



SERVICE MANUAL

UHF TRANSCEIVERS

IC-F4101D

IC-F4102D

IC-F4103D

IC-F4106D

S-14801XZ-C1
Apr. 2011

Icom Inc.

INTRODUCTION

This service manual describes the latest technical information for the **IC-F4101D**, **IC-F4102D**, **IC-F4103D** and **IC-F4106D** UHF TRANSCEIVERS, at the time of publication.

MODEL	VERSION	FREQUENCY RANGE (MHz)	CHANNEL SPACING (kHz)
IC-F4101D	USA-01	400–470	6.25/12.5
IC-F4102D	EUR-01		6.25/12.5/20.0/25.0
	UK-01		6.25/12.5/25.0
IC-F4103D	EXP-01		
	EXP-02		
	EXP-03		
	EXP-07		
EXP-08	350–400		
IC-F4106D	AUS-01	400–470	
	RUS-01		

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

CAUTION

NEVER connect the transceiver to an AC outlet or to a DC power supply that uses more than the specified voltage. 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 Icom part number
2. Component name
3. Equipment model name and unit name
4. Quantity required

<ORDER EXAMPLE>

1110003491 S.IC TA31136FNG IC-F4101D MAIN UNIT 5 pieces
8820001210 Screw 2438 screw IC-F4101D Top cover 10 pieces

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



REPAIR NOTES

1. Make sure that the 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 Standard Signal Generator or a Sweep Generator.
7. **ALWAYS** connect a 30 dB to 40 dB attenuator between the transceiver and a Deviation Meter or Spectrum Analyzer, when using such test equipment.
8. **READ** the instructions of the test equipment thoroughly before connecting it to the transceiver.

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■ GENERAL

• Frequency range	: 400–470 MHz [USA-01], [EUR-01], [UK-01], [EXP-01], [EXP-02], [EXP-03], [AUS-01], [RUS-01] 350–400 MHz [EXP-07], [EXP-08]	
• Number of conventional channels	: 16	
• Type of emission	: Wide 16K0F3E (30.0 kHz) Middle 16K0F3E (25.0 kHz) Narrow 14K0F3E (20.0 kHz) 11K0F3E (15.0 kHz) 8K50F3E (12.5 kHz) Digital 4K00F1E, D (6.25 kHz)	Except [USA], [EUR], [UK] Except [USA] [EUR], [UK] only Except [EUR], [UK]
• Antenna impedance	: 50 Ω (nominal)	
• Operating temperature range	: –30°C to +60°C; –22°F to +140°F –25°C to +55°C	Except [EUR], [UK] [EUR], [UK]
• Power supply voltage	: Specified Icom's battery packs only (7.5 V DC; negative ground)	
• Current drain (approximately)	: Receiving 100 mA (in digital mode, stand-by) 400 mA (max. audio, with the internal speaker) Transmitting 1.3 A (4 W)	
• Dimensions (projections not included)	: 58.0 (W)×111.0 (H)×36.5 (D) mm; 2.3 (W)×4.4 (H)×1.4 (D) in. (with BP-265)	
• Weight (approximately)	: 150 g; 5.3 oz. 310 g; 10.9 oz. (including MB-124, BP-265, FA-SC57U)	

■ TRANSMITTER

• Output power	: 4 W	
• Modulation	: Variable reactance frequency modulation	
• Maximum frequency deviation	: Narrow ±2.5 kHz Middle ±4.0 kHz Wide ±5.0 kHz	[EUR], [UK] only Except [USA]
• Frequency stability	: ±1.0 ppm	
• Spurious emissions	: 70 dB min. 0.25 μW (≤ 1 GHz) 1.00 μW (> 1 GHz)	Except [EUR], [UK] [EUR], [UK] [EUR], [UK]
• Adjacent channel power	: Narrow 60 dB min., 70 dB typ. Middle 70 dB min., Wide 70 dB min., 74 dB typ. Digital 60 dB min., 66 dB typ.	[EUR], [UK] only Except [USA]
• Audio harmonic distortion	: 1.0% typ. (at AF 1 kHz, 40% deviation)	
• FSK error	: 5% max.	
• FM hum and Noise (Except [EUR], [UK]) (without CCITT Filter)	: Narrow 34 dB min., 44 dB typ. Wide 40 dB min., 50 dB typ.	Except [USA]
• Residual modulation ([EUR], [UK] only) (with CCITT Filter)	: Narrow 40 dB min. Middle 43 dB min. Wide 45 dB min.	
• Limiting charact of modulator	: 60–100% of max. deviation	
• Input impedance (MIC)	: 2.2 kΩ	

RECEIVER

• Sensitivity	: 0.24 μ V typ. at 12 dB SINAD –4 dB μ V (EMF) typ. at 20 dB SINAD –8 dB μ V (EMF) typ. at 5% BER	Except [EUR], [UK] [EUR], [UK] [Digital mode]
• Squelch sensitivity (at threshold)	: 0.20 μ V typ. –8 dB μ V (EMF) typ.	Except [EUR], [UK] [EUR], [UK]
• Intermediate frequency	: 1st IF; 46.35 MHz, 2nd IF; 450 kHz	
• Adjacent channel selectivity	: Narrow 60 dB min., 67 dB typ. Middle 70 dB min. Wide 70 dB min., 74 dB typ. Digital 50 dB min., 58 dB typ.	[EUR], [UK] only Except [USA]
• Spurious response	: 70 dB min., 80 dB typ.	
• Intermodulation	: Narrow 70 dB min., 75 dB typ. Wide 70 dB min., 75 dB typ. Digital 65 dB min., 70 dB typ. 65 dB min.	Except [EUR], [UK] Except [EUR], [UK], [USA] Except [EUR], [UK] [EUR], [UK]
• FM hum and Noise (Except [EUR], [UK]) (without CCITT Filter)	: Narrow 34 dB min., 42 dB typ. Wide 40 dB min., 47 dB typ.	Except [USA]
• FM hum and Noise ([EUR], [UK]) (with CCITT Filter)	: Narrow 40 dB min. Middle 43 dB min. Wide 45 dB min.	
• Audio output power	: 0.8 W typ. at 5% distortion with a 12 Ω load (internal speaker) 0.4 W typ. at 5% distortion With an 8 Ω (external speaker)	
• Audio output impedance	: 8 Ω	

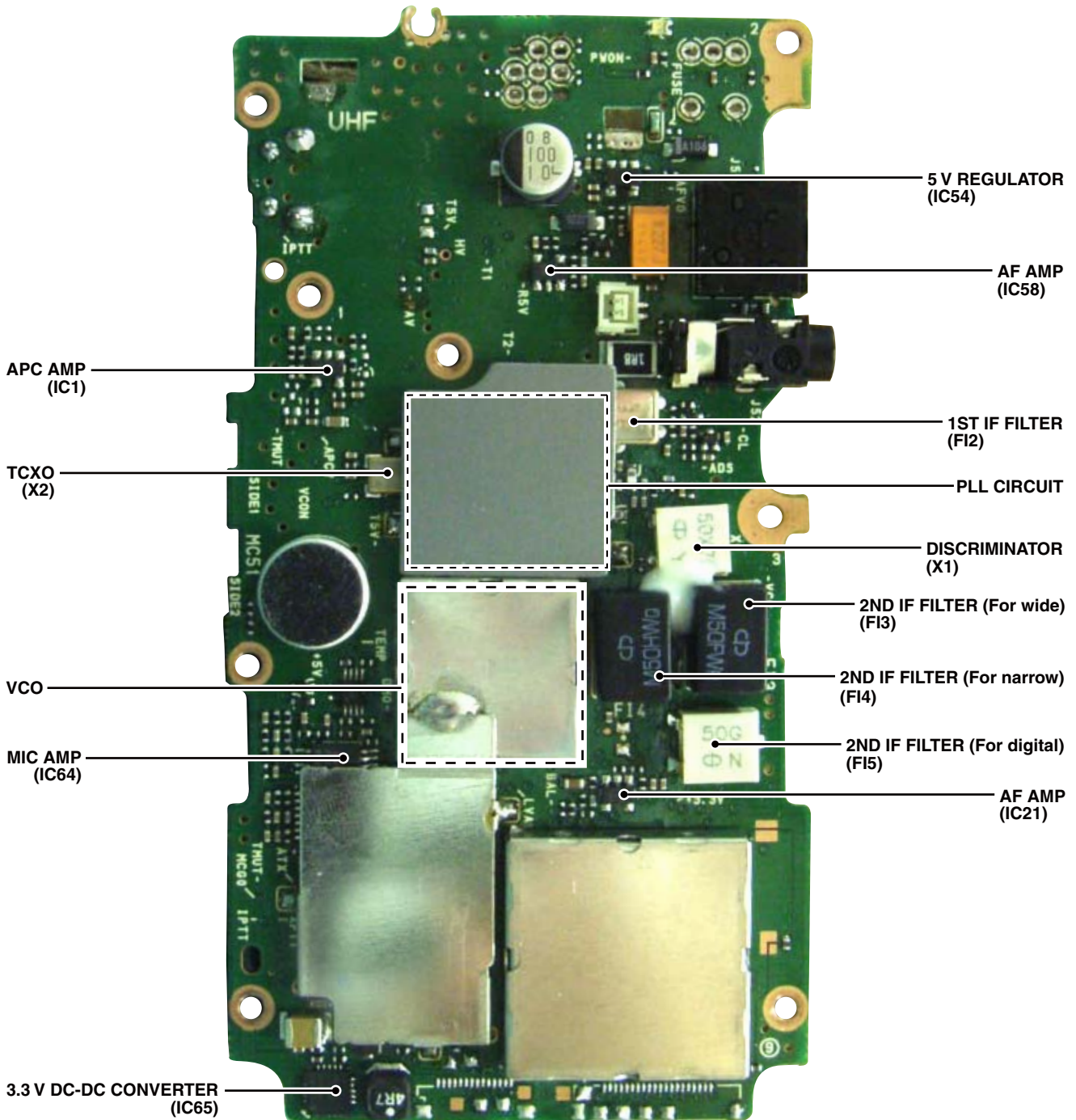
Measurements made in accordance with TIA-603, EN 300 086 or EN 301 166.

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

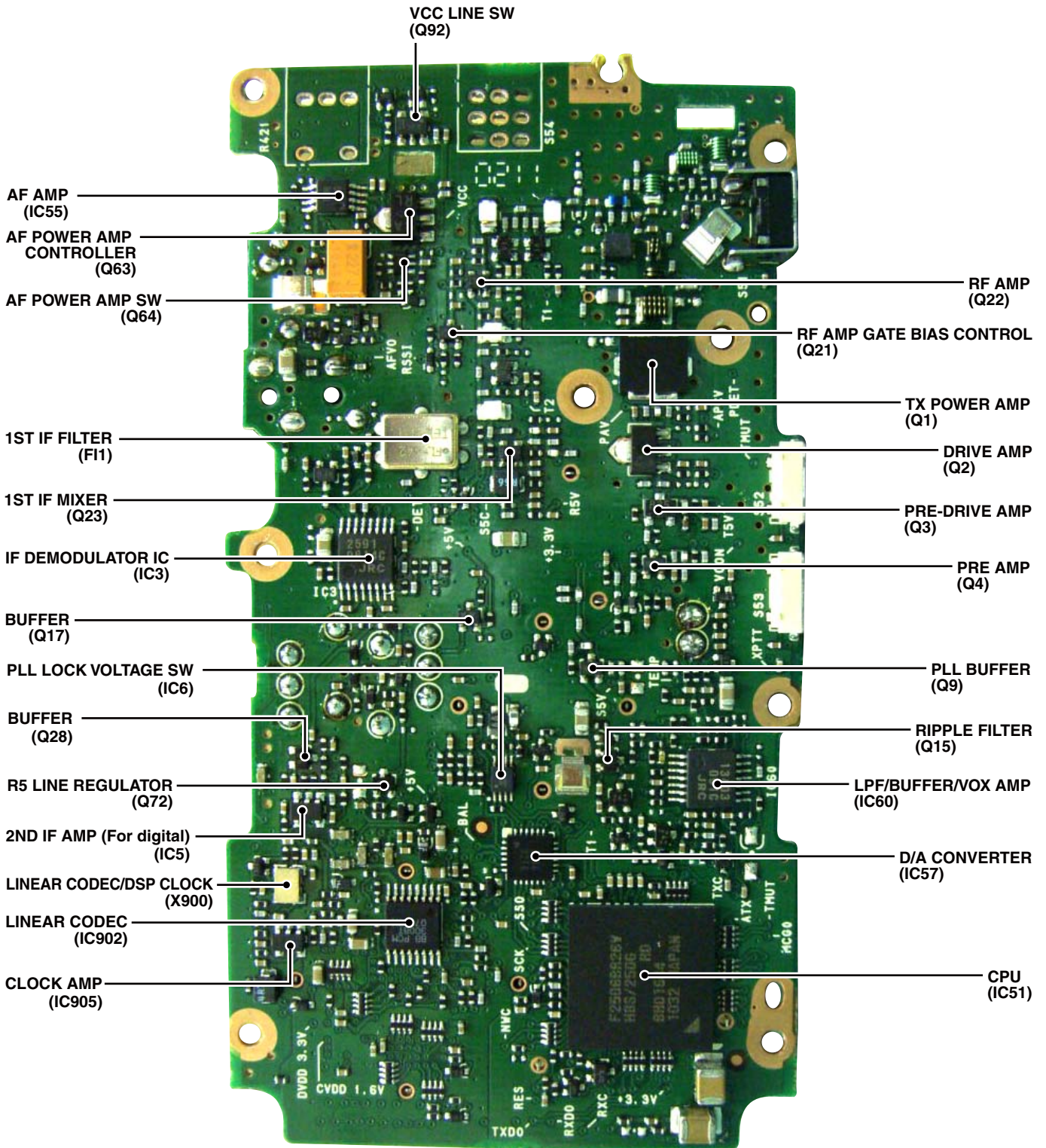
SECTION 2

INSIDE VIEWS

• MAIN-A/MAIN-C UNIT (TOP VIEW)



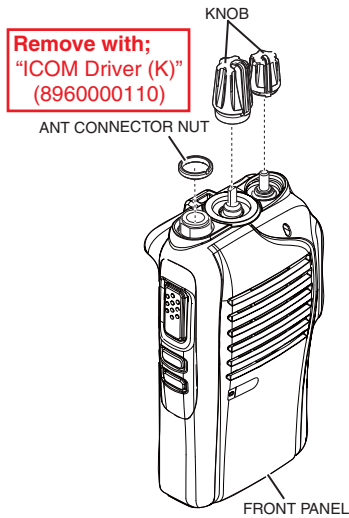
• MAIN-A/MAIN-C UNIT
(BOTTOM VIEW)



SECTION 3 DISASSEMBLY INSTRUCTION

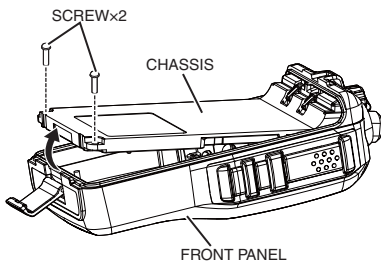
1. REMOVING THE CHASSIS

1) Remove the ANT connector nut and 2 knobs.



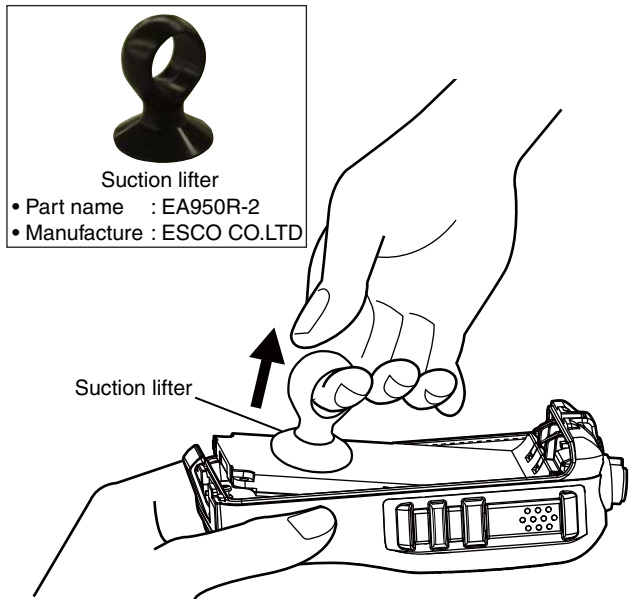
2) Remove 2 screws from the bottom of the CHASSIS.
3) Lift the bottom of the CHASSIS up in the direction of the arrow.

BE CAREFUL to not pull out the **speaker wire** when separating the CHASSIS and the FRONT PANEL.

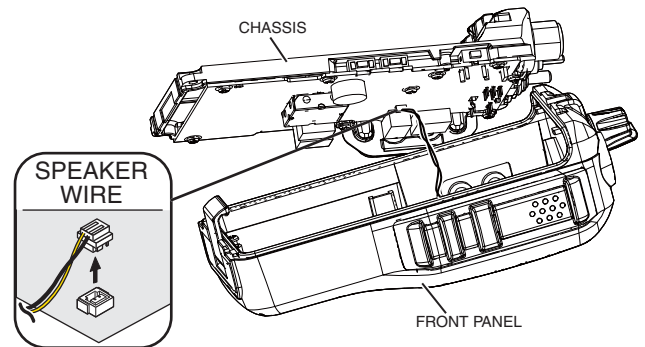


For easy separation of the CHASSIS

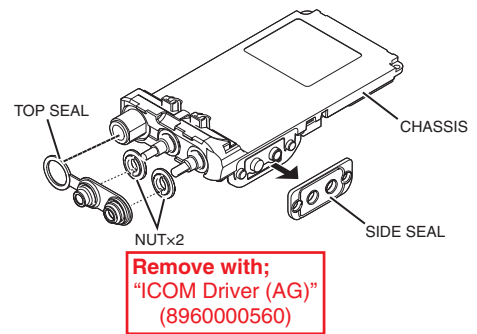
Use a suction lifter to lift the bottom of the CHASSIS up.



4) CAREFULLY lift the chassis out of the FRONT PANEL and turn it over in order to unplug the speaker wire.

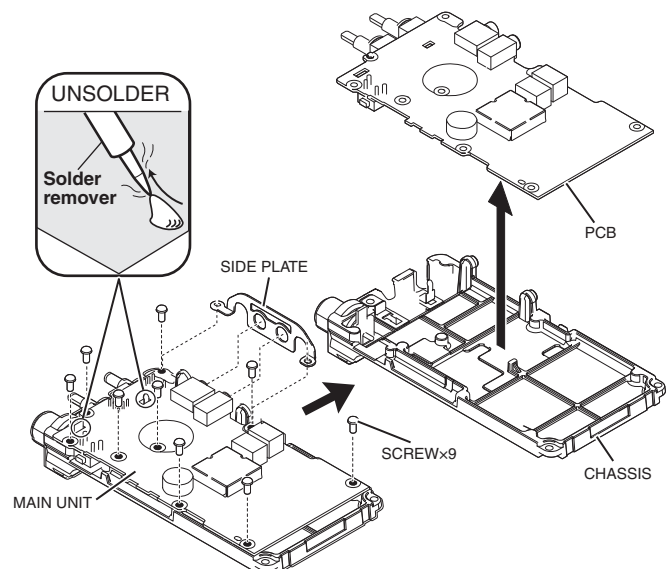


5) Remove the seals and nuts from the CHASSIS.



2. REMOVING THE MAIN UNIT

1) Remove the 9 screws and the side plate from the MAIN UNIT.
2) Unsolder the 2 points shown, and then remove the MAIN UNIT.



(Continued on the right above)

4-1 RECEIVER CIRCUITS

RF CIRCUITS

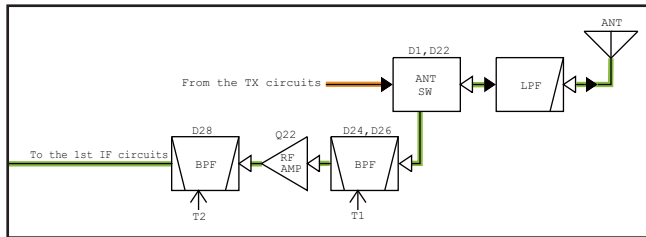
The RX signal from the antenna is passed through the LPF and antenna SW (D3, D22), then filtered by the 2-staged tuned BPF (D24 and D26) to eliminate unwanted out-of-band signals. The filtered RX signal is amplified by the RF AMP (Q22), and filtered by another 2-staged tuned BPF (D28) to obtain a good image response, then applied to the 1st IF circuits.

The BPFs are tuned to the RX frequency by applying adequate tuning voltages: "T1" and "T2" to the variable capacitors.

1ST IF CIRCUITS

The RX signal from the RF circuits is applied to the 1st IF mixer (Q23) and mixed with the 1st LO signal from the RX VCO, resulting in the 46.35 MHz 1st IF signal. The 1st IF signal is passed through the IF SWs (D31–D34) and the crystal filter (FI1: analog mode, FI2: digital mode) to be filtered, amplified by the 1st IF AMP (Q24), then applied to the 2nd IF circuits.

• RF CIRCUITS



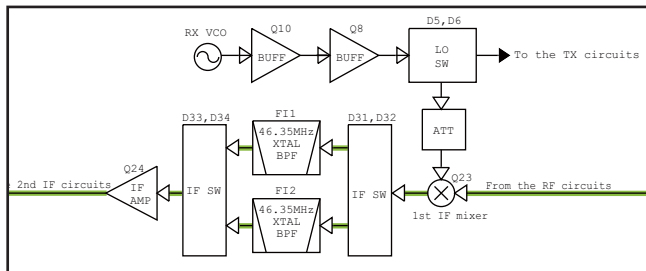
2ND IF AND DEMODULATOR CIRCUITS

The signal from the 1st IF circuits is applied to the IF demodulator IC (IC3) which contains the 2nd IF mixer, 2nd IF AMP, FM detector, squelch circuit and AF AMP in its package.

The 1st IF signal is applied to the 2nd IF mixer and mixed with the 2nd LO signal resulting in the 450 kHz 2nd IF signal.

The 2nd LO signal is generated by tripling the 15.3 MHz reference frequency signal generated by the reference frequency oscillator (TCXO; X2).

• 1ST IF CIRCUITS



• WHILE OPERATING IN THE ANALOG MODE

The 2nd IF signal is filtered by the 2nd IF filter (FI3: wide/middle mode) or filters (FI3 and FI4: narrow) to eliminate unwanted signals. It is amplified by the 2nd IF AMP, and then demodulated by the detector circuit, which employs the discriminator (X1) as the phase shifter.

The demodulated AF signal is amplified by the AF AMP (IC21), and then applied to the linear codec (IC902) through the filter SW (Q901). The filter SW toggles the frequency response of the AF filter (R904, R908, C924), according to the type of reception; Wide, Mid or Narrow.

The AF signal is converted into a digital audio signal by the linear codec (IC902), processed by the DSP (IC903), and then decoded into an analog audio signal.

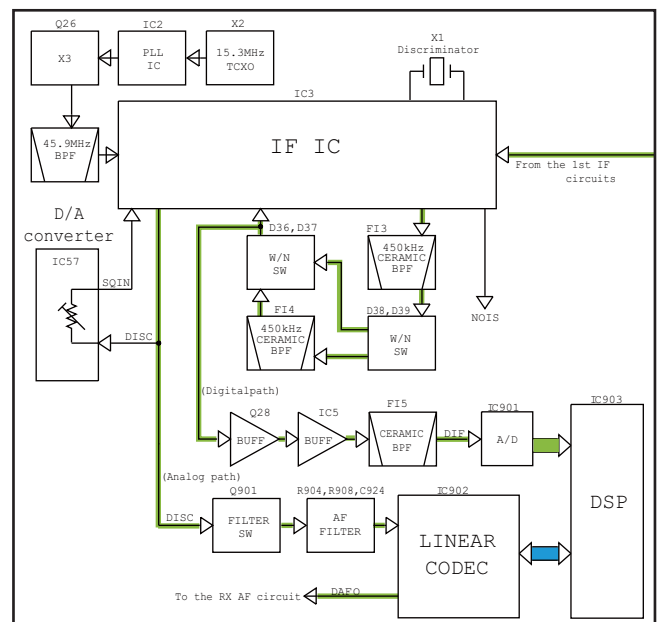
• WHILE OPERATING IN THE DIGITAL MODE

The 2nd IF signal is filtered by the 2nd IF filters (FI3 and FI4) to eliminate unwanted signals and applied to the IF AMP (IC5) through the buffer (Q28). The amplified 2nd IF signal is passed through the ceramic filter (FI5), and then directly applied to the DSP (IC903).

The 2nd IF signal is demodulated by the DSP (IC903), and then applied to the linear codec (IC902) to be decoded into an analog audio signal.

The AF signal is applied to the RX AF circuits.

• 2ND IF AND DEMODULATOR CIRCUITS

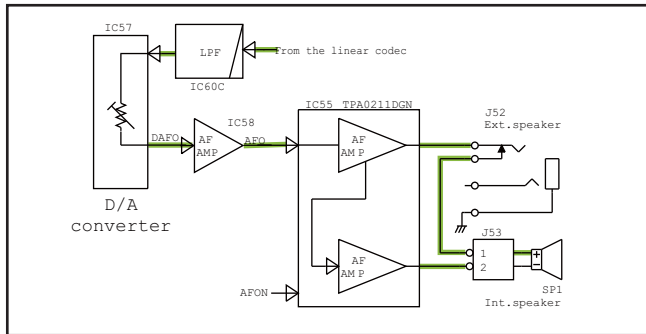


RX AF CIRCUITS

The demodulated AF signal from the linear codec (IC902) is passed through the LPF (IC60C), and then adjusted in level by the D/A converter (IC57). The level-adjusted AF signal is then amplified by AF AMPs (IC58 and IC55).

The amplified AF signal is applied to the internal or external speaker.

• RX AF CIRCUITS



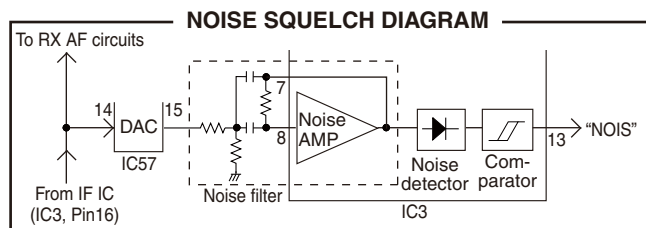
SQUELCH CIRCUITS (Analog mode only)

The squelch circuit cuts off the AF output signals when no RF signals are received. Detecting noise components in the demodulated AF signals, the squelch circuit stops audio signals being emitted.

A portion of demodulated AF signal from the IF IC (IC3) is passed through the D/A converter (IC57) for level (=threshold) adjustment. The level-adjusted AF signals are passed through the noise filter (IC3, pins 7, 8 and R139–R142, C241–C243) to filter the noise components (approx. 30 kHz signals) only. The noise components are rectified, resulting in DC voltage corresponding to the noise level.

If the noise level is higher than the preset one, the internal comparator set the “NOISE” signal to the CPU to “High”, then the CPU turns the “AFON” signal which controls the AF power AMP (IC55) to “Low,” to inactivate it.

• SQUELCH CIRCUITS



4-2 TRANSMITTER CIRCUITS

TX AF CIRCUITS

The audio signal from the internal or external microphone (MIC signal) is passed through the MIC gain SW (IC62), and then applied to the MIC AMP (IC64).

• WHILE OPERATING IN THE ANALOG MODE

The amplified MIC signal is passed through the HPF (IC63A), which attenuates frequencies 300 Hz and below, and then applied to the limiter AMP (IC60A), through the mute SW (Q66). The amplitude-limited MIC signal is applied to the linear codec (IC902), through the MIC line SW (IC66).

The MIC signal is converted into a digital audio signal by the linear codec (IC902), processed by the DSP (IC903), and then converted into an analog baseband signal (modulation signal).

• WHILE OPERATING IN THE DIGITAL MODE

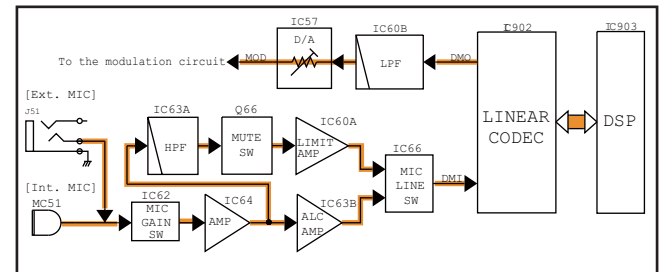
The amplified MIC signal is applied to the ALC (IC63B) which keeps the signal level fixed.

The level-adjusted MIC signal is applied to the linear codec (IC902) through the MIC line SW (IC66).

The MIC signal is converted into a digital audio signal by the linear codec (IC902), processed by the DSP (IC903), and then converted into the digital baseband signal (modulation signal).

The signal from the linear codec (IC902) is passed through the LPF (IC60B), and then applied to the D/A converter (IC57) which adjusts its level (=deviation). The level-adjusted modulation signal is applied to the modulation circuit.

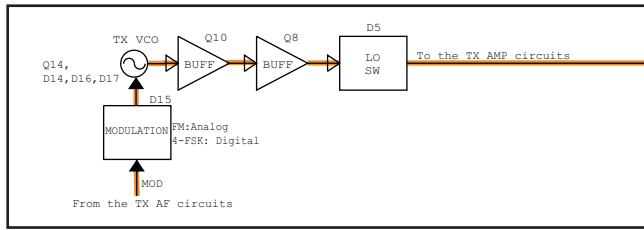
• TX AF CIRCUITS



MODULATION CIRCUIT

The modulation signal from the TX AF circuits is applied to D15 of the TX VCO (Q14, D14–D16) to modulate it (FM for the analog mode, 4FSK for the digital mode). The modulated signal from the TX VCO is buffer-amplified by two buffers (Q8 and Q10), and applied to the TX AMP circuits through the LO SW (D5).

• MODULATION CIRCUIT



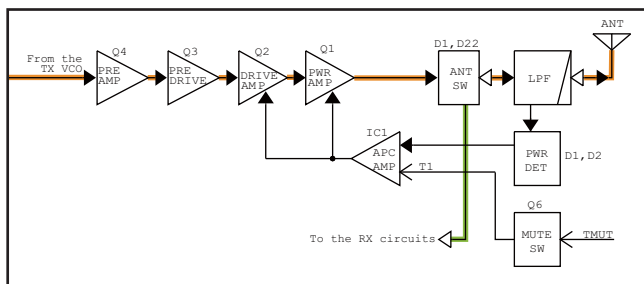
TX AMPLIFIERS

The buffer amplified signal from the LO SW (D5) is sequentially amplified by the pre-AMP (Q4), pre-drive AMP (Q3), drive AMP (Q2), and power AMP (Q1), to obtain TX power. The amplified TX signal is passed through the antenna SW (D3, D22) and the LPF, which eliminates harmonics, and then fed to the antenna.

APC CIRCUITS

D1 and D2 rectify a portion of the TX signal to direct voltage, and the APC AMP (IC1) compares the voltage and the TX power control reference voltage, "T1." The resulting voltage controls the gain of the power and drive AMPs to keep the TX power constant.

• TX AMPLIFIERS AND APC CIRCUITS



4-3 FREQUENCY SYNTHESIZER CIRCUITS

The RX VCO is composed of Q13, and D11, D12. The VCO output signal is buffer-amplified by two buffers (Q8 and Q10) and applied to the 1st IF mixer, through the LO SW (D6) and the LPF (L18, C208, C209).

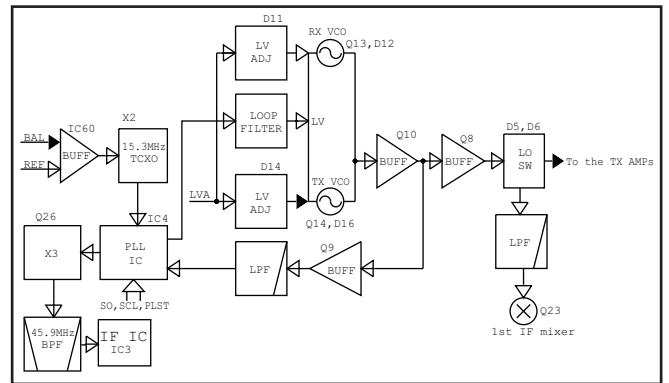
The TX VCO is composed of Q14 and D14–D17. The VCO output signal is buffer-amplified by two buffers (Q8 and Q10) and applied to the pre-AMP (Q4), through the LO SW (D5) and the LPF.

A portion of signal generated by each VCO is fed back to the PLL IC (IC4, pin 17) through the buffer (Q9) and the LPF (L46, C167, C168).

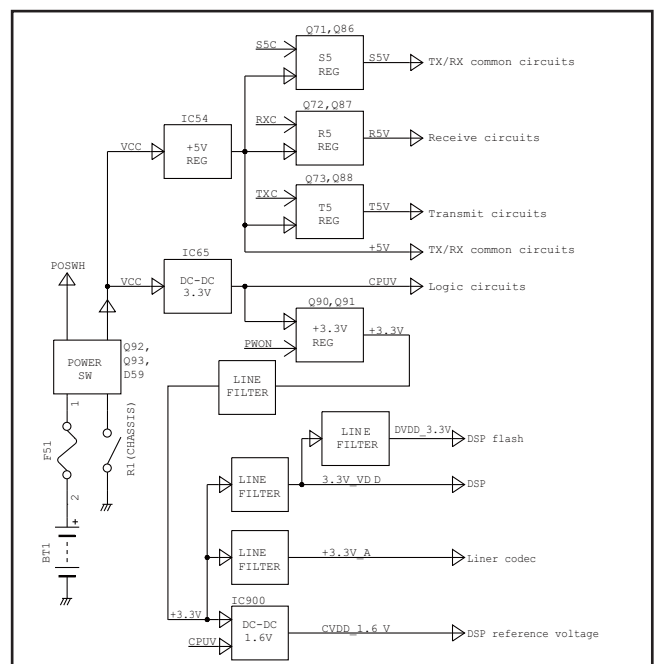
The applied VCO output signal is divided and phase-compared with a 15.3 MHz reference frequency signal from the TCXO (X2), which is also divided. The resulting signal is output from the PLL IC (IC4), and DC-converted by the loop filter, and then applied to the VCO as the lock voltage.

When the oscillation frequency drifts, its phase changes from that of the reference frequency, causing a lock voltage change to compensate for the drift in the VCO oscillating frequency.

• FREQUENCY SYNTHESIZER CIRCUITS



5-4 VOLTAGE DIAGRAMS



4-5 PORT ALLOCATIONS

• CPU (IC51)

BALL No.	LINE NAME	DESCRIPTION	I/O
A5	RXC	Power supply switching control. H= During receive or stand-by.	O
A6	RMUTE	RX AF mute switch control. L= During the squelch circuit is activated.	O
A7	DMOSI	Serial data to the DSP (IC903).	O
A15	PWON	Power supply switching control. H= The transceiver's power is ON.	O
B12	NOIS	Noise level detect. H= Squelch close.	I
B15	AFON	AF power AMP control. H= AF power AMP (IC55) is activated.	O
C1, C2	CBI2, CBI0	[ROTARY SELECTOR] input.	I
C5	TXC	Power supply switching control. H= While transmitting.	O
C8	ESDA	EEPROM (IC52) serial data.	I/O
C13	POSW	[POWER] input.	I
C14	ADS	1st IF filters (FI1 and FI2) switching control. L= During digital mode.	O
C15	NWC	Receive bandwidth switching. L= During narrow mode.	O
D2, D3	CBI3, CBI1	[ROTARY SELECTOR] input.	I
D6	DSCK	DSP (IC903) clock.	O
D8	ESCL	EEPROM (IC52) clock.	O
D13	DPDN	DSP (IC903) power control. H= DSP is inactivated.	O
D14	DRES	DSP (IC903) reset. L= Reset.	O
D15	CSFT	Clock frequency shift. H= Clock frequency is shifted.	O
E13	RES	CPU reset.	I
H1	SIDE1	[UPPER] key input. L= Pushed.	I
H2	SIDE2	[LOWER] key input. L= Pushed.	I
J1	IPTT	Internal [PTT] input. L= Pushed.	I
J2	XPTT	External PTT input. H= An external PTT is pushed.	I
L1, L2	MCG0, MCG1	MIC gain control.	O
L12	TLED	Busy LED (Red) control. L= LED lights. (While transmitting)	O
L13	RLED	Busy LED (Green) control. L= LED lights. (While receiving a signal)	O
L14	SSO	Common serial data.	O
L15	SCK	Common clock.	O
M1	TMUT	Transmission mute. L= TX inhibit.	O
M2	ATX	Automatic TX control for VOX mode. H= While MIC audio from the connected headset is detected.	O
M8	BEEP	Beep audio. (Square waves)	O
M11	MDET	External connection detect.	I
M14	DAST	D/A converter (IC57) strobe. H= Load enable.	O

BALL No.	LINE NAME	DESCRIPTION	I/O
N11	VOXV	Microphone input sensing voltage.	I
N12	BATV	Battery voltage sensing.	I
N14	DMISO	DSP (IC903) serial data.	O
P4	PLSW	PLL lock up time control. L= Fast lock up.	O
P10	TEMP	Temperature sensing voltage.	I
P11	RSSI	RSSI sensing voltage.	I
P12	AFVI	[VOLUME CONTROL] input.	I
P15	DSS	DSP (IC903) chip select.	O
R3	S5C	Power supply line "S5C" switching control. H= Supplying current to the TX/RX common circuits.	O
R4	PLST	PLL strobe.	O
R10	LVIN	Lock voltage input.	I

• D/A CONVERTER (IC57)

PIN No.	LINE NAME	DESCRIPTION
3	BAL	DTCS balance adjustment.
4	AFVO	AF volume adjustment.
12	TENC	Outputs CTCSS deviation adjustment.
15	SQLC	Squelch threshold setting.
16	T1	During RX: Outputs BPF tuning voltage. During TX: Outputs TX power reference voltage.
19	T2	Outputs BPF tuning voltage.
20	REF	Outputs reference frequency adjust voltage.
23	LVA	Outputs additional lock voltage adjustment.
24	MOD	Max. deviation/AF volume adjustment.

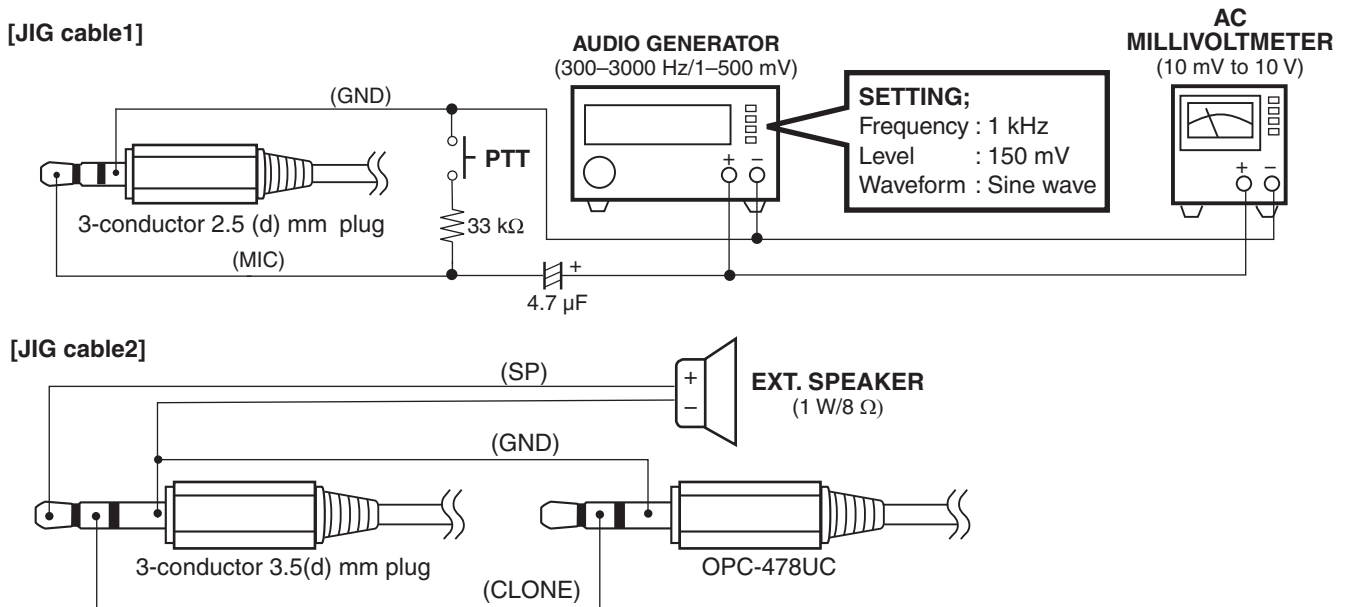
SECTION 5 ADJUSTMENT PROCEDURE

5-1 PREPARATION

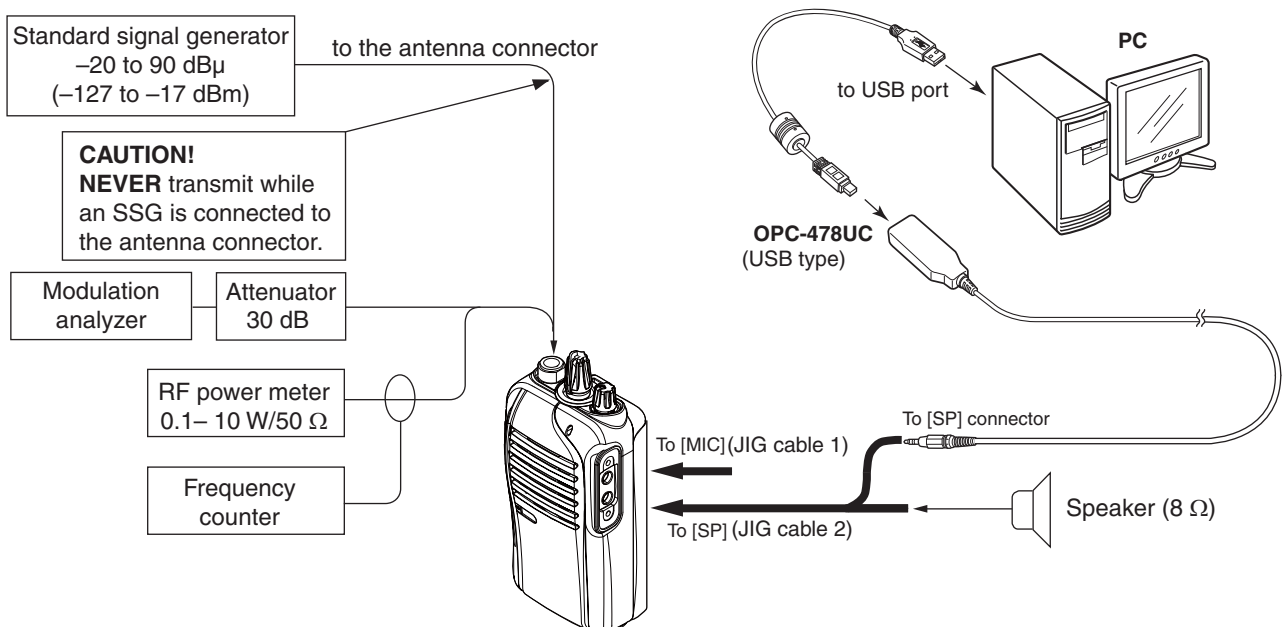
REQUIRED EQUIPMENTS

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
Cloning software	CS-F3100D/F5120D (Revision 1.0 or later)	JIG cable	Modified OPC-478UC (See the illust below)
RF power meter (50 Ω terminated)	Measuring range : 0.1–10 W Frequency range : 100–600 MHz SWR : Less than 1.2 : 1	Frequency counter	Frequency range : 0.1–600 MHz Frequency accuracy : ±1 ppm or better Input level : Less than 1 mW
Modulation Analyzer	Frequency range : 30–600 MHz Measuring range : 0 to ±10 kHz	Standard signal generator (SSG)	Frequency range : 0.1–600 MHz Output level : –20 dBμ to 90 dBμ (–127 to –17 dBm)
AC millivoltmeter	Measuring range : 10 mV to 10 V	Attenuator	Power attenuation : 30 dB Capacity : More than 10 W
Oscilloscope	Frequency range : DC–20 MHz Measuring range : 0.01–20 V	External speaker	Input impedance : 8 Ω Capacity : More than 1 W
Audio generator (AG)	Frequency range : 300–3000 Hz Output level : 1–500 mV		

JIG CABLE



CONNECTION



ADJUSTMENT CHANNELS

Before starting the adjustments, use the cloning software to create the same cloning file as shown below, then upload it into the transceiver.

For 400 MHz band versions

CH	Atr	Inh	RX	TX	Tx Inh	Beat Cancel	W/N	SQL Tight	RX	TX	Text	TOT	RF PWR	PWR Save	Lock-out	Scan	Inc	Assign	Sel Inh	Auto Scar	CH Type	Auto Resc
1- 1	AB		400.000000	<-		OFF	N				LVAJLJL		L1				Inc				Analog	Tim-
1- 2			470.000000	<-		OFF	N				LVAJLJH		L1				Inc				Analog	Tim-
1- 3			470.000000	<-		OFF	N				REF		L1				Inc				Analog	Tim-
1- 4			435.000000	<-		OFF	N				PWR H		H				Inc				Analog	Tim-
1- 5			435.000000	<-		OFF	N				PWR L2		L2				Inc				Analog	Tim-
1- 6			435.000000	<-		OFF	N				PWR L1		L1				Inc				Analog	Tim-
1- 7			400.000000	<-		OFF	N				BAL L		L1				Inc				Analog	Tim-
1- 8			435.000000	<-		OFF	N				BAL C		L1				Inc				Analog	Tim-
1- 9			470.000000	<-		OFF	N				BAL H		L1				Inc				Analog	Tim-
1- 10			400.000000	<-		OFF	N				FM DEV N		L1				Inc				Analog	Tim-
1- 11			435.000000	<-		OFF	N				FM DEV N		L1				Inc				Analog	Tim-
1- 12			470.000000	<-		OFF	N				FM DEV N		L1				Inc				Analog	Tim-
1- 13			400.000000	<-		OFF	W				FM DEV W		L1				Inc				Analog	Tim-
1- 14			435.000000	<-		OFF	W				FM DEV W		L1				Inc				Analog	Tim-
1- 15			470.000000	<-		OFF	W				FM DEV W		L1				Inc				Analog	Tim-
1- 16			400.000000	<-		OFF	W				FM DEV M		L1				Inc				Analog	Tim-
1- 17			435.000000	<-		OFF	W				FM DEV M		L1				Inc				Analog	Tim-
1- 18			470.000000	<-		OFF	W				FM DEV M		L1				Inc				Analog	Tim-
1- 19			400.000000	<-		OFF	W				DG DEV L		L1				Inc				Digital	Tim-
1- 20			435.000000	<-		OFF	W				DG DEV C		L1				Inc				Digital	Tim-
1- 21			470.000000	<-		OFF	W				DG DEV H		L1				Inc				Digital	Tim-
1- 22			435.000000	<-		OFF	W		151.4	<-	CTCS DTH		L1				Inc				Analog	Tim-
1- 23			435.000000	<-		OFF	N		151.4	<-	CTCS USA		L1				Inc				Analog	Tim-
1- 24			435.000000	<-		OFF	W		007N	<-	DTCS DTH		L1				Inc				Analog	Tim-
1- 25			435.000000	<-		OFF	N		007N	<-	DTCS USA		L1				Inc				Analog	Tim-
1- 26			435.000000	<-		OFF	N				2/5 TONE		L1				Inc				Analog	Tim-
1- 27			400.000000	<-	i	OFF	W				SENS DTH		L1				Inc				Analog	Tim-
1- 28			400.000000	<-	i	OFF	N				SENS USA		L1				Inc				Analog	Tim-
1- 29			400.000000	<-	i	OFF	W				RSSI DTH		L1				Inc				Analog	Tim-
1- 30			400.000000	<-	i	OFF	N				RSSI USA		L1				Inc				Analog	Tim-
1- 31			400.000000	<-	i	OFF	W				SQL DTH		L1				Inc				Analog	Tim-
1- 32			400.000000	<-	i	OFF	N				SQL USA		L1				Inc				Analog	Tim-

For 350 MHz band versions

CH	Atr	Inh	RX	TX	Tx Inh	Beat Cancel	W/N	SQL Tight	RX	TX	Text	TOT	RF PWR	PWR Save	Lock-out	Scan	Inc	Assign	Sel Inh	Auto Scar	CH Type	Auto Resc
1- 1	AB		350.000000	<-		OFF	N				LVAJLJL		L1				Inc				Analog	Tim-l
1- 2			400.000000	<-		OFF	N				LVAJLJH		L1				Inc				Analog	Tim-l
1- 3			400.000000	<-		OFF	N				REF		L1				Inc				Analog	Tim-l
1- 4			375.000000	<-		OFF	N				PWR H		H				Inc				Analog	Tim-l
1- 5			375.000000	<-		OFF	N				PWR L2		L2				Inc				Analog	Tim-l
1- 6			375.000000	<-		OFF	N				PWR L1		L1				Inc				Analog	Tim-l
1- 7			350.000000	<-		OFF	N				BAL L		L1				Inc				Analog	Tim-l
1- 8			375.000000	<-		OFF	N				BAL C		L1				Inc				Analog	Tim-l
1- 9			400.000000	<-		OFF	N				BAL H		L1				Inc				Analog	Tim-l
1- 10			350.000000	<-		OFF	N				FM DEV N		L1				Inc				Analog	Tim-l
1- 11			375.000000	<-		OFF	N				FM DEV N		L1				Inc				Analog	Tim-l
1- 12			400.000000	<-		OFF	N				FM DEV N		L1				Inc				Analog	Tim-l
1- 13			350.000000	<-		OFF	W				FM DEV W		L1				Inc				Analog	Tim-l
1- 14			375.000000	<-		OFF	W				FM DEV W		L1				Inc				Analog	Tim-l
1- 15			400.000000	<-		OFF	W				FM DEV W		L1				Inc				Analog	Tim-l
1- 16			350.000000	<-		OFF	W				FM DEV M		L1				Inc				Analog	Tim-l
1- 17			375.000000	<-		OFF	W				FM DEV M		L1				Inc				Analog	Tim-l
1- 18			400.000000	<-		OFF	W				FM DEV M		L1				Inc				Analog	Tim-l
1- 19			350.000000	<-		OFF	W				DG DEV L		L1				Inc				Digital	Tim-l
1- 20			375.000000	<-		OFF	W				DG DEV C		L1				Inc				Digital	Tim-l
1- 21			400.000000	<-		OFF	W				DG DEV H		L1				Inc				Digital	Tim-l
1- 22			375.000000	<-		OFF	W		151.4	<-	CTCS DTH		L1				Inc				Analog	Tim-l
1- 23			375.000000	<-		OFF	W		151.4	<-	CTCS USA		L1				Inc				Analog	Tim-l
1- 24			375.000000	<-		OFF	W		007N	<-	DTCS DTH		L1				Inc				Analog	Tim-l
1- 25			375.000000	<-		OFF	W		007N	<-	DTCS USA		L1				Inc				Analog	Tim-l
1- 26			375.000000	<-		OFF	N				2/5 TONE		L1				Inc				Analog	Tim-l
1- 27			350.000000	<-	i	OFF	W				SENS DTH		L1				Inc				Analog	Tim-l
1- 28			350.000000	<-	i	OFF	W				SENS USA		L1				Inc				Analog	Tim-l
1- 29			350.000000	<-	i	OFF	W				RSSI DTH		L1				Inc				Analog	Tim-l
1- 30			350.000000	<-	i	OFF	W				RSSI USA		L1				Inc				Analog	Tim-l
1- 31			350.000000	<-	i	OFF	W				SQL DTH		L1				Inc				Analog	Tim-l
1- 32			350.000000	<-	i	OFF	W				SQL USA		L1				Inc				Analog	Tim-l

CONVENIENT: The cloning data file for the adjustment, as described in this service manual, is attached. Right click the clip icon, and select "Save Embedded File to Disk."

• For 400 MHz band versions:



• For 350 MHz band versions:



ADJUSTMENT UTILITY

The screenshot shows the 'Adjust Utility' window for a radio device. The left sidebar contains a tree view of adjustment categories. The main window is divided into 'Setting' and 'Adjust' sections. The 'Adjust' section lists various parameters with their current values and units.

Adjustment Category	Parameter	Value	Unit/Notes
ADJUSTMENT CONDITION	CH No.	1	RX=136.10000, TX=136.10000
	TX Mode	1	RF Power=High, Mode=Narrow
	RX Mode	1	CH Type=Analog Analog Voice Analog
TX OUTPUT POWER	Power (Hi)	174	[#####-----]
	Power (L2)	95	[#####-----]
	Power (L1)	59	[####-----]
MODULATION BALANCE	BAL (Wide)	98	[#####-----]
	BAL (Mid)	98	[#####-----]
	BAL (Narrow)	98	[#####-----]
	BAL (Digital)	98	[#####-----]
FM DEVIATION	MOD (Wide)	171	[#####-----]
	MOD (Mid)	145	[#####-----]
	MOD (Narrow)	81	[#####-----]
	MOD (Digital)	109	[#####-----]
CTCSS DEVIATION	CTCSS	125	[#####-----]
	DTCS	0	[-----] 0 = CTCSS Level
DTCS DEVIATION	SQEL	52	[####-----]
	REF	165	[#####-----]
REFERENCE FREQUENCY	BPF C ALL		[Enter] to Sweep
	BPF T1 C	66	[#####-----] [Enter] to Sweep
	BPF T2 C	47	[####-----] [Enter] to Sweep
	BPF L ALL		[Enter] to Sweep
	BPF T1 L	64	[#####-----] [Enter] to Sweep
	BPF T2 L	64	[#####-----] [Enter] to Sweep
	BPF H ALL		[Enter] to Sweep
	BPF T1 H	64	[#####-----] [Enter] to Sweep
	BPF T2 H	64	[#####-----] [Enter] to Sweep
	PLL LOCK VOLTAGE	RX LVA (Adjust)	52
RX LVA (Check)		0	[#####-----] [Enter] to Check
TX LVA (Adjust)		56	[####-----] [Enter] to Sweep
TX LVA (Check)		0	[#####-----] [Enter] to Sweep
S-METER	RSSI	130	[Enter] to Capture
	BAL Start		[Enter] to Prepare
	MOD W H	0	[-----] -----
	MOD D Start		[Enter] to Prepare
DIGITAL DEVIATION	MOD D L	0	[-----] -----
	MOD D C	0	[-----] -----
	MOD D H	0	[-----] -----
	S.Tone	85	[#####-----]
2/5 TONE DEVIATION	Password		

For [EUR] versions:
When adjusting "Deviation" in the middle band, change the bandwidth to "Middle" as shown.

The screenshot shows the 'Common' settings menu. The 'Wide Band Width' setting is highlighted with a red box and a red arrow pointing to the text 'Select "Middle"'. Other settings include Penalty Timer, PWR Save, Auto TX, MSK, and Others.

Setting	Value
Penalty Timer(Sec)	20.000
TOT ID Out	OFF
TOT Beep	OFF
TOT Reset Timer(Sec)	OFF
Lockout Penalty Timer(Sec)	5.000
Lockout Override	OFF
PWR Save	
Start Timer(1st)(Sec)	5.000
Start Timer(2nd)(Sec)	60.000
Auto TX	
Auto TX Timer(Sec)	60.000
MSK	
Call LET Timer(Sec)	0.05
DOS Timer(Sec)	0.00
PTT Sine	
Others	
Beat Cancel	Auto
Wide Band Width	Middle
Forced Narrow	Wide
Forced Narrow Change	Middle
Battery Type	Li-Ion

5-2 FREQUENCY ADJUSTMENTS

- 1) Select an adjustment item using [↑]/[↓] on the PC's keyboard.
- 2) Set or modify the adjustment value as specified using [←]/[→] on the PC's keyboard, then push [ENTER].

ADJUSTMENT	TRANSCIVER'S CONDITION	OPERATION	ADJUSTMENT ITEM	VALUE
PLL LOCK VOLTAGE -RX- (Band low)	1 • Channel : 1-1 • Receiving	1) Connect an RF power meter to the antenna connector. 2) Set the preset adjustment value on the adjustment utility window.	[RX LVA(Adjust)]	1.00 V
	2 • Channel : 1-2 • Receiving		[RX LVA(Check)]	3.70 V
-TX- (Band low)	3 • Channel : 1-1 • Transmitting		[TX LVA(Adjust)]	1.00 V
(Band high)*	4 • Channel : 1-2 • Transmitting		[TX LVA(Check)]	3.20 V
-VERIFY-**	5 • Channel : 1-2 • Transmitting	• Click the [Update (F5)] button to check on the "I/O Check window" as below.	[LVIN] (On the "I/O Check window")	2.00–4.00 V (Verify)
REFERENCE FREQUENCY	1 • Channel : 1-3 • Transmitting	• Loosely couple a frequency counter to the antenna connector.	[REF]	470.000000 MHz [400 MHz band] 400.000000 MHz [350 MHz band] (±50 Hz)

*: For only [350 MHz band]. **: For only [400 MHz band].

• I/O Check window

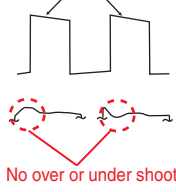
I/O Check			
Input	Dec	Hex	Data
VIN(Mobile/Portable)	198	C6	15.52V/8.20V
TEMPS	186	BA	20.20°C
LVIN	66	42	*** V
SD	48	30	0.62V
Output	Dec	Hex	Data
T1/POW	71	47	1.39V
BPF T2	52	34	1.02V
REF	90	5A	1.76V
MOD BAL	0	0	0.00%
Dev	125	7D	2.45V
CTCSS	0	0	0.00V
SQL Lev	50	32	0.98V
TXLVA	56	38	1.10V
RXLVA	52	34	1.02V

Lock voltage appears here

(The values shown above are an example only. Each transceiver has own values.)

5-3 TRANSMIT ADJUSTMENTS

- 1) Select an adjustment item using [↑]/[↓] on the PC's keyboard.
- 2) Set or modify the adjustment value as specified using [←]/[→] on the PC's keyboard, then push [ENTER].

ADJUSTMENT	TRANSCEIVER'S CONDITION	OPERATION	ADJUSTMENT ITEM	VALUE	
TX OUTPUT POWER (Hi power) (L2 power) (L1 power)	1	• Channel : 1-4 • Transmitting	• Connect an RF power meter to the antenna connector.	[Power (Hi)]	4.0 W
	2	• Channel : 1-5 • Transmitting		[Power (L2)]	2.0 W
	3	• Channel : 1-6 • Transmitting		[Power (L1)]	1.0 W
MODULATION BALANCE	1	–	• Set "MOD -Narrow-" to "90," and set the TX mode to "2" on the "ADJUSTMENT UTILITY" screen.	[MOD -Narrow-]	90
	2	• Set the cursor on [BAL Start] to enter the "MODULATION BALANCE" adjustment mode.		[TX mode]	2
(Band low)	3	• Channel : 1-7 • Transmitting	• Connect a modulation analyzer with an oscilloscope to the antenna connector through an attenuator, and set it as; HPF : OFF LPF : 15 kHz De-emphasis : OFF Detector : (P-P)/2	[BAL 1]	 <p>As flat as possible.</p> <p>No over or under shoot</p>
(Band center)	4	• Channel : 1-8 • Transmitting		[BAL 2]	
(Band high)	5	• Channel : 1-9 • Transmitting		[BAL 3]	
	6	• Set the cursor on [BAL Start] to quit the "MODULATION BALANCE" adjustment mode.		[BAL Start]	–
FM DEVIATION -Narrow- (Band low) (Band center) (Band high)	1	• Set the cursor on [MOD N Start] to enter the "FM DEVIATION -Narrow-" adjustment mode.		[MOD N Start]	–
	2	• Channel : 1-10 • Transmitting	• Connect a modulation analyzer to the antenna connector through an attenuator, and set it as "MODULATION BALANCE."	[MOD N L]	±2.05 to ±2.15 kHz
	3	• Channel : 1-11 • Transmitting		[MOD N C]	
	4	• Channel : 1-12 • Transmitting	• Connect an audio generator to the [MIC] jack through the JIG cable, and set it as; Frequency : 1 kHz Waveform : Sinewave Level : 150 mVrms	[MOD N H]	
	5	• Set the cursor on [MOD N Start] to quit the "FM DEVIATION -Narrow-" adjustment mode.		[MOD N Start]	–
FM DEVIATION -Wide-* (Band low) (Band center) (Band high)	1	• Set the cursor on [MOD W Start] to enter the "FM DEVIATION -Wide-" adjustment mode.		[MOD W Start]	–
	2	• Channel : 1-13 • Transmitting	• Connect a modulation analyzer to the antenna connector through an attenuator, and set it as "MODULATION BALANCE."	[MOD W L]	±4.05 to ±4.15 kHz±
	3	• Channel : 1-14 • Transmitting		[MOD W C]	
	4	• Channel : 1-15 • Transmitting	• Connect an audio generator to the [MIC] jack through the JIG cable, and set it as "FM DEVIATION -Wide-."	[MOD W H]	
	5	• Set the cursor on [MOD W Start] to quit the "FM DEVIATION -Wide-" adjustment mode.		[MOD W Start]	–

*: For all models except [USA].

5-3 TRANSMIT ADJUSTMENTS (Continued)

1) Select an adjustment item using [↑]/[↓] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [←]/[→] on the PC's keyboard, then push [ENTER].

ADJUSTMENT	TRANSCEIVER'S CONDITION	OPERATION	ADJUSTMENT ITEM	VALUE	
FM DEVIATION -Middle-*** (Band low)	1	• Set the cursor on [MOD W Start] to enter the "FM DEVIATION -Middle-" adjustment mode.	[MOD M Start]	–	
	2	• Channel : 1-16 • Transmitting	[MOD M L]	±3.25 to ±3.35 kHz±	
	3	• Channel : 1-17 • Transmitting			[MOD M C]
	4	• Channel : 1-18 • Transmitting	• Connect a modulation analyzer with an oscilloscope to the antenna connector through an attenuator, and set it as; HPF : OFF LPF : 15 kHz De-emphasis : OFF Detector : (P–P)/2	[MOD M H]	–
	5	• Set the cursor on [MOD W Start] to quit the "FM DEVIATION -Middle-" adjustment mode.	[MOD M Start]		
DIGITAL DEVIATION (Band low)	1	• Set the cursor on [MOD D Start] to enter the "DIGITAL DEVIATION" adjustment mode.	[MOD N Start]	–	
	2	• Channel : 1-19 • Transmitting	[MOD D L]	±1.36 to ±1.40 kHz	
	3	• Channel : 1-20 • Transmitting			[MOD D C]
	4	• Channel : 1-21 • Transmitting	• Connect an audio generator to the [MIC] jack through the JIG cable, and set it as "FM DEVIATION -Middle-."	[MOD D H]	
	5	• Set the cursor on [MOD D Start] to quit the "DIGITAL DEVIATION" adjustment mode.	[MOD N Start]	–	
CTCSS DEVIATION	1	• Channel : 1-22* 1-23** • No AF input from the MIC. • Transmitting	[CTCSS]	±0.65 to ±0.75 kHz* ±0.30 to ±0.40 kHz**	
DTCS DEVIATION	1	• Channel : 1-24* 1-25** • No AF input from the MIC. • Transmitting	[DTCS]	±0.65 to ±0.75 kHz* ±0.30 to ±0.40 kHz**	
2/5 TONE, DTMF DEVIATION	1	• Channel : 1-26 • Transmitting	[TX Mode]	5	
	2		• Connect a modulation analyzer to the antenna connector through an attenuator, and set it as "MODULATION BALANCE."	[S.Tone]	±1.45 to ±1.55 kHz

*: For all models except [USA]. **: For [USA] ***: For only [EUR].

5-4 RECEIVE ADJUSTMENTS

1) Select an adjustment item using [↑]/[↓] on the PC's keyboard.

2) Set or modify the adjustment value as specified using [←]/[→] on the PC's keyboard, then push [ENTER].

ADJUSTMENT	TRANSCIVER'S CONDITION	OPERATION	ADJUSTMENT ITEM	VALUE	
RECEIVE SENSITIVITY	NOTE: "RECEIVE SENSITIVITY" must be adjusted before "S-METER." Otherwise, "S-METER" will not be adjusted properly. When "RECEIVE SENSITIVITY" is re-adjusted, "S-METER" must be also re-adjusted.				
	1	<ul style="list-style-type: none"> Channel : 1-27* 1-28** Receiving 	<ul style="list-style-type: none"> Connect an SSG to the antenna connector and set it as; Frequency : 400 MHz [400 MHz band] 350 MHz [350 MHz band] Level† : +20 dBμ (-87 dBm) Modulation : 1 kHz Deviation : ±3.0 kHz* ±1.5 kHz** 	[BPF C ALL]	Push [ENTER] (Automatic adjustment)
S-METER	NOTE: When "RECEIVE SENSITIVITY" is re-adjusted, "S-METER" must be also re-adjusted.				
	1	<ul style="list-style-type: none"> Channel : 1-29* 1-30** Receiving 	<ul style="list-style-type: none"> Connect an SSG to the antenna connector and set it as; Frequency : 400 MHz [400 MHz band] 350 MHz [350 MHz band] Level† : +23 dBμ (-84 dBm) Modulation : 1 kHz Deviation : ±3.0 kHz* ±1.5 kHz** 	[RSSI S3 Level]	Push [ENTER] (Automatic adjustment)
	2		<ul style="list-style-type: none"> Set the SSG as; Level† : -7 dBμ (-114 dBm) 	[RSSI S1 Level]	
SQUELCH	NOTE: When "RECEIVE SENSITIVITY" is re-adjusted, "SQUELCH" must be also re-adjusted.				
	1	<ul style="list-style-type: none"> Channel : 1-31* 1-32** Receiving 	<ol style="list-style-type: none"> Connect an SSG to the antenna connector and set it as; Frequency : 400 MHz [400 MHz band] 350 MHz [350 MHz band] Level† : -14 dBμ (-121 dBm) Modulation : 1 kHz Deviation : ±3.0 kHz* ±1.5 kHz** Once close the squelch by increasing the [SQL] value, and then decrease the value to open the squelch. 	[SQL]	Squelch opens (Push [ENTER] to store the value)

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

*: For all models except [USA]. **: For [USA]

[MAIN-A UNIT] (For [400 MHz band] versions)

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains 187 rows of component specifications for the [400 MHz band] versions.

[MAIN-A UNIT] (For [400 MHz band] versions)

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains 187 rows of component specifications for the [400 MHz band] versions.

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
S.=Surface mount

[MAIN-C UNIT] (For [350 MHz band] versions)

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Rows include parts like D55, D59, D60, etc., with descriptions such as S.DIO L1SS400T1G <SLVJ> and S.MON MFT46.3P3 46.350 MHz (FL-442).

[MAIN-C UNIT] (For [350 MHz band] versions)

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Rows include parts like R65, R66, R67, etc., with descriptions such as S.RES ERJ2GEJ 273 X (27K) and S.RES ERJ2GEJ 823 X (82K).

M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side) S.=Surface mount

SECTION 7

MECHANICAL PARTS

[CHASSIS PARTS]

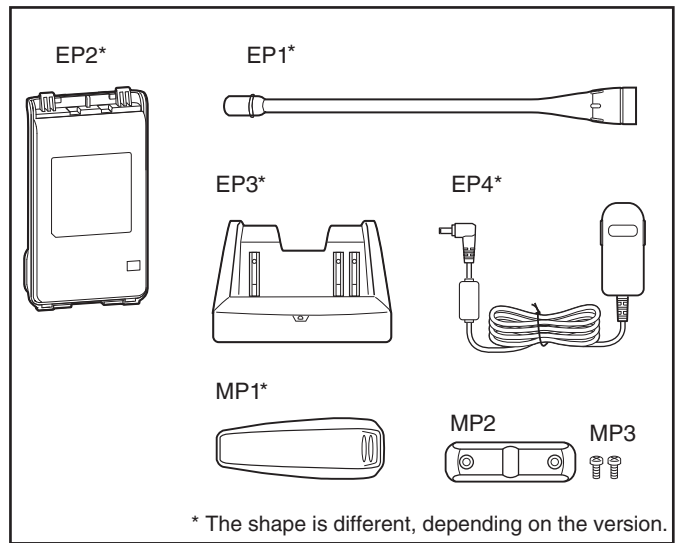
REF NO.	ORDER NO.	DESCRIPTION	QTY.
EP1*	0910067870	B7261 ANT	
J1	6910021491	ANT CONNECTOR 106-1 <SSC>	1
SP1	2510001560	045P01202-02	1
W1	8900009640	OPC-963	1
MP1	8010022041	3286 CHASSIS-1 2X2	1
MP2	8210026490	3328 FRONT PANELASSEMBLY	1
MP10	8930082160	3285 NAME SHEET (A)	1
MP11	8930081140	3328 LENS	1
MP12	8930080620	O-RING (CF) <KRI>	1
MP13	8930080630	3285 SP PLATE Y1174	1
MP14	8930081200	3328 VENT SHEET	1
MP15	8930080410	3285 MIC SPONGE	1
MP16	8930079900	3285 TERMINAL HOLDER	1
MP17	8930080100	3285 PLUS TERMINAL	1
MP18	8930080400	3285 MINUS TERMINAL	1
MP19	8930069710	THERMAL SHEET (BC) TC200HS-1.4 (7.9X7)	1
MP20	8830003390	VR NUT (AB)	2
MP21	8930080091	3285 SIDE PLATE-1 Y1173A0	1
MP22	8930080150	3285 SIDE SEAL <KRI>	1
MP23	8930080140	3285 TOP SEAL <KRI>	1
MP24	8830003440	3285 ANT NUT	1
MP25	8610014180	KNOB N-389	1
MP27	8610014190	KNOB N-390	1
MP31	8810008761	PHBT M2 X 8 NI-ZC3	2
MP32	8810009511	PHBT M2 X 4 NI-ZC3 (3.6-4.0)	9
MP33	8810009511	PHBT M2 X 4 NI-ZC3 (3.6-4.0)	1
MP34	8810009181	BT M2 X 5 NI-ZC3	2
MP35	8930066240	SPONGE (IM)	1
MP36	8930055051	THERMAL SHEET (V)-1 TC400HS (10X15)	1

[MAIN-A/MAIN-C UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J51	6450000131	HSJ1102-018540	1
J52	6450002250	HSJ1456-010320	1
J53*	6510021901	BM02B-ASRS-TF (LF) (SN)	1
F51*	5210000970	ERBSE3R00U	1
MC51	7700002950	EM9745P-33-G <HOR>	1
S51	2260001900	SW-149 (SKHLLD)	1
S52*	2260002800	SW-167 (SKQTLAE010)	1
S53*	2260002800	SW-167 (SKQTLAE010)	1
S54	2250000680	FSR080453W-01+16C L15.9 <SLVJ>	1
MP2	8510016461	2775 VCO COVER-1	1
MP3*	8510016471	2775 VCO CASE-1	1
MP4*	6910014760	OG-503040	1
MP5*	6910014760	OG-503040	1
MP6*	8930083030	SPONGE (LF)	1
MP7*	8930080760	SPONGE (KT)	1
MP8*	8510020110	3328 SHIELD PLATE Y1222	1
MP9*	8510019920	3328 DSP CASE Y1212	1
MP10*	8510019930	3328 DSP COVER Y1213	1
MP11*	6910014760	OG-503040	1
MP12	8930082300	DOUBLE SIDE TAPE (BK)	1
MP13*	8930082310	3328 K-PLATE	1
MP14*	8510020230	3329 SHIELD PLATE Y1239	1

[ACCESSORIES]

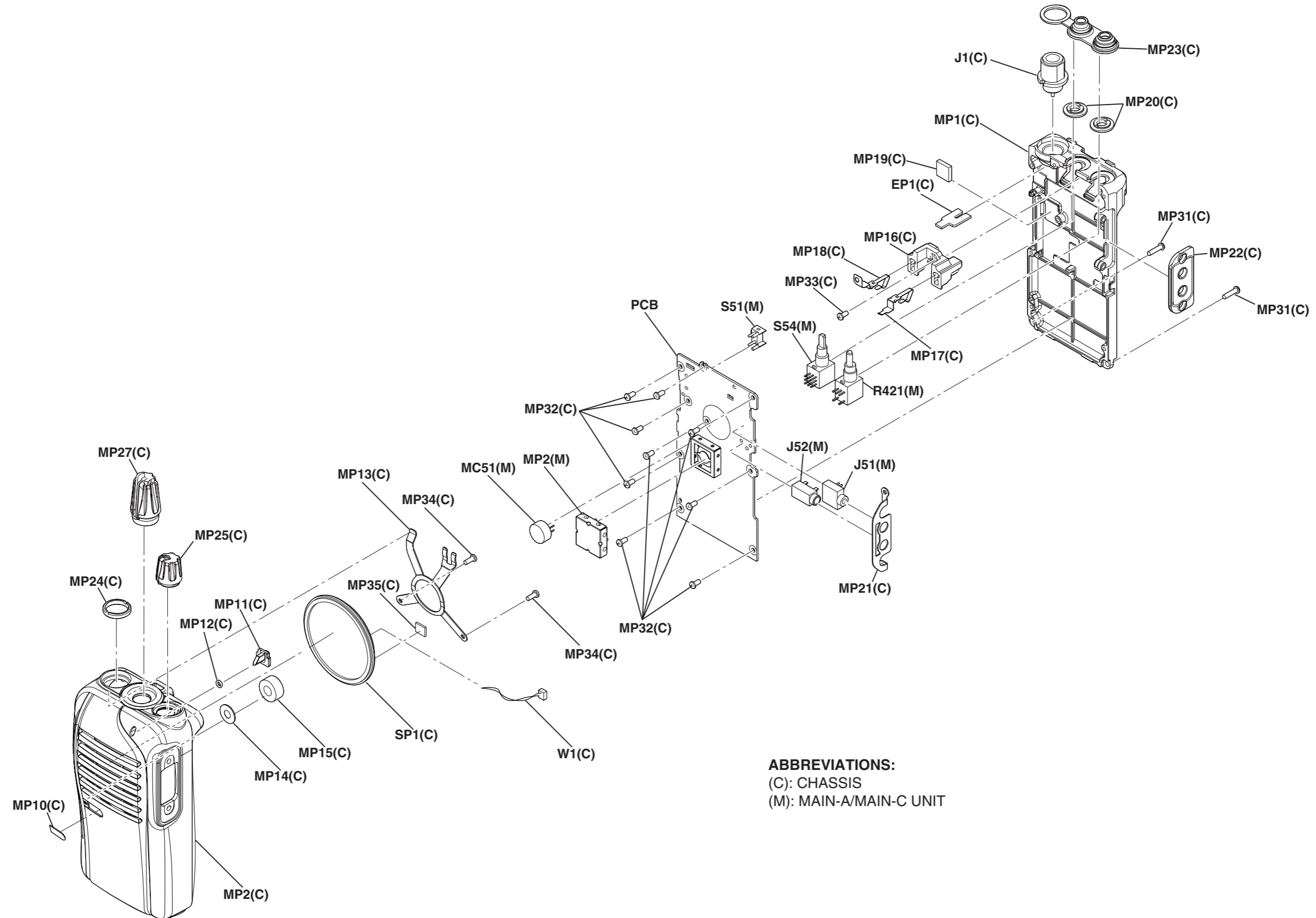
REF NO.	ORDER NO.	DESCRIPTION	QTY.
EP1	(Optional)	FA-SC57U-1 [400 MHz band]	1
EP2	(Optional)	FA-SC01U-2 [350 MHz band]	1
EP3	(Optional)	BP-265	1
	(Optional)	BC-193 [USA-01]	1
	(Optional)	BC-193 [EXP-01]	1
	(Optional)	BC-193 [EXP-02]	1
	(Optional)	BC-193 [AUS-01]	1
	(Optional)	BC-193 [RUS-01]	1
	(Optional)	BC-193 [EXP-07]	1
EP4	(Optional)	BC-123SA [USA-01]	1
	(Optional)	BC-123SA [EXP-01]	1
	(Optional)	BC-123SE [EXP-02]	1
	(Optional)	BC-123SV [AUS-01]	1
	(Optional)	BC-123SE [RUS-01]	1
	(Optional)	BC-123SE [EXP-07]	1
MP1	(Optional)	MB-124	1
MP2	8210025840	3285 JACK PANEL	1
MP3	8810004861	PH M2 X 6 ZK3	2



* The shape is different, depending on the version.

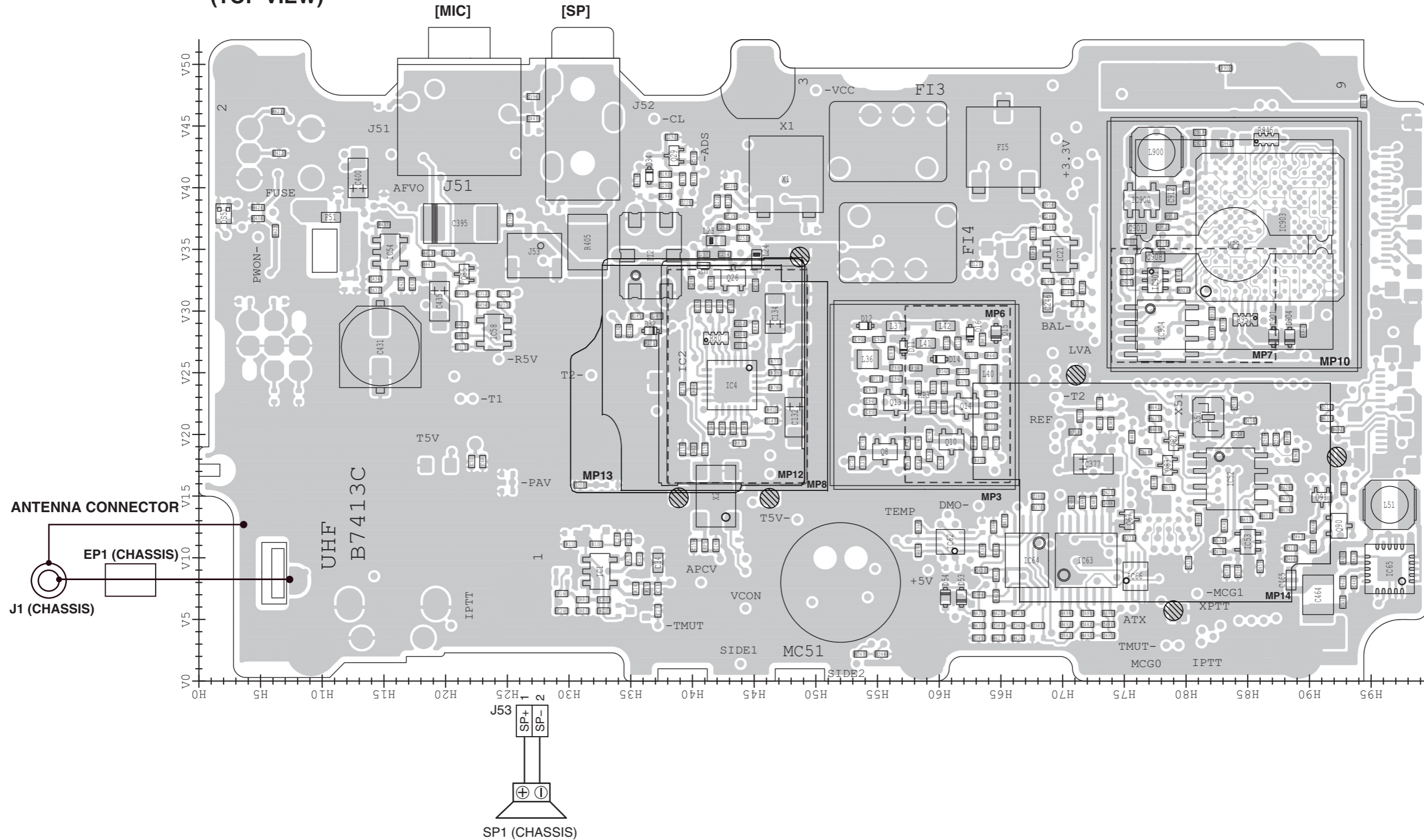
*: Refer to "BOARD LAYOUTS" for the location.

Screw abbreviations A, B0, BT: Self-tapping PH: Pan head ZK: Black NI-ZU: Nickel-Zinc SUS: Stainless

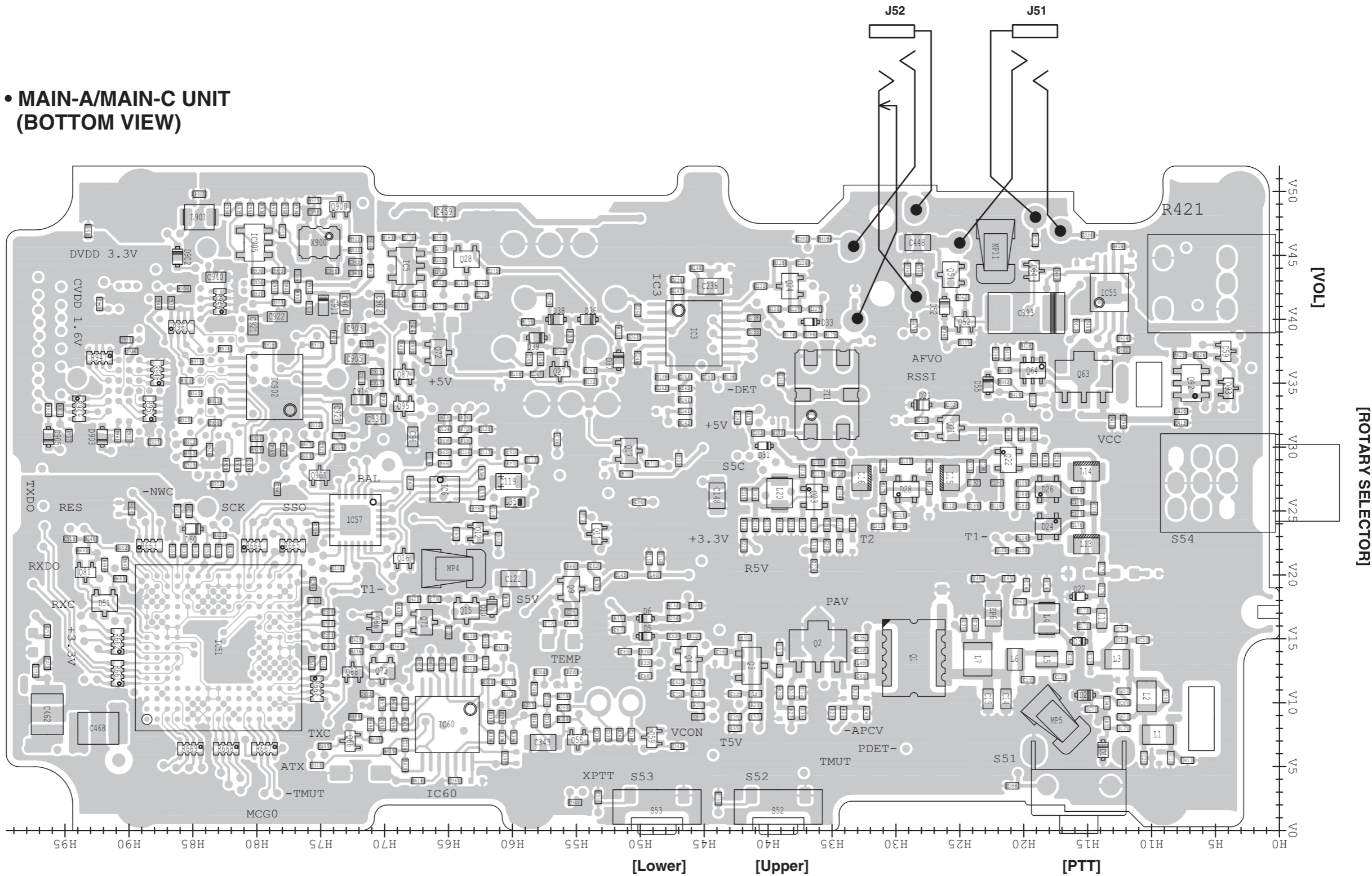


ABBREVIATIONS:
 (C): CHASSIS
 (M): MAIN-A/MAIN-C UNIT

• MAIN-A/MAIN-C UNIT
(TOP VIEW)

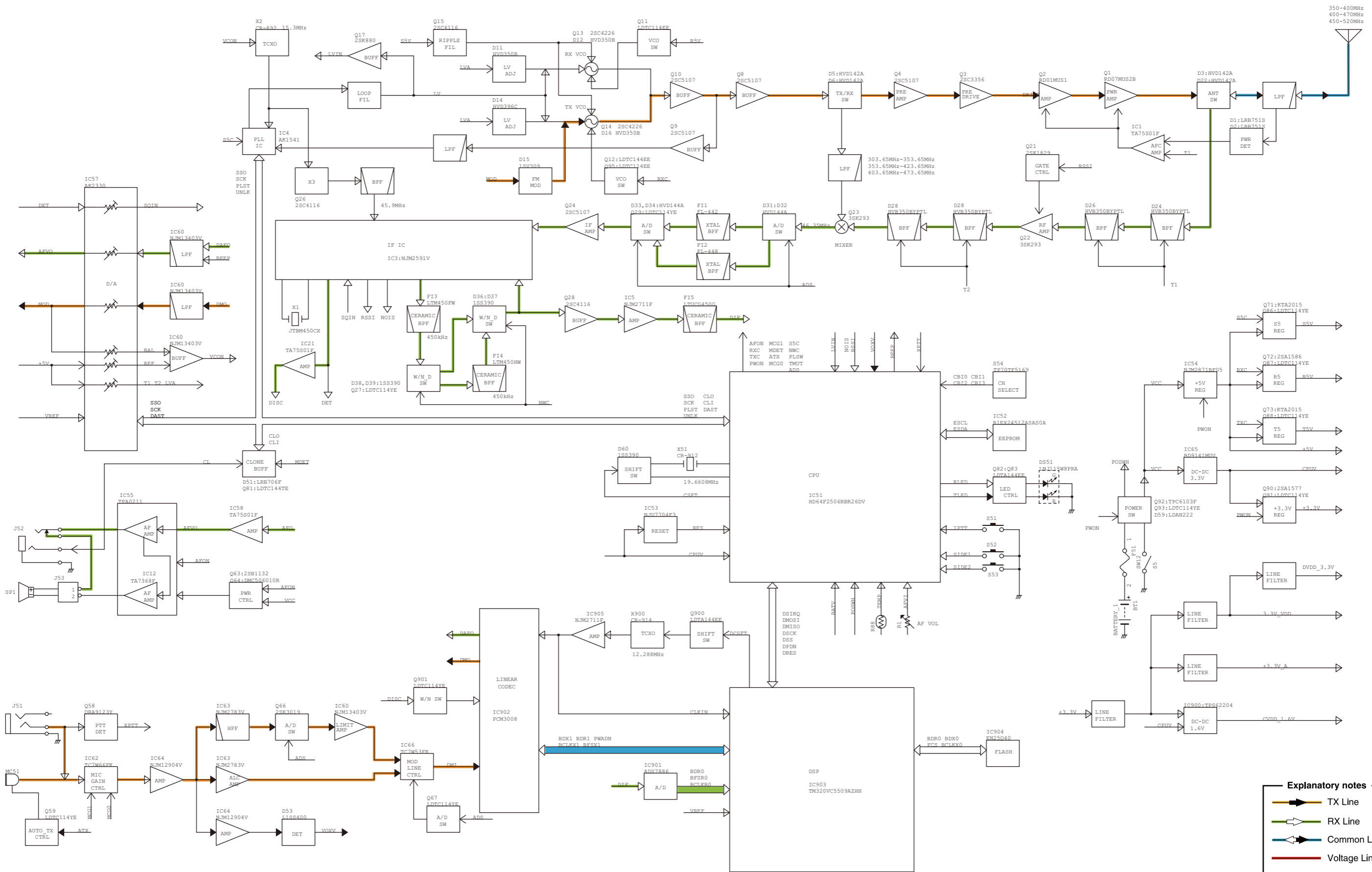


• MAIN-A/MAIN-C UNIT
(BOTTOM VIEW)



SECTION 9

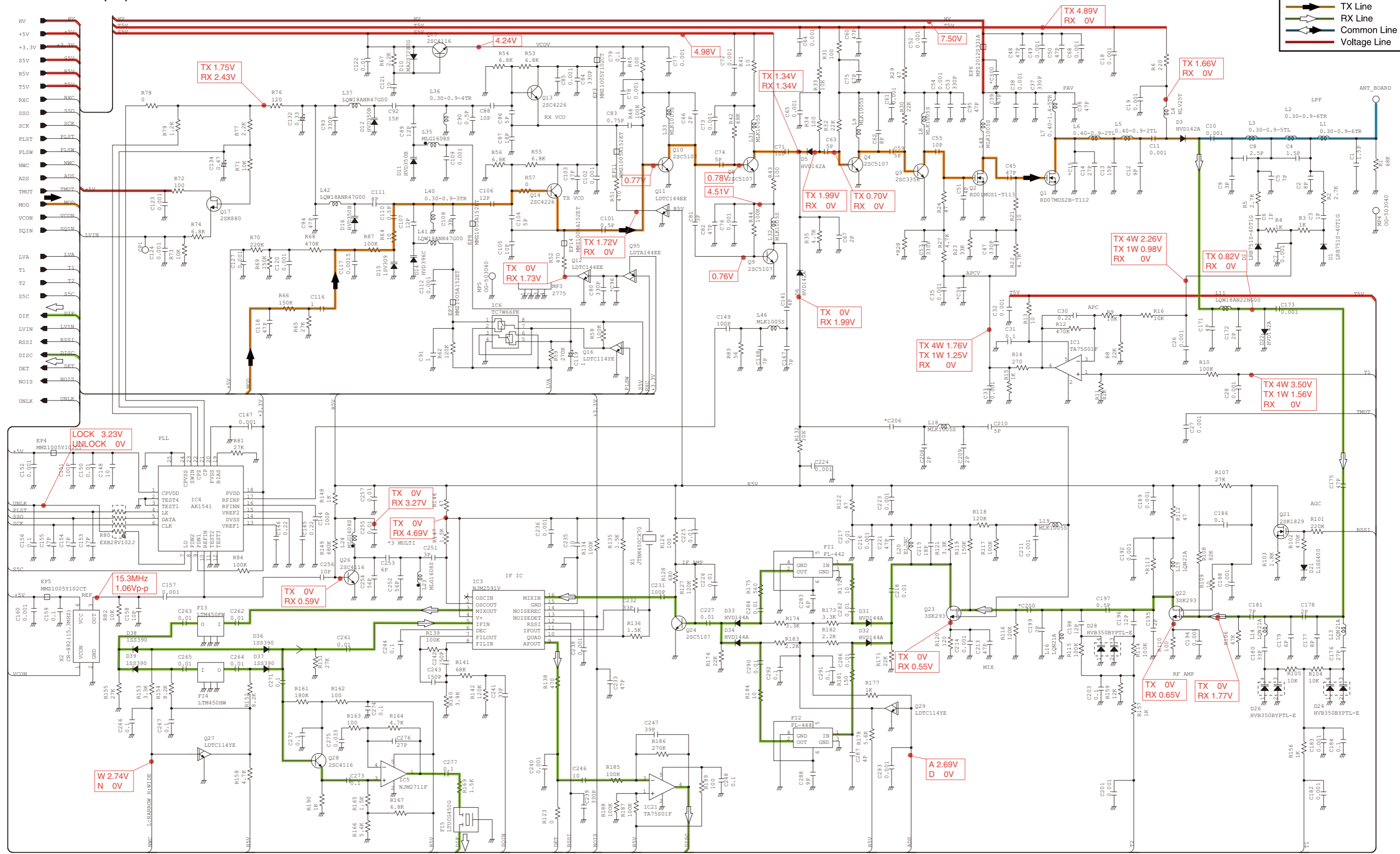
BLOCK DIAGRAM



SECTION 10

VOLTAGE DIAGRAM

• MAIN-A/C UNIT (1/3)

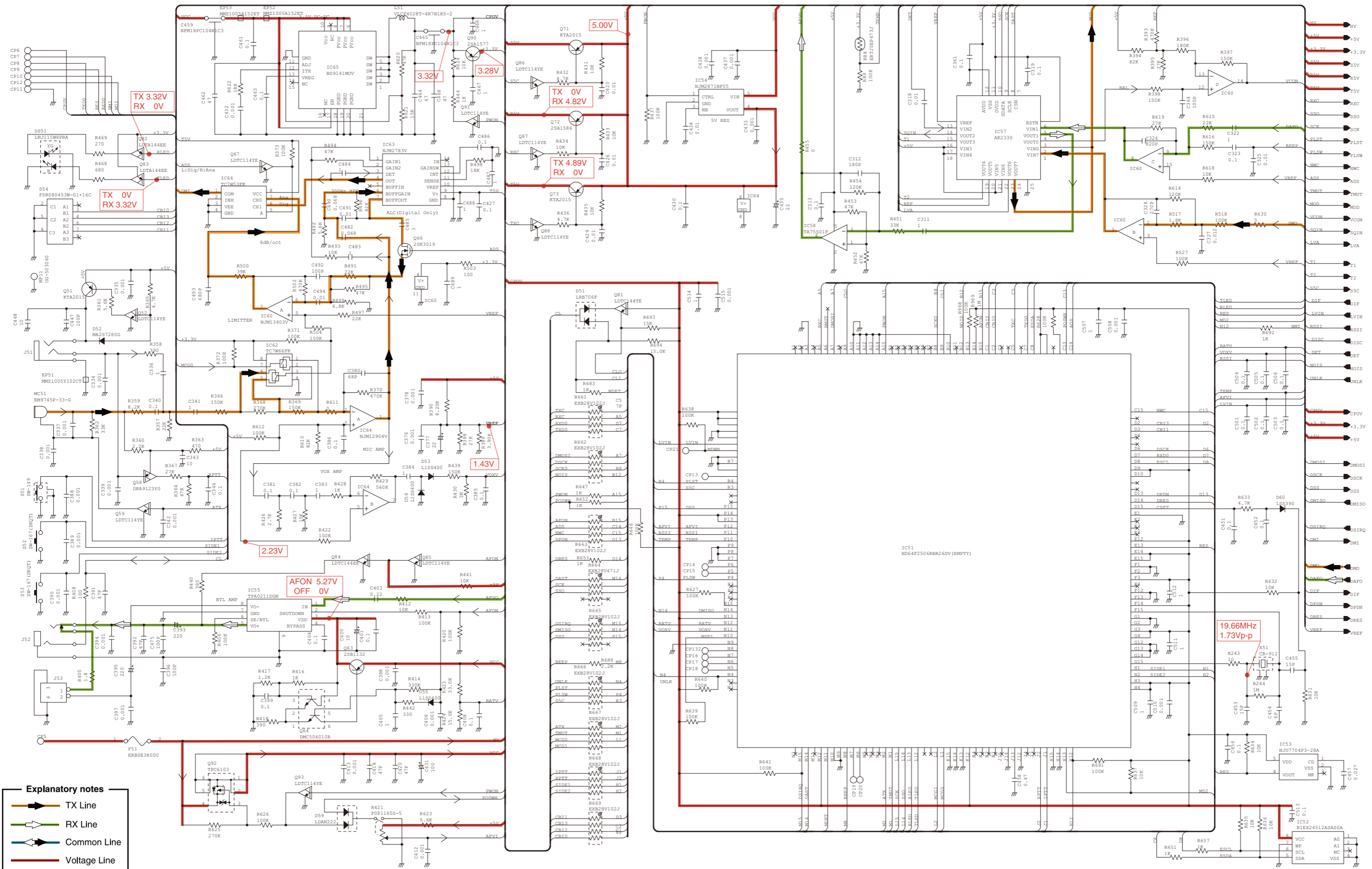


Explanatory notes

- TX Line
- RX Line
- Common Line
- Voltage Line

*: Refer to the PARTS LIST for the value and name of component.

• MAIN-A/C UNIT (2/3)

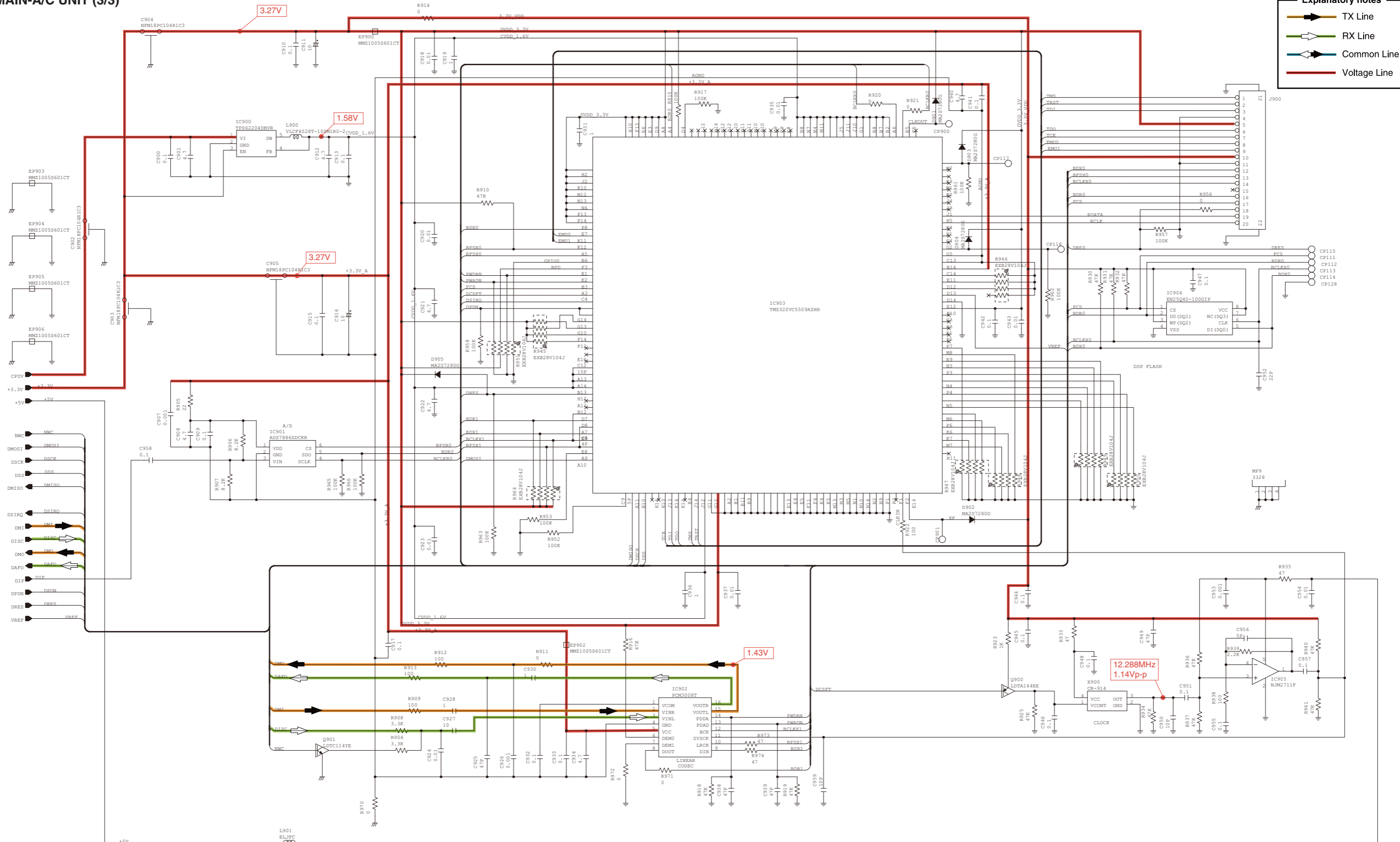


Explanatory notes

- TX Line
- RX Line
- Common Line
- Voltage Line

*: Refer to the PARTS LIST for the value and name of component.

• MAIN-A/C UNIT (3/3)



*: Refer to the PARTS LIST for the value and name of component.

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