW, temp coef 0±60 PPM.
C17		Dipped Mica: 330 pF ±5% 500 VDCW (Used in AL AND BL).
C17		Dipped Mica: 470 pF ±5% 500 VDCW (Used in AH AND BH).
C18		Mica: 330 pF ±5% 500 VDCW (Used in AL AND BL).
C18		Mica: 390 pF ±5% 500 VDCW (Used in AH).
C18		Mica: 470 pF ±5% 500 VDCW (Used in BH).
C19		Ceramic: 0.1 µF ±10% 50 VDCW, temp coef 0±10 %.
C20		Ceramic: 220 pF ±5% 500 VDCW, temp coef 0±60 PPM
C21		Ceramic: 0.1 µF ±10% 50 VDCW, temp coef 0±10 %.
C22		Ceramic: 220 pF ±5% 500 VDCW, temp coef 0±60 PPM.
C23		Mica: 220 pF ±5% 500 VDCW (Used in AH).
C23		Mica: 220 pF ±5% 500 VDCW (Used in AH).
C23		Mica: 470 pF ±5% 500 VDCW (Used in AH).
C23		Mica: 330 pF ±5% 500 VDCW (Used in AH).
C24		Electrolytic: 47 µF ±20% 25 VDCW.
C25		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C26		Ceramic: 0.001 µF ±10% 50 VDCW, temp coef 0±10%.
C27		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±60 PPM.
C28		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C29		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C30		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±60 PPM
C31		Ceramic: 36 pF ±5% 500 VDCW temp coef 0±60 PPM (Used in AL AND AH).
C31		Ceramic: 27 pF ±5% 500 VDCW temp coef 0±60 PPM (Used in BL AND BH)
C32		Ceramic: 39 pF ±5% 500 VDCW temp coef 0±60 PPM (Used in AL AND AH).
C32		Ceramic: 33 pF ±5% 500 VDCW temp coef 0±60 PPM (Used in BL AND BH).
C33		Ceramic: 43 pF ±5% 500 VDCW temp coef 0±60 PPM (Used in AL AND AH).
C33		Ceramic: 39 pF ±5% 500 VDCW temp coef 0±60 PPM (Used in BL AND BH).
C34		Ceramic: 30 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C34		Ceramic: 24 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C35		Ceramic: 47 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C35		Ceramic: 47 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C36		Ceramic: 30 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C36		Ceramic: 24 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C37		Ceramic: 82 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C37		Ceramic: 91 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C38		Ceramic: 27 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C38		Ceramic: 24 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C40 thru C49		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C50		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C52		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C53		Tantalum: 1µF ±20% 16 VDCW
C54		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C55		Ceramic: 0.1 µF +80,-20% 25 VDCW, temp coef +30,-80%.
C56		Tantalum: 4.7µF ±20% 25 VDCW
C57		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C58		Dipped Mica: 820 pF ±5% 200 VDCW
C59		Ceramic: 0.1 µF +80,-20% 25 VDCW, temp coef +30,-80%.
C60		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0%.
C61		Tantalum: 10 µF ±20% 16 VDCW
C62		Tantalum: 10 µF ±20% 16 VDCW
C63		Ceramic: 47 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM.
C63		Ceramic: 39 pF (.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C64		Ceramic: 47 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM.
C65		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C70		Ceramic: 1000 pF +200% 50 VDCW, temp coef +20%.
C71		Ceramic: 1000 pF +200% 50 VDCW, temp coef +20%.
C72		Ceramic: 39 pF ±0.25 pF 500 VDCW, temp coef 0}60 PPM (Used in AL AND AH).
C72		Ceramic: 33 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C73		Ceramic: 56 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C73		Ceramic: 47 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C74		Ceramic: 100 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C74		Ceramic: 82 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C75		Ceramic: 22 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C75		Ceramic: 27 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH)..
C76		Ceramic: 68 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C76		Ceramic: 47 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL AND BH)..
C81		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C82		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C151 thru C153		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C154		Ceramic: 0.001 µF ±10% 50 VDCW, temp coef 0±15%.
C155 thru C158		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C159		Ceramic: 0.1 µF +80,-20% 25 VDCW, temp coef +30,-80%.
C160 thru C162		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C163		Ceramic: 56 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C163		Ceramic: 47 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C164		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C164		Ceramic: 82 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C165		Ceramic: 27 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C165		Ceramic: 22 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C166		Ceramic: 68 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C166		Ceramic: 47 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C167		Ceramic: 39 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in AL AND AH).
C167		Ceramic: 33 pF ±5% 50 VDCW, temp coef 0±60 PPM (Used in BL AND BH).
C168		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
		----------DIODES----------
CD1 and CD2		1SS181 TE85L
CD3		SHOTKY BARRIER: C25T04Q
CD4		ERZ-CF2MK220
CD5		PIN Diode
CD6 and CD8		PIN DIODE: sim to MITSUBISHI MI808
CD9 and CD10		MA741-TX
CD151		1SS184 TE85L
		----INTEGRATED CIRCUIT----
IC1		Linear OP amplifier: sim to New JRC NJM3404AM-T1
IC2		Comparator: sim to New JRC NJM2404M-T1
IC3		+9 V Voltage Regulator: sim to PANASONIC AN6541
IC4		+5 V Voltage Regulator: sim to PANASONIC AN6545SP
		----------CONNECTORS----------
J1		Coaxial Connector: TNC
J2		Coaxial Connector
J3		Connector
J4		Connector
J5		Connector
J6		Connector for power cable
J151		Coaxial Connector
		----------INDUCTORS----------
L1		Coil: 4.7 µH
L4		Coil: RF
L5		Coil: RF
L6 and L7		Coil: 4.7 µH
L8		Coil: RF (Used in AL AND AH).
L8		Coil: RF (Used in BL AND BH).
L9		Coil: RF (Used in AL AND AH).
L9		Coil: RF (Used in BL AND BH).
L10		Coil: RF (Used in AL AND AH).
L10		Coil: RF (Used in BL AND BH).
L11		Coil: RF (Used in AL AND AH).
L11		Coil: RF (Used in BL AND BH).

SYMBOL	PART NO.	DESCRIPTION
L12 and L13		Coil: 4.7 µH
L16 and L17		Coil: 4.7 µH
L18		Coil: RF
L19		Coil: RF
L151		Coil: 4.7 µH
L152		Coil: 4.7 µH
L153		Coil: 120 µH (Used in AL AND AH).
L153		INDUCTOR: 100 nH (Used in BL AND BH).
L154		INDUCTOR: 180 nH
L154		INDUCTOR: 150 nH (Used in BL AND BH).
		----------RESISTORS----------
R1		Metal film: 270 ohm(5% 100 VDCW 1/8W
R2		Metal film: 22 ohm ±5% 100 VDCW 1/8W
R3		Metal film: 270 ohm ±5% 100 VDCW 1/8W
R4		Metal film: 390 ohm ±5% 100 VDCW 1/8W
R5		Metal film: 1K ohm ±5% 100 VDCW 1/8W
R6		Metal film: 2.2 ohm ±5% 100 VDCW 1/8W
R7		Metal film: 47 ohm ±5% 100 VDCW 3W
R8		Metal film: 22 ohm ±5% 100 VDCW 1/8W
R9		Metal film: 47 ohm ±5% 100 VDCW 3W
R10		Metal film: 4.7 ohm ±5 100 VDCW 1W
R11		Metal film: 4.7 ohm ±5% 100 VDCW 1W
R12		Metal film: 47 ohm ±5% 100 VDCW 3W
R13		Metal film: 47 ohm ±5% 100 VDCW 1W
R14		Metal film: 47 ohm ±5% 100 VDCW 1W
R15		Metal film: 47K ohm ±5% 100 VDCW 1/4W
R16		Metal film: 47 ohm ±5% 100 VDCW 1/2W
R17		Metal film: 47 ohm ±5% 100 VDCW 1/2W
R18		Metal film: 10K ohm ±5% 100 VDCW 1/8W
R19		Metal film: 100 ohm ±5% 100 VDCW 1W
R20		Metal film: 47 ohm ±5% 100 VDCW 1W
R21		Metal film: 22K ohm ±5% 100 VDCW 1/10W
R22		Metal film: 15K ohm ±5% 100 VDCW 1/10W
R23		Metal film: 220K ohm ±5% 100 VDCW 1/10W
R24		Metal film: 220K ohm ±5% 100 VDCW 1/10W
R25		Metal film: 2.2K ohm ±5% 100 VDCW 1/10W
R26		Metal film: 2.2 ohm ±5% 100 VDCW 1W
R27		Metal film: 12K ohm ±5% 100 VDCW 1/10W
R28		Metal film: 3.3K ohm ±5% 100 VDCW 1/10W
R29 and R30		Metal film: 27K ohm ±5% 100 VDCW 1/10W
R31 and R32		Metal film: 1K ohm ±5% 100 VDCW 1/10W
R33		Metal film: 27K ohm ±5% 100 VDCW 1/10W
R34		Metal film: 1K ohm ±5% 100 VDCW 1/10W
R35		Metal film: 390 ohm ±5% 100 VDCW 1/4W
R36		Metal film: 470 ohm ±5% 100 VDCW 1/4W
R37		Metal film: 3.3K ohm ±5% 100 VDCW 1/10W
R38		Metal film: 4.7K ohm ±5% 100 VDCW 1/10W
R39 and R40		Metal film: 47K ohm ±5% 100 VDCW 1/10W
R41		Posistor: sim to MURATA PTH9C22BB471Q-T
R45		Metal film: 390 ohm ±5% 100 VDCW 1/8W
R46		Metal film: 22 ohm ±5% 100 VDCW 1/8W
R47		Metal film: 2.2 ohm ±5% 100 VDCW 1W
R48		Metal film: 10K ohm ±5% 100 VDCW 1/10W
R151		Metal film: 470 ohm ±5% 100 VDCW 1/10W
R152		Metal film: 10 ohm ±5% 100 VDCW 1/10W
R153		Metal film: 470 ohm ±5% 100 VDCW 1/10W
R154		Metal film: 1K ohm ±5% 100 VDCW 1/10W
R155		Metal film: 470 ohm ±5% 100 VDCW 1/10W
R156		Metal film: 5.6K ohm ±5% 100 VDCW 1/10W
R157		Metal film: 10 ohm ±5% 100 VDCW 1/10W
R158		Metal film: 100 ohm ±5% 100 VDCW 1/10W
R159		Metal film: 270 ohm ±5% 100 VDCW 1/10W
R160		Metal film: 18 ohm ±5% 100 VDCW 1/10W
R161		Metal film: 270 ohm ±5% 100 VDCW 1/10W
R162		Metal film: 120 ohm ±5% 100 VDCW 1/10W
R163		Metal film: 150 ohm ±5% 100 VDCW 1/10W
R164		Metal film: 1.2K ohm ±5% 100 VDCW 1/10W
R165		Metal film: 10 ohm ±5% 100 VDCW 1/4W
RV1		Variable: 10K ohm
		--------TRANSFORMERS--------
T1		RF TRANSFORMER
T2		RF TRANSFORMER
T4		RF TRANSFORMER
T5		RF TRANSFORMER:
T5-1		FERRITE CORE: 10X15X20 (Used in AL AND BL).
T5		RF TRANSFORMER:
T5-1		FERRITE CORE: 16X16X32 (Used in AH AND BH).
T6		RF TRANSFORMER FOR COUPLER
T151		RF TRANSFORMER:
T152		RF TRANSFORMER:
		---------TRANSISTORS---------
TR1		Silicon, NPN: MITSUBISHI 2SC1971
TR2		Silicon, NPN: MITSUBISHI 2SC1729
TR3		RF POWER TRANSISTOR: 2SC2540 MITSUBISHI (Used in AL AND BL).
TR4		RF POWER TRANSISTOR: 2SC2540 MITSUBISHI (Used in AL AND BL).
TR4		RF POWER TRANSISTOR: 2SC2694 MITSUBISHI (Used in AH AND BH).
TR5		Silicon, PNP: sim to PANASONIC 23B953A
TR6		Silicon, NPN: sim to NEC 2SD596-T1B DV3
TR7		Silicon, PNP: sim to PANASONIC 23B624-T1B BV3
TR8 and TR9		Silicon, NPN: sim to NEC 2SD596-T1B DV3
TR11		Silicon, PNP: sim to PANASONIC 23B624-T1B BV3
TR12		Silicon, NPN: sim to NEC 2SD596-T1B DV3
TR13		Silicon, PNP: sim to PANASONIC 23B624-T1B BV3
TR151		Silicon, NPN: sim to NEC 2SC1971
TR152		Silicon, NPN: sim to MOTOROLA
		----------TERMINALS----------
TB2		Terminal Plate

Linear OP amplifier IC1
(JRC NJM3404AM-T1)

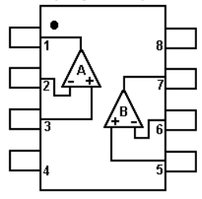


9 V Voltage Regulator IC3
(PANASONIC AN6541)



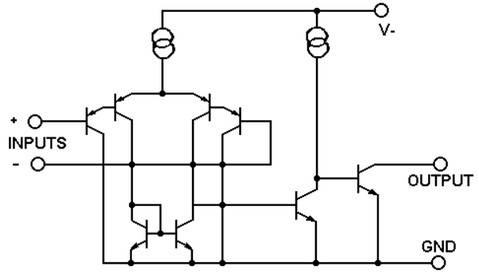
Comparator IC2
(JRC NJM2404M-T1)

Connection Diagram
D.M-Type
(Top View)

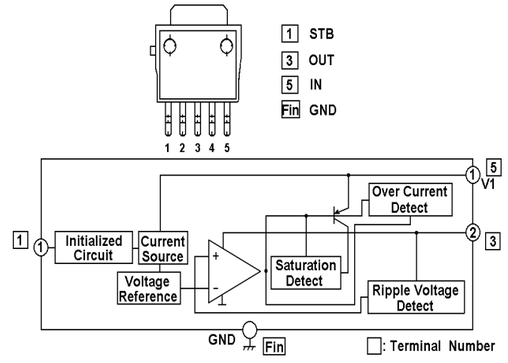


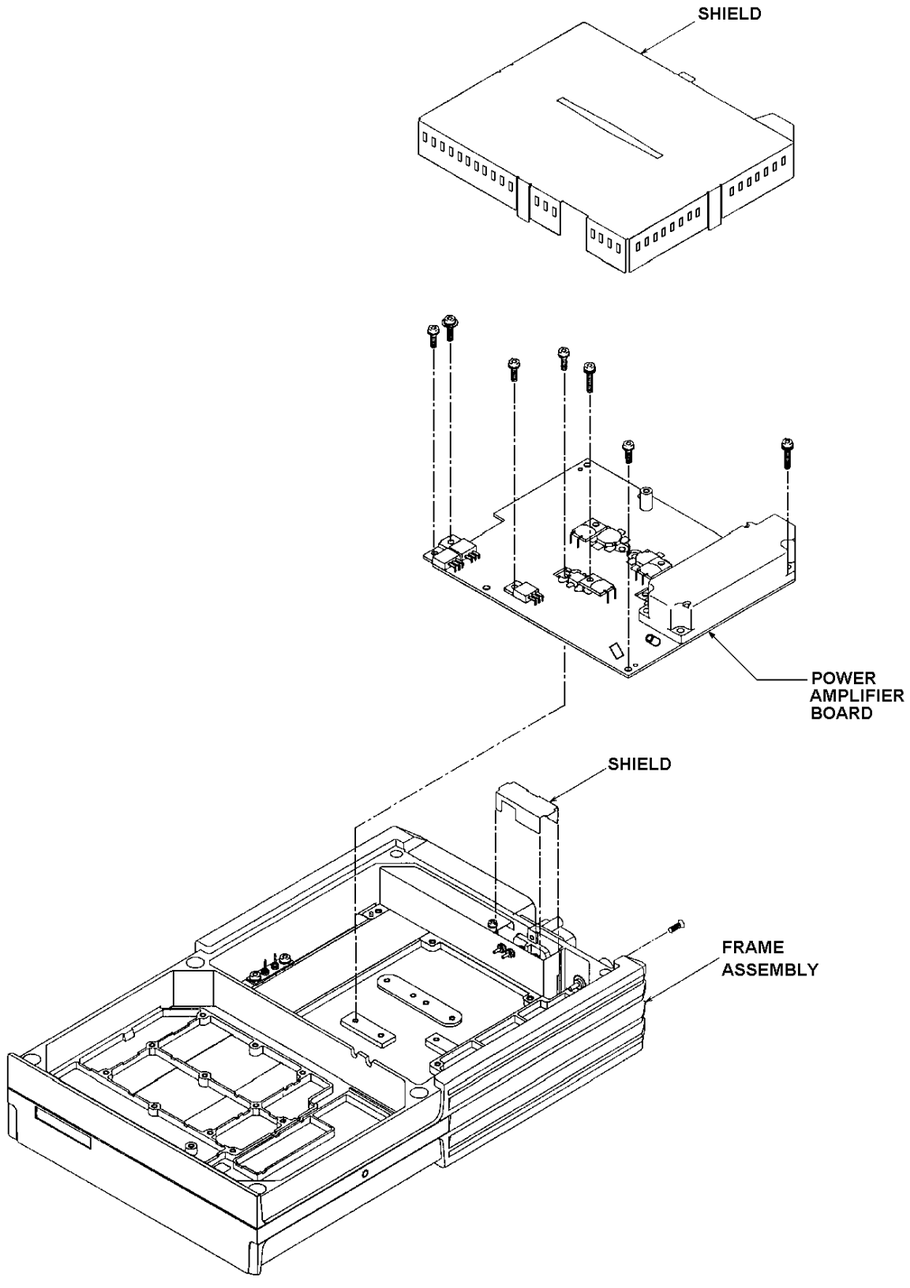
PIN FUNCTION
1. A OUTPUT
2. A- INPUT
3. A+INPUT
4. GROUND
5. B+INPUT
6. B- INPUT
7. B OUTPUT
8. V-

Equivalent Circuit (½ Shown)



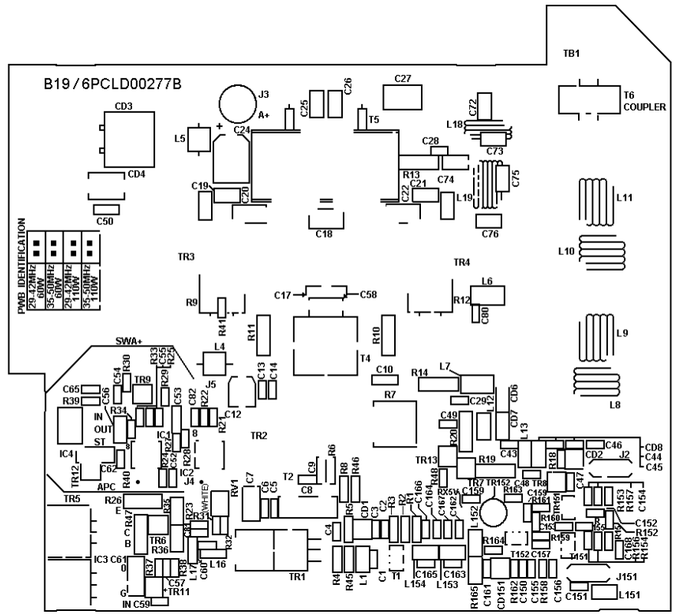
Voltage Regulator IC4
(PANASONIC AN6545SP)



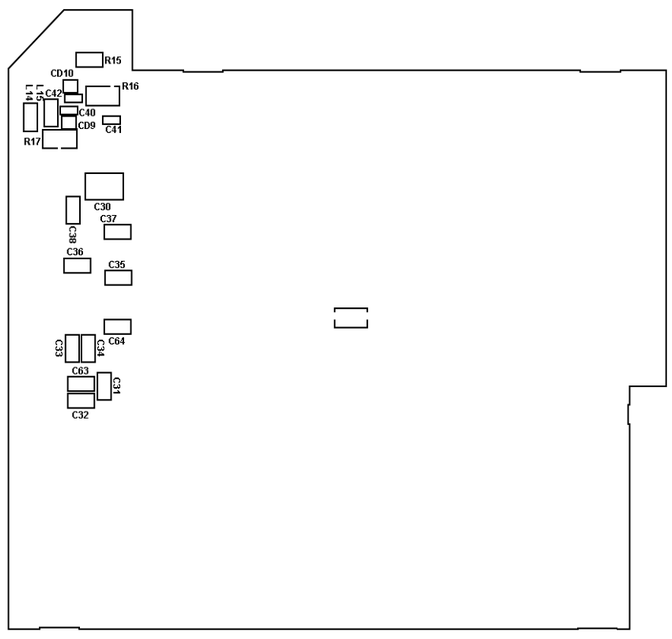


29.0-50 MHz 60/110 Watts
POWER AMPLIFIER

COMPONENT SIDE

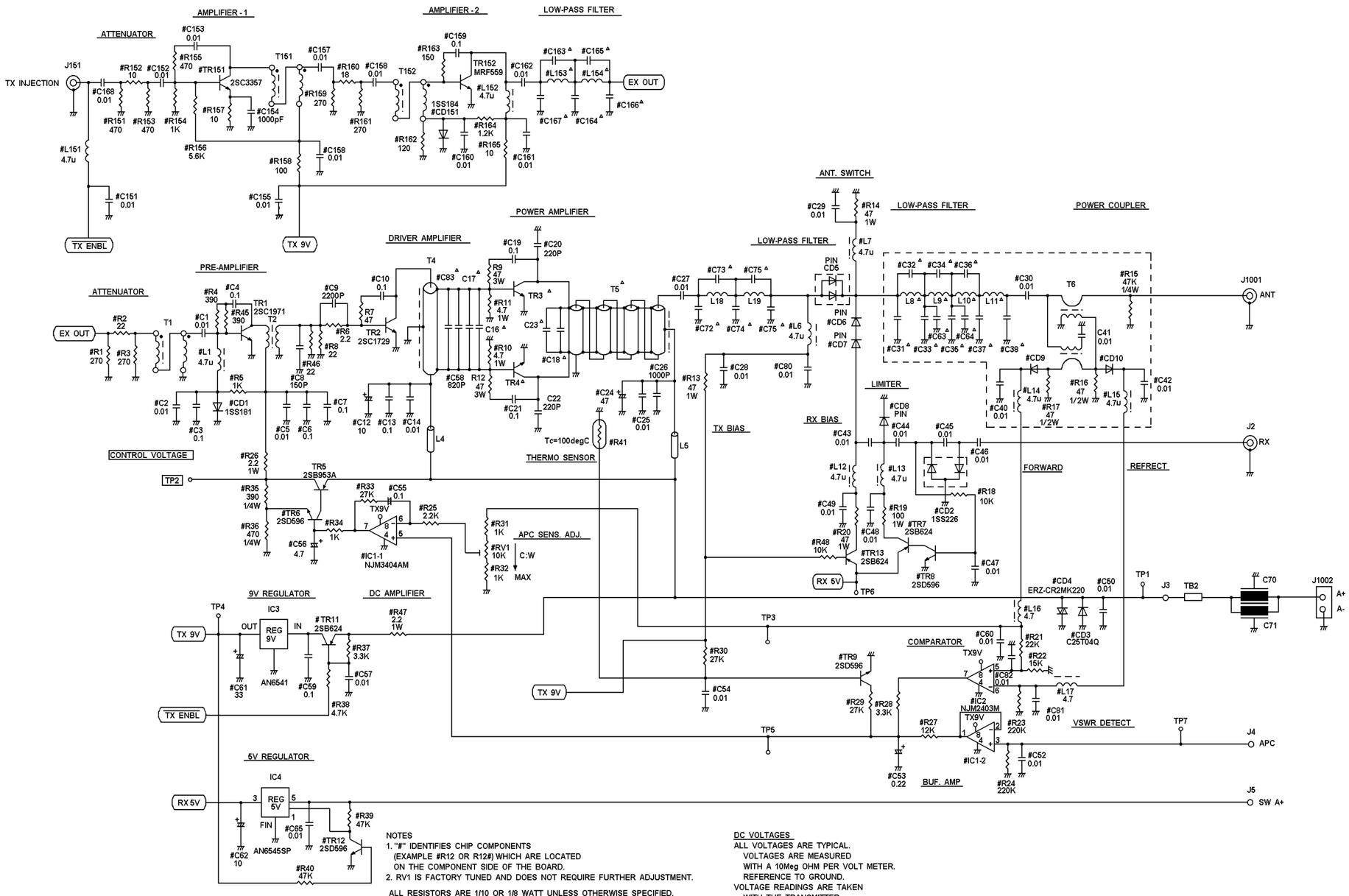


SOLDER SIDE



29.0-50 MHz 60/110 WATTS
POWER AMPLIFIER

(DD00-CAH-505 1/2)



NOTES
1. "#" IDENTIFIES CHIP COMPONENTS
   (EXAMPLE #R12 OR R12#) WHICH ARE LOCATED
   ON THE COMPONENT SIDE OF THE BOARD.
2. RV1 IS FACTORY TUNED AND DOES NOT REQUIRE FURTHER ADJUSTMENT.

ALL RESISTORS ARE 1/10 OR 1/8 WATT UNLESS OTHERWISE SPECIFIED.
RESISTOR VALUES IN Ω UNLESS FOLLOWED BY MULTIPLIER K OR M.
CAPACITOR VALUES IN u UNLESS FOLLOWED BY MULTIPLIER P.
INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m OR u.

DC VOLTAGES
ALL VOLTAGES ARE TYPICAL.
VOLTAGES ARE MEASURED
WITH A 10Meg OHM PER VOLT METER.
REFERENCE TO GROUND.
VOLTAGE READINGS ARE TAKEN
WITH THE TRANSMITTER
UNKEYED / KEYED. EX. 45(UNKEYED) / 0.5 (KEYED).

29.0-50 MHz 60/110 WATTS POWER AMPLIFIER

(DD00-CAH-505 1/2)