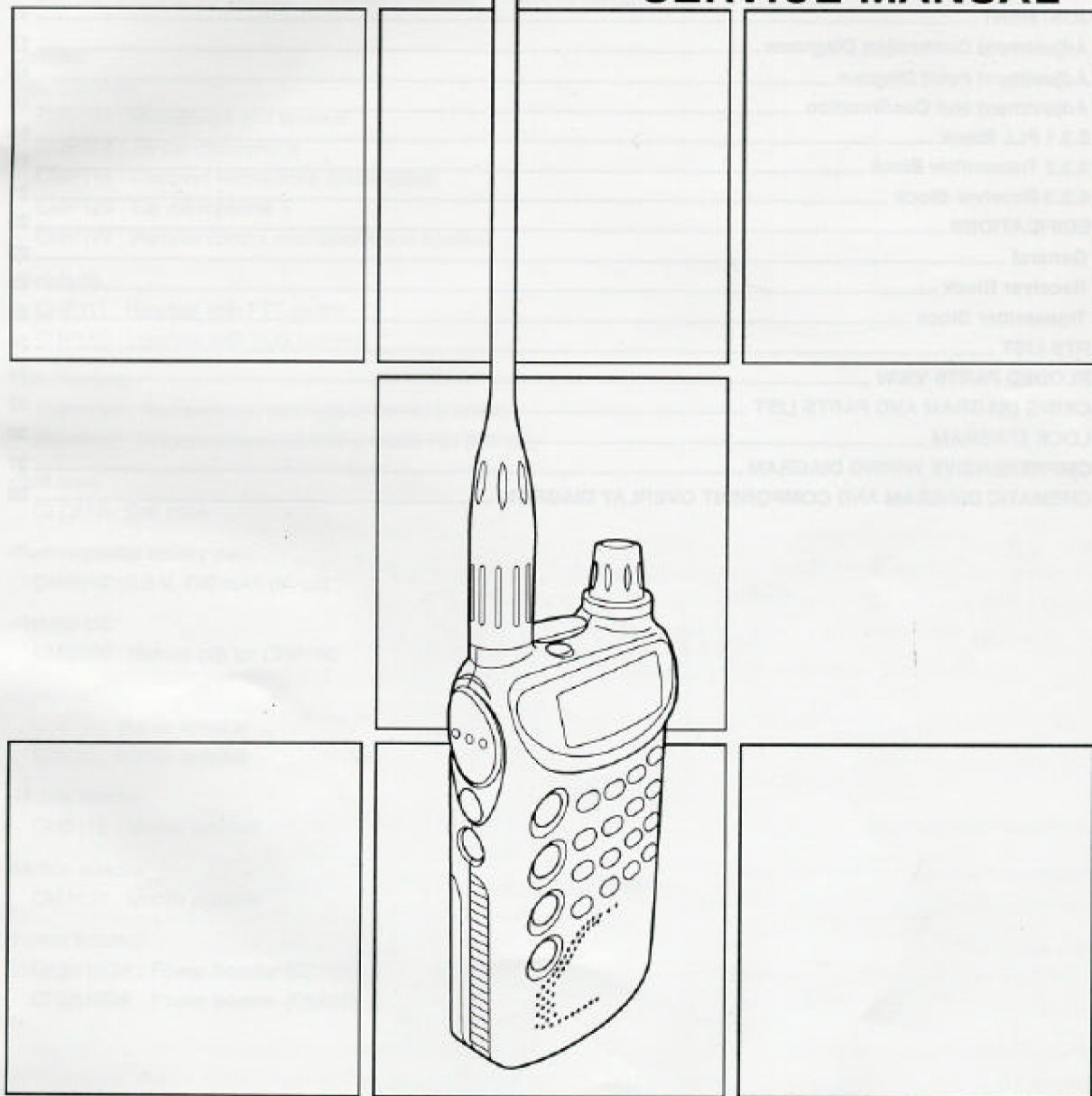


Double Band FM Transceiver

C510A / C510E

SERVICE MANUAL



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Radio Shack, Inc.
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1. INTRODUCTION

This service manual is for use with the C510A and C510E transceivers. Information in the manual relating specifically to C510A is indicated by the notation [C510A], and information in the manual relating specifically to C510E is indicated by the notation [C510E].

- Overview of transceiver -

- The C510A is a double-band FM transceiver for use with the 144 MHz and 450 MHz bands.
- The C510E is a double-band FM transceiver for use with the 144 MHz and 430 MHz bands.

- Accessories and Options -

- The accessories and options for the transceiver are listed below.

Accessories

- Antenna, Belt clip, Block diagram, Hand strap,
- Belt clip securing screws (2), Owner's manual, Mobile hanger

Options

•Microphones

- CMP111 : Microphone and speaker
- CMP113 : Tie-pin microphone
- CMP115 : Compact microphone and speaker
- CMP123 : Ear microphone
- CMP127 : Remote control microphone and speaker

•Headsets

- CHP111 : Headset with PTT switch
- CHP150 : Headset with VDX function

•AC chargers

- CSA510A : Rapid charger (AC 120 V, 60 Hz) [C510A]
- CSA510E : Rapid charger (AC 230 V, 50/60 Hz) [C510E]

•Soft case

- CLC510 : Soft case

•Rechargeable battery pack

- CNB510 : 3.6 V, 700 mAh (Ni-cd)

•Helmet clip

- CMB600 : Helmet clip for CHP150

•Speaker

- CSK12 : Mobile speaker
- CSK15 : Mobile speaker

•Mobile bracket

- CMB112 : Mobile bracket

•Mobile adaptor

- CMA510 : Mobile adaptor

•Power booster

- CPB510DA : Power booster [C510A]
- CPB510DE : Power booster [C510E]

2. CONTROLS AND CONNECTIONS

1. INTRODUCTION

2. CONTROLS AND CONNECTIONS

3. THEORY OF OPERATION

3.1 P.L. Block

3.2 Receiver Block

3.3 Transmitter Block

3.4 Control Block

3.5 Power Supply Block

4. DISASSEMBLY

4.1 Removing the Front Case

4.2 Removing the P.L. Block

4.3 Removing the P.L. Block

5. ADJUSTMENT

5.1 Adjustment C

5.2 Adjustment P

5.3 Adjustment and Control

5.3.1 P.L. Block

5.3.2 Transmitter Block

5.3.3 Receiver Block

6. SPECIFICATIONS

6.1 General

6.2 Receiver Block

6.3 Transmitter Block

7. PARTS LIST

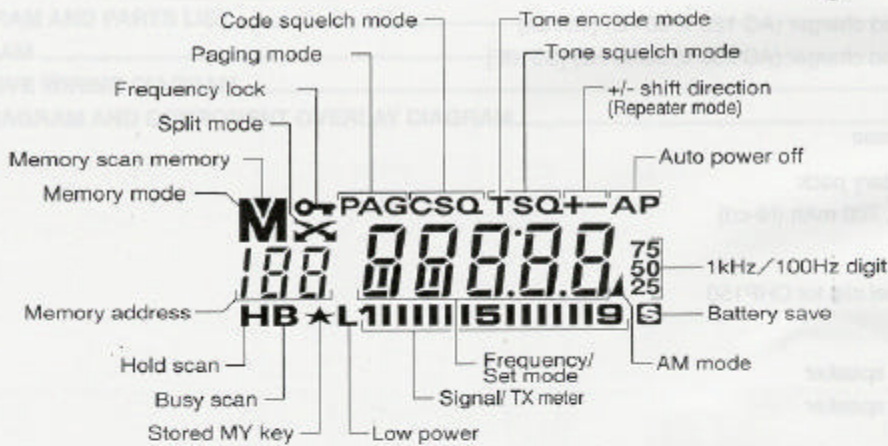
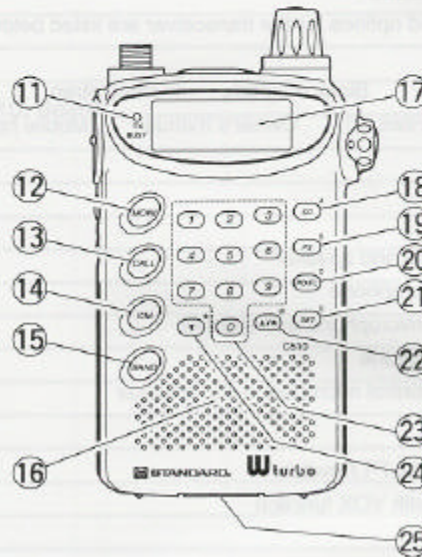
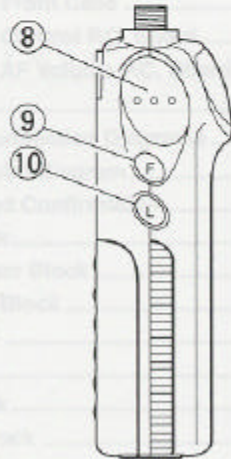
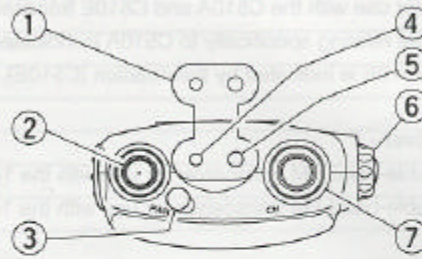
8. EXPLODED PARTS VIEW

9. PACKING DIAGRAM AND PARTS

10. BLOCK DIAGRAM

11. COMPREHENSIVE WITH

12. SCHEMATIC DIAGRAM



① Microphone / Speaker cap

② Antenna connection terminal (SMA type)

This socket is for connecting the supplied antenna.

③ Power key (PWR)

Holding this key down for 0.3 seconds or more powers on the transceiver.

④ External microphone terminal (M)

This socket is for connecting an optional microphone and speaker (CMP111, CMP115, CMP127), headset with PTT switch (CHP111), or headset with VOX function (CHP150).

⑤ External speaker terminal (S)

This socket is for connecting an optional microphone and speaker (CMP111, CMP115, CMP127), headset with PTT switch (CHP111), or headset with VOX function (CHP150). A speaker or earphone with an impedance of 8 Ω can be connected to this socket and used as an external speaker.

⑥ Volume knob

This knob can be turned to adjust the volume of the sound from the speaker. The monitor key should be held down when adjusting the volume. Turn clockwise to increase the volume.

⑦ Rotary channel selector

This knob can be turned to set the transceiver's receive and transmit frequencies, or to set memory addresses. Also, when the transceiver is in the set mode, this knob is used to change various modes.

⑧ PTT switch

The transceiver switches to the transmit mode for as long as this switch is held down.

⑨ Function key (F)

The transceiver switches to the function mode for as long as this switch is held down.

⑩ Lamp key (L)

Press this key to causes the display lamp to light for five seconds. Pressing this key when the lamp is lit causes the lamp to go dark.

⑪ TX/BUSY indicator

This LED lights red when the transceiver is in transmit mode. It lights green when the transceiver is in receive mode (a RF signal is being received).

⑫ Monitor key (MONI)

The transceiver's squelch function is turned off for as long as this key is held down. Pressing this key when the transceiver is in transmit mode causes tone-burst (1750 Hz) to be output.

⑬ Call key (CALL)

Press this key to causes the transceiver to switch to the call mode and calls up the call frequency. Pressing this key a second time causes the transceiver to return to the frequency previously in use.

⑭ VFO/MEMORY key (V/M)

Press this key to switch between VFO status (the transceiver's status when shipped from the factory or immediately after a reset has been performed) and the memory mode. However, this key has no effect if no data has been stored in memory.

⑮ Band key (BAND)

Press this key to causes the display frequency band to switch between the VHF band and UHF band.

⑯ Speaker

⑰ Display

⑱ Scan key (SC)

Press this key to causes the transceiver to start scan operation.

⑲ Program scan key (PS)

Press this key to causes the transceiver to start or temporarily suspend program scanning.

⑳ PO/FL key

Press this key to switch the transceiver's transmission output level. The frequency is locked when this key is pressed while the F key is held down.

㉑ Set key (SET)

Pressing this key calls up the set mode (28 types). Once the set mode has been activated, the set mode type can be changed by turning the rotary channel selector.

㉒ ▲/★ key

Press this key to increase the frequency or address number setting. Also, while holding down the F key, press this key to switch the set mode registered to the my key.

㉓ Numeric keys (0 ~ 9)

These keys are used to input the transceiver's frequencies directly. One of the 0 to 9 DTMF signals is transmitted by pressing the corresponding number key while holding down the PTT switch.

㉔ ▼ key

Press this key to decrease the frequency or address number setting.

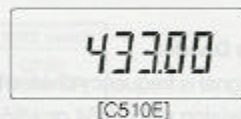
㉕ Interface jack

This jack is for connecting an optional mobile adaptor CMA510 or power booster CPB510DA/CPB510DE.

-All-reset procedure-

This procedure can be used to delete all data stored in memory and return the transceiver to the status it was in when shipped from the factory (initial status). The procedure is called all-reset.

- (1) Press the power key to power off the transceiver.
- (2) Switch on the power by pressing the power key while both the FUNC and MONI keys are held down. (Beeps are heard when the power comes on.)
- (3) Confirm that the display is in initial status.



3. THEORY OF OPERATION

Note : Refer to the block diagrams (figure 3-1 through 3-9) in the text for the operations of the circuits.

3.1 PLL Block

The PLL block comprises a VCO, crystal resonator, PLL IC, and low-pass filter. The VCO circuit generates the transmission signal and first local signal directly.

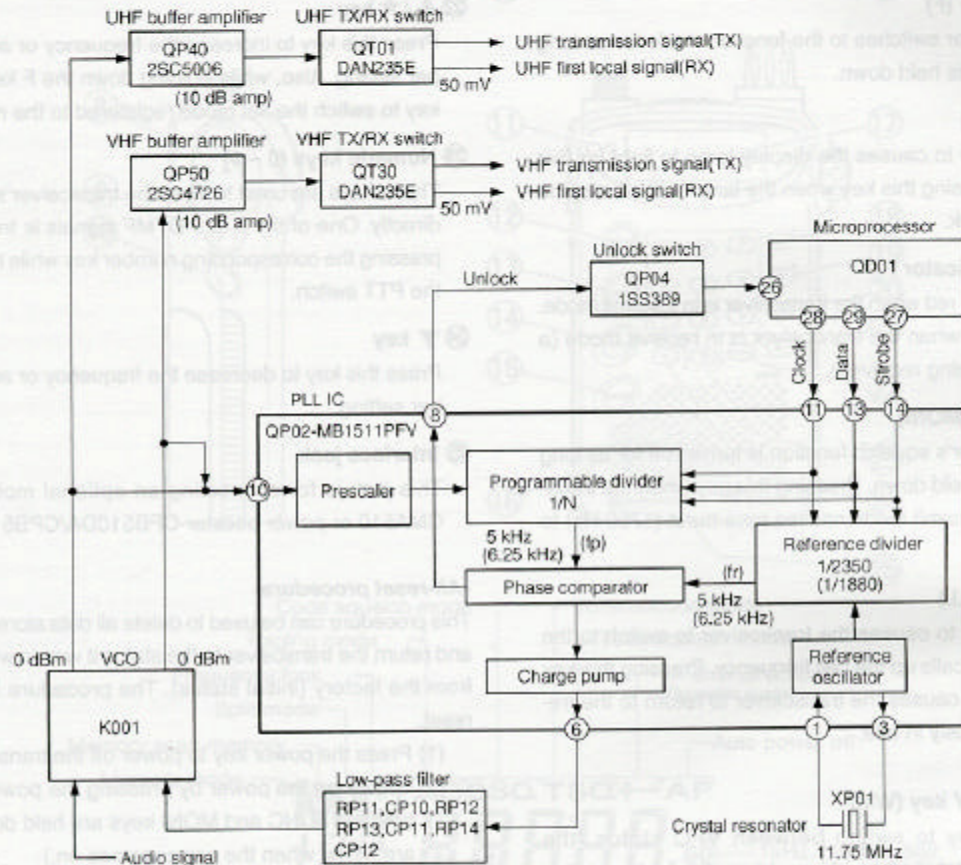


Figure 3-1 PLL block diagram

3.1.1 Programmable Divider

The input oscillation signal is frequency divided by the prescaler using a determined division ratio (1/64 or 1/65). After this, the oscillation signal is input to a programmable divider built into the PLL IC. Based on the data from microprocessor QD01, the programmable divider frequency divides the oscillation signal from the VCO to 1/N to generate a comparison frequency (fp) of 5 kHz or 6.25 kHz.

3.1.2 Reference Divider

The reference divider is a circuit that generates a reference frequency (fr) of 5 kHz or 6.25 kHz based on data from microprocessor QD01. The 11.75 MHz reference oscillation signal from the crystal resonator passes through pin 1 of PLL IC QP02 and is input to the reference divider built into the PLL IC. The 11.75 MHz reference oscillation signal is frequency divided to 1/2,350 (1/1,880) to generate a reference frequency of 5 (6.25) kHz.

3.1.3 Phase Comparator

The phase comparator compares the comparison frequency (f_p) and the reference frequency (f_r) to determine the phase difference.

3.1.4 Charge Pump

The charge pump circuit charges and discharges the electrical charge accumulated in the low-pass filter.

3.1.5 Low-Pass Filter

The low-pass filter CR integrates the level signal (square wave) output from the charge pump, converting it into a DC voltage.

3.1.6 VCO Circuit

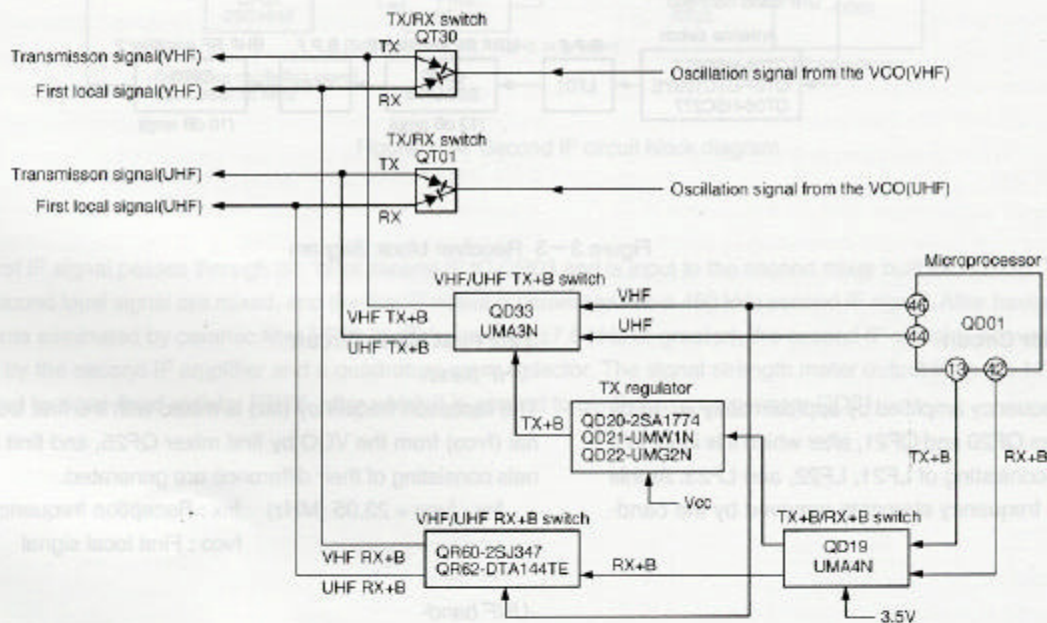
The DC voltage output by the low-pass filter is input to a variable capacitance diode built into the VCO. This DC voltage changes the capacitance between the electrodes of the variable capacitance diode, thereby controlling the oscillation signal of the VCO.

3.1.7 Unlock Detect Circuit

The microprocessor QD01 (pin26) determines whether the status of the PLL circuitry is lock or unlock according to the output level (high or low) from pin 8 of the PLL IC. If the phase comparator built into the PLL IC detects no phase difference (PLL circuit locked), it produces a high level output. This high level output signal is input to an unlock switch QP04, causing it to turn off. When the unlock switch is off, a high level output signal is input to pin 26 of microprocessor QD01. The high level input causes microprocessor QD01 to determine that the PLL circuit is locked.

If there is a phase difference (PLL circuit unlocked), the phase comparator produces a low level output. This low level output signal is input the unlock switch QP04, causing it to turn on. When the unlock switch is on, a low level output signal is input to pin 26 of microprocessor QD01. The low level input causes microprocessor QD01 to determine that the PLL circuit is unlocked.

Refer to figure 3-2 for a description of the VHF TX/RX switch QT30 and UHF TX/RX switch QT01 operations.



When the transceiver is in receive status

	QD01	QD19	QR62	QR60	TX/RX switch
VHF	Pin 42 Lo output	ON	RX+B	OFF	QT30
	Pin 46 Lo output	→	ON	OFF	RX side ON
UHF	Pin 42 Lo output	ON	→	RX+B	QT01
	Pin 44 Hi output	→	OFF	ON	RX side ON

When the transceiver is in transmit status

	QD01	QD19	QD20,QD21,QD22	QD33	TX/RX switch
VHF	Pin 13 Lo output	ON	ON	TX+B	QT30
	Pin 46 Lo output	→	→	ON	TX side ON
UHF	Pin 13 Lo output	ON	ON	TX+B	QT01
	Pin 44 Lo output	→	→	ON	TX side ON

Figure 3-2 TX/RX switch block diagram

3.2 Receiver Block

The reception method is double-conversion superheterodyne with a first IF frequency of 23.05 MHz (lower) and a second IF frequency of 450 kHz (upper). The receiver block comprises an RF amplifier circuit, first mixer circuit, first IF amplifier circuit, second IF circuit, and audio circuit. The RF amplifier circuit and first mixer circuit are independent for the VHF and UHF bands.

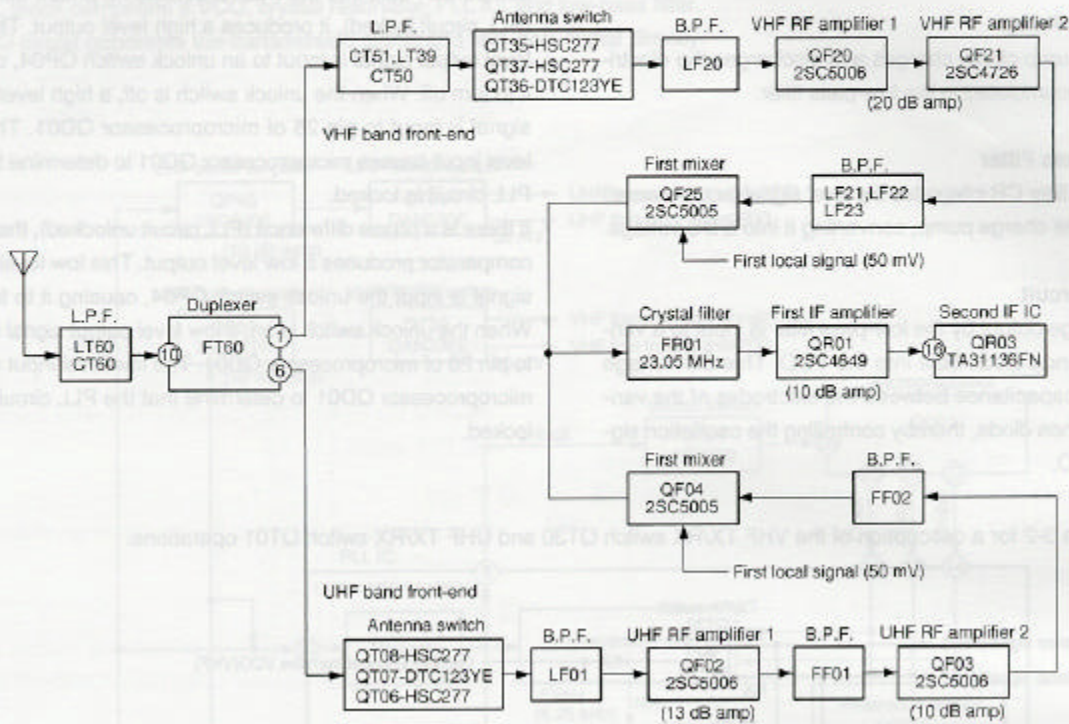


Figure 3-3 Receiver block diagram

3.2.1 RF Amplifier Circuit

-VHF band-

The reception frequency amplified by approximately 20 dB by VHF RF amplifiers QF20 and QF21, after which it is input to a band-pass filter consisting of LF21, LF22, and LF23. At this point, unwanted frequency-elements removed by the band-pass filter.

-UHF band-

The reception frequency amplified by approximately 13 dB by UHF RF amplifier QF02, after which it is input to band-pass filter FF01 and applied to UHF RF amplifier QF03. It is amplified by approximately 10 dB by UHF RF amplifier QF03.

3.2.2 First Mixer Circuit

-VHF band-

The reception frequency (f_{rx}) is mixed with the first local signal (f_{vco}) from the VCO by first mixer QF25, and first IF signals consisting of their difference are generated.

$$f_{rx} - f_{vco} = 23.05 \text{ (MHz)} \quad f_{rx} : \text{Reception frequency}$$

$$f_{vco} : \text{First local signal}$$

-UHF band-

The reception frequency (f_{rx}) is mixed with the first local signal (f_{vco}) from the VCO by first mixer QF04, and first IF signals consisting of their difference are generated.

$$f_{rx} - f_{vco} = 23.05 \text{ (MHz)} \quad f_{rx} : \text{Reception frequency}$$

$$f_{vco} : \text{First local signal}$$

3.2.3 First IF Amplifier Circuit

After being amplified by approximately 10 dB by first IF amplifier QR01, the 23.05 MHz first IF signal is input to pin 16 of second IF IC QR03.

3.2.4 Second IF Circuit

The second IF IC comprises a second local oscillator, second mixer, second IF amplifier, wave detector, signal strength meter detector, noise amplifier, and noise wave detector.

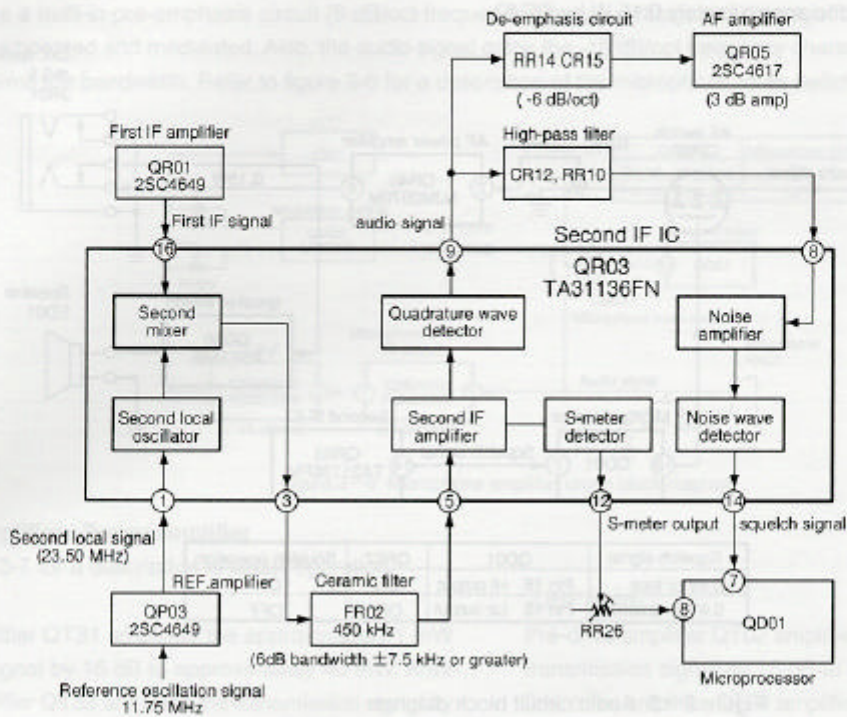


Figure 3-4 Second IF circuit block diagram

The first IF signal passes through pin 16 of second IF IC QR03 and is input to the second mixer built into QR03. The first IF signal and second local signal are mixed, and the first IF signal is converted into a 450 kHz second IF signal. After having adjacent signal elements eliminated by ceramic filter FR02 (6 dB bandwidth ± 7.5 kHz or greater), the second IF signal is converted into an audio signal by the second IF amplifier and a quadrature wave detector. The signal strength meter output from pin 12 of QR03 is level adjusted by semi-fixed resistor RR26, after which it is applied to pin 8 of microprocessor QD01.

3.2.5 Audio Circuit

The frequency of a portion of the audio signal is corrected by the de-emphasis circuit consisting of RR14 and CR15(-6 dB/oct). After this, the audio signal is amplified by approximately 3 dB by AF amplifier QR05. After passing through AF switch QR07, the audio signal is input to pin 2 of AF power amplifier QR40.

The audio signal is amplified to approximately 0.15 W by QR40.

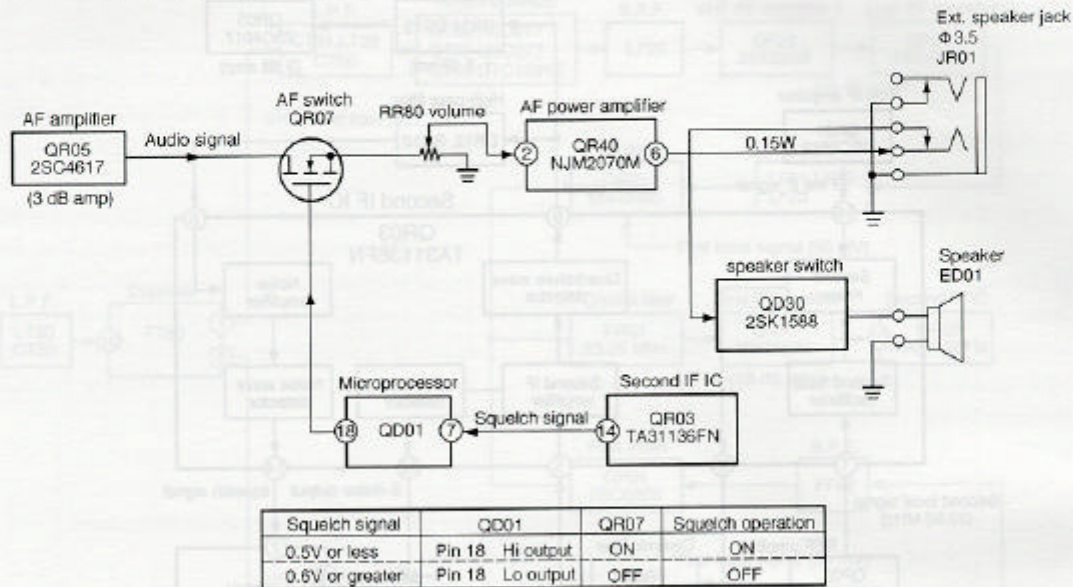


Figure 3-5 Audio circuit block diagram

3.2.6 Squelch Circuit

A portion of the audio signal output from pin 9 of second IF IC QR03 is input to a high-pass filter consisting of CR12 and RR10. Noise elements are extracted from the audio signal by the high-pass filter and input to pin 8 of QR03 as the noise signal. The noise signal has approximately 30 kHz elements only amplified by a noise amplifier built into QR03 to generate the squelch signal. This squelch signal is converted into a DC signal by the noise wave detector built into QR03 and then output from pin 14 of QR03. Refer to figure 3-5 for a description of the squelch on and off operation.

3.2.7 Tone Decoder

A portion of the audio signal output from pin 9 of second IF IC QR03 is input to pin 13 of tone filter QC01.

After its harmonic elements have been eliminated by tone filter QC01, the audio signal is amplified and output from pin 1 of QC01 as the tone signal. This tone signal is input to pin 23 of microprocessor QD01. At this point, if the microprocessor QD01 detects a match between the input tone signal and the transceiver's tone signal setting, output signals from pins 17 and 18 of QD01 to be applied to AF switch QR07 and 5 V regulator QR42. AF switch QR07 turns on and 5 V regulator QR42 operates, supplying power to AF power amplifier QR40 so that it operates. This causes an audio signal to be output from internal speaker ED01.

3.2.8 DTMF Decoder (Paging, Code-squelch)

A portion of the audio signal output from pin 9 of second IF IC QR03 is input to pin 1 of DTMF IC QD36. The audio signal is converted into a serial data and is input to pin 50 of microprocessor QD01. At this point, if the microprocessor QD01 detects a match between the input serial data and the transceiver's DTMF code setting, output signals from pins 17 and 18 of QD01 to be applied to AF switch QR07 and 5 V regulator QR42. AF switch QR07 turns on and 5 V regulator QR42 operates, supplying power to AF power amplifier QR40 so that it operates. This causes an audio signal to be output from internal speaker ED01.

3.3 Transmitter Block

3.3.1 Microphone Amplifier

Audio signal is input to pin 5 of microphone amplifier QM04 (1/2) and amplified by approximately 47 dB. Microphone amplifier QM04 (1/2) has a built-in pre-emphasis circuit (6 dB/oct frequency characteristics), and the high-frequency components of the audio signal are boosted and modulated. Also, the audio signal gains the -18 dB/oct frequency characteristics from low-pass filter QM04 (2/2) to limit the bandwidth. Refer to figure 3-6 for a description of the microphone mute switch QM03 operation.

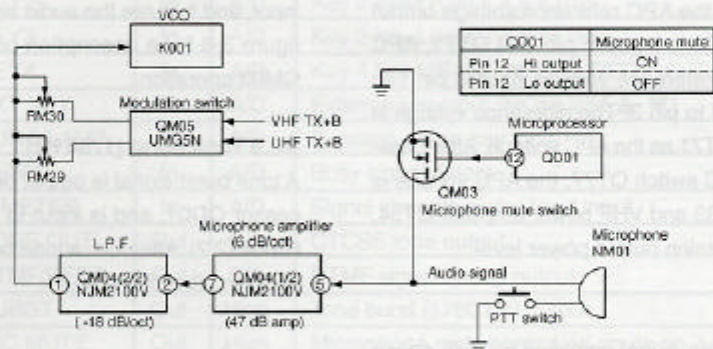


Figure 3-6 Microphone amplifier circuit block diagram

3.3.2 Drive amplifier / Power amplifier

Refer to figure 3-7 for a description of circuit operation.

-VHF band-

Pre-drive amplifier QT31 amplifies the approximately 1 mW transmission signal by 15 dB to approximately 40 mW. After this, drive amplifier QT33 amplifies the transmission signal by 10 dB to approximately 400 mW. The transmission signal is further amplified by approximately 2 W (4.5 V power supply voltage) by the VHF power amplifier QT34.

-UHF band-

Pre-drive amplifier QT02 amplifies the approximately 1.5 mW transmission signal by 15 dB to approximately 45 mW. After this, drive amplifier QT04 amplifies the transmission signal by 10 dB to approximately 400 mW. The transmission signal is further amplified by approximately 1.8 W (4.5 V power supply voltage) by the UHF power amplifier QT05.

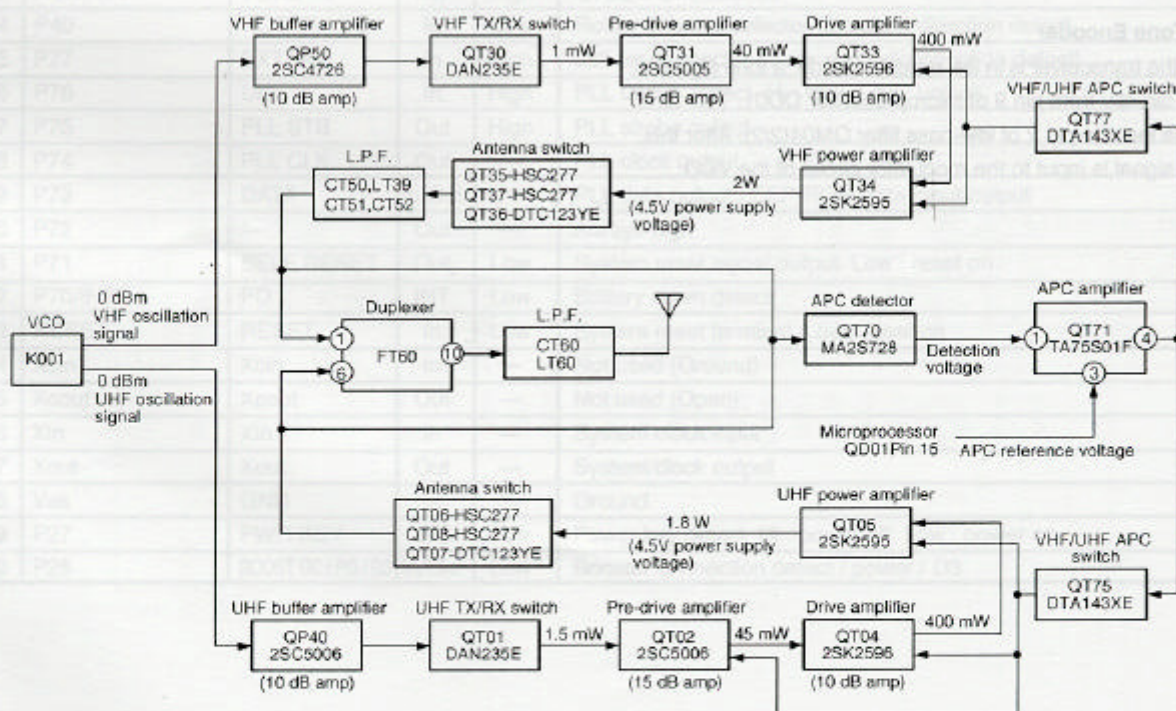


Figure 3-7 Transmission circuit block diagram

3.3.3 Auto Power Control (APC)

Refer to figure 3-7 for a description of the APC circuit operation.

-VHF band-

A portion of the transmission signal amplified by VHF power amplifier QT34 is converted into a DC voltage by APC detector QT70 as the detection voltage. This DC voltage is input to pin 1 of APC QT71. Also, the APC reference voltage output from microprocessor QD01 is input to pin 3 of QT71. APC QT71 compares the APC reference voltage input to pin 1 to the detection voltage input to pin 3. The difference voltage is then output from pin 4 of QT71 as the APC voltage. After passing through VHF/UHF APC switch QT77, the APC voltage is input to drive amplifier QT33 and VHF power amplifier QT34, and it controls the transmission output power level.

-UHF band-

A portion of the transmission signal amplified by UHF power amplifier QT05 is converted into a DC voltage by APC detector QT70 as the detection voltage. This DC voltage is input to pin 1 of APC QT71. Also, the APC reference voltage output from microprocessor QD01 is input to pin 3 of QT71. APC QT71 compares the APC reference voltage input to pin 1 to the detection voltage input to pin 3. The difference voltage is then output from pin 4 of QT71 as the APC voltage. After passing through VHF/UHF APC switch QT75, the APC voltage is input to pre-drive amplifier QT02, drive amplifier QT04 and UHF power amplifier QT05, and it controls the transmission output power level.

3.3.4 Tone Encoder

When the transceiver is in the repeater mode, a tone signal is output directly from pin 9 of microprocessor QD01. This tone signal is input to pin 2 of low-pass filter QM04(2/2). After this, a tone signal is input to the modulator circuit of the VCO.

3.3.5 DTMF Encoder

A DTMF signal is output directly from pin 10 of microprocessor QD01, and is input to pin 5 of microphone amplifier QM04 (1/2). After this, a DTMF signal is input to the modulator circuit of the VCO. While a DTMF signal is being output, a high level is output from pin 12 of microprocessor QD01. At this point, microphone mute switch QM03 is activated by the high level input, and it mutes the audio signal from microphone. Refer to figure 3-6 for a description of the microphone mute switch QM03 operation.

3.3.6 Tone burst (1750 Hz)

A tone burst signal is output directly from pin 11 of microprocessor QD01, and is input to pin 3 of microphone amplifier QM04 (2/2). After this, a tone burst signal is input to the modulator circuit of the VCO.



3.4 Control Block

3.4.1 Microprocessor QD01

The functions of the In / Out ports of microprocessor QD01 are listed below.

Table 3-2 (1/2)

No.	Port Name	Assign	In/Out	Active	Function
1	P67/AN7	KEY1	In	A/D	Key 1 input (MONI,1,2,3,SC)
2	P66/AN6	KEY2	In	A/D	Key 2 input (CALL,4,5,6,PS)
3	P65/AN5	KEY3	In	A/D	Key 3 input (V/M,7,8,9,PO/FL)
4	P64/AN4	KEY4	In	A/D	Key 4 input (BAND,▼,0,▲,SET)
5	P63/SCLK22/AN3	EXT KEY	In	A/D	External key input (MONI,V/M,▲,▼)
6	P62/SCLK21/AN2	FUNC/LAMP	In	A/D	Function / lamp key input
7	P61/SOUT2/AN1	BUSY	In	A/D	Busy signal detect
8	P60/SIN2/AN0	S-METER	In	A/D	Signal strength meter level input
9	P57/ADT/DA2	TONE OUT	Out	D/A	CTCSS tone output
10	P56/DA1	DTMF/BEEP	Out	D/A	DTMF signal / beep output
11	P55/CNTR1	BURST	Out	High	Tone burst (1750 Hz) output
12	P54/CNTR0	MIC MUTE	Out	High	Microphone mute control Hi :mute on Low : mute off
13	P53/RTP1	TX+B	Out	Low	Transmit power supply control Hi : power off Low : power on
14	P52/RTP0	PTT	In	High	PTT key detect Hi : PTT on Low : PTT off
15	P51/PWM1	SHIFT/PO	Out	---	APC reference voltage output
16	P50/PWM0	BUSY LED	Out	High	Busy LED control Hi : LED on Low : LED off
17	P47/SRDY1	AF MAIN	Out	High	Audio signal / beep output control Hi : signal output on Low : signal output off
18	P46/SCLK1	AF PRE	Out	High	Audio signal output control Hi : audio output on Low : audio output off
19	P45/TXD	TXD/BOOST D0	Out	---	Booster D0
20	P44/RXD	RXD/BOOST D1	In/Out	---	Booster D1
21	P43/Q/TOUT	INT SPK	Out	High	Internal speaker output control Hi : speaker on Low : speaker off
22	P42/INT2	ROTARY TRG	INT	Low	Rotary channel selector operation detect
23	P41/INT1	TONE IN	INT	High	CTCSS tone decode
24	P40	ROTARY UD	In	Low	Rotary channel selector operation direction detect
25	P77	EXT DC	In	High	cellular connector power supply(connection detect)
26	P76	UL	In	High	PLL unlock detect Hi : lock Low : unlock
27	P75	PLL STB	Out	High	PLL strobe output
28	P74	PLL CLK	Out	---	PLL clock output
29	P73	DATA	In/Out	---	PLL data output / EEP-ROM data input/output
30	P72	---	Out	---	Always high
31	P71	SELF RESET	Out	Low	System reset signal output Low : reset on
32	P70/INT0	PD	INT	Low	Battery down detect
33	RESET	RESET	In	Low	System reset terminal Low : reset on
34	Xcin	Xcin	In	---	Not used (Ground)
35	Xcout	Xcout	Out	---	Not used (Open)
36	Xin	Xin	In	---	System clock input
37	Xout	Xout	Out	---	System clock output
38	Vss	GND	---	---	Ground
39	P27	PWR KEY	INT	Low	Power key detect Hi : power off Low : power on
40	P26	BOOST DC / PO / D3	In/Out	Low	Booster connection detect / power / D3

Common

Figure 3-3 LCD connection diagram

No.	Port Name	Assign	In/Out	Active	Function
41	P25	PLL+B	Out	Low	PLL power supply control Hi : power off Low : power on
42	P24	RX+B	Out	Low	Receive power supply control Hi : power off Low : power on
43	P23	---	Out	---	Always high
44	P22	UHF	Out	Low	UHF band power supply control Hi : power off Low : power on
45	P21	---	Out	---	Always high
46	P20	VHF	Out	Low	VHF band power supply control Hi : power off Low : power on
47	P17	SCK	Out	High	EEP-ROM clock output
48	P16	ACK	Out	High	DTMF code input clock
49	P15/SEG39	STD	In	---	DTMF signal detect
50	P14/SEG38	SD	In	High	DTMF data input
51	P13/SEG37	---	In	---	Not used(open) (C510A : ground / C510E : open)
52	P12/SEG36	---	In	---	Not used(ground) (C510A : open / C510E : open)
53	P11/SEG35	---	In	---	Not used(open) (C510A : open / C510E : open)
54	P10/SEG34	---	In	---	Not used(open) (C510A : open / C510E : ground)
55	P07/SEG33	SEG33	Out	---	LCD segment signal output
56	P06/SEG32	SEG32	Out	---	LCD segment signal output
57	P05/SEG31	DTMF+B	Out	Low	DTMF decoder power supply control Hi : power off Low : power on
58	P04/SEG30	TSQ+B	Out	Low	CTCSS decode circuit power supply control Hi : power off Low : power on
59	P03/SEG29	TONE FILTER	Out		Tone filter shift control (change in 131.8 Hz)
60	P02/SEG28	BOOST D2	Out		Booster D2
61	P01/SEG27	LAMP	Out	High	Lamp control Hi : lamp on Low : lamp off
62	P00/SEG26	SW+B	Out	Low	Peripheral circuit power supply control Hi : power off Low : power on
63	P37/SEG25	S25	Out	---	LCD segment signal output
88	SEG0	S0			
89	Vcc	Vcc	---	---	Power supply(DC 3.0V)
90	VREF	VREF	---	---	A/D converter power supply / A/D reference voltage terminal
91	AVss	Avss	---	---	A/D converter ground
92	COM3	NC	---	---	Not used(open)
93	COM2	CO2	Out	---	LCD common signal output
94	COM1	CO1	Out	---	LCD common signal output
95	COM0	CO0	Out	---	LCD common signal output
96	VL3	VL3	---	---	LCD bias power supply (3.0V)
97	VL2	VL2	---	---	LCD bias power supply (2.0V)
98	C2	NC	---	---	Not used(open)
99	C1	NC	---	---	Not used(open)
100	VL1	VL1	---	---	LCD bias power supply (1.0V)

3.4.2 Beep

The beep signal is output from pin 10 of microprocessor QD01. After this, the beep signal is input to pin 2 of AF power amplifier QR40, where it is amplified. The amplified beep signal is output from pin 6 of AF power amplifier QR40, passes through external speaker socket JR01, and drives internal speaker ED01.

3.4.3 Display (LCD)

Microprocessor QD01 drives LCD QD02 directly. The driving method is dynamic drive using 28 segment terminals, three common terminals, and a 1/3 duty ratio. The LCD segment and common connections are illustrated below.

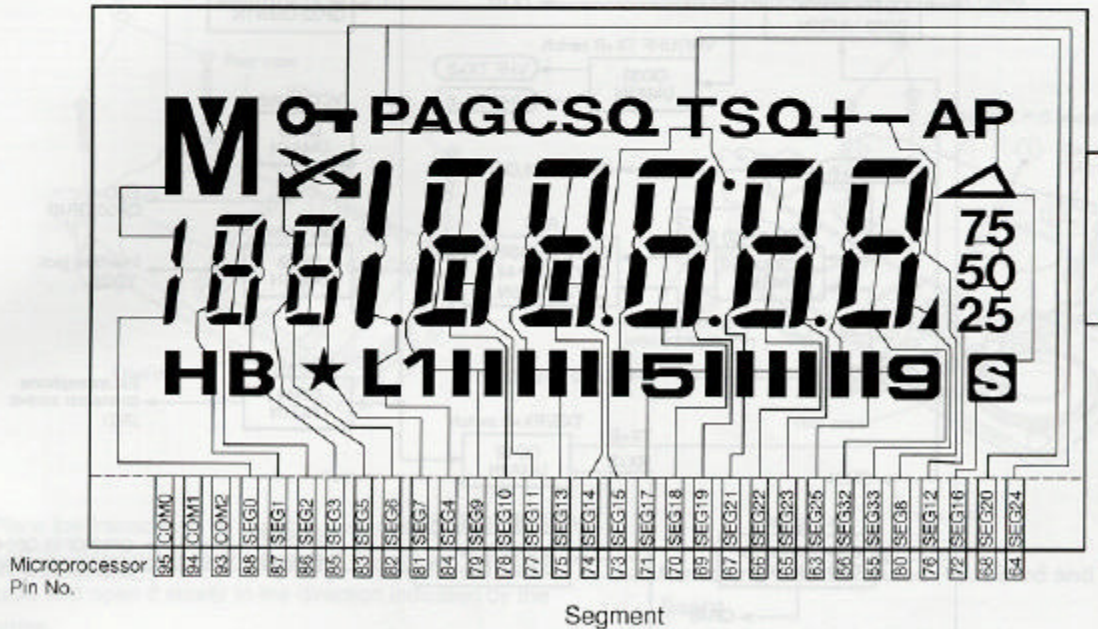


Figure 3-8 LCD connection diagram

3.5 Power Supply Block

The power supply block is diagrammed below.

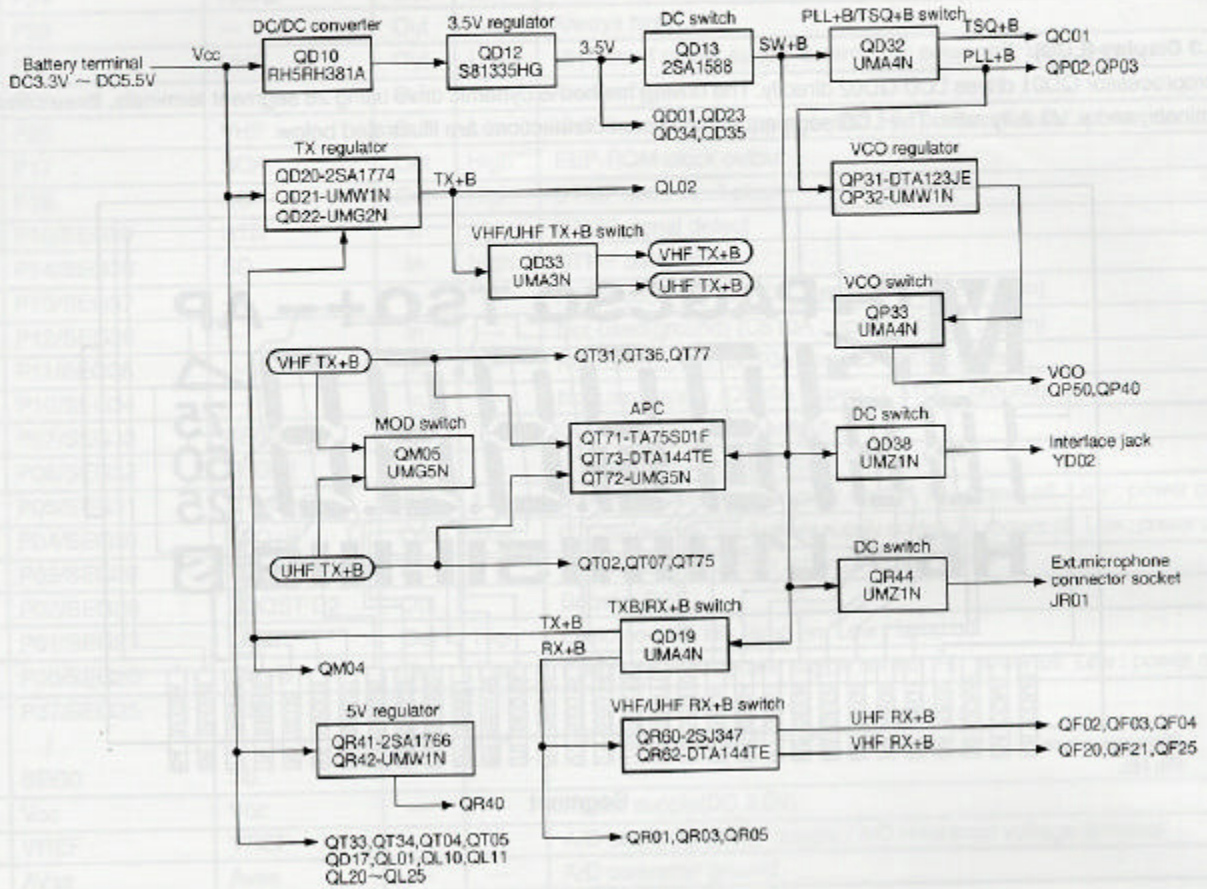


Figure 3-9 Power supply block diagram

4. DISASSEMBLY

Note : Be sure to switch off the transceiver's power before disassembling it.

4.1 Removing the Front Case

- Remove the battery cover, and place the transceiver as shown in figure 4-1.
- Remove the two screws (A), two screws (B) and two screws (C).

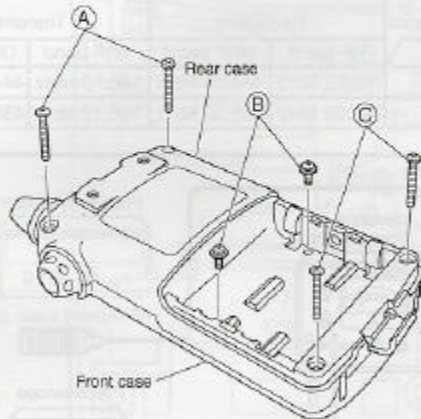


Figure 4-1

- Place the transceiver so that the front case (the surface with the controls) is facing upward, then grasp the front case and open it slowly in the direction indicated by the arrow.

Note : When opening the front case away from the rear case, do not open the left side. Doing so could damage the flexible P.C. board and coaxial cable YA01, YA02.

- Move slide insulators YR01 and YD01 in the direction indicated by the arrow. This will allow the flexible P.C. board to be removed.
- When coaxial cables YA01 and YA02 are disconnected, the front case can be detached from the rear case.

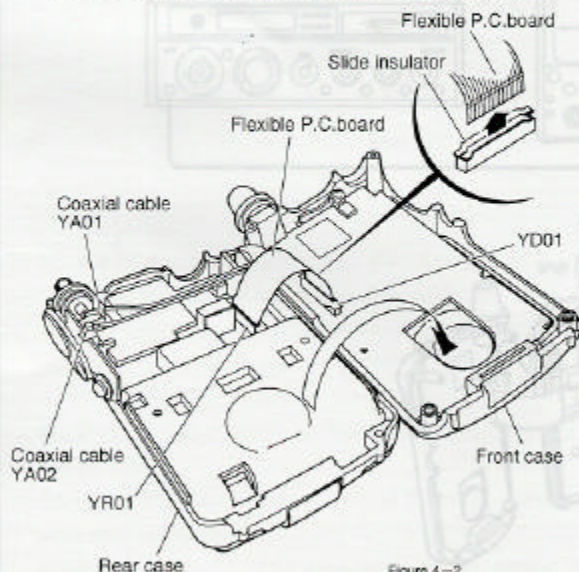


Figure 4-2

4.2 Removing the Control P.C. Board

- Pull off the rotary channel selector knob and remove the single slotted round nut (D) using a slotted round screwdriver.
- Remove the solder from location (1) (two places) and (2) YA02 (two places). Disconnect the two lead wires from the speaker and coaxial cable YA02.
- Remove the coaxial cable YA01.
- Remove the two screws (E) and the control P.C. board can be removed from the front case.

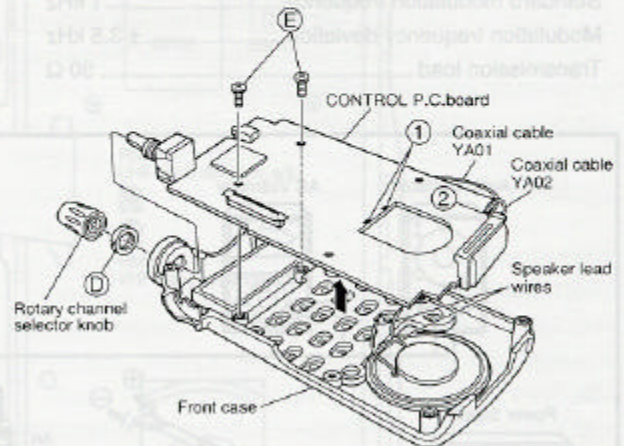


Figure 4-3

4.3 Removing the AF Volume P.C. Board and TX/ RX P.C. Board

- Pull off the volume control knob and remove the single screw (F). The AF volume P.C. board can be removed from the rear case.
- Remove the microphone/speaker cap and remove the solder from location (3), (4) (all three places).
- Remove the clamp and three screws (G) and the TX/RX P.C. board can be removed from the rear case.

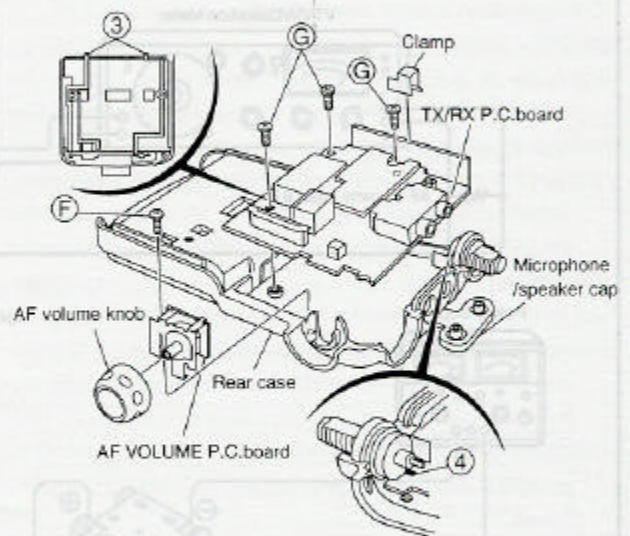


Figure 4-4

5. ADJUSTMENT

5.1 Adjustment Connection Diagrams

Make sure that all test equipment is properly calibrated. Allow sufficient time after powering on equipment for it to warm up before performing adjustments.

Standard conditions-

Power supply voltage	DC 4.5 V
Audio output	25 mW
Audio load	8 Ω
Standard modulation frequency	1 kHz
Modulation frequency deviation	± 3.5 kHz
Transmission load	50 Ω

Adjustment frequencies See Table 5-1

Note : 0 dBμ = 1 μV (emf)

Table 5-1

Adjustment frequencies	Reception		Transmission	
	VHF band	UHF band	VHF band	UHF band
Model				
C510A	146.02 MHz	444.02 MHz	146.10 MHz	444.10 MHz
C510E	146.02 MHz	435.02 MHz	146.10 MHz	435.10 MHz

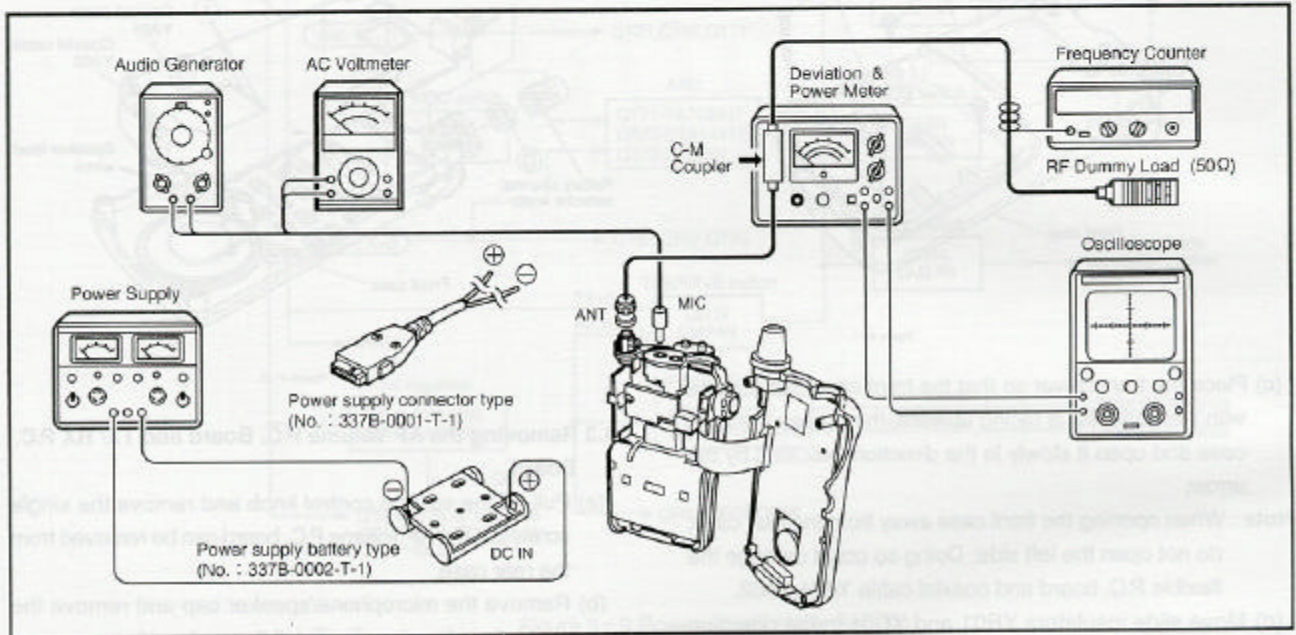


Figure 5-1 Transmission connection diagram

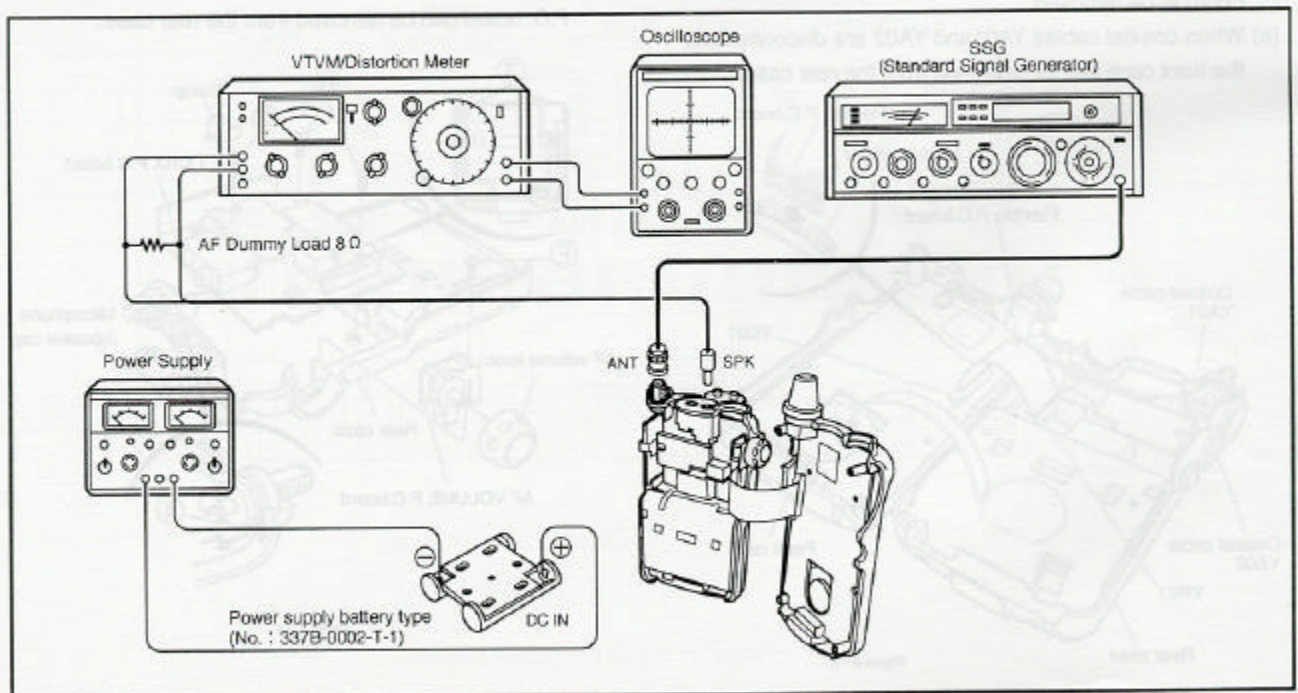


Figure 5-2 Reception connection diagram

5.2 Adjustment Point Diagram

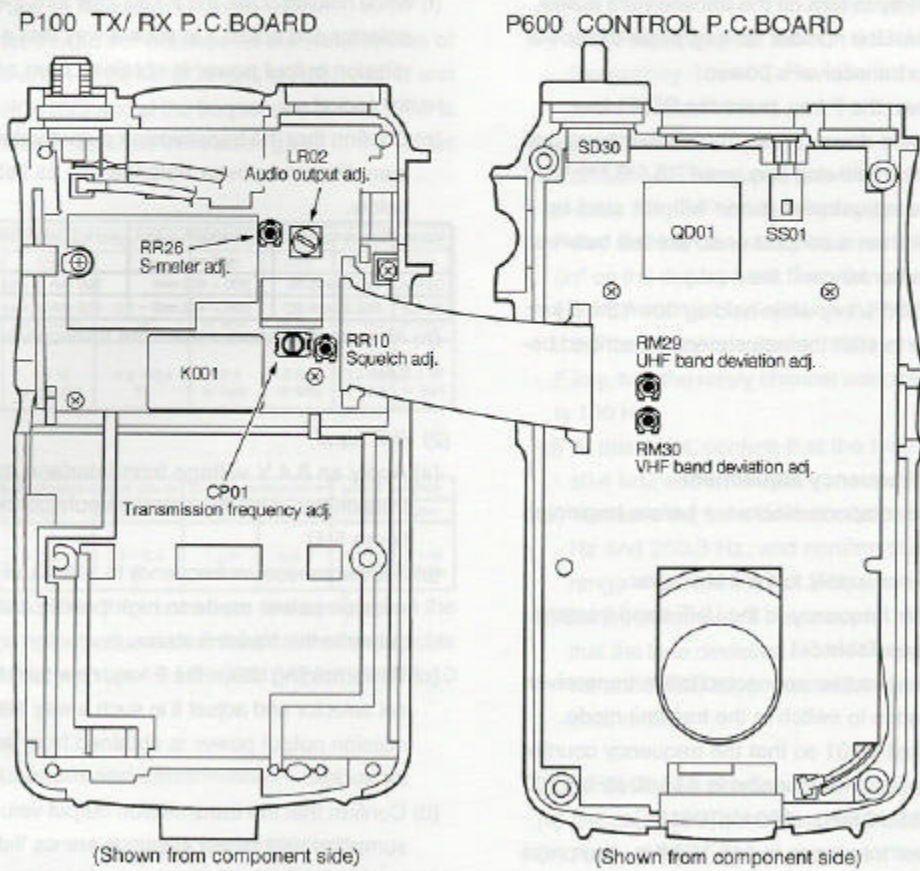


Figure 5-3

2) Switch off the fan of the induction motor. Set

(b) Input a 1 kHz, 30 mV (OPEN) sine wave to the 1000-
power from the audio generator (AG). Switch the trans-
ceiver to the transmit mode.

(c) At this point, adjust RM30 so that the maximum deviation
is 24.7 kHz.

(d) Gradually reduce the output level of the audio generator
(AG) until deviation is 23.5 kHz. At this point, confirm that
the audio generator (AG) sine wave output level is be-
tween 5 and 200.5 mV (OPEN).

the number keys.

(b) At this point, confirm that the 0.3MHz deviation is 24.7
kHz and 0.5MHz deviation is 23.5kHz.

(c) Set the squelch level to 10.0 dB. The squelch level
will be 0.0dB. Adjust the squelch level until the power
level is 10.0 dB. The squelch level will be 10.0 dB.

(d) Write holding down the F key. The squelch level will
be 10.0 dB. The squelch level will be 10.0 dB.

(e) Set the receiver's frequency to 144.0 MHz. The transmission
frequency will be 144.0 MHz. The transmission
power must be kept below 100mW.

(f) Confirm that the transmission mode indicator at
the bottom of the LCD screen is lit.

(g) Write holding down the F key. The squelch level will
be 10.0 dB. The squelch level will be 10.0 dB.

(h) Change the mode from transmit to receive.

Mode	Frequency (MHz)	Power (mW)	Deviation (kHz)	Modulation (%)
TX (1)	144.0	100	24.7	100
TX (2)	144.0	100	23.5	100
TX (3)	144.0	100	23.5	50

5.3 Adjustment and Confirmation

Note : This transceiver must be adjusted in the adjustment mode. How to start up the adjustment mode is described below.

- (a) Press the power key to turn off the transceiver's power.
- (b) While holding down the number "2" key, press the power key to turn on the transceiver's power.
- (c) While holding down the F key, press the PO/FL key.
- (d) With the F key held down, press the number keys one after the other in the following sequence : "5," "3," "2," "3," "2" and "1." (The adjustment mode will not start up if intervals of more than a second or so are left between pressing one number key and the next.)
- (e) Next, press the PO/FL key while holding down the F key. It is now possible to start the adjustments described below.

5.3.1 PLL Block

-VCO transmission frequency adjustment-

- (a) Turn CP01 three rotations clockwise before beginning adjustments.
- (b) Apply a 4.5 V power supply to the transceiver.
- (c) Set the transceiver frequency to the UHF band transmission frequency (see Table 5-1).
- (d) With the directional coupler connected to the transceiver, press the PTT switch to switch to the transmit mode.
- (e) At this point, adjust CP01 so that the frequency counter indication (transmission frequency) is 444.10 MHz \pm 100 Hz [C510A] or 435.10 MHz \pm 100 Hz [C510E].
- (f) Set the transceiver frequency to 146.10 MHz, and press the PTT switch to switch to the transmit mode.
- (g) At this point, confirm that the frequency counter indication (transmission frequency) is 146.10 MHz \pm 100 Hz.

5.3.2 Transmitter Block

-Transmission output adjustment-

(1) UHF band

- (a) Apply an 8.4 V voltage from interface jack YD02 to the transceiver. (Use the power supply connector type. See figure 5-1)
- (b) Set the transceiver's frequency to the UHF band transmission frequency (see Table 5-1), set the transmission power mode to high power, and set the transceiver to the transmit status.
- (c) While holding down the F key, now turn the rotary channel selector and adjust it in such a way that a 3.3 W transmission output power is obtained from antenna connector socket.
- (d) Confirm that the transmission output values, current consumption and power balance are as listed in the table below.

Model	Frequency(MHz)	transmission output values	current consumption	power balance
C510A	438.10/449.90	3.0 ~ 3.5 W	1.8 A or less	0.3 W or less
C510E	430.10/439.90	3.0 ~ 3.5 W	1.8 A or less	0.3 W or less

- (e) Set the transceiver's frequency to the UHF band transmission frequency (see Table 5-1), set the transmission power mode to high power, and set the transceiver to the transmit status.
- (f) While holding down the F key, now turn the rotary channel selector and adjust it in such a way that a 300 mW transmission output power is obtained from antenna connector socket.
- (g) Confirm that the transmission output values, current consumption and power balance are as listed in the table below.

Model	Frequency(MHz)	transmission output values	current consumption	power balance
C510A	438.10/449.90	200 ~ 400 mW	600 mA or less	100 mW or less
C510E	430.10/439.90	200 ~ 400 mW	600 mA or less	100 mW or less

- (h) After confirmation, return the transceiver to receive status.

(2) VHF band

- (a) Apply an 8.4 V voltage from interface jack YD02 to the transceiver. (Use the power supply connector type. See figure 5-1)
- (b) Set the transceiver frequency to 146.10 MHz, set the transmission power mode to high power, and set the transceiver to the transmit status.
- (c) While holding down the F key, now turn the rotary channel selector and adjust it in such a way that a 3.3 W transmission output power is obtained from antenna connector socket.
- (d) Confirm that the transmission output values, current consumption and power balance are as listed in the table below.

Frequency(MHz)	transmission output values	current consumption	power balance
144.10/147.90	3.0 ~ 3.5 W	1.5 A or less	0.3 W or less

- (e) Set the transceiver frequency to 146.10 MHz, set the transmission power mode to high power, and set the transceiver to the transmit status.
- (f) While holding down the F key, now turn the rotary channel selector and adjust it in such a way that a 300 mW transmission output power is obtained from antenna connector socket.
- (g) Confirm that the transmission output values, current consumption and power balance are as listed in the table below.

Frequency(MHz)	transmission output values	current consumption	power balance
144.10/147.90	200 ~ 400 mW	600 mA or less	100 mW or less

- (h) After confirmation, return the transceiver to receive status.

-Transmission output confirmation-

- Apply a 4.5 V voltage from the battery terminal to the transceiver.
- Confirm that the transmission output and current consumption values are as listed in the tables below.
- Confirm that the power balance at the frequencies of 438.10 MHz and 449.90 MHz[C510A] or 430.10 MHz and 439.90 MHz[C510E] and at the frequencies of 144.10 MHz and 147.90 MHz matches the values given in the tables below.

(1) UHF band

Model	Frequency	transmission output values		current consumption		power balance	
		High	Low	High	Low	High	Low
C510A	438.10 MHz	1.1 W or greater	0.2 - 0.4 W	1.2 A or less	0.6 A or less	0.2 W or less	0.1 W or less
	444.10 MHz						
	449.90 MHz						
C510E	430.10 MHz	1.1 W or greater	0.2 - 0.4 W	1.2 A or less	0.6 A or less	0.2 W or less	0.1 W or less
	435.10 MHz						
	439.90 MHz						

(2) VHF band

Frequency	transmission output values		current consumption		power balance	
	High	Low	High	Low	High	Low
144.10 MHz	1.2 W or greater	0.2 - 0.4 W	1.2 A or less	0.6 A or less	0.2 W or less	0.1 W or less
146.10 MHz						
147.90 MHz						

- Connect CMA510 to the transceiver, and confirm that the transmission output value is over 2.3 W at the frequencies of 146.10 MHz and 444.10 MHz[C510A] and of 435.10 MHz[C510E].

-Deviation adjustment and confirmation-

(1) UHF band

- Apply a 4.5 V power supply to the transceiver.
- Set the transceiver frequency to the UHF band transmission frequency (see Table 5-1).
- Switch off the filter of the modulation analyzer.
- Input a 1 kHz, 50 mV (OPEN) sine wave to the transceiver from the audio generator (AG). Switch the transceiver to the transmit mode.
- At this point, adjust RM29 so that the maximum deviation is ± 4.7 kHz.
- Gradually reduce the output level of the audio generator (AG) until deviation is ± 3.5 kHz. At this point, confirm that the audio generator (AG) sine wave output level is between 5 mV and 9 mV (OPEN).

(2) VHF band

- Set the transceiver frequency to 146.10 MHz.
- Switch off the filter of the modulation analyzer.
- Input a 1 kHz, 50 mV (OPEN) sine wave to the transceiver from the audio generator (AG). Switch the transceiver to the transmit mode.
- At this point, adjust RM30 so that the maximum deviation is ± 4.7 kHz.
- Gradually reduce the output level of the audio generator (AG) until deviation is ± 3.5 kHz. At this point, confirm that the audio generator (AG) sine wave output level is between 5 mV and 9 mV (OPEN).

-Tone deviation confirmation-

- Set the HPF of the modulation analyzer to off and the LPF to 3 kHz.
- Apply a 4.5 V power supply to the transceiver.
- Set the transceiver frequency to the UHF band transmission frequency (see Table 5-1). Set the transceiver's tone frequency to 100 Hz. Switch to transmit mode (unmodulated status).

Setting Procedure :

- Press the SET key, and turn the rotary channel selector to display "tSq: oF" on the display area. Next, hold down the F key and turn the rotary channel selector to display "tSq: on" on the display area. Turn the rotary channel selector so that "CF 100" is displayed on the display area. At this point if the frequency is not set to 100 Hz, while holding down the F key, turn the rotary channel selector so that the frequency is 100 Hz.
- At this point, confirm that the tone deviation is between ± 0.4 kHz and ± 1.2 kHz.
 - Measure the tone deviation at tone frequencies of 67.0 Hz and 250.3 Hz, and confirm that it comes within the range of ± 0.4 kHz to ± 1.2 kHz.
 - Set the transceiver's frequency to 146.10 MHz, and confirm that the tone deviation at tone frequencies of 100 Hz, 67.0 Hz and 250.3 Hz comes within the range of ± 0.4 kHz to ± 1.2 kHz.

-DTMF deviation confirmation-

- Switch off the filter of the modulation analyzer.
- Apply a 4.5 V power supply to the transceiver. Set the transceiver frequency to the UHF band transmission frequency (see Table 5-1).
- While holding down the PTT switch, press the "8" key of the numeric keys.
- At this point, confirm that the DTMF deviation is between ± 2.5 kHz and ± 4.0 kHz.
- Set the transceiver frequency to 146.10 MHz and while holding down the PTT switch, press the "8" key of the numeric keys.
- At this point, confirm that the DTMF deviation is between ± 2.5 kHz and ± 4.0 kHz.

-Transmission ham & noise confirmation-

- Confirm that the transmission ham & noise values are as listed in the table below.
- Set the HPF of the modulation analyzer to 50 Hz and the LPF to 20 kHz.

Transmission frequency(MHz)	Ham & noise level
146.10	32 dB or greater
444.10 [C510A]	32 dB or greater
435.10 [C510E]	32 dB or greater

-Tone burst deviation confirmation-

- (a) Set the HPF of the modulation analyzer to 50 Hz and the LPF to 20 kHz.
- (b) Set the transceiver frequency to the UHF band transmission frequency (see Table 5-1).
- (c) While holding down the PTT switch, press the MONI key.
- (d) At this point, confirm that the tone burst deviation is between ± 2.5 kHz and ± 4.0 kHz. Confirm that the tone frequency is $1750 \text{ Hz} \pm 10 \text{ Hz}$.
- (e) Set the transceiver's frequency to 146.10 MHz, and perform the same confirmation described in steps (c) and (d).

5.3.3 Receiver Block

-Audio output adjustment-

- (a) Set the transceiver frequency to the UHF band reception frequency (see Table 5-1).
- (b) Set the standard signal generator (SSG) as follows.
 - Frequency : UHF band reception frequency (see Table 5-1)
 - Standard modulation frequency : 1 kHz
 - Standard frequency deviation : ± 3.5 kHz
 - Output level : $+60 \text{ dB}\mu$
- (c) Adjust LR02 so that the audio output level is maximized.

-Signal strength meter sensitivity adjustment-

- (a) Set the transceiver frequency to the UHF band reception frequency (see Table 5-1).
- (b) Set the standard signal generator (SSG) as follows.
 - Frequency : UHF band reception frequency (see Table 5-1)
 - Standard modulation frequency : 1 kHz
 - Standard frequency deviation : ± 3.5 kHz
 - Output level : $+15 \text{ dB}\mu$
- (c) Adjust RR26 so that the signal strength meter registers through S9.
- (d) After once lowering the SSG output level, raise the output level slowly. Confirm that all the signal strength meter segments register when the output level is $+20 \text{ dB}\mu$ or less.
- (e) Next, set the transceiver and SSG frequency to the 146.02 MHz.
- (f) After once lowering the SSG output level, raise the output level slowly. Confirm that all the signal strength meter segments register when the output level is $+20 \text{ dB}\mu$ or less.

-Squelch adjustment-

- (a) Set the transceiver frequency to 146.02 MHz.
- (b) Set the standard signal generator (SSG) as follows.
 - Frequency : 146.02 MHz
 - Standard modulation frequency : 1 kHz
 - Standard frequency deviation : ± 3.5 kHz
 - Output level : $-12 \text{ dB}\mu$
- (c) Adjust RR10 so that the oscilloscope waveform undergoes a complete level change (squelch opens).
- (d) Gradually lower the SSG output level. After confirming that squelch closes, raise the output level again. Confirm that squelch opens when the SSG output level is between $-10 \text{ dB}\mu$ and $-14 \text{ dB}\mu$.
- (e) Next, set the transceiver and SSG frequency to the UHF band reception frequency (see Table 5-1). Set the SSG output level to $-10 \text{ dB}\mu$.
- (f) Turn the rotary channel selector while holding down the F key, and adjust it in such a way that the oscilloscope waveform undergoes a complete level change (squelch opens).
- (g) Gradually lower the SSG output level. After confirming that squelch closes, raise the output level again. Confirm that squelch opens when the SSG output level is between $-8 \text{ dB}\mu$ and $-12 \text{ dB}\mu$.

-Reception sensitivity confirmation-

(1) UHF band

- (a) Set the transceiver frequency to the UHF band reception frequency (see Table 5-1).
- (b) Set the standard signal generator (SSG) as follows.
 - Frequency : UHF band reception frequency (see Table 5-1)
 - Standard modulation frequency : 1 kHz
 - Standard frequency deviation : ± 3.5 kHz
- (c) At this point, confirm that 12 dB SINAD is approximately $-9 \text{ dB}\mu$.
- (d) Measure 20 dB QS at frequencies of 430.02 MHz and 439.98 MHz [C510E] or 438.02 MHz and 449.98 MHz [C510A]. At this point, confirm that the difference between the measured 20 dB QS values is 3 dB or less.

(2) VHF band

- (a) Set the transceiver frequency to 146.02 MHz.
- (b) Set the standard signal generator (SSG) as follows.
 - Frequency : 146.02 MHz
 - Standard modulation frequency : 1 kHz
 - Standard frequency deviation : ± 3.5 kHz
- (c) At this point, confirm that 12 dB SINAD is approximately $-10 \text{ dB}\mu$.
- (d) Measure 20 dB QS at frequencies of 144.02 and 147.98 MHz. At this point, confirm that the difference between the measured 20 dB QS values is 3 dB or less.

Modulation	Frequency	Standard Modulation Frequency	Standard Frequency Deviation	Output Level
FM	146.02 MHz	1 kHz	± 3.5 kHz	$+60 \text{ dB}\mu$
FM	146.02 MHz	1 kHz	± 3.5 kHz	$+15 \text{ dB}\mu$
FM	146.02 MHz	1 kHz	± 3.5 kHz	$-12 \text{ dB}\mu$
FM	146.02 MHz	1 kHz	± 3.5 kHz	$-10 \text{ dB}\mu$

-Tone decoder confirmation-

Note : Prepare a second transceiver with a tone squelch unit installed.

- (a) Set two transceivers to the same frequency(444.110 MHz[C510A],435.10 MHz[C510E] or 146.10 MHz).
- (b) Set the same tone frequency (179.9 Hz) for both transceivers.
- (c) Switch the C510A/C510E only to the tone squelch mode.
- (d) Switch the other transceiver to the transmit mode. At this point, confirm that squelch does not open on the C510A/C510E when the RF signal is received.
- (e) Next, switch the other transceiver to the tone squelch mode as well.
- (f) Switch the other transceiver to the transmit mode. At this point, confirm that squelch opens on the C510A/C510E when the RF signal is received.
- (g) Cancel tone squelch mode on both transceivers.

-Reception ham & noise confirmation-

- (a) Confirm that the reception ham & noise values are as listed in the table below.(Unsquelched)

Reception frequency(MHz)	Ham & noise level
146.02	40 dB or greater
444.02[C510A]	40 dB or greater
435.02[C510E]	40 dB or greater

-Beep volume confirmation-

- (a) Confirm that a beep sounds when the F key is pressed and that its volume changes when the volume control is turned.

-Paging reception confirmation-

Note : Prepare a second transceiver equipped with a paging function.

- (a) Set two transceivers to the same frequency(444.110 MHz[C510A],435.10 MHz[C510E]).
- (b) Set the same paging code for both transceivers.(any paging code may be used)
- (c) Switch the C510A/C510E and other transceiver to the paging mode.
- (d) Switch the other transceiver to the transmit mode. At this point, confirm that paging operates on the C510A/C510E when the RF signal is received.
- (e) Cancel tone squelch mode on both transceivers.

Adjustment : 

6. SPECIFICATIONS

6.1 General

Frequency range	VHF band : 144.000 MHz ~ 147.995 MHz UHF band : 438.000 MHz ~ 449.995 MHz[C510A] 430.000 MHz ~ 439.995 MHz[C510E]
Frequency type	F2, F3
Microphone impedance	2 k Ω
Speaker impedance	8 Ω
Antenna impedance	50 Ω
Antenna connector	SMA type
Operating voltage range	DC 3.3 V ~ 8.4 V
Rated voltage	DC 4.5 V
Current consumption	
Transmission (High power)	VHF band : Approx. 850 mA UHF band : Approx. 950 mA
Transmission (Low power)	VHF band : Approx. 400 mA UHF band : Approx. 430 mA
Reception	VHF band : approx. 29 mA UHF band : approx. 33 mA
Battery save (1.0 sec.)	Approx. 11 mA
Dimensions (Excluding protrusions)	58 mm (W) x 104 mm (H) x 27 mm (D)
Weight (including battery and antenna)	Approx. 210 g

6.2 Receiver Block

Reception method	Double super heterodyne
Intermediate frequencies	First IF : 23.05 MHz (lower) Second IF : 450 kHz (upper)
Reception sensitivity (12 dB SINAD)	VHF band : 0.2 μ V or less UHF band : 0.22 μ V or less
S/N ratio at 0.5 μ V input	30 dB or greater
Squelch open sensitivity	0.2 μ V or less
Audio output	Approx. 100 mW (8 Ω /10% distortion)

6.3 Transmitter Block

Transmission output

Transmission output	High power	Low power
Power supply		
Size AA alkaline batteries	Approx. 1 W	Approx. 0.3 W
CNB510	Approx. 0.7 W	

Modulation method	Reactance modulation
Maximum frequency deviation	\pm 5 kHz
Spurious signal rejection ratio	VHF band : - 60 dB or less UHF band : - 60 dB or less
Internal microphone	Electric condenser microphone

Specifications are subject to change without notice due to product improvements.

7. PARTS LIST

Parts list

The parts list contains information on electrical and mechanical parts.

Electrical parts are listed first, followed by mechanical parts.

Parts used only in C510A are indicated by the notation [C510A] in the description column.

Parts used only in C510E are indicated by the notation [C510E] in the description column.

Chip parts

Part numbers whose first three characters correspond to the following codes indicate chip parts.

-Capacitors-	-Resistors-	-Semiconductors-	-Coils-
DD4.....	NI.....	BA.....	LU.....
DD5.....	NN.....	HX.....	
DD9.....	NY.....	HY.....	
DF9.....	RI.....	HZ.....	
DK4.....			
DK5.....			
DK9.....			
EY.....			

Ordering replacement parts

Please supply the following information.

Part symbol (4 characters), Part number (10 characters), "Description", Model and serial number

Kind of parts

If the first one or two characters of a part number is one of the following, it indicates the type of part.

-Capacitors-	-Resistors-	-Semiconductors-	-Coils-	-Crystal-
C.....	BW.....	BA.....	FC.....	J.....
D.....	G.....	H.....	L.....	X.....
E.....	N.....		ML.....	
	R.....			
-Capacitors-	-Resistors-			
S.....	FF.....			
	FG.....			
	FM.....			
	FN.....			

REF. DESIG.	QTY	PART NO.	DESCRIPTION
P100 VHF TX/IF P.C.BOARD			
P001	1	WI337B1002	MAIN P.C.BOARD-KIT
P100	1	WI337B1012	VHF TX/IF P.C.BOARD
CF01	1	DD95101300	100 pF ± 5% (CG)
CF20	1	DD95180300	18 pF ± 5% (CG)
CF42	1	DK96102300	1000 pF ± 10%
CF70	1	DD90030300	3 pF ± 0.25 pF (CJ)
CF71	1	DD90020300	2 pF ± 0.25 pF (CK)
CF72	1	DD90040300	4 pF ± 0.25 pF (CH)
CP01	1	CX11000020	CTZ10A 10 pF
CP02	1	DD95220300	22 pF ± 5% (CG)
CP03	1	DD95330300	33 pF ± 5% (CG)
CP04	1	DD95101300	100 pF ± 5% (CG)
CP05	1	DK96103200	0.01 pF ± 10%
CP06	1	DD95430300	43 pF ± 5% (CG)
CP07	1	DD95101300	100 pF ± 5% (CG)
CP08	1	DK96103200	0.01 pF ± 10%
CP09	1	DK96473200	0.047 pF ± 10%
CP10	1	DK96104200	0.1 pF ± 10%
CP11	1	EY10600450	10 pF / 4 V
CP12	1	DK56224200	0.22 pF ± 10% 16 V
CP13	1	DD90030300	3 pF ± 0.25 pF (CJ)
CP14	1	DD90050300	5 pF ± 0.25 pF (CH)
CP15	1	DD95101300	100 pF ± 5% (CG)
CP16	1	DK96104200	0.1 pF ± 10%
CP17	1	DK96102300	1000 pF ± 10%
CP30	1	DK96103200	0.01 pF ± 10%
CP31	1	EY47500430	4.7 pF / 4 V
CP32	1	EY47600470	47 pF / 4 V
CP33	1	DK96102300	1000 pF ± 10%
CP40	1	DK96102300	1000 pF ± 10%
CP41	1	DD90020300	2 pF ± 0.25 pF (CK)
CP42	1	DK96102300	1000 pF ± 10%
CP43	1	DK06102200	1000 pF ± 10%
CP44	1	DK96102300	1000 pF ± 10%
CP45	1	DD90040300	4 pF ± 0.25 pF (CH)
CP50	1	DK96102300	1000 pF ± 10%
CP51	1	DD90020300	2 pF ± 0.25 pF (CK)
CP52	1	DK06102200	1000 pF ± 10%
CP53	1	DK96102300	1000 pF ± 10%
CP54	1	DD91100300	10 pF ± 0.5 pF (CH)
CR02	1	DD95330300	33 pF ± 5% (CG)
CR03	1	DK96103200	0.01 pF ± 10%
CR04	1	DK96103200	0.01 pF ± 10%
CR05	1	DK96103200	0.01 pF ± 10%
CR06	1	DK96103200	0.01 pF ± 10%
CR07	1	DK96103200	0.01 pF ± 10%
CR09	1	EY22600470	22 pF / 4 V
CR10	1	DK96103200	0.01 pF ± 10%

REF. DESIG.	QTY	PART NO.	DESCRIPTION
P100 VHF TX/IF P.C.BOARD			
CR11	1	DK96104200	0.1 pF ± 10%
CR12	1	DK96102300	1000 pF ± 10%
CR13	1	DD95221300	220 pF ± 5% (CG)
CR14	1	DD95221300	220 pF ± 5% (CG)
CR15	1	DK96104200	0.1 pF ± 10%
CR16	1	DK96473200	0.047 pF ± 10%
CR17	1	DD95180300	18 pF ± 5% (CG)
CR18	1	DK96104200	0.1 pF ± 10%
CR19	1	DK96473200	0.047 pF ± 10%
CR20	1	DK96223200	0.022 pF ± 10%
CR21	1	DK96472300	4700 pF ± 10%
CR22	1	EY10600450	10 pF / 4 V
CR23	1	DK96104200	0.1 pF ± 10%
CR24	1	DK96223200	0.022 pF ± 10%
CR25	1	DK96473200	0.047 pF ± 10%
CR26	1	DK96103200	0.01 pF ± 10%
CR27	1	DK96103200	0.01 pF ± 10%
CR28	1	DK96223200	0.022 pF ± 10%
CR29	1	DK96104200	0.1 pF ± 10%
CR30	1	DK96104200	0.1 pF ± 10%
CR40	1	DK96223200	0.022 pF ± 10%
CR41	1	EY10501610	1 pF / 16 V
CR42	1	EY15700470	150 pF / 4 V
CR43	1	DK06104200	0.1 pF ± 10%
CR44	1	DK96102300	1000 pF ± 10%
CR45	1	EY68601070	68 pF / 10 V
CR46	1	DK96473200	0.047 pF ± 10%
CR47	1	DK96102300	1000 pF ± 10%
CR48	1	EY10700670	100 pF / 6.3 V
CR49	1	DK96102300	1000 pF ± 10%
CR50	1	DK96102300	1000 pF ± 10%
CR51	1	DK96102300	1000 pF ± 10%
CR52	1	DK96102300	1000 pF ± 10%
CR60	1	DK96102300	1000 pF ± 10%
CR61	1	DK96102300	1000 pF ± 10%
CR62	1	DK96102300	1000 pF ± 10%
CR63	1	DK96102300	1000 pF ± 10%
CR70	1	DK96102300	1000 pF ± 10%
CR71	1	DK96102300	1000 pF ± 10%
CT01	1	DK96102300	1000 pF ± 10%
CT02	1	DD91100300	10 pF ± 0.5 pF (CH)
CT03	1	DK96102300	1000 pF ± 10%
CT04	1	DK96102300	1000 pF ± 10%
CT05	1	DK96102300	1000 pF ± 10%
CT07	1	DK96103200	0.01 pF ± 10%
CT08	1	DD95220300	22 pF ± 5% (CG)
CT21	1	DK96102300	1000 pF ± 10%
CT22	1	DK96102300	1000 pF ± 10%
CT23	1	DD95101300	100 pF ± 5% (CG)
CT24	1	DD91060300	6 pF ± 0.5 pF (CH) [C510A]
CT24	1	DD91080300	8 pF ± 0.5 pF (CH) [C510E]
CT25	1	DD95101300	100 pF ± 5% (CG)
CT26	1	EY22601070	22 pF / 10 V
CT27	1	DK96102300	1000 pF ± 10%
CT30	1	DK96102300	1000 pF ± 10%

Specifications are subject to change without notice

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
P100 VHF TX/IF P.C. BOARD				P100 VHF TX/IF P.C. BOARD			
CT31	1	DD95470300	47 pF ± 5% (CG)	LT01	1	LU04180040	ELJRE 18 nH ± 5%
CT34	1	DK96102300	1000 pF ± 10%	LT02	1	LU04220040	ELJRE 22 nH ± 5%
CT35	1	DK96102300	1000 pF ± 10%	LT08	1	ML010028M0	1.0-5T (AIR COIL)
CT36	1	DD95150300	15 pF ± 5% (CG)	LT30	1	LU04820040	ELJRE B2 nH ± 5%
CT37	1	DD95101300	100 pF ± 5% (CG)	LT31	1	LU04680040	ELJRE 68 nH ± 5%
CT38	1	DK96102300	1000 pF ± 10%	LT32	1	LU18220010	ELJND 22 nH ± 10%
CT39	1	EY10501610	1 μF / 16 V	LT33	1	LU28680010	LQN21A 68 nH ± 5%
CT40	1	DK96102300	1000 pF ± 10%	LT34	1	LU28560010	LQN21A 56 nH ± 5%
CT41	1	DK96102300	1000 pF ± 10%	LT35	1	ML010029Q0	1.0-9T (AIR COIL)
CT42	1	DD95150300	15 pF ± 5% (CG)	LT36	1	ML010028P0	1.0-7T (AIR COIL)
CT43	1	DD95180300	18 pF ± 5% (CG)	LT38	1	ML019025C0	1.9-6T (AIR COIL)
CT44	1	DK96102300	1000 pF ± 10%	LT39	1	ML019025C0	1.9-6T (AIR COIL)
CT45	1	DD95180300	18 pF ± 5% (CG)	LT40	1	LU18102010	ELJND 1 μH ± 5%
CT46	1	DD95330300	33 pF ± 5% (CG)	LT60	1	ML010028M0	1.0-5T (AIR COIL)
CT47	1	DD95220300	22 pF ± 5% (CG)	QP01	1	HZ20012050	1SS272
CT48	1	DK96102300	1000 pF ± 10%	QP02	1	HC10082180	MB1511PFV (PLL IC)
CT49	1	DK96102300	1000 pF ± 10%	QP03	1	HX346492B0	2SC4649 (N,P)
CT50	1	DD95470300	47 pF ± 5% (CG)	QP04	1	HZ20054050	1SS389
CT51	1	DD95220300	22 pF ± 5% (CG)	QP30	1	HZ20052050	1SS381
CT52	1	DK96102300	1000 pF ± 10%	QP31	1	BA12105000	DTA123JE or RN2105
CT53	1	DK96102300	1000 pF ± 10%	QP32	1	BA21001000	UMW1N
CT60	1	DD90030300	3 pF ± 0.25 pF (CJ)	QP33	1	BA12711000	UMA4N or RN2711
CT70	1	DD90010300	1 pF ± 0.25 pF (CK)	QP40	1	HX350061A0	2SC5006 (FB)
CT71	1	DD90010300	1 pF ± 0.25 pF (CK)	QP50	1	HX347261P0	2SC4726 (P)
CT72	1	DD91080300	8 pF ± 0.5 pF (CH)	QR01	1	HX346492B0	2SC4649 (N,P)
CT73	1	DK96102300	1000 pF ± 10%	QR02	1	HZ21105000	DAN222 or 1SS361
CT74	1	DK96103200	0.01 μF ± 10%	QR03	1	HC10352050	TA31136FN (SECOND IF IC)
CT75	1	DK96103200	0.01 μF ± 10%	QR04	1	HZ21105000	DAN222 or 1SS361
CT76	1	DK96103200	0.01 μF ± 10%	QR05	1	HX346172A0	2SC4617 (Q,R)
CT77	1	DK96102300	1000 pF ± 10%	QR07	1	HY21830000	2SK1830
CT78	1	DK96102300	1000 pF ± 10%	QR08	1	HX346172A0	2SC4617 (Q,R)
CT79	1	DK96102300	1000 pF ± 10%	QR09	1	BA20061210	UMX1N
CT80	1	DK96102300	1000 pF ± 10%	QR40	1	HC10098090	NJM2070M (AUDIO IC)
CT81	1	DK96102300	1000 pF ± 10%	QR41	1	HX11766000	2SA1766
CT82	1	EY10501610	1 μF / 16 V	QR42	1	BA21001000	UMW1N
FR01	1	JX23003270	D235015AD1 (23.05MHz FILTER)	QR43	1	HZ31306050	01S256-X
FR70	1	FU12205010	PROTECT UNIT ICP-S1.2	QR44	1	BA31001000	UMZ1N or HN1B01FU
FT60	1	FF80440010	DUPLEXER GDPX150/350A301	QR60	1	HY10347000	2SJ347
JF01	1	YJ10003120	ANTENNA SOCKET (SMA)	QR61	1	BA12113000	DTA144TE or RN2113 or UN9110
JF02	1	YJ90001260	MM7329-2700	QR62	1	BA12113000	DTA144TE or RN2113 or UN9110
JR01	1	YJ01004110	LGA2519-3601 (MIC/SPK SOCKET)	QR63	1	BA10040210	UMA6N
K001	1	KH054Y6030	VCO (VHF/UHF)	QR64	1	HZ20053050	1SS387
LF70	1	LU04082040	ELJRE 8.2 nH ± 5%	QR65	1	HZ20053050	1SS387
LF71	1	LU04082040	ELJRE 8.2 nH ± 5%	QR66	1	HZ20053050	1SS387
LP01	1	LU18102010	ELJND 1 μH ± 5%	QR70	1	HX419501A0	2SD1950 (VL)
LP40	1	LU04270040	ELJRE 27 nH ± 5%	QR71	1	HZ20052010	HRU0302A
LP50	1	LU18121010	ELJND 120 nH ± 5%	QT01	1	HZ20029210	DAN235E
LR01	1	LU18102010	ELJND 1 μH ± 5%	QT02	1	HX350061A0	2SC5006 (FB)
LR02	1	LA50126010	5CD	QT07	1	BA20059210	DTC123YE
				QT08	1	HZ20051010	HSC277
				QT30	1	HZ20029210	DAN235E

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
P100 VHF TX/IF P.C.BOARD				P100 VHF TX/IF P.C.BOARD			
QT31	1	HX350051A0	2SC5005 (FB)	RR01	1	NP05101610	100 Ω ± 5 % 1/16 W
QT33	1	HY22595000	2SK2595 (RF POWER MOS FET)	RR02	1	NP05471610	470 Ω ± 5 % 1/16 W
QT34	1	HY22595000	2SK2595 (RF POWER MOS FET)	RR03	1	NP05152610	1.5 kΩ ± 5 % 1/16 W
QT35	1	HZ20051010	HSC277	RR04	1	NP05334610	330 kΩ ± 5 % 1/16 W
QT36	1	BA20059210	DTC123YE	RR05	1	NP05220610	22 Ω ± 5 % 1/16 W
QT37	1	HZ20051010	HSC277	RR06	1	NP05101610	100 Ω ± 5 % 1/16 W
QT70	1	HZ20057020	MA2S728	RR07	1	NP05102610	1 kΩ ± 5 % 1/16 W
QT71	1	HC10336050	TA75901F	RR08	1	NP05333610	33 kΩ ± 5 % 1/16 W
QT72	1	BA21707000	UMG5N or RN1707	RR09	1	NP05683610	68 kΩ ± 5 % 1/16 W
QT73	1	BA12113000	DTA144TE or RN2113 or UN9110	RR10	1	NY01030300	MVR22 10 kΩ (CHIP VR)
QT74	1	HZ20054050	1S5389	RR11	1	NP05154610	150 kΩ ± 5 % 1/16 W
QT75	1	BA10056210	DTA143XE	RR12	1	NP05472610	4.7 kΩ ± 5 % 1/16 W
QT76	1	HZ20052050	1S5381	RR13	1	NP05154610	150 kΩ ± 5 % 1/16 W
QT77	1	BA10056210	DTA143XE	RR14	1	NP05332610	3.3 kΩ ± 5 % 1/16 W
Q001	1	HD20031010	DIODE V06C	RR15	1	NP05224610	220 kΩ ± 5 % 1/16 W
RF01	1	NP05223610	22 kΩ ± 5 % 1/16 W	RR16	1	NP05153610	15 kΩ ± 5 % 1/16 W
RF70	1	NP05223610	22 kΩ ± 5 % 1/16 W	RR17	1	NP05103610	10 kΩ ± 5 % 1/16 W
RP01	1	NP05472610	4.7 kΩ ± 5 % 1/16 W	RR18	1	NP05224610	220 kΩ ± 5 % 1/16 W
RP02	1	NP05104610	100 kΩ ± 5 % 1/16 W	RR19	1	NP05153610	15 kΩ ± 5 % 1/16 W
RP03	1	NP05472610	4.7 kΩ ± 5 % 1/16 W	RR20	1	NP05153610	15 kΩ ± 5 % 1/16 W
RP04	1	NP05104610	100 kΩ ± 5 % 1/16 W	RR21	1	NP05474610	470 kΩ ± 5 % 1/16 W
RP05	1	NP05472610	4.7 kΩ ± 5 % 1/16 W	RR22	1	NP05681610	680 Ω ± 5 % 1/16 W
RP06	1	NP05101610	100 Ω ± 5 % 1/16 W	RR23	1	NP05102610	1 kΩ ± 5 % 1/16 W
RP07	1	NP05473610	47 kΩ ± 5 % 1/16 W	RR24	1	NP05471610	470 Ω ± 5 % 1/16 W
RP08	1	NP05684610	680 kΩ ± 5 % 1/16 W	RR25	1	NP05474610	470 kΩ ± 5 % 1/16 W
RP09	1	NP05102610	1 kΩ ± 5 % 1/16 W	RR26	1	NY02040300	MVR22 200 kΩ (CHIP VR)
RP11	1	NP05101610	100 Ω ± 5 % 1/16 W	RR27	1	NP05223610	22 kΩ ± 5 % 1/16 W
RP12	1	NP05102610	1 kΩ ± 5 % 1/16 W	RR28	1	NP05684610	680 kΩ ± 5 % 1/16 W
RP13	1	NP05681610	680 Ω ± 5 % 1/16 W	RR29	1	NP05471610	470 Ω ± 5 % 1/16 W
RP14	1	NP05222610	2.2 kΩ ± 5 % 1/16 W	RR30	1	NP05105610	1 MΩ ± 5 % 1/16 W
RP15	1	NP05470610	47 Ω ± 5 % 1/16 W	RR31	1	NP05474610	470 kΩ ± 5 % 1/16 W
RP16	1	NP05470610	47 Ω ± 5 % 1/16 W	RR40	1	NP05471610	470 Ω ± 5 % 1/16 W
RP17	1	NP05474610	470 kΩ ± 5 % 1/16 W	RR41	1	NP05334610	330 kΩ ± 5 % 1/16 W
RP18	1	NP05223610	22 kΩ ± 5 % 1/16 W	RR42	1	NP05471610	470 Ω ± 5 % 1/16 W
RP19	1	NP05103610	10 kΩ ± 5 % 1/16 W	RR43	1	NP05100610	10 Ω ± 5 % 1/16 W
RP30	1	NP05333610	33 kΩ ± 5 % 1/16 W	RR44	1	NP05022610	2.2 Ω ± 5 % 1/16 W
RP31	1	NP05154610	150 kΩ ± 5 % 1/16 W	RR45	1	NP05104610	100 kΩ ± 5 % 1/16 W
RP32	1	NP05223610	22 kΩ ± 5 % 1/16 W	RR46	1	NP05102610	1 kΩ ± 5 % 1/16 W
RP33	1	NP05100610	10 Ω ± 5 % 1/16 W	RR47	1	NP05223610	22 kΩ ± 5 % 1/16 W
RP40	1	NP05103610	10 kΩ ± 5 % 1/16 W	RR48	1	NP05103610	10 kΩ ± 5 % 1/16 W
RP41	1	NP05103610	10 kΩ ± 5 % 1/16 W	RR49	1	NP05102610	1 kΩ ± 5 % 1/16 W
RP42	1	NP05101610	100 Ω ± 5 % 1/16 W	RR50	1	NP05105610	1 MΩ ± 5 % 1/16 W
RP43	1	NP05470610	47 Ω ± 5 % 1/16 W	RR51	1	NP05155610	1.5 MΩ ± 5 % 1/16 W
RP44	1	NP05223610	22 kΩ ± 5 % 1/16 W	RR52	1	NP05153610	15 kΩ ± 5 % 1/16 W
RP50	1	NP05103610	10 kΩ ± 5 % 1/16 W	RR53	1	NP05104610	100 kΩ ± 5 % 1/16 W
RP51	1	NP05103610	10 kΩ ± 5 % 1/16 W	RR50	1	NP05104610	100 kΩ ± 5 % 1/16 W
RP52	1	NP05221610	220 Ω ± 5 % 1/16 W	RT01	1	NP05222610	2.2 kΩ ± 5 % 1/16 W
RP53	1	NP05470610	47 Ω ± 5 % 1/16 W	RT02	1	NP05152610	1.5 kΩ ± 5 % 1/16 W
RP54	1	NP05223610	22 kΩ ± 5 % 1/16 W	RT03	1	NP05102610	1 kΩ ± 5 % 1/16 W
				RT04	1	NP05220610	22 Ω ± 5 % 1/16 W
				RT05	1	NP05100610	10 Ω ± 5 % 1/16 W
				RT06	1	NP05471610	470 Ω ± 5 % 1/16 W
				RT07	1	NP05471610	470 Ω ± 5 % 1/16 W
				RT13	1	NP05151610	150 Ω ± 5 % 1/16 W
				RT14	1	NP05103610	10 kΩ ± 5 % 1/16 W
				RT30	1	NP05222610	2.2 kΩ ± 5 % 1/16 W

REF. DESIG.	QTY	PART NO.	DESCRIPTION		
P100 VHF TX/IF P.C.BOARD					
RT31	1	NP05152610	1.5 kΩ	± 5 %	1/16 W
RT32	1	NP05102610	1 kΩ	± 5 %	1/16 W
RT33	1	NP05330610	33 Ω	± 5 %	1/16 W
RT34	1	NP05100610	10 Ω	± 5 %	1/16 W
RT35	1	NP05102610	1 kΩ	± 5 %	1/16 W
RT36	1	NP05330610	33 Ω	± 5 %	1/16 W
RT37	1	NP05223610	22 kΩ	± 5 %	1/16 W
RT39	1	NP05472610	4.7 kΩ	± 5 %	1/16 W
RT40	1	NP05103610	10 kΩ	± 5 %	1/16 W
RT41	1	NP05103610	10 kΩ	± 5 %	1/16 W
RT42	1	NP05102610	1 kΩ	± 5 %	1/16 W
RT43	1	NP05151610	150 Ω	± 5 %	1/16 W
RT44	1	NP05470610	47 Ω	± 5 %	1/16 W
RT45	1	NP05104610	100 kΩ	± 5 %	1/16 W
RT72	1	NP05222610	2.2 kΩ	± 5 %	1/16 W
RT73	1	NP05103610	10 kΩ	± 5 %	1/16 W
RT74	1	NP05104610	100 kΩ	± 5 %	1/16 W
W100	1	WE243B1000	FLEXIBLE P.C.BOARD		
XP01	1	JX11001270	UM-5 11.75MHz		
YA01	1	YB00190500	MXFG76XX1900A1(COXIAL CORD)		
YA02	1	YB00190500	MXFG76XX1900A1(COXIAL CORD)		
YF01	1	YP06902160	IMSA-9230B-1-05Z001-T (5PIN)		
YF02	1	YP06902160	IMSA-9230B-1-05Z001-T (5PIN)		
YF03	1	YP06902160	IMSA-9230B-1-05Z001-T (5PIN)		
YR01	1	YJ07009650	IL-FPR-33S-VF (33PIN)		
YR02	1	YJ07010070	IL-WX-06S-VF-B (6PIN)		
P200 UHF TX/SWITCH P.C.BOARD					
P200	1	W1337B1022	UHF TX/SWITCH P.C.BOARD		
CT09	1	DK96102300	1000 pF	± 10 %	
CT10	1	DD95180300	18 pF	± 5 %	(CG)
CT11	1	DK96102300	1000 pF	± 10 %	
CT13	1	DK96102300	1000 pF	± 10 %	
CT14	1	DK96102300	1000 pF	± 10 %	
CT15	1	DD95470300	47 pF	± 5 %	(CG) [C610A]
CT15	1	DD95580300	56 pF	± 5 %	(CG) [C510E]
CT16	1	DD95101300	100 pF	± 5 %	(CG)
CT17	1	DK96102300	1000 pF	± 10 %	
CT18	1	DD91060300	6 pF	± 0.5 pF	(CH)
CT19	1	DD95200300	20 pF	± 5 %	(CG)
CT20	1	DK96103200	0.01 μF	± 10 %	
CT28	1	EY10600450	10 μF / 4 V		
CT61	1	DK96102300	1000 pF	± 10 %	
CT62	1	DK96102300	1000 pF	± 10 %	
CT63	1	DK96102300	1000 pF	± 10 %	
LT03	1	LU28100010	LQN21A 10 nH	± 5 %	
LT04	1	LU18220010	ELJND 22 nH	± 10 %	
LT05	1	LU28150010	LQN21A 15 nH	± 5 %	
LT06	1	LU28033010	LQN21A 3.3 nH	± 0.5 nH	
LT07	1	ML010028P0	1.0-7T (AIR COIL)		

REF. DESIG.	QTY	PART NO.	DESCRIPTION		
P200 UHF TX/SWITCH P.C.BOARD					
QT04	1	HY22596000	2SK2595 (RF POWER MOS FET)		
QT05	1	HY22595000	2SK2595 (RF POWER MOS FET)		
QT06	1	HZ20051010	HSC277		
RT08	1	NP05472610	4.7 kΩ	± 5 %	1/16 W
RT09	1	NP05102610	1 kΩ	± 5 %	1/16 W
RT10	1	NP05103610	10 kΩ	± 5 %	1/16 W
RT11	1	NP05102610	1 kΩ	± 5 %	1/16 W
RT60	1	NP05334610	330 kΩ	± 5 %	1/16 W
RT61	1	NP05473610	47 kΩ	± 5 %	1/16 W
RT62	1	NP05224610	220 kΩ	± 5 %	1/16 W
ST60	1	SP01011820	SKQDAA TACT SWITCH FOR PTT		
ST61	1	SP01011820	SKQDAA TACT SWITCH FOR FUNK		
ST62	1	SP01011820	SKQDAA TACT SWITCH FOR LAMP		
P300 VHF/UHF RX P.C.BOARD					
P300	1	W1337B1032	VHF/UHF RX P.C.BOARD		
CF02	1	DD90050300	5 pF	± 0.25 pF	(CH)
CF03	1	DD91080300	8 pF	± 0.5 pF	(CH)
CF04	1	DD91100300	10 pF	± 0.5 pF	(CH)
CF05	1	DD91070300	7 pF	± 0.5 pF	(CH)
CF06	1	DK96102300	1000 pF	± 10 %	
CF07	1	DK06102200	1000 pF	± 10 %	
CF08	1	DD00050200	5 pF	± 0.25 pF	(CH)
CF09	1	DK06102200	1000 pF	± 10 %	
CF11	1	DK96102300	1000 pF	± 10 %	
CF12	1	DD91080300	8 pF	± 0.5 pF	(CH)
CF14	1	DD09010200	1 pF		(CK)
CF15	1	DD00040200	4 pF	± 0.25 pF	(CH)
CF16	1	DK06102200	1000 pF	± 10 %	
CF21	1	DD01100200	10 pF	± 0.5 pF	(CH)
CF22	1	DD05220200	22 pF	± 5 %	(CH)
CF23	1	DD01070200	7 pF	± 0.5 pF	(CH)
CF24	1	DK06102200	1000 pF	± 10 %	
CF25	1	DK06102200	1000 pF	± 10 %	
CF26	1	DK06102200	1000 pF	± 10 %	
CF27	1	DK06102200	1000 pF	± 10 %	
CF28	1	DD01100200	10 pF	± 0.5 pF	(CH)
CF29	1	DD00050200	5 pF	± 0.25 pF	(CH)
CF30	1	DD09015200	1.5 pF		(CK)
CF31	1	DK06102200	1000 pF	± 10 %	
CF32	1	DD00050200	5 pF	± 0.25 pF	(CH)
CF33	1	DD01090200	9 pF	± 0.5 pF	(CH)
CF34	1	DD09015200	1.5 pF		(CK)
CF35	1	DD01060200	6 pF	± 0.5 pF	(CH)
CF36	1	DD00050200	5 pF	± 0.25 pF	(CH)
CF37	1	DD95180300	18 pF	± 5 %	(CG)
CF38	1	DD00050200	5 pF	± 0.25 pF	(CH)
CF39	1	DK06102200	1000 pF	± 10 %	
CF40	1	DD09015200	1.5 pF		(CK)
CF41	1	DK06102200	1000 pF	± 10 %	
CF43	1	DK96102300	1000 pF	± 10 %	
CF50	1	DD90050300	5 pF	± 0.25 pF	(CH)

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
P300 VHF/UHF RX P.C. BOARD				P300 VHF/UHF RX P.C. BOARD			
CF51	1	DK06102200	1000 pF ± 10 %	QF21	1	HX347261P0	2SC4726 (P)
CF52	1	DD91100300	10 pF ± 0.5 pF (CH)	QF22	1	HZ20052050	1SS381
CF53	1	DD95120300	12 pF ± 5 % (CG)	QF23	1	HZ20052050	1SS381
CF54	1	DD00050200	5 pF ± 0.25 pF (CH)	QF24	1	HZ20052050	1SS381
CF55	1	DK96102300	1000 pF ± 10 %	QF25	1	HX350051A0	2SC5005 (FB)
CF56	1	DD00040200	4 pF ± 0.25 pF (CH)	QF50	1	HX350061A0	2SC5006 (FB)
CF57	1	DK96102300	1000 pF ± 10 %	QF51	1	HX347261P0	2SC4726 (P)
CF58	1	DK06102200	1000 pF ± 10 %	QF52	1	HZ20052050	1SS381
CF59	1	DD00030200	3 pF ± 0.25 pF (CJ)	QF53	1	HZ20052050	1SS381
CF60	1	DD90010300	1 pF ± 0.25 pF (CK)	QF54	1	HX350051A0	2SC5005 (FB)
CF61	1	DD90030300	3 pF ± 0.25 pF (CJ)	QF70	1	HZ50001010	HVC131
CF62	1	DD90010300	1 pF ± 0.25 pF (CK)	QF71	1	HX350081A0	2SC5008 (FB)
CF63	1	DD91080300	8 pF ± 0.5 pF (CH)	QF72	1	HX350061A0	2SC5006 (FB)
CF64	1	DD90020300	2 pF ± 0.25 pF (CK)	QF73	1	HX350061A0	2SC5006 (FB)
CF65	1	DD09010200	1 pF (CK)	QF74	1	HZ50001010	HVC131
CF73	1	DK06102200	1000 pF ± 10 %	RF02	1	NP05222610	2.2 kΩ ± 5 % 1/16 W
CF74	1	DD00040200	4 pF ± 0.25 pF (CH)	RF03	1	NP05221610	220 Ω ± 5 % 1/16 W
CF75	1	DD90025300	2.5 pF ± 0.25 pF (CH)	RF04	1	NP05154610	150 kΩ ± 5 % 1/16 W
CF76	1	DD01080200	8 pF ± 0.5 pF (CH)	RF05	1	NP05470610	47 Ω ± 5 % 1/16 W
CF77	1	DK06102200	1000 pF ± 10 %	RF06	1	NP05221610	220 Ω ± 5 % 1/16 W
CF78	1	DD00050200	5 pF ± 0.25 pF (CH)	RF07	1	NP05154610	150 kΩ ± 5 % 1/16 W
CF79	1	DD05101200	100 pF ± 5 % (CH)	RF08	1	NP05470610	47 Ω ± 5 % 1/16 W
CF80	1	DD01100200	10 pF ± 0.5 pF (CH)	RF10	1	NP05334610	330 kΩ ± 5 % 1/16 W
CF81	1	DK06102200	1000 pF ± 10 %	RF11	1	NP05222610	2.2 kΩ ± 5 % 1/16 W
CF82	1	DD00020200	2 pF ± 0.25 pF (CK)	RF12	1	NP05101610	100 Ω ± 5 % 1/16 W
CF83	1	DD05101200	100 pF ± 5 % (CH)	RF20	1	NP05682610	6.8 kΩ ± 5 % 1/16 W
CF84	1	DD09010200	1 pF (CK)	RF21	1	NP05682610	6.8 kΩ ± 5 % 1/16 W
CR01	1	DD01070200	7 pF ± 0.5 pF (CH)	RF22	1	NP05101610	100 Ω ± 5 % 1/16 W
FF01	1	FF40445010	SAW FILTER 445MHz [C510A]	RF23	1	NP05682610	6.8 kΩ ± 5 % 1/16 W
FF01	1	FF40435010	SAW FILTER 435MHz [C510E]	RF24	1	NP05101610	100 Ω ± 5 % 1/16 W
FF02	1	FF40445010	SAW FILTER 445MHz [C510A]	RF25	1	NP05682610	6.8 kΩ ± 5 % 1/16 W
FF02	1	FF40435010	SAW FILTER 435MHz [C510E]	RF26	1	NP05101610	100 Ω ± 5 % 1/16 W
LF01	1	LU28082010	LQN21A 8.2 nH ± 0.5 nH	RF27	1	NP05472610	4.7 kΩ ± 5 % 1/16 W
LF02	1	LU04330040	ELJRE 33 nH ± 5 %	RF28	1	NP05472610	4.7 kΩ ± 5 % 1/16 W
LF03	1	LU04100040	ELJRE 10 nH ± 5 %	RF29	1	NP05472610	4.7 kΩ ± 5 % 1/16 W
LF04	1	LU04180040	ELJRE 18 nH ± 5 %	RF30	1	NP05474610	470 kΩ ± 5 % 1/16 W
LF05	1	LU04330040	ELJRE 33 nH ± 5 %	RF31	1	NP05000610	0 Ω ± 5 % 1/16 W
LF20	1	LU28680010	LQN21A 68 nH ± 5 %	RF32	1	NP05474610	470 kΩ ± 5 % 1/16 W
LF21	1	LU18820010	ELJND 82 nH ± 5 %	RF33	1	NP05222610	2.2 kΩ ± 5 % 1/16 W
LF22	1	LU18820010	ELJND 82 nH ± 5 %	RF34	1	NP05100610	10 Ω ± 5 % 1/16 W
LF23	1	LU18820010	ELJND 82 nH ± 5 %	RF50	1	NP05222610	2.2 kΩ ± 5 % 1/16 W
LF50	1	LU04100040	ELJRE 10 nH ± 5 %	RF51	1	NP05683610	68 kΩ ± 5 % 1/16 W
LF51	1	LU04180040	ELJRE 18 nH ± 5 %	RF52	1	NP05223610	22 kΩ ± 5 % 1/16 W
LF52	1	LU04180040	ELJRE 18 nH ± 5 %	RF53	1	NP05682610	6.8 kΩ ± 5 % 1/16 W
LF72	1	LU04033040	ELJRE 3.3 nH ± 0.3 nH	RF54	1	NP05101610	100 Ω ± 5 % 1/16 W
LF73	1	LU04033040	ELJRE 3.3 nH ± 0.3 nH	RF55	1	NP05472610	4.7 kΩ ± 5 % 1/16 W
LF74	1	LU04100040	ELJRE 10 nH ± 5 %	RF56	1	NP05472610	4.7 kΩ ± 5 % 1/16 W
QF01	1	HZ20029210	DAN235E	RF58	1	NP05224610	220 kΩ ± 5 % 1/16 W
QF02	1	HX350061A0	2SC5006 (FB)	RF59	1	NP05222610	2.2 kΩ ± 5 % 1/16 W
QF03	1	HX350061A0	2SC5006 (FB)				
QF04	1	HX350051A0	2SC5005 (FB)				
QF05	1	HZ20029210	DAN235E				
QF20	1	HX350061A0	2SC5006 (FB)				

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
			P300 VHF/UHF RX P.C. BOARD				P600 CONTROL P.C. BOARD
RF71	1	NP05222610	2.2 kΩ ± 5% 1/16 W	CD21	1	DK96102300	1000 pF ± 10%
RF72	1	NP05101610	100 Ω ± 5% 1/16 W	CD22	1	DK96102300	1000 pF ± 10%
RF73	1	NP05104610	100 kΩ ± 5% 1/16 W	CD23	1	DK96102300	1000 pF ± 10%
RF74	1	NP05220610	22 Ω ± 5% 1/16 W	CD24	1	DK96104200	0.1 μF ± 10%
RF75	1	NP05331610	330 Ω ± 5% 1/16 W	CD25	1	DK96102300	1000 pF ± 10%
RF76	1	NP05103610	10 kΩ ± 5% 1/16 W	CD26	1	DK96104200	0.1 μF ± 10%
RF77	1	NP05222610	2.2 kΩ ± 5% 1/16 W	CD27	1	EY10600450	10 μF / 4 V
RF78	1	NP05154610	150 kΩ ± 5% 1/16 W	CD28	1	DK96104200	0.1 μF ± 10%
RF79	1	NP05331610	330 Ω ± 5% 1/16 W	CD30	1	DK96102300	1000 pF ± 10%
RF80	1	NP05333610	33 kΩ ± 5% 1/16 W				
			P400 FILTER P.C. BOARD				
P400	1	WI337B1042	FILTER P.C. BOARD	CD31	1	DK96102300	1000 pF ± 10%
FR02	1	FG450302E0	CFWM450E or ALFYM450E	CD32	1	DK96102300	1000 pF ± 10%
			P500 AF VOLUME P.C. BOARD	CD33	1	DK06102200	1000 pF ± 10%
P500	1	WI337B1052	AF VOLUME P.C. BOARD	CD34	1	DK06102200	1000 pF ± 10%
RR80	1	RB01030470	RK08H1110 10 kΩ (B)	CD35	1	DK96473200	0.047 μF ± 10%
YR03	1	YP07005040	IL-WX-06P-HF-B (6PIN)	CD36	1	DK96473200	0.047 μF ± 10%
			P600 CONTROL P.C. BOARD	CD37	1	DK96102300	1000 pF ± 10%
P002	1	WI337B2002	CONTROL P.C. BOARD-KIT	CD38	1	DD05101200	100 pF ± 5% (CH)
P600	1	WI337B2012	CONTROL P.C. BOARD	CD39	1	DD05101200	100 pF ± 5% (CH)
CC01	1	DK96104200	0.1 μF ± 10%	CD40	1	DK96102300	1000 pF ± 10%
CC02	1	DK96223200	0.022 μF ± 10%	CD41	1	DK96103200	0.01 μF ± 10%
CC03	1	DK96103200	0.01 μF ± 10%	CD42	1	DK96102300	1000 pF ± 10%
CC04	1	DK96472300	4700 pF ± 10%	CD43	1	DK96472300	4700 pF ± 10%
CC05	1	EY10501070	1 μF / 10 V	CD44	1	DK96472300	4700 pF ± 10%
CC06	1	DK96333200	0.033 μF ± 10%	CD45	1	DK06102200	1000 pF ± 10%
CC07	1	DK96102300	1000 pF ± 10%	CD46	1	DD95430300	43 pF ± 5% (CG)
CC08	1	DK96103200	0.01 μF ± 10%	CD47	1	DD05390200	39 pF ± 5% (CH)
CC09	1	DK96472300	4700 pF ± 10%	CD48	1	EY22600470	22 μF / 4 V
CC10	1	DK96472300	4700 pF ± 10%	CD49	1	DK96104200	0.1 μF ± 10%
CC11	1	EY10501070	1 μF / 10 V	CD50	1	DK96103200	0.01 μF ± 10%
CC12	1	EY22600470	22 μF / 4 V	CD51	1	DK96104200	0.1 μF ± 10%
CD10	1	DK96102300	1000 pF ± 10%	CD52	1	DK96473200	0.047 μF ± 10%
CD11	1	EY68601070	68 μF / 10 V	CD53	1	DD95300300	30 pF ± 5% (CG)
CD12	1	EY68601070	68 μF / 10 V	CD54	1	DD95330300	33 pF ± 5% (CG)
CD13	1	DK96103200	0.01 μF ± 10%	CD55	1	EY22600470	22 μF / 4 V
CD14	1	EY68601070	68 μF / 10 V	CD56	1	DK06103200	0.01 μF ± 10%
CD15	1	DK96103200	0.01 μF ± 10%	CD57	1	DK06103200	0.01 μF ± 10%
CD16	1	EY10700470	100 μF / 4 V	CD58	1	DK06103200	0.01 μF ± 10%
CD17	1	DK96103200	0.01 μF ± 10%	CD59	1	DK96102300	1000 pF ± 10%
CD18	1	EY10600450	10 μF / 4 V	CD60	1	DK96223200	0.022 μF ± 10%
CD19	1	DK96102300	1000 pF ± 10%	CD61	1	DK06103200	0.01 μF ± 10%
CD20	1	EY47800470	47 μF / 4 V	CL01	1	DK96102300	1000 pF ± 10%
				CL10	1	DK96102300	1000 pF ± 10%
				CM01	1	DK96102300	1000 pF ± 10%
				CM02	1	DK96102300	1000 pF ± 10%
				CM03	1	DK96473200	0.047 μF ± 10%
				CM10	1	DK96103200	0.01 μF ± 10%
				CM11	1	DK96103200	0.01 μF ± 10%
				CM12	1	DD95101300	100 pF ± 5% (CG)
				CM13	1	DK96104200	0.1 μF ± 10%
				CM14	1	DK96104200	0.1 μF ± 10%
				CM15	1	DK96472300	4700 pF ± 10%
				CM16	1	DD95331300	330 pF ± 5% (CG)
				CM17	1	DK96103200	0.01 μF ± 10%
				CM18	1	DK96103200	0.01 μF ± 10%
				CM19	1	EY10501070	1 μF / 10 V
				CM20	1	DK96104200	0.1 μF ± 10%

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
P600 CONTROL P.C.BOARD				P600 CONTROL P.C.BOARD			
CM21	1	DK96103200	0.01 μ F $\pm 10\%$	QL01	1	HI10094300	BRPG1204W (TX/BUSY LAMP)
CM22	1	DK96473200	0.047 μ F $\pm 10\%$	QL02	1	BA21001000	UMW1N
CM23	1	DK96102300	1000 pF $\pm 10\%$	QL10	1	HI10011690	L1650YG (LED FOR LCD)
CM24	1	DK96104200	0.1 μ F $\pm 10\%$	QL11	1	HI10011690	L1650YG (LED FOR LCD)
CM25	1	DK96104200	0.1 μ F $\pm 10\%$	QL20	1	HI10151320	LT1E67A (LED FOR 10KEY)
CM26	1	DK96102300	1000 pF $\pm 10\%$	QL21	1	HI10151320	LT1E67A (LED FOR 10KEY)
CM27	1	DK96103200	0.01 μ F $\pm 10\%$	QL22	1	HI10151320	LT1E67A (LED FOR 10KEY)
CM28	1	EY22600470	22 μ F / 4 V	QL23	1	HI10151320	LT1E67A (LED FOR 10KEY)
CM29	1	DK06102200	1000 pF $\pm 10\%$	QL24	1	HI10151320	LT1E67A (LED FOR 10KEY)
CM40	1	DK96102300	1000 pF $\pm 10\%$	QL25	1	HI10151320	LT1E67A (LED FOR 10KEY)
CM41	1	DK96102300	1000 pF $\pm 10\%$	QL26	1	HX421531A0	2SD2153 (W)
CM42	1	EY10600450	10 μ F / 4 V	QM01	1	HZ31306050	015Z5.6-X
CM43	1	DK96473200	0.047 μ F $\pm 10\%$	QM02	1	HZ31306050	015Z5.6-X
CS01	1	DK96102300	1000 pF $\pm 10\%$	QM03	1	HY21830000	2SK1830
CS10	1	DK96102300	1000 pF $\pm 10\%$	QM04	1	HC10178090	NJM2100V
CS11	1	DK96102300	1000 pF $\pm 10\%$	QM05	1	BA21707000	UMG5N or RN1707
CS12	1	DK96102300	1000 pF $\pm 10\%$	QM40	1	BA12105000	DTA123JE or RN2105
CS13	1	DK96102300	1000 pF $\pm 10\%$	QS01	1	HZ20042050	1SS371
ED01	1	QK00322020	SPEAKER T032S23T0711 8 Ω 0.5W	QS02	1	HZ20042050	1SS371
JD01	1	YU01006700	ZEBRA CONNECTOR	RC01	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
JD02	1	YJ90001280	MM7329-2700	RC02	1	NP05154610	150 k Ω $\pm 5\%$ 1/16 W
LD10	1	LUB1104010	CM-5 100 μ H	RC03	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
NM01	1	MS50000470	E.C.M. EM-125TH	RC04	1	NP05103610	10 k Ω $\pm 5\%$ 1/16 W
QC01	1	HC10145090	NJM064V	RC05	1	NP05103610	10 k Ω $\pm 5\%$ 1/16 W
QC02	1	BA20060210	UMG2N	RC06	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
QC03	1	HZ20043050	1SS372	RC07	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
QD01	1	HS337BM10F	M38267E8L-GP [U11 ONLY]	RC08	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
QD01	1	HU337BM10F	M38267M8L-GP [U12-E13]	RC09	1	NP05103610	10 k Ω $\pm 5\%$ 1/16 W
QD02	1	HQ20601960	MJ16192-34N (LCD)	RC10	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
QD10	1	HC10019770	RH5RH381A (DC/DC CONVERTER)	RC11	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
QD11	1	HZ20054020	MA729	RC12	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
QD12	1	HC98A35530	S-81335HG-KI	RC13	1	NP05473610	47 k Ω $\pm 5\%$ 1/16 W
QD13	1	HX115881A0	2SA1588 (Y)	RC14	1	NP05473610	47 k Ω $\pm 5\%$ 1/16 W
QD14	1	HZ20001080	SPPM-62V	RC15	1	NP05101610	100 Ω $\pm 5\%$ 1/16 W
QD15	1	HZ20054050	1SS389	RC16	1	NP05332610	3.3 k Ω $\pm 5\%$ 1/16 W
QD16	1	HY10347000	2SJ347	RC17	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
QD17	1	HC10059550	PST9123N (RESET IC)	RC18	1	NP05101610	100 Ω $\pm 5\%$ 1/16 W
QD18	1	HC10075550	PST9146N (RESET IC)	RC19	1	NP05103610	10 k Ω $\pm 5\%$ 1/16 W
QD19	1	BA12711000	UMA4N or RN2711	RD10	1	NN05047610	4.7 Ω $\pm 5\%$ 1/16 W
QD20	1	HX117742A0	2SA1774 (Q,F)	RD11	1	NN05010610	1 Ω $\pm 5\%$ 1/16 W
QD21	1	BA21001000	UMW1N	RD12	1	NP05470610	47 Ω $\pm 5\%$ 1/16 W
QD22	1	BA20060210	UMG2N	RD13	1	NP05472610	4.7 k Ω $\pm 5\%$ 1/16 W
QD23	1	HC10059550	PST9123N (RESET IC)	RD14	1	NP05183610	18 k Ω $\pm 5\%$ 1/16 W
QD24	1	HZ20052010	HRUC0302A	RD15	1	NP05103610	10 k Ω $\pm 5\%$ 1/16 W
QD30	1	HY21588100	2SK1588	RD16	1	NP05102610	1 k Ω $\pm 5\%$ 1/16 W
QD31	1	BA12113000	DTA144TE or RN2113 or UN9110	RD17	1	NP05473610	47 k Ω $\pm 5\%$ 1/16 W
QD32	1	BA12711000	UMA4N or RN2711	RD18	1	NP05104610	100 k Ω $\pm 5\%$ 1/16 W
QD33	1	BA10065210	UMA3N	RD19	1	NP05474610	470 k Ω $\pm 5\%$ 1/16 W
QD34	1	HC10007990	24LC16BT-VSN (EEPROM)	RD20	1	NP05101610	100 Ω $\pm 5\%$ 1/16 W
QD35	1	BA12113000	DTA144TE or RN2113 or UN9110				
QD36	1	HC10356030	LC73881M (DTMF IC)				
QD37	1	HZ20054050	1SS389				
QD38	1	BA31001000	UMZ1N or HN1B01FU				

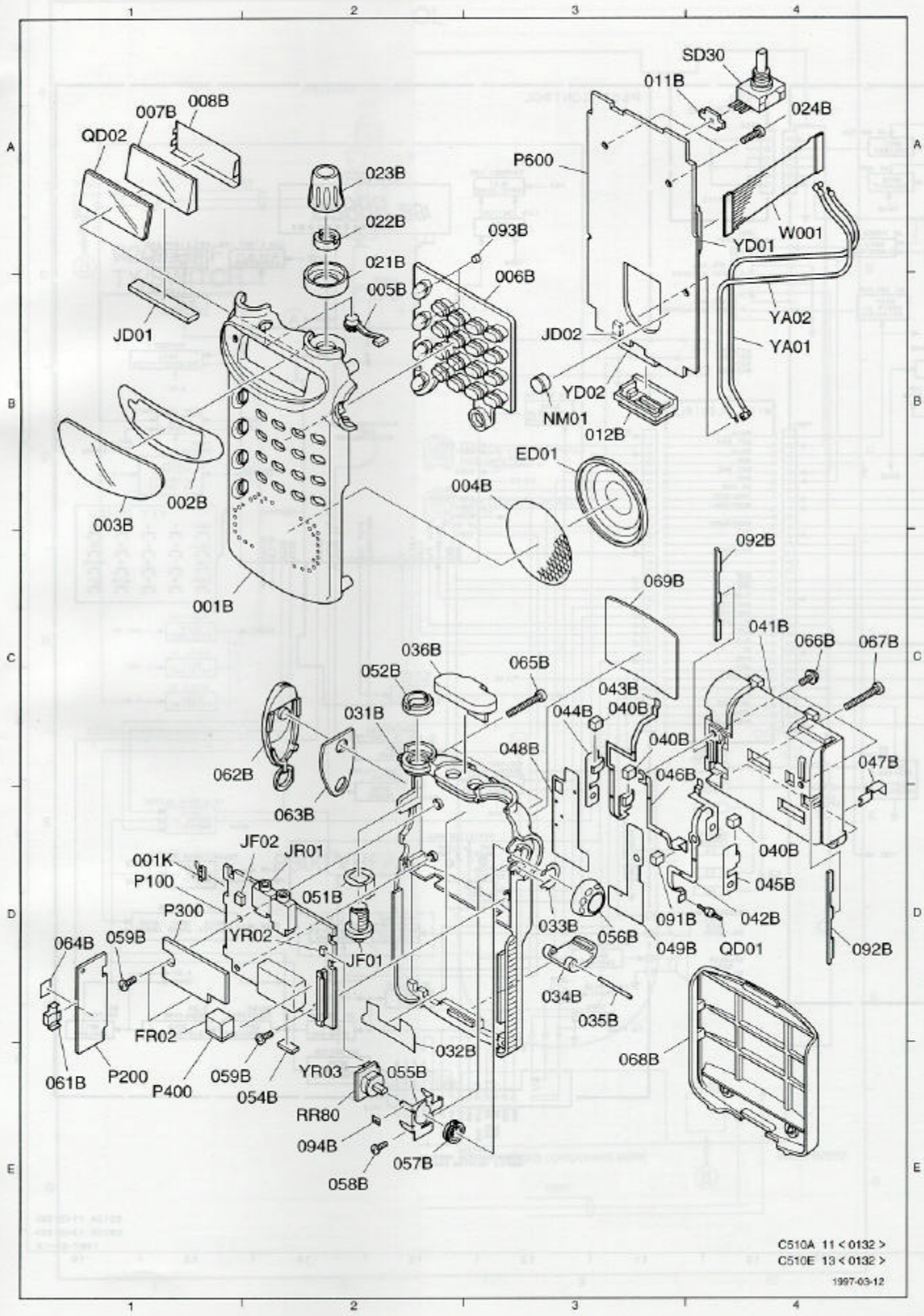
10. BLOCK DIAGRAM

REF. DESIG.	QTY	PART NO.	DESCRIPTION			REF. DESIG.	QTY	PART NO.	DESCRIPTION		
P600 CONTROL P.C.BOARD					P600 CONTROL P.C.BOARD						
RD21	1	NP05152610	1.5 kΩ	± 5 %	1/16 W	RD81	1	NP05153610	15 kΩ	± 5 %	1/16 W
RD22	1	NP05474610	470 kΩ	± 5 %	1/16 W	RD82	1	NP05102610	1 kΩ	± 5 %	1/16 W
RD23	1	NP05224610	220 kΩ	± 5 %	1/16 W	RD84	1	NN05000610	0 Ω	± 5 %	1/16 W
RD24	1	NP05103610	10 kΩ	± 5 %	1/16 W	RD90	1	NP05000610	0 Ω	± 5 %	1/16 W
RD25	1	NP05472610	4.7 kΩ	± 5 %	1/16 W						[C510E]
RD26	1	NP05473610	47 kΩ	± 5 %	1/16 W						
RD27	1	NP05222610	2.2 kΩ	± 5 %	1/16 W	RD92	1	NN05000610	0 Ω	± 5 %	1/16 W
RD28	1	RI05470120	47 OHM	± 5 %	1/2 W						[C510A]
RD29	1	NP05474610	470 kΩ	± 5 %	1/16 W	RD93	1	NP05000610	0 Ω	± 5 %	1/16 W
RD30	1	NP05224610	220 kΩ	± 5 %	1/16 W						[C510E]
RD31	1	NP05102610	1 kΩ	± 5 %	1/16 W	RL01	1	NP05022610	2.2 Ω	± 5 %	1/16 W
RD32	1	NP05224610	220 kΩ	± 5 %	1/16 W	RL02	1	NP05103610	10 kΩ	± 5 %	1/16 W
RD33	1	NP05102610	1 kΩ	± 5 %	1/16 W	RL03	1	NP05472610	4.7 kΩ	± 5 %	1/16 W
RD34	1	NP05102610	1 kΩ	± 5 %	1/16 W	RL04	1	NP05103610	10 kΩ	± 5 %	1/16 W
RD35	1	NP05102610	1 kΩ	± 5 %	1/16 W	RL05	1	NP05472610	4.7 kΩ	± 5 %	1/16 W
RD36	1	NP05223610	22 kΩ	± 5 %	1/16 W	RL06	1	NP05330610	33 Ω	± 5 %	1/16 W
RD37	1	NP05473610	47 kΩ	± 5 %	1/16 W	RL10	1	NP05022610	2.2 Ω	± 5 %	1/16 W
RD38	1	NP05103610	10 kΩ	± 5 %	1/16 W						
RD39	1	NP05103610	10 kΩ	± 5 %	1/16 W	RL20	1	NP05022610	2.2 Ω	± 5 %	1/16 W
RD40	1	NP05102610	1 kΩ	± 5 %	1/16 W	RL21	1	NP05100610	10 Ω	± 5 %	1/16 W
						RL22	1	NP05332610	3.3 kΩ	± 5 %	1/16 W
RD41	1	NP05102610	1 kΩ	± 5 %	1/16 W	RL23	1	NP05472610	4.7 kΩ	± 5 %	1/16 W
RD42	1	NP05102610	1 kΩ	± 5 %	1/16 W						
RD44	1	NP05474610	470 kΩ	± 5 %	1/16 W	RM01	1	NP05333610	33 kΩ	± 5 %	1/16 W
RD45	1	NP05473610	47 kΩ	± 5 %	1/16 W	RM02	1	NP05104610	100 kΩ	± 5 %	1/16 W
RD46	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM10	1	NP05473610	47 kΩ	± 5 %	1/16 W
RD47	1	NP05473610	47 kΩ	± 5 %	1/16 W						
RD48	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM11	1	NP05222610	2.2 kΩ	± 5 %	1/16 W
RD49	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM12	1	NP05684610	680 kΩ	± 5 %	1/16 W
RD50	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM13	1	NP05471610	470 Ω	± 5 %	1/16 W
					RM14	1	NP05164610	160 kΩ	± 5 %	1/16 W	
RD51	1	NP05473610	47 kΩ	± 5 %	1/16 W	RM15	1	NP05223610	22 kΩ	± 5 %	1/16 W
RD52	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM16	1	NP05104610	100 kΩ	± 5 %	1/16 W
RD53	1	NP05473610	47 kΩ	± 5 %	1/16 W	RM17	1	NP05224610	220 kΩ	± 5 %	1/16 W
RD54	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM18	1	NP05682610	6.8 kΩ	± 5 %	1/16 W
RD55	1	NP05473610	47 kΩ	± 5 %	1/16 W	RM19	1	NP05224610	220 kΩ	± 5 %	1/16 W
RD56	1	NP05473610	47 kΩ	± 5 %	1/16 W	RM20	1	NP05473610	47 kΩ	± 5 %	1/16 W
RD57	1	NP05102610	1 kΩ	± 5 %	1/16 W						
RD58	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM21	1	NP05103610	10 kΩ	± 5 %	1/16 W
RD59	1	NP05104610	100 kΩ	± 5 %	1/16 W	RM22	1	NP05103610	10 kΩ	± 5 %	1/16 W
RD60	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM23	1	NP05103610	10 kΩ	± 5 %	1/16 W
					RM24	1	NP05103610	10 kΩ	± 5 %	1/16 W	
RD61	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM25	1	NP05104610	100 kΩ	± 5 %	1/16 W
RD62	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM26	1	NP05823610	82 kΩ	± 5 %	1/16 W
RD63	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM27	1	NP05334610	330 kΩ	± 5 %	1/16 W
RD64	1	NP05470610	47 Ω	± 5 %	1/16 W	RM28	1	NP05333610	33 kΩ	± 5 %	1/16 W
RD65	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM29	1	NY01030300	MVR22 10 kΩ (CHIP VR)		
RD66	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM30	1	NY01030300	MVR22 10 kΩ (CHIP VR)		
RD67	1	NP05103610	10 kΩ	± 5 %	1/16 W						
RD68	1	NP05224610	220 kΩ	± 5 %	1/16 W	RM31	1	NP05101610	100 Ω	± 5 %	1/16 W
RD69	1	NP05105610	1 MΩ	± 5 %	1/16 W	RM32	1	NP05472610	4.7 kΩ	± 5 %	1/16 W
RD70	1	NP05102610	1 kΩ	± 5 %	1/16 W	RM33	1	NP05472610	4.7 kΩ	± 5 %	1/16 W
					RM40	1	NP05471610	470 Ω	± 5 %	1/16 W	
RD71	1	NP05102610	1 kΩ	± 5 %	1/16 W						
RD72	1	NP05220610	22 Ω	± 5 %	1/16 W	RM41	1	NP05474610	470 kΩ	± 5 %	1/16 W
RD73	1	NP05103610	10 kΩ	± 5 %	1/16 W						
RD74	1	NP05103610	10 kΩ	± 5 %	1/16 W	RS01	1	NP05224610	220 kΩ	± 5 %	1/16 W
RD75	1	NP05103610	10 kΩ	± 5 %	1/16 W	RS02	1	NP05102610	1 kΩ	± 5 %	1/16 W
RD76	1	NP05104610	100 kΩ	± 5 %	1/16 W	RS10	1	NP05102610	1 kΩ	± 5 %	1/16 W
RD77	1	NP05104610	100 kΩ	± 5 %	1/16 W						
RD78	1	NP05104610	100 kΩ	± 5 %	1/16 W						
RD79	1	NP05333610	33 kΩ	± 5 %	1/16 W						
RD80	1	NP05105610	1 MΩ	± 5 %	1/16 W						

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
P600 CONTROL P.C.BOARD				MECHANISM			
RS11	1	NP05154610	150 kΩ ± 5 % 1/16 W	001B	1	337B064030	FRONT CASE [C510A]
RS12	1	NP05102610	1 kΩ ± 5 % 1/16 W	001B	1	337B064010	FRONT CASE [C510E]
RS13	1	NP05474610	470 kΩ ± 5 % 1/16 W	002B	1	337B122010	WINDOW FOR ADHESIVE
RS14	1	NP05224610	220 kΩ ± 5 % 1/16 W	003B	1	337B158010	WINDOW
RS15	1	NP05104610	100 kΩ ± 5 % 1/16 W	004B	1	337B202010	SPEAKER NET
RS16	1	NP05333610	33 kΩ ± 5 % 1/16 W	005B	1	337B270030	BUTTON FOR POWER SWITCH
RS17	1	NP05102610	1 kΩ ± 5 % 1/16 W	006B	1	337B270010	KEY PAD
RS18	1	NP05154610	150 kΩ ± 5 % 1/16 W	007B	1	337B151010	INTRODUCER
RS19	1	NP05102610	1 kΩ ± 5 % 1/16 W	008B	1	337B274010	REFLECTOR
RS20	1	NP05474610	470 kΩ ± 5 % 1/16 W				
RS21	1	NP05224610	220 kΩ ± 5 % 1/16 W	011B	1	337B118010	SPACER FOR ROTARY SWITCH(SD30)
RS22	1	NP05104610	100 kΩ ± 5 % 1/16 W	012B	1	337B067020	CAP FOR INTERFACE CABLESOCKET
RS23	1	NP05333610	33 kΩ ± 5 % 1/16 W				
RS24	1	NP05102610	1 kΩ ± 5 % 1/16 W	021B	1	337B353010	RING FOR CHANNEL KNOB
RS25	1	NP05154610	150 kΩ ± 5 % 1/16 W	022B	1	302C0411010	NUT FOR ROTARY SWITCH(SD30)
RS26	1	NP05102610	1 kΩ ± 5 % 1/16 W	023B	1	337B154020	CHANNEL KNOB
RS27	1	NP05474610	470 kΩ ± 5 % 1/16 W	024B	2	51970204U0	P TITE SCREW M2X4
RS28	1	NP05224610	220 kΩ ± 5 % 1/16 W				
RS29	1	NP05104610	100 kΩ ± 5 % 1/16 W	031B	1	337B064020	REAR CASE
RS30	1	NP05333610	33 kΩ ± 5 % 1/16 W	032B	1	337B107010	SHEET FOR REAR CASE(M2.6 HOLE)
				033B	1	337B107020	SHEET FOR VOLUME KNOB
RS31	1	NP05102610	1 kΩ ± 5 % 1/16 W	034B	1	337B102010	LOCK FOR BATTERY LID
RS32	1	NP05154610	150 kΩ ± 5 % 1/16 W	035B	1	337B112010	SHAFT FOR LOCK(034B)
RS33	1	NP05102610	1 kΩ ± 5 % 1/16 W	036B	1	337B067010	CAP FOR EXT.SPK/MIC SOCKET
RS34	1	NP05474610	470 kΩ ± 5 % 1/16 W	040B	3	337B056020	BUFFER FOR CONTACTOR
RS35	1	NP05224610	220 kΩ ± 5 % 1/16 W				
RS36	1	NP05104610	100 kΩ ± 5 % 1/16 W	041B	1	337B163010	BATTERY TRAY
RS37	1	NP05333610	33 kΩ ± 5 % 1/16 W	042B	1	337B123010	BATTERY CONTACTOR(+)
				043B	1	337B123020	BATTERY CONTACTOR(-)
SD30	1	SR01200110	EC09P20 ROTARY SWITCH	044B	1	337B123030	BATTERY CONTACTOR(+,-)
				045B	1	337B123040	BATTERY CONTACTOR(-,+)
SS01	1	SP01012340	SKOLLA TACT SWITCH FOR POWER	046B	1	337B123050	BATTERY CONTACTOR(CHRG -)
				047B	1	337B123060	BATTERY CONTACTOR(CHRG +)
XD30	1	FQ04004060	CERAMIC VIB. CSAC4.00MGC200	048B	1	337B120020	INSULATOR FOR BATTERY TRAY
XD31	1	FQ04194040	CERAMIC VIB. CSAC4.19MGC	049B	1	337B120030	INSULATOR FOR BATTERY TRAY
YD01	1	YJ07009650	IL-FPR-33S-VF (33PIN)	051B	1	337B123070	CONTACTOR FOR ANTENNA SOCKET(JF01)
YD02	1	YJ90001270	16P-1C(16PIN INTERFACE CABLE SOCKET)JACK W/RF JACK	052B	1	484C011010	NUT FOR ANTENNA SOCKET(JF01)
				054B	1	337B056030	BUFFER FOR VCO
				055B	1	337B160010	BRACKET FOR VOLUME KNOB
				056B	1	337B154010	VOLUME KNOB
				057B	1	337B259010	BUSHING FOR VOLUME KNOB
				058B	1	51901603A0	P.H. B TITE (1) M1.6X3
				059B	3	51901603A0	P.H. B TITE (1) M1.6X3
				061B	1	337B116010	LEAF SPRING
				062B	1	337B270020	PTT BUTTON
				063B	1	337B104010	PTT RETAINER
				064B	1	337B123100	CONTACTOR FOR UHF TX / SWITCH PCB
				065B	2	51230212U0	T.H. HEAD SCREW M2X12
				066B	2	337B010010	SCREW FOR FRONT CASE BATTERY TRAY
				067B	2	51230212U0	T.H. HEAD SCREW M2X12
				068B	1	337B257010	BATTERY LID
				069B	1	337B861020	MODEL NAME LABEL [C510A]
				069B	1	337B861030	MODEL NAME LABEL [C510E]
				091B	1	156B056020	BUFFER FOR CHARGE CONTACTOR(-)
				092B	2	337B118020	SPACER FOR BATTERY TRAY
				093B	4	337B056040	BUFFER FOR 10KEY
				094B	1	003B115130	GND CONTACTOR FOR VOLUME BRACKET
				001K	1	337B123090	CONTACTOR FOR VHF TX/IF P.C.BOARD

C510A 11 < 0132 >
C510E 13 < 0132 >

8. EXPLODED PARTS VIEW

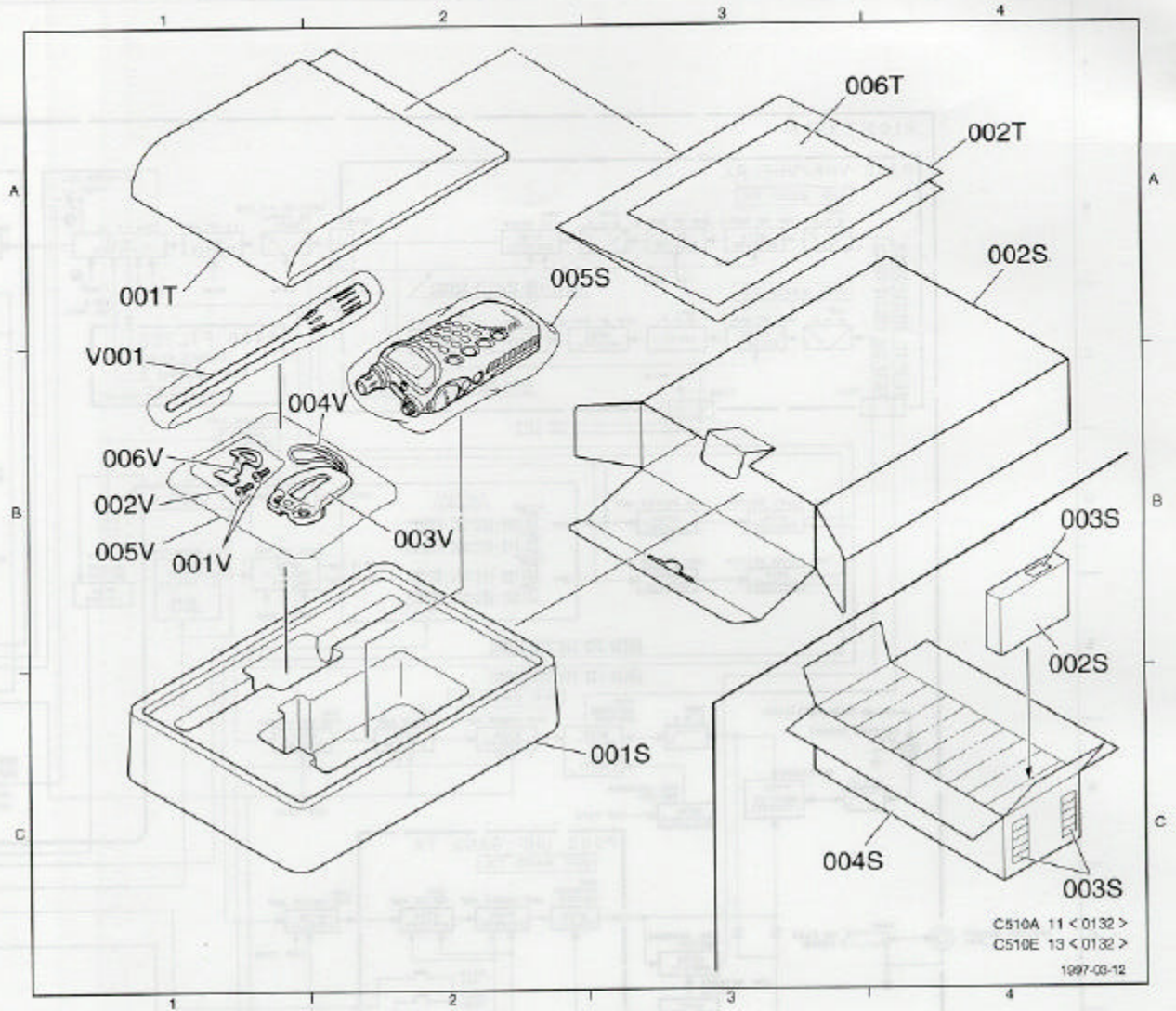


48220711 01/02
 48220461 01/02
 5112011001

C510A 11 < 0132 >
 C510E 13 < 0132 >

1997-03-12

9. PACKING DIAGRAM AND PARTS LIST

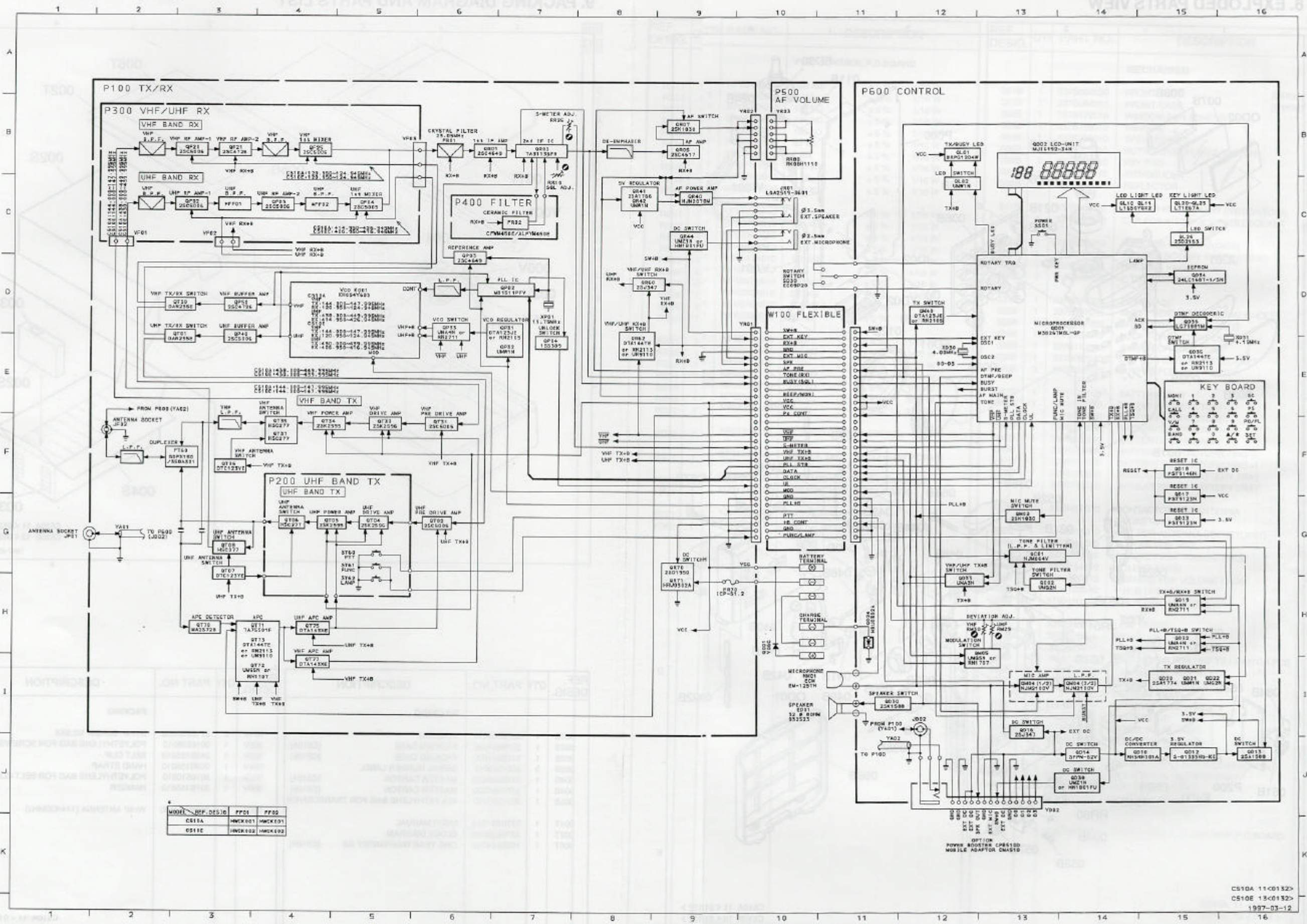


C510A 11 < 0132 >
 C510E 13 < 0132 >
 1997-03-12

REF. DESIG.	QTY	PART NO.	DESCRIPTION	REF. DESIG.	QTY	PART NO.	DESCRIPTION
PACKING				PACKING			
001S	1	337B809010	CUSHION	001V	2	51102604U0	B.H.M. SCREW M2.6X4
002S	1	337B801020	PACKING CASE [C510A]	002V	1	9010506010	POLYETHYLENE BAG FOR SCREWS
002S	1	337B801030	PACKING CASE [C510E]	003V	1	243B155010	BELT CLIP
003S	3	9524520010	SERIAL NUMBER LABEL	004V	1	003B156010	HAND STRAP
004S	1	337B805020	MASTER CARTON [C510A]	005V	1	9010510010	POLYETHYLENE BAG FOR BELT CLIP
004S	1	337B805030	MASTER CARTON [C510E]	006V	1	337B155010	HANGER
005S	1	9011020010	POLYETHYLENE BAG FOR TRANSCEIVER	V001	1	YR99012130	WHIP ANTENNA (144/430MHz)
001T	1	337B851010	USER MANUAL				
002T	1	337B859020	BLOCK DIAGRAM				
006T	1	183B854010	ONE YEAR WARRANTY (U) [C510A]				

C510A 11 < 0132 >
 C510E 13 < 0132 >

10. BLOCK DIAGRAM

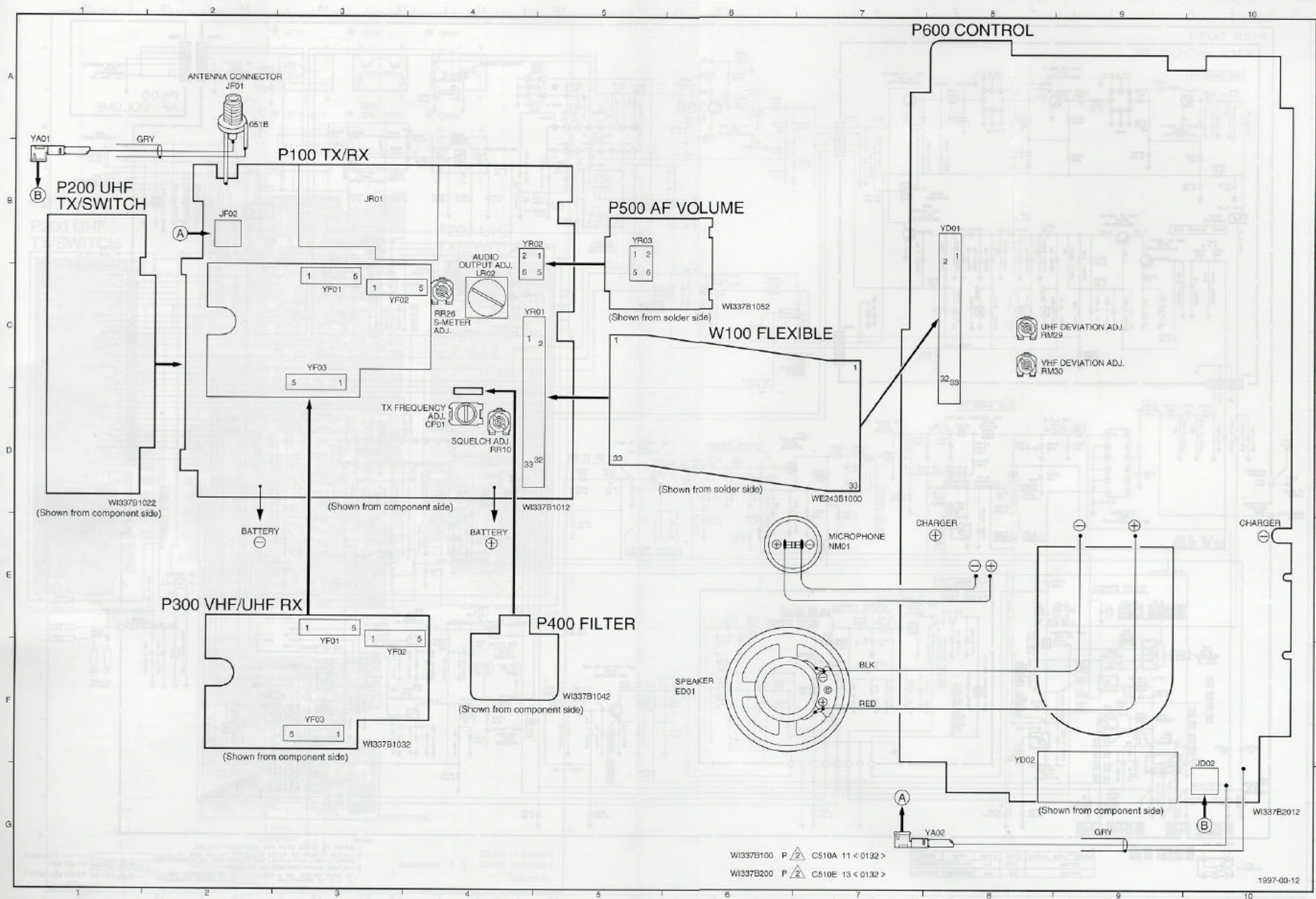


MODEL	REF. DESIG	PP01	PP02
CS10A	HWK001	HWK001	
CS10E	HWK002	HWK002	

CS10A 11-00152
 CS10E 13-00152
 1997-03-12

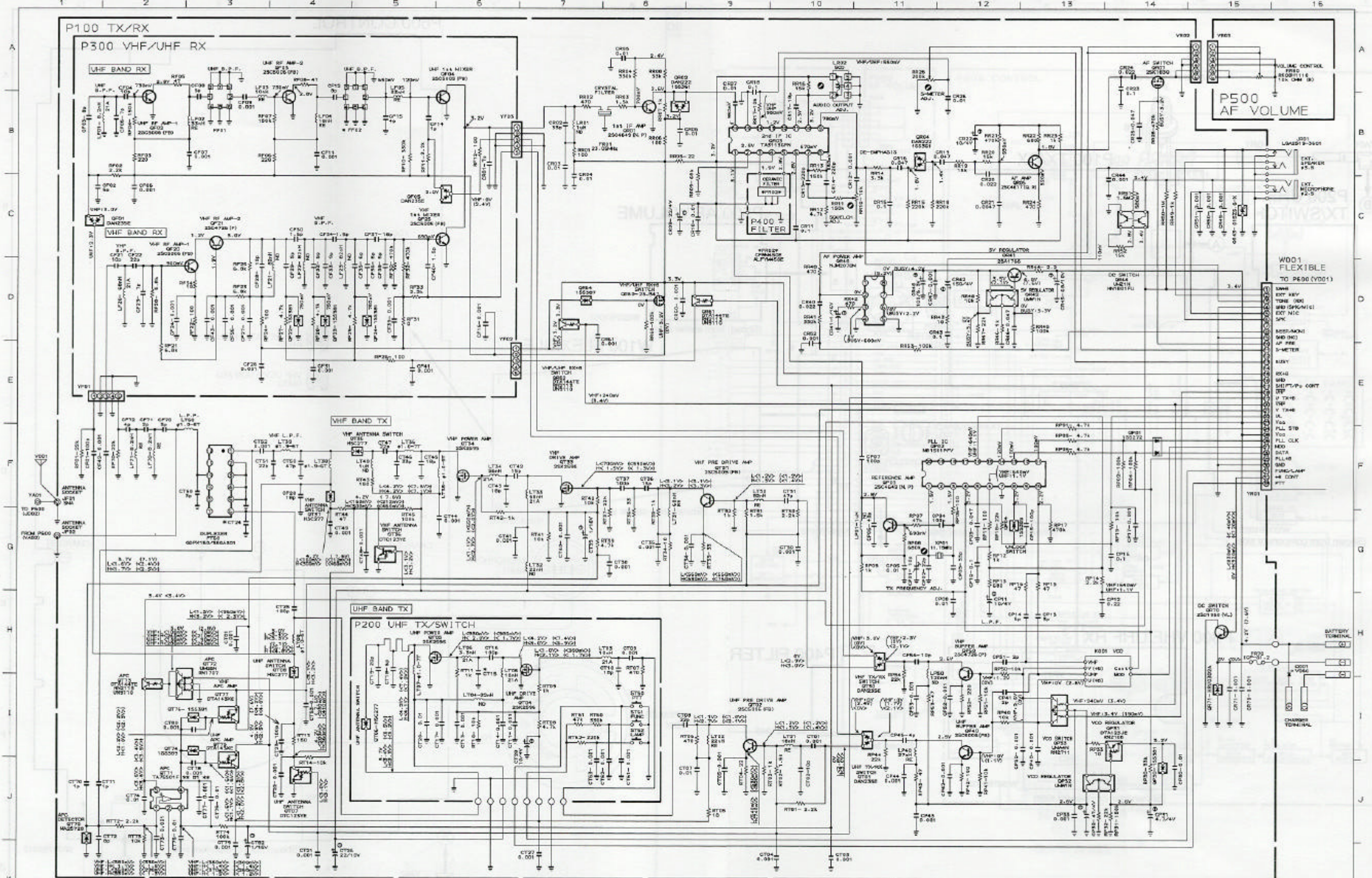
11. COMPREHENSIVE WIRING DIAGRAM

12. SCHEMATIC DIAGRAM AND COMPONENT OVERLAY DIAGRAM



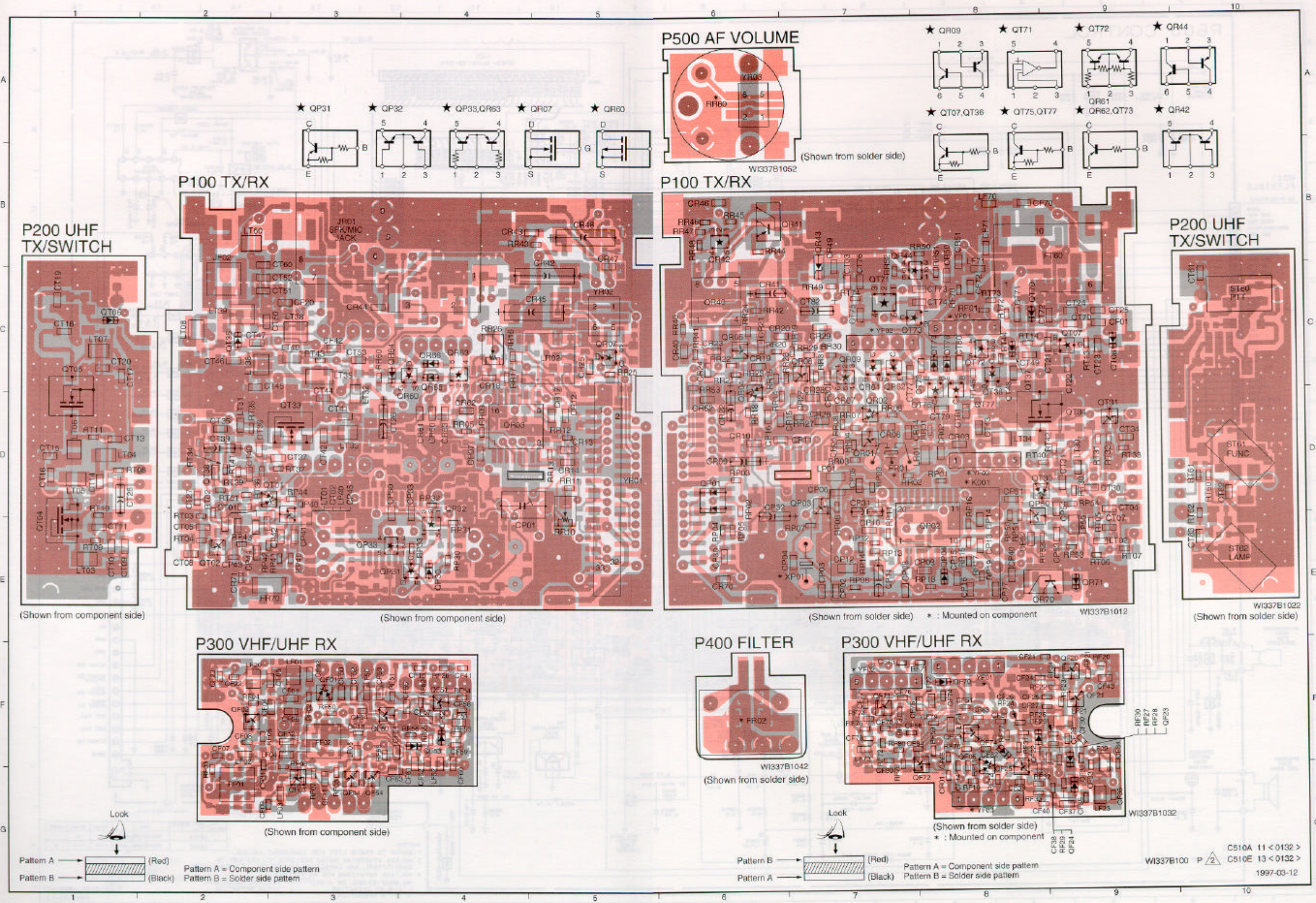
12. SCHEMATIC DIAGRAM AND COMPONENT OVERLAY DIAGRAM

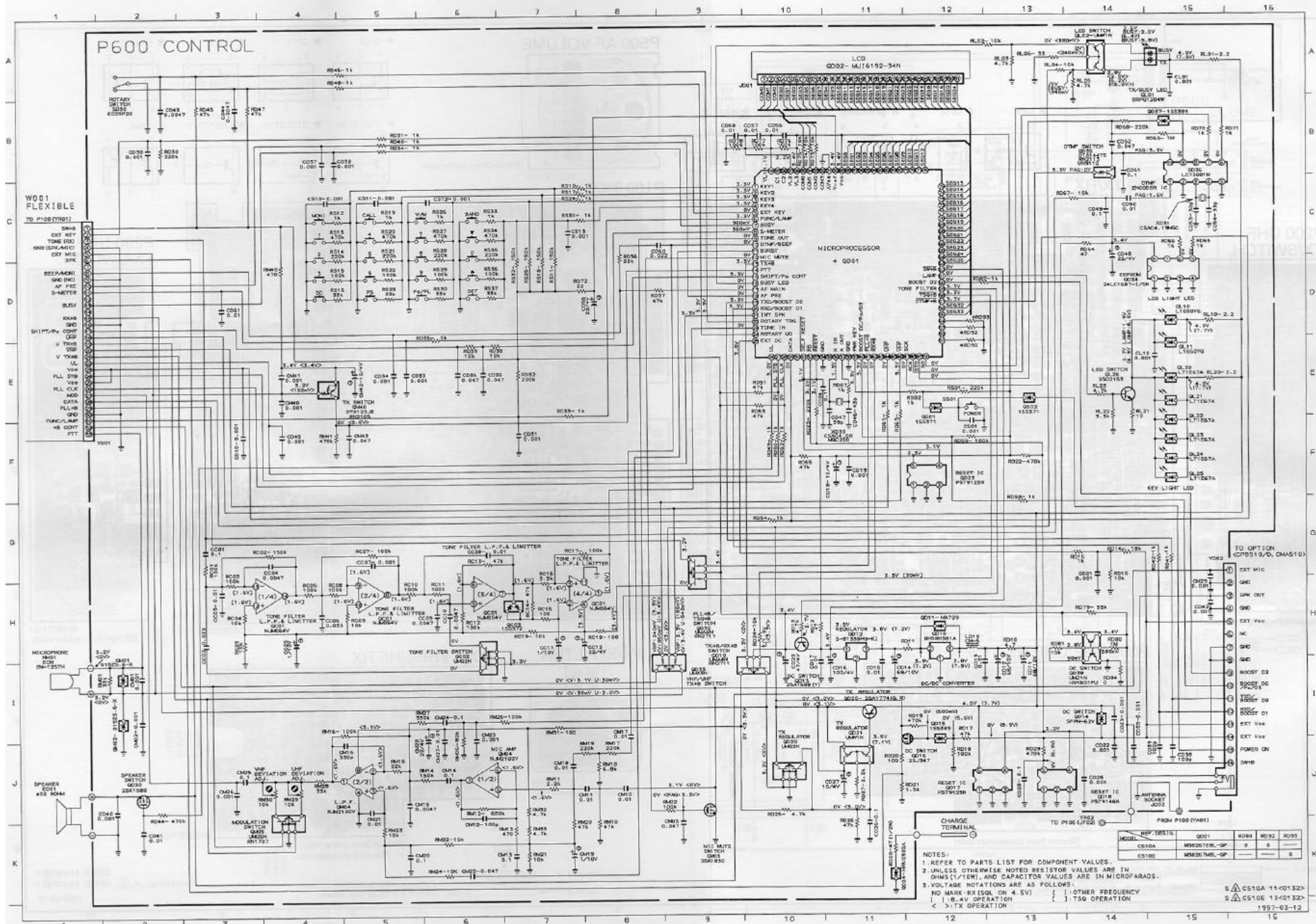
COMPREHENSIVE WIRING DIAGRAM



MODEL	REP. DESIG.	CT15	CT24	FF01	FF02
CS10A	47p	5p	HWCK001	HWCK001	
CS10E	50p	8p	HWCK002	HWCK002	

- NOTES:
1. REFER TO PARTS LIST FOR COMPONENT VALUES.
 2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS (1/10M), AND CAPACITOR VALUES ARE IN MICROFARADS.
 3. VOLTAGE NOTATIONS ARE AS FOLLOWS:
 - NO MARK: RX (300 ON 4.5V)
 - 1: 1.8.4V OPERATION
 - 2: TX OPERATION
 - 3: OTHER FREQUENCY
- S Δ CS10A 11<0182>
 S Δ CS10E 13<0182>
 1997-03-12





NOTES:
 1. REFER TO PARTS LIST FOR COMPONENT VALUES.
 2. UNLESS OTHERWISE NOTED RESISTOR VALUES ARE IN OHMS (1/16W), AND CAPACITOR VALUES ARE IN MICROFARADS.
 3. VOLTAGE NOTATIONS ARE AS FOLLOWS:
 NO MARK RX (SOL ON 4.5V) { OTHER FREQUENCY
 < 1.6.4V OPERATION { 1.750 OPERATION
 < > TX OPERATION

MODEL	REP. DESIG.	Q001	R099	R092	R093
CS10A	MS207CR-GP	0	0		
CS10E	MS267NR-GP				0

S Δ CS10A 11-0132
 S Δ CS10E 13-0132
 1997-03-12

1 2 3 4 5 6 7 8 9 10

A A

B B

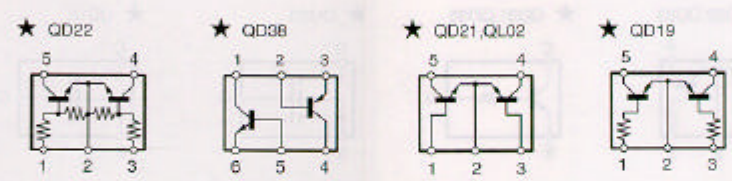
C C

D D

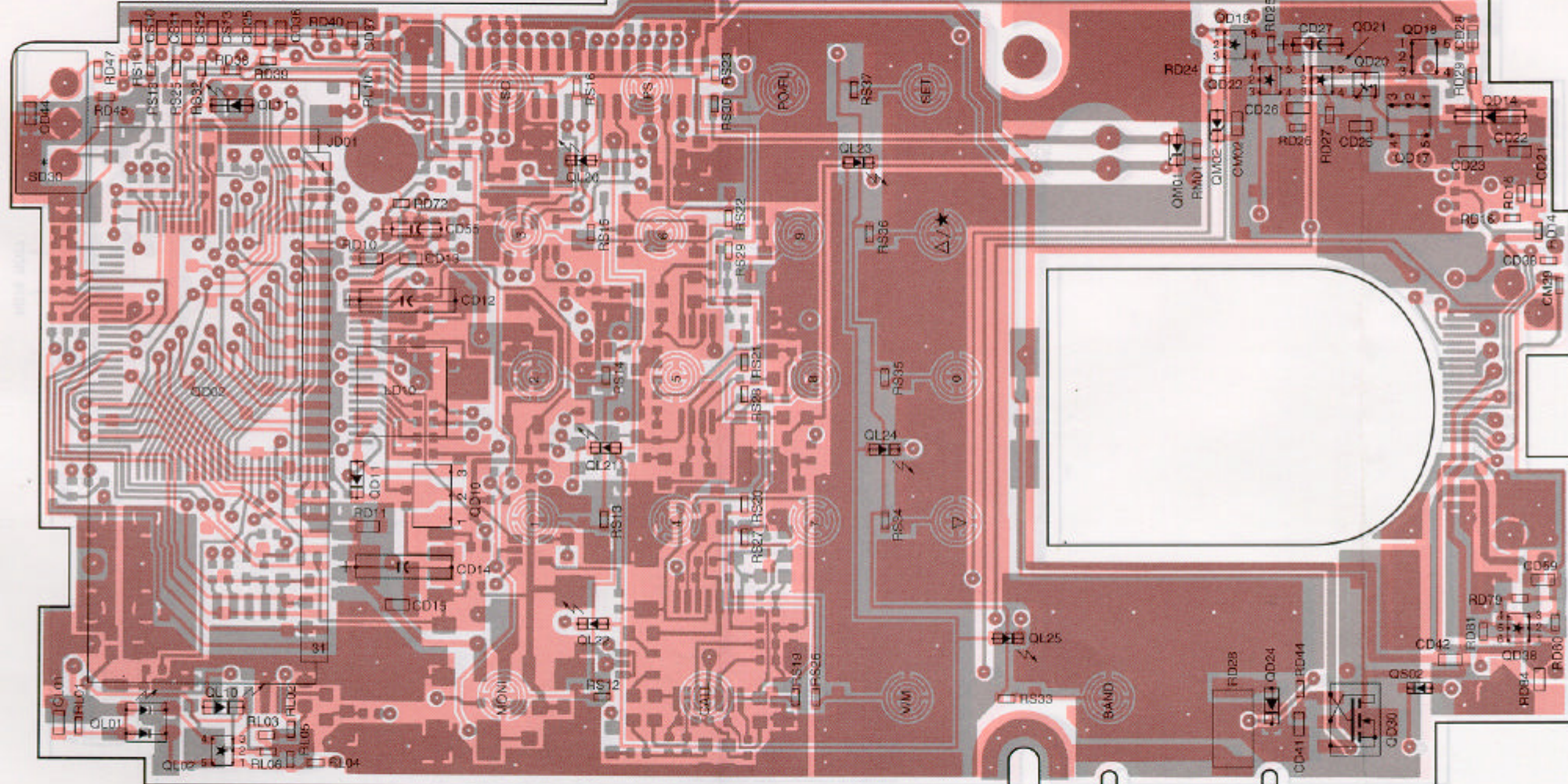
E E

F F

G G



P600 CONTROL



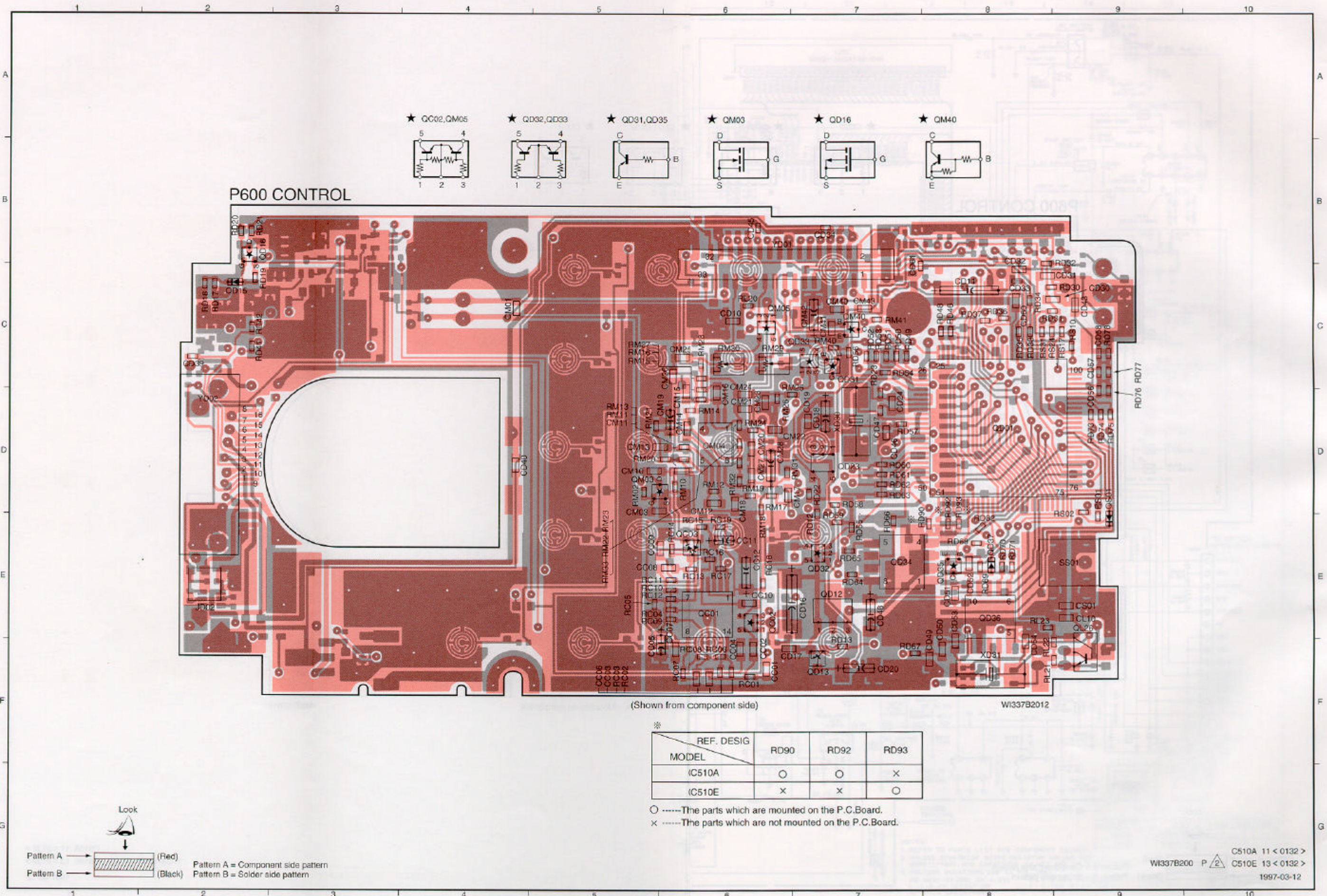
(Shown from solder side) + : Mounted on component

WI337B2012

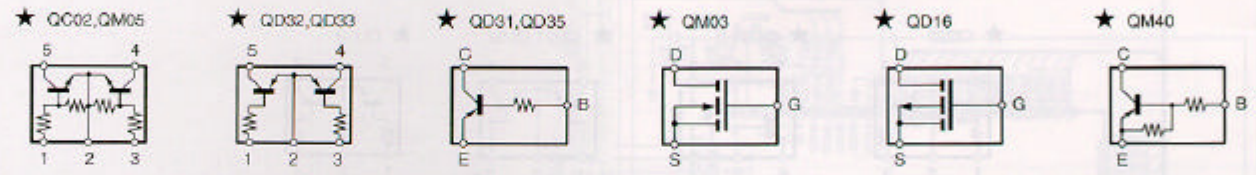


Pattern B → (Red)
 Pattern A → (Black)
 Pattern A = Component side pattern
 Pattern B = Solder side pattern

C510A 11 < 0132 >
 WI337B200 P / 2 C510E 13 < 0132 >
 1997-03-12



P600 CONTROL



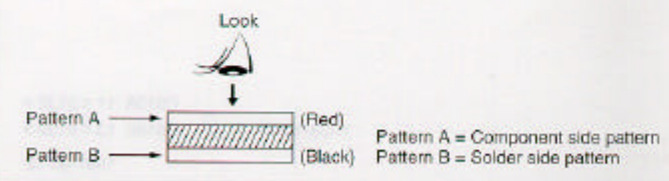
(Shown from component side)

WI337B2012

※

REF. DESIG MODEL	RD90	RD92	RD93
IC510A	○	○	×
IC510E	×	×	○

○ -----The parts which are mounted on the P.C.Board.
 × -----The parts which are not mounted on the P.C.Board.



WI337B200 P 2
 C510A 11 < 0132 >
 C510E 13 < 0132 >
 1997-03-12