



SERVICE MANUAL

DUAL BAND TRANSCEIVER

IC-2730A
IC-2730E

S-15120XZ-C1
March 2015

Icom Inc.

INTRODUCTION

This service manual describes the latest technical information for the **IC-2730A** and **IC-2730E** DUAL BAND TRANSCEIVER, at the time of publication.

MODEL	VERSION	VERSION NUMBER	TX POWER
IC-2730A	TPE-01	#04	25 W/15 W/5 W
	USA-01	#05	50 W/15 W/5 W
	KOR-01	#06	
	EXP-01	#09	
EUR-01	#02		
IC-2730E	ITR-01	#03	
	CHN-01	#10	

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 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.

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



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-2730A MAIN UNIT 5 pieces
8820001210 Screw 2438 screw IC-2730E 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 dis-assembling 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, otherwise the RF power may damage them.
7. **ALWAYS** connect a 50 dB to 60 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 coverage:

EUR	RX	118–174 MHz* ¹ , 375–550 MHz* ²
	TX	144–146 MHz, 430–440 MHz
ITR	RX	118–136.99166 MHz* ³ , 144–146 MHz, 430–434 MHz, 435–438 MHz
	TX	144–146 MHz, 430–434 MHz, 435–438 MHz
TPE	RX, TX	144–146 MHz, 430–432 MHz
USA	RX	118–174 MHz* ⁴ , 375–550 MHz* ⁵
	TX	144–148 MHz, 430–450 MHz* ⁵
KOR	RX, TX	144–146 MHz, 430–440 MHz
EXP, CHN	RX	118–174 MHz* ⁴ , 375–550 MHz* ²
	TX	137–174 MHz* ⁴ , 400–470 MHz* ²

*¹ Guaranteed only 144–146 MHz *² Guaranteed only 430–440 MHz *³ Not guaranteed *⁴ Guaranteed only 144–148 MHz *⁵ Guaranteed only 430–450 MHz

- Mode: F2D/F3E (FM/FM-N),
A3E (AM/AM-N) RX only
- Number of memory channels: 1000 channels
- Number of program scan channels: 25 channels (2 edge frequencies in each channel)
- Number of call channels: 2 channels
- Scan types: Full, Band, Program, Priority, Memory channel, Bank, Skip and Tone scans
- Antenna connector: SO-239
- Antenna impedance: 50 Ω
- Usable temperature range: –10°C to +60°C, +14°F to +140°F
- Frequency stability: ±2.5 ppm (–10°C to +60°C, +14°F to +140°F)
- Frequency resolution: 5 kHz, 6.25 kHz, 8.33 kHz, 10 kHz, 12.5 kHz, 15 kHz, 20 kHz, 25 kHz, 30 kHz, 50 kHz
The 8.33 kHz step is not selectable, depending on the operating band or mode.
- Power supply: 13.8 V DC ±15% (negative ground)
- Current drain:

Transmit	
Maximum current drain:	≤ 10.5 A at 25 W (TPE version) ≤ 13.0 A at 50 W (Other versions)
Receive	
Standby:	≤ 1.2 A
Maximum audio:	≤ 1.8 A
- Dimensions (projections not included):

Main unit:	150(W) × 40(H) × 151(D) mm, 5.9(W) × 1.6(H) × 5.9(D) inches
Controller:	150(W) × 50(H) × 27.2(D) mm, 5.9(W) × 2(H) × 1.1(D) inches
- Weight (approximately):

Main unit:	1.2 kg, 2.6 lb
Controller:	140 g, 4.9 oz

◇ Transmitter

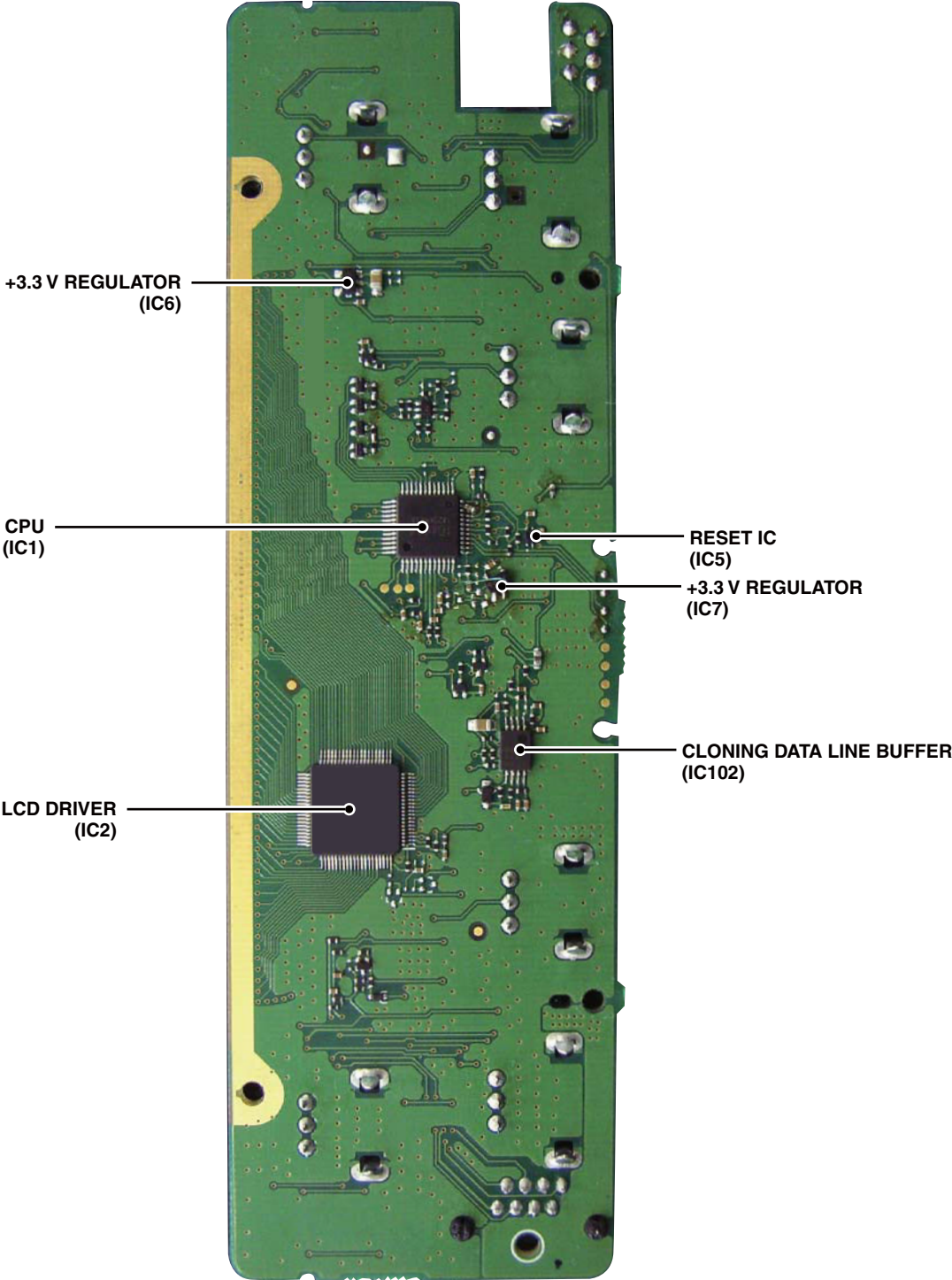
- Modulation system: Variable reactance frequency modulation
- Type of emission: F2D, F3E
- Maximum deviation:

FM:	≤ ±5.0 kHz
FM-N:	≤ ±2.5 kHz
- Input impedance (Mic): 600 Ω
- Spurious emission: ≤ –60 dBc
- Output power: High 25 W, Mid 15 W, Low 5 W (TPE version)
High 50 W, Mid 15 W, Low 5 W (Other versions)

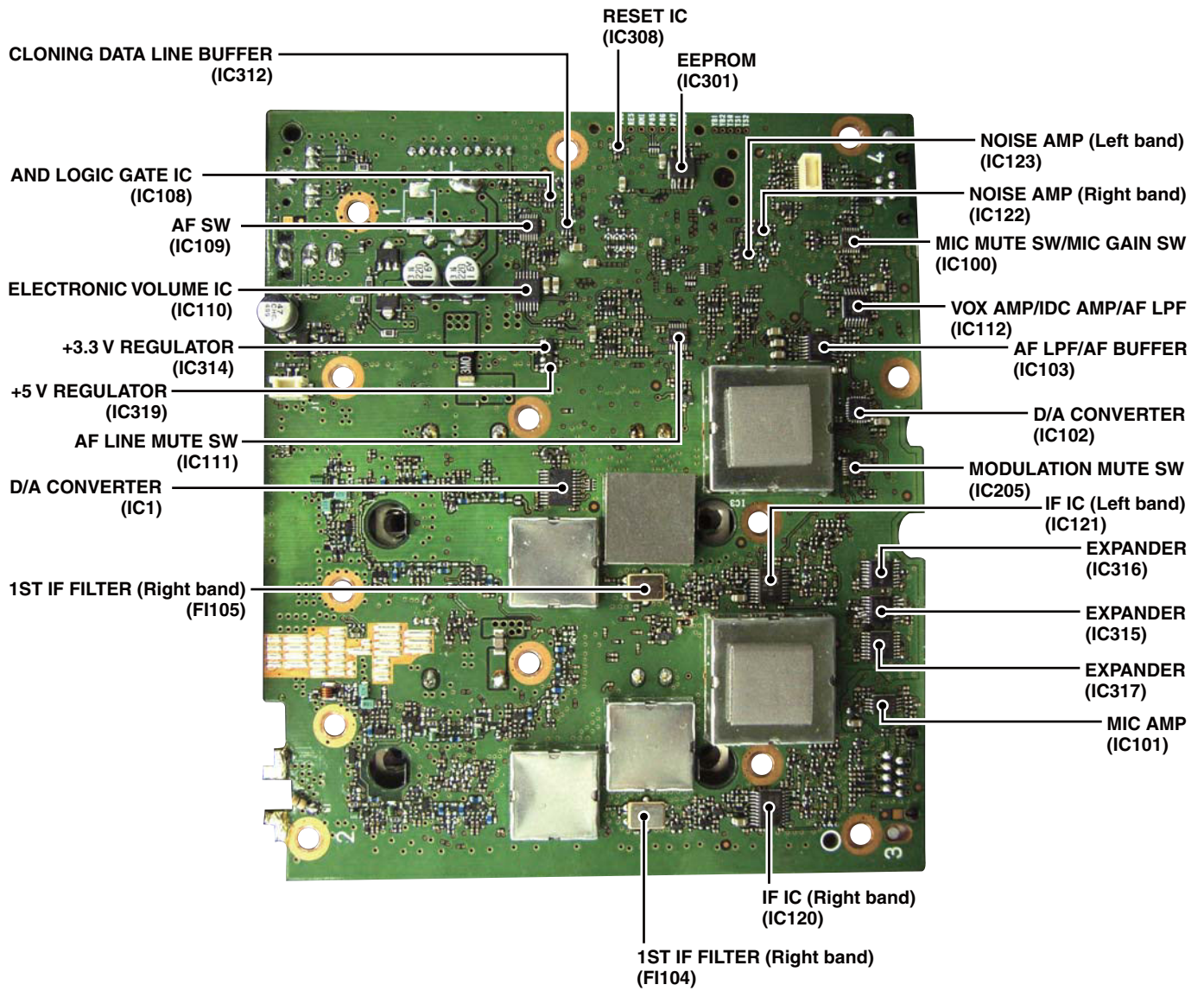
◇ Receiver

- Receive system: Double superheterodyne system
- IF frequencies:
 - Left band
 - 1st IF 38.85 MHz
 - 2nd IF 450 kHz
 - Right band
 - 1st IF 46.35 MHz
 - 2nd IF 450 kHz
- Sensitivity (except spurious points):
 - Amateur bands
 - FM/FM-N (12 dB SINAD)
 $\leq 0.18 \mu\text{V}$
 - Except Amateur bands
 - FM/FM-N (12 dB SINAD)
 - $\leq 0.32 \mu\text{V}$ (137.000–159.995 MHz)
 - $\leq 0.56 \mu\text{V}$ (160.000–174.000 MHz)
 - $\leq 0.56 \mu\text{V}$ (375.000–399.995 MHz)
 - $\leq 0.32 \mu\text{V}$ (400.000–499.995 MHz)
 - $\leq 0.56 \mu\text{V}$ (500.000–550.000 MHz)
 - AM (10 dB S/N)
 $\leq 1 \mu\text{V}$ (118.000–136.99166 MHz)
- Squelch sensitivity: $\leq 0.13 \mu\text{V}$ (Threshold)
- Selectivity:
 - FM $\geq 60 \text{ dB}$
 - FM-N $\geq 55 \text{ dB}$
- Spurious and image rejection ratio:
 - $\geq 60 \text{ dB}$
 - $\geq 55 \text{ dB}$ (Left band UHF)
- AF output power: $\geq 2.0 \text{ W}$ (at 10% distortion into an 8Ω load)
- Output impedance (Speaker): 8Ω

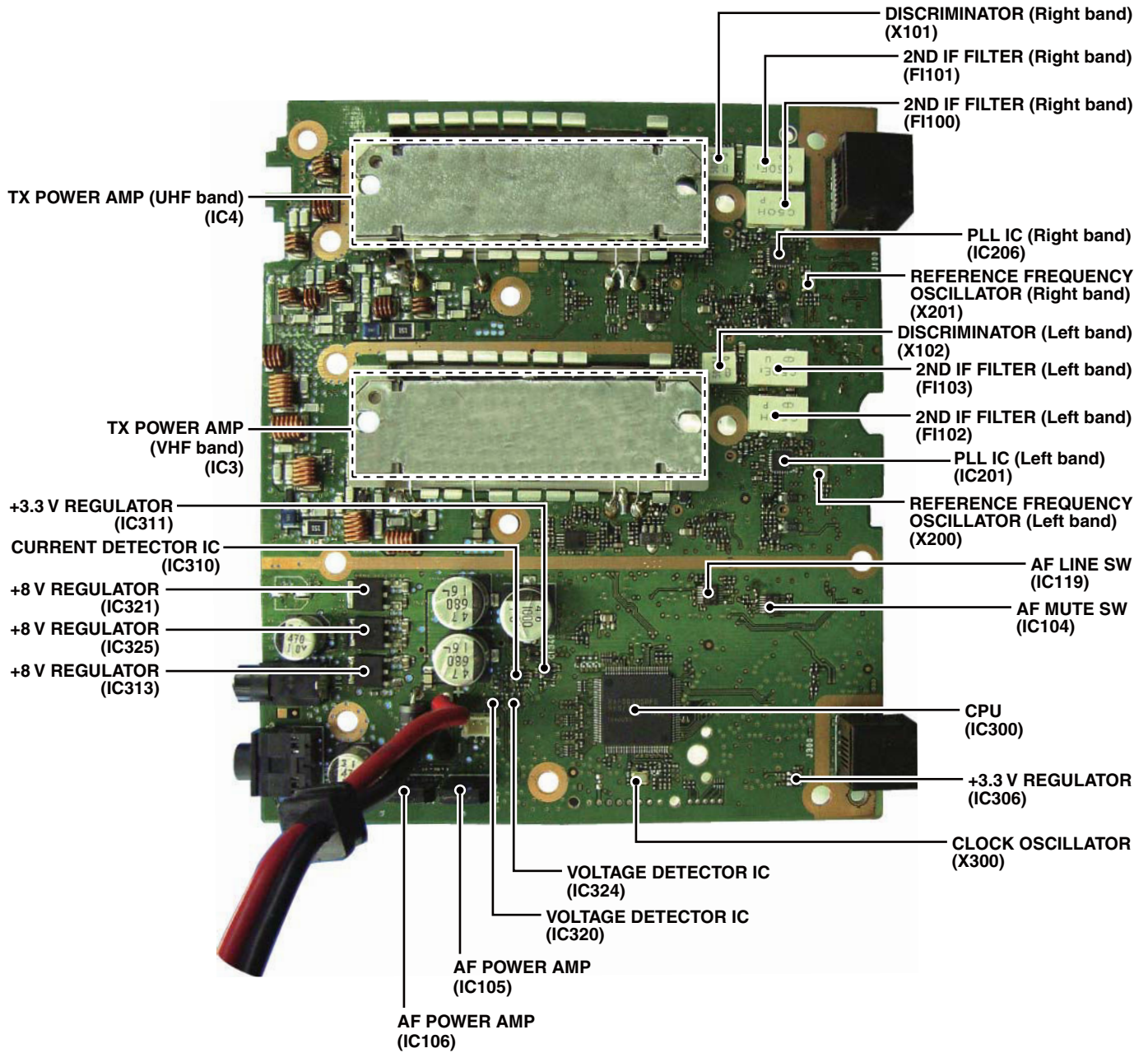
• CONTROL UNIT



• MAIN UNIT
(TOP VIEW)



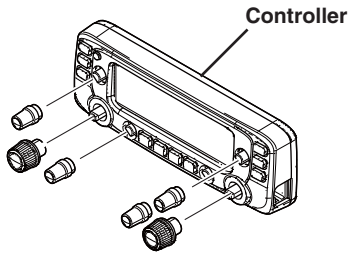
• MAIN UNIT
(BOTTOM VIEW)



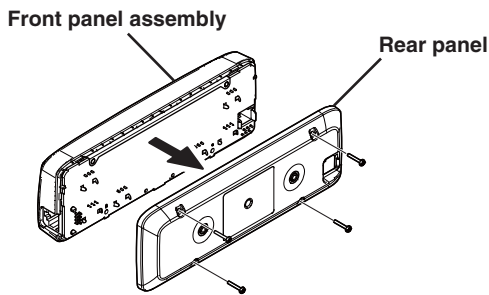
SECTION 3 DISASSEMBLY INSTRUCTION

1. Removing the CONTROL UNIT

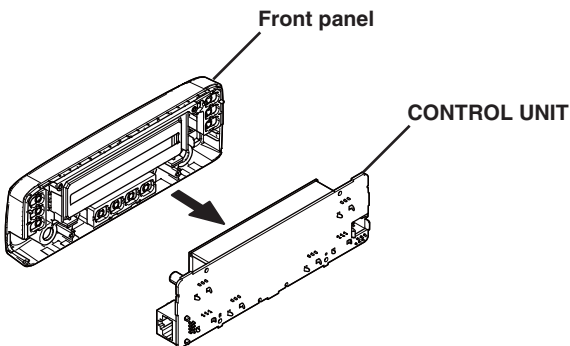
1) Remove all knobs from the controller.



2) Remove four screws from the rear panel.
3) Separate the rear panel from the front panel assembly.

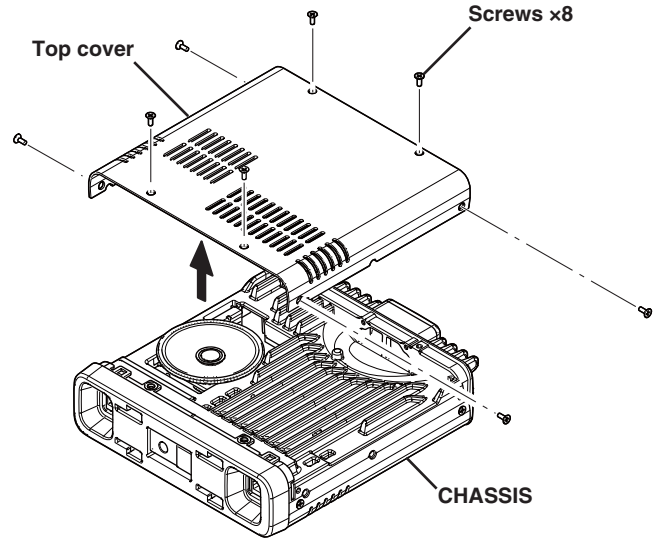


4) Remove the CONTROL UNIT from the front panel.

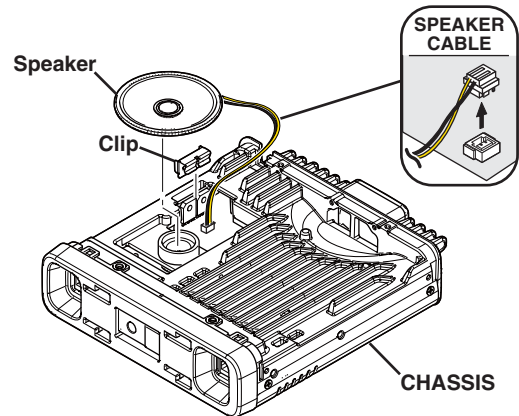


2. Removing the MAIN UNIT

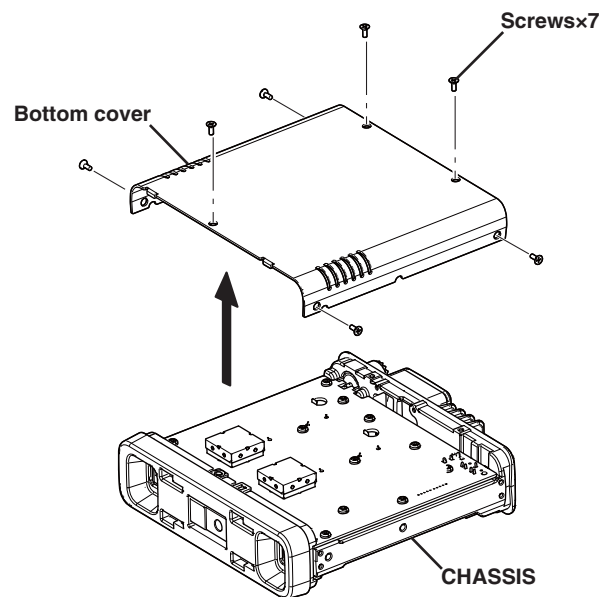
1) Remove eight screws from the top cover.
2) Remove the top cover from the chassis.



3) Disconnect the speaker cable from the MAIN UNIT.
4) Remove the clip from the chassis.

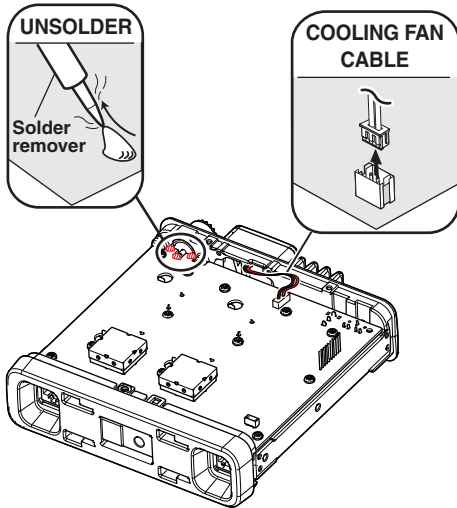


5) Remove seven screws from the bottom cover.

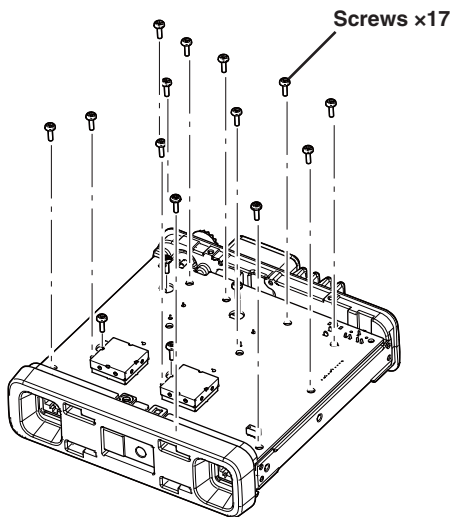


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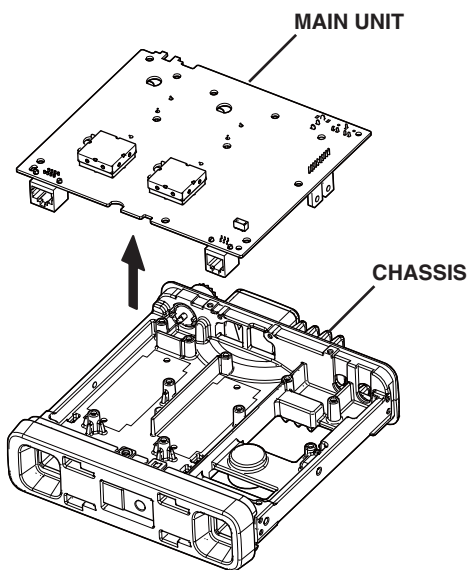
- 6) Unsolder three points at the antenna connector.
- 7) Disconnect the cooling fan cable.



- 8) Remove total of 17 screws from the MAIN UNIT.



- 9) Remove the MAIN UNIT from the chassis.



4-1 RECEIVE CIRCUITS

RF CIRCUITS

The received signal from the antenna connector passed through the LPF (L90, L94, L96, C409, C418 and C428). The filtered signal is applied to either the VHF or UHF band's RF circuit.

VHF BAND (118–174 MHz)

The received VHF band signal from the LPF (L90, L94, L96, C409, C418 and C428) is passed through the LPF (L79, L83, L87, C378, C386 and C394) and TX/RX SW (D66, D69 to D71 and D77), and applied to the PRE-AMP (Q24).

• Left band

The amplified signal is passed through the attenuator (D34) and tuned BPF (D28, D88, L31, L34, C119, C127, C128 and C135), and applied to the RF AMP (Q20). The amplified signal is passed through the tuned BPF (D20, D87, L10, L18, C60, C71, C74, C79 and C86), and then applied to the 1st mixer (Q145).

• Right band

The amplified signal is passed through the attenuator (D33) and tuned BPF (D27, D85, L23, L32, L33, C116, C125, C126 and C132), and applied to RF AMP (Q19). The amplified signal is passed through the tuned BPF (D19, D86, L9, L17, C57, C69, C70, C77 and C84), and then applied to the 1st mixer (Q143).

UHF BAND (375–550 MHz)

The received UHF band signal from the LPF (L90, L94, L96, C409, C418 and C428) is passed through the HPF (L84, L88, C392, C395 and C429), TX/RX SW (D68, D73, D75, D84, L86, L92, C387, C396 and C413), and applied to the PRE-AMP (Q23).

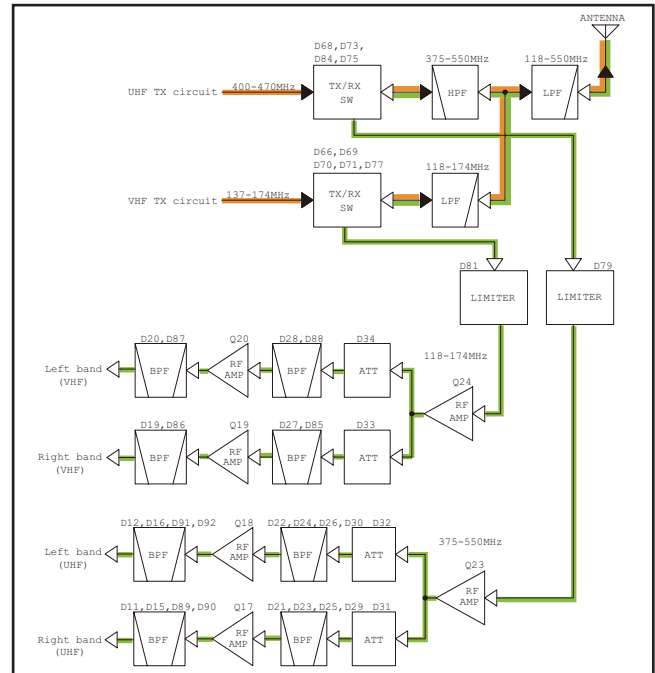
• Left band

The amplified signal is passed through the attenuator (D32) and tuned BPF (D22, D24, D26, D30, L21, L28 and L101), and applied to the RF AMP (Q18). The amplified signal is passed through the tuned BPF (D12, D16, D91, D92, L4, L12, L16, L102, C33, C65 and C67), and then applied to the 1st mixer (Q146).

• Right band

The amplified signal is passed through the attenuator (D31) and tuned BPF (D21, D23, D25, D29, L22, L27 and L99), and applied to the RF AMP (Q17). The amplified signal is passed through the tuned BPF (D11, D15, D89, D90, L3, L11, L15, L100, C32, C63 and C66), and then applied to the 1st mixer (Q144).

RF CIRCUITS



1ST IF CIRCUITS

VHF BAND

• Left band

The received signal from the RF circuit and 1st LO signal are applied to the 1st IF mixer (Q145) and mixed, resulting in the 38.85 MHz 1st IF signal.

The 1st IF signal is applied to the 1st IF filter (F1105), through the band SW (D121).

• Right band

The received signal from the RF circuit and 1st LO signal are applied to the 1st IF mixer (Q143) and mixed, resulting in the 46.35 MHz 1st IF signal.

The 1st IF signal is applied to the 1st IF filter (F1104), through the band SW (D119).

UHF BAND

• Left band

The received signal from the RF circuit and 1st LO signal are applied to the 1st IF mixer (Q146) and mixed, resulting in the 38.85 MHz 1st IF signal.

The 1st IF filter is applied to the 1st IF filter (F1105), through the band SW (D122).

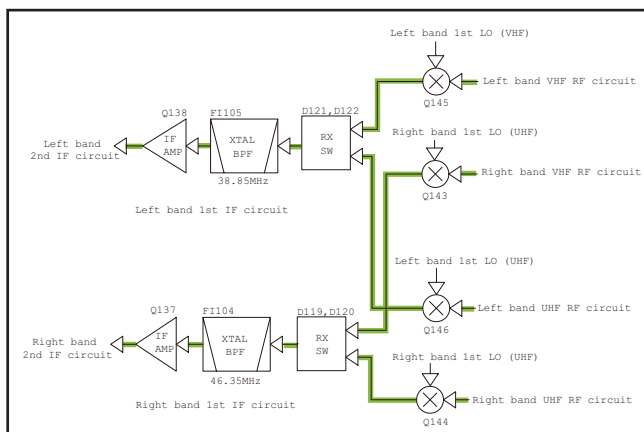
• Right band

The received signal from the RF circuit and 1st LO signal are applied to the 1st IF mixer (Q144) and mixed, resulting in the 46.35 MHz 1st IF signal.

The 1st IF signal is applied to the 1st IF filter (F1104), through the band SW (D120).

The filtered signal is amplified by the IF AMP (Q137), and applied to the IF IC (IC120, pin 20).

1ST IF CIRCUITS



2ND IF CIRCUITS

• Left band

IC121 is an IF IC, which contains the 2nd mixer, limiter AMP, noise AMP, quadrature detector, AM detector, AGC controller, signal strength detector, and so on.

The 1st IF signal from the 1st IF AMP (Q138) and 38.4 MHz 2nd LO signal are mixed, resulting in the 450 kHz 2nd IF signal.

The 2nd IF signal is output from pin 3, and passed through the ceramic filter (F1102: For FM-N or F1103: For FM), and then applied to IC121 from pins 5 and 7.

• Right band

IC120 is an IF IC, which contains the 2nd mixer, limiter AMP, noise AMP, quadrature detector, AM detector, AGC controller, signal strength detector, and so on.

The 1st IF signal from the 1st IF AMP (Q137) and 45.9 MHz 2nd LO signal are mixed, resulting in the 450 kHz 2nd IF signal.

The 2nd IF signal is output from pin 3, and passed through the ceramic filter (F1100: For FM-N or F1101: For FM), and then applied to IC120 from pins 5 and 7.

FM DEMODULATION CIRCUITS

• Left band

The 2nd IF signal applied pin 7 is amplified by the limiter AMP, and then demodulated by the quadrature detector with the ceramic resonator (X102).

The demodulated AF signal is output from pin 11, and then applied to the AF circuit, through the AF SW (IC119, pins 8, 9).

• Right band

The 2nd IF signal applied pin 7 is amplified by the limiter AMP, and then demodulated by the quadrature detector with the ceramic resonator (X101).

The demodulated AF signal is output from pin 11, and then applied to the AF circuit, through the AF SW (IC119, pins 1, 2).

AM DETECTOR CIRCUITS

• Left band

The 2nd IF signal applied from pin 5 is amplified by the IF AMP, and then demodulated by the amplitude detector in the IF IC (IC121).

The demodulated AF signal is output from pin 14, and then applied to the AF circuits, through the AF SW (IC119, pins 11, 10).

In the AM mode, the AGC circuit in the IF IC automatically adjusts the gain of RF AMPs (Q18 and Q20) and 1st IF AMP (Q138), to keep the signal level constant.

The demodulated AF signal is applied to the RX AF circuit.

• Right band

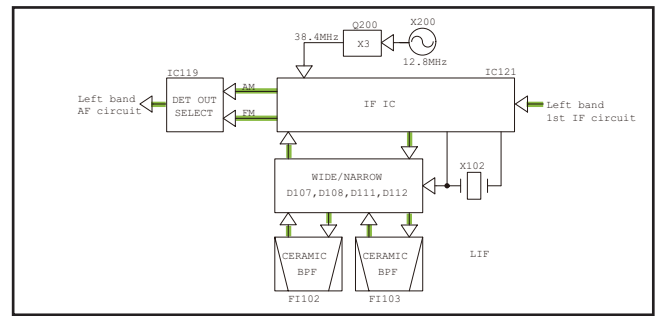
The 2nd IF signal applied from pin 5 is amplified by the IF AMP, and then demodulated by the amplitude detector in the IF IC (IC120).

The demodulated AF signal is output from pin 14, and then applied to the AF circuits, through the AF SW (IC119, pins 4, 3).

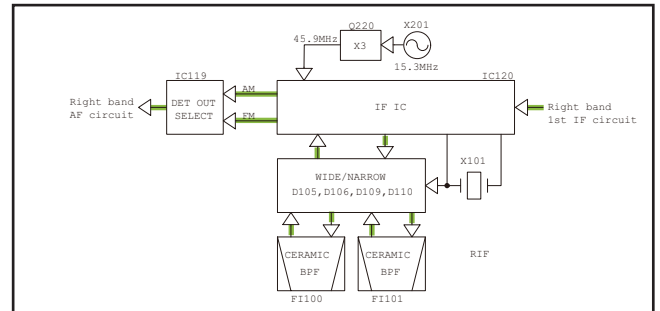
In the AM mode, the AGC circuit in the IF IC automatically adjusts the gain of RF AMPs (Q17 and Q19) and 1st IF AMP (Q137), to keep the signal level constant.

The demodulated AF signal is applied to the RX AF circuit.

2ND IF AND DEMODULATOR CIRCUITS (Left band)



2ND IF AND DEMODULATOR CIRCUITS (Right band)



RX AF CIRCUITS

• Left band

The demodulated AF signal from the AF SW (IC119) is passed through the AF mute SW (IC111, pins 4, 3) and AF filter (Q113), and then applied to the volume IC (IC110, pin 4), which adjusts the AF signal in level.

The level-adjusted AF signal from the volume IC (IC110, pin 11) is passed through the AF SW (IC109, pins 2, 1), which selects the AF signal from Left and Right bands.

• Right band

The demodulated AF signal from the AF SW (IC119) is passed through the AF mute SW (IC111, pins 8, 9) and AF filter (Q112), and then applied to the volume IC (IC110, pin 3), which adjusts the AF signal in level.

The level-adjusted AF signal from the volume IC (IC110, pin 12) is passed through the AF SW (IC109, pins 3, 4), which selects the AF signal from Left and Right bands.

When output from [EXTERNAL SPEAKER JACK1]

The output signal from the AF SW (IC109) is passed through the AF MUTE SW (Q104 and Q105), and applied to the AF AMP (IC105, pin 1).

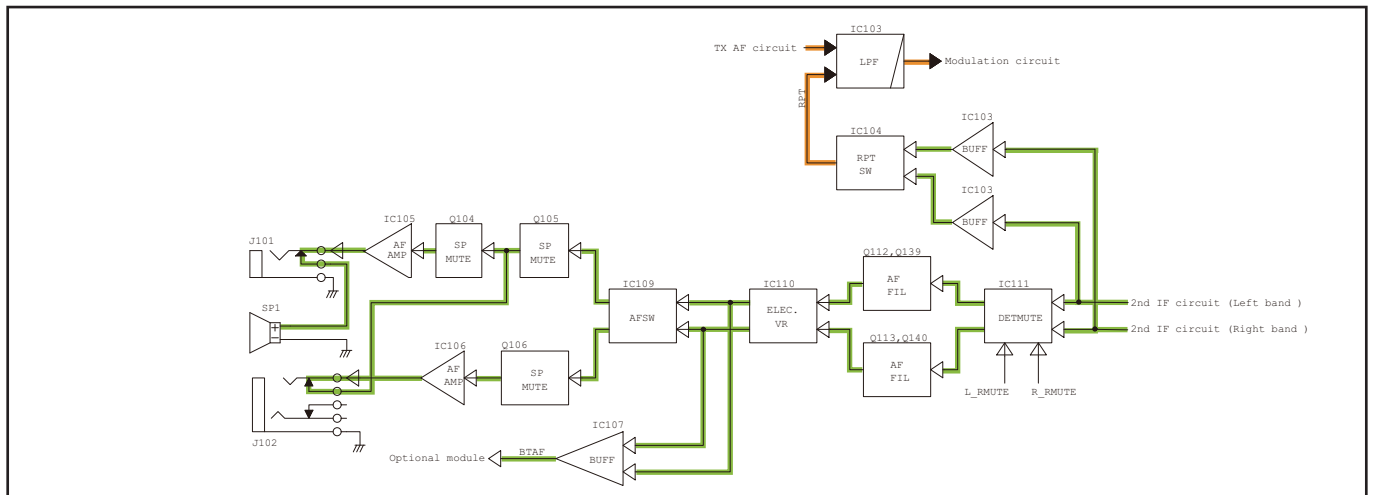
The amplified AF signal is applied to the internal speaker (CHASSIS: SP1) or an external speaker, through [EXTERNAL SPEAKER JACK1] (J101).

When output from [EXTERNAL SPEAKER JACK2]

The output signal from the AF SW (IC109) is passed through the AF MUTE SW (Q106), and applied to the AF AMP (IC106, pin 1).

The amplified AF signal is applied to [EXTERNAL SPEAKER JACK2] (J102).

• RX AF CIRCUITS



4-2 TRANSMIT CIRCUITS

TX AF CIRCUIT (CONTROL AND MAIN UNITS)

When the microphone is connected to the controller:

The AF signal from the microphone is applied to the MIC AMP (CONTROL UNIT: IC102, pin 2), through [MIC] (CONTROL UNIT: J101). The amplified MIC signal is applied to the MIC line SW (MAIN UNIT: IC100, pin 1) on the MAIN UNIT, through the control cable.

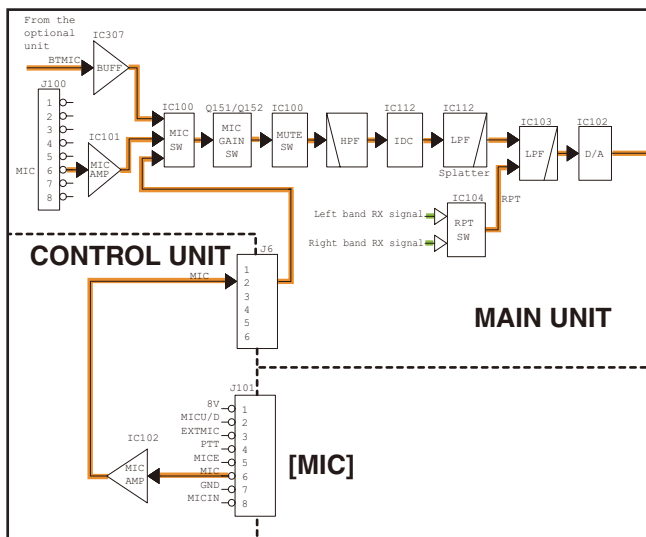
When the microphone is directly connected to the MAIN UNIT:

The AF signal from the microphone is applied to the MIC AMP (MAIN UNIT: IC101, pin 5), through [MIC] (MAIN UNIT: J100).

The amplified MIC signal is passed through the MIC line SW (MAIN UNIT: IC100, pins 11, 10), MIC gain SW (MAIN UNIT: Q151 and Q152), MIC mute SW (MAIN UNIT: IC100, pins 9, 8) and the HPF (MAIN UNIT: R774, C861 and C862), and then adjusted in amplitude by the IDC AMP (MAIN UNIT: IC112, pins 3, 1), and passed through the splatter filter (MAIN UNIT: IC112, pins 13, 14) and LPF (MAIN UNIT: IC103, pins 6, 7), and then applied to the D/A converter (MAIN UNIT: IC102, pin 13).

The level-adjusted MIC signal is passed through the modulation mute SW (MAIN UNIT: VHF band IC205, pins 2, 1/UHF band IC205, pins 3, 4), and then applied to the modulation circuit as the modulation signal.

TX AF CIRCUIT



MODULATION CIRCUITS (MAIN UNIT)

The modulation signal from the TX AF circuit is applied to the VCO as the frequency modulation signal.

VHF BAND

The modulation signal is applied to the VHF VCO (Q211, D203, D204, D206, D228 and D342).

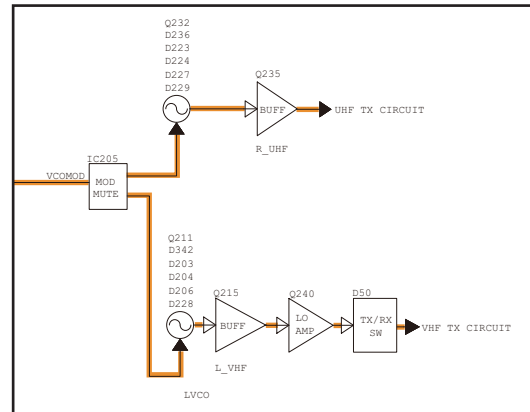
The modulated VCO output signal is amplified by the buffer (Q215), passed through the LO SW (D208), amplified by the LO AMP (Q240), and then applied to the TX AMP circuit as the TX signal, through another LO SW (D50).

UHF BAND

The modulation signal is applied to the UHF VCO (Q232, D223, D224, D227, D229 and D236).

The modulated VCO output signal is amplified by the buffer (Q235), and then applied to the TX AMP circuit as the TX signal.

MODULATION CIRCUITS



TX AMP CIRCUITS (MAIN UNIT)

VHF BAND

The TX signal from the VHF band modulation circuit is passed through the LPF (L50, L51, C215, C220 and C225) and ATT (R146, R147 and R151), and then sequentially amplified by the pre-drive AMP (Q36), drive AMP (Q40) and power AMP (IC3).

The amplified TX signal is passed through the LPF (L67, L68, C291, C297, C301, C302, C326, C331 and C332), TX output power detector (D59 and D63), ANT SW (D66) and two LPFs: (L79, L83, L87, C378, C386, C394 and L90, L94, L96, C409, C418, C428), before being applied to the antenna.

UHF BAND

The TX signal from the UHF band modulation circuit is amplified by the LO AMP (Q37), passed through the HPF (L52 and C232), ATT (R155, R156 and R162), and then sequentially amplified by the pre-drive AMP (Q38), drive AMP (Q41) and power AMP (IC4).

The amplified TX signal is passed through the LPF (L69, L73, C310, C319, C322, C323, C350, C358 and C359), TX output power detector (D62 and D67), ANT SW (D68 and D84) and HPF (L84, L88, C391, C392, C395, C402, C429 and C430) and LPF (L90, L94, L96, C409, C418 and C428), before being applied to the antenna.

APC CIRCUITS

VHF BAND

A portion of RF signal is rectified by the power detector diodes (D59 and D63) at the LPF (L67, L68, C291, C297, C301, C302, C326, C331 and C332), and the produced DC voltage, which represents the TX power level, is used as the TX power sensing voltage.

The TX power sensing voltage is applied to the APC AMP (IC2, pin 2), and the power setting voltage from the D/A converter (IC102, pin 8) is also applied to the AMP from pin 3, resulting in the output voltage which is inversely proportional to the TX power sensing voltage.

When the TX power sensing voltage increases, the output voltage, which controls the gain of the power AMP (IC3), decreases to control the TX power constant.

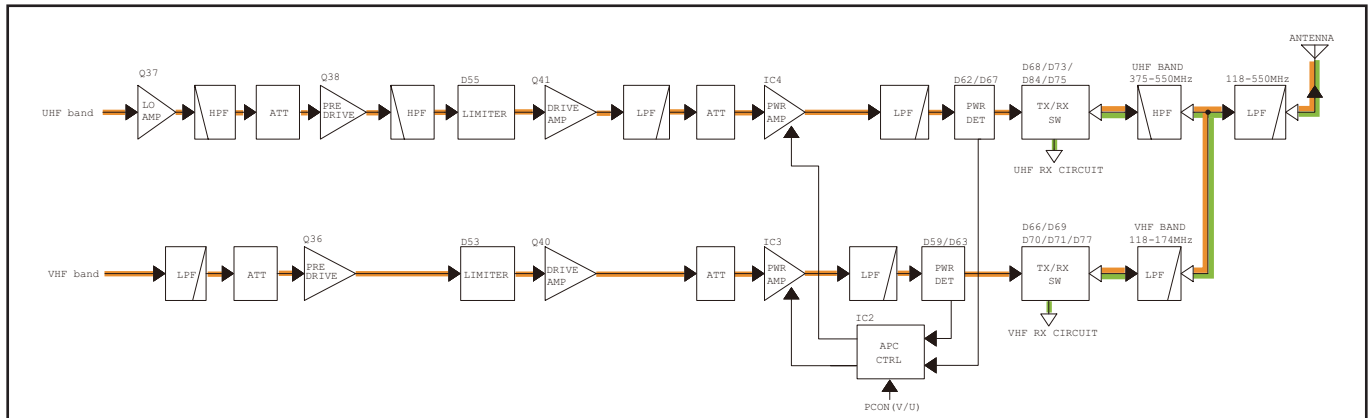
UHF BAND

A portion of RF signal is rectified by the power detector diodes (D62 and D67) at the LPF (L69, L73, C310, C319, C322, C323, C350, C358 and C359), and the produced DC voltage, which represents the TX power level, is used as the TX power sensing voltage.

The TX power sensing voltage is applied to the APC AMP (IC2, pin 6), and the power setting voltage from the D/A converter (IC102, pin 7) is also applied to the AMP from pin 5, resulting in the output voltage which is inversely proportional to the TX power sensing voltage.

When the TX power sensing voltage increases, the output voltage, which controls the gain of the power AMP (IC4), decreases to control the TX power constant.

TX AMP CIRCUITS



4-3 FREQUENCY SYNTHESIZER CIRCUITS (MAIN UNIT)

VCOs

The IC-2730A/E has total of four VCOs: two VCOs for the left band and another two for the right band.

• Left band

VHF VCO

The VHF VCO (Q211, D203, D204, D206, D228 and D342) generates the VHF TX signal. The output of buffer (Q215) is amplified by the LO AMP (Q240), and then applied to the VHF TX AMP circuit, through the LO SW (D50).

UHF VCO

The UHF VCO (Q210, D201, D202 and D205) generates the 1st LO signal (for receiving a UHF signal on the left band).

The output of buffer (Q214) is amplified by the LO AMP (Q240), and then applied to the 1st IF mixer (Q146), through the LO SW (D213) and LPF (L315, C988 and C995).

• Right band

VHF VCO

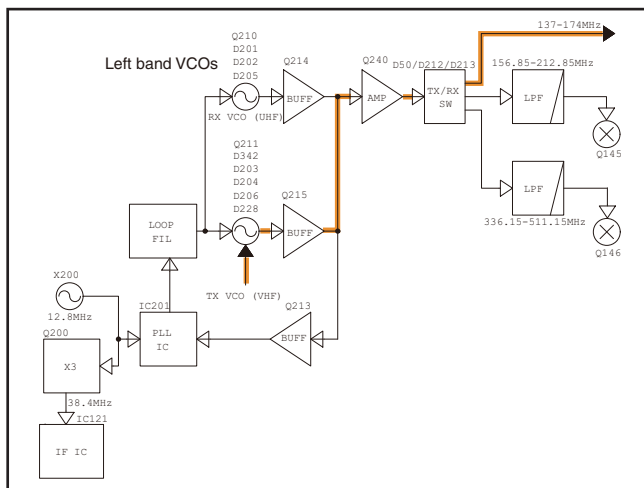
The VHF VCO (Q233, D225, D226 and D230) generates the 1st LO signal (for receiving a VHF signal on the right band).

The output of buffer (Q236) is amplified by the LO AMP (Q238), and then applied to the 1st IF mixer (Q143), through the LO SW (D235) and LPF (L338, L339, C1105 and C1106).

UHF VCO

The UHF VCO (Q232, D223, D224, D227, D229 and D236) generates the UHF TX signal. The output of buffer (Q235) is applied to the UHF TX AMP circuit.

• Left band frequency synthesizer circuit



PLL

The PLL circuit controls the VCO oscillating frequency by comparing the reference signal and the fed back VCO signal. 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.

• Left band

A portion of VHF and UHF VCOs output signal is amplified by the buffer (Q213), and then fed back to the PLL IC (IC201, pin 17).

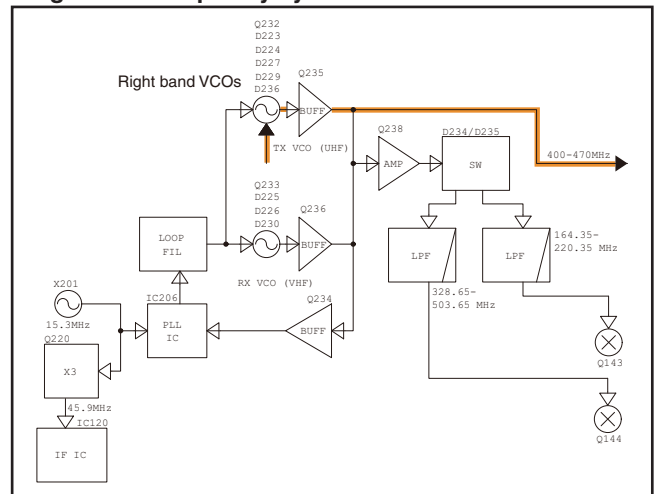
The PLL IC (IC201) phase-compares the output of reference frequency oscillator (TCXO: X200) and VCO, and the phase difference is output as the charge pump current. The current is passed through the loop filter (R715, R717, R719, R722, C924, C926 to C928 and C930) to be converted into the lock voltage, which controls the oscillating frequency of VCO.

• Right band

A portion of VHF and UHF VCOs output signal is amplified by the buffer (Q234), and then fed back to the PLL IC (IC206, pin 17).

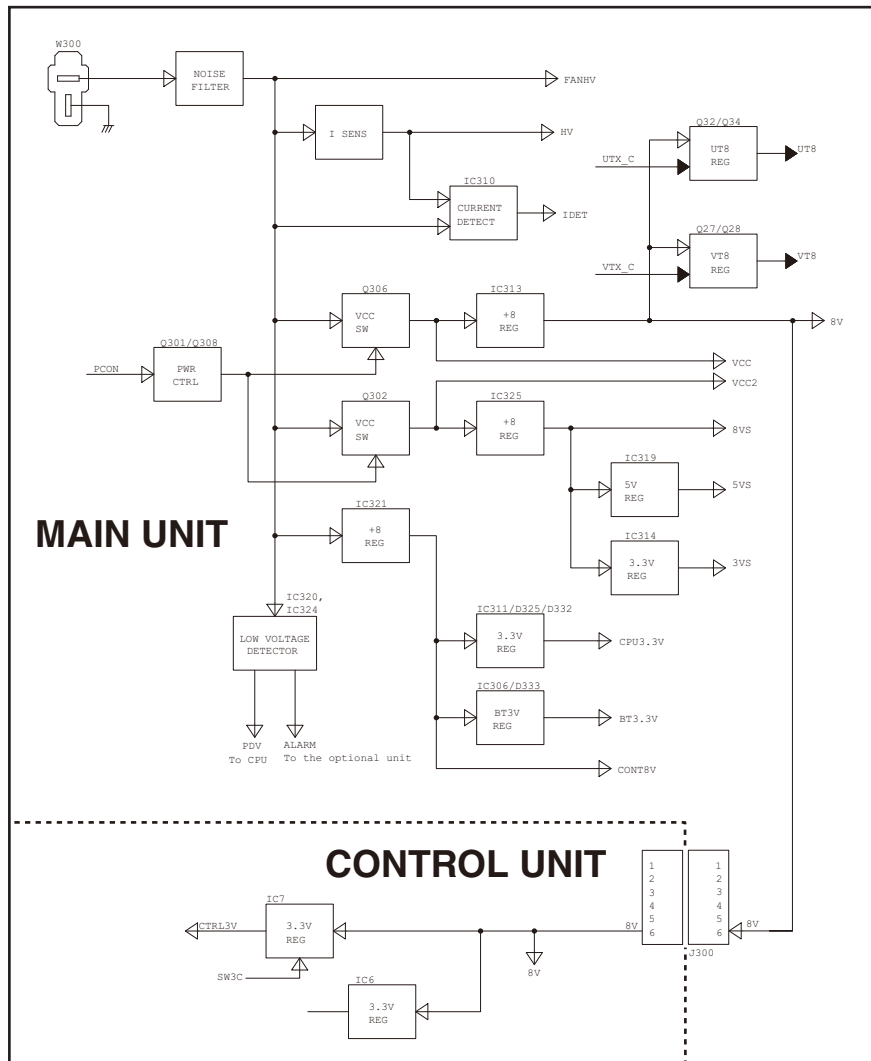
The PLL IC (IC206) phase-compares the output of reference frequency oscillator (TCXO: X201) and VCO, and the phase difference is output as the charge pump current. The current is passed through the loop filter (R797, R799, R802, R805, C1041, C1043 to C1045 and C1048) to be converted into the lock voltage, which controls the oscillating frequency of VCO.

• Right band frequency synthesizer circuit



4-4 VOLTAGE BLOCK DIAGRAM

Voltage from the power supply is routed throughout the transceiver, through regulators and switches.



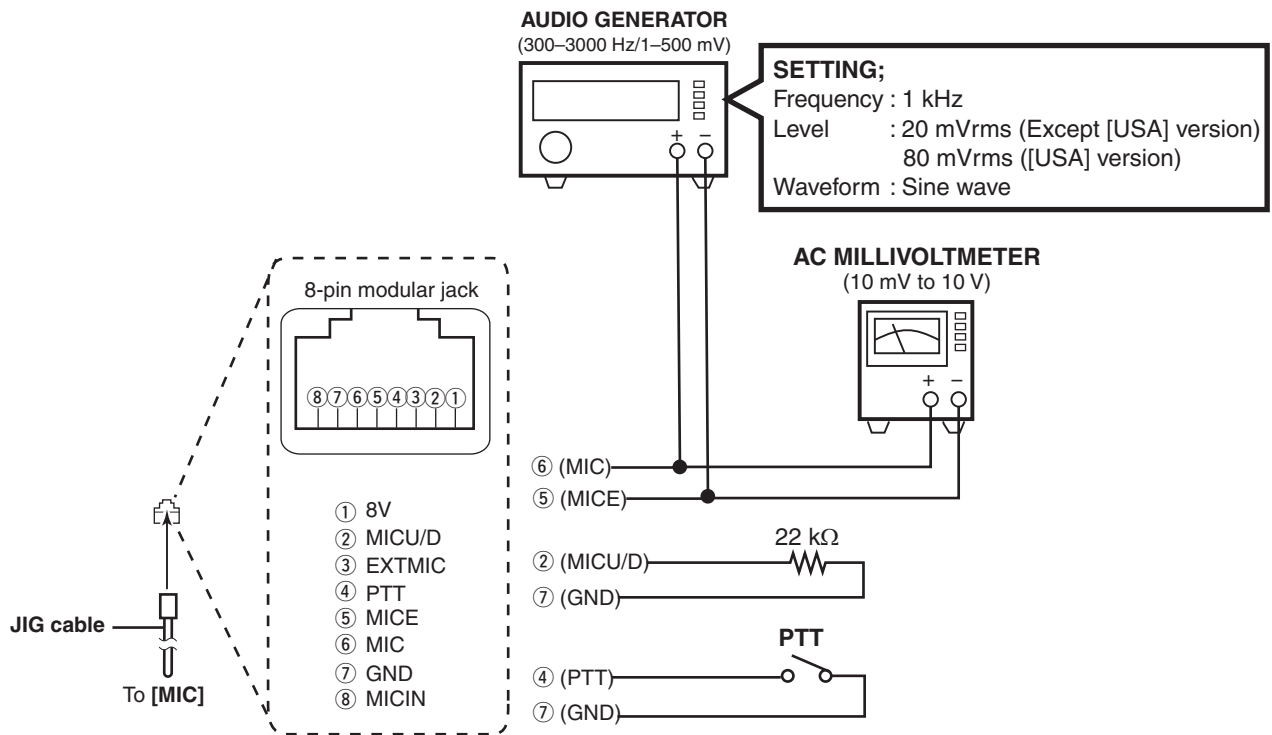
SECTION 5 ADJUSTMENT PROCEDURE

5-1 PREPARATION

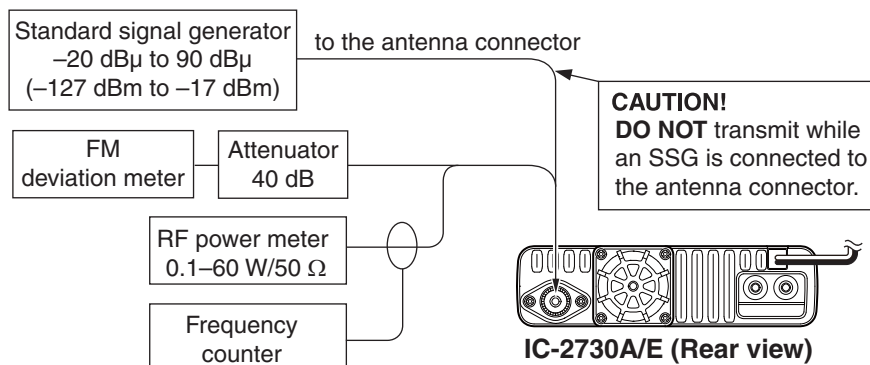
REQUIRED EQUIPMENTS

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
JIG cable	Modified modular cable. (See the illustration shown below.)	Frequency counter	Range: 0.1–600 MHz Accuracy: ± 1 ppm or better Input level: Less than 1 mW
RF power meter (50 Ω terminated)	Measuring range: 0.1–60 W Frequency range: 100–600 MHz SWR: Less than 1.2 : 1		
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 dB μ to 90 dB μ (-127 to -17 dBm)
AC millivoltmeter	Measuring range: 10 mV to 10 V	Attenuator	Attenuation: 40 dB Capacity: More than 60 W
Audio generator (AG)	Frequency range: 300–3000 Hz Output level: 1–500 mV		

JIG CABLE



CONNECTION

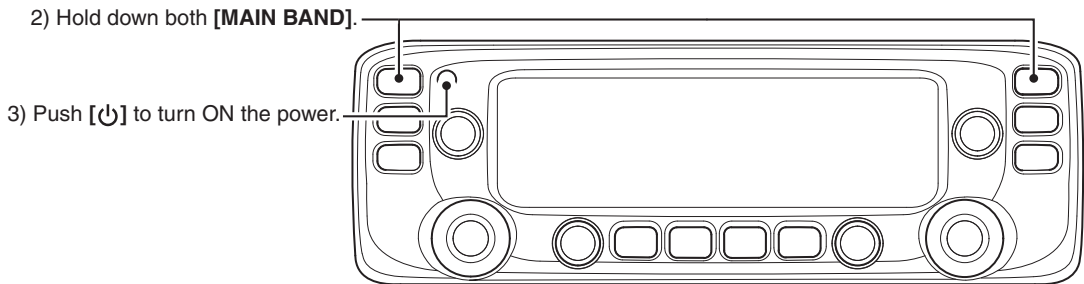
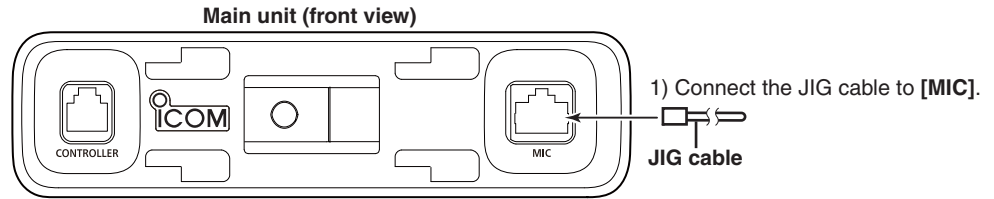


5-1 PREPARATION (Continued)

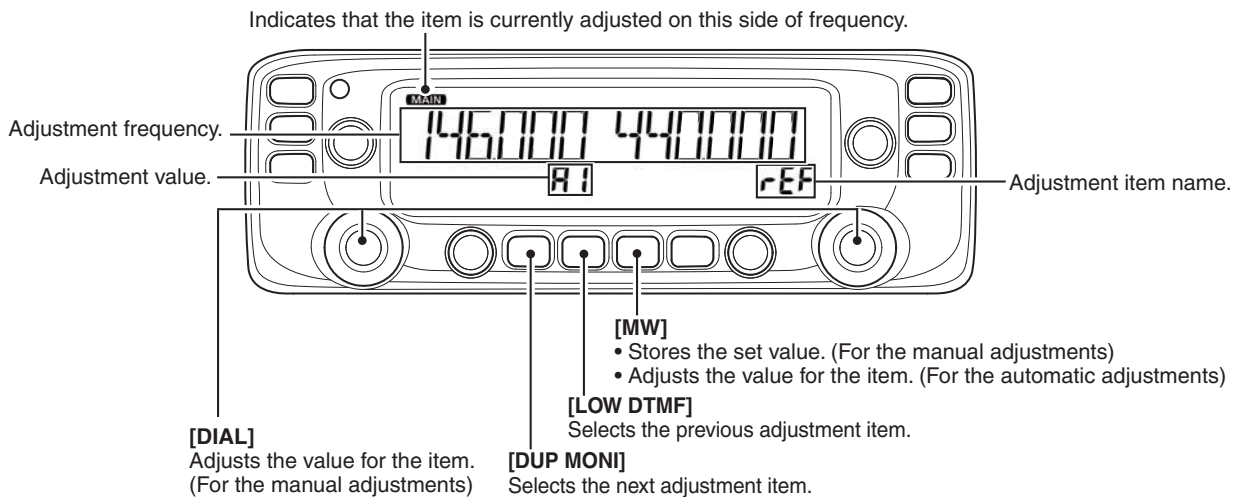
Select an adjustment item using [MONI]/[LOW], and then set the adjustment value as specified using [DIAL].

• ENTERING THE ADJUSTMENT MODE

- 1) Connect the JIG cable to [MIC] on the main unit. (See page 5-1.)
- 2) While holding down both [MAIN BAND], turn ON the power.



• KEY ASSIGNMENTS FOR THE ADJUSTMENT MODE



• QUITTING THE ADJUSTMENT MODE

- 1) Remove the JIG cable from [MIC].
- 2) Turn OFF the power, and then turn ON again.

5-2 FREQUENCY ADJUSTMENT

Select an adjustment item using [DUP MONI]/[LOW DTMF], and then set the adjustment value as specified using [DIAL].

ADJUSTMENT	ADJUSTMENT ITEM	OPERATION		VALUE
REFERENCE FREQUENCY [Left band] [Right band]	[rEF]	1	1) Connect a power meter or dummy load to the antenna connector. 2) Loosely couple a frequency counter to the antenna connector.	146.000 MHz
		2	3) While transmitting, adjust the frequency using [DIAL], and then push [MW] to store the adjustment value.	440.000 MHz

5-3 TRANSMIT ADJUSTMENTS

Select an adjustment item using [DUP MONI]/[LOW DTMF], and then set the adjustment value as specified using [DIAL].

ADJUSTMENT	ADJUSTMENT ITEM	OPERATION		VALUE
TRANSMIT POWER -VHF- (Hi power) [BAND LOW] [BAND HIGH] (Mid power) [BAND LOW] [BAND HIGH] (Low power) [BAND LOW] [BAND HIGH] -UHF- (Hi power) [BAND LOW] [BAND HIGH] (Mid power) [BAND LOW] [BAND HIGH] (Low power) [BAND LOW] [BAND HIGH]	[PL]	1	1) Connect an RF power meter to the antenna connector. 2) While transmitting, adjust the TX power using [DIAL], and then push [MW] to store the adjustment value.	50 W
	[PH]	2		
	[PL] (MID)	3		15 W (22 W [TPE-01])
	[PH] (MID)	4		
	[PL] (LOW)	5		5 W
	[PH] (LOW)	6		
	[PL]	7		50 W
	[PH]	8		
	[PL] (MID)	9		15 W (22 W [TPE-01])
	[PH] (MID)	10		
	[PL] (LOW)	11		5 W
	[PH] (LOW)	12		
DEVIATION -LEFT BAND- (BAND LOW) [FM] [FM-N] (BAND CENTER) [FM] [FM-N] (BAND HIGH) [FM] [FM-N] -RIGHT BAND- (BAND LOW) [FM] [FM-N] (BAND CENTER) [FM] [FM-N] (BAND HIGH) [FM] [FM-N]	[dE]	1	1) Connect a modulation analyzer to the antenna connector through an attenuator, and set it as; HPF: OFF LPF: 20 kHz De-emphasis: OFF Detector: (P-P)/2	±4.2 kHz
	[dE] (NAR)	2		±2.1 kHz
	[dE]	3	2) Connect an audio generator to the JIG cable, and then set it as: Frequency: 1 kHz Level: 20 mVrms (Except [USA] version) 80 mVrms ([USA] version)	±4.2 kHz
	[dE] (NAR)	4		±2.1 kHz
	[dE]	5		±4.2 kHz
	[dE] (NAR)	6	3) While transmitting, adjust the deviation using [DIAL], and then push [MW] to store the adjustment value.	±2.1 kHz
	[dE]	7		±4.2 kHz
	[dE] (NAR)	8		±2.1 kHz
	[dE]	9		±4.2 kHz
	[dE] (NAR)	10		±2.1 kHz
	[dE]	11		±4.2 kHz
	[dE] (NAR)	12		±2.1 kHz

5-3 TRANSMIT ADJUSTMENTS (Continued)

Select an adjustment item using **[DUP MONI]/[LOW DTMF]**, and then set the adjustment value as specified using **[DIAL]**.

ADJUSTMENT	ADJUSTMENT ITEM		OPERATION	VALUE
MODULATION BALANCE -LEFT BAND- (BAND LOW) [FM]	[rdE]	1	1) Connect a modulation analyzer to the antenna connector through an attenuator, and then set it as; HPF: OFF LPF: 20 kHz De-emphasis: OFF Detector: (P-P)/2 2) No audio signal is applied to the JIG cable. 3) While transmitting, adjust the modulation balance using [DIAL] , and then push [MW] to store the adjustment value.	±4.0 kHz
[FM-N]	[rdE] (NAR)	2		±2.0 kHz
(BAND CENTER) [FM]	[rdE]	3		±4.0 kHz
[FM-N]	[rdE] (NAR)	4		±2.0 kHz
(BAND HIGH) [FM]	[rdE]	5		±4.0 kHz
[FM-N]	[rdE] (NAR)	6		±2.0 kHz
-RIGHT BAND- (BAND LOW) [FM]	[rdE]	7		±4.0 kHz
[FM-N]	[rdE] (NAR)	8		±2.0 kHz
(BAND CENTER) [FM]	[rdE]	9		±4.0 kHz
[FM-N]	[rdE] (NAR)	10		±2.0 kHz
(BAND HIGH) [FM]	[rdE]	11		±4.0 kHz
[FM-N]	[rdE] (NAR)	12		±2.0 kHz
TONE DEVIATION -CTCSS- [Left band]	[CtC]	1	1) Connect a modulation analyzer to the antenna connector through an attenuator, and then set it as; HPF: OFF LPF: 20 kHz De-emphasis: OFF Detector: (P-P)/2 2) No audio signal is applied to the JIG cable. 3) While transmitting, adjust the tone deviation using [DIAL] , and then push [MW] to store the adjustment value.	±0.75 kHz
[Right band]		2		
-DTCS- [Left band]		3		
[Right band]	[dtC]	4		

5-4 RECEIVE ADJUSTMENTS

- 1) Select an adjustment item (band) using [DUP MONI]/[LOW DTMF].
- 2) Set the SSG' frequency as specified, and then push [MW] to automatically adjust.

ADJUSTMENT	ADJUSTMENT ITEM	OPERATION	VALUE
RECEIVE SENSITIVITY	NOTE: "RECEIVE SENSITIVITY" must be adjusted before "S-METER." Otherwise, "S-METER" will not be adjusted properly.		
-Preparation-	–	1 • Connect an SSG to the antenna connector, and then set it as; Level: 0 dBμ (-107 dBm) Modulation: None	–
[118.020 MHz] (LEFT BAND) (RIGHT BAND)	[bP1]	2 • Set the SSG as: Frequency: 118.020 MHz	Push [MW]. (Automatic adjustment)
		3	
[145.020/146.020 MHz] (LEFT BAND) (RIGHT BAND)	[bP2]	4 • Set the SSG as: Frequency: (Set the same frequency displayed on the controller.)	Push [MW]. (Automatic adjustment)
		5	
[173.980 MHz] (LEFT BAND) (RIGHT BAND)	[bP3]	6 • Set the SSG as: Frequency: 173.980 MHz	Push [MW]. (Automatic adjustment)
		7	
[375.020 MHz] (LEFT BAND) (RIGHT BAND)	[bP4]	8 • Set the SSG as: Frequency: 375.020 MHz	Push [MW]. (Automatic adjustment)
		9	
[420.020 MHz] (LEFT BAND) (RIGHT BAND)	[bP5]	10 • Set the SSG as: Frequency: 420.020 MHz	Push [MW]. (Automatic adjustment)
		11	
[449.980 MHz] (LEFT BAND) (RIGHT BAND)	[bP6]	12 • Set the SSG as: Frequency: 449.980 MHz	Push [MW]. (Automatic adjustment)
		13	
[450.020 MHz] (LEFT BAND) (RIGHT BAND)	[bP7]	14 • Set the SSG as: Frequency: 450.020 MHz	Push [MW]. (Automatic adjustment)
		15	
[500.020 MHz] (LEFT BAND) (RIGHT BAND)	[bP8]	16 • Set the SSG as: Frequency: 500.020 MHz	Push [MW]. (Automatic adjustment)
		17	
[549.980 MHz] (LEFT BAND) (RIGHT BAND)	[bP9]	18 • Set the SSG as: Frequency: 549.980 MHz	Push [MW]. (Automatic adjustment)
		19	

5-4 RECEIVE ADJUSTMENTS (Continued)

ADJUSTMENT	ADJUSTMENT ITEM	OPERATION	VALUE
S-METER	NOTE: "RECEIVE SENSITIVITY" must be adjusted before "S-METER." Otherwise, "S-METER" will not be adjusted properly.		
	–	1 • Connect an SSG to the antenna connector, and then set it as: Modulation: None	–
-127.020 MHz- (AM mode) [Left band]	[S11]	2 • Set the SSG as: Frequency: 127.020 MHz Level†: –6 dBμ (–113 dBm)	Push [MW]. (Automatic adjustment)
[Right band]	[S11]	3	
[Left band]	[S31]	4 • Set the SSG as: Level†: 0 dBμ (–107 dBm)	
[Right band]	[S31]	5	
[Left band]	[SF1]	6 • Set the SSG as: Level†: +10 dBμ (–97 dBm)	
[Right band]	[SF1]	7	
-145.020/146.020 MHz- (FM mode) [Left band]	[S12]	8 • Set the SSG as: Frequency: (Set the same frequency displayed on the controller.) Level†: –6 dBμ (–113 dBm)	Push [MW]. (Automatic adjustment)
[Right band]	[S12]	9	
[Left band]	[S32]	10 • Set the SSG as: Level†: 0 dBμ (–107 dBm)	
[Right band]	[S32]	11	
[Left band]	[SF2]	12 • Set the SSG as: Level†: +10 dBμ (–97 dBm)	
[Right band]	[SF2]	13	
-387.020 MHz- (FM mode) [Left band]	[S13]	14 • Set the SSG as: Frequency: 387.020 MHz Level†: –6 dBμ (–113 dBm)	Push [MW]. (Automatic adjustment)
[Right band]	[S13]	15	
[Left band]	[S33]	16 • Set the SSG as: Level†: 0 dBμ (–107 dBm)	
[Right band]	[S33]	17	
[Left band]	[SF3]	18 • Set the SSG as: Level†: +10 dBμ (–97 dBm)	
[Right band]	[SF3]	19	
-435.020/445.020 MHz- (FM mode) [Left band]	[S14]	20 • Set the SSG as: Frequency: (Set the same frequency displayed on the controller.) Level†: –6 dBμ (–113 dBm)	Push [MW]. (Automatic adjustment)
[Right band]	[S14]	21	
[Left band]	[S34]	22 • Set the SSG as: Level†: 0 dBμ (–107 dBm)	
[Right band]	[S34]	23	
[Left band]	[SF4]	24 • Set the SSG as: Level†: +10 dBμ (–97 dBm)	
[Right band]	[SF4]	25	
-500.020 MHz- (FM mode) [Left band]	[S15]	26 • Set the SSG as: Frequency: 500.020 MHz Level†: –6 dBμ (–113 dBm)	Push [MW]. (Automatic adjustment)
[Right band]	[S15]	27	
[Left band]	[S35]	28 • Set the SSG as: Level†: 0 dBμ (–107 dBm)	
[Right band]	[S35]	29	
[Left band]	[SF5]	30 • Set the SSG as: Level†: +10 dBμ (–97 dBm)	
[Right band]	[SF5]	31	
-127.020 MHz- (AM-N mode) [Left band]	[S36] (NAR)	32 • Set the SSG as: Frequency: 127.020 MHz Level†: 0 dBμ (–107 dBm)	Push [MW]. (Automatic adjustment)
[Right band]	[S36] (NAR)	33	
-145.020/146.020 MHz- (FM-N mode) [Left band]	[S37] (NAR)	34 • Set the SSG as: Frequency: (Set the same frequency displayed on the controller.) Level†: 0 dBμ (–107 dBm)	Push [MW]. (Automatic adjustment)
[Right band]	[S37] (NAR)	35	
-387.020 MHz- (FM-N mode) [Left band]	[S38] (NAR)	36 • Set the SSG as: Frequency: 387.020 MHz Level†: 0 dBμ (–107 dBm)	Push [MW]. (Automatic adjustment)
[Right band]	[S38] (NAR)	37	

5-4 RECEIVE ADJUSTMENTS (Continued)

ADJUSTMENT	ADJUSTMENT ITEM	OPERATION		VALUE
-435.020/450.020 MHz- (FM-N mode) [Left band]	[S39] (NAR)	38	<ul style="list-style-type: none"> Set the SSG as: Frequency: (Set the same frequency displayed on the controller.) Level†: 0 dBμ (-107 dBm) 	Push [MW]. (Automatic adjustment)
[Right band]	[S39] (NAR)	39		
-500.020 MHz- (FM-N mode) [Left band]	[S40] (NAR)	40	<ul style="list-style-type: none"> Set the SSG as: Frequency: (Set the same frequency displayed on the controller.) Level†: 0 dBμ (-107 dBm) 	Push [MW]. (Automatic adjustment)
[Right band]	[S40] (NAR)	41		
SQUELCH	NOTE: "RECEIVE SENSITIVITY" must be adjusted before "SQUELCH" and "S-METER." Otherwise, "SQUELCH" will not be adjusted properly.			
-127.020 MHz- (AM mode) [Left band]	[Sq1]	1	<ul style="list-style-type: none"> Connect a 50 Ω dummy load to the antenna connector. 	Push [MW]. (Automatic adjustment)
[Right band]	[Sq1]	2		
(AM-N mode) [Left band]	[Sq1] (NAR)	3		
[Right band]	[Sq1] (NAR)	4		
-145.020/146.020 MHz- (FM mode) [Left band]	[Sq2]	5		
[Right band]	[Sq2]	6		
(FM-N mode) [Left band]	[Sq2] (NAR)	7		
[Right band]	[Sq2] (NAR)	8		
-387.020 MHz- (FM mode) [Left band]	[Sq3]	9		
[Right band]	[Sq3]	10		
(FM-N mode) [Left band]	[Sq3] (NAR)	11		
[Right band]	[Sq3] (NAR)	12		
-440.020 MHz- (FM mode) [Left band]	[Sq4]	13		
[Right band]	[Sq4]	14		
(FM-N mode) [Left band]	[Sq4] (NAR)	15		
[Right band]	[Sq4] (NAR)	16		
-500.020 MHz- (FM mode) [Left band]	[Sq5]	17		
[Right band]	[Sq5]	18		
(FM-N mode) [Left band]	[Sq5] (NAR)	19		
[Right band]	[Sq5] (NAR)	20		

†: This output level of a standard signal generator (SSG) is indicated in SSG's 50 ohms termination.

[MAIN UNIT]

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains parts list for [MAIN UNIT] including items like MLG1608S 1R0J-T, C2012H-10NH-R-0231, and ERJ2GEJ 104 X (100K).

[MAIN UNIT]

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains parts list for [MAIN UNIT] including items like ERJ2GEJ 104 X (100K), ERJ2GEJ 102 X (1K), and ERJ2GEJ 101 X (100).

Eqv.= This component is equivalent to the REF No. component listed above, and may be substituted on parts orders and repairs.

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

[MAIN UNIT]

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains 945 rows of component data for the [MAIN UNIT].

Eqv.= This component is equivalent to the REF No. component listed above, and may be substituted on parts orders and repairs.

[MAIN UNIT]

Table with columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Contains 945 rows of component data for the [MAIN UNIT].

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

[MAIN UNIT]

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Rows include part numbers like C936, C937, C938, etc., with descriptions such as GRM21BB31C106KE15L and C1005 JB 1H 102K-T.

Eqv.= This component is equivalent to the REF No. component listed above, and may be substituted on parts orders and repairs.

[MAIN UNIT]

Table with 5 columns: REF NO., PARTS NO., DESCRIPTION, M., H/V LOCATION. Rows include part numbers like C1076, C1079, C1080, etc., with descriptions such as C1005 JB 1H 102K-T and C1005 CH 1H 010B-T.

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

[MAIN UNIT]

REF NO.	PARTS NO.	DESCRIPTION	M.	H/V LOCATION
C1310	4030017460	S.CER C1005 JB 1H 102K-T	T	54.1/13.7
C1311	4030017460	S.CER C1005 JB 1H 102K-T	T	40.7/13.7
C1314	4030017650	S.CER C1005 CH 1H 270J-T	B	44.3/6.3
C1315	4030017650	S.CER C1005 CH 1H 270J-T	B	44.0/9.6
C1316	4030017360	S.CER C1005 CH 1H 030B-T	B	46.1/7.1
C1317	4030016930	S.CER C1005 JB 1A 104K-T	B	58.3/8.5
C1318	4030017460	S.CER C1005 JB 1H 102K-T	B	70.9/4.9
C1319	4030017460	S.CER C1005 JB 1H 102K-T	T	49.6/2.5
C1320	4030017460	S.CER C1005 JB 1H 102K-T	B	51.6/6.9
C1321	4030017460	S.CER C1005 JB 1H 102K-T	T	112.2/104.1
C1322	4030017460	S.CER C1005 JB 1H 102K-T	T	47.8/47.3
C1323	4030017460	S.CER C1005 JB 1H 102K-T	T	46.8/46.4
C1324	4030020000	S.CER C1005 JB 1A 105K-T	T	93.9/73.0
C1325	4030018860	S.CER C1005 JB 0J 105K-T	T	94.7/68.6
C1326	4030017460	S.CER C1005 JB 1H 102K-T	T	128.0/26.4
C1328	4030017460	S.CER C1005 JB 1H 102K-T	T	131.4/28.3
C1329	4030017460	S.CER C1005 JB 1H 102K-T	T	134.4/26.7
C1330	4030017460	S.CER C1005 JB 1H 102K-T	T	134.2/28.3
C1331	4030016930	S.CER C1005 JB 1A 104K-T	B	118.2/75.1
C1332	4030017030	S.CER C1005 JB 1A 273K-T	B	119.1/79.0
C1333	4030019550	S.CER C1608 JB 1E 334K-T	B	99.9/95.0
C1334	4030019560	S.CER GRM21BB31C106KE15L	B	96.9/94.8
C1336	4030017460	S.CER C1005 JB 1H 102K-T	T	100.7/105.7
C1340	4510010230	S.ELE 10 CE 1000 LX	B	101.4/70.6
C1343	4030019550	S.CER C1608 JB 1E 334K-T	B	107.6/95.0
C1344	4030019560	S.CER GRM21BB31C106KE15L	B	104.6/94.8
C1346	4030017030	S.CER C1005 JB 1A 273K-T	B	120.7/73.7
C1487	4510010240	S.ELE 16 CE 680 LX	B	110.3/83.2
C1488	4030017600	S.CER C1005 CH 1H 080C-T	T	20.6/55.5
C1500	4030017650	S.CER C1005 CH 1H 270J-T	B	45.2/35.0
C1501	4030017460	S.CER C1005 JB 1H 102K-T	B	39.0/35.6
C1502	4030017460	S.CER C1005 JB 1H 102K-T	B	38.1/34.3
C1503	4030017460	S.CER C1005 JB 1H 102K-T	B	38.5/27.0
C1504	4030017460	S.CER C1005 JB 1H 102K-T	B	40.1/27.0
C1505	4030017460	S.CER C1005 JB 1H 102K-T	T	126.7/12.9
J1	6510014961	S.CON B2B-ZR-SM4-TF(LF)(SN)	T	90.2/118.2
J100	6510023110	CON 3008L-8P8C <KIN>		
J101	6450001440	CON HSJ1403-01-010		
J102	6510025940	CON PJ-3047S <XIN>		
J103	6510014961	S.CON B2B-ZR-SM4-TF(LF)(SN)	B	123.4/80.5
J300	6510025950	CON PCB-606(6P6C) BLACK <VKH>		
J301	6510029570	S.CON 20P5.0-JMCS-G-B-TF(N)	T	130.1/21.4
W1	7030014230	JUM RJ20S00HM		
W300	8900016020	CAB OPC-1671 <TJM>		
EP1	6910014690	S.BEA MPZ1608S221A-T	T	102.1/113.6
EP2	6910018460	S.BEA MMZ1005Y102C-T	T	94.7/116.6
EP6	6910018460	S.BEA MMZ1005Y102C-T	T	68.5/73.1
EP100	6910018460	S.BEA MMZ1005Y102C-T	T	14.8/12.7
EP101	6910018460	S.BEA MMZ1005Y102C-T	T	15.9/12.7
EP102	6910018460	S.BEA MMZ1005Y102C-T	T	17.8/12.7
EP103	6910018460	S.BEA MMZ1005Y102C-T	T	18.7/12.7
EP104	6910018460	S.BEA MMZ1005Y102C-T	T	23.6/2.7
EP105	6910018460	S.BEA MMZ1005Y102C-T	T	24.7/5.7
EP106	6910018460	S.BEA MMZ1005Y102C-T	T	23.6/3.6
EP107	6910018460	S.BEA MMZ1005Y102C-T	T	26.3/7.7
EP111	6910014690	S.BEA MPZ1608S221A-T	T	116.8/105.5
EP113	6910018460	S.BEA MMZ1005Y102C-T	T	127.7/110.2
EP115	6910014690	S.BEA MPZ1608S221A-T	T	133.3/109.3
EP118	6910018460	S.BEA MMZ1005Y102C-T	T	127.7/109.3
EP200	6910018460	S.BEA MMZ1005Y102C-T	B	40.7/36.8
EP201	6910018460	S.BEA MMZ1005Y102C-T	B	40.6/29.4
EP202	6910018460	S.BEA MMZ1005Y102C-T	B	39.7/29.4
EP300	6910018460	S.BEA MMZ1005Y102C-T	T	131.6/12.4
EP304	6910018460	S.BEA MMZ1005Y102C-T	B	131.9/51.0
EP305	6910018460	S.BEA MMZ1005Y102C-T	B	131.9/47.8
EP306	6910018460	S.BEA MMZ1005Y102C-T	T	127.3/55.2
EP312	6910018460	S.BEA MMZ1005Y102C-T	T	130.3/26.7
EP315	6910018460	S.BEA MMZ1005Y102C-T	T	128.7/25.1
EP316	6910018460	S.BEA MMZ1005Y102C-T	T	128.4/17.8
EP320	6910018460	S.BEA MMZ1005Y102C-T	T	129.3/17.8
EP324	6910018460	S.BEA MMZ1005Y102C-T	B	134.0/21.5
EP351	6910018460	S.BEA MMZ1005Y102C-T	T	117.9/67.5
EP352	6910018460	S.BEA MMZ1005Y102C-T	T	130.2/12.4
EP357	6910018460	S.BEA MMZ1005Y102C-T	T	131.8/17.8
EP358	6910018460	S.BEA MMZ1005Y102C-T	T	132.8/17.8
EP360	6910018460	S.BEA MMZ1005Y102C-T	T	131.4/26.7
EP361	6910018460	S.BEA MMZ1005Y102C-T	T	132.0/25.1
EP362	6910018460	S.BEA MMZ1005Y102C-T	T	132.5/26.7
EP363	6910018460	S.BEA MMZ1005Y102C-T	T	125.0/12.0
EP364	6910018460	S.BEA MMZ1005Y102C-T	T	126.7/12.0
EP409	6910014690	S.BEA MPZ1608S221A-T	T	94.7/120.5

Eqv.= This component is equivalent to the REF No. component listed above, and may be substituted on parts orders and repairs.

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.
W1	8600037590	SP CABLE -1 70MM <PHL>	1
J1	6510004881	MR-DSE-01-1 <GA>	1
SP1	2510001160	057P0802	1
MF1	2710000820	EFB0412VHD-6P38 <USE>HK	1
MP1	8010023321	3598 CHASSIS-1 <YPE>	1
MP2	8210030390	3598 CHASSIS PANEL	1
MP3	8110010790	3598 U-COVER ASSEMBLY	1
MP4	8110010750	3598 L-COVER	1
MP5	8110009020	2969 FAN COVER	1
MP6	8930078590	3167 SP RUBBER (TOP)	1
MP7	8930089330	3484 CLIP Y1311	1
MP8	8810009611	FLAT M2.6X 6 ZK3	15
MP9	8810008661	PHBT M3 X 8 NI-ZC3	13
MP10	8810008661	PHBT M3 X 8 NI-ZC3	4
MP11	8810008661	PHBT M3 X 8 NI-ZC3	2
MP12	8810010141	SCREW PH M3 X30 ZK3	4
MP14	8930069590	THERMAL SHEET (BB)TC-400HS-1.4 (9.7X2)	1
MP15	8930091690	SPONGE (NB)	1
MP16	8930091700	HIMELON SHEET (DL)	3
MP17	8930085740	3401 GPS SPONGE	1
MP20	8930091740	SHIELD SPONGE (DG)	#02 2
	8930091740	SHIELD SPONGE (DG)	#03 2
	8930091740	SHIELD SPONGE (DG)	#05 2
	8930091740	SHIELD SPONGE (DG)	#10 2
MP21	8930091720	FERRITE SHEET (AW)	#02 1
	8930091720	FERRITE SHEET (AW)	#03 1
	8930091720	FERRITE SHEET (AW)	#05 1
	8930091720	FERRITE SHEET (AW)	#10 1
MP22	8930091730	FERRITE SHEET (AX)	#02 1
	8930091730	FERRITE SHEET (AX)	#03 1
	8930091730	FERRITE SHEET (AX)	#05 1
	8930091730	FERRITE SHEET (AX)	#10 1

[MAIN UNIT]

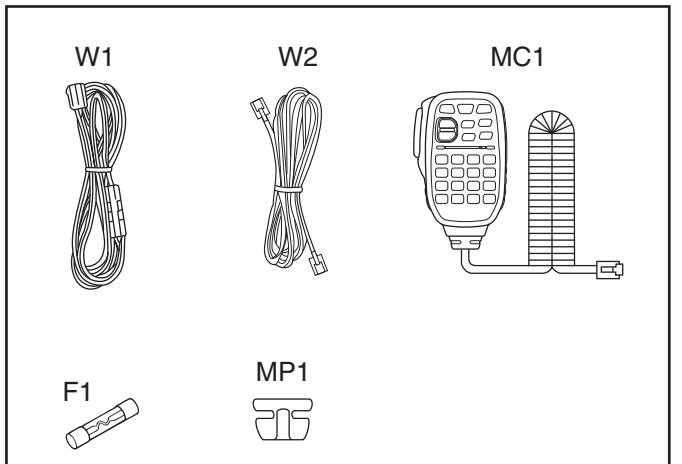
REF NO.	ORDER NO.	DESCRIPTION	QTY.
J1*	6510014961	B2B-ZR-SM4-TF (LF) (SN)	1
J100	6510023110	3008L-8P8C <KIN>	1
J101	6450001440	HSJ1403-01-010	1
J102	6510025940	PJ-3047S <XIN>	1
J103*	6510014961	B2B-ZR-SM4-TF (LF) (SN)	1
J300	6510025950	PCB-606 (6P6C) BLACK <VKH>	1
J301*	6510029570	20P5.0-JMCS-G-B-TF (N)	1
W1	7030014230	RJ20S0OHM	1
W300	8900016020	OPC-1671	1
MP200*	8510019340	3179 VCO CASE Y1142	1
MP202*	8510016471	2775 VCO CASE-1	1
MP203*	8510016471	2775 VCO CASE-1	1
MP204*	8510019340	3179 VCO CASE Y1142	1
MP206*	8510016471	2775 VCO CASE-1	1
MP207*	8510016471	2775 VCO CASE-1	1
MP208	8510019350	3179 VCO COVER Y1143	2
MP212	8930060270	2633 M-SHEET	2
MP213	8930059770	2633 M-HOLDER Y668	2
MP214	8510016461	2775 VCO COVER-1	4

[ACCESSORIES]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
F1	5210000121	FGB 15A PBF (FGB0 125V)	1
MC1	(Optional)	HM-207	1
W1	8900015280	OPC-345A	1
W2	(Optional)	OPC-837	1
MP1	8930007300	MIC HANGER	1

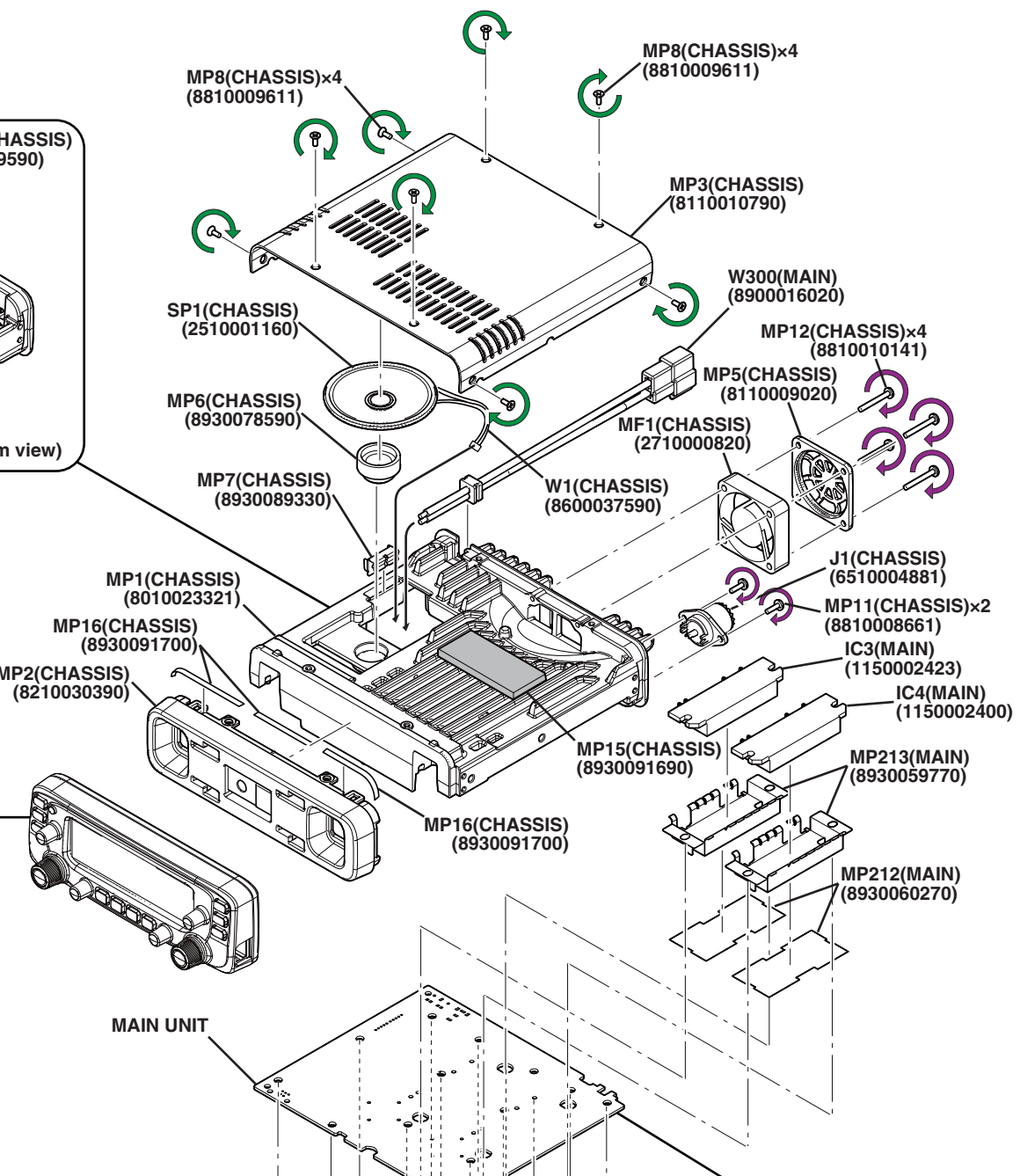
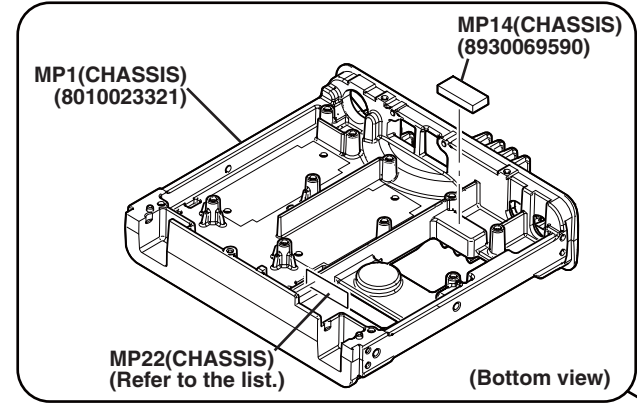
[CONTROL UNIT]

REF NO.	ORDER NO.	DESCRIPTION	QTY.
J6	6450002420	9691-6614 <SJC>	1
J101	6510023110	3008L-8P8C <KIN>	1
DS1	5030003920	JIC-LTNN013601-01 <RYOYO>	1
S14	2250000790	EC12E24204A9	1
S15	2250000790	EC12E24204A9	1
EP15	8930091410	SRCN-3598-SP-N-W (SHJ)	1
MP1	8210030360	3598 FRONT PANEL	1
MP3	8210030450	3598 REAR PANEL ASSEMBLY	1
MP4	8210030380	3598 REFLECTOR	1
MP5	8930091190	3598 LCD PLATE Y1338	1
MP6	8930091310	3598 LCD FILTER	1
MP7	8610015560	KNOB N-428	2
MP9	8610011170	KNOB N290	4
MP11	8930091160	3598 C-KEY	1
MP12	8930091170	3598 L-KEY	1
MP13	8930091180	3598 R-KEY	1
MP14	8810008991	PHBT M2 X10 NI-ZK3	4



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

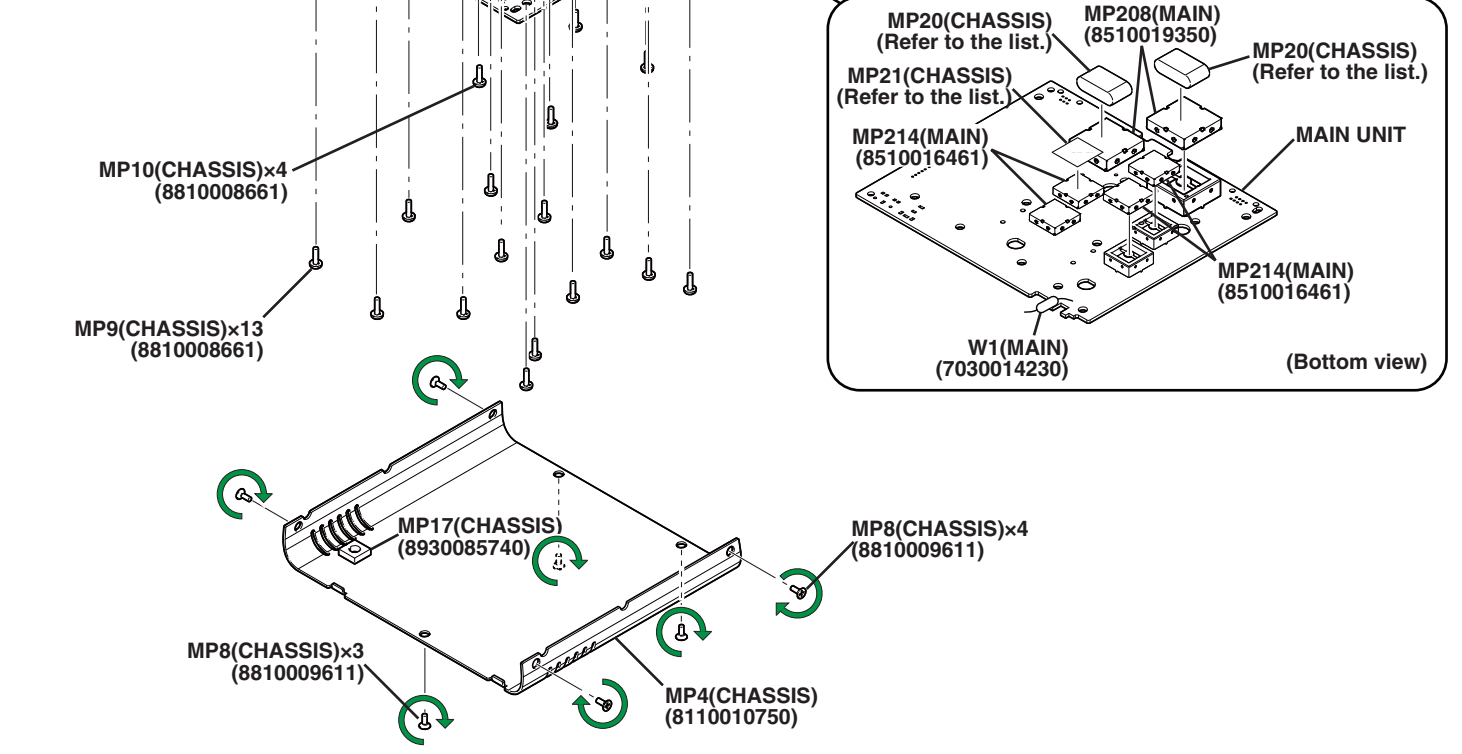
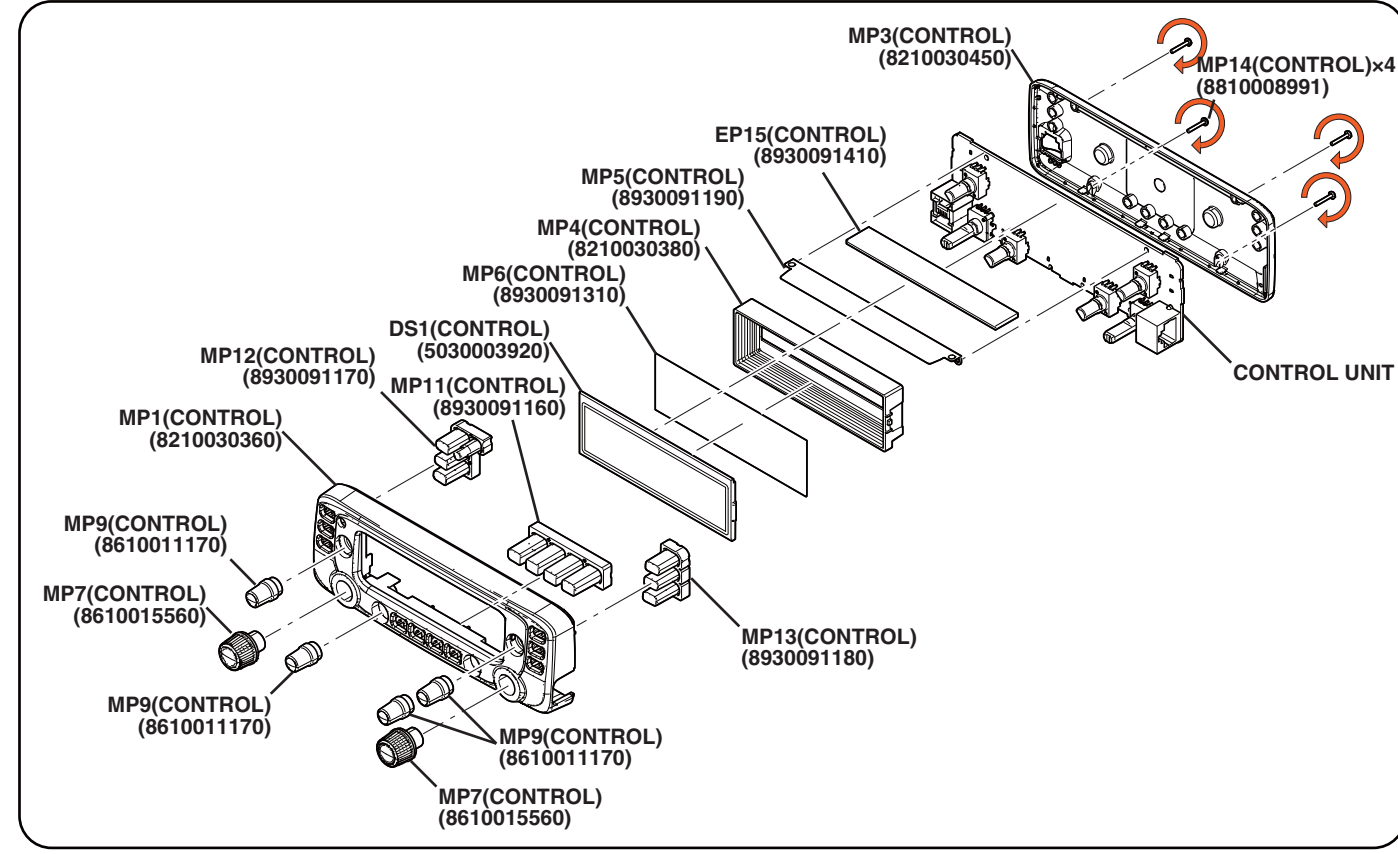
Screw abbreviations A, B0, BT: Self-tapping PH: Pan head ZK: Black NI-ZU: Nickel-Zinc SUS: Stainless



Tightening torque

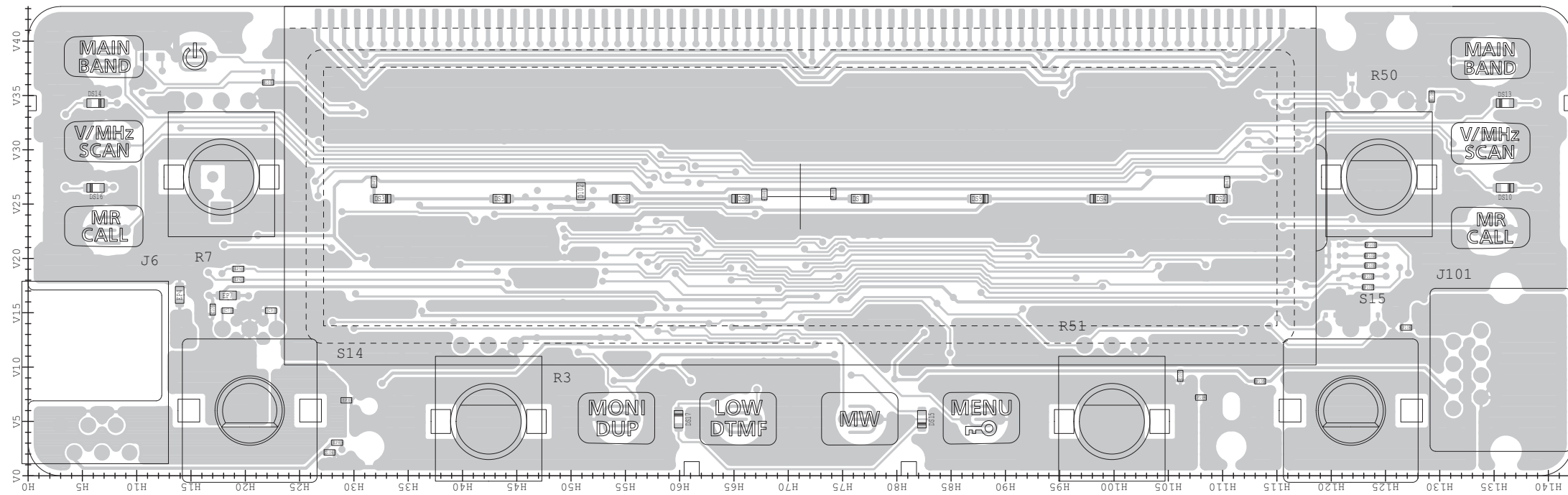
- : <math><0.8 \text{ (N}\cdot\text{m)}></math>
- : <math><0.7 \text{ (N}\cdot\text{m)}></math>
- : <math><0.6 \text{ (N}\cdot\text{m)}></math>
- : <math><0.5 \text{ (N}\cdot\text{m)}></math>
- : <math><0.4 \text{ (N}\cdot\text{m)}></math>
- : <math><0.3 \text{ (N}\cdot\text{m)}></math>
- : <math><0.2 \text{ (N}\cdot\text{m)}></math>
- : <math><0.1 \text{ (N}\cdot\text{m)}></math>

Explanatory note:
 Ref. No. Unit Name
 MP1(CHASSIS)
 (8010020541)
 Parts No.



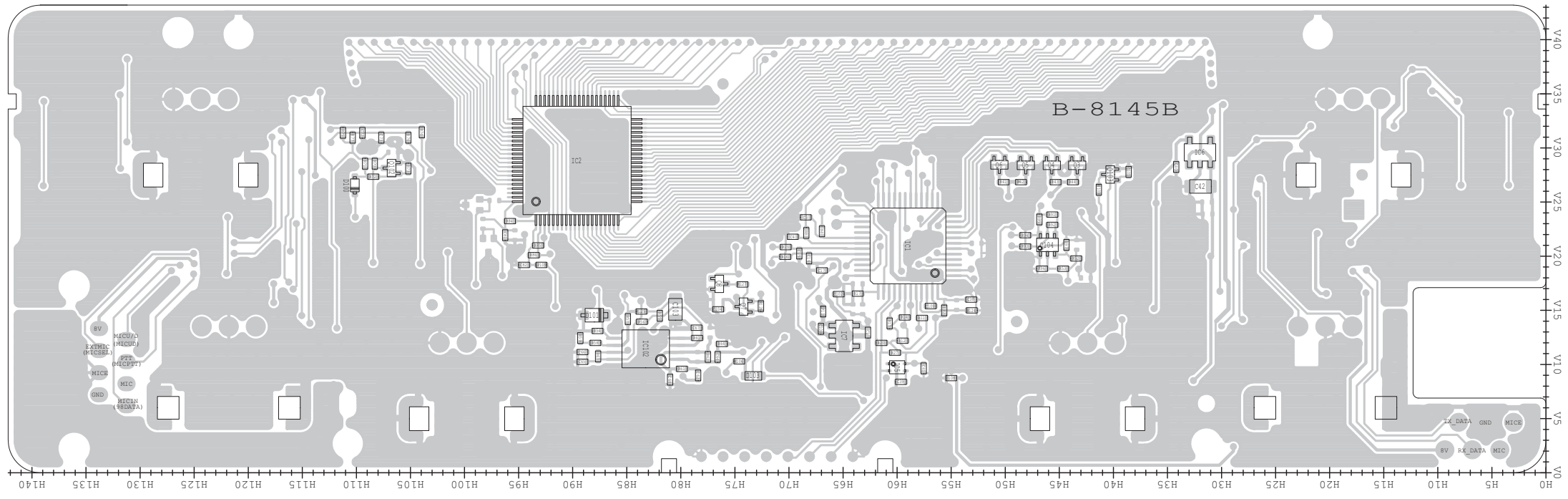
The actual configuration of the PC board can be seen by viewing the top and bottom BOARD LAYOUT pages together.

• CONTROL UNIT (B-8145B)
(TOP VIEW)



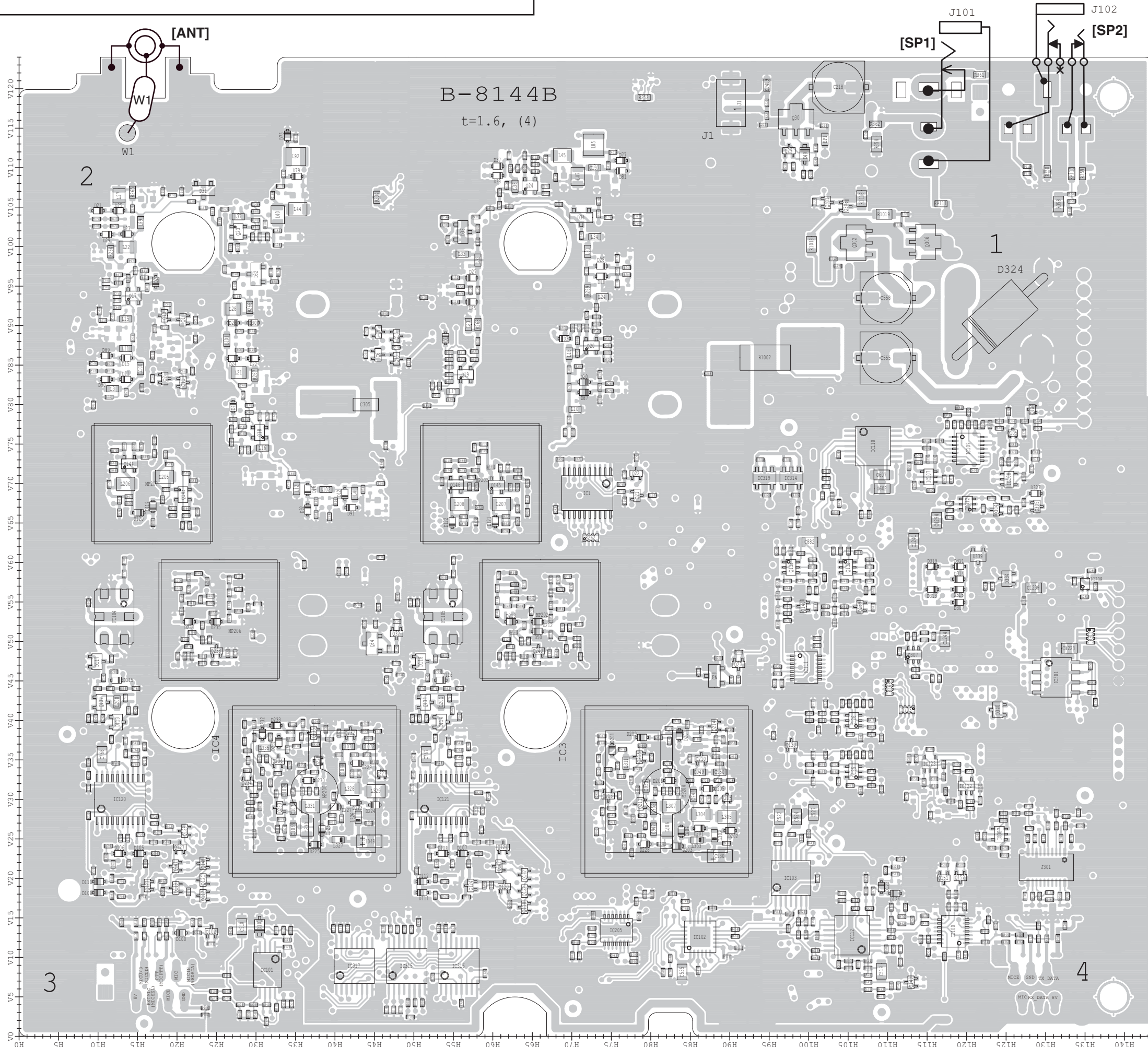
The actual configuration of the PC board can be seen by viewing the top and bottom BOARD LAYOUT pages together.

• CONTROL UNIT (B-8145B)
(BOTTOM VIEW)



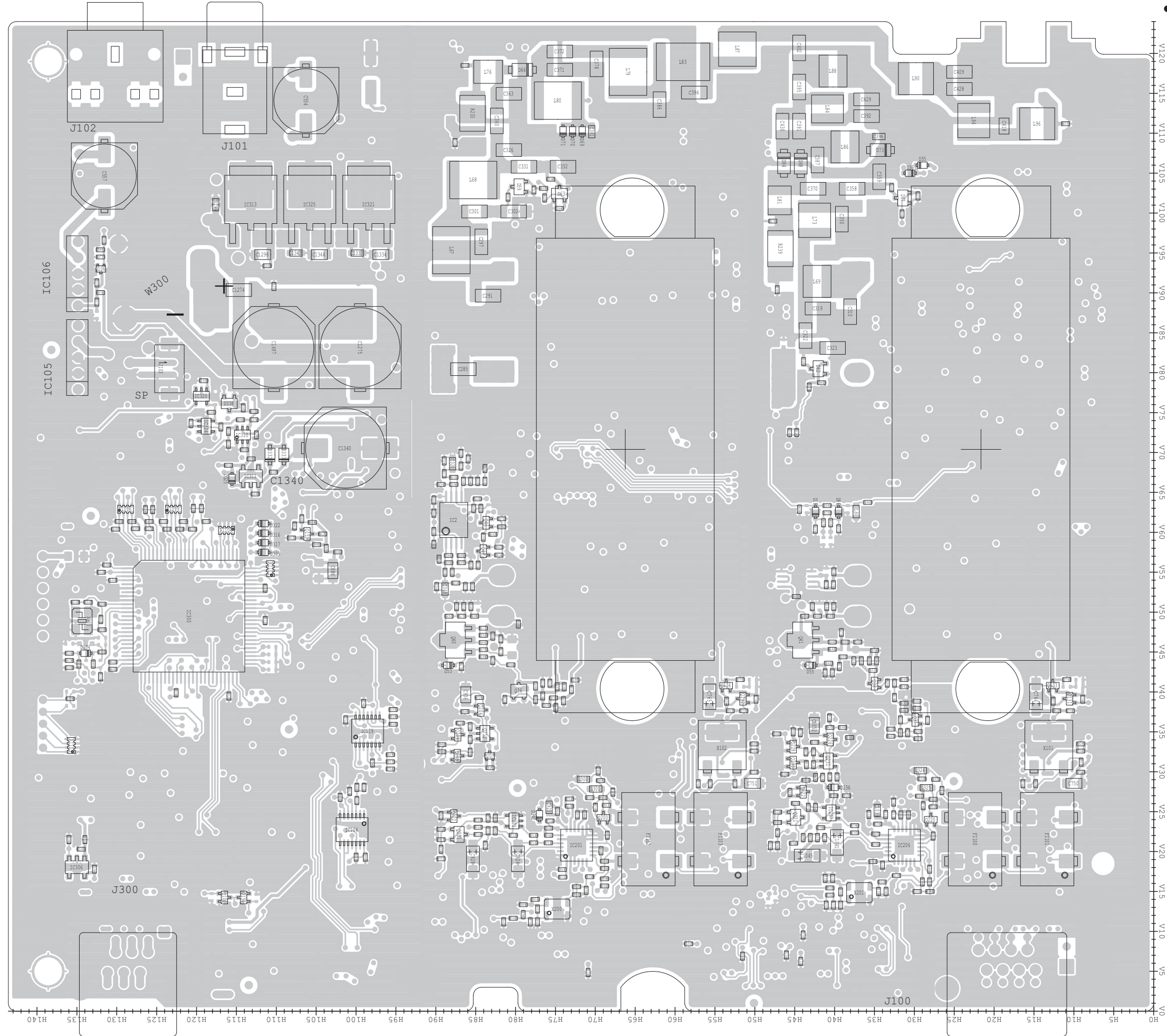
The actual configuration of the PC board can be seen by viewing the top and bottom BOARD LAYOUT pages together.

• MAIN UNIT (B-8144B)
(TOP VIEW)



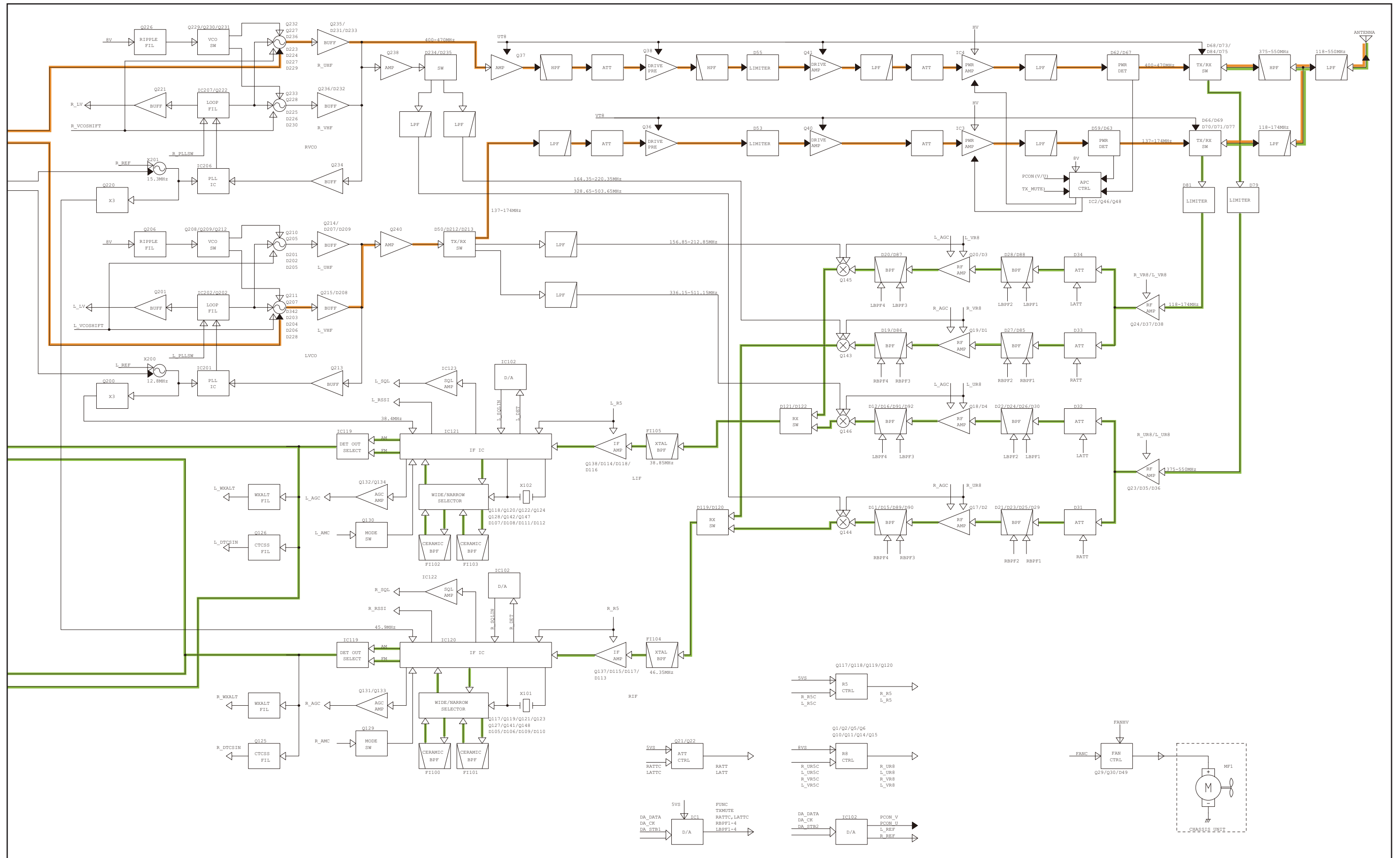
The actual configuration of the PC board can be seen by viewing the top and bottom BOARD LAYOUT pages together.

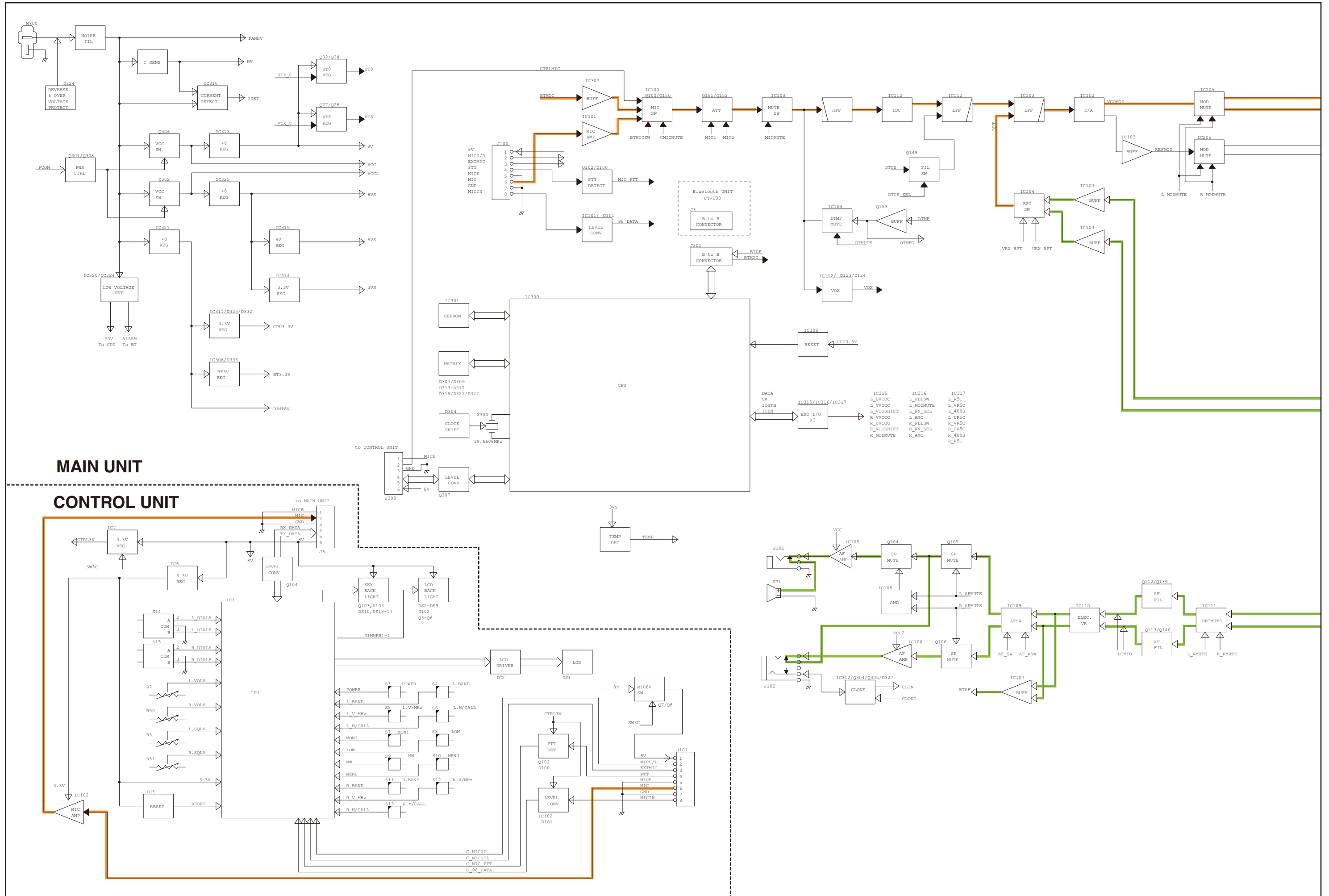
• MAIN UNIT (B-8144B)
(BOTTOM VIEW)



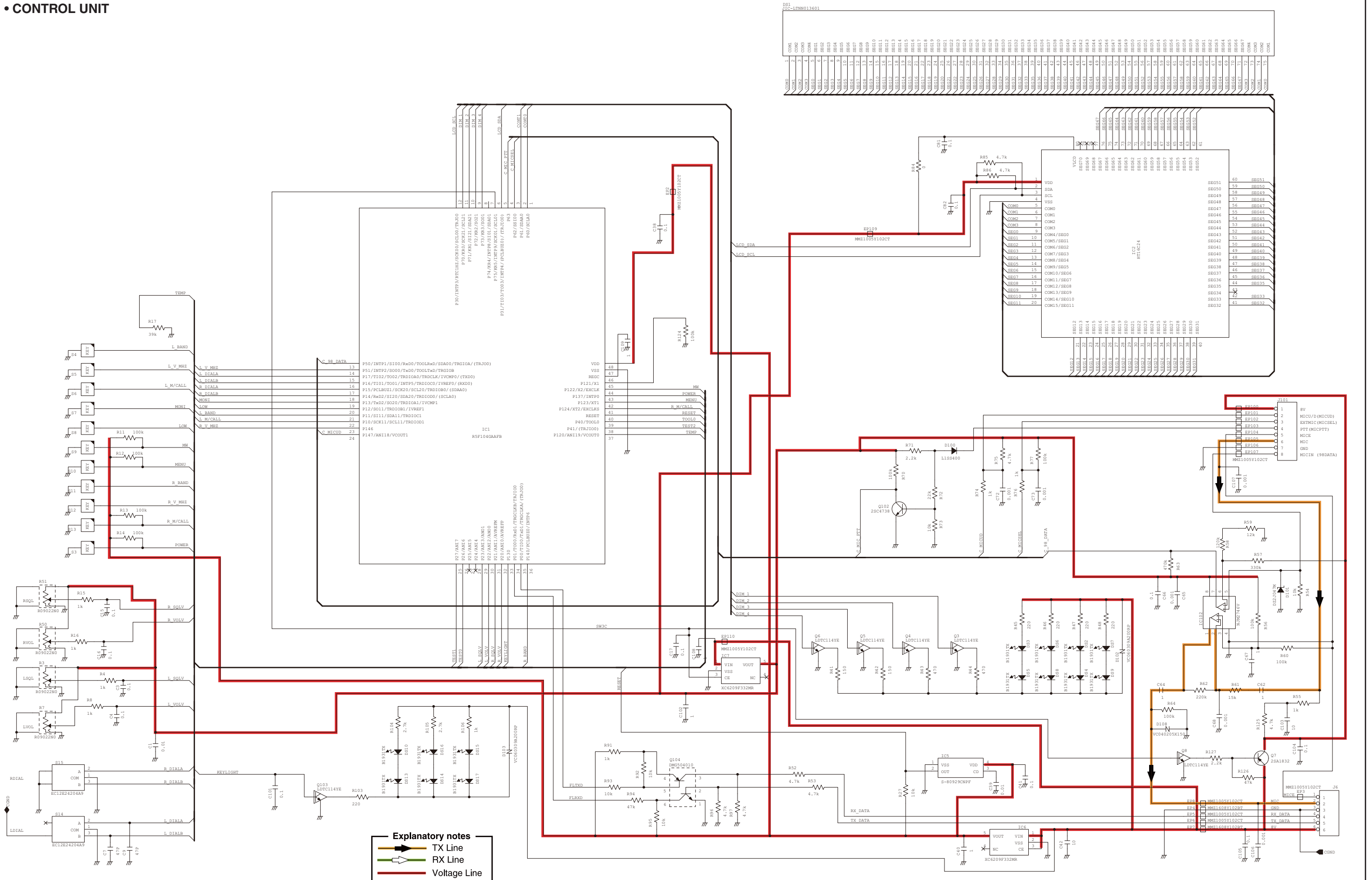
SECTION 9

BLOCK DIAGRAM



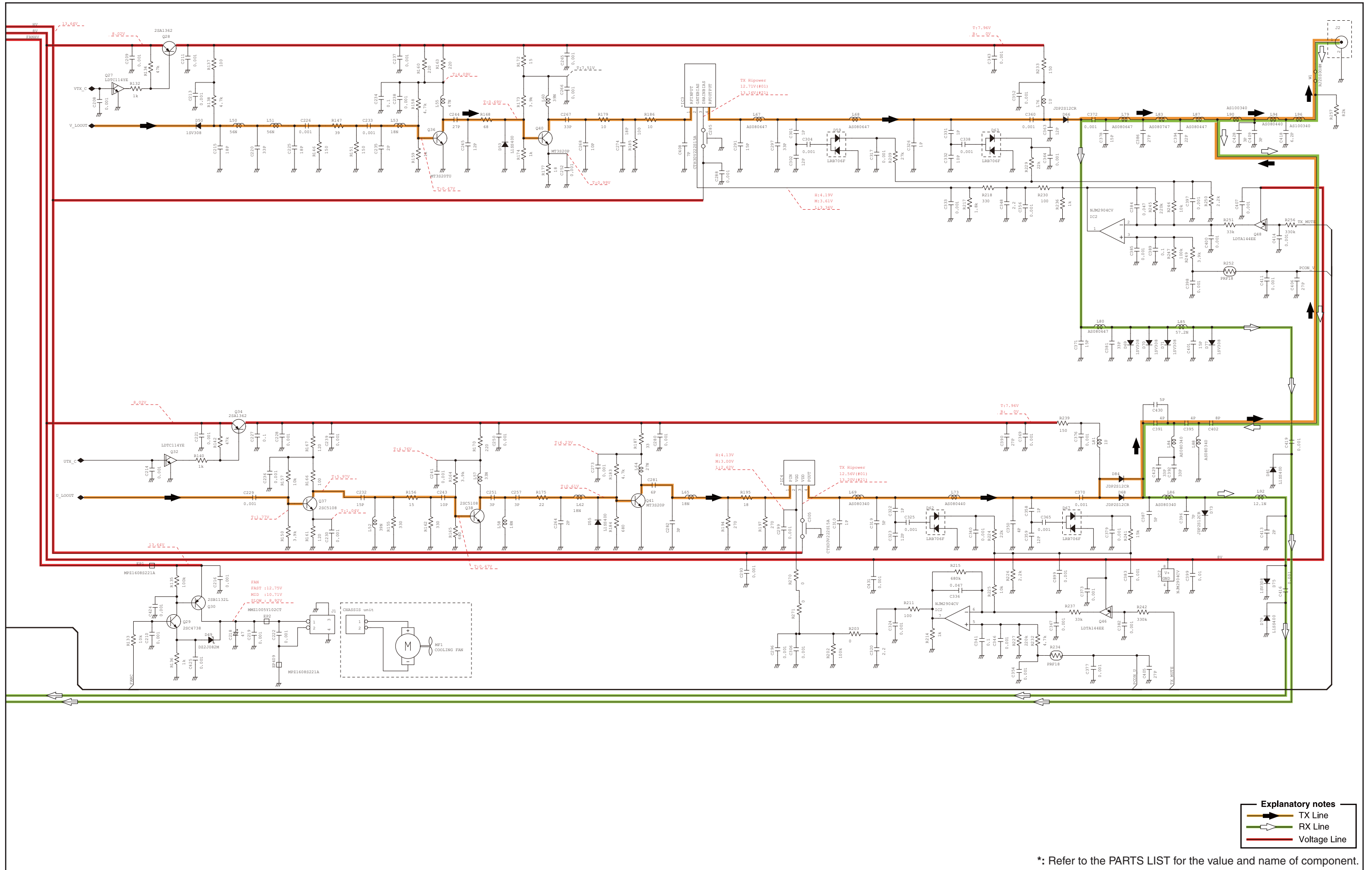


• CONTROL UNIT



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

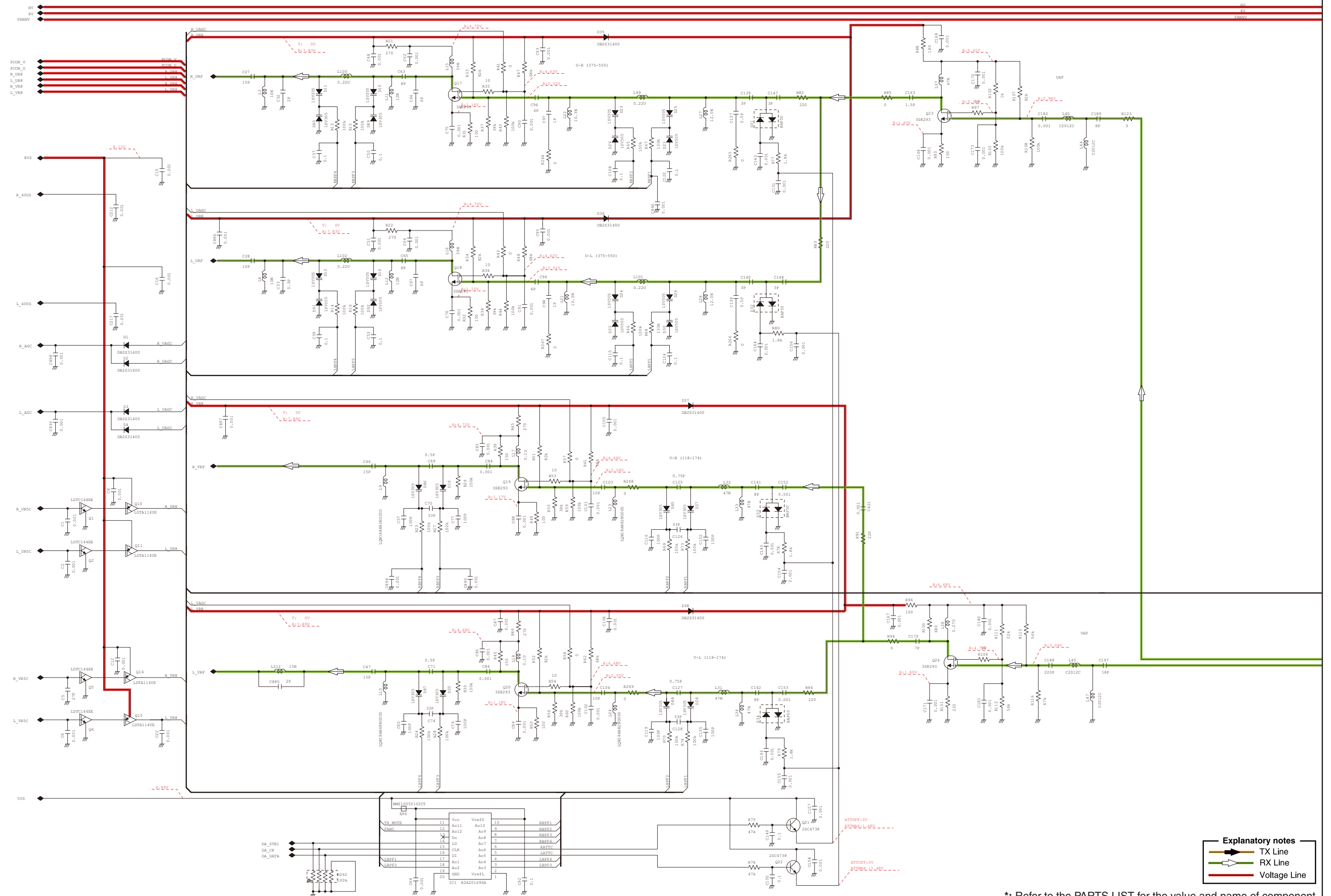
• MAIN UNIT (1/8)



Explanatory notes
 TX Line
 RX Line
 Voltage Line

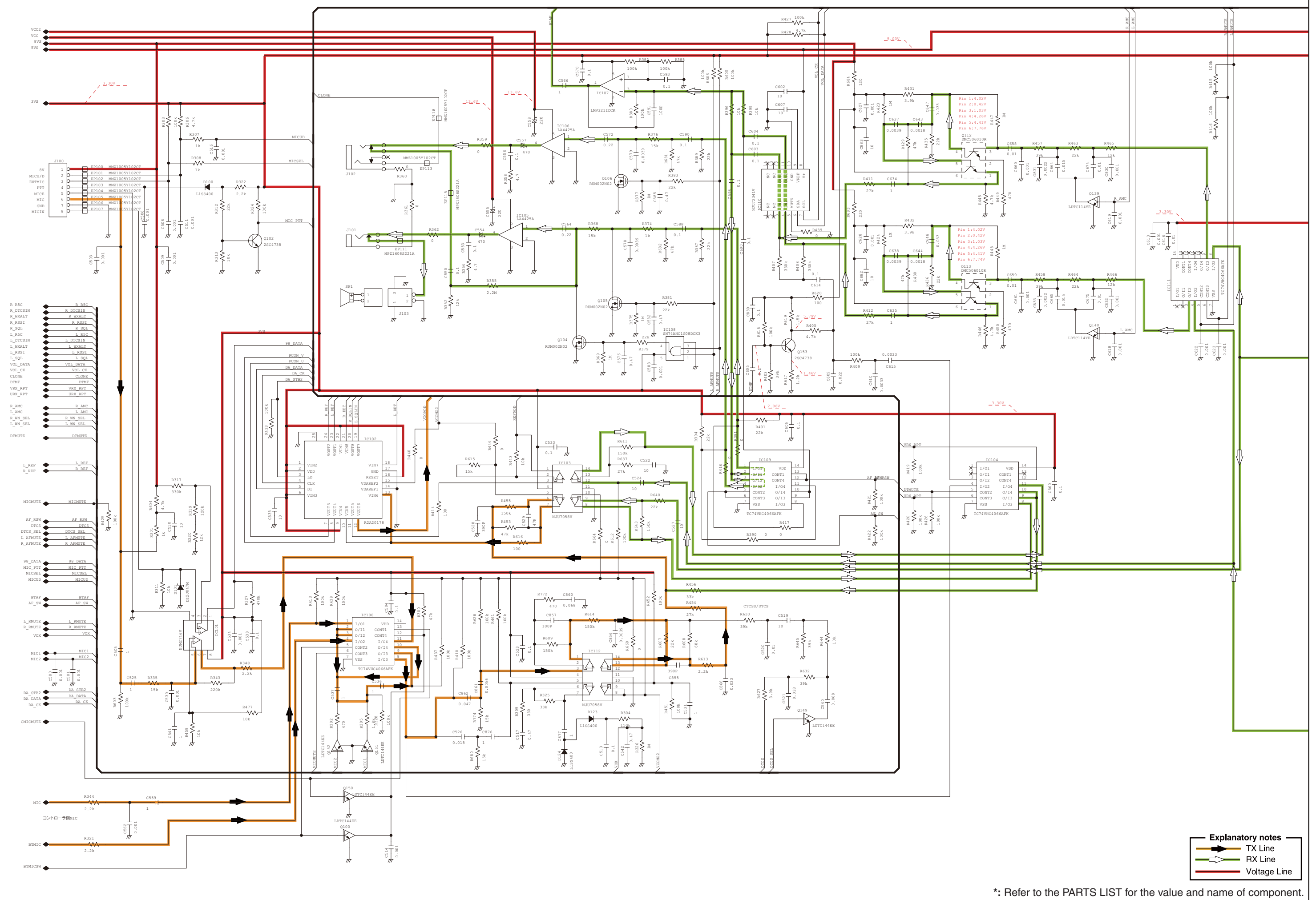
*: Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (2/8)



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

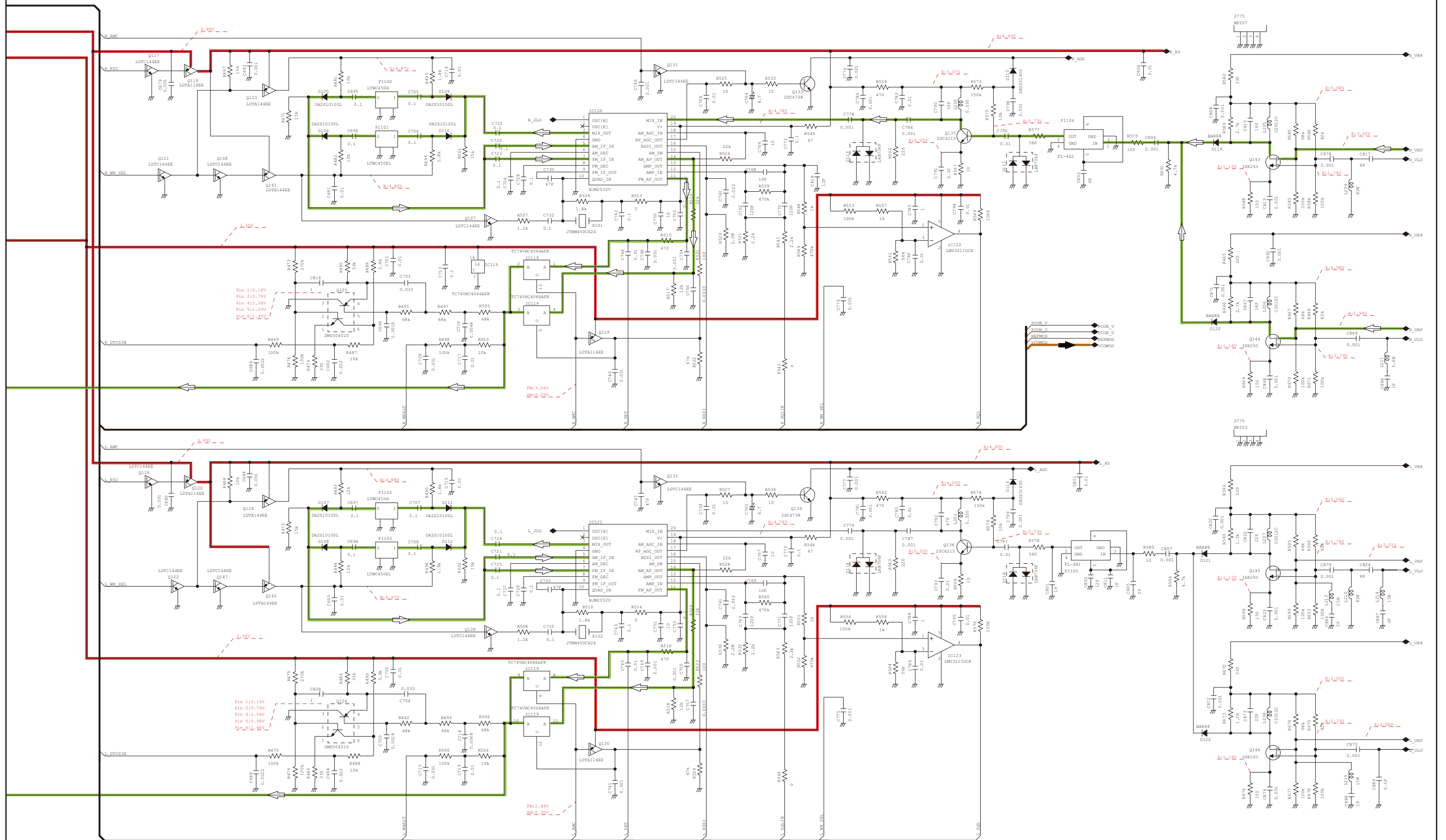
• MAIN UNIT (3/8)



Explanatory notes
 TX Line
 RX Line
 Voltage Line

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

• MAIN UNIT (4/8)

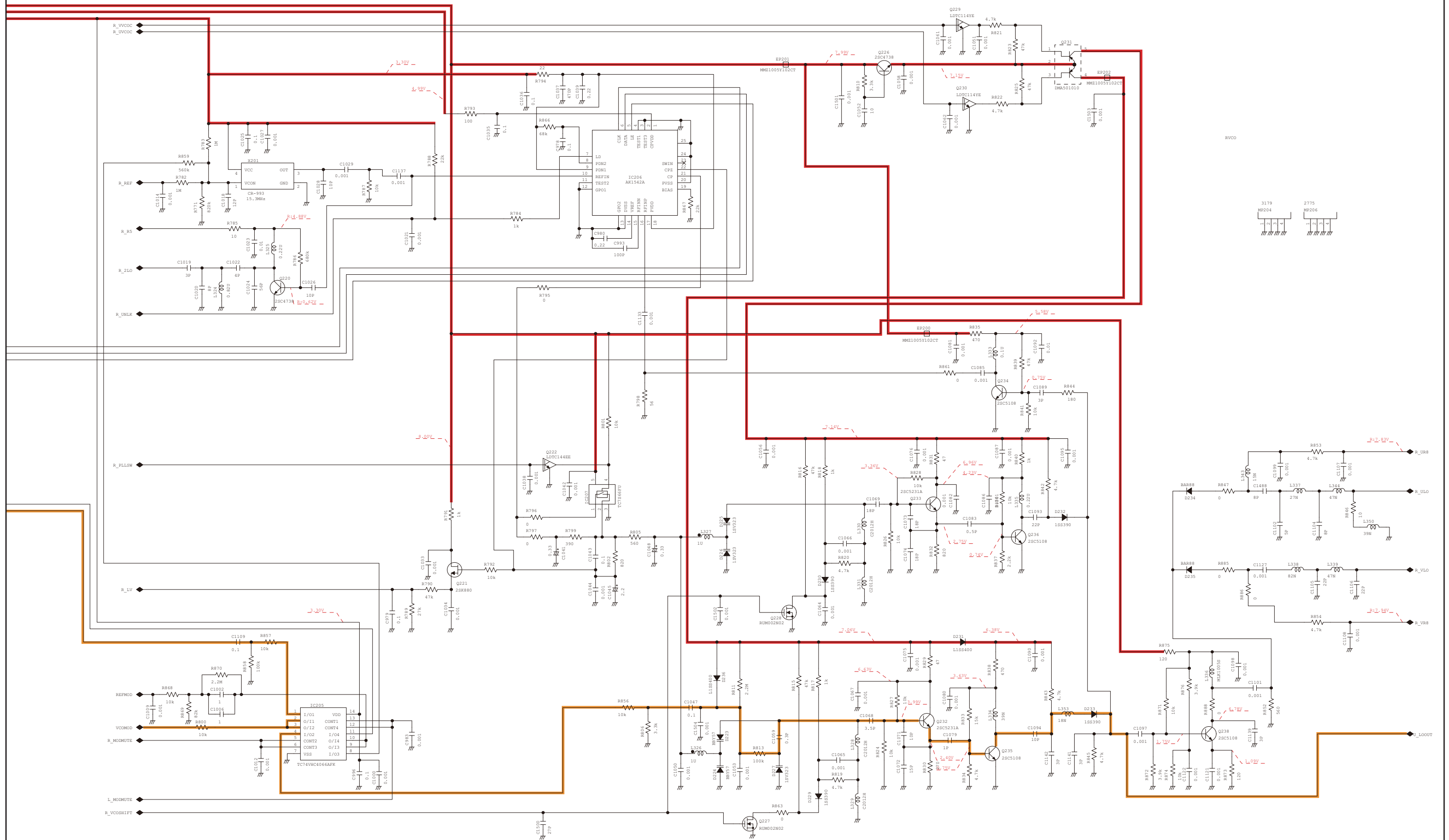


Explanatory notes

- TX Line
- RX Line
- Voltage Line

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

• MAIN UNIT (5/8)

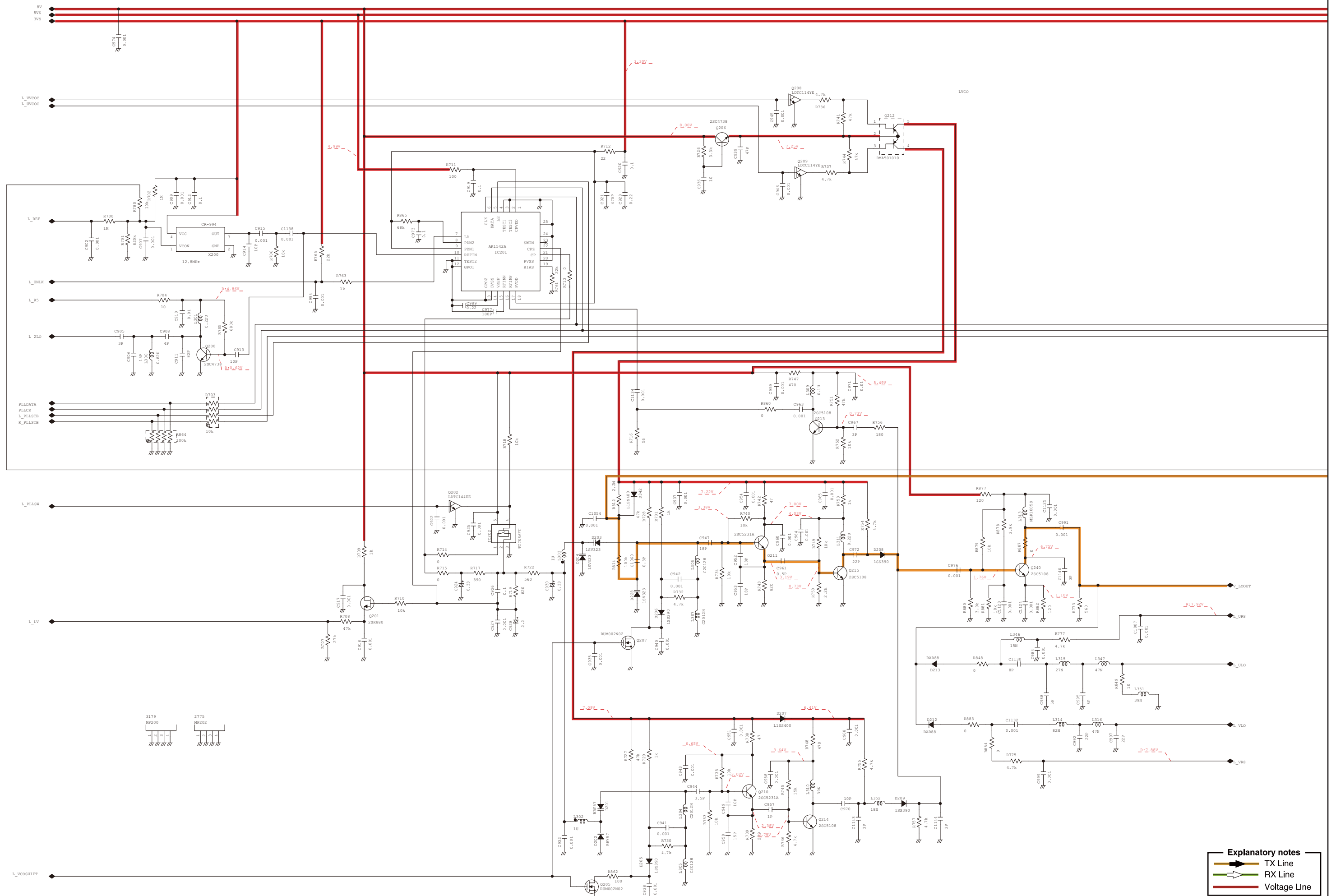


Explanatory notes

- TX Line
- RX Line
- Voltage Line

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

• MAIN UNIT (6/8)

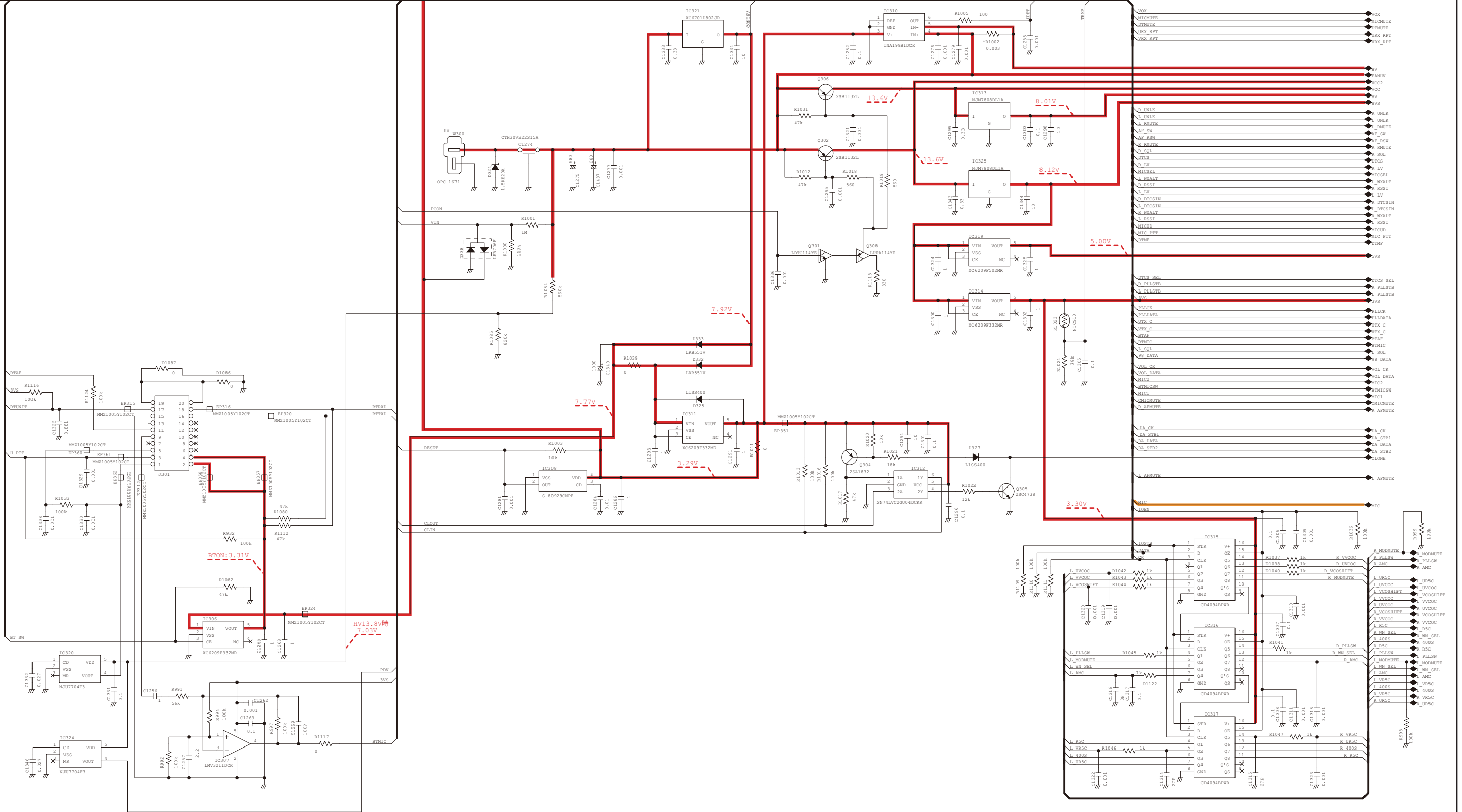


Explanatory notes

- TX Line
- RX Line
- Voltage Line

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

• MAIN UNIT (7/8)

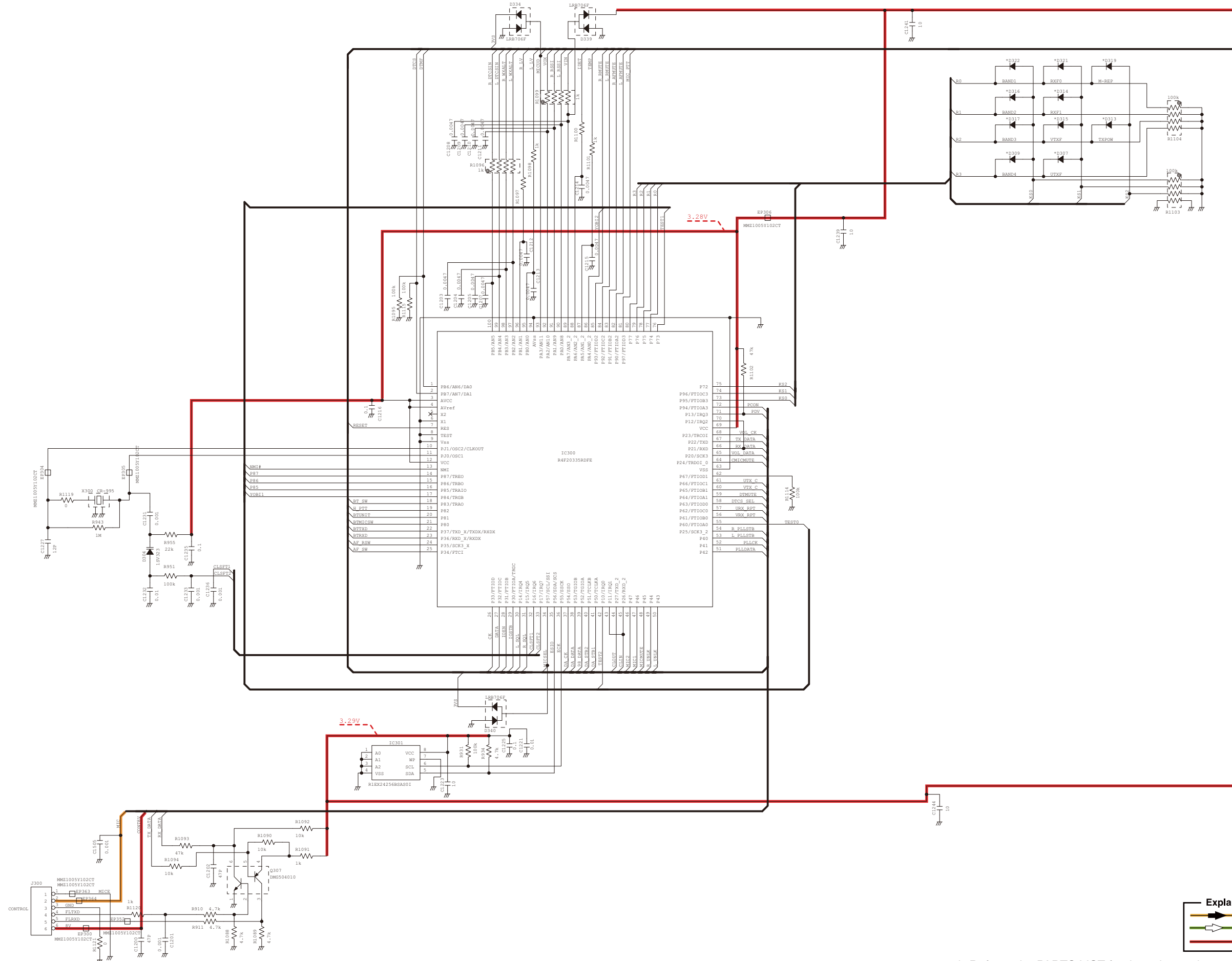


Explanatory notes

- TX Line
- RX Line
- Voltage Line

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

• MAIN UNIT (8/8)



Explanatory notes

- TX Line
- RX Line
- Voltage Line

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

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