



SERVICE MANUAL

VHF FM TRANSCEIVERS

IC-F3GT

IC-F3GS

INTRODUCTION

This service manual describes the latest service information for the **IC-F3GT** and **IC-F3GS** at the time of publication.

To upgrade quality, all 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 16 V. Such a connection could cause a fire hazard and/or electric shock.

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 (100mW) 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>

0910051872	PCB B-5386B	IC-F3GT	MAIN UNIT	1 pieces
8810009510	Screw BT M2 x 6 ZK	IC-F3GS	Chassis	10 pieces

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



IC-F3GT

IC-F3GS

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 turning 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 the transceiver.

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SECTION 1 SPECIFICATIONS

■ GENERAL

- Frequency coverage : 136.000–150.000 MHz
- Type of emission : 16K0F3E (W-type), 8K50F3E (N-type)
- Number of channels : 32 ch (16 channels × 2 banks: 2-BANK version), 16 ch (16 channel version)
- Power supply requirement : 7.2 V DC (negative ground; supplied battery pack)
- Current drain (approx.) : Transmit at High (5.0 W) 1.6 A
at Low (1.0 W) 700 mA
Receive rated audio 250 mA
stand-by 70 mA
- Frequency stability : ±0.0005 %
- Usable temperature range : –30°C to +60°C; –22°F to +140°F
- Dimensions (projections not included) : 54(W) × 132(H) × 35(D) mm; 2 5/32(W) × 5 3/16(H) × 1 3/8(D) in.
- Weight (with ant., BP-209) : 370 g; 13.1 oz.

■ TRANSMITTER

- RF output power (at 7.2 V DC (with supplied battery pack) : 5 W / 1 W (High / Low)
- Modulation system : Variable reactance frequency modulation
- Maximum frequency deviation : ±5.0 kHz (W-type), ±2.5 kHz (N-type)
- Spurious emissions : 73 dBc typical
- Adjacent channel power : 60 dB typical
- Transmitter audio distortion : Less than 3% at 1 kHz, 40% deviation
- Limiting charact of modulator : 70–100% of max. deviation
- Ext. microphone connector : 3-conductor 2.5(d) mm (1/10")/2.2 kΩ

■ RECEIVER

- Receive system : Double conversion superheterodyne system
- Intermediate frequencies : 1st 31.05 MHz
2nd 450 kHz
- Sensitivity : 0.25 μV at 12 dB SINAD (typical)
- Squelch sensitivity : 0.25 μV at threshold (typical)
- Adjacent channel selectivity : 65 dB (typical)
- Spurious response rejection : 70 dB (typical)
- Intermodulation rejection ratio : 70 dB (typical)
- Hum and noise : 40 dB (typical)
- Audio output power (at 7.4 V DC) : 500 mW typical at 5% distortion with an 8 Ω load
- Ext. speaker connector : 3-conductor 3.5(d) mm (1/8")/8 Ω

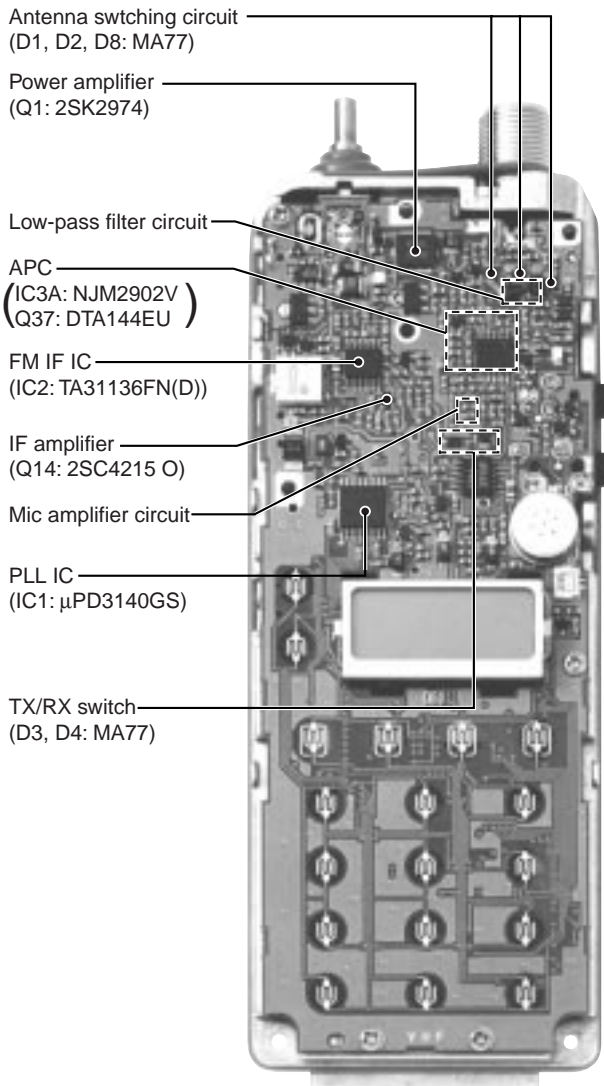
Specifications are measured in accordance with EIA/TIA-603.

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

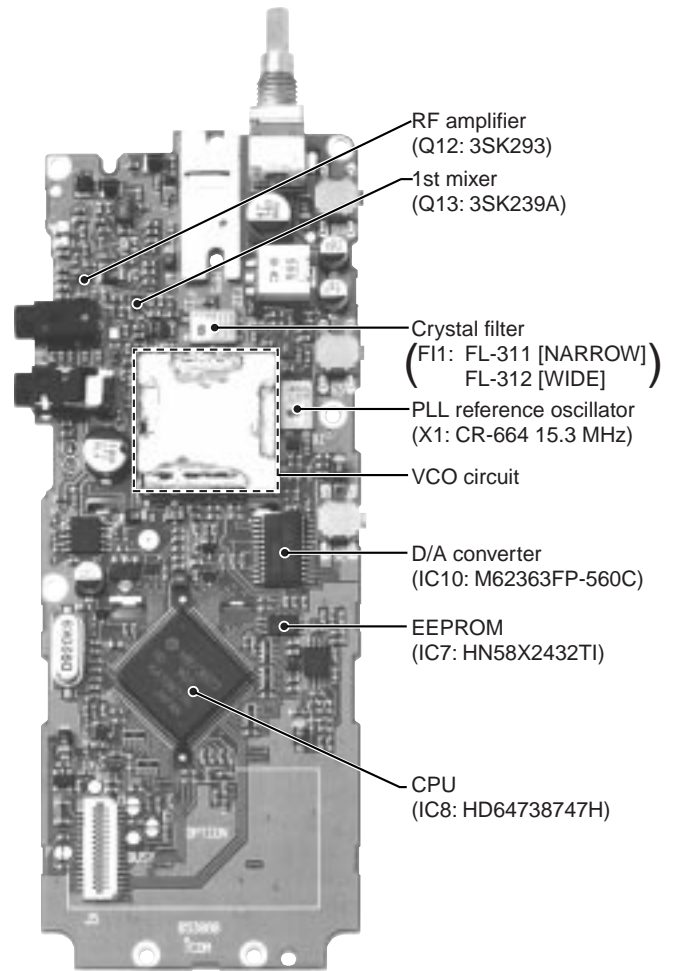
SECTION 2 INSIDE VIEWS

• MAIN UNIT

TOP VIEW



BOTTOM VIEW

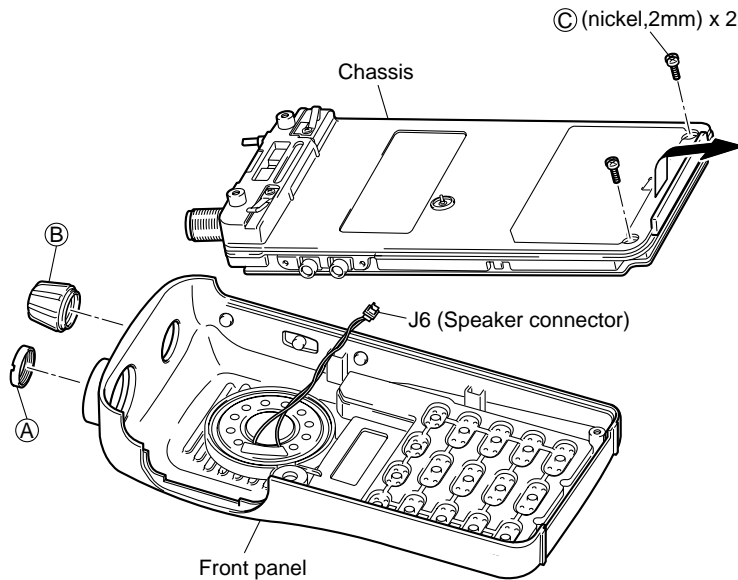


SECTION 3 DISASSEMBLY AND OPTION INSTRUCTIONS

3-1 DISASSEMBLY INSTRUCTION

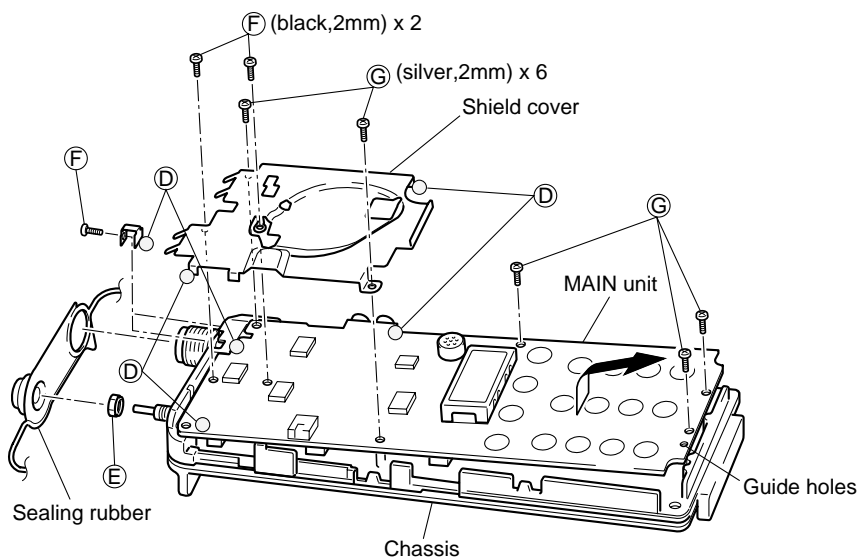
• REMOVING THE CHASSIS PANEL

- ① Unscrew 1 nut (A), and remove 1 knob (B).
- ② Unscrew 2 screws (C).
- ③ Take off the chassis in the direction of the arrow.
- ④ Unplug J6 to separate front panel and chassis.



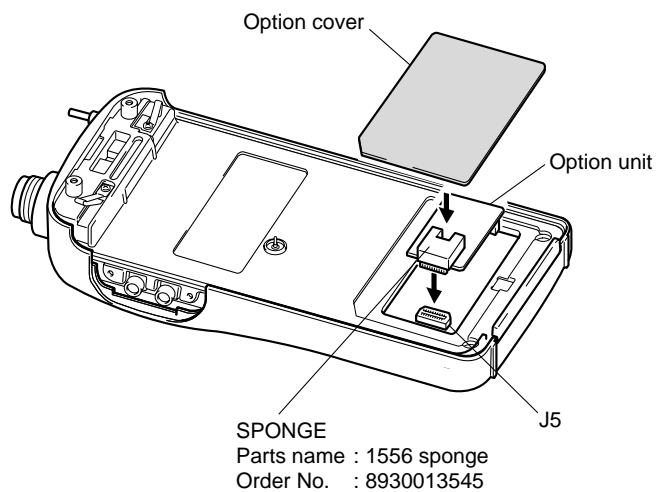
• REMOVING THE MAIN UNIT

- ① Remove the searing rubber.
- ② Unsolder 3 points (D), and unscrew 1 nut (E).
- ③ Unscrew 4 screws (F) and 5 screws (G) (silver, 2mm) to separate the chassis and the MAIN unit.
- ④ Take off the MAIN unit in the direction of the arrow.



3-2 OPTIONAL UNIT INSTALLATIONS

- ① Remove the option cover.
- ② Remove the bottom protective paper of spoge.
- ③ Connect one of UT-96, UT-105, UT-109, UT-110, UT-111, and UT-108 optional unit J5.
- ④ Replace the option cover to the chassis-hole.



SECTION 4 CIRCUIT DESCRIPTION

4-1 RECEIVER CIRCUITS

4-1-1 ANTENNA SWITCHING CIRCUIT

Received signals are passed through the low-pass filter (L1, L2, C1–C5, C8). The filtered signals are applied to the $\frac{1}{4}$ type antenna switching circuit (D2, D8).

The antenna switching circuit functions as a low-pass filter while receiving. However, its impedance becomes very high while D2 and D8 are turned ON. Thus transmit signals are blocked from entering the receiver circuits. The antenna switching circuit employs a $\frac{1}{4}$ type diode switching system. The passed signals are then applied to the RF amplifier circuit.

4-1-2 RF CIRCUIT

The RF circuit amplifies signals within the range of frequency coverage and filters out-of-band signals.

The signals from the antenna switching circuit are amplified at the RF amplifier (Q12) after passing through the tunable bandpass filter (L16, L17, D9, D10, C78–C80, C86, C93, C277). The amplified signals are applied to the 1st mixer circuit (Q13) after out-of-band signals are suppressed at the tunable bandpass filter (D11, D12, L18, L19, C91, C92, C94, C96–C98).

Varactor diodes are employed at the bandpass filters that track the filters and are controlled by the CPU (IC8) via the expander IC (IC10) using T1–T4 signals. These diodes tune the centre frequency of an RF passband for wide bandwidth receiving and good image response rejection.

4-1-3 1ST MIXER AND 1ST IF CIRCUITS

The 1st mixer circuit converts the received signal into a fixed frequency of the 1st IF signal with a PLL output frequency. By changing the PLL frequency, only the desired frequency will pass through a crystal filter at the next stage of the 1st mixer.

The signals from the RF circuit are mixed at the 1st mixer (Q13) with a 1st LO signal coming from the VCO circuit to produce a 31.05 MHz 1st IF signal.

The 1st IF signal is applied to a pair of crystal filters (F11) to suppress out-of-band signals. The filtered 1st IF signal is applied to the IF amplifier (Q14), then applied to the 2nd mixer circuit (IC2, pin 16).

4-1-4 2ND IF AND DEMODULATOR CIRCUITS

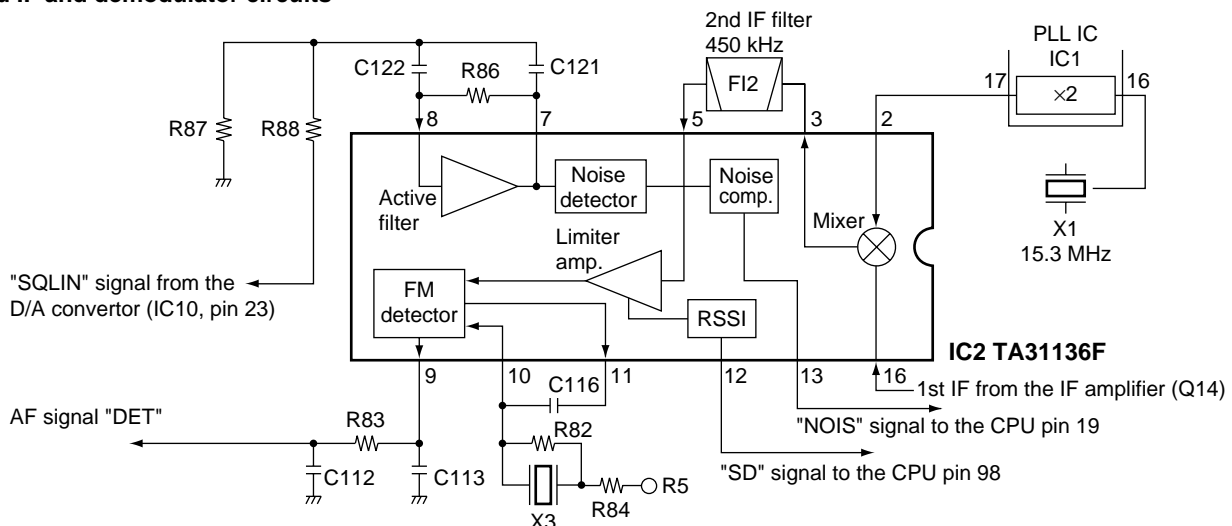
The 2nd mixer circuit converts the 1st IF signal into a 2nd IF signal. A double conversion superheterodyne system (which converts receive signals twice) improves the image rejection ratio and obtains stable receiver gain.

The 1st IF signal from the IF amplifier is applied to the 2nd mixer section of the FM IF IC (IC2, pin 16), and is mixed with the 2nd LO signal to be converted into a 450 kHz 2nd IF signal.

The FM IF IC contains the 2nd mixer, limiter amplifier, quadrature detector and active filter circuits. A 2nd LO signal (30.6 MHz) is produced at the PLL circuit by doubling its reference frequency.

The 2nd IF signal from the 2nd mixer (IC2, pin 3) passes through a ceramic filter (F12) to remove unwanted heterodyned frequencies. It is then amplified at the limiter amplifier (IC2, pin 5) and applied to the quadrature detector (IC2, pins 10, 11) to demodulate the 2nd IF signal into AF signals.

• 2nd IF and demodulator circuits



4-1-5 AF CIRCUIT

AF signals from the FM IF IC (IC2, pin 9) are applied to the mute switch (IC4, pin 1) via the AF filter circuit (IC3b, pins 6, 7). The output signals from pin 11 are applied to the AF power amplifier (IC5, pin 4) after being passed through the [VOL] control (R143).

The applied AF signals are amplified at the AF power amplifier circuit (IC5, pin 4) to obtain the specified audio level. The amplified AF signals, output from pin 10, are applied to the internal speaker (SP1) as the "SP" signal via the [SP] jack when no plug is connected to the jack.

4-1-6 SQUELCH CIRCUIT

A squelch circuit cuts out AF signals when no RF signals are received. By detecting noise components in the AF signals, the squelch switches the AF mute switch.

A portion of the AF signals from the FM IF IC (IC2, pin 9) are applied to the active filter section (IC2, pin 8) where noise components are amplified and detected with an internal noise detector.

The active filter section amplifies noise components. The filtered signals are rectified at the noise detector section and converted into "NOIS" (pulse type) signals at the noise comparator section. The "NOIS" signal is applied to the CPU (IC8, pin 19).

The CPU detects the receiving signal strength from the number of the pulses, and outputs an "RMUT" signal from pin 49. This signal controls the mute switch (IC4) to cut the AF signal line.

4-2 TRANSMITTER CIRCUITS

4-2-1 MICROPHONE AMPLIFIER CIRCUIT

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

The AF signals from the microphone are applied to the microphone amplifier circuit (IC3c, pin 10). The amplified AF signals are passed through the low-pass filter circuit (IC3d, pins 13, 14) via the mute switch (IC4, pins 4, 3). The filtered AF signals are applied to the modulator circuit after being passed through the mute switch (IC4, pins 9, 8).

4-2-2 MODULATION CIRCUIT

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

The audio signals change the reactance of a diode (D6) to modulate an oscillated signal at the VCO circuit (Q7, Q8). The oscillated signal is amplified at the buffer-amplifiers (Q4, Q6), then applied to the T/R switching circuit (D3, D4).

4-2-3 DRIVE/POWER AMPLIFIER CIRCUITS

The signal from the VCO circuit passes through the T/R switching circuit (D3) and is amplified at the buffer (Q3), drive (Q2) and power amplifier (Q1) to obtain 5 W of RF power (at 7.2 V DC). The amplified signal passes through the antenna switching circuit (D1), and low-pass filter and is then applied to the antenna connector.

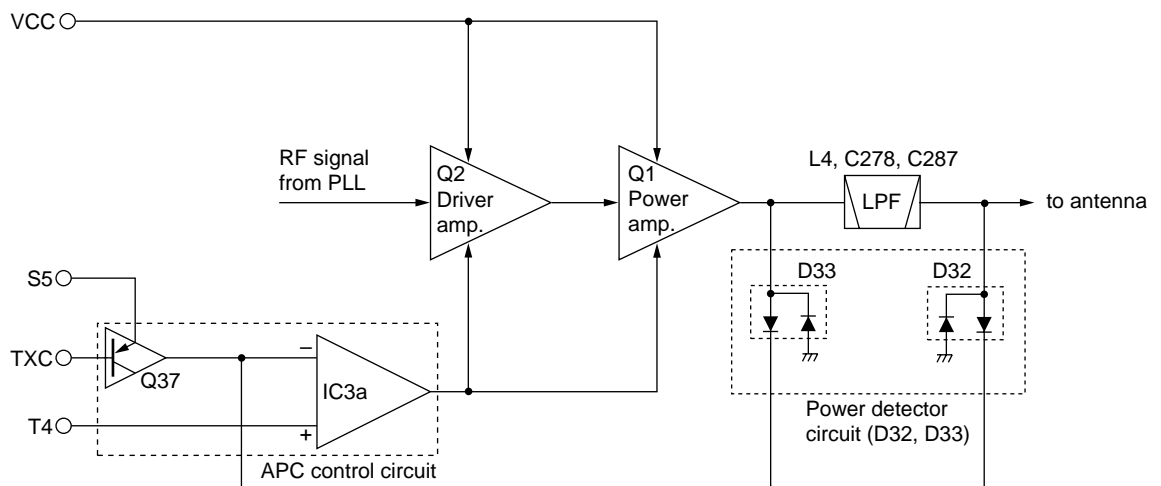
The bias current of the drive (Q2) and the power amplifier (Q1) is controlled by the APC circuit.

4-2-5 APC CIRCUIT

The APC circuit (IC3a, Q37) protects the drive and the power amplifiers from excessive current drive, and selects HIGH or LOW output power.

The signal output from the power detector circuit (D32, D33) is applied to the differential amplifier (IC3a, pin 2), and the "T4" signal from the expander (IC10, pin 11), controlled by the CPU (IC8), is applied to the other input for reference.

• APC circuit



When the driving current is increased, input voltage of the differential amplifier (pin 2) will be increased. In such cases, the differential amplifier output voltage (pin 1) is decreased to reduce the driving current.

4-3 PLL CIRCUIT

A PLL circuit provides stable oscillation of the transmit frequency and receive 1st LO frequency. The PLL output compares the phase of the divided VCO frequency to the reference frequency. The PLL output frequency is controlled by the divided ratio (N-data) of a programmable divider.

The PLL circuit contains the VCO circuit (Q7, Q8). The oscillated signal is amplified at the buffer-amplifiers (Q6, Q5) and then applied to the PLL IC (IC1, pin 2).

The PLL IC contains a prescaler, programmable counter, programmable divider and phase detector, etc. The entered signal is divided at the prescaler and programmable counter section by the N-data ratio from the CPU. The divided signal is detected on phase at the phase detector using the reference frequency.

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

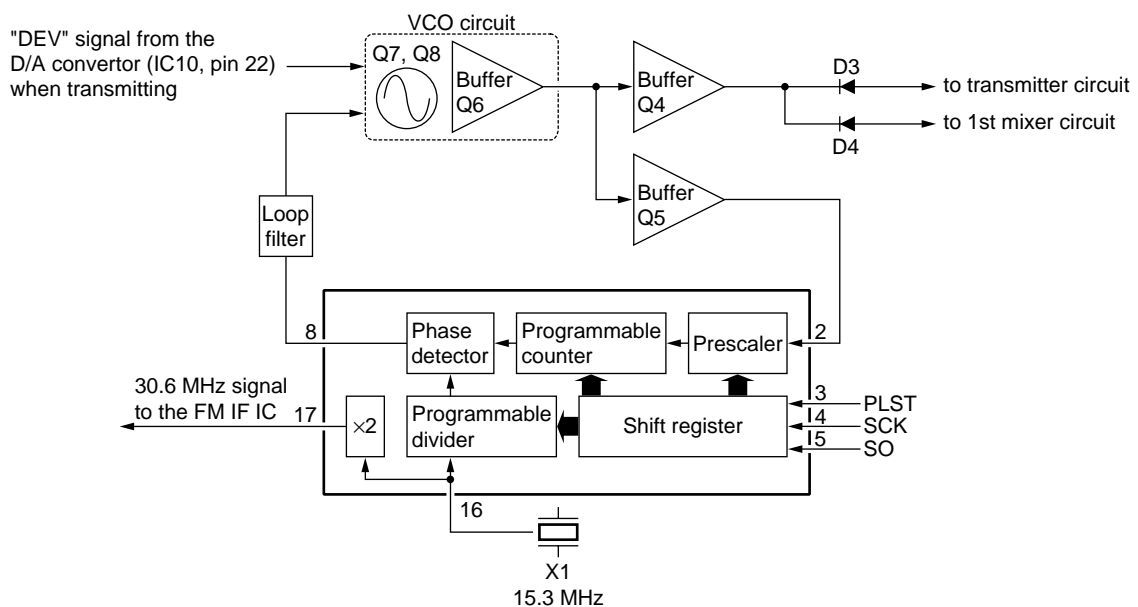
A portion of the VCO signal is amplified at the buffer-amplifier (Q4) and is then applied to the receive 1st mixer (Q13) or transmit buffer-amplifier circuit (Q3) via the T/R switching diode (D3, D4).

4-4 POWER SUPPLY CIRCUITS

VOLTAGE LINE

LINE	DESCRIPTION
HV	The voltage from the attached battery pack.
VCC	The same voltage as the HV line (battery voltage) which is controlled by the power switch ([VOL] control).
5V	Common 5 V converted from the VCC line by the reference regulator circuit (IC6). The output voltage is applied to the CPU (IC8), the 5 V regulator circuit (Q18, Q19) and reset circuit (IC11).
T5	5 V for transmitter circuits regulated by the T5 regulator circuit (Q22).
R5	5 V for receiver circuits regulated by the R5 regulator circuit (Q21).
S5	Common 5 V converted from the VCC line by the S5 regulator circuit (Q18, Q19).
OPT	The same voltage as the 5V line for the optional HM-46L, EM-71 or HS-51 through a resistor (R132).

• PLL circuit



4-5 PORT ALLOCATIONS

4-5-1 CPU (IC8)

Pin number	Port name	Description
1	VIN	Input port for battery voltage detection.
9	RESET	Input port for RESET signal.
11	CSIFT	Outputs reference oscillator for the CPU control signal.
12	SCK	Outputs clock signal to the PLL IC (IC1), EEPROM (IC7), etc.
15	DAST	<ul style="list-style-type: none"> Outputs strobe signals to the expander IC (IC10, pin 6). Input port for the initial version signal.
16	CLIN	Input port for the cloning signal.
17	CLOUT	Outputs the cloning signal.
18	PLST	Outputs strobe signals to the PLL IC (IC1, pin 3).
19	NOIS	Input for noise signals (pulse type).
21	BUSY	Outputs BUSY detection. Low: The channel is busy.
36–38	OPV3–OPV1	Input port for the optional unit detection signal from J5.
44–47	KR3–KR0	Output ports for key matrix. Low: When the key is pushed.
49	RMUT	<ul style="list-style-type: none"> Outputs RX mute control signal. Input port for the RX mute signal from optional units.
50	MMUT	<ul style="list-style-type: none"> Output TX mute control signal. Input port for the TX mute signal from optional units.
51	DUSE	Outputs low-pass filter cut-off frequency control signal when DTCS is activated.
52	S5C	Outputs S5 regulator control signal. Low: While power is ON.
53	R5C	Outputs R5 regulator control signal. Low: While receiving.
54	T5C	Outputs T5 regulator control signal. Low: While transmitting.
55	TXC	Outputs APC circuit control signal. High: While transmitting.
56	AFON	Outputs control signal for the regulator circuit of AF power amplifier. High: When squelch is open, etc.
57	LIGT	Outputs LCD backlight control signal. High: Lights ON.
58	ESCK	Outputs EEPROM (IC7, pin 6) clock signal.
59	ESDA	I/O port for data signals from/to EEPROM (IC7, pin 5)

CPU (IC8)–continued

Pin number	Port name	Description
63	UNLK	Input port for unlock signal. High: PLL is unlocked. Low: PLL is locked.
90	MTONE	Output port for: Beep audio while receiving. 2/5-tone signals while transmitting.
91	DTMF	Outputs DTMF tone signal while transmitting.
94	CTCIN	CTCSS/DTCS signals input port for decoding.
95	PTT0	Input port for the [PTT] switch. High: While [PTT] switch is pushed.
96	BDET	Input port for the battery's type detection.
97	REM0	Input port for the remote-control signal from external MIC (HM-75).
98	SD	Input port for the RSSI detection.
99	LVIN	Input port for the PLL lock voltage.
100	TEMP	Input port for the transceiver's internal temperature detection.

4-5-2 OUTPUT EXPANDER IC (IC10)

Pin number	Port name	Description
2, 3, 10, 11	T1–T4	Output tunable bandpass filter control signals.
6	DAST	Input port for strobe signal from the CPU (IC8, pin 15).
7	SCK	Input port for clock signal from the CPU (IC8, pin 12).

SECTION 5 ADJUSTMENT PROCEDURES

5-1 PREPARATION

When you adjust the contents on page 5-5 or 5-6, SOFTWARE ADJUSTMENT, the optional CS-F3G ADJ ADJUSTMENT SOFTWARE (Rev. 1.0 or later), OPC-478 CLONING CABLE and a JIG CABLE (see illustration at page 5-2) are required.

■ REQUIRED TEST EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
DC power supply	Output voltage : 7.2 V DC Current capacity : 5 A or more	Audio generator	Frequency range : 300–3000 Hz Output level : 1–500 mV
RF power meter (terminated type)	Measuring range : 1–10 W Frequency range : 120–500 MHz Impedance : 50 Ω SWR : Less than 1.2 : 1	Attenuator	Power attenuation : 40 or 50 dB Capacity : 10 W or more
Frequency counter	Frequency range : 0.1–500 MHz Frequency accuracy : ±1 ppm or better Sensitivity : 100 mV or better	Standard signal generator (SSG)	Frequency range : 120–500 MHz Output level : 0.1 μV–32 mV (–127 to –17 dBm)
FM deviation meter	Frequency range : DC–500 MHz Measuring range : 0 to ±5 kHz	DC voltmeter	Input impedance : 50 kΩ/V DC or better
Digital multimeter	Input impedance : 10 MΩ/V DC or better	Oscilloscope	Frequency range : DC–20 MHz Measuring range : 0.01–20 V
		AC millivoltmeter	Measuring range : 10 mV–10 V

■ SYSTEM REQUIREMENTS

- IBM PC compatible computer with an RS -232C serial port (38400 bps or faster).
- Microsoft Windows 95 or Windows 98
- Intel i486DX processor or faster (Pentium 100 MHz or faster recommended)
- At least 16 MB RAM and 10 MB of hard disk space
- 640×480 pixel display (800×600 pixel display recommended)

■ ADJUSTMENT SOFTWARE INSTALLATION

NOTE: Before using the program, make a backup copy of the original disk. After making a backup copy, keep the original disk in a safe place.

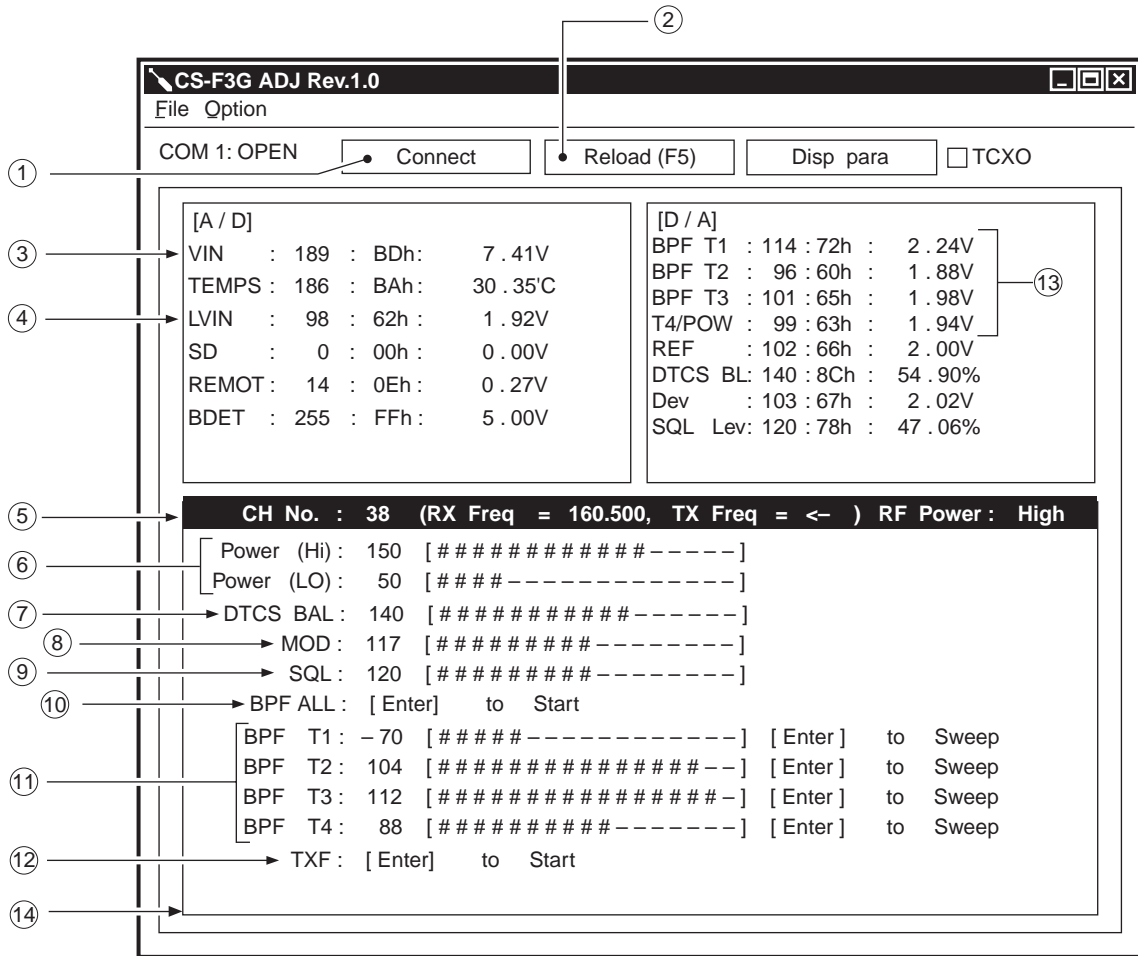
- ① Boot up Windows.
 - Quit all applications when Windows is running.
- ② Insert the backup disk1 into the appropriate floppy drive.
- ③ Select 'Run' from the [Start] menu.
- ④ Type the setup program name using the full path name, then push the [Enter] key. (A:\ setup)
- ⑤ Follow the prompts.
- ⑥ Program group 'CS-F3G ADJ' appears in the 'Programs' folder of the [Start] menu.

■ STARTING SOFTWARE ADJUSTMENT

- ① Connect IC-F3GT/GS and PC with the optional OPC-478 and the JIG cable.
- ② Boot up Windows, and turn the transceiver power ON.
- ③ Click the program group 'CS-F3G ADJ' in the 'Programs' folder of the [Start] menu, then CS-F3G ADJ's window is appeared.
- ④ Click 'Connect' on the CS-F3G's window, then appears IC-F3GT/GS's up-to-date condition.
- ⑤ Set or modify adjustment data as desired.

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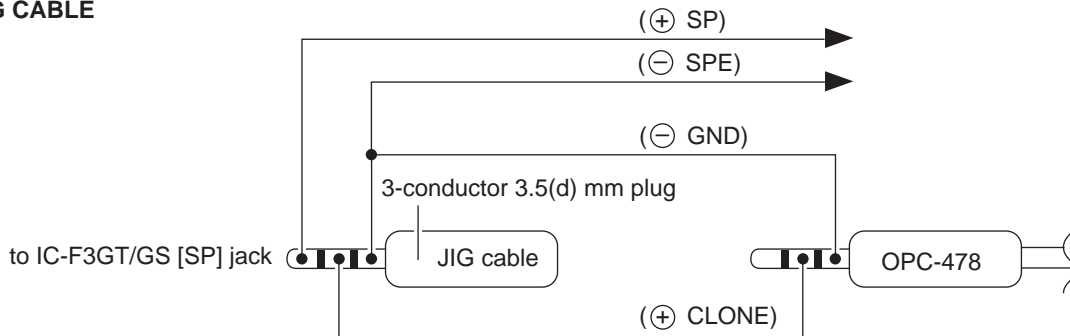
• ADJUSTMENT SOFTWARE'S SCREEN DISPLAY EXAMPLE



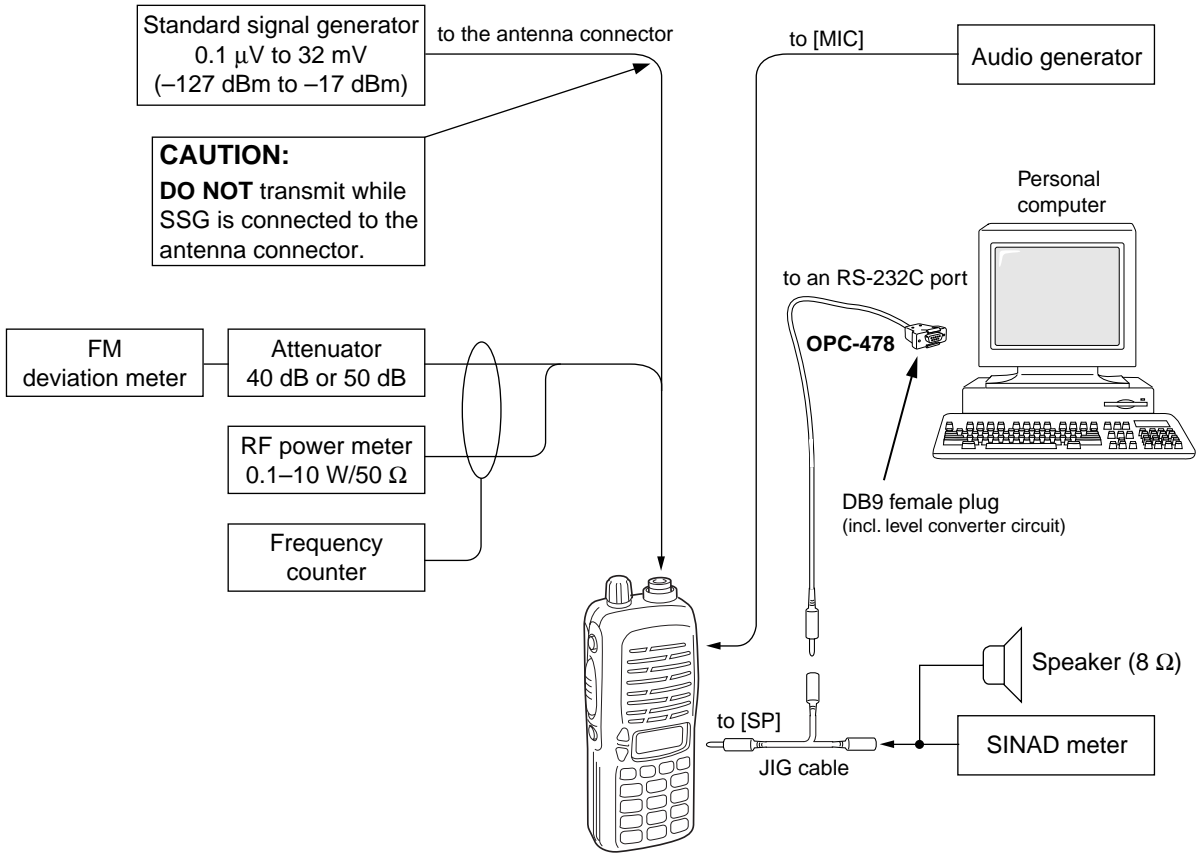
NOTE: The above values for settings are example only.
Each transceiver has its own specific values for each setting.

- ① : Transceiver's connection state
- ② : Reload adjustment data
- ③ : Connected DC voltage
- ④ : PLL lock voltage
- ⑤ : Operating channel select
- ⑥ : RF output power
- ⑦ : DTCS wave form
- ⑧ : FM deviation
- ⑨ : Squelch level
- ⑩ : Receive sensitivity (automatically)
- ⑪ : Receive sensitivity (manually)
- ⑫ : Reference frequency
- ⑬ : Receive sensitivity measurement
- ⑭ : Adjustment items

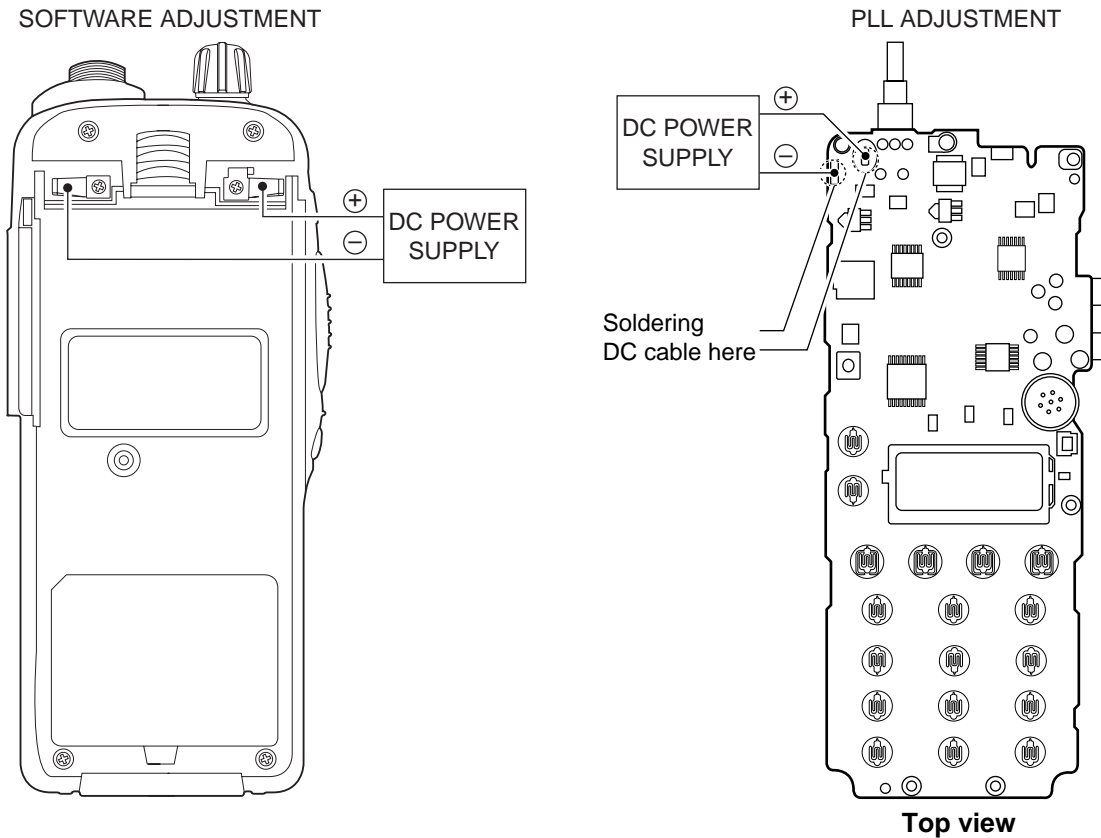
• JIG CABLE



• CONNECTION



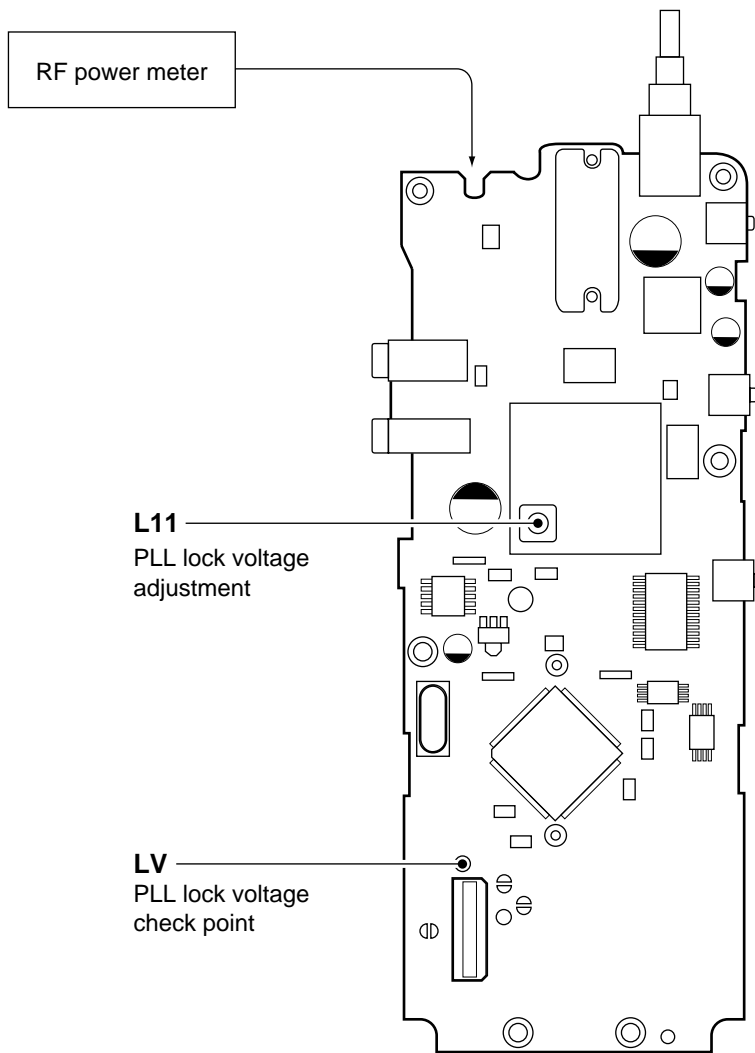
• DC POWER CABLE CONNECTIONS



5-2 PLL ADJUSTMENT

ADJUSTMENT	ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT	
		UNIT	LOCATION		UNIT	ADJUST
PLL LOCK VOLTAGE	1 • Operating frequency: 146.000 MHz • Receiving	MAIN	Connect a digital multi meter to check point LV.	2.0 V	MAIN	L11
	2 • Transmitting			1.5–2.5 V		Verify

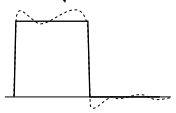
• MAIN unit



Bottom view

5-3 SOFTWARE ADJUSTMENT

Select an operation using [↑] / [↓] keys, then set specified value using [←] / [→] keys on the connected computer keyboard.

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE
		UNIT	LOCATION	
REFERENCE FREQUENCY [TXF]	1 • Operating frequency: 146.000 MHz • High/Low switch : Low • Connect the RF power meter or 50 Ω dummy load to the antenna connector. • Transmitting	Top panel	Loosely couple a frequency counter to the antenna connector.	146.00000 MHz
	2 • Transmitting			146.00146 MHz
OUTPUT POWER [POWER(LO)]	1 • Operating frequency: 146.000 MHz • High/Low switch : Low • Transmitting	Top panel	Connect an RF power meter to the antenna connector.	1.0 W
	[POWER(HI)] 2 • High/Low switch : High • Transmitting			5.0 W
FM DEVIATION [MOD]	1 • Operating frequency: 146.000 MHz • High/Low switch : Low • Connect the audio generator to the [MIC] jack and set as: 1.0 kHz/150 mVrms • Set the FM deviation meter as: HPF : OFF LPF : 20 kHz De-emphasis : OFF Detector : (P-P)/2 • Transmitting	Top panel	Connect an FM deviation meter to the antenna connector through the attenuator.	±4.2 kHz (W-type) ±2.1 kHz (N-type)
DTCS WAVE FORM [DTCS BAL]	1 • Operating frequency: 160.000 MHz • High/Low switch : Low • No audio applied to the [MIC] jack. • DTCS code : 007 • Transmitting	Top panel	Connect an FM deviation meter with an oscilloscope to the antenna connector through an attenuator.	Set to flat wave form 

SOFTWARE ADJUSTMENT – continued

Select an operation using [↑] / [↓] keys, then set specified value using [←] / [→] keys on the connected computer keyboard.

ADJUSTMENT	ADJUSTMENT CONDITION	MEASUREMENT		VALUE	
		UNIT	LOCATION		
RX SENSITIVITY [BPF T1] – [BPF T4]	1	<ul style="list-style-type: none"> Operating frequency: 146.000 MHz Connect a standard signal generator to the antenna connector and set as: <ul style="list-style-type: none"> Frequency : 146.000 MHz Level : 3.2 μV* (-97 dBm) Modulation : 1 kHz Deviation : \pm3.5 kHz (W-type) \pm1.75 kHz (N-type) Receiving 	Top panel	Connect a SINAD meter with an 8 Ω load to the [SP] jack.	Minimum distortion level
	<p>CONVENIENT: The BPF T1–BPF T4 can be adjusted automatically.</p> <p>①-1: Set the cursor to “BPF ALL” on the adjustment program and then push [ENTER] key.</p> <p>①-2: The connected PC tunes BPF T1–BPF T4 to peak levels. or</p> <p>②-1: Set the cursor to one of BPF T1, T2, T3, or T4 as desired.</p> <p>②-2: Push [ENTER] key to start tuning.</p> <p>②-3: Repeat ②-1 and ②-2 to perform additional BPF tuning.</p>				
SQUELCH LEVEL [SQL]	1	<ul style="list-style-type: none"> Operating frequency: 146.000 MHz Connect a standard signal generator to the antenna connector and set as: <ul style="list-style-type: none"> Frequency : 146.000 MHz Level : OFF Modulation : 1 kHz Deviation : \pm3.5 kHz (W-type) \pm1.75 kHz (N-type) Receiving 	Top panel	Connect a SINAD meter with an 8 Ω load to the [SP] jack.	12 dB SINAD
	2	<ul style="list-style-type: none"> Receiving 			At the point where the audio signals just appears.

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

SECTION 6 PARTS LIST

MAIN UNIT

REF NO.	ORDER NO.	DESCRIPTION	
IC1	1130007610	S.IC	μ PD3140GS-E1 (DS8)
IC2	1110003490	S.IC	TA31136FN (D.EL)
IC3	1110003780	S.IC	NJM2902V-TE1
IC4	1130008090	S.IC	BU4066BCFV-E1
IC5	1110001810	S.IC	TA7368F (TP1)
IC6	1180001740	S.IC	TK11250BMCL
IC7	1130009680	S.IC	HN58X2432TI
IC8	1140003750	S.IC	HD6473877H (Z-TAT)
IC10	1190000350	S.IC	M62363FP-650C
IC11	1130009110	S.IC	S-80942ANMP-DD6-T2
IC12	1110003800	S.IC	NJM2904V-TE1
Q1	1560001050	S.FET	2SK2974
Q2	1560001020	S.FET	2SK2973 (MTS101P)
Q3	1530003230	S.TRANSISTOR	2SC5085-Y (TE85R)
Q4	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q5	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q6	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q7	1530003230	S.TRANSISTOR	2SC5085-Y (TE85R)
Q8	1530003230	S.TRANSISTOR	2SC5085-Y (TE85R)
Q10	1530002690	S.TRANSISTOR	2SC4116-GR (TE85R)
Q11	1590001190	S.TRANSISTOR	XP6501-(TX).AB
Q12	1580000730	S.FET	3SK293 (TE85L)
Q13	1580000720	S.FET	3SK239AXRTL
Q14	1530002600	S.TRANSISTOR	2SC4215-O (TE85R)
Q15	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q16	1590001190	S.TRANSISTOR	XP6501-(TX).AB
Q17	1590002530	S.TRANSISTOR	UN911H (TX)
Q18	1520000460	S.TRANSISTOR	2SB1132 T100 R
Q19	1590001190	S.TRANSISTOR	XP6501-(TX).AB
Q20	1590000720	S.TRANSISTOR	DTA144EUA T106
Q21	1510000920	S.TRANSISTOR	2SA1577 T107 Q
Q22	1510000920	S.TRANSISTOR	2SA1577 T107 Q
Q25	1530002690	S.TRANSISTOR	2SC4116-GR (TE85R)
Q31	1590000660	S.TRANSISTOR	DTC144TU T107
Q32	1590000430	S.TRANSISTOR	DTC144EUA T106
Q33	1590000430	S.TRANSISTOR	DTC144EUA T106
Q34	1560000810	S.FET	2SK1069-4-TL
Q35	1530002690	S.TRANSISTOR	2SC4116-GR (TE85R)
Q36	1530002690	S.TRANSISTOR	2SC4116-GR (TE85R)
Q37	1590000720	S.TRANSISTOR	DTA144EUA T106
Q38	1590000430	S.TRANSISTOR	DTC144EUA T106
D1	1790000620	S.DIODE	MA77 (TX)
D2	1790000620	S.DIODE	MA77 (TX)
D3	1790000620	S.DIODE	MA77 (TX)
D4	1790000620	S.DIODE	MA77 (TX)
D5	1750000710	S.VARICAP	HVC350BTRF
D6	1790001260	S.DIODE	MA2S077-(TX)
D7	1720000660	S.VARICAP	1SV288 (TPH2)
D8	1790000620	S.DIODE	MA77 (TX)
D9	1720000370	S.VARICAP	HVU350TRF
D10	1720000370	S.VARICAP	HVU350TRF
D11	1720000370	S.VARICAP	HVU350TRF
D12	1720000370	S.VARICAP	HVU350TRF
D13	1750000710	S.VARICAP	HVC350BTRF
D14	1790000620	S.DIODE	MA77 (TX)
D26	1160000070	S.DIODE	DAN202K T146
D27	1790001670	S.DIODE	RB706F-40T106
D28	1790000620	S.DIODE	MA77 (TX)
D29	1730002260	S.ZENER	MA8030-H (TX)
D32	1790001670	S.DIODE	RB706F-40T106
D33	1790001670	S.DIODE	RB706F-40T106
F11	2010002430	S.XTAL	FL-311 (31.05 MHz) [Narrow]
	2010002440	S.XTAL	FL-312 (31.05 MHz) [Wide]
F12	2020001080	S.CERAMIC	SFPC450G-TC01 [Narrow]
	2020001490	S.CERAMIC	SFPC450E-TC01 [Wide]
X1	6050010880	S.XTAL	CR-664 (15.3 MHz)
X2	6050010870	S.XTAL	CR-663 (9.200 MHz)
X3	6070000210	S.DISCRIMINATOR	CDBCA450CX24

MAIN UNIT

REF NO.	ORDER NO.	DESCRIPTION	
L1	6200008580	S.COIL	0.30-1.4-6TL 32N
L2	6200008500	S.COIL	0.30-1.3-6TL 28N
L4	6200008280	S.COIL	0.30-1.7-7TL 50N
L5	6200008510	S.COIL	0.30-0.9-4TR 10.5N
L6	6200007730	S.COIL	LQN21A 39NJ04
L7	6200009180	S.COIL	ELJRE R10J-F3
L8	6200009180	S.COIL	ELJRE R10J-F3
L9	6200009180	S.COIL	ELJRE R10J-F3
L10	6200009180	S.COIL	ELJRE R10J-F3
L11	6200004850	S.COIL	MC152-E558CN-100024
L12	6200003710	S.COIL	NL 252018T-2R7J
L13	6200001980	S.COIL	NL 252018T-1R0J
L14	6200009150	S.COIL	ELJRE 82NJ-F3
L15	6200008280	S.COIL	0.30-1.7-7TL 50N
L16	6200007750	S.COIL	LQN21A 56NJ04
L17	6200007750	S.COIL	LQN21A 56NJ04
L18	6200007750	S.COIL	LQN21A 56NJ04
L19	6200007750	S.COIL	LQN21A 56NJ04
L20	6200004770	S.COIL	ELJNC R56J-F
	6200005540	S.COIL	ELJNC R47K-F
L21	6200009170	S.COIL	ELJRE 47NJ-F2
L22	6200008280	S.COIL	0.30-1.7-7TL 50N
L24	6200003090	S.COIL	NL 322522T-2R7J-3
L25	6200001980	S.COIL	NL 252018T-1R0J
L26	6200003590	S.COIL	EXCCL3225U1
L28	6200009150	S.COIL	ELJRE 82NJ-F3
L29	6200009180	S.COIL	ELJRE R10J-F3
L31	6200008490	S.COIL	0.30-0.9-3TR 7.5N
L32	6200008330	S.COIL	0.45-1.4-4TL 15N
L33	6200001980	S.COIL	NL 252018T-1R0J
L34	6200004920	S.COIL	MLF1608A 2R2K-T
R1	7030003670	S.RESISTOR	ERJ3GEYJ 823 V (82 k Ω)
R2	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 k Ω)
R3	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 k Ω)
R5	7030003240	S.RESISTOR	ERJ3GEYJ 220 V (22 Ω)
R7	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R9	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 k Ω)
R10	7030003310	S.RESISTOR	ERJ3GEYJ 820 V (82 Ω)
R11	7030003450	S.RESISTOR	ERJ3GEYJ 122 V (1.2 k Ω)
R12	7030003500	S.RESISTOR	ERJ3GEYJ 332 V (3.3 k Ω)
R13	7030003260	S.RESISTOR	ERJ3GEYJ 330 V (33 Ω)
R14	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 k Ω)
R15	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R16	7030004050	S.RESISTOR	ERJ3GEYJ 1R0 V (1 Ω)
R17	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 k Ω)
R18	7030003630	S.RESISTOR	ERJ3GEYJ 393 V (39 k Ω)
R19	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R20	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 k Ω)
R21	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R22	7030003660	S.RESISTOR	ERJ3GEYJ 683 V (68 k Ω)
R23	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R25	7030005040	S.RESISTOR	ERJ2GEJ 472 X (4.7 k Ω)
R26	7030005040	S.RESISTOR	ERJ2GEJ 472 X (4.7 k Ω)
R27	7030003400	S.RESISTOR	ERJ3GEYJ 471 V (470 Ω)
R28	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R29	7030005120	S.RESISTOR	ERJ2GEJ 102 X (1 k Ω)
R30	7030003520	S.RESISTOR	ERJ3GEYJ 472 V (4.7 k Ω)
R31	7030003440	S.RESISTOR	ERJ3GEYJ 102 V (1 k Ω)
R32	7030003410	S.RESISTOR	ERJ3GEYJ 561 V (560 Ω)
R33	7030003480	S.RESISTOR	ERJ3GEYJ 222 V (2.2 k Ω)
R34	7030003200	S.RESISTOR	ERJ3GEYJ 100 V (10 Ω)
R35	7030003420	S.RESISTOR	ERJ3GEYJ 681 V (680 Ω)
R41	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R44	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 k Ω)
	7030003590	S.RESISTOR	ERJ3GEYJ 183 V (18 k Ω)
R45	7030003320	S.RESISTOR	ERJ3GEYJ 101 V (100 Ω)
R48	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 k Ω)
R49	7030003640	S.RESISTOR	ERJ3GEYJ 473 V (47 k Ω)
R50	7030003760	S.RESISTOR	ERJ3GEYJ 474 V (470 k Ω)
R51	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 k Ω)
R52	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 k Ω)
R53	7030003560	S.RESISTOR	ERJ3GEYJ 103 V (10 k Ω)
R54	7030003710	S.RESISTOR	ERJ3GEYJ 184 V (180 k Ω)
R57	7030003680	S.RESISTOR	ERJ3GEYJ 104 V (100 k Ω)

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S.=Surface mount

[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
C156	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C158	4550006200	S.TANTALUM	ECST0JY106R
C159	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C160	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C161	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C162	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C163	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C164	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C165	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C166	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C167	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C168	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C169	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C171	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C173	4510004640	S.ELECTROLYTIC	ECEV1CA470SP
C174	4510005430	S.ELECTROLYTIC	ECEV0JA220SR
C179	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C193	4030006990	S.CERAMIC	C1608 CH 1H 080D-T-A
C194	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C195	4030007100	S.CERAMIC	C1608 CH 1H 560J-T-A
C196	4030006850	S.CERAMIC	C1608 JB 1H 471K-T-A
C197	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C198	4550006170	S.TANTALUM	ECST1AY225R
C199	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C200	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C201	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C202	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C204	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C205	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C209	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C211	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C212	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C213	4550006170	S.TANTALUM	ECST1AY225R
C214	4030008900	S.CERAMIC	C1608 JB 1C 333K-T-A
C215	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C216	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C217	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C218	4030013850	S.CERAMIC	ECUE1E102KBQ
C219	4030009630	S.CERAMIC	C1608 JB 1H 822K-T-A
C221	4030008910	S.CERAMIC	C1608 JB 1C 393K-T-A
C222	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C223	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C224	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C225	4030006880	S.CERAMIC	C1608 JB 1H 472K-T-A
	4030009880	S.CERAMIC	C1608 JB 1H 682K-T-A
C227	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C228	4030009490	S.CERAMIC	C1608 JB 1H 821K-T-A
C229	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C230	4030008880	S.CERAMIC	C1608 JB 1C 223K-T-A
C231	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C232	4030008630	S.CERAMIC	C1608 JF 1C 104Z-T-A
C233	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C234	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C235	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C236	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C243	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C244	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C245	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C248	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C249	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C250	4030006900	S.CERAMIC	C1608 JB 1E 103K-T-A
C251	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C252	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C277	4030009520	S.CERAMIC	C1608 CH 1H 020B-T-A
	4030009540	S.CERAMIC	C1608 CH 1H 1R5B-T-A
C278	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C280	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C281	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C282	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C283	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C285	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C286	4030006870	S.CERAMIC	C1608 JB 1H 222K-T-A
C287	4030009990	S.CERAMIC	C1608 CH 1H 200J-T-A
C288	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C289	4030007090	S.CERAMIC	C1608 CH 1H 470J-T-A
C290	4030007030	S.CERAMIC	C1608 CH 1H 150J-T-A
C293	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C294	4550006110	S.TANTALUM	TEMSVB2 0J 336M8L
C295	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C296	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C297	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C298	4550006540	S.TANTALUM	ECST1CY475R

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[MAIN UNIT]

REF NO.	ORDER NO.	DESCRIPTION	
C299	4030011340	S.CERAMIC	C1608 CH 1H 471J-T-A
C300	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C301	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C302	4030011600	S.CERAMIC	C1608 JB 1C 104KT-N
C303	4030006860	S.CERAMIC	C1608 JB 1H 102K-T-A
C304	4030008920	S.CERAMIC	C1608 JB 1C 473K-T-A
J2	6450001680	CONNECTOR	HSJ1122-010010
J3	6450001690	CONNECTOR	HSJ1456-01-220
J5	6510018430	S.CONNECTOR	AXN330C038P
J6	6510021900	S.CONNECTOR	BM02B-ASRS-TF
DS1	5030001800	LCD	LM-7045B
DS2	5010000160	S.LED	LNJ310M6URA
DS3	5010000160	S.LED	LNJ310M6URA
MC1	7700002160	MICROPHON	KUC3523-040245
S1	2230000900	S.SWITCH	JPM1990-2013R
S2	2230000900	S.SWITCH	JPM1990-2013R
S3	2230000900	S.SWITCH	JPM1990-2013R
SP1	2510001060	SPEAKER	K036NA500-47
W5	8900009640	CABLE	OPC-963
W7	7030003860	S.JUMPER	ERJ3GE JPW V
W8	7030003860	S.JUMPER	ERJ3GE JPW V
EP1	0910051872	PCB	B 5386B
EP2	8930051310	LCD CONTACT	SRCN-2251-SP-N-W

S.=Surface mount

SECTION 7 MECHANICAL PARTS AND DISASSEMBLY

[CHASSIS PARTS]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
MP1	8210016750	2251-T front panel [F3GT]	1
	8210016740	2251-S front panel [F3GS]	1
MP2	8930050890	2251 terminal holder	1
MP3	8010017990	2251 chassis	1
MP4	8210016570	2251 rear panel	1
MP5	8930050870	2251 release button	1
MP7	8310047580	2251 window plate	1
MP8	8930051350	2251 jack rubber	1
MP9	8210016550	2251 jack panel	1
MP10	8610010780	Knob N-276	1
MP12	8930050820	2251 main seal	1
MP13	8930050790	2251 10key [F3GT]	1
	8930050590	2251 6key [F3GS]	1
MP14	8930050840	2251 minus terminal	1
MP15	8930050850	2251 plus terminal	1
MP18	8930050880	2251 spring holder	1
MP20	8930042350	1922 mic sheet	1
MP21	8930051300	2251 mic sponge	1
MP22	8930051290	2251 opt sheet	1
MP23	8830001340	1903 hex nut	1
MP24	8930050900	2251 window sheet	1
MP25	8930036751	Spring	1
MP26	8950005260	Ant connector-102	1
MP27	8830001250	Ant connector-101	1
MP31	8810009510	Screw BT M2 x 4 NI-ZU	8
MP32	8810009560	Screw BT M2 x 6 ZK	7
MP33	8810000100	Screw M2 x 4 ZK	4
MP36	8930051330	2251 contact rubber	1
MP37	8930050800	2251 jack cap	1
MP38	8950005240	2251 contact spring	1
MP39	8860001210	2251 ANT rug	1
MP40	8930051750	Sponge	1
MP41	8510012900	2251 shield plate	1

Screw abbreviations

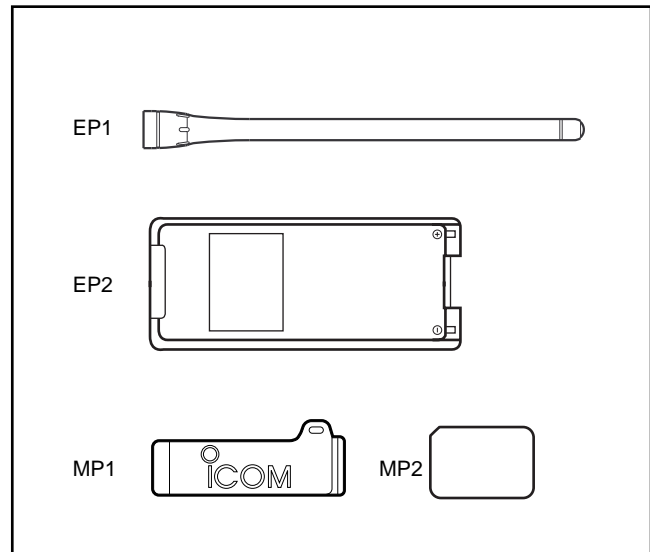
- A, B0, BT: Self-tapping
- PH: Pan head
- FH: Flat head
- BiH: Bind head
- SUS: Stainless
- NI: Nickel
- ZK: Black

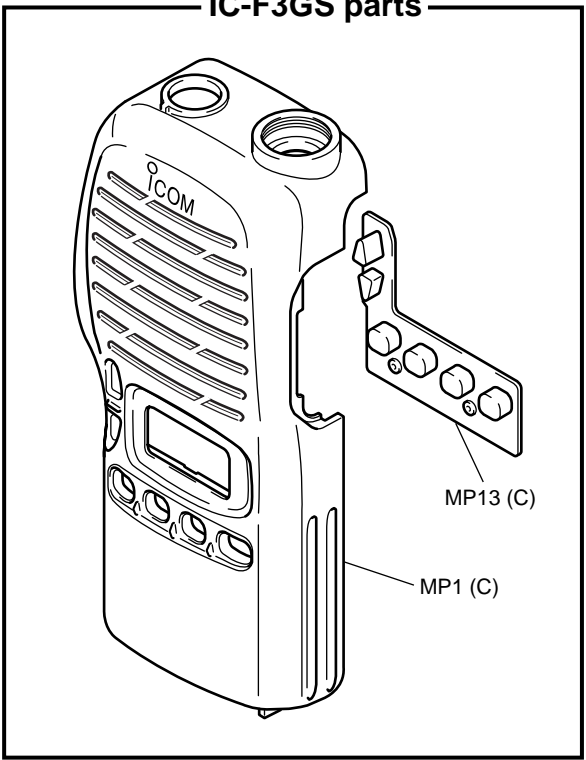
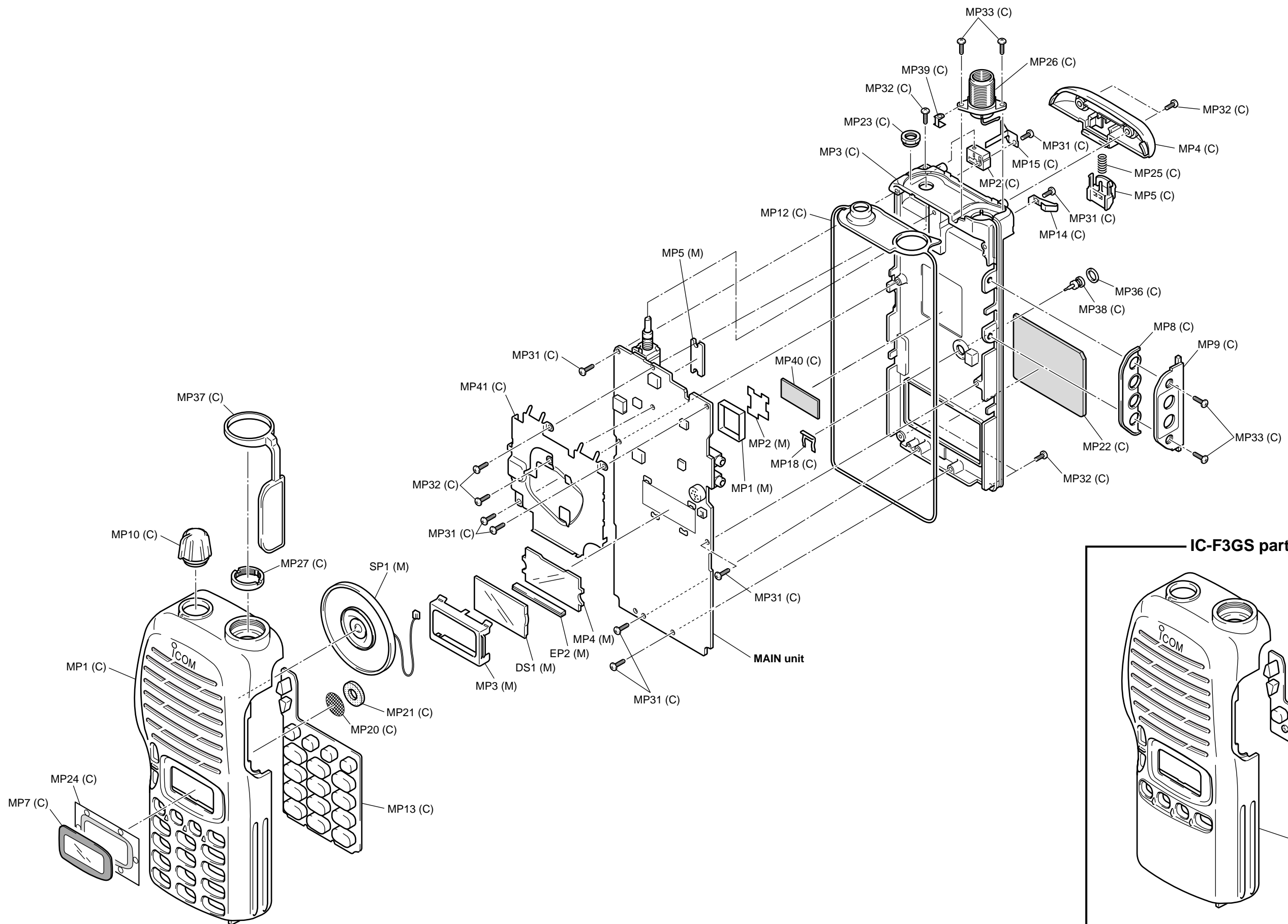
[MAIN UNIT]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
SP1	2510001060	Speaker K036NA500-47	1
EP2	8930051310	LCD contact SRCN-2251-SP-N-W	1
MP1	8510011111	1922 VCO case-1	1
MP2	8510011101	1922 VCO cover-1	1
MP3	8930050810	2251 LCD holder	1
MP4	8210016580	2251 reflector	1
MP5	8410002230	2078 PA heatsink	1

[ACCESSORIES]

REF. NO.	ORDER NO.	DESCRIPTION	QTY.
EP1	3310002330	Antenna FA-SC25V	1
	3310002320	Antenna FA-SC55V	1
EP2	0800005400	Battery BC-209	1
MP1	8930042040	1922 Belt clip	1
MP2	8930051290	2251 OPT sheet	1

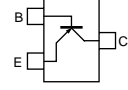
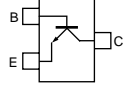
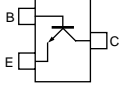
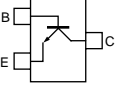
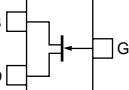
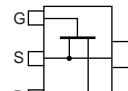
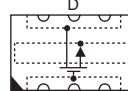
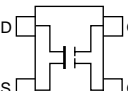
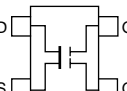
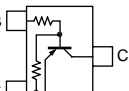
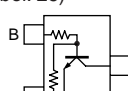
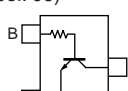
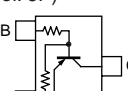
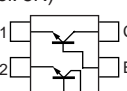




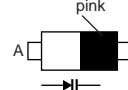
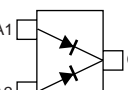
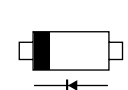
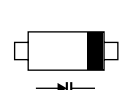
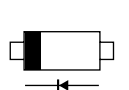
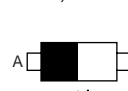
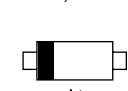
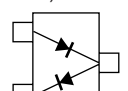
UNIT abbreviation (C): CHASSIS PARTS, (M): MAIN UNIT

SECTION 8 SEMI-CONDUCTOR INFORMATION

• TRANSISTOR AND FET'S

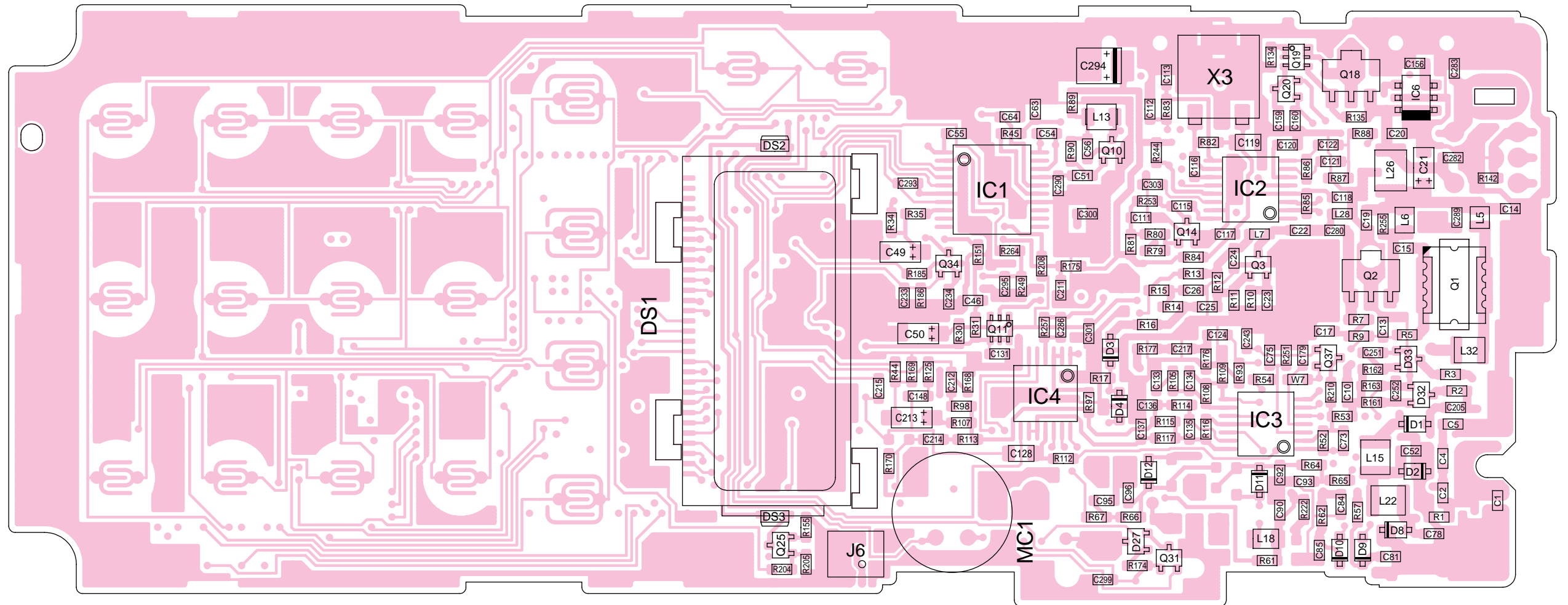
2SA1577 Q (Symbol: HQ) 	2SC4116 GR (Symbol: LG) 	2SC4215 O (Symbol: QO) 	2SC5085 Y (Symbol: MCY) 	2SK1069 4 (Symbol: FJ4) 
2SK2973 (Symbol: K1) 	2SK2974 (Symbol: K2974)  (top view)	3SK239 A (Symbol: XR) 	3SK293 (Symbol: UF) 	DTA144 EU (Symbol: 16) 
DTC144 EU (Symbol: 26) 	DTC144 TU (Symbol: 06) 	UN911 H (Symbol: 6P) 	XP6501 AB (Symbol: 5N) 	

• DIODES

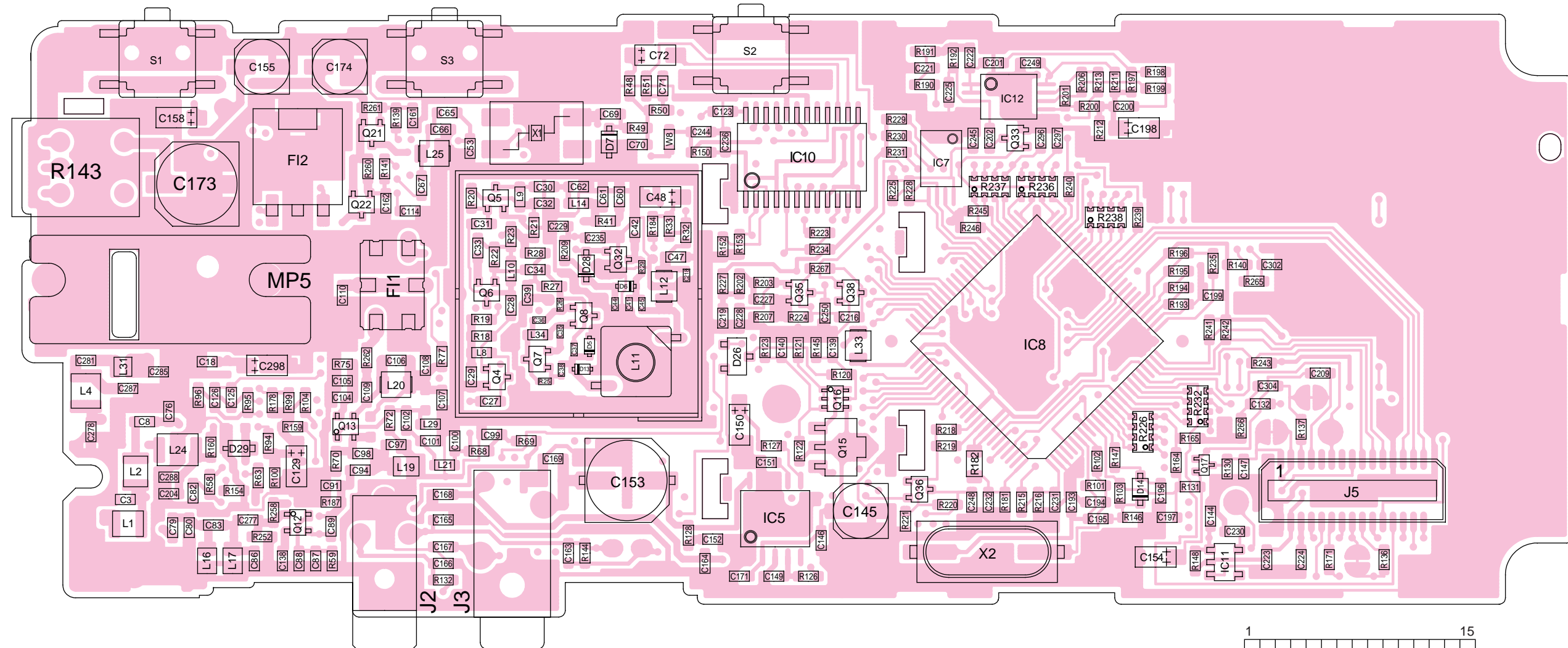
1SV288 (Symbol: TJ) 	DAN202K (Symbol: N) 	HVC350B (Symbol: BO) 	HVU350 (Symbol: 4) 	MA2S077 (Symbol: S) 
MA77 (Symbol: 4B) 	MA8030 H (Symbol: 3^0) 	RB706F-40 (Symbol: 3J) 		

SECTION 9 BOARD LAYOUTS

MAIN UNIT
• TOP VIEW



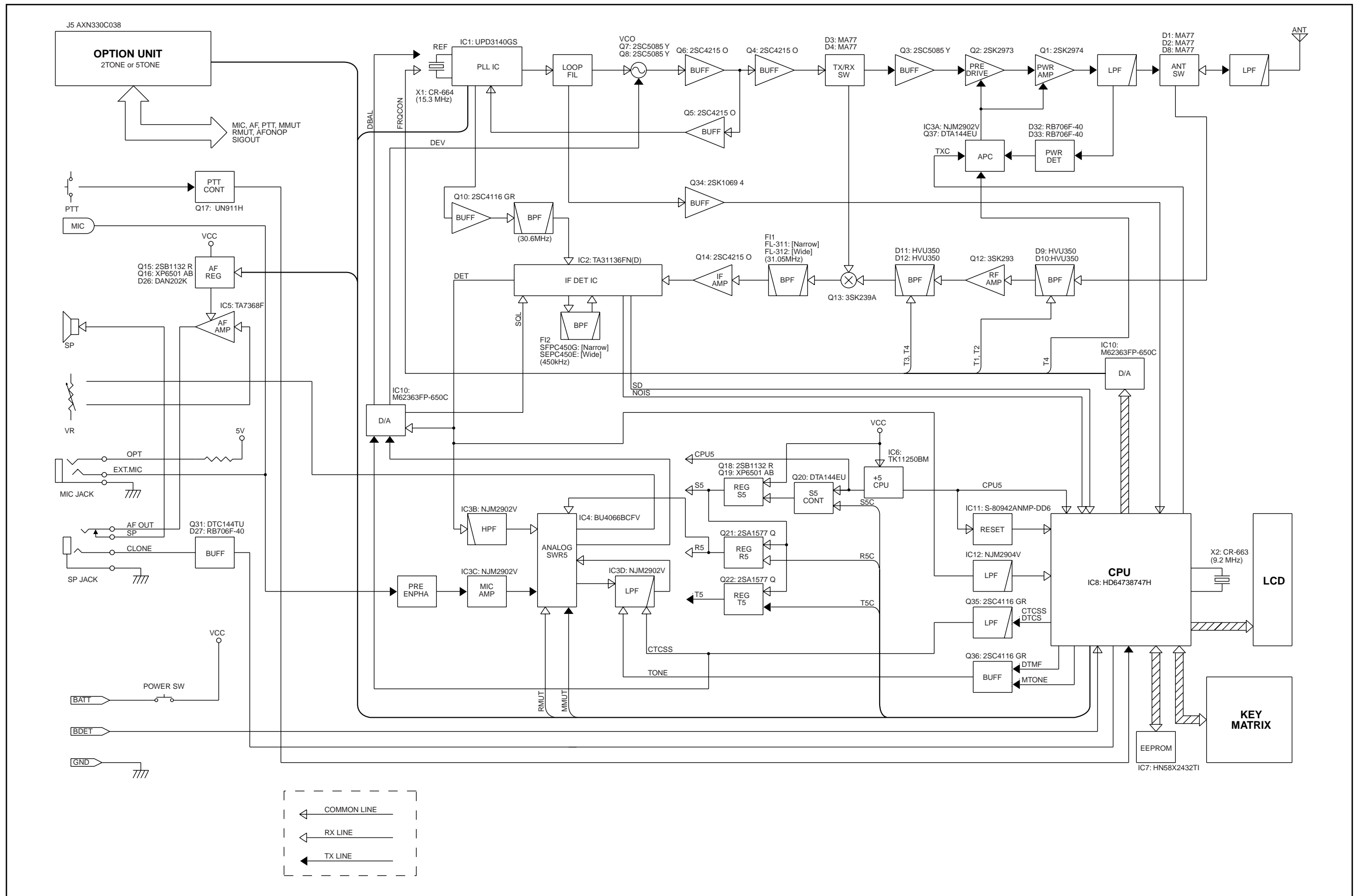
• BOTTOM VIEW



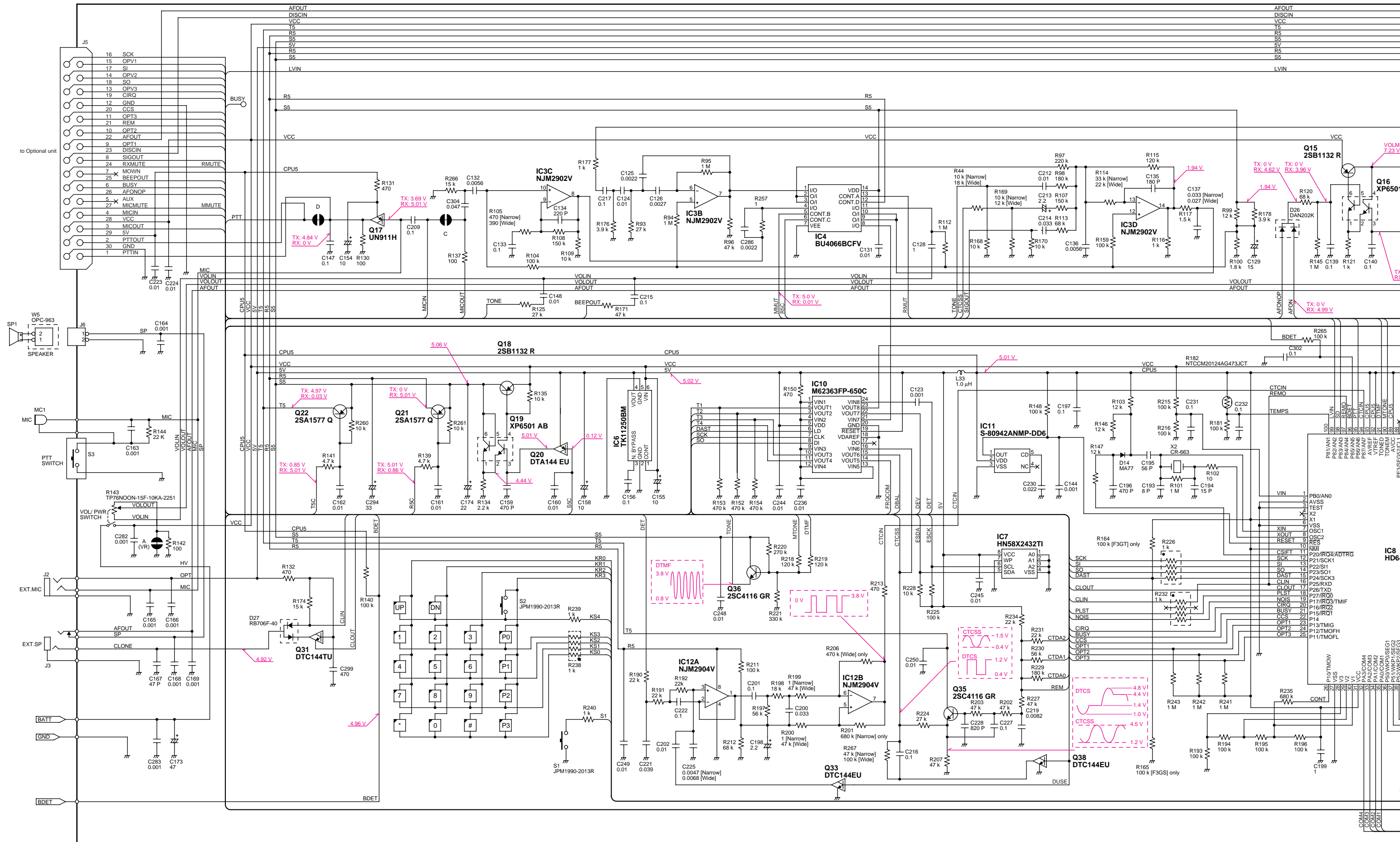
1	PTTIN	15
	PTTOUT	
	MICOUT	
	MICIN	
	AUX	
	BUSY	
	MOWN	
	AFOUT	
	DISCIN	
	SIGOUT	
	RXMUTE	
	OPT1	
	BEEPOUT	
	OPT2	
	AFONOP	
	OPT3	
	MICMUTE	
	GND	
	VCC	
	5V	
	OPV3	
	OPV2	
	OPV1	
16		30

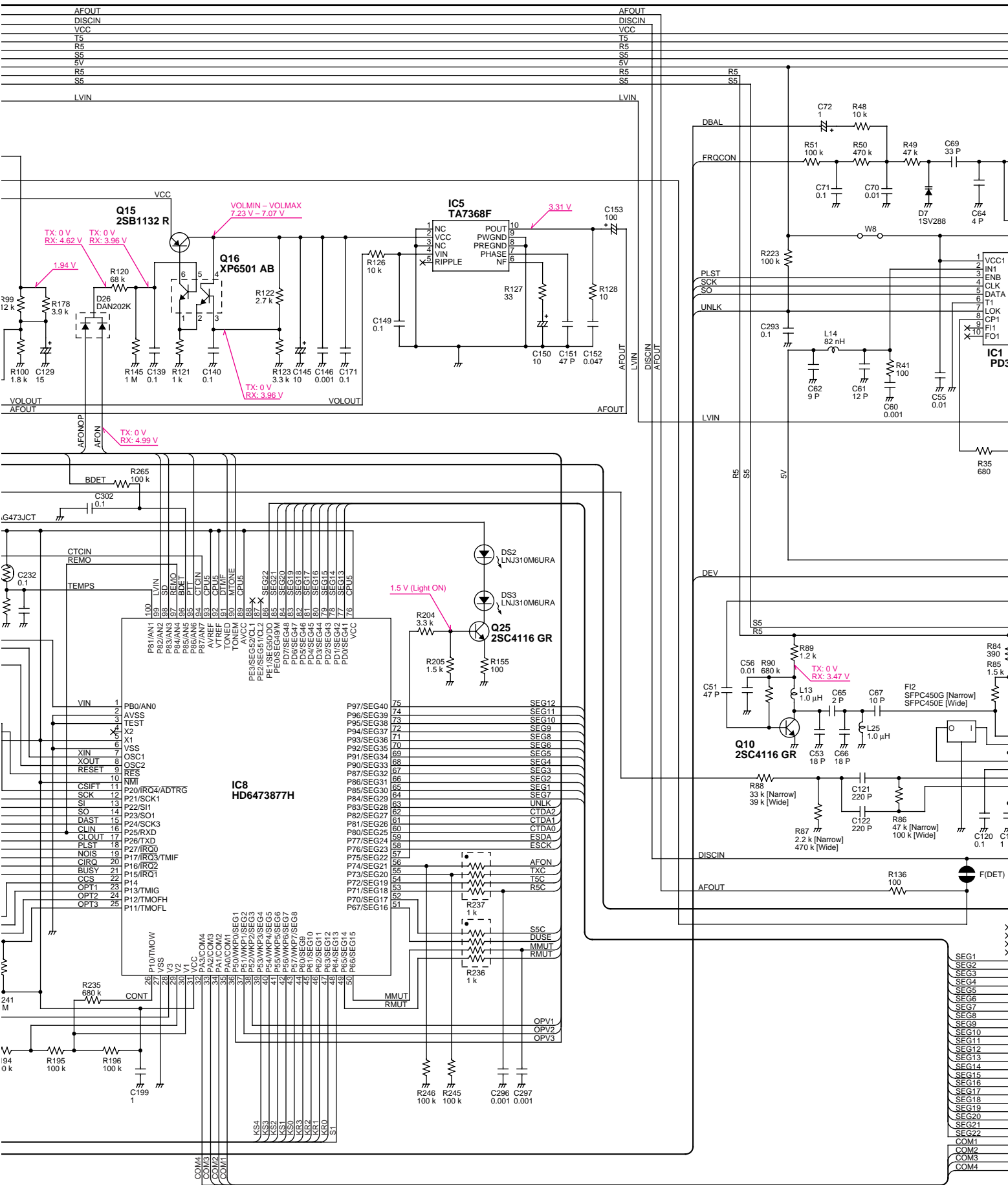
J5
to the OPTIONAL unit

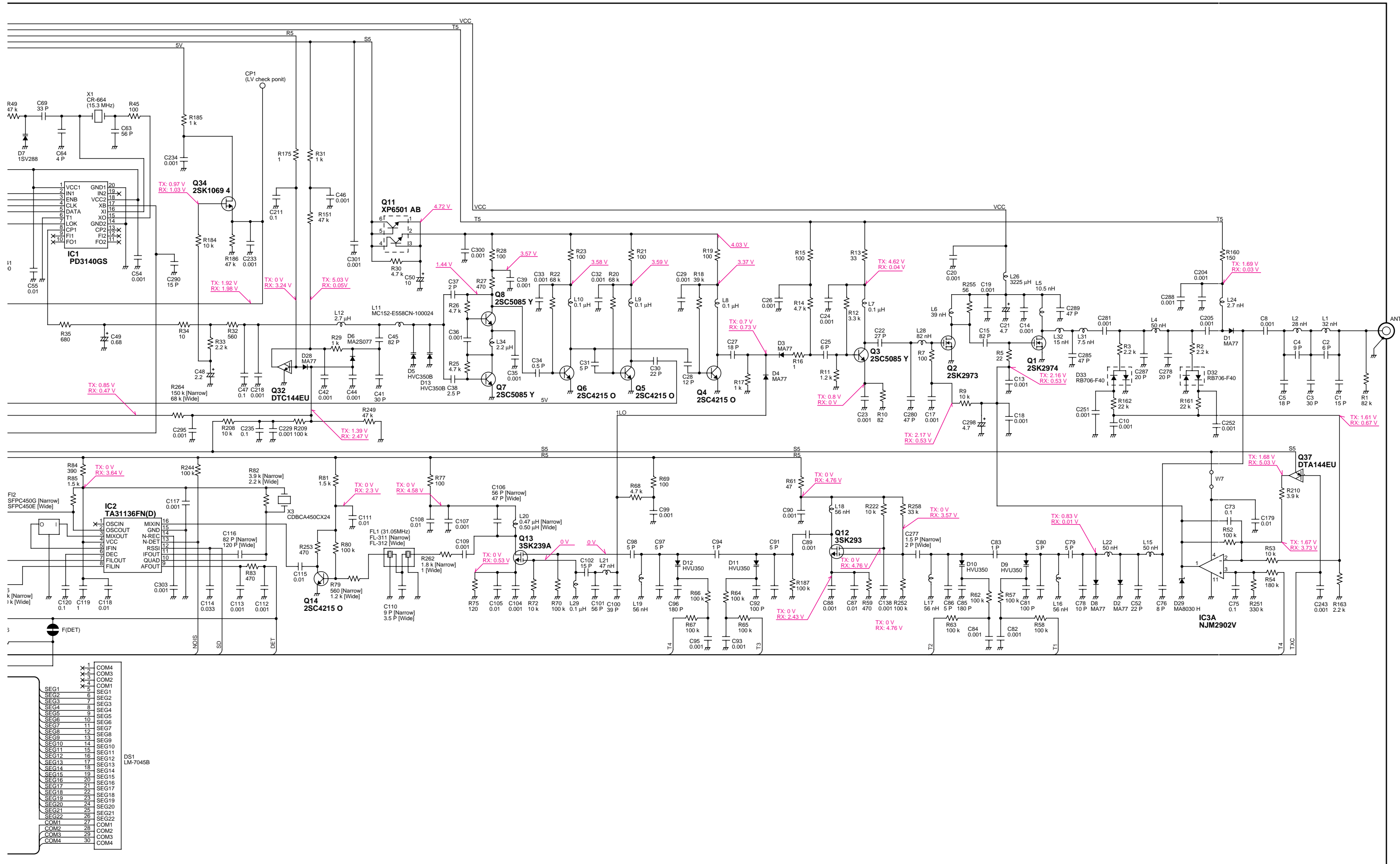
SECTION 10 BILOCK DIAGRAM



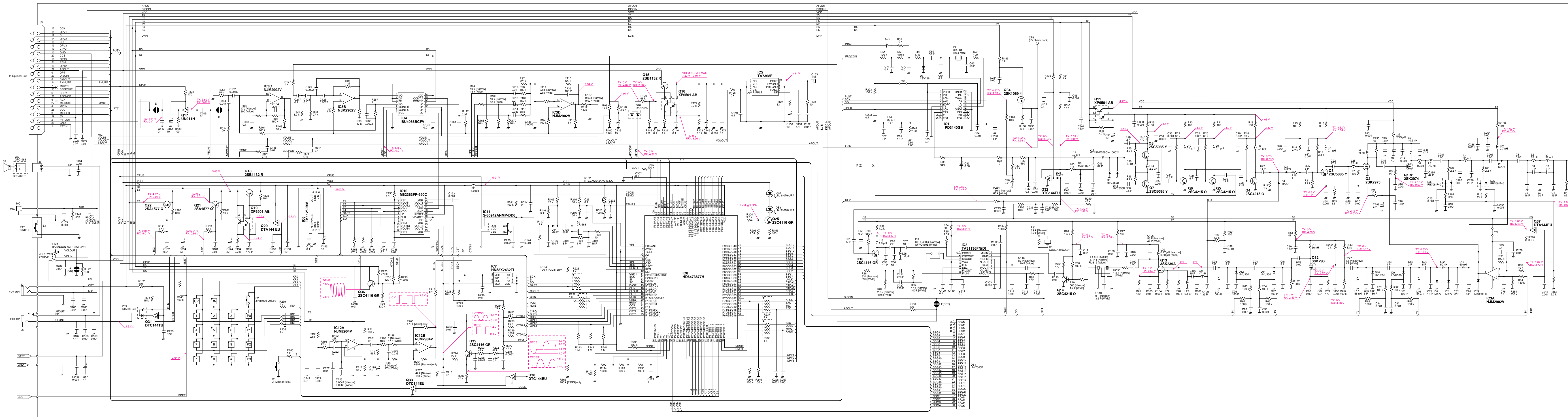
SECTION 11 VOLTAGE DIAGRAM







SECTION 11 VOLTAGE DIAGRAM



LEFT SIDE

CENTER

RIGHT SIDE

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Fax : 06 6793 0013

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<Corporate Headquarters>
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