



SERVICE MANUAL

VHF REPEATER

ID-RP2010V

S-15801XZ-C1
August 2021

Icom Inc.

INTRODUCTION

This service manual describes the latest technical information for the following version of the ID-RP2010V VHF REPEATER at the time of publication.

MODEL	VERSION	VERSION NUMBER	FREQUENCY RANGE (MHz)	MAXIMUM OUTPUT POWER
ID-RP2010V	EUR	#21	144 ~ 146	25 W
	USA	#31	144 ~ 148	

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

SERVICE CAUTION

NEVER connect the repeater to an AC outlet or to a DC power supply that outputs more than the specified voltage. This will ruin the repeater.

DO NOT expose the repeater to rain, snow or liquids.

DO NOT reverse the polarity of the DC power cable when directly connecting to the repeater.

DO NOT apply an RF signal of more than 20 dBm (100 mW) to the RX antenna connector. This could damage the repeater'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>

2710001060 FD128025HB ID-RP2010V CHASSIS 5 pieces
2710000870 0402B104K160 ID-RP2010V MAIN 1 piece

REPAIR NOTES

1. Make sure that the problem is internal before disassembling the repeater.
2. **DO NOT** open the repeater until the repeater is disconnected from its power source.
3. **DO NOT** short any circuits or electronic parts. An insulated tuning tool **MUST** be used for all adjustments.
4. **DO NOT** keep power ON for a long time when the repeater is defective.
5. **NEVER** directly transmit power into any test equipment such as Standard Signal Generator or a Sweep Generator, otherwise the RF power may damage them.
6. **ALWAYS** connect a 40 dB to 50 dB attenuator between the repeater and such test equipment.
7. **READ** the instructions of the test equipment thoroughly before connecting it to the repeater.

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■ GENERAL

• Operating frequency range:	USA EUR	144 ~ 148 MHz 144 ~ 146 MHz
• Type of emission:	ID FM DV	F2A F3E F7W
• Antenna impedance:		50 Ω nominal
• Antenna connector type:		N-Type
• Operating temperature range:		-10°C ~ +50°C, 14°F ~ +122°F
• Frequency stability:		±0.5 ppm
• Frequency resolution:		1 Hz
• Transfer rate:		4.8 kbps (DV mode)
• Current drain:	TX High TX Low Maximum AF output	9.0 A or less 4.0 A or less 1.8 A or less
• Power supply voltage:		13.8 V DC ± 15% (negative ground)
• Dimensions: (Projections not included)		482 (W) × 88 (H) × 275 (D) mm, 19 (W) × 3.5 (H) × 10.8 (D) inches
• Weight (Approximate):		6 kg, 13.2 lbs

■ TRANSMITTER

• Output power:		25 W (High), 2.5 W (Low)
• Modulation system:	FM DV	Digital reactance modulation Digital GMSK modulation
• Maximum frequency deviation:	FM narrow FM wide	± 2.5 kHz ± 5.0 kHz
• Occupied bandwidth:		6 kHz or less (DV)
• Spurious emissions:	Harmonics Out-of-band emission	-63 dB or less -60 dB or less

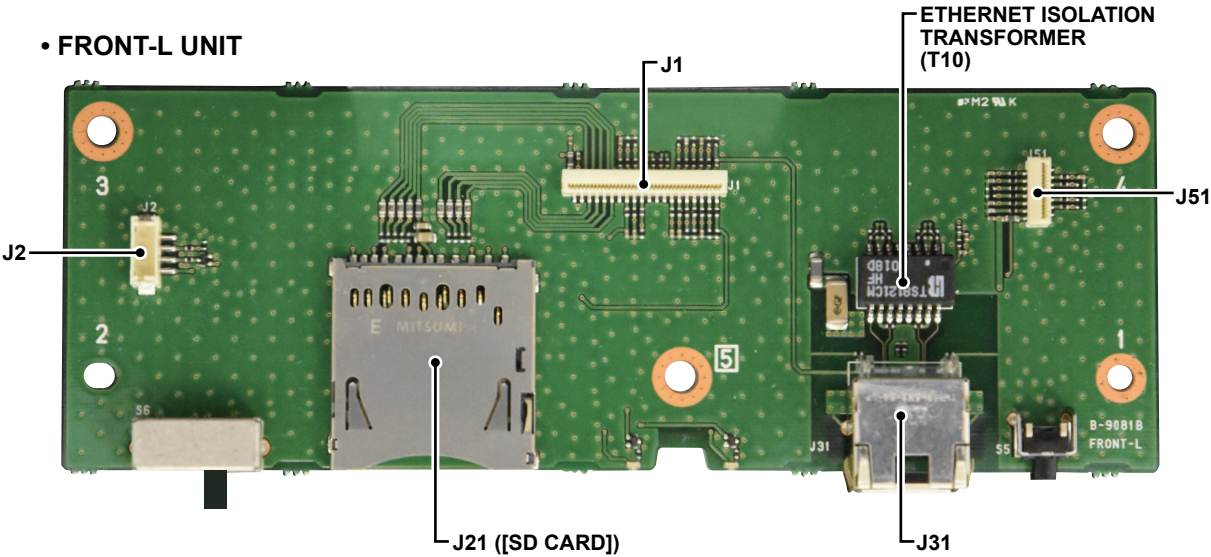
■ RECEIVER

• Receive system:		RF direct sampling
• Sensitivity:	FM DV	-15 dBμV (0.18 μV) or less (At 12 dB SINAD) -13 dBμV (0.22 μV) or less (At 1% BER (PN9))
• Selectivity:	FM (BW: 15 kHz) DV	More than 12.0 kHz/-6 dB, 20 kHz or less/-60 dB -50 dB or less (Channel spacing=12.5 kHz)
• Intermodulation:		-60 dB or less
• Receive spurious:		2 nW (-57 dBm) or less
• Spurious & image rejection:		More than 55 dB
• Audio output power:		More than 2.0 W (1 kHz, 10% distortion into an 8 Ω load)
• AF output impedance:		8 Ω

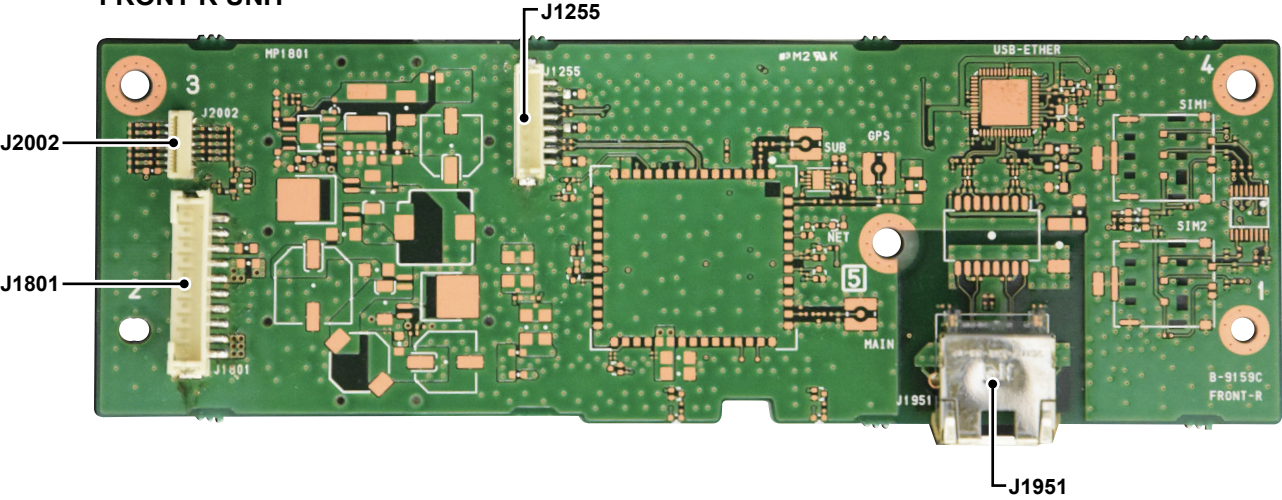
① Measurements made without an antenna.

① All stated specifications are subject to change without notice or obligation.

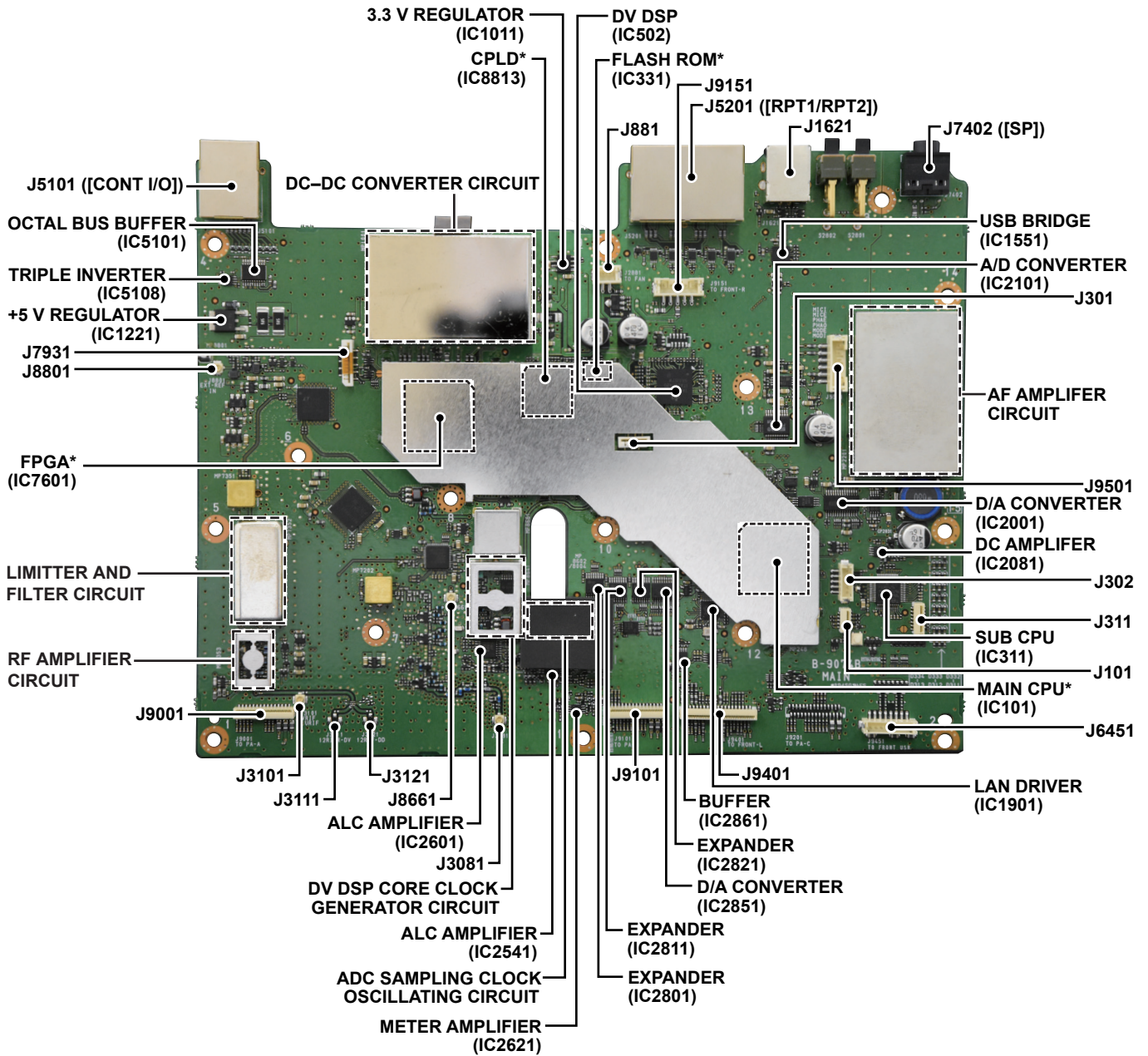
• FRONT-L UNIT



• FRONT-R UNIT



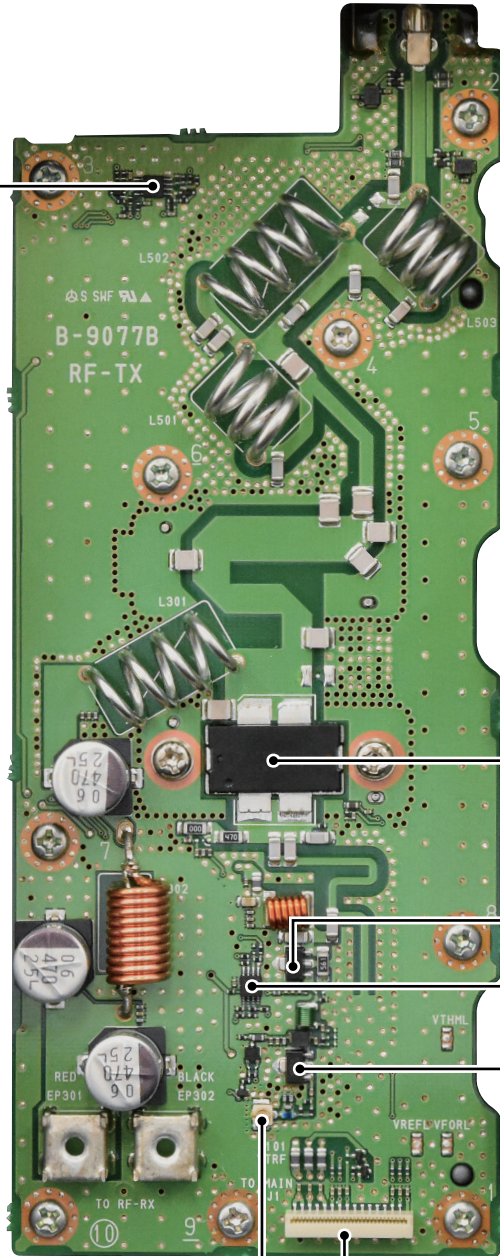
• MAIN UNIT



*Mounted under the shield cover

• RF-TX UNIT

FORWARD/REFLECTED WAVE
DETECTED VOLTAGE BUFFER
(IC691)



POWER AMPLIFIER
(Q301)

DRIVE AMPLIFIER
(Q201)

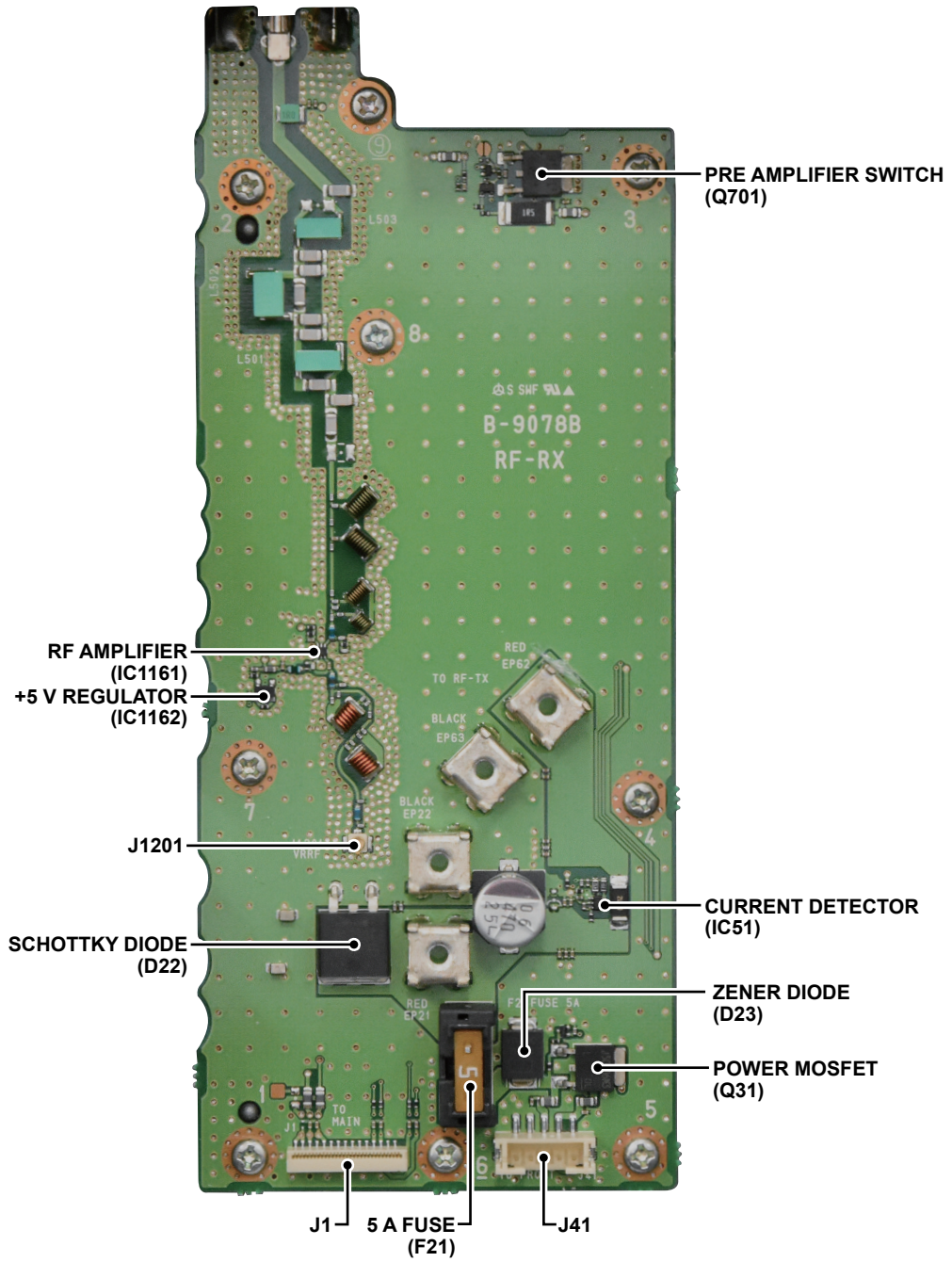
POWER AMPLIFIER BIAS VOLTAGE
BUFFER
(IC211)

PRE-DRIVE AMPLIFIER
(IC101)

J101

J1

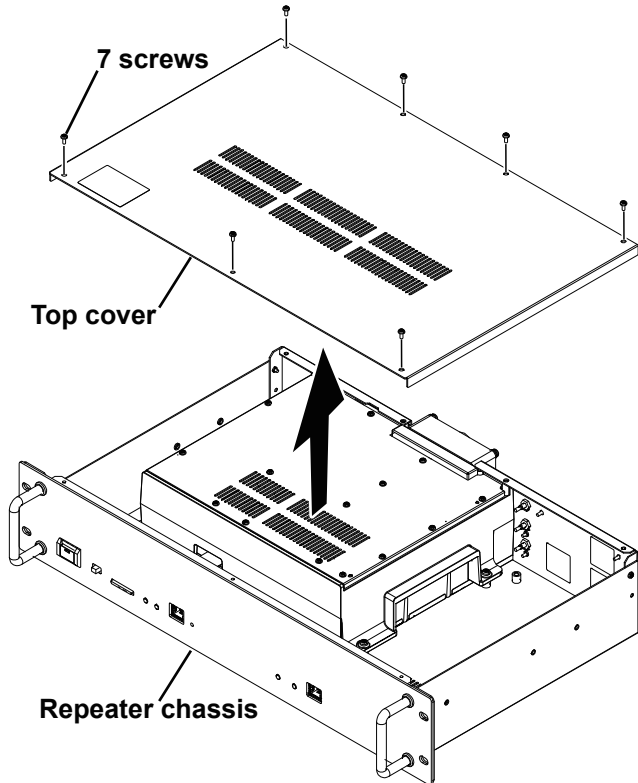
• RF-RX UNIT



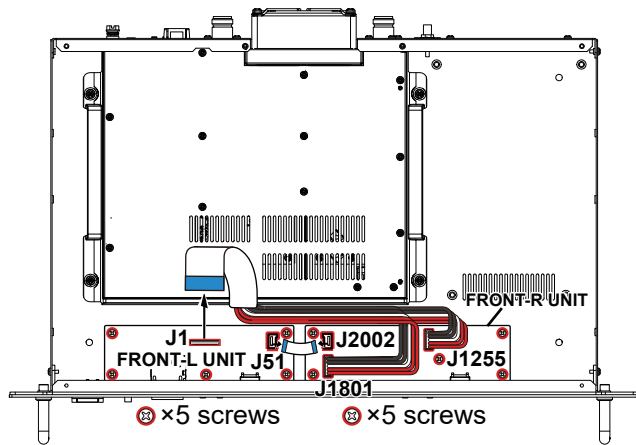
SECTION 3 DISASSEMBLY INSTRUCTION

1. Removing the FRONT-R and FRONT-L UNITS

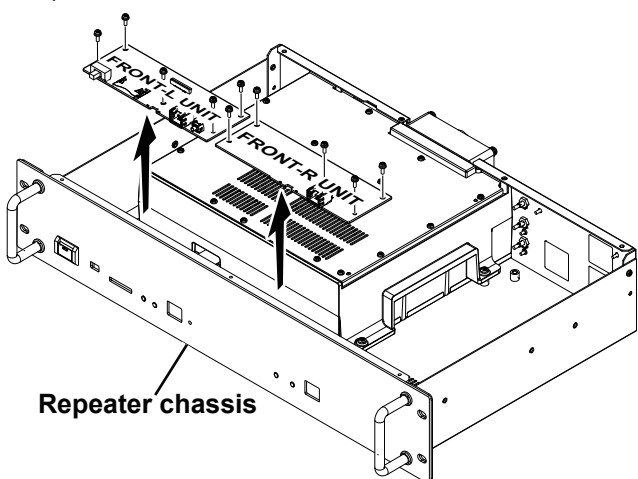
1) Remove the 7 screws from the top cover, then remove the top cover from the repeater chassis.



2) Remove the 10 screws and the 4 cables from the FRONT-R and FRONT-L UNITS.

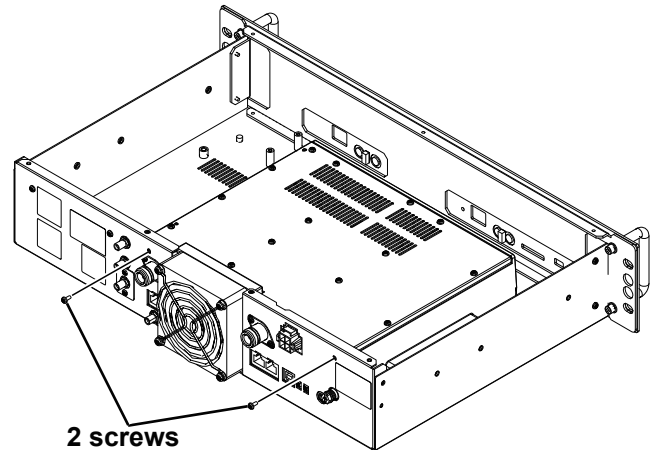


3) Remove the FRONT-R and FRONT-L UNITS from the repeater chassis.

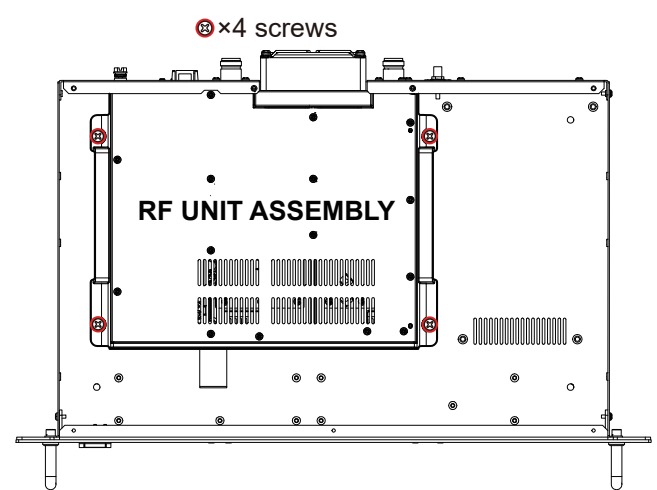


2. Removing the RF UNIT ASSEMBLY

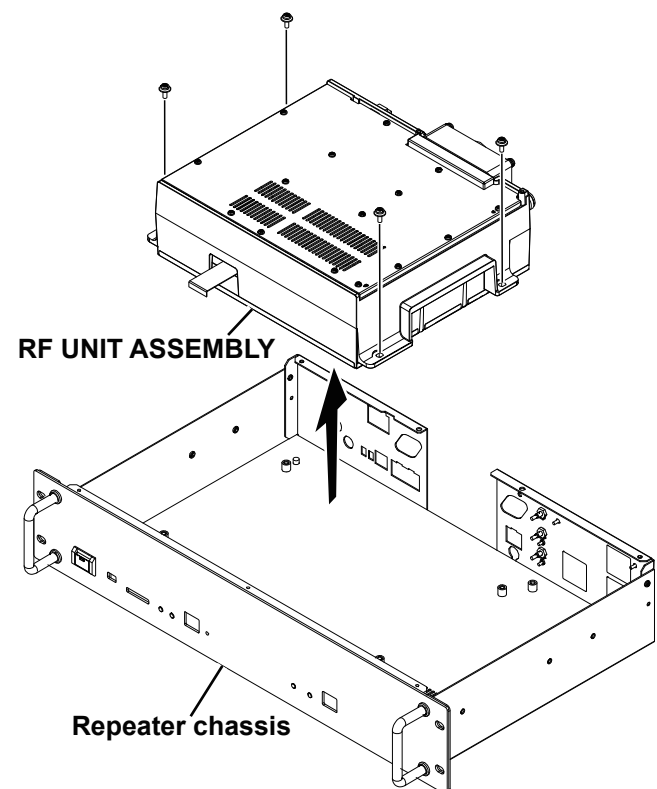
1) Remove the 2 screws from the rear panel of the repeater chassis.



2) Remove the 4 screws from the RF UNIT ASSEMBLY.

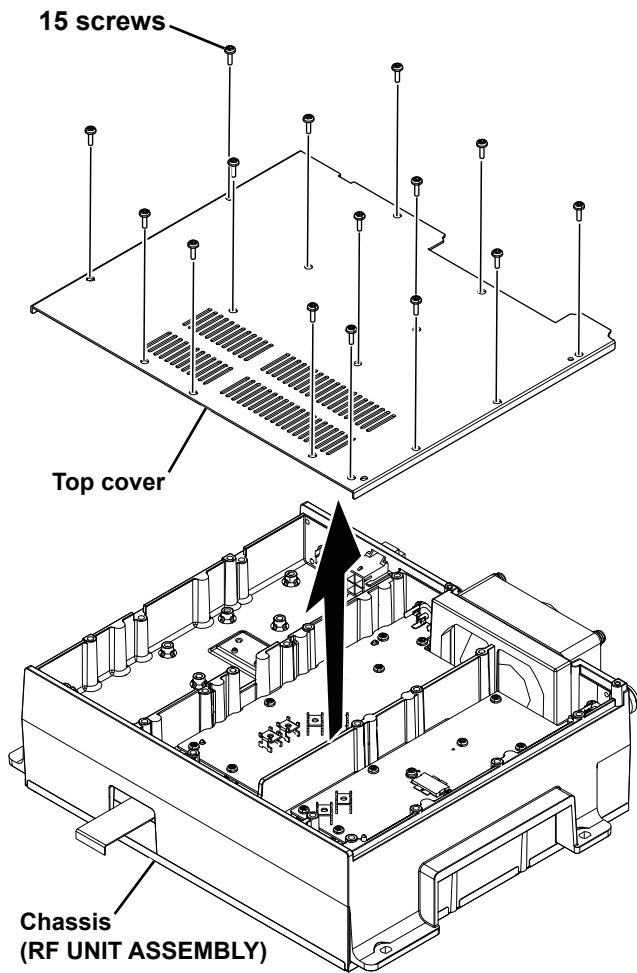


3) Remove the RF UNIT ASSEMBLY from the repeater chassis.

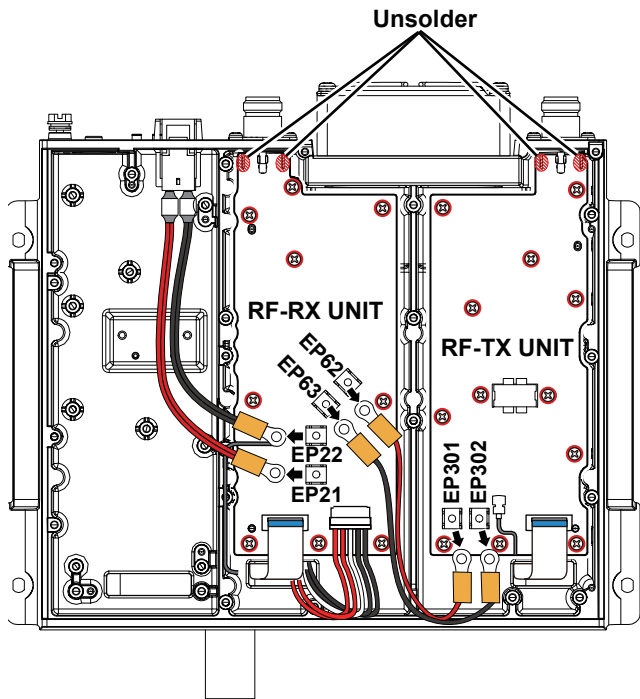


3. Removing the RF-RX and RF-TX UNITS

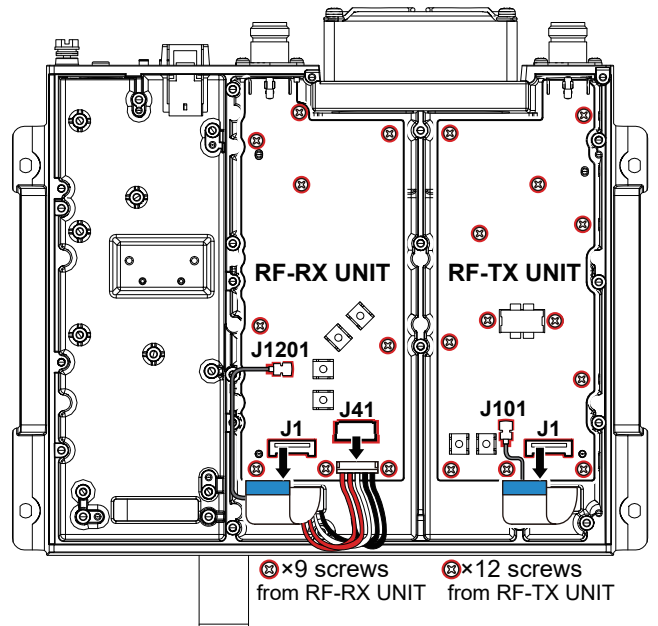
1) Remove the 15 screws from the top cover, then remove it.



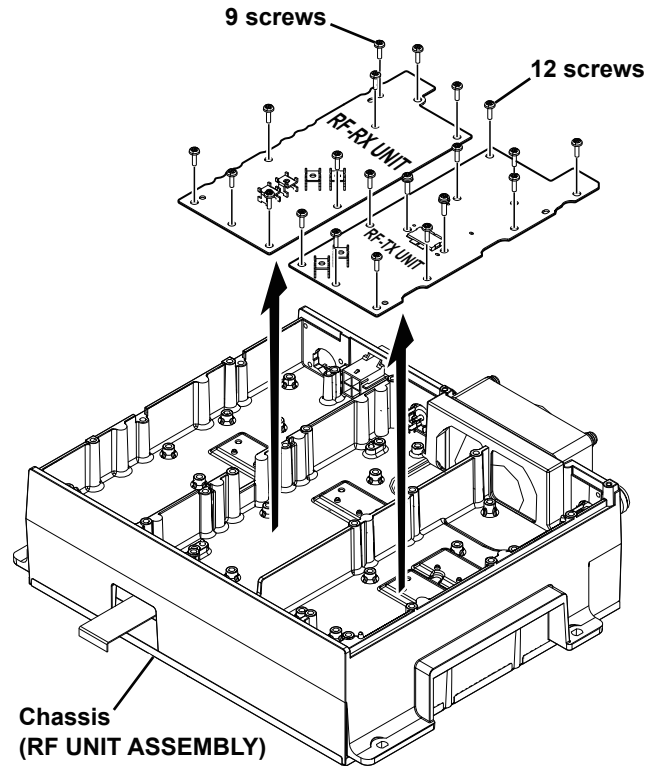
2) Remove the DC cables from the RF-RX and RF-TX UNITS, and unsolder the antenna connectors (ground).



3) Remove the 21 screws and disconnect the cables from the RF-RX and RF-TX UNITS.



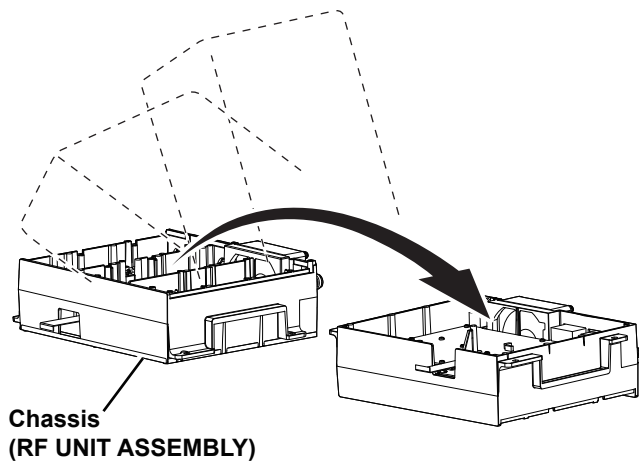
4) Remove the RF-RX and RF-TX UNITS from the chassis.



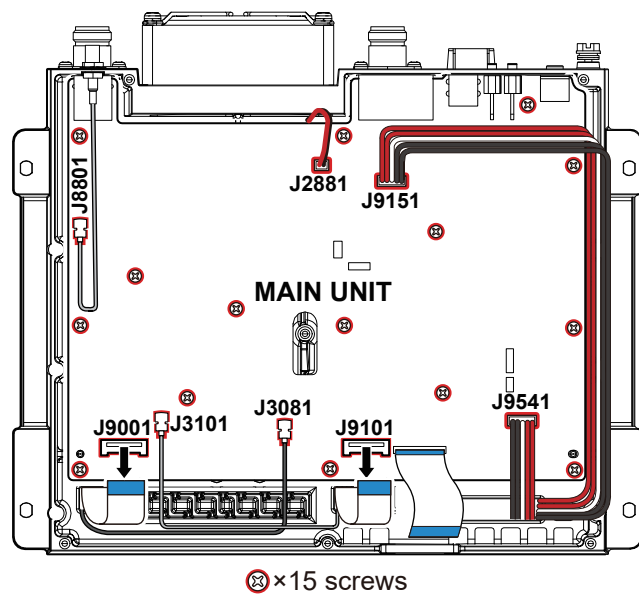
(Continued on the right above)

4. Removing the MAIN UNIT

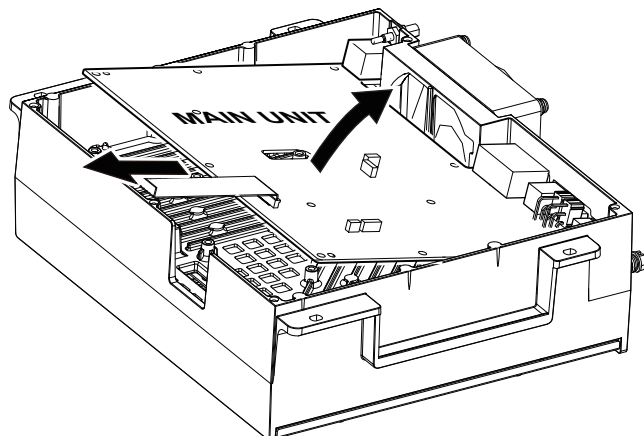
1) Turn the RF UNIT ASSEMBLY upside down.



2) Remove the 15 screws, and disconnect the 8 cables from the MAIN UNIT.



3) Remove the MAIN UNIT from the chassis in the direction of the arrow.

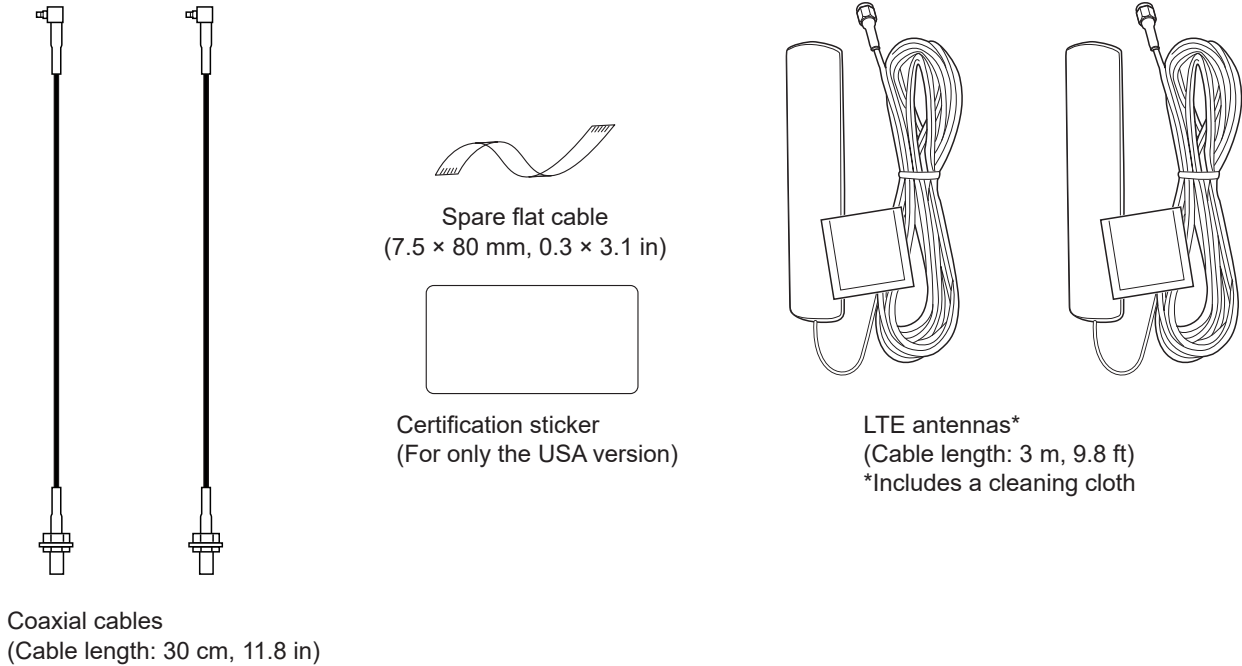


SECTION 4 OPTIONAL PRODUCT INSTALLATION

NOTE: For the latest information, refer to the UX-262 SETTING GUIDE that is available from the Extranet.

4-1 INSTALLING THE LTE MODULE (UX-262)

■ SUPPLIED ACCESSORIES



NOTE: Place the repeater within reach of the antenna cables to paste the LTE antennas on a window glass.

◆ About the certification sticker:

For the USA version, paste the supplied certification sticker on the repeater case to show that the repeater is certified.

CAUTION: DO NOT paste the sticker where it blocks vents on the case. This may damage the repeater.

◆ Preparation

Carefully check your repeater settings before installing the LTE unit.

The system with a single repeater:

Confirm the repeater is connected to a Gateway Server.

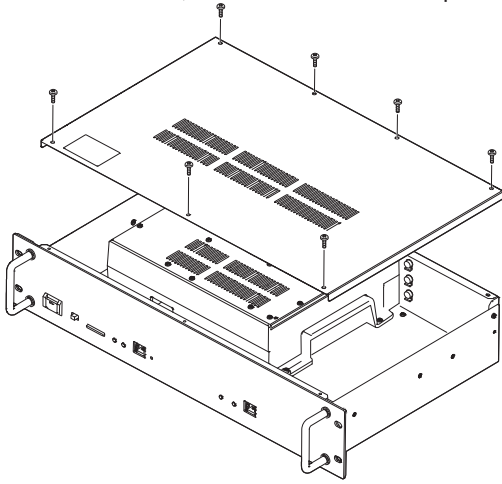
The system with multiple repeaters:

Install the unit to a repeater that is connected to a Gateway Server.

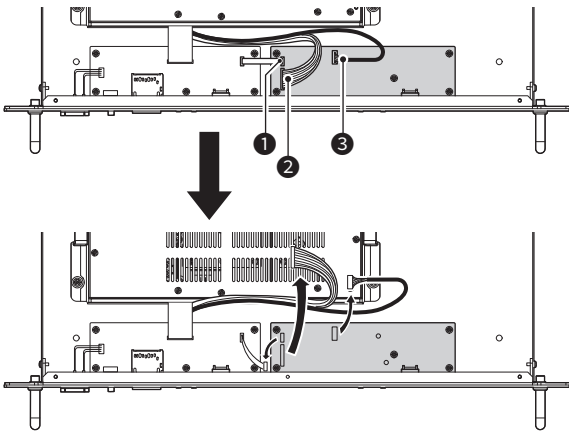
Connect the gateway server to the ID-RP1200VD in DD mode if it is included in your system. The system will not work if it is connected to other repeaters.

■ INSTALLING THE UNIT

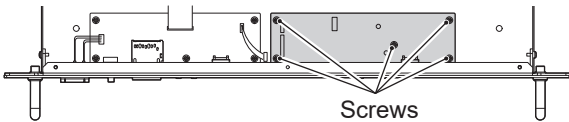
1) Remove the screws, and then remove the top cover.



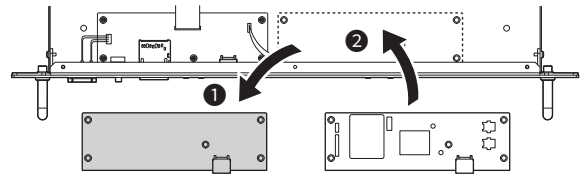
2) Carefully remove three cables (1, 2, 3), as shown below.



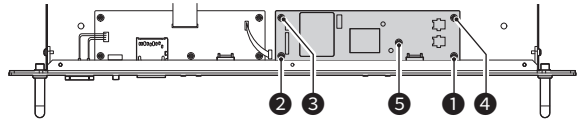
3) Remove the five screws.



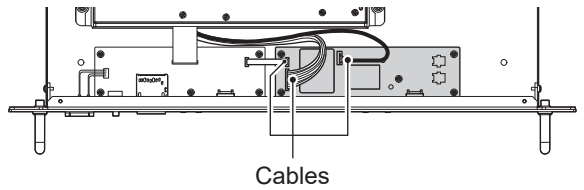
4) Remove the PCB (FRONT-R UNIT: 1), and then attach the unit (2).



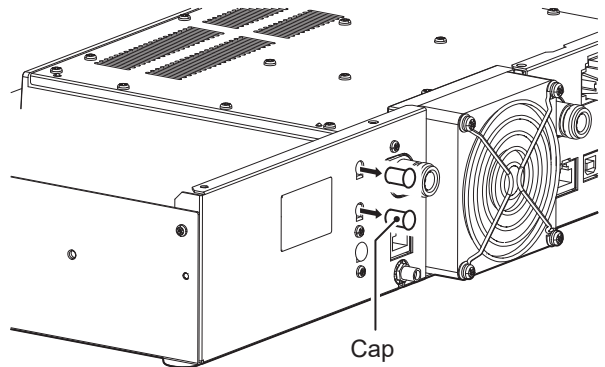
5) Secure the unit using the screws removed in step 3.
① Firmly tighten the screws in the order shown below.



6) Reattach the cables removed in step 2.



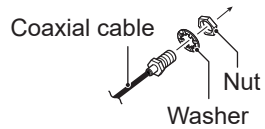
7) Remove the two caps on the rear panel, as shown below.



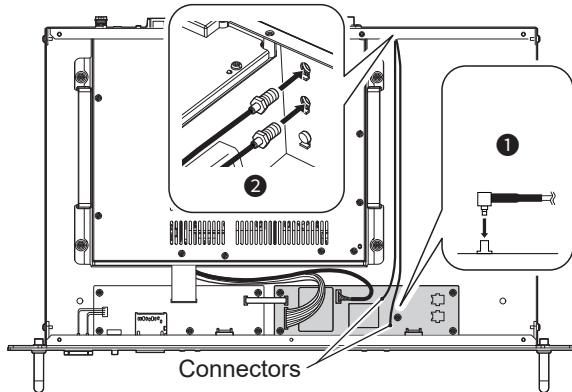
(Continued on the next page)

■ INSTALLING THE UNIT (CONTINUED)

- 8) Remove the nuts and washers from the straight connectors on the supplied coaxial cables.

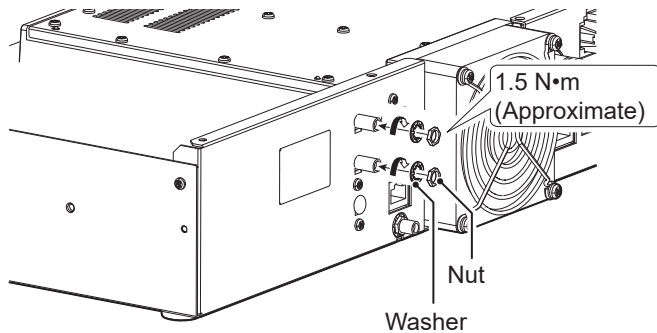


- 9) Attach one end of the cables to the connectors on the unit (1), and then attach the other ends through the holes in the repeater's rear panel (2) where the caps were located.



- 10) Secure the coaxial cables to the rear panel using the nuts and washers removed in step 8.

① Torque the nuts to approximately 1.5 N•m.



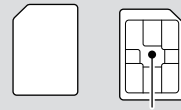
■ INSTALLING THE SIM CARD

Install valid SIM cards, as shown below.

Caution for handling the nanoSIM cards:

- To avoid damage from static discharge, touch a metal object such as a doorknob or a metal window sash to remove any static electricity that may be accumulated in your body before handling the nanoSIM cards.
- Never directly touch the IC part (metal sections) of the nanoSIM, or the unit's contacts connected to the nanoSIM card, with your fingers.
- Observe the proper direction when installing the card.
- Always carefully install and remove the card.
- Do not apply too much force to the slot cover when removing or replacing a nanoSIM card. If it is bent or damaged, it will not be usable.

① Install the nanoSIM card to the SIM1 slot when using the unit with a single nanoSIM card.

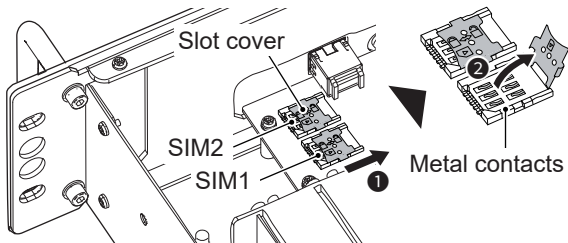


IC (Metal sections)

- 1) Carefully slide the slot cover in the direction of the arrow (①), and then open it (②).

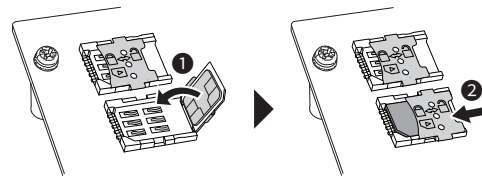
① Do not apply too much force to the slot cover.

② Do not touch the metal contacts of the slot with your finger.



- 3) Close the slot cover (①), and then slide it in the direction of the arrow until it locks (②).

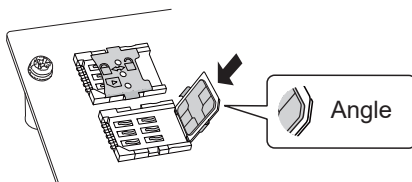
4) Do not apply too much force to the slot cover.



- 5) If you install a second nanoSIM card, repeat steps 1 ~ 3.


6) Reattach the top cover that you removed on page 2.

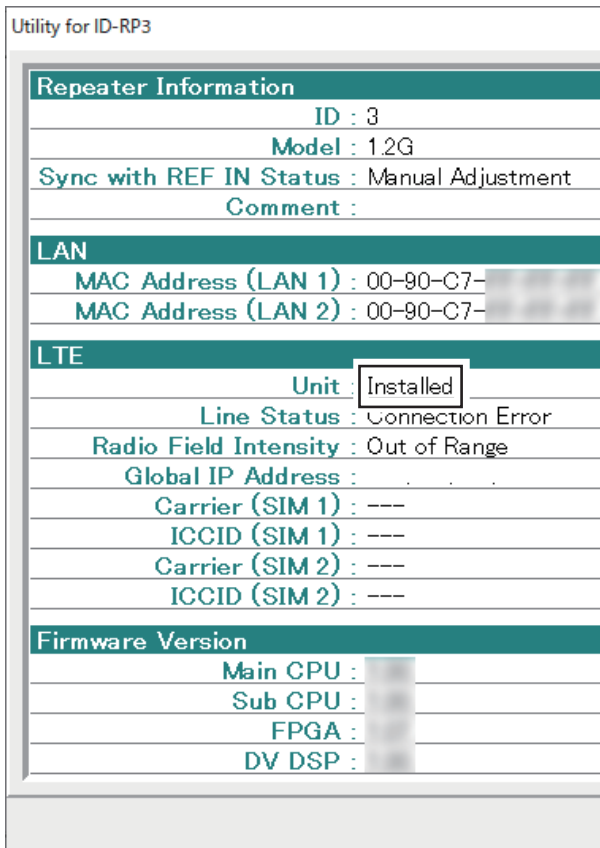
- 2) Observe the angled corner of the nanoSIM card and install the card as shown below.



■ VERIFICATION

Use the Utility for ID-RP3 to verify that the repeater recognizes the installed unit.

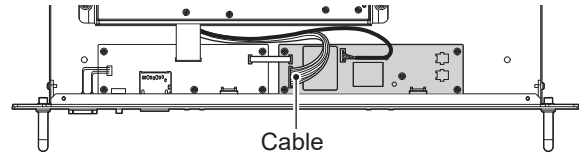
- 1) Connect the PC to the repeater with a unit
 - ① See the instruction manual included with the repeater for details of USB driver settings, utility installation, and connection instructions.
- 2) Turn ON the repeater.
- 3) Open the Utility.
- 4) Select the COM port that the USB cable is connected to.
- 5) Click “- ① “Connection Error” is displayed in “Line Status” until you complete the LTE settings.



◇ Troubleshooting

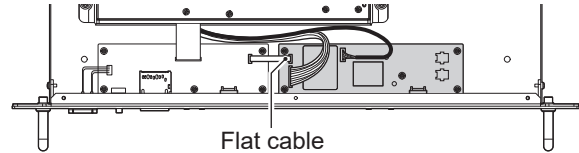
The repeater does not turn ON:

Confirm the cable shown below is properly attached.



“None” is displayed in “Unit”:

Confirm the flat cable shown below is properly attached.



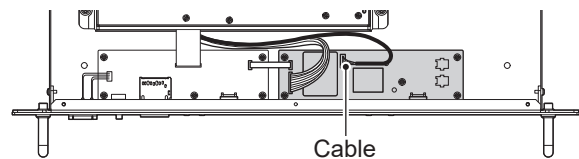
“Connection Error” is displayed in “Line Status”:

Check after you complete the LTE settings described in section 3.

If the problem is not solved, confirm the cable shown below is properly attached.

① You must complete the LTE settings before checking “Line Status” and “Radio Field Intensity.”

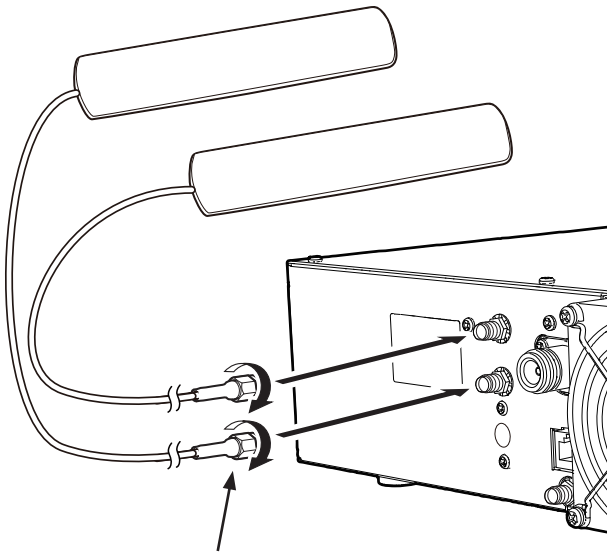
① You can also check the status on the repeater’s front panel. See the instruction manual included with the repeater for details.



■ PLACING ANTENNAS

◇ Attaching antennas

Attach the supplied antennas as shown below.

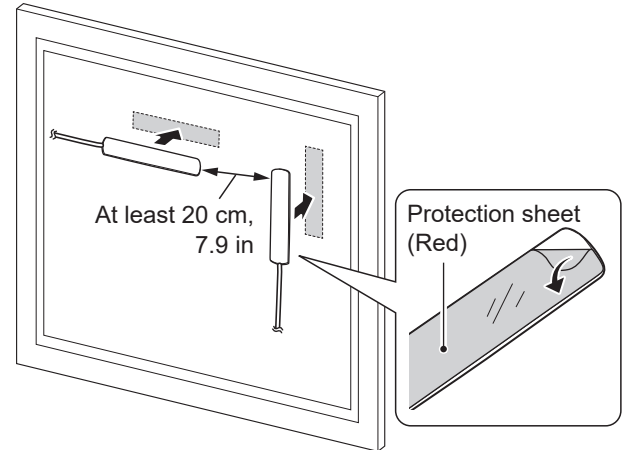


Firmly secure by turning the nut in the direction of the arrow.

◇ Securing antennas

Remove the protection sheet on the antenna surface, and then paste antennas on the window glass.

- ① Clean the window glass using the supplied cleaning cloth before pasting.
- ① Place the two antennas at a distance of at least 20 cm, 7.9 in apart.
- ① Relocate the antennas if the repeater has a poor connection.



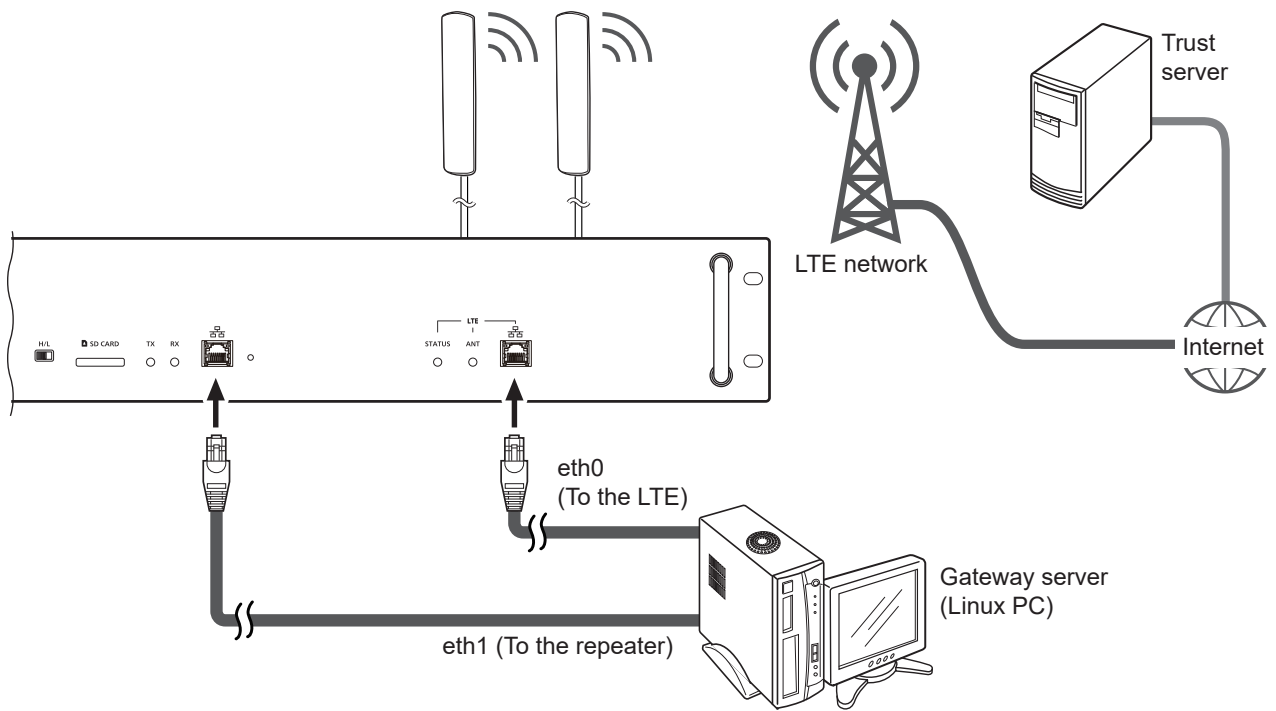
CAUTION:

- **DO NOT** use other than the supplied antennas.
- **DO NOT** forcibly bend or pull the coaxial cables. This may damage the cables.
- **DO NOT** step on the coaxial cables, place heavy objects on them, or pinch them. This may damage the cables.
- **DO NOT** touch the coaxial cables with wet hands. This may damage the cables.
- **DO NOT** apply too much force to the coaxial cable when removing it. This may damage the cables.

4-2 CONNECTING A GATEWAY SERVER

■ USING A GATEWAY SERVER

Connect a Gateway server to the repeater to use an LTE network.

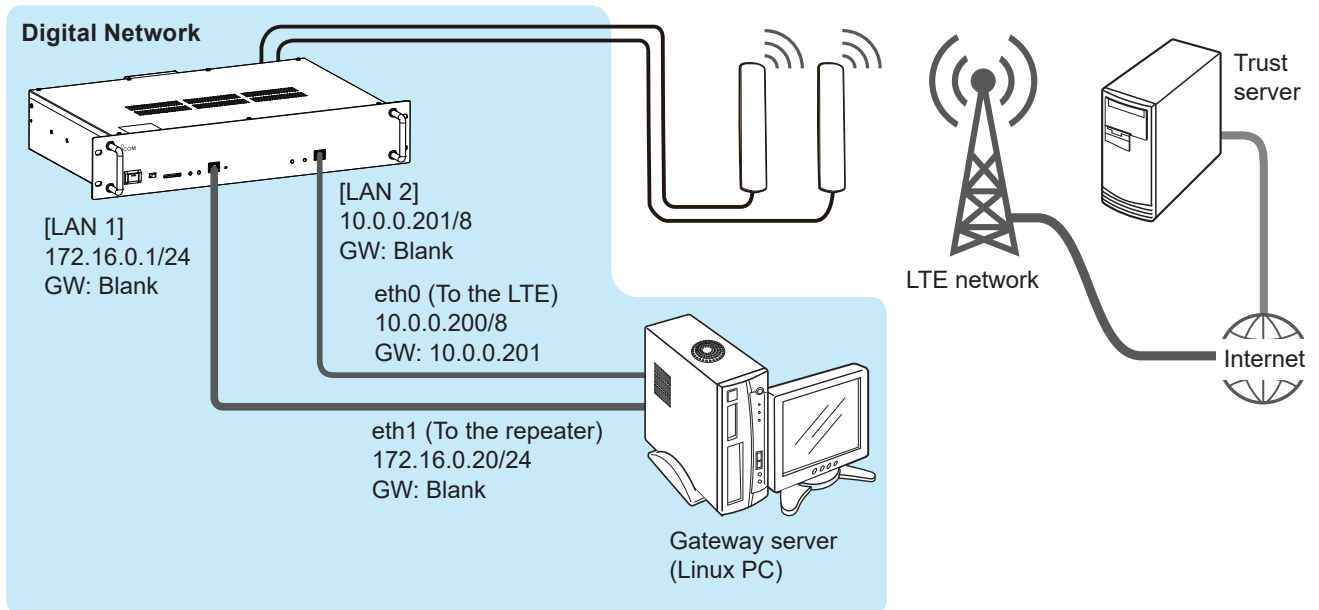


4-3 REPEATER SETTINGS

This section describes about the required IP address and LTE settings in the Utility for ID-RP3.

① The IP addresses shown in the figure are examples. Set appropriate IP addresses according to your environment.

■ USING A GATEWAY SERVER



■ UTILITY FOR ID-RP3 SETTINGS (COMMON)

① If your repeater is already in operation online, skip this topic.

The settings shown below are the minimum required to use the Digital Repeater function. See the Utility for ID-RP3 HELP for more details for other setting items.

◇ RX Frequency/TX Frequency

Enter the repeater's receive/transmission frequency.

- ① "X" is displayed when frequencies are set to default.
- ① Confirm the entered frequencies are assigned to your repeater.

Common Setting	
Frequency	
RX Frequency	X
TX Frequency	X
TX/RX Frequency (DD)	—

◇ Mode

Select the repeater's operating mode.

- ① Not selectable when configuring the DD mode on the ID-RP1200VD.

Common Setting	
Mode	
Mode	DV

◇ Call Sign

Enter the repeater call sign assigned to it.

- ① An Emergency Stop command provided through the LAN is usable by setting the call sign.

Common Setting	
Repeater Call Sign	
Call Sign	

◇ Squelch Level

Enter the squelch level at which the squelch just opens, and the repeater starts operating.

Common Setting	
Squelch	
Squelch Level	77 (30%)

◇ Selecting the output power

Select the output power using the [H/L] switch on the repeater's front panel.

■ UTILITY FOR ID-RP3 SETTINGS (GATEWAY SETTINGS)

① If your repeater is already in operation online, skip this topic.

Settings shown below are required if operating the repeater as a Gateway.

◇ Using a Gateway server

- 1) Select "Use Gateway Server" in "Gateway" (①).
 ① The option "Use Simple gateway" is usable only in Japan.
- 2) Enter the IP address of the port to the repeater (②).
 ① Enter the IP address assigned by your environment.
- 3) Enter the UDP port number (③).
 ① Confirm the UDP port number is not a duplicate if using the Monitor function on the same IP address.

Digital Repeater		
Gateway		
Gateway	Use Gateway Server	①
Gateway Server		
IP Address	172. 16. 0. 20	②
UDP Port	20000	③
Monitor		
Monitor	Not Used	
IP Address	172. 16. 0. 20	
UDP Port	21000	

TIP: Using the Gateway function with multiple repeaters

Only one repeater is settable as a Gateway.

① "X" is displayed if multiple repeaters are set as Gateways.

If the ID-RP1200VD in DD mode is included, set it as a Gateway.

① "X" is displayed if another repeater is set as a Gateway

Digital Repeater		
UHF (ID=2) 1.2G (ID=3)		
Gateway	Not Used	, Use Gateway Server

■ UTILITY FOR ID-RP3 SETTINGS (NETWORK SETTINGS)

◇ Using a Gateway server

Using the DHCP Client function:

Automatically gets the repeater IP address and Subnet mask from the connected router.

- Select "ON" in "DHCP."

Network	
LAN 1	
DHCP	ON
IP Address	172.16.0.1
Subnet Mask	255.255.255.0 (24bit)
Default Gateway	. . .
Primary DNS Server	. . .
Secondary DNS Server	. . .

◇ Time Settings

Turn the Network Time Protocol (NTP) function ON or OFF. If the NTP function is "ON," the repeater gets the exact time through the network.

- ① The setting is required for giving a file-generating date when saving a setting file (icf).
- ① Use the default NTP server address if possible.

Network	
Time Set	
NTP Function	ON
NTP Server Address	time.nist.gov
UTC Offset	0:00

Manually entering the repeater IP address and Subnet mask:

- 1) Select "OFF" in "DHCP" (①).
- 2) Enter the fixed IP address and Subnet Mask (② ③).
 - ① If connecting to a router that has the DHCP Server function enabled, set the IP address that is outside the range of the automatically assigned one.
 - ① If you connect to other networks through the repeater, enter the same IP address as the target network.
- 3) Confirm nothing is entered in "Default Gateway" (④).

Network	
LAN 1	
DHCP	OFF ①
IP Address	172.16.0.1 ②
Subnet Mask	255.255.255.0 (24bit) ③
Default Gateway	. . . ④
Primary DNS Server	. . .
Secondary DNS Server	. . .

■ LTE SETTINGS

◇ Using a Gateway server

- 1) Select "OFF" in "DHCP" (❶).
- 2) Enter the fixed IP address and Subnet Mask (❷ ❸).

LTE	
	UHF (ID=2)
LAN 2	
DHCP	OFF ❶
IP Address	10. 0. 0.201 ❷
Subnet Mask	255. 0. 0. 0 (8bit) ❸
Default Gateway	. . .

◇ LTE settings

- Select "ON" in "LTE Function" (❶), and then select a SIM card slot with a valid SIM card in it (❷).
- ❶ If "ON" is selected in "SIM Auto Switch," the repeater switches to the other SIM card slot if the selected SIM card slot goes offline for a certain period of time.

LTE	
LTE	
LTE Function	ON ❶
SIM Select	SIM1 ❷
SIM Auto Switch	OFF
Primary Recovery Time	OFF

◇ SIM card settings

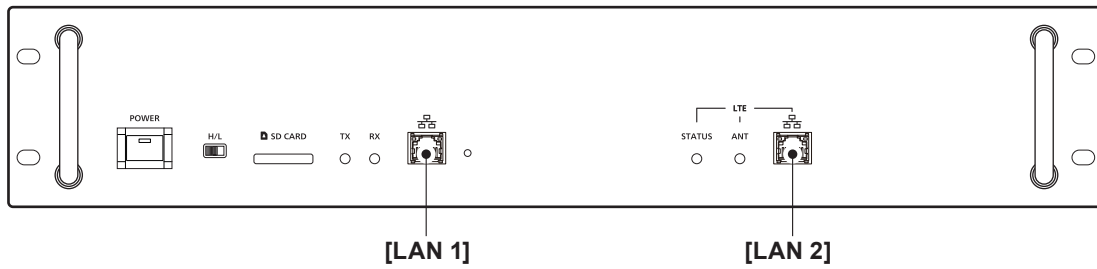
Enter the APN, User Name, Password, and Authentication Type provided by the mobile carrier.

- ❶ If "ON" is selected in "SIM Auto Switch," enter the information of SIM 2 as well.
- ❶ Confirm the settings completed adequately by checking the "Information" in the <Program> menu.
You can also check the status on the repeater's front panel. See the instruction manual included with the repeater for details.

SIM 1	
APN	
User Name	
Password	
Authentication Type	OFF
SIM 2	
APN	
User Name	
Password	
Authentication Type	OFF

SECTION 5 INTERFACE INFORMATION

• FRONT PANEL



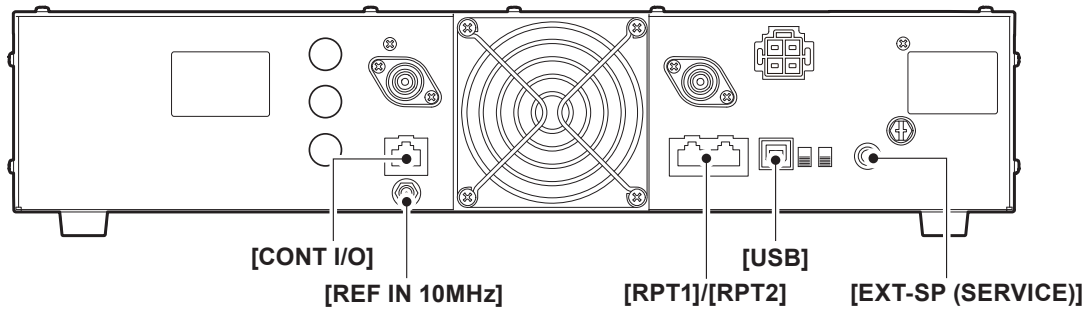
[LAN 1]

[LAN 1]	Indication	Description	Specification
	① LINK/ACT	<ul style="list-style-type: none"> Lights when a cable is connected. Does not light when a cable is not connected. Blinks while communicating. 	Connects to a Gateway server when operating in the Gateway repeater mode.
	② SPEED	<ul style="list-style-type: none"> Lights while communicating in 100BASE-TX. Does not light while communicating. Blinks while communicating in 10BASE-T, or not connected. 	


[LAN 2]

[LAN 2]	Indication	Description	Specification
	① LINK/ACT	<ul style="list-style-type: none"> Lights when a cable is connected. Does not light when a cable is not connected. Blinks while communicating. 	Connects to a Gateway server when operating in the LTE mode. ① An optional LTE unit is required.
	② SPEED	<ul style="list-style-type: none"> Lights while communicating in 100BASE-TX. Does not light while communicating. Blinks while communicating in 10BASE-T, or not connected. 	


• REAR PANEL




[CONT I/O]

[CONT I/O]	Description
	Connects to the LAN port of the ID-RP2C using a supplied control cable, when the repeater system is operating as a gateway or assist repeater with the ID-RP2C. ① Set [CONT I/O RPT] on the rear panel to "CONT I/O," when using this port.


[RPT1]/[RPT2]

[RPT1]/[RPT2]	Description
	Connects to other repeaters using the supplied control cable for data communications, when multiple repeaters are installed in the repeater system. ① Set [CONT I/O RPT] on the rear panel to "RPT," when using this port.


[REF IN 10MHz]

[REF IN 10MHz]	Description
 SMA connector	Inputs a 10 MHz signal as a reference frequency signal. • Input frequency: 10 MHz • Impedance: 50 Ω (unbalanced) • Input level: -10 dBm (approximately)

[USB]

[USB]	Description
	Connects to the PC with a supplied USB cable to set the details of the repeater, such as the callsign, frequencies, IP address, and any other functions using the utility software. • Connector type: USB type B (1.1/2.0)

[EXT-SP (SERVICE)]

[EXT-SP (SERVICE)]	Line Name	Description
 (3.5 mm, 1/8 in (d)) MIC Connects a 3.5 mm stereo plug	AF/DTMF	Received audio or DTMF tone signal output port. • Output impedance: 4 ~ 8 Ω • Output level: 2 W or more at 10% distortion into an 8 Ω load.
	MIC	Audio input port for adjustment. Connects to an audio generator. Refer to ADJUSTMENT PROCEDURE for details.

SECTION 6

ADJUSTMENT PROCEDURE

6-1 PREPARATION

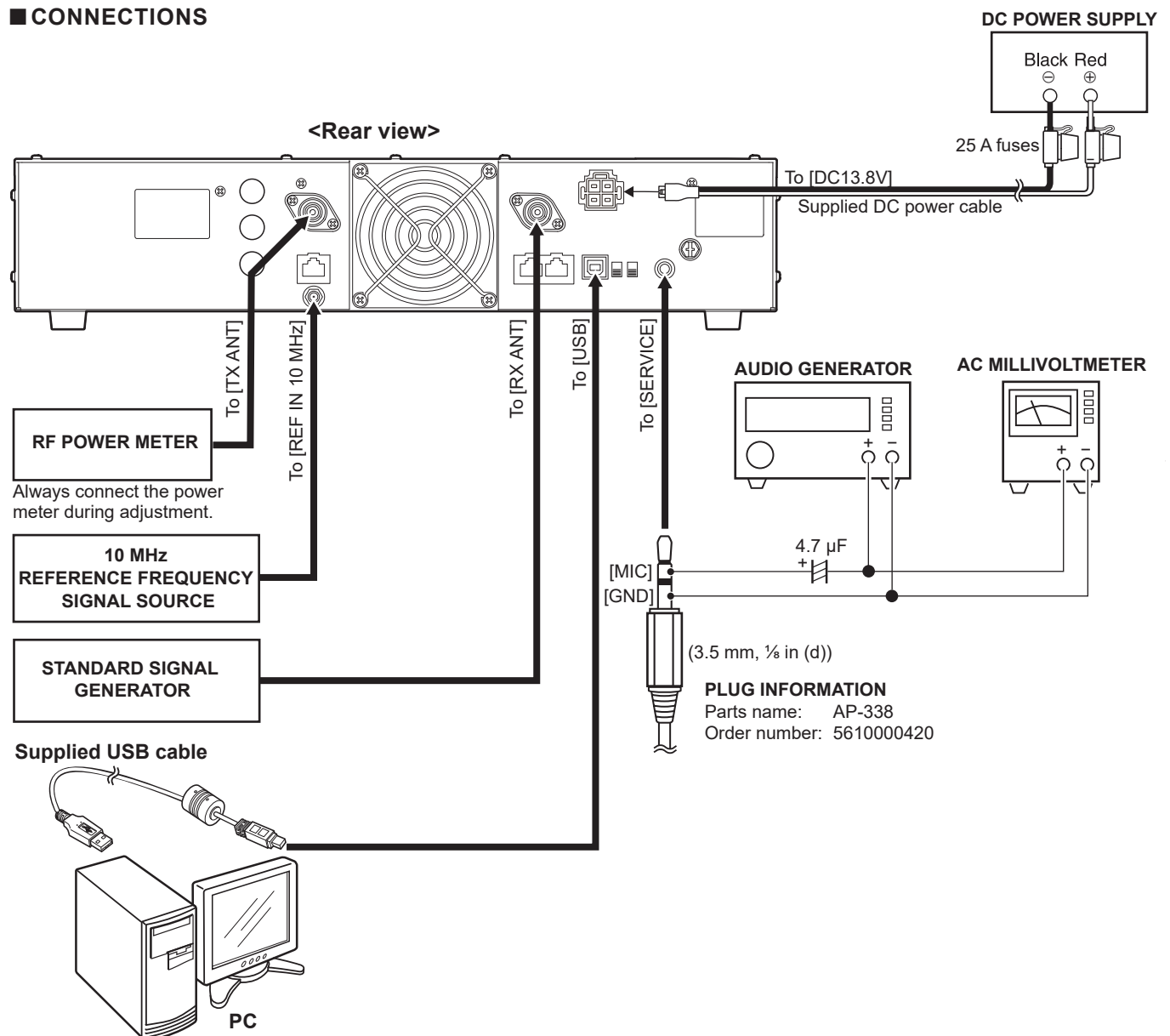
■ REQUIRED EQUIPMENT

EQUIPMENT	GRADE AND RANGE	EQUIPMENT	GRADE AND RANGE
Adjustment software	ID-RP3 ADJ	Programming cable	USB cable (Supplied with the repeater)
DC power supply	Output voltage: 13.8 V Current capacity: 10 A or more	Standard signal generator (SSG)	Frequency range: 0.1 ~ 300 MHz Output level: -20 to 90 dB μ V (-127 to -17 dBm)
RF power meter (50 Ω terminated)	Measuring range: 0.1 ~ 30 W Frequency range: 100 ~ 300 MHz SWR: 1.2 : 1 or less	10 MHz reference frequency signal source	Frequency: 10.000000 MHz Accuracy: $\pm 5 \times 10^{-4}$ ppm or less Output level: 97 dB μ V (-10 dBm)
Audio generator (AG)	Frequency range: 300 ~ 3000 Hz Output level: 1 ~ 500 mV	AC millivoltmeter	Measuring range: 1 mV ~ 10 V

■ SAVE THE PROGRAMMING DATA

- Adjusting the repeater will change the programming setting.
- Before adjusting, save the programming data of the repeater with the programming software.
After adjusting, write back the programming data.

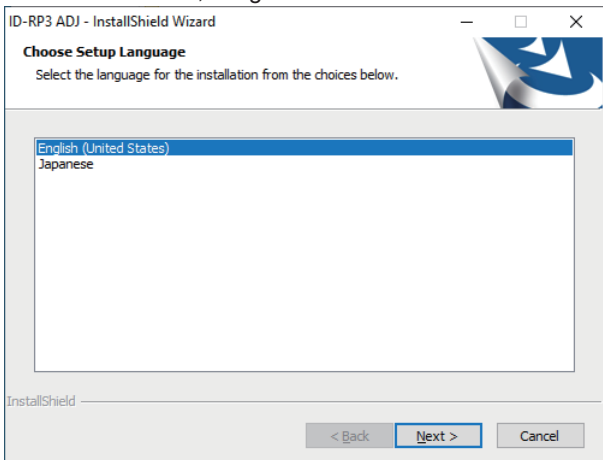
■ CONNECTIONS



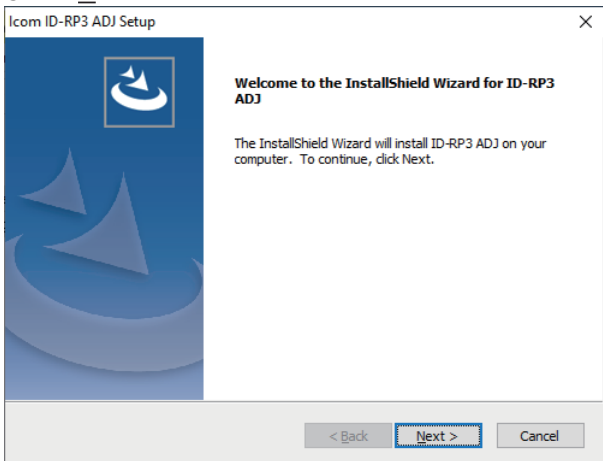
■ INSTALLING THE ADJUSTMENT SOFTWARE (ID-RP3 ADJ)

When installing the software, confirm Windows has completed its startup, and then log in as the **administrator**.

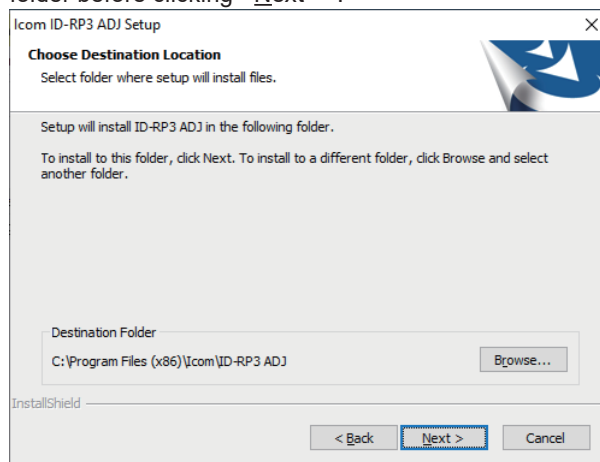
- 1) Confirm no other applications are running.
- 2) Double-click "setup.exe."
 - If "User Account Control" is displayed, click <Yes> to continue.
- 3) Select "English" (or "Japanese") and then click <Next >>.
 - In this document, "English" is selected.



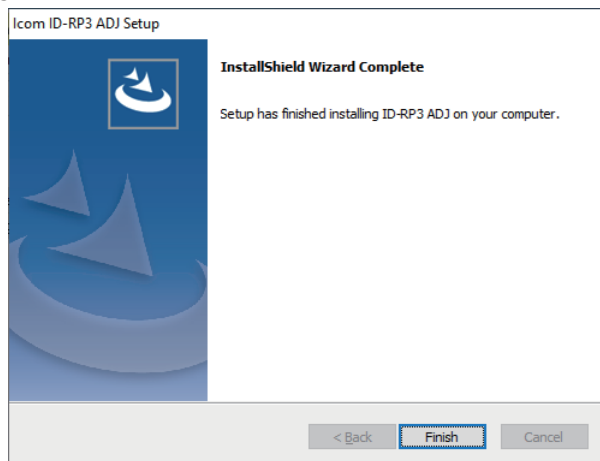
- 4) "Welcome to the InstallShield Wizard for ID-RP3 ADJ" is displayed. Click <Next >>.



- 5) "Choose Destination Location" is displayed. Click <Next >>.
 - If desired, click <Browse...> to select another destination folder before clicking <Next >>.



- 6) After the installation has completed, "InstallShield Wizard Complete" is displayed. Click <Finish>.



- 7) An 'ID-RP3 ADJ' group is created on the menu, and a shortcut icon is created on the desktop.

■ BEFORE CONNECTING THE REPEATER TO THE PC

To use the USB cable between the repeater and a PC, you must first install a USB driver.

The latest USB driver and installation guide can be downloaded from the Icom website.

Carefully read the guide, before installing the driver.

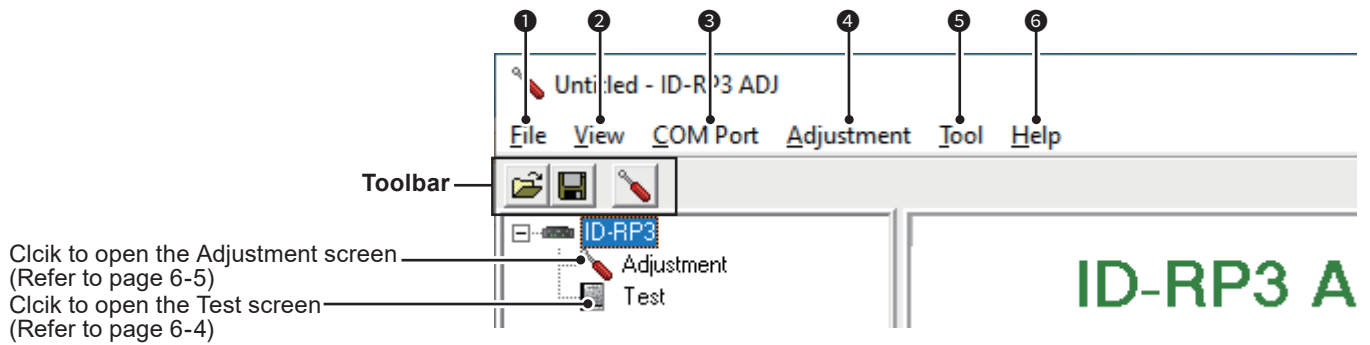
https://www.icomjapan.com/support/firmware_driver/

■ IF A COMMUNICATION ERROR MESSAGE APPEARS

Check the following if an error message appears.

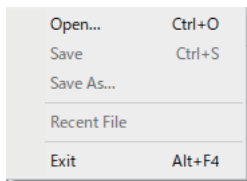
- The correct port number is set in the [COM Port] menu.
- The repeater and PC are correctly connected together with the cloning cable.
- The repeater is turned ON.

■ ABOUT THE ADJUSTMENT SOFTWARE (ID-RP3 ADJ)



1 File

The File menu contains sub-menus that you use to open, and save data file, and to exit the software.



Open... (Ctrl+O)

Click to open a data file (.icf).

- The Adjustment data is not written to the repeater at opening a file.

Save (Ctrl+S)

Click to save the settings to a data file (.icf).

- You need to load the data to save from the repeater.

Save As...

Click to save the current settings with a different file name, or in a different location.

If the same file name exists in the selected folder, a warning message appears. Click <OK> if you want to overwrite it, otherwise change the file name or location and then save it.

- You need to load the data to save from the repeater.

Recent File

Click to show up to the last four files that you accessed.

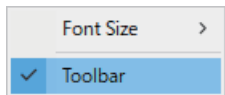
Select a file for simple reloading.

Exit (Alt+F4)

Click to close the software.

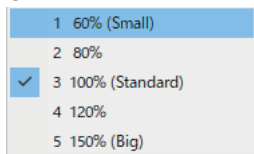
2 View

The View menu contains sub-menu that you use to change the font size and to hide or display the toolbar.



Font Size

Click to select the font size of the contents list screen.



Toolbar

Click to hide or display the toolbar.

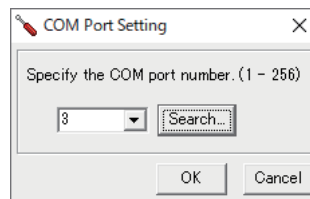
The toolbar has 3 function icons, Open, Save, and load the adjustment data.

3 COM Port

Setting

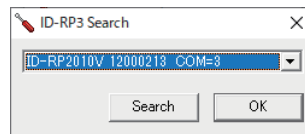
Opens the "COM Port Setting" window.

Select the number of the COM port that the repeater is connected to.



You may also search the COM port number that the ID-RP2010V is connected to, by clicking <Search> on the "COM Port Setting" window.

- The "ID-RP3 Search" window appears.



4 Adjustment

Read <- Repeater

Loads the adjustment value from the repeater.

NOTE: Check the following if an error message appears.

- The correct port number is set in the [COM Port] menu.
- The repeater and PC are correctly connected together with the programming cable.
- The repeater is turned ON.

5 Tool

All Reset

Performs the Repeater All Reset.

All Reset returns all repeater settings to their default value.

- [TX] and [RX] blink until the repeater setting data is newly programmed.

NOTE: It is recommended that you save the programming data of the repeater with the programming software before adjusting.

6 Help

About ID-RP3 ADJ

Click to open the information window which displays the revision number of the software.

Click <OK> to close the window.

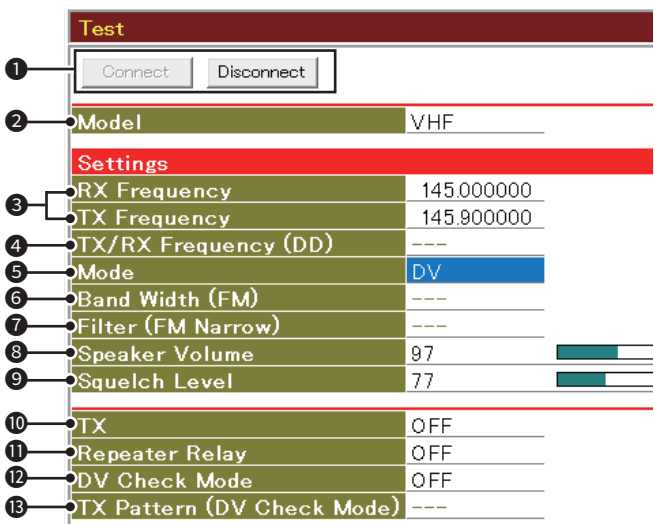


(This window is an example.)

■ ABOUT THE TEST SCREEN

On the Test screen, you can temporarily change the repeater settings to test the repeater operation.

- Perform the Repeater All Reset after you have changed all the necessary settings on this screen, checked the result, and finished the test. Click <Disconnect>, then Repeater All Reset.



(This screen is an example.)

❶ <Connect> and <Disconnect> buttons

Click <Connect> to load the repeater setting data onto the PC. Click <Disconnect> to exit the repeater test.

NOTE: Check the following if an error message appears.

- The correct port number is set in the [COM Port] menu.
- The repeater and PC are correctly connected together with the programming cable.
- The repeater is turned ON.

❷ Model

“VHF” is displayed when the repeater setting data has been successfully loaded.

❸ RX Frequency / TX Frequency

Sets the uplink (RX) or downlink (TX) frequency (in MHz). Double-click on the item and enter the frequency using the PC’s keyboard, then push [Enter].

Enter the frequency of up to 6 digits (in MHz).

The settable frequency range may differ, depending on the repeater version.

❹ TX/RX Frequency (DD)

This item is not for the ID-RP2010V.

❺ Mode

Sets the operating mode.

Double-click on the item and set the mode to “FM” (Analog audio) or “DV” (Digital audio).

❻ Band Width (FM)

Sets the pass bandwidth in the FM mode.

Double-click on the item and set the bandwidth to “Wide” or “Narrow.”

- This item can be set when the “Mode” item is set to “FM.”

❼ Filter (FM Narrow)

Sets the IF filter pass bandwidth in the FM mode.

Double-click on the item and set the bandwidth to “10k” (10 kHz) or “7k” (7 kHz).

- This item can be set when the “Mode” item is set to “FM.”

❽ Speaker Volume

Sets the output signal level of the [SERVICE] jack.

Double-click on the item and push the PC’s [←] or [→] key to increase or decrease the audio output level.

- Settable range: 0 (0%) ~ 255 (100%)
- The received audio signal (the demodulated signal in the FM mode or the decoded digital signal in the DV mode) is output from the [SERVICE] jack.

❾ Squelch Level

Sets the noise squelch level.

Double-click on the item and push the PC’s [←] or [→] key to increase or decrease the squelch level.

- Settable range: 0 (0% loose) ~ 255 (100% tight)
- When you set to “0,” the squelch is forcibly opened.

❿ TX

Turns the test transmission ON or OFF.

Double-click this item and select “ON” to start transmission. Select “OFF” to stop transmission.

⓫ Repeater Relay

Turns the repeater relay operation ON or OFF.

Double-click on the item and select “ON” to turn ON the relay operation (Normal repeater operation).

Select “OFF” to inhibit the transmission (The repeater does not transmit even when an uplink signal is received.)

⓬ DV Check Mode

Turns the DV Check Mode ON or OFF.

When “ON” is selected, clock and data signals for the RX decoding are output from the SD card slot, and the downlink signal with the test pattern that is selected in the “TX Pattern (DV Check Mode)” is transmitted.

- This item can be set when the “Mode” item is set to “DV.”
- You need to restart the repeater when changing the selection from “ON” to “OFF.” Restart the repeater by following the instructions that are displayed when you select “OFF.”

⓭ TX Pattern

Selects the test pattern of the transmit signal (downlink signal).

Normal: Received signal is transmitted. (Normal repeater operation)

0/1 Repeat: Data bits “0” and “1” are repeatedly transmitted.

PN9: PN9 data is transmitted.

PN15: PN15 data is transmitted.

All 1: Only data bit “1” is transmitted.

All 0: Only data bit “0” is transmitted.

- This item can be set when the “DV Check Mode” item is set to “ON.”

About the transmitted signal

The repeater transmits the following signal (if there is no uplink signal received), depending on the related item settings.

“Mode” item	“DV Check Mode” item	“Repeater Relay” item	Transmit signal
FM	—*1	ON	Non-modulated signal
FM	—*1	OFF	Externally applied AF signal
DV	OFF	ON	The DV signal and carrier.*2
		OFF	The coded data (AMBE) of externally applied AF signal
DV	ON	—*1	The signal with the pattern that is selected in “TX Pattern (DV Check Mode)”

*1 Does not affect the transmit signal.

*2 2 seconds of DV signal followed by the continuous non-modulated signal.

■ ABOUT THE ADJUSTMENT SCREEN

On the Adjustment screen, you can adjust the repeater.

- Perform the Repeater All Reset after you have finished the adjustment.

Adjustment value in hexadecimal

Adjustment				
	Start	Stop	[Enter]: Starts the automatic adjustment.	
	Model	VHF		
	IDLING		Hex	Result
Idling current adjustment (Automatic)	VDL IDL Set	02FE (2.470V)	00E0 (0.722V)	--
	VHF FIDV	B0 (3.450V)		--
	VHF DIDV	CB (3.980V)		--
	TX OUTPUT POWER			
Transmit output power adjustment (Manual)	TX Total VHF Gain	63 (1.941V)		--
	POWER VHF2 MIN	0E (0.274V)		--
	POWER VHF2 1%	0E (0.274V)		--
	POWER VHF2 10%	21 (0.647V)		--
	POWER VHF2 50%	42 (1.294V)		--
	TX BALANCE			
Transmit balance adjustment (Manual)	POWER VHF1 100%	5A (99%)		--
	POWER VHF3 100%	5C (101%)		--
	POWER VHF4 100%	5E (103%)		--
	ALC/DRIVE GAIN			
ALC and DRIVE GAIN adjustments (Automatic)	ALC VHF	005F (0.306V)		--
		02C9 (2.300V)		
		0343 (2.893V)		
	DRIVE VHF	2C (0.862V)		--
		50 (1.568V)		
		23 (0.886V)		
		56 (1.686V)		
		6B (2.098V)		
		2B (0.843V)		
		4D (1.509V)		
81 (1.901V)				
	REFERENCE FREQUENCY			
Reference frequency adjustment (Automatic)	REF OSC 1	6B	57	--
	RX TOTAL GAIN/AGC ATTENUATOR			
Receive adjustments (Automatic)	Total Gain VHF PRE ON ref	[Enter]		--
	Total Gain VHF PRE ON set	92		--
	VHF AGC set	[Enter]		--

• Click [Start] to start the adjustment.
• Click [Stop] to quit the adjustment.

“VHF” is displayed when the repeater setting data have been successfully loaded.

“OK” is displayed when the automatic adjustment is successfully finished.

“OK” is displayed when the automatic adjustment is successfully finished.

■ COMMON ADJUSTMENT PROCEDURE

For the Automatic adjustments

- 1) Click on the adjustment value in hexadecimal for the item.
 - The cell is highlighted in blue and selected.
- 2) Push the PC's [ENTER] key.
 - “OK” is displayed and the adjustment value is stored.

Adjustment value in hexadecimal

Adjustment item	Hex	Result
IDLING	02FE (2.470V)	--
	00E0 (0.722V)	

“OK” is displayed.

For the Manual adjustments

- 1) Click on the adjustment value in hexadecimal for the item.
 - The cell is highlighted in blue.
- 2) Push the PC's [ENTER] key.
 - The cell is selected.
- 3) Push the PC's [←] or [→] key to adjust the value.
- 4) If you want to cancel the adjustment, push the PC's [ESC] key.
 - The adjustment value returns to its original value.
- 5) Push the PC's [ENTER] key.
 - “OK” is displayed and the adjustment value is stored.

Adjustment value in hexadecimal

Adjustment item	Hex	Result
TX OUTPUT POWER	02FE (1.941V)	--
	00E0 (0.722V)	

6-2 TRANSMIT ADJUSTMENTS AND VERIFICATIONS

*The repeater automatically transmits while pushing the PC's [←], [→], or [ENTER] key. Be sure to select the appropriate power range before pushing keys.

ADJUSTMENT		ITEM NAME	REPEATER'S CONDITION	OPERATION	VALUE
IDLING -Adjustment (Auto)-	1	[VDL IDL Set]	• Transmitting	<ul style="list-style-type: none"> • Connect the RF power meter* to the TX antenna connector. • Connect the audio generator and AC millivoltmeter to the [SERVICE] jack (MIC line), and set it to: Frequency: 1.5 kHz Level: 30 mVrms • Push the PC's [ENTER] key. 	"OK" is displayed in the Result row.
	2	[VHF FIDV]			
	3	[VHF DIDV]			
TX OUTPUT POWER -Adjustment (Manual)-	1	[TX Total VHF Gain]	• Transmitting	<ul style="list-style-type: none"> • Connect the RF power meter* to the TX antenna connector. • Connect the audio generator and AC millivoltmeter to the [SERVICE] jack (MIC line), and set it to: Frequency: 1.5 kHz Level: 30 mVrms • Push the PC's [←] or [→] key to adjust, then push the [ENTER] key. 	12.5 W
	2	[POWER VHF2 MIN]			0.25 W
	3	[POWER VHF2 1%]			2.5 W
	4	[POWER VHF2 10%]			12.5 W
	5	[POWER VHF2 50%]			25 W
	6	[POWER VHF2 100%]			
TX BALANCE -Adjustment (Manual)-	1	[POWER VHF1 100%]	• Transmitting	<ul style="list-style-type: none"> • Connect the RF power meter* to the TX antenna connector. • Connect the audio generator and AC millivoltmeter to the [SERVICE] jack (MIC line), and set it to: Frequency: 1.5 kHz Level: 30 mVrms • Push the PC's [←] or [→] key to adjust, then push the [ENTER] key. 	25 W
	2	[POWER VHF3 100%]			
ALC/DRIVE -Adjustment (Auto)-	1	[ALC VHF]	• Transmitting	• Connect the RF power meter* to the TX antenna connector.	"OK" is displayed in the Result row.
	2	[DRIVE VHF]			

6-3 FREQUENCY VERIFICATION

†The output level of the signal source is measured at the load end (PD).

ADJUSTMENT		ITEM NAME	REPEATER'S CONDITION	OPERATION	VALUE
REFERENCE FREQUENCY -Adjustment (Auto)-	1	[REF OSC1]	• Receiving	<ul style="list-style-type: none"> • Connect the 10 MHz reference frequency source to the [REF IN 10 MHz] connector, and set it to: Frequency: 10.000000 MHz Level†: +97 dBμV (-10 dBm) Modulation: None • Push the PC's [ENTER] key. 	"OK" is displayed in the Result row.

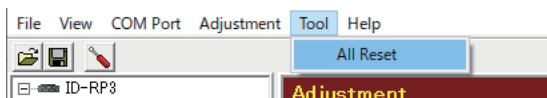
6-4 RECEIVE VERIFICATIONS

†The output level of the standard signal generator (SSG) is measured at the load end (PD).

ADJUSTMENT		ITEM NAME	REPEATER'S CONDITION	OPERATION	VALUE
RECEIVE SENSITIVITY -Adjustment (Auto)-	1	[Total Gain VHF PRE ON ref]	• Receiving	<ul style="list-style-type: none"> • Connect the SSG to the [RX ANT] connector, and set it to: Frequency: 146.0215 MHz Level†: +30 dBμV (-77 dBm) Modulation: None • Push the PC's [ENTER] key. 	"OK" is displayed in the Result row.
	2	[Total Gain VHF PRE ON set]		<ul style="list-style-type: none"> • Set the SSG output as: Level†: OFF • Push the PC's [ENTER] key. 	
	3	[VHF AGC set]		<ul style="list-style-type: none"> • Set the SSG output as: Level†: +50 dBμV (-57 dBm) • Push the PC's [ENTER] key. 	

6-5 RESTARTING THE REPEATER

1) Click [Stop], then perform the All Reset on the ID-RP3 ADJ window.



2) Turn OFF the repeater.

[MAIN UNIT]

Table with columns: REF NO., PART NO., DESCRIPTION, M., H/V LOCATION. Contains components like IC101, IC171, IC181, etc.

Table with columns: REF NO., PART NO., DESCRIPTION, M., H/V LOCATION. Contains components like Q8811, Q8821, Q8822, etc.

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) H/V LOCATION=See the BOARD LAYOUTS for details.

[MAIN UNIT]

Table with columns: REF NO., PART NO., DESCRIPTION, M., H/V LOCATION. Contains parts list for the main unit.

Table with columns: REF NO., PART NO., DESCRIPTION, M., H/V LOCATION. Contains parts list for the main unit, continuing from the previous table.

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) H/V LOCATION=See the BOARD LAYOUTS for details.

[MAIN UNIT]

REF NO.	PART NO.	DESCRIPTION		M.	H/V LOCATION
EP9505	6910019900	S.BEA	MPZ1608S601AT	T	173.3/108.5
EP9506	6910023350	S.BEA	MMZ1005B601CT	T	173.8/106.5

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)
H/V LOCATION=See the BOARD LAYOUTS for details.

[FRONT-R UNIT]

REF NO.	PART NO.	DESCRIPTION	M.	H/V LOCATION
J1255	6510019421	S.CON B8B-ZR-SM4-TF	T	56.9/40.2
J1801	6510022801	S.CON B10B-PH-SM4-TB	T	12.3/18.4
J1951	6510024040	CON TM11R-5M2-88-LP *0		
J2002	6510022022	S.CON 14FLT-SM2-TB	T	10.8/37.1

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

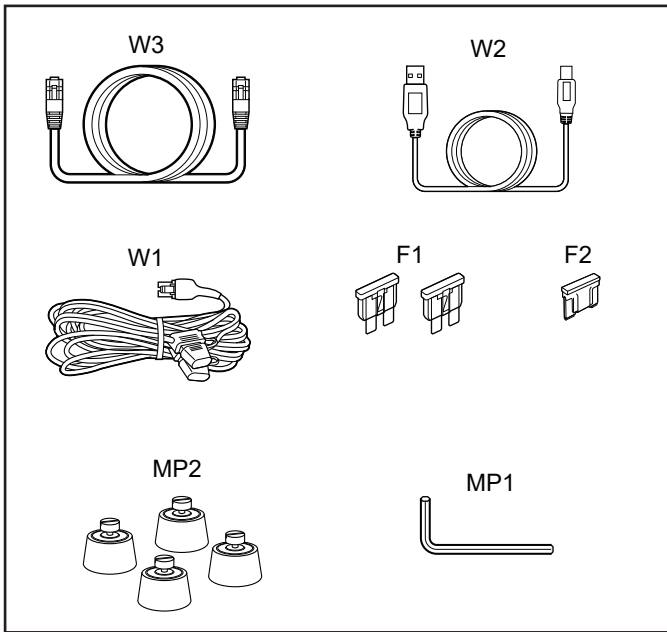
M.=Mounted side (T: Mounted on the Top side, B: Mounted on the Bottom side)
H/V LOCATION=See the BOARD LAYOUTS for details.

[FRONT-R UNIT]

REF NO.	PART NO.	DESCRIPTION	QTY.
J1255*	6510019421	B8B-ZR-SM4-TF (LF) (SN)	1
J1801*	6510022801	B10B-PH-SM4-TB (LF) (SN)	1
J1951*	6510024040	TM11R-5M2-88-LP	1
J2002*	6510022022	14FLT-SM2-TB (LF) (SN) (M)	1

[ACCESSORIES]

REF NO.	PART NO.	DESCRIPTION	QTY.
F1	5210001360	ATQ 25A	2
F2	5210001430	11930011 (BFLP 5A 58V)	1
W1	8900022020	OPC-2361	1
W2	8900010530	OPC-1045	1
W3	8900022600	OPC-2423	1
MP1	8860001320	HEX WRENCH 3MM	1
MP2	8930105980	RUBBER STAND (R) SF104	4

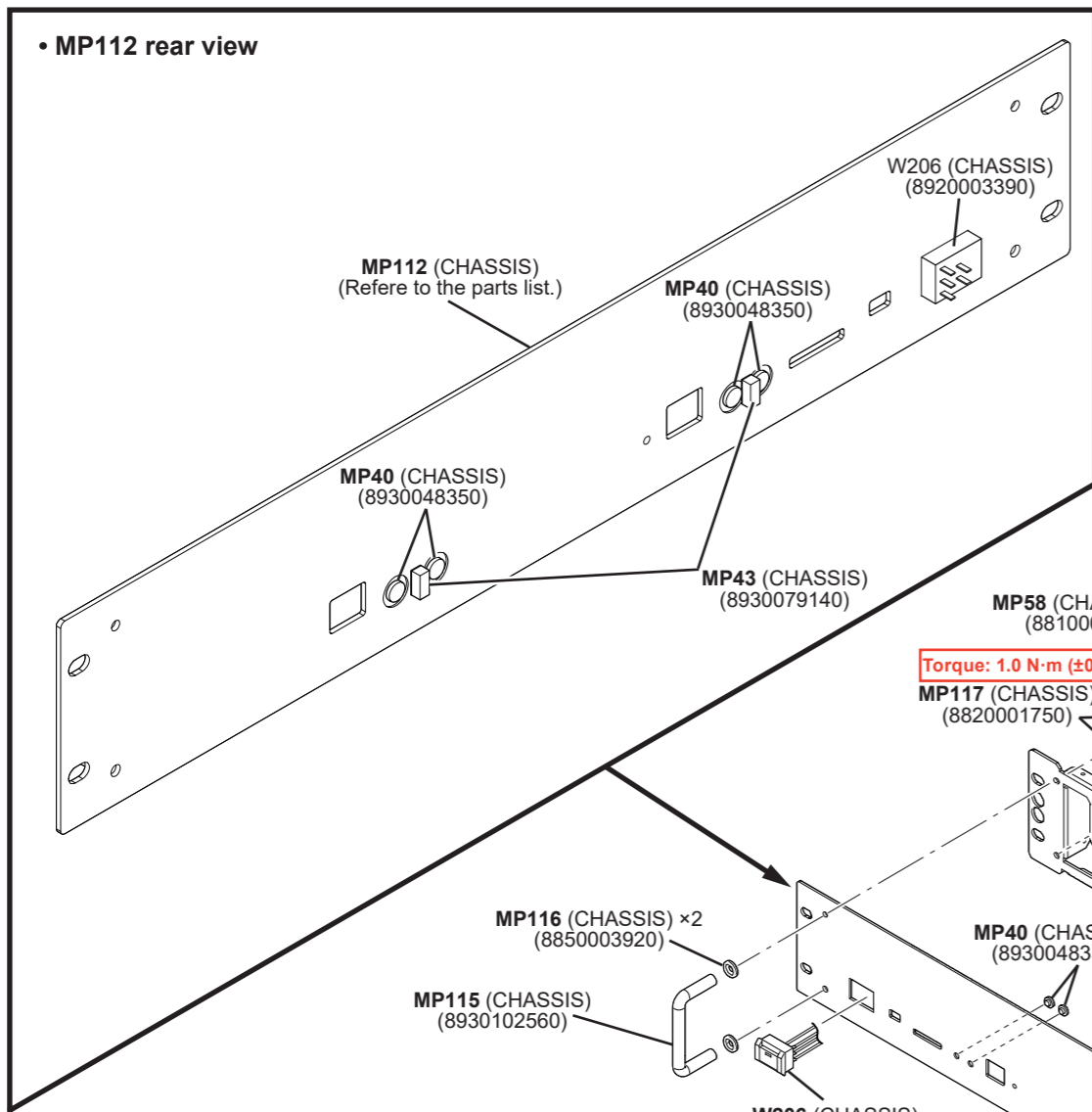


*: Refer to "BOARD LAYOUTS" for the location.

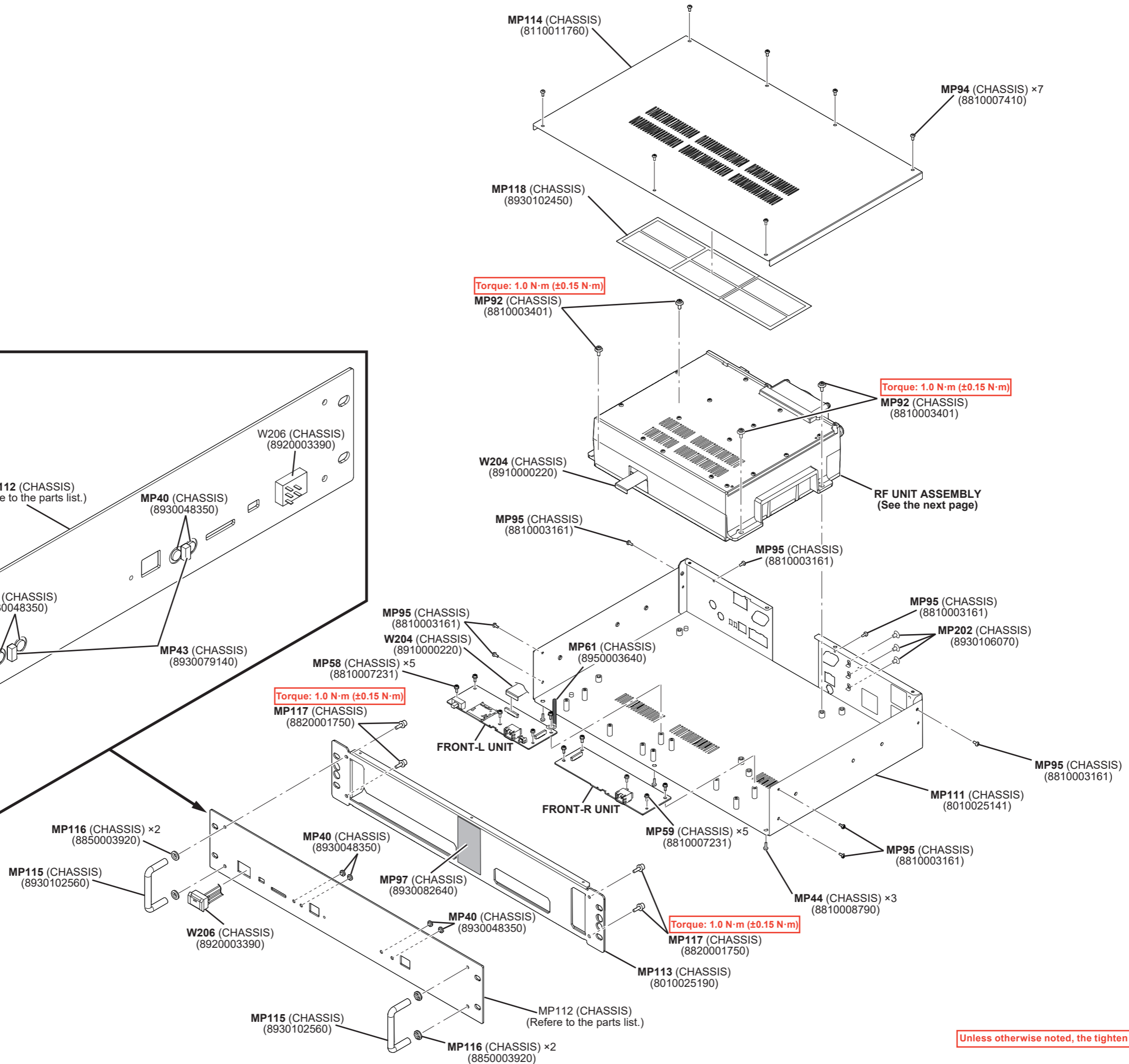
** : Refer to "GENERAL WIRING" for the connection

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

• CHASSIS ASSEMBLY



Legend:	
Ref. No.	Unit Name
MP1	(CHASSIS)
(1234567890)	
Parts No.	

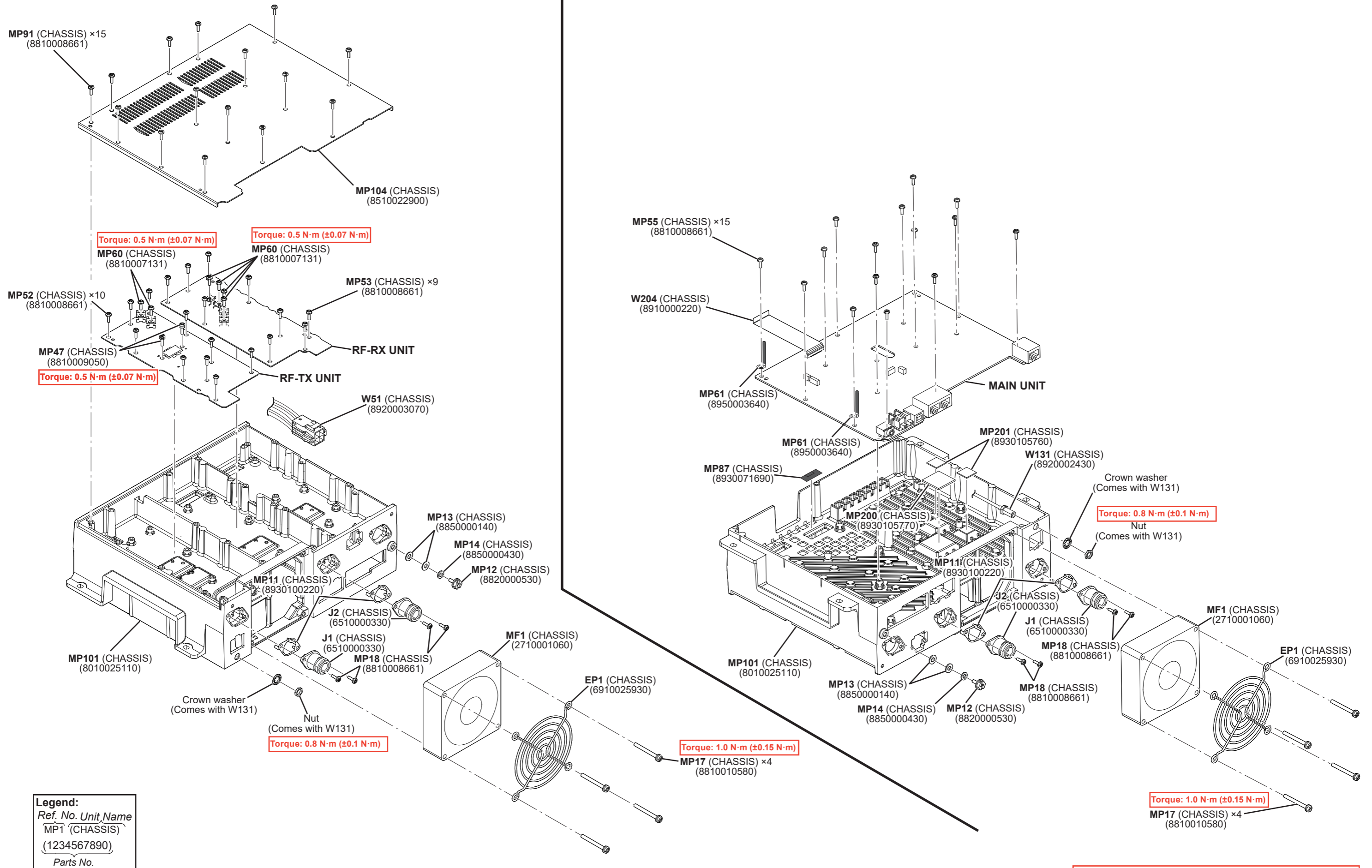


Unless otherwise noted, the tighten to torque is 0.7 N·m (±0.1 N·m).

• RF UNIT ASSEMBLY

Top view

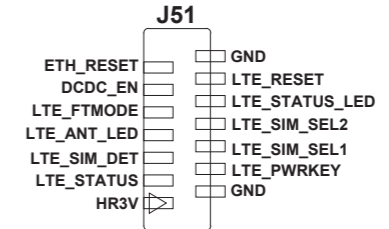
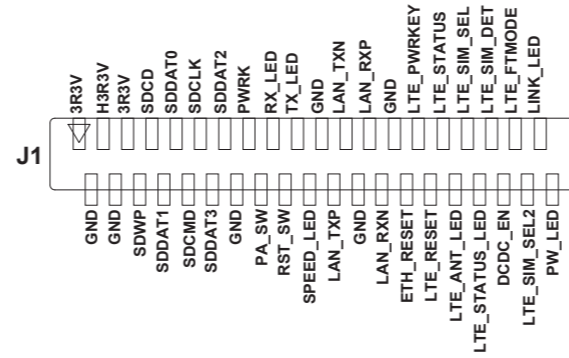
Bottom view



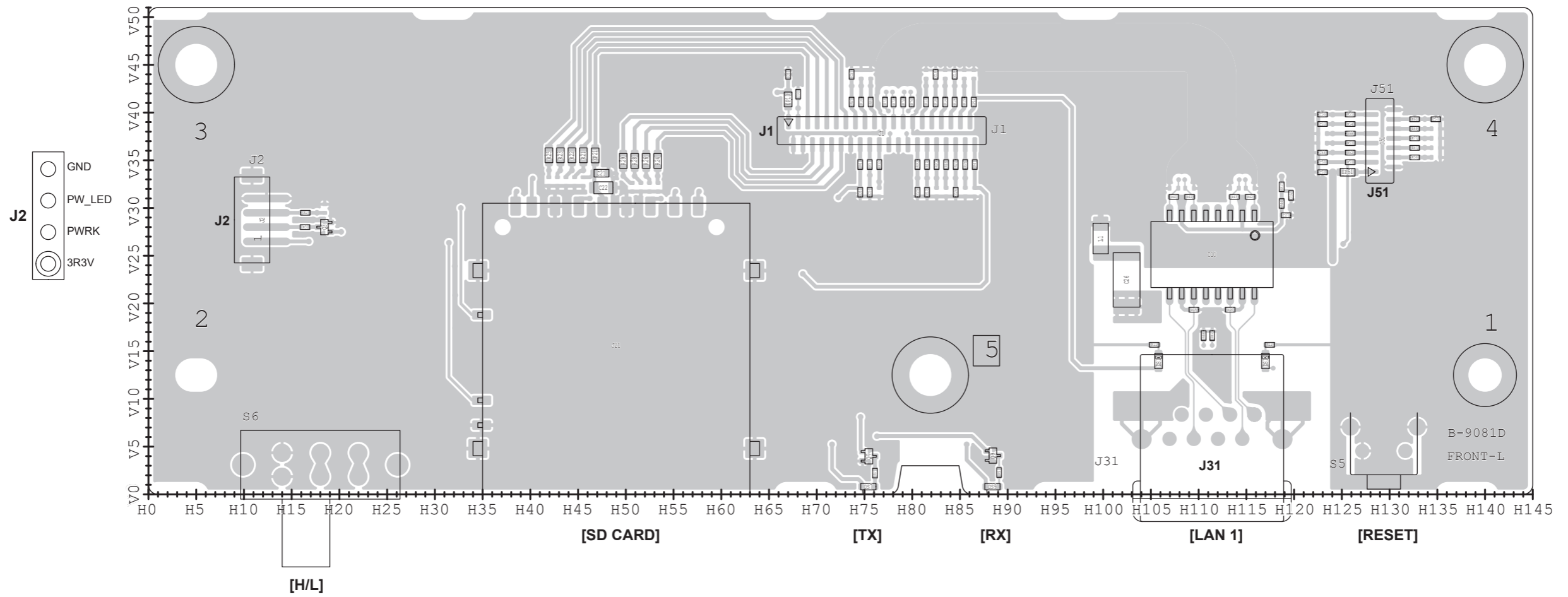
Legend:

Ref. No.	Unit Name
MP1	(CHASSIS)
(1234567890)	
	Parts No.

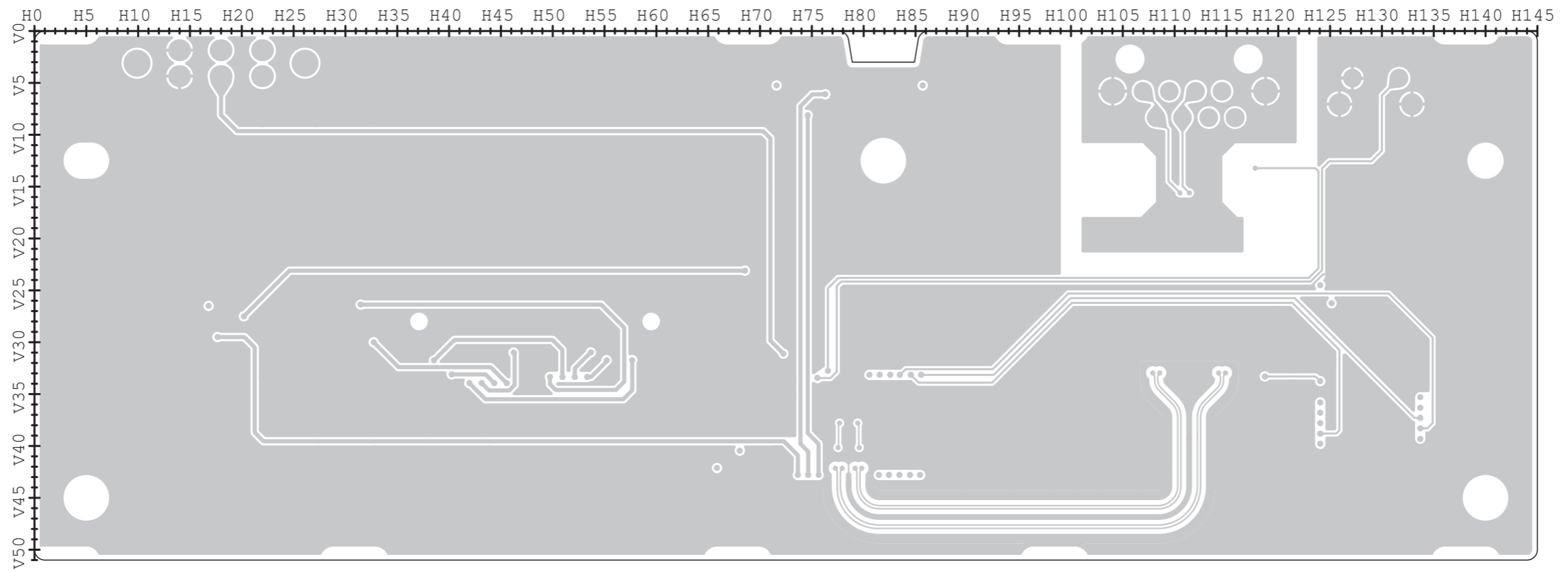
Unless otherwise noted, the tighten to torque is 0.7 N·m (±0.1 N·m).



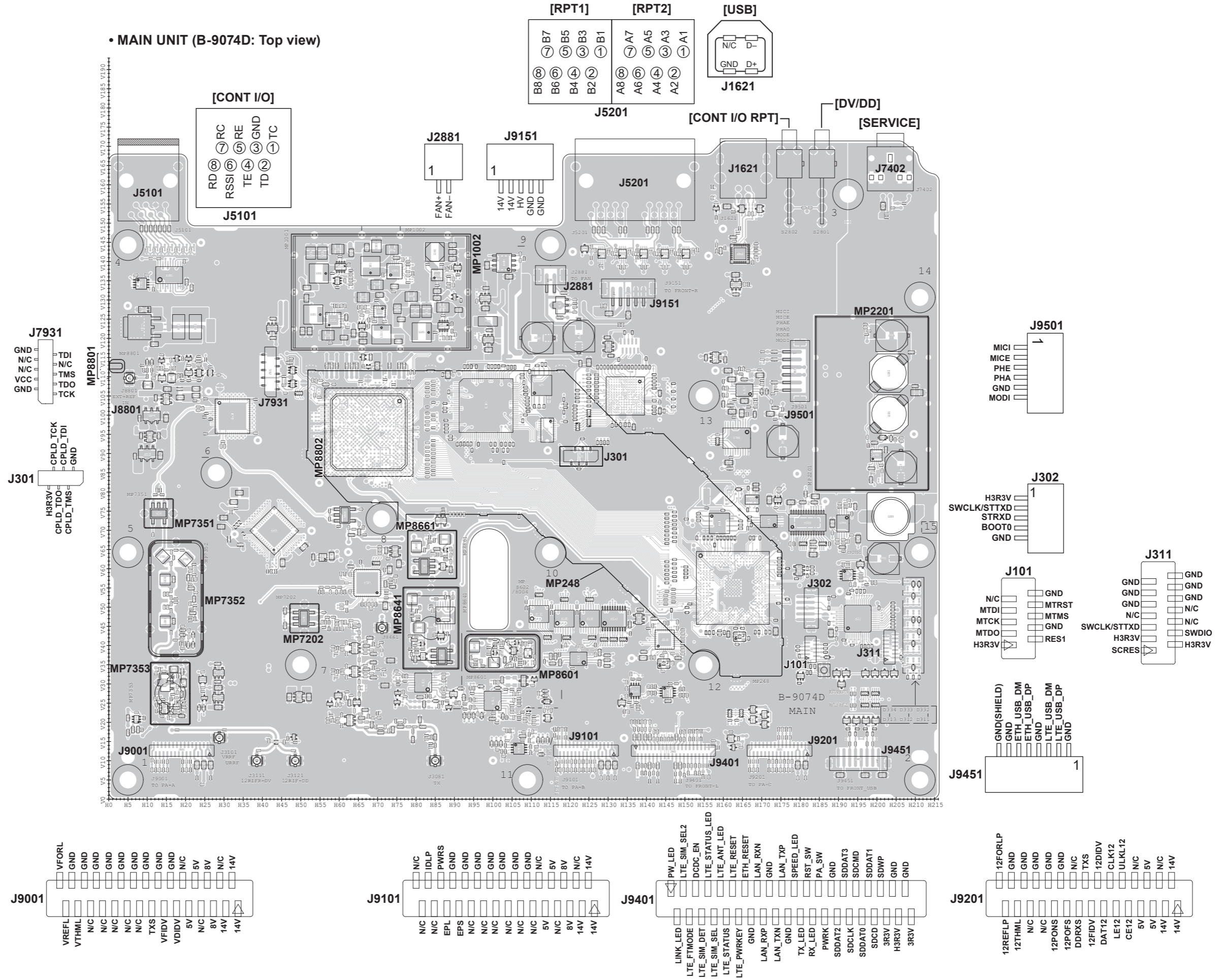
• FRONT-L UNIT (B-9081D: Top view)



• FRONT-L UNIT (B-9081D: Bottom view)



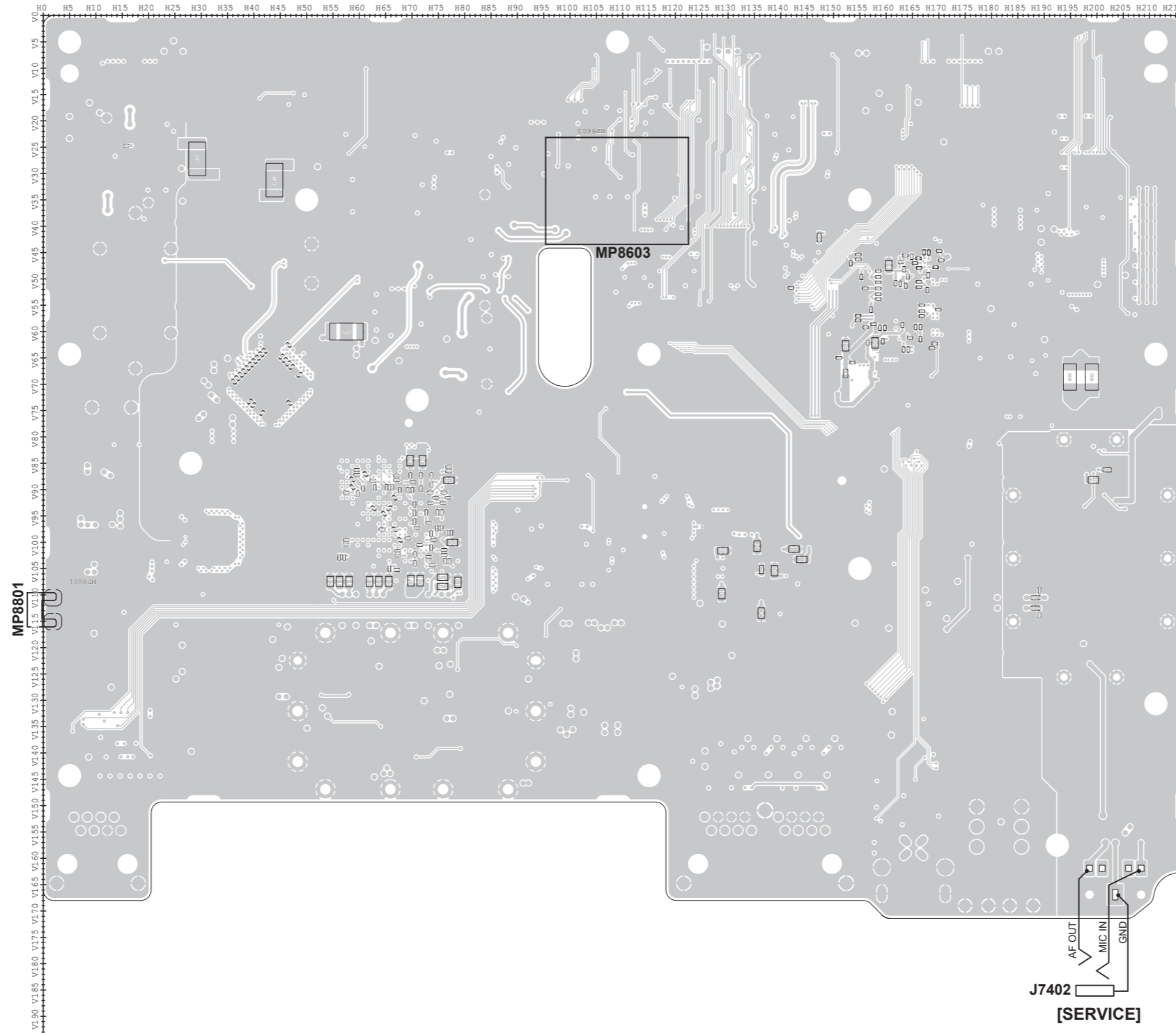
• MAIN UNIT (B-9074D: Top view)



NOTE: Some parts may not be mounted on the PCB.

See the PARTS LIST H/V location on the PARTS LIST for location details.

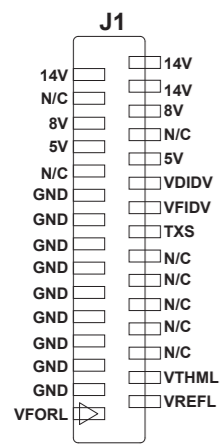
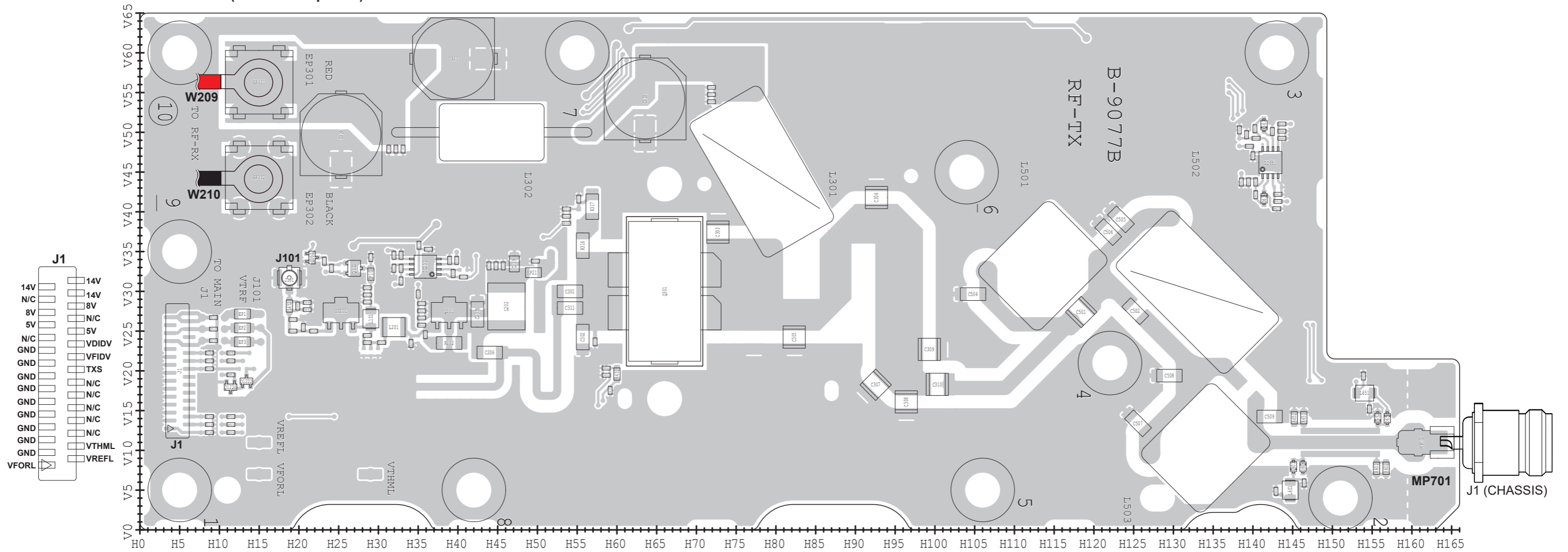
• MAIN UNIT (B-9074D: Bottom view)



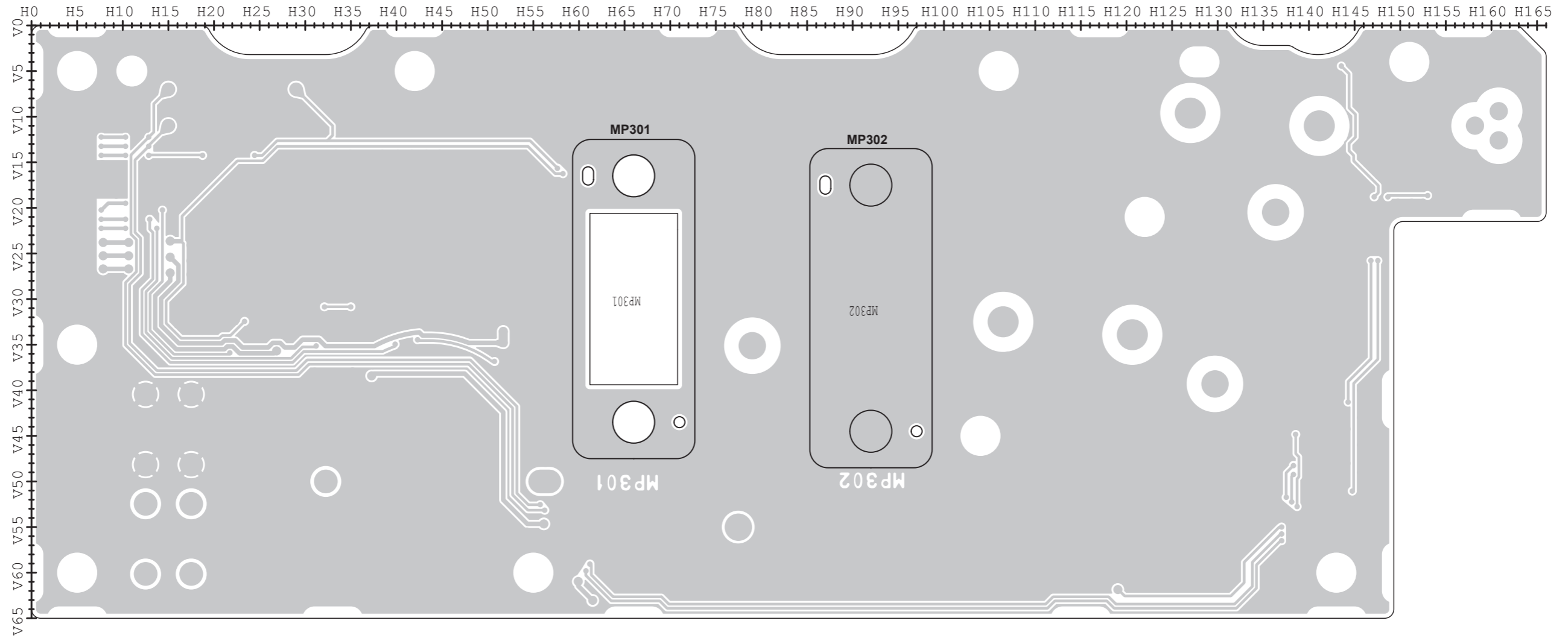
NOTE: Some parts may not be mounted on the PCB.

See the PARTS LIST H/V location on the PARTS LIST for location details.

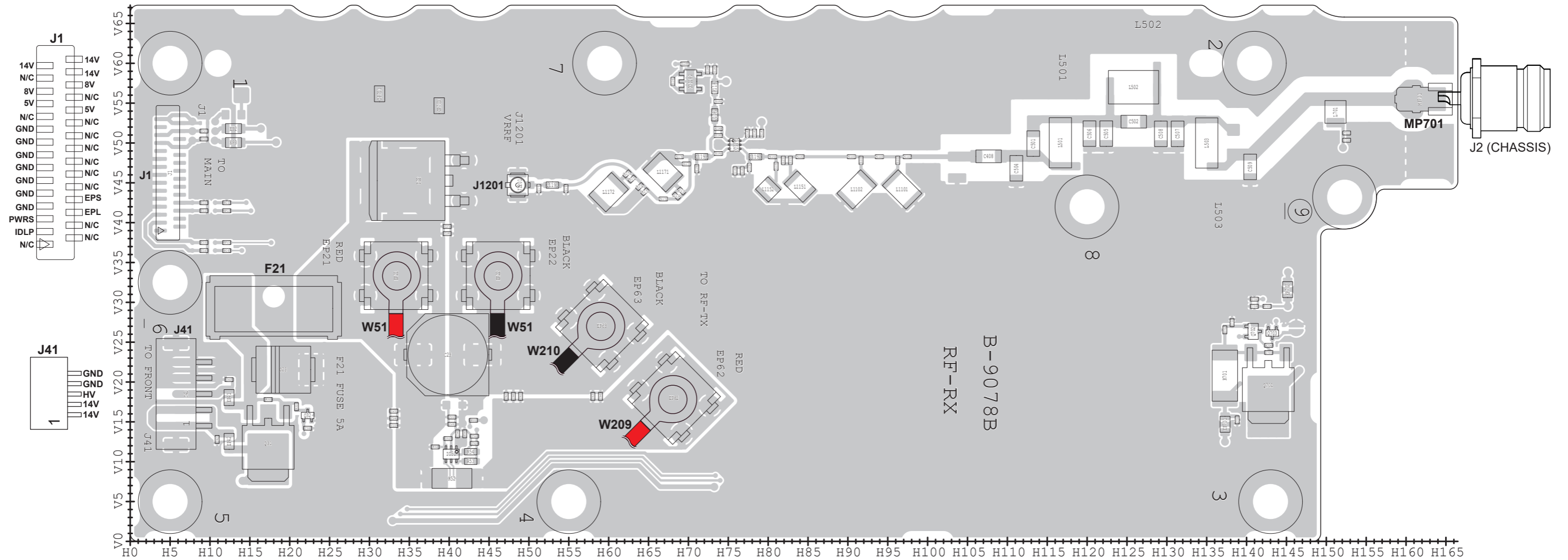
• RF-TX UNIT (B-9077B: Top view)



• RF-TX UNIT (B-9077B: Bottom view)



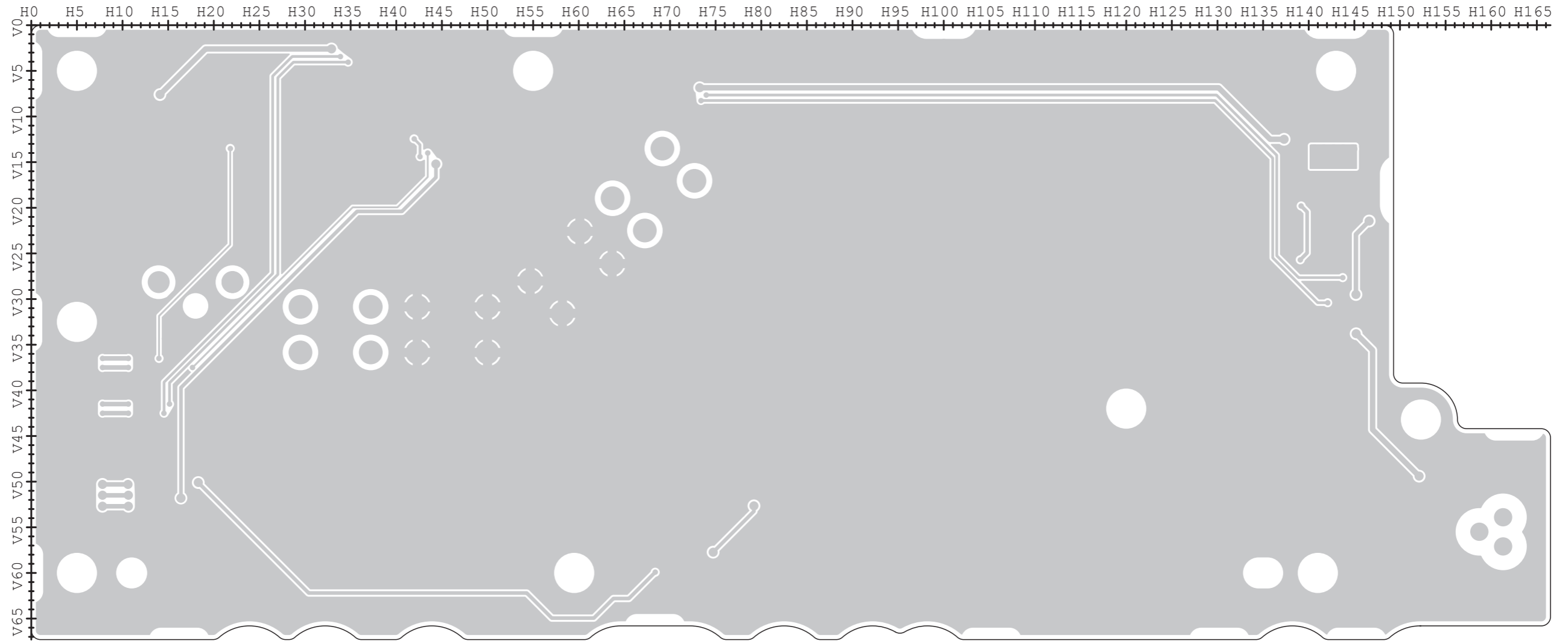
• RF-RX UNIT (B-9078B: Top view)



NOTE: Some parts may not be mounted on the PCB.

See the PARTS LIST H/V location on the PARTS LIST for location details.

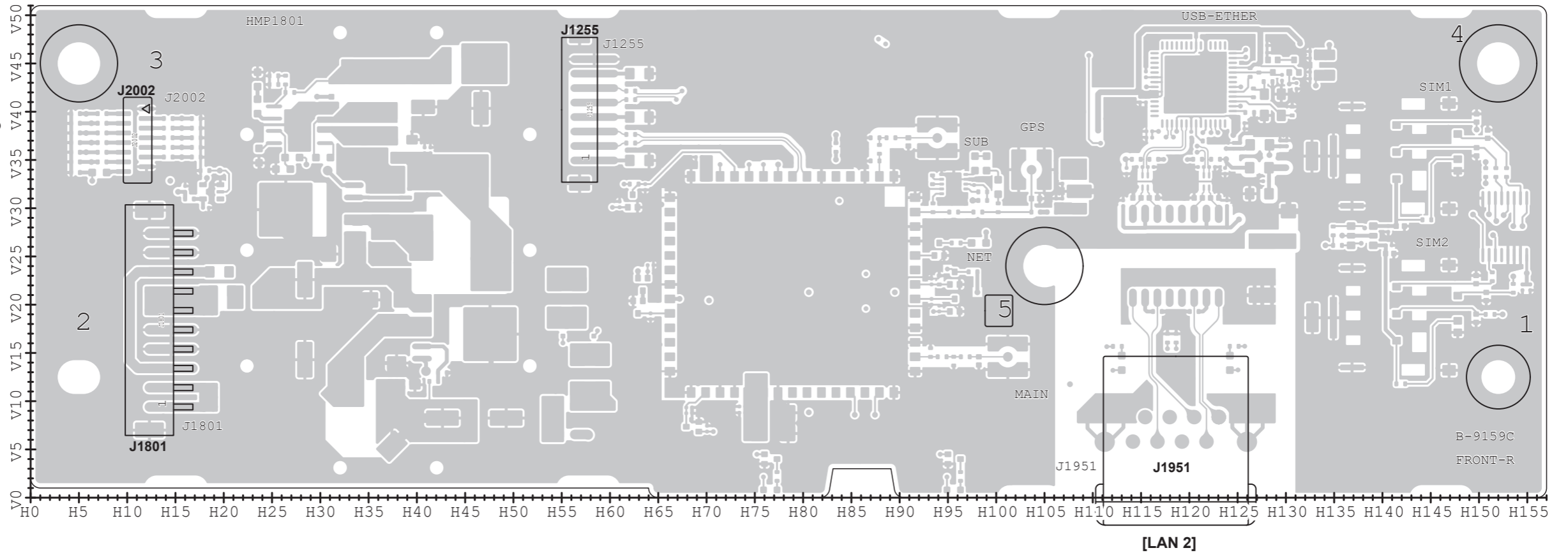
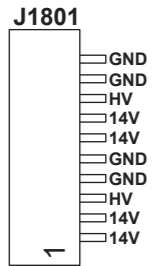
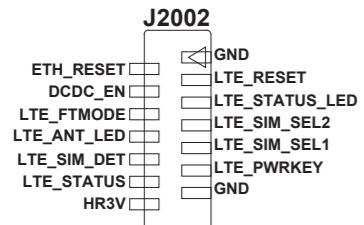
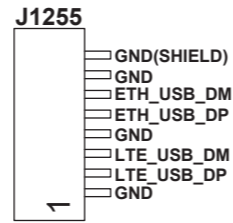
• RF-RX UNIT (B-9078B: Bottom view)



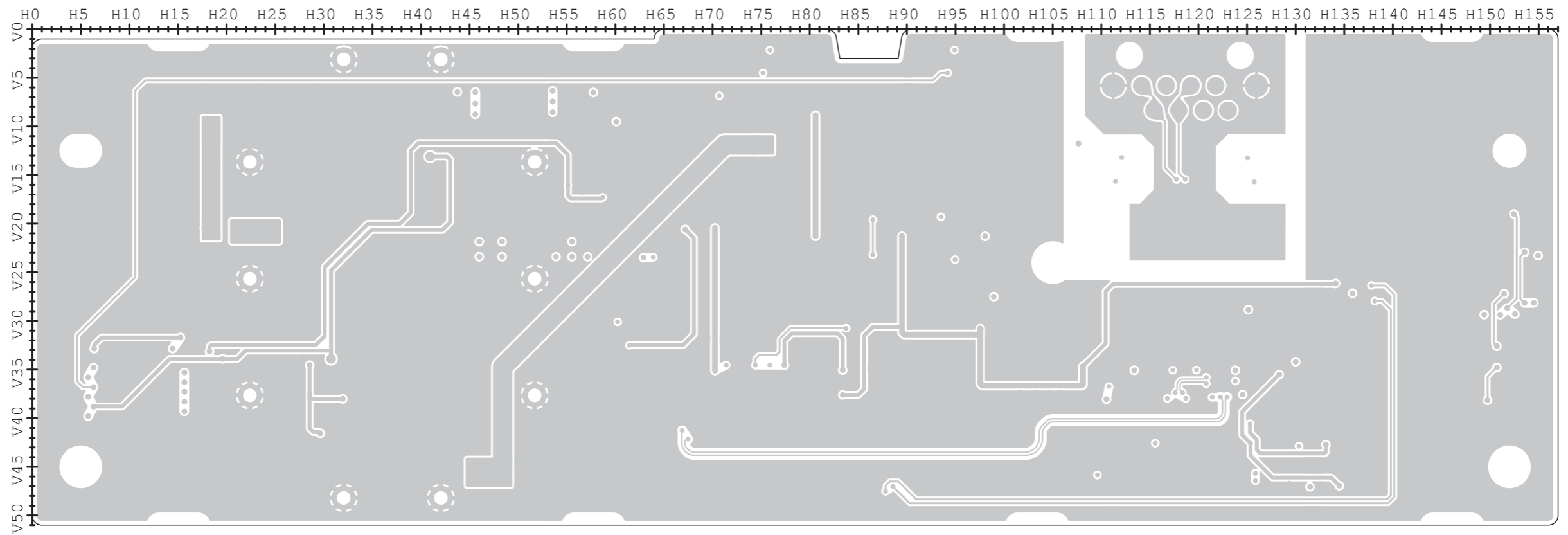
NOTE: Some parts may not be mounted on the PCB.

See the PARTS LIST H/V location on the PARTS LIST for location details.

• FRONT-R UNIT (B-9159C: Top view)

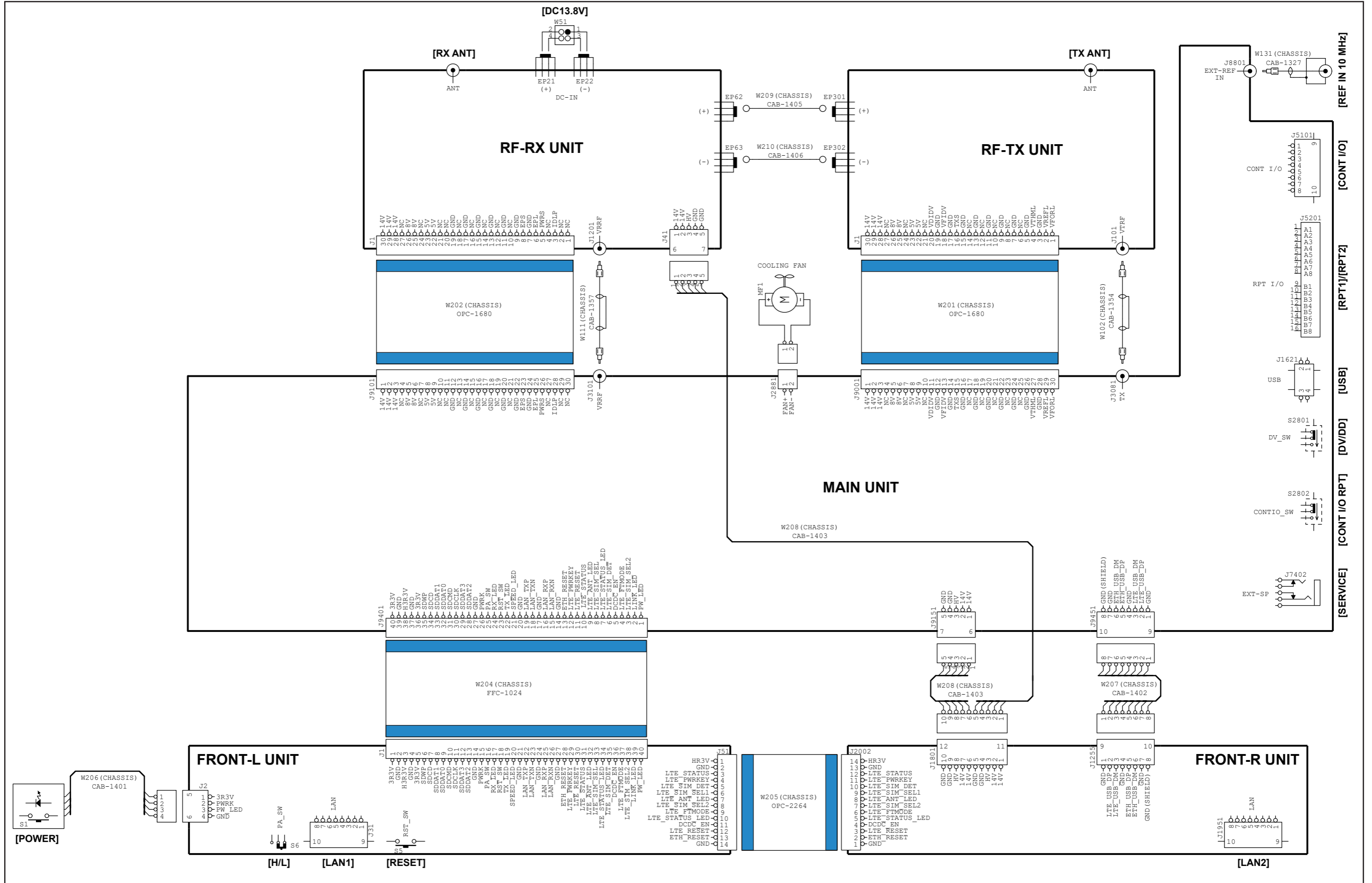


• FRONT-R UNIT (B-9159C: Bottom view)



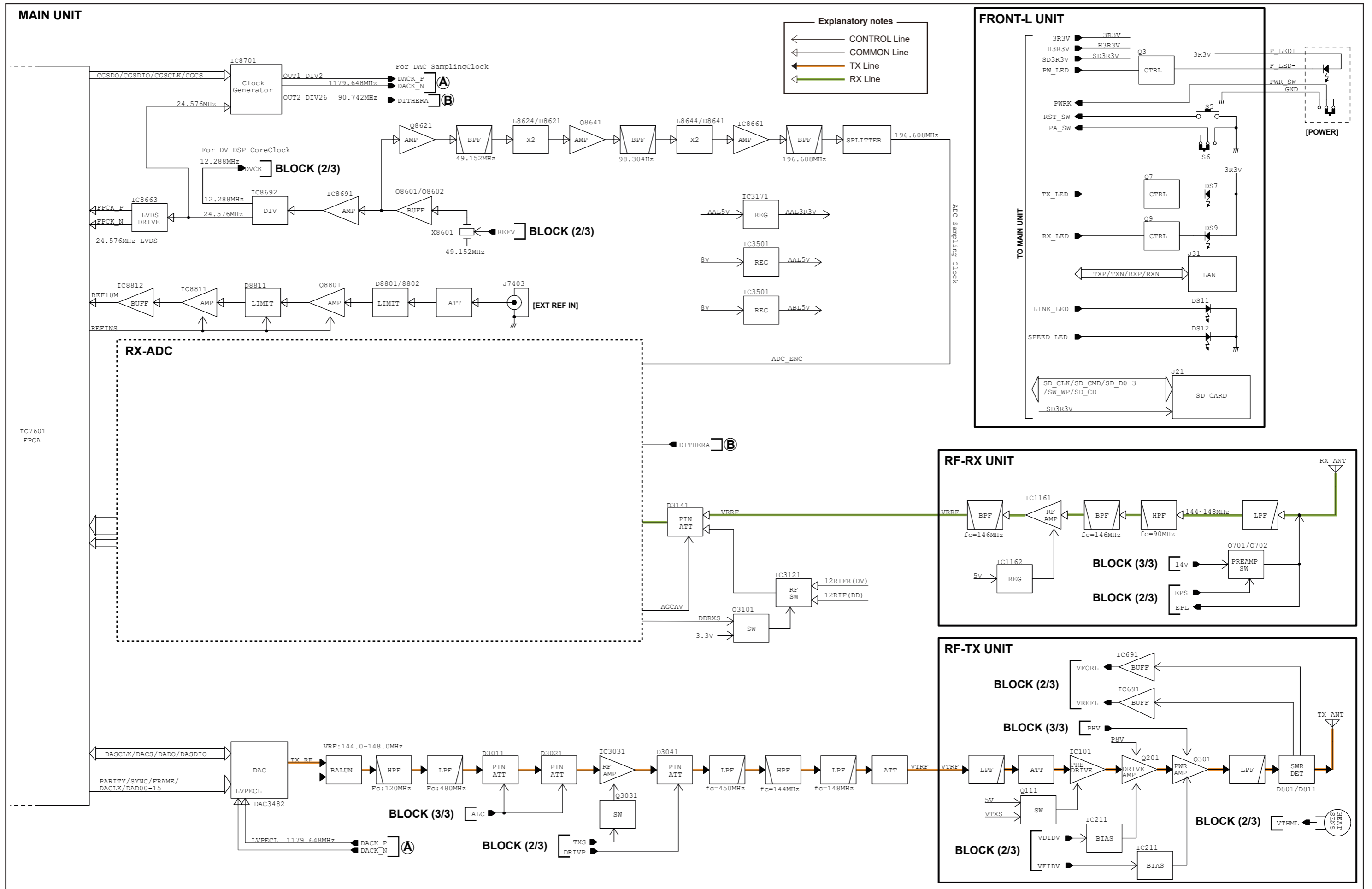
NOTE: Some parts may not be mounted on the PCB.

See the PARTS LIST H/V location on the PARTS LIST for location details.

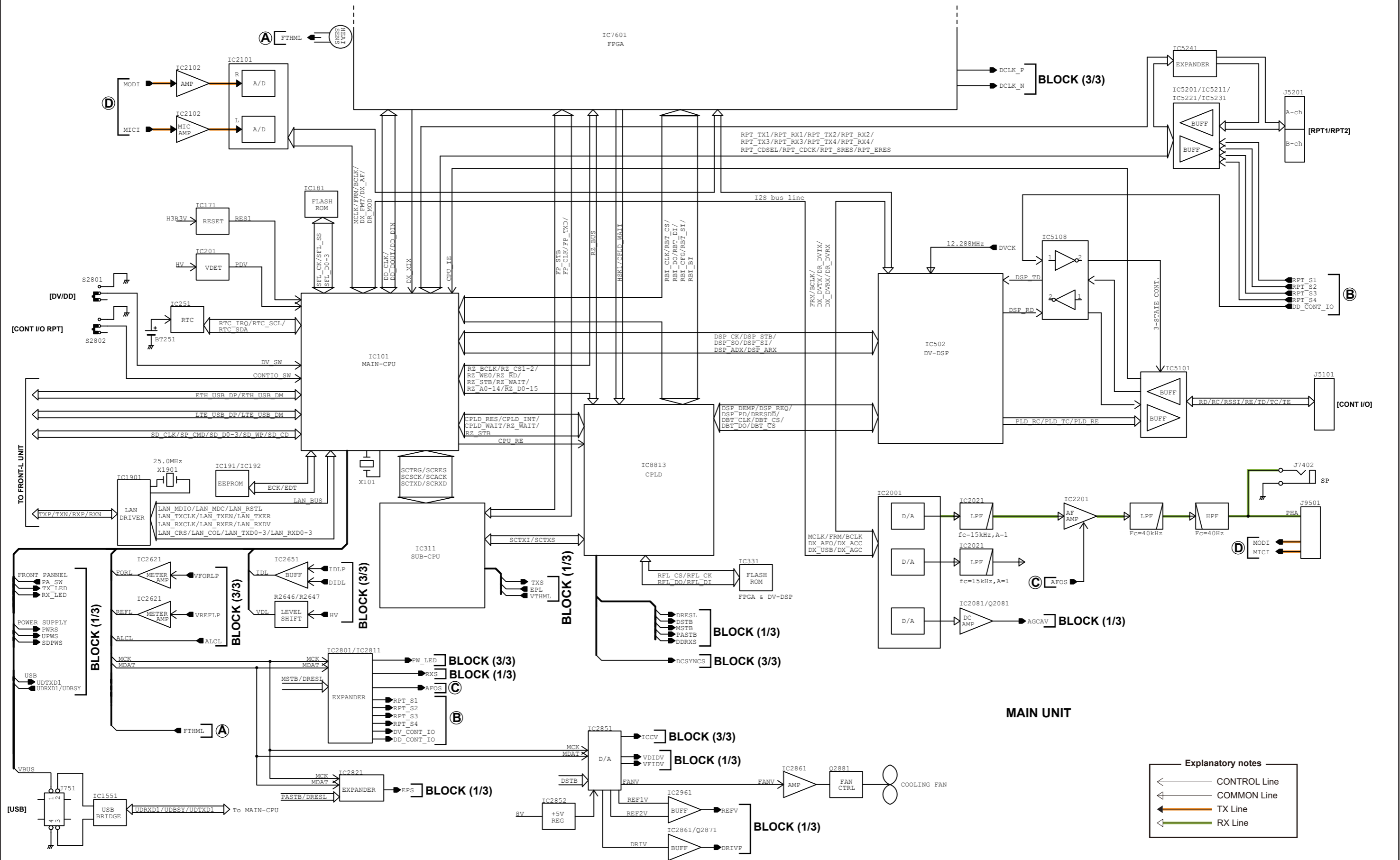


SECTION 11

BLOCK DIAGRAM



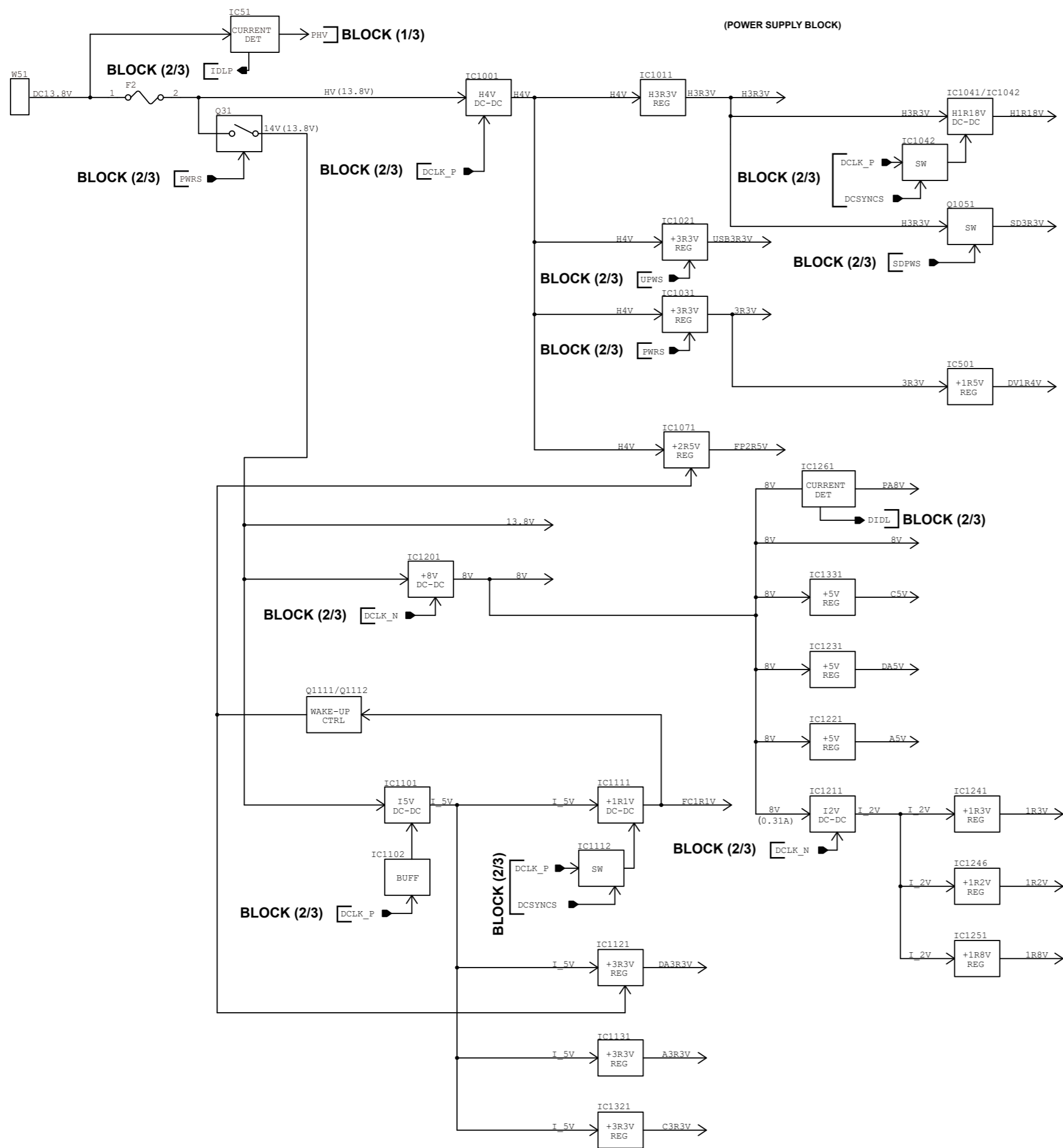
MAIN UNIT



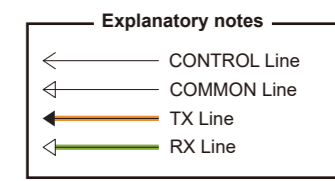
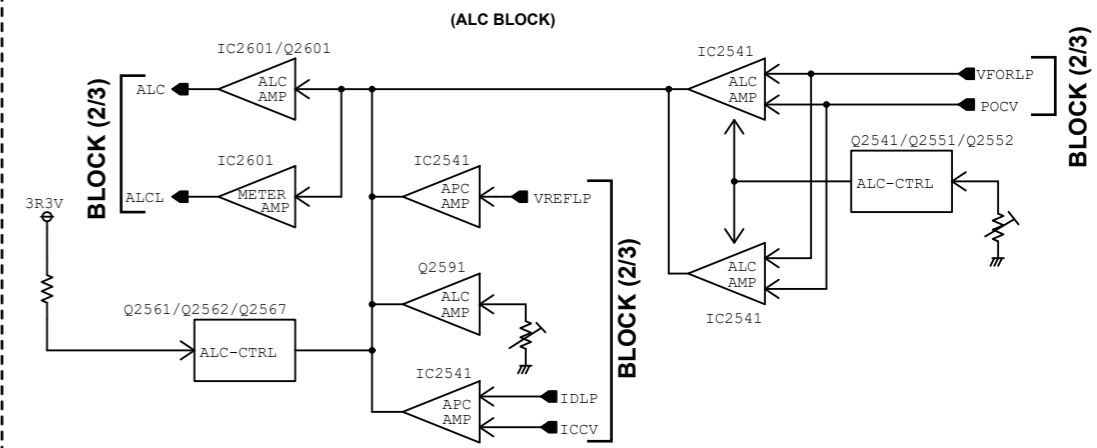
Explanatory notes

- ← CONTROL Line
- ← COMMON Line
- ← TX Line
- ← RX Line

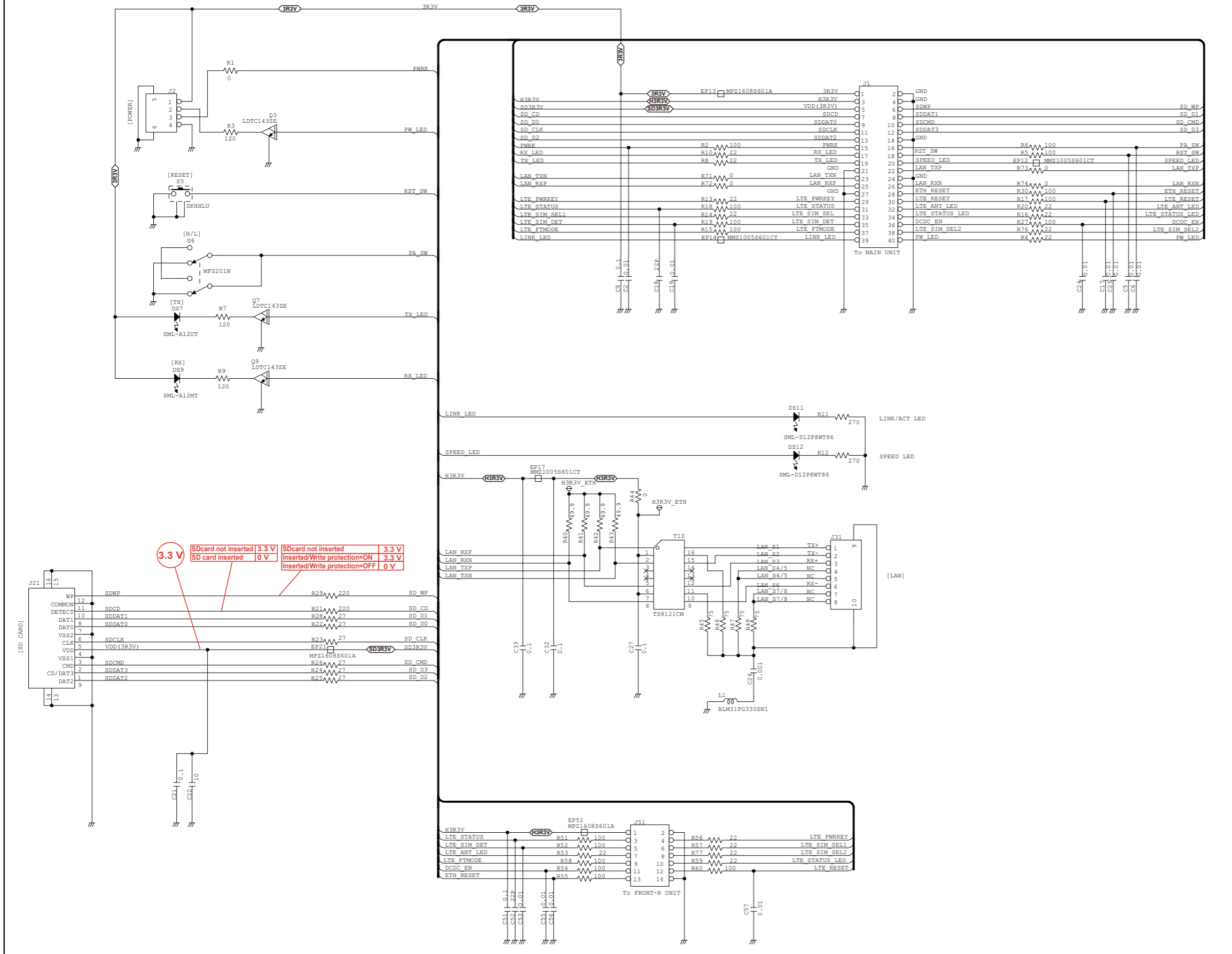
MAIN UNIT



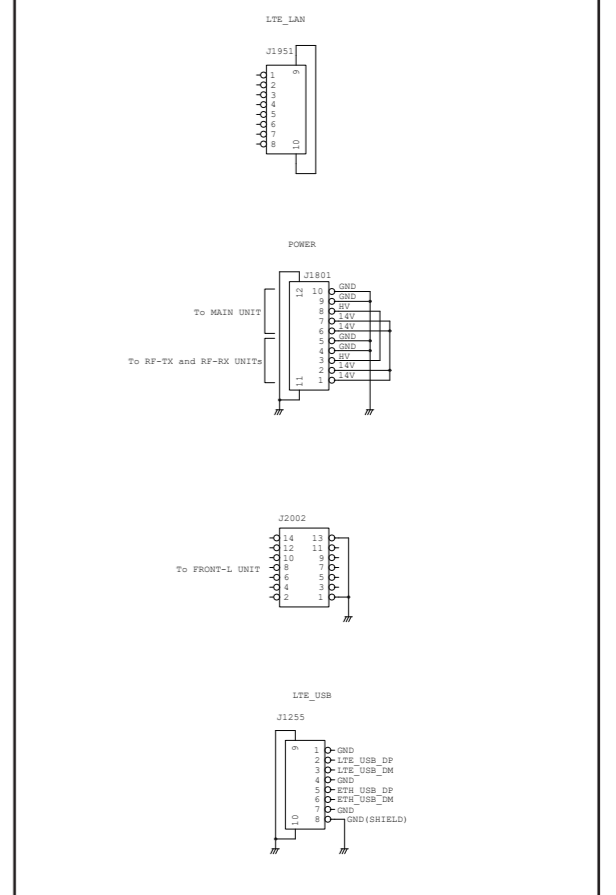
MAIN UNIT



• FRONT-L UNIT

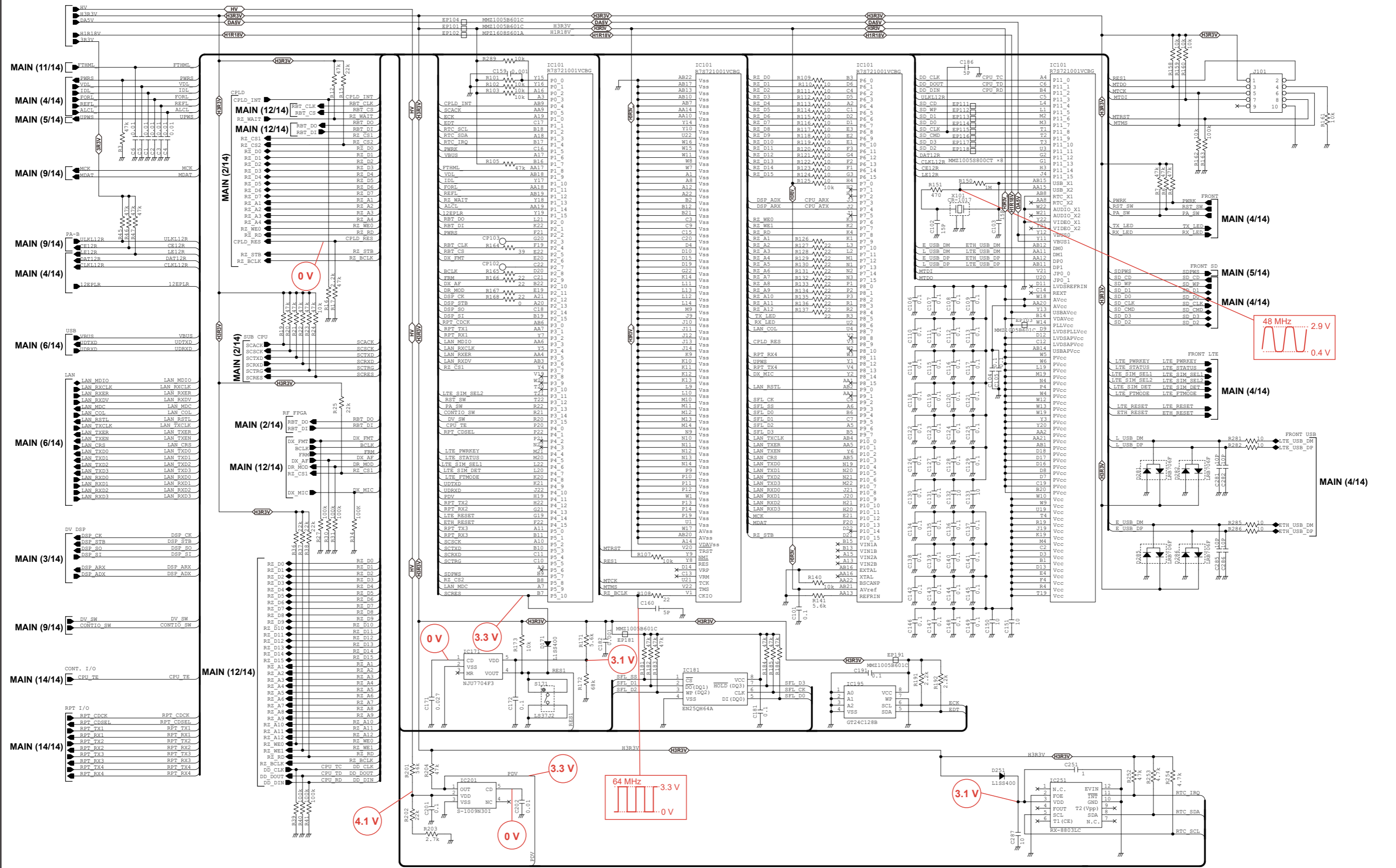


• FRONT-R UNIT



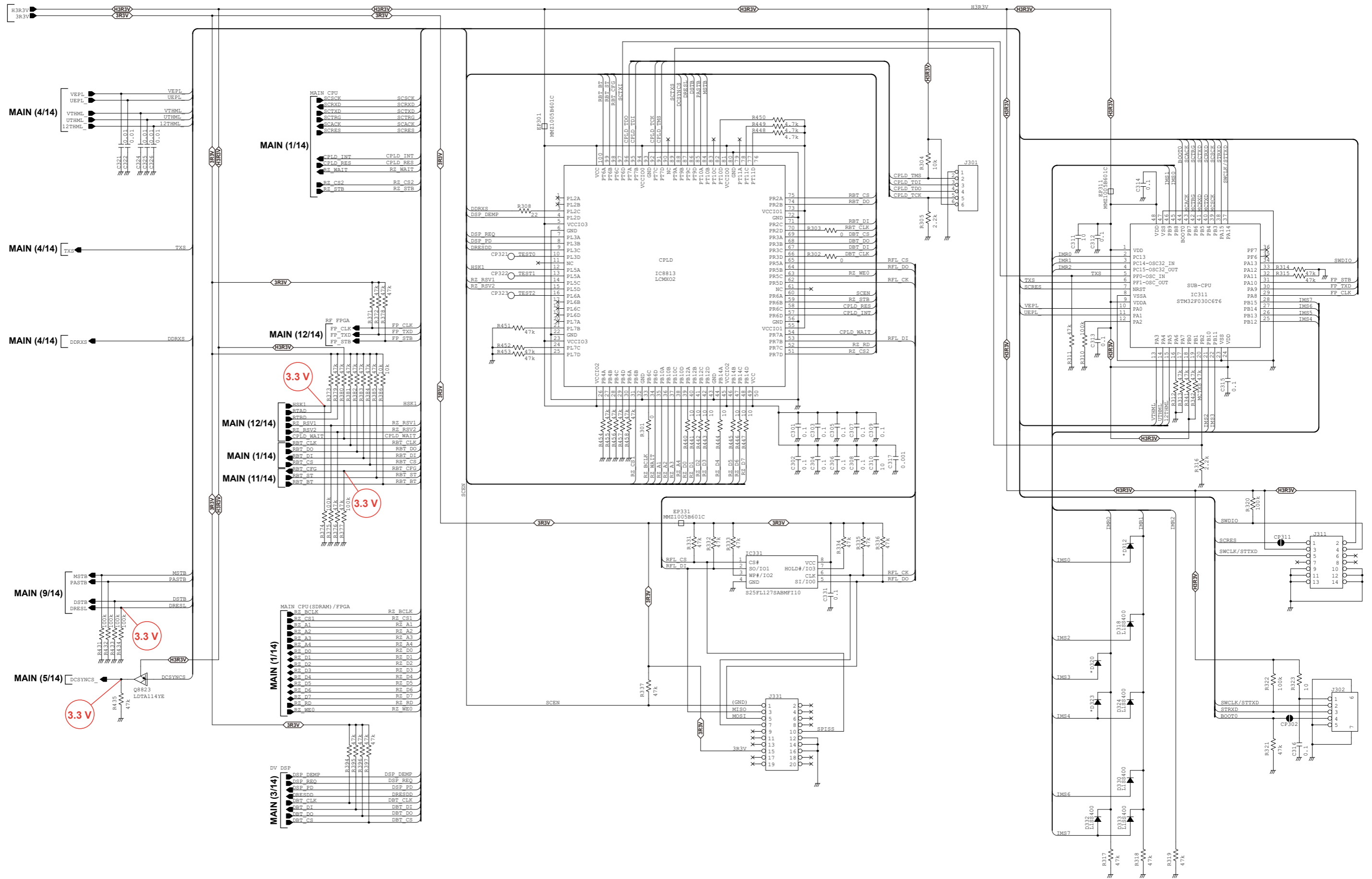
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (1/14)



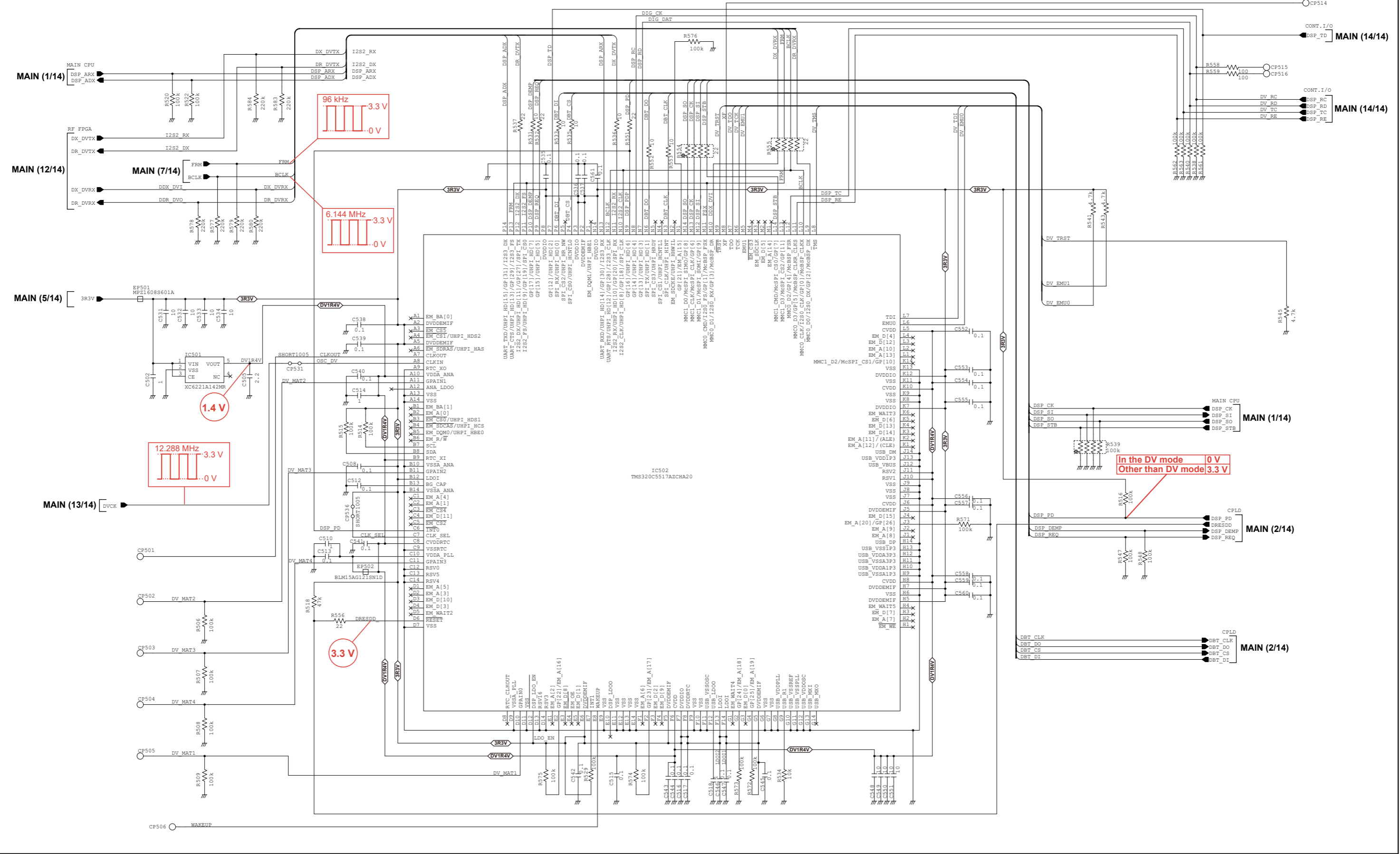
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (2/14)



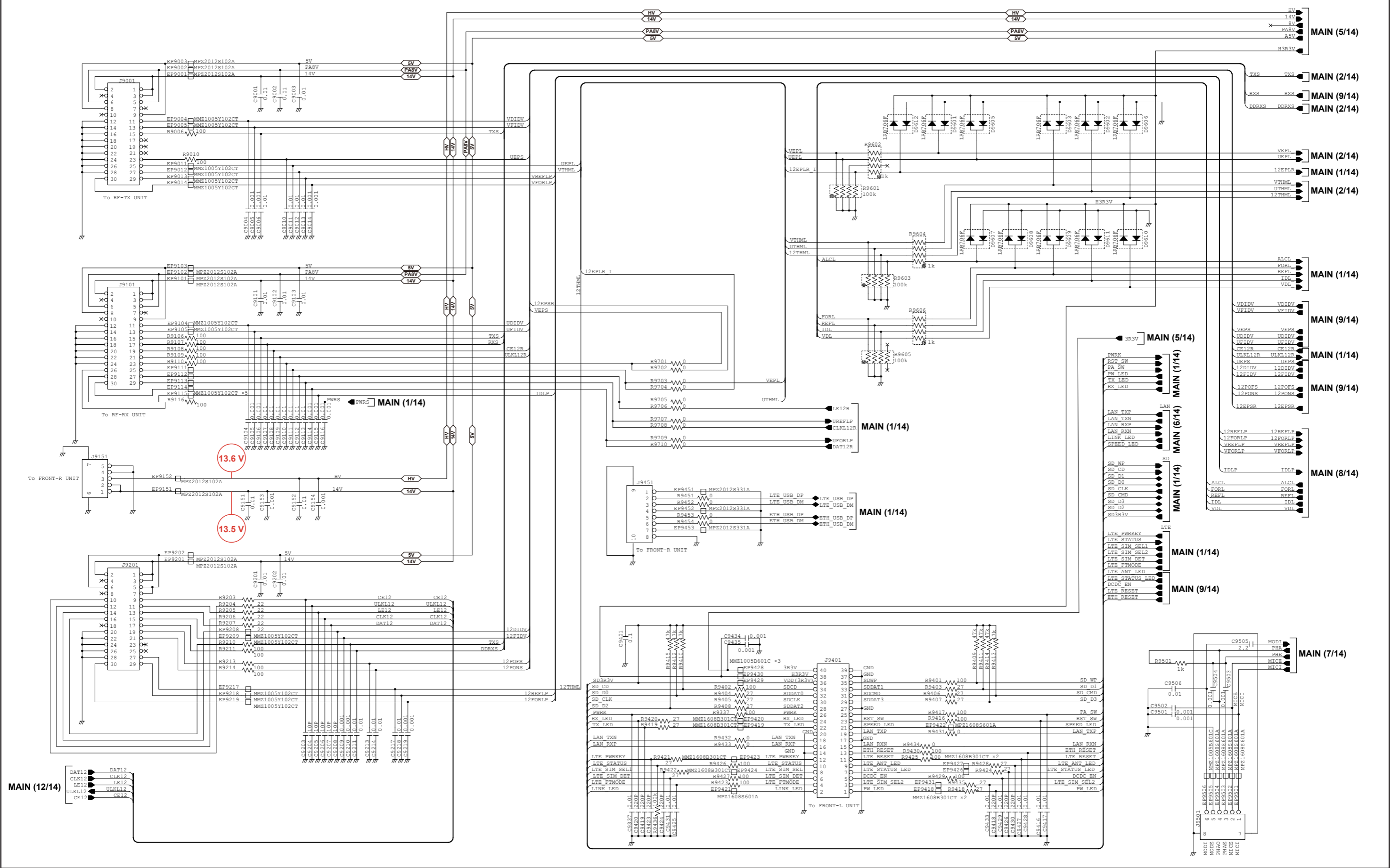
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (3/14)



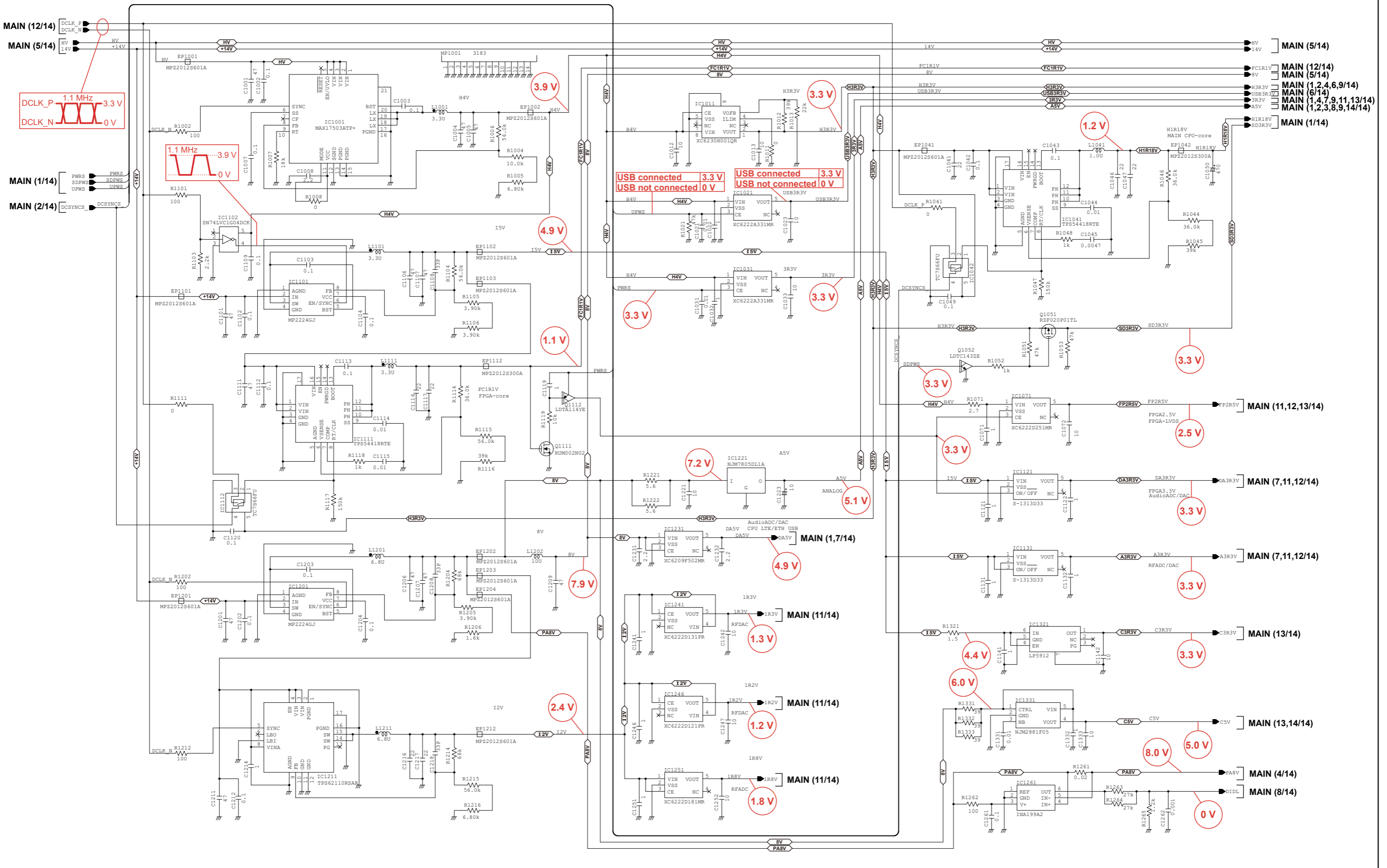
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (4/14)



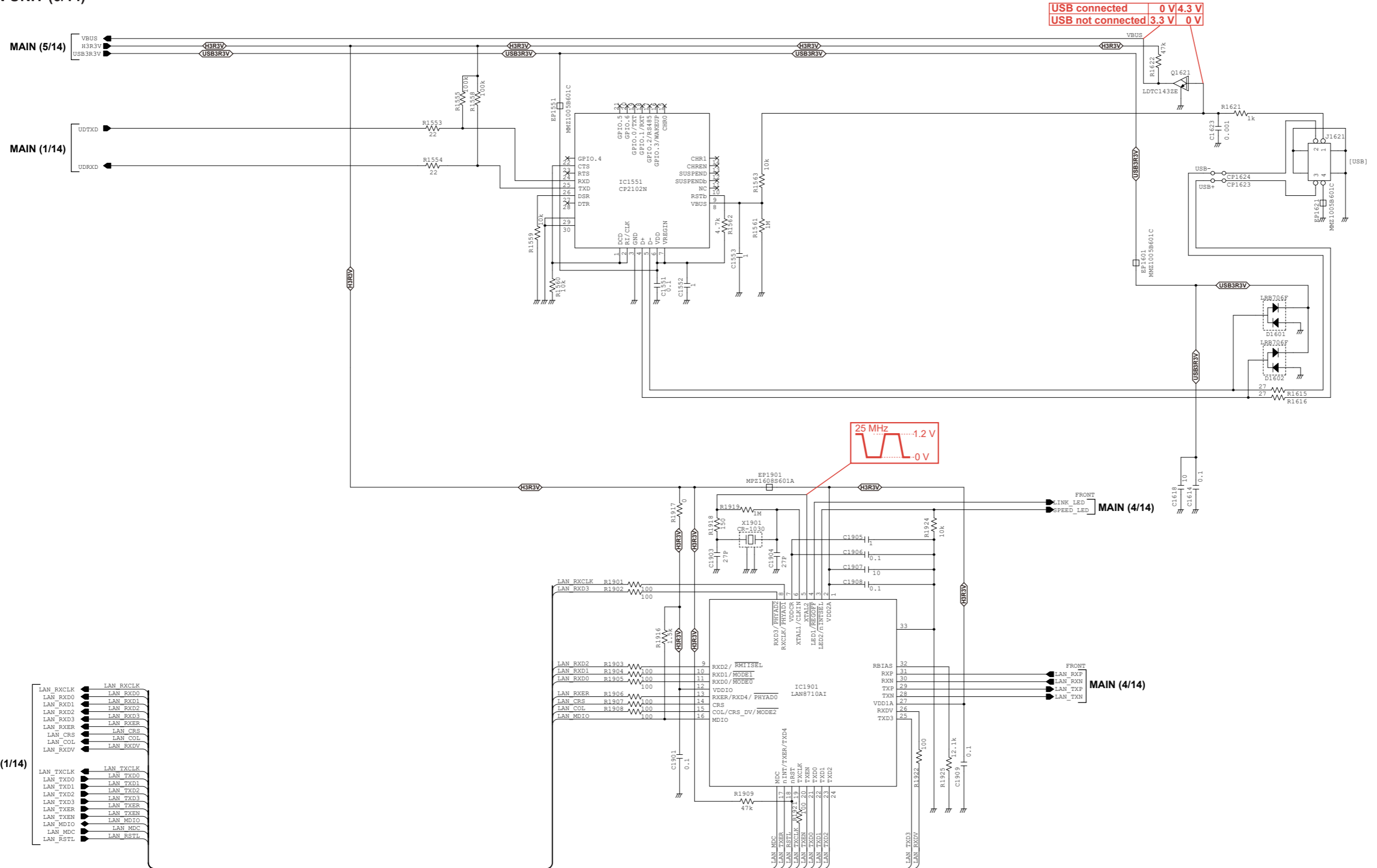
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (5/14)



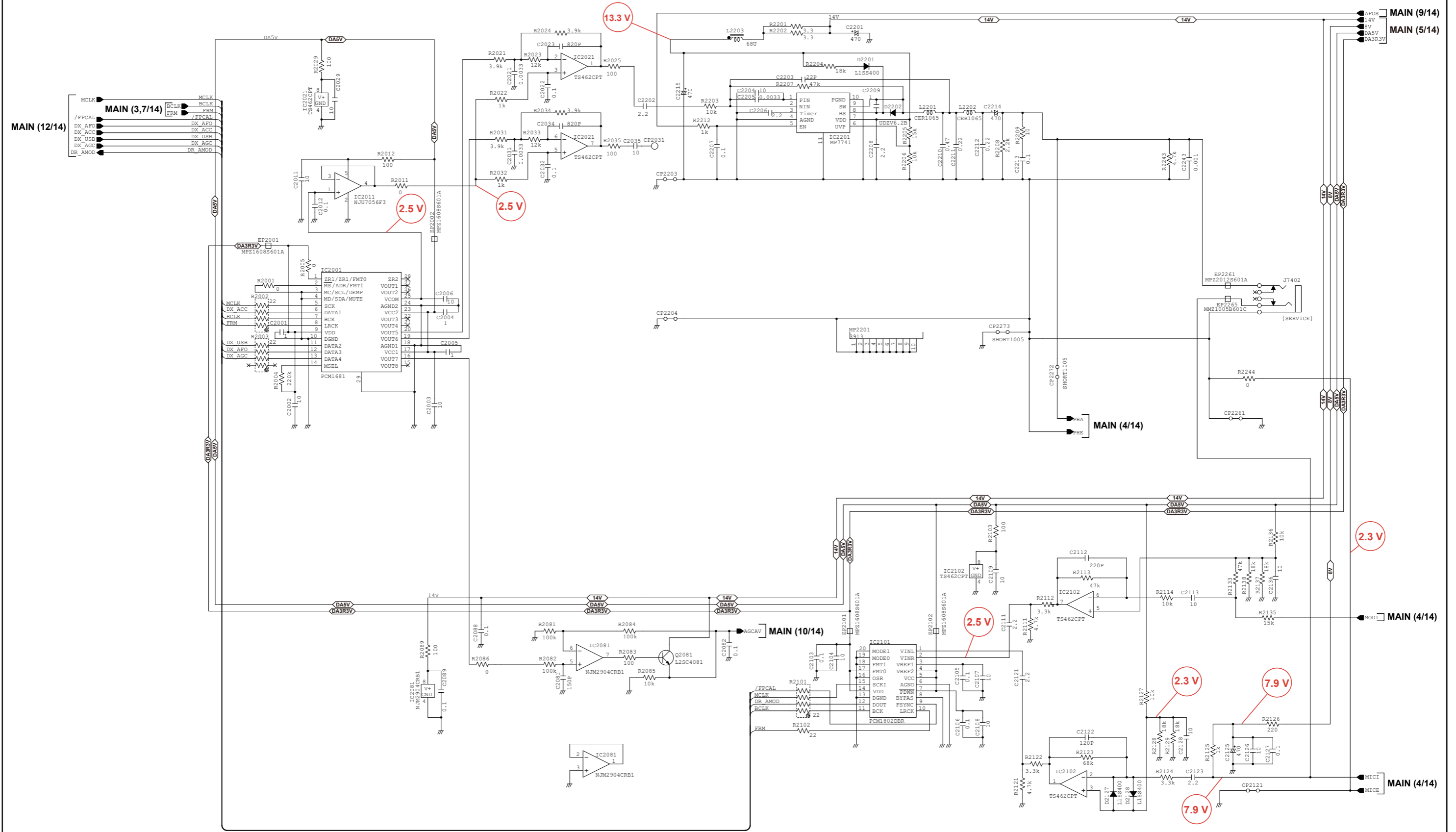
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (6/14)



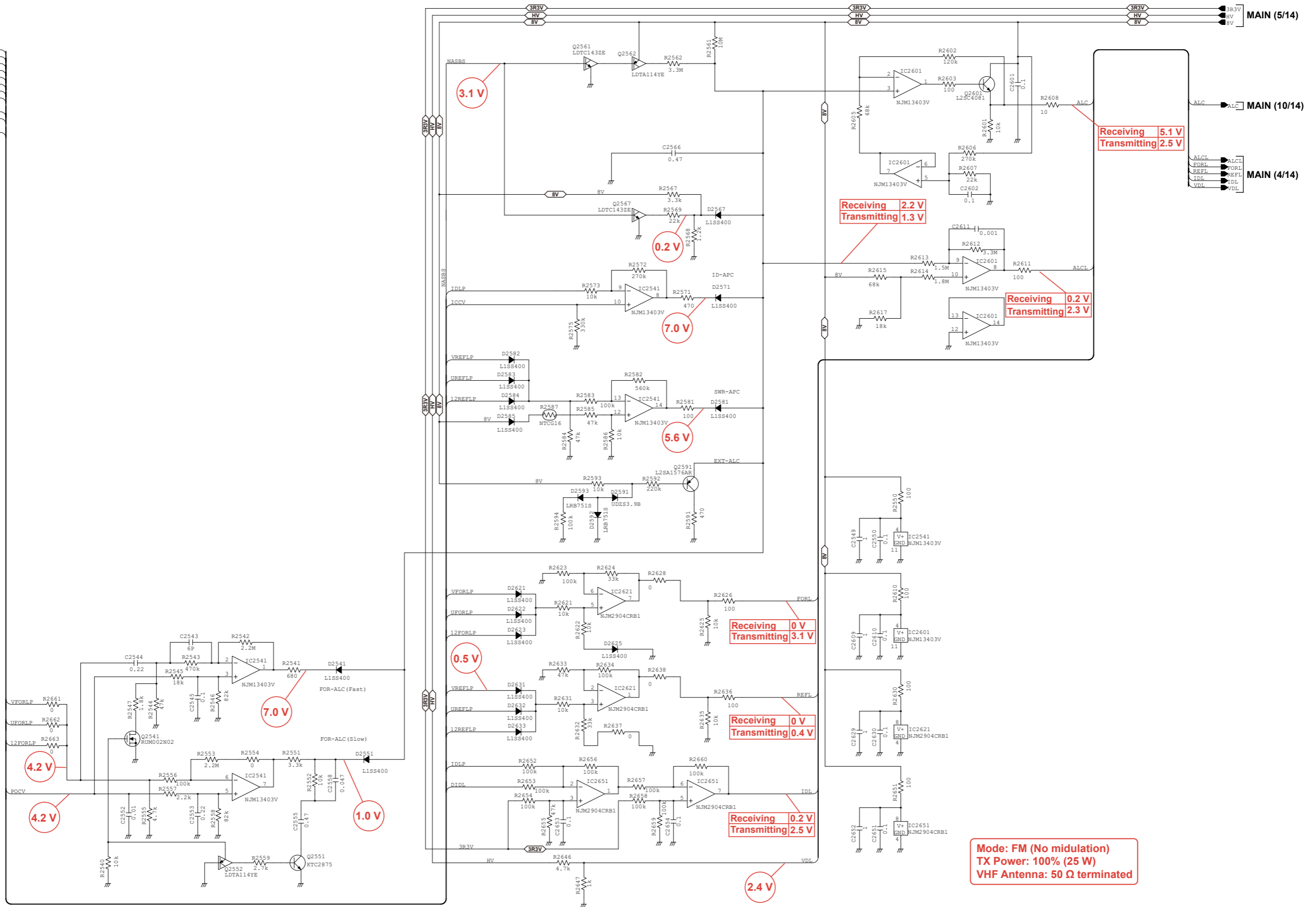
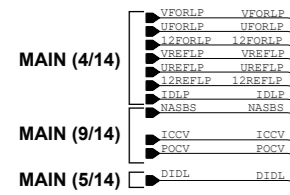
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (7/14)



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

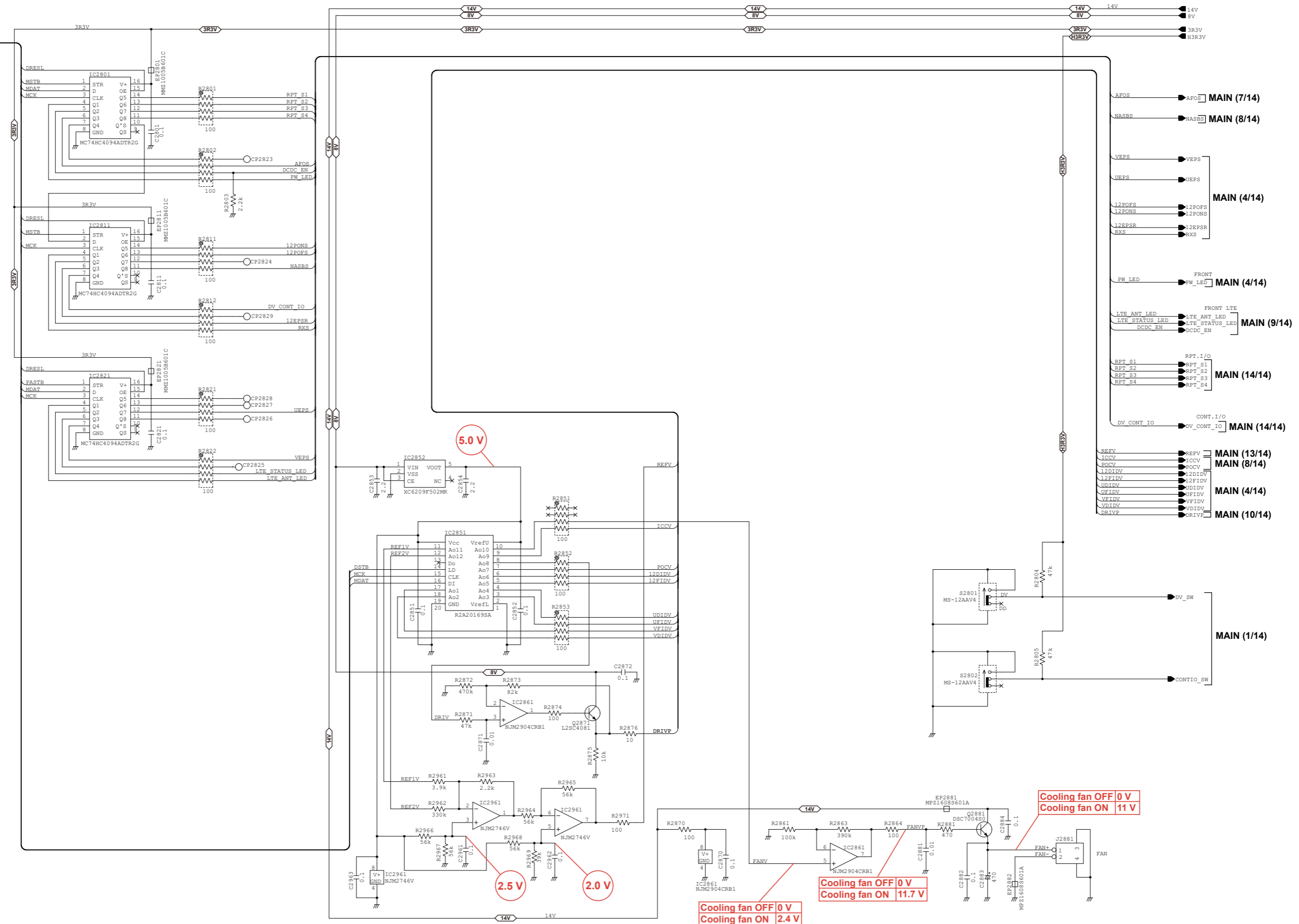
• MAIN UNIT (8/14)



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

• MAIN UNIT (9/14)

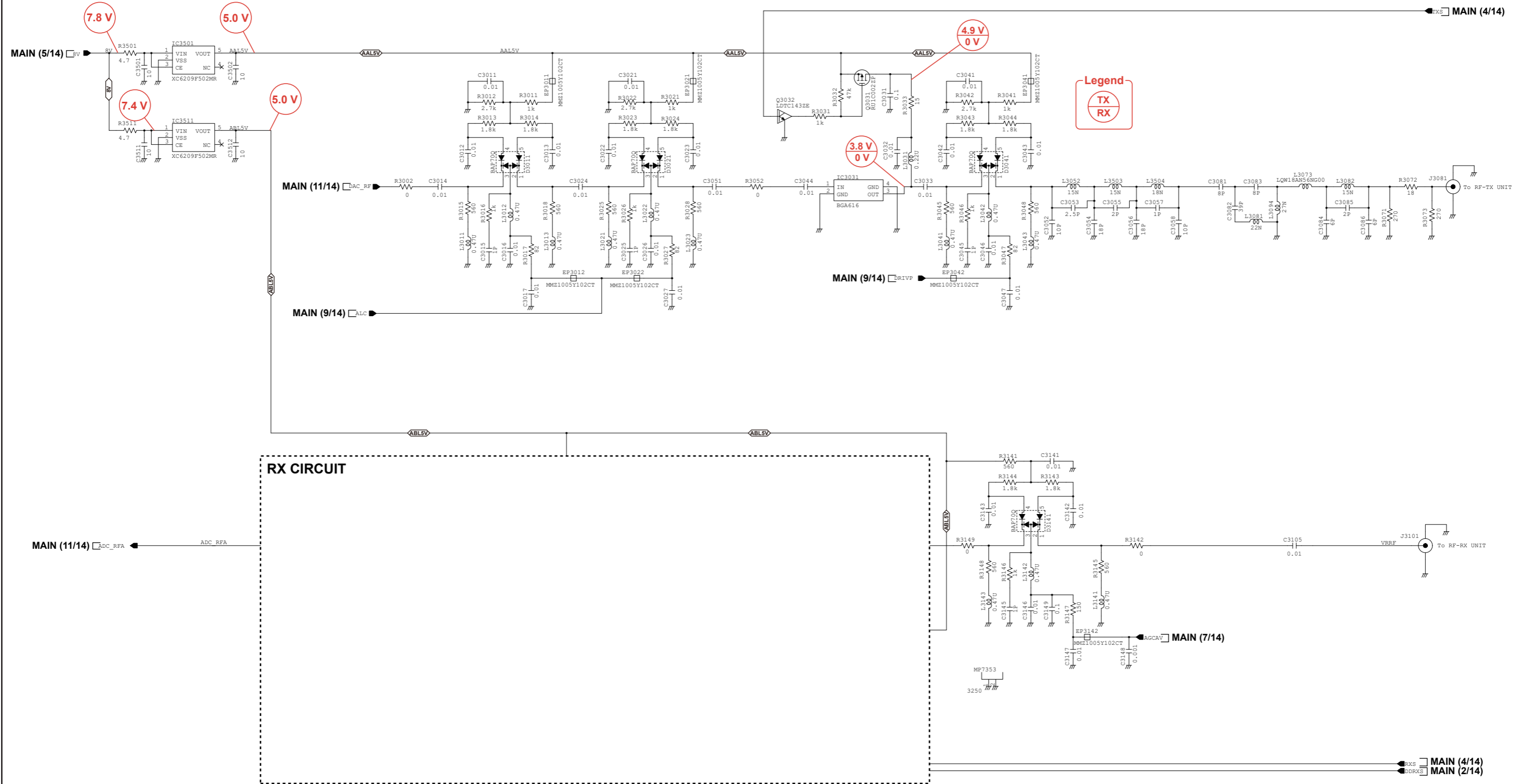
- MAIN (2/14) DRES1
- MAIN (1/14) MSTAT
- MAIN (2/14) MCK
- MAIN (1/14) DSTR
- MAIN (2/14) MSTB
- MAIN (1/14) PASTB



- 14V
- 8V
- 3R3V
- H3R3V
- AFOS MAIN (7/14)
- NASBS MAIN (8/14)
- VEPS MAIN (4/14)
- UEPS MAIN (4/14)
- 12POFS MAIN (4/14)
- 12PONS MAIN (4/14)
- 12EFSR MAIN (4/14)
- RKS MAIN (4/14)
- FRONT PW_LED MAIN (4/14)
- FRONT LTE LTR_STATUS_LED MAIN (9/14)
- FRONT LTE LTR_ANT_LED MAIN (9/14)
- DCDC_EN MAIN (9/14)
- RPT_S1 MAIN (14/14)
- RPT_S2 MAIN (14/14)
- RPT_S3 MAIN (14/14)
- RPT_S4 MAIN (14/14)
- CONT.I/O DV_CONT_IO MAIN (14/14)
- REFV MAIN (13/14)
- ICCV MAIN (8/14)
- POCV MAIN (4/14)
- 12DIDV MAIN (4/14)
- 12FIDV MAIN (4/14)
- UDIDV MAIN (4/14)
- VIDV MAIN (4/14)
- VDIDV MAIN (4/14)
- DRIVE MAIN (10/14)
- DV_SW MAIN (1/14)
- CONTIO_SW MAIN (1/14)

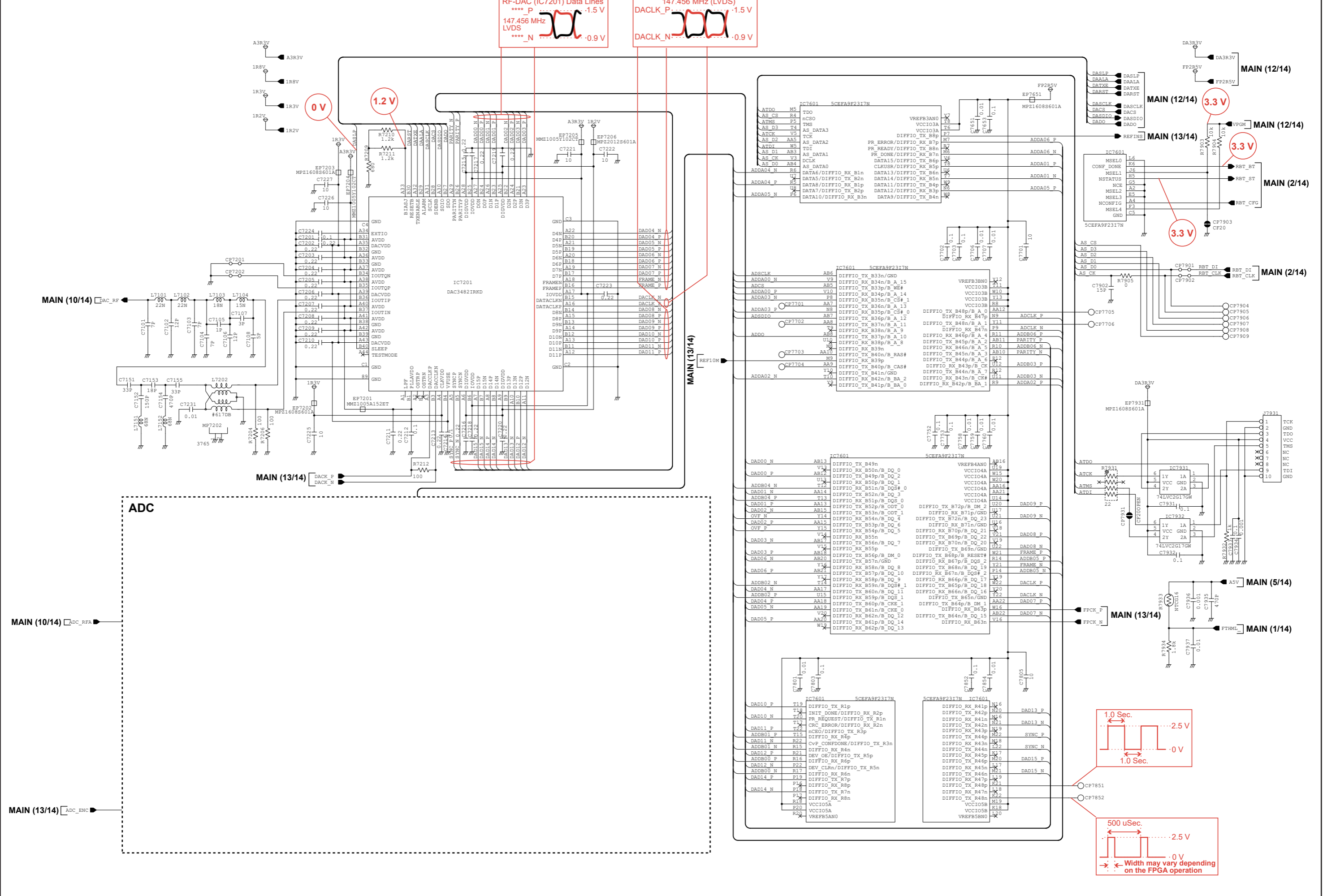
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (10/14)



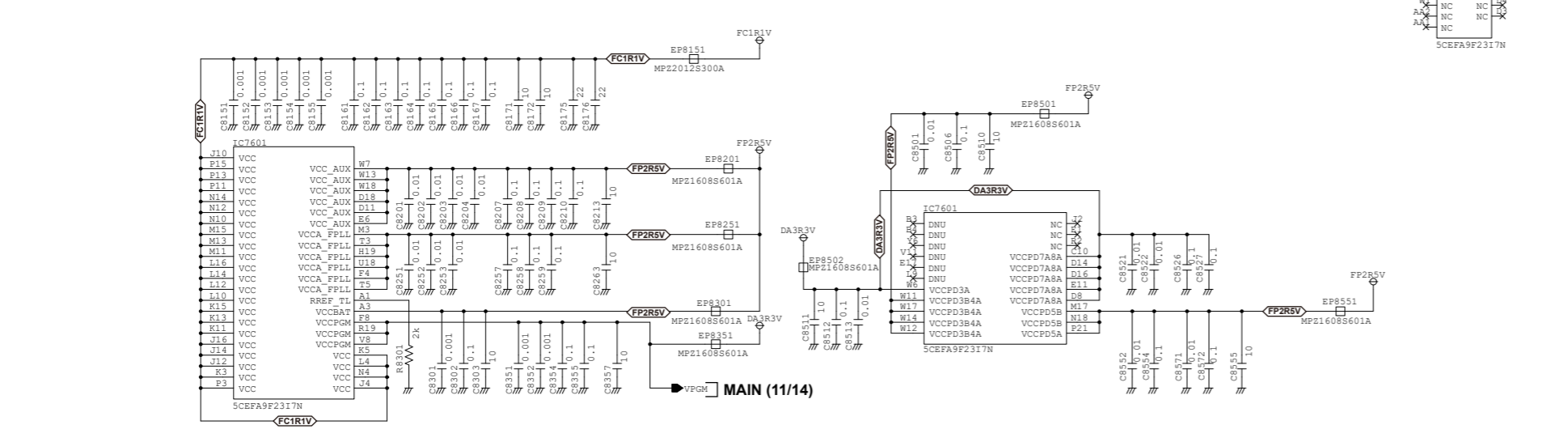
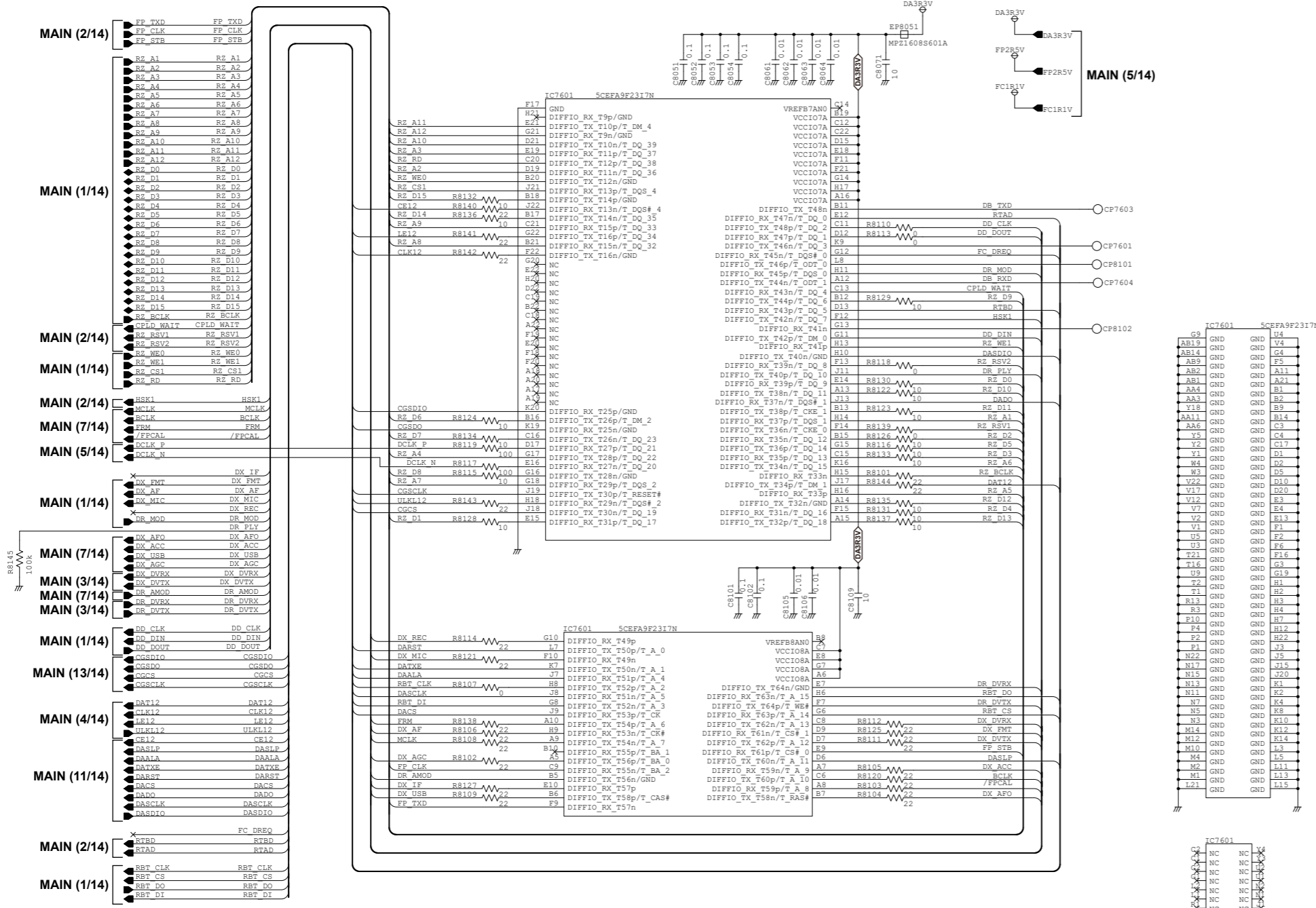
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (11/14)



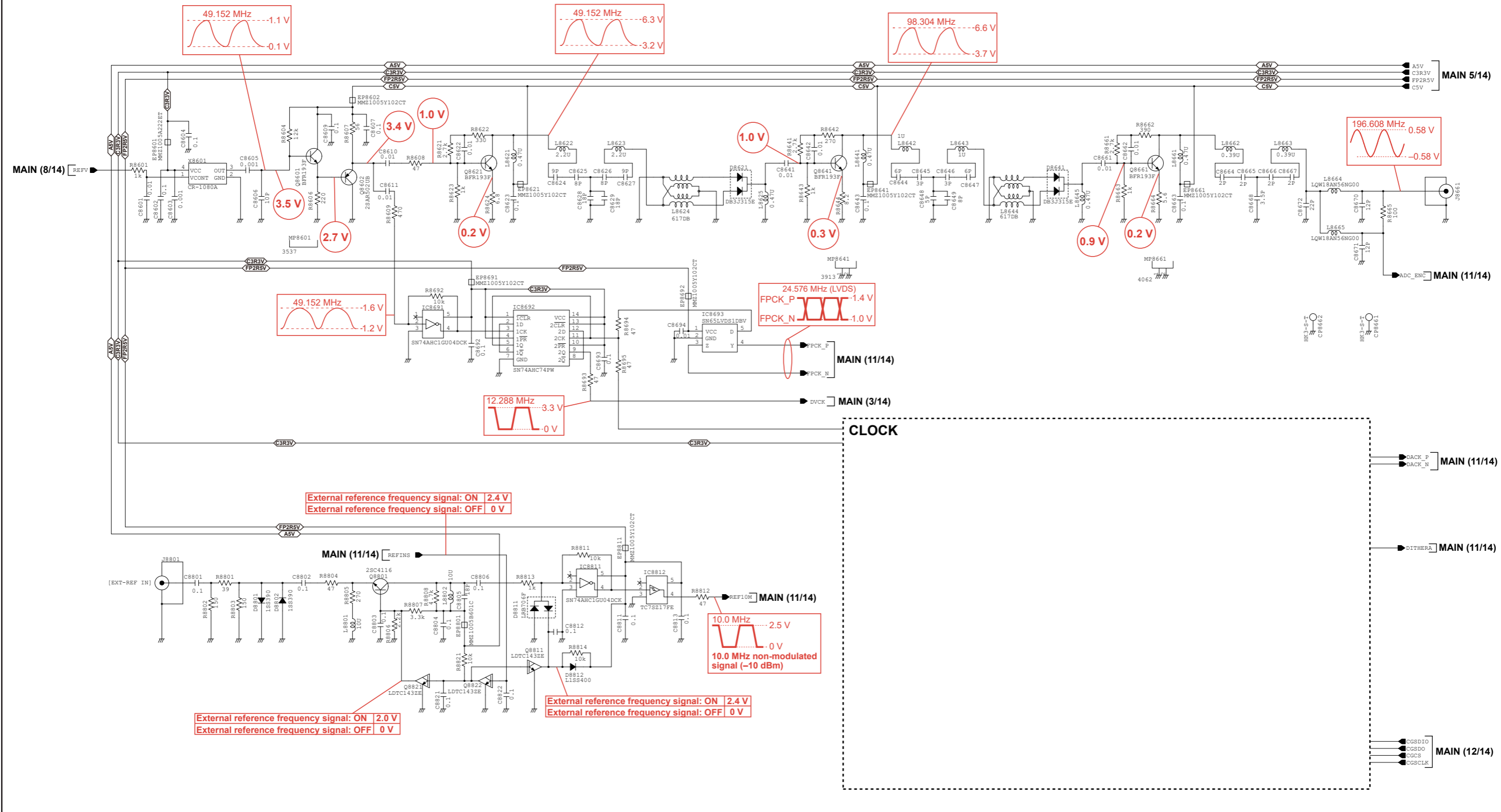
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (12/14)



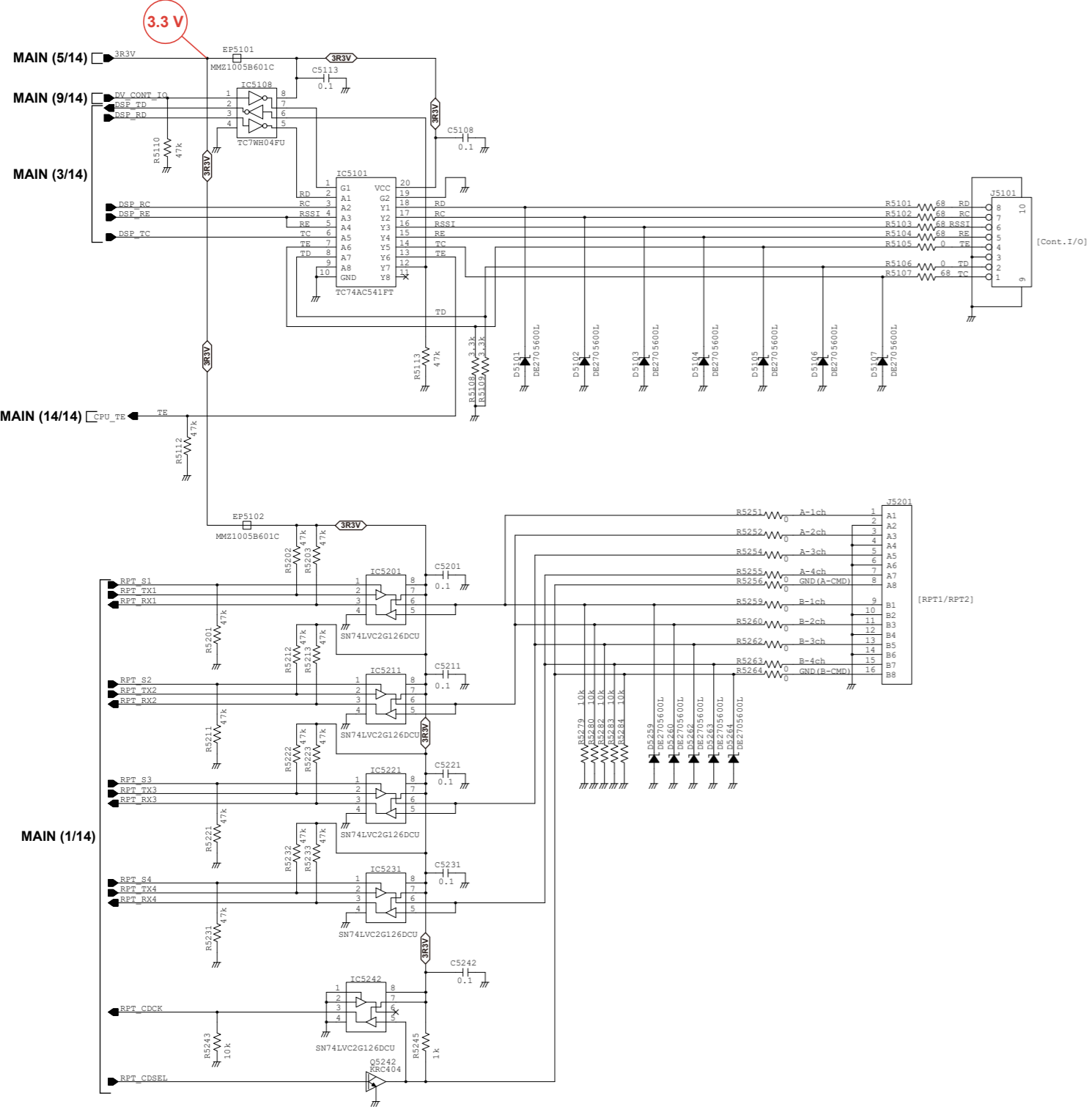
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (13/14)



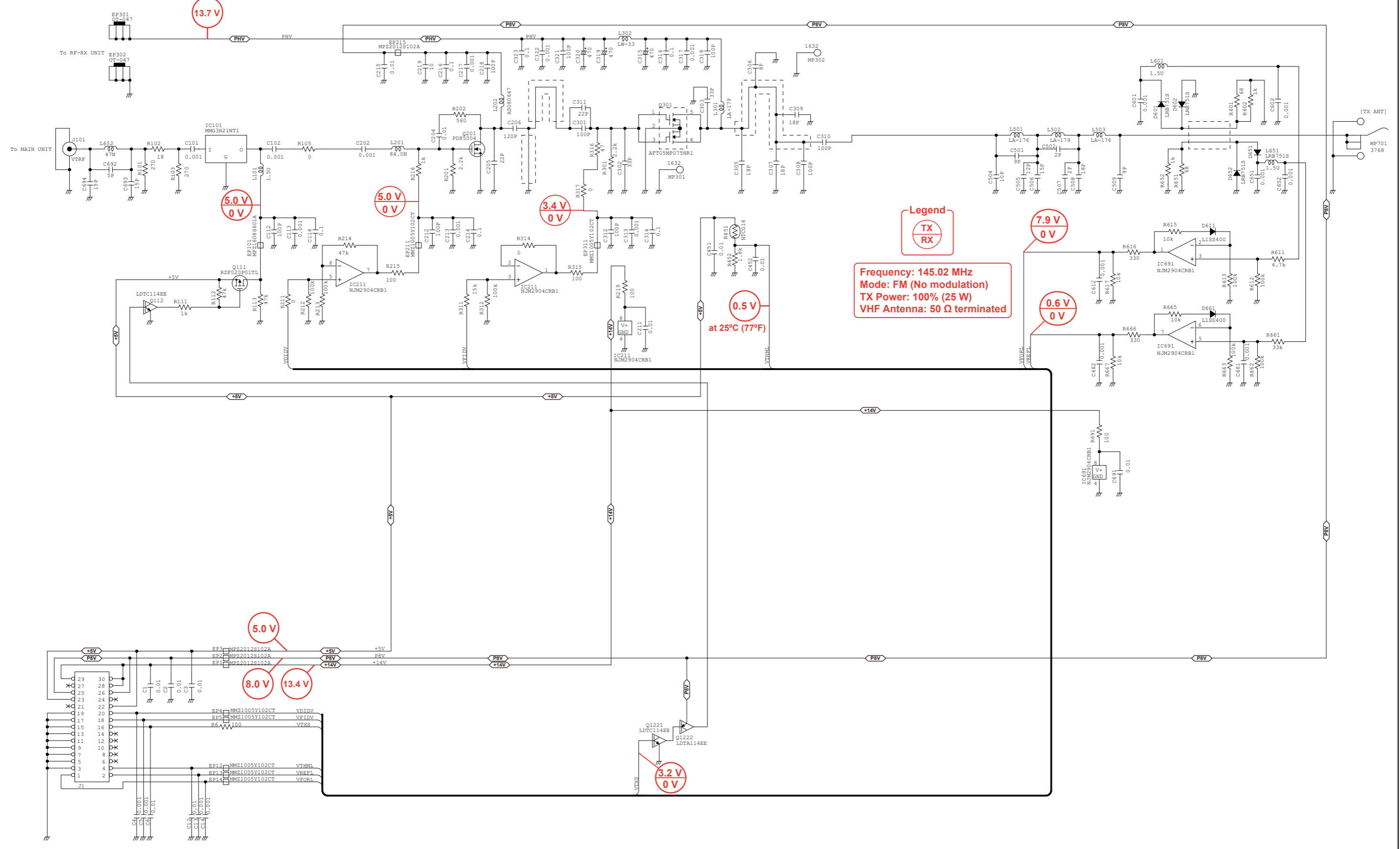
*Refer to the PARTS LIST for the value and name of component.

• MAIN UNIT (14/14)



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

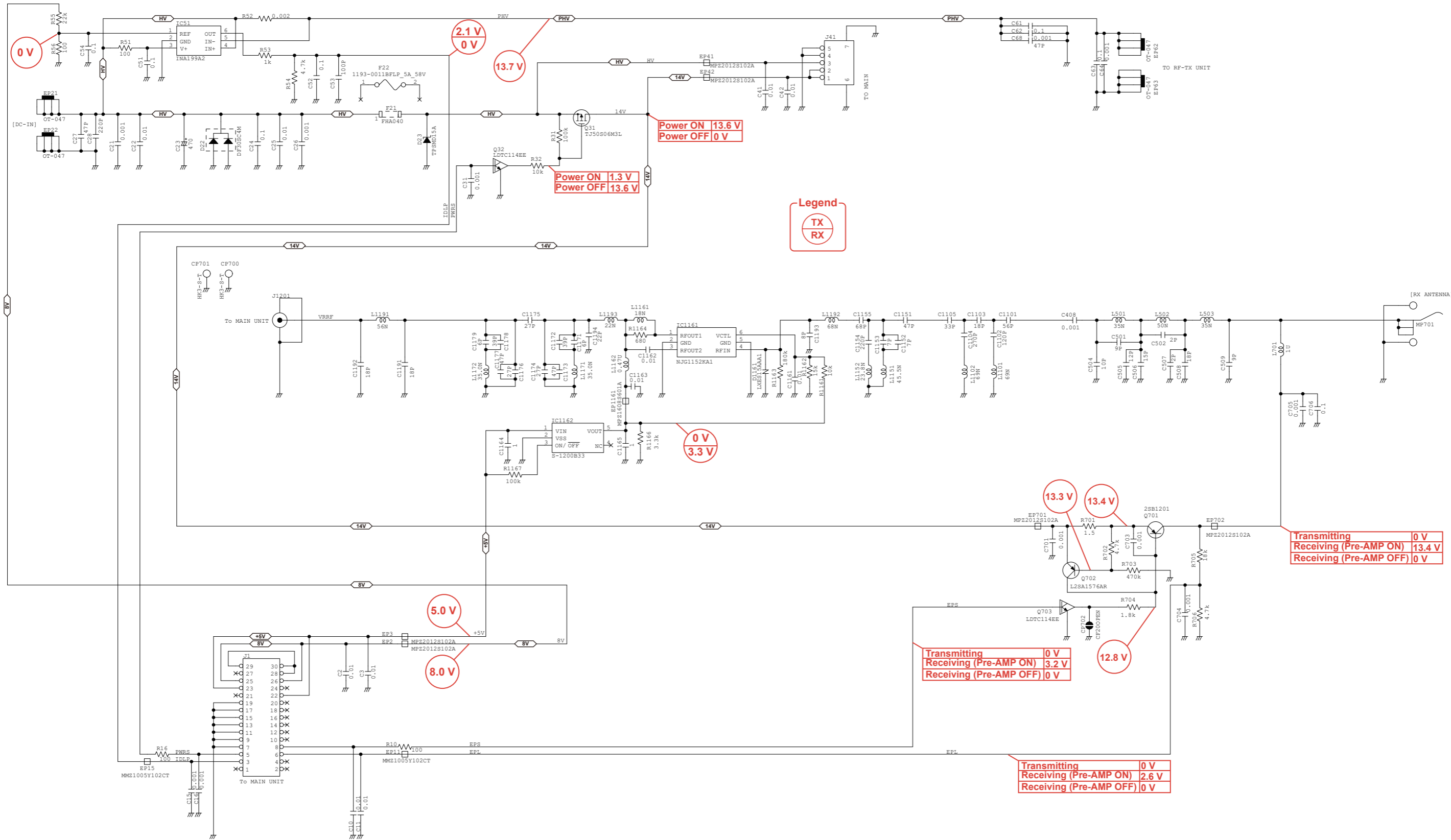
• RF-TX UNIT



Legend
 TX
 RX
 Frequency: 145.02 MHz
 Mode: FM (No modulation)
 TX Power: 100% (25 W)
 VHF Antenna: 50 Ω terminated

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

• RF-RX UNIT



Transmitting	0 V
Receiving (Pre-AMP ON)	13.4 V
Receiving (Pre-AMP OFF)	0 V

Transmitting	0 V
Receiving (Pre-AMP ON)	2.6 V
Receiving (Pre-AMP OFF)	0 V

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

If you have any inquiries regarding service, contact your distributor. The contact number or E-mail address of your distributor can be found on our website.

<https://www.icomjapan.com/>

Count on us!