ICOM

SERVICE MANUAL

UHF TRANSCEIVER

IC-U68

Icom Inc.

INTRODUCTION

This service manual describes the latest information for the **IC-U68** UHF TRANSCEIVER at the time of publication.

To upgrade quality, any electrical or mechanical parts and internal circuits are subject to change without notice or obligation.

DANGER

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than 9 V. This will ruin the transceiver.

DO NOT expose the transceiver to rain, snow or any liquids.

DO NOT reverse the polarities of the power supply when connecting the transceiver.

DO NOT apply an RF signal of more than 20 dBm (100 mW) to the antenna connector. This could damage the transceiver's front end.

ORDERING PARTS

Be sure to include the following four points when ordering replacement parts:

1. 10-digit order numbers
2. Component part number and name
3. Equipment model name and unit name
4. Quantity required

<SAMPLE ORDER>

1110003390	S.IC	AN8005M-(E1)	IC-U68	MAIN UNIT	5 pieces
8810008990	Screw	PT BT M2 x 10 ZK	IC-U68	Rear panel	10 pieces

Addresses are provided on the inside back cover for your convenience.

REPAIR NOTES

1. Make sure a problem is internal before disassembling the transceiver.
2. **DO NOT** open the transceiver until the transceiver is disconnected from its power source.
3. **DO NOT** force any of the variable components. Turn them slowly and smoothly.
4. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
5. **DO NOT** keep power ON for a long time when the transceiver is defective.
6. **DO NOT** transmit power into a signal generator or a sweep generator.
7. **ALWAYS** connect a 40 dB to 50 dB attenuator between the transceiver and a deviation meter or spectrum analyzer when using such test equipment.
8. **READ** the instructions of test equipment thoroughly before connecting equipment to transceiver.

TABLE OF CONTENTS

SECTION 1 SPECIFICATIONS

■ GENERAL

• Frequency range	: 400 MHz to 470 MHz		
• Mode	: FM (16K0F3E)		
• Channel spacing	: 25 kHz		
• Frequency resolution	: 5 kHz, 12.5 kHz		
• Number of channels	: 40 channels		
• Antenna impedance	: 50 Ω (unbalanced)		
• Usable temperature range	: −10 °C to +60 °C		
• Power supply requirement	: 9 V DC (nominal)		
• Current drain (at 13.8 V)	: Receive	Standby	40 mA
		Power saved	10 mA
		Max. audio	190 mA
	Transmit	at 5 W	1300 mA
		at 0.5 W	500 mA
• Dimensions	: 57 (W) × 145(H) × 35 (D) mm		
• Weight	: 340g (include dry cell batteries)		

■ TRANSMITTER

• Output power (at 13.8 V)	: High	400 MHz to 470 MHz	5W
	Low	400 MHz to 470 MHz	0.5 W
• Modulation system	: Variable reactance frequency modulation		
• Maximum frequency deviation	: ±5 kHz		
• Frequency tolerance	: ±0.0005 % (5 ppm)		
• Spurious emissions	: Less than −60 dB		
• Audio frequency response	: −3 dB to +1 dB of 6 dB/octave with 300 Hz to 3000 Hz input		
• Audio harmonic distortion	: 10 %		
• Noise and hum	: More than 30 dB		

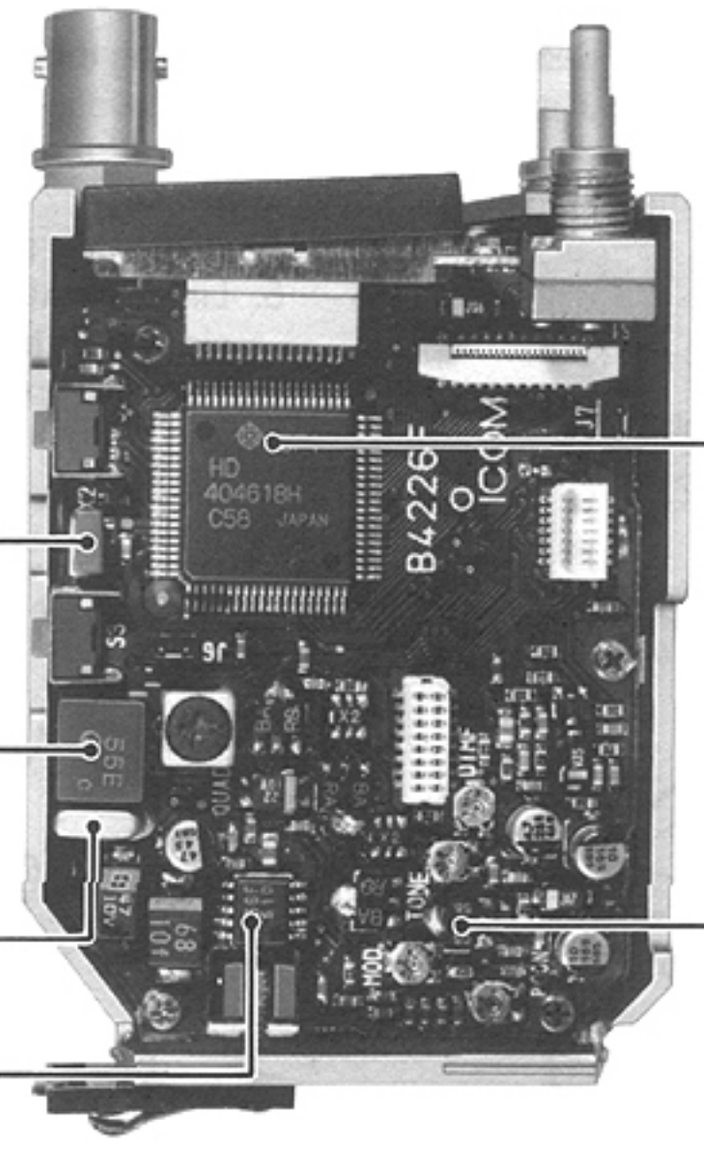
■ RECEIVER

• Receive system	: Double conversion superheterodyne		
• Intermediate frequencies	: 1st	30.875 MHz	
	2nd	455 kHz	
• Sensitivity	: 0.3 µV for 12 dB SINAD		
• Squelch threshold sensitivity	: 0.3 µV		
• Adjacent channel selectivity	: Less than −50 dB		
• Spurious response	: Less than −50 dB		
• Image rejection	: Less than −50 dB		
• Intermodulation rejection	: Less than −50 dB		
• Audio frequency response	: −6 dB to +2 dB/octave with 500 Hz to 3000 Hz modulation		
• Noise and hum	: More than 30 dB		
• Frequency tolerance	: ±0.0005 % (±5 ppm)		
• Audio output power	: 350 mW at 10 % distortion with an 8 Ω load		

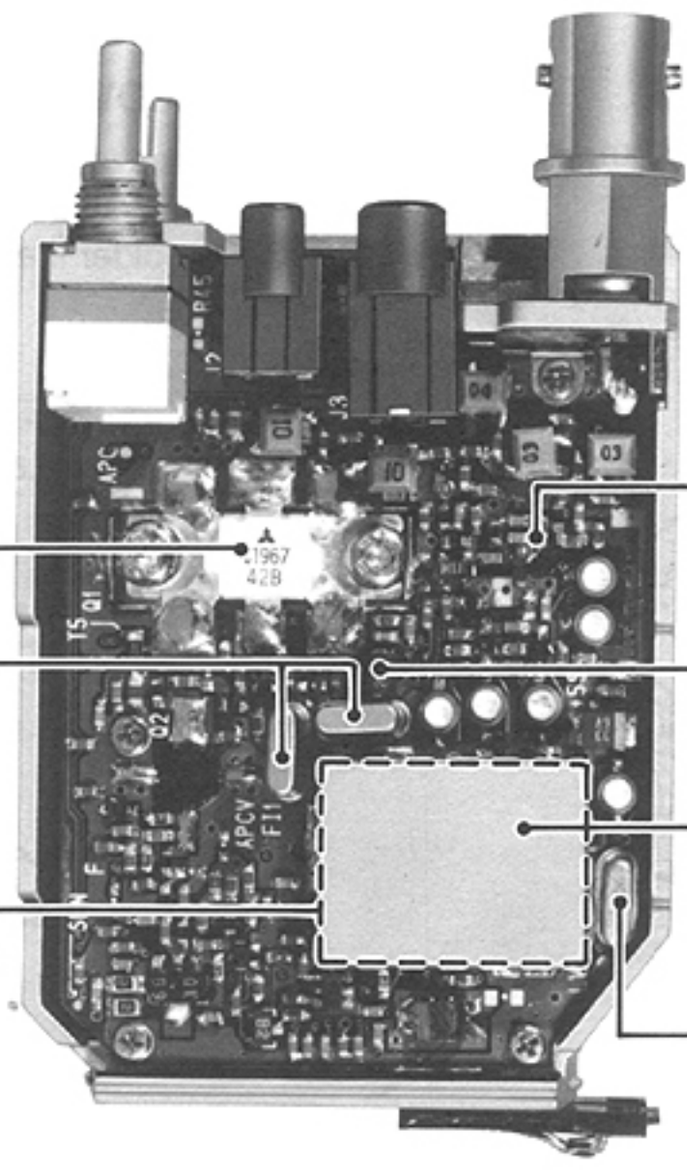
All stated specifications are subject to change without notice or obligation.

SECTION 2 INSIDE VIEWS

• MAIN unit



• RF unit

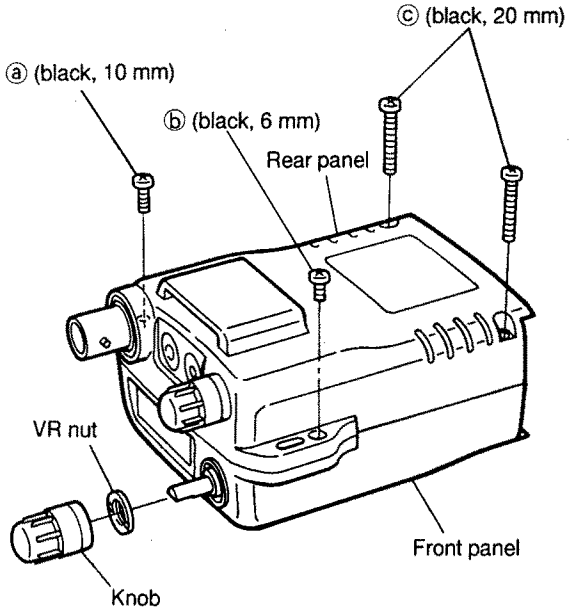


* located under side of this point

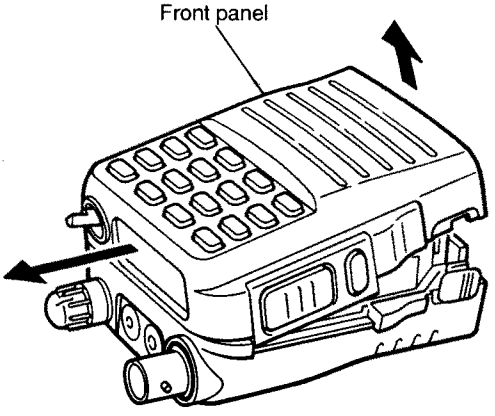
SECTION 3 DISASSEMBLY INSTALLATIONS

• REMOVING THE FRONT PANEL

1. Turn the power OFF, then remove the battery pack.
2. Unscrew 4 screws ⓐ, ⓑ and ⓒ from the rear and front panels.
3. Pull off the [DIAL] knob, then unscrew the exposed VR nut.

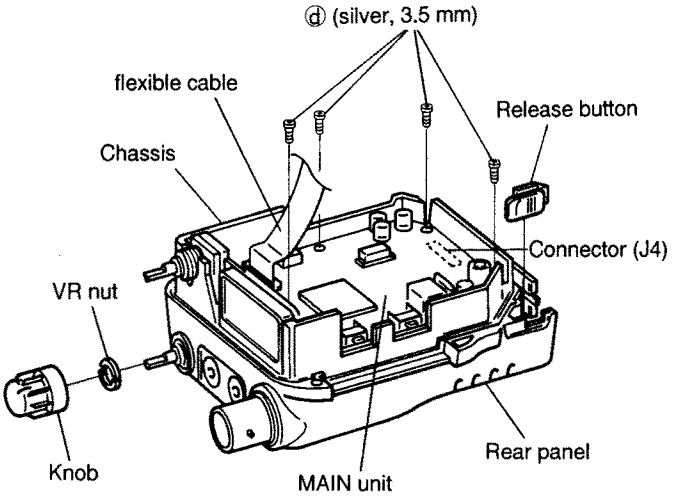


4. Carefully open the front panel from the bottom side.



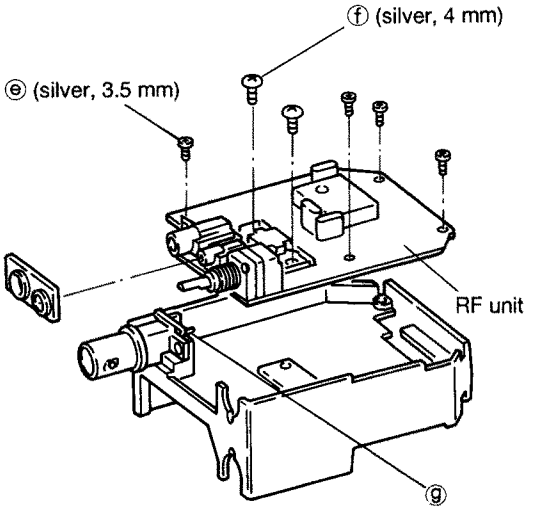
• REMOVING THE MAIN UNIT AND REAR PAMEL

1. Unplug the flexible cable.
2. Remove the release button.
3. Pull off the [OFF/VOL] knob, then unscrew the exposed VR nut.
4. Unscrew 4 screws ⓓ from the MAIN unit.
5. Lift the MAIN unit to remove. (Disconnect J4 on reverse side of the MAIN unit to remove.)
6. Carefully open the rear panel from the chassis.



• REMOVING THE RF UNIT

1. Remove the jack seal.
2. Unscrew 6 screws ⓔ and ⓕ.
3. Unsolder the point ⓖ, then remove the RF unit.



SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 ANTENNA SWITCHING CIRCUIT (RF UNIT)

The antenna switching circuit functions as a low-pass filter while receiving and a resonator circuit while transmitting. The circuit does not allow transmit signals to enter receiver circuits.

Received signals enter the antenna connector and then pass through the low-pass filter (L1, L2, C44, C50, C51, C57, C58) and high-pass filter (L3, C56, C59) to suppress out-of-band signals. The filtered signals are passed through the 1/4 λ type antenna switching circuit (D1, D2) and are then applied to the RF unit.

4-1-2 RF AND 1ST MIXER CIRCUITS (RF UNIT)

The 1st mixer circuit converts the received signal to a fixed frequency of the 1st IF signal with a 1st LO (VCO output) signal. By changing the 1st LO frequency, only the desired frequency will be passed through a pair of the crystal filters at the next stage of the 1st mixer.

The signals from the antenna switching circuit are amplified at the RF amplifier (Q6) and are then passed through the tunable bandpass filter (D8, D9, L17, L18). The filtered signals are again amplified at the another RF amplifier (Q7) and again passed through the another tunable bandpass filter (D10–D12, L20–L22).

D8–D12 employ varactor diodes that track the bandpass filters and are control by the PLL lock voltage. These diodes tune the center frequency of an RF passband for wide bandwidth receiving and good image rejection.

The filtered signals are then mixed at the 1st mixer (Q8) with a 1st LO signal coming from the PLL circuit to produce 30.875 MHz 1st IF signal. The 1st IF signal is passed through a pair of crystal filters (FI1), amplified at Q9 and is then applied to the MAIN unit.

4-1-3 2ND IF AND DEMODULATOR CIRCUITS (MAIN UNIT)

The 2nd mixer circuit converts the 1st IF signal to a 2nd IF signal. A double superheterodyne system (which converts receive signals twice) improves the image rejection ratio and obtain stable receiver gain.

The 1st IF signal from the RF unit is applied to a 2nd mixer section of IC3 (pin 16). The signal is then mixed with a 2nd LO signal for conversion to a 455 kHz 2nd IF signal.

IC3 contains the 2nd mixer, local oscillator, limiter amplifier, quadrature detector and noise detector. The local oscillator section generates 30.42 MHz using X1.

The 2nd IF signal from the 2nd mixer (IC3 pin 3) passes through a ceramic filter (FI1) to remove unwanted heterodyned frequencies. It is then amplified at the limiter amplifier (IC3 pin 5) and applied to the quadrature detector (IC3 pin 10, L1, R43, C59) to demodulate the 2nd IF signal into AF signals. The AF signals (detector signals) are output from pin 9 and applied to the AF circuit.

4-1-4 AF CIRCUIT (MAIN UNIT)

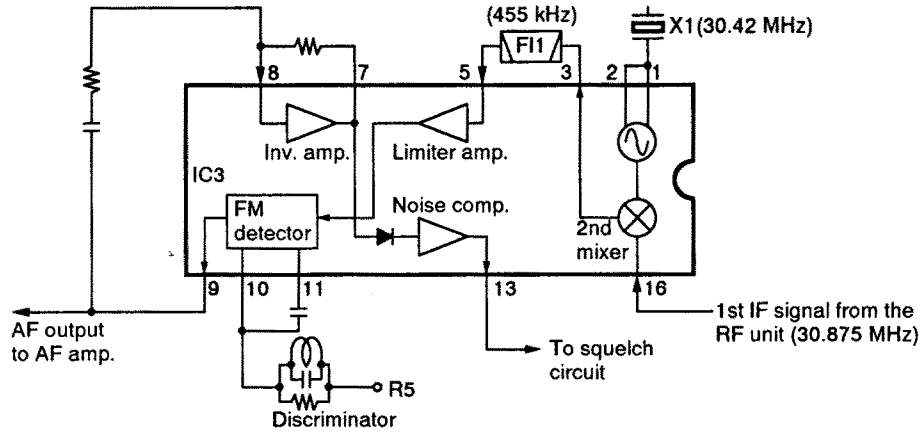
AF signals from the demodulator circuit are passed through the de-emphasis circuit and are then applied to the AF circuit.

The demodulated signals are applied to the de-emphasis circuit (Q1) and passed through the AF mute switch (Q2) and the [VOL] control (RF unit R45). The mute switch (Q2) cuts the audio line when the squelch closes.

The passed signals (via "AF IN") are amplified at the AF power amplifier (IC2) to a level needed to drive the speaker.

For power conservation, the power supply circuit for the AF power amplifire (Q5, Q6, D1) does not supply VCC voltage to the AF power amplifier (IC2) when the squelch closes. The power supply circuit (Q5, Q6, D1) is controlled by the CPU (IC4) via the AFOF line.

FM DETECTOR AND SQUELCH CIRCUITS



4-1-5 SQUELCH CIRCUIT (MAIN UNIT)

A squelch circuit cuts out AF signals when no RF signal is received. By detecting noise components in the AF signals, the squelch circuit switches the AF mute switch (Q2) in the MAIN unit.

A portion of the AF signals from the FM IF IC (IC3 pin 9) are applied to the active filter (IC3 pin 8) where noise components above 20 kHz are amplified. The signals are rectified at the noise detector and then applied to the noise comparator to obtain pulse signals.

The pulse signals output from IC3 pin 13 are applied to the differential circuit (IC5, Q12) for pulse width control. The resulting signals are applied to the CPU (IC4 pin 30).

The CPU counts the pulse signals and outputs the "TONL" signal from pin 79. The "TONL" signal is applied to the AF mute switch (Q2) to cut the AF signals.

4-2 TRANSMITTER CIRCUITS

4-2-1 MICROPHONE AMPLIFIER (MAIN UNIT)

The microphone amplifier circuit amplifies audio signals with +6dB/octave pre-emphasis characteristic from the microphone to a level needed for the modulation circuit.

The AF signals from the microphone (MC1) pass through the TENKEY unit and enter the MAIN unit. The signals are amplified at the limiter amplifier (Q9–Q10) which has a negative feedback circuit for +6dB/octave pre-emphasis.

The amplified signals are filtered out at the splatter filter (Q9) and applied to the RF unit as the "MOD" signal.

4-2-2 MODULATION CIRCUIT (RF UNIT)

The modulation circuit modulates the VCO oscillating signal (RF signal) using the microphone audio signals.

While transmitting, the "RX" line becomes "HIGH", therefore, D302 and D303 turns OFF.

The audio signals (MOD) change the reactance of D302 and D303 on the RF unit to modulate the oscillated signal at the VCO (Q301, Q302). The oscillated signal is amplified at the buffer-amplifiers (IC301, IC321), then applied to the drive amplifiers (Q2, Q321, Q322) via the transmit/receive switch (D321).

4-2-3 DRIVE/POWER AMPLIFIER CIRCUITS (RF UNIT)

The signal from the VCO circuit is passed through the transmit/receive switching circuit (D321) and amplified by the pre-drivers (Q321, Q322), YGR amplifier (Q2) and the power amplifier (Q1) in sequence to obtain 5 W (at 13.5 V DC) of RF power. The amplified signal is passed through the antenna switching circuit (D1, D2), high-pass filter (L3, C56, C59), low-pass filter (L1, L2, C44, C50, C51, C57, C58) and is then applied to the antenna connector.

The drive current of the pre-drivers (IC321, IC322) are controlled by the APC circuit to stabilize the output power.

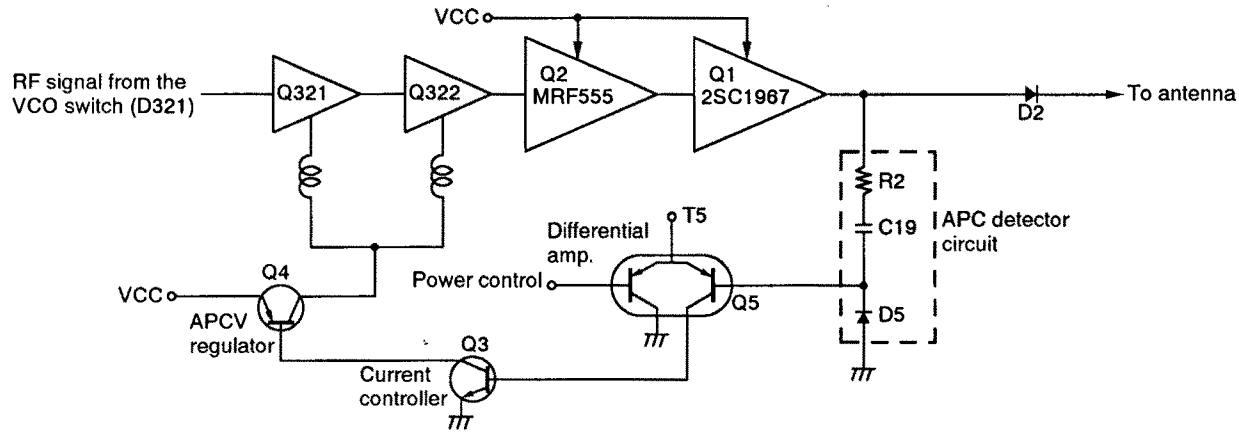
4-2-4 APC CIRCUIT (RF UNIT)

The APC circuit provides stable output power from the power amplifier (Q1) even when the input voltage or temperature changes; and, selects high or low output power.

The APC detector circuit (D5, R2, C19) detects the output power level. The detected voltage increase according to the output power level.

The detected voltage is applied to one of the differential amplifier inputs (Q5a) and a power setting voltage is applied to the other input (Q5b). When the output power is increased, the detected voltage exceeds a power setting voltage, Q4 controls vias voltage of Q321, Q322 via Q3 to reduce the RF output.

APC CIRCUIT



4-3 PLL CIRCUIT (RF UNIT)

A PLL circuit provides stable oscillation of the transmitter frequency and the receive 1st LO frequency. The PLL output frequency is controlled by the divided ratio (N-data) of the programmable divider.

The oscillated signal at the VCO (Q301, Q302, D301–D303) is amplified at the buffer-amplifiers (IC301, Q15) and then applied to the PLL IC (IC1 pin 2).

The PLL IC (IC1) contains a prescaler, two programmable dividers, and a phase detector, charge pump, etc. The entered signal is divided at the prescaler and programmable counter sections by the N-data ratio from the CPU. The divided signals are detected on phase at the phase detector using the reference frequency.

If the oscillated signal drifts, the phase of its frequency changes from the reference frequency, cousing a lock voltage change to compensate for a drift in the oscillated frequency.

The VCO signal is amplified at the buffer-amplifier (IC321) and is then applied to the receive 1st mixer or transmit driver circuit.

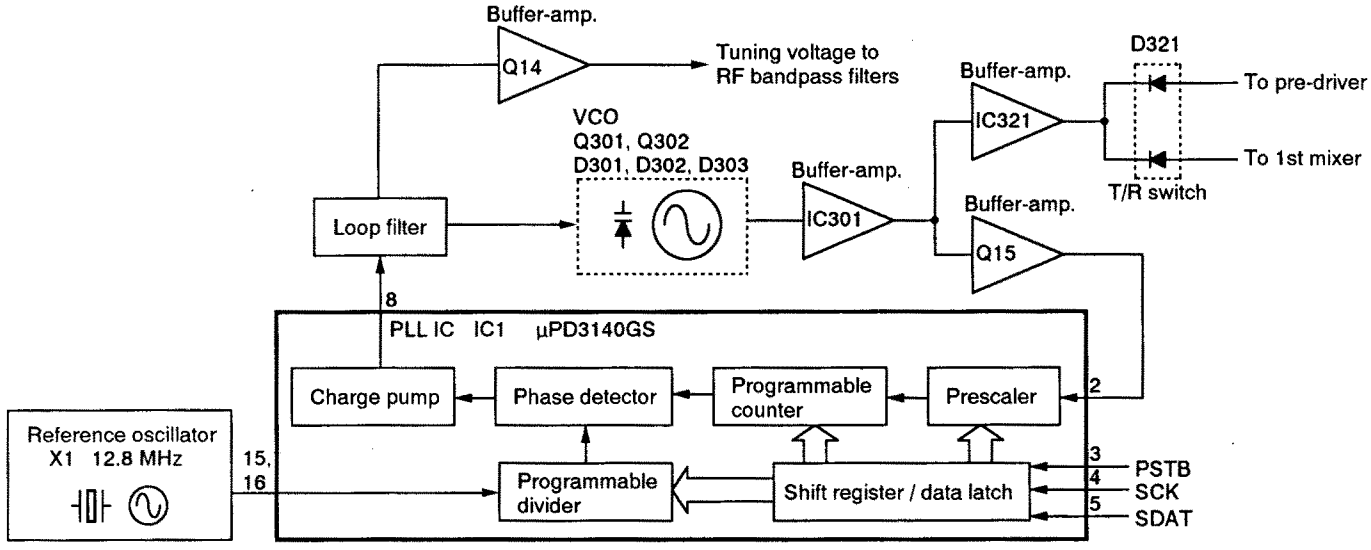
The lock voltage is also used for the receiver tunable bandpass filter to match the filter's center frequency to the desired receive frequency. The lock voltage is amplified at the buffer-amplifier (Q14) and then applied to the RF circuits.

4-4 POWER SUPPLY CIRCUITS

VOLTAGE LINES

Line	Description
BT	The voltage from the attached battery pack.
VCC	The same voltage as the BT line (battery voltage) which is controlled by the power switch ([VOL] control).
+5	Common 5 V converted from the VCC line by the 5 V regulator circuit (Q3, Q4) using the reference regulator (IC1) on the MAIN unit.
+5S	Common 5 V controlled by the power saver function. The "+5S" regulator circuit (RF unit Q10) switches +5 V using the PLLP signal from the CPU (MAIN unit IC4).
R5	5 V for receiver circuit switched by Q12 on the RF unit with the RX signal from the CPU (MAIN unit IC4).
T5	5 V for transmitter circuit converted from the VCC line by the 5 V regulator circuit (Q7, Q8) using the reference regulator (IC1) on the MAIN unit. T5 is controlled by the TX signal from the CPU (MAIN unit IC4).

PLL CIRCUIT BLOCK DIAGRAM



4-5 PORT ALLOCATIONS

CPU (MAIN UNIT)

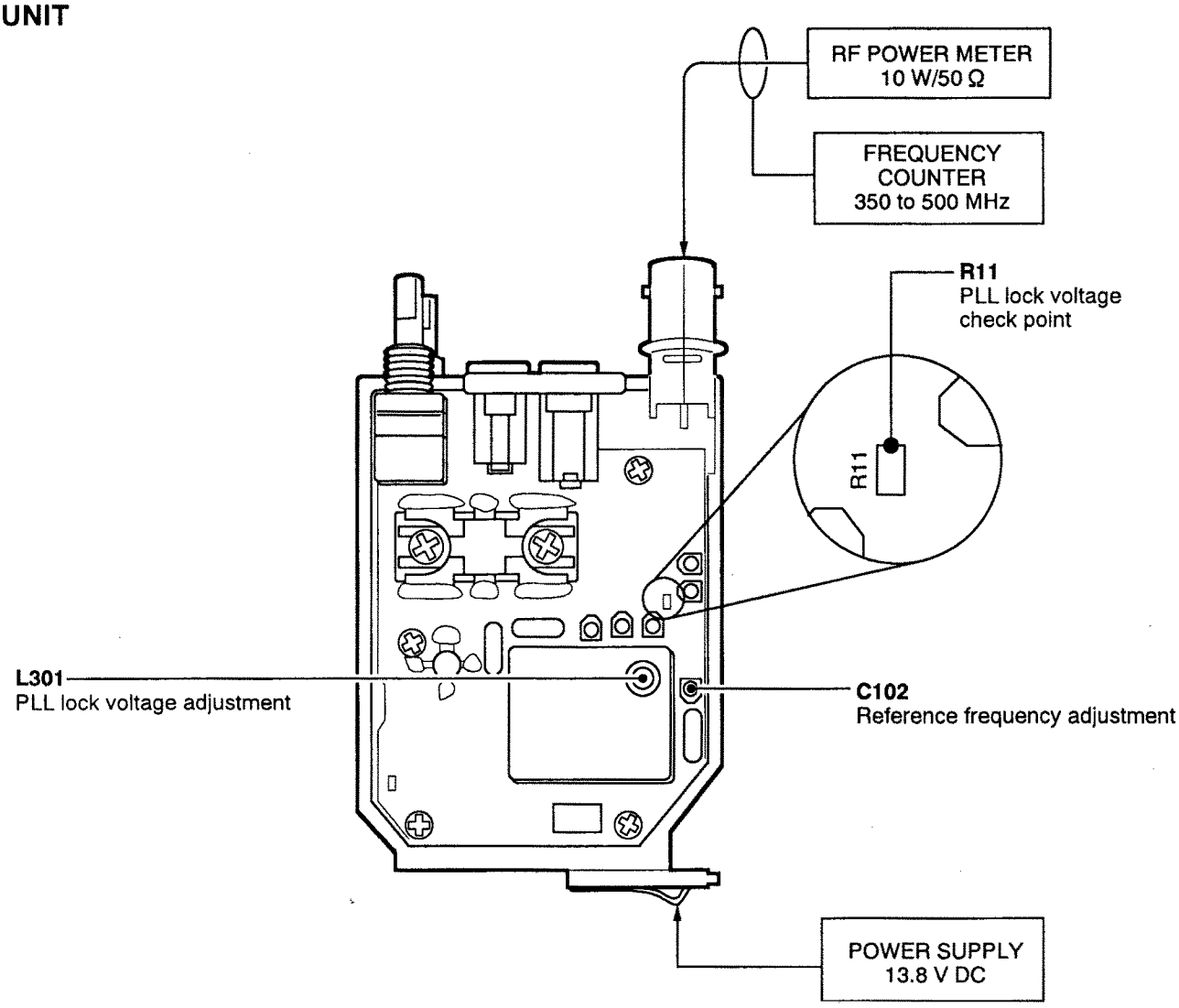
Pin number	Port name	Description
1	RX	Output port for receiver circuits control signal. "LOW": Activates receiver circuits.
2	LAMP	Output port for display backlight control signal. "LOW": Backlight ON.
3	BUSY/ COR	Outputs the busy LED and DTMF decoder control signals. "LOW": The busy LED lighting up and activates the DTMF decoder IC (TENKEY unit IC2).
4	MMUT/ FUNC	【Transmit mode】 : MMU Outputs a microphone mute signal. "HIGH": Mute a mic audio. 【Receive mode】 : FUNC Inputs a [FUNC] switch signal. "HIGH": [FUNC] switch is pushed.
5	CLO	Output port for cloning data.
6	EED	DATA bus line for the EEPROM (TENKEY unit IC1) serial data.
7	SQL	Input port for squelch mute control signal from the optional tone squelch unit. "LOW": Tone squelch is open.
8	PTT/CLI	Input port for: 【Operation mode】 : PTT Inputs controlled signals by the [PTT] switch. "HIGH": When transmitting. 【Cloning mode】 : CLI Input port for cloning data.
9	OPB	Input port for detecting a WST board installation. "High": When WST board is installed.
10	STD	Input port for DTMF decoder circuit. "HIGH": When correct DTMF signal is decoded.
15	SCK/DC	Input/Output port for: 【Input】 : DC Detects the tuning dial rotation while this port is "LOW". 【Output】 : SCK Outputs serial clock signals to PLL, tone squelch and EEPROM IC.
16	PSTB	Output port for PLL strobe signals.
17	SDAT/ UNLK	【PLL locked】 : SDAT Output port for serial data to the PLL IC (RF unit IC1) and optional tone squelch unit. 【PLL unlocked】 : UNLK Input port for PLL unlock signal.
18	IOST	Output port for a strobe signals to the optional tone squelch unit.
19–22	KEY1– KEY4	Input ports for the key matrix, tuning dial and decoded DTMF code signals.
23–26	KEY5– KEY8	Outputs strobe signals ("LOW") for the key matrix.
27	TOE	Outputs a DTMF decoder circuit (TENKEY unit IC2) control signal. "HIGH": Activates the DTMF decoder circuit.
28	PLLP	Outputs a PLL regulator circuit (RF unit Q13) control signal.
30	NDET	Input port for "NDET" signal (pulse type) from the noise amplifier (IC5, Q12) for noise squelch control.
76	RESET	Input port for the CPU reset signal.
77	AFOF	Outputs an AF regulator circuit (MAIN unit Q5, Q6) control signal. "LOW": Activate the AF amplifier.
78	PCON	Outputs a transmit high/low switching signal. "HIGH": High power.
79	TONL	Output port for: 【Receive mode】 : AMU Outputs AF mute switch (MAIN unit Q2) control signal. "HIGH": Turn ON the mute switch. 【Transmit mode】 : TON Outputs an 88.5 Hz tone signal while transmitting.
80	TX	Output port for transmitter circuit control signal. "LOW": Activates transmitter circuits.

SECTION 5 ADJUSTMENT PROCEDURES

5-1 PLL ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
PLL LOCK VOLTAGE	1	• Displayed frequency: 435.000 MHz • Receiving	RF	Connect a digital multimeter or oscilloscope to R11.	2.6 V	RF	L301
	2	• Displayed frequency: 400.000 MHz • Transmitting			More than 1 V		Verify
	3	• Receiving					
PLL REFERENCE FREQUENCY	1	• Displayed frequency: 470.000 MHz • Connect an RF power meter or a 50 Ω dummy load to the antenna connector.	Top panel	Loosely couple a frequency counter to the antenna connector.	470.000 MHz	RF	C102

RF UNIT



5-2 RECEIVER ADJUSTMENT

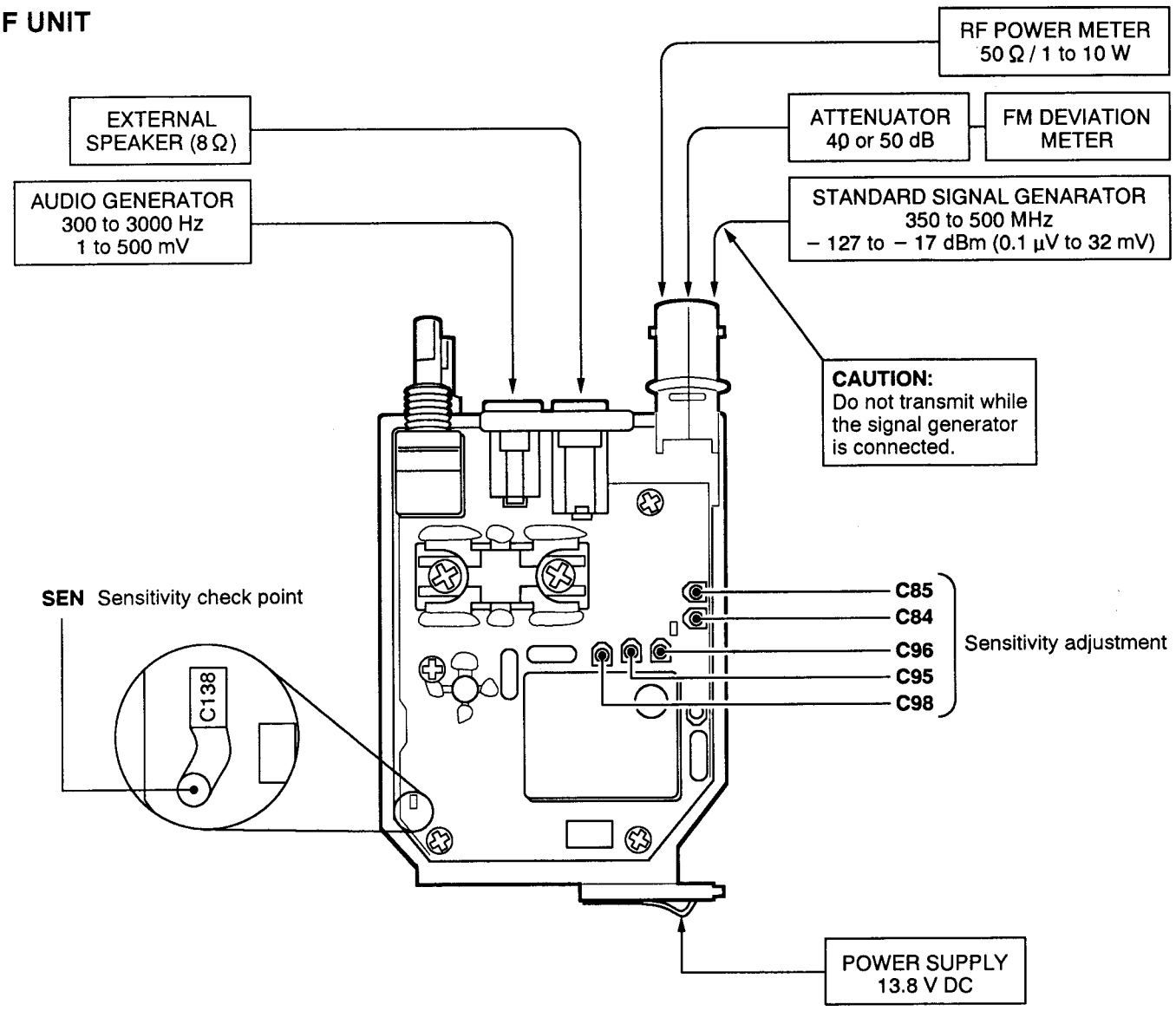
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	• Displayed frequency: 415.000 MHz • Connect the SSG to the antenna connector and set as: Level : 5.6 μV* (−92 dBm) Modulation : 1 kHz Deviation : ±3.0 kHz • Receiving	RF	Connect a DC voltmeter to the check point, "SEN" terminal.	Maximam DC voltage	RF	Adjust in sequence C98, C95 C96, C84 C85
			MAIN	Connect a DC voltmeter to the check point, "QUAD" terminal.	1.0 V	MAIN	L1

*This output level of the standard signal generator (SSG) is indicated as SSG's open circuit.

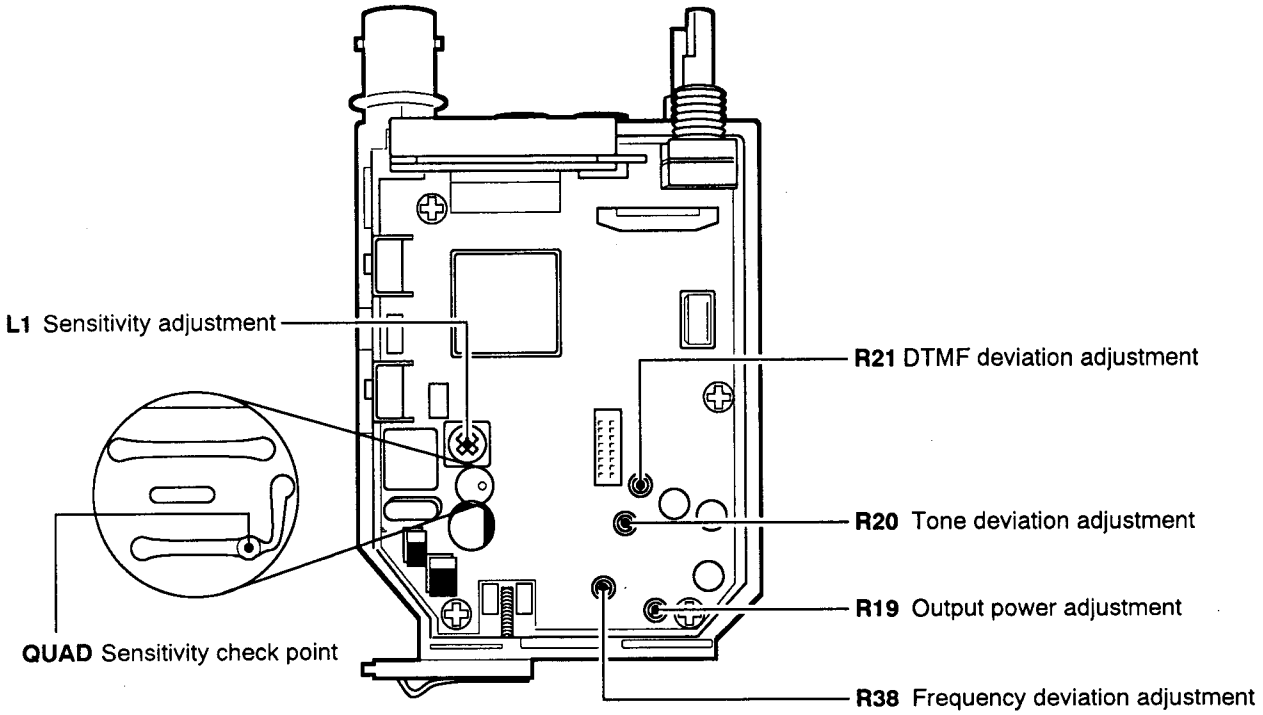
5-3 TRANSMITTER ADJUSTMENT

ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
OUTPUT POWER	1	• Displayed frequency : 435.000 MHz • Output power : High • Transmitting	Top panel	Connect an RF power meter to the antenna connector.	5.0 W	MAIN	R19
FREQUENCY DEVIATION	1	• Displayed frequency: 435.000 MHz • Connect an audio generator to the microphone connector and set as: 1 kHz/120 mVrms • Set the FM deviation meter as: HPF : 50 Hz LPF : 20 kHz De-emphasis : OFF Detector : (P−P)/2 • Output power : High • Transmitting	Top panel	Connect an FM deviation meter to the antenna connector via an attenuator.	±4.2 kHz	MAIN	R38
TONE DEVIATION	1	• Displayed frequency: 435.000 MHz • No signal is applied to the microphone connector. • Set the the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P−P)/2 • Subaudible tone encoder: ON • Transmitting	Top panel	Connect an FM deviation meter to the antenna connector via an attenuator.	±0.7 kHz	MAIN	R20
DTMF DEVIATION	1	• Displayed frequency: 435.000 MHz • No signal is applied to the microphone connector. • Set the the FM deviation meter as: HPF : 50 Hz LPF : 20 kHz De-emphasis : OFF Detector : (P−P)/2 • Press [D] key while transmitting.	Top panel	Connect an FM deviation meter to the antenna connector via an attenuator.	±3.0 kHz	MAIN	R21

RF UNIT



MAIN UNIT



SECTION 6 PARTS LIST

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130007610	S.IC	μPD3140GS-E1 (DS8)
IC301	1110003080	S.IC	μPC2715T-E3
IC321	1110003370	S.IC	μPC2748T-E3
Q1	1530003250	TRANSISTOR	2SC1967
Q2	1590002020	TRANSISTOR	MRF555
Q3	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q4	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q5	1590000620	S.TRANSISTOR	FMS1 T148
Q6	1530003170	S.TRANSISTOR	2SC4863-4-TR
Q7	1530003170	S.TRANSISTOR	2SC4863-4-TR
Q8	1530003330	S.TRANSISTOR	2SC4401-3-TL
Q9	1530002380	S.TRANSISTOR	2SC4215-Y (TE85R)
Q10	1590001730	S.TRANSISTOR	UN9113(TX)
Q11	1590001470	S.TRANSISTOR	UN9213(TX)
Q12	1590001230	S.TRANSISTOR	RN2302 (TE85R)
Q13	1590002040	S.TRANSISTOR	HN1B01F-GR (TE85R)
Q14	1560000540	S.FET	2SK880-Y (TE85R)
Q15	1530003170	S.TRANSISTOR	2SC4863-4-TR
Q301	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q302	1530002920	S.TRANSISTOR	2SC4226-T2 R25
Q321	1530002560	S.TRANSISTOR	2SC4403-3-TL
Q322	1530002340	S.TRANSISTOR	2SC2954-T2B
D1	1790000450	S.DIODE	MA862(TX)
D2	1790000620	S.DIODE	MA77(TW)
D3	1750000390	S.DIODE	1SS353 TE-17
D4	1750000390	S.DIODE	1SS353 TE-17
D5	1790000660	S.DIODE	MA728(TW)
D7	1750000390	S.DIODE	1SS353 TE-17
D8	1720000370	S.VARICAP	HVU350TRF
D9	1720000370	S.VARICAP	HVU350TRF
D10	1720000370	S.VARICAP	HVU350TRF
D11	1720000370	S.VARICAP	HVU350TRF
D12	1720000370	S.VARICAP	HVU350TRF
D13	1790000680	S.DIODE	SB20-03P-TD
D301	1720000370	S.VARICAP	HVU350TRF
D302	1790000620	S.DIODE	MA77(TW)
D303	1790000620	S.DIODE	MA77(TW)
D321	1790000580	S.DIODE	HSM2693TR
FI1	2010001600	XTAL	FL-199 (30.875 MHz)
X1	6050009250	XTAL	CR-500 (12.8 MHz)
L1	6200005780	S.COIL	33CS-Y655LY-03K=P3
L2	6200005780	S.COIL	33CS-Y655LY-03K=P3
L3	6200005770	S.COIL	33CS-Y655LY-04K=P3
L4	6200005790	S.COIL	33CS-Y655LY-01M=P3
L5	6200002850	S.COIL	NL 252018T-R82J
L6	6200005790	S.COIL	33CS-Y655LY-01M=P3
L7	6200003700	S.COIL	BLM21A10PT
L8	6200004260	S.COIL	MLR1608M 2N2S-T
L9	6200004580	S.COIL	MLR1608M 8N2D-T
L11	6200004070	S.COIL	MLR1608M 22NJ-T
L12	6200004260	S.COIL	MLR1608M 2N2S-T
L13	6200004060	S.COIL	MLR1608M 18NJ-T
L14	6200004060	S.COIL	MLR1608M 18NJ-T
L15	6200004290	S.COIL	MLR1608M 10NJ-T
L16	6200004810	S.COIL	MLR1608M 5N6D-T
L17	6200003470	S.COIL	LL2012-F4N7K
L18	6200002320	S.COIL	LQN 1A 8N8J04
L19	6200004580	S.COIL	MLR1608M 8N2D-T
L20	6200003470	S.COIL	LL2012-F4N7K
L21	6200002320	S.COIL	LQN 1A 8N8J04

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
L22	6200002320	S.COIL	LQN 1A 8N8J04
L23	6200004650	S.COIL	MLR1608M 68NJ-T
L24	6200003090	S.COIL	NL 322522T-2R7J-3
L25	6200004220	S.COIL	MLR1608M 27NJ-T
L26	6200003960	S.COIL	MLF1608A 1R0K-T
L27	6200003960	S.COIL	MLF1608A 1R0K-T
L28	6200003960	S.COIL	MLF1608A 1R0K-T
L29	6200003590	S.COIL	EXCCL3225U1
L301	6200003690	S.COIL	MC152-E558ANA-1
L302	6200002850	S.COIL	NL 252018T-R82J
L321	6200004220	S.COIL	MLR1608M 27NJ-T
L322	6200004220	S.COIL	MLR1608M 27NJ-T
L323	6200004280	S.COIL	MLR1608M 6N8D-T
R1	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R2	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R3	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R4	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R5	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R6	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R7	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R8	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R9	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R10	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R11	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R12	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R14	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R15	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R16	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R17	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R19	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R20	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R22	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R23	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R24	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R25	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R26	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R27	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R28	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R29	7030003830	S.RESISTOR	ERJ3GEYJ 185 V (1.8 MΩ)
R30	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R31	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R32	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R33	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R34	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R35	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R36	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R37	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R38	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R39	7030003700	S.RESISTOR	ERJ3GEYJ 154 V (150 kΩ)
R40	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R41	7030000300	S.RESISTOR	MCR10EZHJ 220 Ω (221)
R42	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R43	7030003510	S.RESISTOR	ERJ3GEYJ 392 V (3.9 kΩ)
R44	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R45	7210002520	VARIABLE	TP96N00N-16F-10KA-1517
R46	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R47	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R48	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R50	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R51	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R52	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R53	7030000280	S.RESISTOR	MCR10EZHJ 150 Ω (151)
R54	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R55	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R56	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R57	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R58	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R59	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)

S.=Surface mount

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R60	7030003430	S.RESISTOR	ERJ3GEYJ 821 V (820 Ω)
R61	7030000420	S.RESISTOR	MCR10EZHJ 2.2 kΩ (222)
R62	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R63	7030000300	S.RESISTOR	MCR10EZHJ 220 Ω (221)
R65	7030000420	S.RESISTOR	MCR10EZHJ 2.2 kΩ (222)
R301	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R302	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R303	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R304	7030003360	S.RESISTOR	ERJ3GEYJ 221 V (220 Ω)
R305	7030003550	S.RESISTOR	ERJ3GEYJ 822 V (8.2 kΩ)
R306	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R307	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R308	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 kΩ)
R309	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R310	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R311	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R312	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R313	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R314	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R321	7030000280	S.RESISTOR	MCR10EZHJ 150 Ω (151)
R322	7030003280	S.RESISTOR	ERJ3GEYJ 470 V (47 Ω)
R323	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R324	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R325	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R326	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R327	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R328	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R329	7030000280	S.RESISTOR	MCR10EZHJ 150 Ω (151)
R330	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R331	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R332	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
C1	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C2	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C3	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C4	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C7	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C8	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C9	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C10	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C11	4030009350	S.CERAMIC	C1608 CH 1H 3R5B-T-A
C12	4030007110	S.CERAMIC	C1608 CH 1H 680J-T-A
C13	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C14	4030007110	S.CERAMIC	C1608 CH 1H 680J-T-A
C15	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C16	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C17	4030007160	S.CERAMIC	C1608 CH 1H 181J-T-A
C18	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C19	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C21	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C22	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C23	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C24	4550006800	S.TANTALUM	TEMSVB2 1D 475M-8R
C25	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C26	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C27	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C28	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C29	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C30	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C31	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C33	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C34	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C35	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C36	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C38	4550006110	S.TANTALUM	TEMSVB2 0J 336M8L
C39	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C40	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C41	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C42	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C43	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C44	4030009550	S.CERAMIC	C1608 CH 1H 2R5B-T-A
C45	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C46	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C47	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C48	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C49	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C50	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C51	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C52	4550002960	S.TANTALUM	TESVA 1C 155M1-8L
C53	4550000530	S.TANTALUM	TESVA 1V 104M1-8L
C55	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C56	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C57	4030009550	S.CERAMIC	C1608 CH 1H 2R5B-T-A
C58	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C59	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C60	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C61	4030006920	S.CERAMIC	C1608 CH 1H 010C-T-A
C62	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C63	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C64	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C66	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C67	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C69	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C70	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C71	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C72	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C73	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C74	4550006121	S.TANTALUM	TEMSVA 0G 226M-8R
C75	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C77	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C78	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C79	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C81	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C82	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C83	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C84	4610001910	S.TRIMMER	CTZ3E-10A-W1
C85	4610001910	S.TRIMMER	CTZ3E-10A-W1
C86	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C87	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C89	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C90	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C91	4030006930	S.CERAMIC	C1608 CH 1H 020C-T-A
C92	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C93	4030006950	S.CERAMIC	C1608 CH 1H 040C-T-A
C94	4030007020	S.CERAMIC	C1608 CH 1H 120J-T-A
C95	4610001910	S.TRIMMER	CTZ3E-10A-W1
C96	4610001910	S.TRIMMER	CTZ3E-10A-W1
C97	4030007000	S.CERAMIC	C1608 CH 1H 090D-T-A
C98	4610001910	S.TRIMMER	CTZ3E-10A-W1
C99	4030009500	S.CERAMIC	C1608 CH 1H 0R5B-T-A
C100	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C101	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C102	4610001910	S.TRIMMER	CTZ3E-10A-W1
C103	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C106	4030007060	S.CERAMIC	C1608 CH 1H 270J-T-A
C108	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C109	4030008560	S.CERAMIC	C1608 CH 1H 300J-T-A
C110	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C111	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C112	4030009560	S.CERAMIC	C1608 CH 1H R75B-T-A
C113	4030009560	S.CERAMIC	C1608 CH 1H R75B-T-A
C114	4030009560	S.CERAMIC	C1608 CH 1H R75B-T-A
C115	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C117	4030007120	S.CERAMIC	C1608 CH 1H 820J-T-A
C118	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C119	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C121	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C123	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C124	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C125	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C126	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C128	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C129	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C130	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C134	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C135	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C136	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C137	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C138	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A

S.=Surface mount

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C139	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C140	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C141	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C142	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C143	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C144	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C145	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C146	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C147	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C148	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C150	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C151	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C153	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C154	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C157	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C159	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C160	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C161	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C162	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C163	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C301	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C302	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C303	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C304	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C305	4030006970	S.CERAMIC	C1608 CH 1H 060D-T-A
C306	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C307	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C308	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
C309	4030009510	S.CERAMIC	C1608 CH 1H 010B-T-A
C310	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C311	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C312	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C313	4030009570	S.CERAMIC	C1608 CH 1H 0R3B-T-A
C314	4030006960	S.CERAMIC	C1608 CH 1H 050C-T-A
C315	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C316	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C317	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C318	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C319	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C321	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C322	4030008560	S.CERAMIC	C1608 CH 1H 300J-T-A
C323	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C324	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C325	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C326	4030006940	S.CERAMIC	C1608 CH 1H 030C-T-A
C327	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C328	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C329	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C331	4030007070	S.CERAMIC	C1608 CH 1H 330J-T-A
C332	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C333	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
J2	6450001430	CONNECTOR	HSJ1462-01-010
J3	6450001440	CONNECTOR	HSJ1403-01-010
J4	6510016080	S.CONNECTOR	53281-2490
W1	7120000380	JUMPER	JPW 01 R-01
W2	7030003860	S.JUMPER	ERJ3GE JPW V
W4	7030003860	S.JUMPER	ERJ3GE JPW V
W6	7030003860	S.JUMPER	ERJ3GE JPW V
W7	7030003860	S.JUMPER	ERJ3GE JPW V
W8	7030003860	S.JUMPER	ERJ3GE JPW V
EP1	0910042546	PCB	B 4245F

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1110003390	S.IC	AN8005M-(E1)
IC2	1110001810	S.IC	TA7368F(TP1)
IC3	1110003330	S.IC	TA31136F(EL)
IC4	1140004710	S.IC	HD404618C58H [CHN] [CHN-1]
	1140004950	S.IC	HD404618D02H [GEN]
IC5	1130001910	S.IC	µPD4011BG-T1
Q1	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q2	1590001390	S.FET	2SJ144-Y (TE85R)
Q3	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q4	1590001930	S.TRANSISTOR	IMX2 T108
Q5	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q6	1590001930	S.TRANSISTOR	IMX2 T108
Q7	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q8	1590001930	S.TRANSISTOR	IMX2 T108
Q9	1590001930	S.TRANSISTOR	IMX2 T108
Q10	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q11	1590001930	S.TRANSISTOR	IMX2 T108
Q12	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q13	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
Q14	1590000420	S.TRANSISTOR	RN1404 (TE85R)
Q15	1590001930	S.TRANSISTOR	IMX2 T108
Q16	1590000630	S.TRANSISTOR	RN1403 (TE85R)
Q17	1530000160	S.TRANSISTOR	2SC2712-Y (TE85RTEM)
Q18	1590000410	S.TRANSISTOR	RN2404 (TE85R)
Q19	1510000110	S.TRANSISTOR	2SA1162-Y (TE85R)
D1	1790001170	S.ZENER	MA8068-M(TX)
D2	1790001010	S.ZENER	MA8043-L(TX)
D3	1750000120	S.DIODE	DWA010-TE
D4	1750000020	S.DIODE	1SS184 (TE85R)
D5	1750000020	S.DIODE	1SS184 (TE85R)
D6	1750000020	S.DIODE	1SS184 (TE85R)
FI1	2020000080	CERAMIC	CFU455E2
X1	6050008810	XTAL	CR-473 (30.41909 MHz)
X2	6060000260	CERAMIC	CSB800J220
L1	6150002770	COIL	LS-293
R2	7030003330	S.RESISTOR	ERJ3GEYJ 121 V (120 Ω)
R3	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R4	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R5	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R6	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R7	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R8	7030003540	S.RESISTOR	ERJ3GEYJ 682 V (6.8 kΩ)
R9	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R10	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R11	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R12	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R13	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R14	7030003580	S.RESISTOR	ERJ3GEYJ 153 V (15 kΩ)
R15	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R16	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R17	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R18	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R19	7310002740	S.TRIMMER	RV-150 (RH03A3A14X0FC)103
R20	7310002770	S.TRIMMER	RV-153 (RH03A3AN4X02A)333
R21	7310002600	S.TRIMMER	RV-110 (RH03A3AS4X0AA)473
R22	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R23	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R24	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 kΩ)
R25	7030003530	S.RESISTOR	ERJ3GEYJ 562 V (5.6 kΩ)
R26	7030003570	S.RESISTOR	ERJ3GEYJ 123 V (12 kΩ)

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
R27	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R28	7030003690	S.RESISTOR	ERJ3GEYJ 124 V (120 kΩ)
R29	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R30	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R31	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 kΩ)
R32	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 kΩ)
R33	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R34	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 kΩ)
R35	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R36	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R37	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R38	7310002740	S.TRIMMER	RV-150 (RH03A3A14X0FC)103
R39	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R40	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R41	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R42	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R43	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R44	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R45	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R46	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R47	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R48	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R49	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R50	7030003460	S.RESISTOR	ERJ3GEYJ 152 V (1.5 kΩ)
R51	7030003300	S.RESISTOR	ERJ3GEYJ 680 V (68 Ω)
R52	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R53	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 kΩ)
R54	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R55	7030003840	S.RESISTOR	ERJ3GEYJ 225 V (2.2 MΩ)
R56	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R57	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R58	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R59	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R60	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R61	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R62	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R63	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R64	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R65	7030003490	S.RESISTOR	ERJ3GEYJ 272 V (2.7 kΩ)
R66	7030003750	S.RESISTOR	ERJ3GEYJ 394 V (390 kΩ)
R67	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R68	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R69	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R70	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R71	7030003650	S.RESISTOR	ERJ3GEYJ 563 V (56 kΩ)
R72	7030003720	S.RESISTOR	ERJ3GEYJ 224 V (220 kΩ)
R73	7030003380	S.RESISTOR	ERJ3GEYJ 331 V (330 Ω)
R74	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R75	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 kΩ)
R76	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R77	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R78	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R79	7030003600	S.RESISTOR	ERJ3GEYJ 223 V (22 kΩ)
R80	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R81	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R82	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R83	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 kΩ)
R84	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R85	7030003800	S.RESISTOR	ERJ3GEYJ 105 V (1 MΩ)
R86	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R87	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R88	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 kΩ)
R89	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R90	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 kΩ)
R91	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
R92	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 kΩ)
C1	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C2	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C3	4030009630	S.CERAMIC	C1608 JB 1H 822K-T-A
C4	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C5	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C6	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C8	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C9	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C10	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C11	4030009660	S.CERAMIC	C1608 JF 1C 224Z-T-A
C12	4030008960	S.CERAMIC	C2012 JB 1C 104K-T-A
C13	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C14	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C15	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C16	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C17	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C18	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C19	4030009970	S.CERAMIC	C1608 JB 1H 182K-T-A
C21	4510004630	S.ELECTROLITIC	ECEV1CA100SR
C22	4510006090	S.ELECTROLITIC	ECEV0GA470SR
C23	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C24	4550006690	S.TANTALUM	ECST1AC476R
C25	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C26	4510004650	S.ELECTROLITIC	ECEV1EA4R7SR
C27	4550006130	S.TANTALUM	ECST1VY224R
C28	4510004630	S.ELECTROLITIC	ECEV1CA100SR
C29	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C30	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C31	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C32	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
C33	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C34	4550006280	S.TANTALUM	TEMSVD2 1A 686M-12L
C35	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C36	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C37	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C38	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C39	4030007160	S.CERAMIC	C1608 CH 1H 181J-T-A
C40	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C41	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C42	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C43	4550006200	S.TANTALUM	ECST0JY106R
C44	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C45	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C46	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C47	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C48	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C49	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C50	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C51	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C52	4030007130	S.CERAMIC	C1608 CH 1H 101J-T-A
C53	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C54	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C55	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C56	4030007040	S.CERAMIC	C1608 CH 1H 180J-T-A
C57	4030009580	S.CERAMIC	C1608 JB 1H 681K-T-A
C58	4030009580	S.CERAMIC	C1608 JB 1H 681K-T-A
C59	4030007010	S.CERAMIC	C1608 CH 1H 100D-T-A
C60	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C61	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C62	4030007170	S.CERAMIC	C1608 CH 1H 221J-T-A
C65	4550006320	S.TANTALUM	ECST0JY475R
C66	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C67	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C68	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C69	4030008870	S.CERAMIC	C1608 JB 1C 183K-T-A
C70	4030010740	S.CERAMIC	C1608 JB 1A 104K-T-A
C71	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C72	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C75	4030009660	S.CERAMIC	C1608 JF 1C 224Z-T-A
C76	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C77	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C78	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C79	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C80	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C81	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C82	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C83	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C84	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C85	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C86	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C88	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C94	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C95	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A

S.=Surface mount

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
C96	4550006210	S.TANTALUM	ECST1CX106R
C97	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C98	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C99	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
S1	2250000200	ENCODER	TP90N00E20-16F-1517
S2	2260001900	SWITCH	SW-149 (SKHLLD)
S3	2260001900	SWITCH	SW-149 (SKHLLD)
J1	6510016430	S.CONNECTOR	53307-1491
J2	6510017640	S.CONNECTOR	52559-2090
J3	6510016040	S.CONNECTOR	52357-2490
J4	6510017450	S.CONNECTOR	3-178750-0
J5	6510017860	S.CONNECTOR	52357-1690
J6	6910007660	CONNECTOR	IMSA-9210B-1-02T
J7	6910007660	CONNECTOR	IMSA-9210B-1-02T
P1	6910007600	CONNECTOR	IMSA-9215H-T
P2	6910007600	CONNECTOR	IMSA-9215H-T
W1	7030003860	S.JUMPER	ERJ3GE JPW V
EP1	0910042506	PCB	B 4226F

[TENKEY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
IC1	1130007670	S.IC	24LC04BT-I/SN
IC2	1130004330	S.IC	LC7385M
D1	1750000120	S.DIODE	DWA010-TE
D2	1750000120	S.DIODE	DWA010-TE
D3	1790001170	S.ZENER	MA8068-M(TX)
X1	6060000550	S.CERAMIC	PBRC 3.58AR
R1	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R2	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 kΩ)
R3	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 kΩ)
R4	7030003620	S.RESISTOR	ERJ3GEYJ 333 V (33 kΩ)
R5	7030003740	S.RESISTOR	ERJ3GEYJ 334 V (330 kΩ)
R6	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
C1	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C2	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C4	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C5	4030007050	S.CERAMIC	C1608 CH 1H 220J-T-A
C6	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C7	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C8	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C9	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C10	4030008680	S.CERAMIC	C2012 JF 1C 105Z-T-A
C11	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
J1	6510017640	S.CONNECTOR	52559-2090
W1	9015170010	WIRE	71/98/015/X98/X98
W2	9015170010	WIRE	71/98/015/X98/X98
W3	9016095084	WIRE	72/98/012/X98/X98
W4	9016095084	WIRE	72/98/012/X98/X98
W5	8900005310	CABLE	OPC-518
SP1	2510000641	SPEAKER	T036S23A0020
MC1	7700002070	MICROPHONE	KUC3523-03245
EP1	0910042526	PCB	B 4228F

[DISP UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	
DS1	5040001760	S.LED	SEC 2422C
DS2	5010000120	S.LED	LN1371G-(TR)
DS3	5010000120	S.LED	LN1371G-(TR)
DS4	5030001130	LCD	LD-B4234J
J1	6510017460	S.CONNECTOR	3-178749-0
EP1	0910042532	PCB	B 4229B
EP2	8930035050	LCD CONTACT	SRCN-1517

S.=Surface mount

SECTION 7 MECHANICAL PARTS

[CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J1	6510005240	Antenna connector BNC-RM 107	1
MP1	8010015590	1517 chassis	1
MP3	8930032520	1517 contact base	1
MP4	8930032510	1517 keyboard	1
MP5	8510009240	1517 front shield	1
MP6	8930033290	1517 key sheet	1
MP7	8310033800	1517 window plate	1
MP8	8930029121	1257 release button (A) -1	1
MP9	8210011832	1517 front panel (A) -2 (incl. window plate)	1
MP10	8210011112	1517 rear panel -2	1
MP11	8930035090	1517 rear seal	1
MP12	8930032560	1517 PTT rubber	1
MP14	8930034230	1518 jack seal	1
MP15	8810006620	Screw PH No.0 M2 x 3.5 NI	1
MP16	8810008580	Screw PH M2 x 10 NI	1
MP17	8810006620	Screw PH No.0 M2 x 3.5 NI	4
MP18	8810006620	Screw PH No.0 M2 x 3.5 NI	4
MP19	8810006620	Screw PH No.0 M2 x 3.5 NI	1
MP20	8810006460	Screw FH M2 x 3	1
MP21	8810006040	Screw PH M3 x 4 NI	2
MP22	8610009200	Knob N214 [CH]	1
MP23	8610009250	Knob N216 [OFF/VOL]	1
MP25	8830000570	VR nut (A)	2
MP26	8810008990	Screw PH BT M2 x 10 ZK	1
MP27	8810008620	Screw PH BT M2 x 20 ZK	2
MP28	8810008280	Screw M2 x 6 ZK	1
MP29	8810006550	Screw PH B0 No.0-3 M1.4 x 3 NI	4
MP30	8930030041	1452 contact spring -1	2
MP31	8930034220	1518 MIC seal	1
MP32	8930032530	1517 connector seal	1

[RF UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
J2	6450001430	Connector HSJ1462-01-010 [MIC]	1
J3	6450001440	Connector HSJ1403-01-010 [SP]	1
R45	7210002520	Variable resistor TP96N00N-16F-10KA-1517 [OFF/VOL]	1
MP1	8510009110	1518 VCO case	1
MP2	8930032550	1517 terminal	1
MP3	8930038710	1518 TR plate	1
MP4	8930038750	1518 ANT plate	1
MP10	8930040150	1518 VR plate	1
MP11	8930040310	VCO sheet (E)	1

[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
S1	2250000200	Encoder TP90N00E20-16F-1517 [DIAL]	1

[TENKEY UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
W5	8900005310	Flat cable OPC-518	1
MC1	7700002070	Microphone KUC3523-03245	1
SP1	2510000641	Speaker T036S23A0020	1

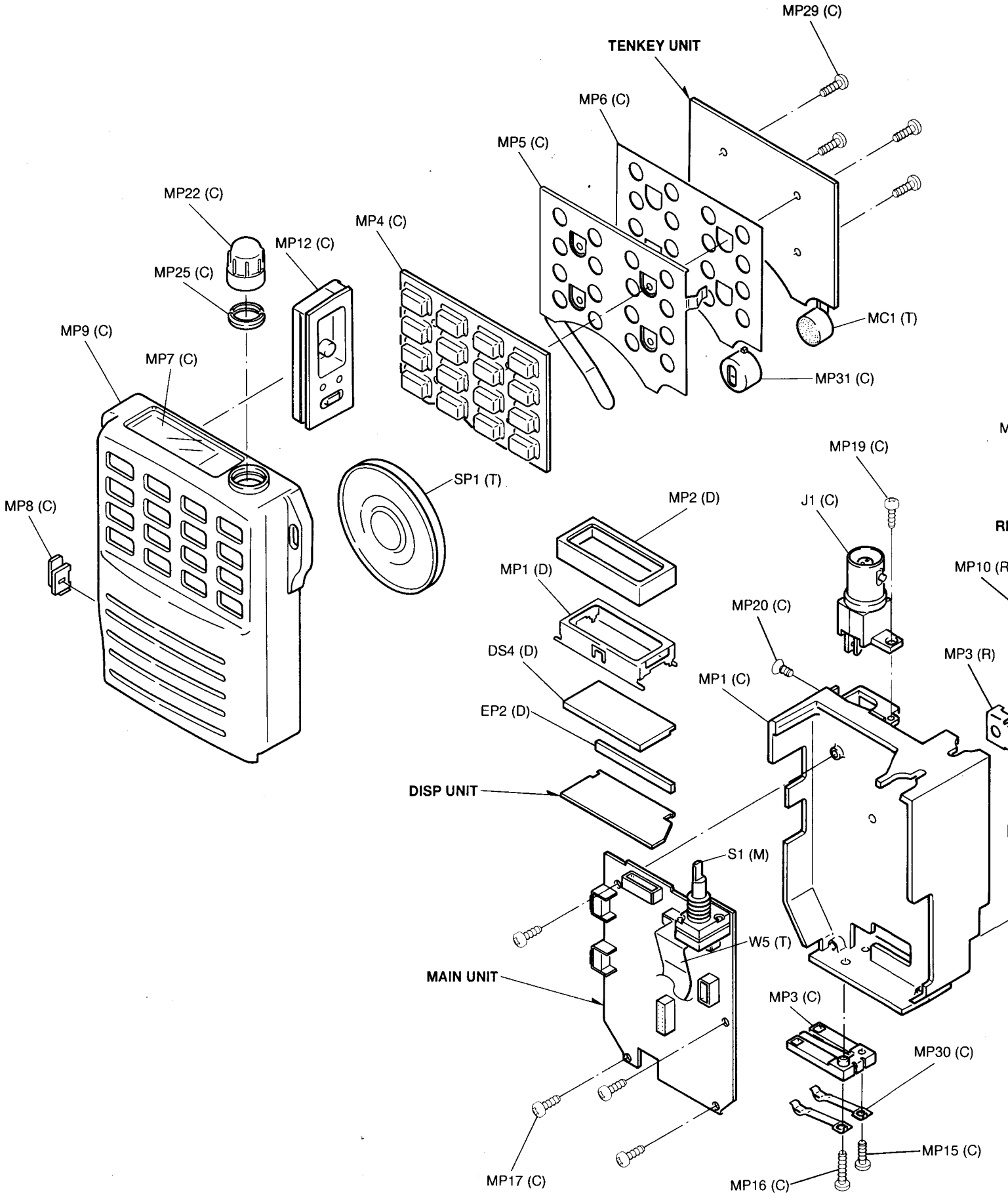
[DISP UNIT]

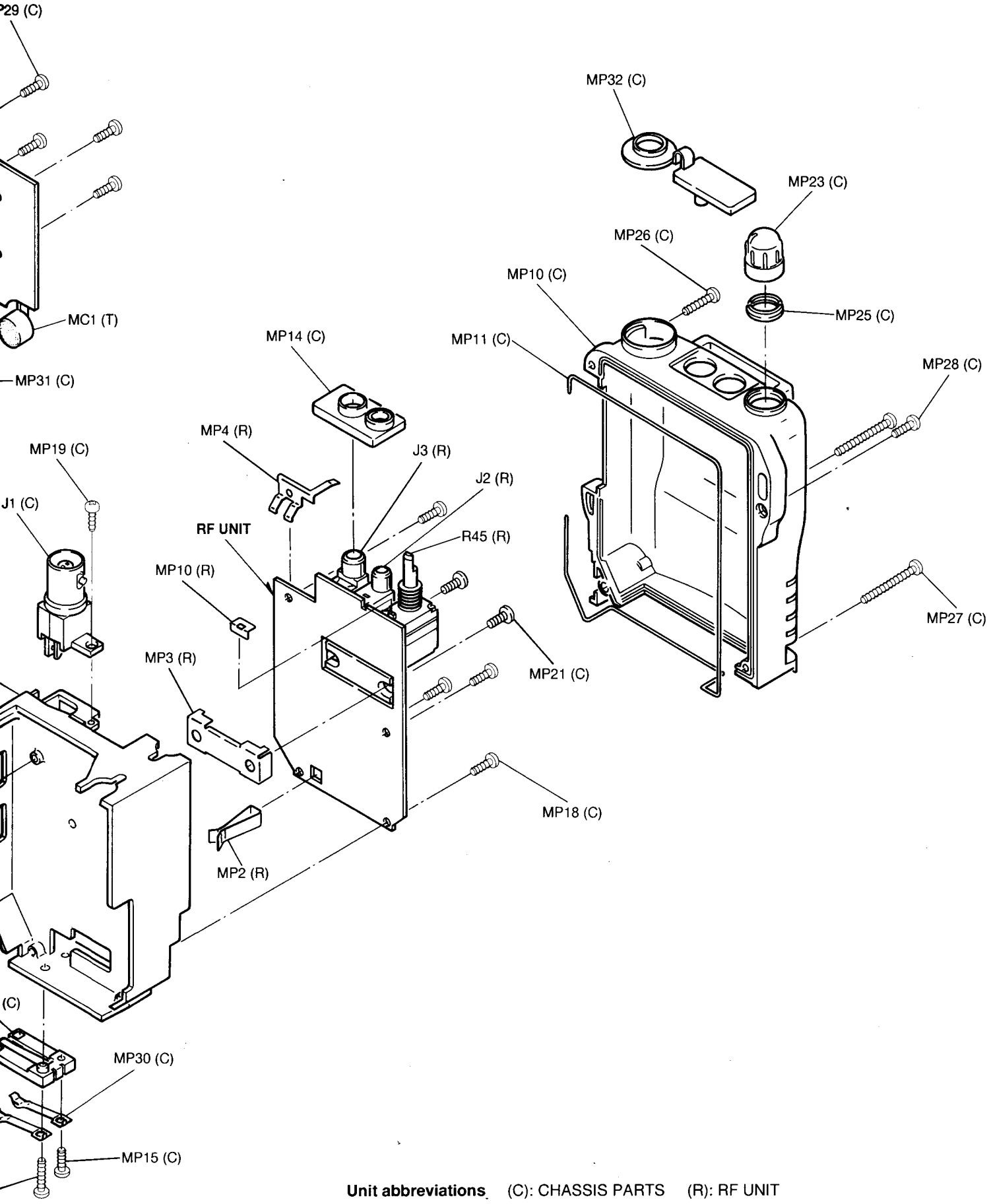
REF. NO.	ORDER NO.	DESCRIPTION	QTY.
DS4	5030001130	LCD LD-B4234J	1
EP2	8930035050	LCD contact SRCN-1517 ZCC	1
MP1	8930032540	1517 LCD holder	1
MP2	8930032650	1517 LCD rubber	1

[UNPACKING]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
EP1	Optional product	ANTENNA FA-B56U	1
EP2	Optional product	BATTERY BP-99	1
MP1	Optional product	1517 BELT CLIP	1

Screw abbreviations B0, BT: Self-tapping PH: Pan head
FH: Flat head NI: Nickel ZK: Black

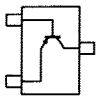
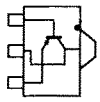
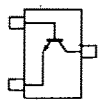
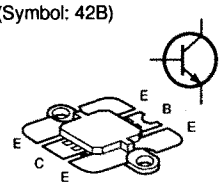
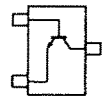
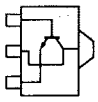
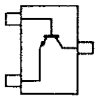
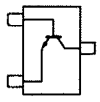
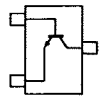
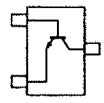
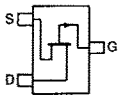
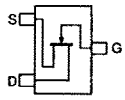
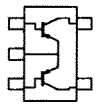
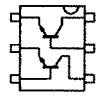
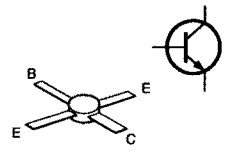
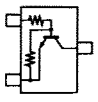
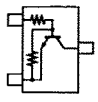
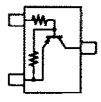
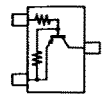
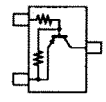
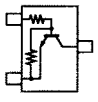

MP29 (C)
TENKEY UNIT
MP6 (C)
MP5 (C)
MP22 (C)
MP4 (C)
MP12 (C)
MP25 (C)
MC1 (T)
MP9 (C)
MP7 (C)
MP31 (C)
MP19 (C)
SP1 (T)
MP8 (C)
MP2 (D)
J1 (C)
MP1 (D)
MP10 (R
MP20 (C)
DS4 (D)
MP3 (R)
MP1 (C)
EP2 (D)
DISP UNIT
S1 (M)
W5 (T)
MAIN UNIT
MP3 (C)
MP30 (C)
MP15 (C)
MP17 (C)
MP16 (C)



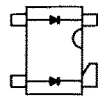
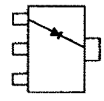
Unit abbreviations (C): CHASSIS PARTS (R): RF UNIT
(M): MAIN UNIT (T): TENKEY UNIT (D):DISP UNIT

SECTION 8 SEMI-CONDUCTOR INFORMATION

• TRANSISTORS AND FET'S

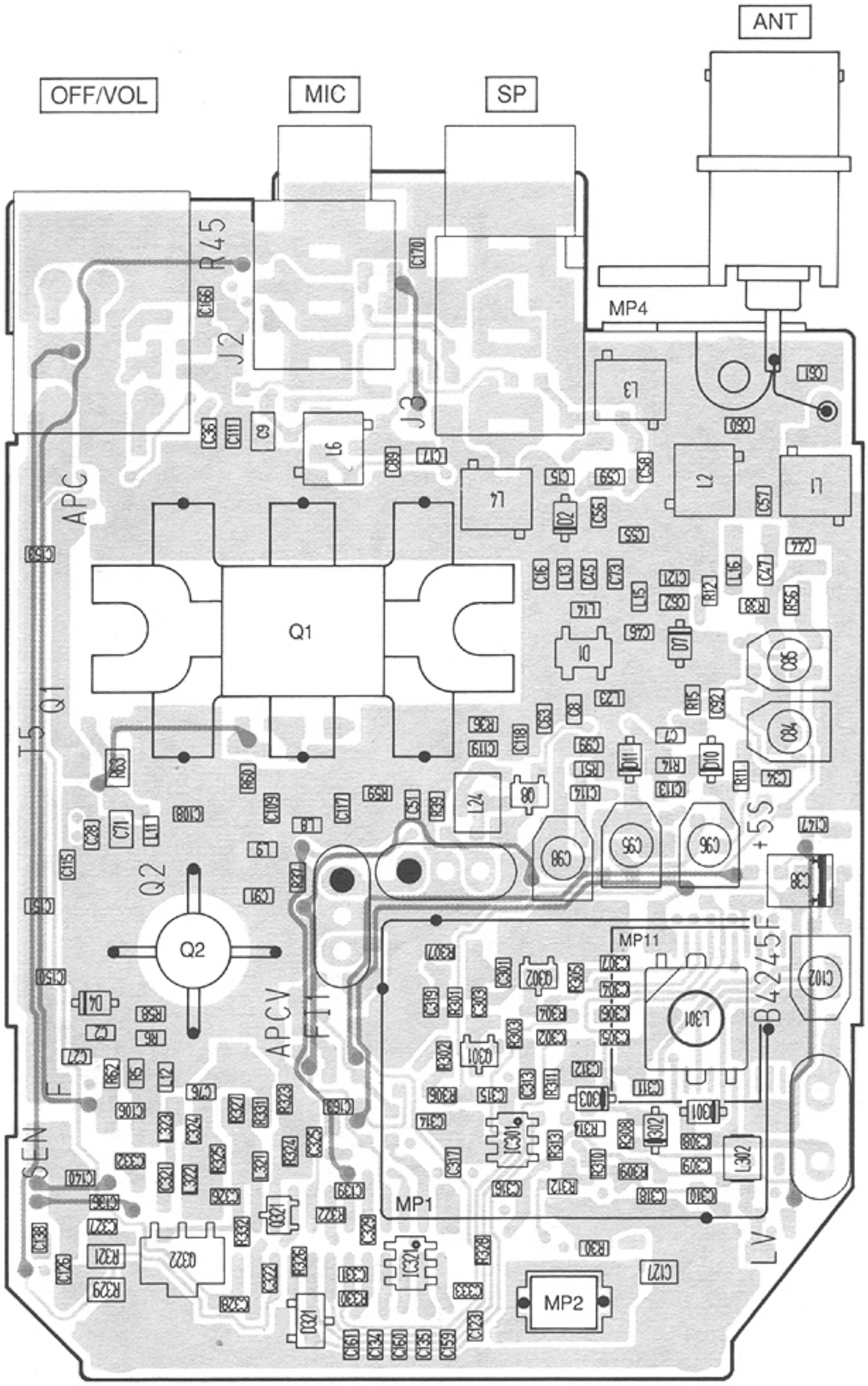
2SA1162 Y (Symbol: SY) 	**2SB1132 R** (Symbol: BAR) 	**2SC1863 4** (Symbol: FN4) 	**2SC1967** (Symbol: 42B) 	**2SC2712 Y** (Symbol: LY) 
2SC2954 (Symbol: QK) 	**2SC4215 Y** (Symbol: QY) 	**2SC4226 R25** (Symbol: R25) 	**2SC4401 3** (Symbol: OT3) 	**2SC4403 3** (Symbol: LY3) 
2SJ144 Y (Symbol: VY) 	**2SK880 Y** (Symbol: XY) 	**FMS1** (Symbol: SI) 	**IMX2** (Symbol: X2) 	**MRF555** 
RN1403 (Symbol: XC) 	**RN1404** (Symbol: XD) 	**RN2302** (Symbol: YB) 	**RN2404** (Symbol: YD) 	**UN9113** (Symbol: 6C) 
UN9213 (Symbol: 8C) 				

• DIODES

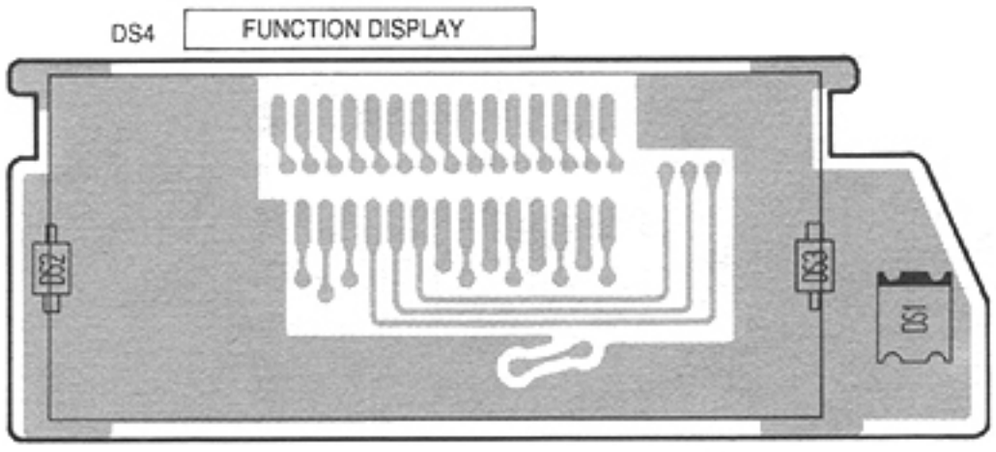
1SS184 (Symbol: B3) 	**DWA010** (Symbol: W8) 	**HSM2693TR** (Symbol: B2) 	**MA862** (Symbol: M1I) 	**SB20 03P** (Symbol: SC) 

SECTION 9 BOARD LAYOUTS

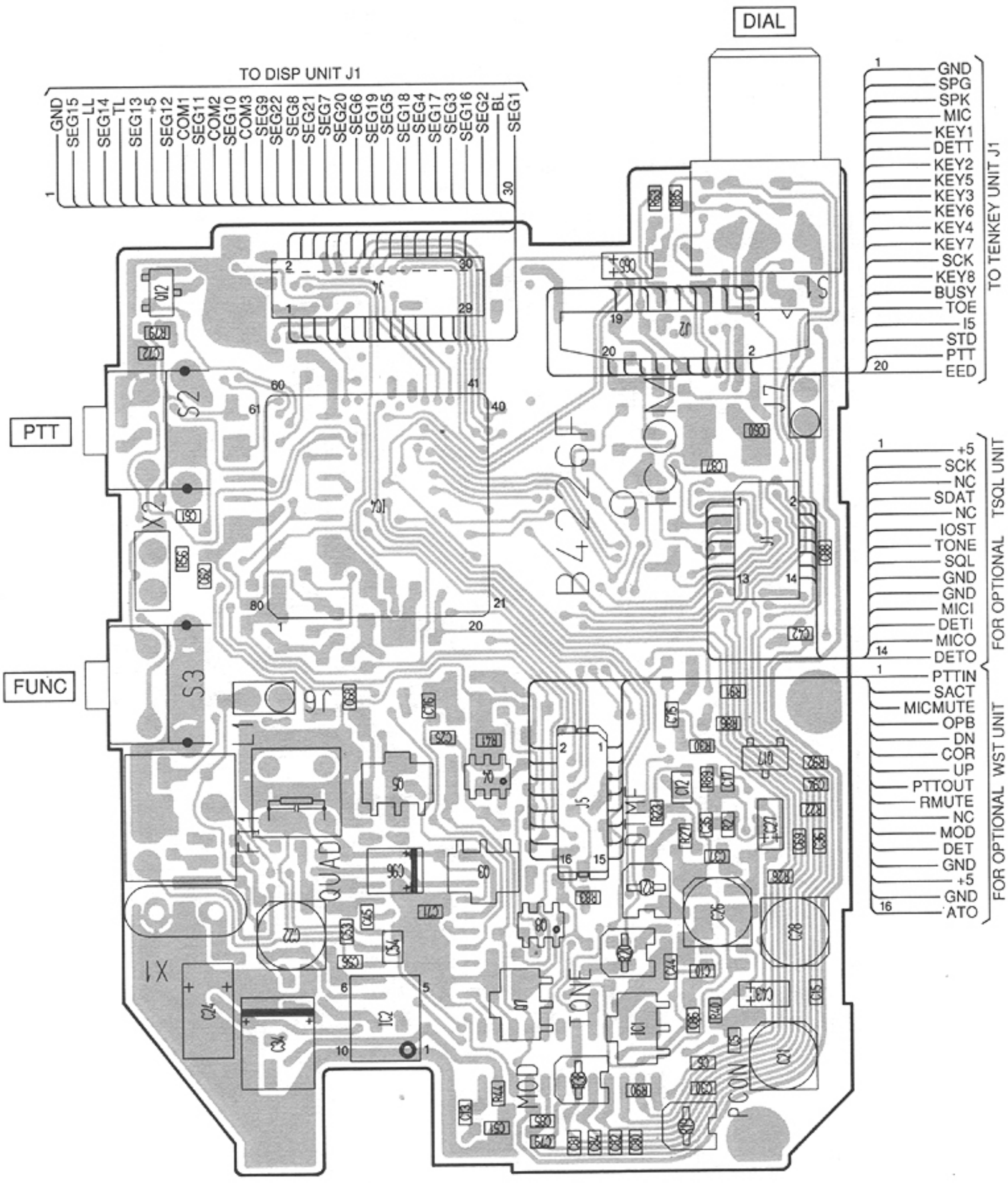
● **RF UNIT**



● DISP UNIT

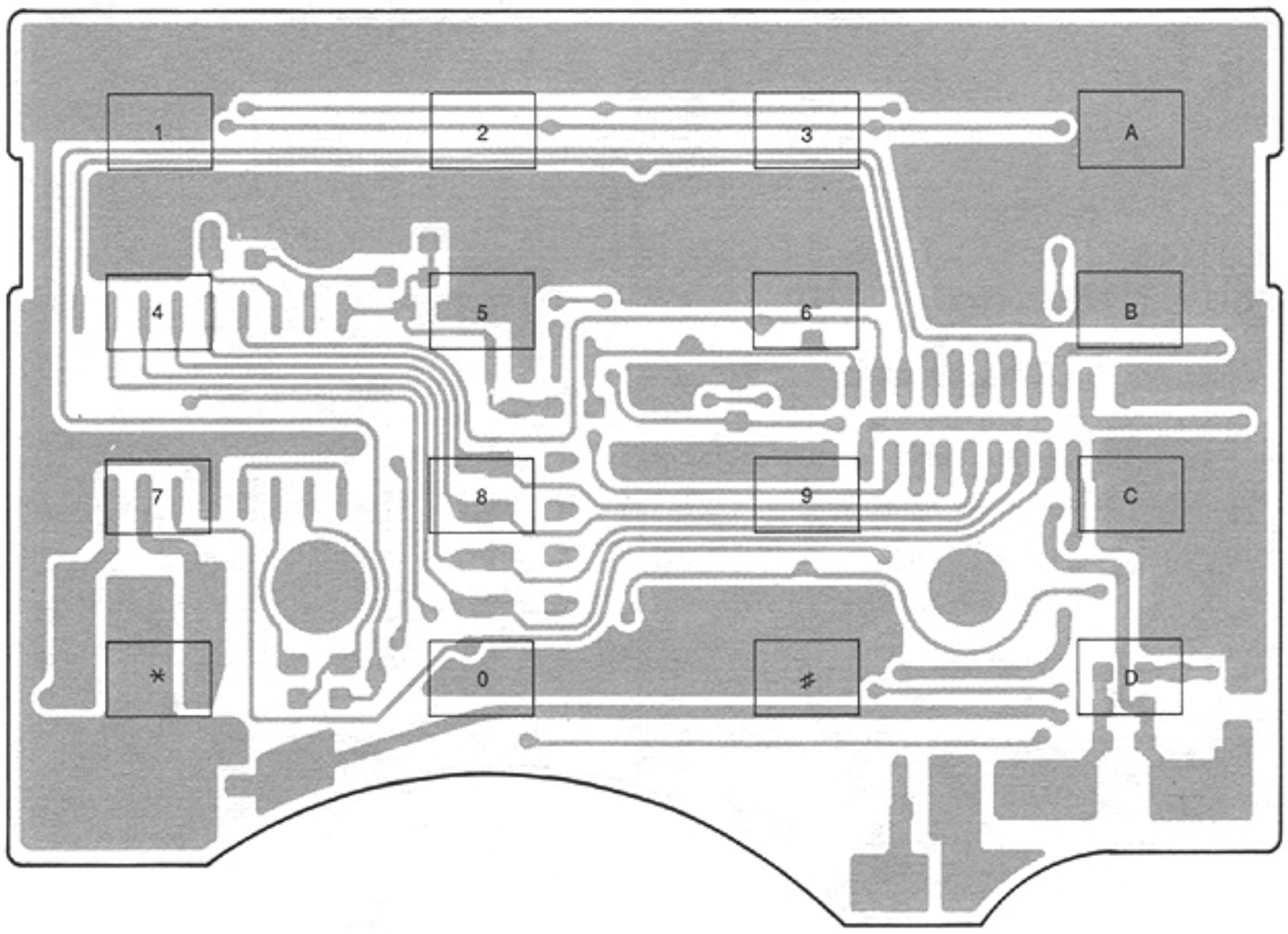


● MAIN UNIT

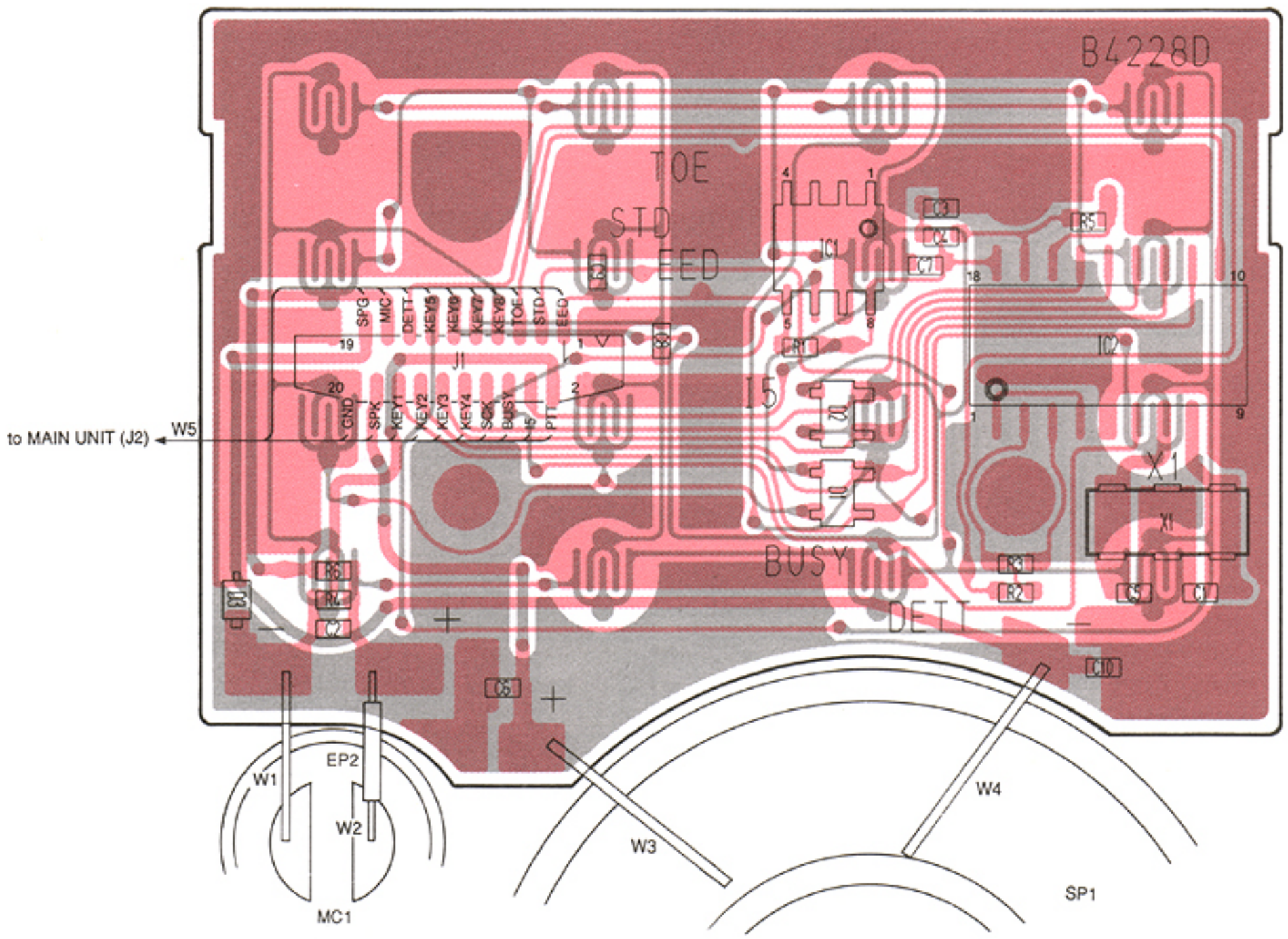


• TENKEY UNIT

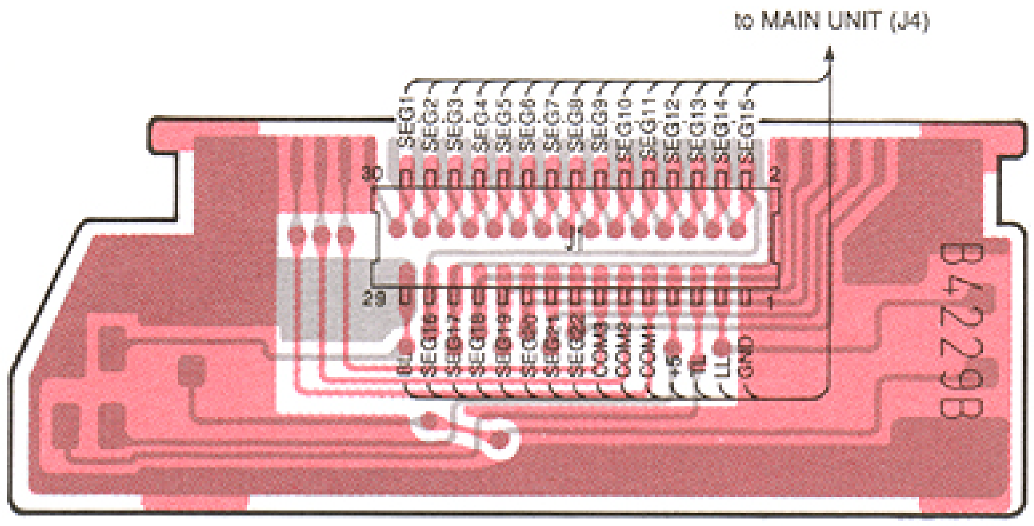
The combination of this page and the next page show the unit layout in the same configuration as the actual P. C. Board.



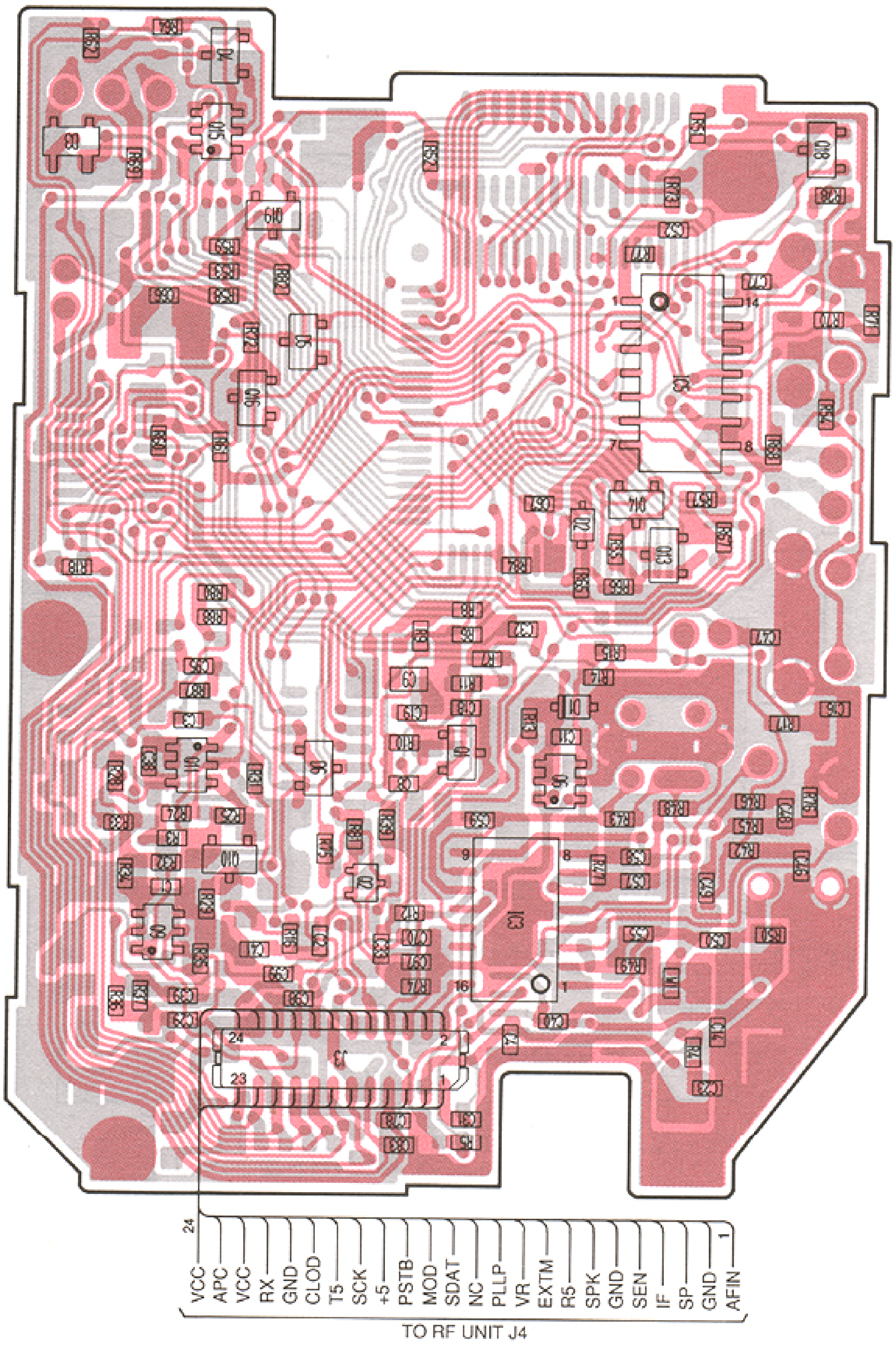
● TENKEY UNIT


B4228D
TOE
STD
EED
BUSY
DETT
SPG
MIC
DETT
KEY5
KEY0
KEY7
KEY6
TOE
STD
EED
GND
SPK
KEY1
KEY2
KEY3
KEY4
SCK
BUSY
PIT
J1
IC1
IC2
X1
R1
R2
R3
R4
R5
R6
C1
C2
C3
C4
C5
C6
C7
C10
D1
D2
D3
Q1
Q2
W1
W2
W3
W4
W5
EP2
MC1
SP1
to MAIN UNIT (J2)

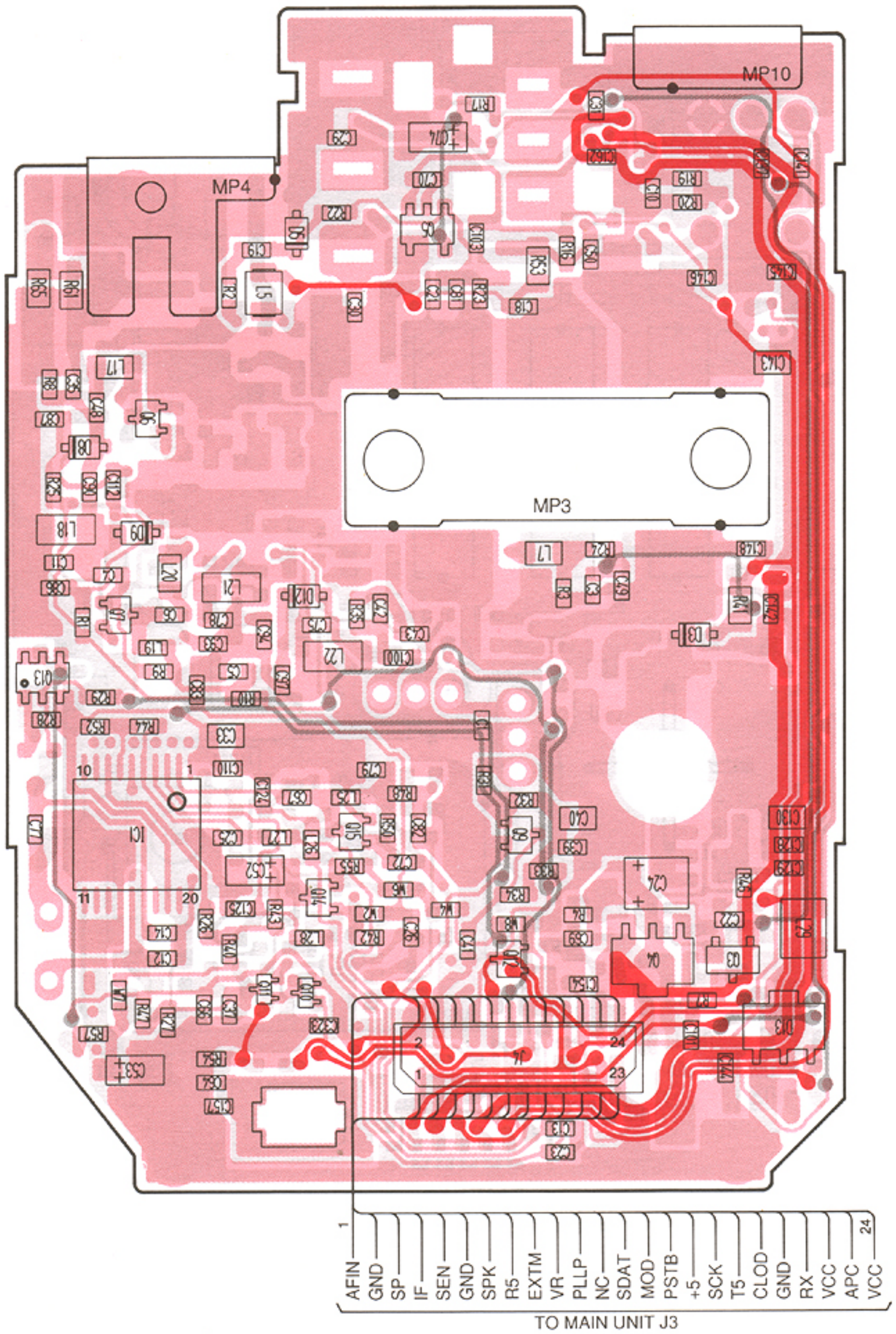
● DISP UNIT



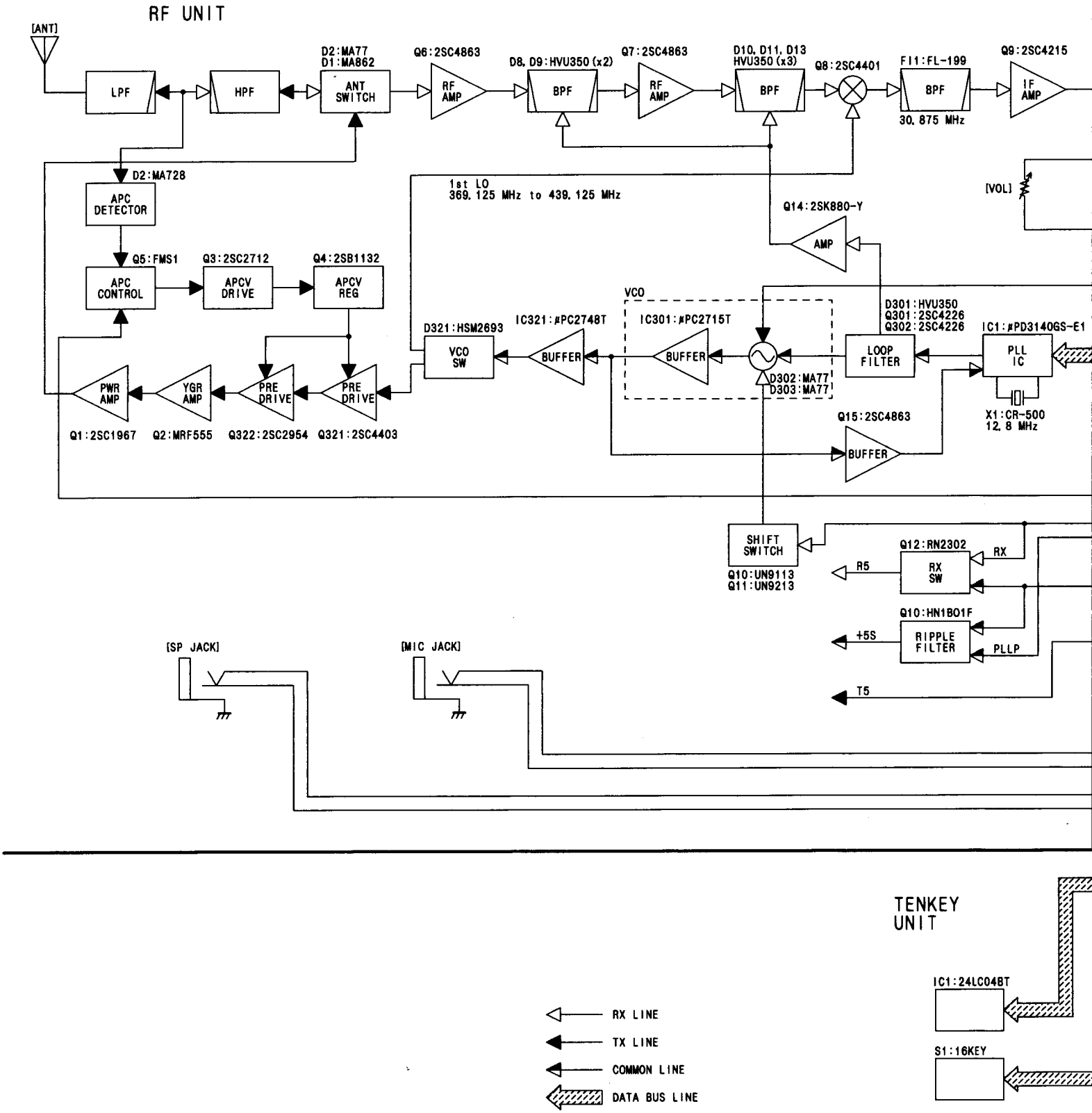
● MAIN UNIT

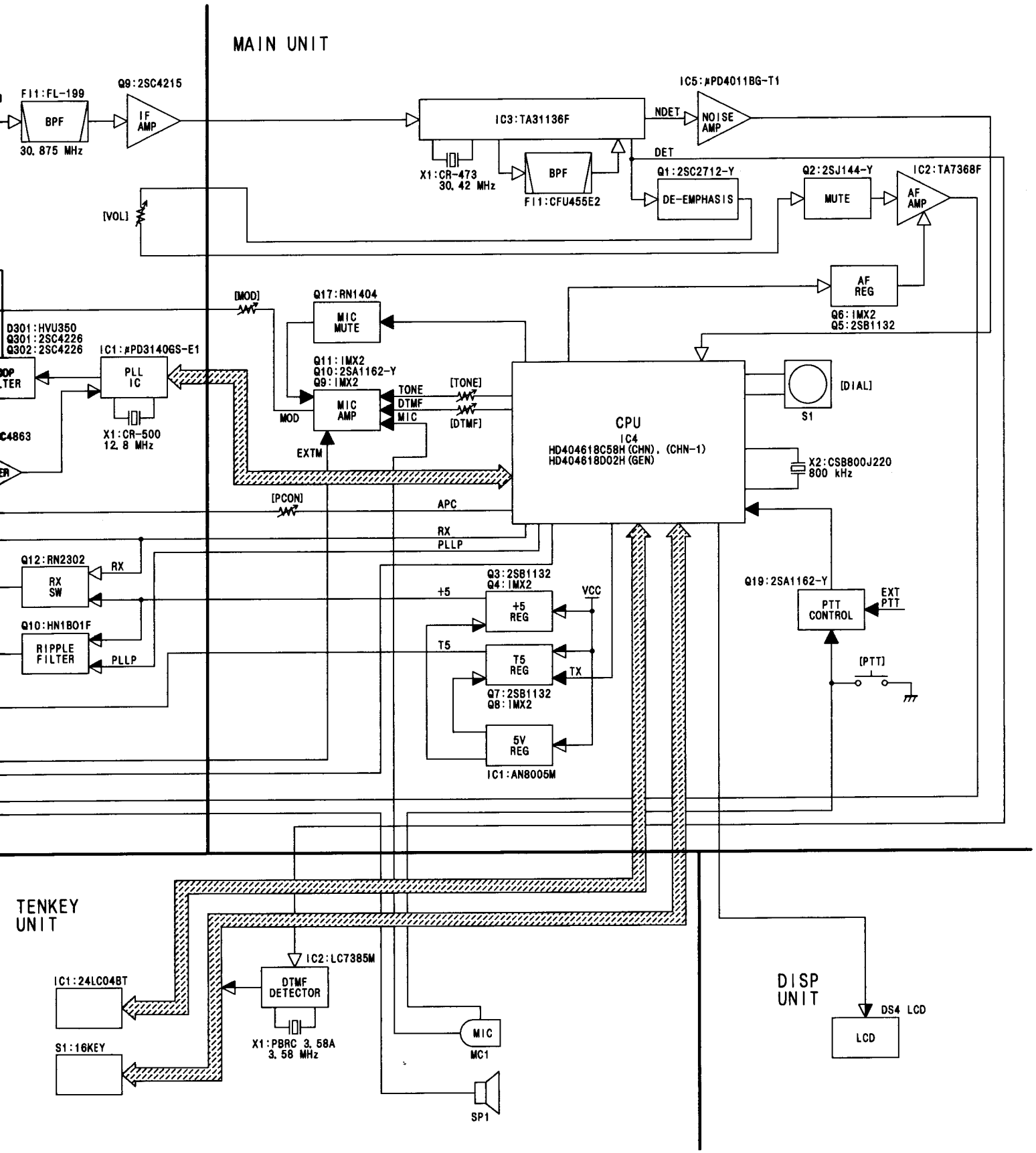


• RF UNIT

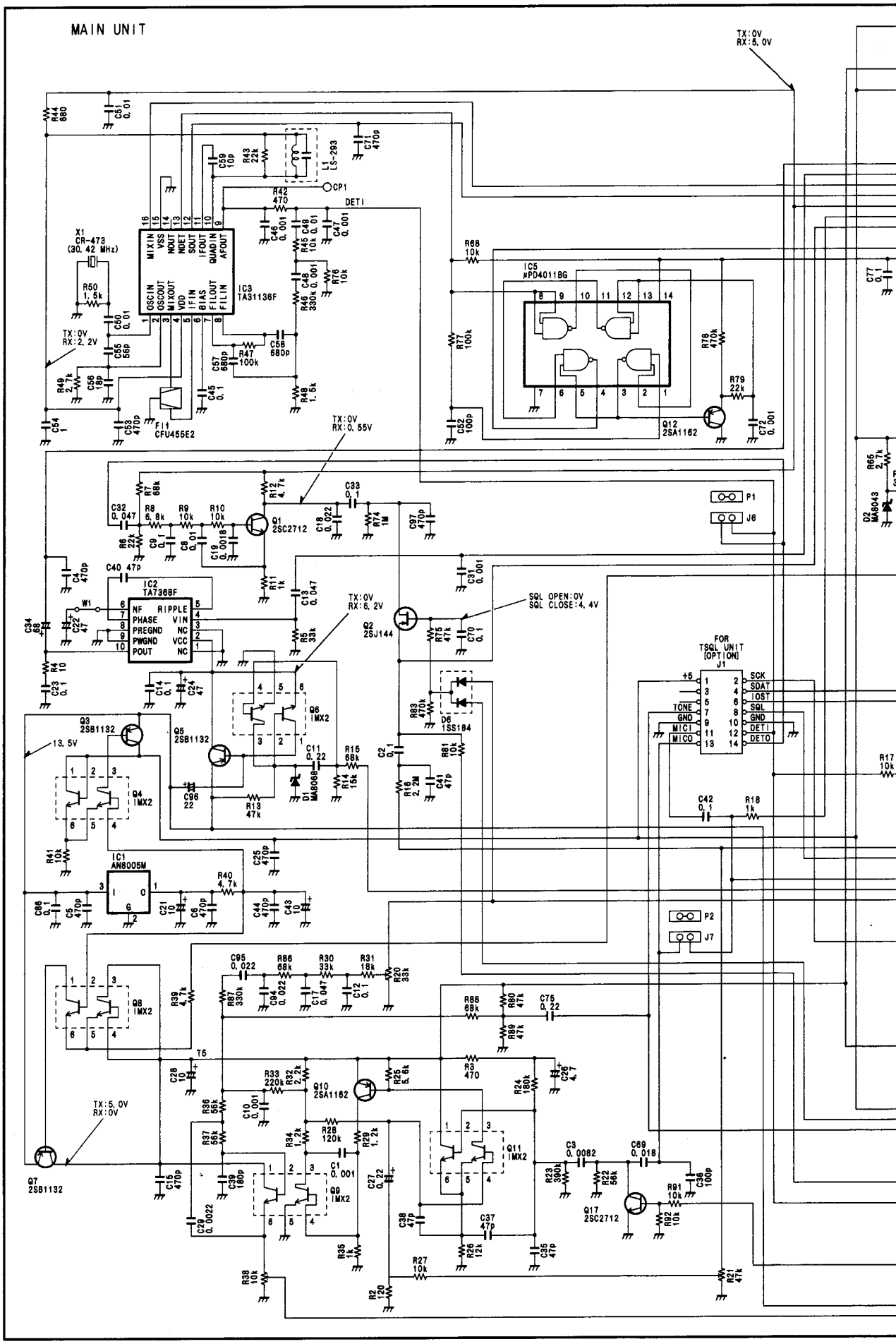

MP10
MP4
MP3
IC1
Q13
1
10
11
20
2
24
1
23
J4
1
AFIN
GND
SP
IF
SEN
GND
SPK
R5
EXTM
VR
PLLP
NC
SDAT
MOD
PSTB
+5
SCK
T5
CLOD
GND
RX
VCC
APC
VCC
24
TO MAIN UNIT J3

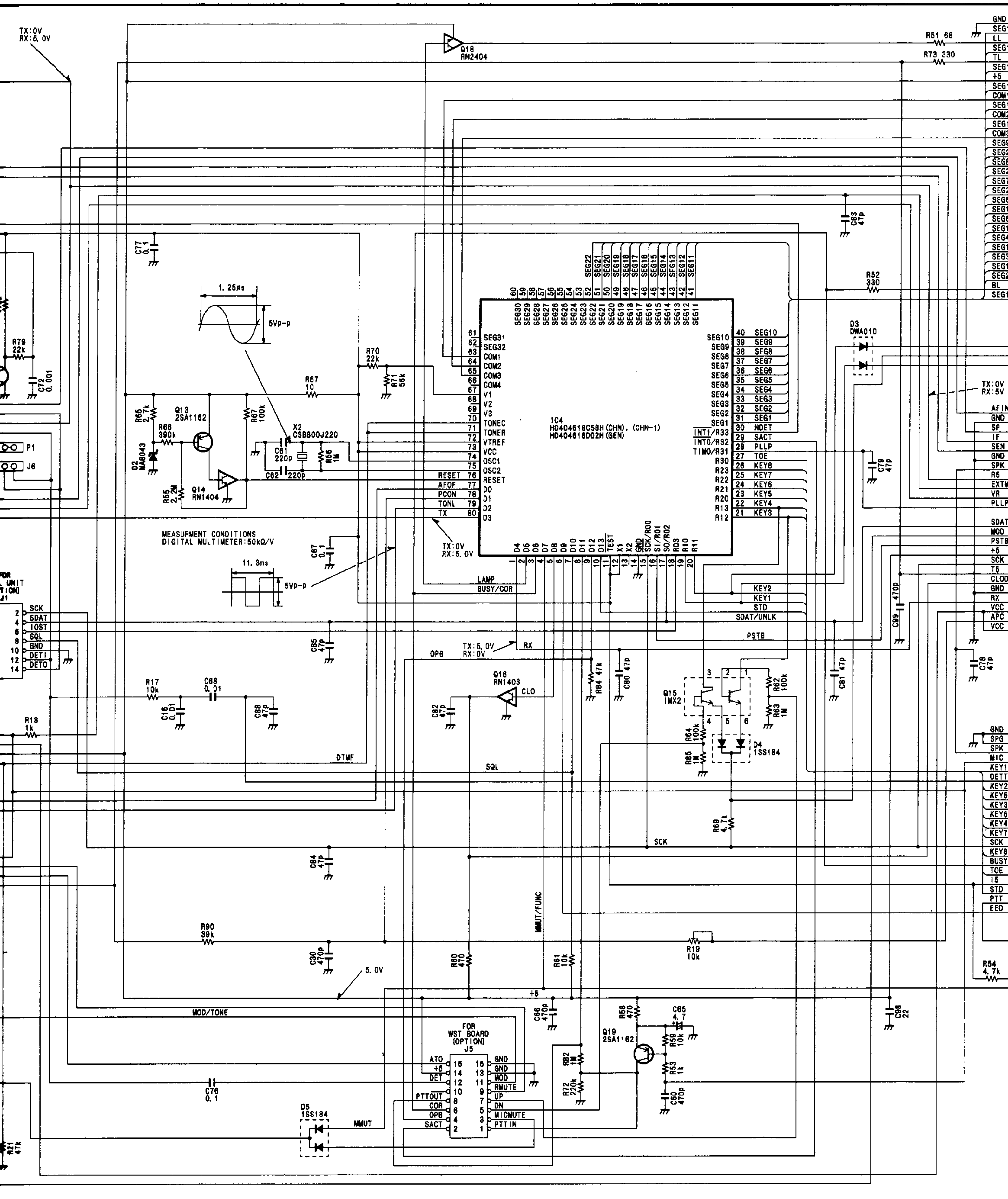
SECTION 10 BLOCK DIAGRAM



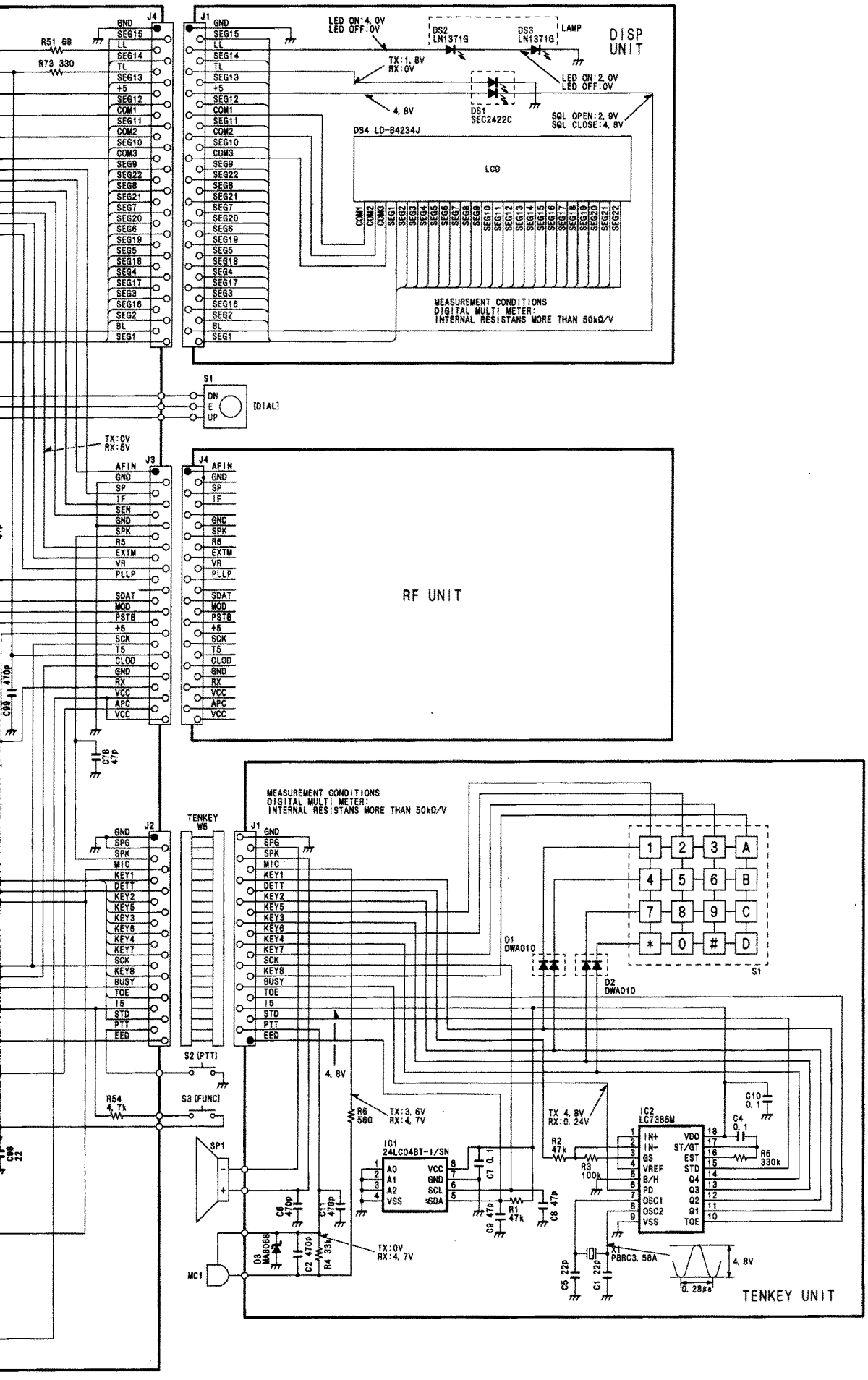

MAIN UNIT
F11:FL-199
BPF
30.875 MHz
Q9:2SC4215
IF AMP
IC3:TA31136F
X1:CR-473
30.42 MHz
BPF
F11:CFU455E2
NDET
NOISE AMP
IC5:μPD4011BG-T1
DET
Q1:2SC2712-Y
DE-EMPHASIS
Q2:2SJ144-Y
MUTE
IC2:TA7368F
AF AMP
[VOL]
AF REG
Q6:IMX2
Q5:2SB1132
[MOD]
Q17:RN1404
MIC MUTE
D301:HVU350
Q301:2SC4226
Q302:2SC4226
IC1:μPD3140GS-E1
PLL IC
X1:CR-500
12.8 MHz
Q11:IMX2
Q10:2SA1162-Y
Q9:IMX2
MIC AMP
TONE
DTMF
MIC
[TONE]
[DTMF]
MOD
EXTM
CPU
IC4
HD404618C58H (CHN), (CHN-1)
HD404618D02H (GEN)
[DIAL]
S1
X2:CSB800J220
800 kHz
[PCON]
APC
RX
PLLP
Q12:RN2302
RX SW
Q10:HN1B01F
RIPPLE FILTER
Q3:2SB1132
Q4:IMX2
+5
+5 REG
VCC
T5
T5 REG
TX
Q7:2SB1132
Q8:IMX2
5V REG
IC1:AN8005M
Q19:2SA1162-Y
PTT CONTROL
EXT PTT
[PTT]
TENKEY UNIT
IC2:LC7385M
DTMF DETECTOR
X1:PBRC 3.58A
3.58 MHz
IC1:24LC04BT
S1:16KEY
MIC
MC1
SP1
DISP UNIT
DS4 LCD
LCD

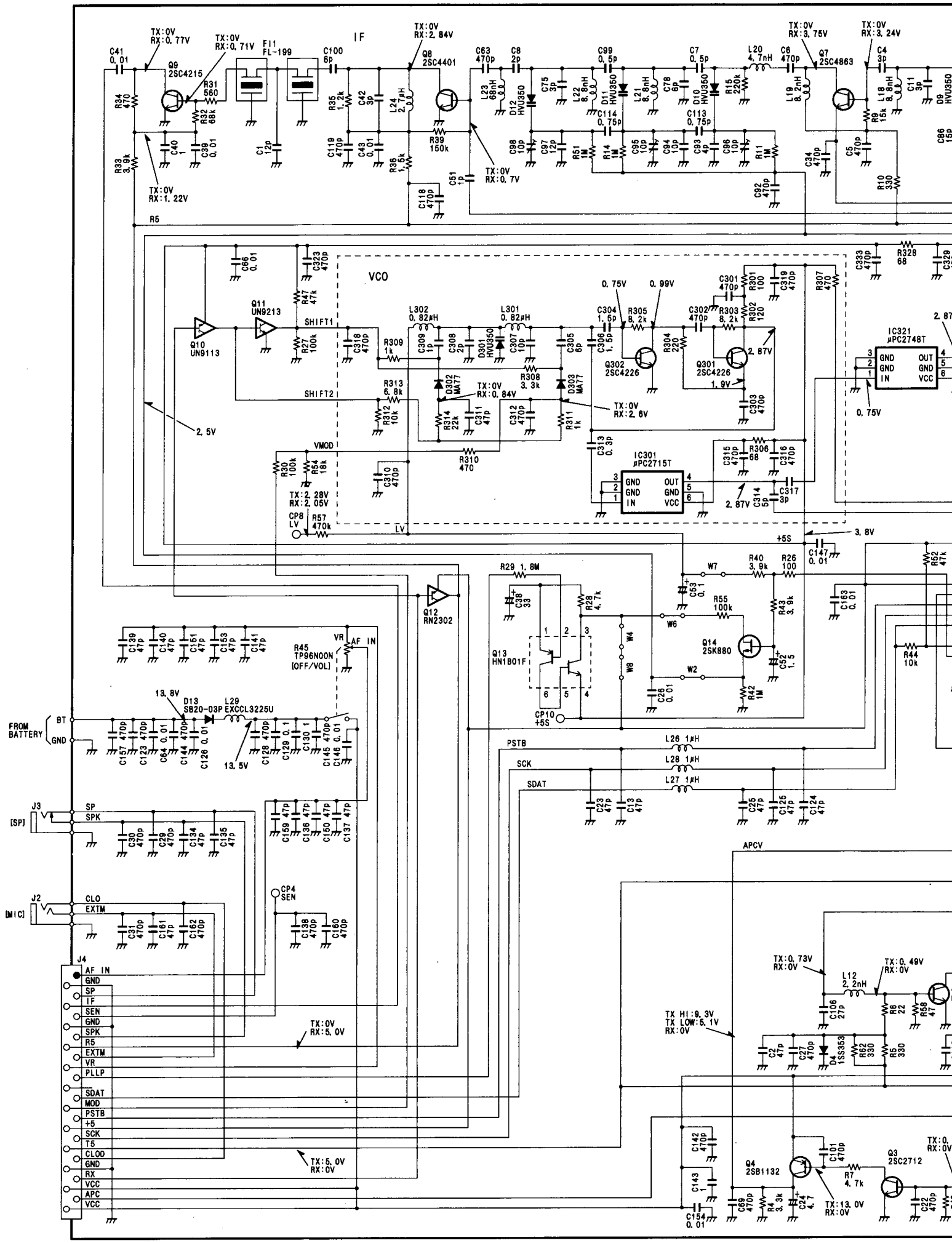
SECTION 11 VOLTAGE DIAGRAM

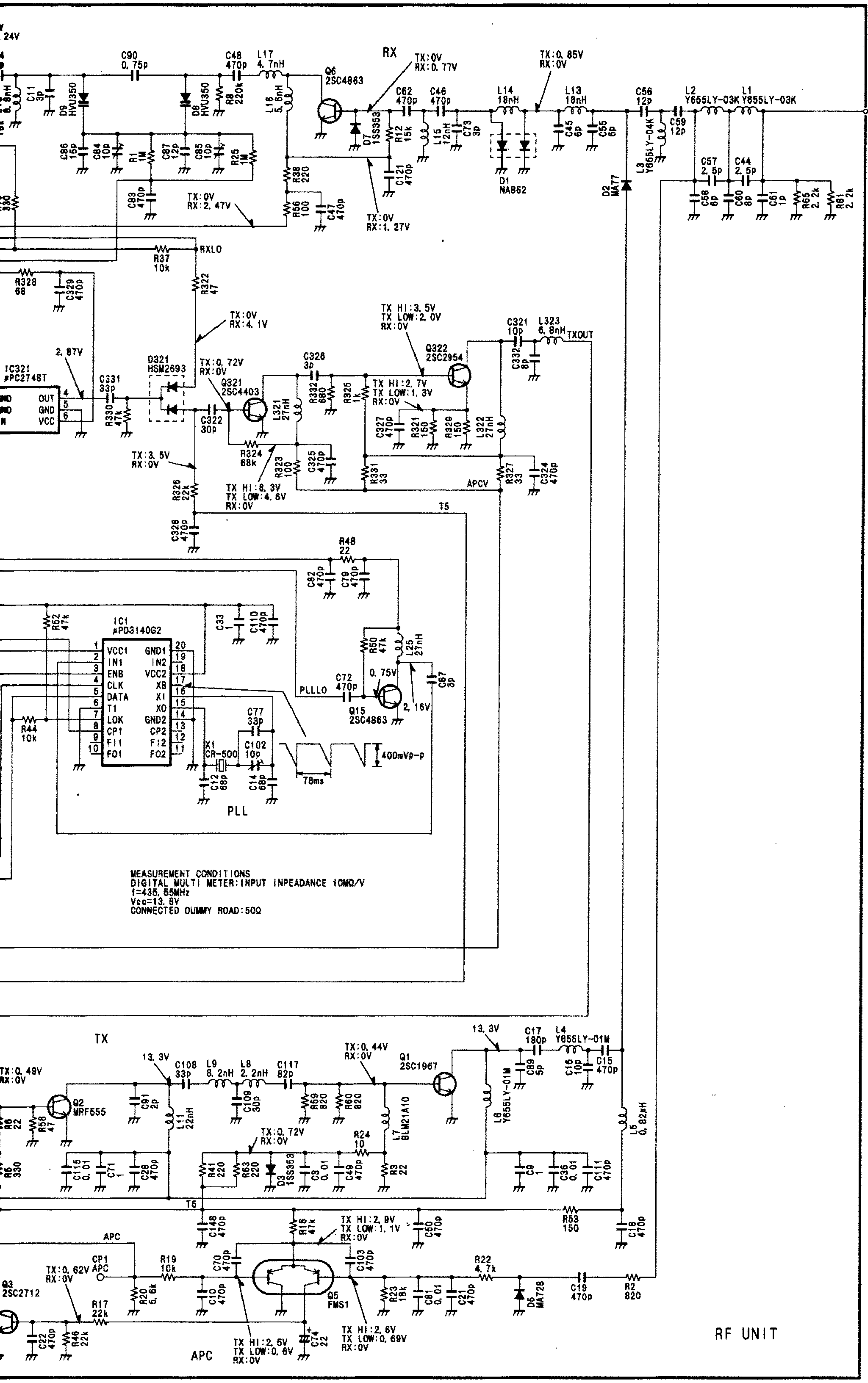




IC4
HD404618C58H (CHN), (CHN-1)
HD404618D02H (GEN)
MEASUREMENT CONDITIONS
DIGITAL MULTIMETER:50kΩ/V
1.25μs
5Vp-p
11.3ms
5Vp-p
TX:0V
RX:5.0V
TX:5.0V
RX:0V
5.0V
Q13
2SA1162
Q14
RN1404
Q16
RN1403
Q18
RN2404
Q19
2SA1162
Q15
IMX2
D2
MA8043
D3
DWA010
D4
1SS184
D5
1SS184
X2
CSB800J220
FOR
WST BOARD
(OPTION)
J5
P1
J6
J1
SCK
SDAT
IOST
SQL
GND
DETI
DETO
LAMP
BUSY/COR
RESET
AFOF
PCON
TONL
TX
RX
OPB
CLO
DTMF
SQL
SCK
KEY2
KEY1
STD
SDAT/UNLK
PSTB
MMUT/FUNC
MOD/TONE
MMUT
+5
ATO
DET
PTTOUT
COR
SACT
GND
MOD
RMUTE
UP
DN
MICMUTE
PTTIN
R51 68
R73 330
R52 330
R70 22k
R71 56k
R57 10
R79 22k
R65 2.7k
R66 390k
R67 100k
R56 1M
R55 2.2M
R17 10k
R18 1k
R90 39k
R19 10k
R60 470
R61 10k
R62 100k
R63 1M
R64 100k
R85 1M
R69 4.7k
R84 47k
R58 470
R59 10k
R53 1k
R82 1M
R72 220k
R21 47k
R54 4.7k
C77 0.1
C72 0.001
C61 220p
C62 220p
C67 0.1
C85 47p
C16 0.01
C68 0.01
C88 47p
C84 47p
C30 470p
C76 0.1
C82 47p
C80 47p
C81 47p
C83 47p
C79 47p
C99 470p
C78 47p
C66 470p
C65 4.7
C60 470p
C98 22


DISP UNIT
LED ON:4.0V
LED OFF:0V
DS2 LN1371G
DS3 LN1371G
LAMP
TX:1.8V
RX:0V
LED ON:2.0V
LED OFF:0V
4.8V
DS1 SEC2422C
SQL OPEN:2.9V
SQL CLOSE:4.8V
DS4 LD-B4234J
LCD
MEASUREMENT CONDITIONS
DIGITAL MULTI METER:
INTERNAL RESISTANS MORE THAN 50kΩ/V
S1
DN
E
UP
[DIAL]
TX:0V
RX:5V
RF UNIT
TENKEY UNIT
TENKEY W5
S2 [PTT]
S3 [FUNC]
SP1
MC1
D1 DWA010
D2 DWA010
IC1 24LC04BT-I/SN
IC2 LC7385M
P8RC3.58A
4.8V
0.28μs
TX:3.6V
RX:4.7V
TX:0V
RX:4.7V
TX 4.8V
RX:0.24V


IF
VCO
APCV
TX:0V RX:0.77V
TX:0V RX:0.71V
FI1 FL-199
TX:0V RX:2.84V
TX:0V RX:3.75V
TX:0V RX:3.24V
TX:0V RX:1.22V
TX:0V RX:0.7V
TX:0V RX:0.84V
TX:0V RX:2.6V
2.5V
0.75V
0.99V
2.87V
1.9V
TX:2.28V RX:2.05V
3.8V
13.8V
13.5V
TX:0V RX:5.0V
TX:5.0V RX:0V
TX:0.73V RX:0V
TX:0.49V RX:0V
TX HI:9.3V TX LOW:5.1V RX:0V
TX:13.0V RX:0V
Q9 2SC4215
Q8 2SC4401
Q7 2SC4863
Q11 UN9213
Q10 UN9113
Q12 RN2302
Q13 HN1B01F
Q14 2SK880
Q302 2SC4226
Q301 2SC4226
Q4 2SB1132
Q3 2SC2712
IC321 μPC2748T
IC301 μPC2715T
D13 SB20-03P
D302 MA77
D303 MA77
D301 HVU350
D11 HVU350
D10 HVU350
D12 HVU350
D4 1SS353
L29 EXCCL3225U
L12 2.2nH
L26 1μH
L28 1μH
L27 1μH
SHIFT1
SHIFT2
VMOD
LV
PSTB
SCK
SDAT
FROM BATTERY
BT
GND
[SP]
[MIC]
J3
J2
J4
SP
SPK
CLO
EXTM
AF IN
SEN
VR
PLLP
MOD
+5
T5
CLOD
RX
VCC
APC
CP8 LV
CP10 +5S
CP4 SEN
R45 TP96N00N [OFF/VOL]


RX
TX
PLL
APC
RF UNIT
[ANT]
J1
MEASUREMENT CONDITIONS
DIGITAL MULTI METER:INPUT INPEADANCE 10MΩ/V
f=435.55MHz
Vcc=13.8V
CONNECTED DUMMY ROAD:50Ω
IC1
μPD3140G2
IC321
μPC2748T
Q6
2SC4863
Q321
2SC4403
Q322
2SC2954
Q15
2SC4863
Q1
2SC1967
Q2
MRF555
Q3
2SC2712
Q5
FMS1
D321
HSM2693
D1
NA862
D2
MA77
D5
MA728
X1
CR-500
RXLO
TXOUT
PLLLO
APCV
T5
T6
CP1
APC
400mVp-p
78ms
TX:0V
RX:0.77V
TX:0.85V
RX:0V
TX:0V
RX:2.47V
TX:0V
RX:1.27V
TX:0V
RX:4.1V
TX HI:3.5V
TX LOW:2.0V
RX:0V
TX HI:2.7V
TX LOW:1.3V
RX:0V
TX HI:8.3V
TX LOW:4.6V
RX:0V
TX:0.72V
RX:0V
TX:3.5V
RX:0V
TX:0.49V
RX:0V
TX:0.44V
RX:0V
TX:0.72V
RX:0V
TX:0.62V
RX:0V
TX HI:2.9V
TX LOW:1.1V
RX:0V
TX HI:2.5V
TX LOW:0.6V
RX:0V
TX HI:2.6V
TX LOW:0.69V
RX:0V
13.3V
2.87V
0.75V
2.16V

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