MAINTENANCE MANUAL
ORION™

UHF POWER AMPLIFIER UNITS

344A4573P1	20 WATT	403-440 MHz
344A4573P2	20 WATT	440-470 MHz
344A4573P3	40 WATT	403-440 MHz
344A4573P4	40 WATT	440-470 MHz
344A4573P5	35 WATT	470-512 MHz
344A4573P6	100 WATT	403-440 MHz
344A4573P7	100 WATT	440-470 MHz
344A4573P8	80 WATT	470-512 MHz
344A4573P9	20 WATT	378-403 MHz

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ILLUSTRATIONS

ERICSSON

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DESCRIPTION

The **R**adio **F**requency (**RF**) Power Amplifiers for the UHF **ORION**™ mobile radio are provided in three different frequency ranges and power levels designated as follows:

- 344A4573P1 (CAH-545EA) - 403-440 MHz, 20 WATT used in low power applications.
  344A4573P2 (CAH-545EB) - 440-470 MHz, 20 WATT used in low power applications.
  344A4573P9 (CAH-545ED) - 378-403 MHz, 20 WATT used in low power applications.
- 344A4573P3 (CAH-545AL) - 403-440 MHz, 35/40 WATT used in mid power applications.
  344A4573P4 (CAH-545BL) - 440-470 MHz, 35/40 WATT used in mid power applications.
  344A4573P5 (CAH-545CL) - 470-512 MHz, 35/40 WATT used in mid power applications.
- 344A4573P6 (CAH-545AH) - 403-440 MHz, 80/100 WATT used in high power applications.
  344A4573P7 (CAH-545BH) - 440-470 MHz, 80/100 WATT used in high power applications.
  344A4573P8 (CAH-545CH) - 470-512 MHz, 80/100 WATT used in high power applications.

The exciter for each of the three power amplifiers is located on Synthesizer/Receiver/Exciter board CMN-354-1. This exciter circuit provides approximately 500 milliwatt input to the PA (refer to Maintenance Manual LBI- 38905). The PA utilizes a single power amplifier module (HC1) as the driver unit. In the case of the 20 watt amplifier the power module is the only power amplifying unit (Refer to Figure 1). With the other two power levels the power module drives other power transistors to provide the power output required (Refer to Figures 2 and 3). Each power amplifier is provided with an antenna switch and limiter circuit to isolate the receive circuit from the transmit circuit, limiting the receiver input from being over driven due to large RF signals. Each power amplifier has a power detect circuit which controls an **A**utomatic **P**ower **C**ontrol (**APC**) circuit to keep the power output constant. A low-pass filter is provided in the antenna circuit to reduce harmonic emissions. A keyed **Tx 9V** regulator is provided to power the APC circuits.

CIRCUIT ANALYSIS

20 WATT

The 20 Watt PA assembly uses one power module (HC1) to provide the output power.

Supply voltage for the power amplifier is connected from power leads on the System Interface Board to J3 (A+) and G (A-) on the PA Board. Diode CD7 is a surge protector to suppress pulses on the power leads. Diode CD8 will cause the fuse to blow if the polarity of the power leads is reversed.

The Exciter output is coupled through connector J151 on the Synthesizer/Receiver/Exciter Board to input connector J1 on the PA board. The 500 milliwatt RF input at J1 is coupled to power module HC1 through an attenuator pad consisting of resistors R1-R3. This pad attenuates the power to about 300 milliwatt and provides isolation between Exciter and PA. The power module (HC1) amplifies the 300 milliwatt input to 20 Watts.

The power module consists of a three-stage RF amplifier (Refer to **IC DATA**). The first stage power supply voltage is supplied by the power control circuit. The second and third stage power supply voltage is supplied by **SMOOTHING FILTER** transistor TR1. The second and third stage RF amplifiers operate as class C.

The 20 Watts output of HC1 is coupled to the **ANTENNA** and **ANTENNA SWITCH & LIMITER** circuits through 50 ohm stripline Z1.

Antenna Switch & Limiter

The Antenna Switch circuit consists of capacitor C25 and inductor L9 and takes the place of a quarter-wave micro strip line. When **TX9V** output goes high, bias current flows through switching diodes CD3 and CD4. A low impedance now exists at the anode of CD4 and a high impedance exists at the node connection of C25 and L9. This isolates the transmitter power from the receiver. Diode CD3 is now an RF short and along with capacitor C12, couples the power to the lowpass filter and on to the antenna.

The limiter circuit consists of transistors TR7, TR8 and diode package CD13. While receiving, if the received signal level exceeds +10 dBm, the rectified currents of CD13 provide forward bias to TR7, TR8 and PIN diode CD4 proportional to the received signal level. This causes a quarter-wave circuit (lumped constants C25 and L9) to turn on when the received signal exceeds +10 dBm and protects the receiver from excessively high receive signal levels.

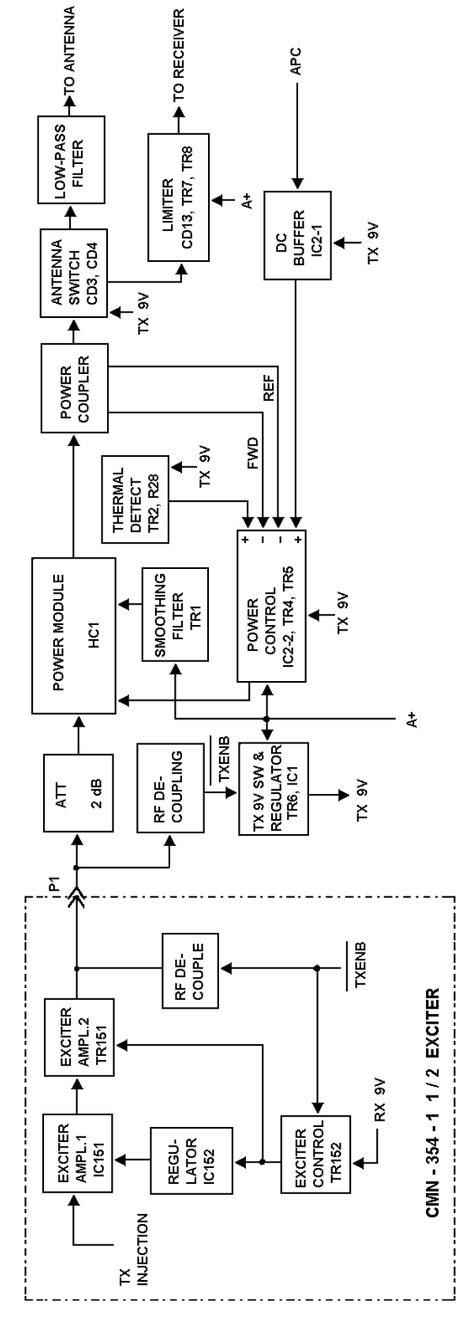


Figure 1 - 20-Watt Power Amplifier Block Diagram

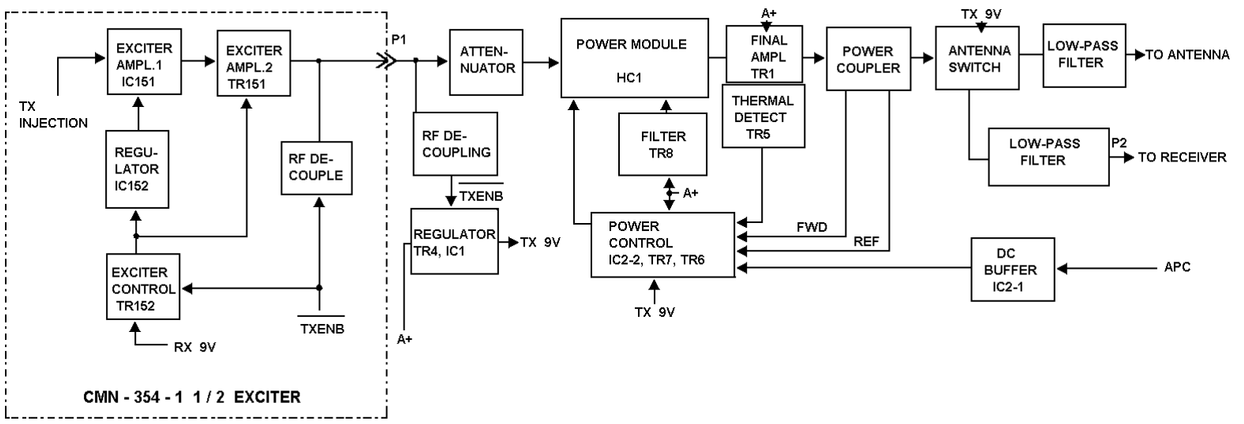


Figure 2 - 35/40-Watt Power Amplifier Block Diagram

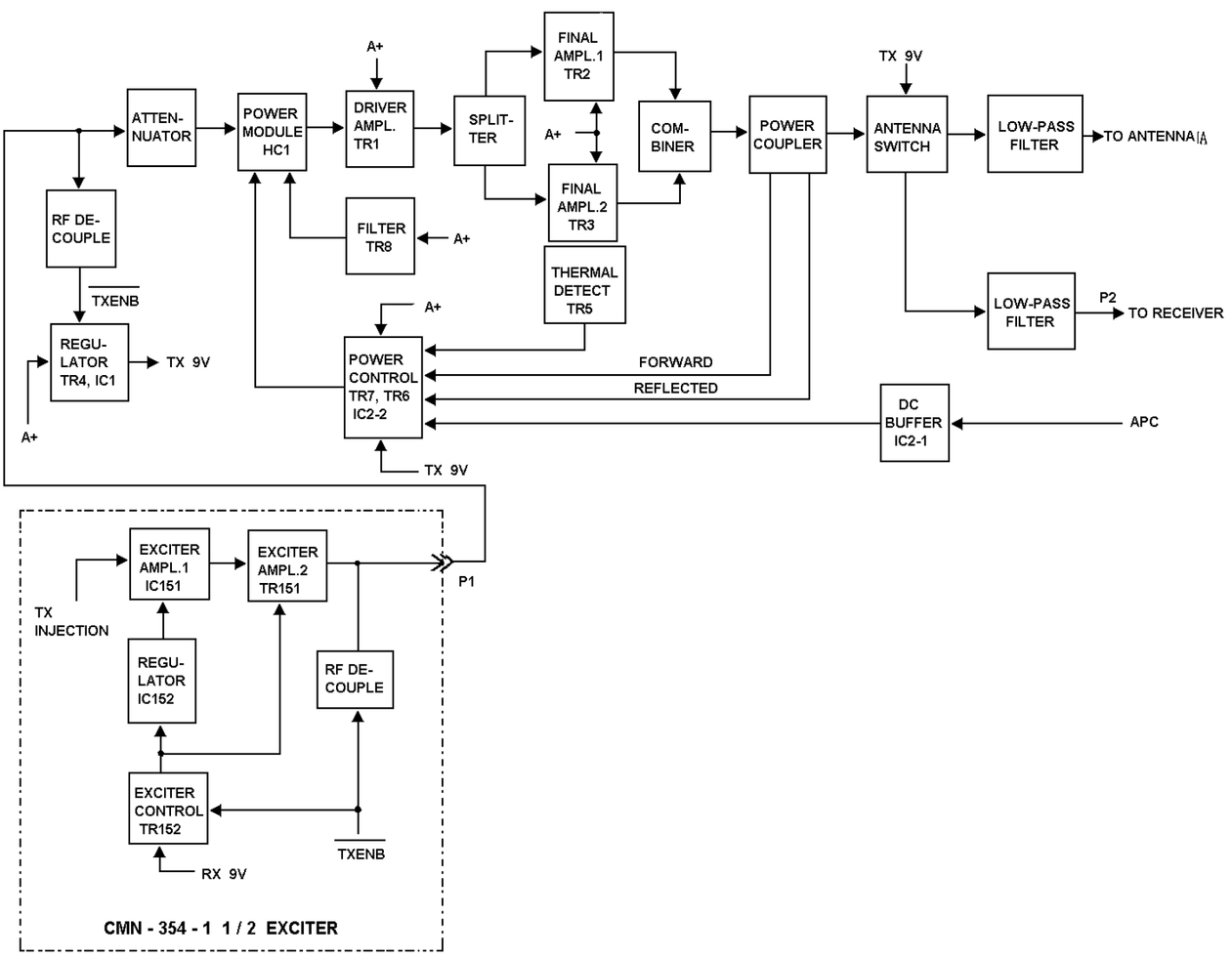


Figure 3 - 80/100 - Watt Power Amplifier Block Diagram

Tx 9V Switch

When the lead, located on the Synthesizer/Receiver/Exciter board, goes low, the DC voltage on J151 goes low. On the PA board, the DC voltage on J1 also goes low completing the circuit for diode CD9. With CD9 conducting TX 9V Switch transistor TR6 conducts applying A+ (13.32 V) to the input of +9 Volt Regulator IC1. The regulated +9 volts applies bias to operational amplifier IC2, transistor TR2 and switching diodes CD3 and CD4.

Power Control

The **A**uto **P**ower **C**ontrol (**APC**) circuit protects the transmitter PA from damage due to:

a. excessive output power

b. excessive reflected power

or

c. excessive temperature

The output power control circuit allows the RF output power to be set at rated power by the APC voltage from the Logic/IF/Audio Board. If the output power of the PA increases, the detected voltage and the input to operational amplifier IC2-2 increases. The output voltage of operational amplifier IC2-2 decreases. This causes **DC DRIVER** transistor TR5 to conduct less. This increases the base voltage on PNP **DC PASS** transistor TR4, causing it to conduct less. This results in less voltage being applied to the first amplifier stage in RF Power Module HC1, reducing the output power of the PA in proportion to the increases in output power detected by the circuit.

To protect the PA against badly mismatched loads, a reverse power detector circuit (**VSWR**) consisting of diode CD2, transistor TR5, operational amplifier IC2-2 and pass transistor TR4 detects reverse (reflected) power. When sufficient power is detected by CD2 to cause it to conduct, the voltage at the output of IC2-2 decreases, causing the Power Module to lower the output power, protecting the PA. The reverse power level is set by resistor R8 connected in series with diode CD2.

The PA is protected against temperature increases by a thermal detector circuit. This circuit consists of resistor R28, **THERMAL DETECT** transistor TR2, **DC DRIVER** transistor TR5 and **DC AMPL** operational amplifier IC2-2. As temperature increases, the resistance to ground through thermal detector resistor R28 increases. This causes IC2-2 to conduct less, causing a decrease in PA output until the temperature level is reduced. The temperature level is set by resistor R28. When the heatsink temperature rises above 90 C, the resistance of R28 increases and the power output is reduced.

35/40 WATT

The 35/40 Watt PA assembly uses one power module (HC1) and one RF power transistor (TR1) to provide the output power.

Supply voltage for the power amplifier is connected from power leads on the System Interface Board to J3 (A+) and G (A-) on the PA Board. Diode CD2 is a surge protector to suppress pulses on the power leads. (Diode CD1001 in the PA UNIT will cause a fuse to blow if the voltage polarity is reversed. Refer to the PA INTERCONNECTION DIAGRAM)

Test **P**oints (**TP**) are the printed board terminals for measuring control voltage as follows:

- TP1 A+ (13.42V)
- TP2 Control Voltage (4.72V)
- TP3 Forward Power Detect (2.64V)
- TP4 Tx 9V (9.12V)
- TP5 APC Voltage on output of DC AMPL IC2-1 (2.64V)
- TP6 Voltage to HC1, pins 3 &4 (12.5V)
- TP7 APC Voltage (3.5V)

The Exciter output is coupled through connector J151 on the Synthesizer/Receiver/Exciter Board to input Jack P1 on the PA board. The 500 milliwatt RF input at P1 is coupled to power module HC1 through an attenuator pad consisting of resistors R1-R4. This pad attenuates the 500 milliwatt to about 300 milliwatt and provides isolation between Exciter and PA. The power module (HC1) amplifies the 300 milliwatt input to 13 Watts.

The power module consists of a three-stage RF amplifier (Refer to IC DATA). The first stage power supply voltage is supplied by the power control circuit. The second and third stage power supply voltage is supplied by **SMOOTHING FILTER** transistor TR8. The second and third RF amplifiers operate as class C.

The 13 Watts output of HC1 is coupled to **POWER AMPL** transistor TR1 through impedance matching components consisting of capacitors C7, C9, C10 and inductor L2 through coupling capacitor C8. Transistor TR1 amplifies the 13 Watt level to 40 Watts. The output of TR1 is coupled to the **ANTENNA** and **ANTENNA SWITCH** through impedance matching components consisting of capacitors C11-C13, inductor L6 and impedance matching network Z2 through coupling capacitor C14 and 50 ohm stripline Z7.

Antenna Switch

The Antenna Switch circuit consists of capacitor C64 and inductor L23 and takes the place of a quarter-wave micro strip line. When **TX9V** output goes high, bias current flows through switching diodes CD5, CD7 and CD9. A low impedance now exists at the anode of CD7 and a high impedance exists at the connection of C64 and L23. This isolates the transmitter power from the receiver. Diode CD5 is now an RF short and along with capacitor C55 couples the power to the lowpass filter and on to the antenna.

Tx 9V Switch

When the **$\overline{\text{TX ENB}}$** lead goes low, TX 9V switch transistor TR4 conducts applying A+ (13.32 V) to the input of +9 Volt Regulator IC1. The regulated +9 volts (**TX 9V**) applies bias to operational amplifier IC2, transistor TR5 and switching diodes CD5, CD7 and CD9.

Power Control

The **A**uto **P**ower **C**ontrol (**APC**) circuit protects the transmitter PA from damage due to:

a. excessive output power

b. excessive reflected power

or

c. excessive temperature

The output power control circuit allows the RF output power to be set at rated power by the APC voltage from the Logic/IF/Audio Board. If the output power of the PA increases, the detected voltage and the input of operational amplifier IC2-2 increases. The output voltage of IC2-2 decreases. This causes **DC DRIVER** transistor TR6 to conduct less. This increases the base voltage on PNP **DC PASS** transistor TR7, causing it to conduct less. This results in less voltage being applied to the first amplifier stage in driver module (HC1), reducing the output power of the PA in proportion to the increases in output power detected by the circuit.

To protect the PA against badly mismatched loads, a reverse power detector circuit (**VSWR**) consisting of diode CD4, transistor TR6, operational amplifier IC2-2 and pass transistor TR7 detects reverse (reflected) power. When sufficient power is detected by CD4 to cause it to conduct, the voltage at the output of IC2-2 decreases, causing the driver module to lower the output power, protecting the PA. The reverse power level is set by resistor R15 connected in series with diode CD4.

The PA is protected against temperature increases by a thermal detector circuit. This circuit consists of resistor R49, transistors TR5, TR6, TR7 and operational amplifier IC2-2. As temperature increases, the resistance to ground through thermal detector resistor R49 increases. This causes IC2-2 to conduct less, causing a decrease in PA output until the temperature level is reduced. The temperature level is set by resistor R49. When the heatsink temperature rises above 90 C, the resistance of R49 increases and the power output is reduced.

80/100 WATT

The 80/100 Watt PA assembly uses one power module (HC1) and three RF power transistors (TR1, TR2 and TR3) to provide the output power.

Supply voltage for the power amplifier is connected from power leads on the System Interface Board to J3 (A+) and G (A-) on the PA Board. Capacitors C73 and C95 prevent RF from getting on the power leads. Diode CD1 causes a fuse to blow if the polarity of the power leads is reversed. Diode CD2 is a surge protector to suppress pulses on the power leads.

Test **P**oints (**TP**) are the printed board terminals for measuring control voltage as follows:

- TP1 A+ (13.32V)
- TP2 Control Voltage (4.27V)
- TP3 Forward Power Detect (3.2V)
- TP4 Tx 9V (9.2V)
- TP5 APC Voltage on output of DC AMPL IC2-1 (2.66V)
- TP6 Voltage to HC1, pins 3 &4 (12.8V)
- TP7 APC Voltage (3.5V)

The exciter output is coupled through connector J102 on the Synthesizer/Receiver/Exciter Board to input Jack P1 on the PA board. The 500 milliwatt RF input at P1 is coupled to power module HC1 through an attenuator pad consisting of resistors R1 through R4. This pad attenuates the 500 milliwatt input to 300 milliwatt and provides isolation between the Exciter and PA. **POWER MODULE** HC1 amplifies the 300 milliwatt input to 12 Watts. The power module (HC1) consists of a three stage RF amplifier. The first stage of the module is controlled by the voltage from the power control circuit. The amplifier consist of a Class C driver amplifier and two Class C common-emitter amplifiers. The 12 watt

output is coupled to **DRIVER AMPL** transistor TR1 through impedance matching components consisting of capacitors C7, C9 C10, inductors L2 through L4 and coupling capacitor C8. The output of TR1 is coupled to the power **SPLITTER** through the impedance matching components consisting of capacitors C11 through C13, C15, C96, C97, inductor L6 and impedance matching network Z1 through coupling capacitor C14. Transistor TR1 amplifies the 12 watt input level to 40 watts. The power splitter consists of capacitors C18, C27, C36 and Inductors L7 and L11. Resistor R5 absorbs any unbalance in the drive to **POWER AMPL-1**, **AMPL-2** transistors TR2 and TR3. These power amplifier stages consist of two identical paralleled Class C power amplifiers. The output of the power splitter is coupled to transistors TR2 and TR3 through coupling capacitors C19 and C28 and the impedance matching components consisting of capacitors C20, C21, C29 and C30. The output of TR2 and TR3 is coupled to the power combiner through impedance matching components consisting of capacitors C22-C25, C31-C34 and impedance matching networks Z2 and Z3. The power **COMBINER** consists of capacitors C26, C35, C40, C41 and inductors L10, L14 and L15. Resistor R8 absorbs the difference in the output power of TR2 and TR3. Transistors TR2 and TR3 each amplify the input level from 20 watts to about one-half (1/2) of the rated output power. The output of the combiner is coupled to the **ANTENNA SWITCH** through 50 ohm stripline Z7.

Antenna Switch

The antenna switch circuit consists of capacitor C64 and inductor L23 and takes the place of a quarter-wave micro strip line. When **TX9V** output goes high, bias current flows through switching diodes CD6 through CD9. A low impedance now exists at the anode of CD7 and CD8 and high impedance exists at the connection of C64 and L23. This isolates the transmitter power from the receiver. Diode CD6 is now an RF short and along with capacitor C55 couples the power to the lowpass filter and on to the antenna.

Tx 9V Switch

When the **$\overline{\text{TX ENB}}$** lead goes low, **TX 9V** switch transistor TR4 conducts applying A+ (13.32 V) to the input of +9 Volt Regulator IC1. The regulated +9 volts (**TX 9V**) applies bias to operational amplifier IC2, transistor TR5 and switching diodes CD6 through CD9.

Power Control

The Automatic Power Control (APC) circuit protects the transmitter PA from damage due to:

a. excessive output power

b. excessive reflected power

or

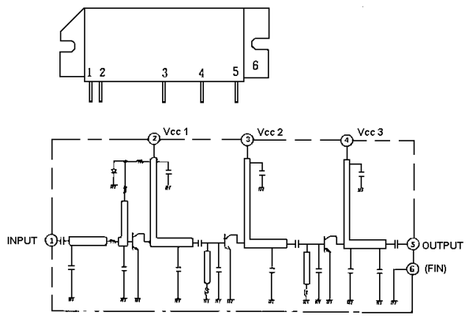
c. excessive temperature

The output power control circuit allows the RF output power to be set at rated power by the APC voltage from the LOGIC/IF/AUDIO Board. If the output power of the PA increases, the detected voltage and the input of operational amplifier IC2-2 increases. The output voltage of operational amplifier IC2-2 decreases. This causes transistor TR6 to conduct less. This increases the base voltage on PNP pass transistor TR7, causing it to conduct less. This results in less voltage being applied to the first amplifier stage in driver module (HC1), reducing the output power of the exciter/ PA in proportion to the increases in output power detected by the circuit.

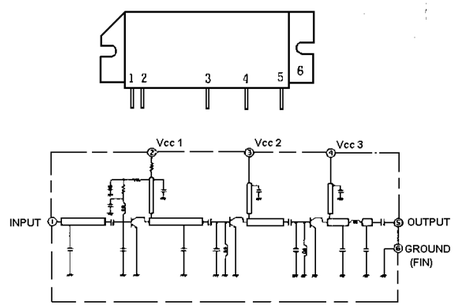
To protect the PA against badly mismatched loads, a reverse power detector circuit (VSWR) consisting of diode CD4, transistor TR6, operational amplifier IC2-2 and pass transistor TR7 detect reverse (reflected) power. When sufficient power is detected by CD4 to cause it to conduct, the voltage at the output of IC2-2 decreases, causing the driver module to lower the output power, protecting the PA. The reverse power level is set by resistor R15 connected in series with diode CD4.

The PA is protected against temperature increases by a thermal detector circuit. This circuit consists of resistor R49, transistors TR5, TR6, TR7 and operational amplifier IC2-2. As temperature increases, the resistance to ground through thermal detector resistor R49 increases. This causes IC2-2 to conduct less, causing a decrease in PA output until the temperature level is reduced. The temperature level is set by resistor R49. When the heatsink temperature rises above 90 C, the resistance of R49 increases and the power output is reduced.

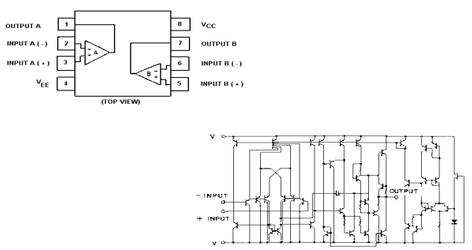
403-512 MHz, 20-WATT POWER MODULE HC1



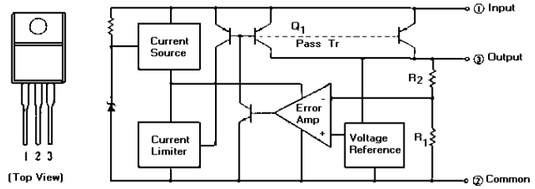
403-512 MHz, 35/40 -WATT POWER MODULE HC1



9 VOLT REGULATOR IC1



OPERATIONAL AMPLIFIER IC2



PA UNIT (EUROPEAN MODEL)
344A4573P1/JHM-471PAE, 344A4573P2/JHM-471PBE
344A4573P9/JHM-471PDE

SYMBOL	PART NO.	DESCRIPTION
A1001	NOTE: Parts listed are for reference only. Refer to Service Section for serviceable parts.	PA CIRCUIT CAH-545EA (Used in 344A4573P1).
A1001		PA CIRCUIT CAH-545EB (Used in 344A4573P2).
A1001		PA CIRCUIT CAH-545ED (Used in 344A4573P9).
A1002		INTERFACE CMH-1231E.
		----------CAPACITORS----------
C1001 and C1002		Ceramic: 1000 pF +50%, -20% 50 VDCW temp coef ±15%.
		----------CONNECTORS----------
J1001		H-6JALD00005.
TB1001		ALB-01A.
		----------WIRE----------
W1001		250V-HV-19/0.18-(2)
		----------COAXIAL CABLES----------
ZC1002		H-6JJLD25150.
ZC1003		H-6JJLD027076.
ZC1004		H-6ZCLD41060.

PA UNIT (USA MODEL)

344A573P3/JHM-471PAL **344A573P4/JHM-471PBL**
344A4573P5/JHM-471PCL **344A4573P6/JHM-471PAH**
344A4573P7/JHM-471PBH **344A4573P8/JHM-471PCH**

SYMBOL	PART NO.	DESCRIPTION
A1001	NOTE: Parts listed are for reference only. Refer to Service Section for serviceable parts.	PA CIRCUIT CAH-545AL (Used in 344A4573P3).
A1001		CIRCUIT CAH-545BL (Used in 344A4573P4).
A1001		PA CIRCUIT CAH-545CL (Used in 344A4573P5).
A1001		PA CIRCUIT CAH-545AH (Used in 344A4573P6).
A1001		PA CIRCUIT CAH-545BH (Used in 344A4573P7).
A1001		PA CIRCUIT CAH-545CH (Used in 344A4573P8).
A1002		INTERFACE (Used in 344A4573P3,P4,P5).
A1002		INTERFACE (Used in 344A4573P6,P7,P8).
		---------- CAPACITORS ----------
C1001		Ceramic: 1000 pF +200%,-0%, 50 VDCW temp coef +20%,-55%.
C1002		Ceramic: 1000 pF +200%,-0%, 50 VDCW temp coef +20%,-55% (Used in P6,P7,P8).
C1004		Ceramic: 1000pF +50-20% 50 VDCW.
		---------- DIODE ----------
CD1001		Silicon fwd current 3A, 200 PIV ;sim to MOTOROLA MR751 (Used in 344A4573P3,P4,P5).
		---------- JACKS ----------
J1001		Connector: ALB05.
J1002		CCT9402-0501R.
		---------- TERMINALS----------
TB1001		ALB-01A.
		----------COAXIAL CABLES----------
ZC1002		H-6ZCLD41060.
ZC1003		H-6ZCLD40111 (Used in 344A4573P6,P7,P8).
ZC1003		H-6ZCLD40009 (Used in 344A4573P3,P4,P5).

*COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

POWER AMPLIFIER
CAH-545E - 20 WATT
CAH-545EA (Used in 344A4573P1)
CAH-545EB (Used in 344A4573P2)
CAH-545ED (Used in 344A4573P9)

SYMBOL	PART NO.	DESCRIPTION
	NOTE: Parts listed are for reference only. Refer to Service Section for serviceable parts.	---------- CAPACITORS ----------
C1 and C2		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C3		Electrolytic: 33 µF ±20% 25 VDCW, temp coef ±20%.
C4		Film: 0.1 µF ±10% 50 VDCW, temp coef ±15%.
C5		Ceramic: 4.7 pF ±10% 50 VDCW, temp coef ±10%.
C7		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C8		Ceramic: 7 pF ±0.5pF 50 VDCW, temp coef 0±30PPM. (Used in EA).
C8		Ceramic: 6 pF ±0.5pF 50 VDCW, temp coef 0±30PPM. (Used in EB, ED).
C11		Ceramic: 7 pF ±0.5pF 50 VDCW, temp coef 0±30PPM. (Used in EA).
C11		Ceramic: 6 pF ±0.5pF 50 VDCW, temp coef 0±30PPM. (Used in EB, ED).
C12		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60 PPM.
C13 and C14		Ceramic: 3 pF ±0.25pF 500 VDCW, temp coef 0±120 PPM.
C15		Ceramic: 2 pF ±0.25 PF 500 VDCW, temp coef 0±250 PPM.
C16		Ceramic: 3 pF ±0.25pF 500 VDCW, temp coef 0±120 PPM.
C17		Ceramic: 5 pF ±0.25pF 500 VDCW, temp coef 0±60 PPM.
C19		Ceramic: 6 pF ±0.5pF 500 VDCW, temp coef 0±60PPM.
C20		Ceramic: 2 pF ±0.25 PF 500 VDCW, temp coef 0±250 PPM.
C21		Electrolytic: 220 µF ±20% 25 VDCW, temp coef ±20%.
C22 thru C24		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C25		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM.
C26		Ceramic: 4 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C27		Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM.
C28		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C30		Tantalum: 4.7 µF ±20% 25 VDCW.
C31		Electrolytic: 10 µF ±20% 25 VDCW, temp coef ±20%.
C32		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30PPM.
C34		Electrolytic: 10 µF ±20% 25 VDCW, temp coef ±20%.
C35		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C36		Tantalum: 1 uF ±20% 16 VDCW.
C37		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C38		Ceramic: 0.1 µF +80%,-20% 25 VDCW, temp coef +30%,-80%.
C39 and C40		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C43		Ceramic: 6 pF ±0.5 pF 500 VDCW, temp coef 0±60 PPM.
C44		Ceramic: 4 pF ±0.25 pF% 50 VDCW, temp coef 0±30PPM.
C60 thru C62		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60PPM.
		---------- DIODES ----------
CD1 and CD2		Silicon: sim to PANASONIC MA741-TX.
CD3 and CD4		PIN DIODE: sim to MITSUBISHI M1809-T11.
CD7		VARISTOR: sim to PANASONIC ERZ-CF2MK220.
CD8		Silicon: sim to MOTOROLA MR751.
CD9		Silicon: fast recovery (2 diodes in cathode common): sim to TOSHIBA ISS184
CD13		Silicon: fast recovery : sim to TOSHIBA ISS226.
		---------INTEGRATED CIRCUITS---------
HC1		RF Power Amplifier: sim to MITSUBISHI M57788L-38 (Used in EA).
HC1		RF Power Amplifier: sim to MITSUBISHI M57788H-38 (Used in EB).
HC1		RF Power Amplifier: sim to MITSUBISHI M57729UL-38 (Used in ED).
IC1		Linear: Positive Voltage Regulator; sim to PANASONIC AN6541.
IC2		Linear: Dual OP Amp: sim to NEW JRC-NJM 3404 AM-T1.
		----------CONNECTORS----------
J1 and J2		Connector.
J3		Connector.
J4		Connector.
		----------INDUCTORS----------
L1		Coil: 0.22 µH.
L2		Coil: RF 0.22 µH.
L3 and L4		Coil: 19 nH.
L5 thru L8		RF Coil: AIRWOUND.
L9 and L10		Coil: RF 19 nH.
L9 and L10		Coil: RF 19 nH.
L11		Coil: RF 0.22 µH.
		---------- RESISTORS ----------
R1		Metal film: 470 ohms ±5%, 100 VDCW, 1/10W.
R2		Metal film: 12 ohms ±5%, 200 VDCW, 1/4W.
R3		Metal film: 470 ohms ±5%, 100 VDCW, 1/10W.
R4 and R5		Metal film: 22 ohms ±5%, 200 VDCW, 1/2W.
R6		Metal film: 100 ohms ±5%, 250 VDCW, 1W.
R8		Metal film: 100 ohms ±5%, 100 VDCW, 1/10W.
R9 and R10		Metal film: 47 ohms ±5%, 100 VDCW, 1/10W.
R11		Metal film: 47K ohms ±5%, 200 VDCW, 1/8W.
R14		Metal film: 27K ohms ±5%, 100 VDCW, 1/10W.
R15		Metal film: 2.7K ohms ±5%, 100 VDCW, 1/10W.
R16		Metal film: 390 ohms ±5%, 200 VDCW, 1/4W.
R17		Metal film: 470 ohms ±5%, 200 VDCW, 1/4W.
R18		Metal film: 1K ohms ±5%, 100 VDCW, 1/10W.
R19 thru R21		Metal film: 2.2K ohms ±5%, 200 VDCW, 1/10W.
R22		Metal film: 100k ohms ±5%, 100 VDCW, 1/10W.
R23		Metal film: 3.3K ohms ±5%, 100 VDCW, 1/10W.
R24		Metal film: 4.7k ohms ±5%, 100 VDCW, 1/10W.
R25		Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10W.
R26		Metal film: 47K ohms ±5%, 100 VDCW, 1/10W.
R27		Metal film: 1K ohms ±5%, 100 VDCW, 1/10W.
R28		Posistor: sim to MURATA PTH9M04BE222TS2F333.
R35		Metal film: 100 ohms ±5%, 250 VDCW, 1W.
R36		Metal film: 10K ohms ±5%, 100 VDCW, 1/10W.
RV1		Variable: 10K ohms.
		---------- TRANSISTORS----------
TR1		Silicon, NPN: sim to PANASONIC 2SD1445A.
TR2		Silicon, NPN: sim to NEC 2SD596-T1B DV3.
TR4		Silicon, PNP: sim to PANASONIC 2SB953A.
TR5		Silicon, NPN: sim to NEC 2SD596-T1B DV3.
TR6		Silicon, PNP: sim to NEC 2SB624-T1B BV3.
TR7		Silicon, NPN: sim to NEC 2SD596-T1B DV3.
TR8		Silicon, PNP: sim to NEC 2SB624-T1B BV3.

(Continued)

UHF POWER AMPLIFIER
CAH-545L - 35/40 WATT
CAH-545H - 80/100 WATT
CAH-545AL (Used in 344A4573P3), CAH-545BL (Used in 344A4573P4)
CAH-545CL (Used in 344A4573P5), CAH-545AH (Used in 344A4573P6)
CAH-545BH (Used in 344A4573P7), CAN-545CH (Used in 344A4573P8)

SYMBOL	PART NO.	DESCRIPTION
	NOTE: Parts listed are for reference only. Refer to Service Section for serviceable parts.	---------- CAPACITORS ----------
C1 and C2		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C3		Electrolytic: 33 µF ±20% 25 VDCW, temp coef ±20%.
C5		Ceramic: 0.01 µF ±10% 50 VDCW, temp coef 0±10%.
C6		Ceramic: 0.1 µF +80%,-20% 50 VDCW, temp coef +30%,-80%.
C7		Ceramic: 12 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in AL,BL,AH,).
C7		Ceramic: 10 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in CL,BH,CH).
C7		Ceramic: 8 pF ±0.5pF, 500 VDCW, temp coef 0±60PPM (Used in CL).
C8		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60PPM.
C9		Ceramic: 56 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in AL, AH).
C9		Ceramic: 47 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in BL,CL,BH,CH).
C10		Ceramic: 56 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in AL,AH).
C10		Ceramic: 43 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in BH).
C10		Ceramic: 36 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in CL,CH).
C10		Ceramic: 36 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in CL,CH).
C10		Ceramic: 47 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in BL).
C11		Metal mica: 56 pF ±5% 100 VDCW, (Used in AH, BH).
C11		Metal mica: 36 pF ±5% 100 VDCW, (Used in AL).
C11		Metal mica: 33 pF ±5% 100 VDCW, (Used in BL,CL,CH).
C12		Metal mica: 39 pF ±5% 100 VDCW, (Used in AH).
C12		Metal mica: 47 pF ±5% 100 VDCW, (Used in BL,CL).
C12		Metal mica: 33 pF ±5% 100 VDCW, (Used in BH,CH).
C12		Metal mica: 51 pF ±5% 100 VDCW (Used in AL).
C13		Mica: 30 pF ±5% 500 VDCW (Used in AL,AH).
C13		Mica: 24 pF ±5% 500 VDCW (Used in CL).
C13		Mica: 30 pF ±5% 500 VDCW (Used in AH).
C13		Mica: 27 pF ±5% 500 VDCW (Used in BL).
C13		Mica: 24 pF ±5% 100 VDCW (Used in BH).
C14		Mica: 90 pF ±5% 500 VDCW (Used in AL,BL,CL).
C14		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in AH, BH,CH).
C15		Ceramic: 3 pF ±0.25pF 500 VDCW, temp coef 0±60PPM (Used in AH).
C15		Ceramic: 5 pF ±0.25pF 500 VDCW, temp coef 0±60PPM (Used in AH,BH).
C15		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60PPM (Used in CH).

SYMBOL	PART NO.	DESCRIPTION
C16		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60PPM.
C17		Electrolytic: 22 µF ±10% 40 VDCW, (Used in AH, BH,CH).
C18		Ceramic: 10 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in AH).
C18		Ceramic: 9 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in BH).
C18		Ceramic: 8 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in CH).
C19		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in AH,BH,CH).
C20		Mica: 56 pF ±5% 500 VDCW (Used in AH).
C20		Mica: 47 pF ±5% 500 VDCW (Used in BH).
C20		Mica: 36 pF ±5% 500 VDCW (Used in CH).
C21		Mica: 47 pF ±5% 500 VDCW (Used in AH).
C21		Mica: 39 pF ±5% 500 VDCW (Used in BH).
C21		Mica: 36 pF ±5% 500 VDCW (Used in CH).
C22		Metal mica: 39 pF ±5% 100 VDCW (Used in AH).
C22		Metal mica: 36 pF ±5% 100 VDCW (Used in BH,CH).
C22		Metal mica: 33 pF ±5% 100 VDCW (Used in CH).
C23		Metal mica: 56 pF ±5% 100 VDCW (Used in AH,BH).
C23		Metal mica: 47 pF ±5% 100 VDCW (Used in BH).
C24		Metal mica: 30 pF ±5% 100 VDCW (Used in AH).
C24		Metal mica: 24 pF ±5% 100 VDCW (Used in BH).
C24		Metal mica: 18 pF ±5% 100 VDCW (Used in CH).
C25		Mica: 90 pF ±5% 500 VDCW (Used in AH,BH,CH).
C26		Ceramic: 10 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in AH,BH.
C26		Ceramic: 8 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in CH).
C27		Ceramic: 10 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in AH).
C27		Ceramic: 9 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in BH).
C27		Ceramic: 8 pF ±0.5pF 500 VDCW, temp coef 0±60PPM. (Used in CH).
C28		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60PPM. (Used in AH,BH,CH).
C29		Mica: 47 pF ±5% 500 VDCW. (Used in AH).
C29		Mica: 39 pF ±5% 500 VDCW (Used in BH).
C29		Mica: 36 pF ±5% 500 VDCW (Used in CH).
C30		Mica: 56 pF ±5% 500 VDCW (Used in AH).
C30		Mica: 47 pF ±5% 500 VDCW (Used in BH).
C30		Mica: 36 pF ±5% 500 VDCW (Used in CH).
C31		Metal mica: 56 pF ±5% 100 VDCW (Used in AH).

SYMBOL	PART NO.	DESCRIPTION
C31		Metal mica: 47 pF ±5% 100 VDCW (Used in BH,CH).
C32		Metal mica: 39 pF ±5% 100 VDCW (Used in AH).
C32		Metal mica: 36 pF ±5% 100 VDCW (Used in BH,CH).
C32		Metal mica: 33 pF ±5% 500 VDCW (Used in CH).
C33		Metal mica: 30 pF ±5% 100 VDCW (Used in AH).
C33		Metal mica: 27 pF ±5% 100 VDCW (Used in BH).
C33		Metal mica: 24 pF ±5% 100 VDCW (Used in CH).
C34		Mica: 90 pF ±5% 500 VDCW (Used in AH,BH,CH).
C35		Ceramic: 10 pF ±0.5pF 500 VDCW, temp coef 0±60PPM. (Used in AH,BH).
C35		Ceramic: 8 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in CH).
C36		Ceramic: 6 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in AH,BH,CH).
C37		Electrolytic: 22 µF ±10% 40 VDCW (Used in AH,BH,CH).
C38		Ceramic: 0.1 µF +80%,-20% 50 VDCW, temp coef +30%, -80% (Used in AH,BH,CH).
C39		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in AH,BH,CH).
C40		Ceramic: 8 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in AH,BH,CH).
C41		Mica: 8 pF ±0.5pF 500 VDCW (Used in AH, BH).
C41		Mica: 6 pF ±0.5pF 50 VDCW, (Used in CH).
C41		Ceramic: 12 pF ±5% 500 VDCW, temp coef 0±60PPM (Used in AL).
C41		Ceramic: 10 pF ±0.5pF 500 VDCW, temp coef 0±60PPM (Used in BL,CL).
C44		Ceramic: 6 pF ±0.5pF 50 VDCW, temp coef 0±30PPM (Used in AH).
C44		Ceramic: 5 pF ±0.25pF 50 VDCW, temp coef 0±30PPM. (Used in BH,CH).
C44		Ceramic: 7 pF ±0.5pF 50 VDCW, temp coef 0±30PPM. (Used in AL,BL,CL).
C45		Ceramic: 6 pF ±0.5pF 50 VDCW, temp coef 0±30PPM (Used in AH).
C45		Ceramic: 5 pF ±0.5pF 50 VDCW, temp coef 0±30PPM (Used in BH,CH).
C47 and C48		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C49		Ceramic: 8 pF ±0.5 pF, 50 VDCW, temp coef 0±30 PPM. (Used in AH).
C49		Ceramic: 7 pF ±0.5 pF, 50 VDCW, temp coef 0±30 PPM. (Used in BH).
C49		Ceramic: 2 pF ±0.25 pF, 50 VDCW, temp coef 0±30 PPM (Used in CL).
C50		Ceramic: 4 pF ±0.25 pF, 50 VDCW, temp coef 0±30 PPM (Used in CH).
C50		Ceramic: 6 pF ±0.5 pF, 50 VDCW, temp coef 0±30 PPM (Used in AL,BL,CL).
C51		Ceramic: 100 pF ±5%, 50 VDCW, temp coef 0±30 PPM.
C52		Ceramic: 1000 pF ±10% 50 VDCW, temp coef 0±15% ±15% (Used in AH,BH,CH).
C53		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30PPM.
C54		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.

SYMBOL	PART NO.	DESCRIPTION
C55		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60 PPM.
C56		Ceramic: 3 pF ±0.25 pF 500 VDCW, temp coef 0±120 PPM (Used in AH,BH).
C56		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in AL,BL,CL,CH).
C57		Ceramic: 6 pF ±0.5pF 500 VDCW, temp coef 0±60 PPM (Used in CH).
C57		Ceramic: 5 pF ±0.5pF 500 VDCW, temp coef 0±60 PPM (Used in BH).
C57		Ceramic: 7 pF ±0.5 pF 500 VDCW, temp coef 0±60 PPM (Used in AL,BL,CL,AH).
C58		Ceramic: 3 pF ±0.25 pF 500 VDCW, temp coef 0±120 PPM (Used in AL,AH,BH).
C58		Ceramic: 2 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL,CL,CH).
C59		Ceramic:2 pF ±0.25pF 500 VDCW, temp coef 0±250 PPM (Used in CH).
C59		Ceramic: 3 pF ±0.25 pF 500 VDCW, temp coef 0±120 PPM (Used in AH,BH,CL).
C59		Ceramic: 5 pF ±0.25pF 500 VDCW, temp coef 0±60 PPM (Used in AL).
C59		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL).
C60		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in CH).
C60		Ceramic: 3 pF ±0.25 pF 500 VDCW, temp coef 0±120 PPM (Used in AH,BH).
C60		Ceramic: 6 pF ±0.25pF 500 VDCW, temp coef 0±60 PPM (Used in AL,BL).
C60		Ceramic: 7 pF ±0.5pF 500 VDCW, temp coef 0±60 PPM (Used in CL).
C61		Ceramic: 2 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in AL,AH,BH).
C61		Ceramic: 1 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL,CL,CH).
C62		Ceramic: 7 pF ±0.5 pF 500 VDCW, temp coef 0±60 PPM (Used in AL,BL,CL,AH).
C62		Ceramic: 6 pF ±0.5pF 500 VDCW, temp coef 0±60 PPM (Used in BH,CH).
C63		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in AL,BL,CL,AH,BH).
C63		Ceramic: 3 pF ±0.25pF 500 VDCW, temp coef 0±120 PPM (Used in CH).
C64		Mica: 2 pF ±0.25pF 500 VDCW (Used in BH).
C64		Mica: 1.5 pF ±0.25pF 500 VDCW (Used in CH).
C64		Ceramic: 5 pF ±0.25pF 500 VDCW, temp coef 0±60 PPM (Used in AL).
C64		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BL).
C64		Ceramic: 3 pF ±0.25pF 500 VDCW, temp coef 0±120 PPM (Used in CL).
C64		Mica: 3 pF ±0.25pF 500 VDCW (Used in AH).
C65		Ceramic: 6 pF ±0.5pF 500 VDCW, temp coef 0±60 PPM (Used in AH,BH).
C65		Ceramic: 5 pF ±0.5pF 500 VDCW, temp coef 0±60 PPM (Used in AL).
C65		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in BH).
C66		Ceramic: 4 pF ±0.25 pF 500 VDCW, temp coef 0±60 PPM (Used in AL,BL,BH).
C66		Ceramic: 7 pF ±0.5 pF 500 VDCW, temp coef 0±60 PPM (Used in BH).
C66		Ceramic: 3 pF ±0.25pF 500 VDCW, temp coef 0±120 PPM (Used in CL).

*COMPONENTS, ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

(Continued)

SYMBOL	PART NO.	DESCRIPTION
C66		Ceramic: 5 pF ±0.25pF 500 VDCW, temp coef 0±60 PPM (Used in CH).
C67		Ceramic: 2 pF ±0.25 pF 50 VDCW, temp coef 0±30 PPM (Used in AH,BH,CH).
C68		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C69		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in AH,BH,CH).
C71		Tantalum: 10 µF ±20%,35 VDCW (Used in AH,BH,CH).
C71		Tantalum: 10 µF ±20% 16 VDCW (Used in AL,BL,CL).
C72		Electrolytic: 10 µF ±10%.
C73		Ceramic: 100 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in AH,BH,CH).
C82		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C84 thru C88		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM.
C89		Ceramic: 0.1 µF ±5% 25 VDCW. (Used in AL,AH,BH,CH).
C89		Ceramic: 0.022 µF ±5% 25 VDCW. (Used in BL,CL).
C90		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in AH,BH,CH).
C91		Tantalum: 4.7 µF ±10% 16 VDCW. (Used in AL,AH,BH).
C91		Tantalum: 3.3 µF ±10% 16 VDCW. (Used in BL).
C91		Tantalum: 1.0 µF ±10% 16 VDCW. (Used in CL,CH).
C92		Electrolytic: 100 µF ±20% 50 VDCW,
C93		Mica: 100 pF ±5% 500 VDCW,
C95		Electrolytic: 33 µF ±10% 25 VDCW,
C96		Ceramic: 18 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in AH).
C96		Ceramic: 15 pF ±5% 500 VDCW, temp coef 0±60 PPM (Used in BH,CH).
C97		Mica: 24 pF ±5% 100 VDCW (Used in CH).
C98		Mica: 90 pF ±5% 500 VDCW (Used in AH,BH,CH).
C99		Ceramic: 100 pF ±5% 50 VDCW, temp coef 0±30 PPM (Used in AL,BL,CL).
C99		Ceramic: 0.022 µF ±5% 50 VDCW, temp coef 0±30 PPM (Used in AH).
C151		Ceramic: 330 pF ±5% 50 VDCW. (Used in AL, CL, AH, BH).
C151		Ceramic: 7 pF ±0.5% 50 VDCW, temp coef 0±30 PPM (Used in BL).
		---------- DIODES ----------
CD1		Silicon: fwd current 3A, 200 PIV; sim to MOTOROLA MR751 (Used in AH,BH,CH).
CD2		Ceramic: Varistor; sim to HOKURIKU 22ZR-10D.
CD3 and CD4		Diode: sim to PANASONIC MA741-TX.
CD5		Diode M1809-TIL. (Used in AL,BL,CL).
CD6		Diode (Used in AH,BH,CH).
CD7		Diode M1809-TIL.
CD8		Diode M1809-TIL. (Used in AH,BH,CH).
CD9		Diode M1809-TIL.
CD10		Silicon: fast recovery (2 diodes in cathode common); sim to TOSHIBA 1SS184 TE85L.

SYMBOL	PART NO.	DESCRIPTION
CD11 and CD12		Silicon: fast recovery, (RF Switch); sim to MITSUBISHI MI301
		----------INTEGRATED CIRCUITS----------
HC1		RF Power Amplifier: sim to MITSUBISHI M57704M-38 (Used in AL,AH).
HC1		RF Power Amplifier: sim to MITSUBISHI M57704H-38 (Used in BL,BH).
HC1		RF Power Amplifier: sim to MITSUBISHI M57704SH-38 (Used in CL,CH).
IC1		Linear: Positive Voltage Regulator; sim to PANASONIC AN6541.
IC2		Linear, Dual OP Amp: sim to NEW JRC NJM3404AM.
J3		Connector.
J4		Connector.
		----------INDUCTORS----------
L1		Coil.
L2		Coil (Used in AL,AH,BH).
L2		Coil (Used in BL,CL,CH).
L3		Coil.
L4		Coil.
L5		Coil. (Used in AL,BL,CL).
L5		Coil. (Used in AH,BH,CH).
L6		Coil (Used in AH,BH,CH).
L6		Coil (Used in AL).
L6		Coil (Used in BL,CL).
L7		Coil (Used in AH,BH,CH).
L8		Coil (Used in AH,BH,CH).
L9		Coil (Used in AH,BH,CH).
L10		Coil (Used in AH,BH,CH).
L11		Coil (Used in AH,BH,CH).
L12		Coil (Used in AH,BH,CH).
L13		Coil (Used in AH,BH,CH).
L14		Coil (Used in AH,BH,CH).
L15		Coil (Used in AH,BH).
L15		Coil (Used in CH).
L16		Coil (Used in AL,BL,CL).
L16		Coil (Used in AH,BH,CH).
L17		Coil.
L18		Coil.
L19		Coil (Used in AH,BH,CH).
L19		Coil (Used in AL,BL,CL).
L20 and L21		Coil.
L22		Coil.
L23 and L24		Coil (Used in AH,BH).
L23 and L24		Coil (Used in CH).
L23		Coil (Used in AL,BL,CL,).
L24		Coil (Used in AL,BL,CL,).
L25		Coil (Used in AH,BH,CH).
P1		Coaxial cable with connector (Used in AL,BL,CL).
P1		Coaxial cable with connector (Used in AH,BH,CH).

SYMBOL	PART NO.	DESCRIPTION
P2		Coaxial cable with connector (Used in AL,BL,CL).
P2		Coaxial cable with connector (Used in AH,BH,CH).
		----------RESISTORS ----------
R1		Metal film: 470 ohms ±5%, 100 VDCW, 1/10W.
R2 and R3		Metal film: 22 ohms ±5%, 100 VDCW, 1/10W.
R4		Metal film: 470 ohms ±5%, 100 VDCW, 1/10W.
R5		Metal film: 24 ohms ±5%, 350 VDCW, 3W (Used in AH,BH,CH).
R6 and R7		Metal film: 3.3K ohms ±5%, 250 VDCW, 1W (Used in AH,BH,CH).
R8		Metal film: 24 ohms ±1%, 500 VDCW, 1.5W (Used in AH,BH,CH).
R10		Metal film: 82 ohms ±5%, 100 VDCW, 1/8W (Used in AH,BH,CH).
R10		Metal film: 68 ohms ±5%, 100 VDCW, 1/10W (Used in AL,BL,CL).
R11		Metal film: 120 ohms ±5%, 200 VDCW, 1/8W (Used in AH,BH,CH).
R11		Metal film: 82 ohms ±5%, 100 VDCW, 1/8W (Used in AL,BL,CL).
R12		Metal film: 120 ohms ±5%, 200 VDCW, 1/8W (Used in AH,CH).
R12		Metal film: 82 ohms ±5%, 200 VDCW, 1/8W (Used in BH).
R12 and R13		Metal film: 100 ohms ±5%, 200 VDCW, 1/8W (Used in AL,BL,CL).
R13		Metal film: 82 ohms ±5%, 100 VDCW, 1/10W (Used in AH,BH,CH).
R14		Metal film: 12k ohms ±5%, 100 VDCW, 1/10W (Used in AH).
R14		Metal film: 18k ohms ±5%, 100 VDCW, 1/10W (Used in BH).
R14		Metal film: 47k ohms ±5%, 100 VDCW, 1/10W (Used in CH).
R14		Metal film: 2.7 ohms ±5%, 100 VDCW, 1/10W (Used in AL,BL,CL).
R15		Metal film: 100 ohms ±5%, 100 VDCW, 1/10W.
R16		Metal film: 1.5k ohms ±5%, 100 VDCW, 1/10W (Used in AH).
R16		Metal film: 3.9K ohms ±5%, 100 VDCW, 1/10W (Used in BH).
R16		Metal film: 4.7K ohms ±5%, 100 VDCW, 1/10W (Used in CH).
R16		Metal film: 1K ohms ±5%, 100 VDCW, 1/10W (Used in AL,BL,CL).
R17 and R18		Metal film: 120 ohms ±5%, 250 VDCW, 1W (Used in AH,BH,CH).
R17 and R18		Metal film: 180 ohms ±5%, 250 VDCW, 1W (Used in AL,BL,CL).
R19		Metal film: 47K ohms ±5%, 200 VDCW, 1/4W.
R20		Metal film: 4.7K ohms ±5%, 100 VDCW, 1/10W.
R21		Metal film: 680 ohms ±5%, 200 VDCW, 1/4W.
R35		Metal film: 10K ohms ±5%, 100 VDCW, 1/10W.

SYMBOL	PART NO.	DESCRIPTION
R36		Metal film: 3.3K ohms ±5%, 100 VDCW, 1/10W (Used in AH).
R36		Metal film: 1.8K ohms ±5%, 100 VDCW, 1/10W (Used in BH,CH).
R36		Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10W. (Used in AL,BL,CL).
R37		Metal film: 1.8K ohms ±5%, 100 VDCW, 1/10W (Used in AL,AH).
R37		Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10W (Used in BH).
R37		Metal film: 1.5K ohms ±5%, 100 VDCW, 1/10W (Used in BL).
R37		Metal film: 1.2K ohms ±5%, 100 VDCW, 1/10W (Used in CL,CH).
R38		Metal film: 10K ohms ±5%, 100 VDCW, 1/10W, (Used in BH).
R39		Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10W (Used in CH).
R40		Metal film: 27K ohms ±5%, 100 VDCW, 1/10W.
R41		Metal film: 2.2K ohms ±5%, 100 VDCW, 1/10W.
R42		Metal film: 68K ohms ±5%, 100 VDCW, 1/10W (Used in AL,AH).
R42		Metal film: 150K ohms ±5%, 100 VDCW, 1/10W (Used in BL).
R42		Metal film: 56K ohms ±5%, 100 VDCW, 1/10W (Used in CL).
R42		Metal film: 82K ohms ±5%, 100 VDCW, 1/10W (Used in BH).
R42		Metal film: 12K ohms ±5%, 100 VDCW, 1/10W (Used in CH).
R43		Metal film: 1K ohms ±5%, 100 VDCW, 1/10W.
R44 and R45		Metal film: 820 ohms ±5%, 100 VDCW, 1/10W.
R46 and R47		Metal film: 470 ohms ±5%, 100 VDCW, 1/10W.
R48		Metal film: 10 ohms ±5%, 200 VDCW, 1/8W.
R49		Polyester: sim to MURATA PTH9M04BE222TS2F333.
R50		Metal film: 100K ohms ±5%, 100 VDCW, 1/10W.
R52		Metal film: 50 ohms, 10W (Used in AL, BL, CL, AH, BH).
RV1		Variable.
		---------- TRANSISTOR ----------
TR1		Silicon,NPN: sim to MITSUBISHI 2SC3102.
TR2 and TR3		Silicon,NPN: sim to MITSUBISHI 2SC4989 (Used in AH,BH,CH).
TR4		Silicon, PNP: sim to NEC 2SB624-T1B BV3.
TR5 and TR6		Silicon, PNP: sim to NEC 2SB596-T1B DV3.
TR7		Silicon PNP: sim to PANASONIC 2SB953A.
TR8		Silicon NPN: sim to PANASONIC 2SD1271-Q.
		----------WIRE----------
W1		Jumper wire: (Used in AH,BH,CH).
W3		Jumper wire: (Used in AH,BH,CH).

PRODUCTION CHANGES

Changes in the equipment to improve or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number on the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for the description of parts affected by these revisions.

REV. A - Power Amplifier Units 344A4573P1 & P2

To improve stability. Deleted capacitor C6. Changed capacitor C45 to 4.7 µF.

REV. A - Power Amplifier Units 344A4573P3, P4 & P5

To improve stability. Changed capacitor C12 from 36 pF to 47 pF metal mica. This improves matching to the final amplifier.

REV. B- Power Amplifier Units 344A4573P3, P4 & P5

To improve PA stability. Added RC feedback to power amplifier transistor TR1 consisting of a 50-ohm resistor and a 330 pF capacitor.

REV. A - Power Amplifier Units 344A4573P6 & P7

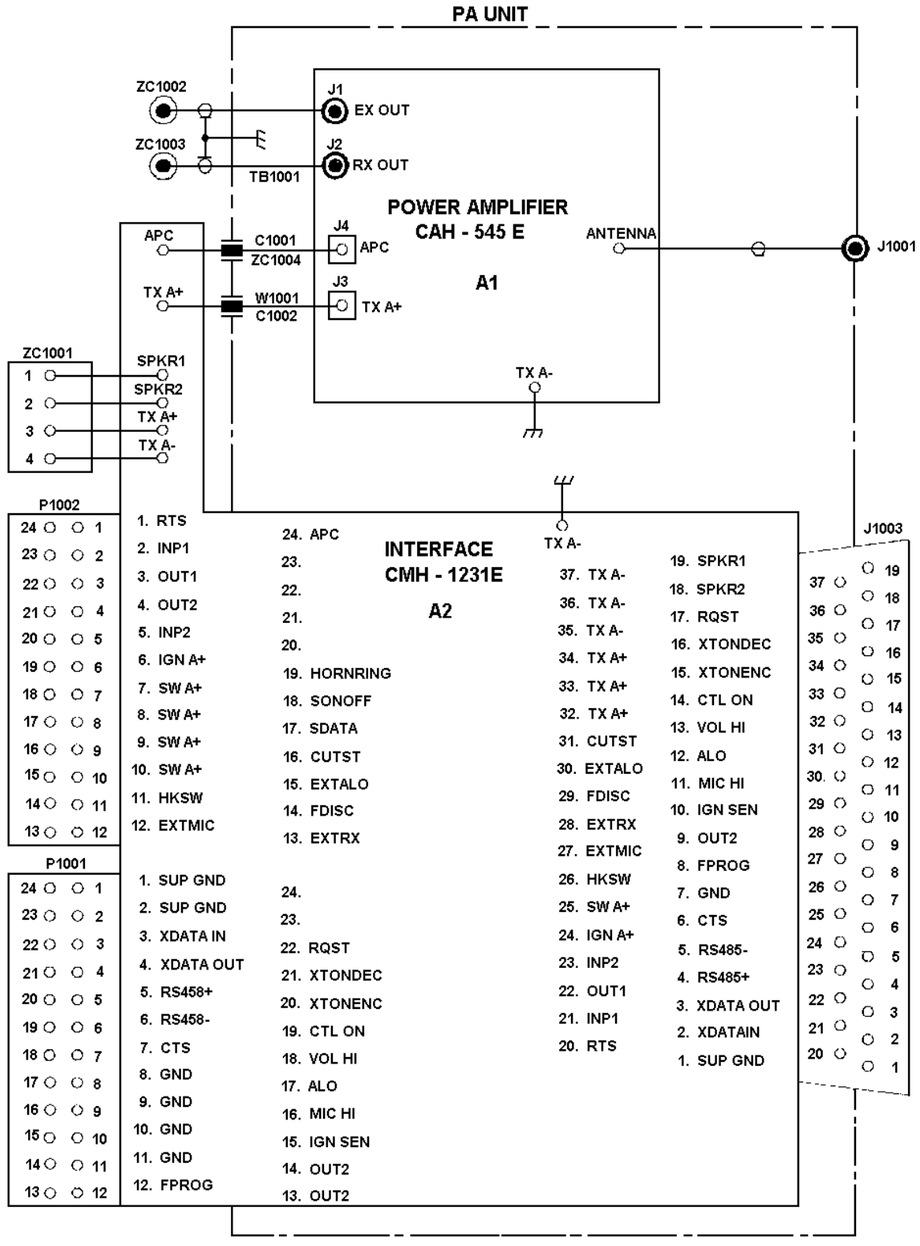
To improve PA stability. Added RC feedback to power amplifier transistor TR1 consisting of a 50-ohm resistor and a 330 pF capacitor.

REV. B - Power Amplifier Units 344A4573P1 & P2

For improved ETSI radiated spurs ground clips added.

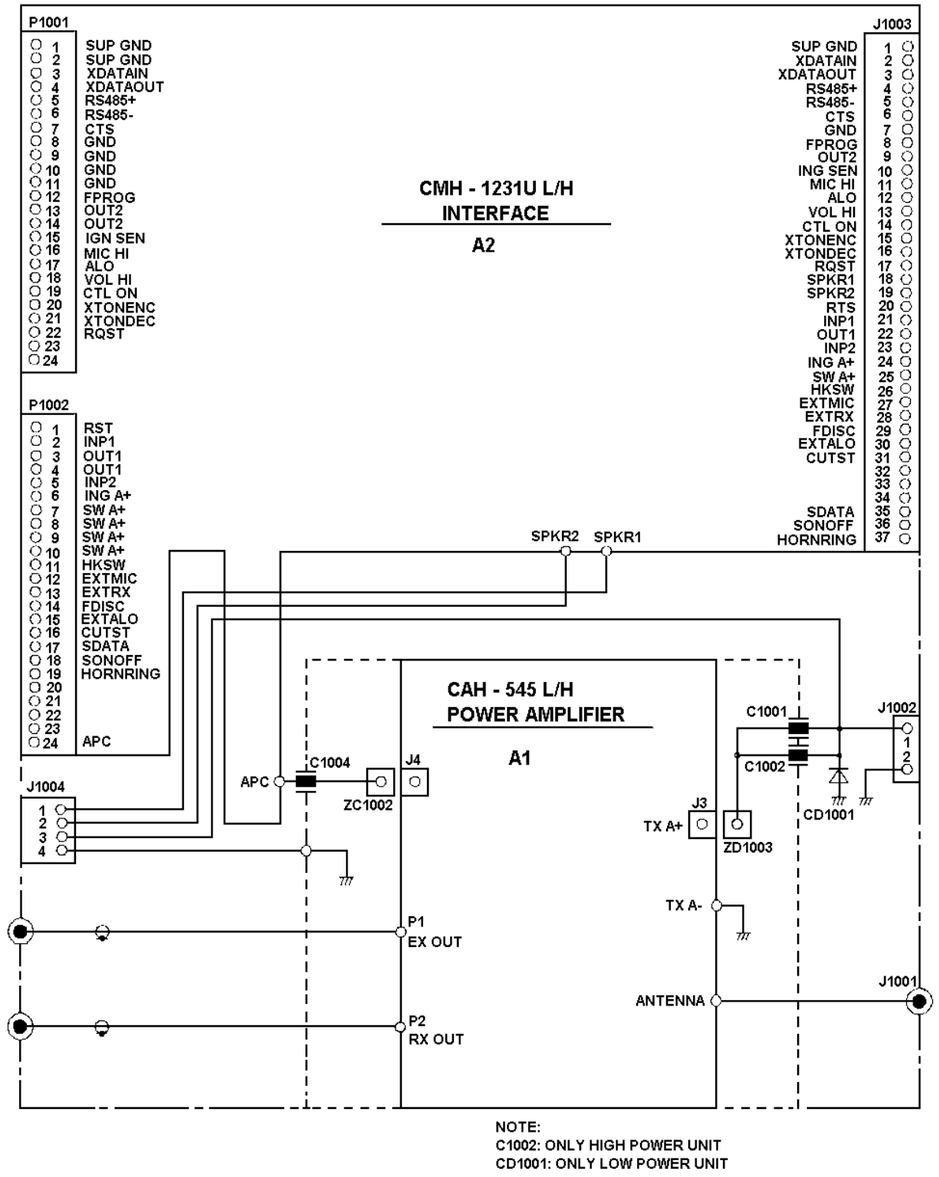
REV. A - Power Amplifier Units 344A4573P8

Incorporated in first production units.



INTERCONNECTION DIAGRAM
EUROPEAN UHF PA UNIT

(DD00-JHM-471PE)



NOTE:
C1002: ONLY HIGH POWER UNIT
CD1001: ONLY LOW POWER UNIT

INTERCONNECTION DIAGRAM
U.S.A. UHF PA UNIT

(DD00-JHM-471PL/H)

COMPONENT IDENTIFICATION CHART
403-512 MHz 35/40-Watt Power Amplifier

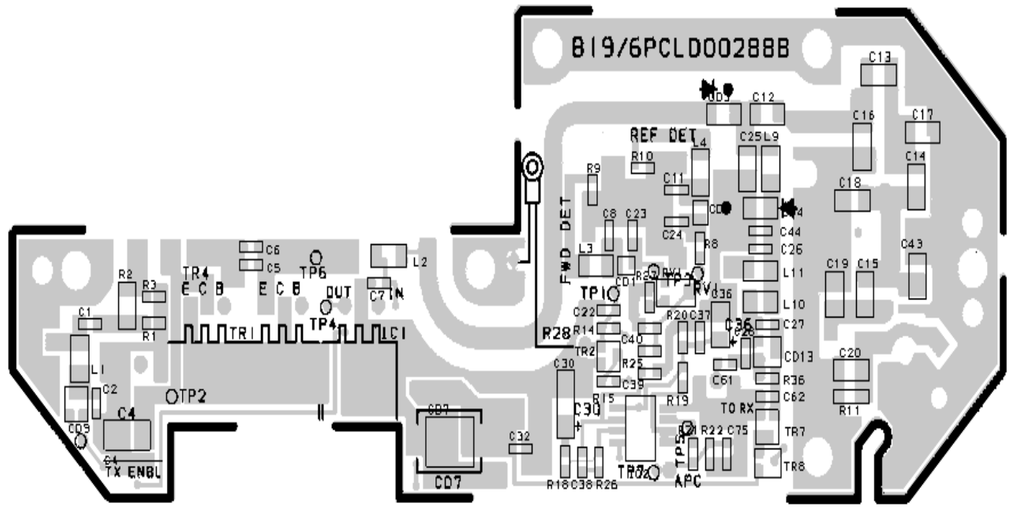
PART	CAH-545AL 403-440 MHz (40W)	CAH-545BL 440-470 MHz (40W)	CAH-545CL 470-512 MHz (35W)
C7	12 pF	12 pF	8 pF (8-10)
C9	56 pF	47 pF	47 pF
C10	56 pF	47 pF	36 pF
C11	36 pF	33 pF	33 pF
C12	51 pF (47-56)	47 pF (47-56)	47 pF (39-56)
C13	30 pF	27 pF	24 pF
C41	12 pF	10 pF (8-12)	10 pF
C50	6 pF	6 pF	5 pF
C58	3 pF	2 pF	2 pF
C59	5 pF	4 pF	3 pF
C60	6 pF	6 pF	7 pF
C61	2 pF	1 pF	1 pF
C64	5 pF	4 pF	3 pF
C65	5 pF	4 pF	4 pF
C66	4 pF	4 pF	3 pF
C89	0.1 µF	0.022 µF	0.022 µF
C91	4.7 µF	3.3 µF	1.0 µF
C151	330 pF	7 pF	330 pF
R37	1.8kΩ	1.5kΩ	1.2kΩ
R42	47kΩ	150kΩ	56kΩ
L2	6LALD20855	6LALD20850	6LALD20850
L6	6LALD20855	6LALD20850	6LALD20850
HC1	M57704M-38	M57704H-38	M57704SH-38

(MADE FROM DD02-CAH-545L 2/2)

COMPONENT IDENTIFICATION CHART
403-512 MHz 80/100-Watt Power Amplifier

PART	CAH-545AH 403-440 MHz (100W)	CAH-545BH 440-512 MHz (100W)	CAH-545CH 470-512 MHz (80W)
C7	12 pF	10 pF	10 pF
C9	56 pF	47 pF	47 pF
C10	56 pF	43 pF	36 pF
C11	56 pF	56 pF	33 pF
C12	39 pF	33 pF	33 pF
C13	30 pF	24 pF	-
C15	3 pF	5 pF	4 pF
C18	10 pF	9 pF	8 pF
C20	56 pF	47 pF	36 pF
C21	47 pF	39 pF	36 pF
C22	39 pF	36 pF	33 pF
C23	56 pF	47 pF	47 pF
C24	30 pF	24 pF	18 pF
C26	10 pF	10 pF	8 pF
C27	10 pF	9 pF	8 pF
C29	47 pF	39 pF	36 pF
C30	56 pF	47 pF	36 pF
C31	56 pF	47 pF	47 pF
C32	39 pF	36 pF	33 pF
C33	30 pF	24 pF	18 pF
C35	10 pF	10 pF	8 pF
C41	8 pF	8 pF	6 pF
C44	6 pF	5 pF	5 pF
C45	6 pF	5 pF	5 pF
C49	8 pF	7 pF	2 pF
C50	-	-	4 pF
C56	3 pF	3 pF	4 pF
C57	7 pF	5 pF	6 pF
C58	3 pF	3 pF	2 pF
C59	3 pF	3 pF	2 pF
C60	3 pF	3 pF	4 pF
C61	2 pF	2 pF	1 pF
C62	7 pF	6 pF	6 pF
C63	4 pF	4 pF	3 pF
C64	3 pF	2 pF	1.5 pF
C65	6 pF	4 pF	4 pF
C66	-	4 pF	5 pF
C91	4.7 µF	4.7 µF	1.0 µF
C96	18 pF	15 pF	15 pF
C97	-	-	24 pF
C99	0.022 µF	-	-
R12	120Ω	82Ω	120Ω
R14	12kΩ	18kΩ	47kΩ
R16	1.5kΩ	3.9kΩ	4.7kΩ
R36	3.3kΩ	1.8kΩ	1.8kΩ
R37	1.8kΩ	2.2kΩ	1.2kΩ
R38	-	10kΩ	-
R39	2.7kΩ	2.7kΩ	2.2kΩ
R42	68kΩ	82kΩ	12kΩ
R53	-	-	1kΩ
L2	6LALD20855	6LALD20855	6LALD20850
L15	6LALD20875	6LALD20875	6LALD20855
L23	6LALD12014	6LALD12014	6LALD12213
L24	6LALD12014	6LALD12014	6LALD12213
HC1	M57704M-38	M57704H-38	M57704SH-38

(MADE FROM DD03-CAH-545H 2/2)



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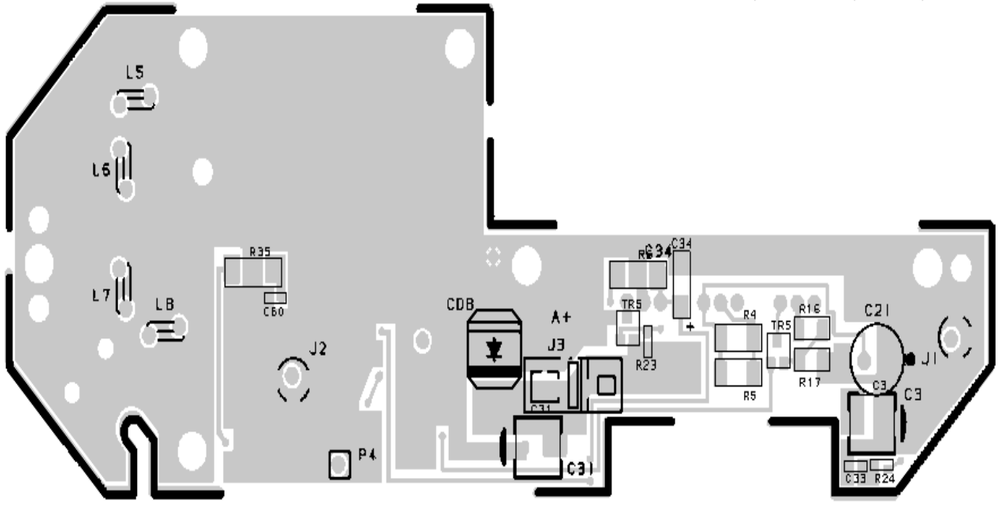
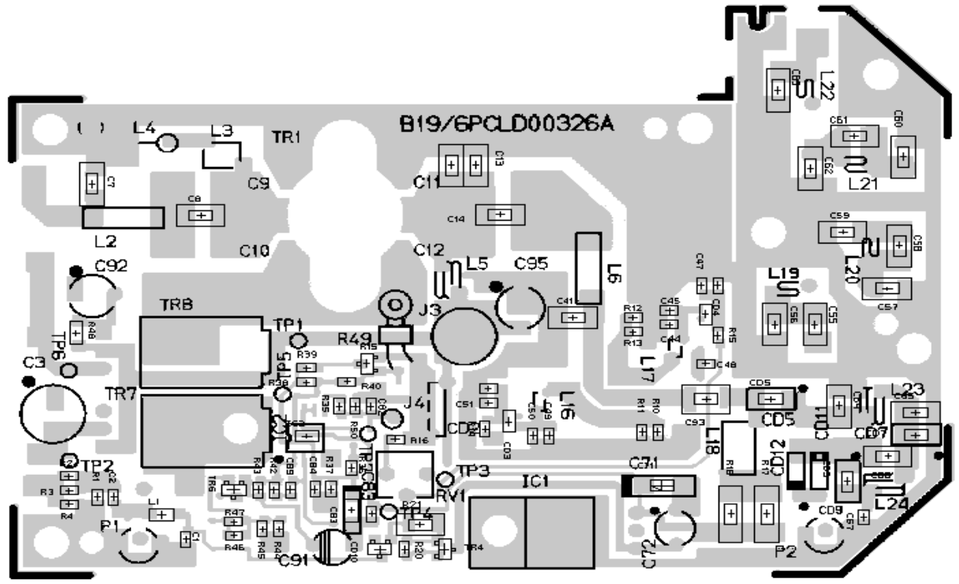
(B19/6PCLD00288B, Chip Components)
(B19/6PClD00288B, Component Side)

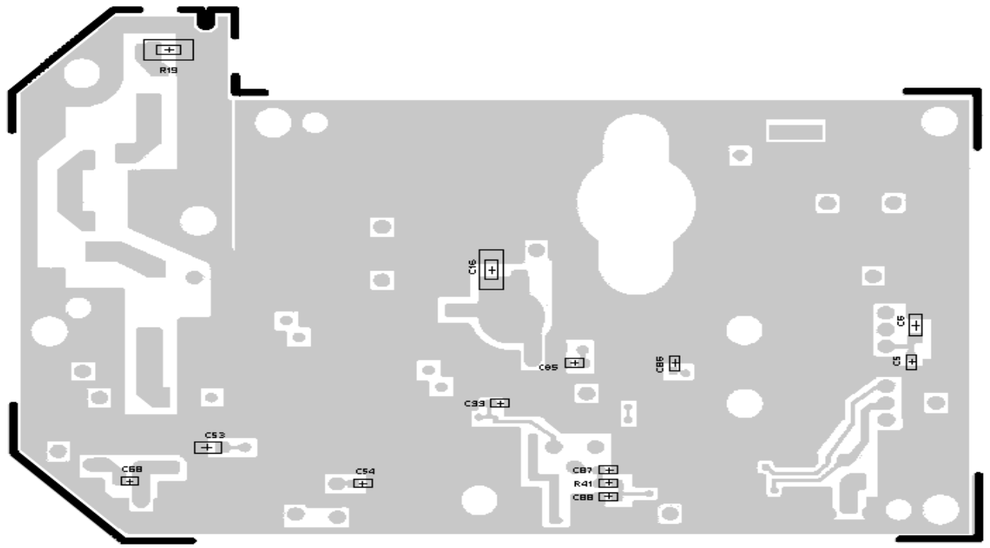


20-Watt Power Amplifier
CAH-545E

(B19/6PCLD00288B, Chip Components)
(B19/6PCLD00288B, Solder Side



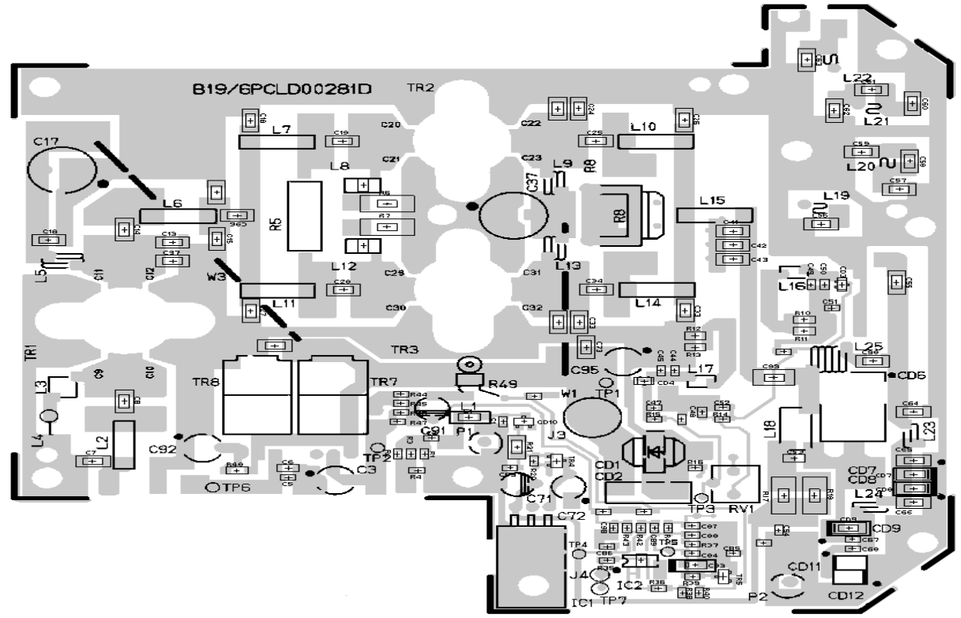
(19B/6PCLD00326A, Component Side Layout)
(19B6PCID00326A, Chip Components)
(19B6PLCD00326A, Component Side)



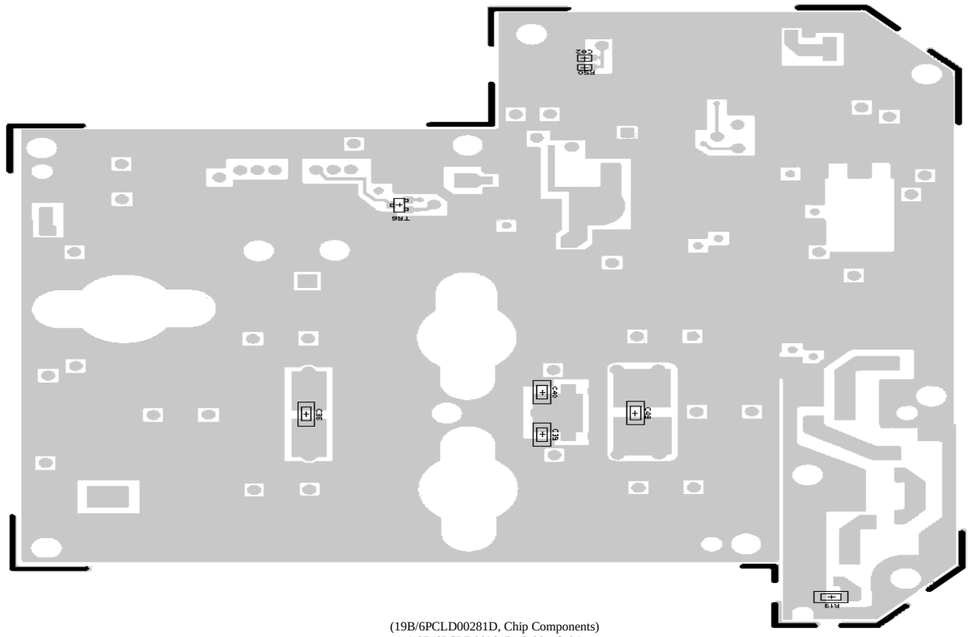
(19B/6PCLD00326A, Component Side Layout)
(19B/6PCLD0032A, Chip Components)
(19B/6PCLD00326A, Solder Side)

35/40 Watt Power Amplifier

CAH-545L



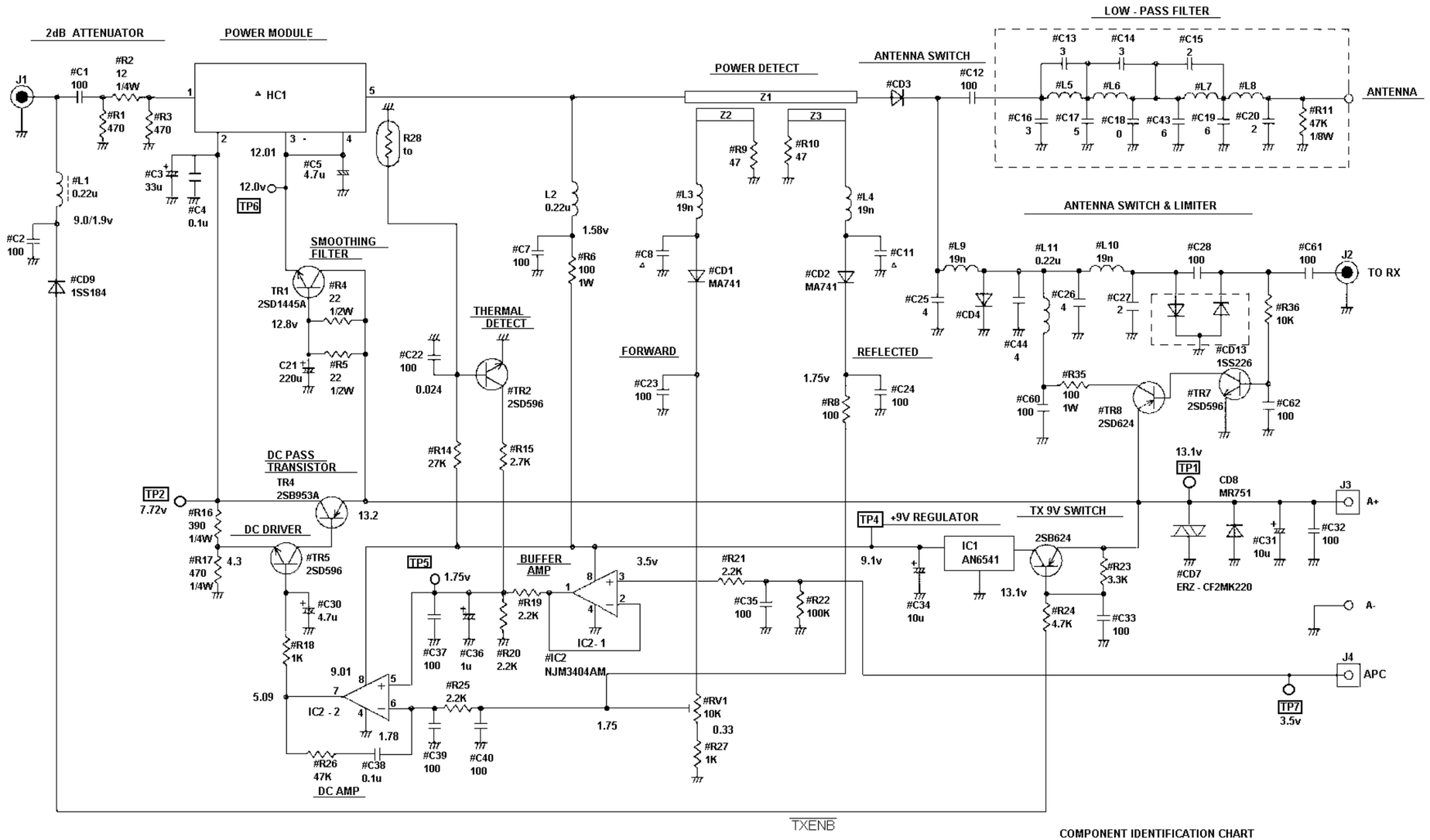
(19B/6PCLD00281D, Component Side Layout)
(19B/6PCLD00281D, Chip Components)
(19B/6PCLD00281D, Component Side)



(19B/6PCLD00281D, Chip Components)
(19B/6PCLD00281D, Solder Side)

80/100 Watt Power Amplifier

CAH-545H



NOTES:
1. "#" IDENTIFIES CHIP COMPONENTS (EXAMPLE #R12 OR R12#) WHICH ARE LOCATED ON THE COMPONENT SIDE OF THE BOARD.
2. Z1, Z2 AND Z3 ARE STRIPLINE PART OF PWB.
3. 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 P UNLESS FOLLOWED BY MULTIPLIER µ.
INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m OR µ.

DC VOLTAGE READINGS

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)/ .05 (KEYED).

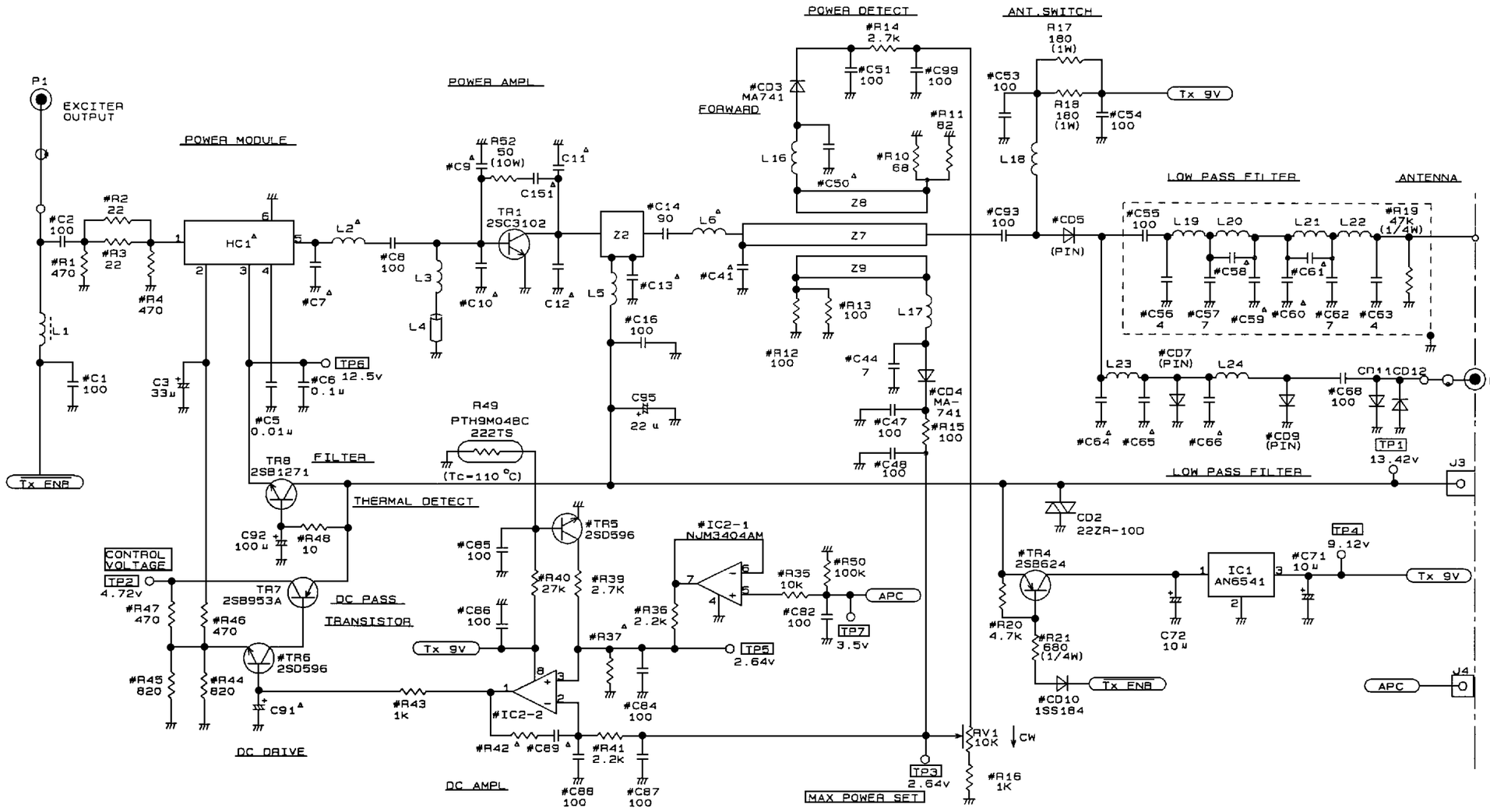
COMPONENT IDENTIFICATION CHART

SPLIT / PART	378-403 (MHz)	403-440 (MHz)	440 - 470 (MHz)
C8	6PF	7pF	6pF
C11	6PF	7pF	6pF
HC1	M57729ULF-38	M57788L-38	M57788H-38

20 Watt Power Amplifier

CAH-545E

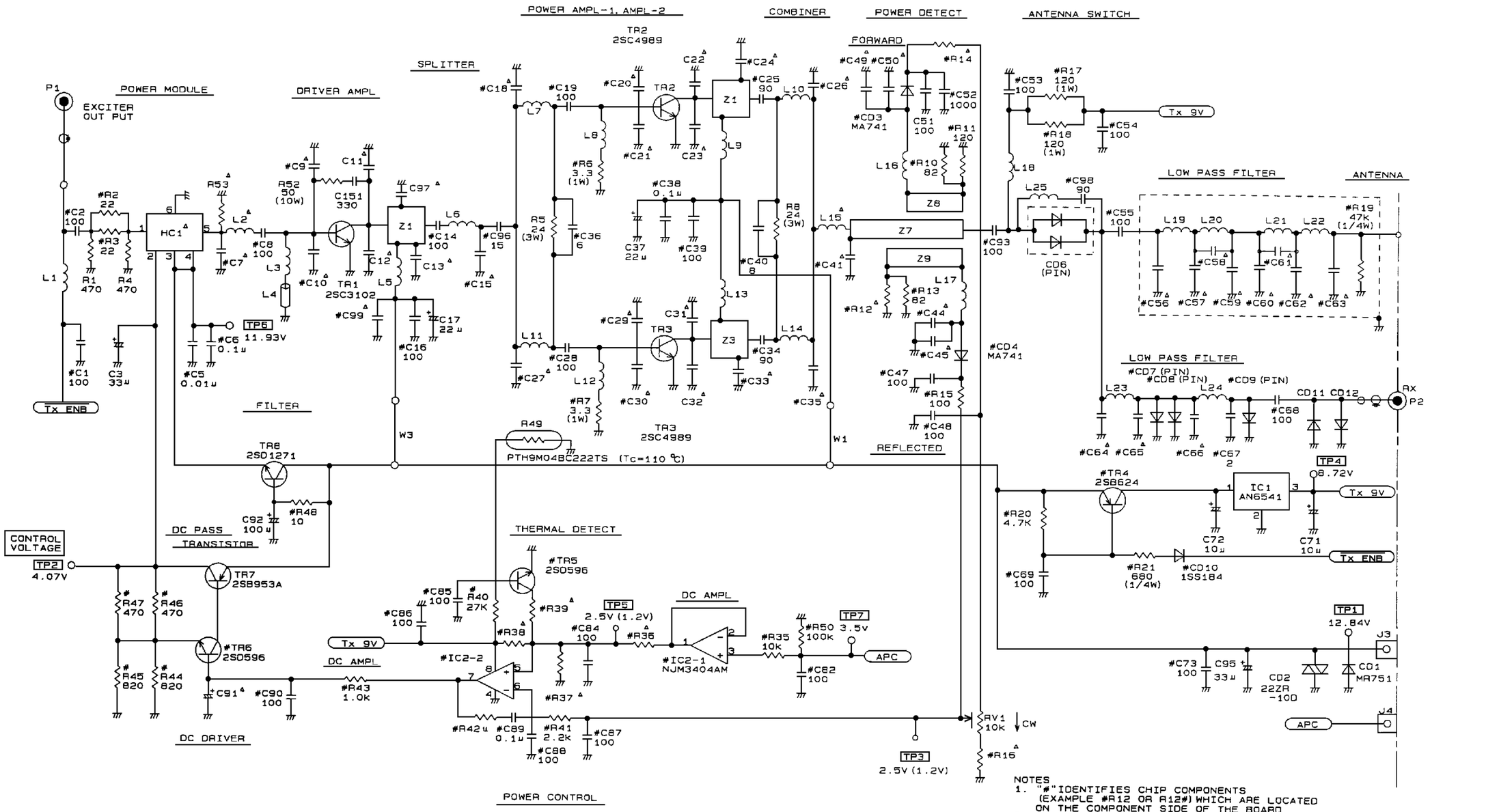
(DD02-CAH-545E)



NOTES
1. "#" IDENTIFIES CHIP COMPONENTS
   (EXAMPLE #R12 OR R12#) WHICH ARE LOCATED
   ON THE COMPONENT SIDE OF THE BOARD
2. Z1, Z2, Z7~Z9, STRIPLINE PART OF PWB.
3. RV2 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 P UNLESS FOLLOWED BY MULTIPLIER μ.
INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m OR μ.

35/40 Watt Power Amplifier
CAH-545L

(DD02-CAH-545L 1/2)



NOTES
1. "#"IDENTIFIES CHIP COMPONENTS (EXAMPLE #R12 OR R12#) WHICH ARE LOCATED ON THE COMPONENT SIDE OF THE BOARD
2. Z1-Z9 STRIPLINE PART OF PWB.
3. 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 P UNLESS FOLLOWED BY MULTIPLIER μ.
INDUCTANCE VALUES IN H UNLESS FOLLOWED BY MULTIPLIER m OR μ.

80/100 Watt Power Amplifier

CAH-545H

(DD03-CAH-545H 1/2)

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