SERVICE MANUAL

notebook

NS50AU / NS51AU

Notebook Computer

NS50AU / NS51AU

Service Manual

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About this Manual

This manual is intended for service personnel who have completed sufficient training to undertake the maintenance and inspection of personal computers.

It is organized to allow you to look up basic information for servicing and/or upgrading components of the ***NS50AU / NS51AU*** series notebook PC.

The following information is included:

Chapter 1, Introduction, provides general information about the location of system elements and their specifications.
Chapter 2, Disassembly, provides step-by-step instructions for disassembling parts and subsystems and how to upgrade elements of the system.

Appendix A, Part Lists
Appendix B, Schematic Diagrams

IMPORTANT SAFETY INSTRUCTIONS

Follow basic safety precautions, including those listed below, to reduce the risk of fire, electric shock and injury to persons when using any electrical equipment:

1. Do not use this product near water, for example near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
2. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord and batteries indicated in this manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for possible special disposal instructions.
5. This product is intended to be supplied by a Listed Power Unit with an AC Input of 100 - 240V, 50 - 60Hz, DC Output of 19V, 4.74A (**90** Watts) minimum AC/DC Adapter.

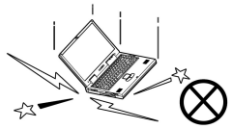
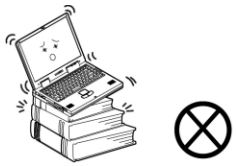
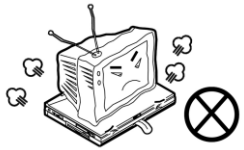
FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
This device may not cause harmful interference.
This device must accept any interference received, including interference that may cause undesired operation.

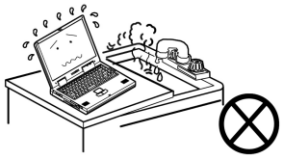
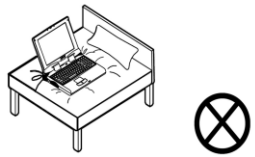
Instructions for Care and Operation

The notebook computer is quite rugged, but it can be damaged. To prevent this, follow these suggestions:

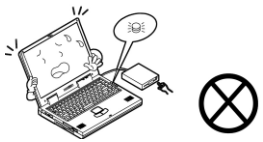
1. **Don't drop it, or expose it to shock.** If the computer falls, the case and the components could be damaged.

Do not expose the computer to any shock or vibration.	*Do not place it on an unstable surface.*	*Do not place anything heavy on the computer.*
		

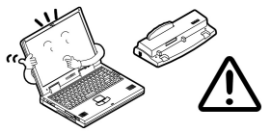
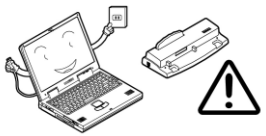
2. **Keep it dry, and don't overheat it.** Keep the computer and power supply away from any kind of heating element. This is an electrical appliance. If water or any other liquid gets into it, the computer could be badly damaged.

Do not expose it to excessive heat or direct sunlight.	*Do not leave it in a place where foreign matter or moisture may affect the system.*	*Don't use or store the computer in a humid environment.*	*Do not place the computer on any surface which will block the vents.*
			

3. **Follow the proper working procedures for the computer**. Shut the computer down properly and don't forget to save your work. Remember to periodically save your data as data may be lost if the battery is depleted.

Do not turn off the power until you properly shut down all programs.	*Do not turn off any peripheral devices when the computer is on.*	*Do not disassemble the computer by yourself.*	*Perform routine maintenance on your computer.*
			

4. **Avoid interference.** Keep the computer away from high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage your data.
5. **Take care when using peripheral devices**.

Use only approved brands of peripherals.	*Unplug the power cord before attaching peripheral devices.*
	

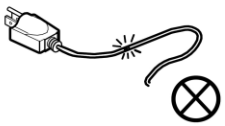
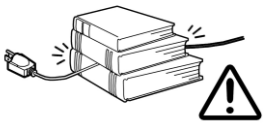
Power Safety

The computer has specific power requirements:

- Only use a power adapter approved for use with this computer.
- Your AC adapter may be designed for international travel but it still requires a steady, uninterrupted power supply. If you are unsure of your local power specifications, consult your service representative or local power company.
- The power adapter may have either a 2-prong or a 3-prong grounded plug. The third prong is an important safety feature; do not defeat its purpose. If you do not have access to a compatible outlet, have a qualified electrician install one.
- When you want to unplug the power cord, be sure to disconnect it by the plug head, not by its wire.
- Make sure the socket and any extension cord(s) you use can support the total current load of all the connected devices.
- Before cleaning the computer, make sure it is disconnected from any external power supplies.

Power Safety Warning

Before you undertake any upgrade procedures, make sure that you have turned off the power, and disconnected all peripherals and cables (including telephone lines and power cord). It is advisable to also remove your battery in order to prevent accidentally turning the machine on.

Do not plug in the power cord if you are wet.	*Do not use the power cord if it is broken.*	*Do not place heavy objects on the power cord.*
		

Battery Precautions

- Only use batteries designed for this computer. The wrong battery type may explode, leak or damage the computer.
- Do not continue to use a battery that has been dropped, or that appears damaged (e.g. bent or twisted) in any way. Even if the computer continues to work with a damaged battery in place, it may cause circuit damage, which may possibly result in fire.
- Recharge the batteries using the notebook's system. Incorrect recharging may make the battery explode.
- Do not try to repair a battery pack. Refer any battery pack repair or replacement to your service representative or qualified service personnel.
- Keep children away from, and promptly dispose of a damaged battery. Always dispose of batteries carefully. Batteries may explode or leak if exposed to fire, or improperly handled or discarded.
- Keep the battery away from metal appliances.
- Affix tape to the battery contacts before disposing of the battery.
- Do not touch the battery contacts with your hands or metal objects.

Battery Guidelines

The following can also apply to any backup batteries you may have.

- If you do not use the battery for an extended period, then remove the battery from the computer for storage.
- Before removing the battery for storage charge it to 60% - 70%.
- Check stored batteries at least every 3 months and charge them to 60% - 70%.

Battery Disposal

The product that you have purchased contains a rechargeable battery. The battery is recyclable. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

Caution

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used battery according to the manufacturer's instructions.

Battery Level

Click the battery icon in the taskbar to see the current battery level and charge status. A battery that drops below a level of 10% will not allow the computer to boot up. Make sure that any battery that drops below 10% is recharged within one week.

Related Documents

You may also need to consult the following manual for additional information:

User's Manual on CD/DVD

This describes the notebook PC's features and the procedures for operating the computer and its ROM-based setup program. It also describes the installation and operation of the utility programs provided with the notebook PC.

System Startup

1. Remove all packing materials.
2. Place the computer on a stable surface.
3. Securely attach any peripherals you want to use with the computer (e.g. keyboard and mouse) to their ports.
4. **When first setting up the computer use the following procedure** (as to safeguard the computer during shipping, the battery will be locked to not power the system until first connected to the AC/DC adapter and initially set up as below):
   - Attach the AC/DC adapter cord to the DC-In jack on the left of the computer, then plug the AC power cord into an outlet, and connect the AC power cord to the AC/DC adapter. The battery will now be unlocked.
5. Use one hand to raise the lid/LCD to a comfortable viewing angle (do not exceed 180 degrees); use the other hand (as illustrated in Figure 1) to support the base of the computer (**Note**: **Never** lift the computer by the lid/LCD).
6. Press the power button on the left side of the computer to turn it on (note that the lid/LCD must be open for the power button to function).

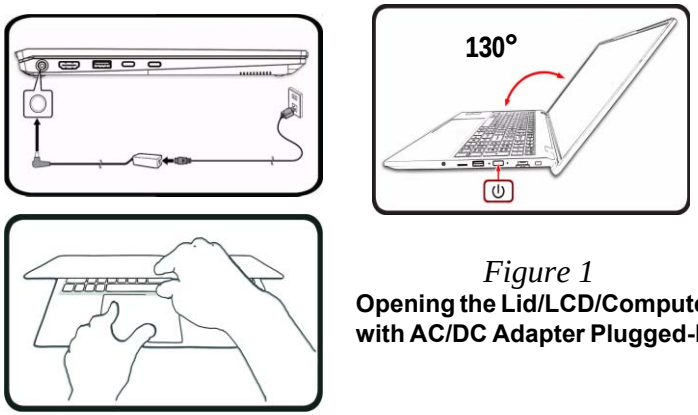


Figure 1
Opening the Lid/LCD/Computer with AC/DC Adapter Plugged-In

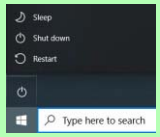
Powering the Computer On

After every disassembly, make sure that the bottom case's screws are all inserted and tightened before turning the computer on.

Shut Down

Note that you should always shut your computer down by choosing the **Shut down** command in ***Windows*** (see below). This will help prevent hard disk or system problems.

1. Click the Start Menu icon .
2. Click the **Power** item .
3. Choose **Shut down** from the menu.



Contents

Chapter 1: Introduction

Overview

This manual covers the information you need to service or upgrade the ***NS50AU / NS51AU*** series notebook computer. Information about operating the computer (e.g. getting started, and the *Setup* utility) is in the *User's Manual*. Information about dri-vers (e.g. VGA & audio) is also found in the *User's Manual*. The manual is shipped with the computer.

Operating systems (e.g. *Window 11*, etc.) have their own manuals as do application softwares (e.g. word processing and database programs). If you have questions about those programs, you should consult those manuals.

The ***NS50AU / NS51AU*** series notebook is designed to be upgradeable. See ***Disassembly on page 2 - 1*** for a detailed description of the upgrade procedures for each specific component. Please take note of the warning and safety information indicated by the "  " symbol.

The balance of this chapter reviews the computer's technical specifications and features.

Specifications

Latest Specification Information

The specifications listed in this section are correct at the time of going to press. Certain items (particularly processor types/speeds) may be changed, delayed or updated due to the manufacturer's release schedule. Check with your service center for details.

Note that this computer model series may support a range of CPUs and/or video adapters.

To find out which CPU is installed on your system go to the **Start** menu and select **Settings**, and then select **System** and click **About**. This will also provide information on the amount of **Installed RAM** etc.

To get information on your system's **video adapter** go to the **Start** menu and select **Settings**, and then select **System** and click **Display > Advanced display settings > Display adapter properties**.

CPU

The CPU is not a user serviceable part. Accessing the CPU in any way may violate your warranty.

Processor Options

i7-1355U (1.70GHz), TDP 15W
i5-1335U (1.30GHz), TDP 15W
i3-1315U (1.20GHz), TDP 15W

BIOS

256Mb SPI Flash ROM
Insyde BIOS

Memory

Dual Channel DDR5
Two 262 Pin SO-DIMM Socket Supporting **DDR5 5600MHz** Memory
Memory Expandable up to **64GB**
Compatible with 8GB,16GB or 32GB Modules

(The real memory operating frequency depends on the processor and memory modules.)

LCD Options

LCD, 15.6" (39.62cm), 16:9, FHD (1920x1080)

Storage

Two M.2 2280 **PCIe Gen4 x4** SSDs supporting RAID level 0/1

Security

Security (Kensington® Type) Lock Slot
BIOS Password
Intel PTT for Systems Without TPM Hardware
(**Factory Option**) TPM 2.0
(**Factory Option**) Fingerprint Sensor

Video Adapter

Intel® Iris Xe Graphics (i7-1355U / i5-1335U)
Intel Xe Micro Architecture
Variable Rate Shading
Microsoft DirectX® 12 Compatible
Intel® DLBoost: DP4A
Intel UHD Graphics (i3-1315U)
HDR Support
Rec. 2020
Microsoft DirectX® 12 Compatible

Pointing Device

Built-in Touchpad (with Microsoft PTP Multi Gesture & Scrolling Functionality)
Or
(**Factory Option**) Built-in Secure Pad (with Microsoft PTP Multi Gesture & Scrolling Functionality)

Keyboard

Full-size Keyboard
Or
(**Factory Option**) Full-size **White-**LED Keyboard

Audio

High Definition Audio Compliant Interface
Sound Blaster Studio
Built-In Array Microphone
Two Speakers

M.2 Slots

Slot 1 for **WLAN and Bluetooth** Combo Module
Slot 2 for **PCIe Gen4 x4 SSD**
Slot 3 for **SATA** or **PCIe Gen3 x4 SSD**

Card Reader

MicroSD Card Reader

Interface

One USB 2.0 Port

One USB 3.2 Gen 2 Type-A Port
Or
(**Factory Option**) One Powered USB 3.2 Gen 2 Type-A Port

One USB 3.2 Gen 2 Type-C Port*

**The maximum amount of current supplied by USB Type-C ports is 500mA (USB 2.0)/900mA (USB3.2).*

One Thunderbolt 4 Port with Power Delivery (DC-In)**
***The power output of the Thunderbolt 4 port is 5V/3A in AC mode or 5V/1.5A in DC mode.*

One HDMI-Out Port

One 2- In-1 Audio Jack (Headphone / Microphone)

One RJ-45 LAN Jack

One DC-In Jack

Communication

Built-In 10/100/1000Mb Base-TX Ethernet LAN

1.0M HD Webcam
Or
(**Factory Option**) Windows Hello Camera Module

WLAN/ Bluetooth M.2 Modules:

(**Factory Option**) Intel® Dual Band Wi-Fi 6E AX211, 2x2 AX Wireless LAN + Bluetooth

(**Factory Option**) Intel® Dual Band Wi-Fi 6E AX210, 2x2 AX Wireless LAN + Bluetooth

(**Factory Option**) Intel® Dual Band Wi-Fi 6 AX201, 2x2 AX Wireless LAN + Bluetooth

(**Factory Option**) Intel® Dual Band Wi-Fi 5 Wireless-AC 9462, 1x1 AC Wireless LAN + Bluetooth

Power

Full Range AC/DC Adapter
AC Input: 100 - 240V, 50 - 60Hz
DC Output: 19V, 4.74A (**90W**)

Embedded Lithium-Ion Polymer Battery Pack, 36WH
(**Factory Option**) Embedded Lithium-Ion Polymer Battery Pack, 73WH

Environmental Spec

Temperature
Operating: 5°C - 35°C
Non-Operating: -20°C - 60°C
Relative Humidity
Operating: 20% - 80%
Non-Operating: 10% - 90%

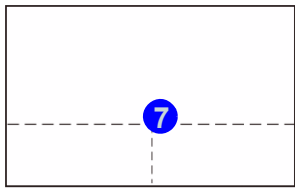
Dimensions & Weight

357mm (w) * 220.5mm (d) * 19.9mm (h)
1.59kg (Barebone with 36Wh Battery)
Or
1.74kg (Barebone with 73Wh Battery)

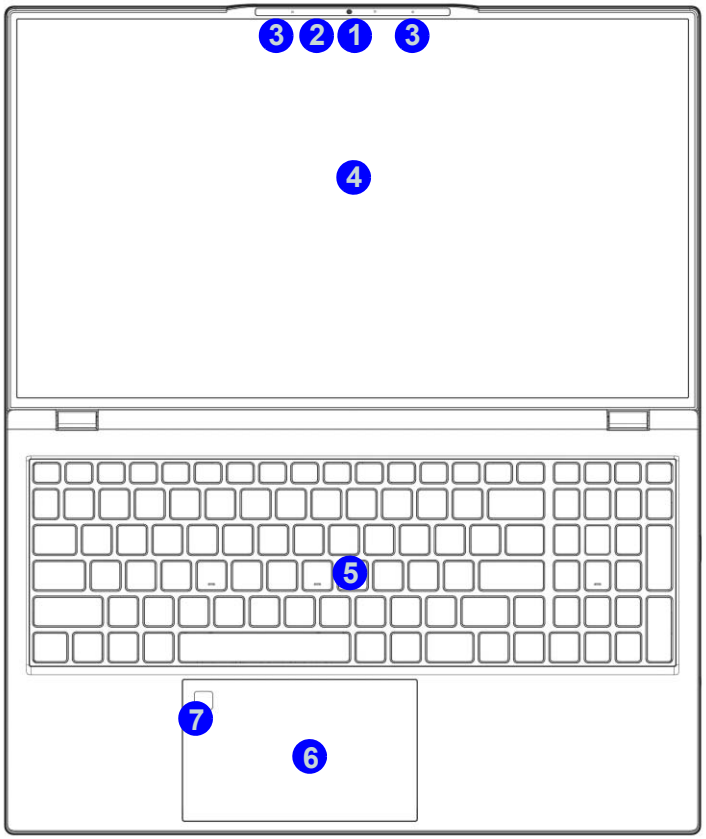
External Locator - Top View with LCD Panel Open

Figure 1
Top View

1. Webcam
   Or
   (**Factory Option**)
   Windows Hello Camera
2. *Camera LED
   **When the camera is in use, the LED will be illuminated.*
3. Built-In Array Microphone
4. Display
5. Keyboard
6. Touchpad & Buttons
7. (**Factory Option**) Fingerprint Sensor



Note that the Touchpad and Buttons has a valid operational area indicated within the dotted lines.



External Locator - Front & Right Side Views

Figure 2
Front View

FRONT VIEW

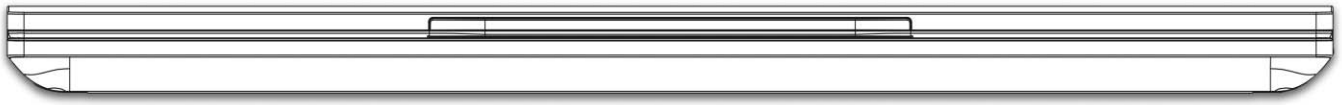
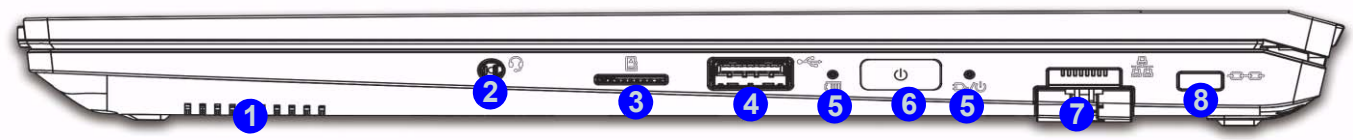


Figure 3
Right Side View

RIGHT SIDE VIEW



1. Speaker
2. 2-In-1 Audio Jack (Headphone and Microphone)
3. MicroSD Card Reader
4. USB 2.0 Port
5. LED Indicators
6. Power Button
7. RJ-45 LAN Jack
8. Security Lock Slot

External Locator - Left Side & Rear View

Figure 4
Left Side View

1. DC-In Jack
2. HDMI-Out Port
3. USB 3.2 Gen 2 Type-A Port
   Or
   (**Factory Option**) Powered USB 3.2 Gen 2 Type-A Port
4. USB 3.2 Gen 2 Type-C Port
5. Thunderbolt 4 Port with Power Delivery (DC-In)
6. Speaker

LEFT SIDE VIEW

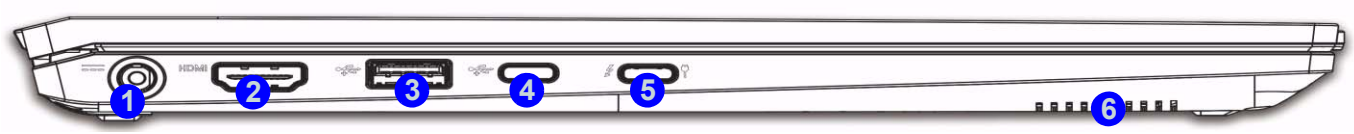


Figure 5
Rear View

1. Vent

REAR VIEW

External Locator - Bottom View

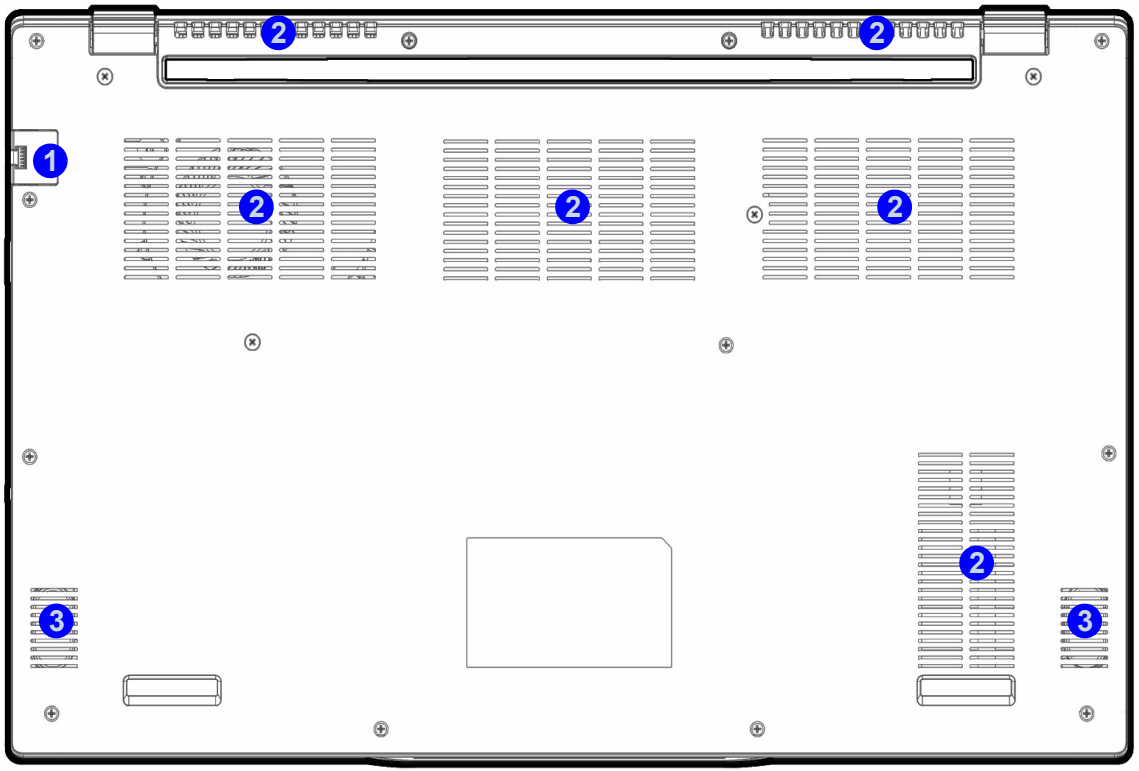


Figure 6
Bottom View

1. RJ-45 LAN Jack
2. Vent
3. Speakers

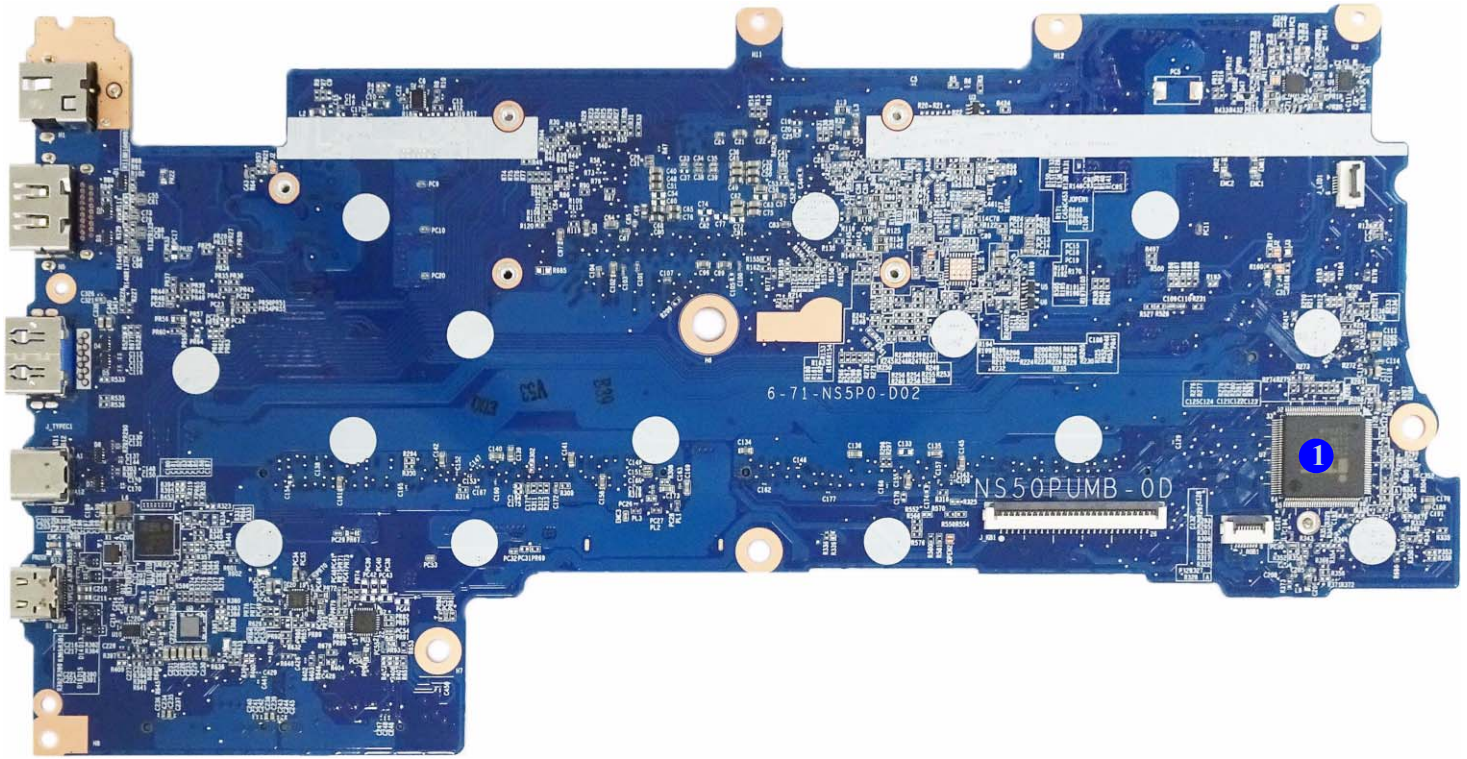
Overheating

To prevent your computer from overheating, make sure nothing blocks any vent while the computer is in use.

Mainboard Overview - Top (Key Parts)

Figure 7
Mainboard Top Key Parts

1. KBC-ITE IT5570



Mainboard Overview - Bottom (Key Parts)

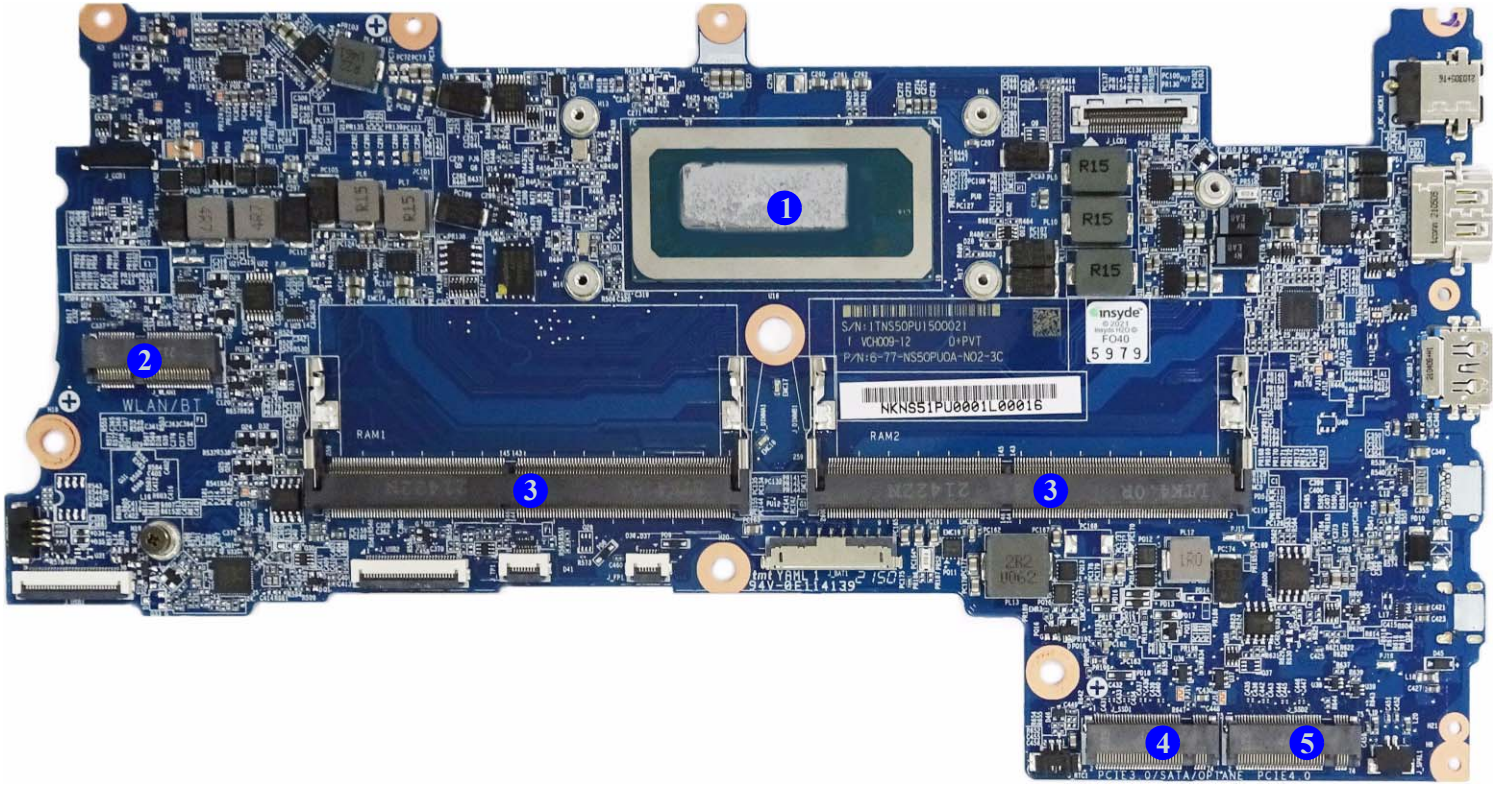


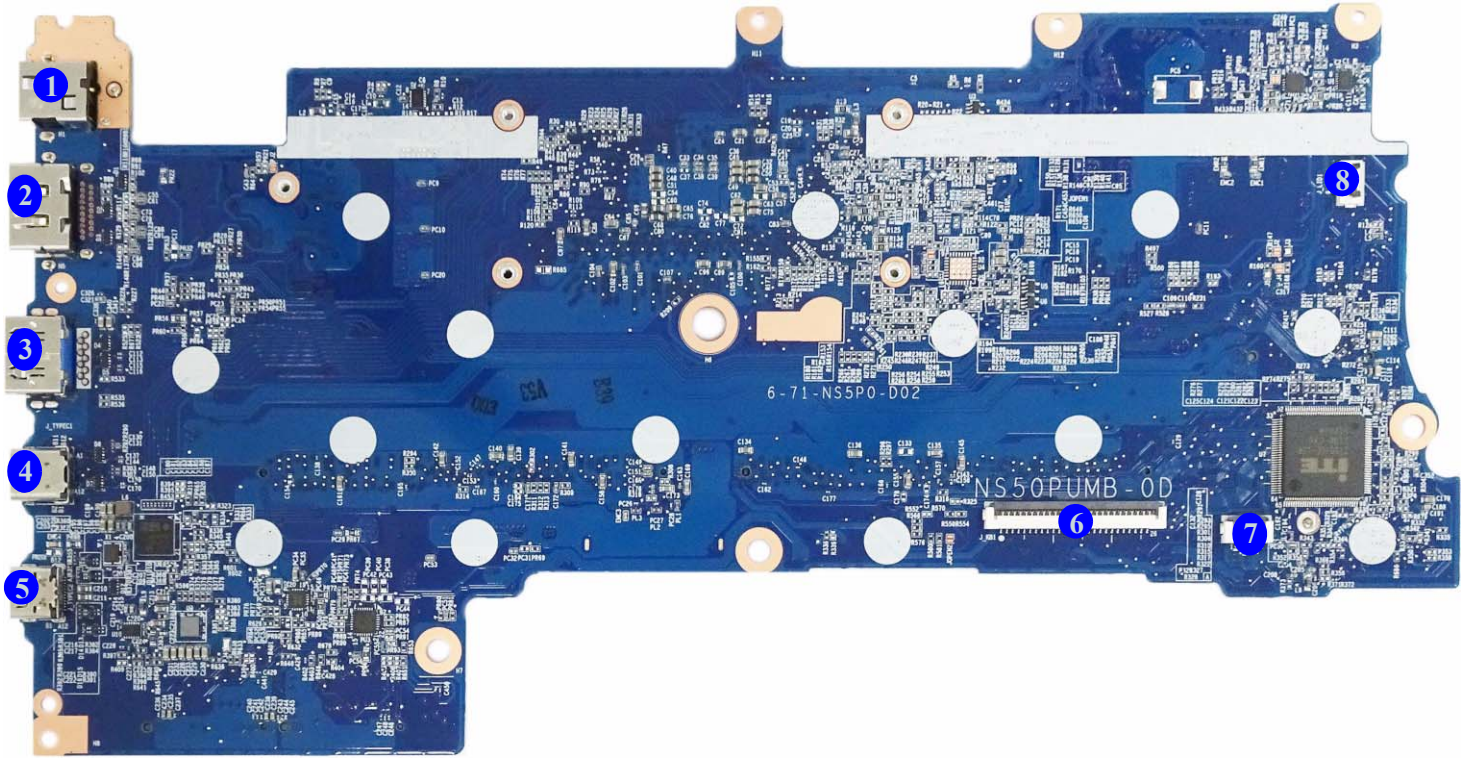
Figure 8
Mainboard Bottom Key Parts

1. CPU
2. Mini-Card Connector (WLAN/ BT Module)
3. Memory Slots DDR5 SO-DIMM
4. Mini-Card Connector (M.2 PCIE SSD Module)
5. Mini-Card Connector (M.2 PCIE SSD Module)

Mainboard Overview - Top (Connectors)

Figure 9
Mainboard Top Connectors

1. DC-In Jack
2. HDMI-Out Port
3. USB 3.2 Gen 2 Type-A Port
4. USB 3.2 Gen 2 Type-C Port
5. Thunderbolt 4 Port with Power Delivery (DC-In)
6. Keyboard Cable Connector
7. LED KB Connector
8. LID Connector



Mainboard Overview - Bottom (Connectors)

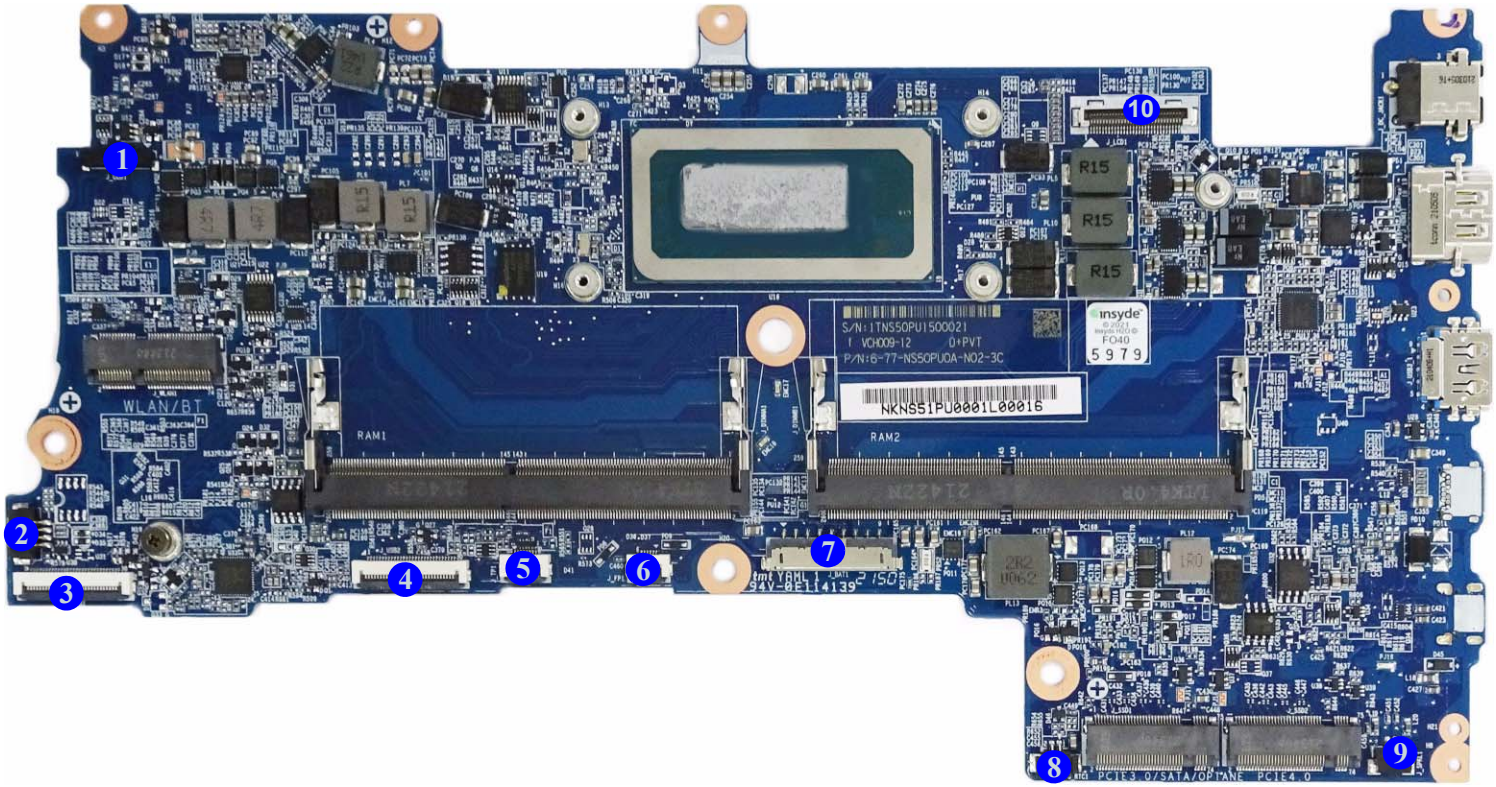


Figure 10
Mainboard Bottom Connectors

1. CCD Connector
2. Fan Connector
3. USB Board Connector
4. USB Connector
5. Touchpad Cable Connector
6. Fingerprint Connector
7. Battery Connector
8. RTC Connector
9. Speaker Connector
10. LCD Connector

Chapter 2: Disassembly

Disassembly

Note that for the disassembly of any key parts, **the bottom case must be properly closed before opening the upper part of the LCD** to avoid any damage caused by the nature of the structure.

Overview

This chapter provides step-by-step instructions for disassembling the ***NS50AU / NS51AU*** series notebook's parts and subsystems. When it comes to reassembly, reverse the procedures (unless otherwise indicated).

We suggest you completely review any procedure before you take the computer apart.

Information

Procedures such as upgrading/replacing the RAM, optical device and hard disk are included in the User's Manual but are repeated here for your convenience.

To make the disassembly process easier each section may have a box in the page margin. Information contained under the figure # will give a synopsis of the sequence of procedures involved in the disassembly procedure. A box with a lists the relevant parts you will have after the disassembly process is complete. **Note**: The parts listed will be for the disassembly procedure listed ONLY, and not any previous disassembly step(s) required. Refer to the part list for the previous disassembly procedure. The amount of screws you should be left with will be listed here also.

A box with a will also provide any possible helpful information. A box with a contains warnings.

Warning

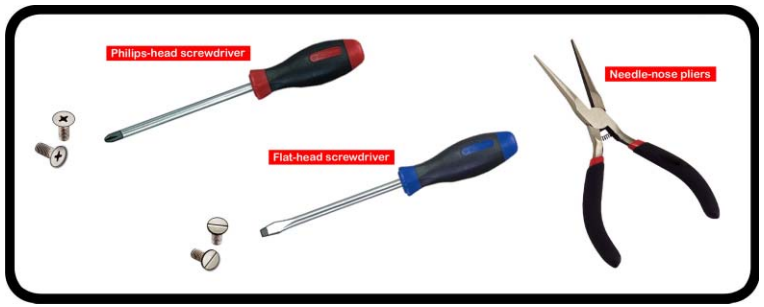
An example of these types of boxes are shown in the sidebar.

NOTE: All disassembly procedures assume that the system is turned **OFF**, and disconnected from any power supply (the battery is removed too).

Maintenance Tools

The following tools are recommended when working on the notebook PC:

- M3 Philips-head screwdriver
- M2.5 Philips-head screwdriver (magnetized)
- M2 Philips-head screwdriver
- Small flat-head screwdriver
- Pair of needle-nose pliers
- Anti-static wrist-strap



Connections

Connections within the computer are one of four types:

Locking collar sockets for ribbon connectors	To release these connectors, use a small flat-head screwdriver to gently pry the locking collar away from its base. When replacing the connection, make sure the connector is oriented in the same way. The pin1 side is usually not indicated.
Pressure sockets for multi-wire connectors	To release this connector type, grasp it at its head and gently rock it from side to side as you pull it out. Do not pull on the wires themselves. When replacing the connection, do not try to force it. The socket only fits one way.
Pressure sockets for ribbon connectors	To release these connectors, use a small pair of needle-nose pliers to gently lift the connector away from its socket. When replacing the connection, make sure the connector is oriented in the same way. The pin1 side is usually not indicated.
Board-to-board or multi-pin sockets	To separate the boards, gently rock them from side to side as you pull them apart. If the connection is very tight, use a small flat-head screwdriver - use just enough force to start.

Maintenance Precautions

The following precautions are a reminder. To avoid personal injury or damage to the computer while performing a removal and/or replacement job, take the following precautions:

1. **Don't drop it**. Perform your repairs and/or upgrades on a stable surface. If the computer falls, the case and other components could be damaged.
2. **Don't overheat it**. Note the proximity of any heating elements. Keep the computer out of direct sunlight.
3. **Avoid interference**. Note the proximity of any high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage components and/or data. You should also monitor the position of magnetized tools (i.e. screwdrivers).
4. **Keep it dry**. This is an electrical appliance. If water or any other liquid gets into it, the computer could be badly damaged.
5. **Be careful with power**. Avoid accidental shocks, discharges or explosions.
   - Before removing or servicing any part from the computer, turn the computer off and detach any power supplies.
   - When you want to unplug the power cord or any cable/wire, be sure to disconnect it by the plug head. Do not pull on the wire.
6. **Peripherals** – Turn off and detach any peripherals.
7. **Beware of static discharge**. ICs, such as the CPU and main support chips, are vulnerable to static electricity. Before handling any part in the computer, discharge any static electricity inside the computer. When handling a printed circuit board, do not use gloves or other materials which allow static electricity buildup. We suggest that you use an anti-static wrist strap instead.
8. **Beware of corrosion**. As you perform your job, avoid touching any connector leads. Even the cleanest hands produce oils which can attract corrosive elements.
9. **Keep your work environment clean**. Tobacco smoke, dust or other air-born particulate matter is often attracted to charged surfaces, reducing performance.
10. **Keep track of the components**. When removing or replacing any part, be careful not to leave small parts, such as screws, loose inside the computer.

Power Safety Warning

Before you undertake any upgrade procedures, make sure that you have turned off the power, and disconnected all peripherals and cables (including telephone lines and power cord). It is advisable to also remove your battery in order to prevent accidentally turning the machine on.

Cleaning

Do not apply cleaner directly to the computer, use a soft clean cloth.

Do not use volatile (petroleum distillates) or abrasive cleaners on any part of the computer.

(For Computer Models Supplied with Light Blue Cleaning Cloth) Some computer models in this series come supplied with a light blue cleaning cloth. To clean the computer case with this cloth follow the instructions below.

- Power off the computer and peripherals.
- Disconnect the AC/DC adapter from the computer.
- Use a little water to dampen the cloth slightly.
- Clean the computer case with the cloth.
- Dry the computer with a dry cloth, or allow it time to dry before turning on.
- Reconnect the AC/DC adapter and turn the computer on.

Disassembly Steps

The following table lists the disassembly steps, and on which page to find the related information. **PLEASE PERFORM THE DISASSEMBLY STEPS IN THE ORDER INDICATED.**

To remove the Battery:

To remove the Keyboard:

To remove the System Memory:

To remove the Wireless LAN Module:

To remove the M.2 SSD Module:

To remove the CCD Module:

Removing the Battery

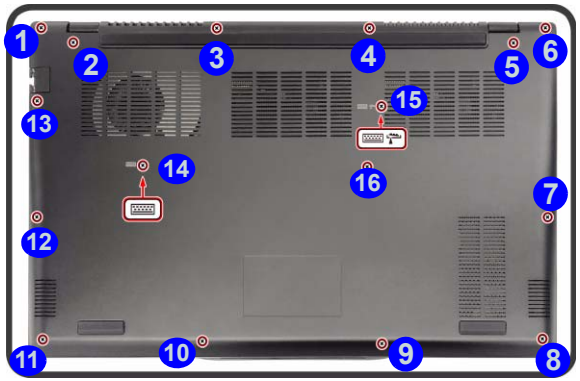
Battery-1 Removal Procedure

1. Turn **off** the computer, turn it over.
2. Remove screws 1 - 16 from the bottom case (*Figure 1a*).
3. Carefully lift the bottom case 17 up from point 18 - 19 as shown. The battery will be visible at point 20 on the computer (*Figure 1b*).
4. Carefully disconnect the cable 21, then remove the adhesive mylar 22 as shown (*Figure 1c*).
5. Lift the battery 23 off the computer (*Figure 1d*).
6. Reverse the process to install a new battery (do not forget to replace all the screws and bottom cover).

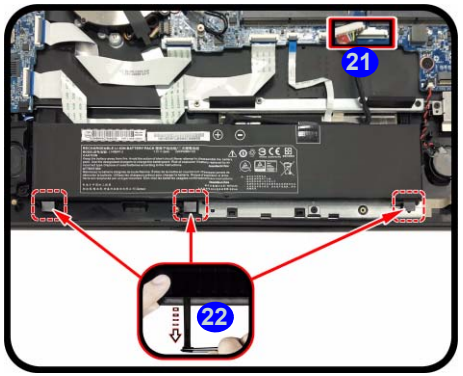
Figure 1
Battery-1 Removal

a. Remove the screws.
b. Remove the bottom case and locate the battery.
c. Disconnect the cable and remove the adhesive. mylar
d. Lift the battery off the computer.

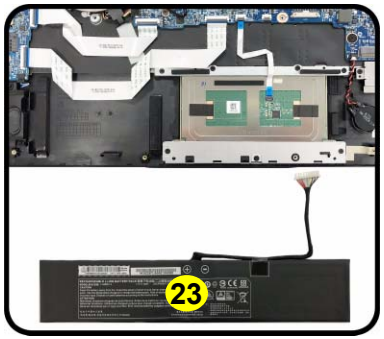
a.



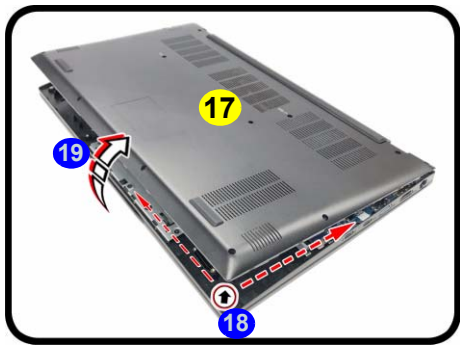
c.

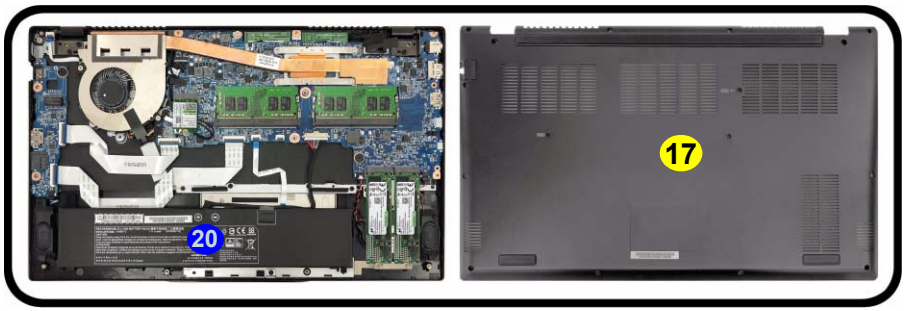


d.



b.





Powering the Computer On

After every disassembly, make sure that the bottom case's screws are all inserted and tightened before turning the computer on.

17. Bottom Cover
23. Battery

- 16 Screws

Figure 2
Battery-2 Removal

a. Remove the screws.
b. Remove the bottom case and locate the battery.
c. Disconnect the cable and remove the adhesive. mylar
d. Lift the battery off the computer.

Battery-2 Removal Procedure

1. Turn **off** the computer, turn it over.
2. Remove screws 1 - 16 from the bottom case (*Figure 2a*).
3. Carefully lift the bottom case 17 up from point 18 - 19 as shown. The battery will be visible at point 20 on the computer (*Figure 2b*).
4. Carefully disconnect the cable 21, then remove the adhesive mylar 22 as shown (*Figure 2c*).
5. Lift the battery 23 off the computer (*Figure 2d*).
6. Reverse the process to install a new battery (do not forget to replace all the screws and bottom cover).

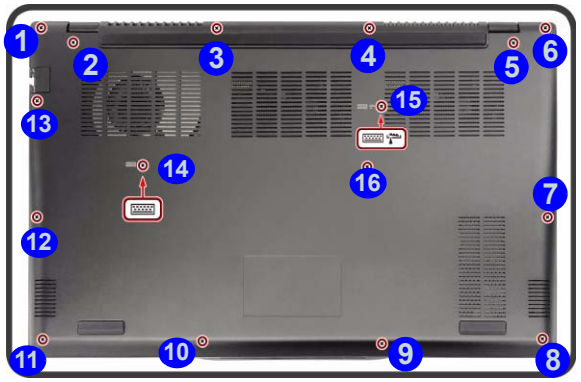
Powering the Computer On

After every disassembly, make sure that the bottom case's screws are all inserted and tightened before turning the computer on.

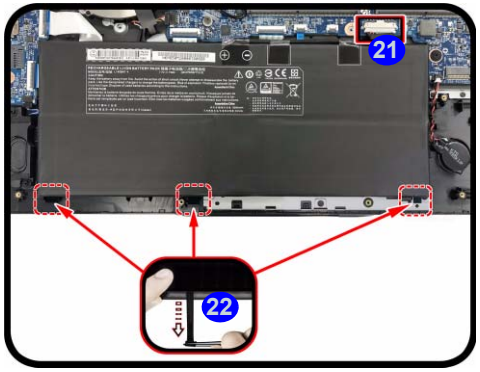
17. Bottom Cover
23. Battery

- 16 Screws

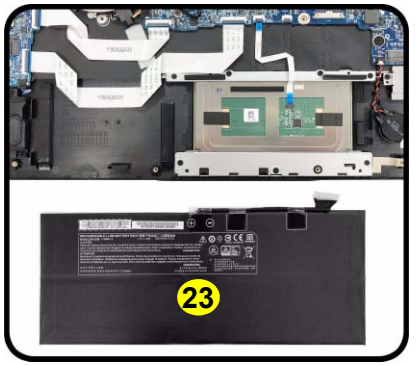
a.



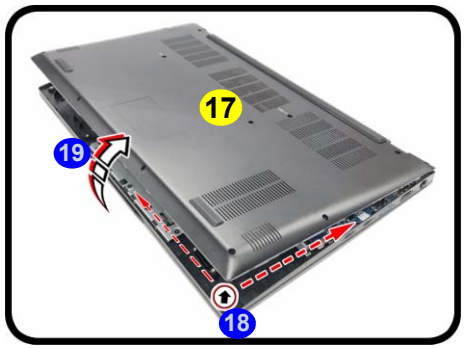
c.



d.



b.



Removing the Keyboard

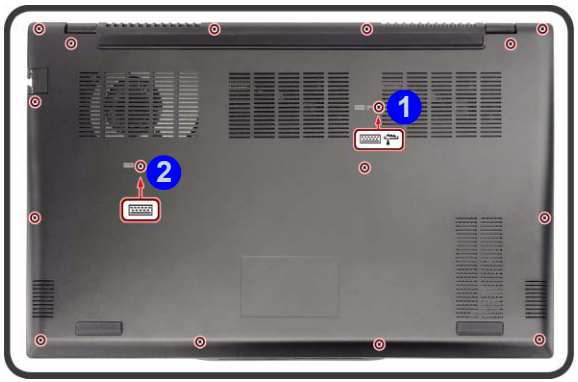
Keyboard-1 Removal Procedure

1. Turn **off** the computer, turn it over to remove the battery (*page 2 - 5*).
2. Locate the release points 1 - 2 from the open bottom case (*Figure 3a*).
3. Open it up with the LCD on a flat surface before pressing at point 3 to release the keyboard module (use the specific eject stick 4 to do this) while releasing the keyboard in the direction of the arrow 5 as shown (*Figure 3b*).
4. Carefully lift the keyboard 6 up, being careful not to bend the keyboard ribbon cable 7. Disconnect the keyboard ribbon cable from the locking collar socket 8 (*Figure 3c*).
5. Carefully lift up the keyboard 6 off the computer (*Figure 3d*).
6. Reverse the process to install the keyboard (be careful not to bend the keyboard ribbon cable).

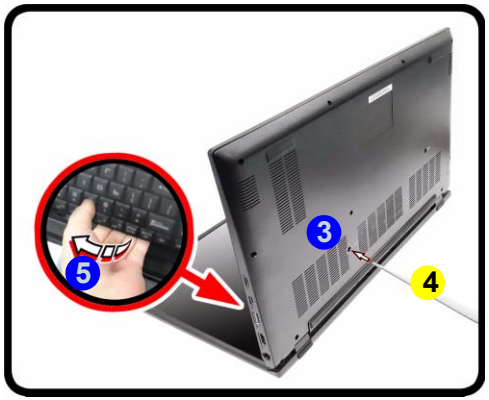
Figure 3
Keyboard-1 Removal

a. Remove the screws.
b. Release the keyboard by pressing at point 3.
c. Disconnect the keyboard ribbon cable from the locking collar socket.
d. Remove the keyboard.

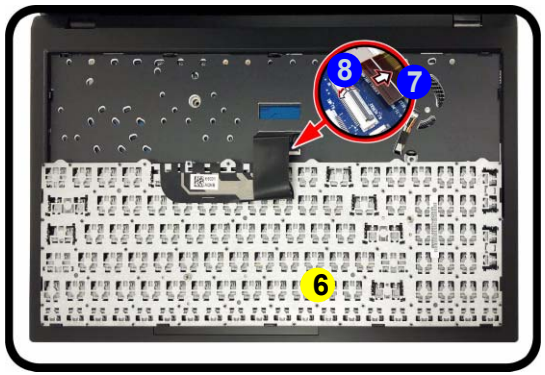
a.



b.



c.



d.

4. Eject Stick
6. Keyboard

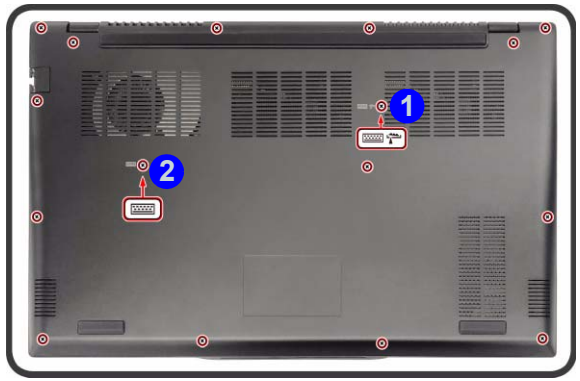
Figure 4
Keyboard-2 Removal

a. Remove the screws.
b. Release the keyboard by pressing at point 3.
c. Disconnect the keyboard ribbon cable from the locking collar socket.
d. Remove the keyboard.

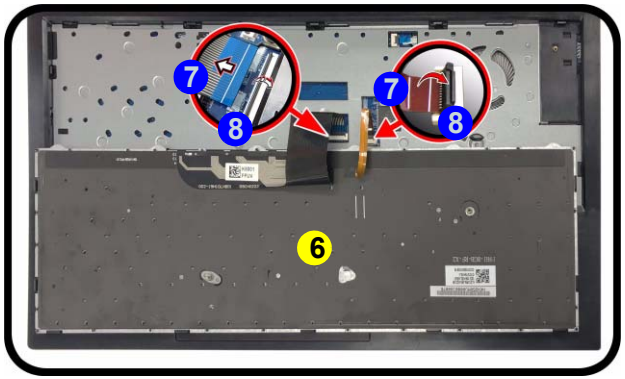
Keyboard-2 Removal Procedure

1. Turn **off** the computer, turn it over to remove the battery (*page 2 - 5*).
2. Locate the release points 1 - 2 from the open bottom case (*Figure 4a*).
3. Open it up with the LCD on a flat surface before pressing at point 3 to release the keyboard module (use the specific eject stick 4 to do this) while releasing the keyboard in the direction of the arrow 5 as shown (*Figure 4b*).
4. Carefully lift the keyboard 6 up, being careful not to bend the keyboard ribbon cable 7. Disconnect the keyboard ribbon cable from the locking collar socket 8 (*Figure 4c*).
5. Carefully lift up the keyboard 6 off the computer (*Figure 4d*).
6. Reverse the process to install the keyboard (be careful not to bend the keyboard ribbon cable).

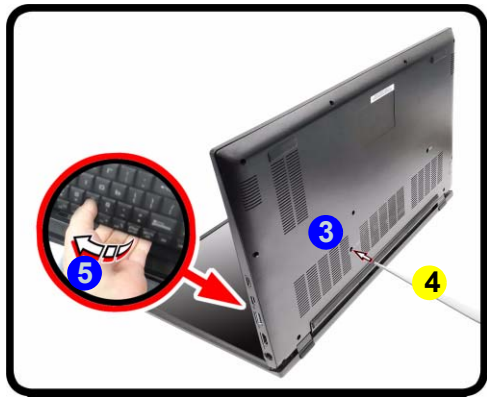
a.



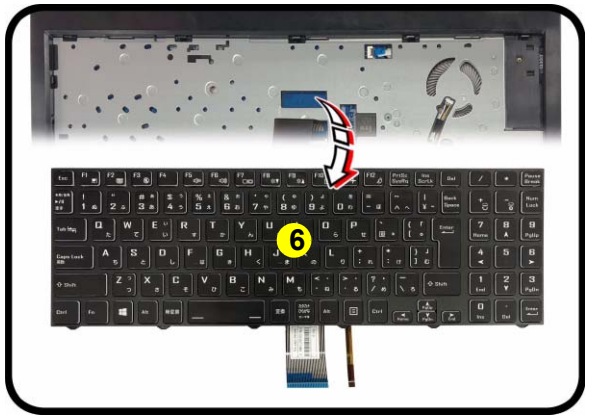
c.



b.



d.



4. Eject Stick
6. Keyboard

Removing the System Memory (RAM)

The computer has one memory sockets for 262 pin Small Outline Dual In-line Memory Modules (SO-DIMM) supporting DDR5 5600MHz. The main memory can be expanded up to 64GB. The total memory size is automatically detected by the POST routine once you turn on your computer.

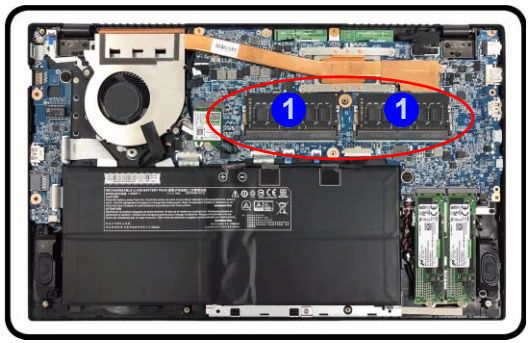
Memory Upgrade Process

1. Turn **off** the computer, turn it over to remove the battery (*page 2 - 5*).
2. The RAM modules will be visible at point 1 on the mainboard (*Figure 5b*).
3. Gently pull the two release latches (2 & 3) on the sides of the memory socket in the direction indicated by the arrows (*Figure 5b*).
4. The RAM module 4 will pop-up (*Figure 5c*), and you can then remove it.

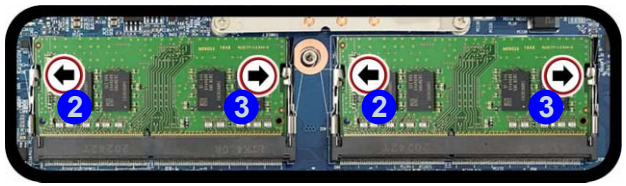
Figure 5
RAM Module Removal

a. The RAM modules will be visible at point 1 on the mainboard.
b. Pull the release latches.
c. Remove the module.

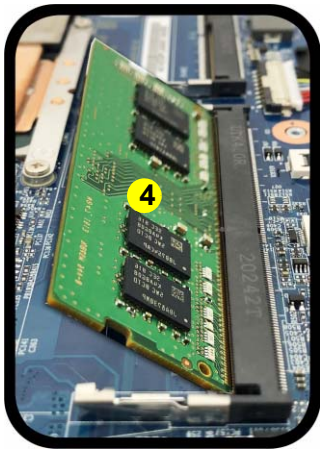
a.



b.



c.



Contact Warning

Be careful not to touch the metal pins on the module's connecting edge. Even the cleanest hands have oils which can attract particles, and degrade the module's performance.

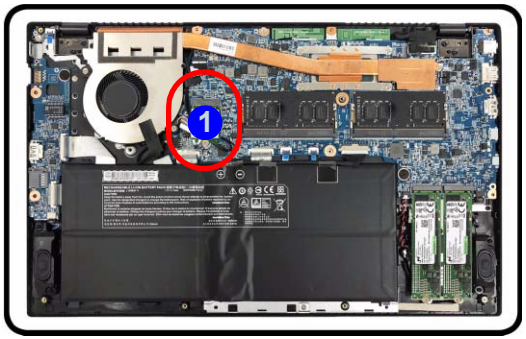
4. RAM Module

5. Pull the latches to release the second module if necessary.
6. Insert a new module holding it at about a 30° angle and fit the connectors firmly into the memory slot.
7. The module will only fit one way as defined by its pin alignment. Make sure the module is seated as far into the slot as it will go. DO NOT FORCE IT; it should fit without much pressure.
8. Press the module in and down towards the mainboard until the slot levers click into place to secure the module.
9. Replace the bottom case and the screws (see ***page 2 - 5***).
10. Restart the computer to allow the BIOS to register the new memory configuration as it starts up.

Removing the Wireless LAN Module

1. Turn **off** the computer, turn it over to remove the battery (*page 2 - 5*).
2. The Wireless LAN module will be visible at point 1 on the mainboard (*Figure 6a*).
3. Carefully disconnect the cables 2 & 3, and then remove the screw 4 (*Figure 6b*)
4. The Wireless LAN module 5 (*Figure 6c*) will pop-up, and you can remove it from the computer.
5. Reverse the process to install a new module (do not forget to replace all the screws and bottom cover).

a.



b.

c.

Figure 6
Wireless LAN Module Removal

a. Locate the WLAN.
b. Disconnect the cable and remove the screw.
c. The WLAN module will pop up and lift it out of the computer.

Note: Make sure you reconnect the antenna cable to the "1 + 2" socket (*Figure 6b*).

5.Wireless LAN Module

- 1 Screw

Wireless LAN, and Combo Module Cables

Note that the cables for connecting to the antennae on WLAN, WLAN & Bluetooth Combo, 3G and LTE modules are not labelled. The cables/covers (each cable will have either a black or transparent cable cover) are color coded for identification as outlined in the table below.

Module Type	Antenna Type	Cable Color	Cable Cover Type
WLAN/WLAN & Bluetooth Combo	WL 1	Black	Transparent
	WL 2	Black	White

Cable 1 is usually connected to antenna 1 (Main) on the module, and cable 2 to antenna 2 (Aux).

Removing the M.2 SSD Module

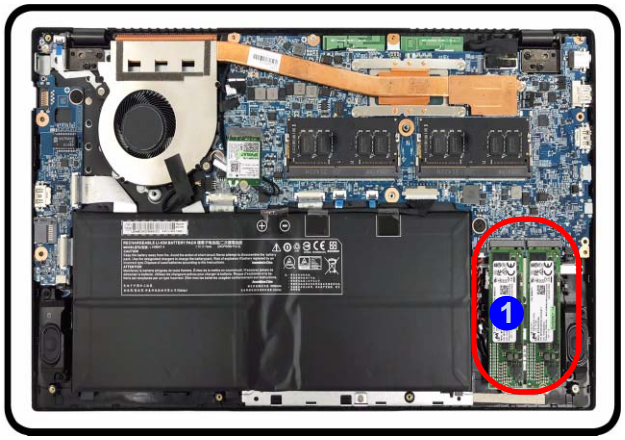
M.2 SSD-1 Removal Procedure

1. Turn **off** the computer, turn it over to remove the battery (*page 2 - 5*).
2. The M.2 SSD module will be visible at point 1 on the mainboard (*Figure 7a*).
3. Remove the screw 2 (*Figure 7b*)
4. The M.2 SSD module 3 (*Figure 7c*) will pop-up, and you can remove it from the computer.

Figure 7
M.2 SSD-1 Module Removal

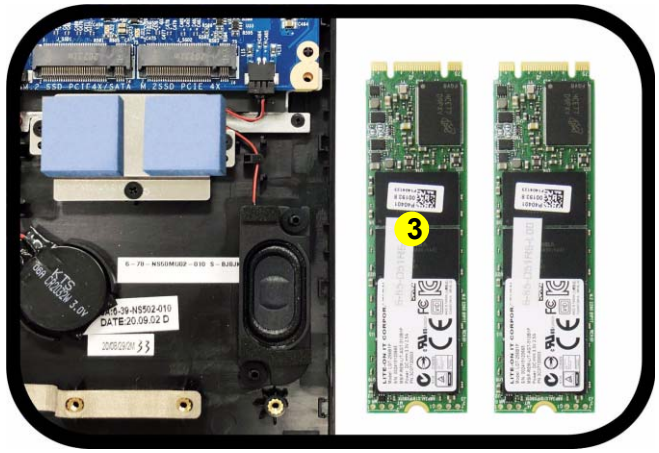
a. Locate the M.2 SSD.
b. Remove the screw.
c. The M.2 SSD module will pop up.

a.



b.

c.



Thermal Pad

Make sure to place the thermal pad's adhesive side down on the mainboard's surface as illustrated.

3.M.2 SATA/PCIE SSD Module

- 1 Screw

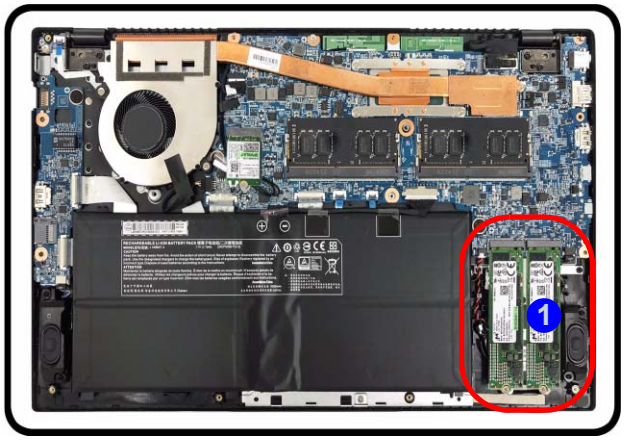
Figure 8
M.2 SSD-2 Module Removal

a. Locate the M.2 SSD.
b. Remove the screw.
c. The M.2 SSD module will pop up.

M.2 SSD-2 Removal Procedure

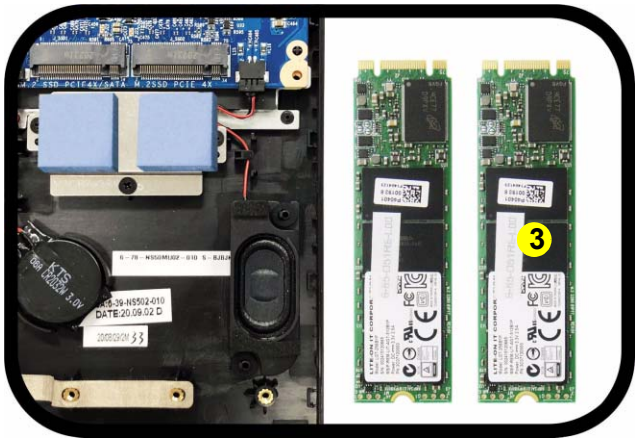
1. Turn **off** the computer, turn it over to remove the battery (***page 2 - 5***).
2. The M.2 SSD module will be visible at point 1 on the mainboard (***Figure 8a***).
3. Remove the screw 2 (***Figure 8b***)
4. The M.2 SSD module 3 (***Figure 8c***) will pop-up, and you can remove it from the computer.
5. Reverse the process to install a new module (do not forget to replace the thermal pad, screws and bottom cover).

a.



b.

c.



3.M2 PCIE SSD Module

- 1 Screw

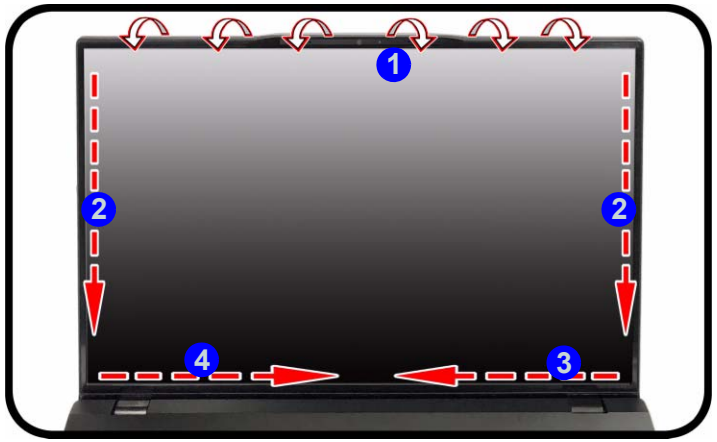
Thermal Pad

Make sure to place the thermal pad's adhesive side down on the mainboard's surface as illustrated.

Removing the CCD

1. Turn **off** the computer, turn it over to remove the battery (*page 2 - 5*).
2. Lay the computer down on a flat surface with the top case up forming a 90 degree angle.
3. Carefully run your fingers around the inner frame of the LCD panel to lift at points 1 - 4 as indicated by the arrows (*Figure 9a*).
4. Remove the LCD front cover 5 (*Figure 9b*).

a.



b.

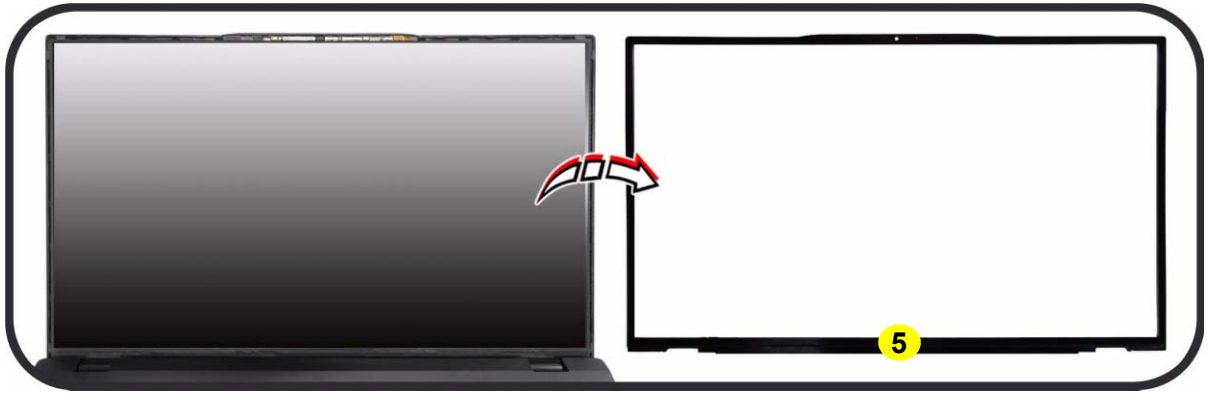


Figure 9
CCD Removal

a. Carefully release the inner frame of the LCD panel at the points indicated by the arrows.
b. Remove the LCD front cover.

5. LCD Front Cover

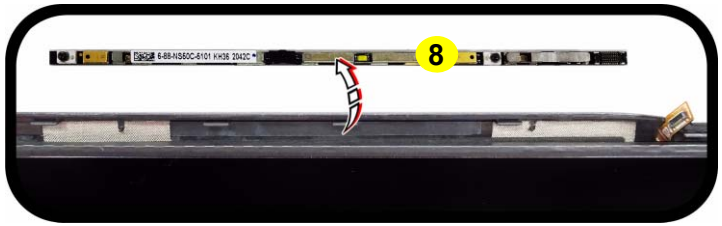
Figure 10
CCD Removal (cont'd)

c. Disconnect the cable from the locking collar socket.
d. Remove the CCD module.

5. Disconnect the cable 6 from the locking collar socket by using a flat-head screwdriver to pry the locking collar pins 7 away from the base (***Figure 10c***).
6. Remove the CCD module 8 (***Figure 10d***).
7. Reverse the process to install a new CCD module.

c.

d.



8. CCD Module

Appendix A: Part Lists

This appendix breaks down the ***NS50AU / NS51AU*** series notebook's construction into a series of illustrations. The component part numbers are indicated in the tables opposite the drawings.

Note: This section indicates the *manufacturer's* part numbers. Your organization may use a different system, so be sure to cross-check any relevant documentation.

Note: Some assemblies may have parts in common (especially screws). However, the part lists DO NOT indicate the total number of duplicated parts used.

Note: Be sure to check any update notices. The parts shown in these illustrations are appropriate for the system at the time of publication. Over the product life, some parts may be improved or re-configured, resulting in *new* part numbers.

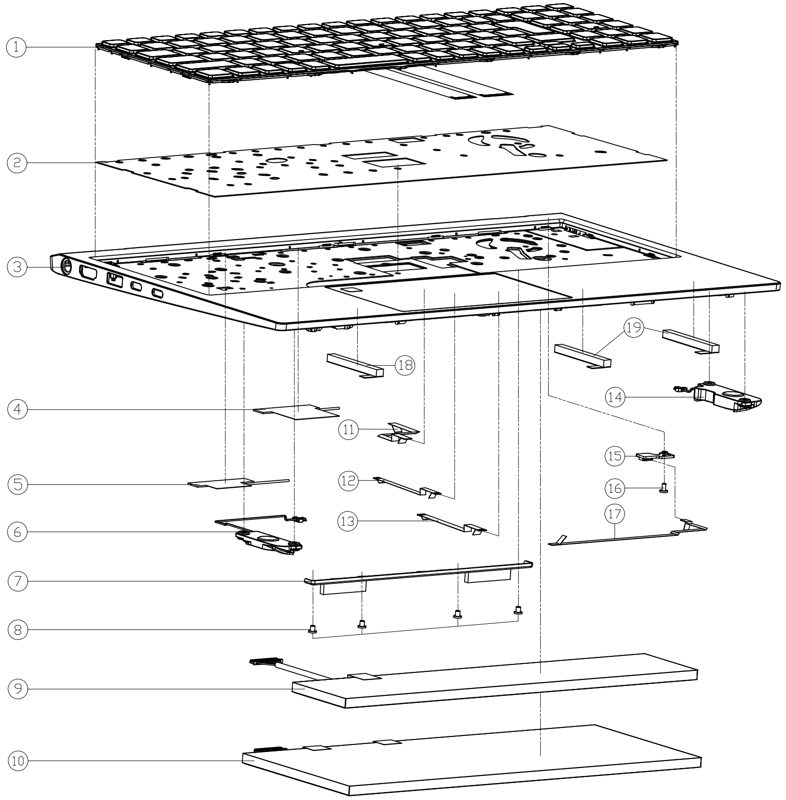
Part List Illustration Location

The following table indicates where to find the appropriate part list illustration.

Table A - 1
Part List Illustration Location

Part	
Top	*page A - 3*
Bottom	*page A - 4*
LCD	*page A - 5*
MB	*page A - 6*

Top

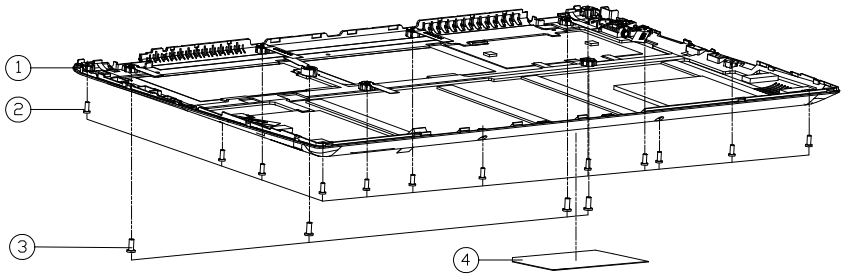


ITEM	PART NAME	PART NO	REMARK
1	KB FOR NON BL KB US SERIES NS50AU	6-NS50AU-KB-NBL-US	
1	KB FOR WHITE BL KB US SERIES NS50AU	6-NS50AU-KB-WBL-US	
1	BL KB JAPANESE WIN11 KEY CVM19H10J0-4304 N151ZU BLACK WHITE SILVER LINING PRINTING ISOLATION (332.95MM) FOR MCJ	6-80-N1510-21A-1M	
1	KB JAPANESE WIN11 KEY CVM19G90J0-4303 N151ZU BLACK ISOLATION (332.95MM) FOR MCJ	6-80-N1510-210-1M	
2	W/O BL KB MYLAR NS50NU	6-40-NS502-041	FOR NON BL KB
3	(PRE-PROCESS) TOP CASE (W/O FP) MODULE NS50PU	6-78-NS50PU02-010	
3	(PRE-PROCESS) TOP CASE (W/FP) MODULE NS50PU	6-78-NS50PU02-020	
3	(PRE-PROCESS) TOP CASE (W/FP) MODULE NS50MU	6-78-NS50MU02-021	
3	(PRE-PROCESS) TOP CASE (W/O FP) MODULE NS51PU	6-78-NS51PU02-010	
3	(PRE-PROCESS) TOP CASE (W/FP) MODULE NS51MU	6-78-NS51MU02-021	
3	(PRE-PROCESS) TOP CASE (W/FP) MODULE NS51PU	6-78-NS51PU02-020	
4	ANTENNA IPEX4 WLAN WGT WL1 PCB OL 30X7.5MM 2.4G/5G/6GHZ WL1=200MM NS50PU	6-23-7NS5P-010	
5	ANTENNA IPEX4 WLAN WGT WL2 PCB OL 40X9MM 2.4G/5G/6GHZ WL2=250MM NS50MU	6-23-7NS50-020	
6	SPK+CABLE L 42.45*15.85 45MM 2W 4? SPONGE NS50PU (B1425-004-013H-L4)	6-23-5NS5P-0L0	
7	TOP SUPPORT BKT SECC NS50MU	6-33-NS502-041	FOR BAT 36WH
8	.SCREW M2*3L KI NI ICT NY (DD=Ø4.0,DT=0.8)	6-35-B1120-3RD	FOR BAT 36WH to TOP SUPPORT BKT
9	BAT.P S LI 7.7V/4.8AH/36WH PSE 2S1P GETAC/VEKEN (POLYMER) 541390620001 (4675MAH) LABEL CHANGE FOR TAPE LOCATION	6-87-L140S-32B02	FOR BAT 36WH
9	BAT.P S LI 7.7V/4.8AH/36WH 2S1P ATC VEKEN (5 41390620001) (4675MAH) PSE 2S1P GETAC/VEKEN (POLYMER) 541390620001 (4675MAH) LABEL CHANGE ADD UKCA MARK	6-87-L140S-32B03	FOR BAT 36WH
10	BAT.P S LI 7.7V/9.6AH/73WH PSE 2S2P GETAC/VEKEN (POLYMER) 541390650001 (9350MAH) LABEL CHANGE	6-87-L140S-72B01	FOR BAT 73WH
10	BAT.P S LI 7.7V/9.6AH/73WH 2S2P ATC VEKEN (541390650 00) (9350MAH) PSE 2S2P GETAC/VEKEN (POLYMER) 541390650001 (9350MAH) LABEL CHANGE ADD UKCA MARK	6-87-L140S-72B02	FOR BAT 73WH
11	FFC CABLE W/O FP CLICK TO MB L=101MM 3V 8PIN (QX) NS50MU	6-43-NS500-010	FOR W/O FIP
12	FFC CABLE W/FP TO MB L=86MM 5V 6PIN (QX) NS50MU	6-43-NS500-060	FOR W/ FIP
13	FFC CABLE W/FP CLICK TO MB L=85MM 3V 8PIN (QX) NS50MU	6-43-NS500-020	FOR W/ FIP
14	SPK+CABLE R 53.5*16.9 15.5MM 2W 4? SPONGE NS50PU (B1425-004-013H-L3)	6-23-5NS5P-0R0	
15	HALL SENSOR BOARD V1.0 NS50AU	6-77-NS5A1-D01	
16	SCREW M2*4L KI NI ICT NY (DD=Ø4.5,DT=0.8)	6-35-B1120-4RC	
17	FFC CABLE LID TO MB L=140MM 3V 6PIN (QX) NS50MU	6-43-NS500-031	
18	BAT LALA TAPE CR4382+TMQB200(46*5*4.3T) NS50MU	6-47-NS502-022	
19	BAT LALA TAPE CR4382+TMQB200 (57*8*4.3T) NS50MU	6-47-NS502-032	

Figure A - 1
Top

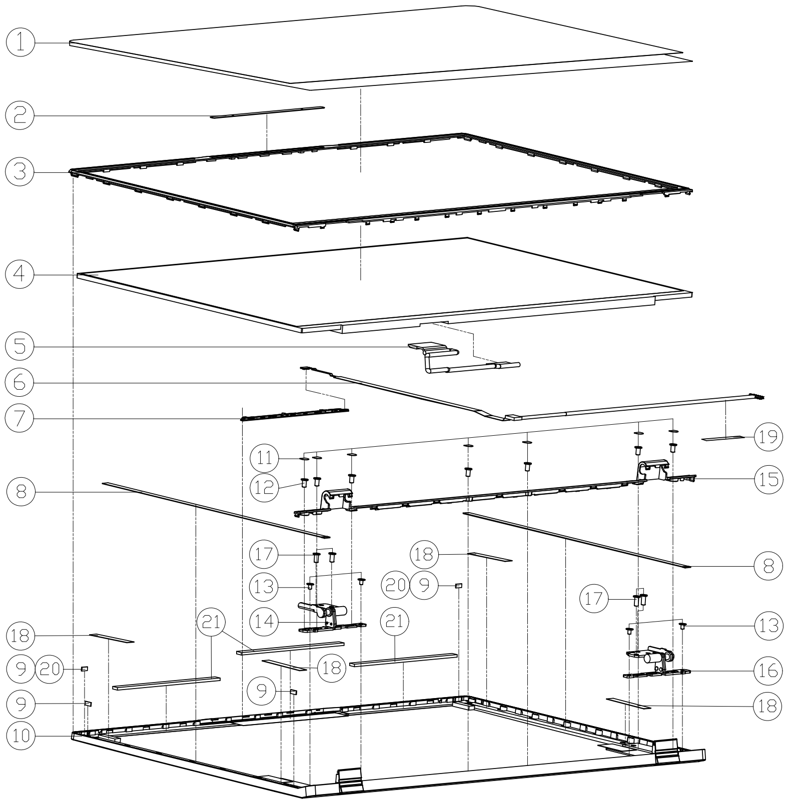
Bottom

Figure A - 2
Bottom



ITEM	PART NAME	PART NO	REMARK
1	BOTTOM CASE MODULE NS50MU	6-39-NS503-014	
2	SCREW M2*5L KICT=0.8 D=4.0) BK/Z ICT NY	6-35-B6120-5R0	
3	SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
4	PRODUCT LABEL FOR NS50MU	6-45-NS50MU03-010	
4	PRODUCT LABEL FOR NS51MU	6-45-NS51MU03-010	
4	PRODUCT LABEL FOR NS50PU	6-45-NS50PU03-010	
4	PRODUCT LABEL FOR NS51PU	6-45-NS51PU03-010	
4	PRODUCT LABELGHAIER(MC-15*) FOR NS50PU	6-45-NS50PU03-6T0	
4	PRODUCT LABEL FOR NS50AU	6-45-NS50AU03-010	
4	PRODUCT LABEL FOR NS51AU	6-45-NS51AU03-010	

LCD

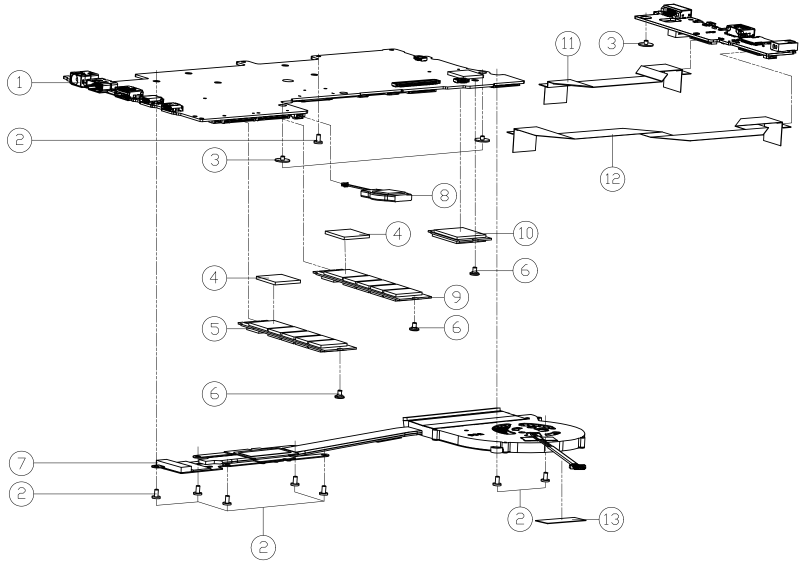


ITEM	PART NAME	PART NO	REMARK
1	LCD PROTECT MYLAR BOPP NS50MU	6-40-NS501-070	
2	CCD LENS W/ IR NS50MU	6-42-NS501-050	
2	CCD LENS W/O IR NS50MU	6-42-NS501-060	
3	FRONT COVER MODULE NS50MU	6-39-NS501-012	
4	LCD B15.6" FHD/WVA/N4/NON GT/EDP INNOLUX N156HCA-E5B 5.4MM	6-50-LBB54-V011	
4	LCD B15.6" FHD/WVA/N4/NON GT/EDP BOE NV156FHM-N4V 5.4MM	6-50-LBB54-Z011	
4	LCD B15.6" FHD/WVA/N7/NON GT/EDP BOE NV156FHM-N4M 5.4MM	6-50-LBB54-Z020	
4	LCD B15.6" FHD/WVA/N7/NON GT/EDP BOE NV156FHM-N63 4.6MM	6-50-LBB46-Z020	
5	WIRE CABLE FOR EDP 150MM (I) 30V 30P TO 30P (CMI/HLS CON:HLX09008) NS50MU	6-43-NS501-011-S	
6	WIRE+FPC CABLE FOR CCD 450MM 3.3V 12P TO 16P CMI (KB-R0368) NS50PU	6-43-NS5PT-010	
6	WIRE+FPC CABLE FOR CCD 450MM 12P TO 16P 3.3V (L) (CMI CON:ACES 50410-01211-001) KB-R0335B NS50MU	6-43-NS50T-011	
7	UVC CAMERA CHICONY FIX(RGB) CKFKH2621003920LH 1M HD W/2D-MIC 2.2*86.65 DV01A10 NS50MU FWXXXX W/WHITE-LED	6-88-NS50C-5110	OPTION
7	UVC CAMERA CHICONY FIX(RGBIR4.1) SECUREBIO CKFKH3621003922LH 1M HD W/2D-MIC 2.2*95 DV01A1S NS50MU FW0011 W/WHITE-LED	6-88-NS50C-5102	OPTION
8	LALATAPE+MYLAR (195*5*1.0T)	6-47-0019L-005	FOR 6-50-LBB46-Z020
9	RUBBER (5*2.4*0.5T) GRAY NS50MU	6-47-NS501-031	
10	BACK COVER MODULE NS50MU	6-39-NS501-022	
10	BACK COVER MODULE NS51MU	6-39-NS511-020	
11	MYLAR SCREW COVER FOR NS50MU	6-40-NS501-051	
12	SCREW M2.5*4.5L OD4.5 T0.5 K BZ ICT NY BROWN	6-35-82125-4R5	
13	SCREW M2*3L KI BZ ICT NY (DD=Ø4.5,DT=0.4)	6-35-B6120-3RD	
14	HINGE L NS50MU	6-33-NS501-0L1	
15	HINGE CAP MODULE NS50MU	6-42-NS501-102	
16	HINGE R NS50MU	6-33-NS501-0R1	
17	.SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
18	TOP BAT LALATAPE REWORK ((50+5)*10*0.3T) L140CU	6-47-L1402-050	FOR 6-50-LBB54-V011 6-50-LBB54-Z011 6-50-LBB54-Z020
19	TAPE MYLAR TRANSPARENT (30*5*0.05) W251HPQ	6-40-W25P3-010	
20	RUBBER (5*2.4*1.2T) WHITE NS50MU	6-47-NS501-040	FOR 6-50-LBB46-Z020
21	PORON SR-S32P (92*5*0.5T)MM NS51PU-HM	6-47-NS5P1-010-HM	FOR 6-50-LBB46-Z020

Figure A - 3
LCD

MB

Figure A - 4
MB



ITEM	PART NAME	PART NO	REMARK
1	MAIN BOARD(CPU/I7-1355U/1.7G) V2.0 (EDP)(W/TPM,USB CHARGER) +MULTI BOARD V1.0 NS50AU	6-77-NS50AU0A-N02-D	
2	SCREW M2*4L KI NI ICT NY (DD=Ø4.5,DT=0.8)	6-35-B1120-4RC	
3	SCREW M2*2L KI BK/Z ICT NY(Ø8,T=0.6)	6-35-B6120-2RE	
4	THERMAL PAD MA500 17.3*17.3*1.5MM L140CU	6-48-L1402-010	
5	SSD PCIE G4*4 M.2 2280 2TB WD SDCPNRZ-2T00 (SN810) 3D TLC 96 LAYERS	6-85-D512T-W00	OPTION
6	SCREW M2*3.2L BNI ICT NY FOR M2	6-35-Z9120-3R2	
7	CPU HEATSINK MODULE (HEATSINK + FAN PWM) NS50PU	6-31-NS5PN-101	
8	BAT. 20MM 3V 220MAH W/CABLE 55MM BCR2032H5.5VM1UB (SHIHNO)	6-23-22015-TE0	
9	SSD M.2 2280 1TB SAMSUNG MZVLB1T0HBLR-XXXXX (PM981A) PCIE G3*4 3D TLC 96 LAYERS	6-85-D511T-S04	OPTION
10	WLAN+BT COMBO DUAL BAND INTEL WIFI 6E GARFIELD PEAK 2 AX211.NGWG.NV (MM#999M5J) NO-VPRO 2X2 AX+BT BT5.2 M.2 2230 X270PTA	6-88-X270F-4210	OPTION
10	WLAN+BT COMBO DUAL BAND INTEL WIFI 6E TYPHOON PEAK 2 AX210.NGWG.NV (MM#999M85) NON-VPRO 2X2 AX+BT BT5.2 M.2 2230	6-88-X17KF-4210	OPTION
10	WLAN+BT COMBO DUAL BAND INTEL HARRISON PEAK 2 NEW OTP AX201.NGWG.NVW (MM#999TD0) NON-VPRO 2X2 AX+BT BT5.0 CNVI M.2 2230	6-88-NV40F-4210	OPTION
10	WLAN+BT COMBO DUAL BAND INTEL JEFFERSON PEAK 1 9462.NGWG.NV(MM#958856) NON-VPRO 1X1 DIVERSITY ANTENNA AC+BT BT5.0 CNVI M.2 2230	6-88-N24GF-4200	OPTION
11	FFC CABLE USB1 TO MB L=132MM 5V 30PIN (QX) NS50MU	6-43-NS500-041	
12	FFC CABLE USB2 TO MB L=196MM 5V 30PIN (QX) NS50MU	6-43-NS500-051	
13	TAPE MYLAR (C),MYLAR M550J	6-40-M55J2-030	

A.Part Lists

Appendix B: Schematic Diagrams

This appendix has circuit diagrams of the ***NS50AU / NS51AU*** notebook's PCB's. The following table indicates where to find the appropriate schematic diagram.

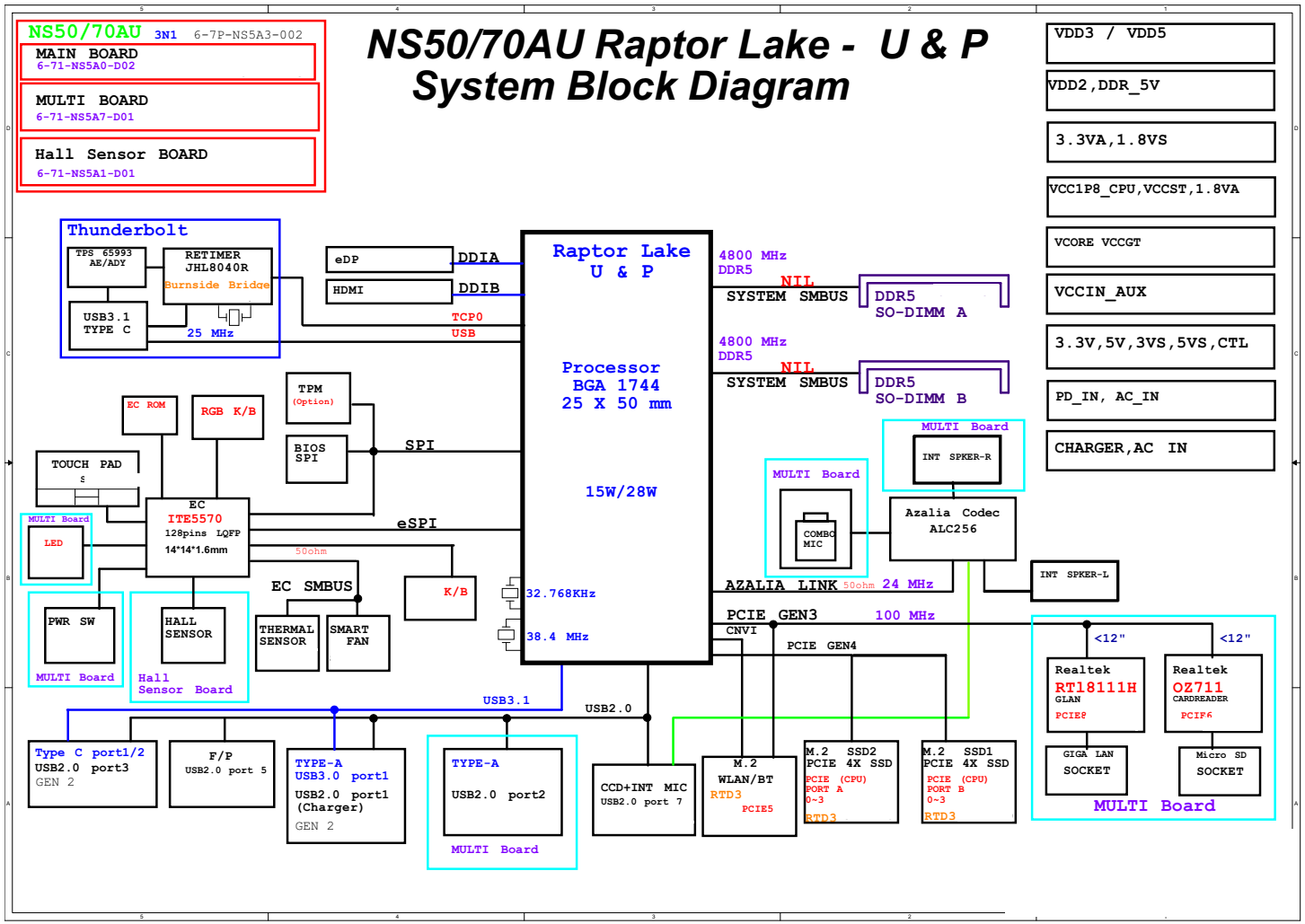
Table B - 1
SCHEMATIC DIAGRAMS

Version Note

The schematic diagrams in this chapter are based upon version 6-7P-NS5A3-002. If your mainboard (or other boards) are a later version, please check with the Service Center for updated diagrams (if required).

System Block Diagram

Sheet 1 of 47
System Block Diagram



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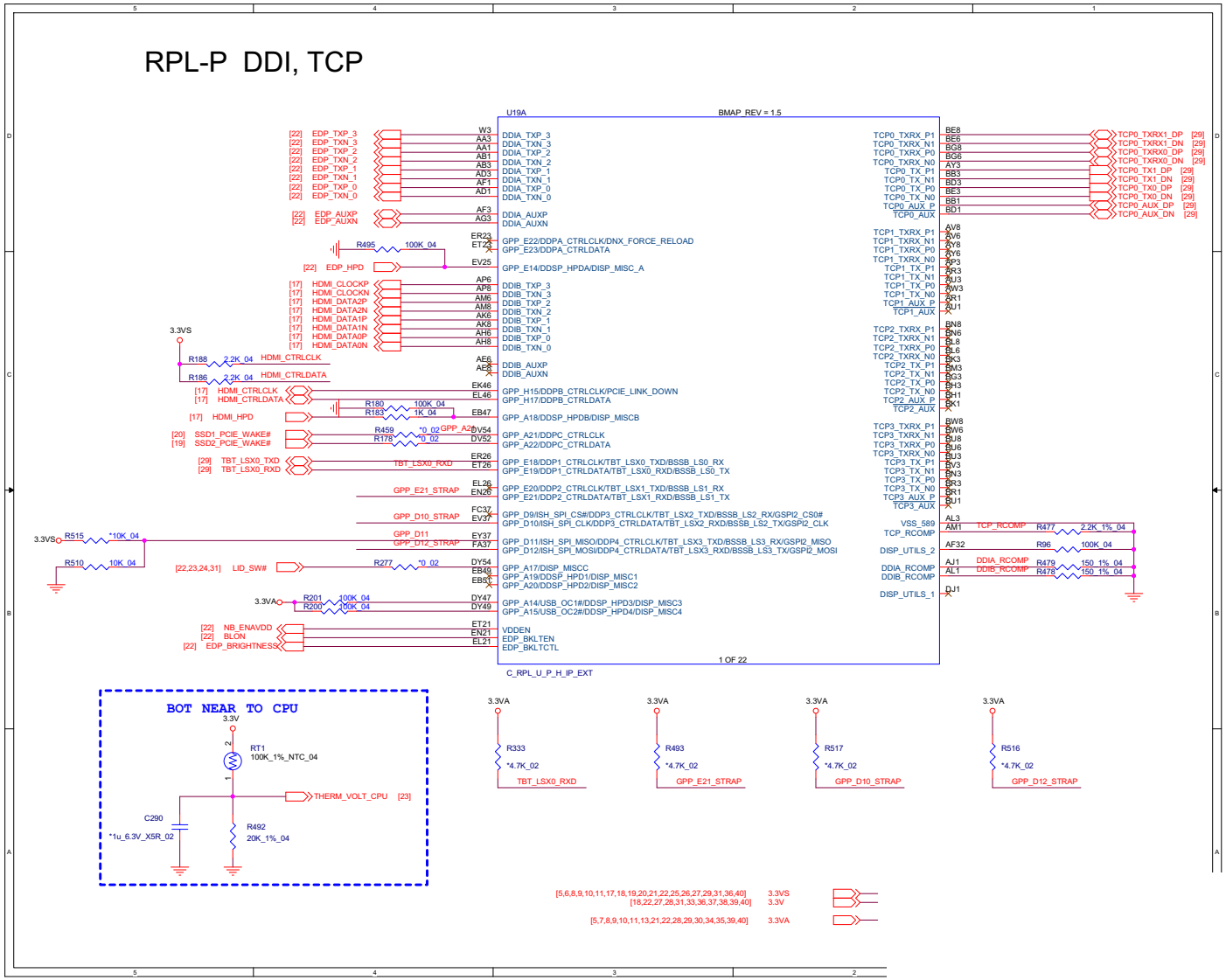
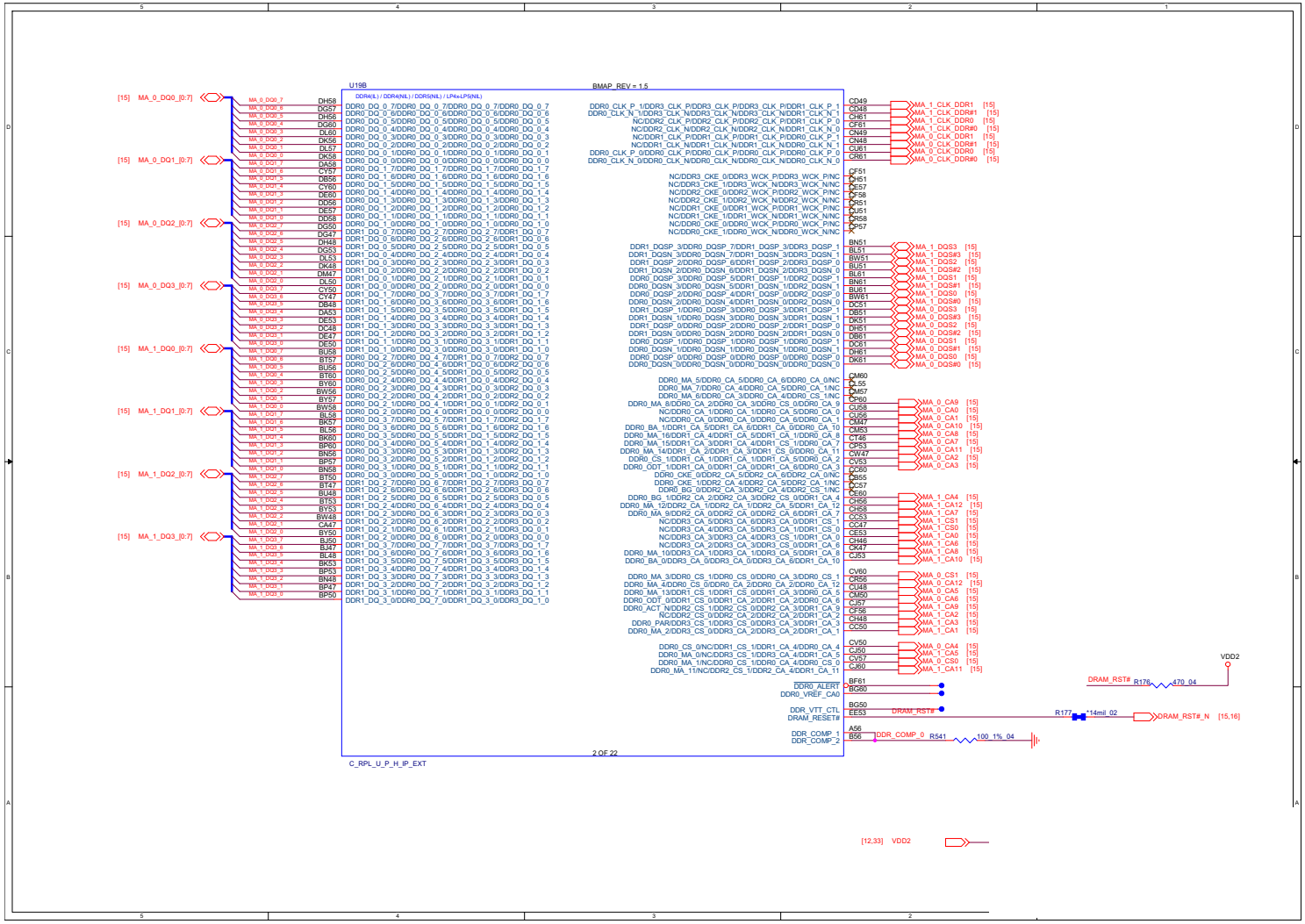


Sheet 2 of 47
Processor 1/13

Processor 2/13

Sheet 3 of 47
Processor 2/13



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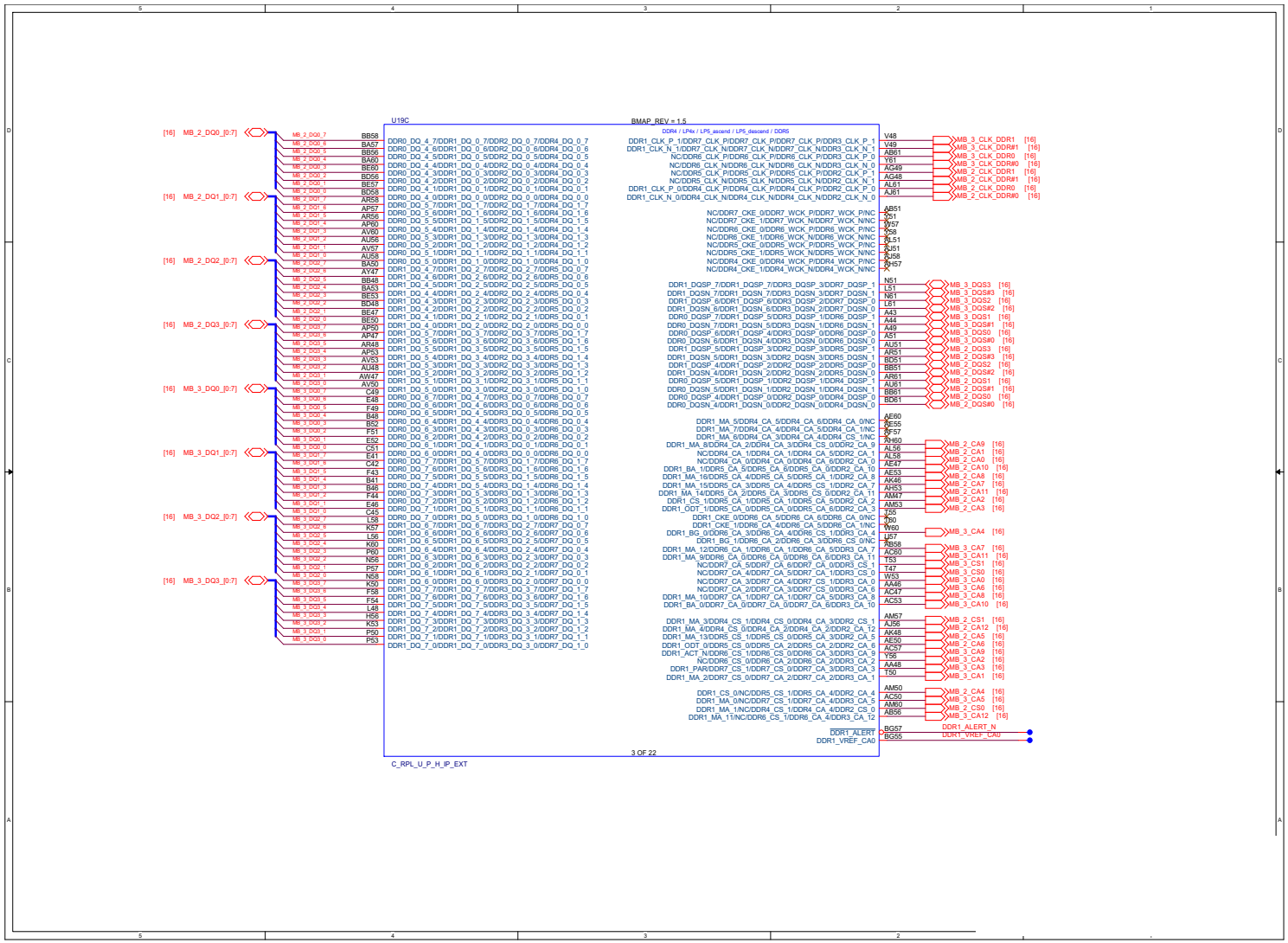
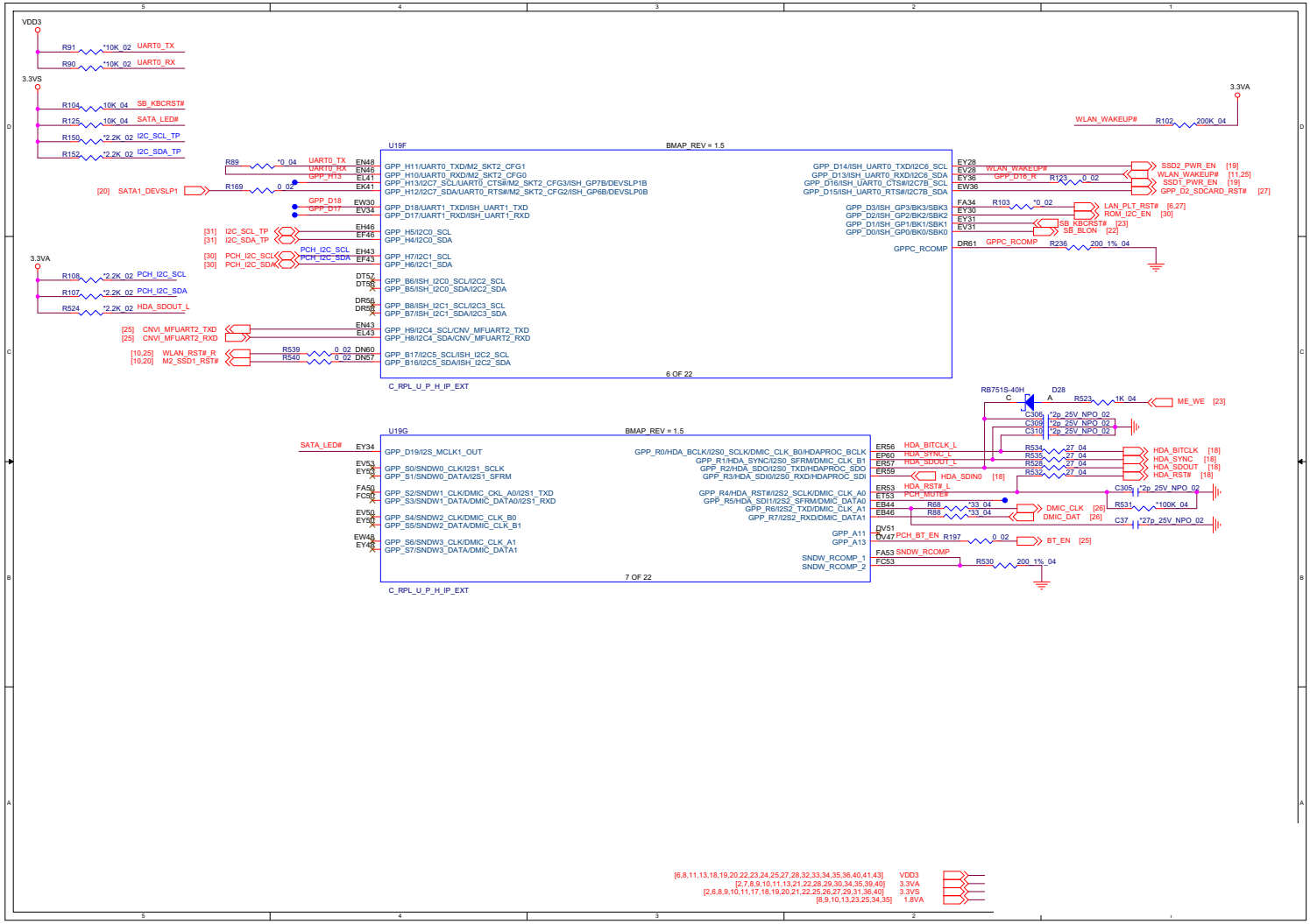


Sheet 4 of 47
Processor 3/13

Processor 4/13

Sheet 5 of 47
Processor 4/13



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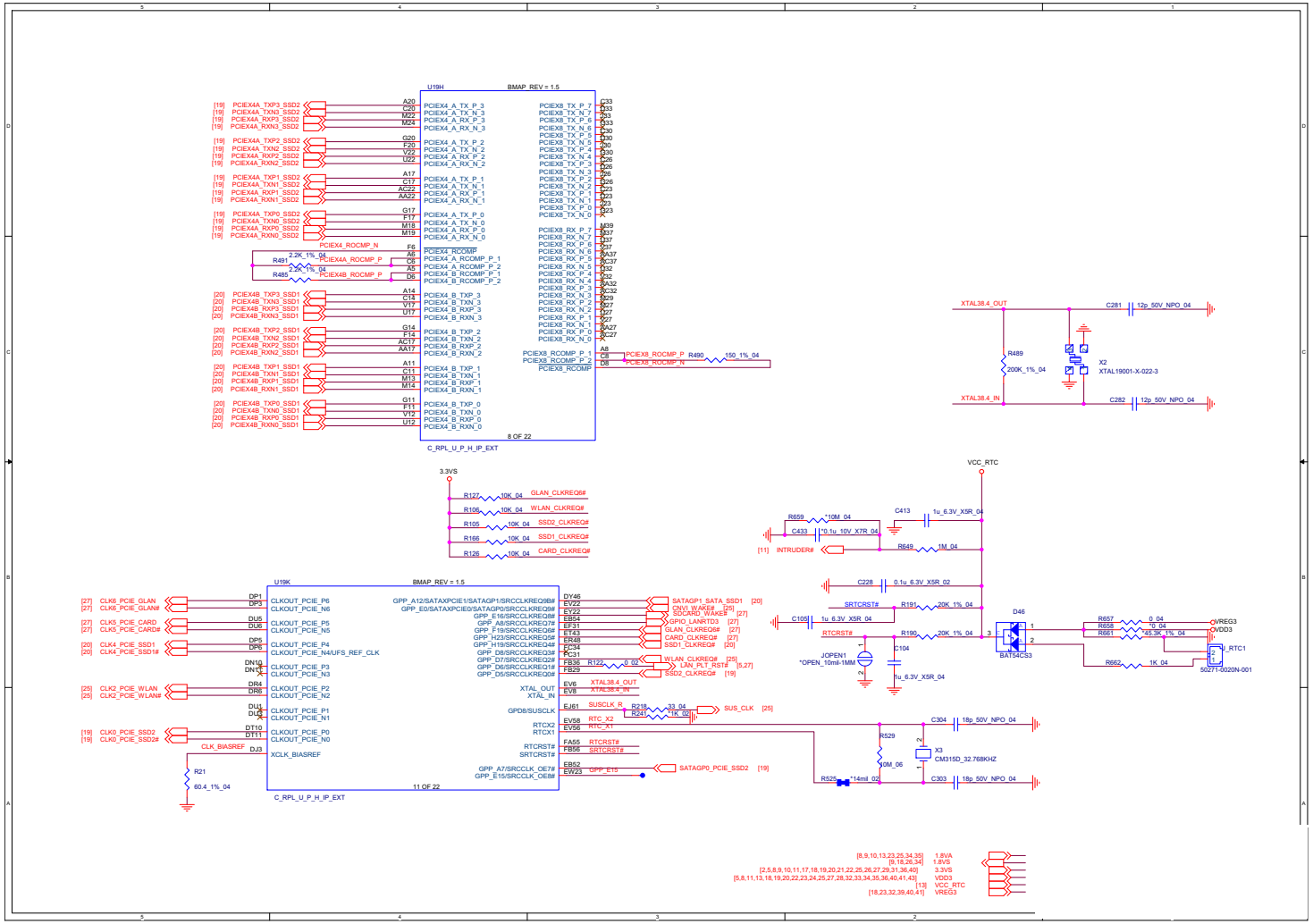
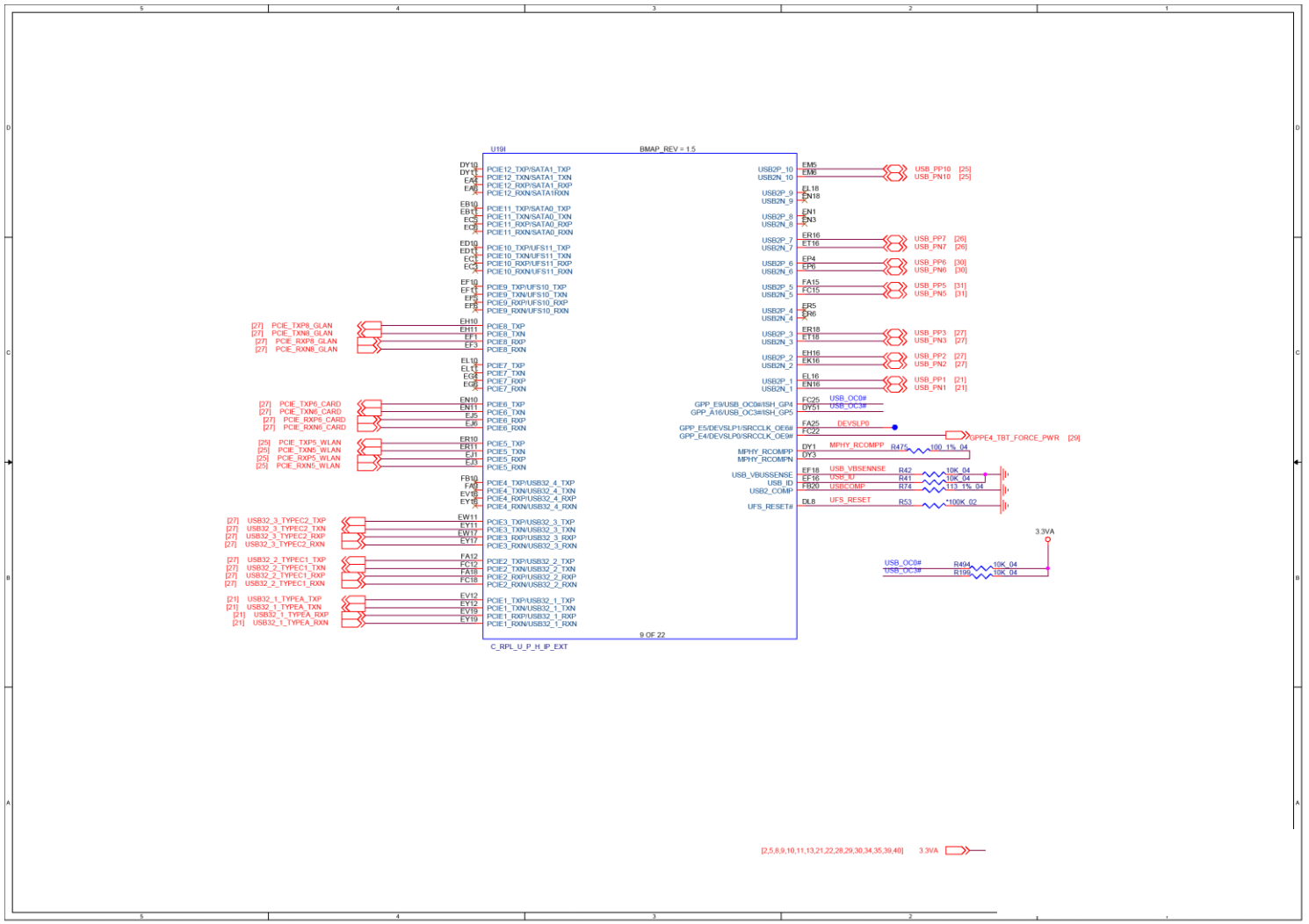


Sheet 6 of 47
Processor 5/13

Processor 6/13

Sheet 7 of 47
Processor 6/13



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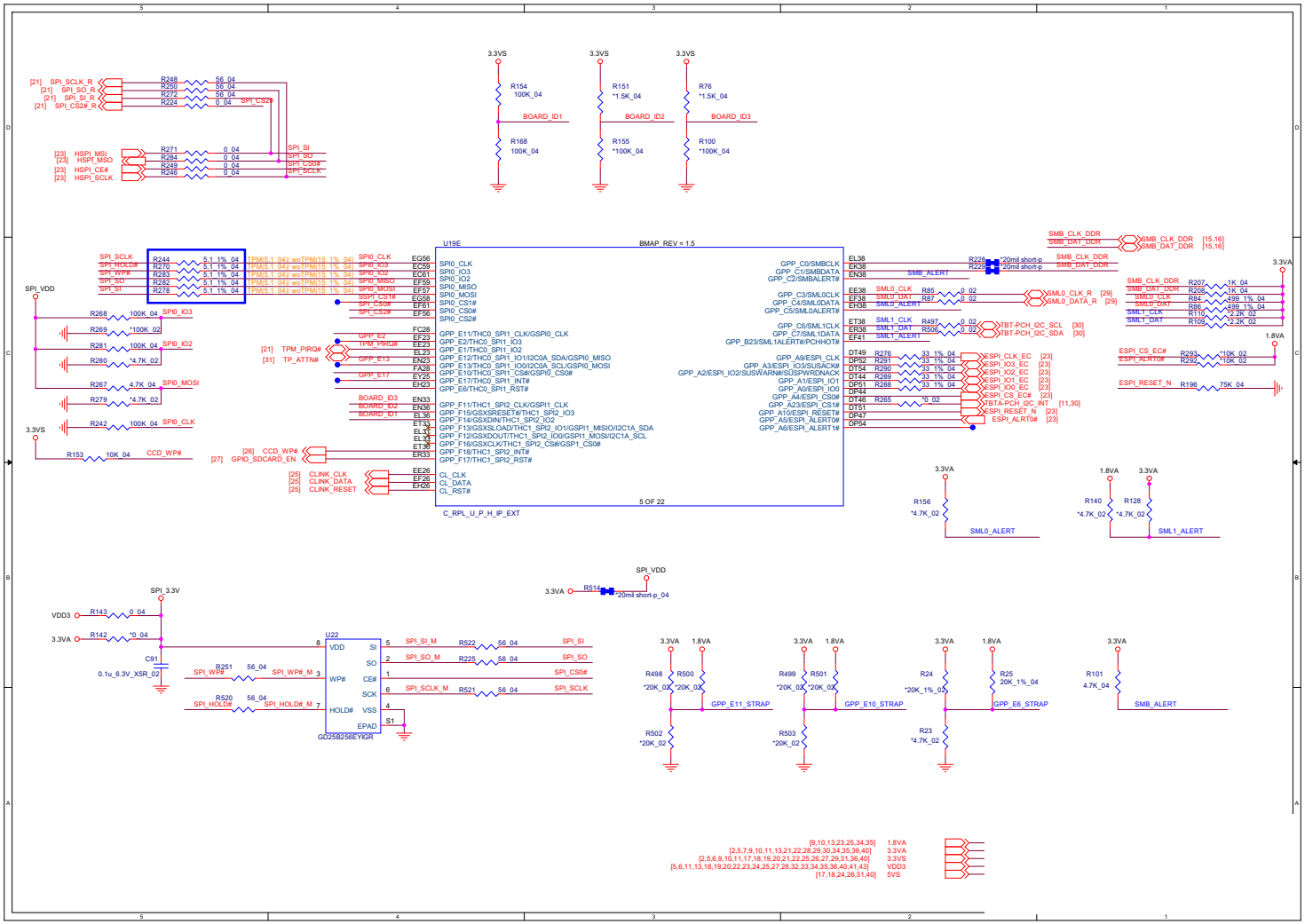
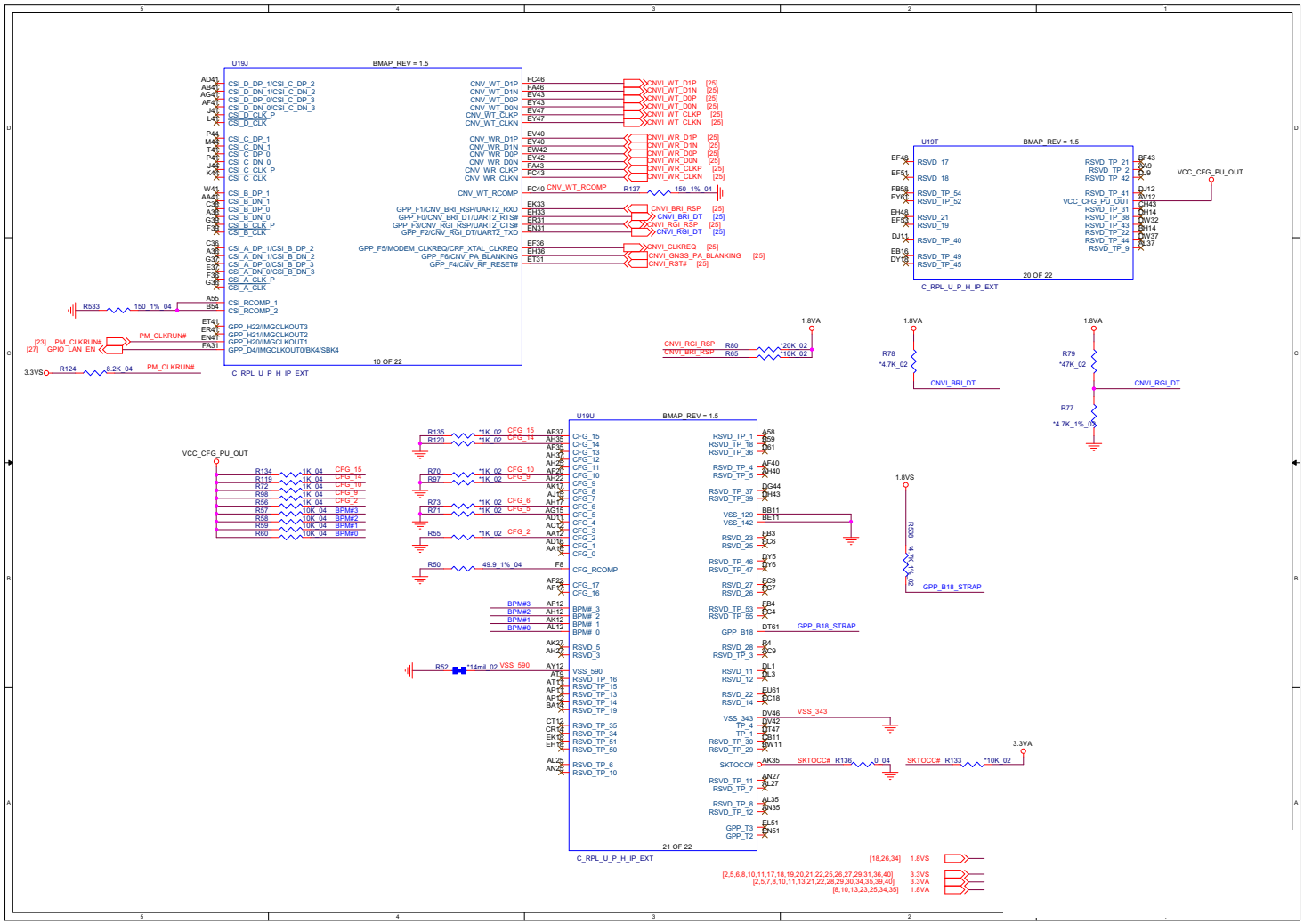


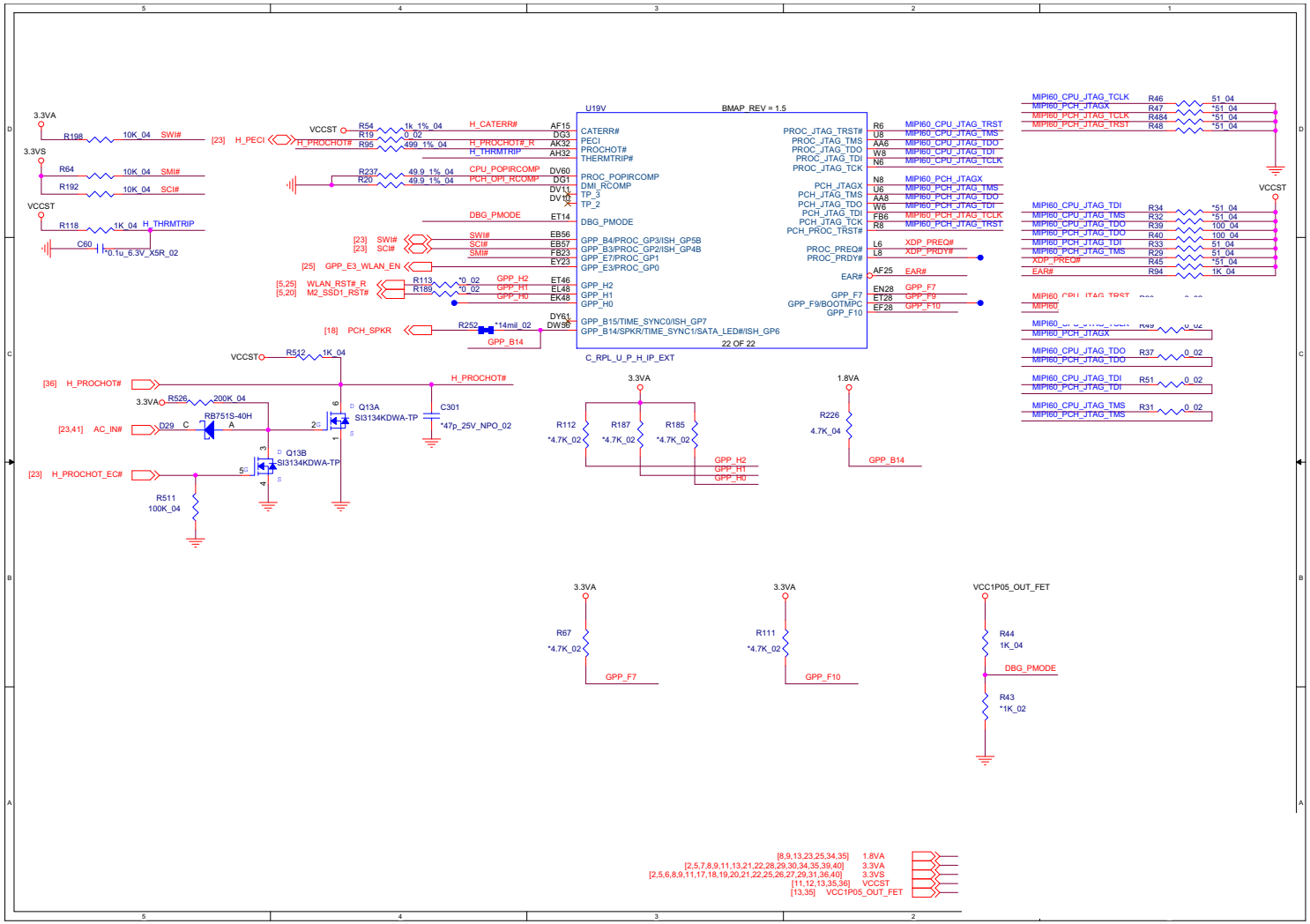
Sheet 8 of 47
Processor 7/13

Processor 8/13

Sheet 9 of 47
Processor 8/13



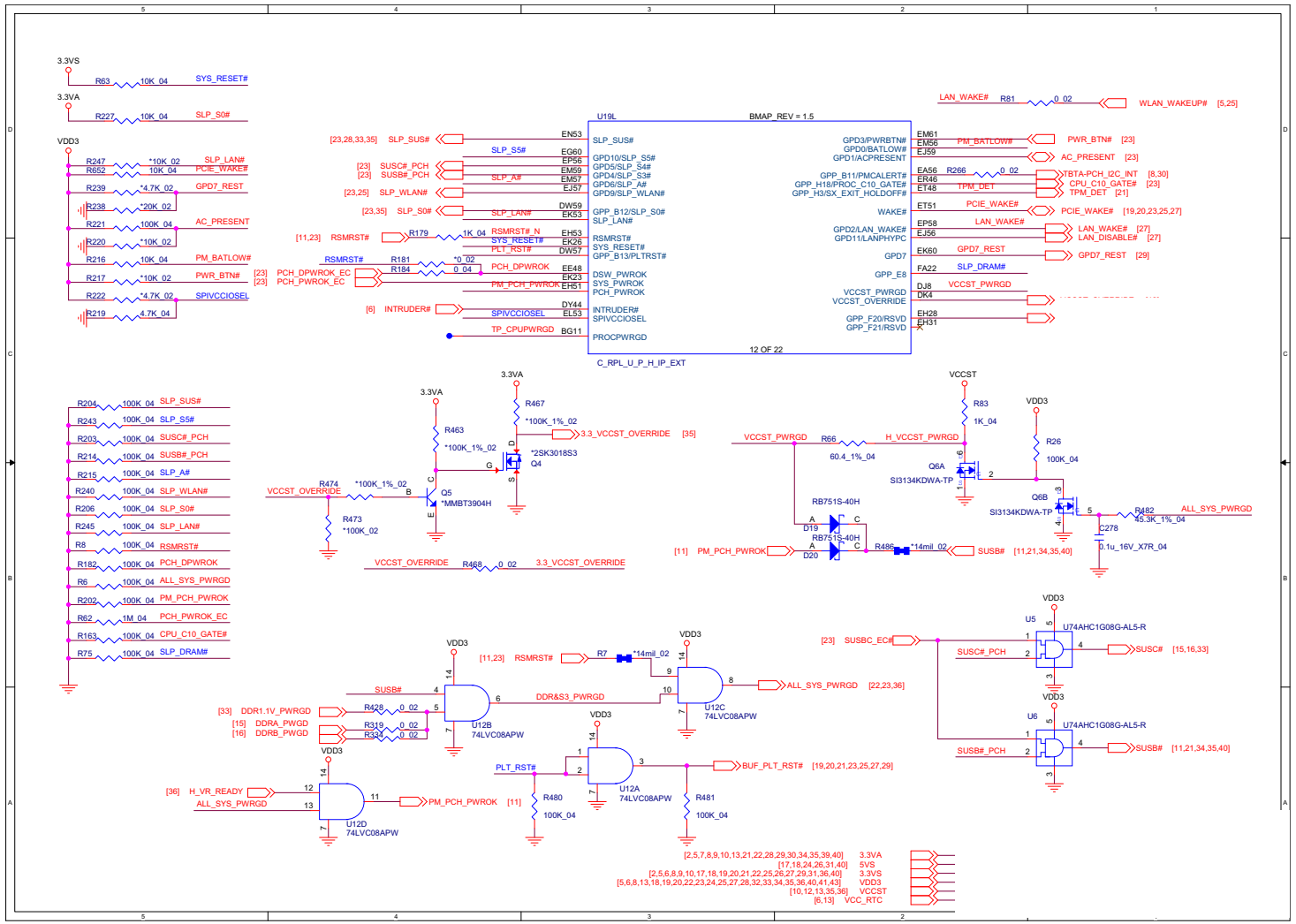
Processor 9/13



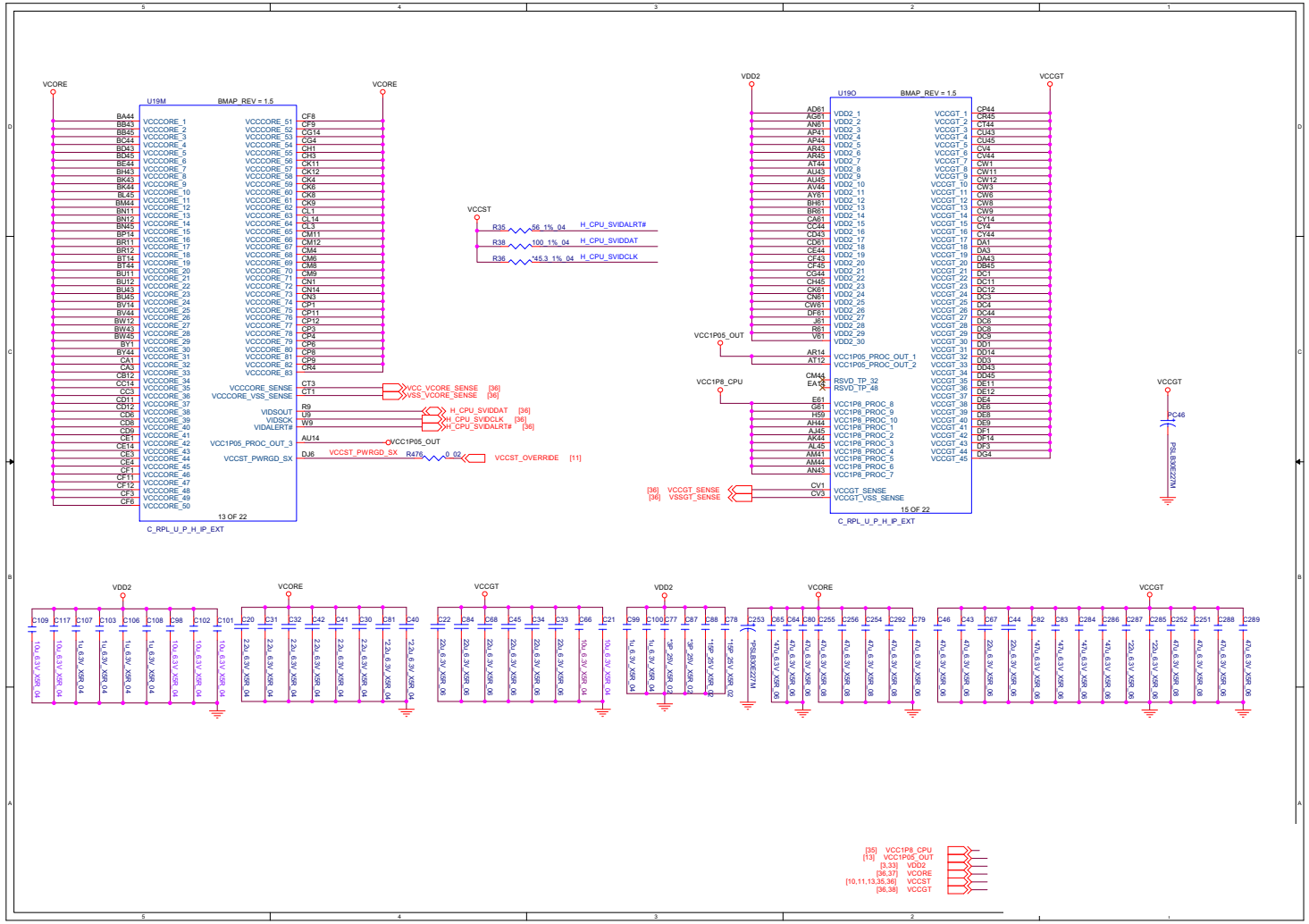
Sheet 10 of 47
Processor 9/13

Processor 10/13

Sheet 11 of 47
Processor 10/13



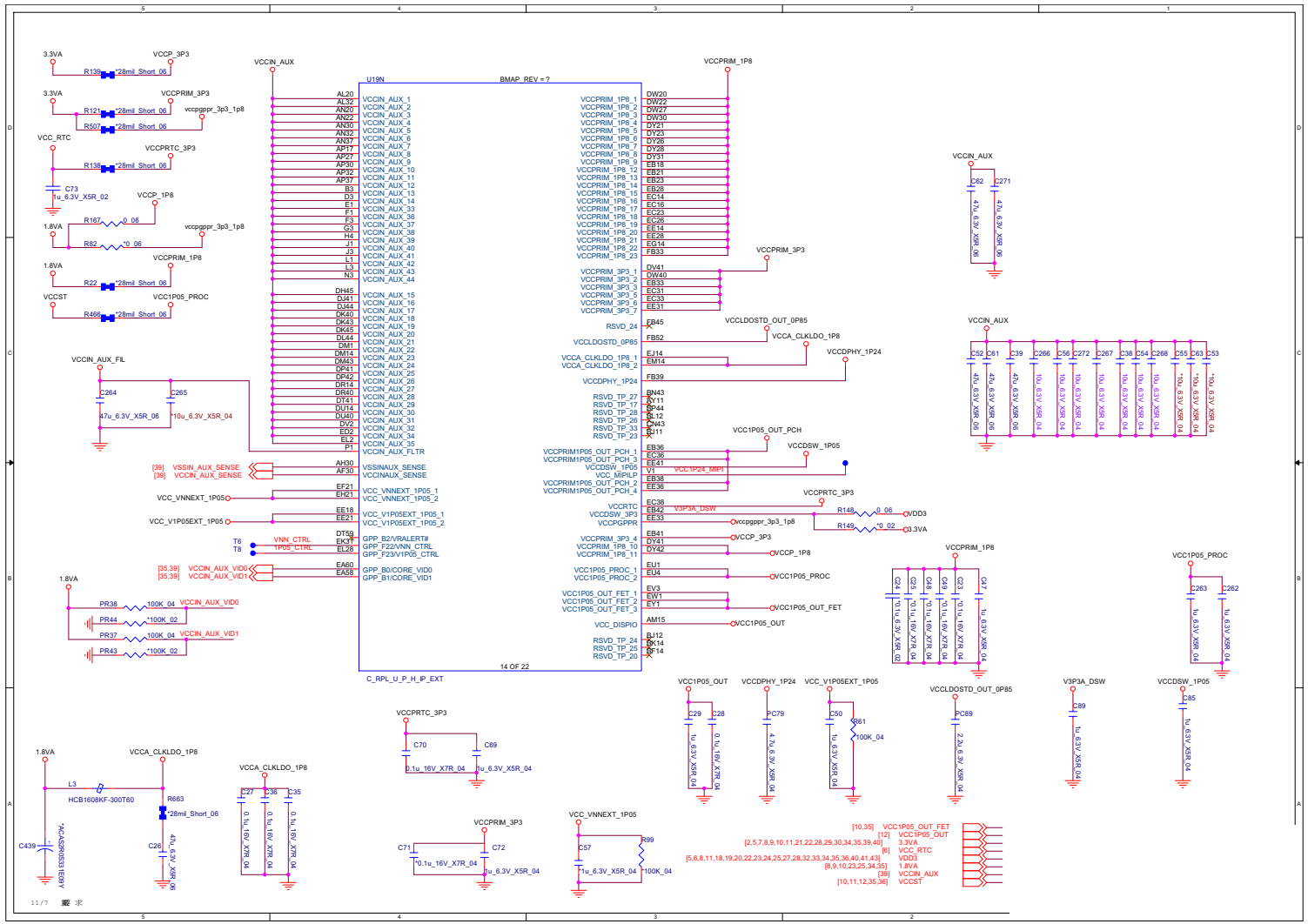
Processor 11/13



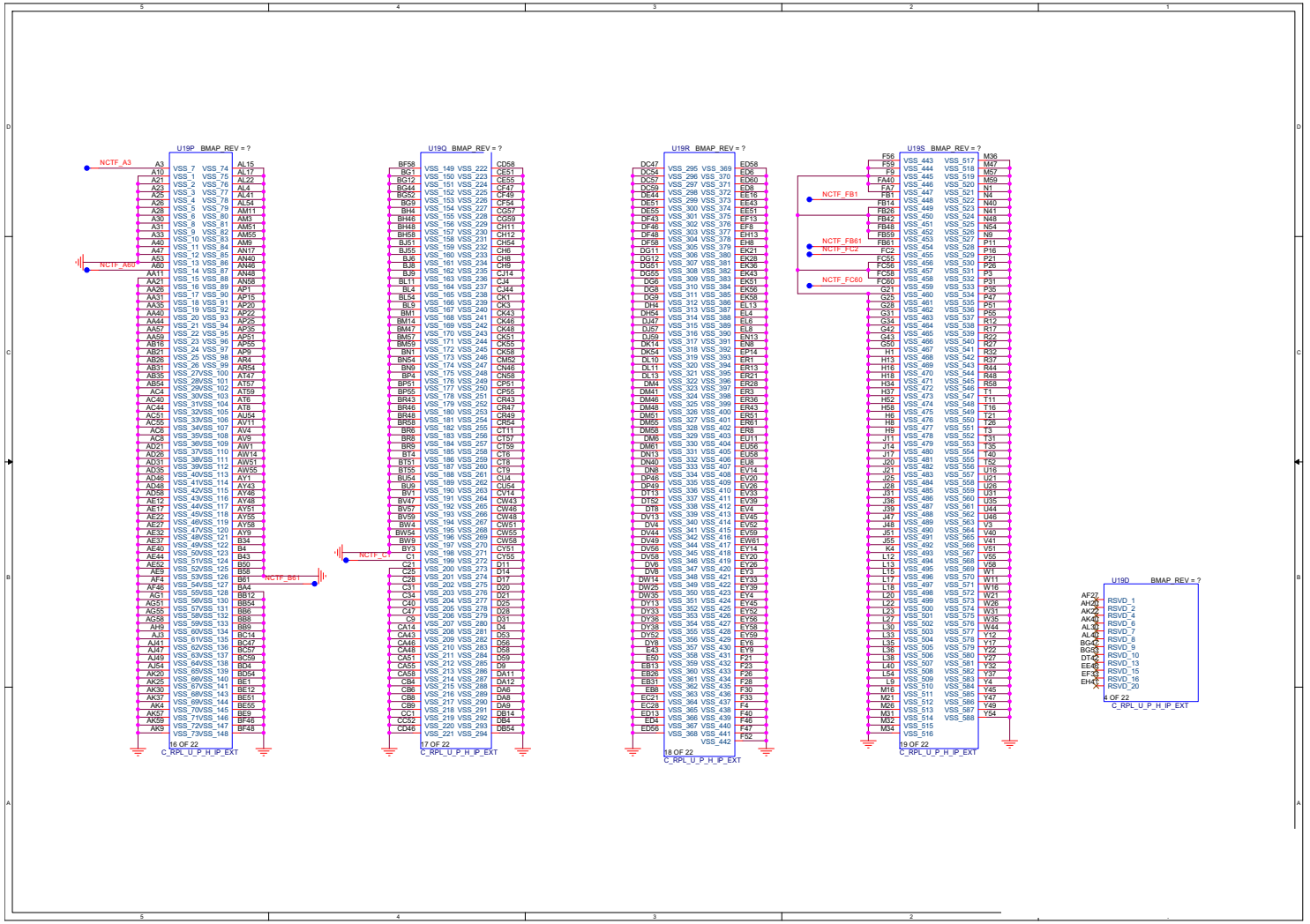
Sheet 12 of 47
Processor 11/13

Processor 12/13

Sheet 13 of 47
Processor 12/13



Processor 13/13



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Processor 13/13

DDR5 SO-DIMM A

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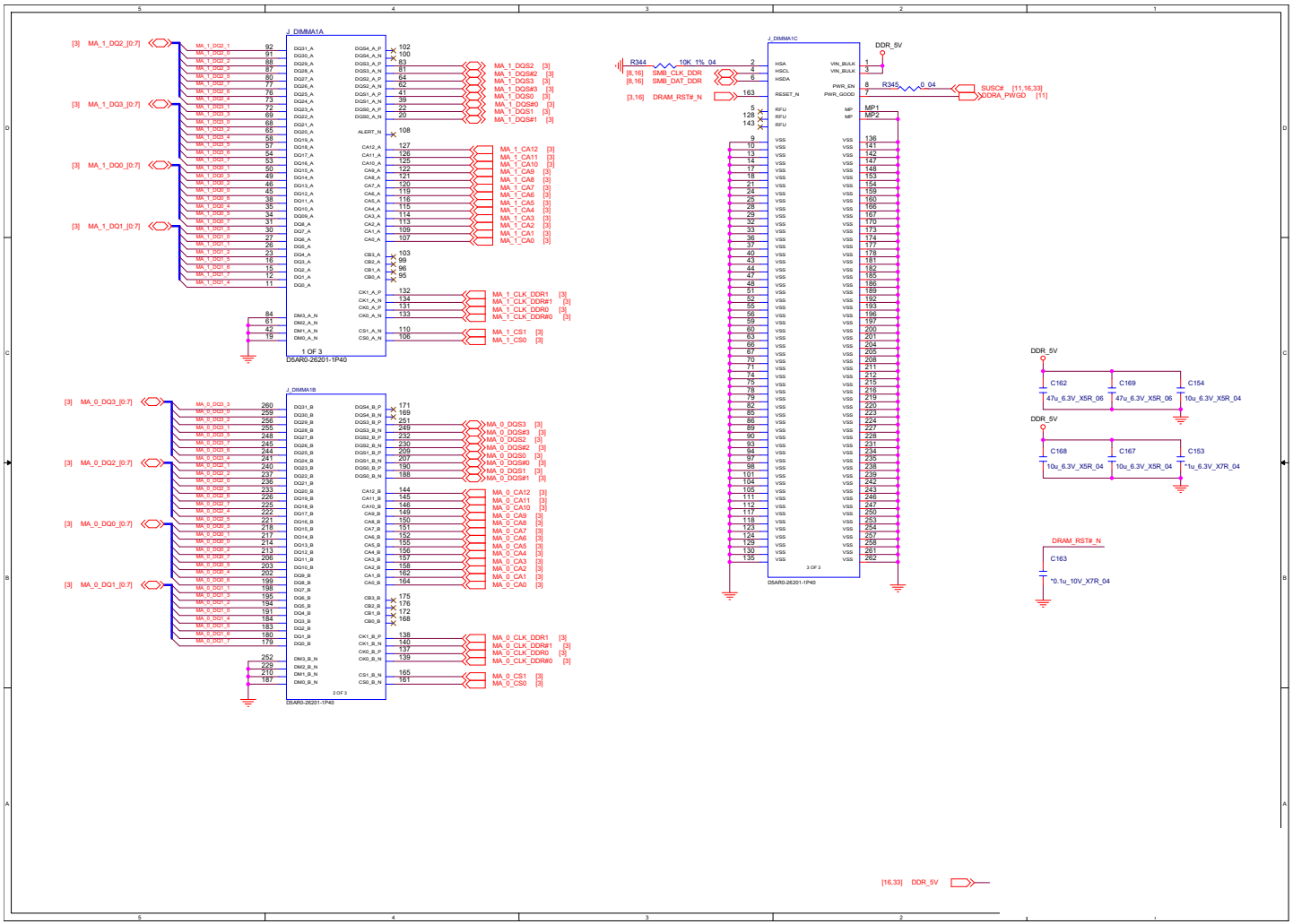
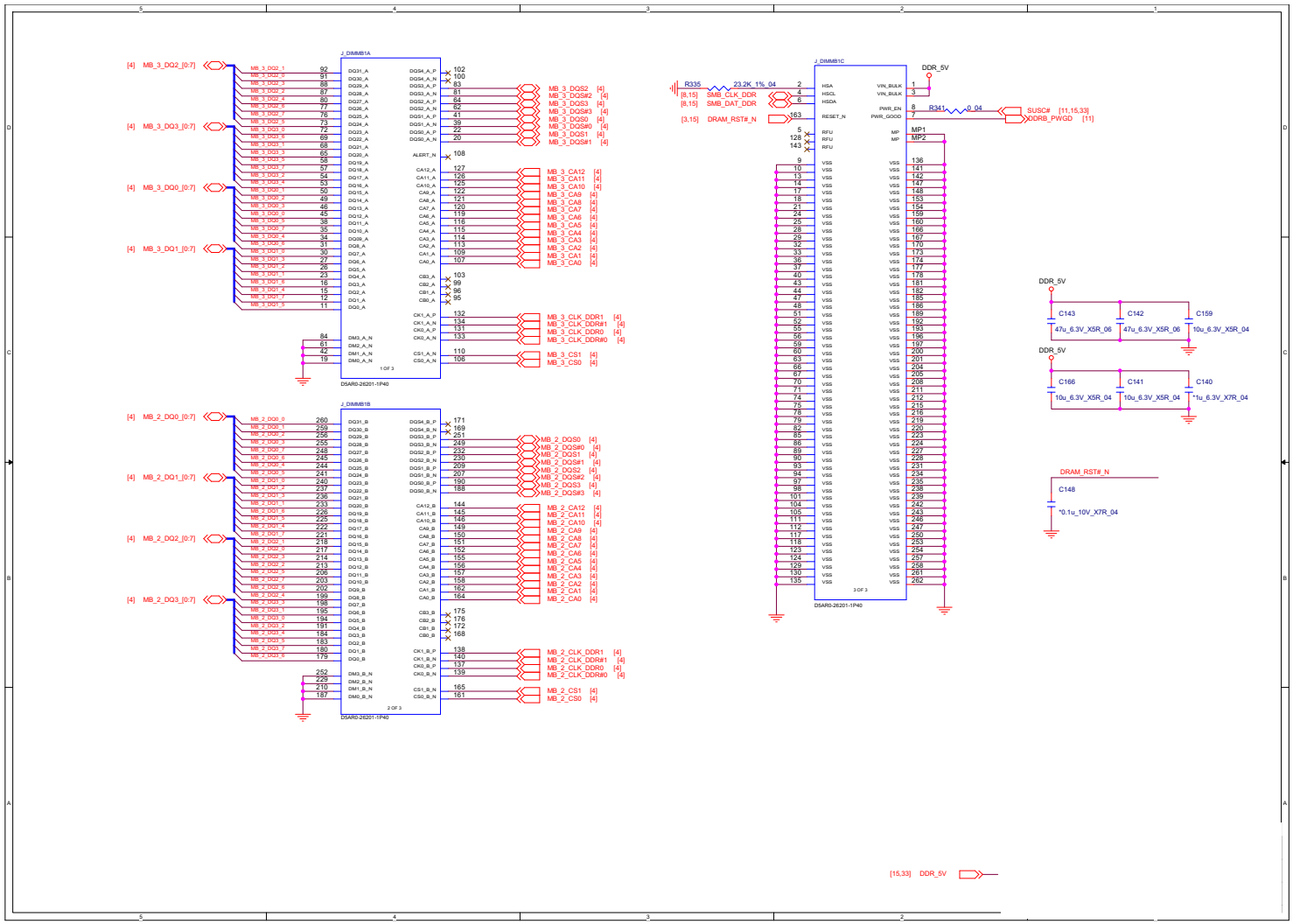
DDR5 SO-DIMM A



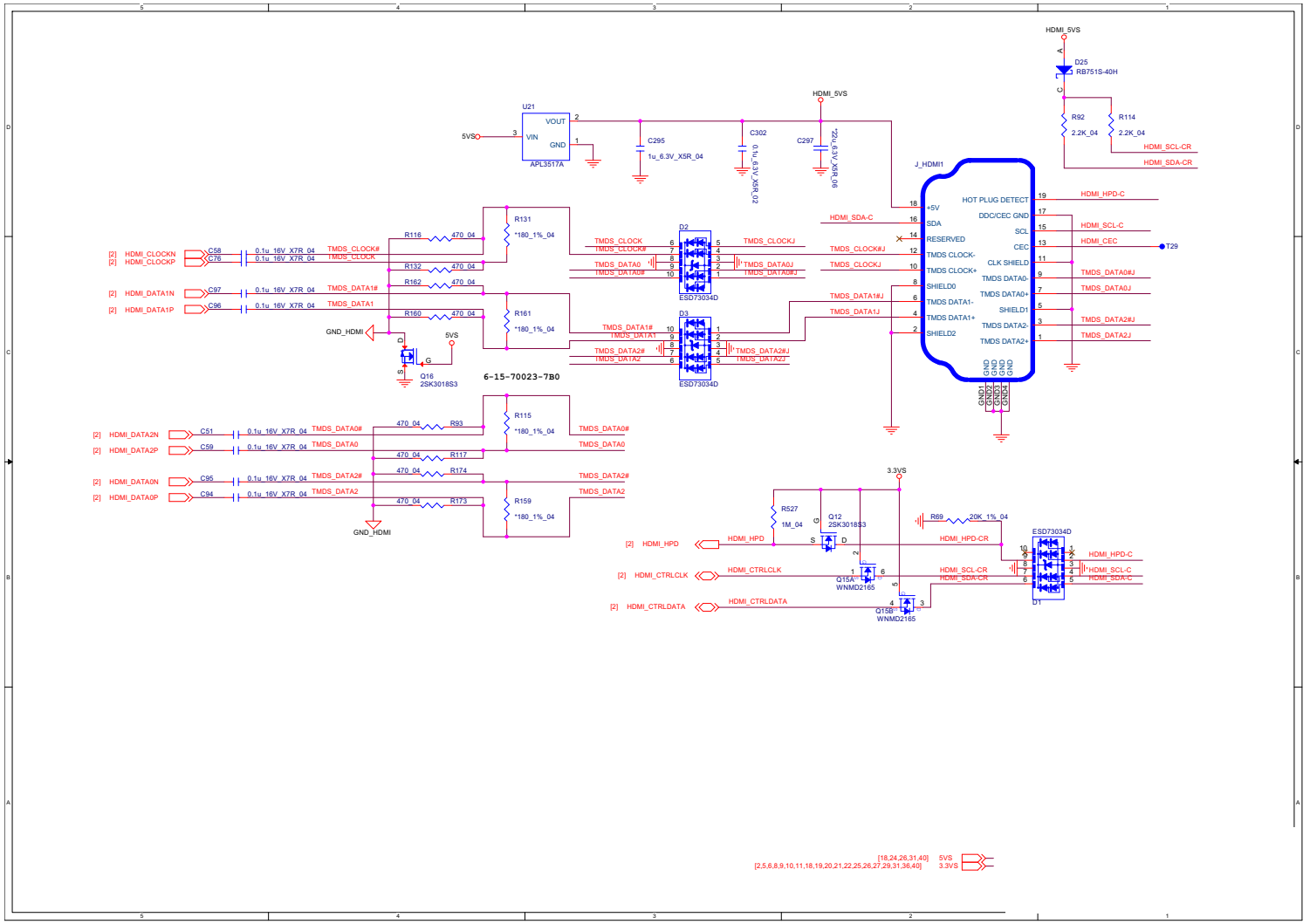
DDR5 SO-DIMM B



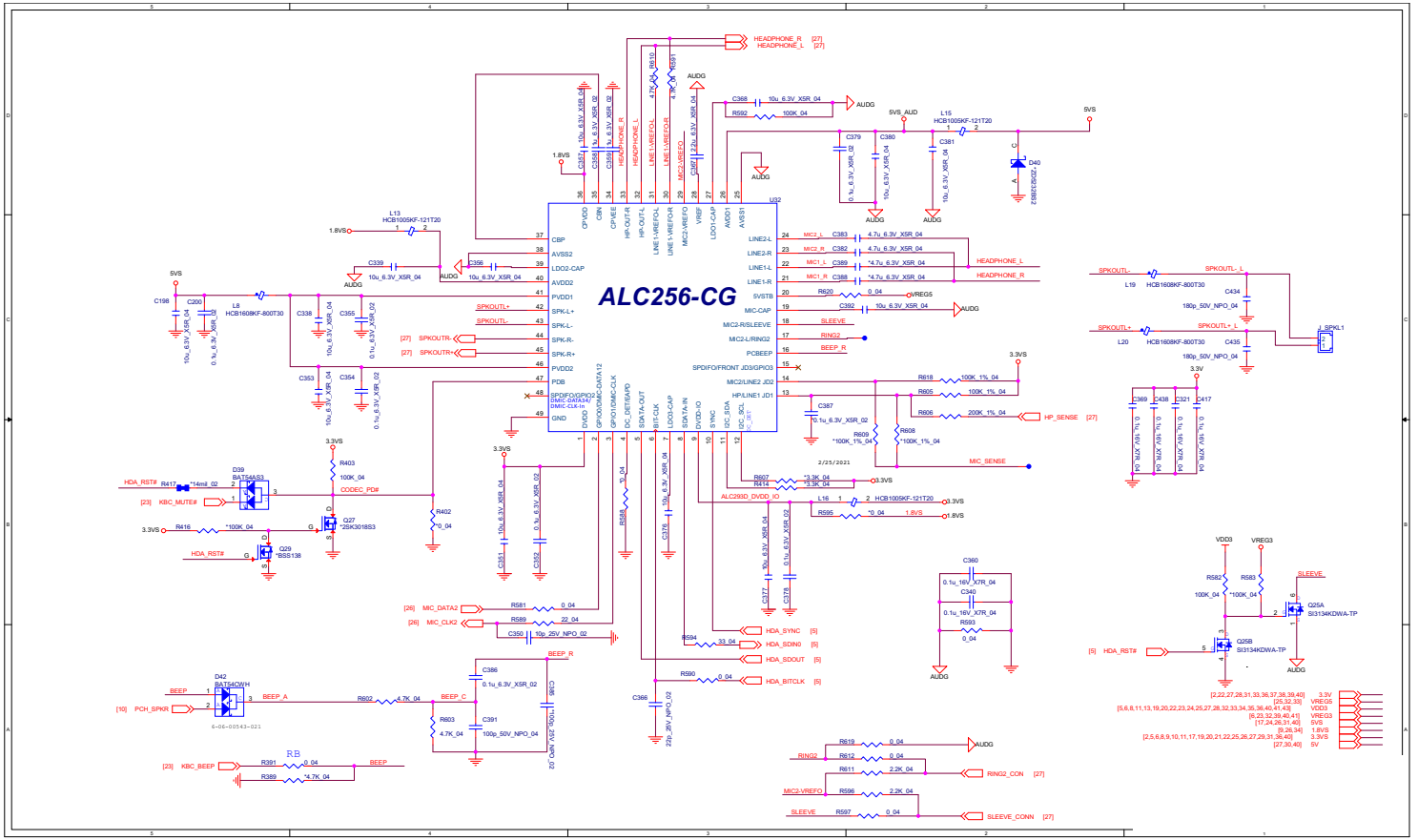
Sheet 16 of 47
DDR5 SO-DIMM B

HDMI

Sheet 17 of 47
HDMI



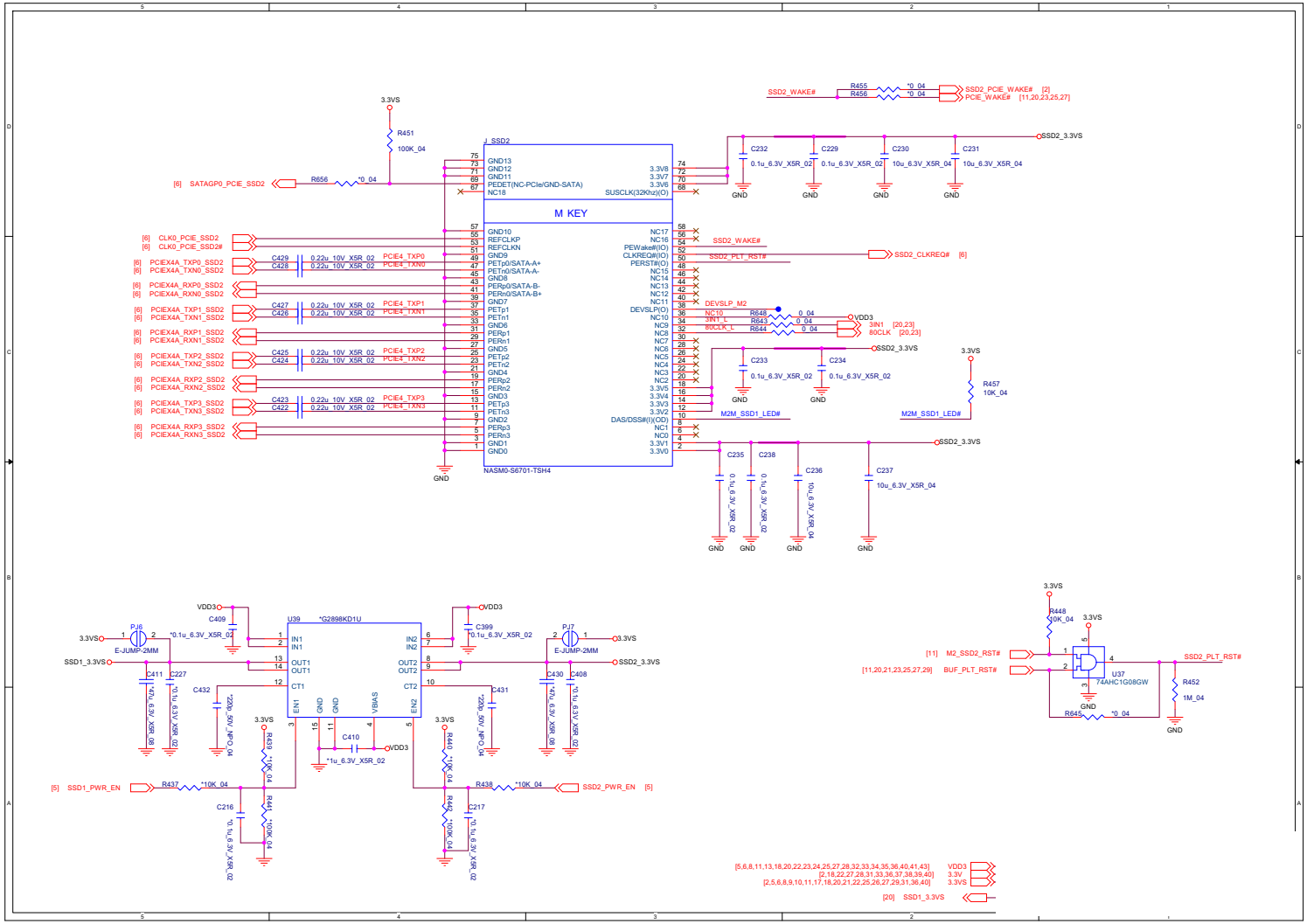
Audio Codec



Sheet 18 of 47
Audio Codec

M.2 PCIE Gen4 SSD2

Sheet 19 of 47
M.2 PCIE Gen4 SSD2



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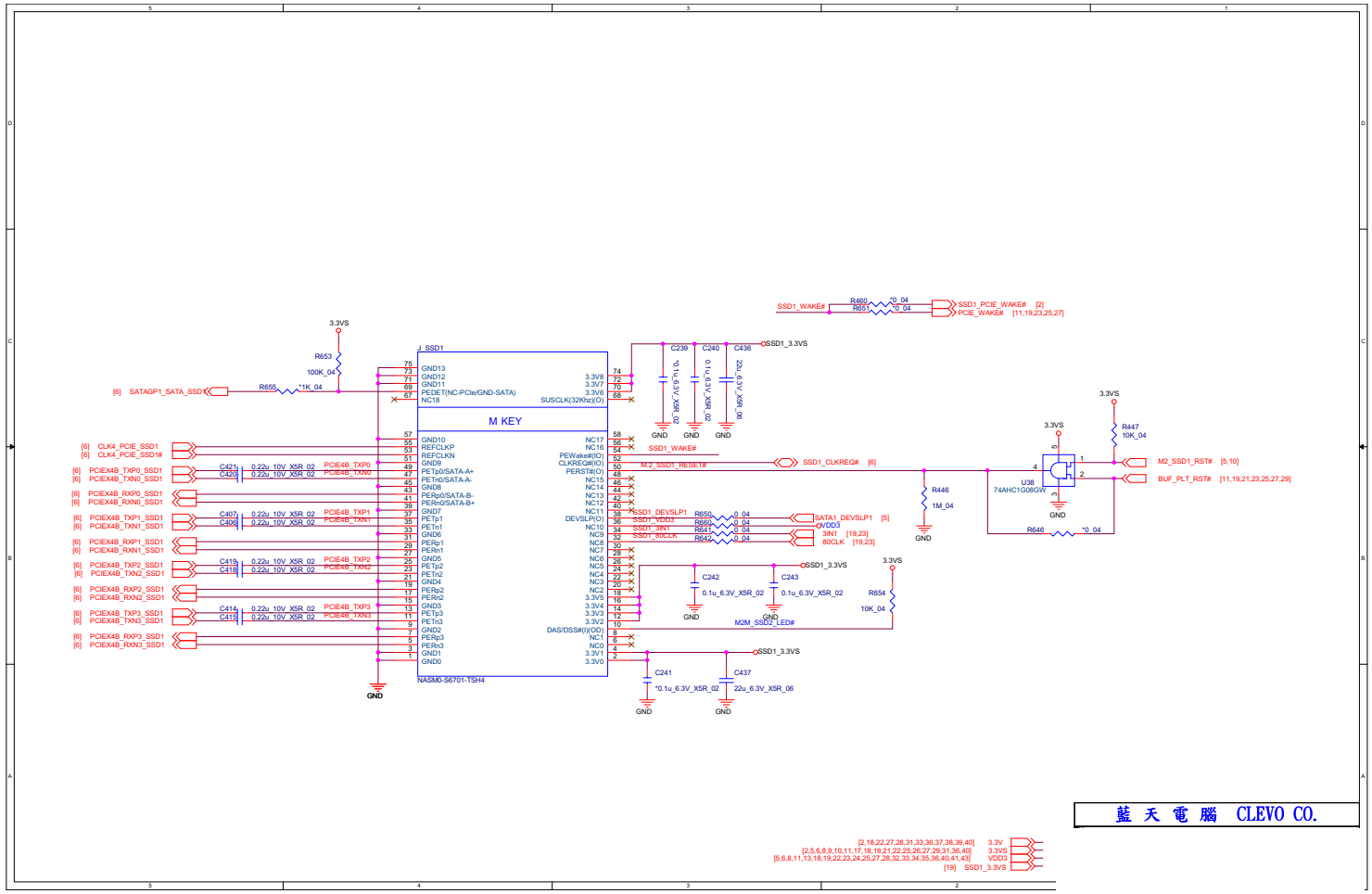

Sheet 20 of 47
M.2 PCIE Gen4
SSD1

USB Port

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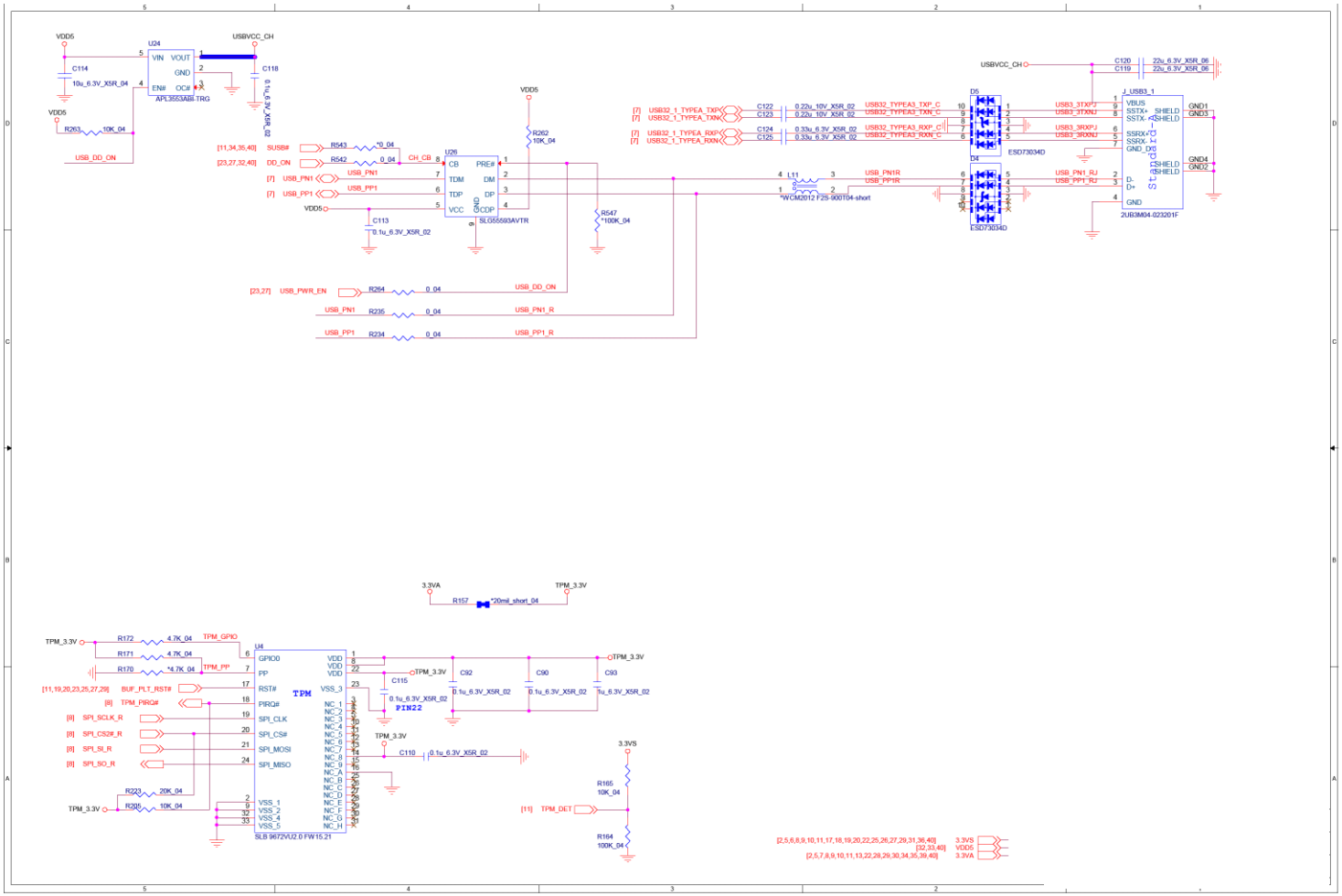
USB Port



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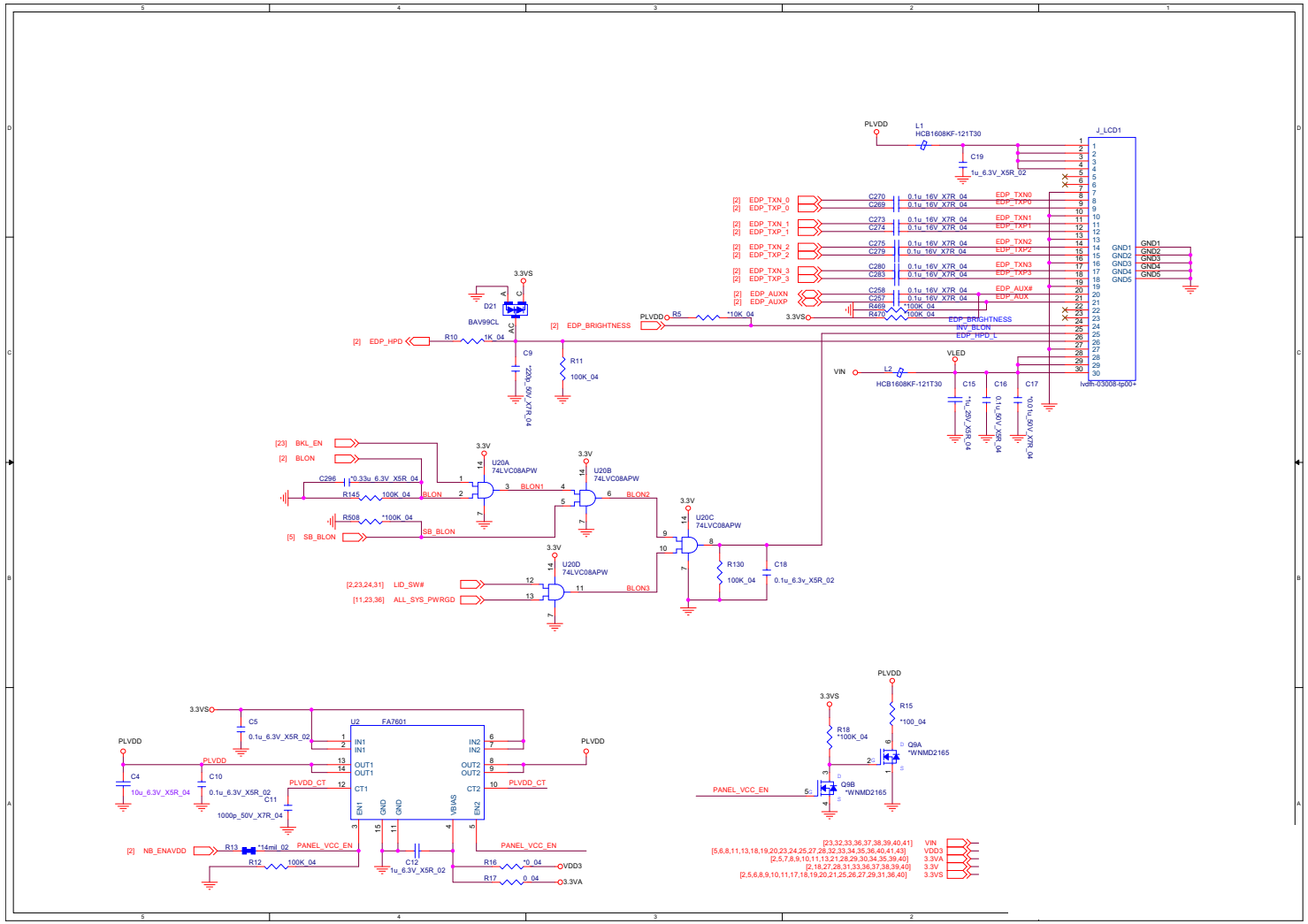

Sheet 22 of 47
Panel

IT5570

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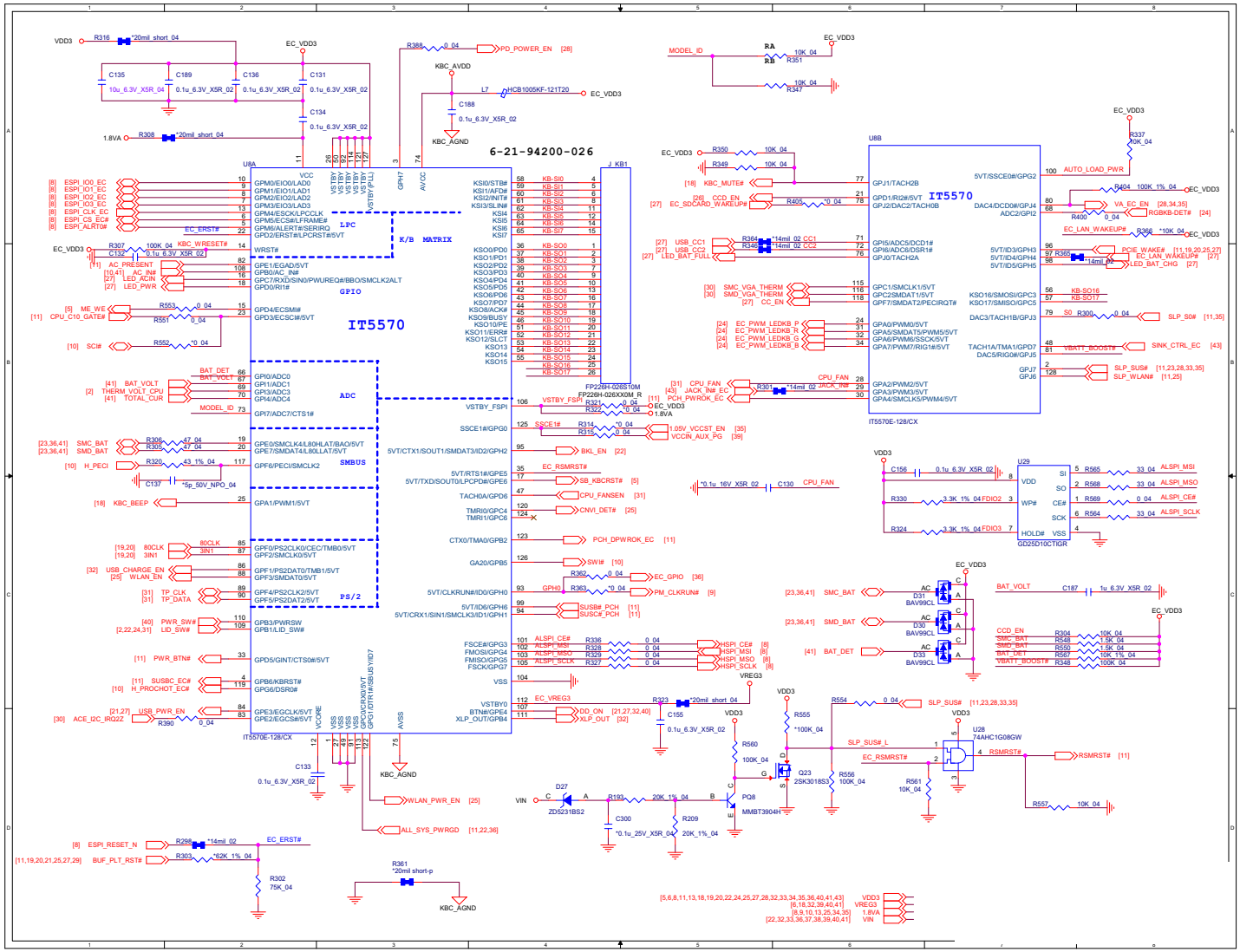
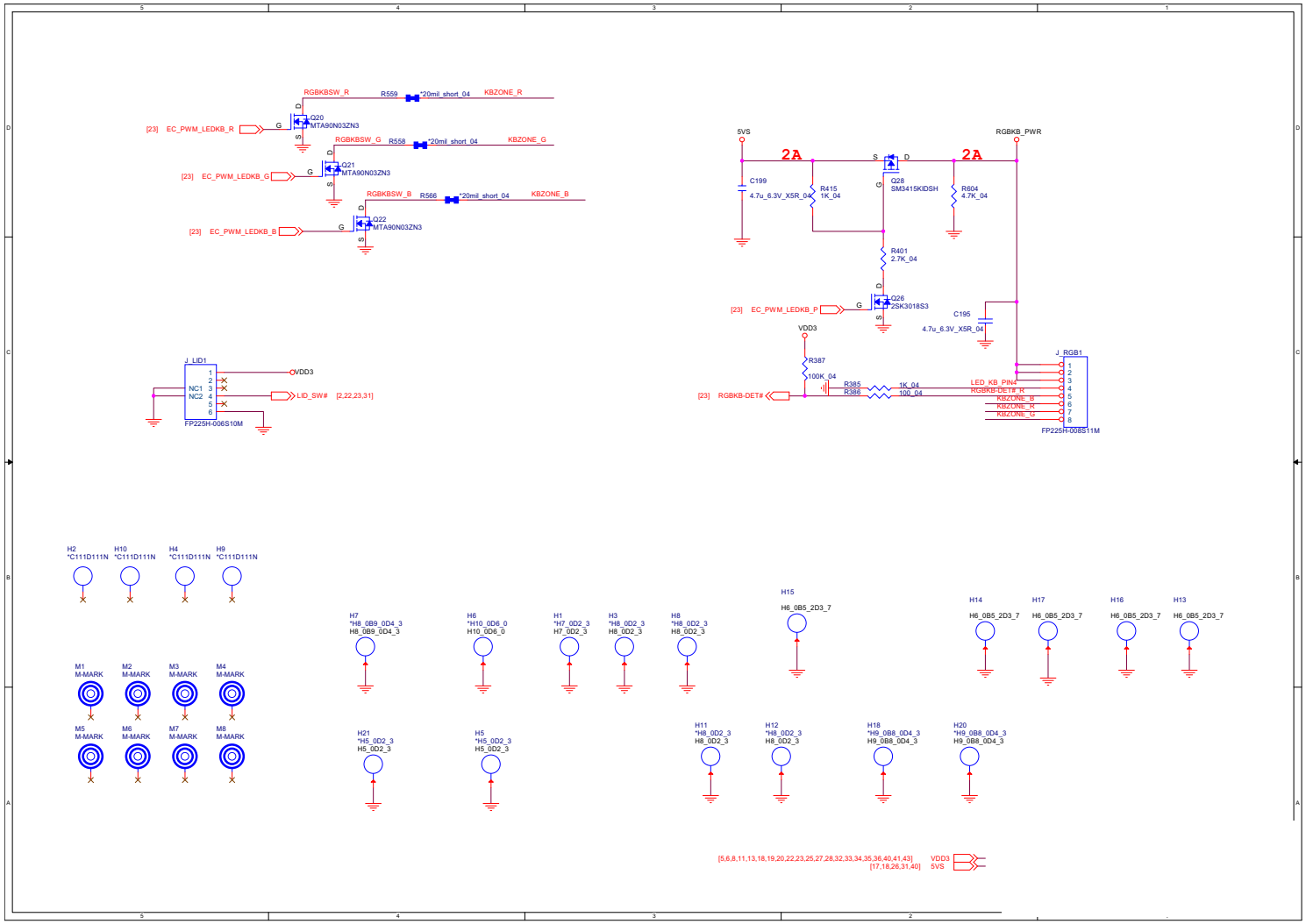
IT5570



RGB KB, LID Conn



Sheet 24 of 47
RGB KB, LID Conn

WLAN/BT

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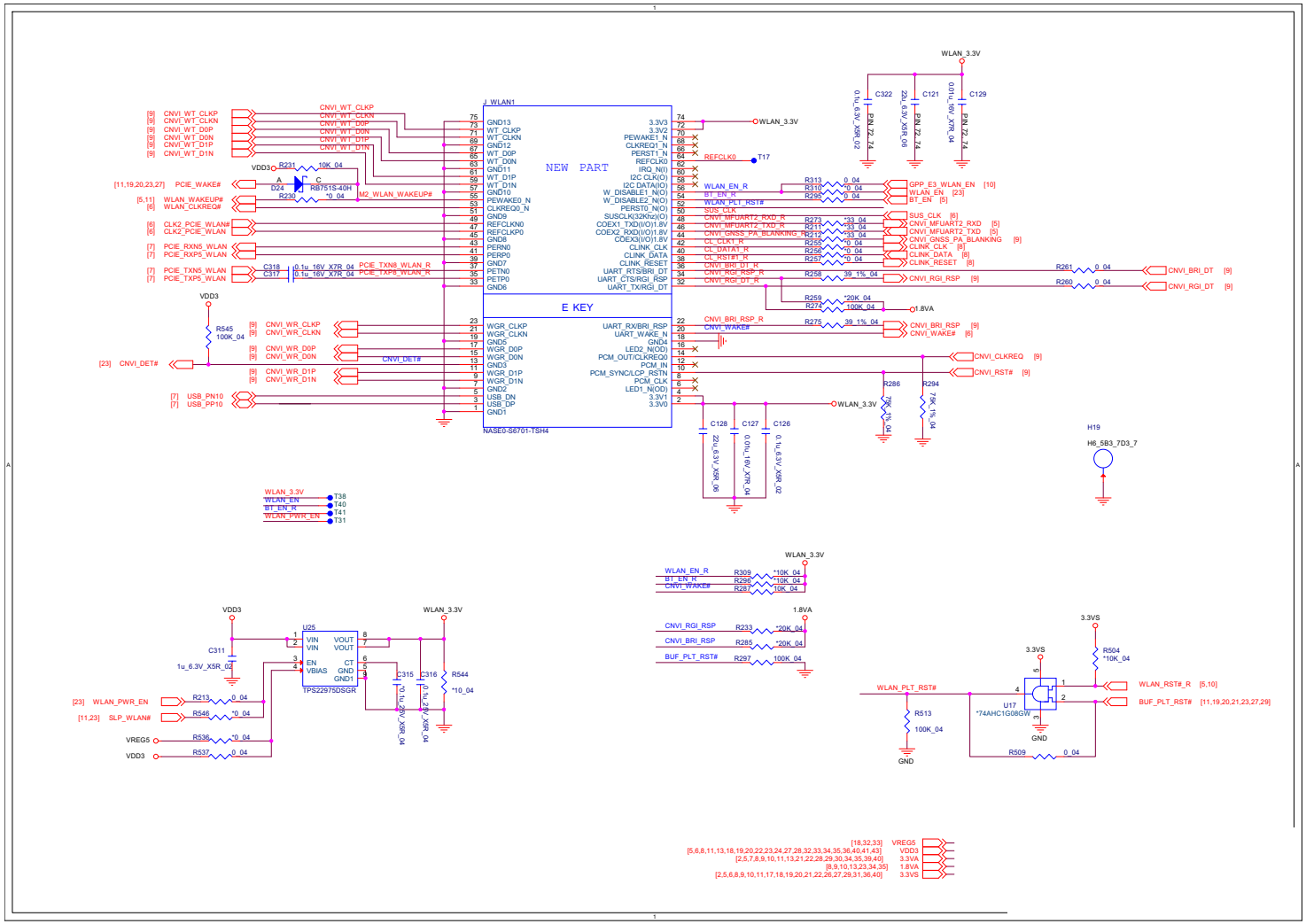
WLAN/BT



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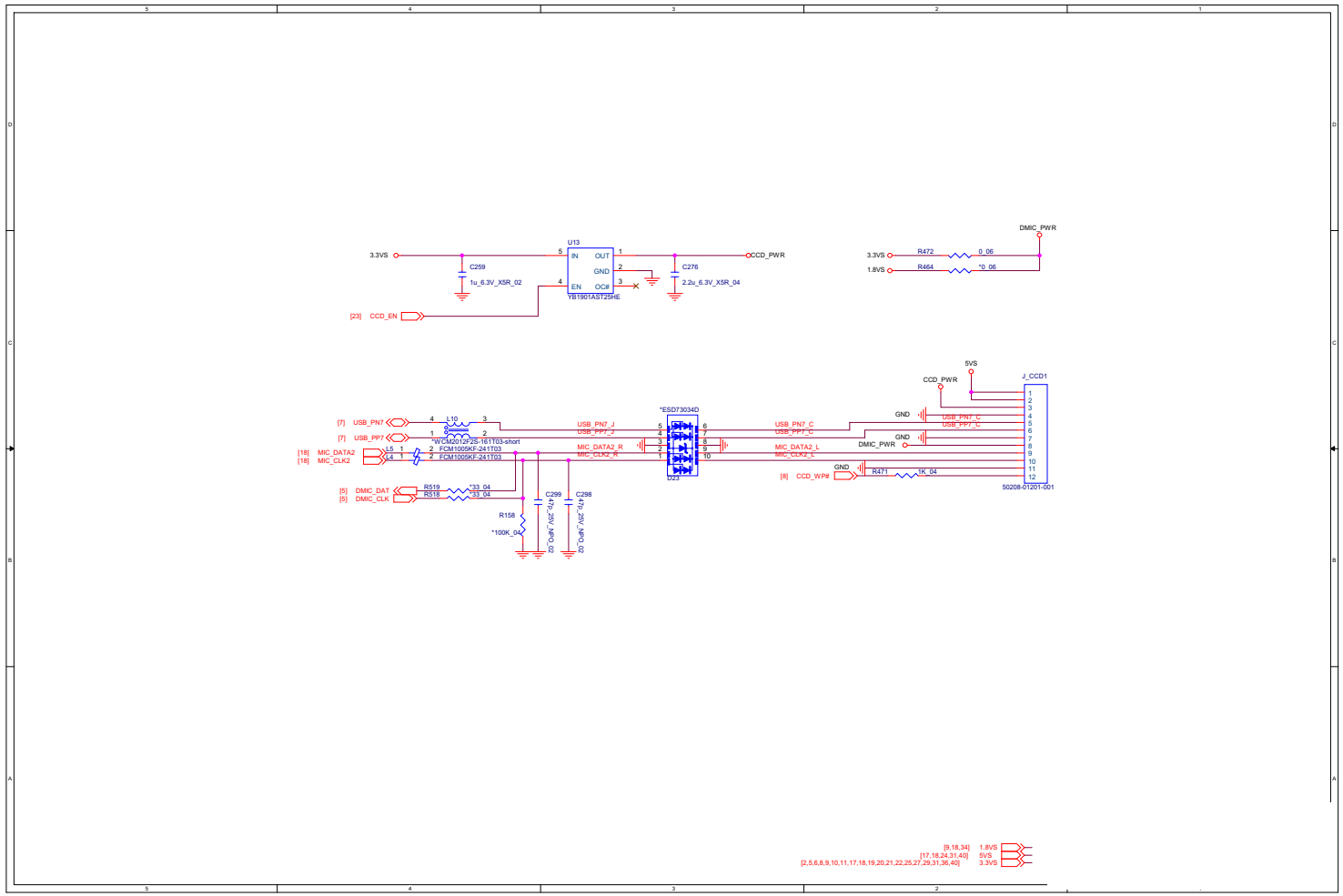

Sheet 26 of 47
CCD

Type-C USB

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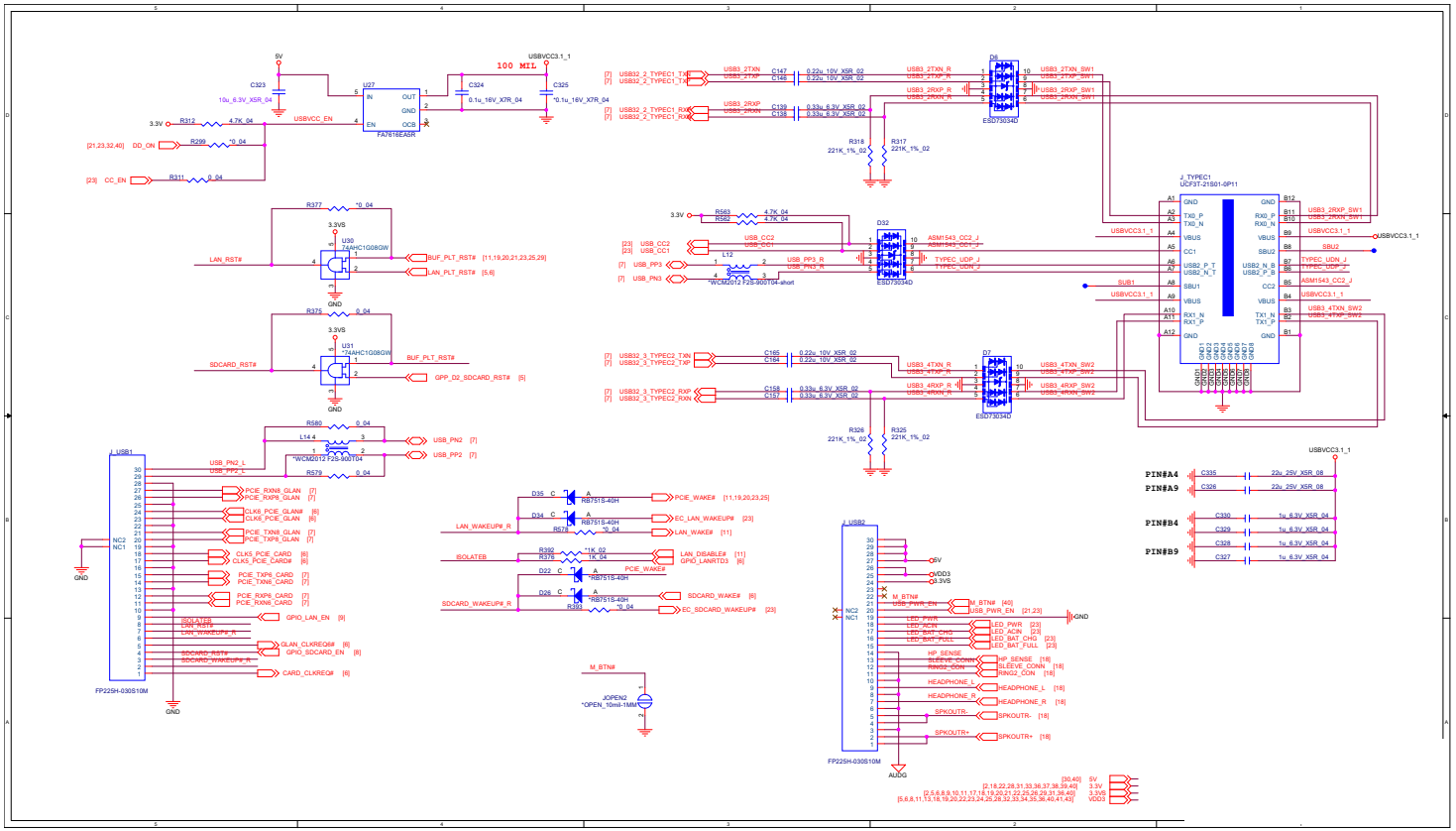
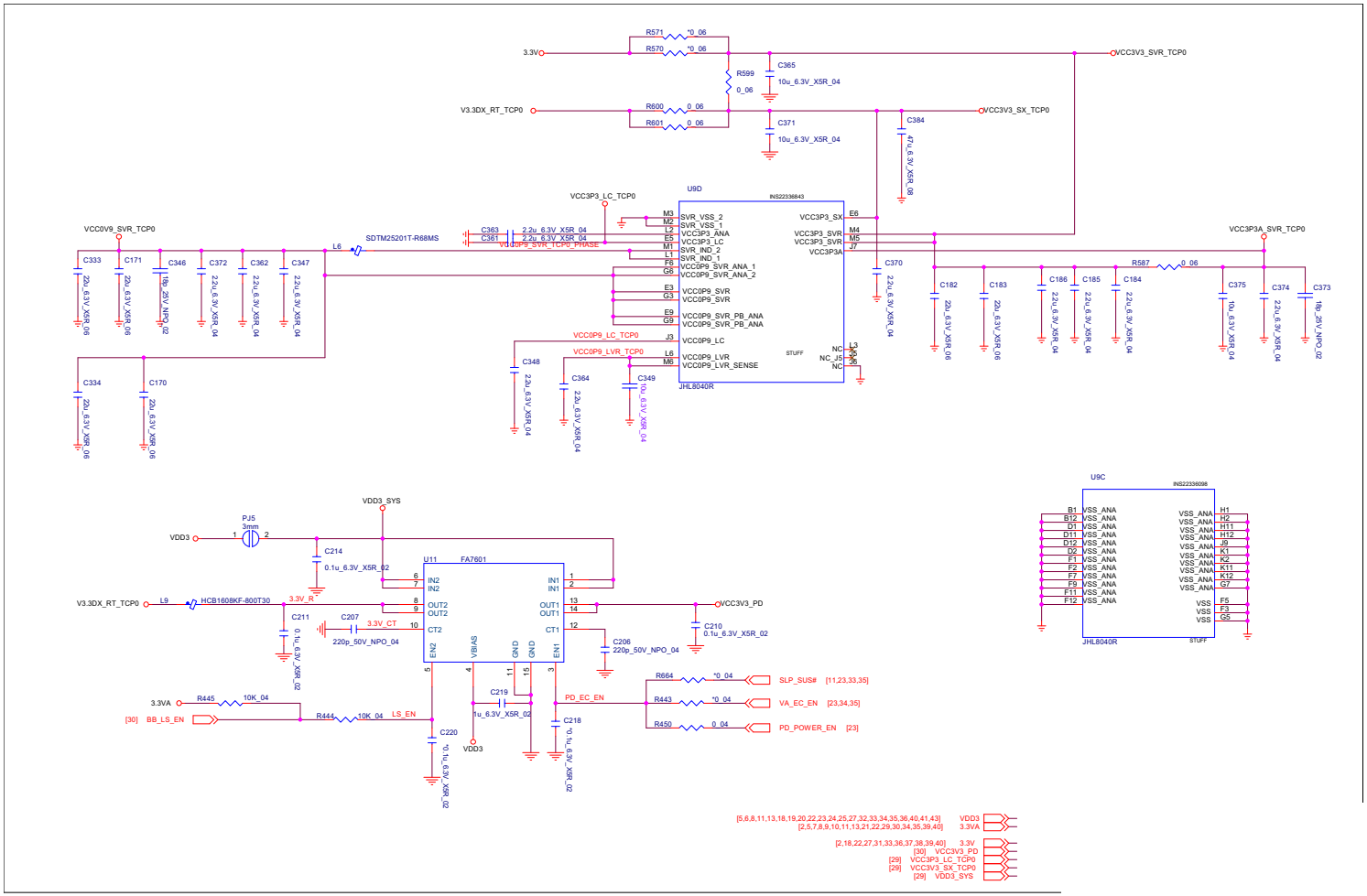
Type-C USB



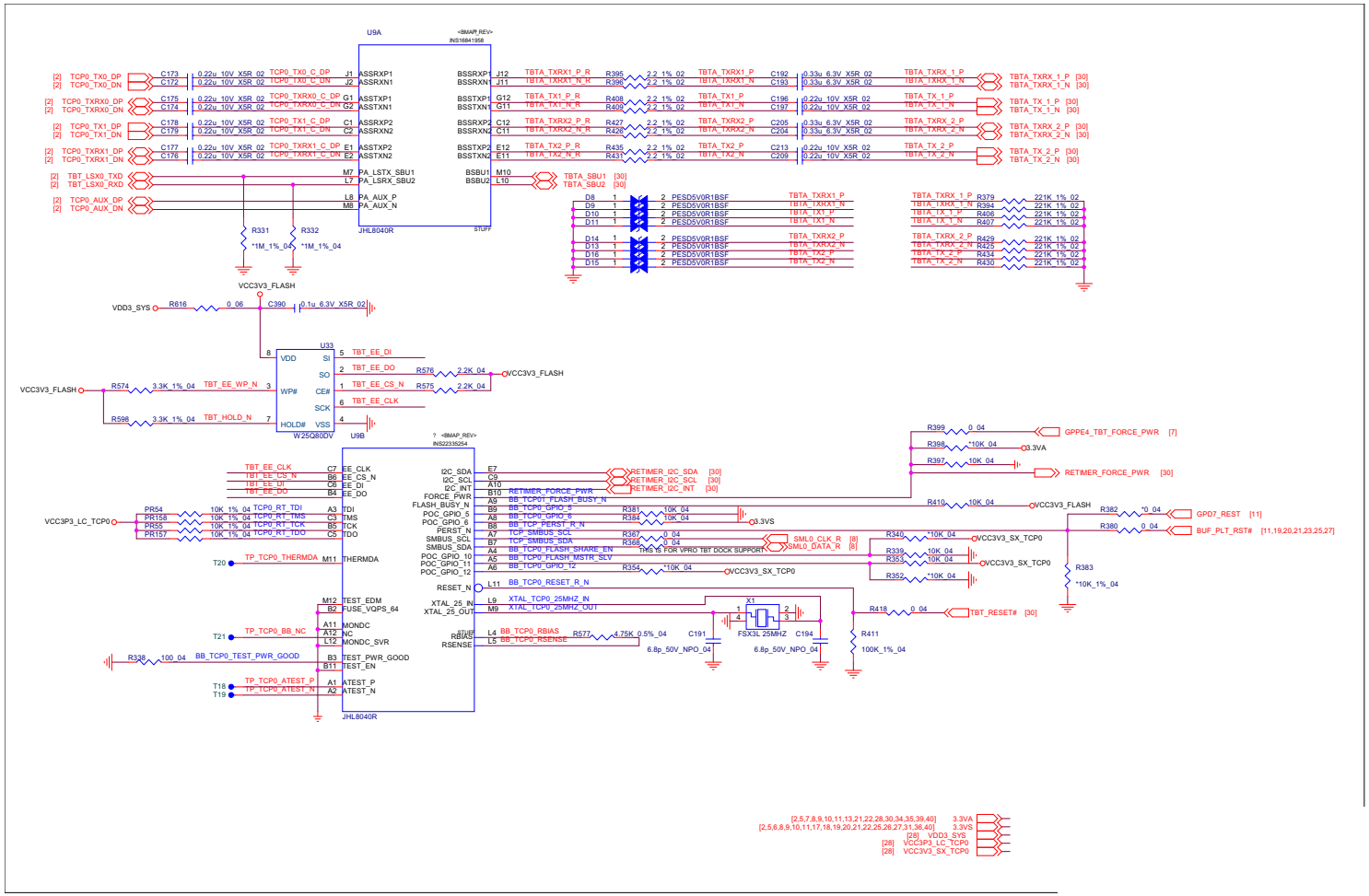
Retimer 1/2



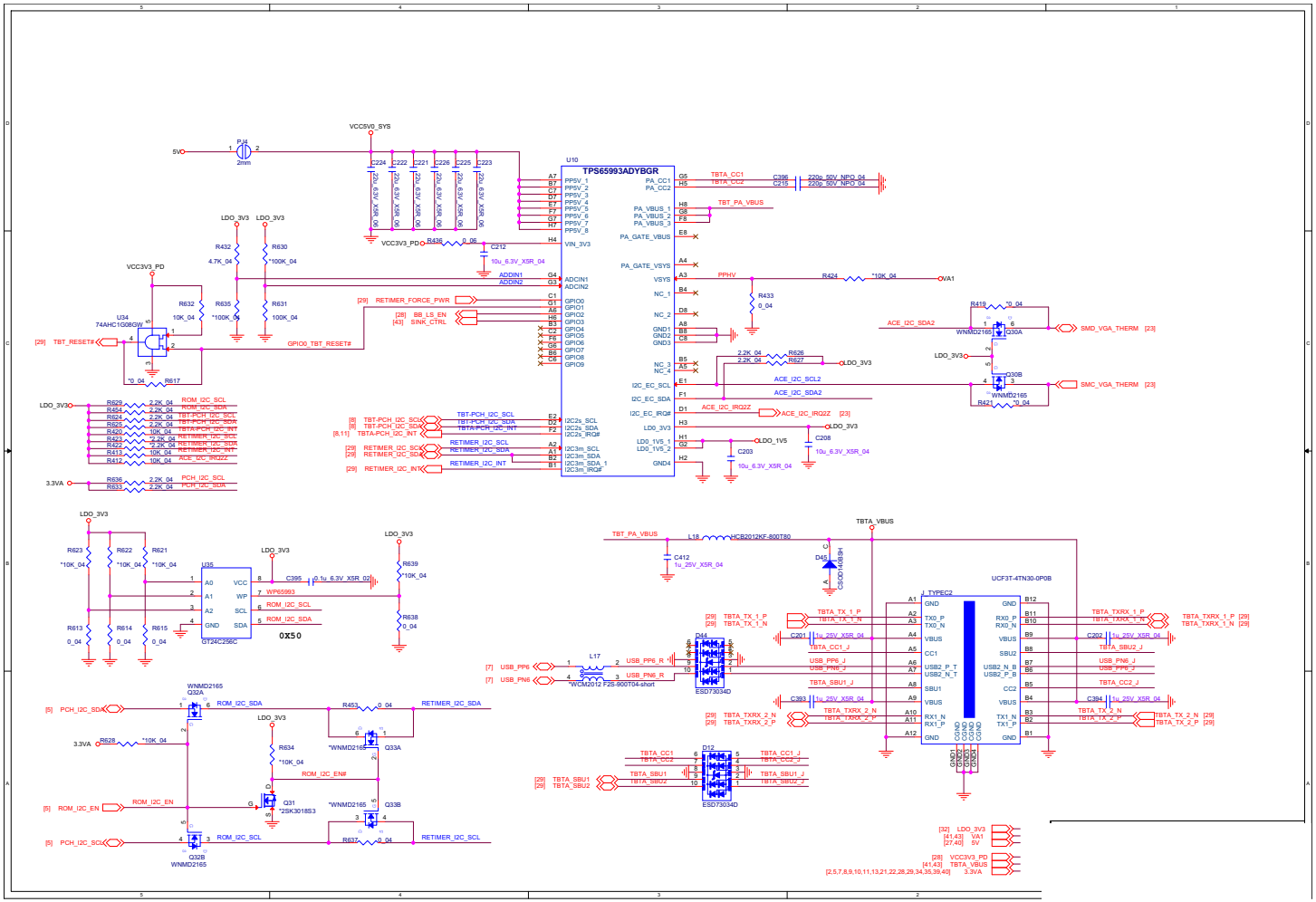
Sheet 28 of 47
Retimer 1/2

Retimer 2/2

Sheet 29 of 47
Retimer 2/2



Type-C



Sheet 30 of 47
Type-C

Fan, TP

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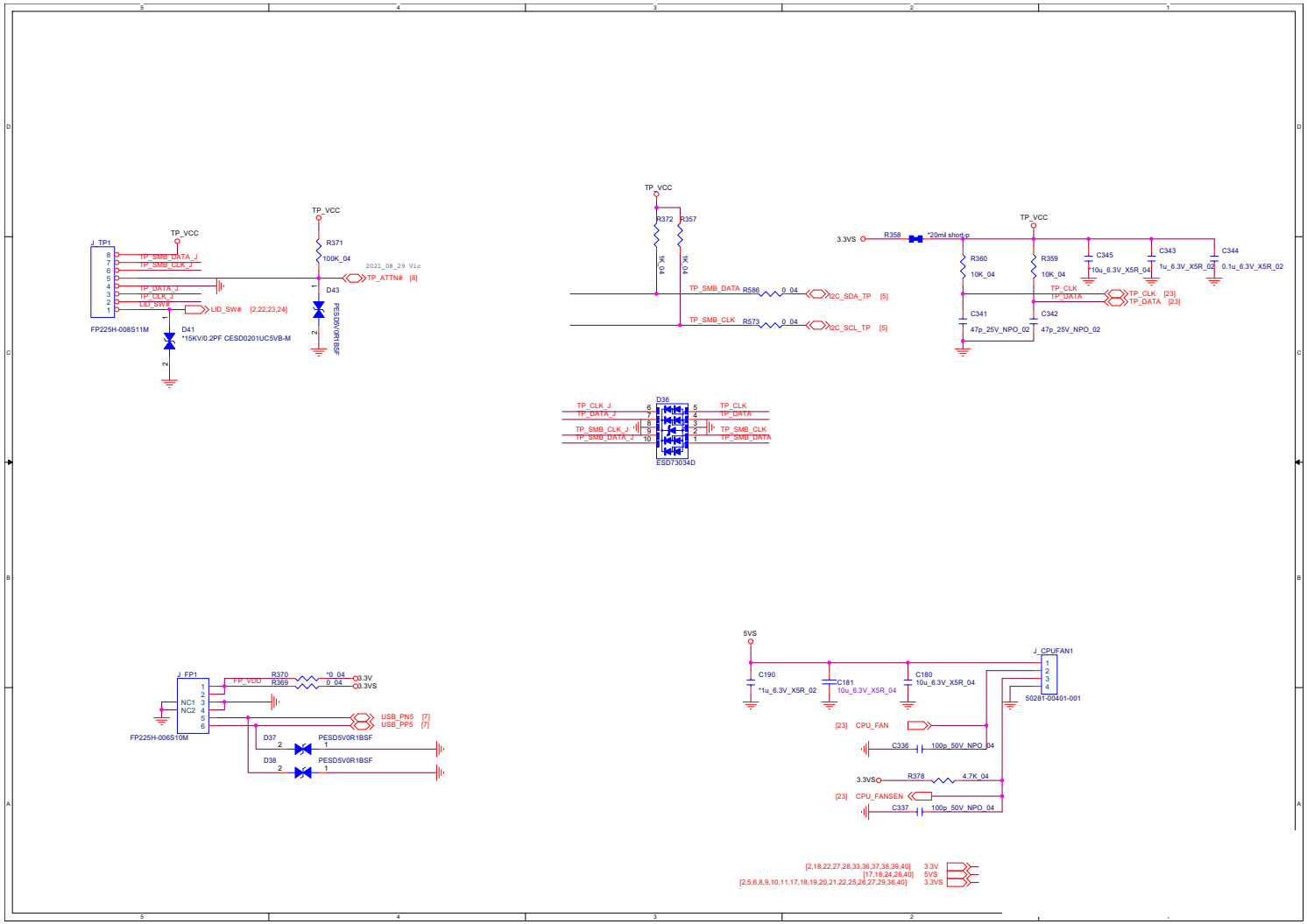
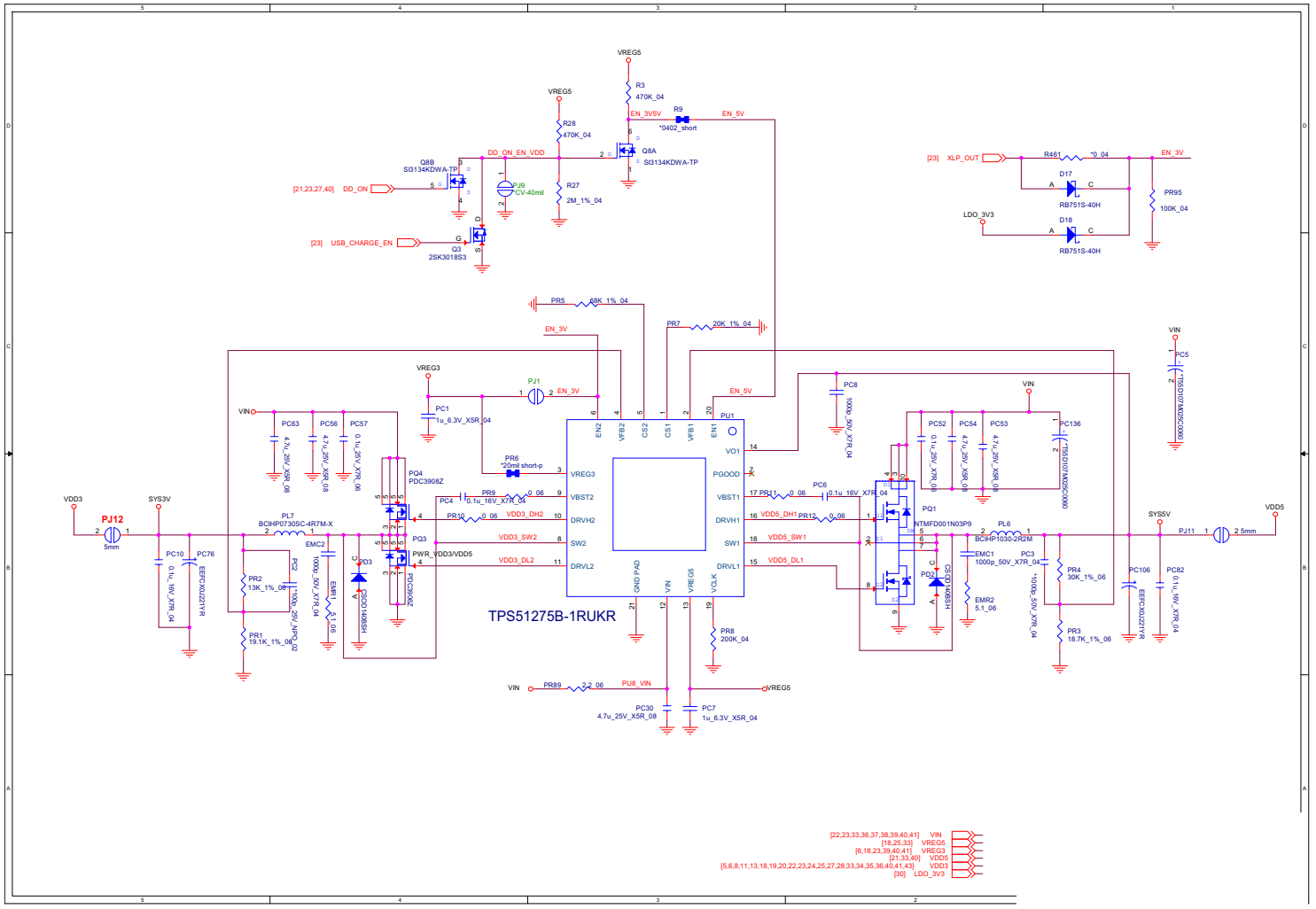
Fan, TP



VDD3, VDD5



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VDD3, VDD5

VDDQ, VDDQ_VTT, 1.8VA

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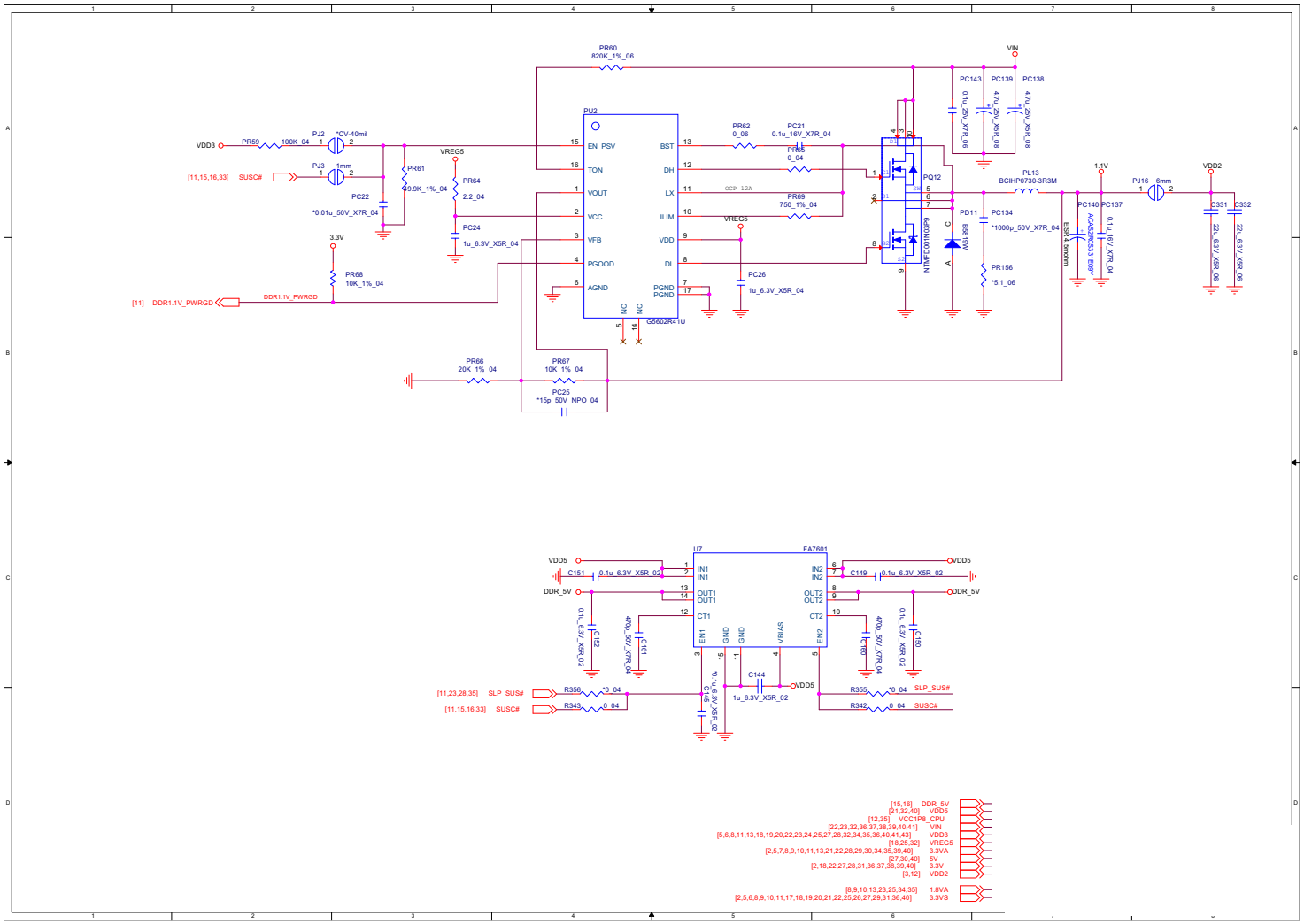
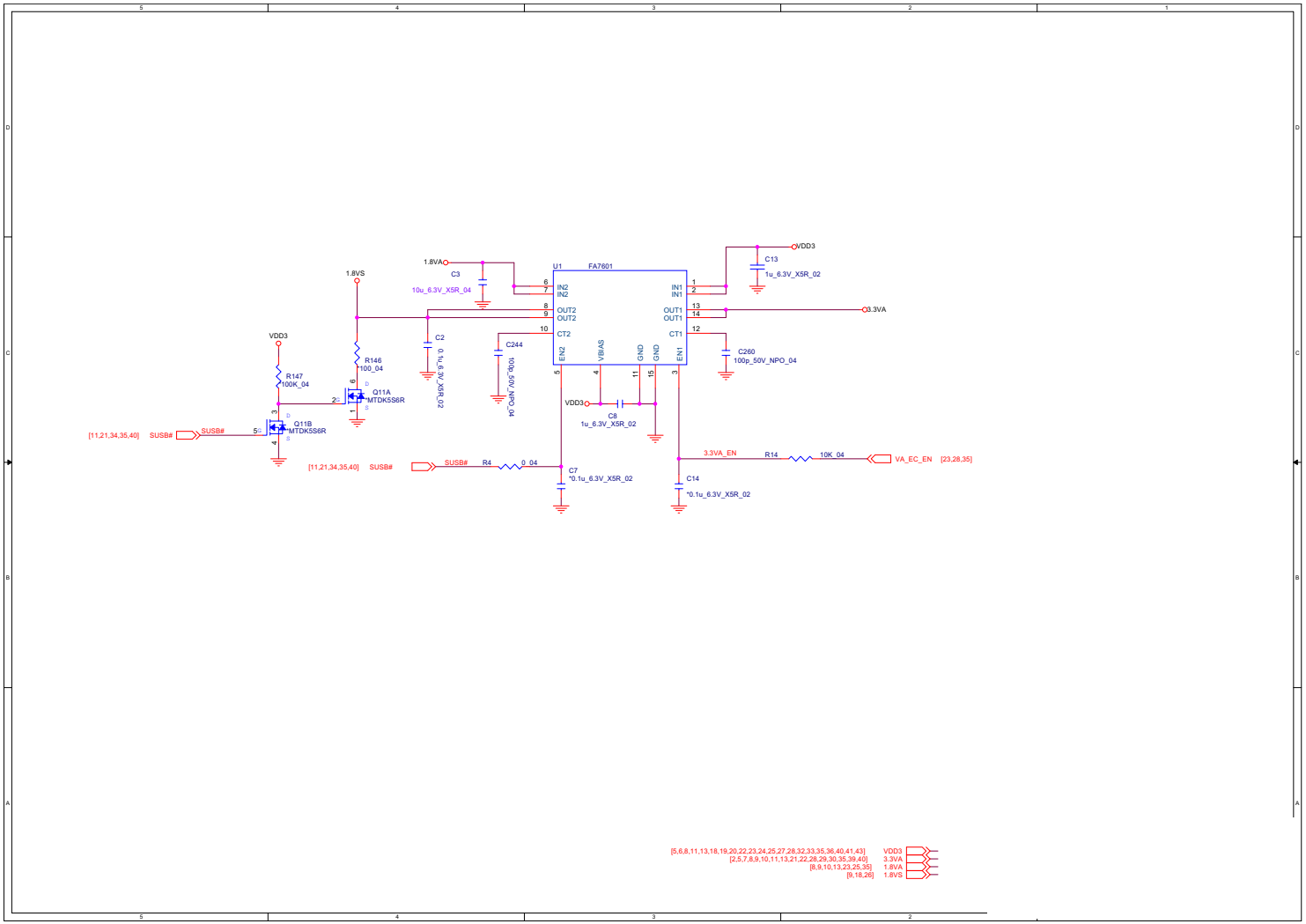
VDDQ, VDDQ_VTT, 1.8VA



3.3VA, 1.8VS



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3.3VA, 1.8VS

2.5V, VCCST, VCCSTG

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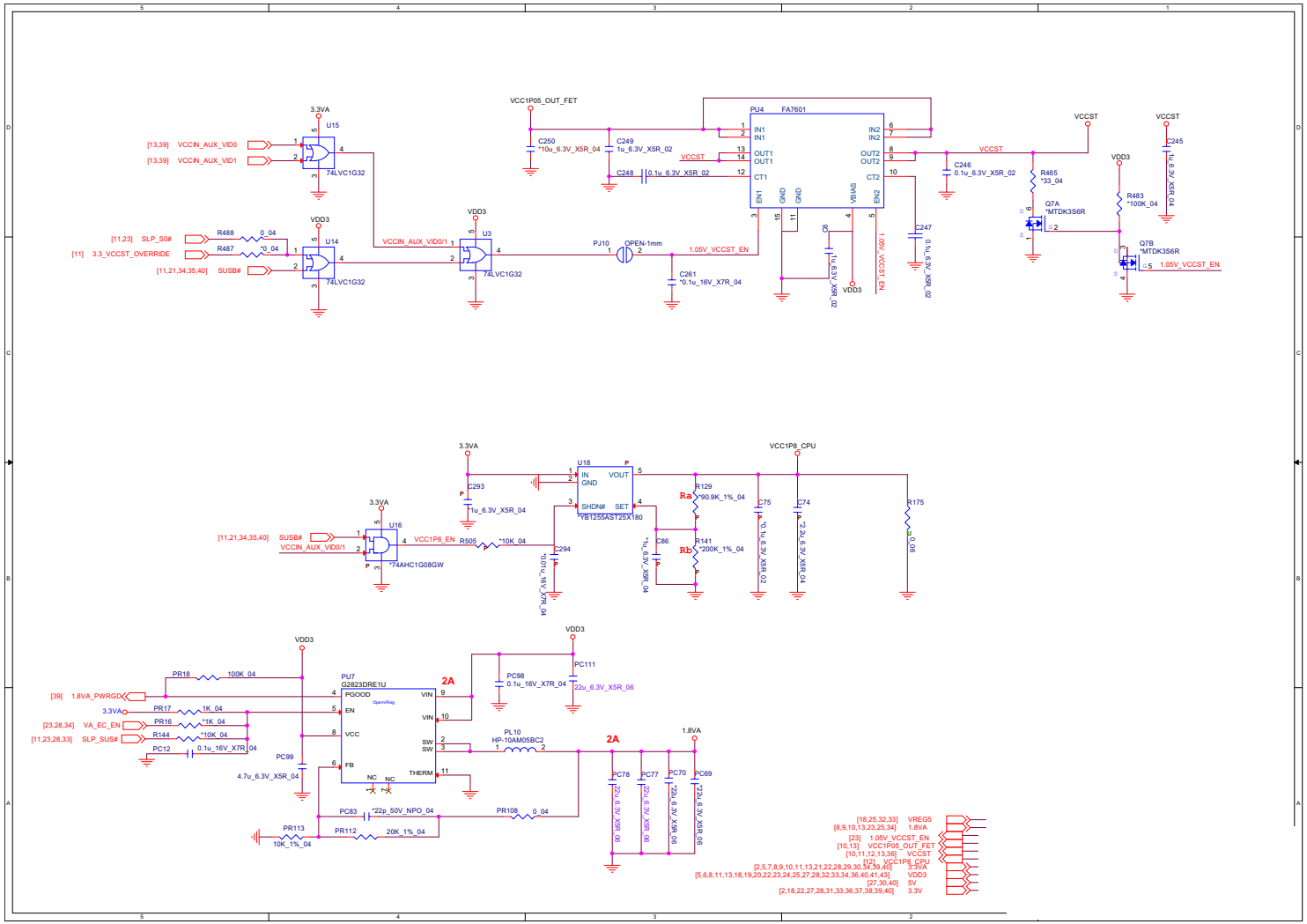
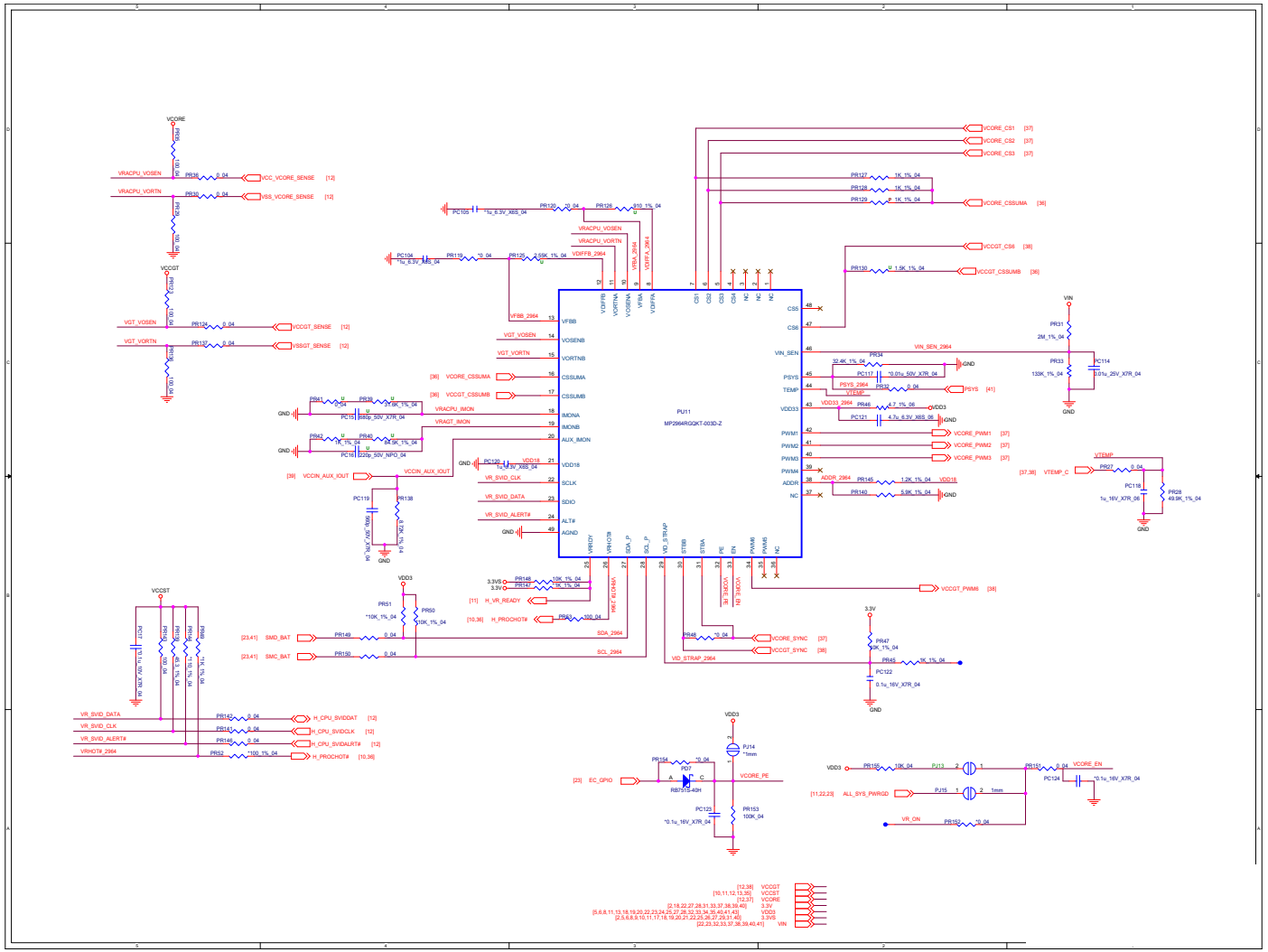
2.5V, VCCST,
VCCSTG



MP2964 Controller



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MP2964 Controller

VCore

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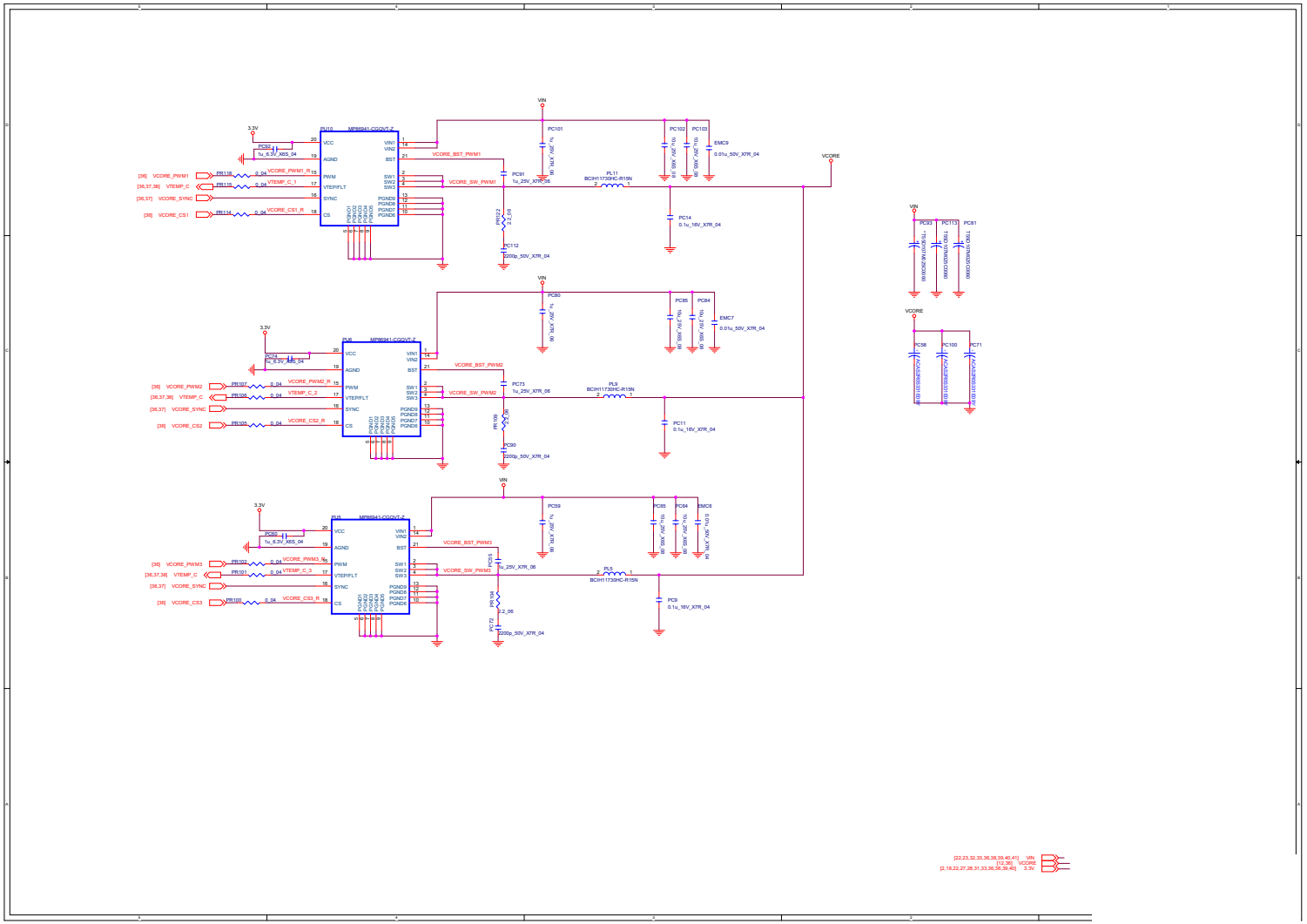
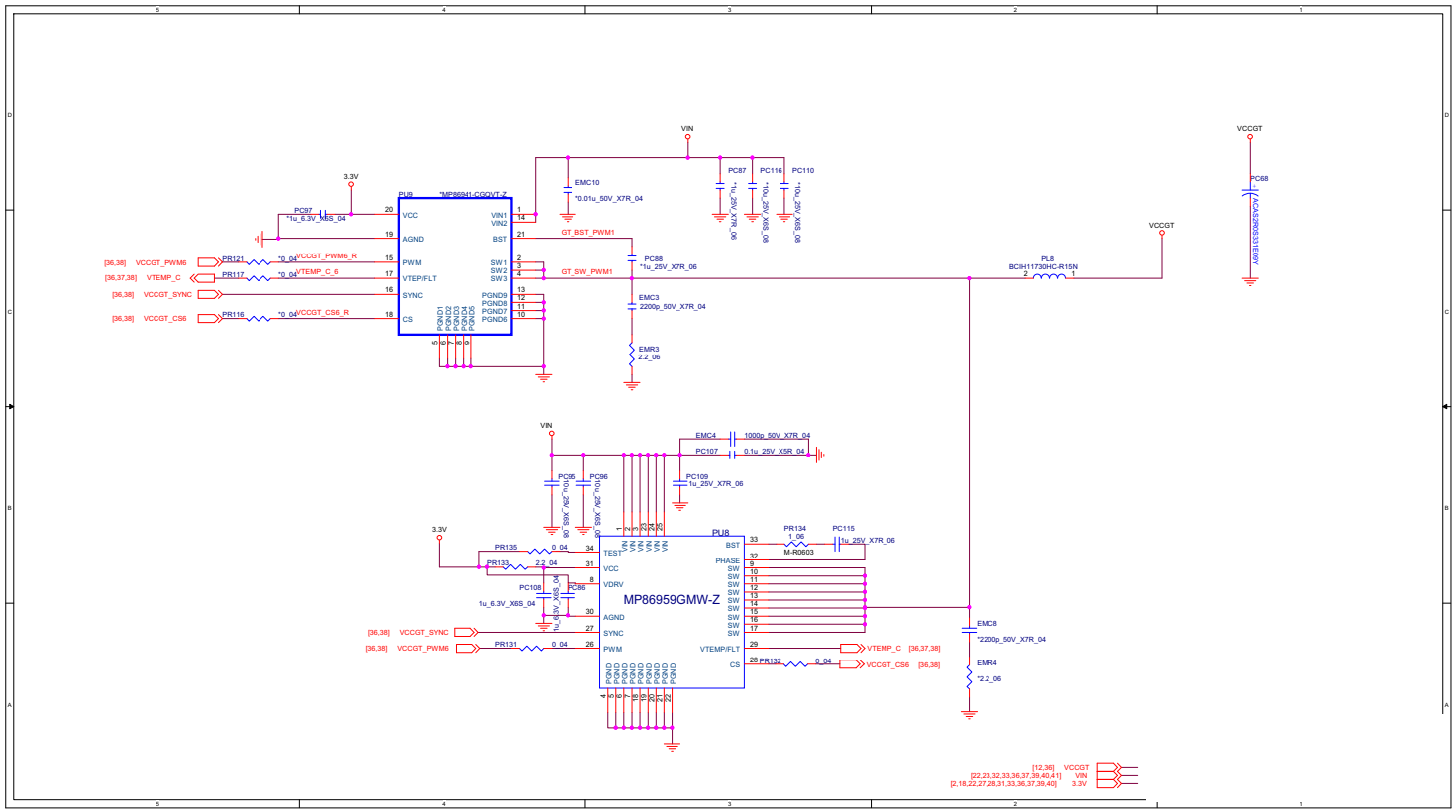
VCore



VCCGT



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VCCGT

VCCIN AUX

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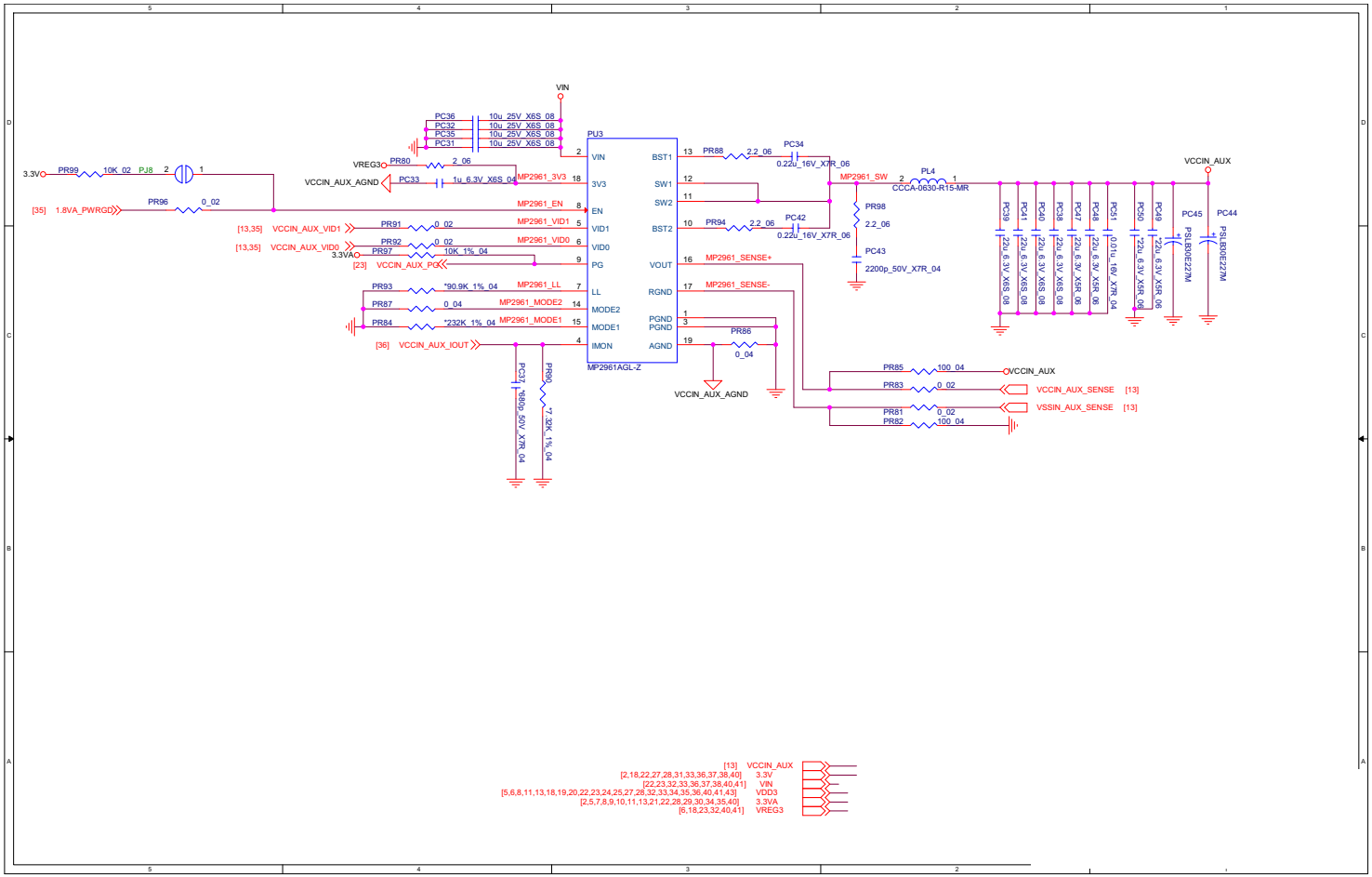
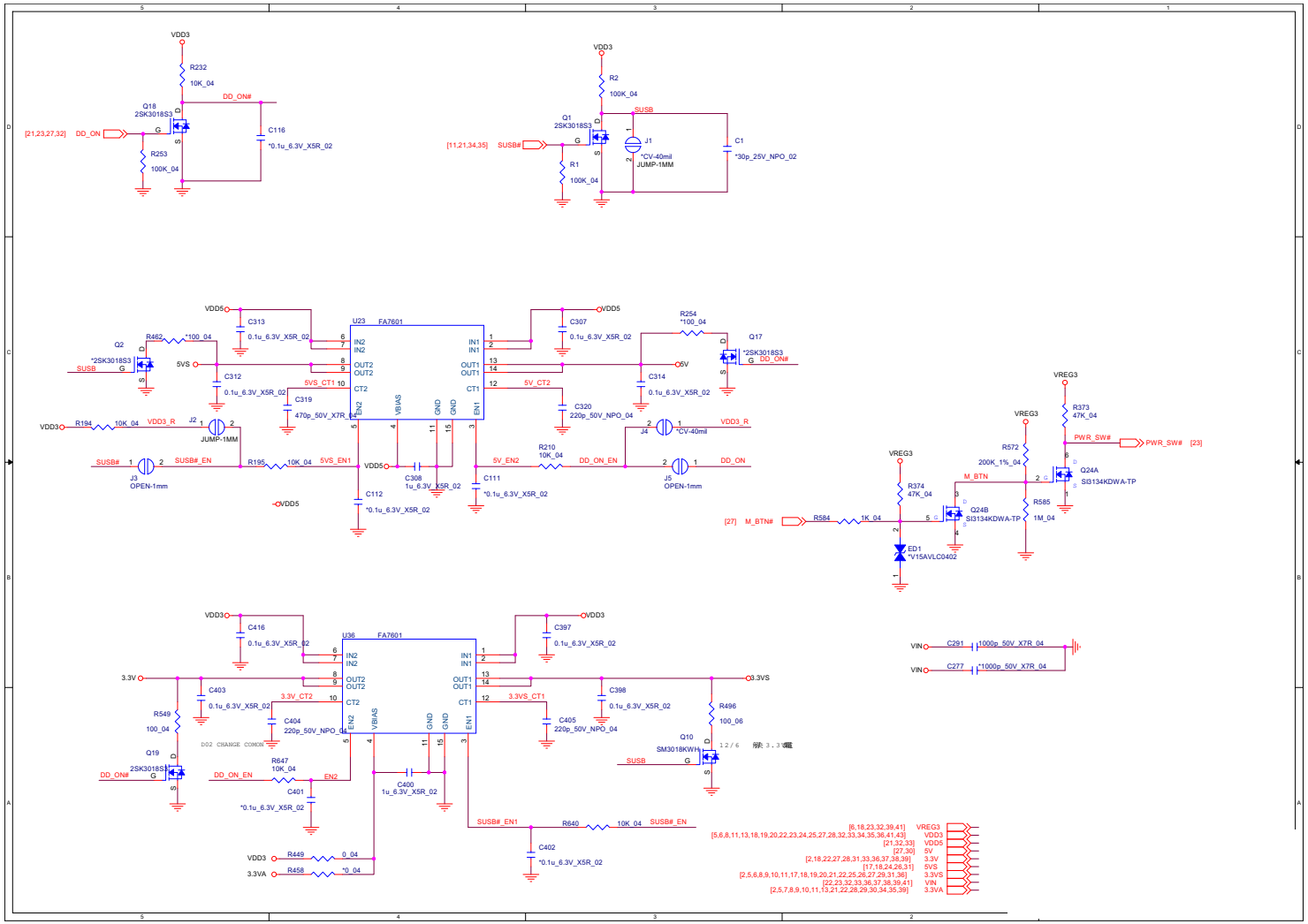
VCCIN AUX



3.3V, 5V, 3VS, 5VS, CTL



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3.3V, 5V, 3VS, 5VS, CTL

Charger

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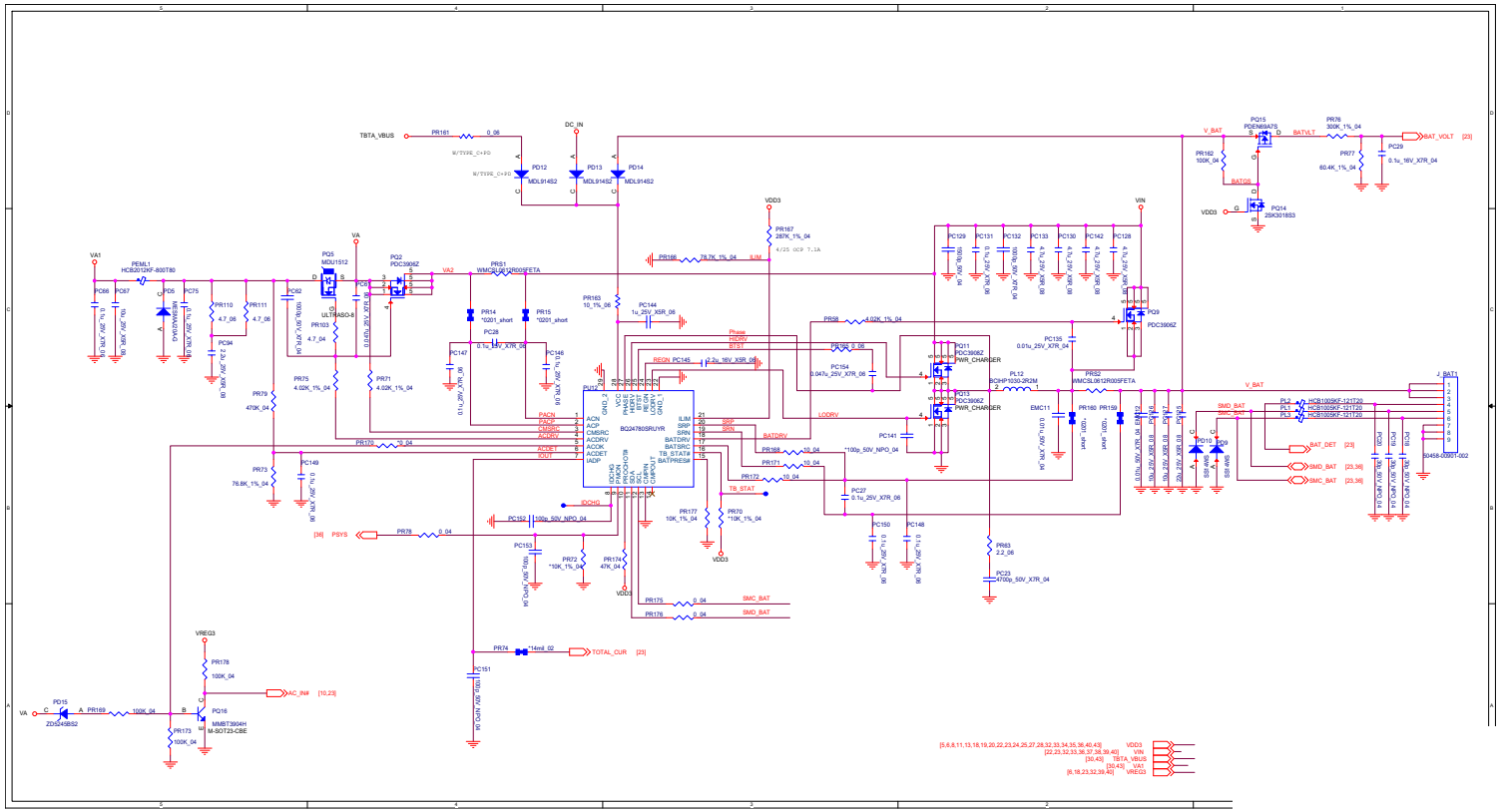
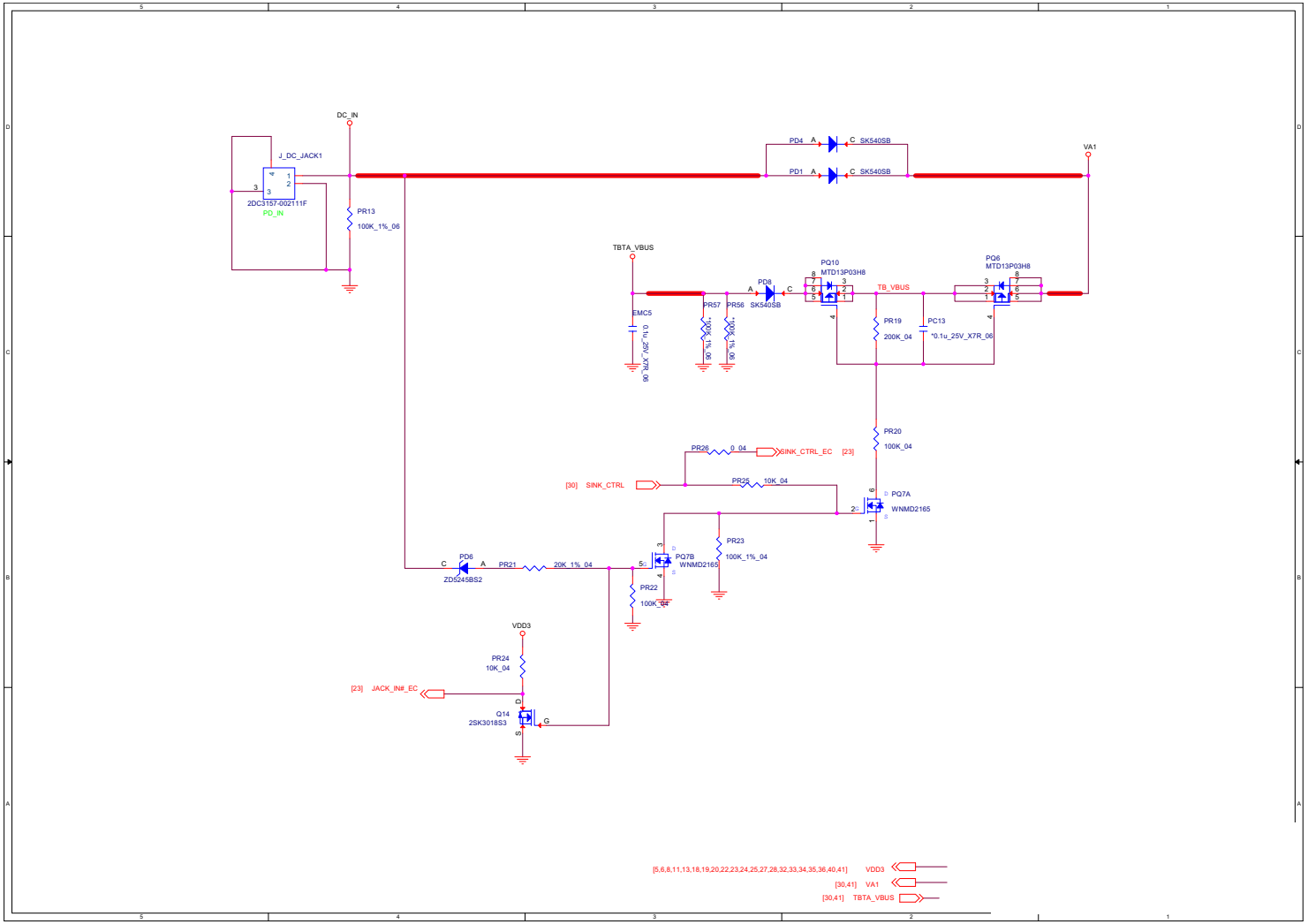
Charger



AC_In



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AC_In

Multi Board - USB, LED

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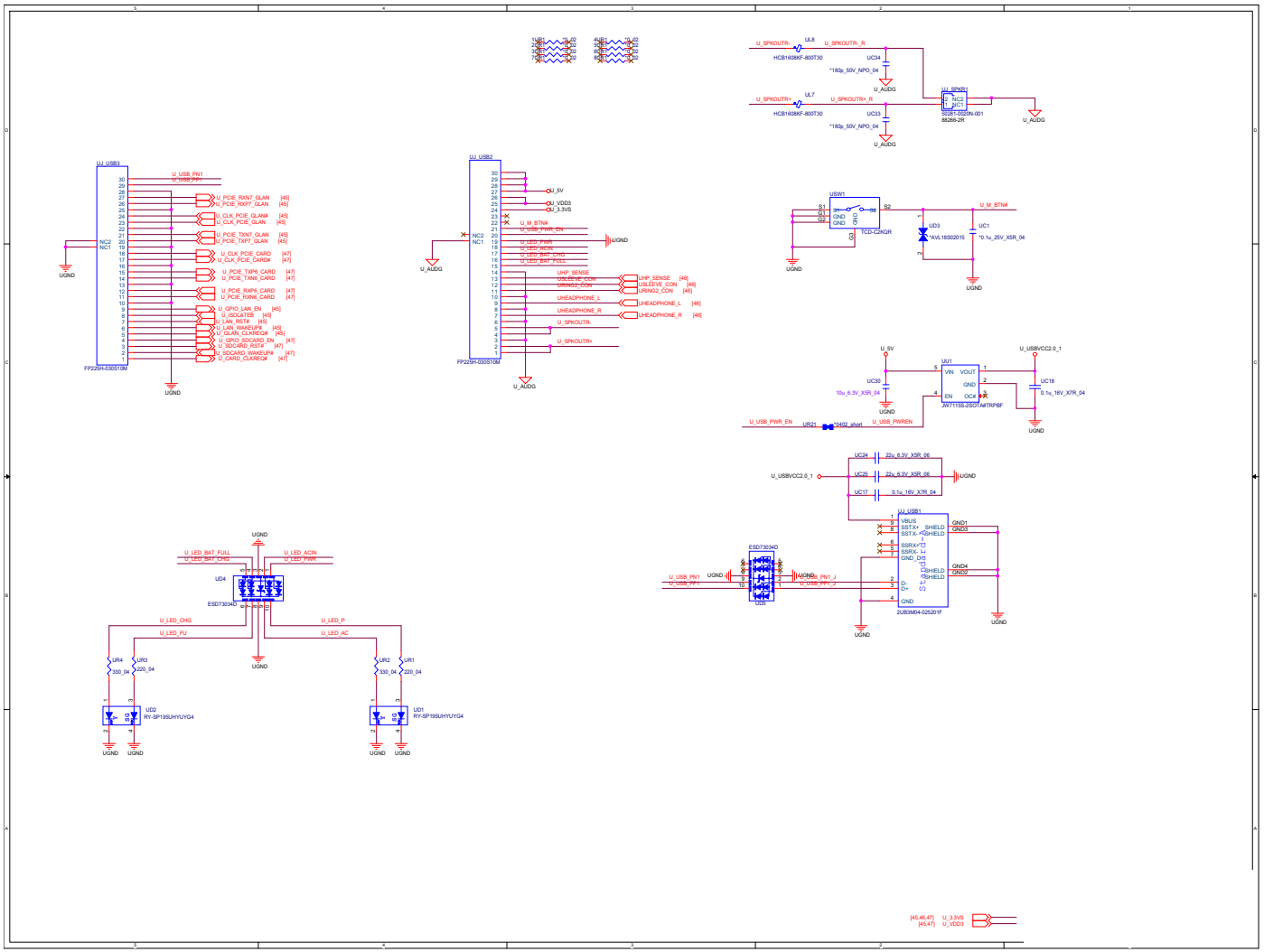
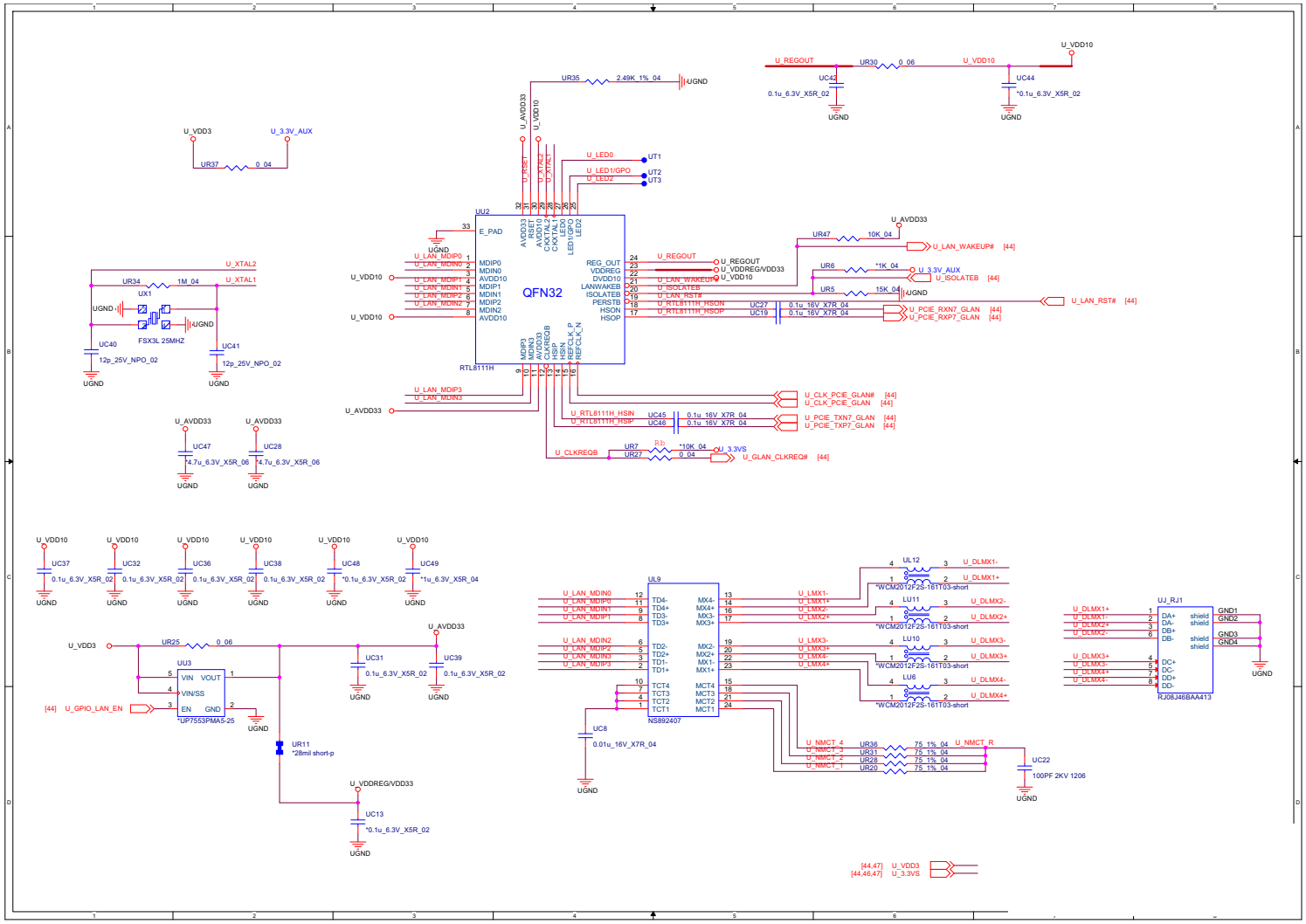
Multi Board - USB, LED



Multi Board - RTL8111H RTD3



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Multi board -
RTL8111H RTD3

Audio Board

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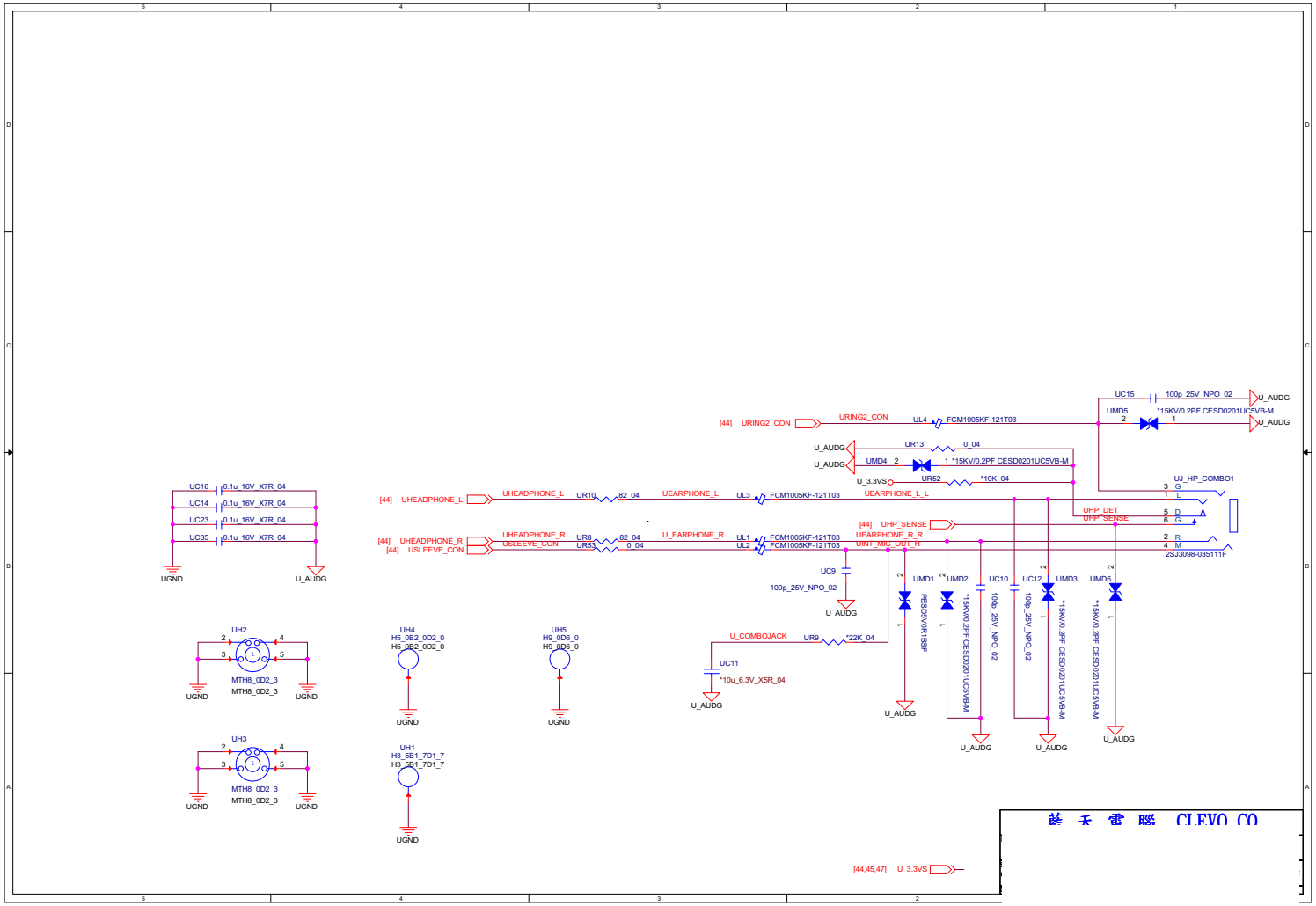
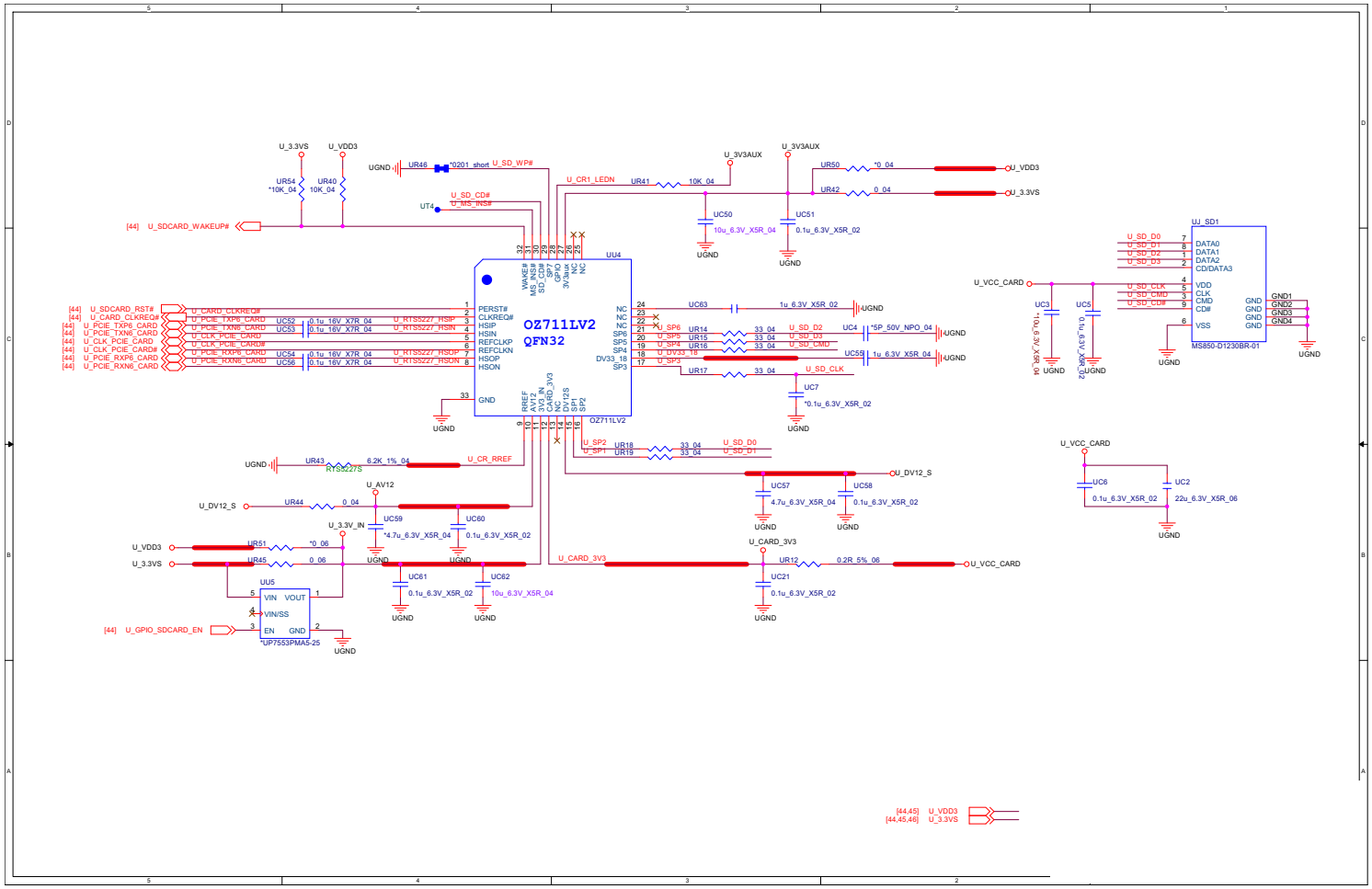
Audio Board



OZ711LV2



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OZ711LV2

Hall Sensor Board

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Hall Sensor Board