SERVICE MANUAL

NP60SNC / NP60SND / NP60SNE

notebook

Notebook Computer

NP60SNC / NP60SND / NP60SNE

Service Manual

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HDMI™
HIGH-DEFINITION MULTIMEDIA INTERFACE

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 ***NP60SNC / NP60SND / NP60SNE*** 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 as follows:

- AC Input of 100 - 240V, 50 - 60Hz, DC Output of 20V, 14A (**280** Watts) minimum AC/DC Adapter.

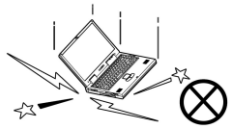
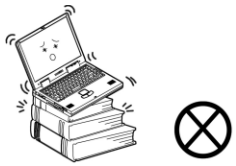
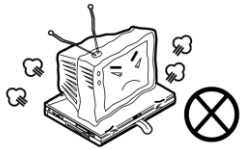
FCC Statement

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.

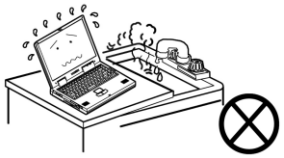
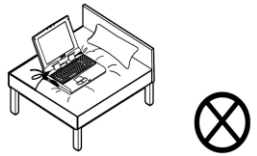
Instructions for Care and Operation

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

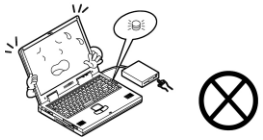
1. **Don't drop it, or expose it to shock.** If the computer falls, the case and the components could be damaged.

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.*
		

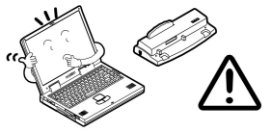
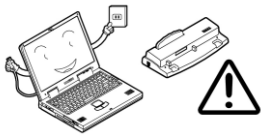
2. **Keep it dry, and don't overheat it.** Keep the computer and power supply away from any kind of heating element. This is an electrical appliance. If water or any other liquid gets into it, the computer could be badly damaged.

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.*
	

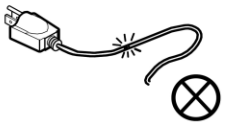
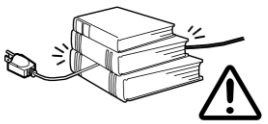
Power Safety

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 rear 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 130 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 to turn the computer "on".

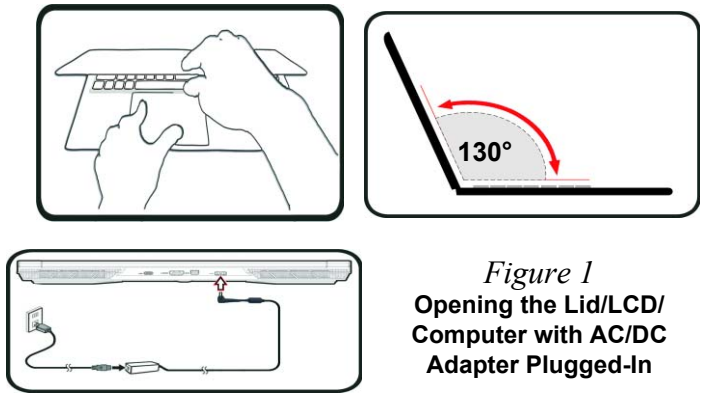
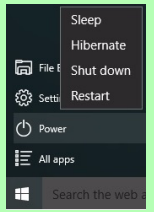


Figure 1
Opening the Lid/LCD/ Computer with AC/DC Adapter Plugged-In

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 ***NP60SNC / NP60SND / NP60SNE*** 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. *Windows 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 ***NP60SNC / NP60SND / NP60SNE*** 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 here are correct at the time of sending them to the 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 more details.

CPU Speed & Computer in DC Mode

Note that when the computer is in DC mode (powered by the battery only) the CPU may not run at full speed. This is a design feature implemented in order to protect the battery.

Processor Options

i9-13900HX (2.20GHz), TDP 55W
i7-13700HX (2.10GHz), TDP 55W
i5-13500HX (2.50GHz), TDP 55W

LCD Options

LCD, 16" (40.64cm), 16:10, QHD+ (2560x1600)/FHD+ (1920x1200)

BIOS

INSYDE BIOS (256Mb SPI Flash ROM)

Memory

Dual Channel DDR5
Two 262 Pin SO-DIMM Sockets
Supporting up to **4800/5600MHz DDR5** Memory
Memory Expandable up to **64GB**
Compatible with 8GB,16GB or 32GB Modules

(The real memory operating frequency depends on the FSB of the processor.)

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

Video Adapter Options

NVIDIA Advanced Optimus Capable Technology
Supports up to 4 Active Displays

Intel® UHD Graphics
HDR Support
Rec. 2020
Microsoft DirectX®12 Compatible

NVIDIA® GeForce RTX4070 (NP60SNE)
8GB GDDR6 Video RAM
Microsoft DirectX®12 Compatible
Supports PCIe Gen4

NVIDIA® GeForce RTX4060 (NP60SND)
8GB GDDR6 Video RAM
Microsoft DirectX®12 Compatible
Supports PCIe Gen4

NVIDIA® GeForce RTX4050 (NP60SNC)
6GB GDDR6 Video RAM
Microsoft DirectX®12 Compatible
Supports PCIe Gen4

Pointing Device

Built-In Touchpad (with Microsoft PTP Multi Gesture & Scrolling Functionality)

Keyboard

Full-size **Multi-Color** LED Keyboard (with Numeric Keypad)

Audio

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

Card Reader

MicroSD Card Reader

M.2 Slots

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

Communication

Built-In 10/100/1000Mb Base-TX Ethernet LAN
1.0M HD Webcam
Or
(**Factory Option**) 2.0M FHD Webcam with TNR

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

Interface

One USB 2.0 Port
One USB 3.2 Gen 1 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
One Mini DisplayPort 1.4
One HDMI-Out Port
One Microphone-In Jack
One 2- In-1 Audio Jack (Headphone / Microphone)
One RJ-45 LAN Jack
One DC-In Jack

Environmental Spec

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

Power

Embedded 4 Cell Polymer Battery Pack, 73Wh

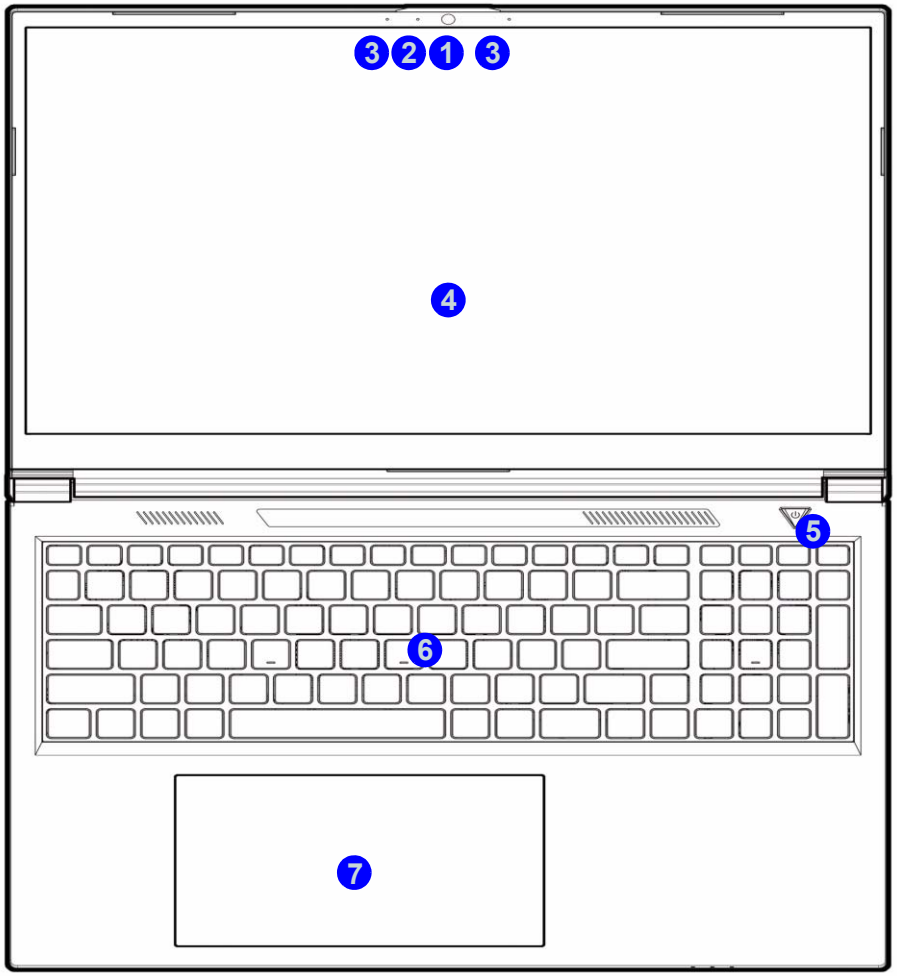
Full Range AC/DC Adapter
AC Input: 100 - 240V, 50 - 60Hz
DC Output: 20V, 14A (**280W**)

Dimensions & Weight

359.5mm (w) * 263.8mm (d) * 27.5mm (h)
2.45kg (Barebone with 73Wh Battery)

External Locator - Top View with LCD Panel Open

Figure 1
Top View



1. Webcam
2. *Camera LED
   **When the PC camera is in use, the LED will be illuminated.*
3. Built-In Array Microphone
4. Display
5. Power Button
6. Keyboard
7. Touchpad & Buttons

External Locator - Front & Right Side Views

FRONT VIEW

Figure 2
Front View

1. LED Indicators

RIGHT SIDE VIEW

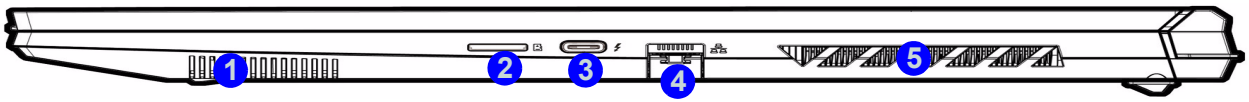


Figure 3
Right Side View

1. Speaker
2. MicroSD Card Reader
3. Thunderbolt 4 Port
4. RJ-45 LAN Jack
5. Vent

External Locator - Left Side & Rear View

Figure 4
Left Side View

1. Security Lock Slot
2. Vent
3. USB 3.2 Gen 1 Type-A Port
4. USB 2.0 Port
5. Microphone-In Jack
6. 2-In-1 Audio Jack (Headphone and Microphone)
7. Speaker

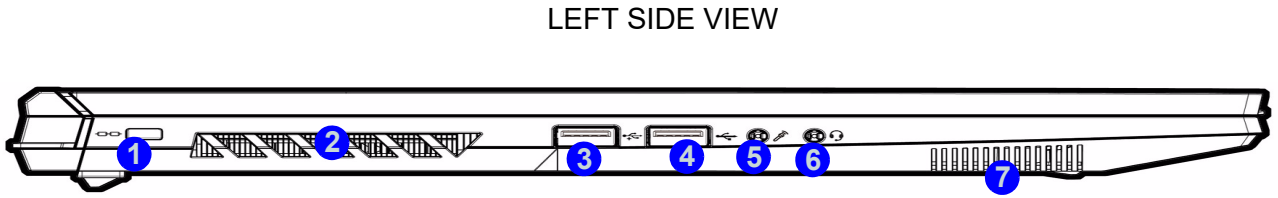
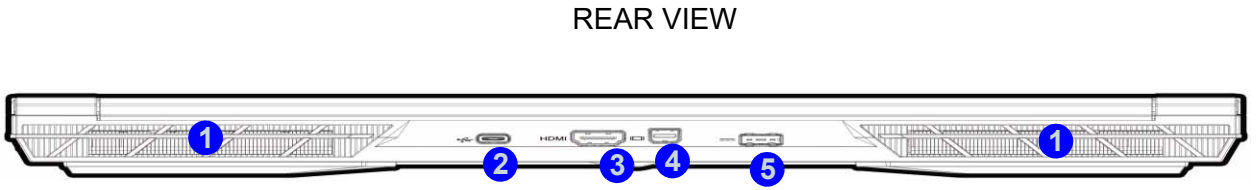


Figure 5
Rear View

1. Vent
2. USB 3.2 Gen 2 Type-C Port
3. HDMI-Out Port
4. Mini DisplayPort 1.4
5. DC-In Jack



External Locator - Bottom View

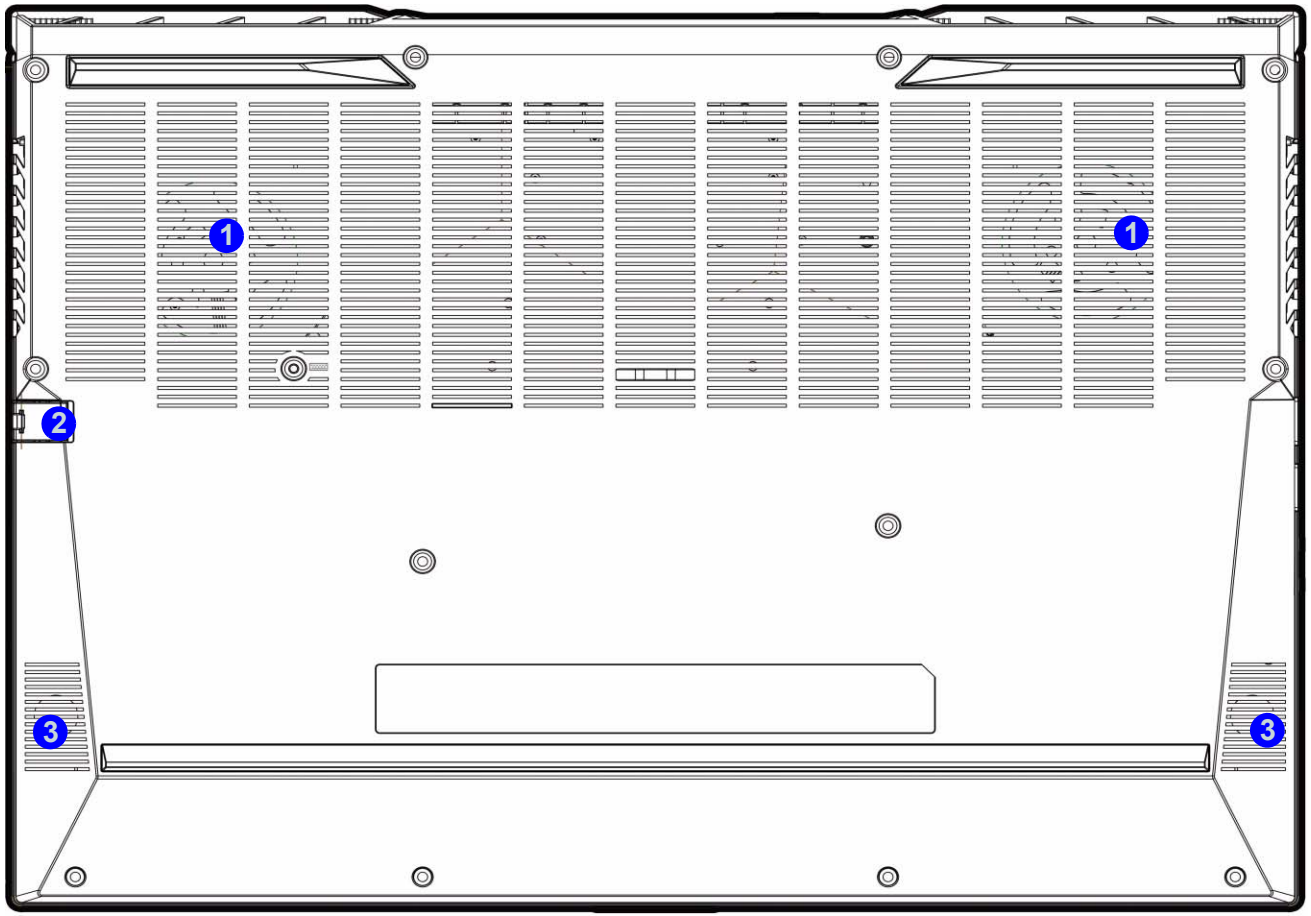


Figure 6
Bottom View

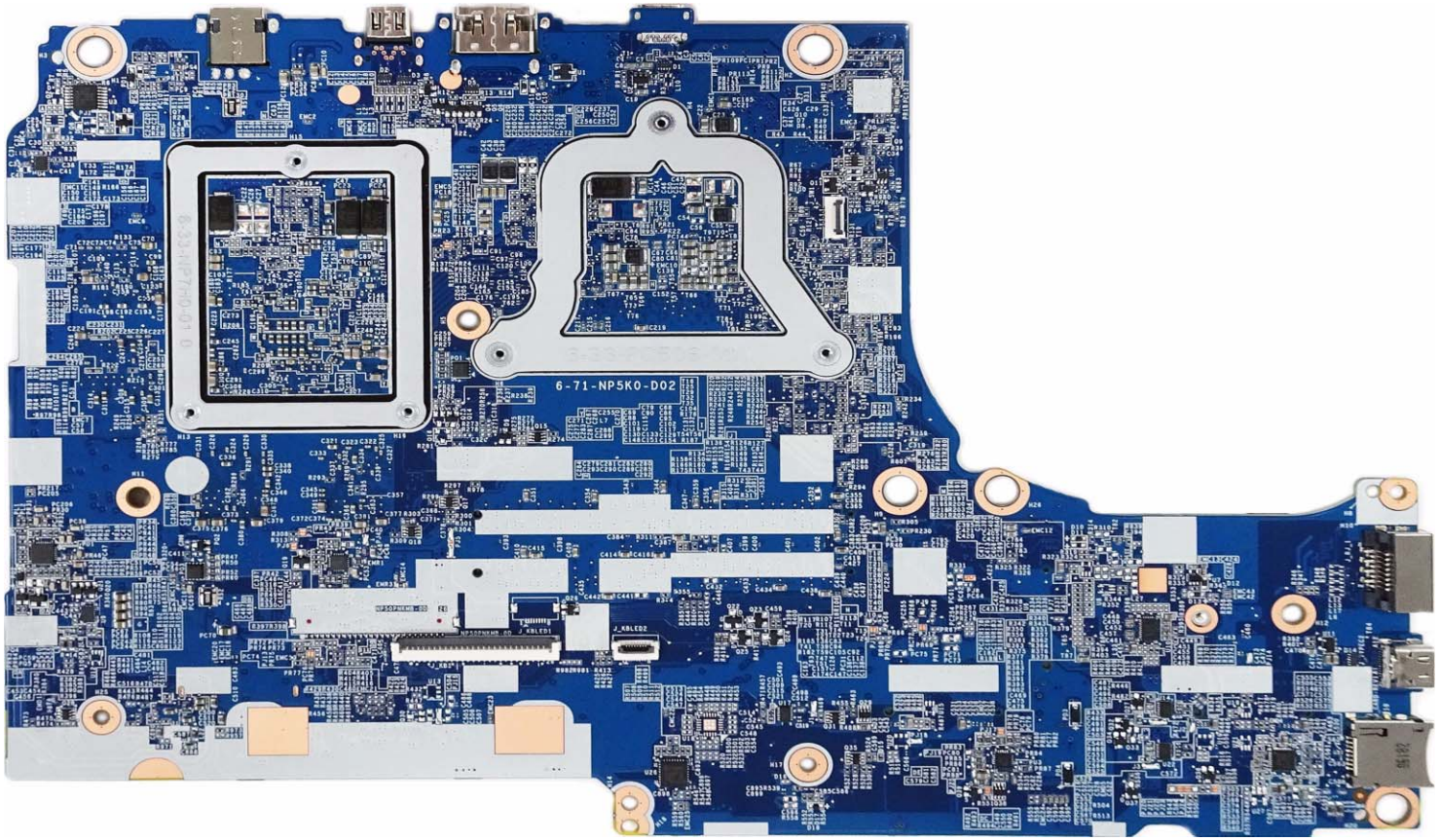
1. Vent
2. RJ-45 LAN Jack
3. Speakers

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



Mainboard Overview - Bottom (Key Parts)

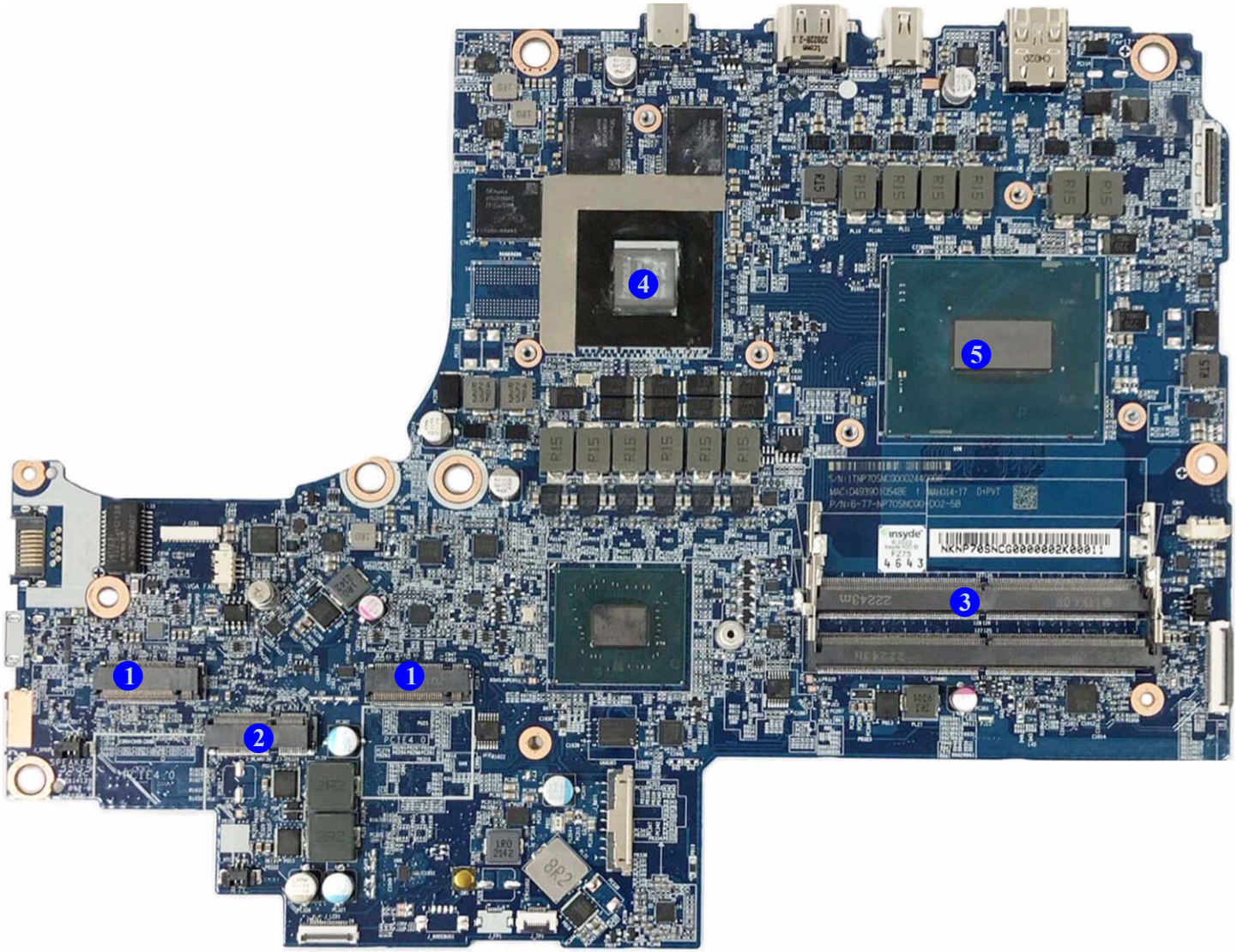


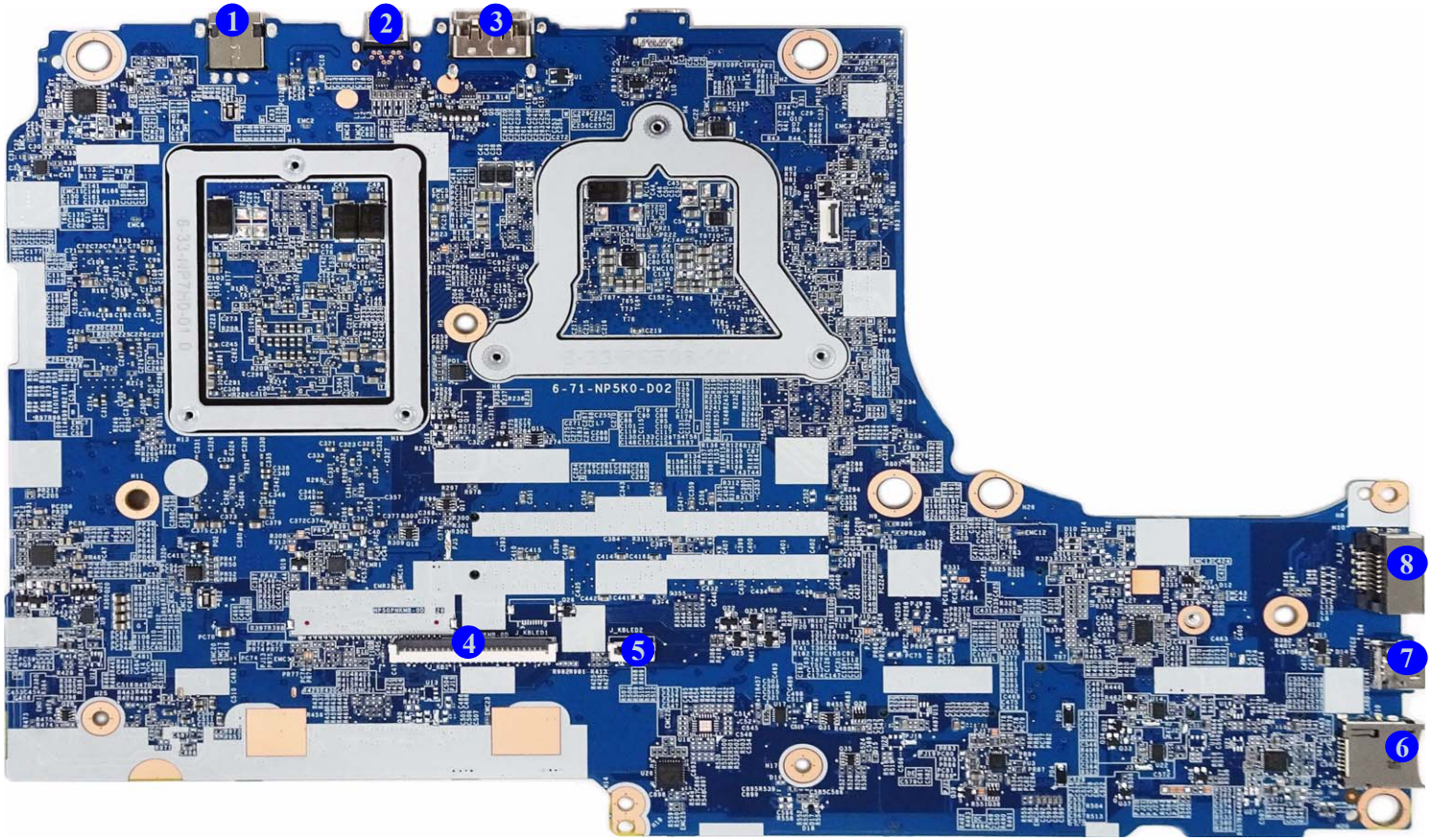
Figure 8
Mainboard Bottom Key Parts

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

Mainboard Overview - Top (Connectors)

Figure 9
Mainboard Top Connectors

1. DC-In Jack
2. Mini Display Port
3. HDMI Port
4. Keyboard Cable Connector
5. LED KB Connector
6. MicroSD Card Reader
7. Thunderbolt 4 Port
8. RJ-45 LAN Jack



Mainboard Overview - Bottom (Connectors)

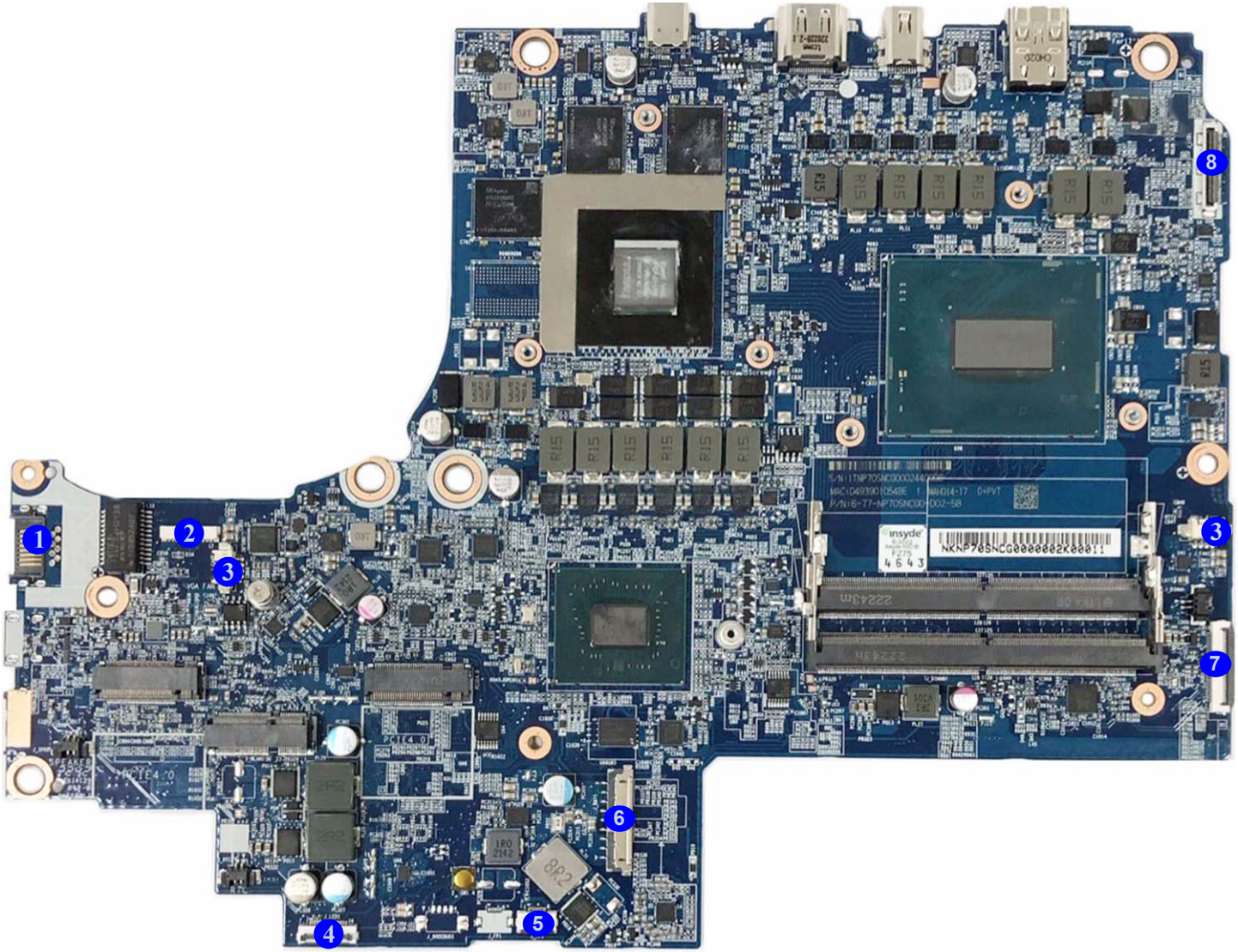


Figure 10
Mainboard Bottom Connectors

1. RJ-45 LAN Jack
2. CCD Connector
3. Fan Connector
4. LED Connector
5. Clickpad Cable Connector
6. Battery Connector
7. Audio Connector
8. LCD Connector

Chapter 2: Disassembly

Overview

This chapter provides step-by-step instructions for disassembling the ***NP60SNC / NP60SND / NP60SNE*** series notebook's parts and subsystems. When it comes to reassembly, reverse the procedures (unless otherwise indicated).

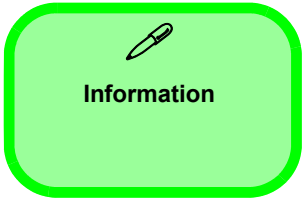
We suggest you completely review any procedure before you take the computer apart.

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.

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

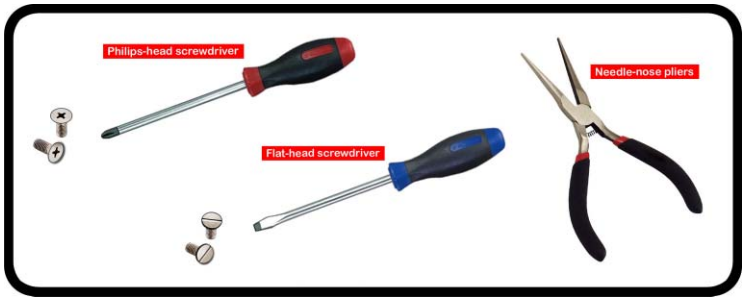


NOTE: All disassembly procedures assume that the system is turned **OFF**, and disconnected from any power supply (the battery is removed too).

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:

1. Remove the battery *page 2 - 5*

To remove the Keyboard:

1. Remove the battery *page 2 - 5*
2. Remove the keyboard *page 2 - 7*
3. Install the keyboard *page 2 - 9*

To remove the M.2 SSD:

1. Remove the battery *page 2 - 5*
2. Remove the M.2 SSD-1 *page 2 - 10*
3. Remove the M.2 SSD-2 *page 2 - 11*

To remove the System Memory:

1. Remove the battery *page 2 - 5*
2. Remove the system memory *page 2 - 12*

To remove the Wireless LAN Module:

1. Remove the battery *page 2 - 5*
2. Remove the WLAN *page 2 - 13*

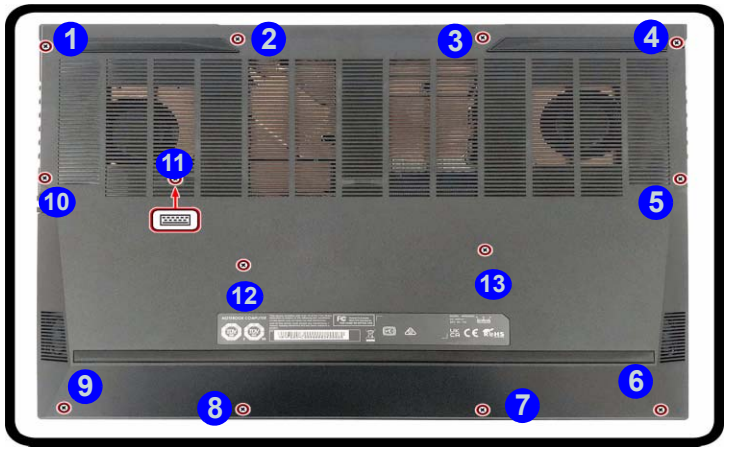
Removing the Battery

1. Turn **off** the computer, turn it over.
2. Remove screws 1 - 13 (*Figure 1a*).
3. Carefully lift the bottom case 14 up in the direction of the arrow at point 15 and remove it (*Figure 1b*).

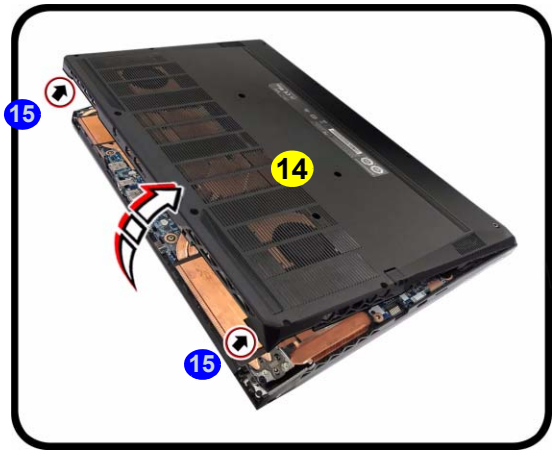
Figure 1
Battery Removal

a. Remove the screws.
b. Remove the bottom case.

a.



b.



14. Bottom Case

- 13 Screws

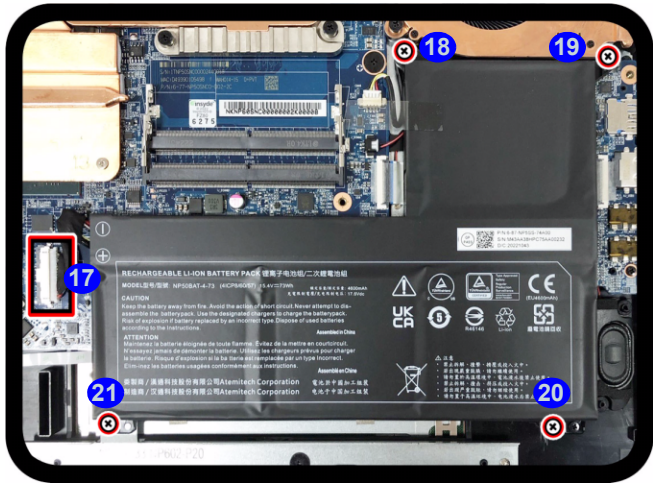
Figure 2
Battery Removal (cont'd.)

c. Locate the battery.
d. Disconnect the cable and remove the screws.
e. Lift the battery off the computer.

4. The battery will be visible at point 16 on the computer (***Figure 2c***).
5. Carefully disconnect the cable 17, then remove screws 18 - 21 (***Figure 2d***).
6. Lift the battery 22 off the computer (***Figure 2e***).
7. Reverse the process to install a new battery (do not forget to replace all the screws and bottom cover).

c.

d.



e.

22. Battery

- 4 Screws

Removing the Keyboard

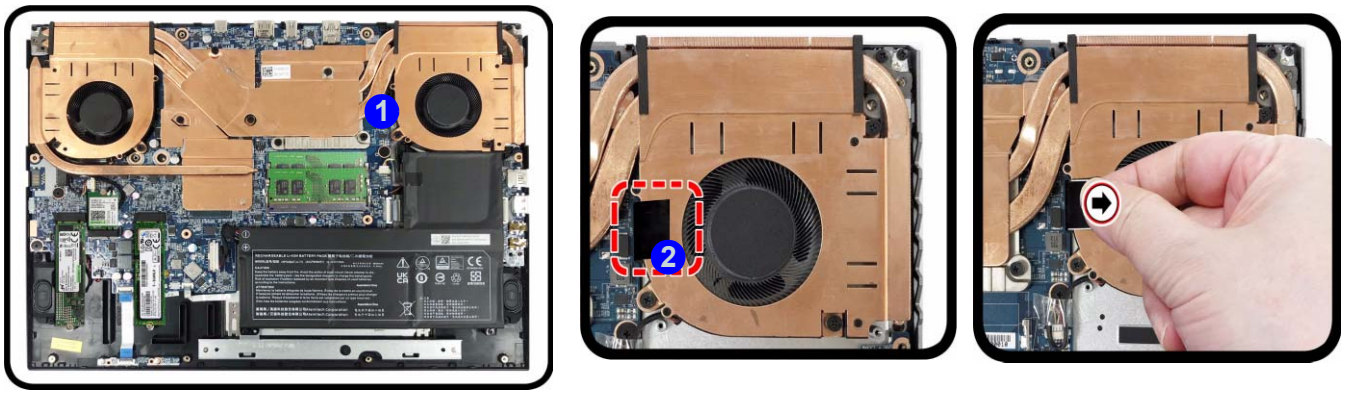
Keyboard Removal Procedure

1. Turn **off** the computer, remove the battery (*page 2 - 5*).
2. The keyboard adhesive mylar will be visible at point 1 on the computer. Pull the adhesive mylar 2 out to release the keyboard (*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 special eject stick 4 to do this) while releasing the keyboard in the direction of the arrow 5 as shown (*Figure 3b*).

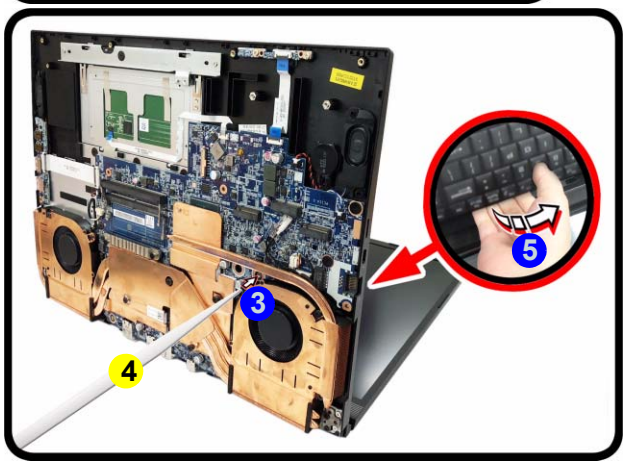
Figure 3
Keyboard Removal

a. Remove the adhesive mylar from the keyboard.
b. Use a special eject stick to push the keyboard out while releasing the keyboard as shown.

a.



b.



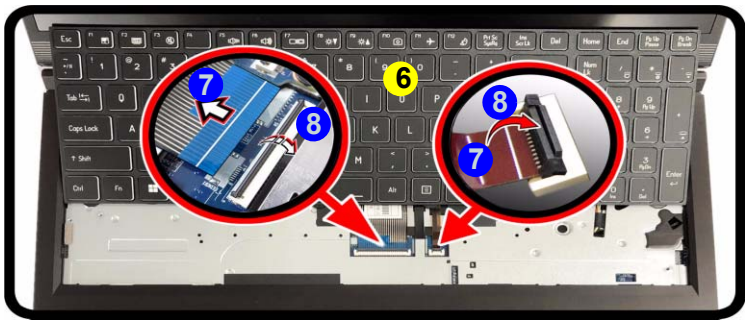
4. Eject Stick

Figure 4
Keyboard Removal (cont'd.)

c. Lift the keyboard up and disconnect the keyboard ribbon cable from the locking collar socket.
d. Remove the keyboard.

4. Carefully lift the keyboard 6 up, being careful not to bend the keyboard ribbon cable 7. Disconnect the keyboard ribbon cable 7 from the locking collar socket by using a flat-head screwdriver to pry the locking collar pins 8 away from the base (***Figure 4c***).
5. Carefully lift the keyboard 6 off the computer (***Figure 4d***).

c.



d.

Re-inserting the Keyboard

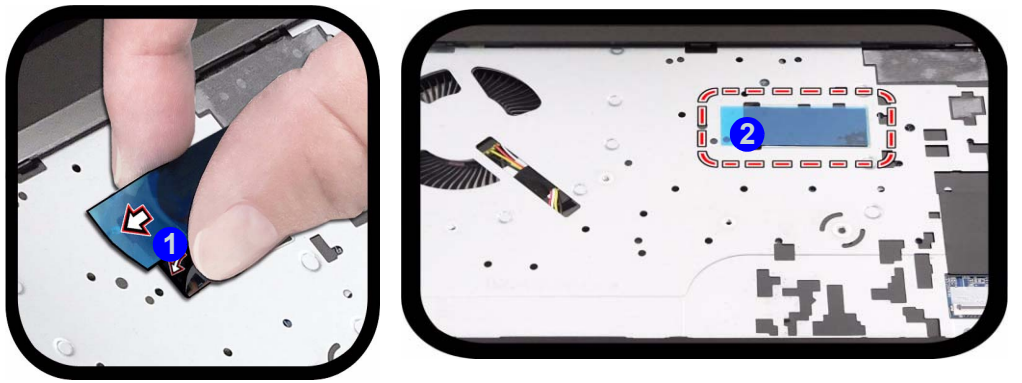
When re-inserting the keyboard firstly, align the keyboard tabs at the bottom of the keyboard with the slots in the case.

6. Keyboard

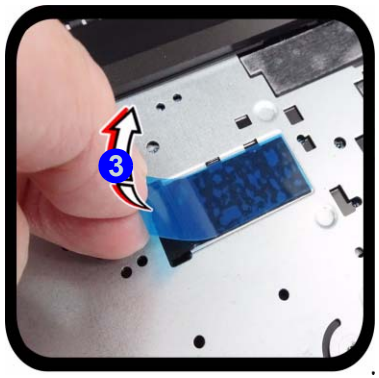
Keyboard Installation Procedure

1. Make sure to insert 1 a part of the adhesive mylar 2 and then install it properly in the location as shown (*Figure 5a*).
2. Pull the mylar cover 3 to reveal the adhesive side of the mylar (*Figure 5b*).
3. Carefully connect the keyboard ribbon cable 4 to the locking collar socket 5 and then insert the keyboard 6 in place (*Figure 5c*).
4. Make sure to press the keyboard downward in the indicated area as shown 7 to ensure that it sticks to the adhesive mylar (*Figure 5d*). Apply atleast 2kg of pressure for 10 seconds.

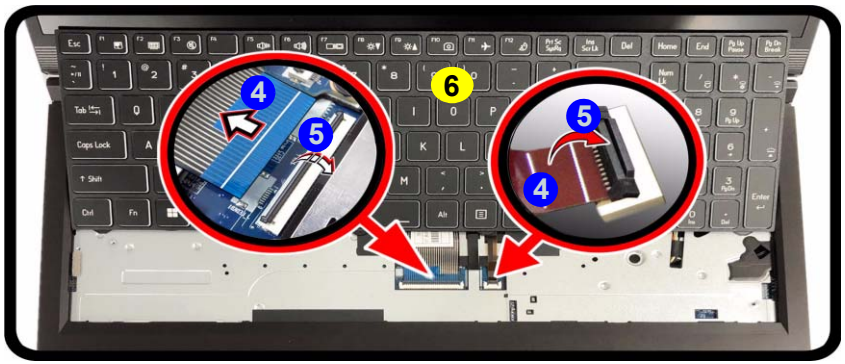
a.



b.



c.



d.

Figure 5
Keyboard Installation

a. Install the adhesive mylar.
b. Remove the mylar cover.
c. Connect the keyboard ribbon cable to the locking collar socket and insert the keyboard in place.
d. Make sure to press the keyboard toward the computer.

Re-inserting the Keyboard

When re-inserting the keyboard firstly, align the keyboard tabs at the bottom of the keyboard with the slots in the case.

6. Keyboard

Figure 6
M.2 SSD-1 Module Removal

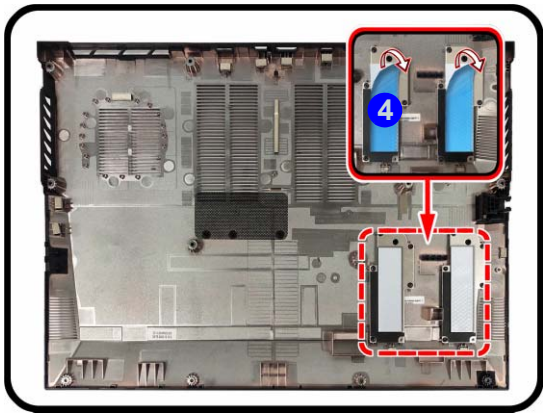
a. Locate the M.2 SSD.
b. Remove the screw.
c. The M.2 SSD module will pop up.

Removing the M.2 SSD Module

M.2 SSD-1 Removal Procedure

1. Turn **off** the computer, turn it over, remove the battery (*page 2 - 5*).
2. The M.2 SSD module will be visible at point 1 on the mainboard (*Figure 6a*).
3. Remove the screw 2 (*Figure 6b*).
4. The M.2 SSD module 3 (*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 the screws and make sure that the thermal pad 4 is attached).

a.



Thermal Pad

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

b.

c.

3.M2 SSD Module
PCIE

- 1 Screw

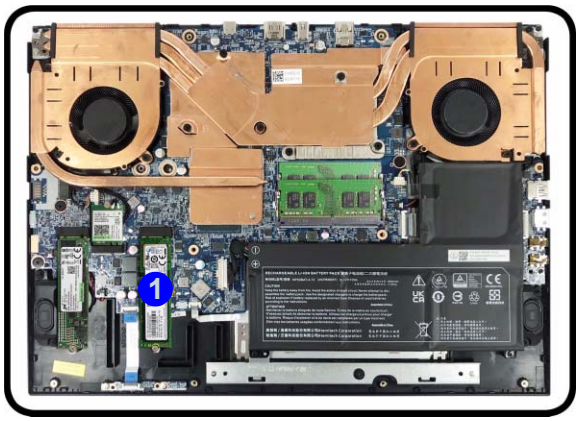
M.2 SSD-2 Removal Procedure

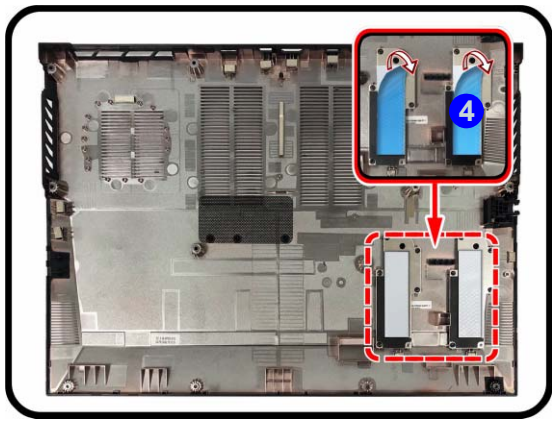
1. Turn **off** the computer, turn it over, remove the battery (*page 2 - 5*).
2. The M.2 SSD module will be visible at point 1 on the mainboard (*Figure 7a*).
3. Remove the screw 2 (*Figure 7b*).
4. The M.2 SSD module 3 (*Figure 7c*) will pop-up, and you can remove it from the computer.
5. Reverse the process to install a new module (do not forget to replace the screws and make sure that the thermal pad 4 is attached).

Figure 7
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.

a.





Thermal Pad

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

b.

c.

3.M2 SSD Module
PCIE

- 1 Screw

Figure 8
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.

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

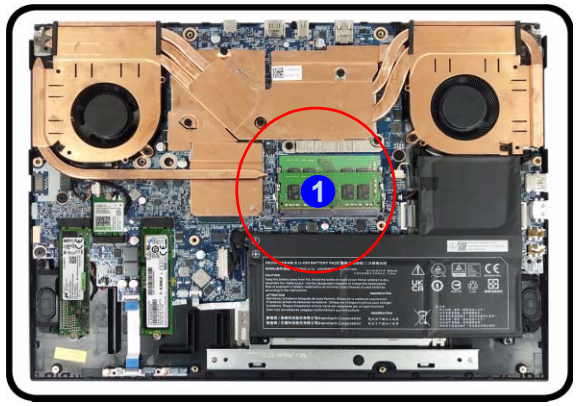
Removing the System Memory (RAM)

The computer has four memory sockets for 262 pin Small Outline Dual In-line Memory Modules (SO-DIMM) supporting DDR5 Up to 4800/5600 MHz. 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.

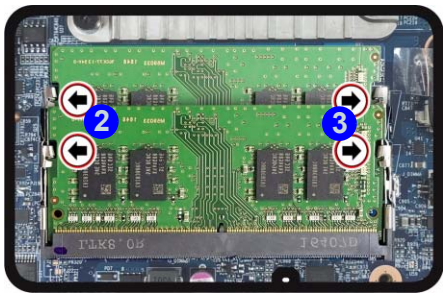
Memory Upgrade Process

1. Turn **off** the computer, turn it over, remove the battery (***page 2 - 5***).
2. The RAM-2 modules will be visible at point 1 on the mainboard (***Figure 8a***).
3. Gently pull the two release latches (2 & 3) on the sides of the memory socket in the direction indicated by the arrows (***Figure 8b***). The RAM module 4 will pop-up (***Figure 8c***), and you can then remove it.
4. Pull the latches to release the second module if necessary.
5. Insert a new module holding it at about a 30° angle and fit the connectors firmly into the memory slot.
6. 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.
7. Press the module in and down towards the mainboard until the slot levers click into place to secure the module.
8. Replace the bottom cover and the screws (see ***page 2 - 5***).
9. Restart the computer to allow the BIOS to register the new memory configuration as it starts up.

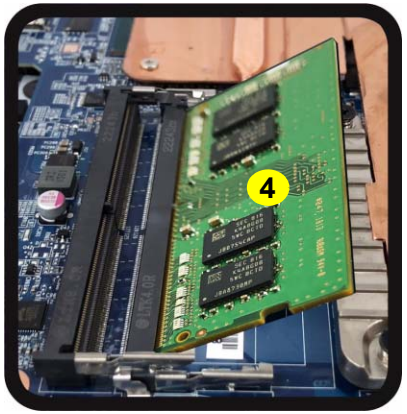
a.



b.



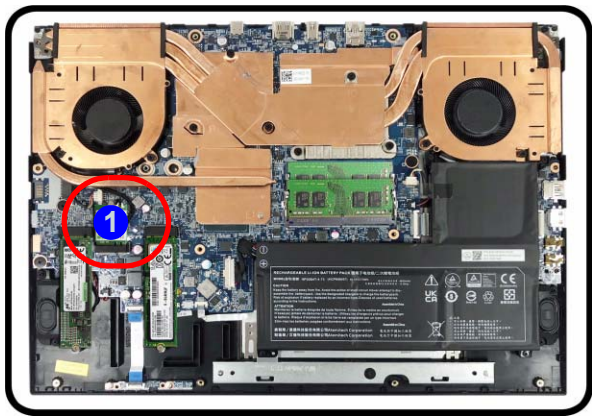
c.



Removing the Wireless LAN Module

1. Turn **off** the computer, turn it over, remove the battery (*page 2 - 5*).
2. The Wireless LAN module will be visible at point 1 on the mainboard (*Figure 9a*).
3. Carefully disconnect the cables 2 & 3, and then remove the screw 4 (*Figure 9b*)
4. The Wireless LAN module 5 (*Figure 9c*) will pop-up, and you can remove it from the computer.

a.



b.

c.

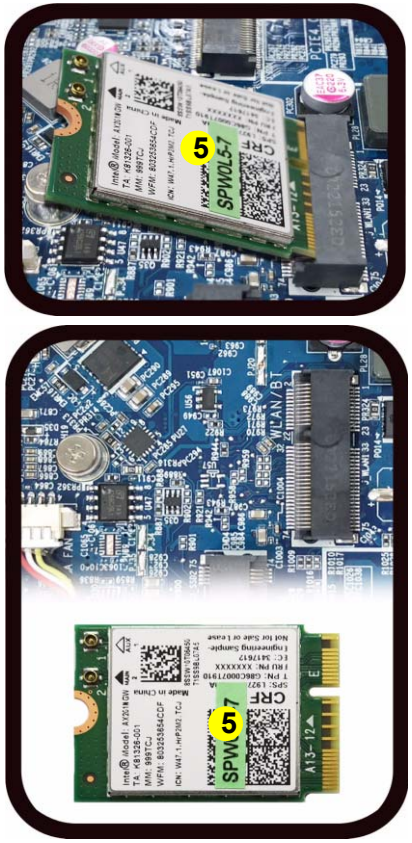


Figure 9
Wireless LAN Module Removal

a. Locate the WLAN.
b. Disconnect the cables and remove the screw.
c. The WLAN module will pop up.

Note: Make sure you reconnect the antenna cable to the "1 + 2" socket (*Figure 9b*).

5.Wireless LAN Module

- 1 Screw

Wireless LAN, Combo Module Cables

Note that the cables for connecting to the antennae on WLAN, WLAN & Bluetooth Combo, 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 on the module, and cable 2 to antenna 2.

Appendix A:Part Lists

This appendix breaks down the ***NP60SNC / NP60SND / NP60SNE*** 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.

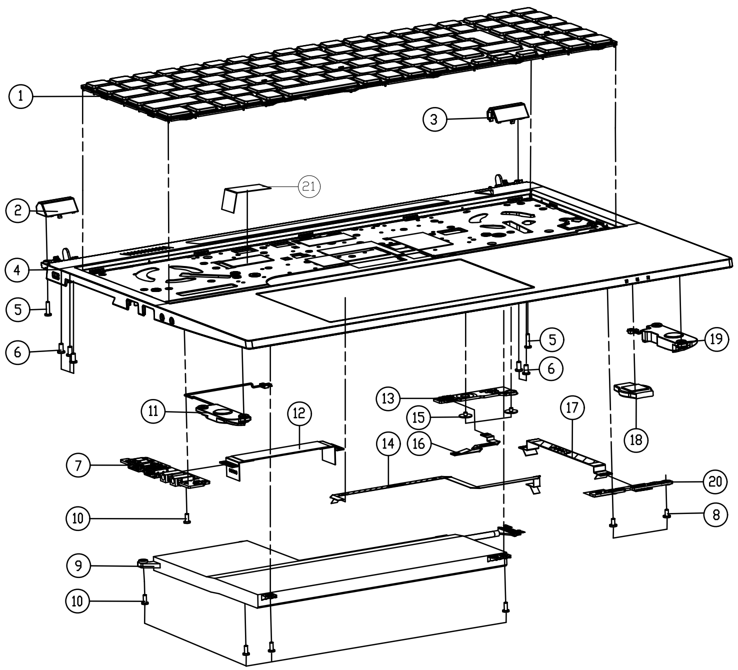
Part List Illustration Location

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

Table A - 1
Part List Illustration Location

Part	NP60SNC/NP60SND/NP60SNE	NP60SNC-G/NP60SND-G/NP60SNE-G
Top	*page A - 3*	
Bottom	*page A - 4*	
Main Board	*page A - 5*	
LCD	*page A - 6*	*page A - 7*

Top

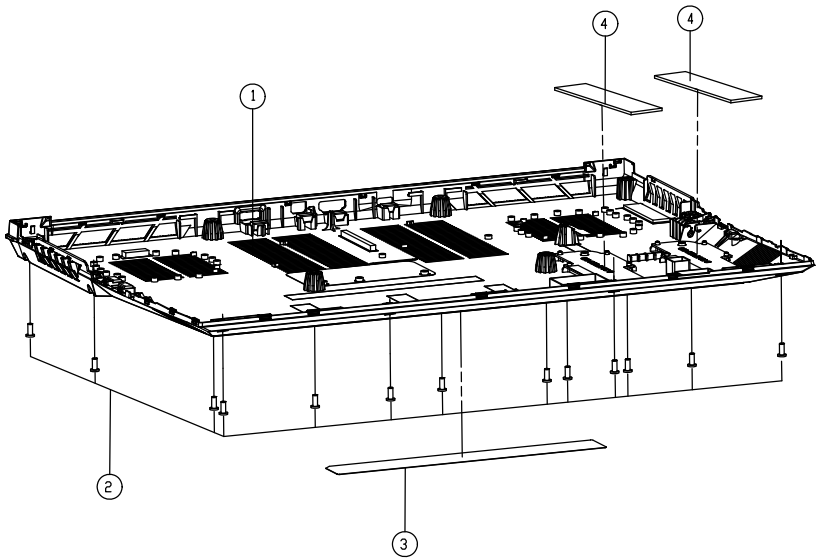


ITEM	PART NAME	PART NO	REMARK
1	KB FOR MULTI 15C BL KB US SERIES NP50SNE	6-NP50SNE-KB-MCL-US	
1	BL KB JAPANESE WIN11 KEY CVM19H10J094305 PC51HS BLACK WHITE SILVER LINING PRINTING ISOLATION (332.95MAX NUT*1) FOR MCJ	6-80-PC510-210-1M	
2	HINGE CAP L (COVESTRO FR3008+) NP60HP	6-42-NP602-042	
3	HINGE CAP R (COVESTRO FR3008+) NP60HP	6-42-NP602-032	
4	(PRE-PROCESS) TOP CASE MODULE NP60SNE	6-78-NP60SNE2-010	
5	.SCREW M2*8L K1 BK/Z ICT NY	6-35-B6120-8R0	
6	SCREW M2.5*5L KI BK/Z ICT NYT NY	6-35-B6125-5RA	
7	AUDIO BOARD V2.0 NP50SNE	6-77-NP5S8-D02	
8	SCREW M2*4L KI NI ICT NY (DD=Ø4.5,DT=0.8)	6-35-B1120-4RC	
9	BAT POLYMER 15.4V/4730MAH/73WH 4S1P SCUD HIGH POWER (SH366006) (RH5K37140005) (4550MAH)	6-87-NP5SS-73A00	
9	BAT POLYMER 15.4V/4760AH/73WH 4S1P SMP HPT 805957 (TI BQ40Z50) (980QA053H/HB) (4600MAH)	6-87-NP5SS-71M00	
9	BAT POLYMER 15.4V/4760MAH/73WH 4S1P ATC HIGH POWER (SH366006+BQ294708) (5413AA380001) (4600MAH)	6-87-NP5SS-74A00	
10	SCREW M2*5L KI(T=0.8 D=4.0) BK/Z ICT NY	6-35-B6120-5R0	
11	SPK+CABLE L L42.45*15.85 2W 4ΩL150MM VTS251410-03 NL50CU	6-23-5NL5C-0L0	
12	FFC CABLE AUDIO TO MB L=91MM 60V 30PIN (QX) NP50DB	6-43-NP500-011	
13	POWER SWITCH BOARD V1.0 NP50SNE	6-77-NP5SS-D01	
14	FFC CABLE TP TO MB L=198.5MM 60V 8PIN (QX) NP60SNE	6-43-NP600-S11	
15	SCREW M2*2L KI BK/Z ICT NY(Ø8,T=0.6)	6-35-B6120-2RE	
16	FFC CABLE POWER TO MB L=93.5MM 60V 4PIN (QX) NP50SNE	6-43-NP5S0-021	
17	FFC CABLE HALL TO MB L=69MM 60V 16PIN (QX) NP70SNE	6-43-NP7S0-021	
18	BAT. 20MM 3V 220MAH W/CABLE 55MM BCR2032H5.5VM1UB (SHIHNO)	6-23-22015-TE0	
19	SPK+CABLE R L53.5*16.9 2W 4ΩL50MM VTS251410-04 NL50CU	6-23-5NL5C-0R0	
20	LED BOARD V1.0 NP50HP	6-77-NP5H4-D01	
21	LALATAPE(30*15*0.3T) TMQB-300 PC50HS	6-47-PC502-H10	

Figure A - 1
Top

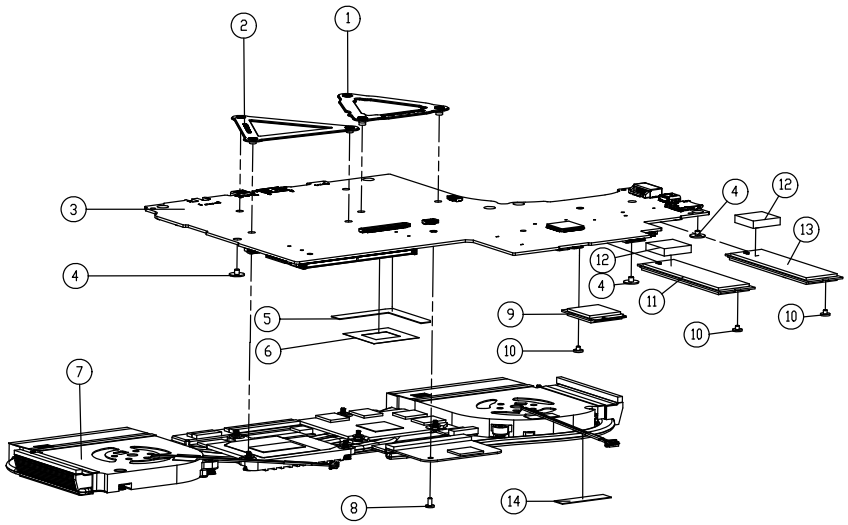
Bottom

Figure A - 2
Bottom



ITEM	PART NAME	PART NO	REMARK
1	BOTTOM CASE MODULE NP60SNE	6-39-NP603-S12	
2	SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
3	PRODUCT LABEL FOR NP60SNE	6-45-NP60SNE3-010	
3	PRODUCT LABEL FOR NP60SNC	6-45-NP60SNC3-010	
3	PRODUCT LABEL FOR NP60SND	6-45-NP60SND3-010	
3	PRODUCT LABEL FOR NP60SNE-G	6-45-NP60SNEG-010	
3	PRODUCT LABEL FOR NP60SNC-G	6-45-NP60SNCG-010	
3	PRODUCT LABEL FOR NP60SND-G	6-45-NP60SNDG-010	
3	PRODUCT LABEL FOR NP60SND-G	6-45-NP60SNDG-010	
3	PRODUCT LABEL(OMPS3H-TB-3A(NP)) FOR 戰神 NP60SNE-HA1/NP60SNC-HA1-NP60SND-HA1	6-45-NP60SNEHA1-010	
4	THERMAL PAD(SR-1000-A530BS-UA1(65*18*1.25T,MMK)+P2)PD70SNE-G	6-48-PD7S1-011	

Main Board

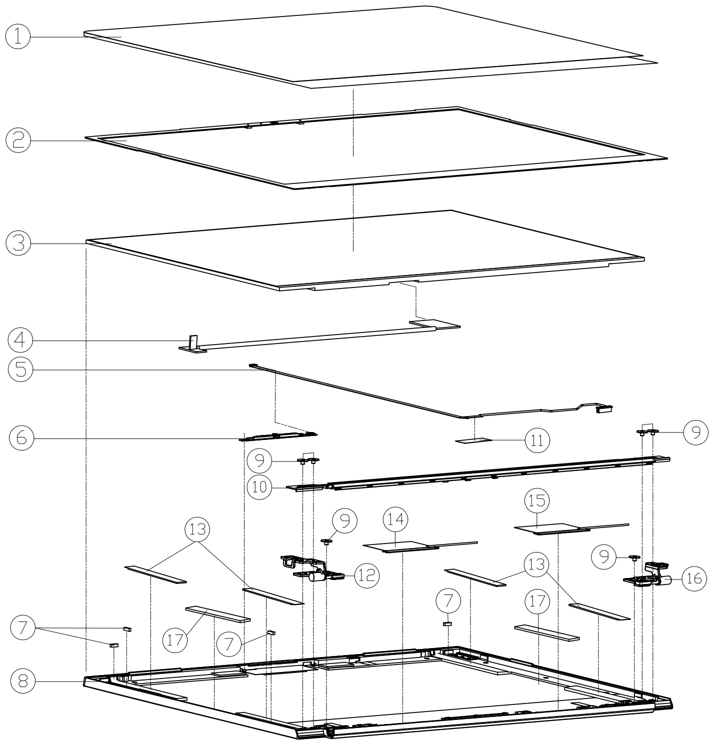


ITEM	PART NAME	PART NO.	REMARK
1	CPU SUPPORT SECC0.5T X270PTA	6-33-X2700-010	
2	VGA SUPPORT BRACKET SGCC PD50SNE-G	6-33-PD5SS-010	
3	MAIN BOARDCPU/I5-13500HX/25G V2.0 SAMSUNG VRAMX8EIPXV/USB CHARGERXV/D TPM NP50SNE	6-77-NP50SNE0-D02-2D	
3	MAIN BOARDCPU/I7-13650HX/25G V2.0 SAMSUNG VRAMX8EIPXV/USB CHARGERXV/D TPM NP50SNC	6-77-NP50SNC0-D02-2C	
3	MAIN BOARDCPU/I7-13700HX/25G V2.0 SAMSUNG VRAMX8EIPXV/TPMXV/D USB CHARGERD NP50SND	6-77-NP50SND0-D02-1B	
3	MAIN BOARDCPU/I9-13900HX/25G V2.0 SAMSUNG VRAMX8EIPXV/D TPM,USB CHARGERD NP60SNE-G	6-77-NP60SNEG0-D02-3A	
3	MAIN BOARDCPU/I9-13900HX/25G V2.0 SAMSUNG VRAMX8EIPXV/TPMXV/D USB CHARGERD NP60SNC-G	6-77-NP60SNCG0-D02-1A	
3	MAIN BOARDCPU/I9-13900HX/25G V2.0 SAMSUNG VRAMX8EIPXV/TPMXV/D USB CHARGERD NP60SND-G	6-77-NP60SNDG0-D02-1A	
4	SCREW M2.5*2.5L KI BK/Z ICT NY(Ø8,T=0.6)	6-35-B6125-2R5	
5	ABSORBER MB VGA (HAST-12030+3M467) NP50SNE	6-47-NP5SS-010	
6	GN21 X6 MYLAR (29*29*0.1) PD50SNE-G	6-40-PD5SS-020	
6	GN21 X2X4 MYLAR (29*29*0.1) PD50SNE-G	6-40-PD5SS-010	
7	HEATSINK MODULE NP50SNE	6-31-NP5S2-102	
8	SCREW M2*4L KI NI ICT NY (DD=Ø4.5,DT=0.8)	6-35-B1120-4RC	
9	MAIN BOARDCPU/I9-13900HX/25G V2.0 SAMSUNG VRAMX8EIPXV/TPMXV/D USB CHARGERD NP60SNE-G	6-88-N24GF-4200	
9	MAIN BOARDCPU/I9-13900HX/25G V2.0 SAMSUNG VRAMX8EIPXV/TPMXV/D USB CHARGERD NP60SNC-G	6-88-NV40F-4210	
9	MAIN BOARDCPU/I9-13900HX/25G V2.0 SAMSUNG VRAMX8EIPXV/TPMXV/D USB CHARGERD NP60SND-G	6-88-X17KF-4210	
9	MAIN BOARDCPU/I9-13900HX/25G V2.0 SAMSUNG VRAMX8EIPXV/TPMXV/D USB CHARGERD NP60SNE-G	6-88-X270F-4210	
10	SCREW M2*2L KI NI ICT NY (DD=Ø5 ,T=0.8)	6-35-B1120-2RA	
11	SSD PCIE G4*4 M2 2280 512GB BIWIN CE980128600-512 (AP713) 3D TLC 128 LAYERS	6-85-D515B-B06	
12	THERMAL PAD MA500 (17.3*17.3*4T)MM X170KM-G	6-48-X17K2-0G0	
13	SSD M2 2280 512GB SAMSUNG MZVL2512HCJQ-XXXXX (PM9AD) PCIE G4*4 3D TLC 128 LAYERS	6-85-D515B-S0C	
14	TAPE MYLAR (C),MYLAR M550J	6-40-M55J2-030	

Figure A - 3
Main Board

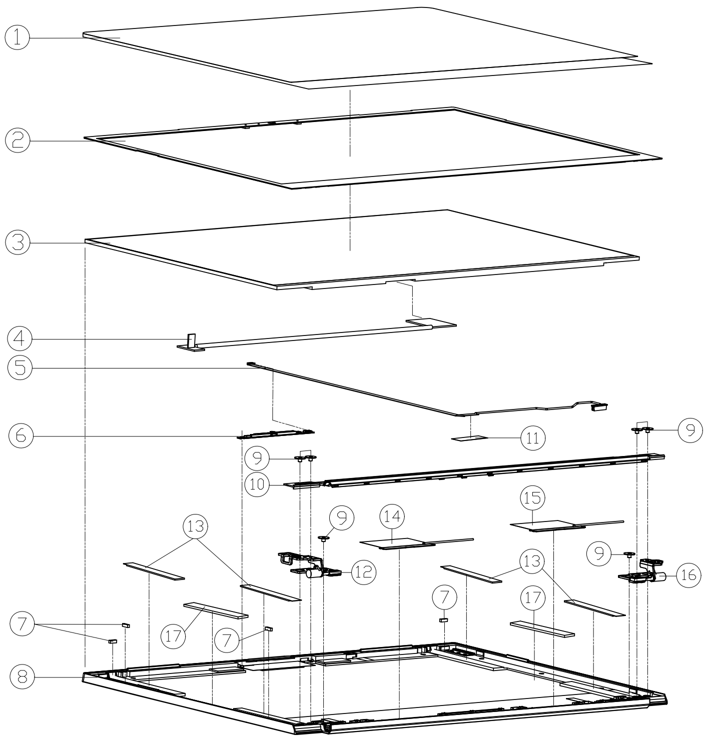
LCD (NP60SNC/NP60SND/NP60SNE)

Figure A - 4
LCD (NP60SNC/ NP60SND/ NP60SNE)



ITEM	PART NAME	PART NO	REMARK
1	LCD PROTECT MYLAR BOPP NP60HP	6-47-NP601-050	
2	FRONT COVER MYLAR 1870A+TESA4965 0.2T NP60HP	6-40-NP601-012	
3	LCD B16.0" FHD+/WVA/165HZ/DDS G-SYNC/N7/NON GT/EDP BOE NV160WUM-NX3 4.6MM(SRGB100%)	6-50-MBB46-Z250	
3	LCD B16.0" QHD+/WVA/165HZ/N7/NON GT/EDP BOE NE160QDM-NY1 4.6MM(SRGB 100%)NEW F/W	6-50-MCB46-Z211	
4	COAXIAL CABLE DDS EDP TO MB 250MM 30V (I) 40PIN 85?±10% (0.5 PITCH) (HT/LW CON?LV03140-212) NP50PNP	6-43-NP5P1-020-N	
5	CCD CABLE L=550MM 30V 8PIN (HL) ADD MARK LABLE NH50ED	6-43-NH50T-011	
6	UVC CAMERA CHICONY FIX(RGB) C7FKH7221003920LH 1M HD W/2D-MIC 4.0*71.2 OV9734 N150ZU FW2739 W/WHITE-LED	6-88-N15ZC-5102	OPTION
6	UVC CAMERA BISON FIX(RGB) BNH419VXB-000 1M HD OV9734 N150ZU FWXXXX W/WHITE-LED W/2D-MIC(NARROW BORDER WITH FFC)	6-88-N15ZC-4900	OPTION
6	UVC CAMERA BISON FIX(RGB) BNH4UGNE5-200 2M FHD +TNR W/2D-MIC 4.0*71.2 SONY 208 X170JNM FW0603 W/WHITE-LED	6-88-X17JC-4900	OPTION
7	LCD STOP RUBBER 6X2X1.8 GRAY NV40ME	6-47-NV401-0C1	
8	BACK COVER MODULE NP60HP	6-39-NP601-022	
9	SCREW M2.5*2.5L KI BK/Z ICT NY(Ø8,T=0.6)	6-35-B6125-2R5	
10	HINGE COVER MODULE NP60HP	6-42-NP601-102	
11	TOP CASE MYLAR FR83 25*7*0.05 P180HM	6-40-P1802-030	
12	HINGE L (SK7) NP60HP	6-33-NP601-0L0	
13	LALATAPE SPONGE (9*60*1.0T)	6-47-0019L-003	
14	ANTENNA IPEX4 WLAN WGT WL2 PCB DL 50X5.8MM 2.4G/5G/6GHZ WL2=400MM NP70HP	6-23-7NP7H-020	
15	ANTENNA IPEX4 WLAN WGT WL1 PCB DL 50X5.8MM 2.4G/5G/6GHZ WL1=250MM NP70HP	6-23-7NP7H-010	
16	HINGE R (SK7) NP60HP	6-33-NP601-0R0	
17	FIN SPONGE SM55+DS-15 (66*15*2.65MM) NL50MU	6-47-NL5M2-010	

LCD (NP60SNC-G/NP60SND-G/NP60SNE-G)



ITEM	PART NAME	PART NO	REMARK
1	LCD PROTECT MYLAR BOPP NP60HP	6-47-NP601-050	
2	FRONT COVER MYLAR 1870A+TESA4965 0.2T NP60HP	6-40-NP601-012	
3	LCD B16.0" QHD+/WVA/165HZ/DDS G-SYNC/N7/NON GT/EDP BOE NE160QDM-NY1 V8.3 FG:8943 4.6MM(SRGB100%)	6-50-MCB46-Z250	
4	COAXIAL CABLE DDS EDP TO MB 250MM 30V (I) 40PIN 85?±10% (0.5 PITCH) (HT/LW CON?LV03140-212) NP50PNP	6-43-NP5P1-020-N	
5	CCD CABLE L=550MM 30V 8PIN (HL) ADD MARK LABLE NH50ED	6-43-NH50T-011	
6	UVC CAMERA CHICONY FIX(RGB) C7FKH7221003920LH 1M HD W/2D-MIC 4.0*71.2 OV9734 N150ZU FW2739 W/WHITE-LED	6-88-N15ZC-5102	OPTION
6	UVC CAMERA BISON FIX(RGB) BNH419VXB-000 1M HD OV9734 N150ZU FWXXXX W/WHITE-LED W/2D-MIC(NARROW BORDER WITH FFC)	6-88-N15ZC-4900	OPTION
6	UVC CAMERA BISON FIX(RGB) BNH4UGNE5-200 2M FHD +TNR W/2D-MIC 4.0*71.2 SONY 208 X170JNM FW0603 W/WHITE-LED	6-88-X17JC-4900	OPTION
7	LCD STOP RUBBER 6X2X1.8 GRAY NV40ME	6-47-NV401-0C1	
8	BACK COVER MODULE NP60HP	6-39-NP601-022	
9	SCREW M2.5*2.5L KI BK/Z ICT NY(Ø8,T=0.6)	6-35-B6125-2R5	
10	HINGE COVER MODULE NP60HP	6-42-NP601-102	
11	TOP CASE MYLAR FR83 25*7*0.05 P180HM	6-40-P1802-030	
12	HINGE L (SK7) NP60HP	6-33-NP601-0L0	
13	LALATAPE SPONGE (9*60*1.0T)	6-47-0019L-003	
14	ANTENNA IPEX4 WLAN WGT WL2 PCB DL 50X5.8MM 2.4G/5G/6GHZ WL2=400MM NP70HP	6-23-7NP7H-020	
15	ANTENNA IPEX4 WLAN WGT WL1 PCB DL 50X5.8MM 2.4G/5G/6GHZ WL1=250MM NP70HP	6-23-7NP7H-010	
16	HINGE R (SK7) NP60HP	6-33-NP601-0R0	
17	FIN SPONGE SM55+DS-15 (66*15*2.65MM) NL50MU	6-47-NL5M2-010	

Figure A - 5
LCD (NP60SNC-G/ NP60SND-G/ NP60SNE-G)

Appendix B: Schematic Diagrams

This appendix has circuit diagrams of the ***NP60SNC / NP60SND / NP60SNE*** 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-NP5S4-003. If your mainboard (or other boards) are a later version, please check with the Service Center for updated diagrams (if required).

System Block Diagram

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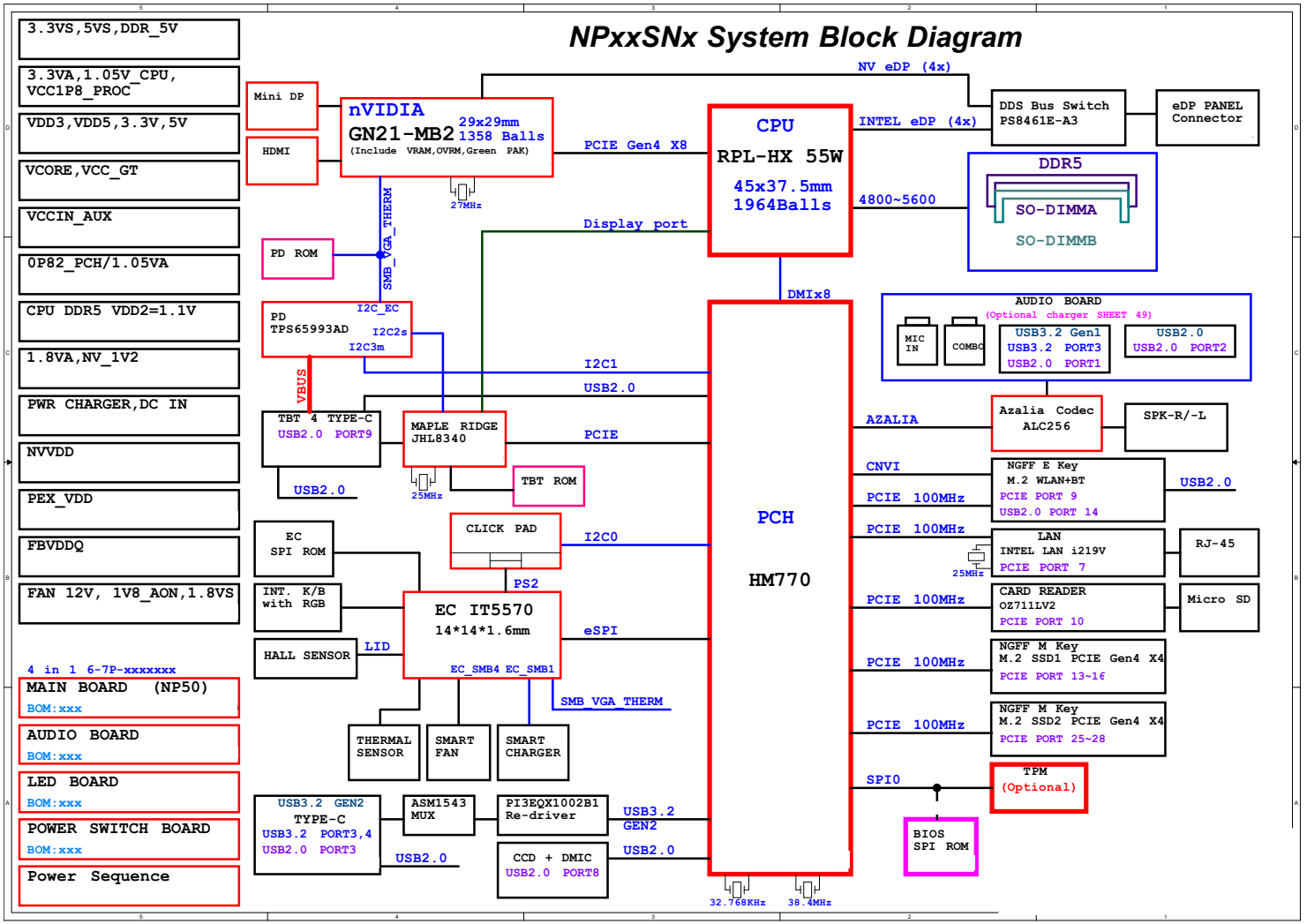
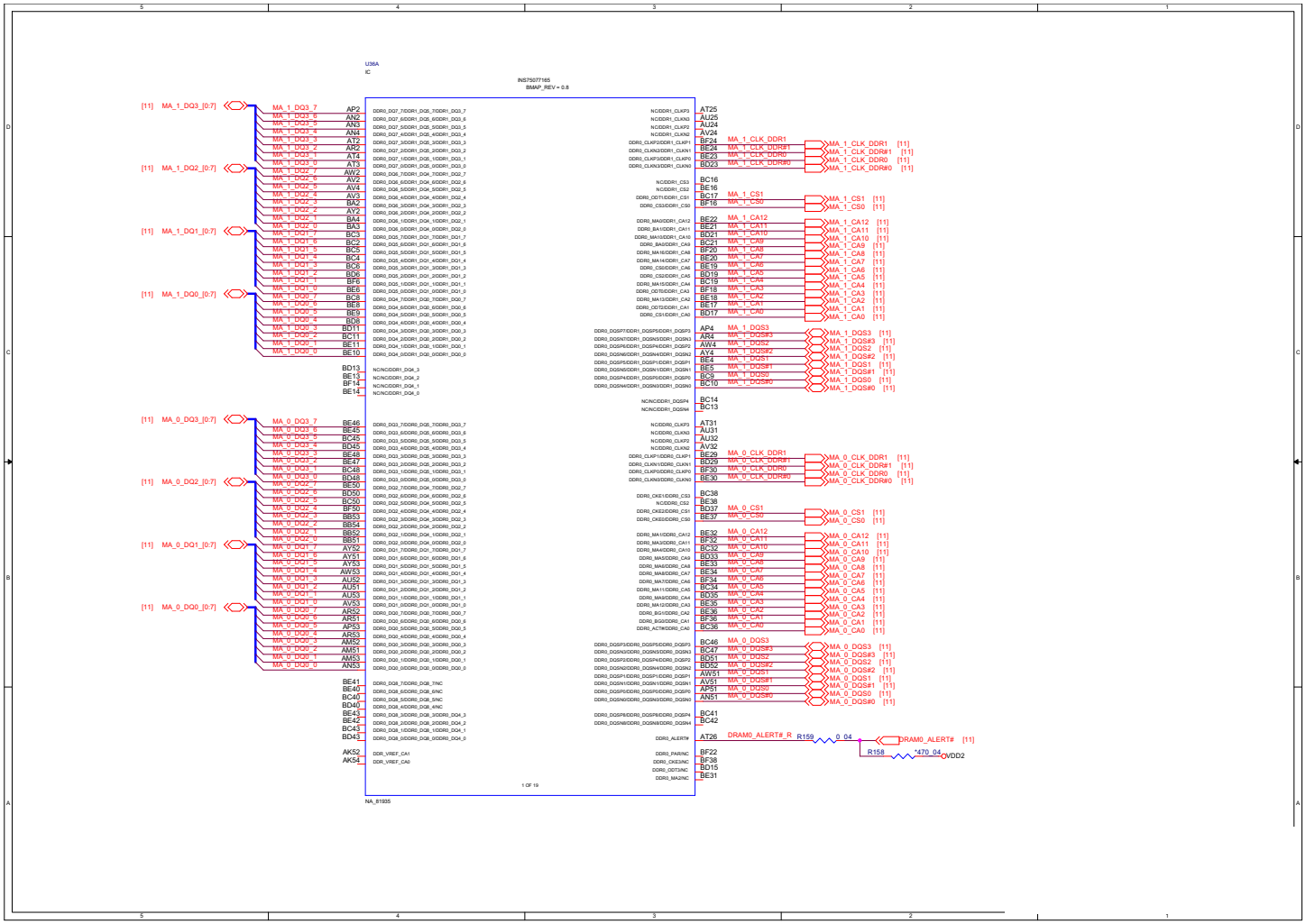
System Block Diagram



Processor 1/9



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Processor 1/9

Processor 2/9

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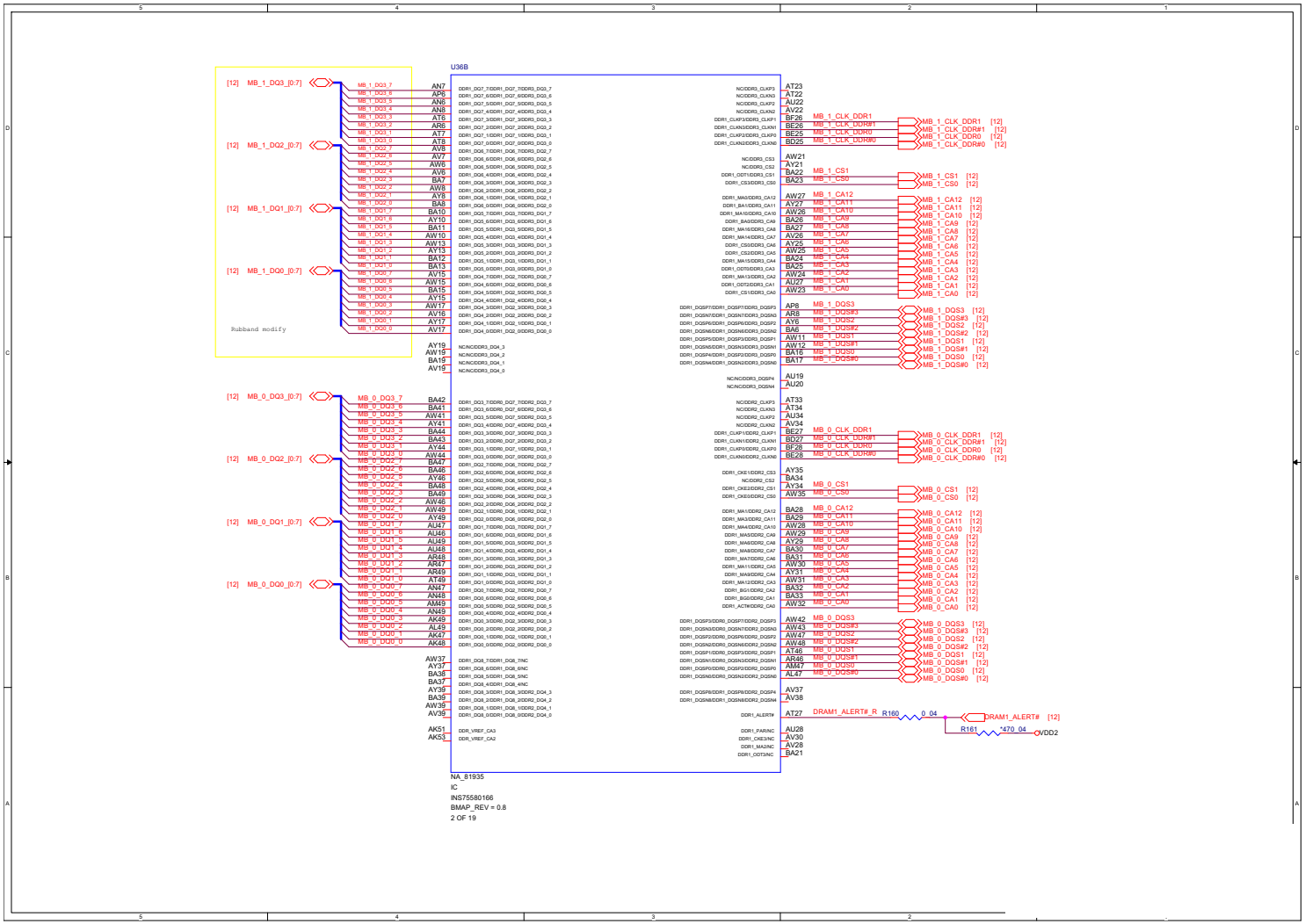
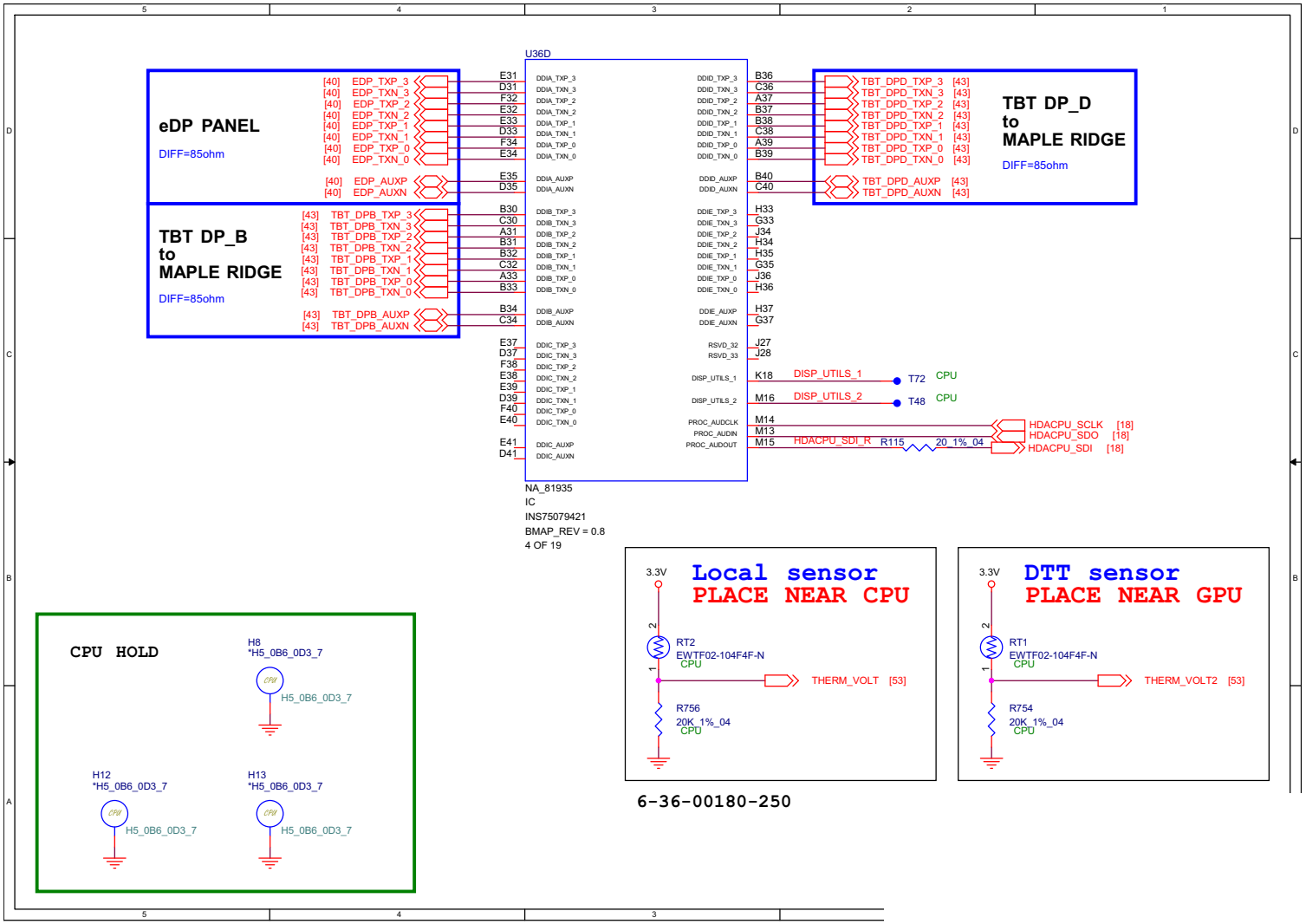
Processor 2/9



Processor 3/9



6-36-00180-250

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Processor 3/9

B.Schematic Diagrams

Processor 4/9

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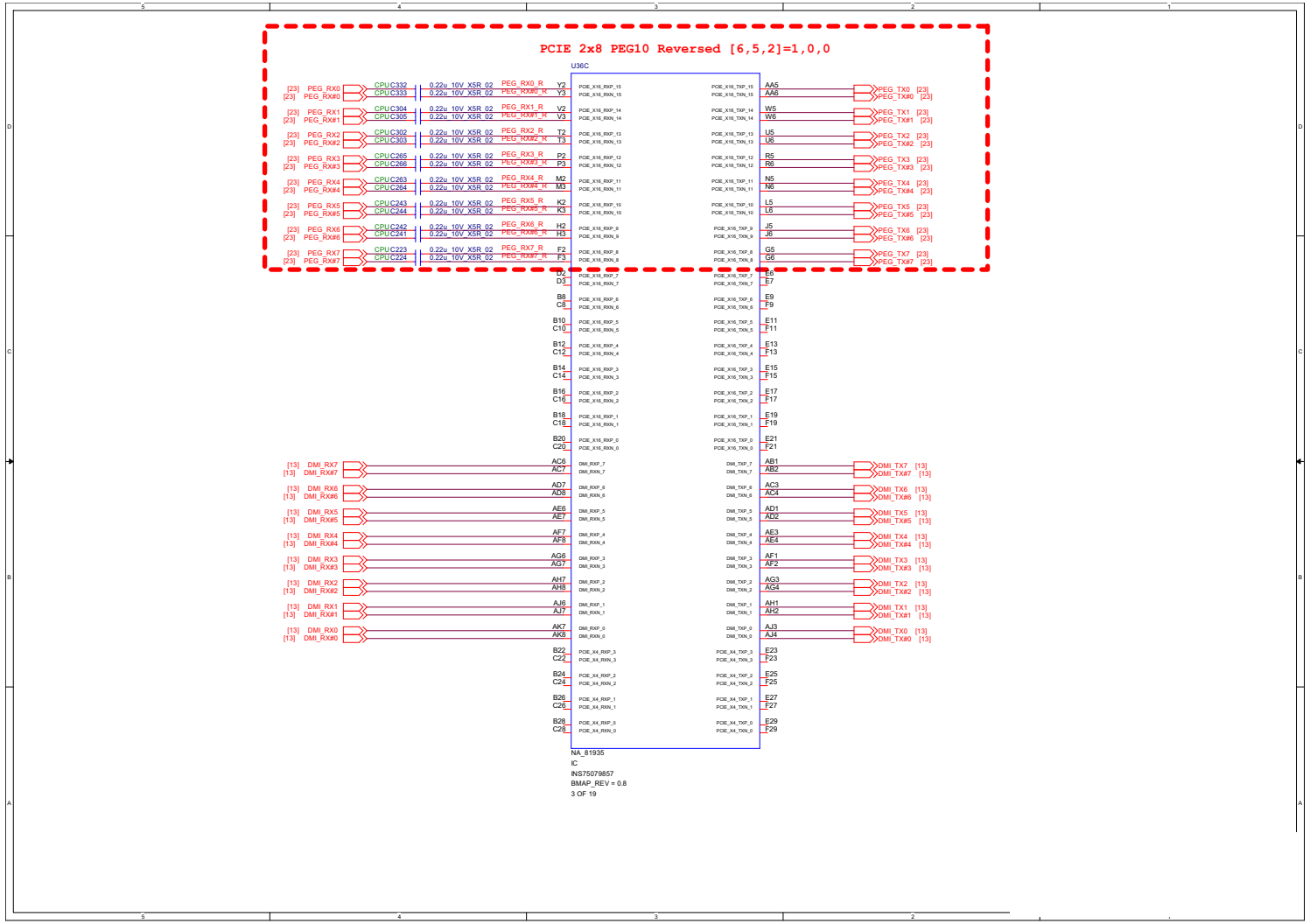
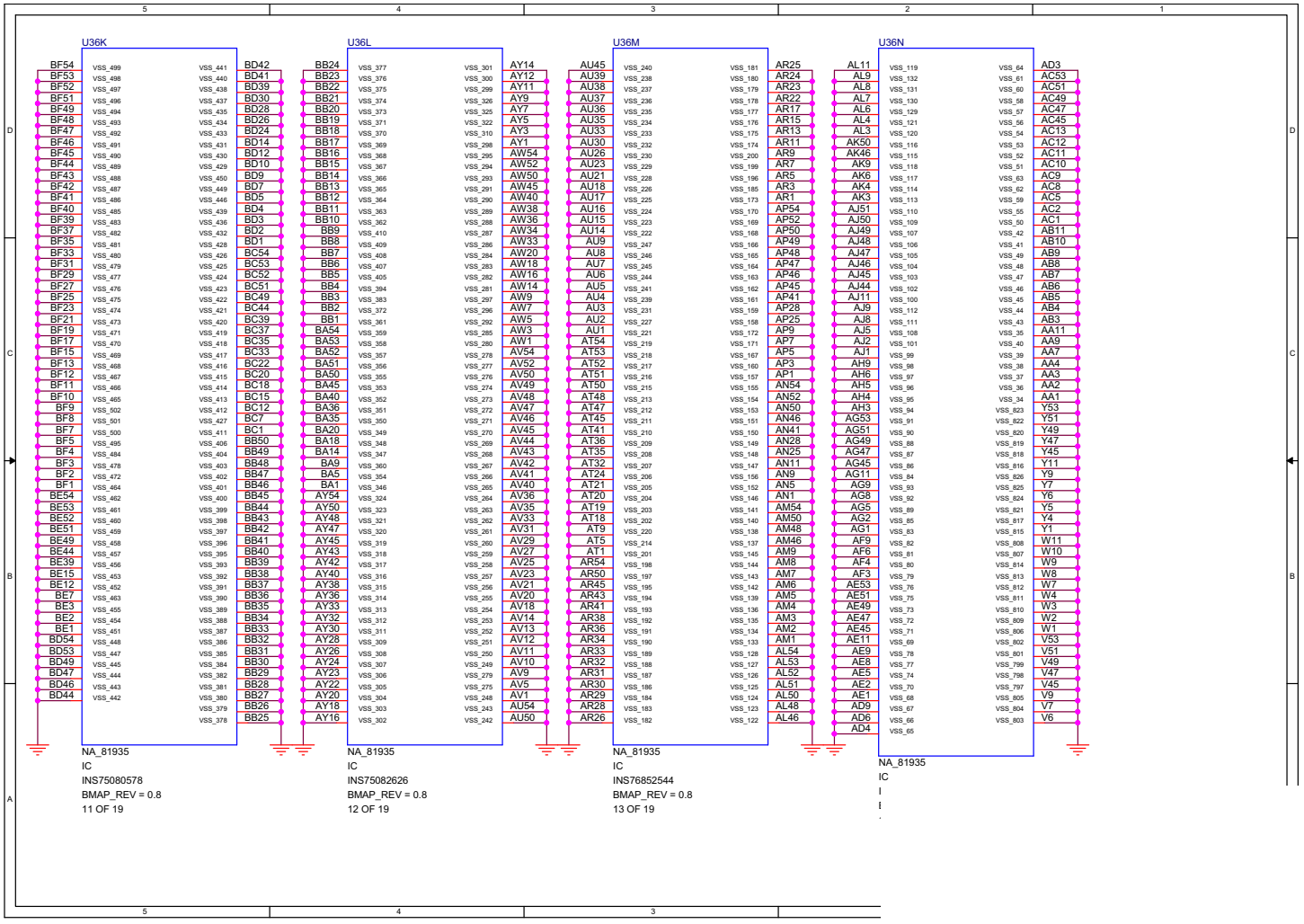
Processor 4/9



Processor 5/9



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Processor 5/9

Processor 6/9

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Processor 6/9

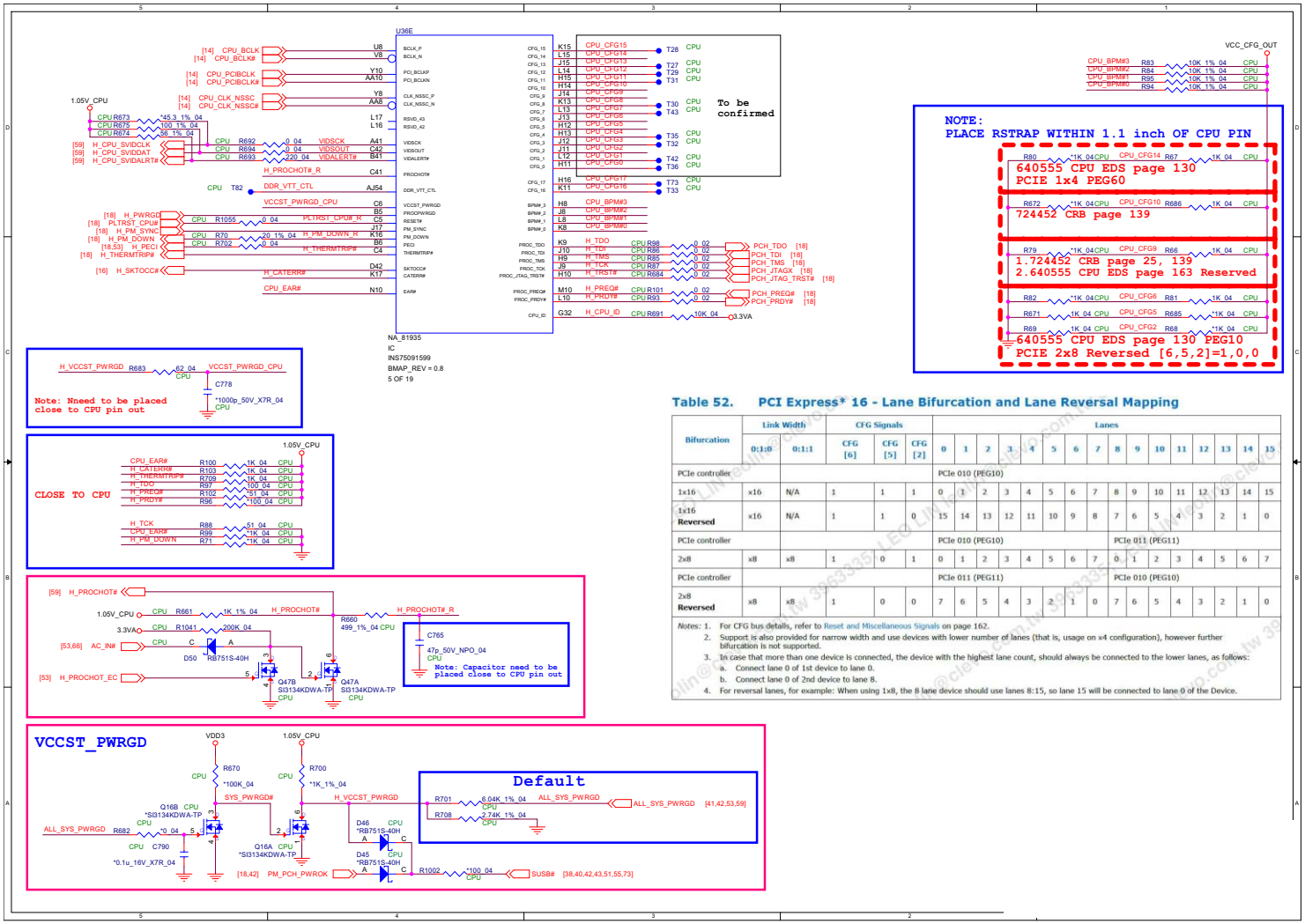
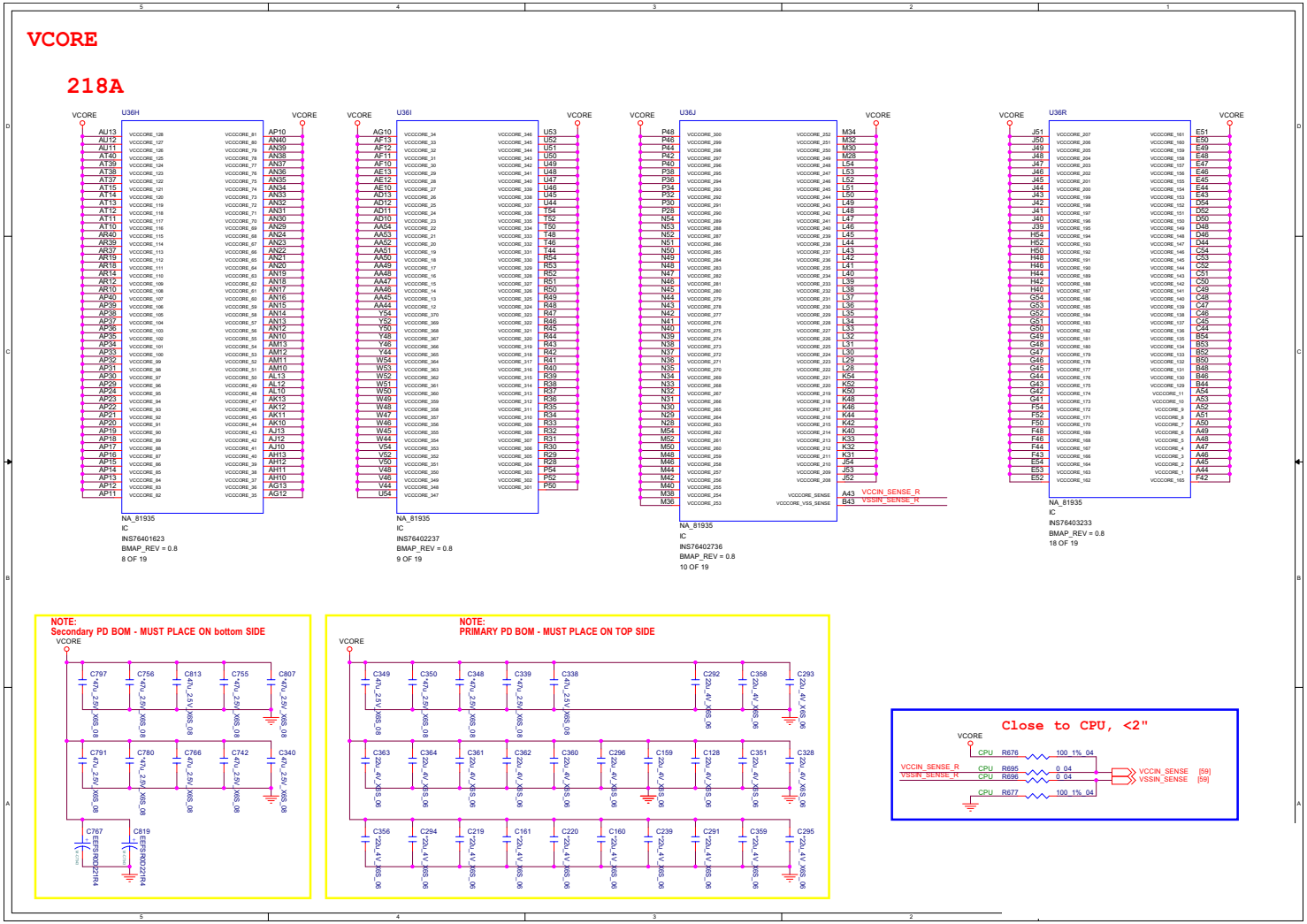


Table 52. PCI Express* 16 - Lane Bifurcation and Lane Reversal Mapping

Bifurcation	Link Width		CFG Signals			Lanes													
	0:1:0	0:1:1	CFG [6]	CFG [5]	CFG [2]	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PCIe controller						PCIe 010 (PEG10)															
1x16	x16	N/A	1	1	1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1x16 **Reversed**	x16	N/A	1	1	0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
PCIe controller						PCIe 010 (PEG10)								PCIe 011 (PEG11)							
2x8	x8	x8	1	0	1	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
PCIe controller						PCIe 011 (PEG11)								PCIe 010 (PEG10)							
2x8 **Reversed**	x8	x8	1	0	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0

Notes: 1. For CFG bus details, refer to Reset and Miscellaneous Signals on page 162.
2. Support is also provided for narrow width and use devices with lower number of lanes (that is, usage on x4 configuration), however further bifurcation is not supported.
3. In case that more than one device is connected, the device with the highest lane count, should always be connected to the lower lanes, as follows:
   a. Connect lane 0 of 1st device to lane 0.
   b. Connect lane 0 of 2nd device to lane 8.
4. For reversal lanes, for example: When using 1x8, the 8 lane device should use lanes 8:15, so lane 15 will be connected to lane 0 of the Device.

Processor 7/9



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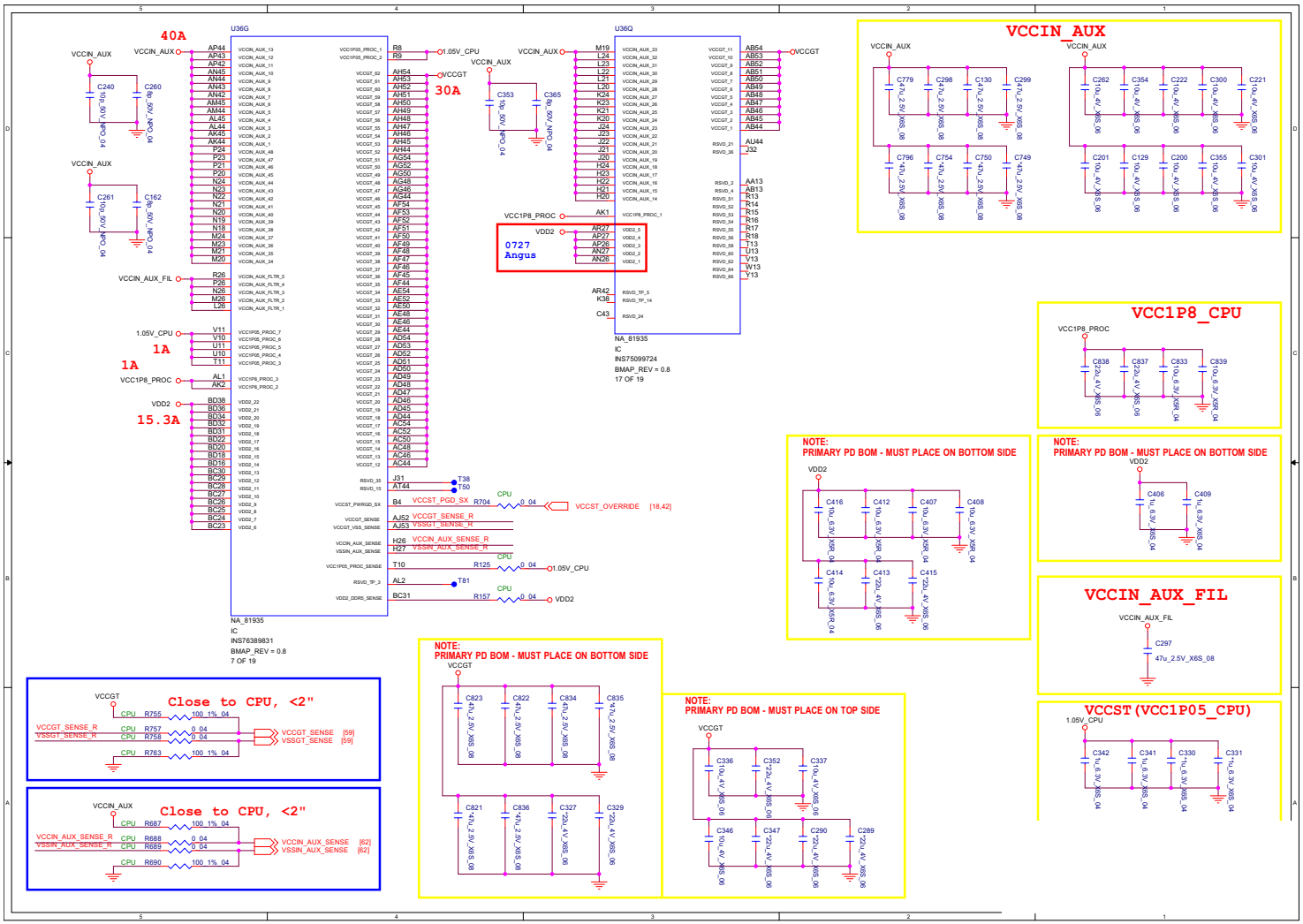
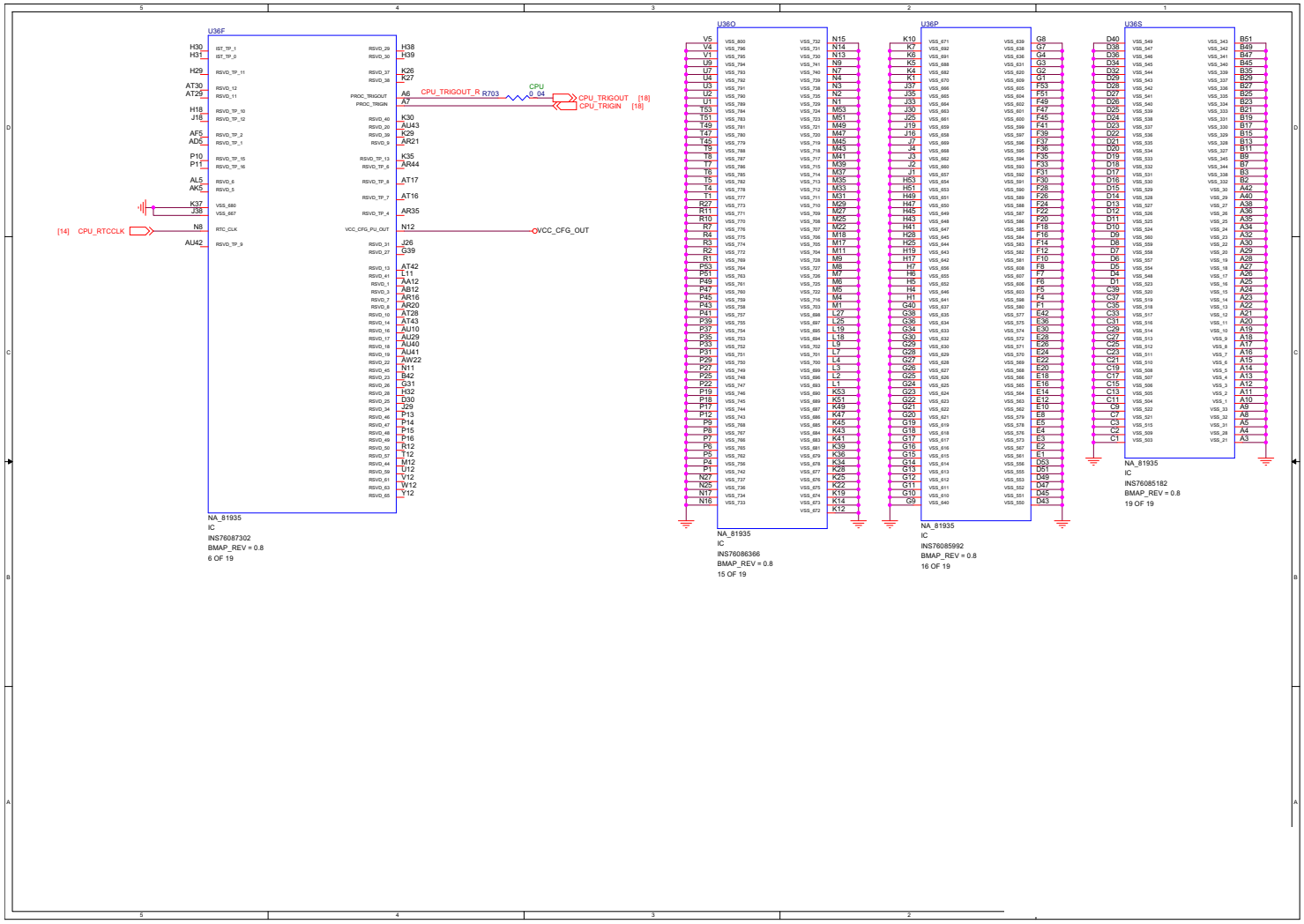
Processor 8/9



Processor 9/9



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Processor 9/9

DDR5 CHA SO-DIMM_0

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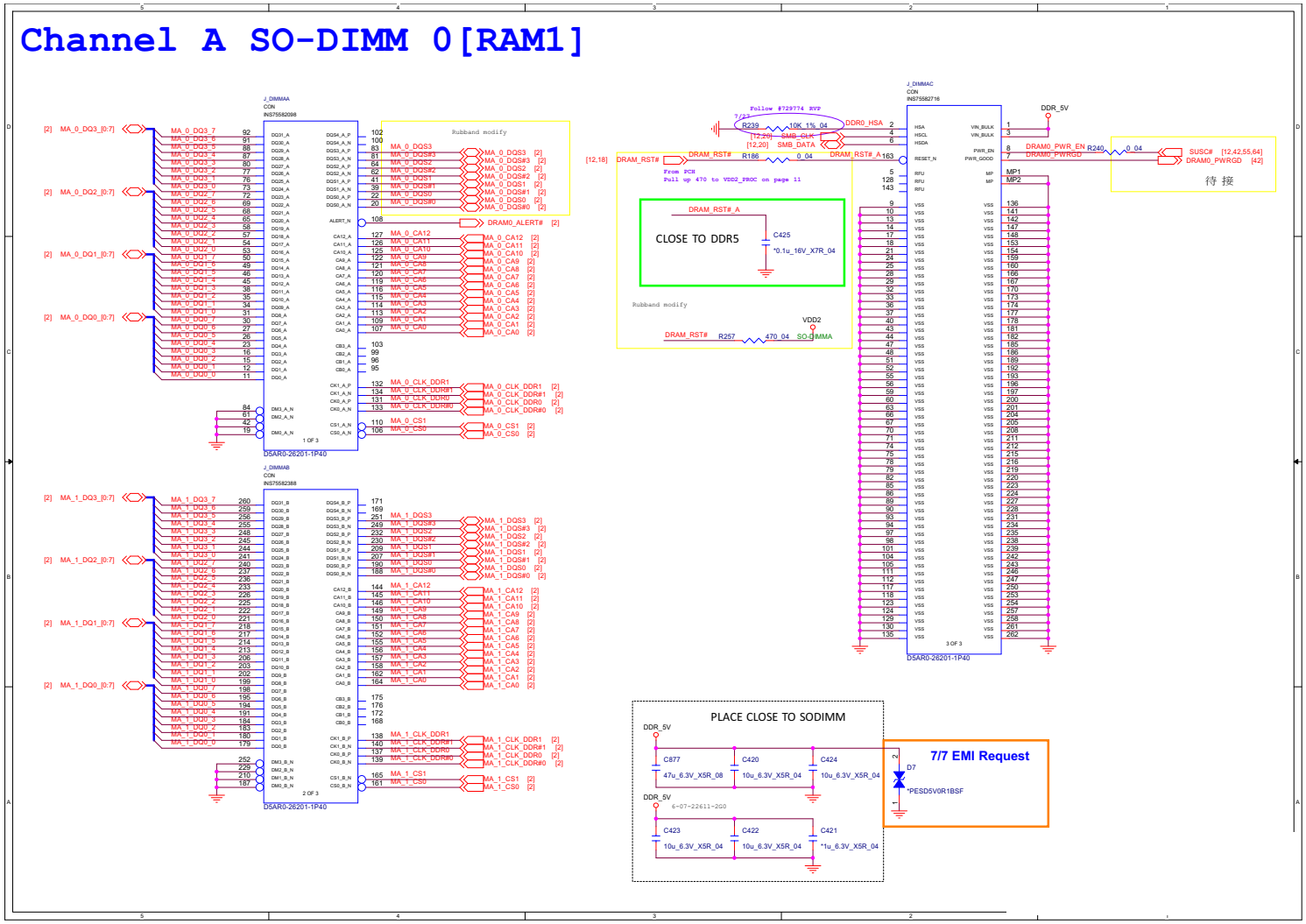
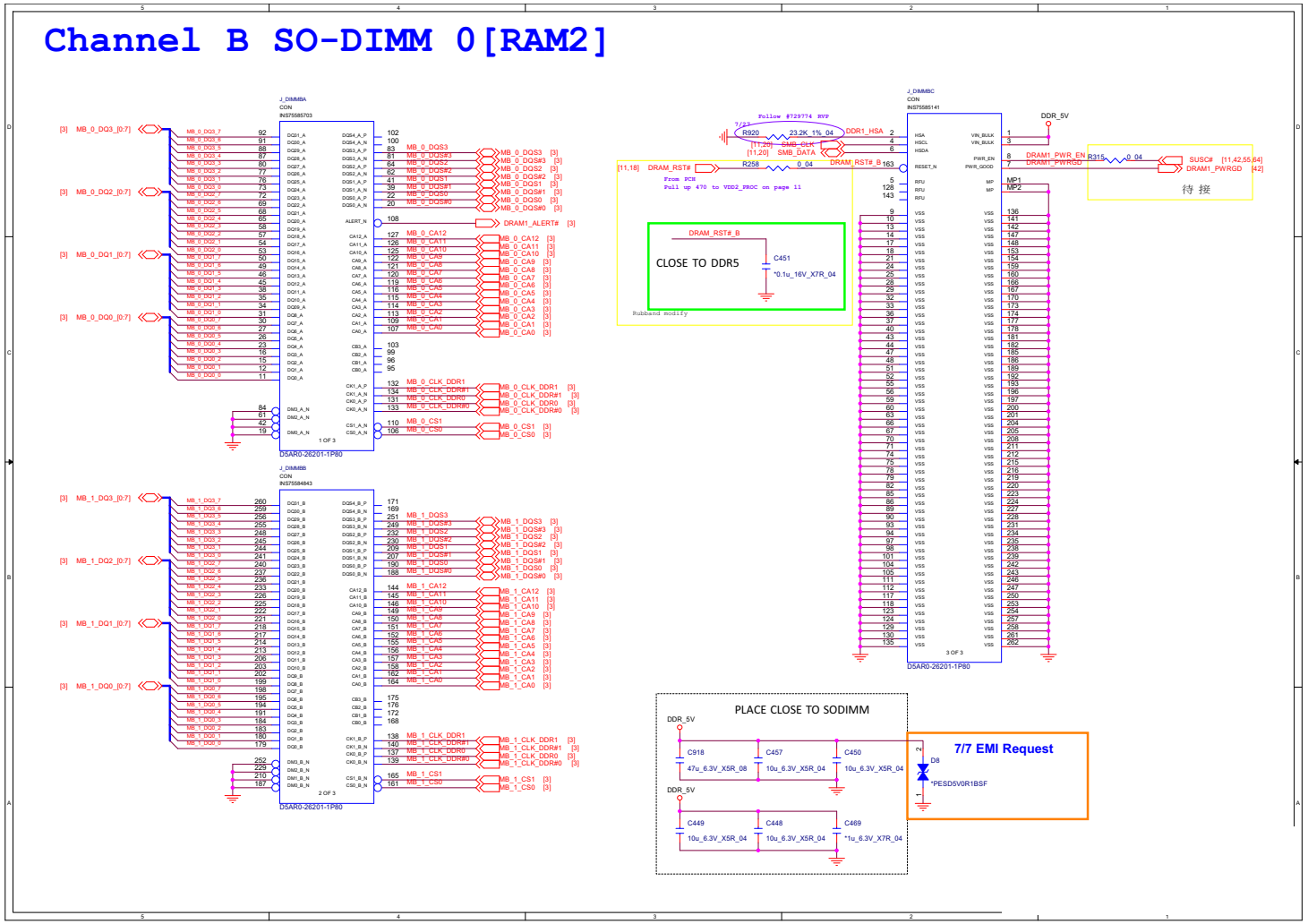
DDR5 CHA SO-DIMM_0



DDR5 CHB SO-DIMM_0



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DDR5 CHB SO-DIMM_0

PCH 1/10

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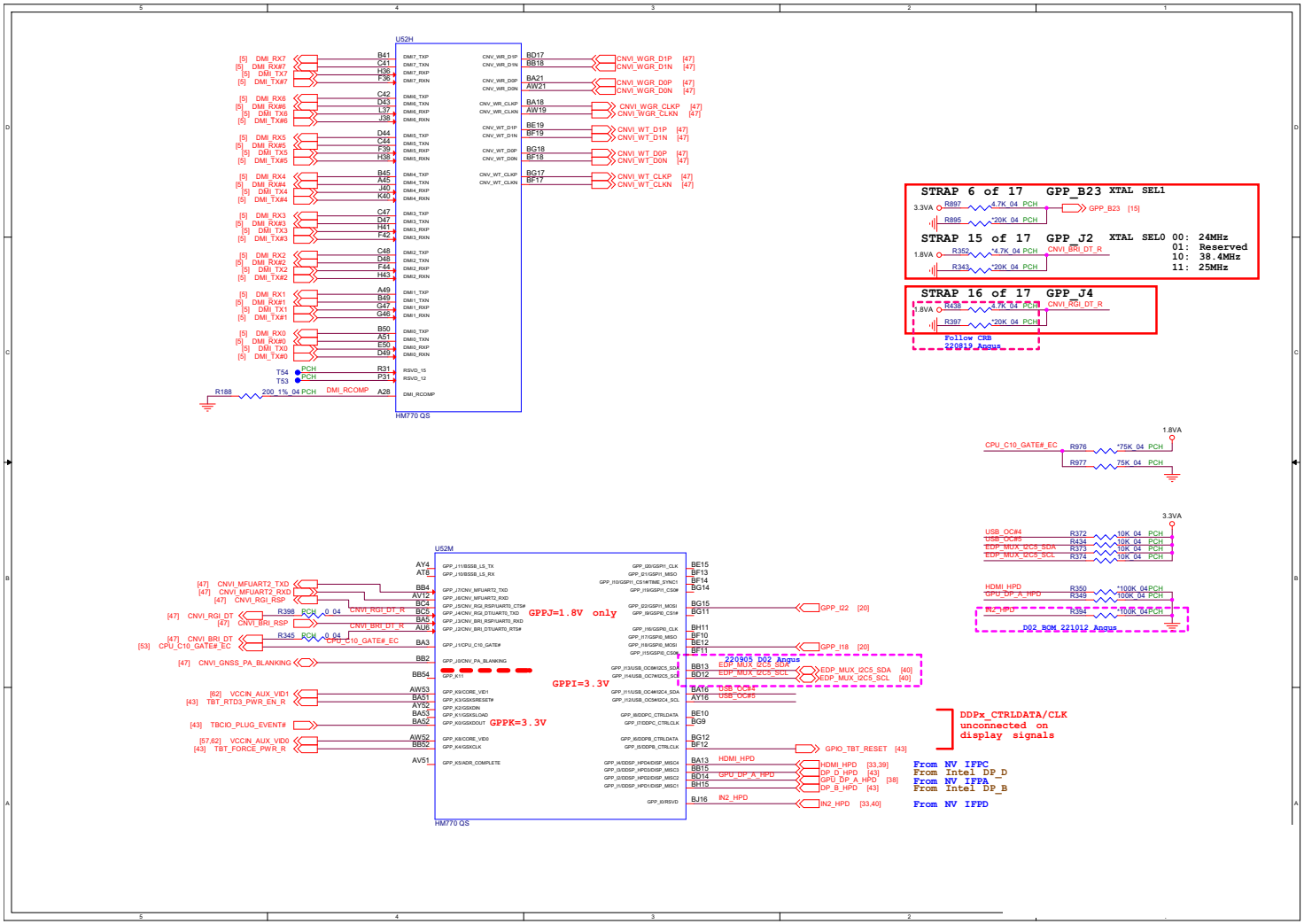
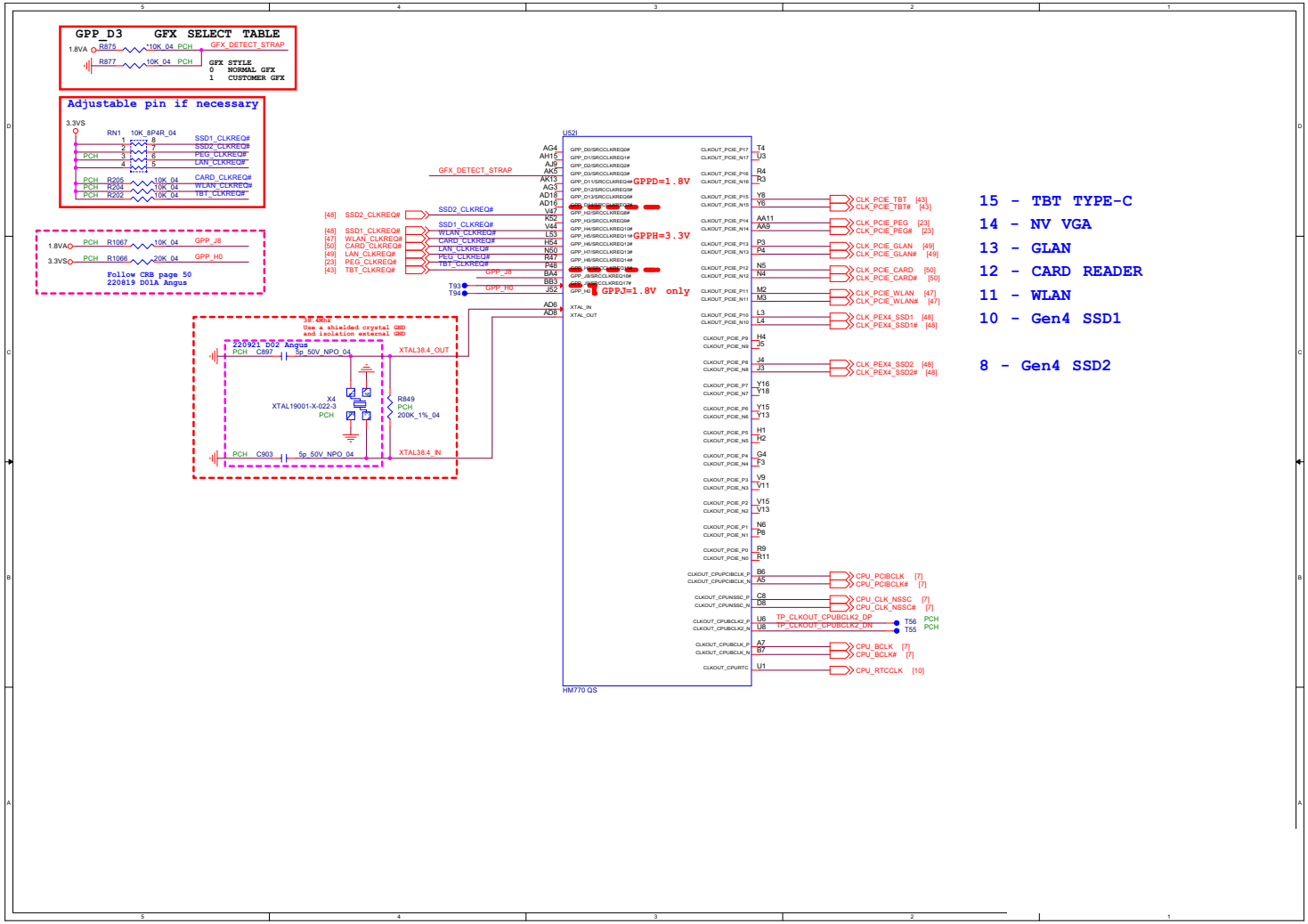
PCH 1/10



PCH 2/10



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PCH 2/10

PCH 3/10

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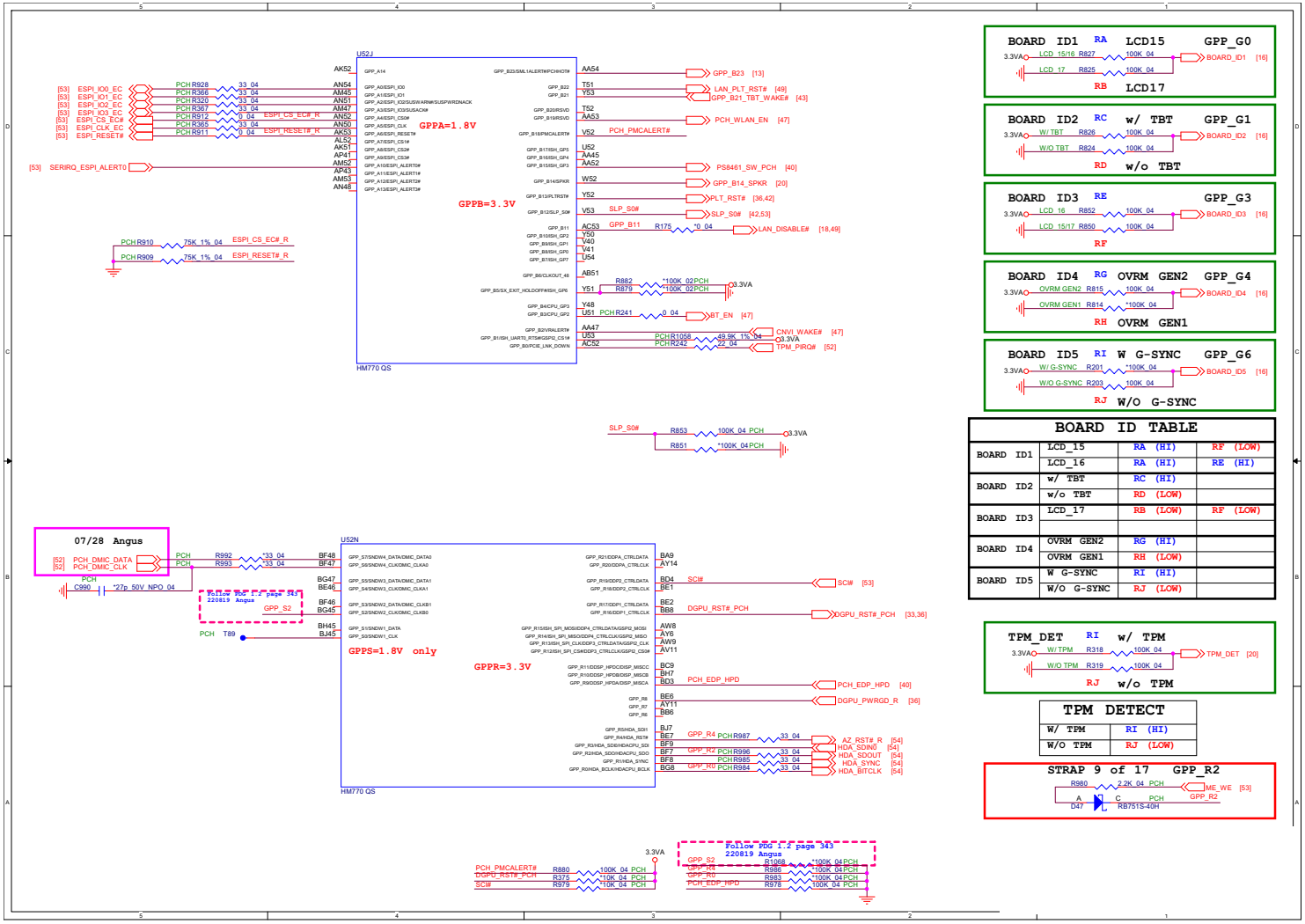
PCH 3/10



PCH 4/10

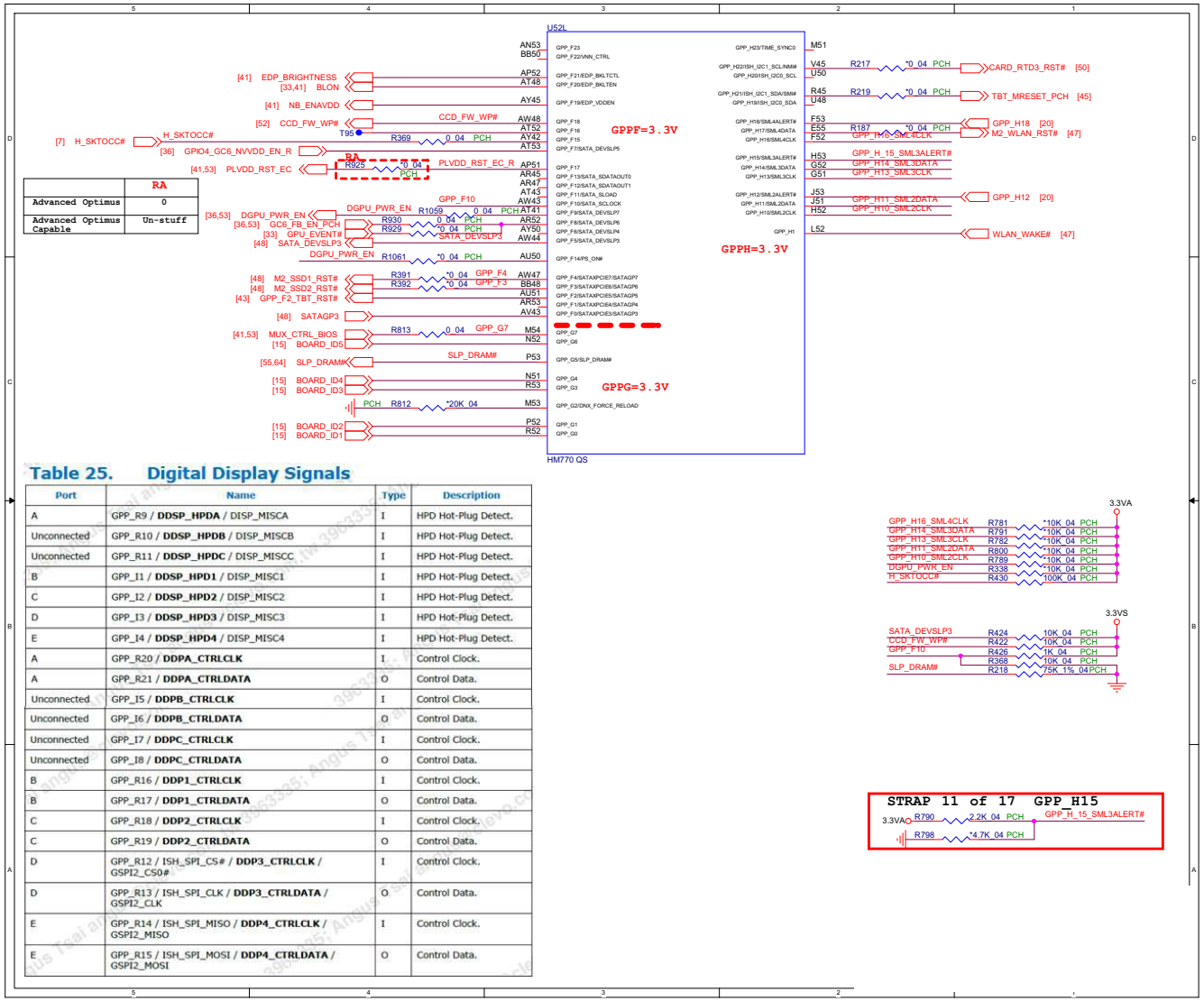


Table 25. Digital Display Signals

Port	Name	Type	Description
A	GPP_R9 / **DDSP_HPDA** / DISP_MISCA	I	HPD Hot-Plug Detect.
Unconnected	GPP_R10 / **DDSP_HPDB** / DISP_MISCB	I	HPD Hot-Plug Detect.
Unconnected	GPP_R11 / **DDSP_HPDC** / DISP_MISCC	I	HPD Hot-Plug Detect.
B	GPP_I1 / **DDSP_HPD1** / DISP_MISC1	I	HPD Hot-Plug Detect.
C	GPP_I2 / **DDSP_HPD2** / DISP_MISC2	I	HPD Hot-Plug Detect.
D	GPP_I3 / **DDSP_HPD3** / DISP_MISC3	I	HPD Hot-Plug Detect.
E	GPP_I4 / **DDSP_HPD4** / DISP_MISC4	I	HPD Hot-Plug Detect.
A	GPP_R20 / **DDPA_CTRLCLK**	I	Control Clock.
A	GPP_R21 / **DDPA_CTRLDATA**	O	Control Data.
Unconnected	GPP_I5 / **DDPB_CTRLCLK**	I	Control Clock.
Unconnected	GPP_I6 / **DDPB_CTRLDATA**	O	Control Data.
Unconnected	GPP_I7 / **DDPC_CTRLCLK**	I	Control Clock.
Unconnected	GPP_I8 / **DDPC_CTRLDATA**	O	Control Data.
B	GPP_R16 / **DDP1_CTRLCLK**	I	Control Clock.
B	GPP_R17 / **DDP1_CTRLDATA**	O	Control Data.
C	GPP_R18 / **DDP2_CTRLCLK**	I	Control Clock.
C	GPP_R19 / **DDP2_CTRLDATA**	O	Control Data.
D	GPP_R12 / ISH_SPI_CS# / **DDP3_CTRLCLK** / GSPI2_CS0#	I	Control Clock.
D	GPP_R13 / ISH_SPI_CLK / **DDP3_CTRLDATA** / GSPI2_CLK	O	Control Data.
E	GPP_R14 / ISH_SPI_MISO / **DDP4_CTRLCLK** / GSPI2_MISO	I	Control Clock.
E	GPP_R15 / ISH_SPI_MOSI / **DDP4_CTRLDATA** / GSPI2_MOSI	O	Control Data.

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PCH 5/10

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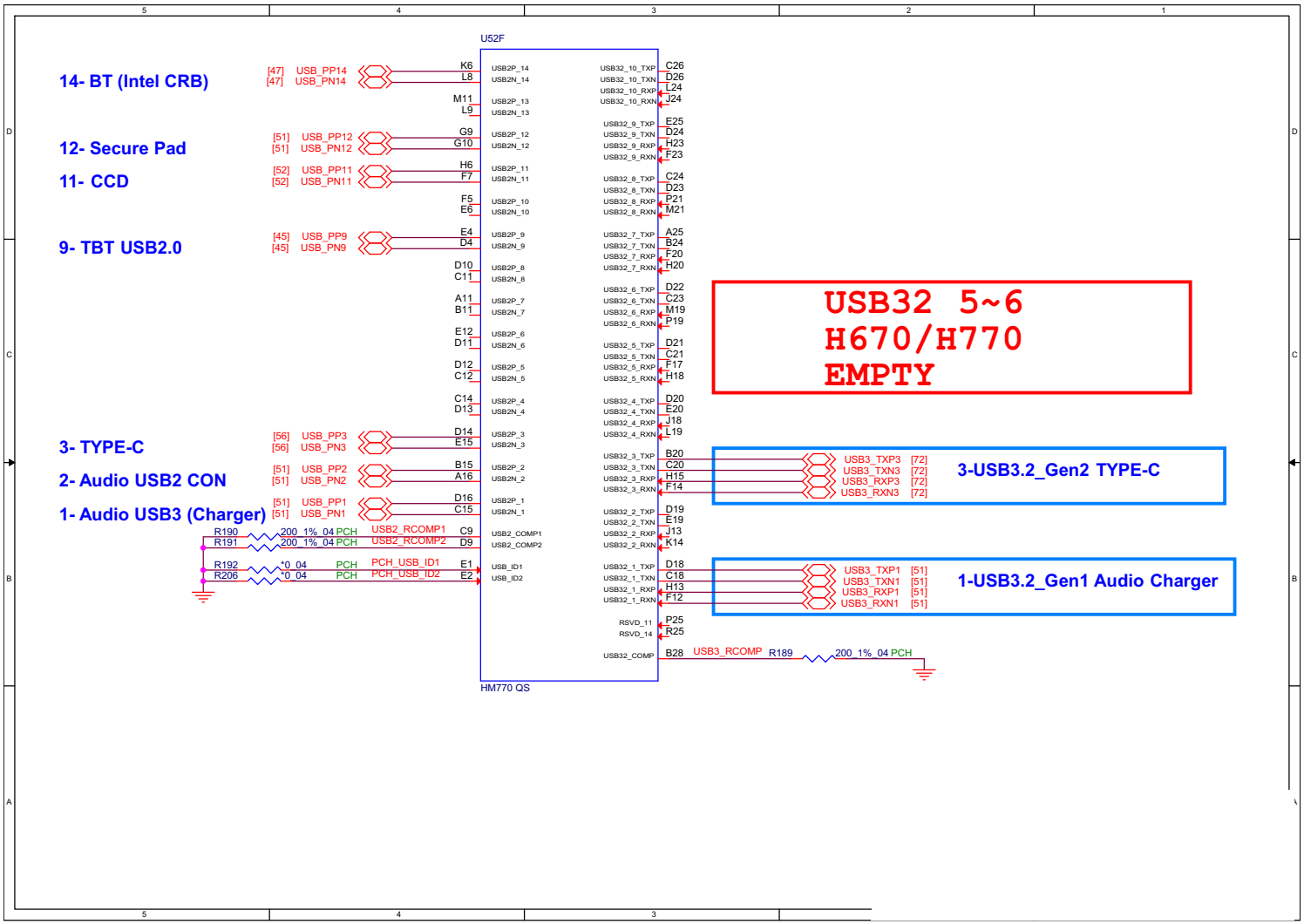
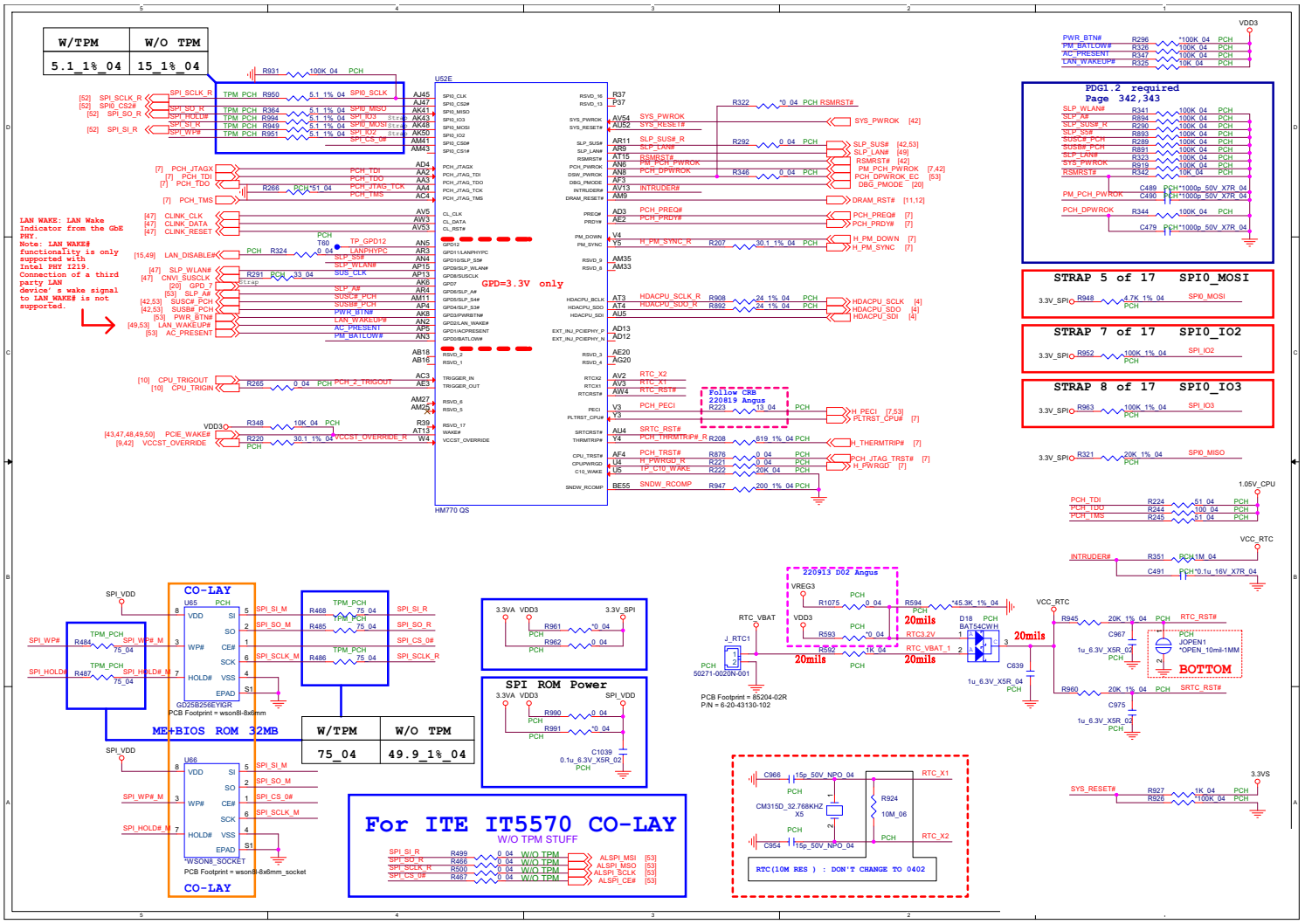


PCH 6/10



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PCH 6/10

PCH 7/10

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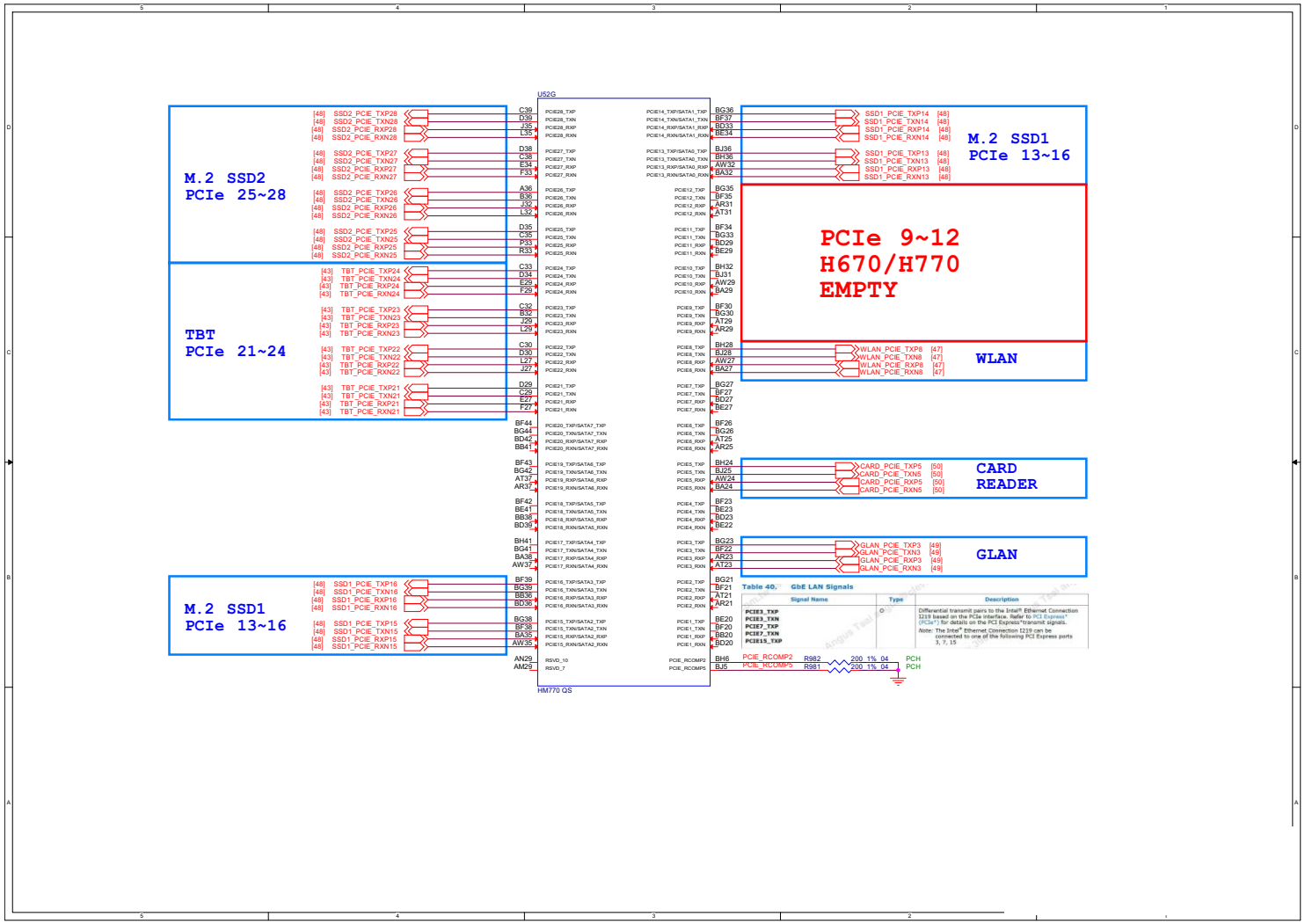

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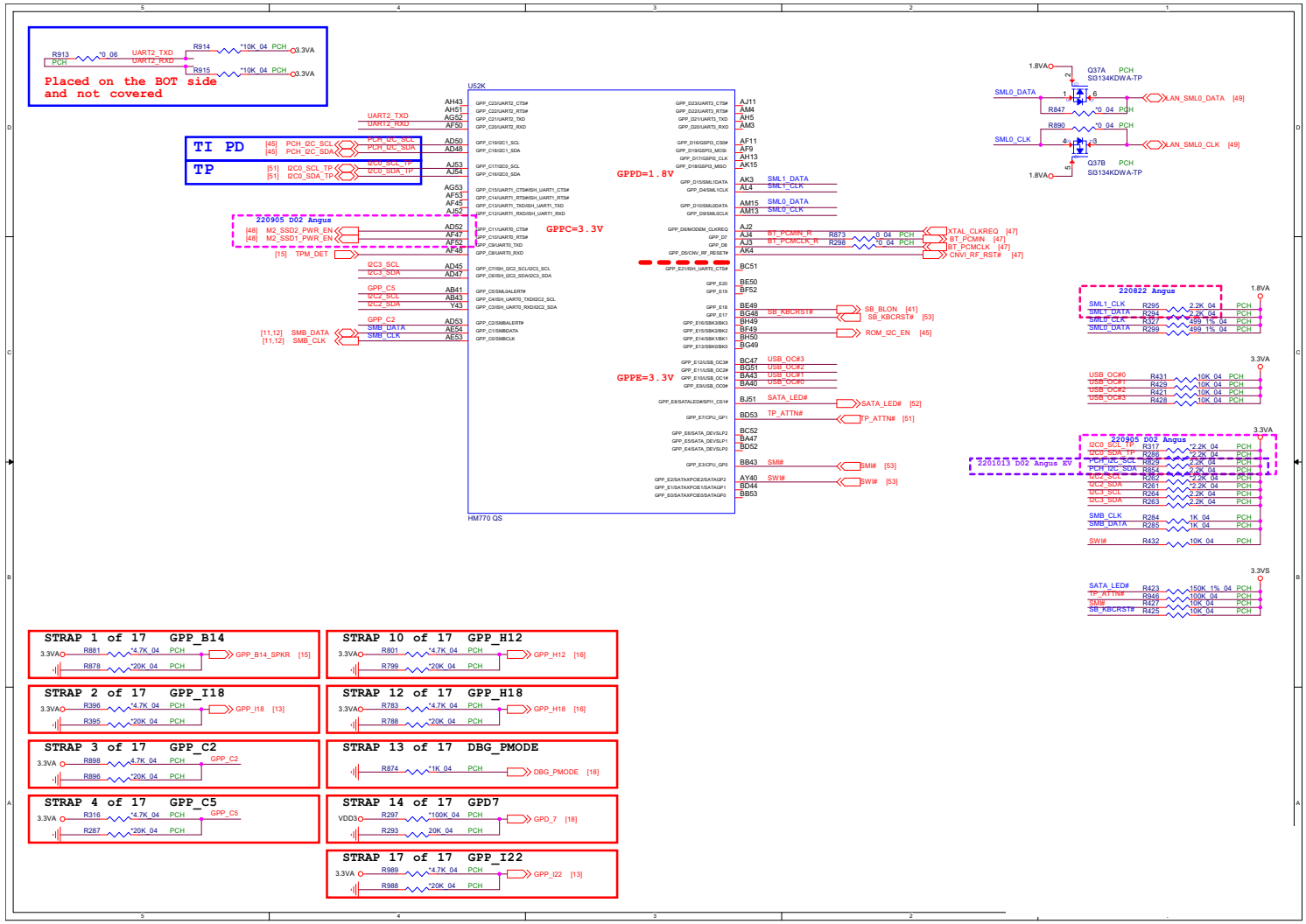

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PCH 8/10

PCH 9/10

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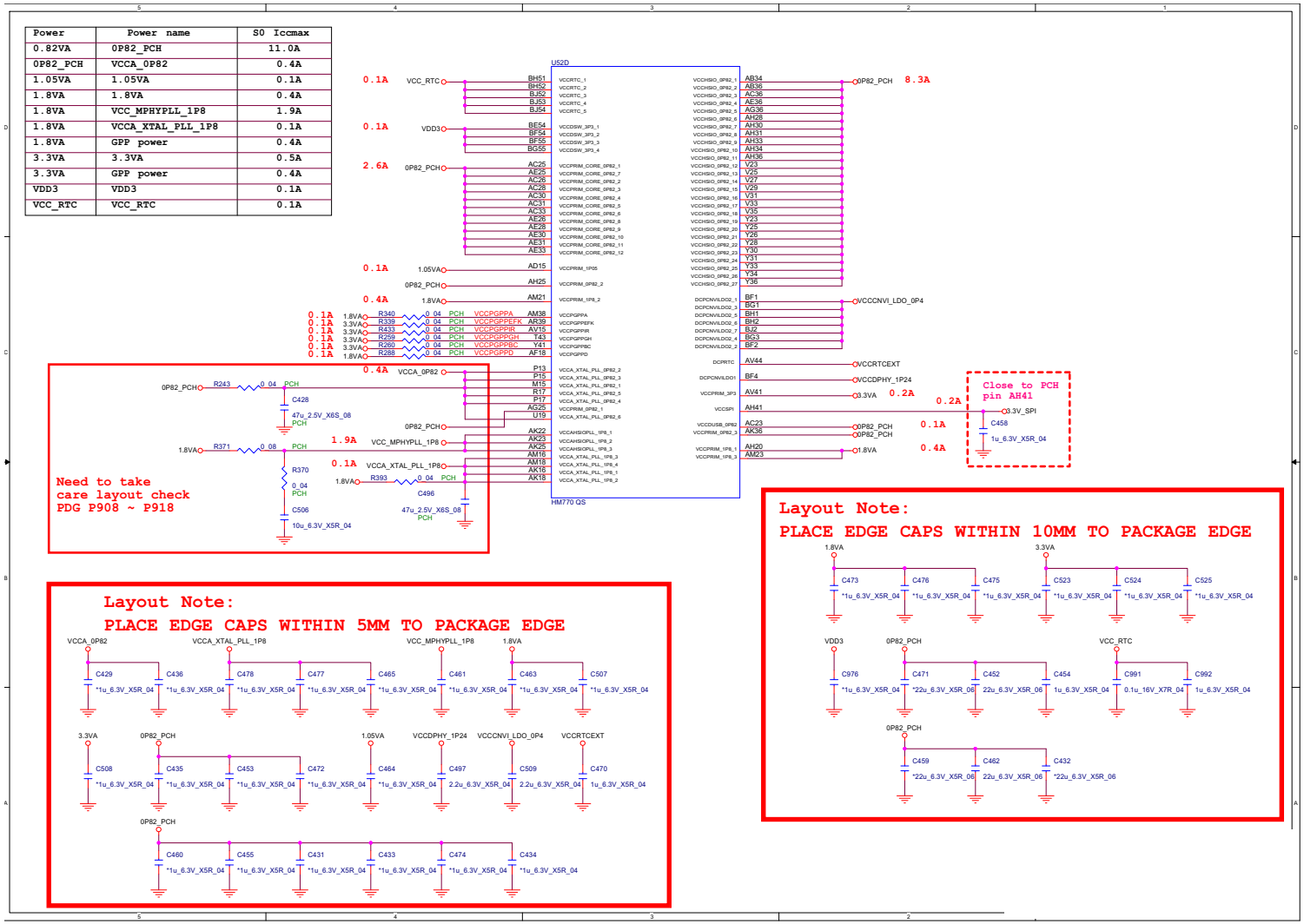
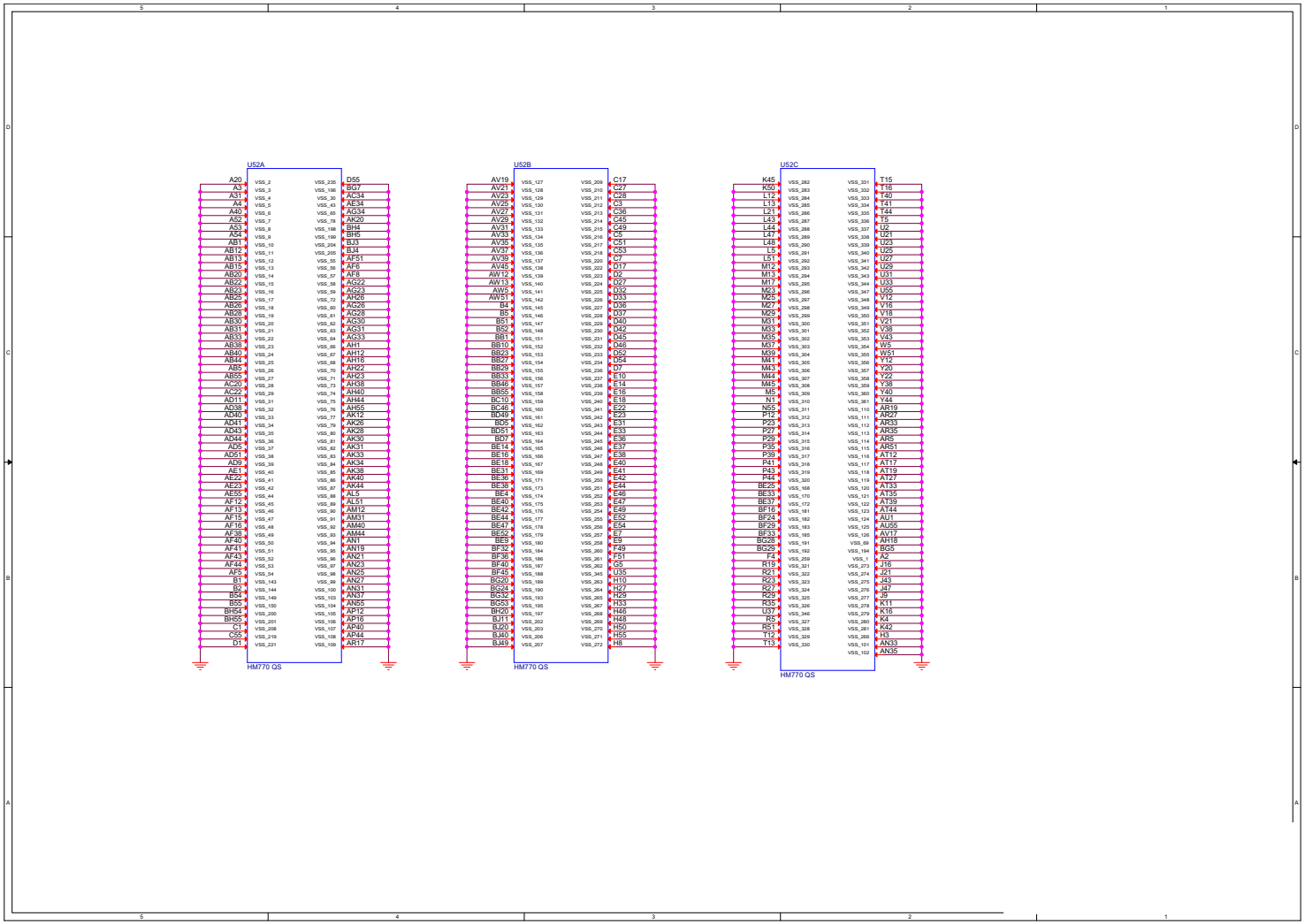
PCH 9/10

Power	Power name	S0 Iccmax
0.82VA	0P82_PCH	11.0A
0P82_PCH	VCCA_0P82	0.4A
1.05VA	1.05VA	0.1A
1.8VA	1.8VA	0.4A
1.8VA	VCC_MPHYPLL_1P8	1.9A
1.8VA	VCCA_XTAL_PLL_1P8	0.1A
1.8VA	GPP power	0.4A
3.3VA	3.3VA	0.5A
3.3VA	GPP power	0.4A
VDD3	VDD3	0.1A
VCC_RTC	VCC_RTC	0.1A



PCH 10/10



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PCH 10/10

GPU PCI Express

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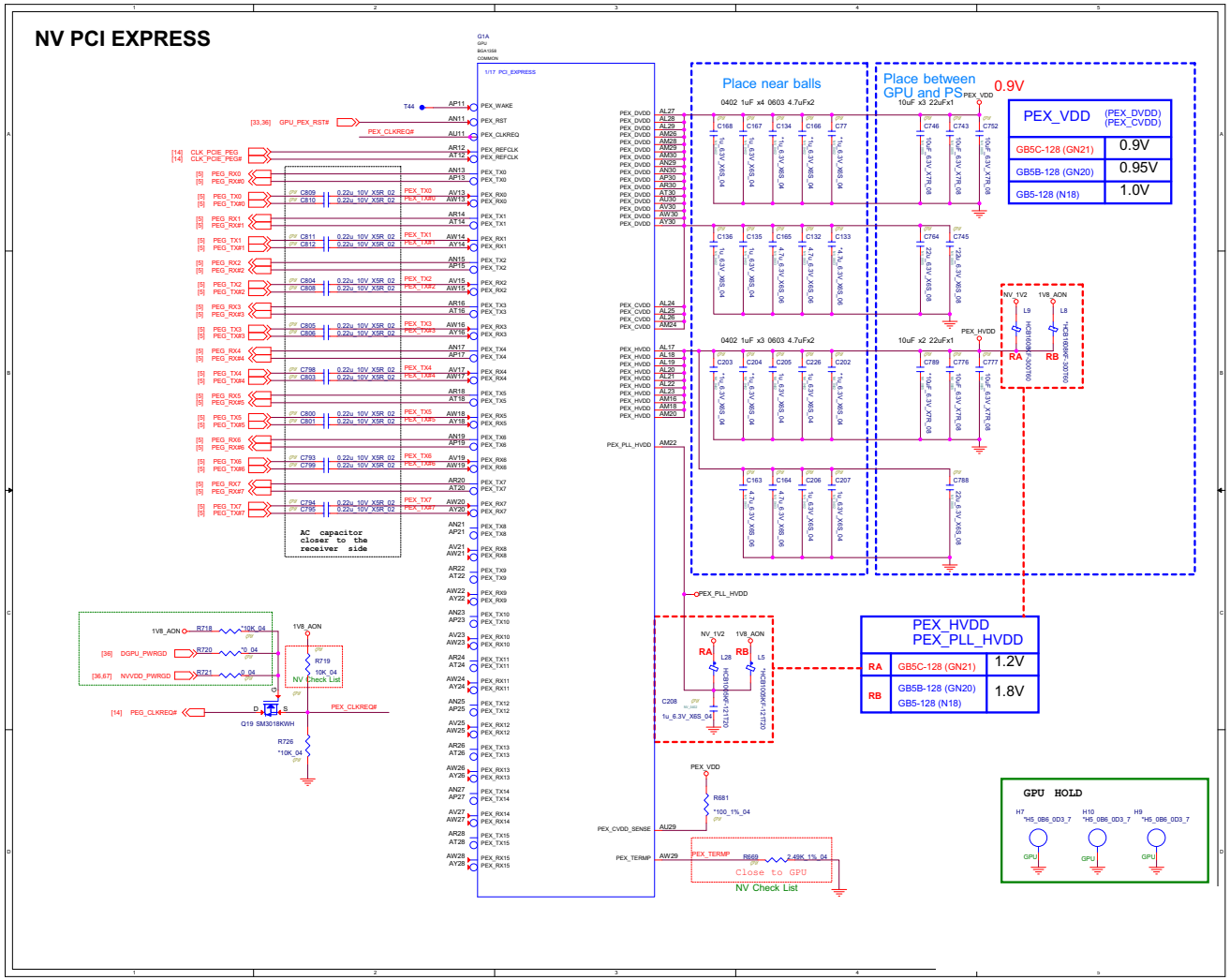
GPU PCI Express



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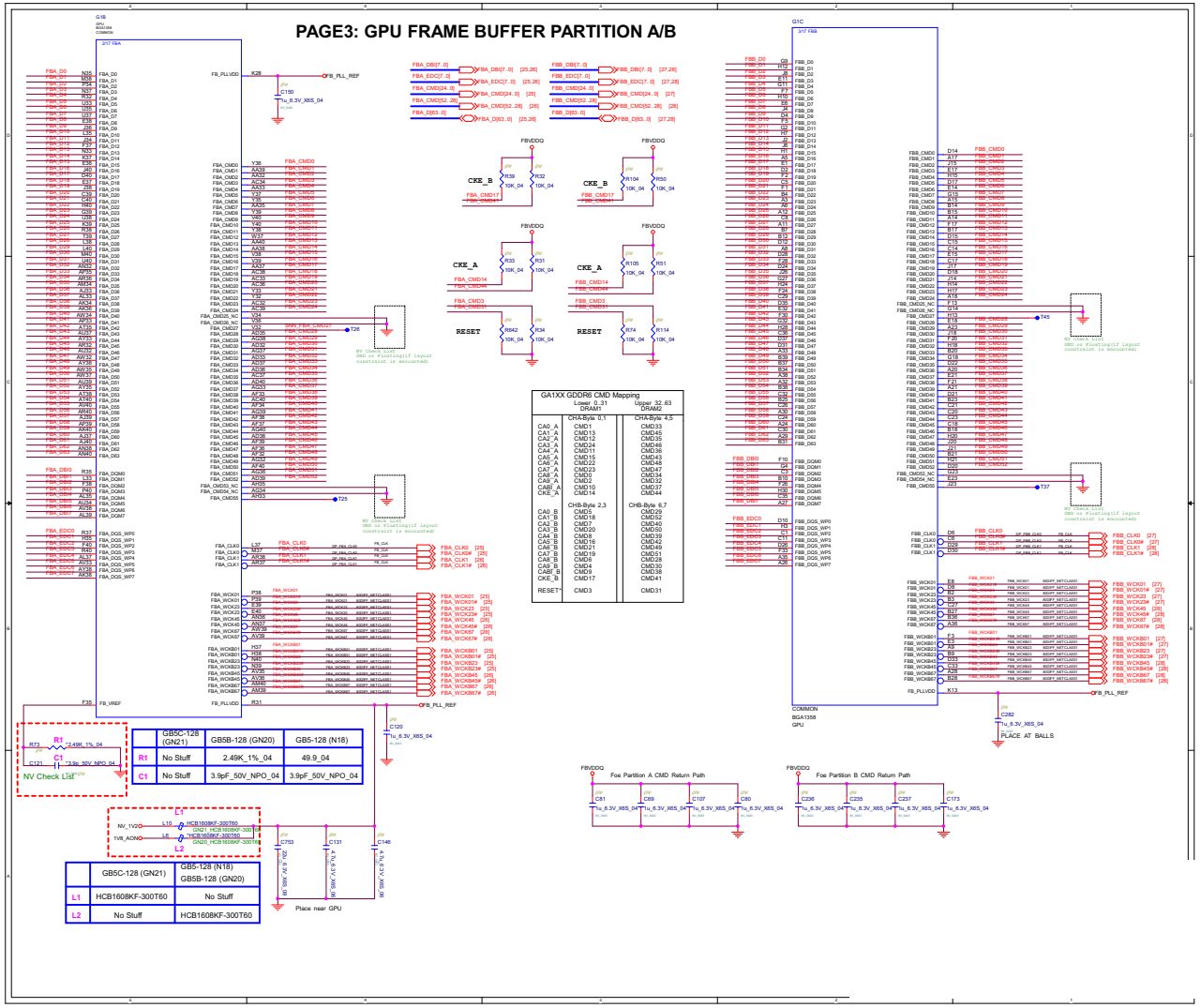

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Partition A/B

B.Schematic Diagrams

Frame Buffer A

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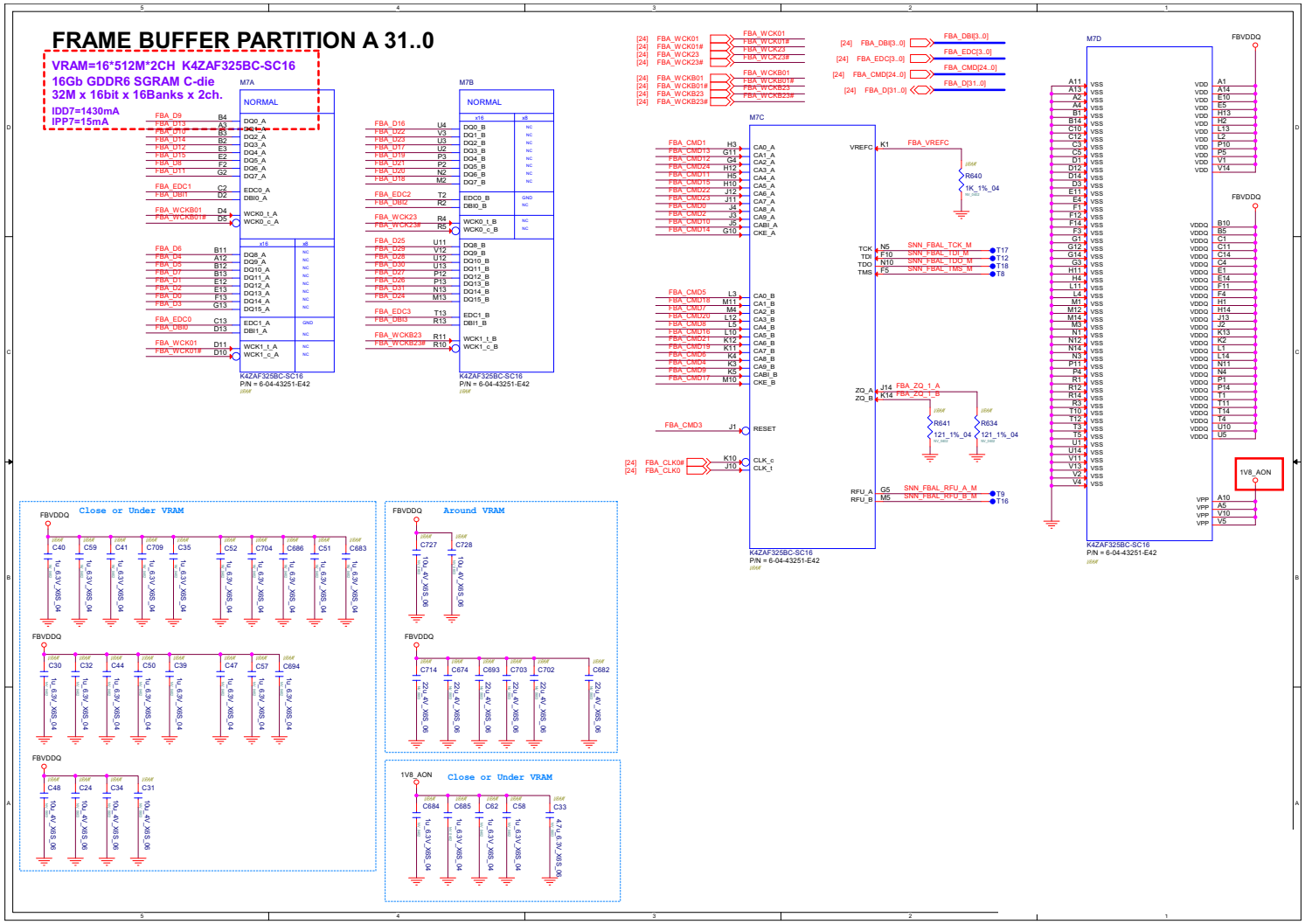
Frame Buffer A



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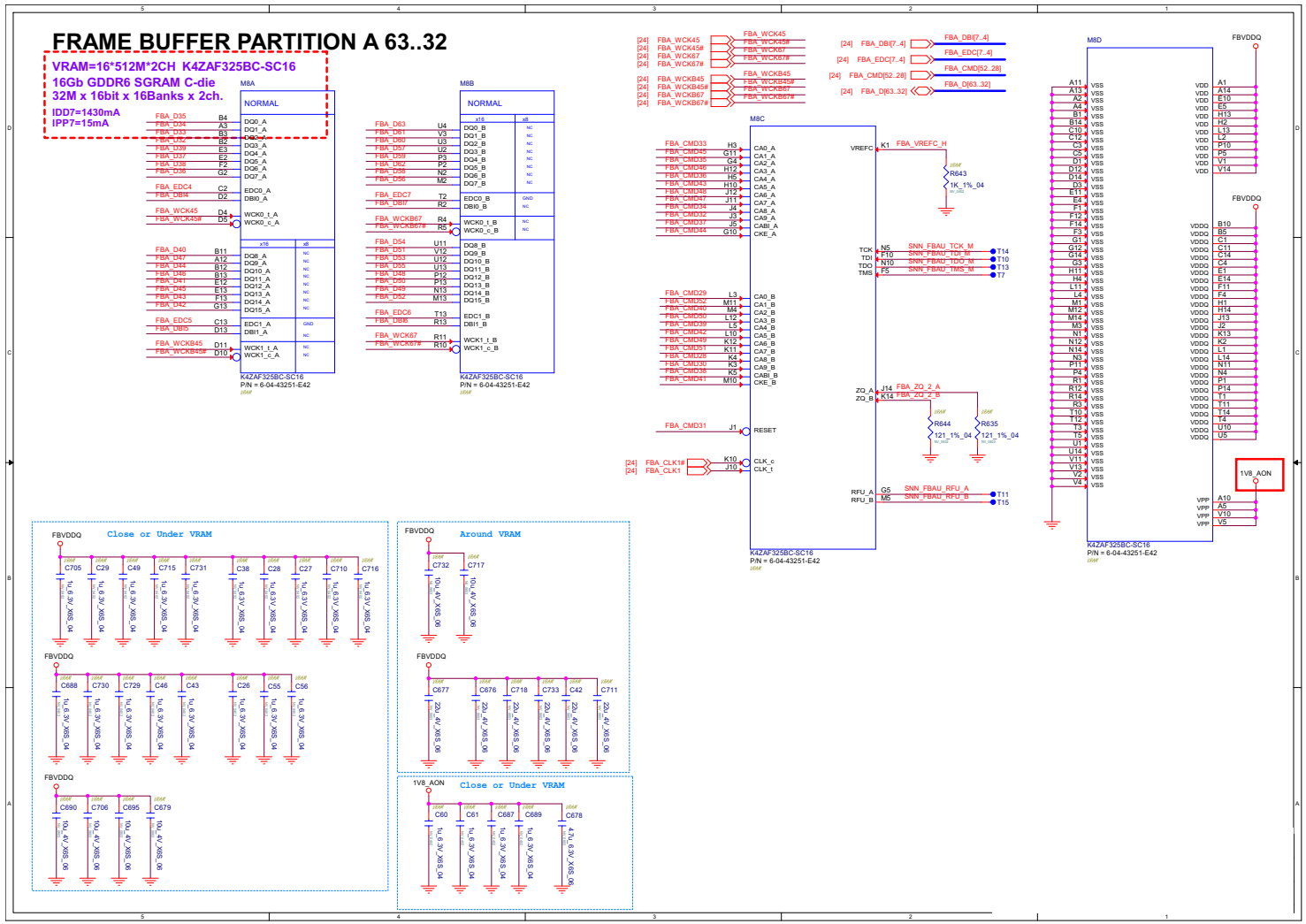

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Sheet 27 of 78
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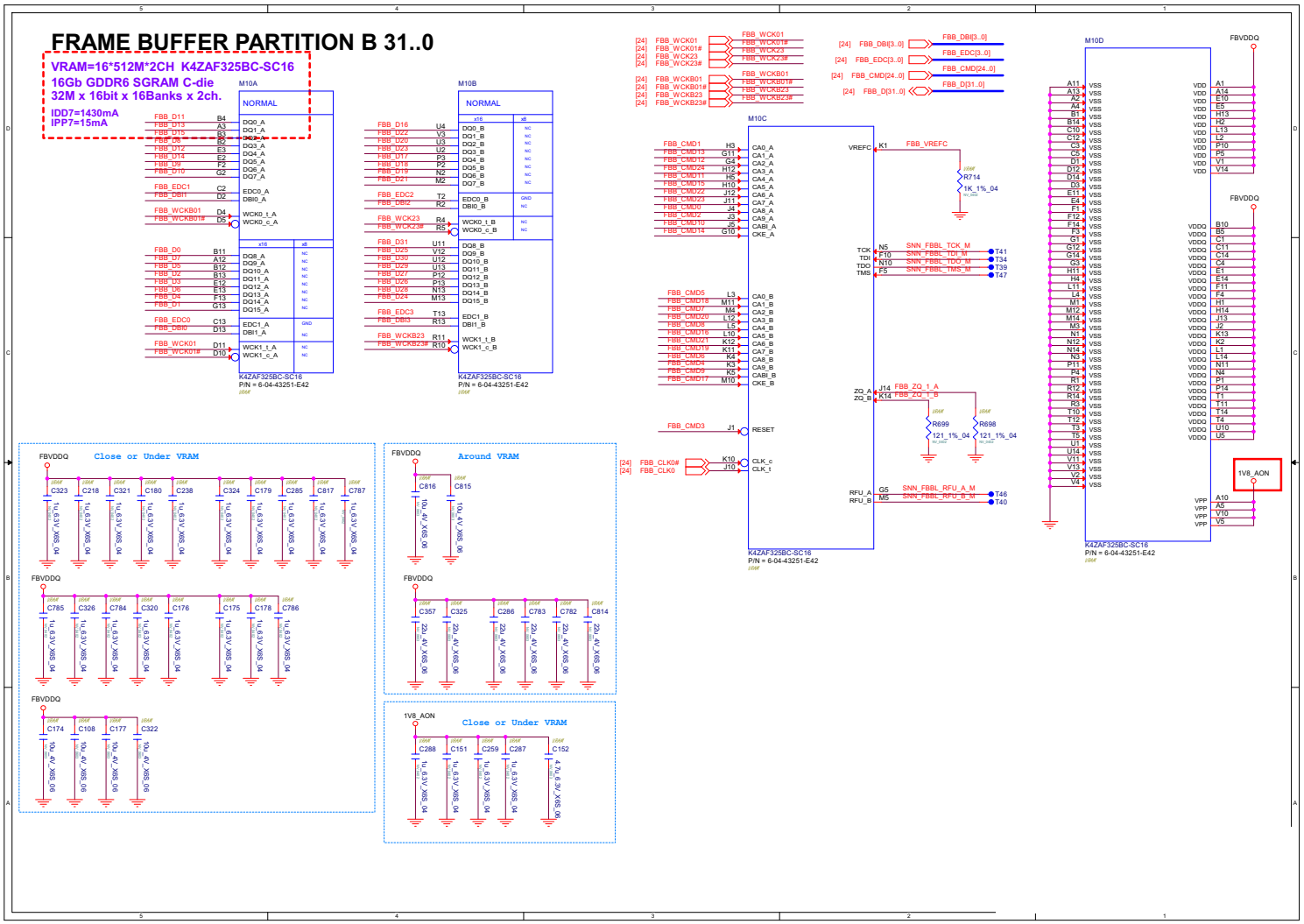

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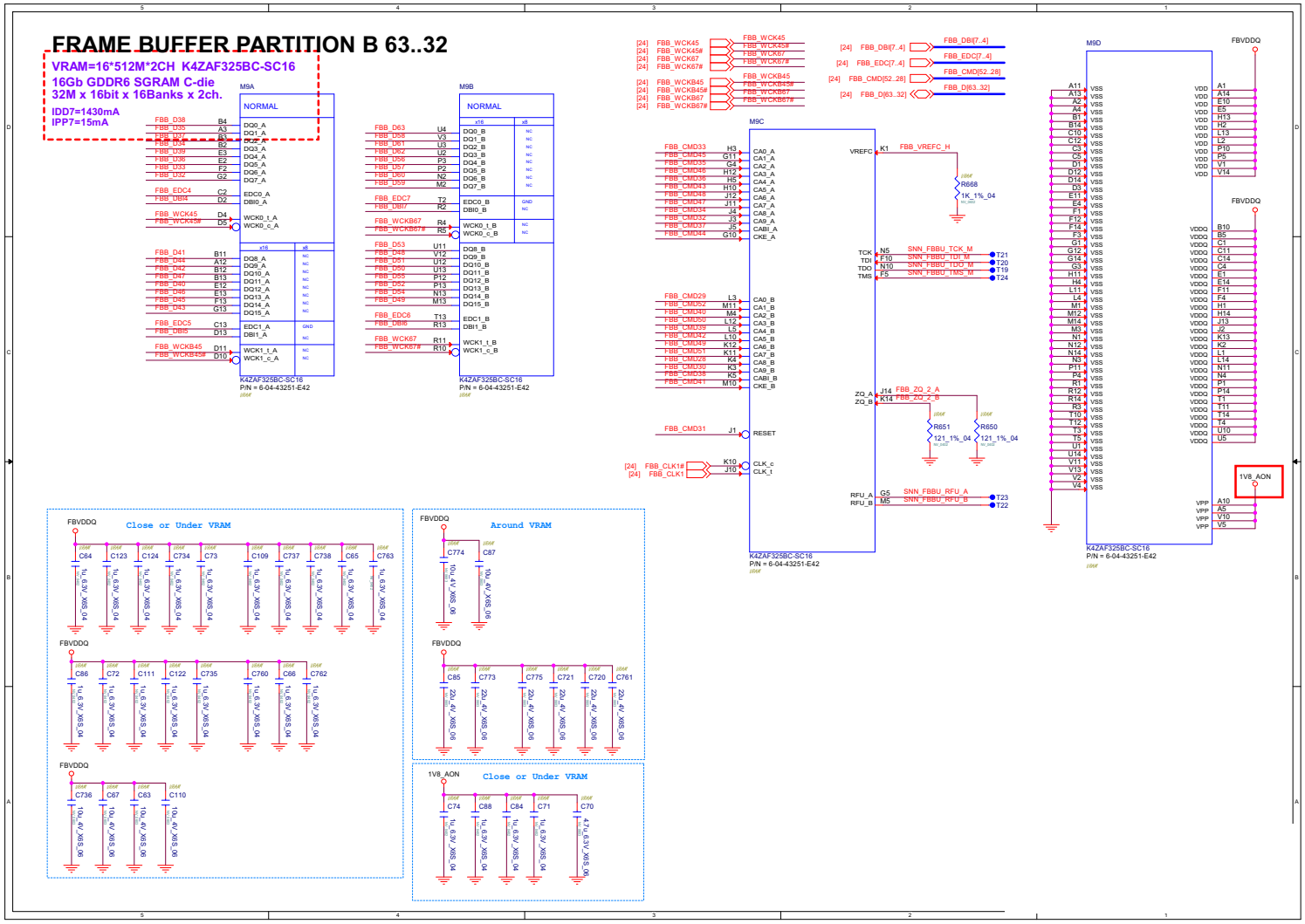

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Frame Buffer B

EDP-c

Table 12. Miscellaneous Regulator Specification

GPU	TGP (W)	0.9V Total[1] EDPc (A)	0.9V Total[1] EDPp (A)	1.2V Total[2] EDPc (A)	1.2V Total[2] EDPp (A)	1.8V Total[3] EDPc (A)	1.8V Total[3] EDPp (A)
GN21 MB2	35 to 115	2.5	2.5	3.5	3.5	0.22	0.22

Notes:
[1] 0.9V Total includes the PCIe and other 0.9V rails. Add 218 mA per IFP.
[2] 1.2V Total includes the 1V2, PLLs, and HVDD rails. Add 223 mA per IFP.
[3] 1.8V Total includes 1V8, and other 1.8V rails.

Table 11. FBVDD Regulator Specification[1]

GPU	TGP (W)	EDPc (A)	EDPe (A)	EDPp (A)	di/dt (A/µs)	Regulator Phase Count (Minimum)
GN21 MB2	35 to 115	23	15	33	TBD	1

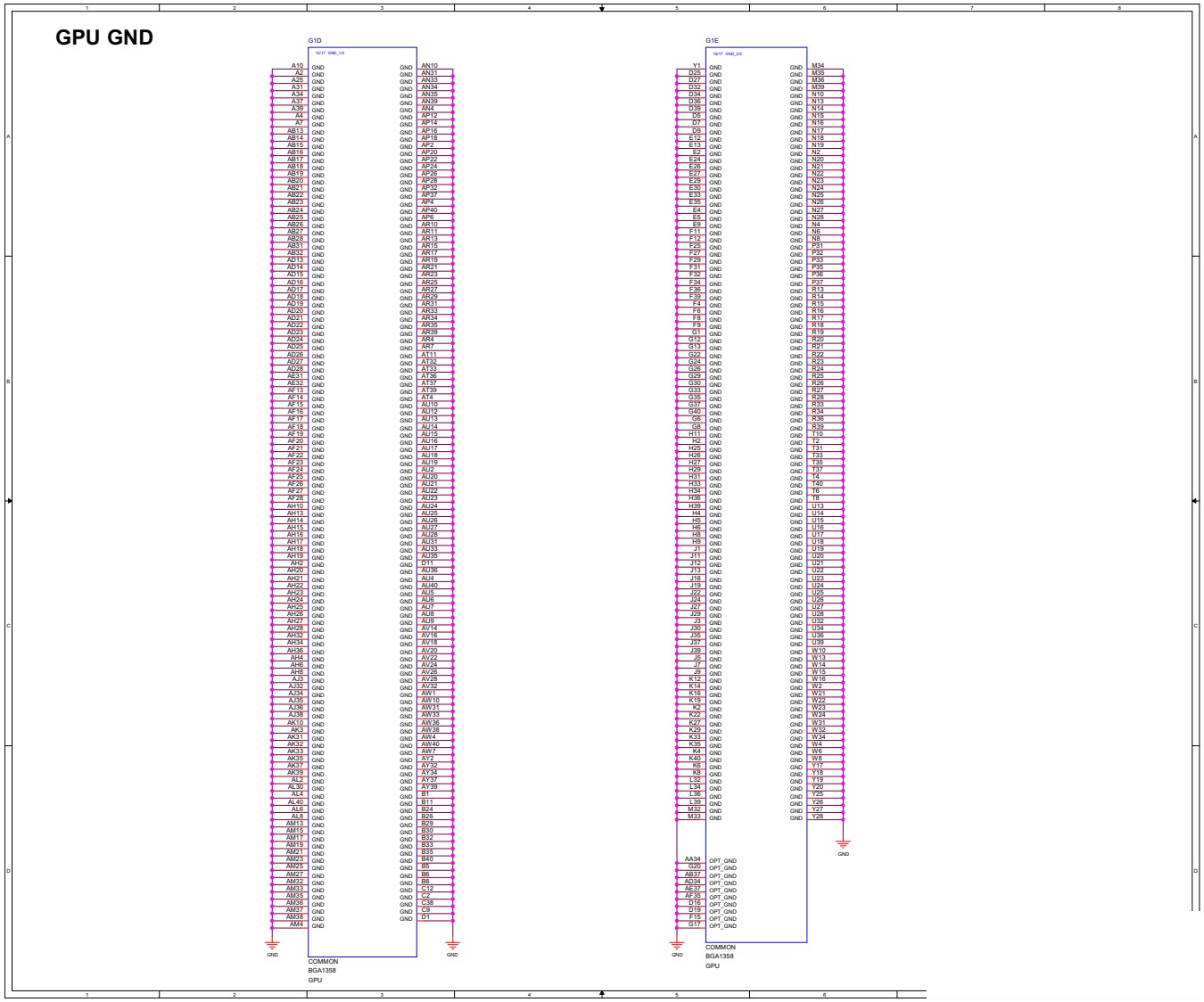
Note:
[1] FBVDD_Total = GPU FBIO+ Memory Core + Memory I/O+ Memory Vpp. These values are with nominal memory and are taken without temperature control on memory.

Table 9. NVVDD Regulator Specification[1,2]

GPU	TGP (W)	EDPc (A)	EDPe (A)	EDPp (A)	di/dt (A/µs)	Regulator Phase Count[3] (Minimum)
GN21 MB2	35	42	27	150	TBD	2
	45	53	36	150	TBD	2
	60	70	49	225	TBD	3
	70	79	56	225	TBD	3
	80	88	63	300	TBD	4
	90	97	70	300	TBD	4
	100	105	76	300	TBD	4
	110	114	83	300	TBD	4
	115	118	86	375	TBD	5

Notes:
[1] NVVDD regulator efficiency should be: Recommend: 91%, Minimum: 87%
[2] Power supply rail voltages set to maximum DC tolerance. Worst case current is observed at GPU maximum operating temperature.
[3] Regulator configuration: OVR4i+, DrMOS (5×6), IMON /DCR Current Sensing, L = 12 × 8, Support 1-phase DCM. Efficiency :87% to 91%

GPU GND



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GPU GND

GPU NVVDD, FBVDDQ

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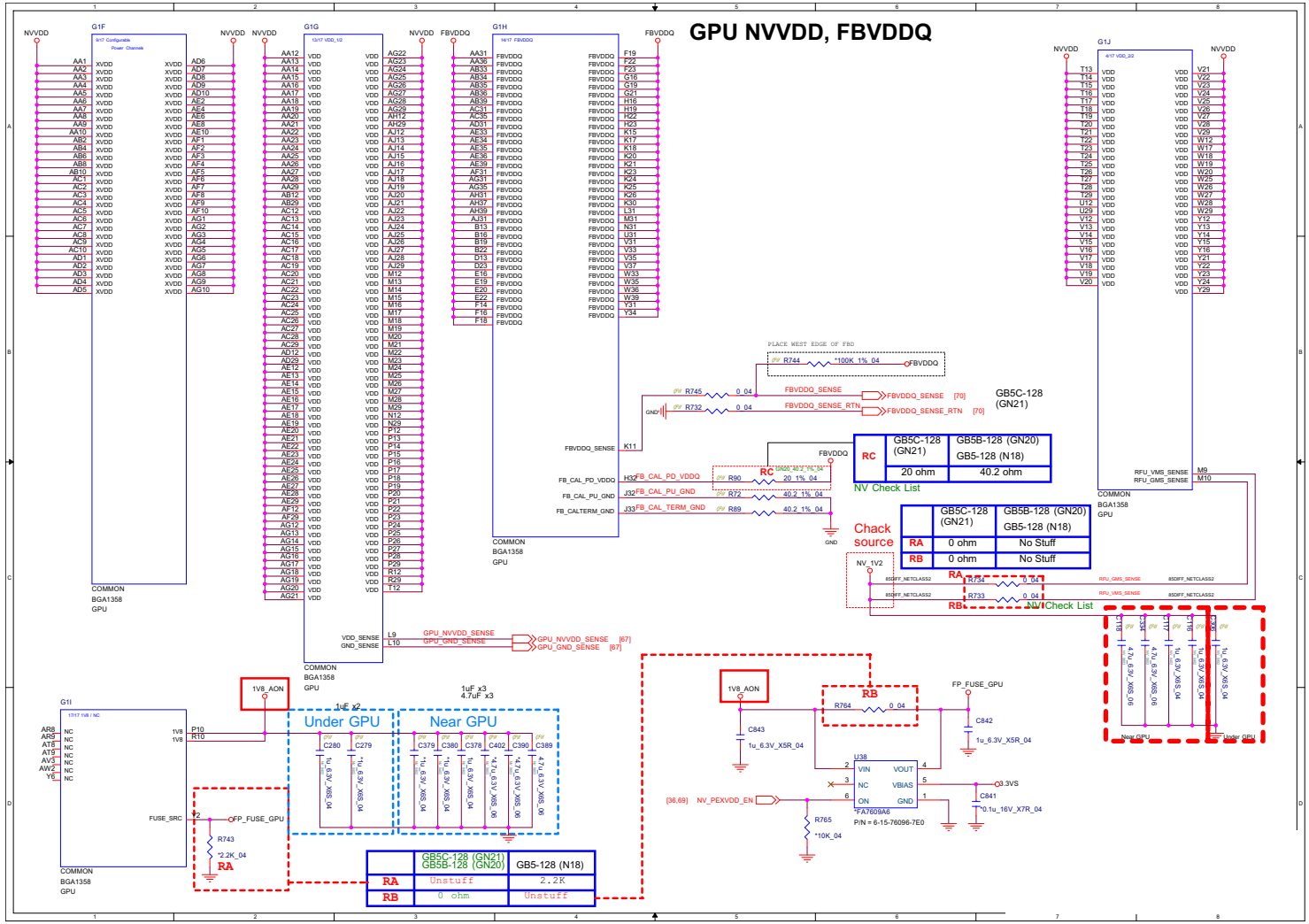
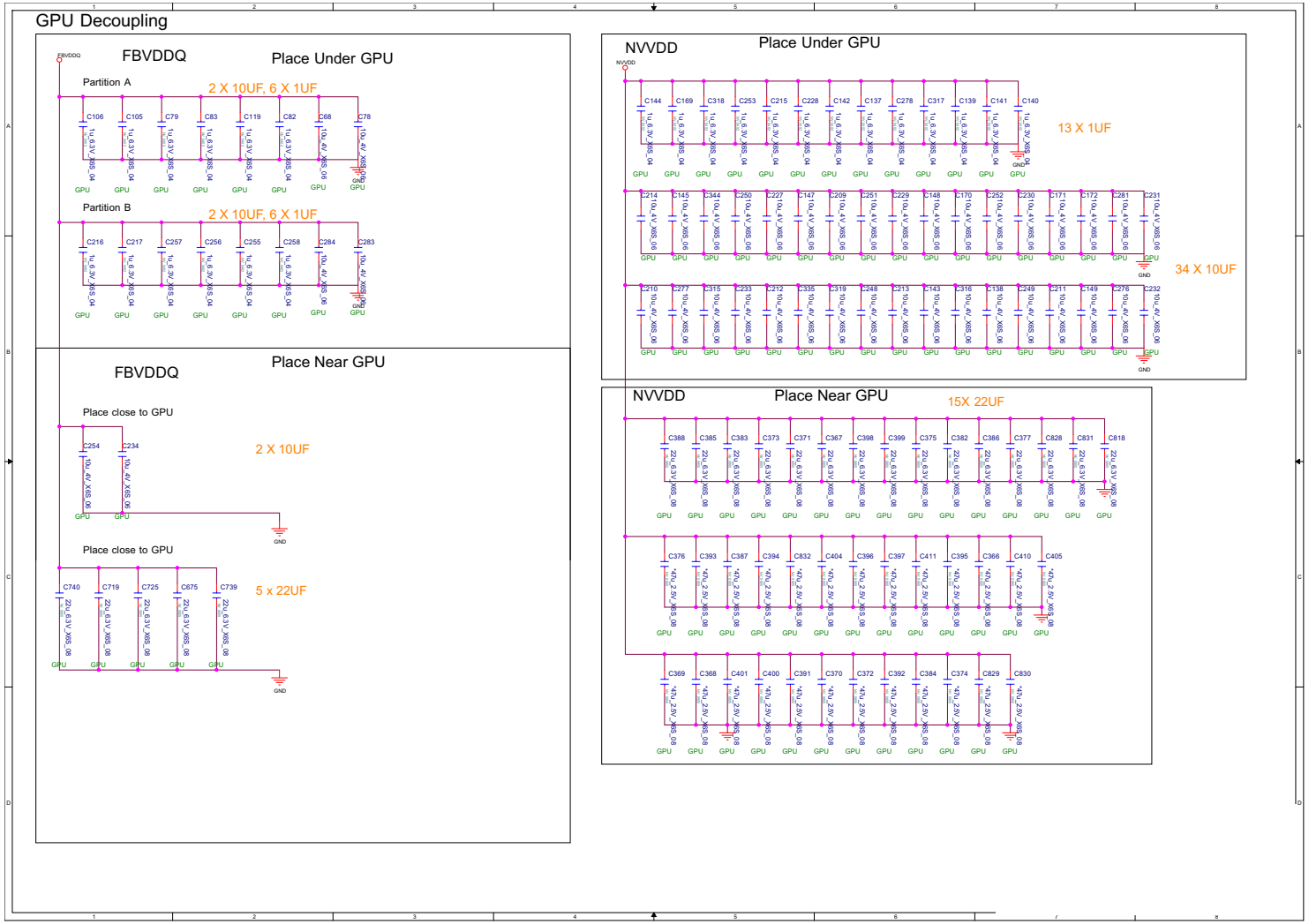
GPU NVVDD,
FBVDDQ



GPU Decoupling - NVVDD



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GPU Decoupling - NVVDD

Misc - GPIO, I2C, ROM

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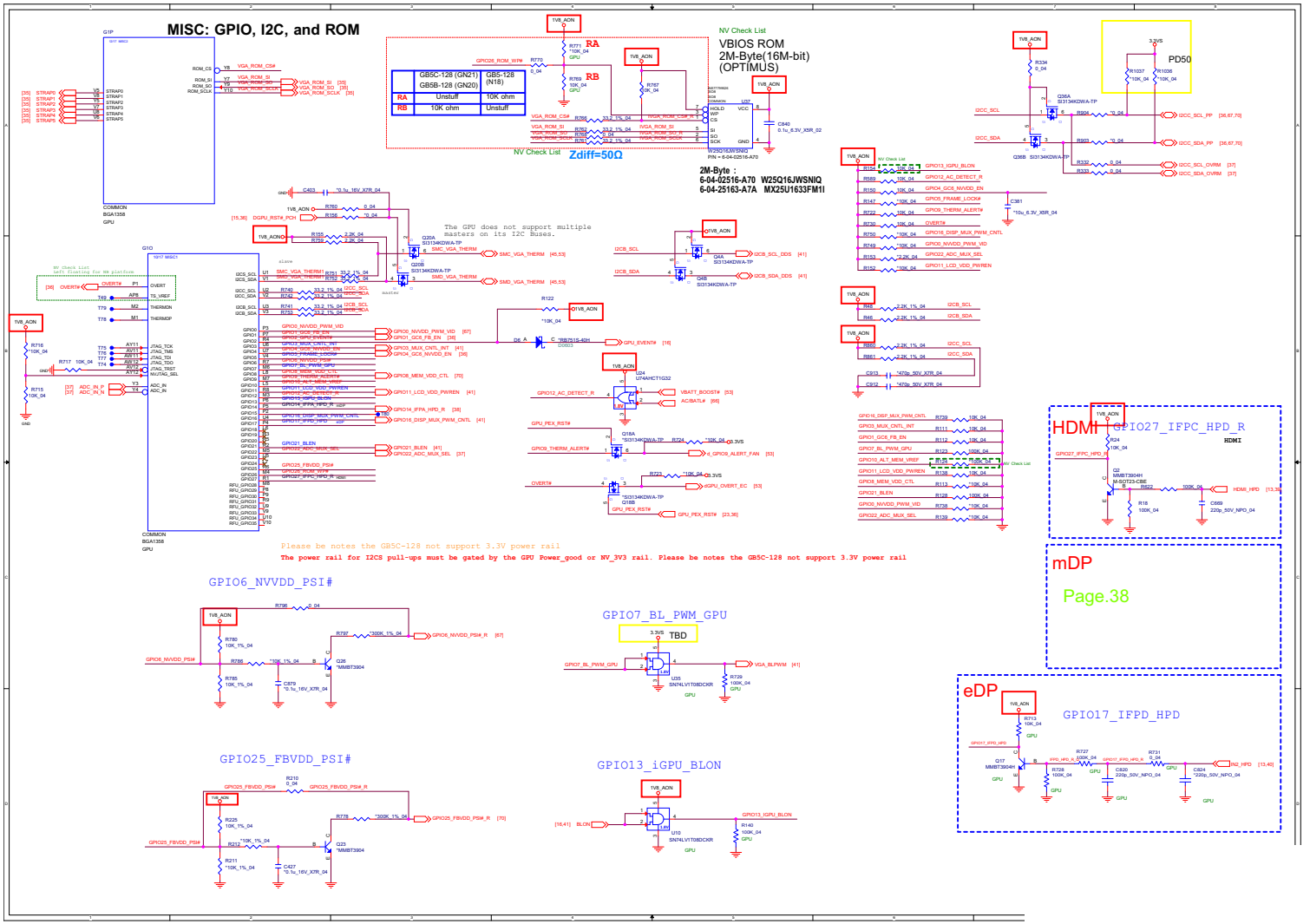
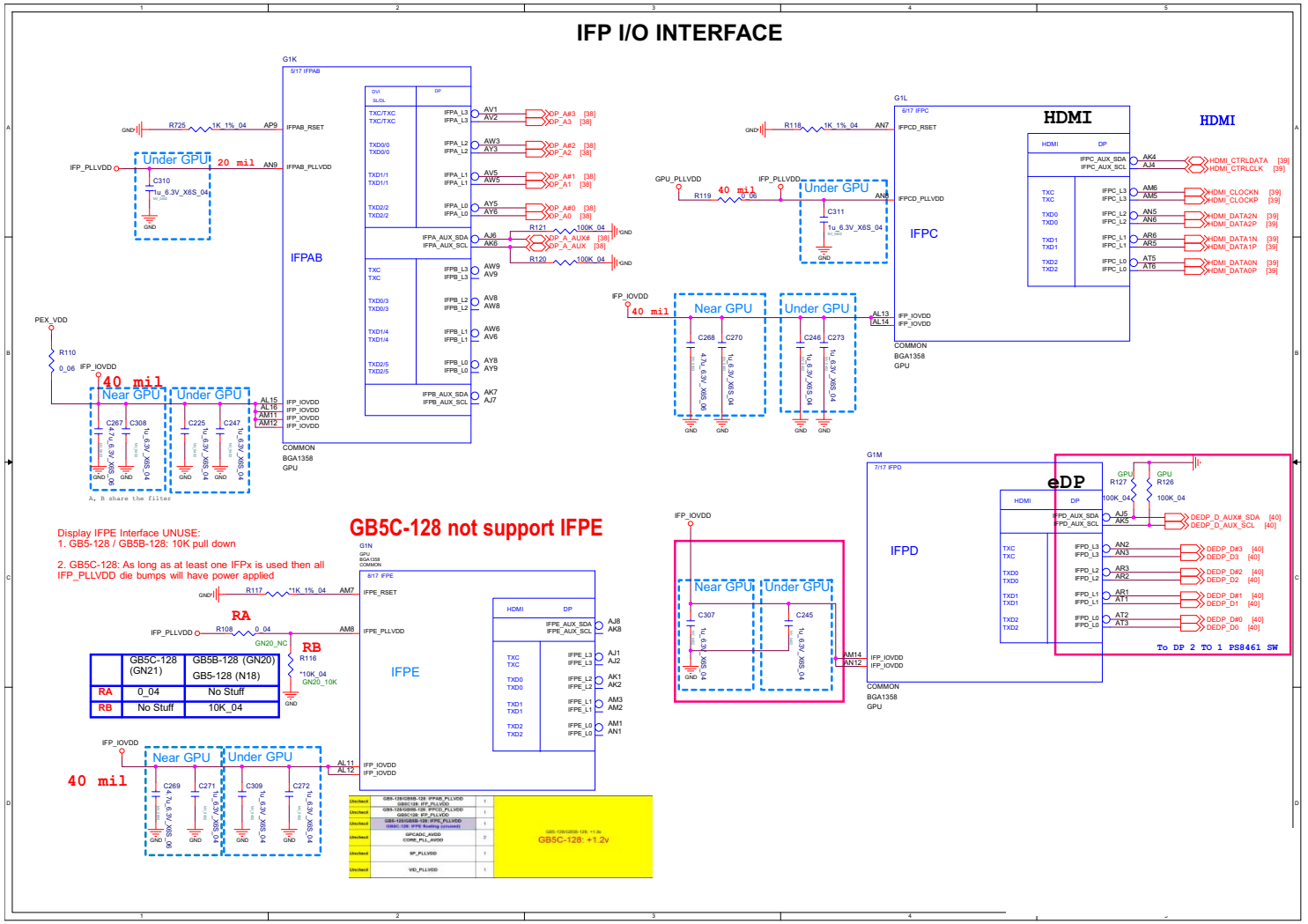
Misc - GPIO, I2C, ROM



IFP I/O Interface



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IFP I/O Interface

B.Schematic Diagrams

Straps and XTAL

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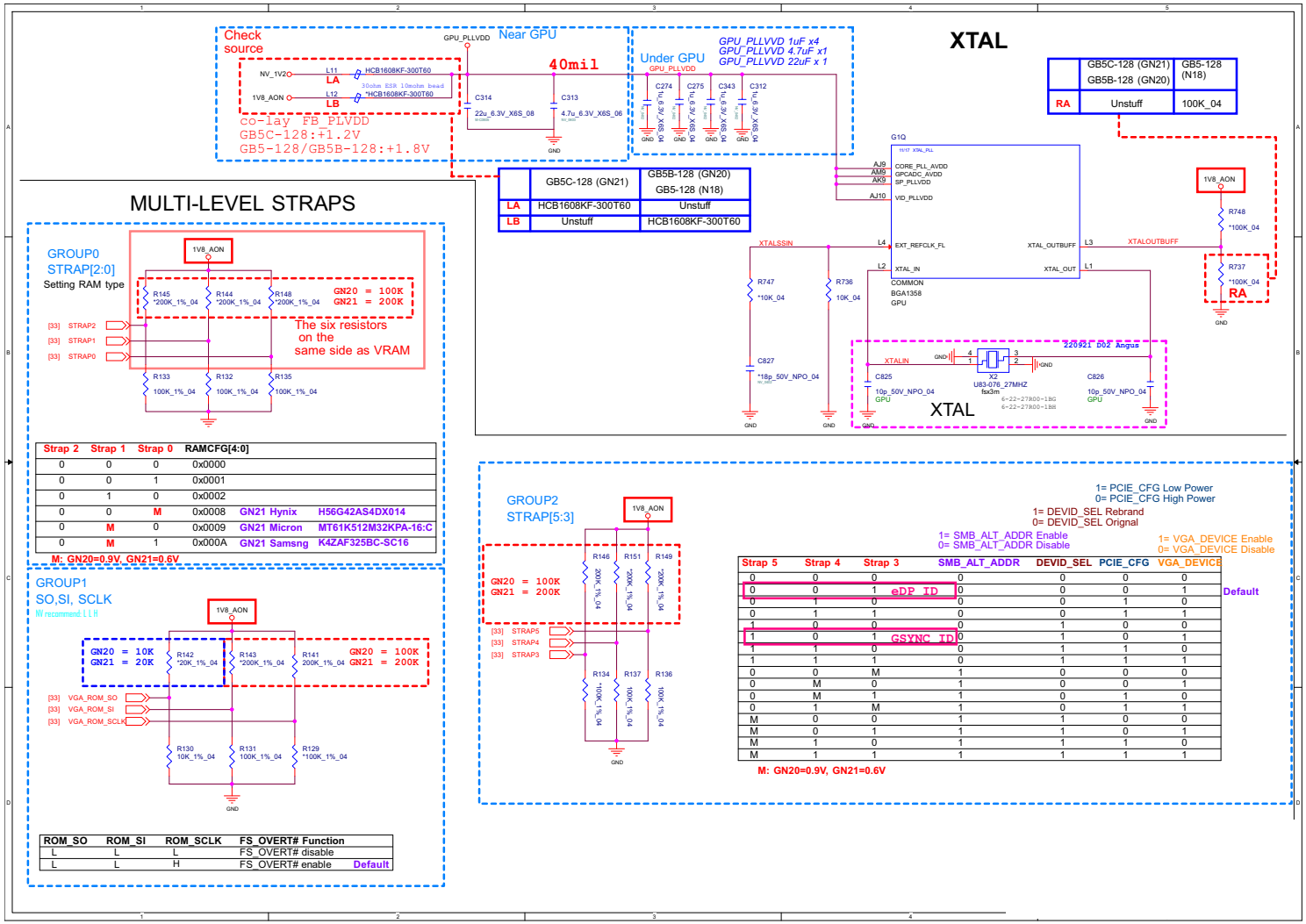
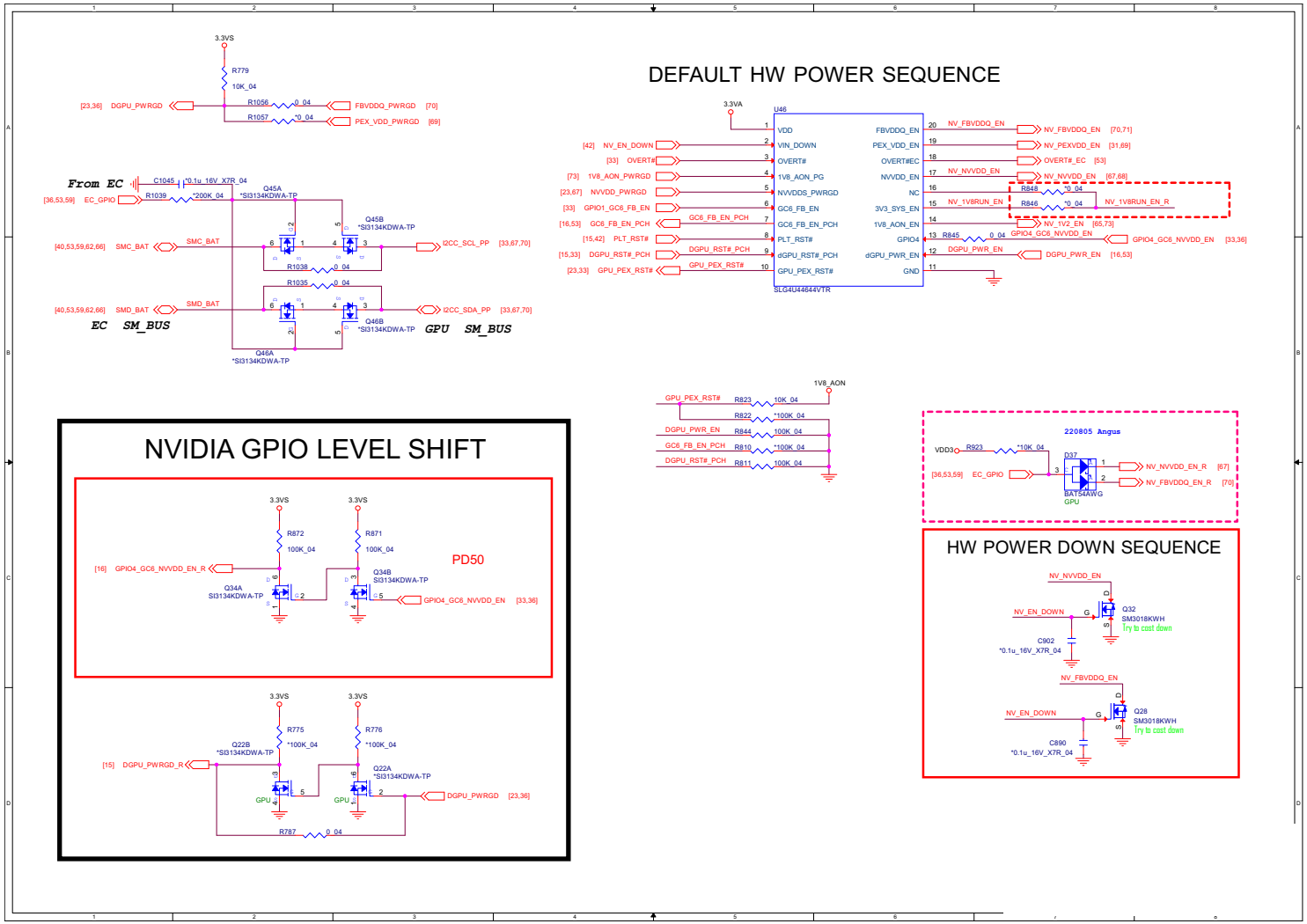
Straps and XTAL



NVIDIA Power Sequence



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NVIDIA Power Sequence

OVR-M

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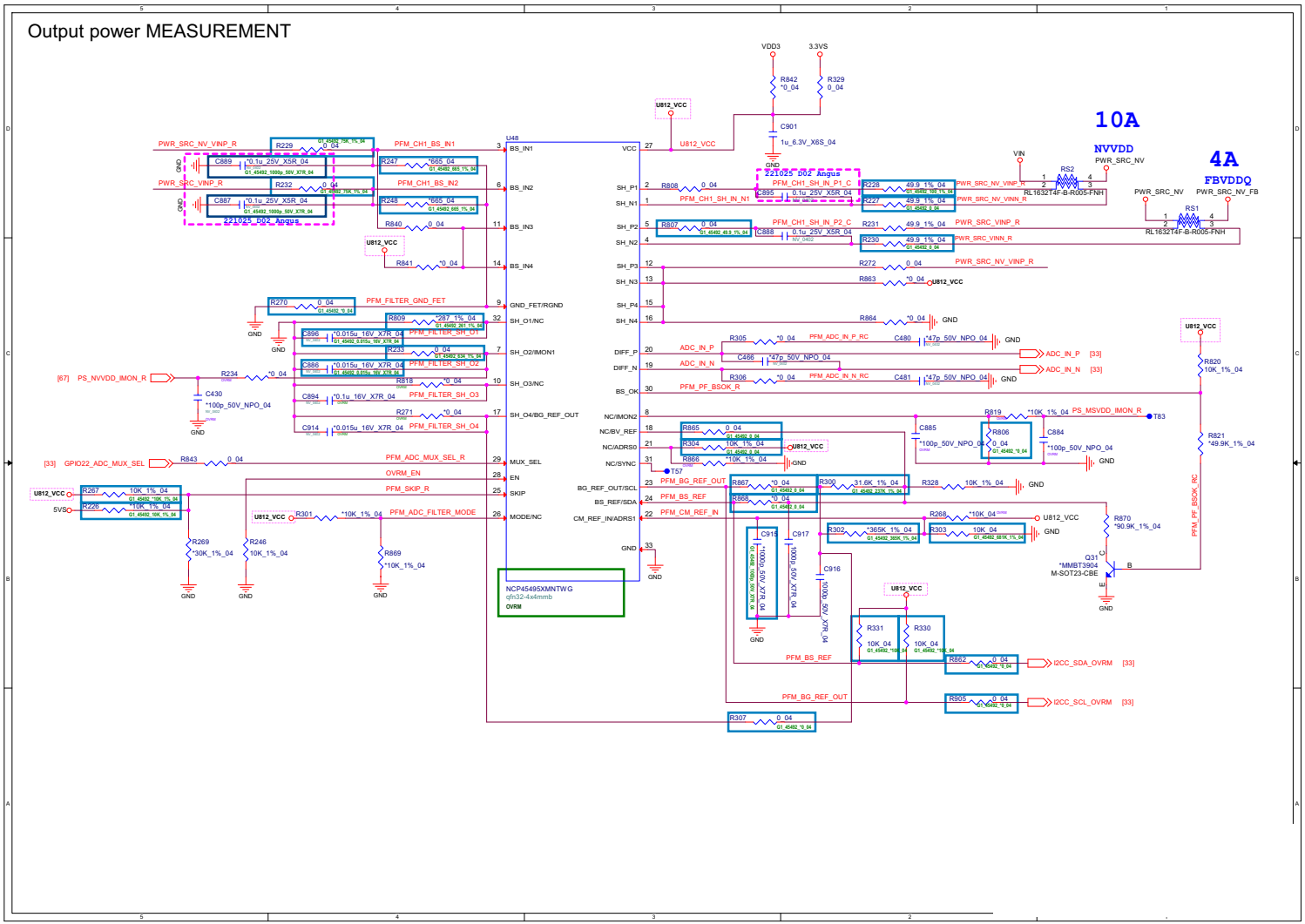
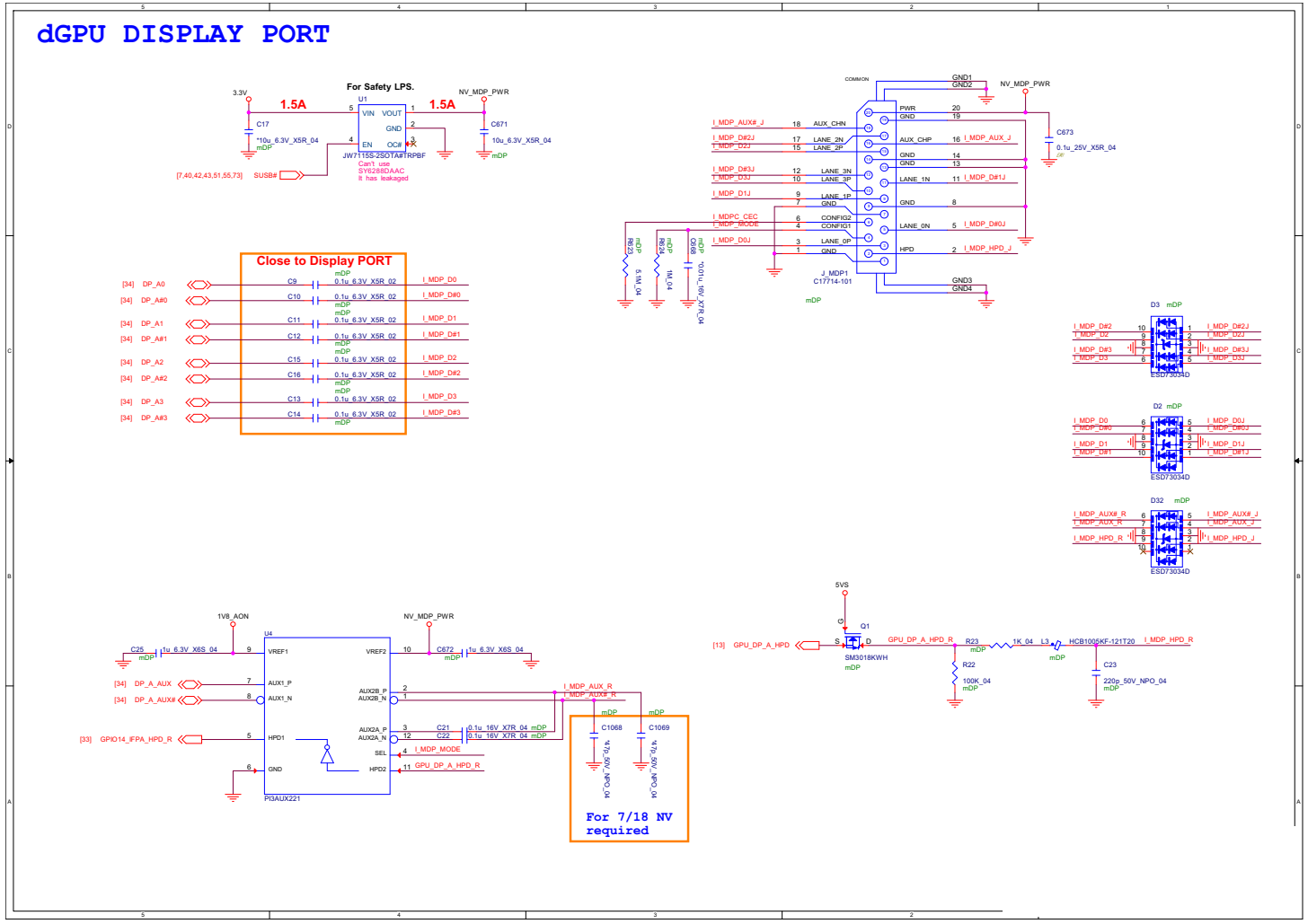
OVR-M



mDP



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mDP

HDMI

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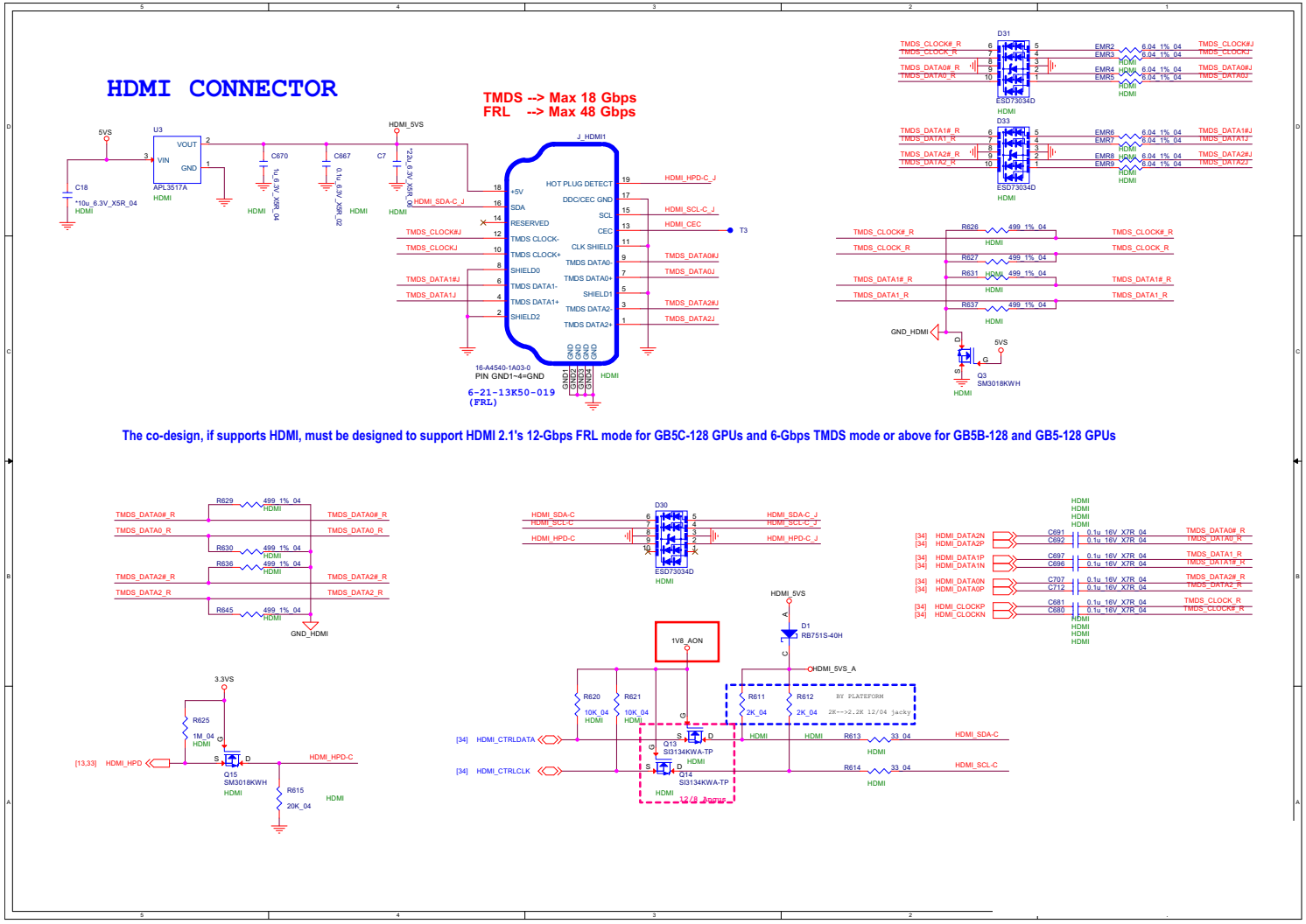
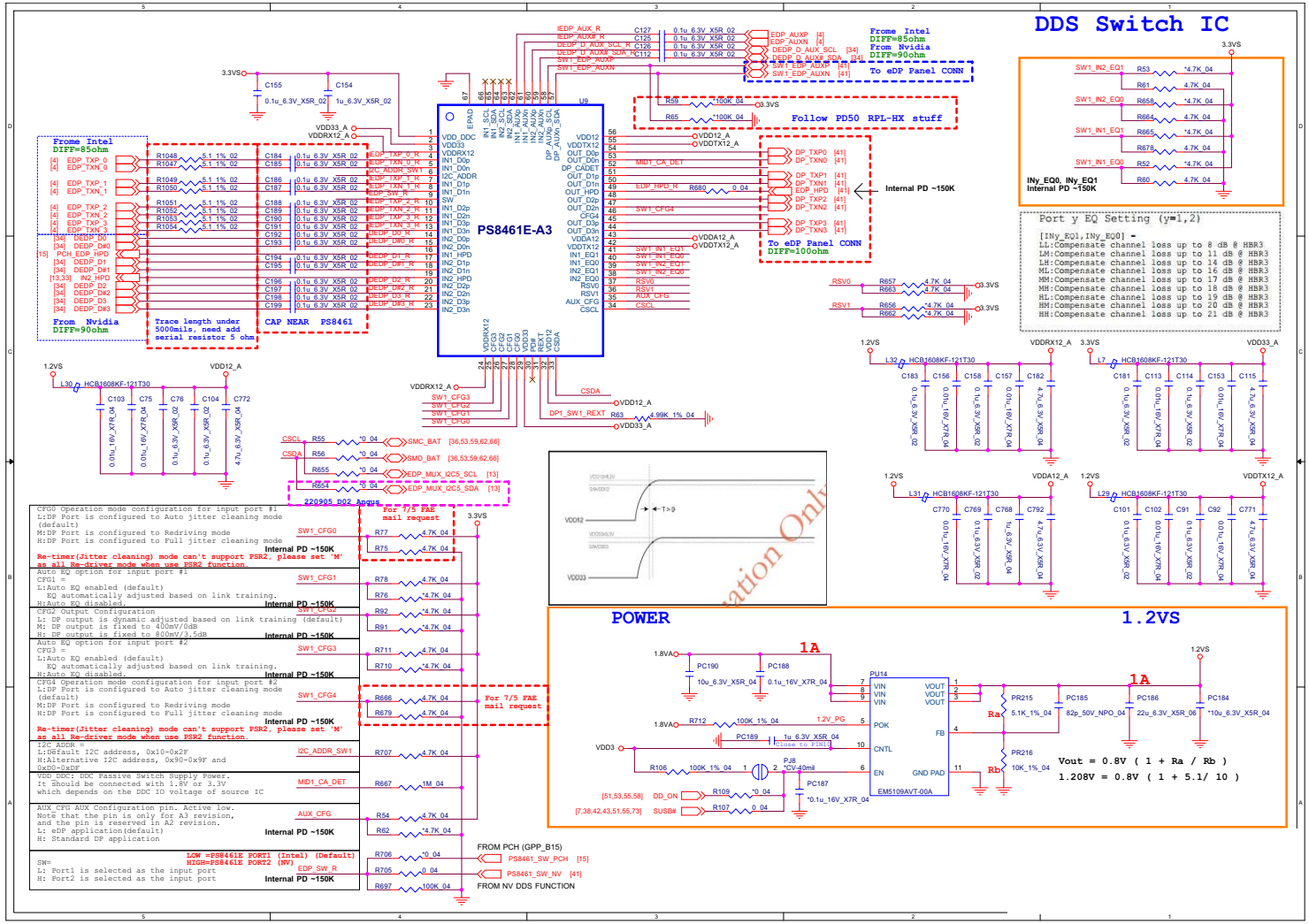
HDMI



PS8461E-A3


DDS Switch IC
PS8461E-A3
POWER
1.2VS
Follow PD50 RPL-HX stuff
To eDP Panel CONN
From Intel
DIFF=85ohm
From Nvidia
DIFF=90ohm
Internal PD ~150K
Vout = 0.8V (1 + Ra / Rb)
1.208V = 0.8V (1 + 5.1/ 10)
FROM PCH (GPP_B15)
FROM NV DDS FUNCTION

Panel, Inverter

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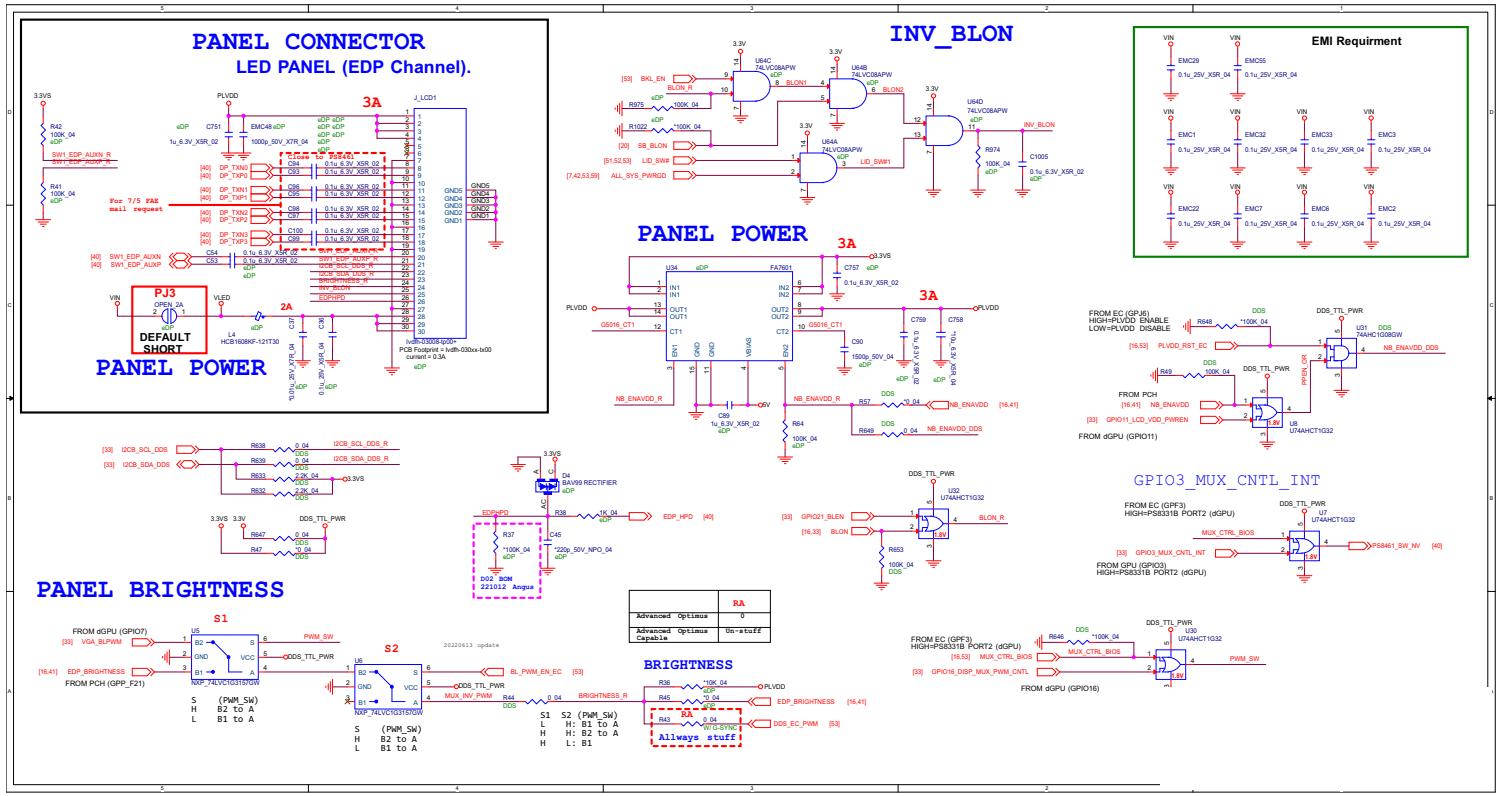
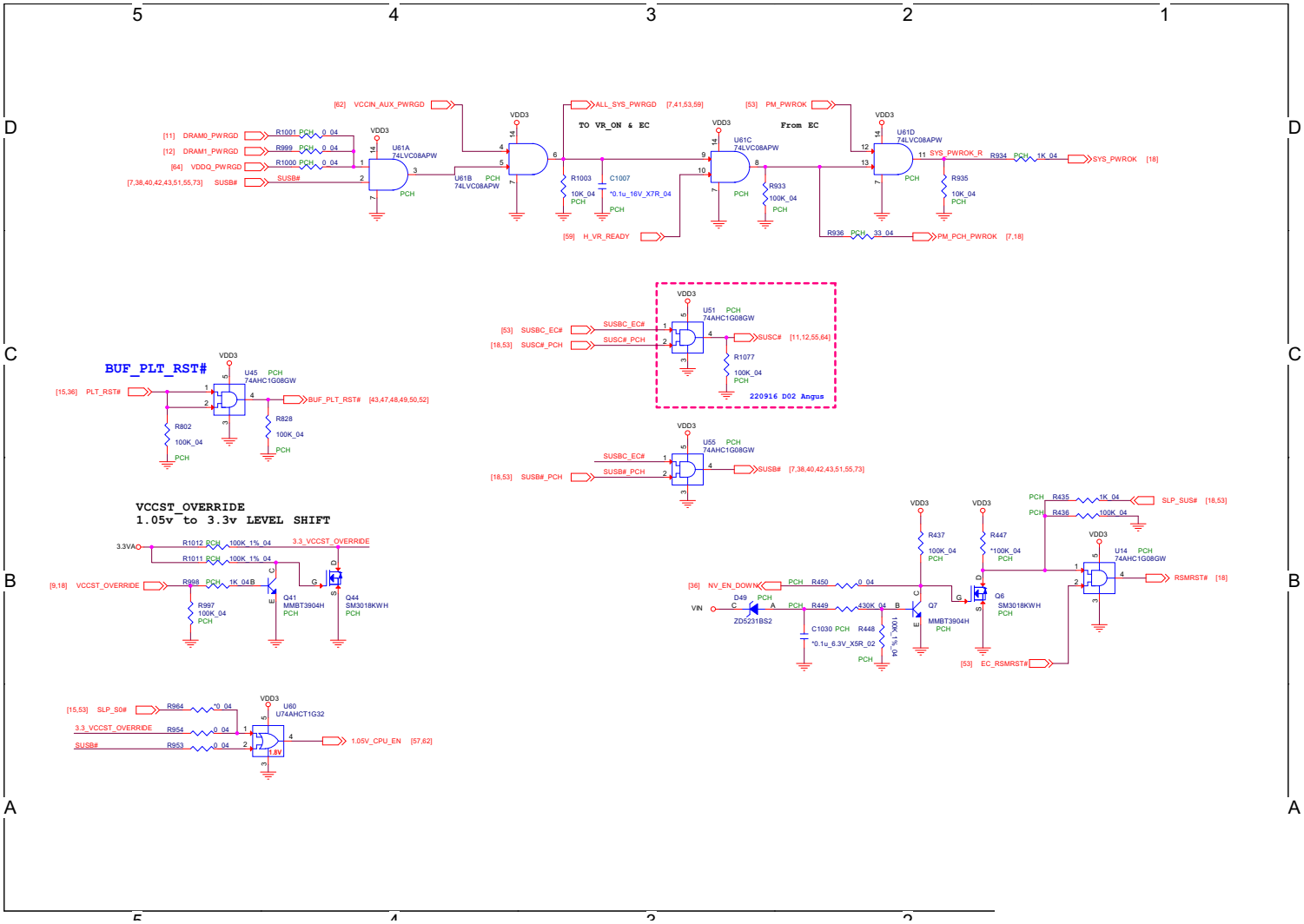
Panel, Inverter



PM Control



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PM Control

Maple Ridge 1/2

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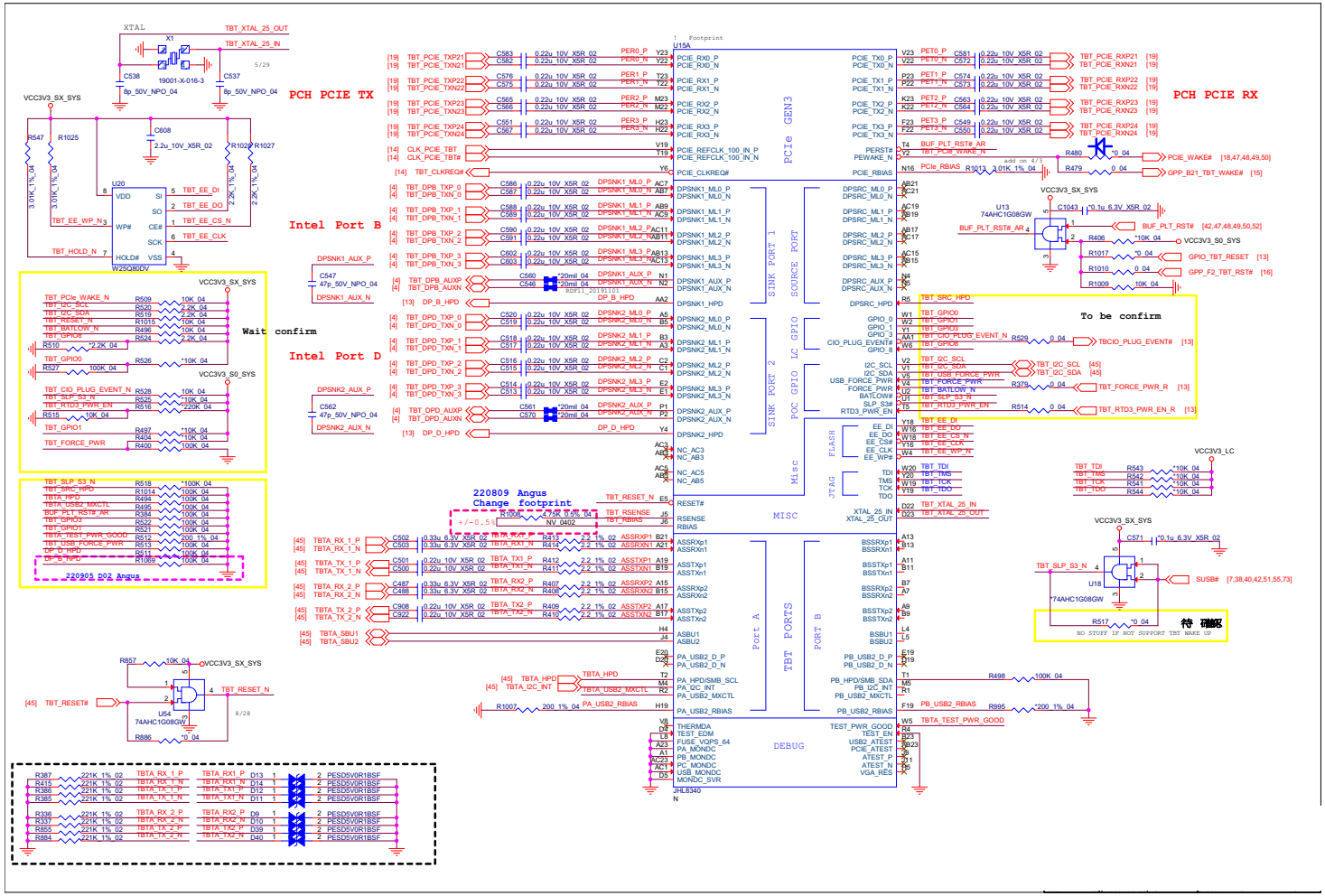
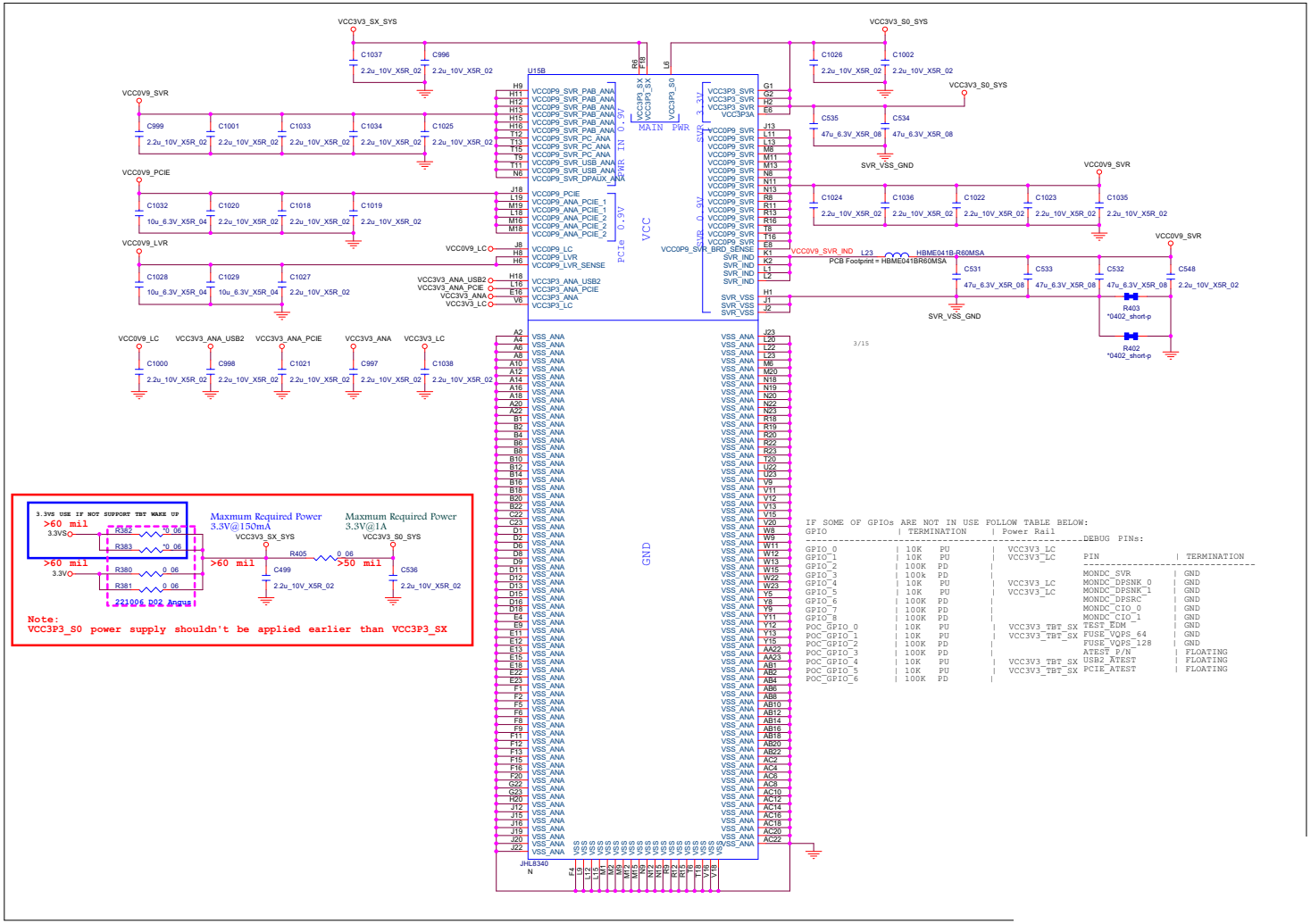
Maple Ridge 1/2



Maple Ridge 1/2



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Maple Ridge 2/2

TPS65993, Type-C

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TPS65993, Type-C

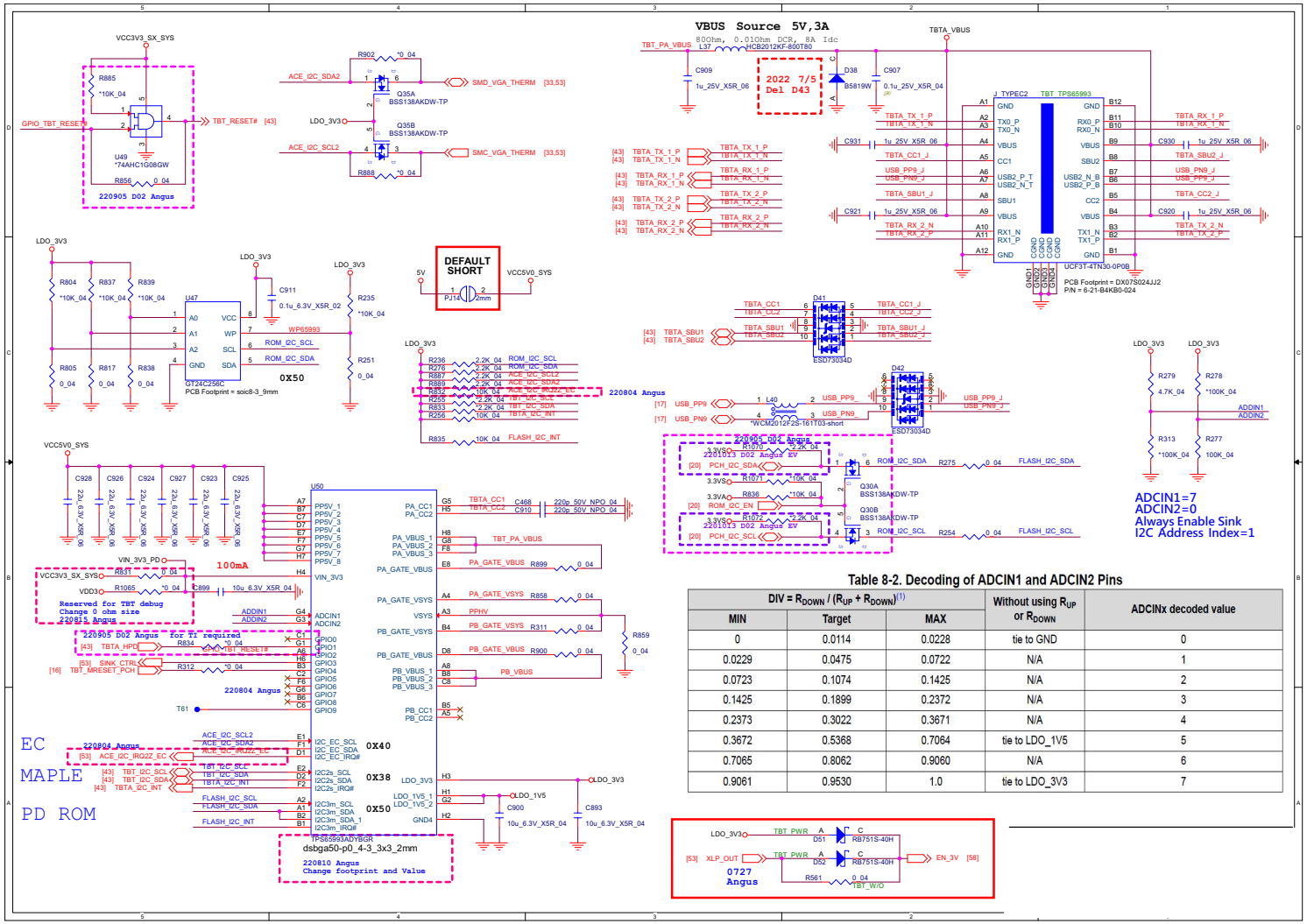
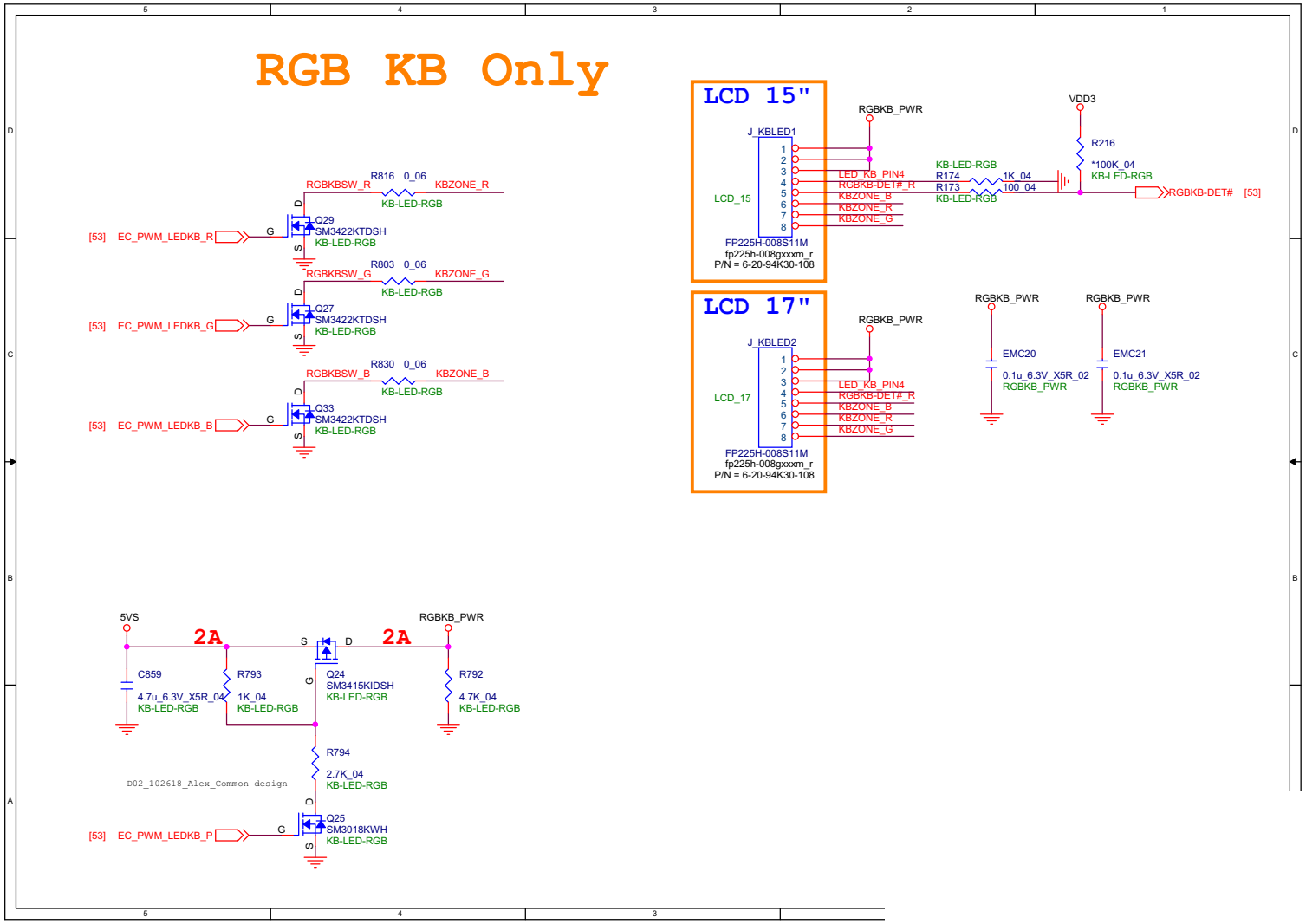


Table 8-2. Decoding of ADCIN1 and ADCIN2 Pins

DIV = R_{DOWN} / (R_{UP} + R_{DOWN})(1)			Without using R_{UP} or R_{DOWN}	ADCINx decoded value
MIN	Target	MAX		
0	0.0114	0.0228	tie to GND	0
0.0229	0.0475	0.0722	N/A	1
0.0723	0.1074	0.1425	N/A	2
0.1425	0.1899	0.2372	N/A	3
0.2373	0.3022	0.3671	N/A	4
0.3672	0.5368	0.7064	tie to LDO_1V5	5
0.7065	0.8062	0.9060	N/A	6
0.9061	0.9530	1.0	tie to LDO_3V3	7

RGB KB



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RGB KB

M.2 WLAN+BT

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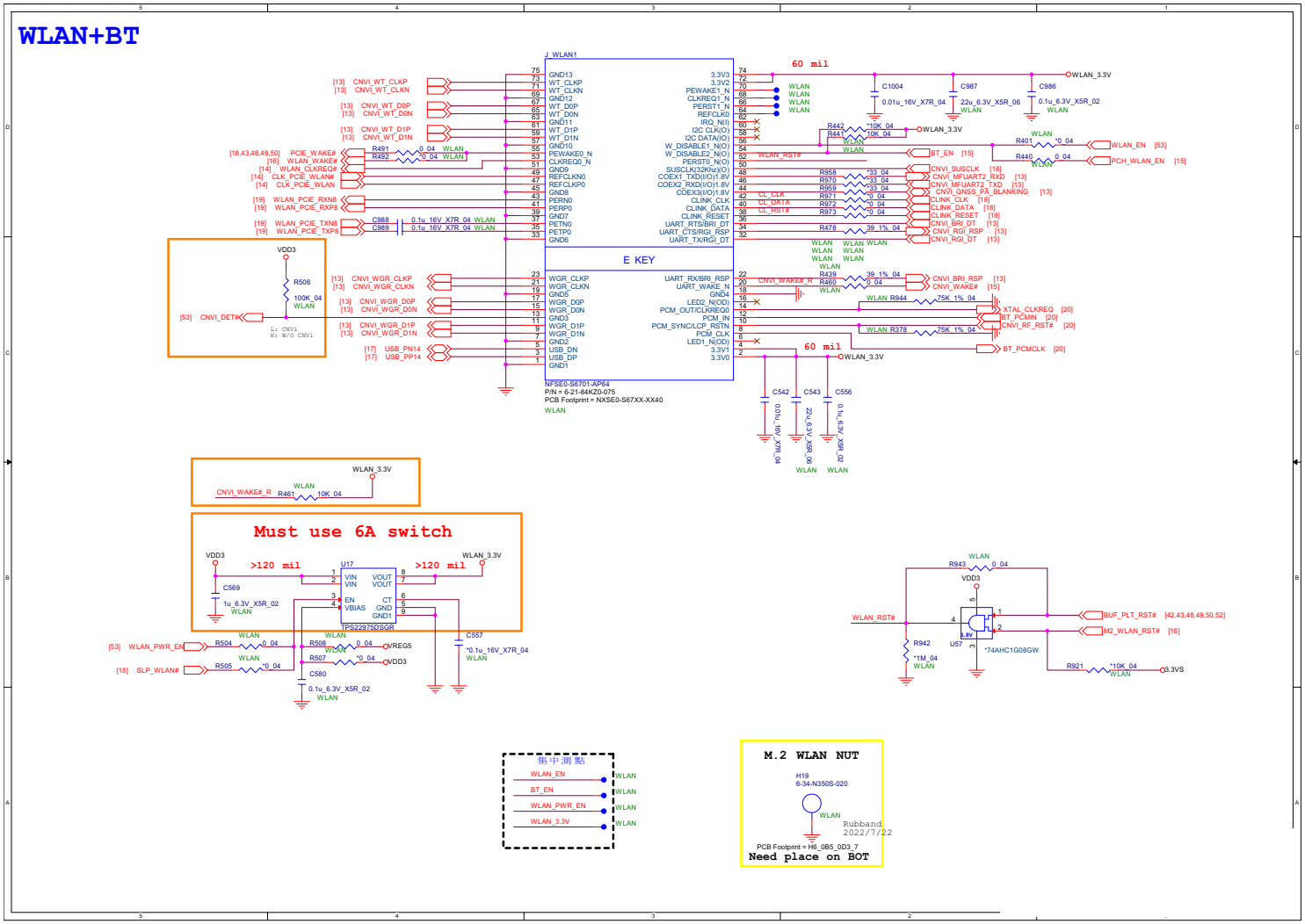
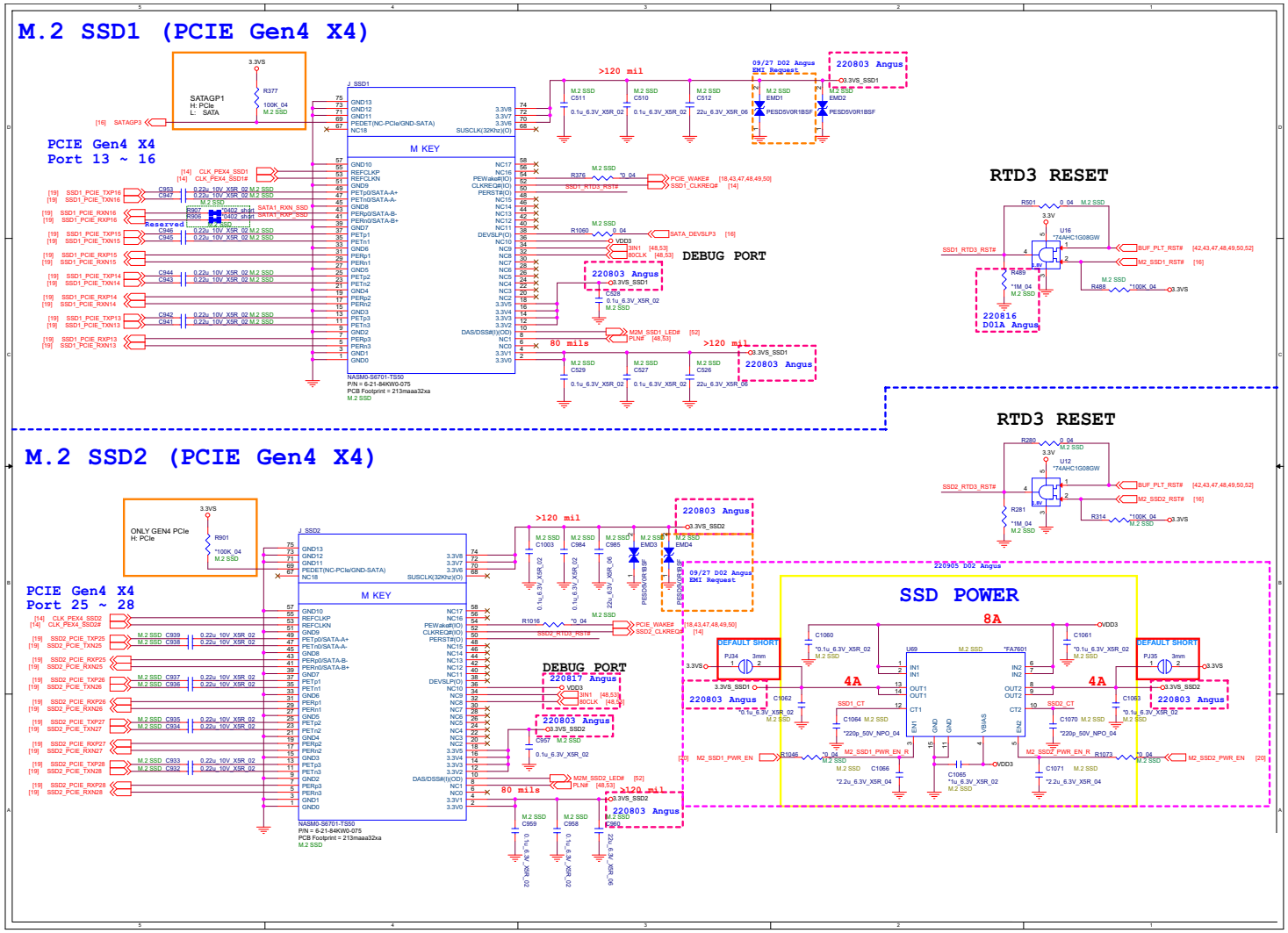
M.2 WLAN+BT



M.2 SSD1, SSD2



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M.2 SSD1, SSD2

LAN i219V

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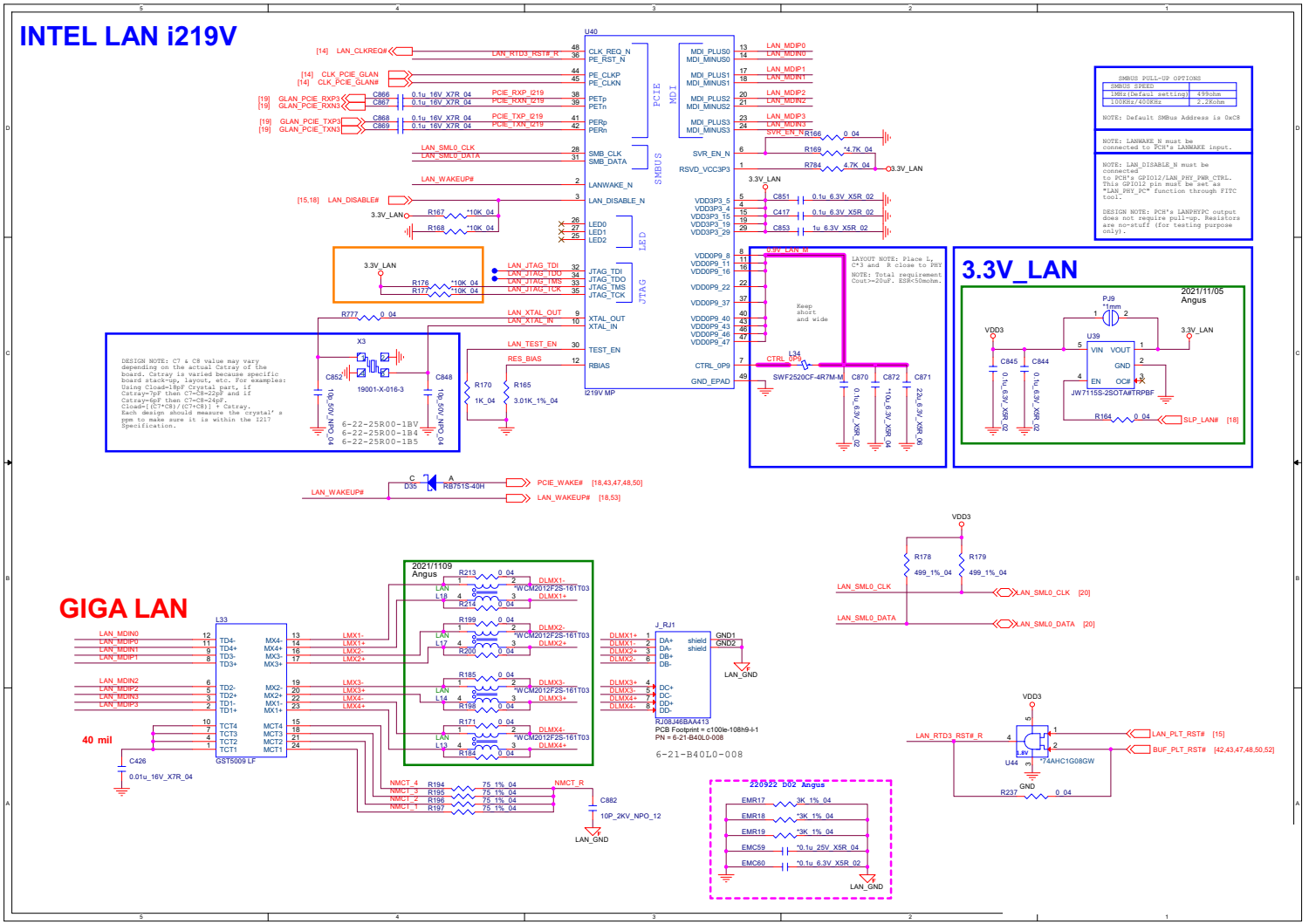
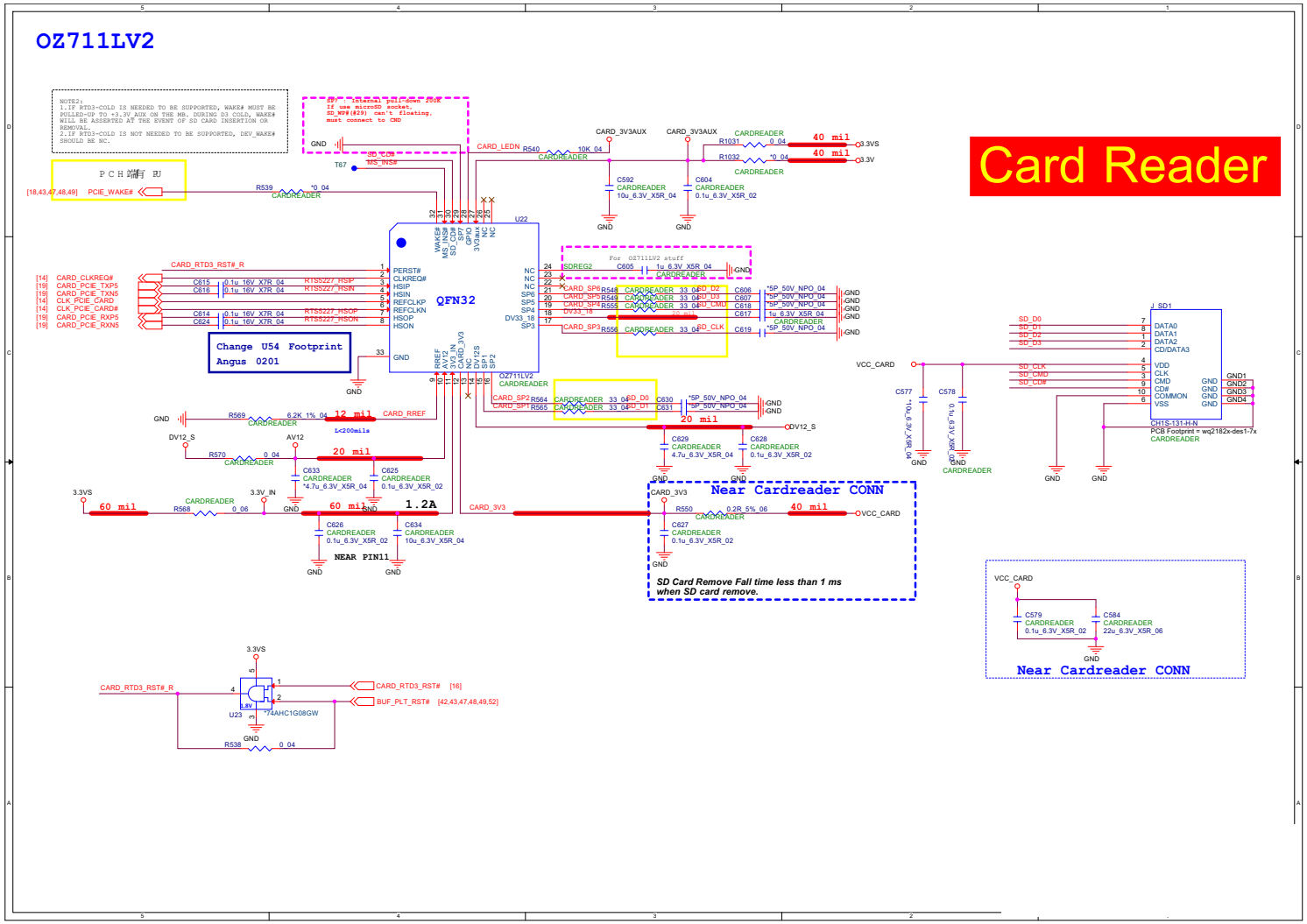
LAN i219V



Card Reader



Sheet 50 of 78
Card Reader

HDD, TP, Audio, USB Charger

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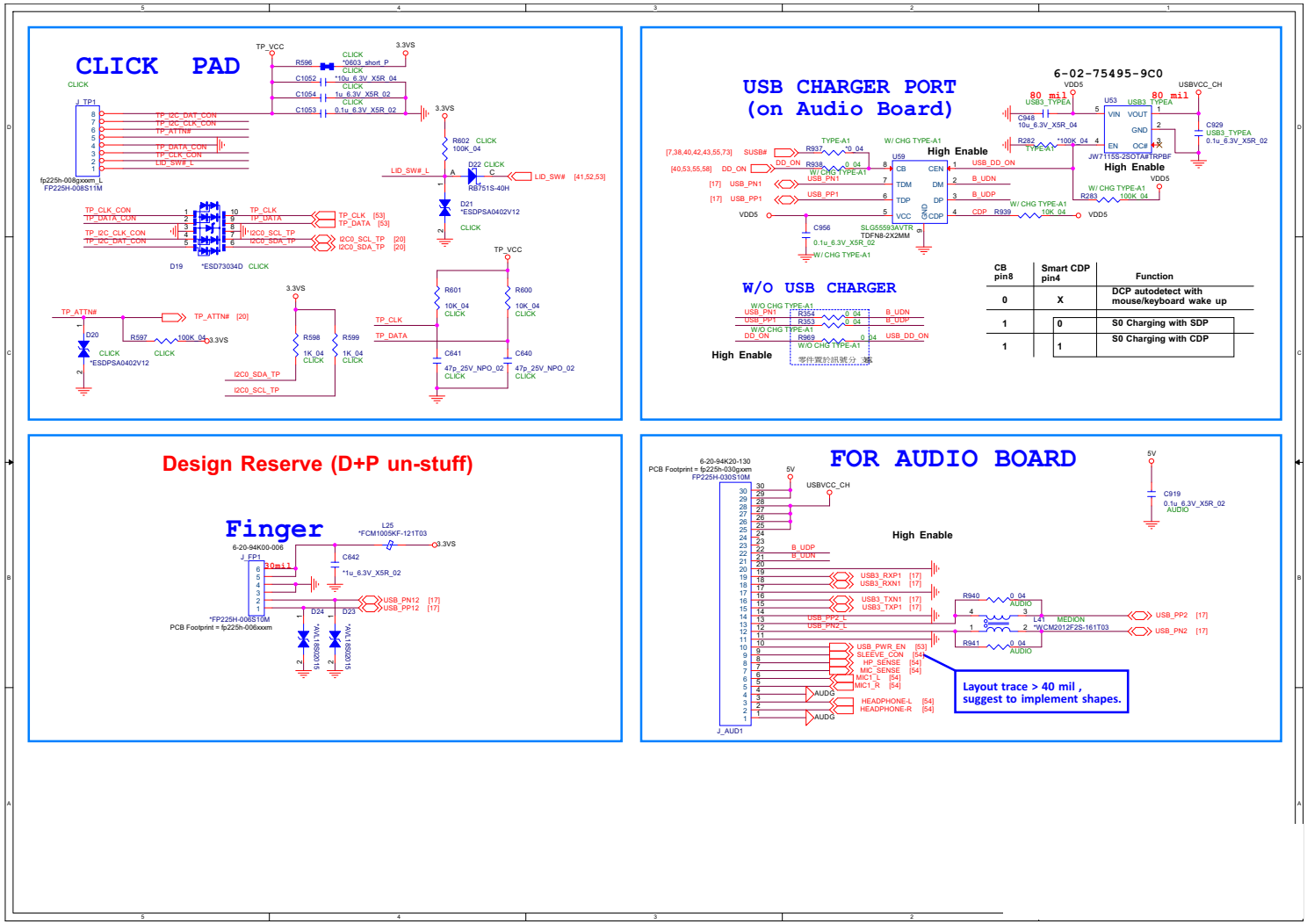
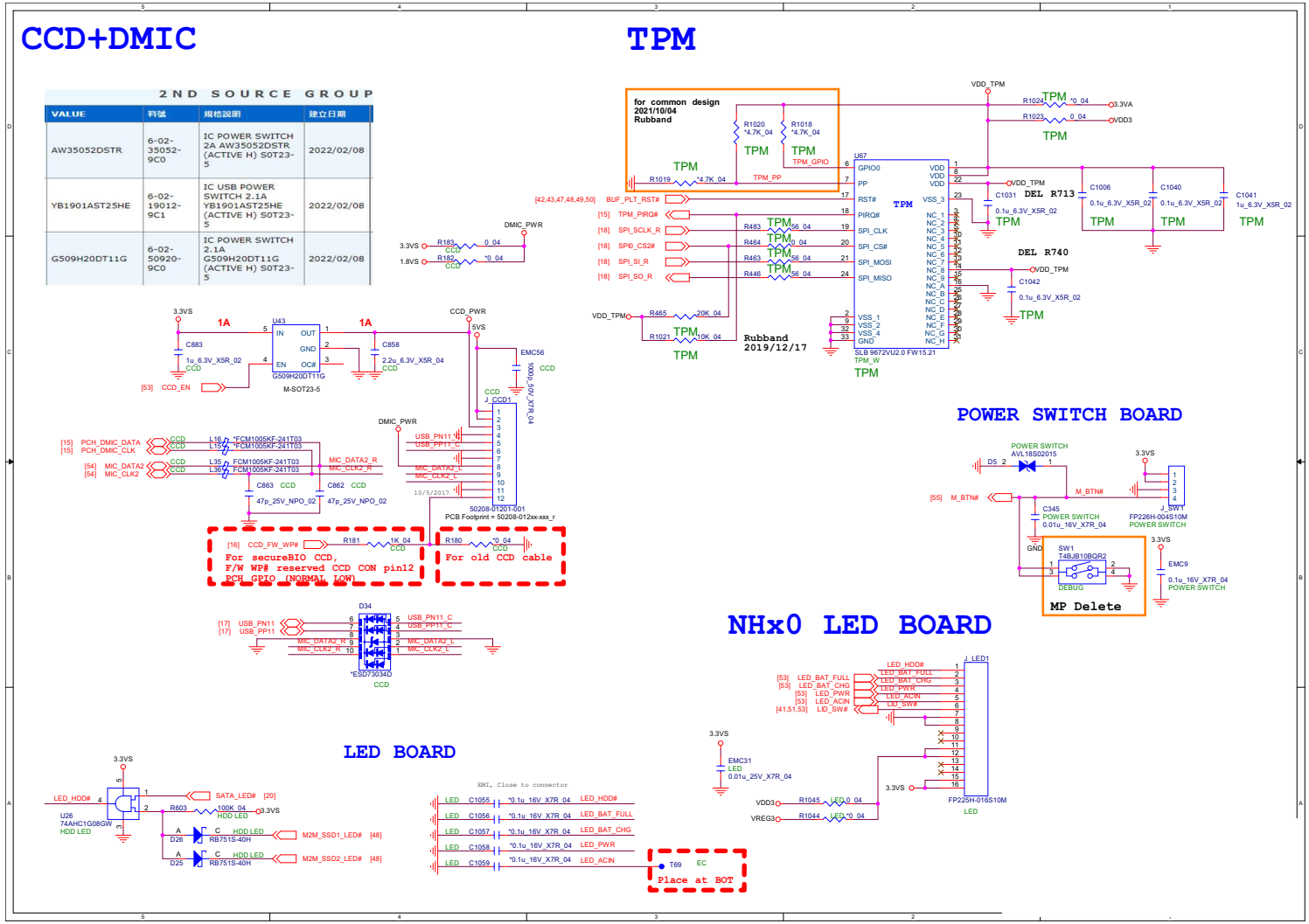
HDD, TP, Audio, USB Charger



LED, CCD, TPM, Power SW Con.



Sheet 52 of 78
LED, CCD, TPM, Power SW Con.

KBC-ITE IT5570

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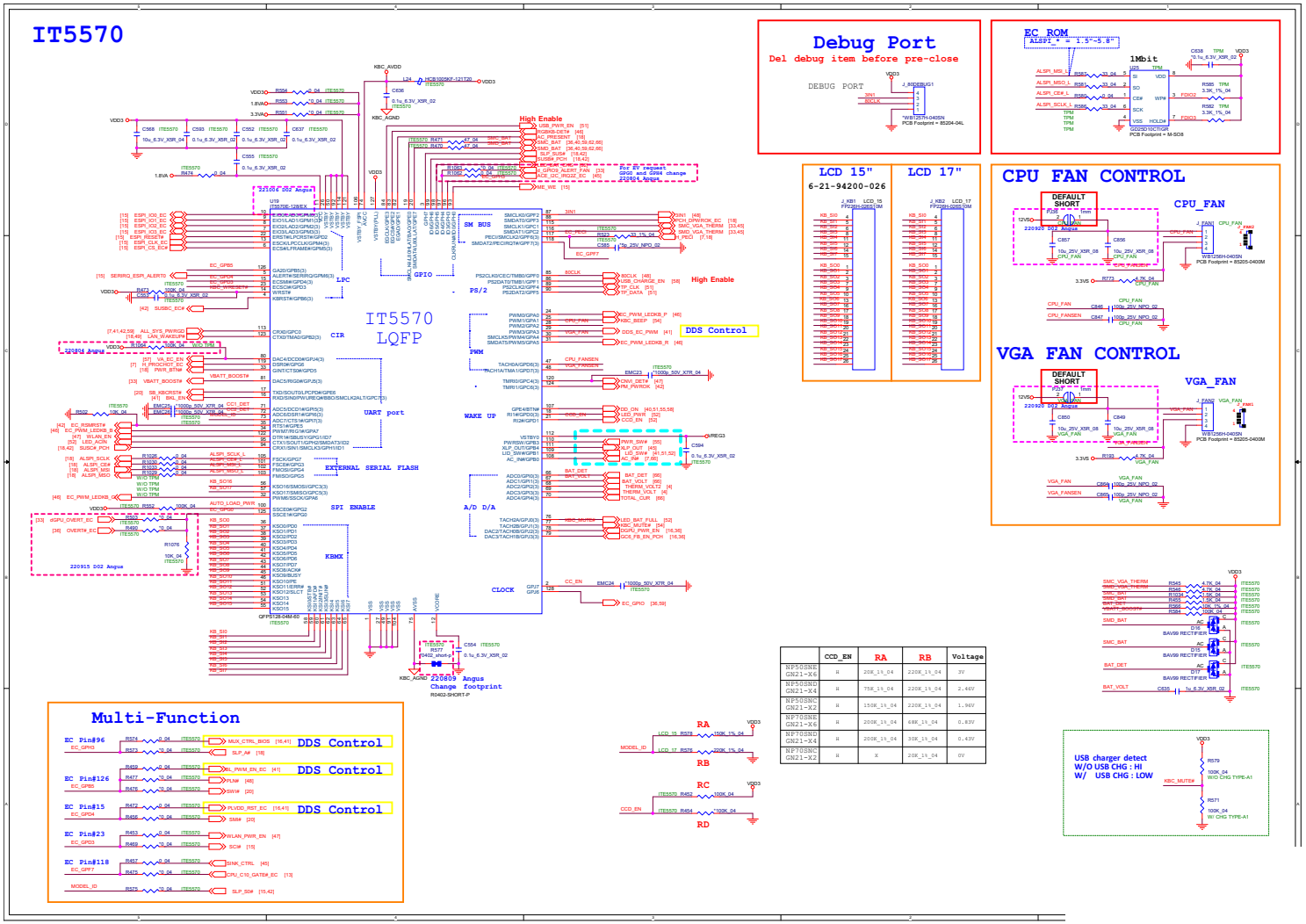
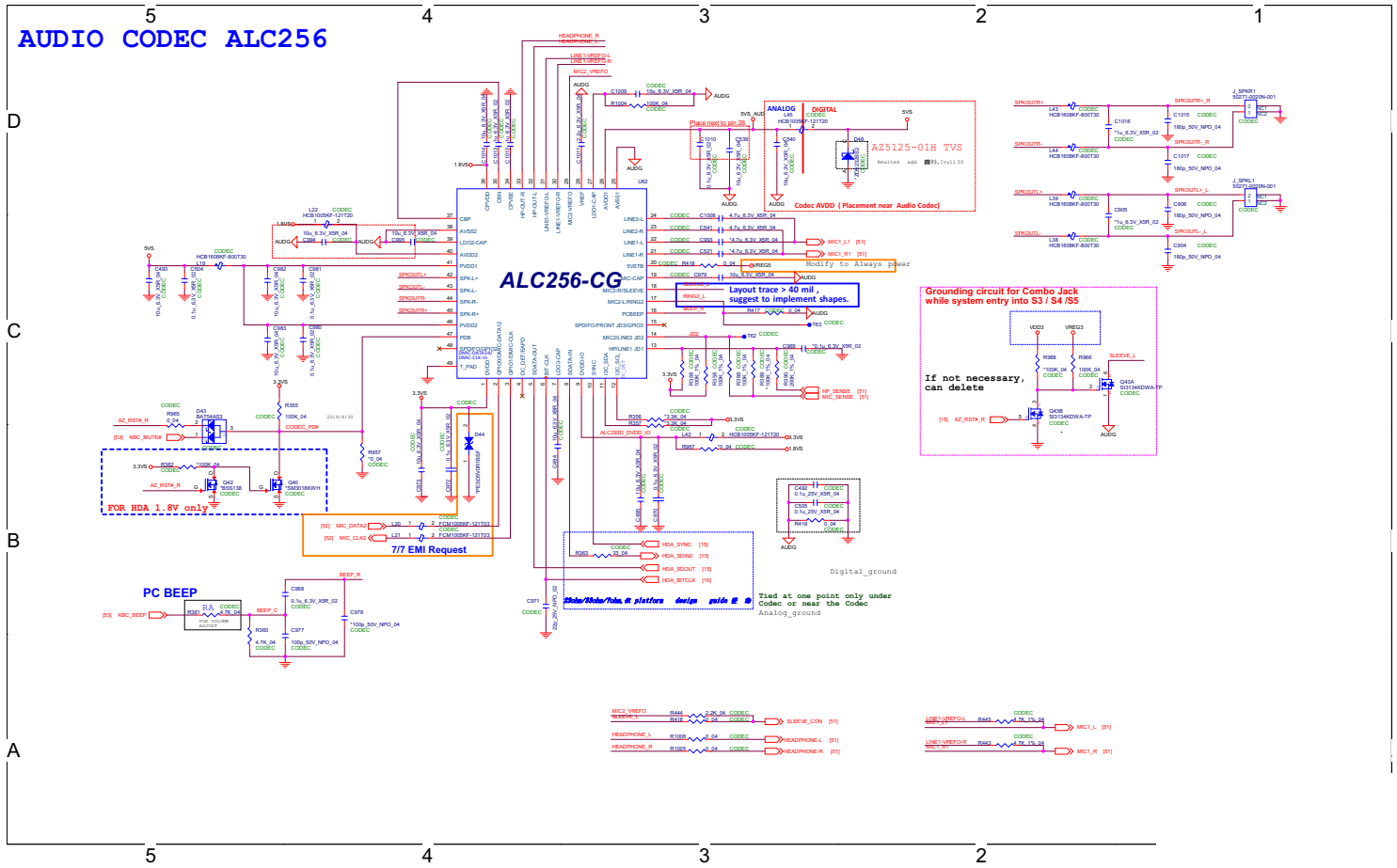
KBC-ITE IT5570



Audio Codec



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Audio Codec

5VS, 3.3VS

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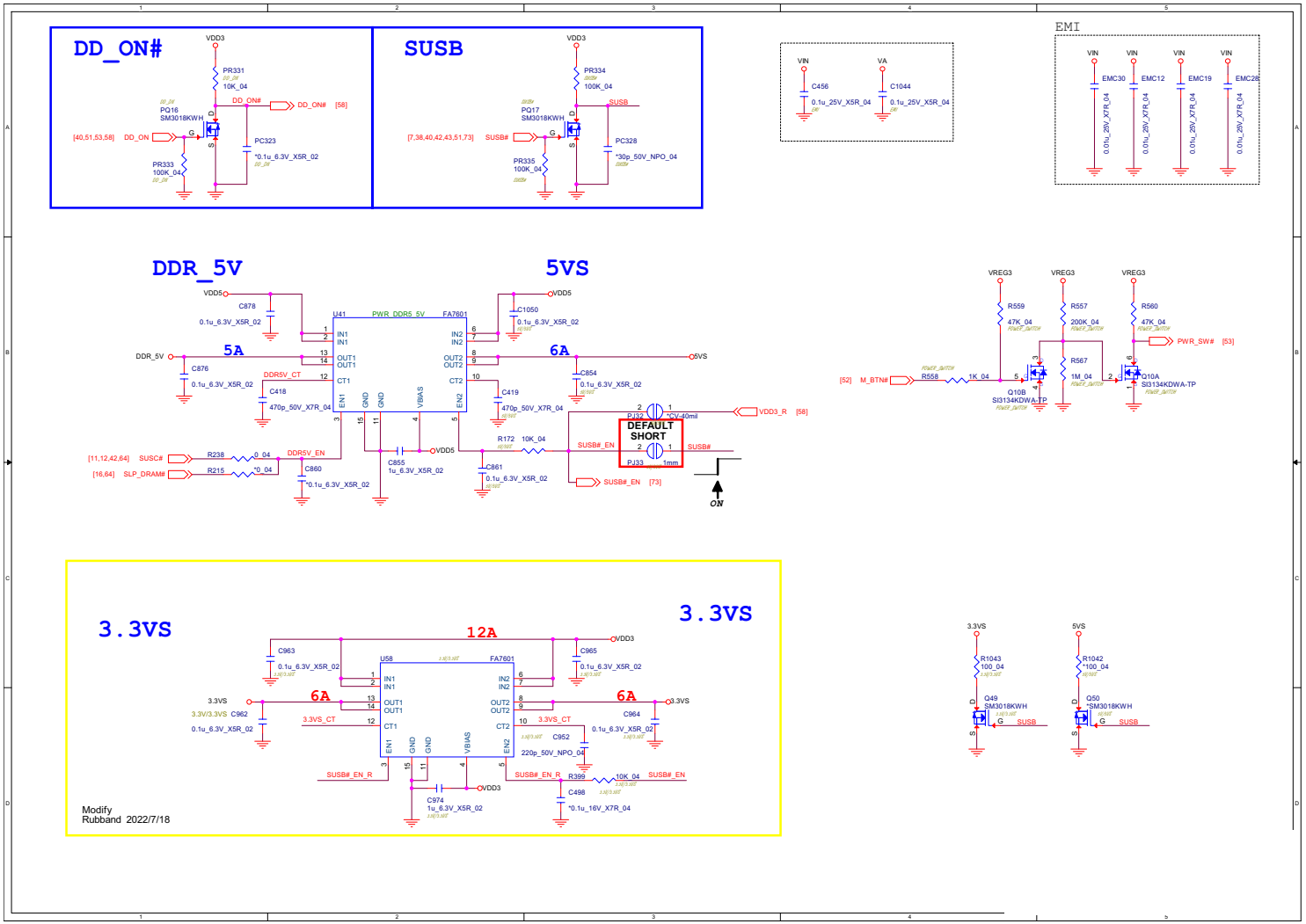
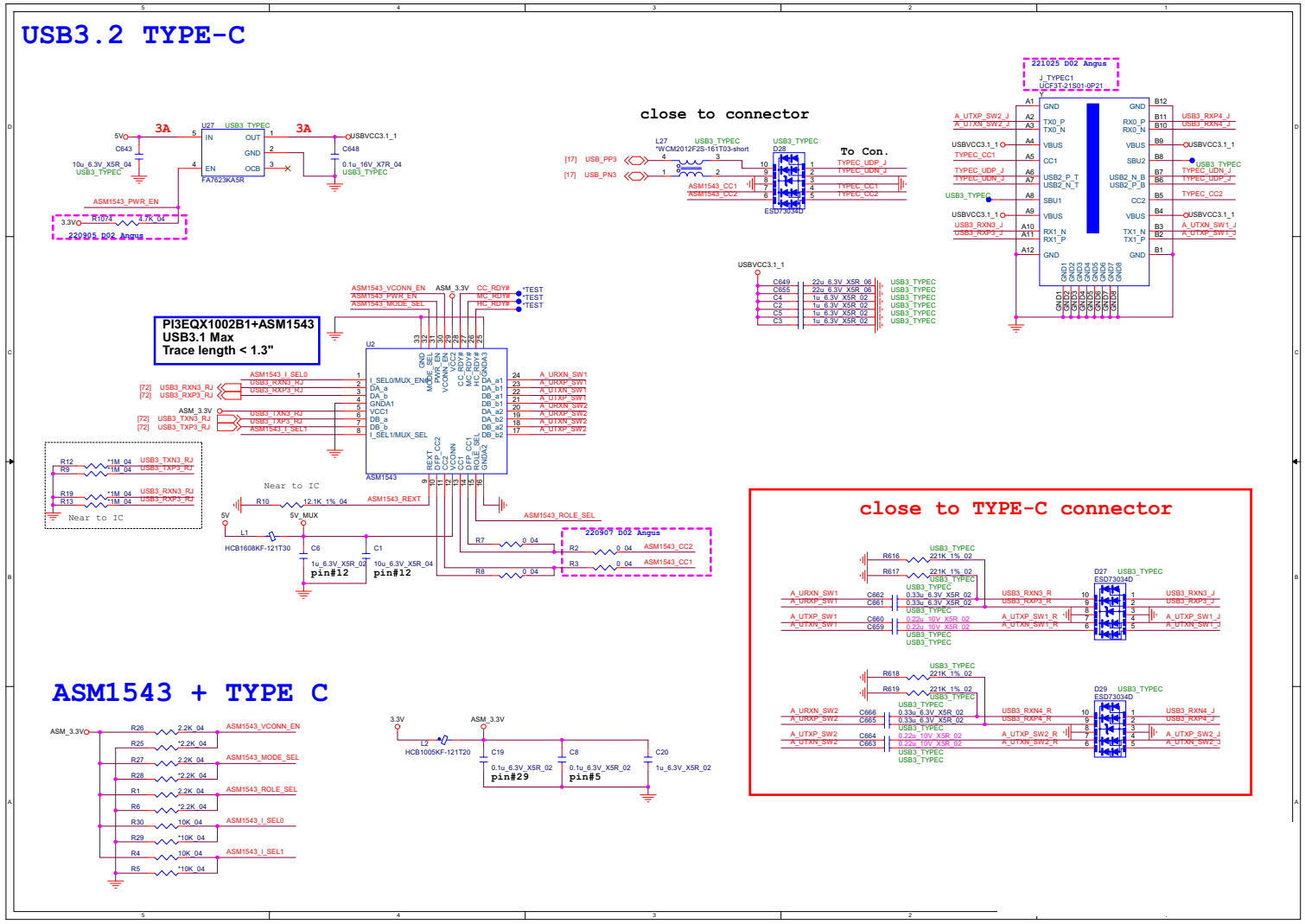
5VS, 3.3VS



USB Type-C



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USB Type-C

3.3VA, 1.05V, 1.8V CPU

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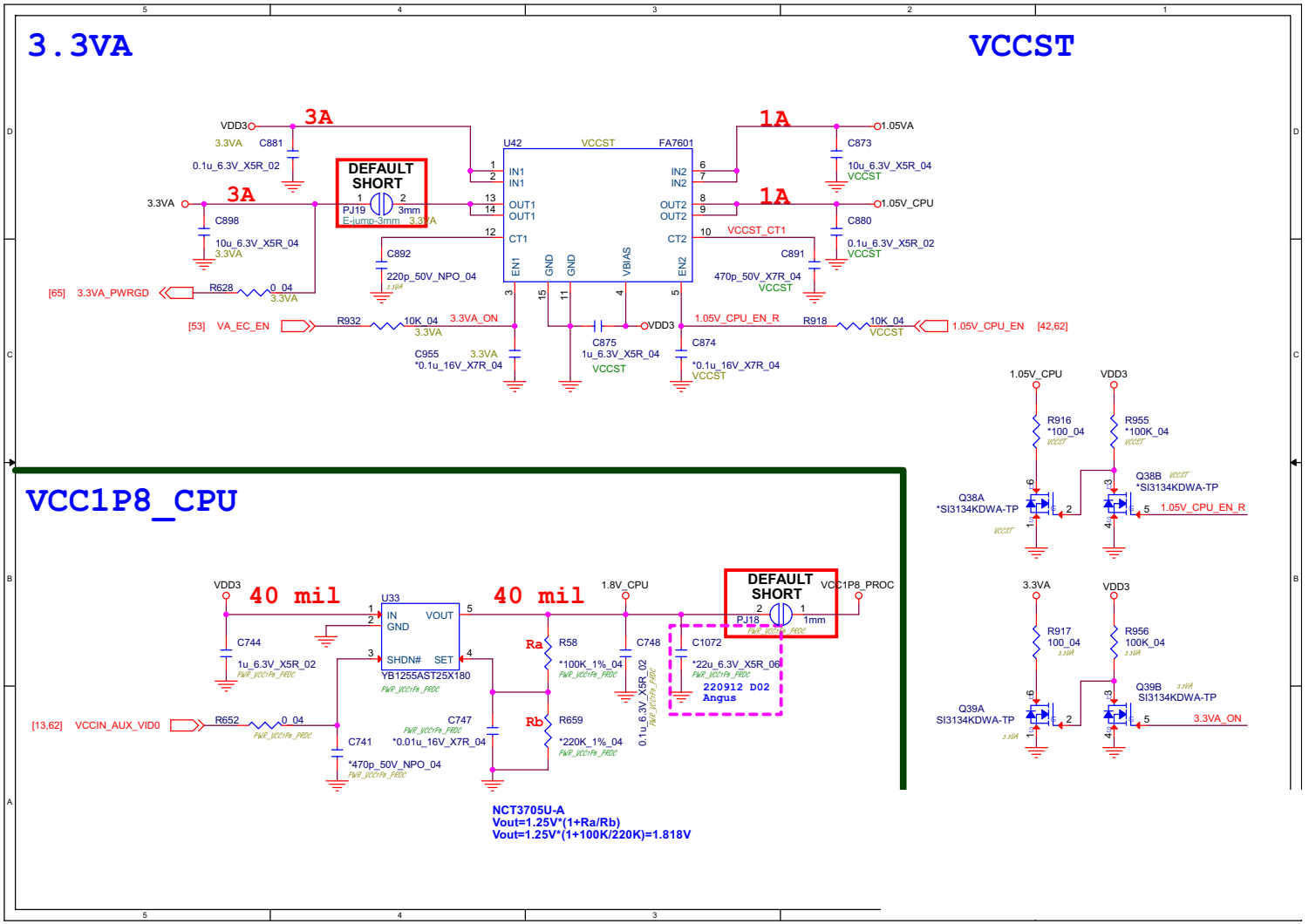
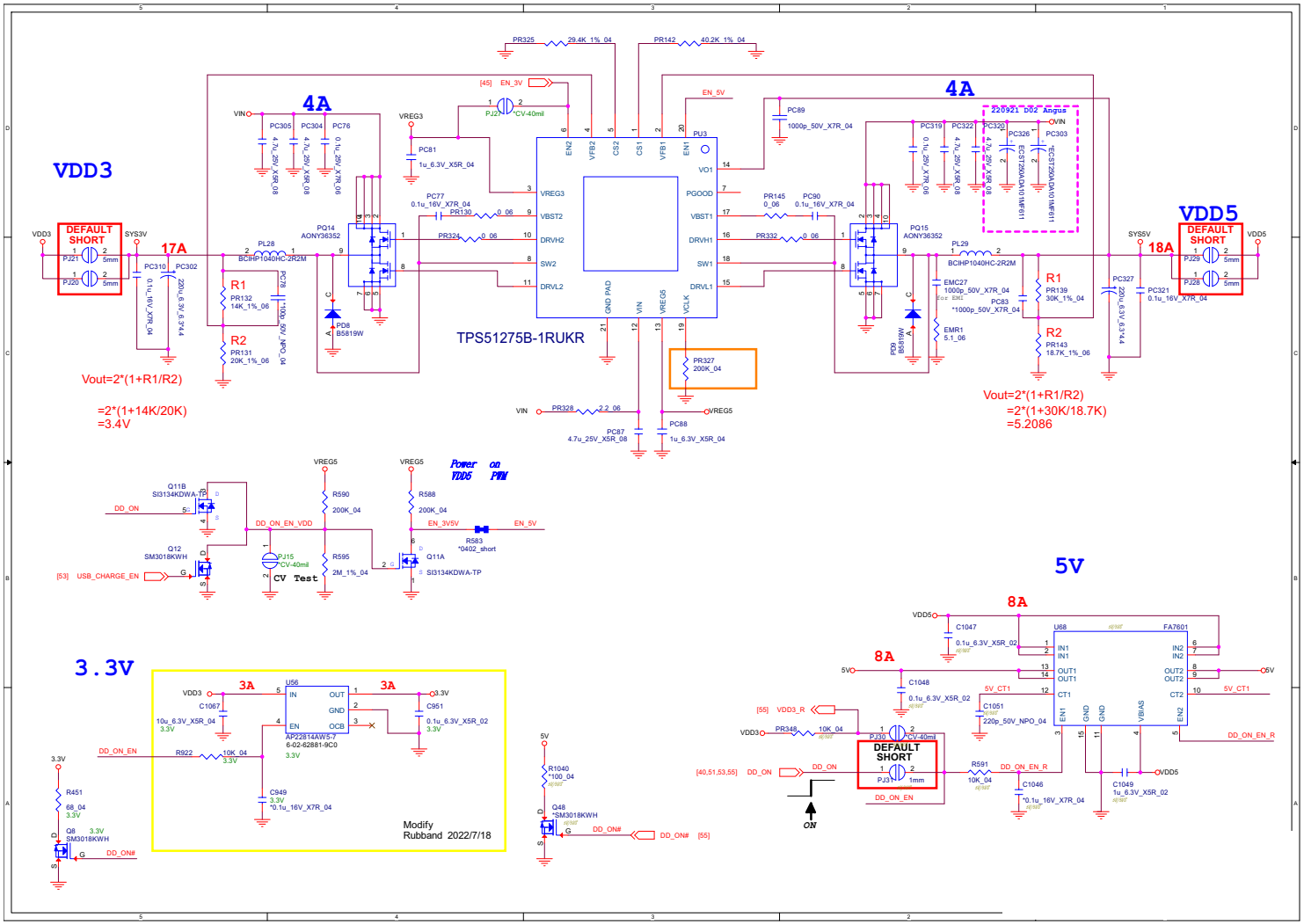
3.3VA, 1.05V, 1.8V CPU



VDD3, VDD5



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VDD3, VDD5

VCore

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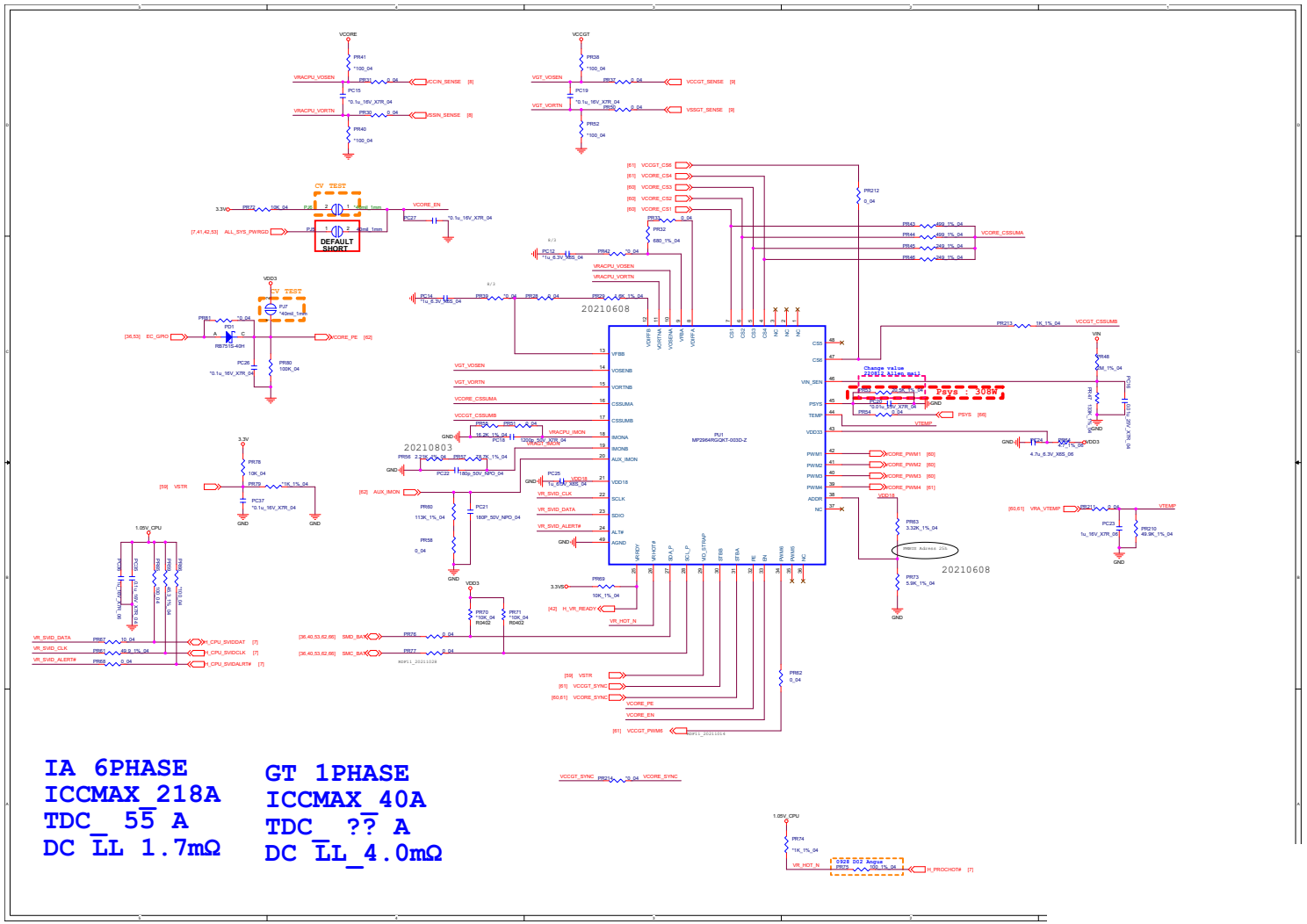
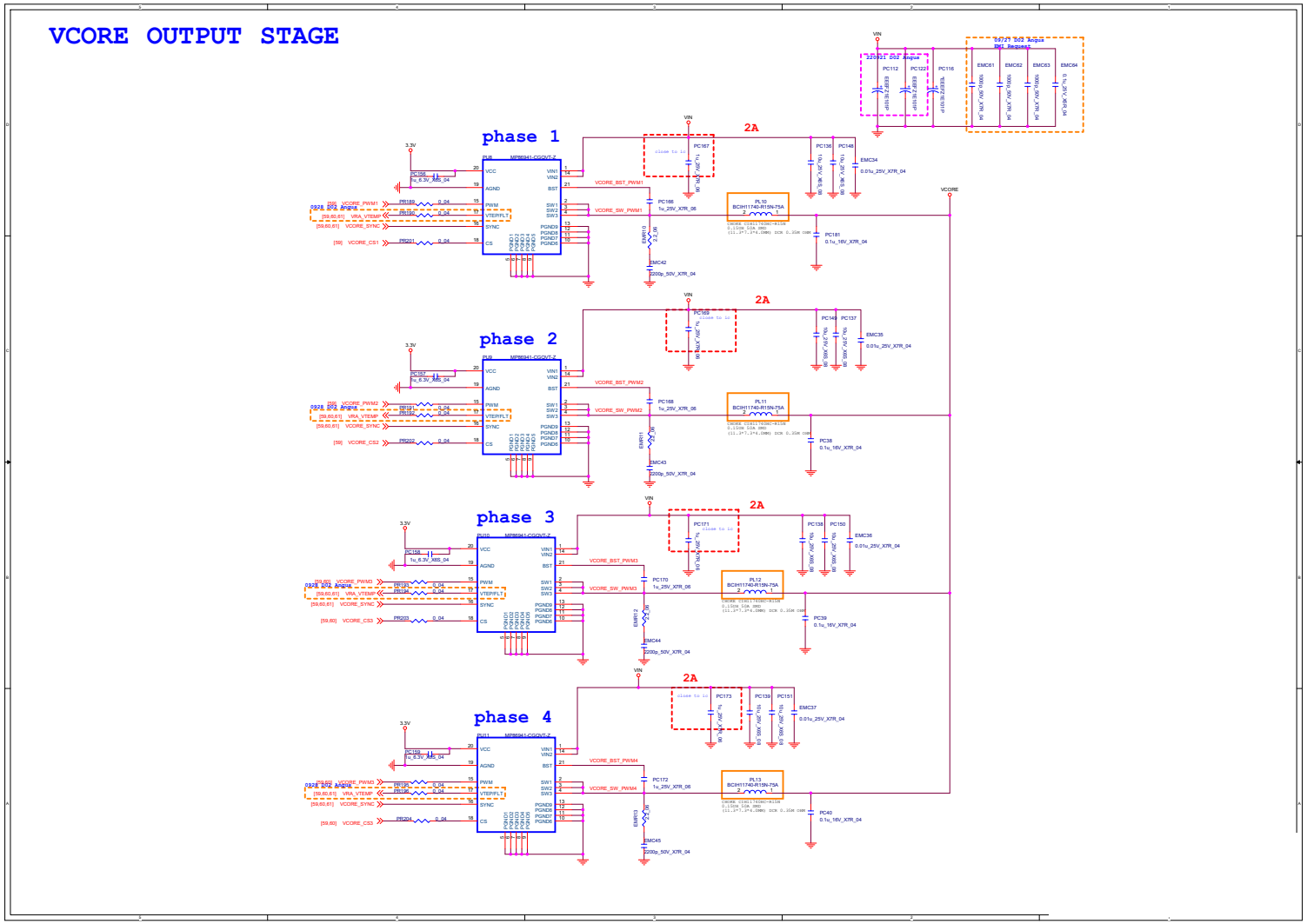
VCore



VCore Output Stage



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VCore Output Stage

VCore, VCCGT

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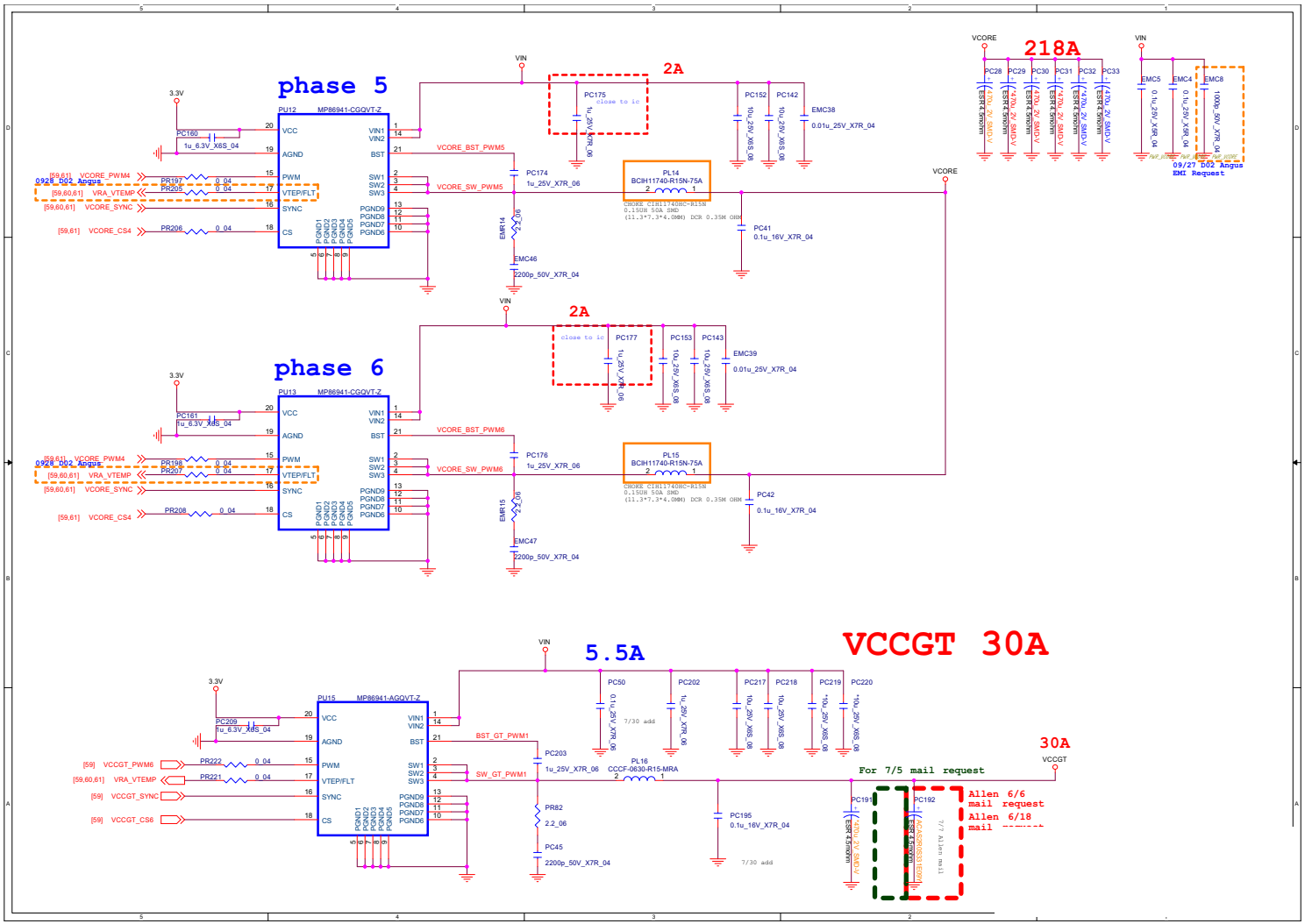
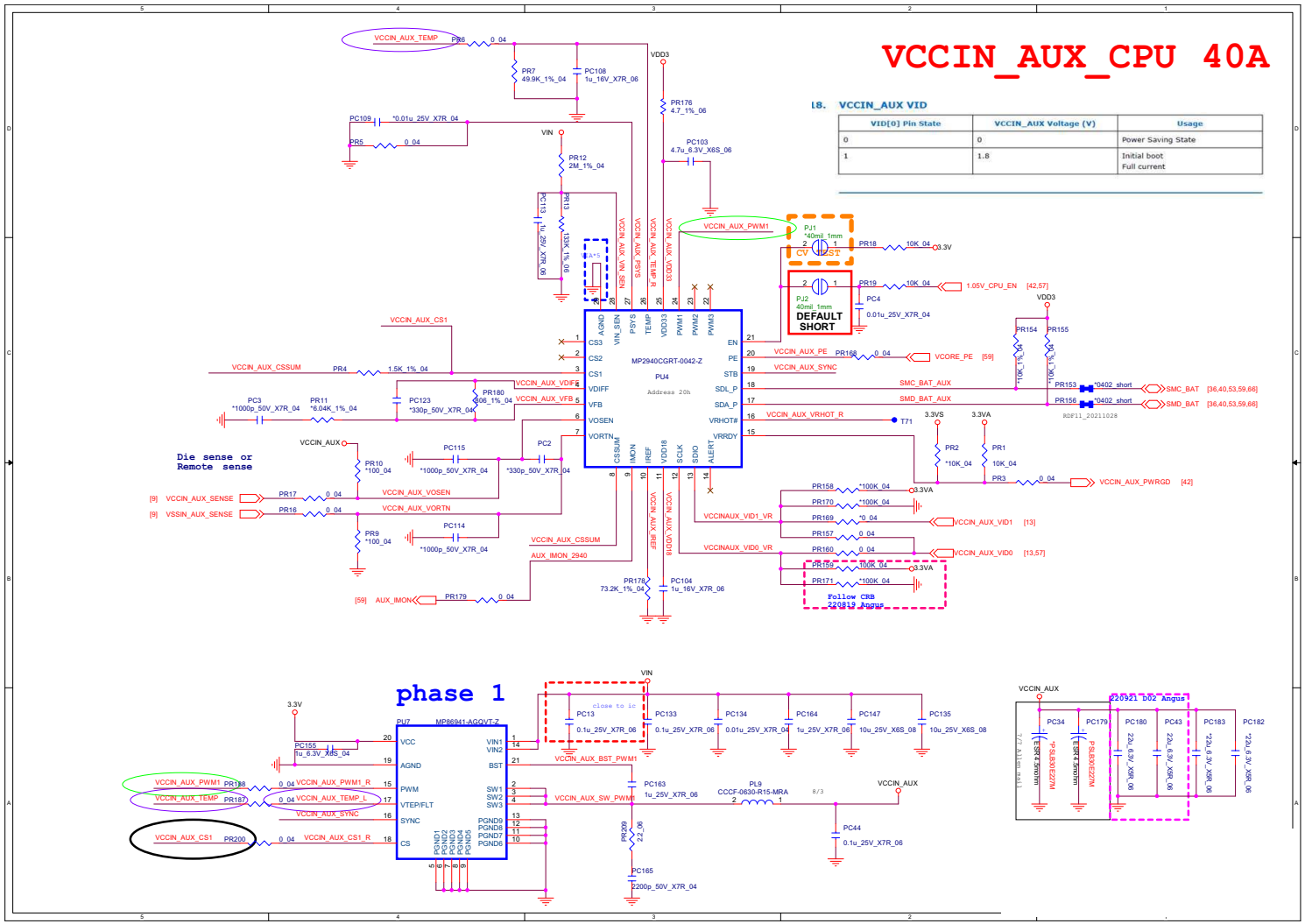
VCore, VCCGT



VCCIN AUX



Sheet 62 of 78
VCCIN AUX

0.82V, 1.05VA

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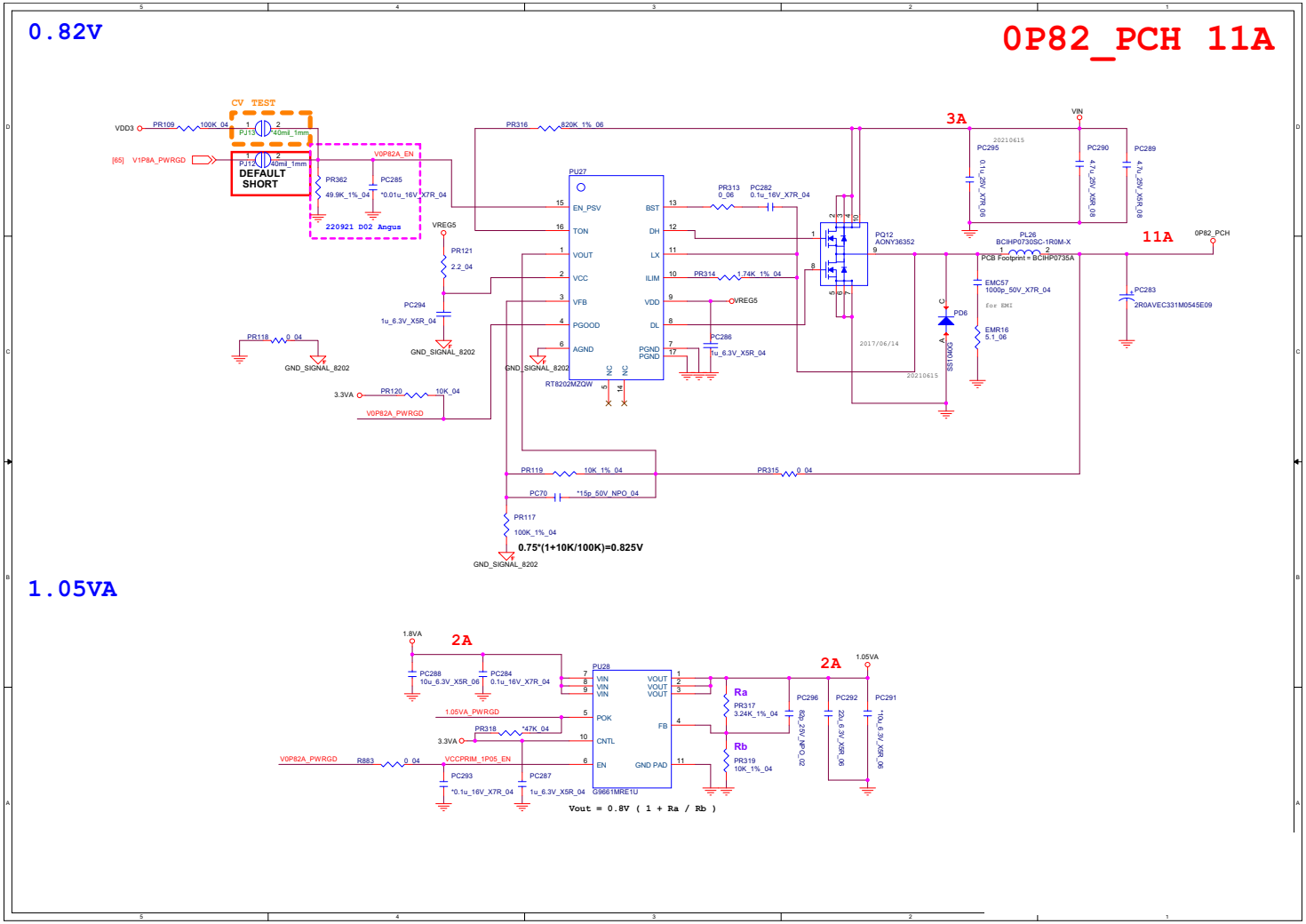
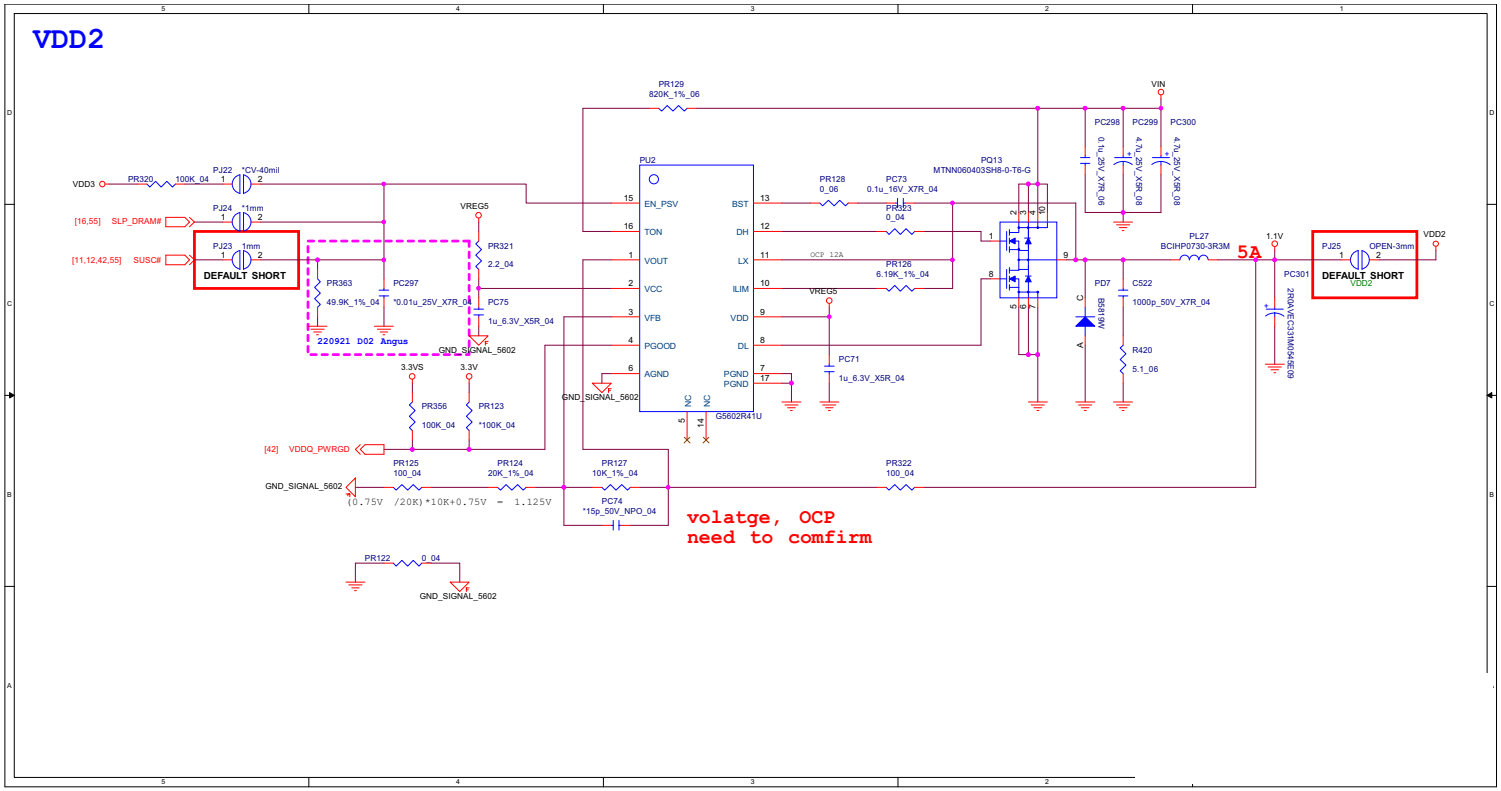
0.82V, 1.05VA



VDD2



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VDD2

1.8VA, NV_1V2

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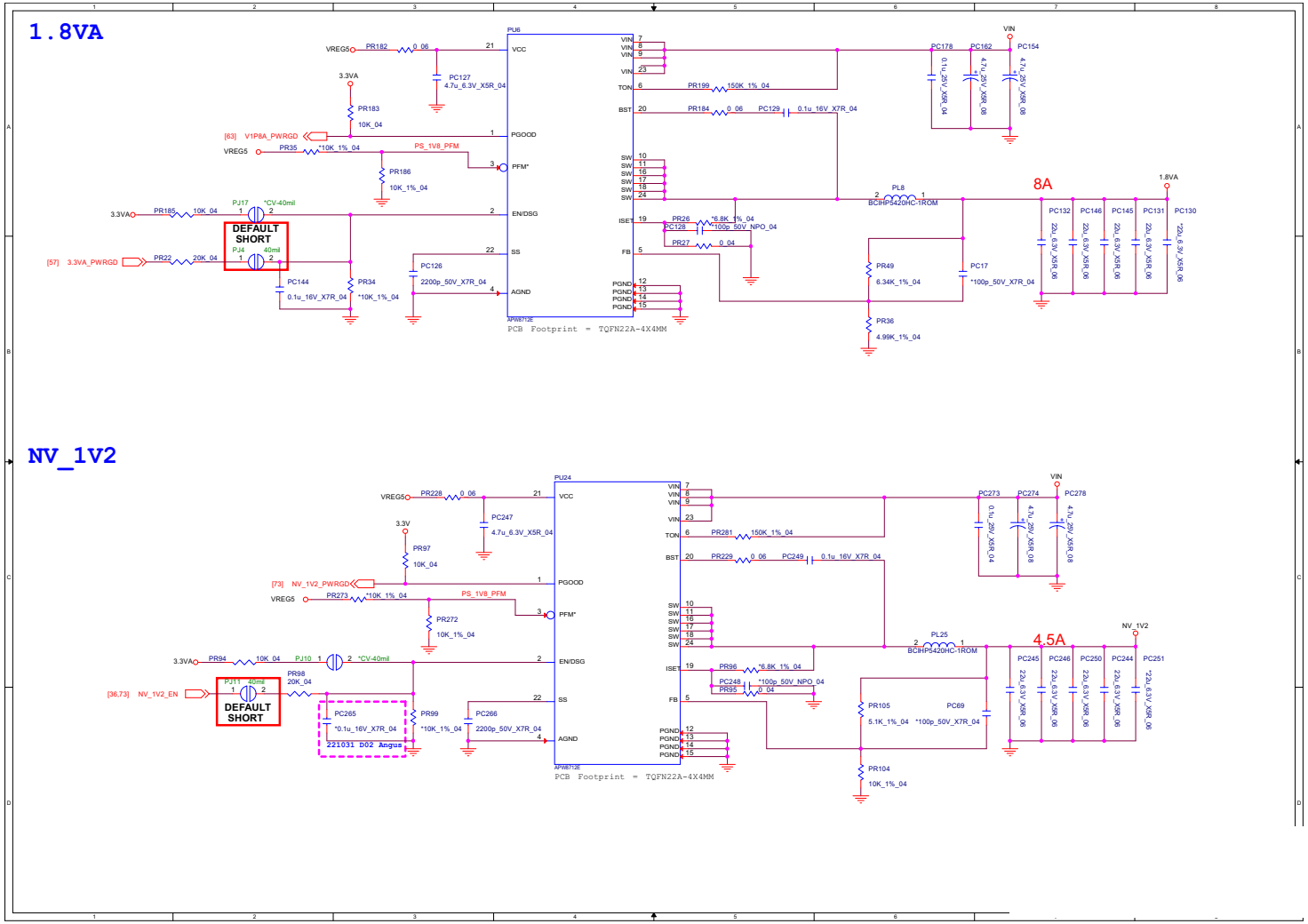
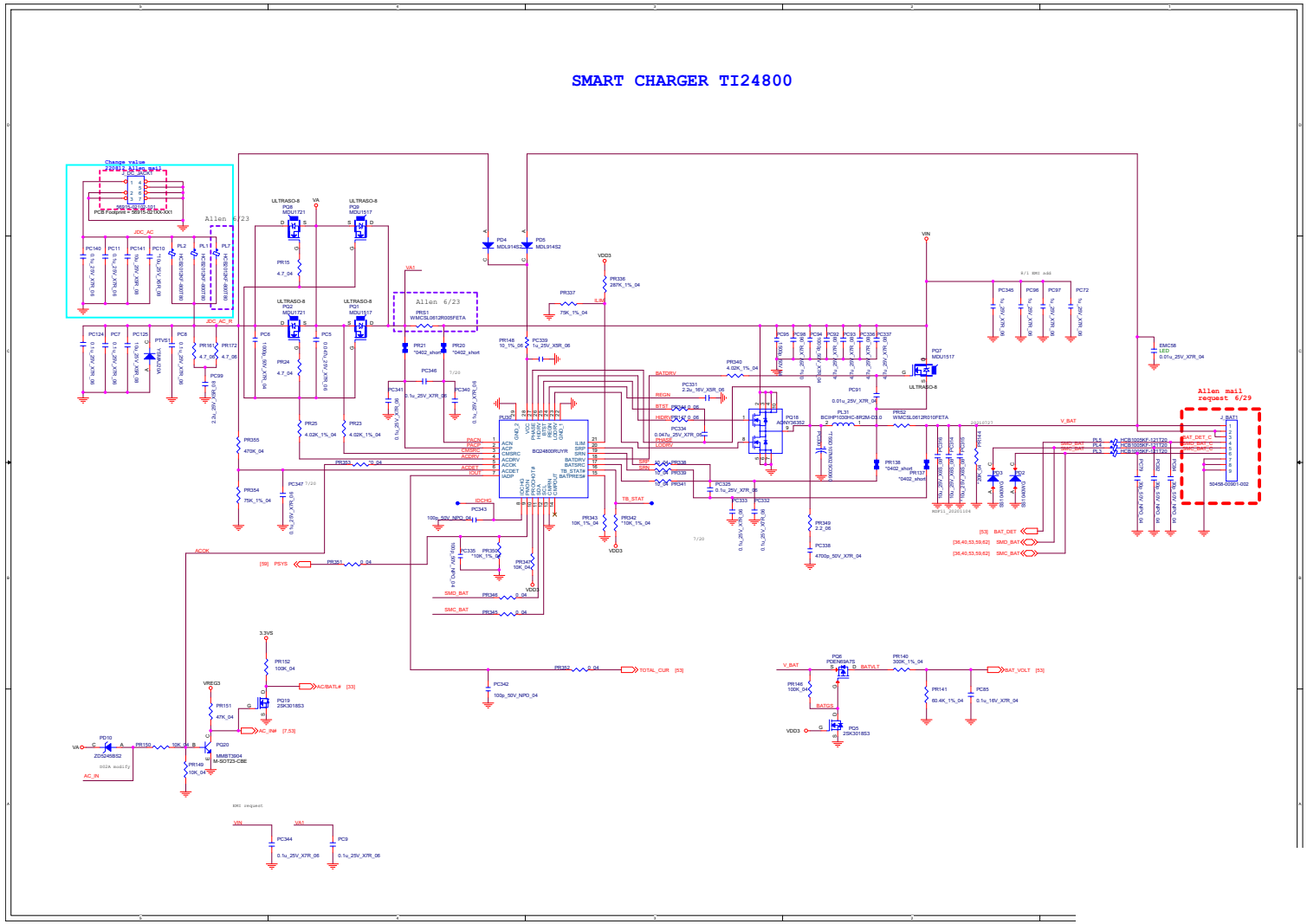
1.8VA, NV_1V2



Smart Charger



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Smart Charger

NVVDD1

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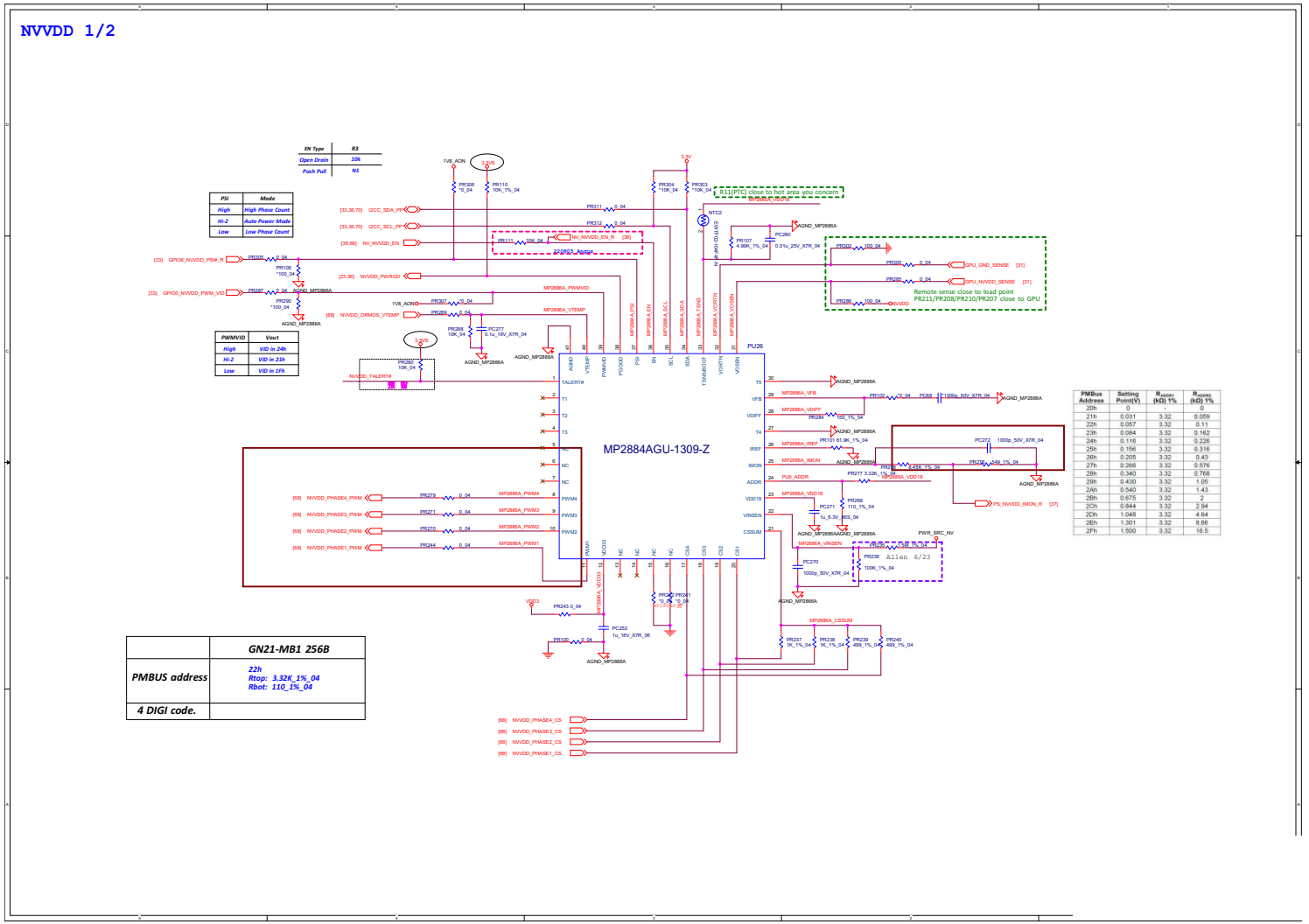
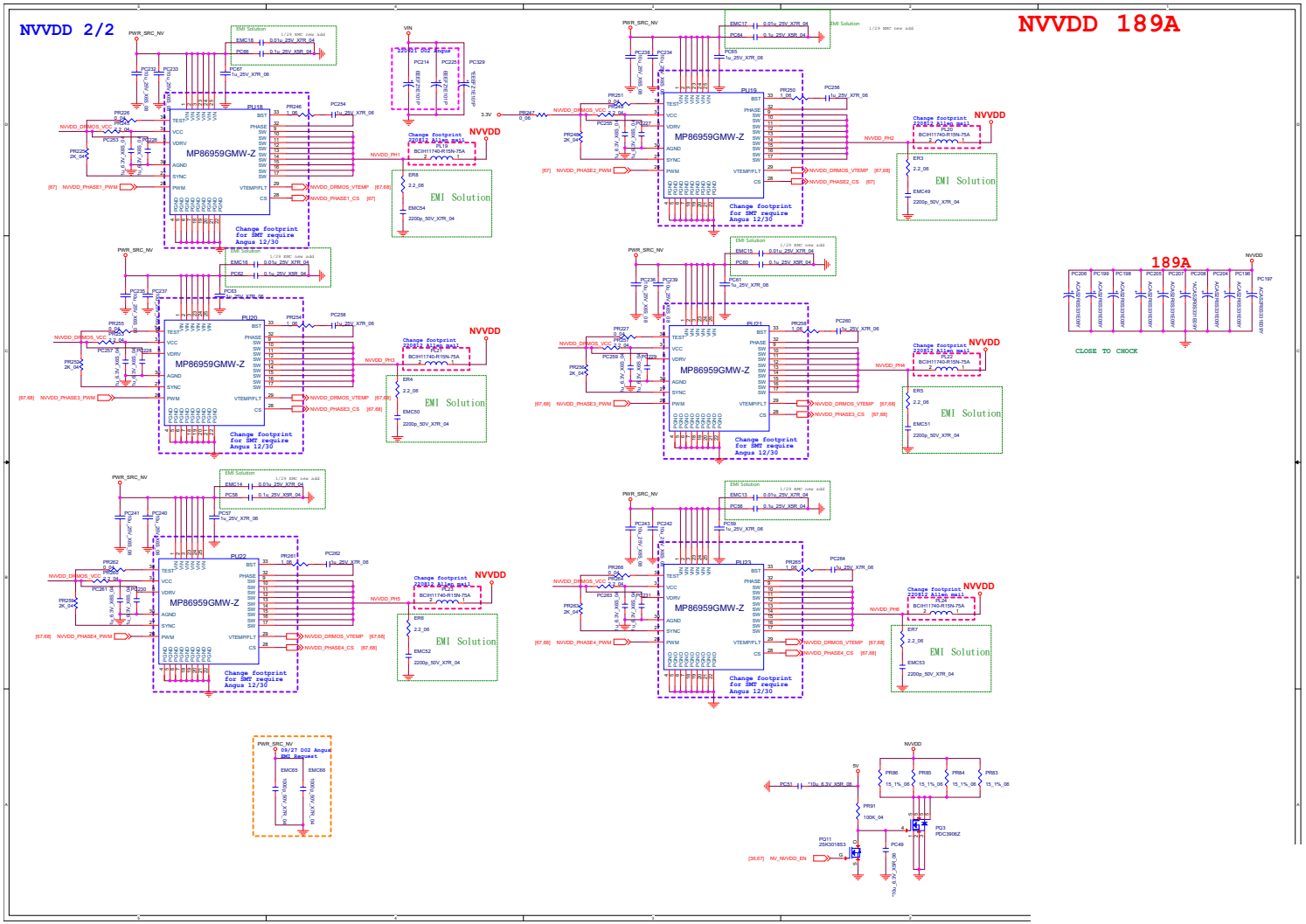
NVVDD1



NVVDD2



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NVVDD2

PEX_VDD

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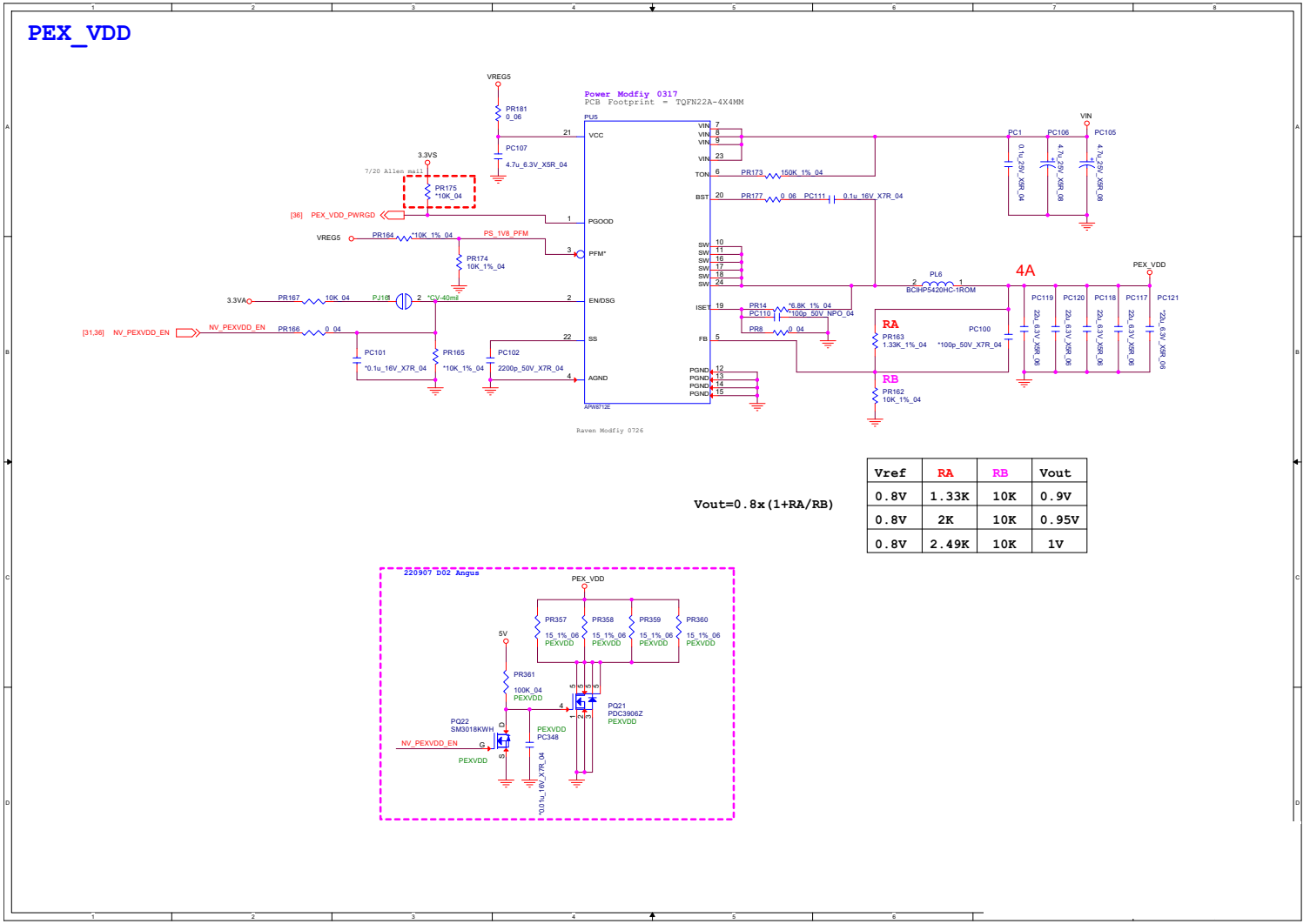
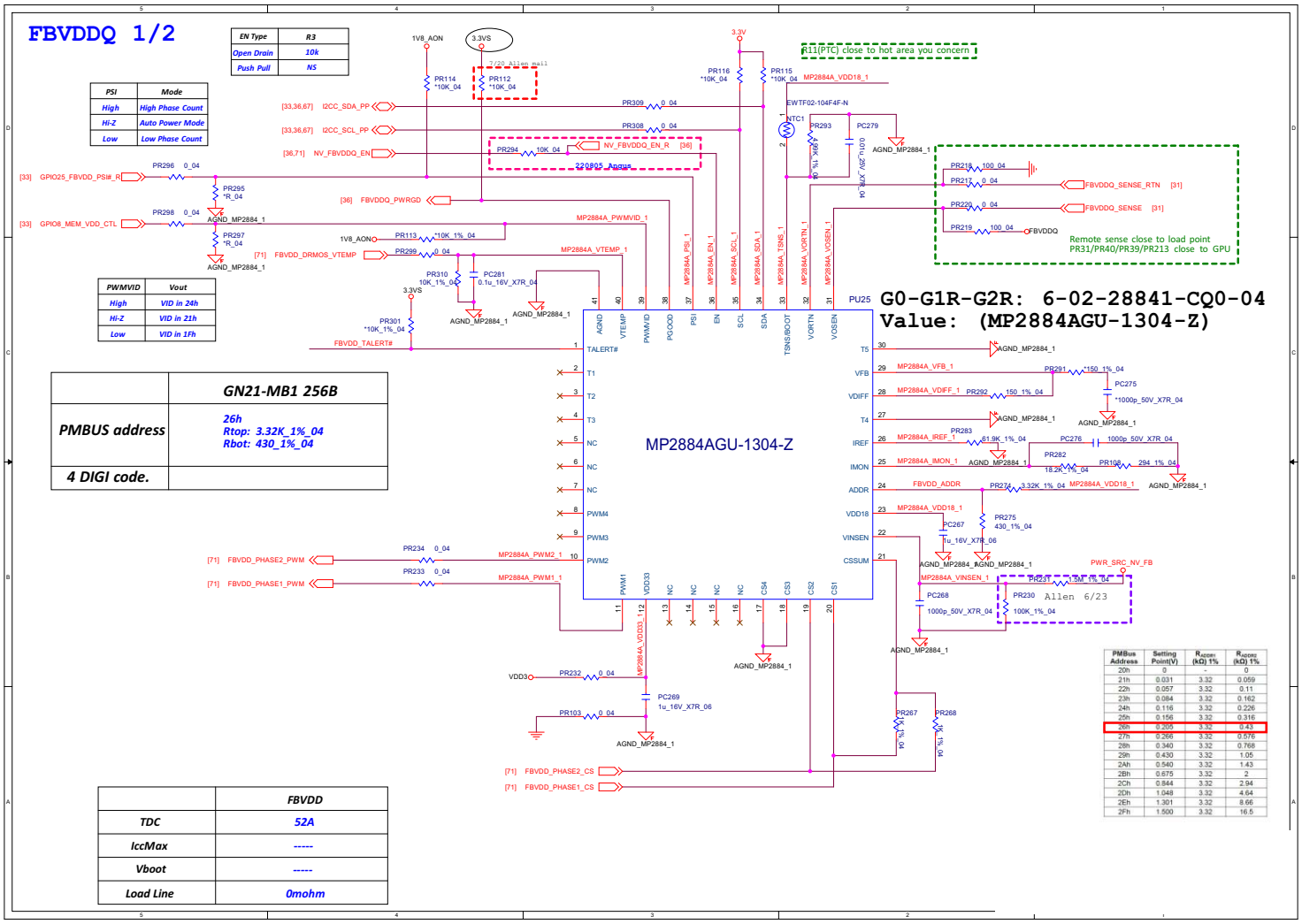
PEX_VDD



FBVDDQ 1/2



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FBVDDQ 1/2

FBVDDQ 2/2

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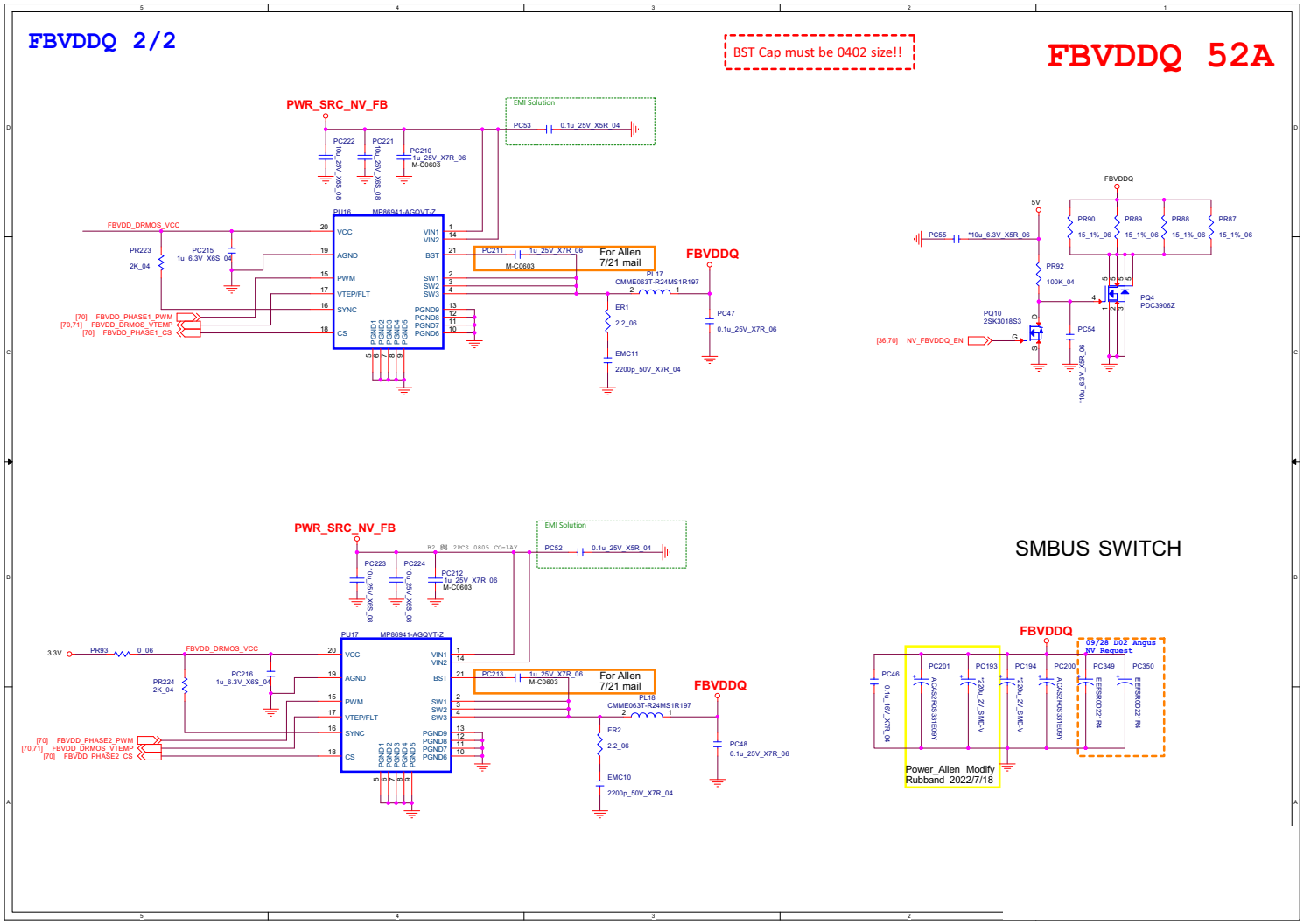
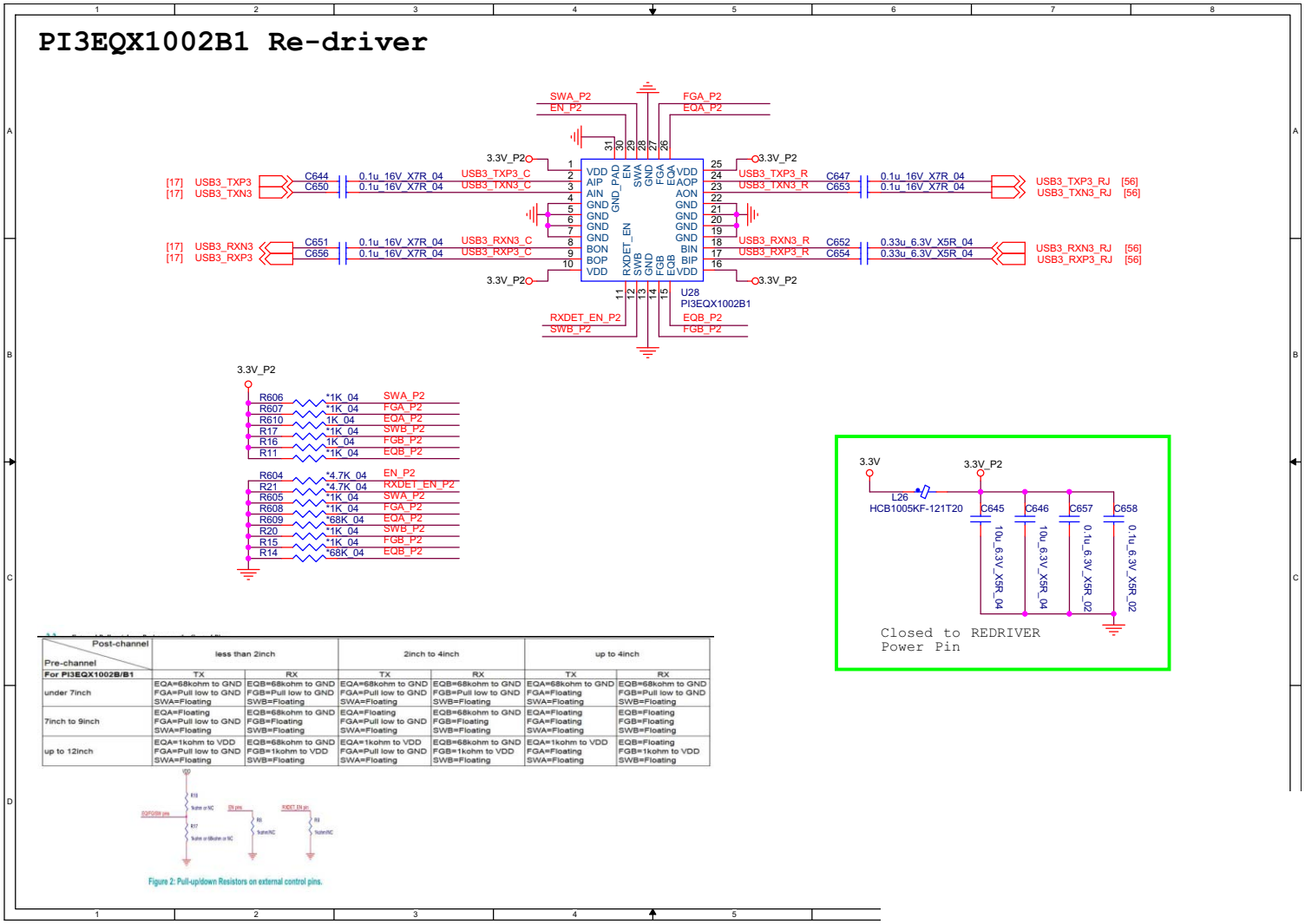
FBVDDQ 2/2



USB Type-C Redriver



Post-channel / Pre-channel For PI3EQX1002B/B1	less than 2inch		2inch to 4inch		up to 4inch	
	TX	RX	TX	RX	TX	RX
under 7inch	EQA=68kohm to GND FGA=Pull low to GND SWA=Floating	EQB=68kohm to GND FGB=Pull low to GND SWB=Floating	EQA=68kohm to GND FGA=Pull low to GND SWA=Floating	EQB=68kohm to GND FGB=Pull low to GND SWB=Floating	EQA=68kohm to GND FGA=Floating SWA=Floating	EQB=68kohm to GND FGB=Pull low to GND SWB=Floating
7inch to 9inch	EQA=Floating FGA=Pull low to GND SWA=Floating	EQB=68kohm to GND FGB=Floating SWB=Floating	EQA=Floating FGA=Pull low to GND SWA=Floating	EQB=68kohm to GND FGB=Floating SWB=Floating	EQA=Floating FGA=Floating SWA=Floating	EQB=Floating FGB=Floating SWB=Floating
up to 12inch	EQA=1kohm to VDD FGA=Pull low to GND SWA=Floating	EQB=68kohm to GND FGB=1kohm to VDD SWB=Floating	EQA=1kohm to VDD FGA=Pull low to GND SWA=Floating	EQB=68kohm to GND FGB=1kohm to VDD SWB=Floating	EQA=1kohm to VDD FGA=Floating SWA=Floating	EQB=Floating FGB=1kohm to VDD SWB=Floating

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USB Type-C Redriver

Fan 12V

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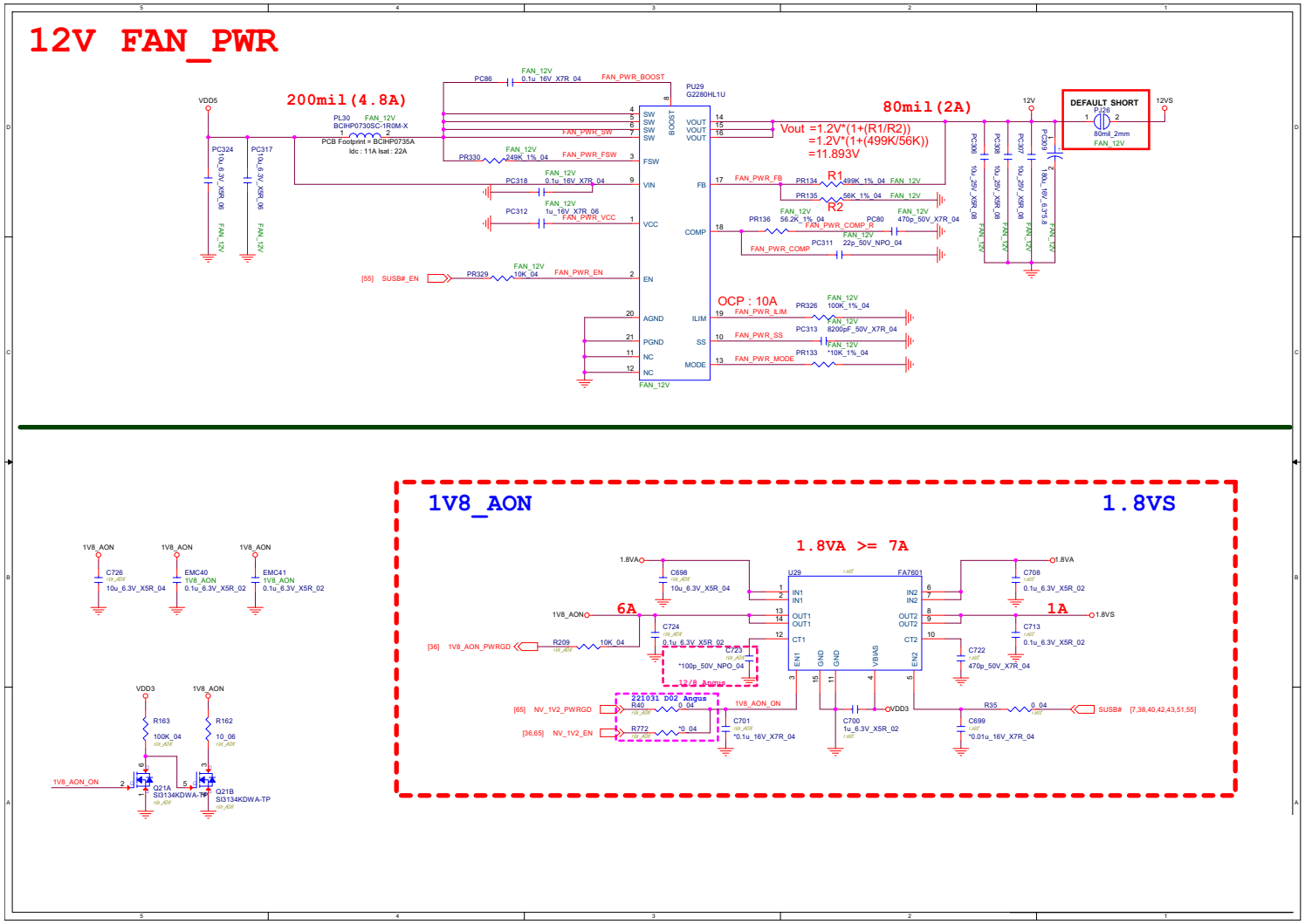
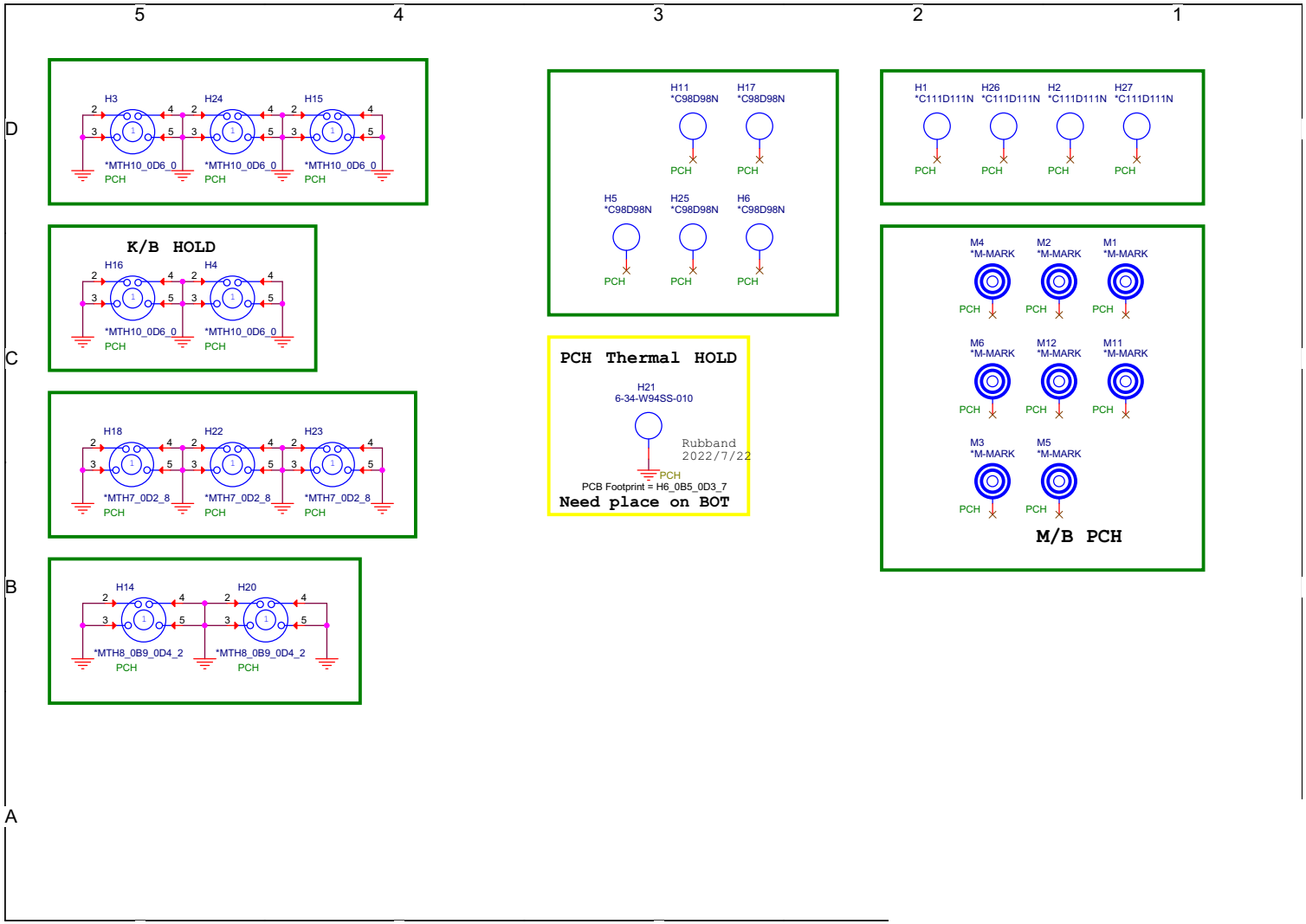
Fan 12V



Holes



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Holes

Audio Board w/ Redriver

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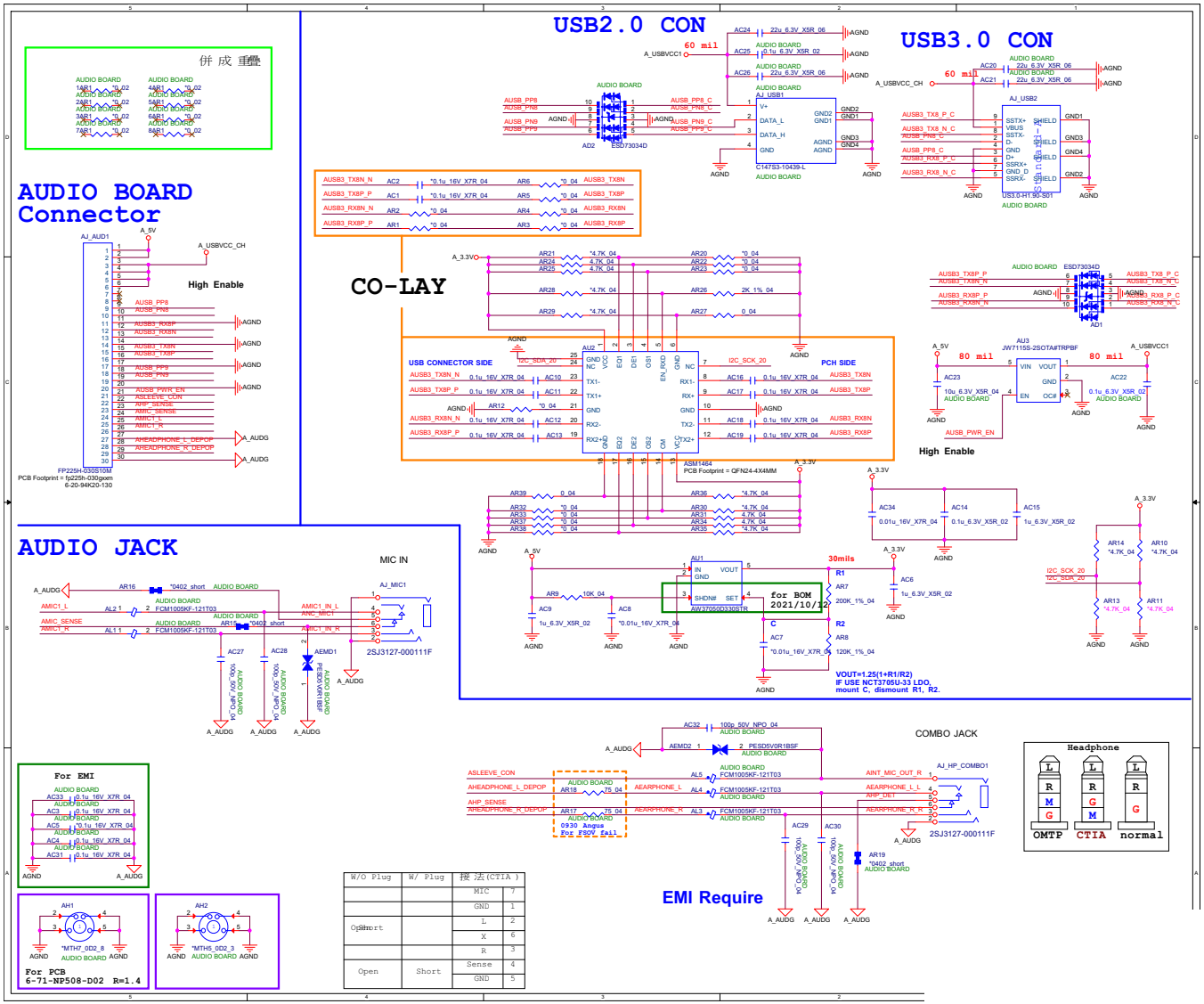
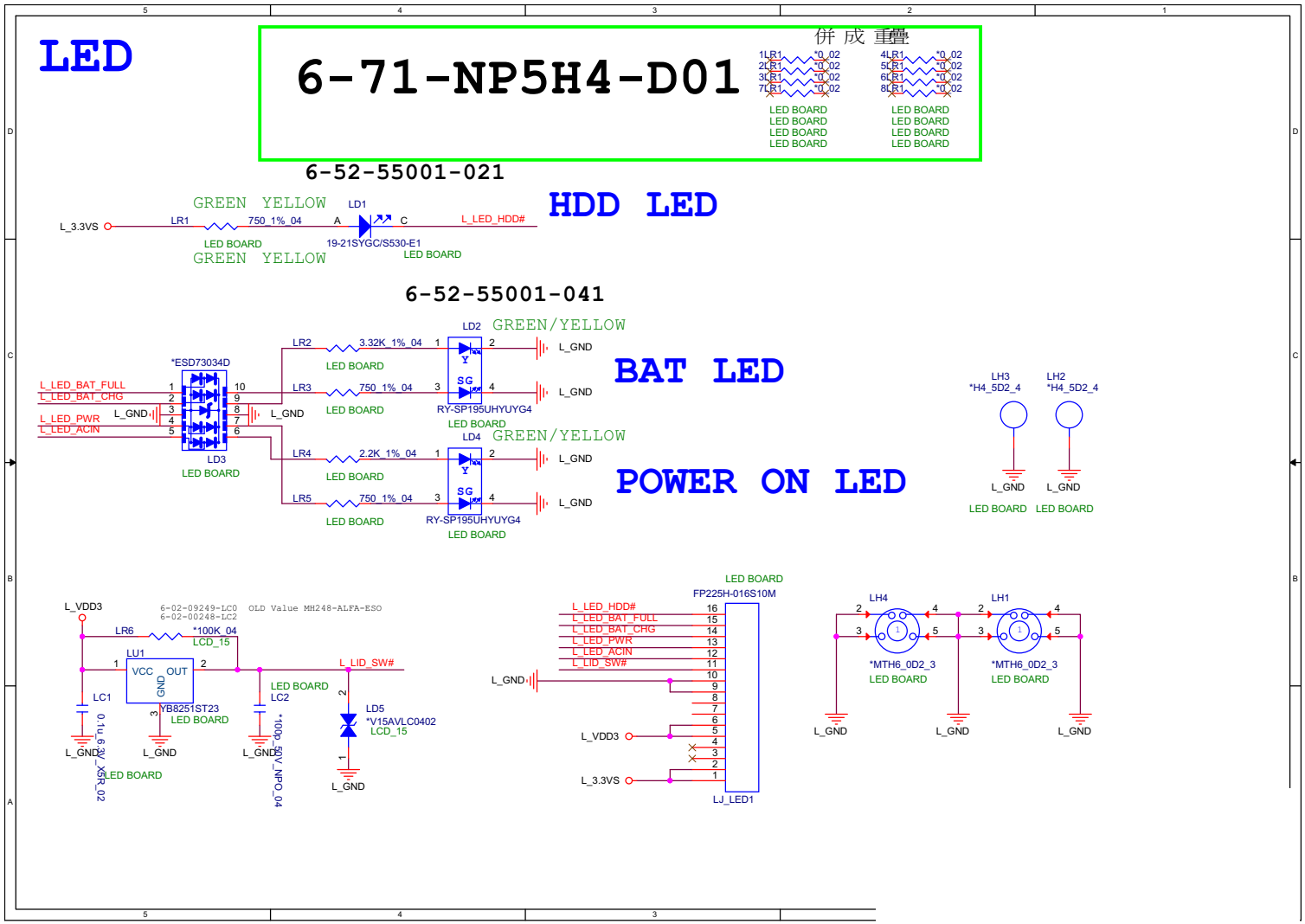
Audio Board w/
Redriver



LED Board



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LED Board

Power SW Board

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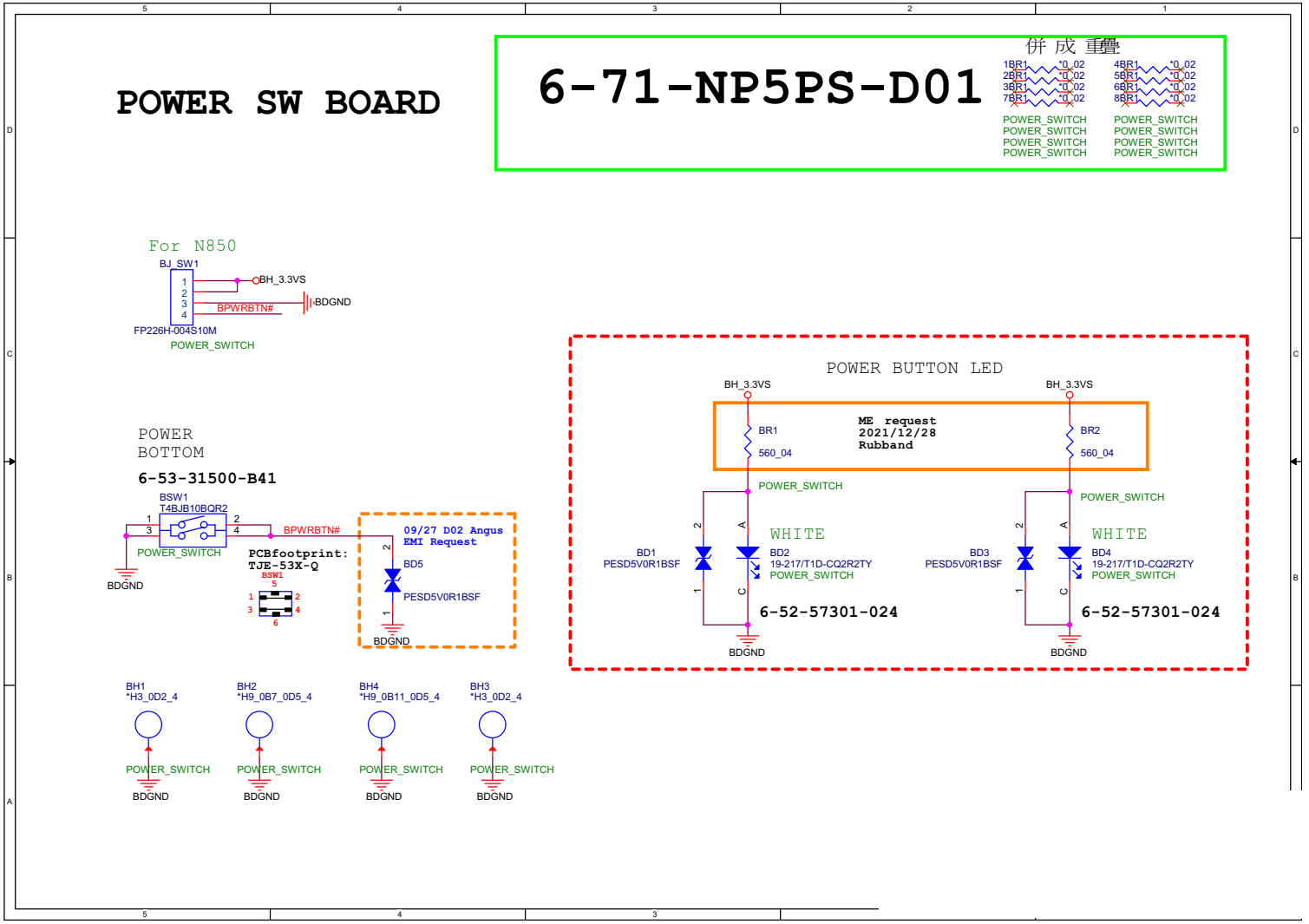
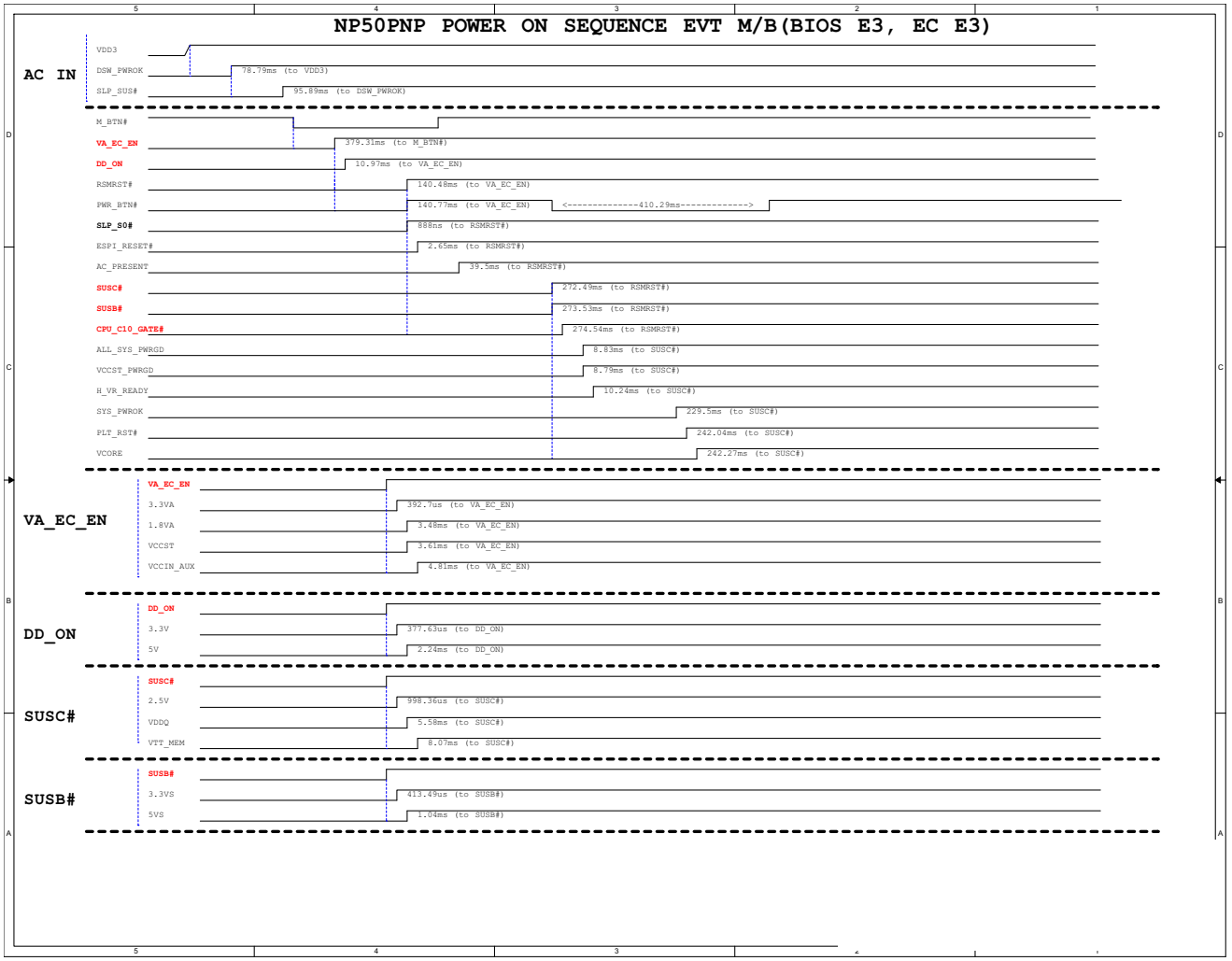
Power SW Board



Power Sequence



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Power Sequence