

SERVICE MANUAL

P650REG(-G) / P651RG(-G)

notebook



Notebook Computer
P650REG(-G) / P651RG(-G)
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 **P650REG(-G) / P651RG(-G)** 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

Appendix C, Updating the FLASH ROM BIOS

Preface

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 19V, 10.5A (**200 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.

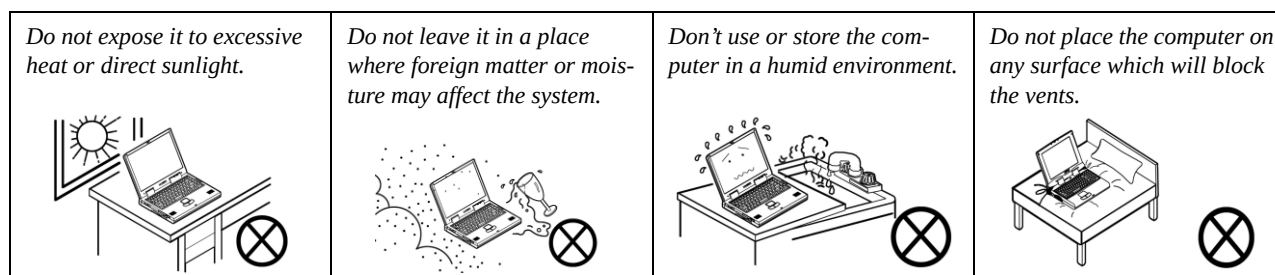
Instructions for Care and Operation

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

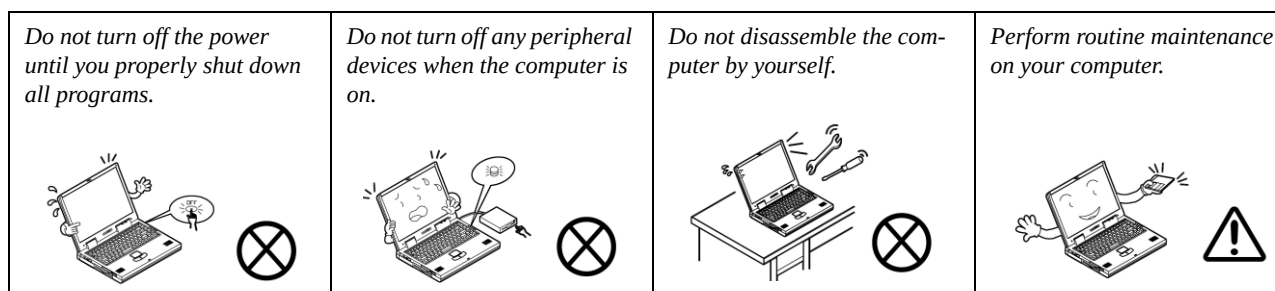
1. **Don't drop it, or expose it to shock.** If the computer falls, the case and the components could be damaged.



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.

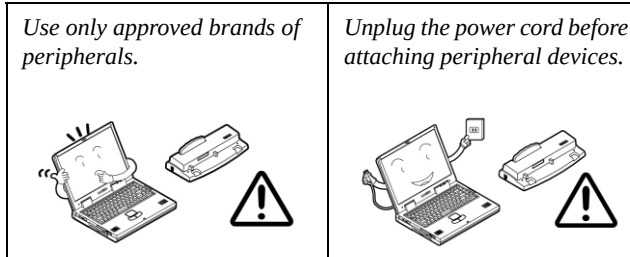


3. **Follow the proper working procedures for the computer.** Shut the computer down properly and don't forget to save your work. Remember to periodically save your data as data may be lost if the battery is depleted.



Preface

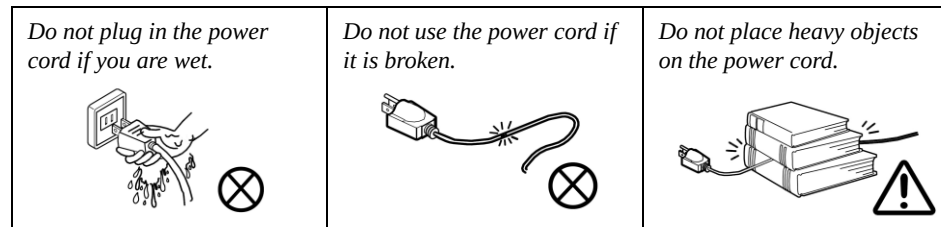
4. **Avoid interference.** Keep the computer away from high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage your data.
5. **Take care when using peripheral devices.**



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.

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. Insert the battery and make sure it is locked in position.
4. Securely attach any peripherals you want to use with the computer (e.g. keyboard and mouse) to their ports.
5. Attach the AC/DC adapter to the DC-In jack at 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.
6. Use one hand to raise the lid/LCD to a comfortable viewing angle (do not exceed 135 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).
7. Press the power button to turn the computer "on".

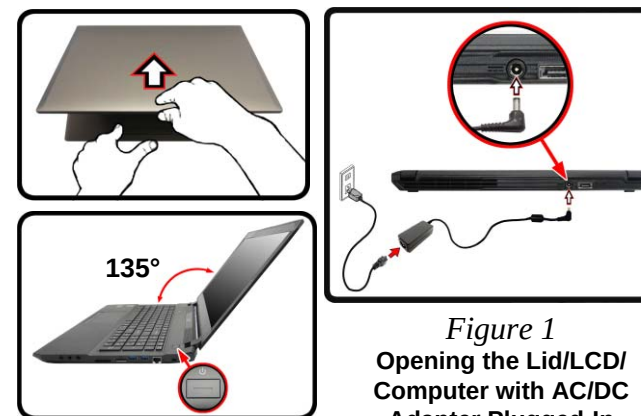


Figure 1
**Opening the Lid/LCD/
Computer with AC/DC
Adapter Plugged-In**



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.

Click the icon  in the **Start Screen** and choose **Shut down** from the menu.



Or

Right-click the **Start button**  at the bottom of the **Start Screen** or the **Desktop** and choose **Shut down or sign out** > **Shut down** from the context menu.

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Chapter 1: Introduction

Overview

This manual covers the information you need to service or upgrade the **P650REG(-G) / P651RG(-G)** series notebook computer. Information about operating the computer (e.g. getting started, and the *Setup* utility) is in the *User's Manual*. Information about drivers (e.g. VGA & audio) is also found in the *User's Manual*. The manual is shipped with the computer.

Operating systems (e.g. *Windows 8.1*, 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 **P650REG(-G) / P651RG(-G)** 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.

Introduction

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.

G-SYNC Support

NVIDIA® G-SYNC™ Technology is supported by some LCD panels and GTX 970M/980M series video adapters only (contact your distributor or supplier for 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.

SO-DIMM Memory Types

All SO-DIMM memory modules installed in the system should be identical (the same size and brand) in order to prevent unexpected system behavior.

Do not mix SO-DIMM memory module sizes and brands otherwise unexpected system problems may occur.

Processor Options

i7-6820HK (2.70GHz)

8MB Smart Cache, **14nm**, DDR4-2133MHz, TDP 45W
Support Intel® XTU over-clocking technology on i7-6820HK

i7-6700HQ (2.60GHz)

6MB Smart Cache, **14nm**, DDR4-2133MHz,
TDP 45W

Core Logic

Intel® HM170 Express Chipset

LCD Options

15.6" (39.62cm), 16:9, QFHD (3840x2160)/FHD (1920x1080)

BIOS

AMI BIOS (64Mb SPI Flash-ROM)

Memory

Four 260 Pin SO-DIMM Sockets Supporting **DDR4 2133MHz** Memory

Memory Expandable from **4GB (minimum)** up to **64GB (maximum)**

Security

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

Video Adapter Options

Microsoft Hybrid Graphics Mode or Discrete Graphics Mode

Supports up to 4 Active Displays

Intel Integrated GPU

Intel® HD Graphics 530

Dynamic Frequency
Intel Dynamic Video Memory Technology
Microsoft DirectX®12 Compatible

NVIDIA® Discrete GPU

NVIDIA® GeForce GTX 980M

8GB GDDR5 Video RAM
Microsoft DirectX®12 Compatible

Storage

(**Factory Option**) Two **SATA** M.2 2280 SSDs supporting RAID level 0/1

Or

(**Factory Option**) One **PCIe Gen3 x4** M.2 2280 SSD

Two Changeable 2.5" (6cm) **SATA** (Serial) Hard Disk Drives (HDDs)/SSDs (**1st: 7.0mm (h) & 2nd: 7.0mm/9.5mm (h)**) supporting RAID Level 0/1

Pointing Device

Built-in Touchpad (scrolling key functionality integrated)

Keyboard

Full-size Winkey **Illuminated White-LED** Keyboard (with numeric keypad)

Audio

High Definition Audio Compliant Interface
S/PDIF Digital Output
Two Speakers
Sound Blaster X-Fi MB4
ANSP™ 3D sound technology on headphone output
Built-In Array Microphone

Note: External 5.1CH Audio Output Supported by Headphone, Microphone and S/PDIF Out Jacks

Communication

Built-In Gigabit Ethernet LAN
2.0M FHD PC Camera Module
(**Factory Option**) M.2 **3G/4G** Module

WLAN/ Bluetooth M.2 Modules:

(**Factory Option**) Intel® Wireless-AC 8260 Wireless LAN (**802.11ac**) + Bluetooth **4.1**

(**Factory Option**) Intel® Wireless-N 7265 Wireless LAN (**802.11b/g/n**) + Bluetooth **4.0**

(**Factory Option**) Intel® Wireless-AC 3165 Wireless LAN (**802.11ac**) + Bluetooth **4.0**

(**Factory Option**) Qualcomm® Atheros Killer™ Wireless-AC 1535 Wireless LAN (**802.11ac**) + Bluetooth **4.1**

(**Factory Option**) Third-Party Wireless LAN **802.11b/g/n** + Bluetooth **4.0**

Interface

Four USB 3.0 Ports (Including one AC/DC Powered USB port)
One HDMI-Out Port
Two Mini DisplayPorts (1.2)
One S/PDIF Out Jack
One Headphone/Speaker-Out Jack
One Microphone-In Jack
One RJ-45 LAN Jack
One DC-In Jack

M.2 Slots

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

Or

(**Factory Option**) Slot 3 for **3G/4G** Module

Note: (**Factory Option**) LTE-1/LTE-2 Antenna



M.2 SSD Limitation

When slot 3 has an M.2 SATA SSD installed, then slot 2 will not be available for M.2 PCIe SSDs.

Card Reader

Embedded Multi-In-1 Push-Push Card Reader
MMC (MultiMedia Card) / RS MMC
SD (Secure Digital) / Mini SD / SDHC/ SDXC

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, 60WH

Full Range AC/DC Adapter

AC Input: 100 - 240V, 50 - 60Hz

DC Output: 19V, 10.5A (**200W**)

Dimensions & Weight

385mm (w) * 271mm (d) * 25mm (h)

2.6kg (Barebone with 60WH Battery)

Or

385mm (w) * 271mm (d) * 28.8mm (h)

2.6kg (Barebone with 60WH Battery)

Or

385mm (w) * 271mm (d) * 26.9mm (h)

2.7kg (Barebone with 60WH Battery)

Introduction

Figure 1
Top View

1. PC Camera
2. *PC Camera LED
**When the PC camera is in use, the LED will be illuminated.*
3. Built-In Array Microphone
4. LCD
5. Speakers
6. Power Button
7. Keyboard
8. Touchpad & Buttons
9. Fingerprint Reader (Optional)

External Locator - Top View with LCD Panel Open



External Locator - Front & Right Side Views

Figure 2
Front View

1. LED Indicator

FRONT VIEW



RIGHT SIDE VIEW

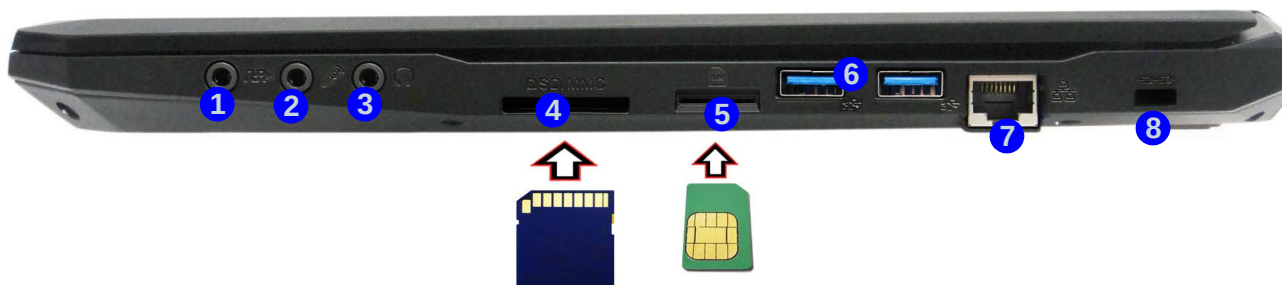


Figure 3
Right Side View

1. S/PDIF-Out Jack
2. Microphone-In Jack
3. Headphone-Out Jack
4. Multi-in-1 Card Reader
5. USIM Card Reader (for 3G/4G USIM Cards)
6. USB 3.0 Ports
7. RJ-45 LAN Jack
8. Security Lock Slot

Introduction

External Locator - Left Side & Rear View

Figure 4
Left Side View

1. Vent
2. HDMI-Out Port
3. Powered USB 3.0 Port
4. Mini DisplayPorts

LEFT SIDE VIEW



Figure 5
Rear View

1. Vent
2. DC-In Jack
3. USB 3.0 Port

REAR VIEW



External Locator - Bottom View

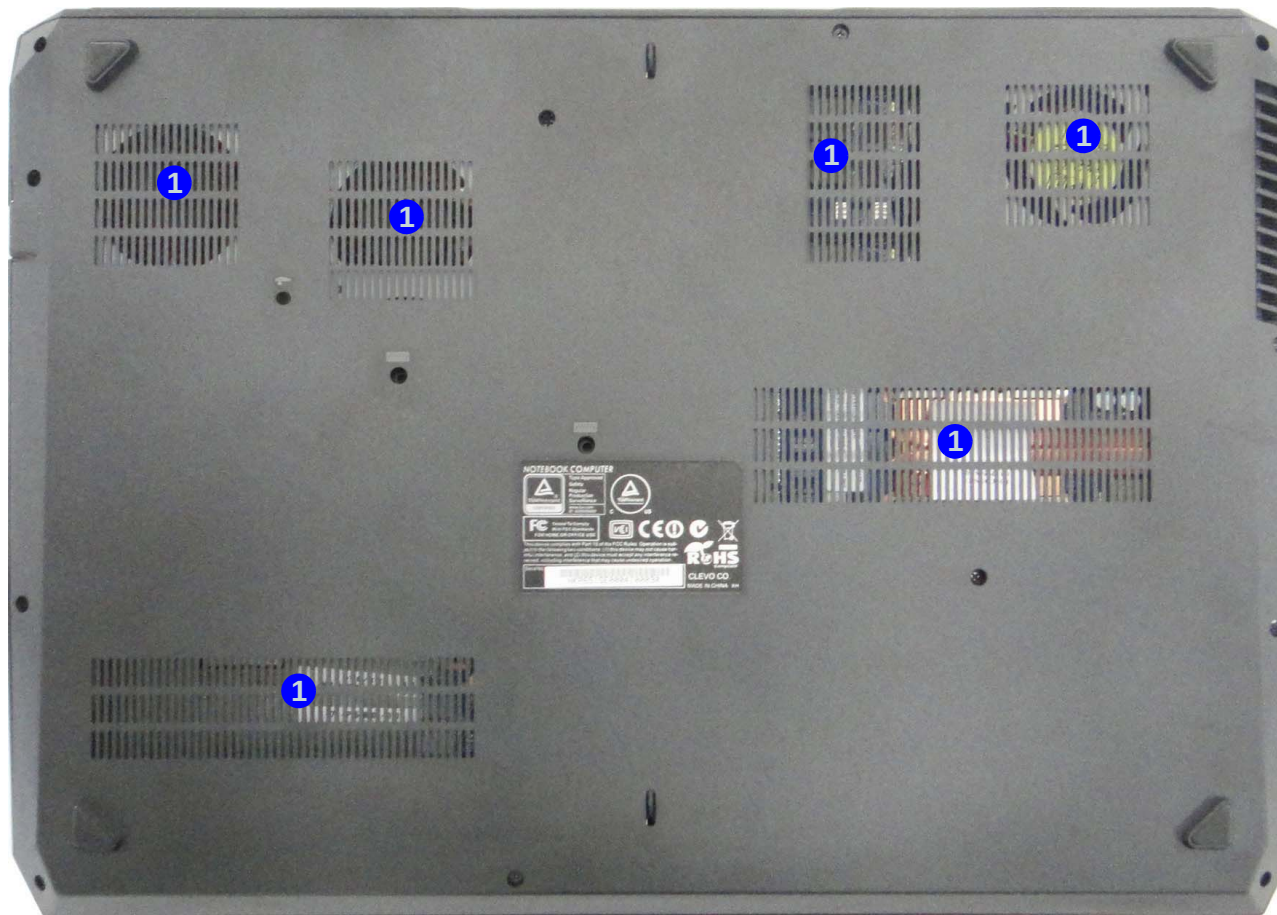


Figure 6
Bottom View

1. Vent



Overheating

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

Introduction

Figure 7
**Mainboard Top
Key Parts**

1. Memory Slots
DDR4 SO-DIMM
2. KBC-ITE IT8587
3. CMOS Battery

Mainboard Overview - Top (Key Parts)



Mainboard Overview - Bottom (Key Parts)

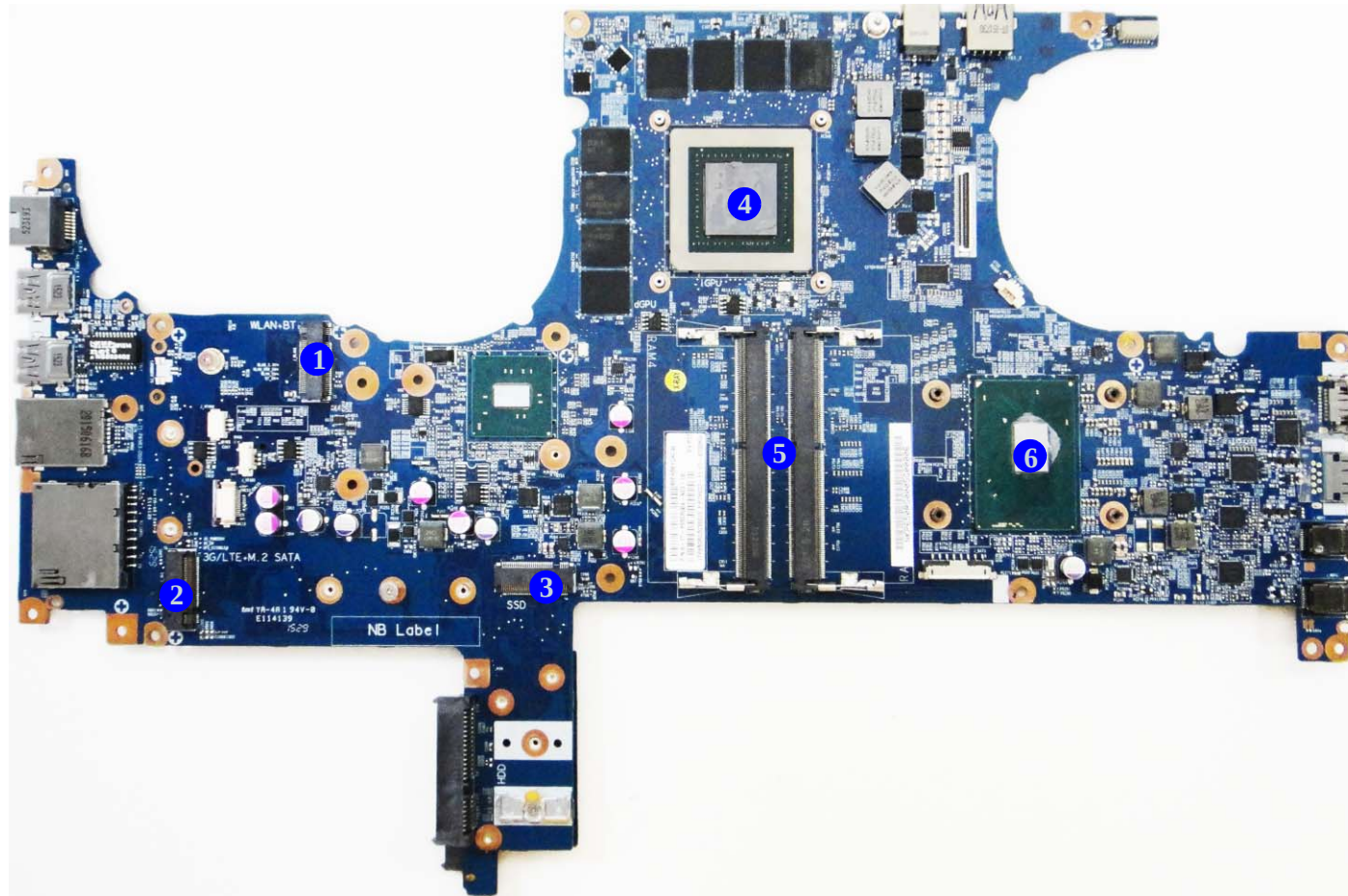


Figure 8
**Mainboard Bottom
Key Parts**

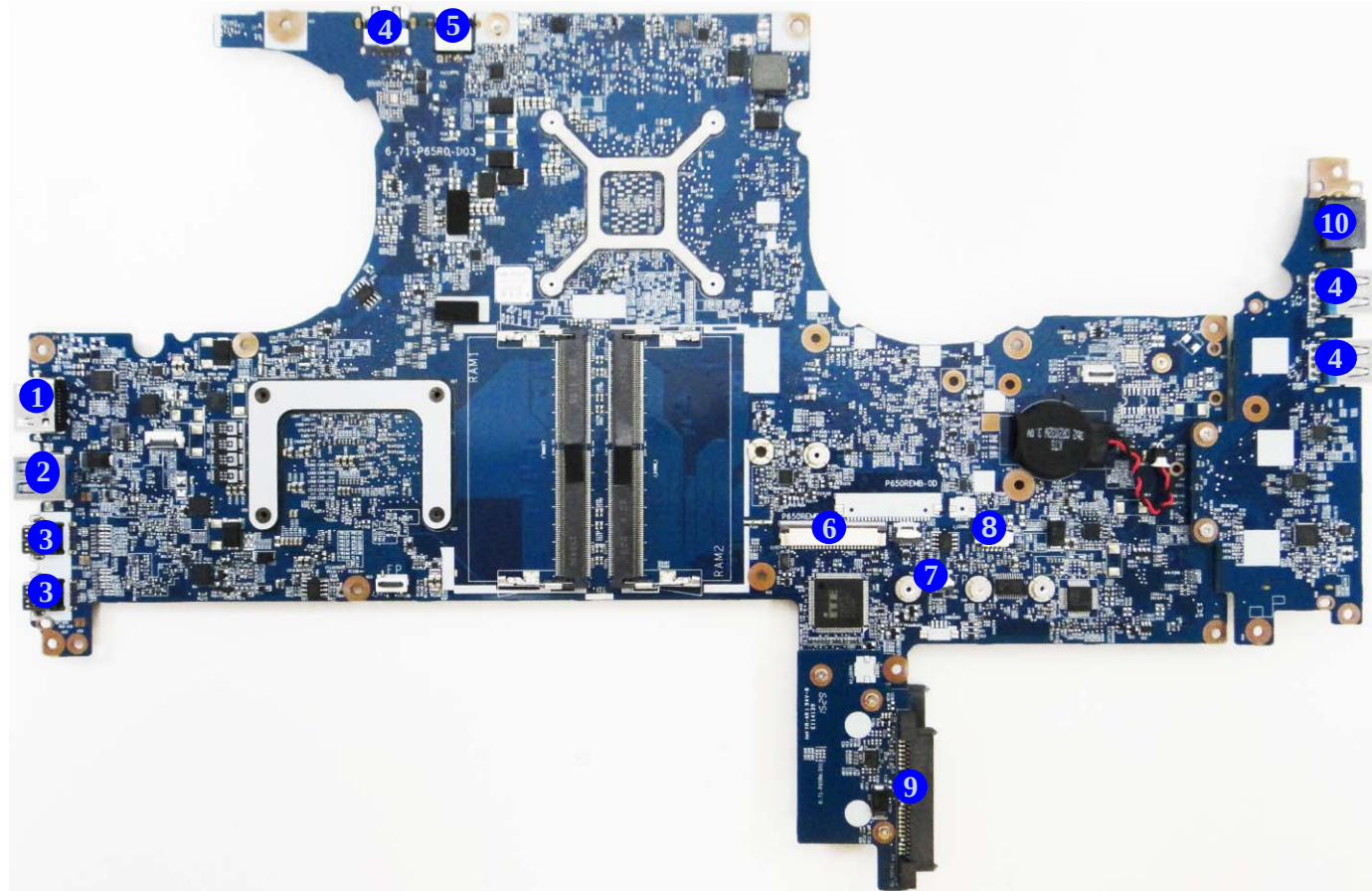
1. Mini-Card Connector (WLAN Module)
2. Mini-Card Connector (M.2 3G/SATA Module)
3. Mini-Card Connector (M.2 PCIE/SATA SSD Module)
4. GPU-GTX980M
5. Memory Slots (DDR4 SO-DIMM)
6. CPU

Introduction

Figure 9
**Mainboard Top
Connectors**

1. HDMI-Out Port
2. Powered USB Port 3.0 Connector
3. Mini Display Port
4. USB Port 3.0 Connector
5. DC-In Jack
6. Keyboard Cable Connector
7. TP Connector
8. Speaker Connector
9. HDD Connector
10. RJ-45 LAN Jack

Mainboard Overview - Top (Connectors)



Mainboard Overview - Bottom (Connectors)

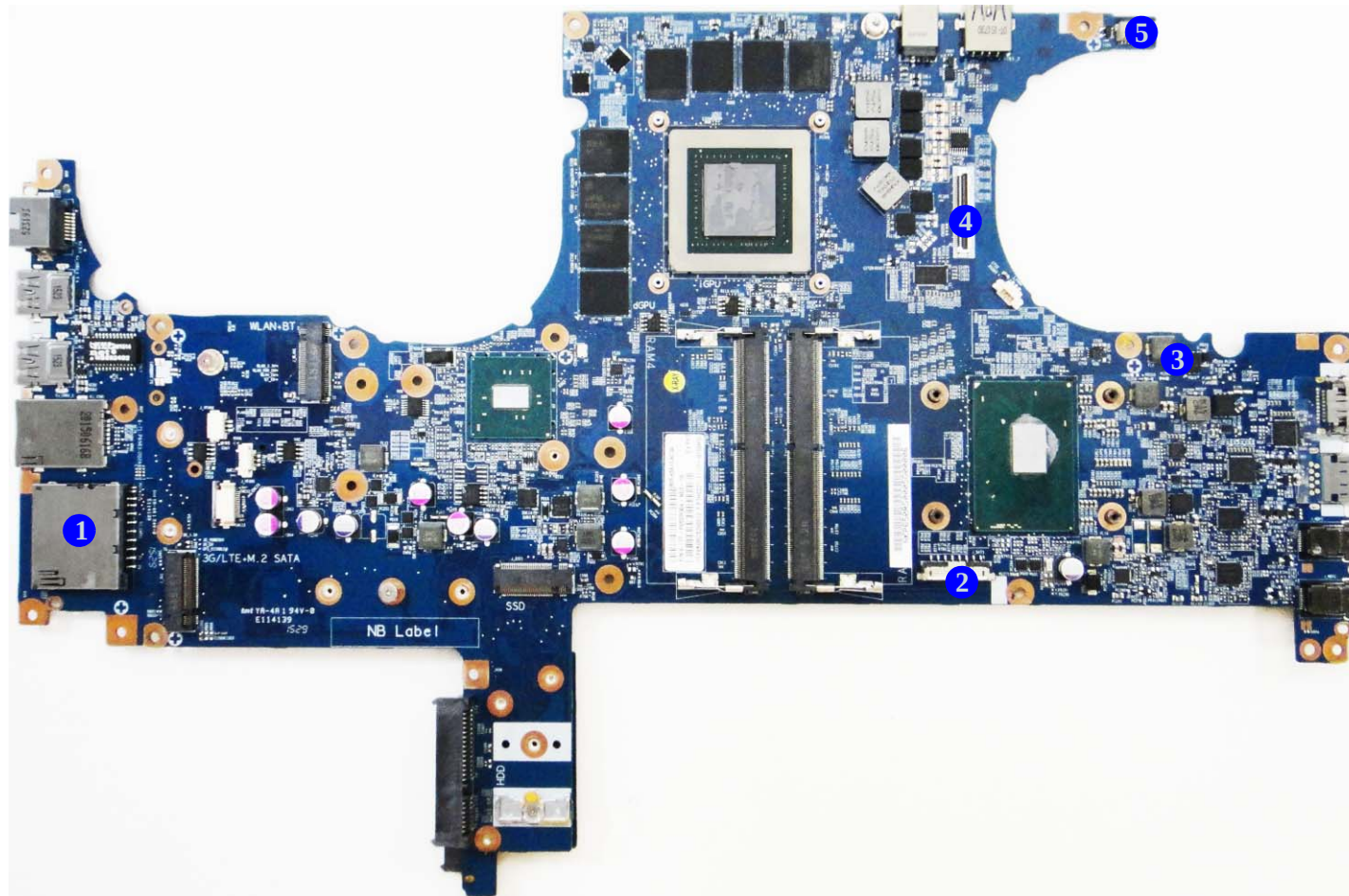


Figure 10
**Mainboard Bottom
Connectors**

1. Multi-in-1 Card Reader
2. Battery Connector
3. Fan Connector
4. LCD Cable Connector
5. CCD Connector

Chapter 2: Disassembly

Overview

This chapter provides step-by-step instructions for disassembling the **P650REG(-G)** / **P651RG(-G)** series notebook's parts and subsystems. When it comes to reassembly, reverse the procedures (unless otherwise indicated).

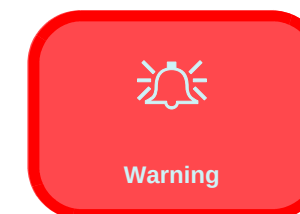
We suggest you completely review any procedure before you take the computer apart.

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.



Disassembly

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.

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.



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.

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 Keyboard:

1. Remove the keyboard [page 2 - 5](#)

To remove the Battery:

1. Remove the battery [page 2 - 6](#)

To remove the HDD:

1. Remove the battery [page 2 - 6](#)
2. Remove the HDD [page 2 - 8](#)

To remove the System Memory:

1. Remove the battery [page 2 - 6](#)
2. Remove the system memory [page 2 - 10](#)

To remove the M.2 SSD:

1. Remove the battery [page 2 - 6](#)
2. Remove the M.2 SSD [page 2 - 13](#)

To remove the Wireless LAN Module:

1. Remove the battery [page 2 - 6](#)
2. Remove the WLAN [page 2 - 14](#)

To remove and install the 3G / SATA Module:

1. Remove the battery [page 2 - 6](#)
2. Remove the 3G [page 2 - 16](#)
3. Remove the SATA [page 2 - 17](#)
4. Install the 3G / SATA [page 2 - 18](#)

Removing the Keyboard

1. Turn **off** the computer, turn it over.
2. Remove screws **1** - **2** from the bottom of the computer.
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 1a**).
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 1b**).
5. Carefully lift the keyboard **6** off the computer (**Figure 1c**).

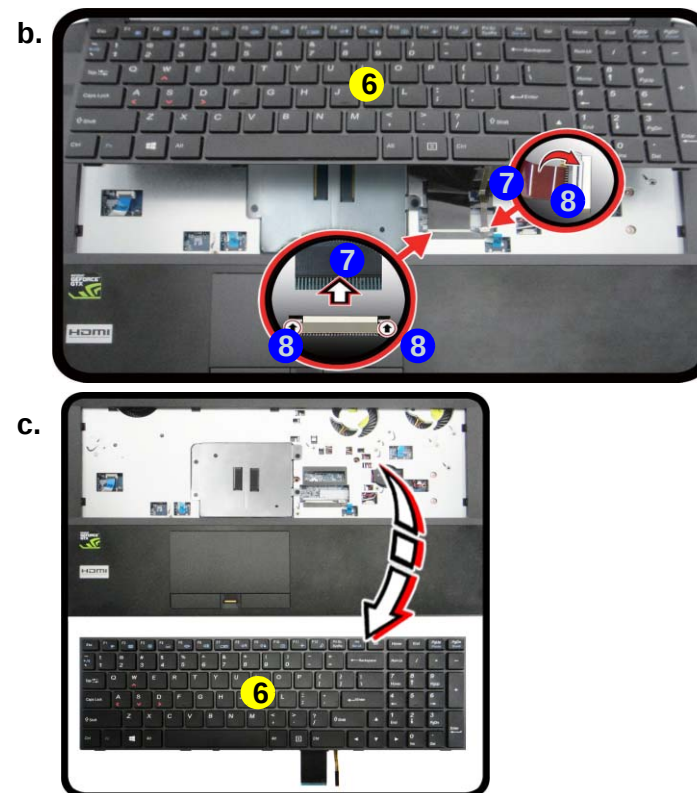
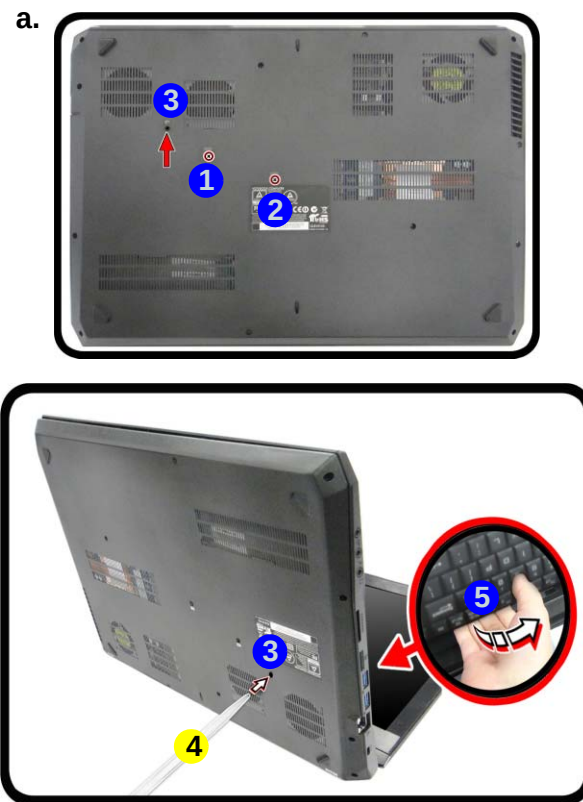


Figure 1
Keyboard Removal

- a. Remove the screws from the bottom of the computer and then eject the keyboard using a special eject stick to push the keyboard out while releasing the keyboard as shown.
- b. Lift the keyboard up and disconnect the keyboard ribbon cable from the locking collar socket.
- c. Remove the keyboard.



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.



4. Eject Stick
6. Keyboard

- 2 Screws

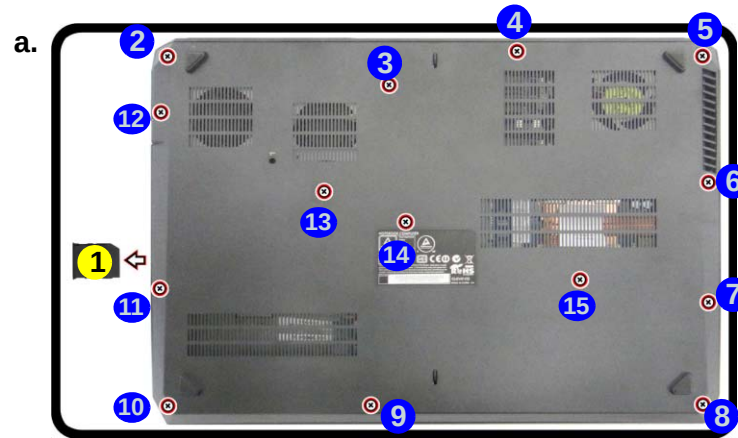
Disassembly

Figure 2
Battery Removal

- a. Remove the SD cover and screws.
- b. Remove the bottom case.
- c. Locate the battery.

Removing the Battery

1. Turn the computer **off**, and turn it over.
2. Remove the SD card cover **1** and screws **2** - **15** (*Figure 2a*).
3. Carefully lift the bottom case **16** up in the direction of the arrow **17** and remove it (*Figure 2b*).
4. The battery will be visible at point **18** on the computer (*Figure 2c*).



Screw Size

Note that the size of screw **2** & **5** is M2.5 x 8L.



1. SD Card Cover
16. Bottom Case

- 14 Screws

5. Carefully disconnect the cable **19**, then remove screws **20** - **22** (*Figure 3b*).
6. Lift the battery **23** off the computer (*Figure 3e*).
7. Reinsert the bottom case starting from point **24** as shown (*Figure 3f*) to avoid damaging the rear eSATA/USB 3.0 port. Tighten the screws to secure the bottom case in place.

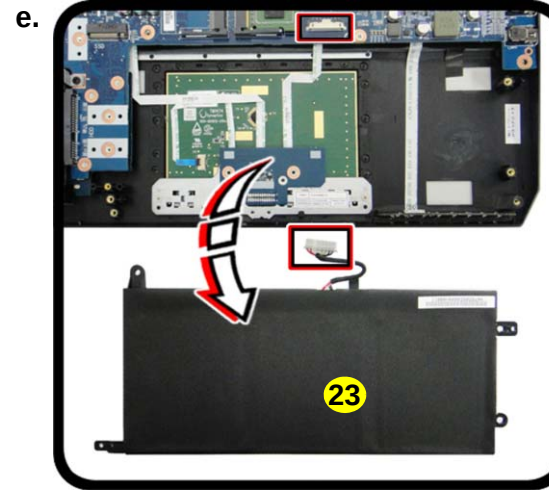
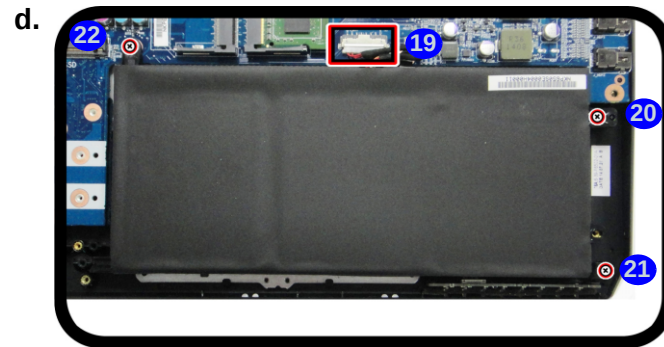


Figure 3
Battery Removal
(cont'd.)

- d. Disconnect the cable and remove the screws.
- e. Lift the battery off the computer.
- f. Reinsert the bottom case and tighten the screws.



24. Battery

- 3 Screws

Disassembly

Figure 4
HDD Assembly Removal

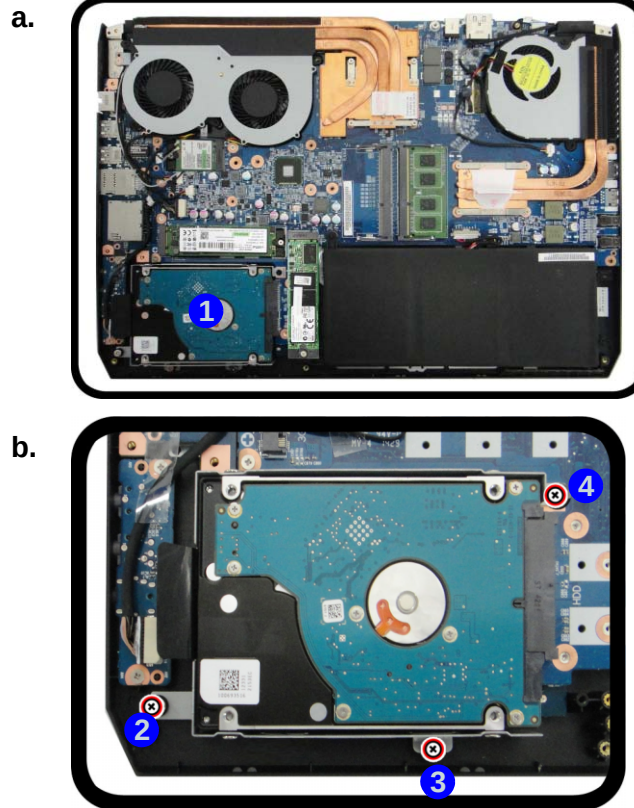
- Locate the HDD.
- Remove the screws.

Removing the Hard Disk Drive

The hard disk drive can be taken out to accommodate other 2.5" serial (SATA) hard disk drives with a height of 9.5mm or 7mm (h). Follow your operating system's installation instructions, and install all necessary drivers and utilities (as outlined in **Chapter 4 of the User's Manual**) when setting up a new hard disk.

Hard Disk Disassembly Process

- Turn **off** the computer, and remove the battery ([page 2 - 6](#)).
- The HDD will be visible at point **1** on the mainboard ([Figure 4a](#)).
- Remove screws **2** - **4** from the HDD assembly ([Figure 4b](#)).



- 
- Hard Disk
 - 3 Screws



HDD System Warning

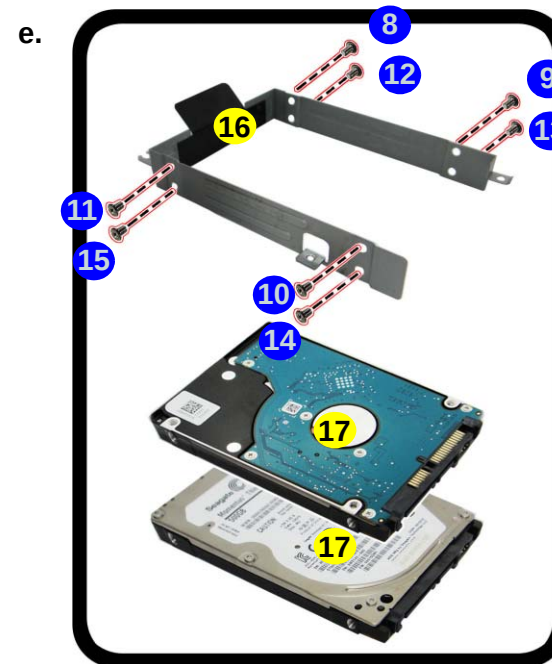
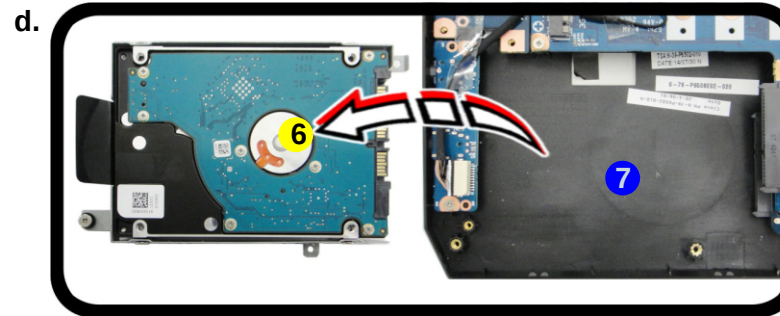
New HDD's are blank. Before you begin make sure:

You have backed up any data you want to keep from your old HDD.

You have all the CD-ROMs and FDDs required to install your operating system and programs.

If you have access to the internet, download the latest application and hardware driver updates for the operating system you plan to install. Copy these to a removable medium.

4. Slightly lift and pull the hard disk in the direction of arrow **5** (Figure 5c).
5. Lift the hard disk assembly **6** out of the bay **7** (Figure 5d).
6. Remove screws **8** - **15** and bracket **16** from the hard disk **17** (Figure 5e).
7. Reverse the process to install a new hard disk (do not forget to replace the screws).



Installing 9.5mm or 7mm HDD

Note that the hard disks pictured on the following pages are all 7mm(h) hard disk drive.

In some cases 9.5mm(h) hard disk drives will be installed. It can only be installed on the upper slot.

There are two hard disk drive options:

Two changeable 2.5" (6cm) **7.0mm** (h) **SATA** (Serial) Hard Disk Drives/Solid State Drives (SSD) supporting RAID level 0/1

Or

One changeable 2.5" (6cm) **9.5mm** (h) **SATA** (Serial) Hard Disk Drive/Solid State Drive (SSD)

For more information, contact your distributor/supplier, and bear in mind your warranty terms.

Figure 5
HDD Assembly
Removal (cont'd.)

- c. Slightly lift and pull the HDD in the direction of the arrow.
- d. Lift the HDD assembly out of the bay.
- e. Remove the screws and bracket from the HDD.

6. HDD Assembly
16. HDD Bracket
17. HDD

- 8 Screws

Disassembly

Figure 6
RAM-1 Module Removal

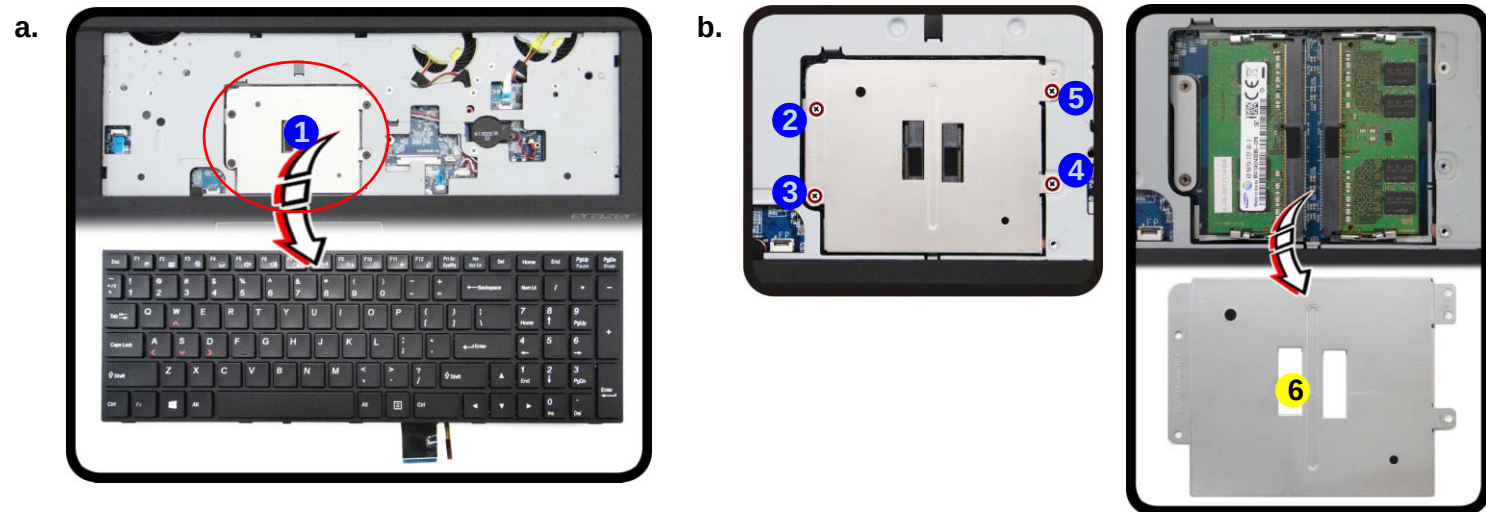
- The RAM modules will be visible at point ①.
- Remove the screws and lift the shielding plate out.

Removing the System Memory (RAM)

The computer has four memory sockets for 260 pin Small Outline Dual In-line Memory Modules (SO-DIMM) supporting DDR4 2133 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-1 Upgrade Process

- Turn **off** the computer, turn it over, remove the keyboard ([page 2 - 5](#)).
- The RAM modules will be visible at point ① after removing the shielding plate ([Figure 6a](#)).
- Remove screws ② - ⑤ and lift the shielding plate ⑥ off the computer ([Figure 6b](#)).



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.



6. RAM Shielding Plate

- 4 Screws

4. Gently pull the two release latches (7 & 8) on the sides of the memory socket in the direction indicated by the arrows (Figure 8c). The RAM module 9 will pop-up (Figure 8d), and you can then remove it.
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.

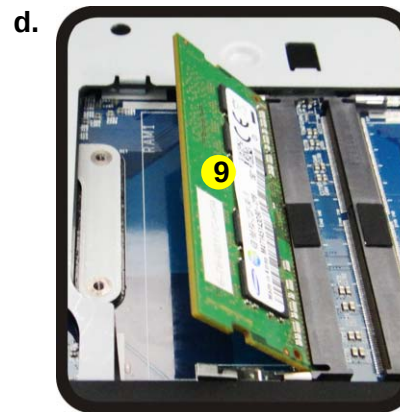
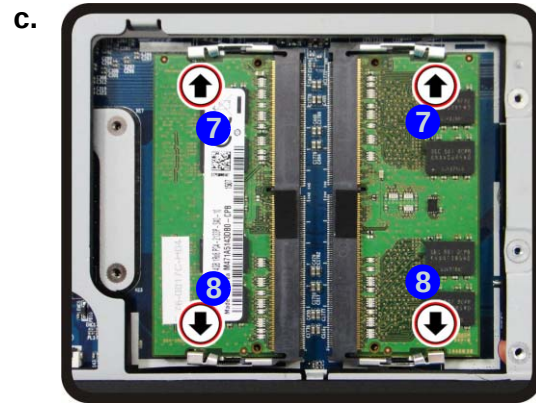


Figure 7
**RAM-1 Module
Removal (cont'd)**

- c. Pull the release latches.
- d. 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.



9. RAM Module

Disassembly

Figure 8
RAM-2 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

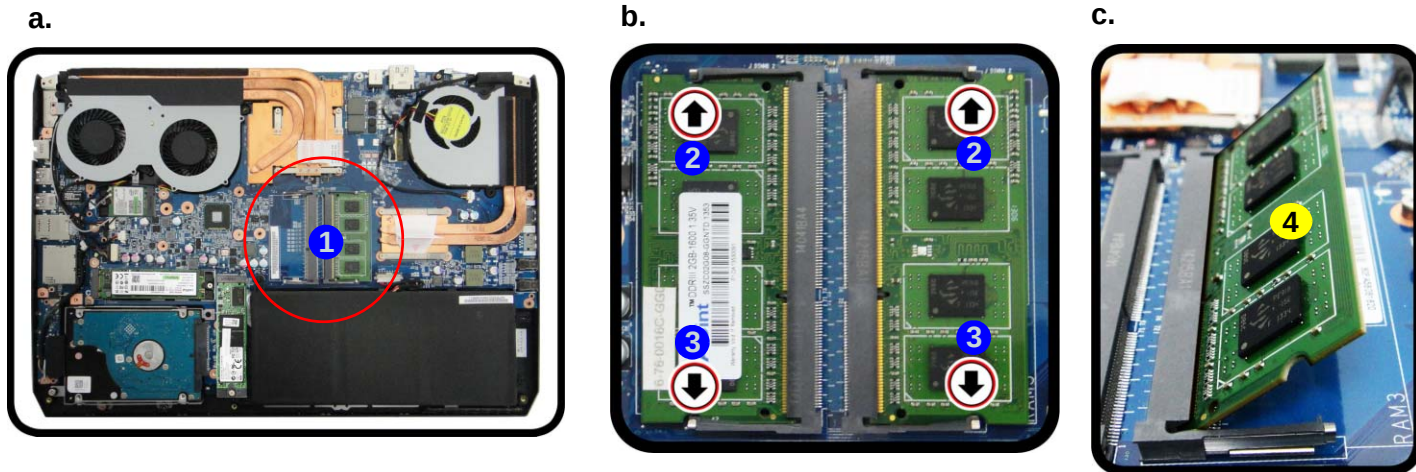
Be careful not to touch the metal pins on the module's connecting edge. Even the cleanest hands have oils which can attract particles, and degrade the module's performance.



4. RAM Module

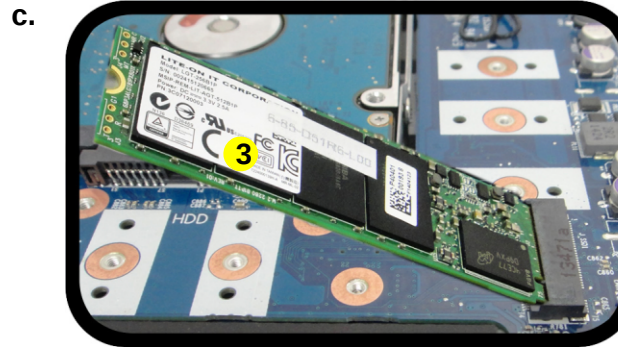
Memory-2 Upgrade Process

1. Turn **off** the computer, turn it over, remove the battery ([page 2 - 6](#)).
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 - 6](#)).
9. Restart the computer to allow the BIOS to register the new memory configuration as it starts up.



Removing the M.2 SSD Module

1. Turn **off** the computer, turn it over, remove the battery ([page 2 - 6](#)).
2. The M.2 SSD module will be visible at point **1** on the mainboard ([Figure 9a](#)).
3. Remove the screw **2** ([Figure 9b](#))
4. The M.2 SSD module **3** ([Figure 9c](#)) will pop-up, and you can remove it from the computer.



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



3.M2 SSD Module

- 1 Screw

Disassembly

Figure 10
**Wireless LAN
Module Removal**

- Locate the WLAN.
- Disconnect the cables and remove the screw.
- The WLAN module will pop up.

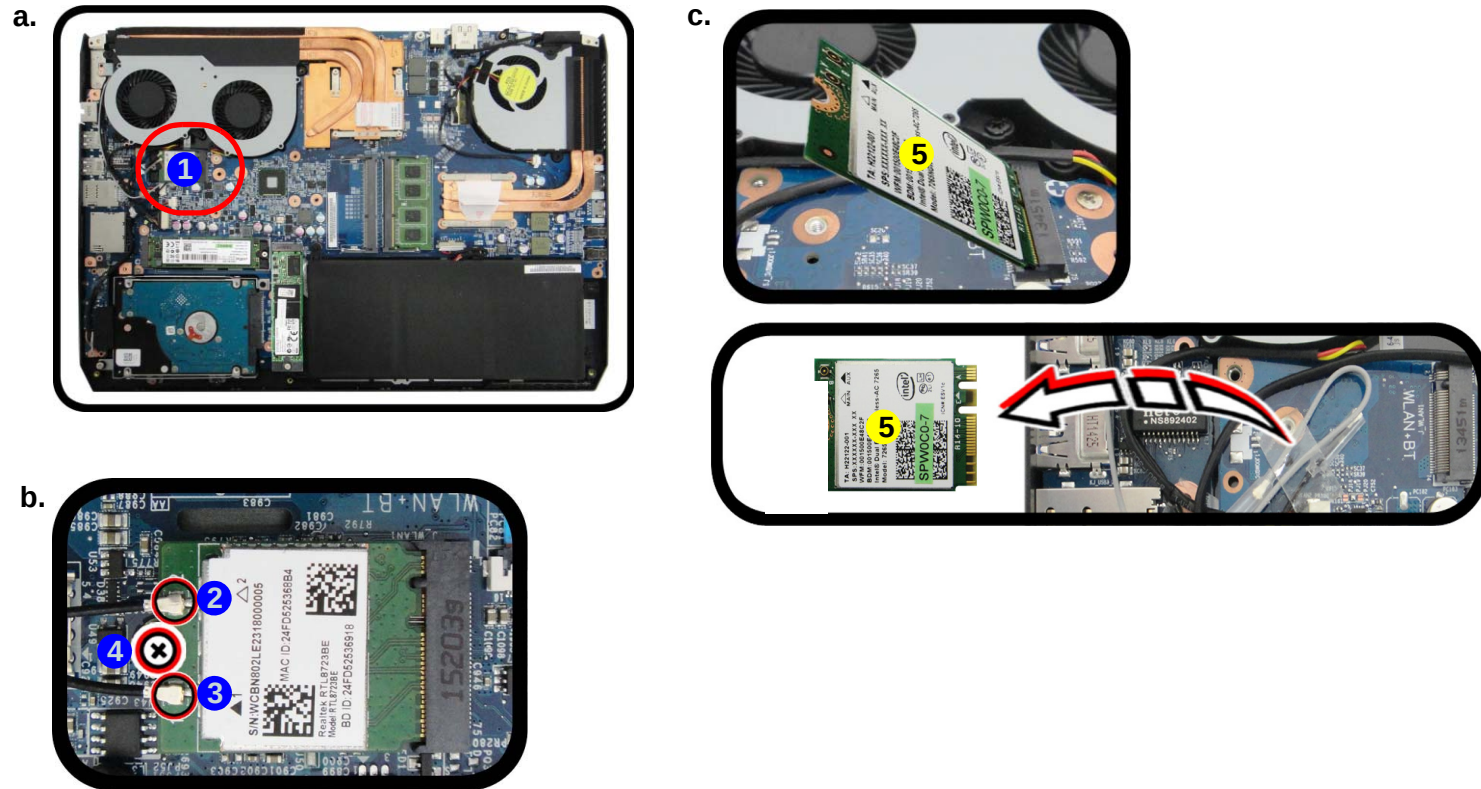
Note: Make sure you reconnect the antenna cable to the “1 + 2” socket (*Figure 10b*).

5. Wireless LAN Module

- 1 Screw

Removing the Wireless LAN Module

- Turn **off** the computer, turn it over, remove the battery (*page 2 - 6*).
- The Wireless LAN module will be visible at point **1** on the mainboard (*Figure 10a*).
- Carefully disconnect the cables **2** & **3**, and then remove the screw **4** (*Figure 10b*).
- The Wireless LAN module **5** (*Figure 10c*) will pop-up, and you can remove it from the computer.



Wireless LAN, Combo, 3G & LTE 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	WM 1	Black	Transparent
	WM 2	Gray	
	WM 3	White	
LTE Broadband	LTE 1	Black	Black
	LTE 2	Gray	
3G Broadband	3G 1	Black	Black
	3G 2	Gray	

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

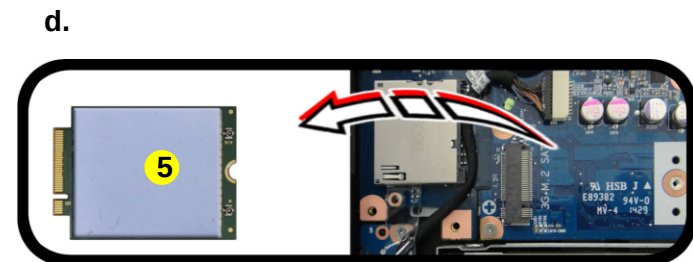
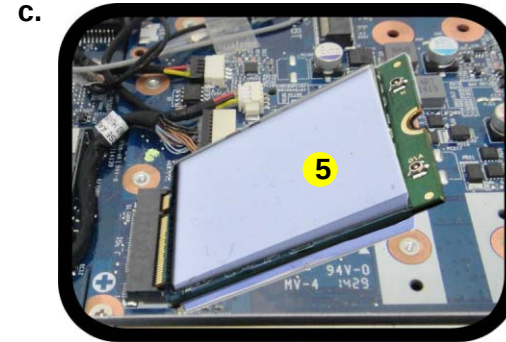
Disassembly

Figure 11
3G Module Removal

Removing and Installing the 3G / SATA Module

3G Removal Procedure

1. Turn **off** the computer, remove the battery ([page 2 - 6](#)).
- a. Locate the module.
2. Locate the module, it is visible at point **1** ([Figure 11a](#)).
- b. Disconnect the cables and remove the screw.
3. Carefully disconnect the cables **2** & **3**, and then remove the screw **4** from the module ([Figure 11b](#)).
- c. The module will pop-up.
4. The module **3** will pop-up ([Figure 11c](#)).
- d. Lift the module **5** up and off the computer ([Figure 11d](#)).
5. Lift the module **5** up and off the computer ([Figure 11d](#)).



5. MSATA Module

- 1 Screw

SATA Removal Procedure

1. Turn **off** the computer, remove the battery ([page 2 - 6](#)).
2. Locate the module, it is visible at point **1** ([Figure 12a](#)).
3. Remove the screw **2** from the module ([Figure 12b](#)).
4. The module **3** will pop-up ([Figure 12c](#)).
5. Lift the module **3** up and off the computer ([Figure 12d](#)).

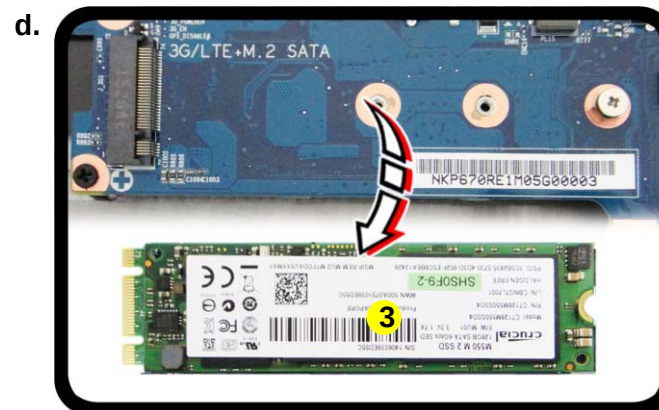


Figure 12
SATA Module Removal

- a. Locate the module.
- b. Disconnect the cables and remove the screw.
- c. The module will pop-up.
- d. Lift the module up off the socket.



3. M2 SATA Module

- 1 Screw

Disassembly

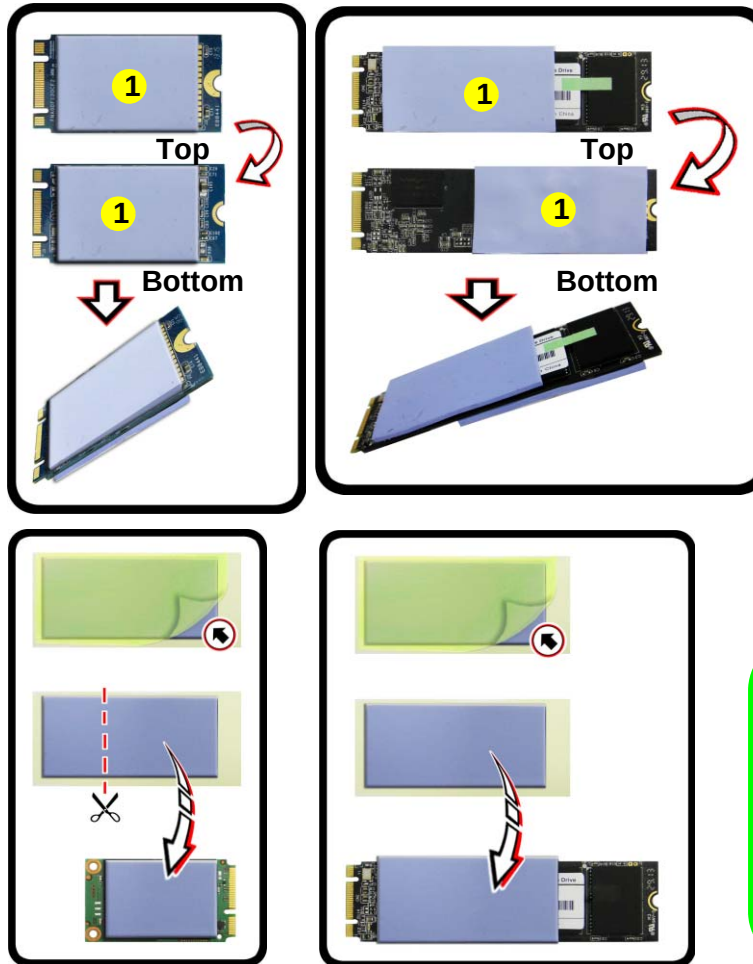
Figure 13
3G / SATA Module Installation

- Place the thermal pad.
- Insert the module.
- Tighten the screw.

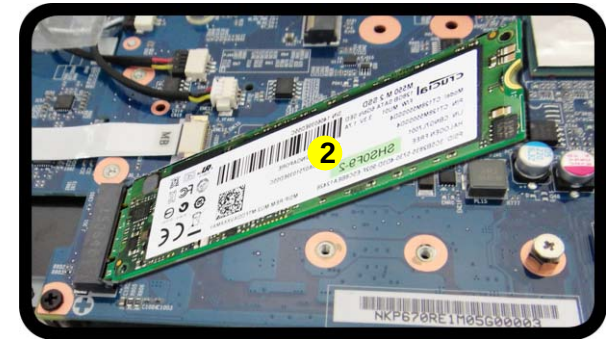
3G / SATA Installation Procedure

- Place the thermal pad **1** on the module as shown (*Figure 13a*).
- Insert the module **2** in the computer (*Figure 13b*).
- Tighten the screw **3** to secure it in place (*Figure 13c*).

a.



b.



c.



- Thermal Pad
- M2 SATA Module

- 1 Screw



Thermal Pad

Be sure to place the thermal pad's adhesive side down onto the module surface. The thicker thermal pad should be placed on the top side of the module as shown.

The thermal pad needs to be cut (along the two markers as shown) to fit the corresponding size of the module.

Appendix A:Part Lists

This appendix breaks down the **P650REG(-G) / P651RG(-G)** 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.

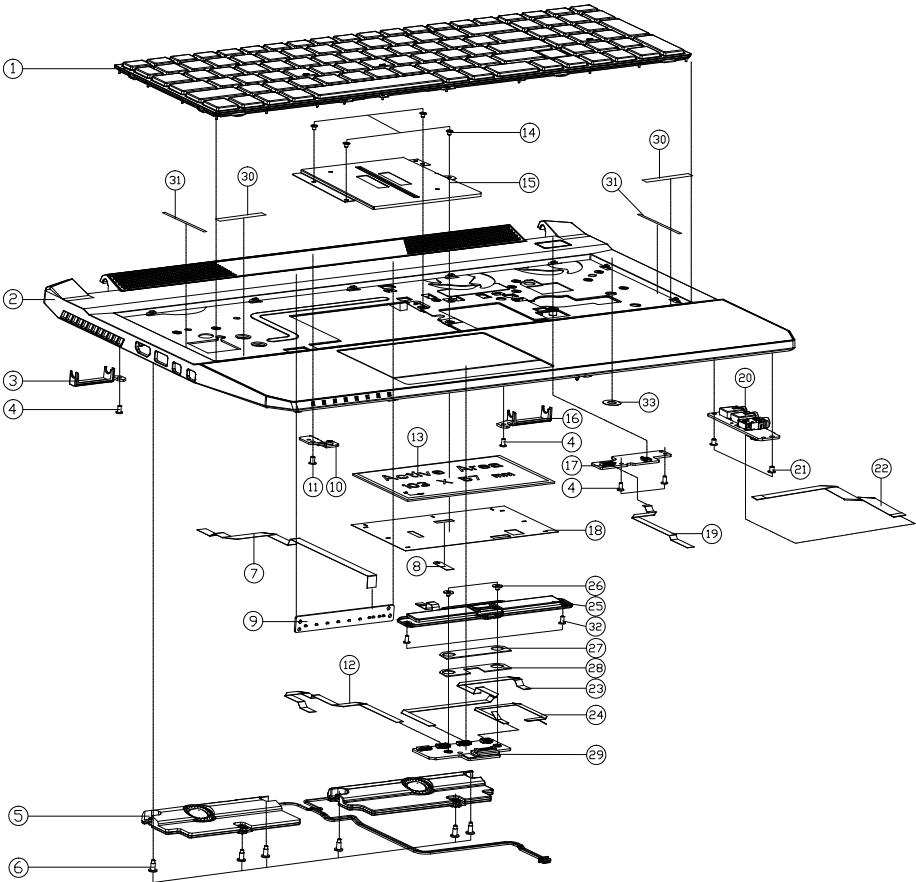
Part List Illustration Location

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

Table A - 1
**Part List Illustration
Location**

Part	
Top	<i>page A - 3</i>
Bottom	<i>page A - 4</i>
Main Board	<i>page A - 5</i>
HDD	<i>page A - 6</i>
LCD	<i>page A - 7</i>
LCD (Sharp)	<i>page A - 8</i>

Top

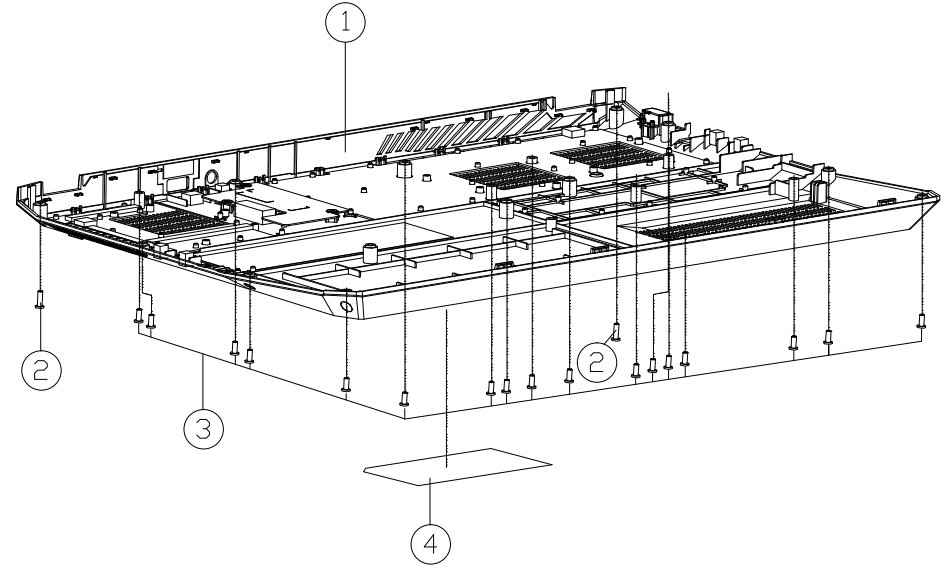


ITEM	PART NAME	PART NO	REMARK
1	WELD IN KEY HOLE FOR SPEAKER HOLES BLACK TOLERANCE WITH VIB KEY + VIB FINGER	6-80-P6500-013-1	
2	TOP CASE MODULE (INKYDOKKAPDO) P650SE	6-39-P6502-018-N	
2	TOP CASE MODULE (INKYDOKKAPDO) P65ISE	6-39-P6512-017-N	
3	HINGE COVER L (TEIJIN TNG75BX-CM262BX) P650SE	6-42-P6502-0L2	
4	SCREW M2*4L K1 NI ICT NY (DD-040,DT-05)	6-35-B1120-4RA	
5	SPK/CABLE FRONT BAL 3W 15.2 2W 41 (EUREKA L-263MM P-230MM) P650SE	6-23-SP650-0S1	
6	SCREW M2*6.2L NI ICT NY FOR SPEAKER	6-35-Z1120-6R2	
7	FFC CABLE LED TO MB (P-45) 1845MM 60V 12PIN P650SE	6-43-P6500-040	
8	BOTTOM CASE GASKET 3 (3047*40.1) P650SE	6-47-00190-254	
9	LED BOARD V2.0 P650RE6	6-77-P65R4-D02	REWORK 6-47-00190-209
10	SPK BRK-3 (SECC T=1.0MM) P650SE	6-33-P6502-031	
11	SCREW M2.5*4L K1 BK/D ICT NY	6-35-B4125-4RA	
12	FFC CABLE FINGER TO MB (P-10) 1235MM 60V 4PIN P650SE	6-43-P6500-051	ONLY FOR W/FINGER
13	TOUCH PAD SYNTHETICS TM-0363-001 P650MM (08*6MM)	6-49-P75D3-010	
14	SCREW M2*2L K1 BK/Z ICT NY (06,T=0.5)	6-35-B6120-2RC	
15	DDR BRACKET (SUS304) P650SE	6-33-P6502-050	
16	HINGE COVER R MODULE P650SE	6-42-P6502-R00	
17	POWER BOARD V1.0 P650RE6	6-77-P65RC-D01	
18	TOUCH PAD MYLAR PET (125*66.8) P650SE	6-40-P6502-031	
19	FFC CABLE POWER TO MB (P-10) 923MM 60V 4PIN P650SE	6-43-P6500-030	
20	AUDIO BOARD V2.0 P650RE6	6-77-P65R8-D02	
21	SCREW M2.5*3L K1 NI ICT NY	6-35-B1125-3R0	
22	FFC CABLE AUDIO TO MB (PITCH=45) 946MM 300V 15PIN P650SE	6-43-P6500-071	
23	FFC CABLE TRANSFER TO MB (P-45) 1943MM 60V 6PIN P650RE6	6-43-P65R0-011	
24	FFC CABLE TP TO CLICK (P-45) 1008MM 60V 8PIN P650RE6	6-43-P65R0-021	
25	FUNCTION KEY FOR CLICK BUTTON MODULE W/O FINGER P650SE	6-23-KP65R-022	
25	FUNCTION KEY FOR CLICK BUTTON MODULE W/FINGER P650SE	6-23-KP65R-012	
26	SCREW M2*2L K1 BK/Z ICT NY (08,T=0.6)	6-35-B6120-2RE	
27	CLICK W/O FP MYLAR PET (48*14*0.5T) P650SE	6-40-P6502-080	ONLY FOR W/O FINGER
28	CLICK W/FINGER MYLAR2 PET (48*14*0.3T) P650SE	6-40-P6502-040	ONLY FOR W/FINGER
29	CLICK BOARD V2.0 (W/FP) FINGER SENSOR BOARD V1.0 P650RE6	6-77-P65RA-N02	
29	CLICK BOARD V2.0 (W/O FP) P650RE6	6-77-P65R2-D02-1	
30	MYLAR MAGNET 35*5*0.3MM FOR V740SU	6-40-W7402-080	
31	TOP CASE GAP MYLAR(S0M1.5*1.0T) FOR P650SE	6-40-P6502-0A0	
32	SCREW M2*3L K1 NI ICT NY (DD-045,DT-04)	6-35-B1120-3RE	
33	WASHER 06*03*0.3t (MYLAR)	6-37-02000-601	

Figure A - 1
Top

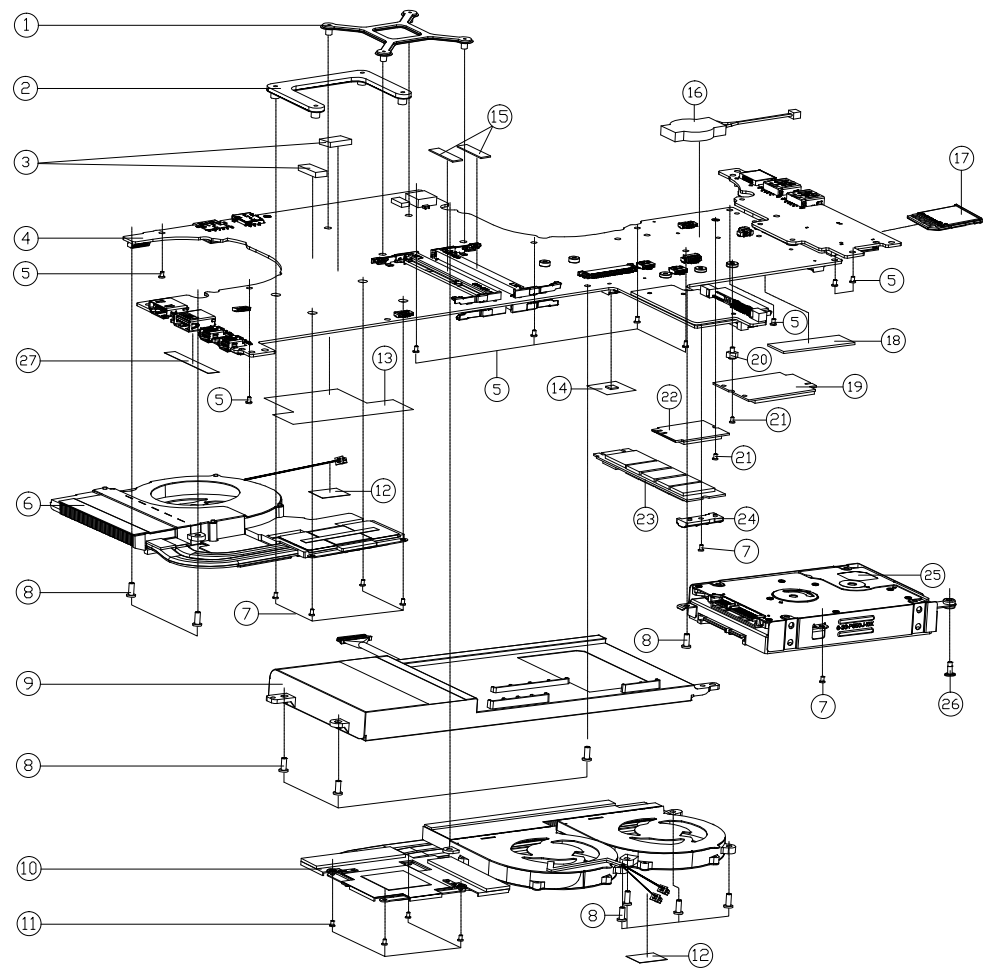
Bottom

Figure A - 2
Bottom



ITEM	PART NAME	PART NO	REMARK
1	BOTTOM CASE MODULE P650RG	6-39-P65R3-G11	
1	BOTTOM CASE MODULE P651RG	6-39-P6513-R11	
2	SCREW M2.5*8L KI BK/Z NY ICT	6-35-B6125-8R0	
3	SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
4	PRODUCT LABEL FOR P650RG (CHANGE RATING)	6-45-P650RG03-011	
4	PRODUCT LABEL FOR P651RG (CHANGE RATING)	6-45-P651RG03-011	
4	PRODUCT LABEL FOR P650RG-G (CHANGE RATING)	6-45-P650RGG3-011	
4	PRODUCT LABEL FOR P651RG-G (CHANGE RATING)	6-45-P651RGG3-011	

Main Board

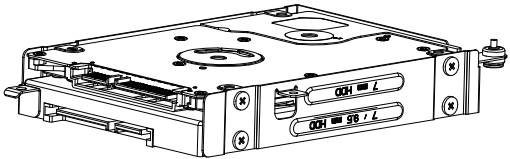
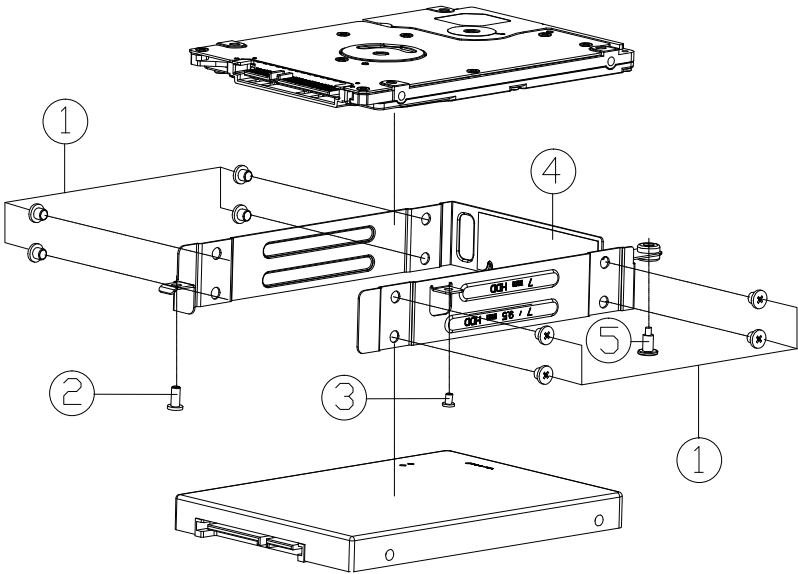


ITEM	PART	NAME	PART	NO	REMARK
1	VGA	SUPPORTER SUS430 X7200XIESHOLD	6-33-X720S-040-1		
2	CPU	SUPPORT BRACKET SECC T-1.5 P150MM	6-33-X510S-011		
3	RUBBER	M8 (SILICON 60 DEGREE) P650SE	6-47-P6502-030		
4	W/O	DRIVE/CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-77-P650RGA-N03-A		
4	W/O	DRIVE/CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-77-P650RGA-N03-1B		
4	W/O	DRIVE/CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-77-P650RGA-N03-1A		
4	W/O	DRIVE/CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-77-P650RGA-N03-A		
4	W/O	DRIVE/CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-77-P650RGA-N03-B		
4	W/O	DRIVE/CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-77-P650RGA-N03-1B		
5	SCREW	M2.5X3L KI NI ICT NY	6-35-B1125-3R0		
6	CPU	HEATING MODULE (CASTING) AL P650SG	6-31-P65R2-G01		
7	SCREW	M2X3L KI NI ICT NY (CDD=4.5,DT=0.4)	6-35-B1120-3RE		
8	SCREW	M2.5X6L K BZ ICT NY	6-35-B2125-6RA		
9	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-87-P650S-4U31		
9	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-87-P650S-4252		
10	CPU	HEATING MODULE & FAN MODULE P650SG	6-31-P6502-G02		
11	SCREW	M2.5X3L KI NI ICT NY (CDD=4.5,DT=0.4)	6-35-B2116-3R5		
12	TAPE	MYLAR TRANSPARENT (CDD=4.5,DT=0.4) P180MM	6-40-P1803-020		
13	EMI	SHIELD FOR AL FOIL (P/CD 42X76.2) P650SE	6-47-P650S-020		
14	AL	FOIL+THERMAL PAD 20X20 P650SE	6-40-P650S-020		
15	DRIVE	SUPPORTER RUBBER (CDD=4.5) SILICON P650RGA	6-47-P65RS-011		
16	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-23-22015-TE0		
17	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-42-W970B-010		
18	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-48-P650S-030		
19	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-88-S210W-B800		OPTION
19	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-88-W3306-B841		OPTION
20	SCREW	M2.5X6L KI NI ICT NY (CDD=4.5,DT=0.4)	6-35-ZA120-2R5		
21	SCREW	M2X3L KI NI ICT NY (CDD=4.5,DT=0.4)	6-35-B1120-2R0		
22	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-88-N25JF-4200		OPTION
22	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-88-W95LF-4240		OPTION
22	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-88-N240F-4200		OPTION
22	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-88-P75DF-9600		OPTION
22	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-88-S210F-9400		OPTION
22	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-88-N170F-5100		OPTION
23	SSD	M2 2280 SATA3 CRITICAL (CDD=4.5,DT=0.4) W/O P/CD	6-85-D515B-S02		OPTION
23	SSD	M2 2280 SATA3 CRITICAL (CDD=4.5,DT=0.4) W/O P/CD	6-85-D513G-200		OPTION
23	SSD	M2 2280 SATA3 CRITICAL (CDD=4.5,DT=0.4) W/O P/CD	6-85-D51R6-S00		OPTION
23	SSD	M2 2280 SATA3 CRITICAL (CDD=4.5,DT=0.4) W/O P/CD	6-85-D515B-S00		OPTION
23	SSD	M2 2280 SATA3 CRITICAL (CDD=4.5,DT=0.4) W/O P/CD	6-85-D515A-100		OPTION
23	SSD	M2 2280 SATA3 CRITICAL (CDD=4.5,DT=0.4) W/O P/CD	6-85-D51R0-100		OPTION
23	SSD	M2 2280 SATA3 CRITICAL (CDD=4.5,DT=0.4) W/O P/CD	6-85-D515B-S01		OPTION
23	SSD	M2 2280 SATA3 CRITICAL (CDD=4.5,DT=0.4) W/O P/CD	6-85-D515B-101		OPTION
24	W/O	CD/DVD/SSD FOR W/O P/CD IN CONVEYER DRUM FOR W/O P/CD	6-42-P6503-031		
25	W/O	HDD ASS'Y P650SG	6-79-P650SG0J-010		
25	W/O	HDD ASS'Y P650SG	6-79-P650SG0J-020		
25	W/O	2ND HDD ASS'Y P650SG	6-79-P650SG0J-030		
25	W/O	2ND HDD ASS'Y P650SG	6-79-P650SG0J-040		
26	SCREW	M2.5X6L KI NI ICT NY FOR SPEAKER	6-35-Z1120-6R2		
27	TAPE	MYLAR (C) MYLAR M550J	6-40-M55J2-030		

Figure A - 3
Main Board

HDD

Figure A - 4
HDD



ITEM	PART NAME	PART NO	REMARK
1	SCREW M3*2.5L KI NI ICT NY	6-35-B1130-2R5	
2	SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
3	.SCREW M2*3L KI NI ICT NY (DD=4.5,DT=0.4)	6-35-B1120-3RE	
4	HDD BKT SECC P670SG	6-33-P6702-061	
5	.SCREW M2*6.2L NI ICT NY FOR SPEAKER	6-35-Z1120-6R2	

A.Part Lists



LCD A - 7

A.Part Lists

This exploded view diagram illustrates the assembly of a rectangular frame. The components are numbered as follows:

- 1**: Top glass panel.
- 2**: Upper frame rail.
- 3**: Upper frame rail (alternative view).
- 4**: Vertical support pin.
- 5**: Upper frame rail (alternative view).
- 6**: Lower frame rail.
- 7**: Lower frame rail (alternative view).
- 8**: Lower frame rail (alternative view).
- 9**: Bottom glass panel.
- 10**: Lower frame rail (alternative view).
- 11**: Lower frame rail (alternative view).
- 12**: Lower frame rail (alternative view).
- 13**: Lower frame rail (alternative view).
- 14**: Lower frame rail (alternative view).
- 15**: Lower frame rail (alternative view).
- 16**: Lower frame rail (alternative view).
- 17**: Lower frame rail (alternative view).
- 18**: Lower frame rail (alternative view).
- 19**: Lower frame rail (alternative view).
- 20**: Lower frame rail (alternative view).
- 21**: Lower frame rail (alternative view).
- 22**: Lower frame rail (alternative view).
- 23**: Lower frame rail (alternative view).
- 24**: Lower frame rail (alternative view).

ITEM	PART NAME	PART NO	REMARK
1	LCD FRONT COVER PROTECTION MYLAR (PET+30H95) P650SE	6-40-P6501-010	
2	CCD LENS PMMA P650SE	6-42-P6501-010	
3	LCD FRNNT COVER MODULE P650SE	6-39-P6501-015	
4	SCREW M2x2.5L KI BK/Z ICT NY 1# #35 T=0.5	6-35-B6120-2RD	
5	LCD 156" 8MB CPD IPS MOE SHARP LGDSALMVA LED 30MM F/W UPDATE	6-50-L1231-A01	
6	WIRE CALBE FOR CCD 535MM 30V 8PIN (CMD) P650SE	6-43-P650T-011-1	
7	ANTENNA PEBA W/LAN JEN PCB 2.4G/5G 1-500MM P650SE	6-23-7P650-072	必須先選 3G/LTE-T1 天線 才可以選 LTE-T2 天線
8	LCD BACK COVER MODULE P650SE	6-39-P6501-025	
9	LCD BACK COVER MODULE P651SE	6-39-P6511-024	
10	LCD BACK COVER PROTECTION MYLAR (PET+30H95) P650SE	6-40-P6501-020	
11	VAC-CABLE CORD FOR EPSON/SHP 200W 30V 4P @ 0.001A COMBINEDS P650SE	6-43-P6501-052-1C	
12	OVC CAMERA DOME INDOOR/OUTDOOR 2 IN FIBER OPTIC P650SE FIBERS W/LED VIOGY MC	6-88-P650C-4900	OPTION
13	ANTENNA PEBA W/LAN JEN PCB 2.4G/5G 1-500MM P650SE	6-23-7P650-060	需要選 3G/LTE 模組 必須此 3G/LTE-T1 天線
14	LCD PANEL BRACKET (SECC) P650SE	6-33-P6501-010	ONLY FOR SHARP
15	SCREW M2x2L KI BK/Z ICT NY (#8,T=0.6)	6-35-B6120-2RE	
16	LCD HINGE L (SK7) P650SE	6-33-P6501-0L3	
17	LCD HINGE R SK7 P650SE	6-33-P6501-0R3	
18	SCREW M2.5*3L KI NI ICT NY	6-35-B1125-3R0	
19	ANTENNA PEBA W/LAN JEN W/LZ PCB 2.4G/5G CABLE BLADE 1-500MM P650SE	6-23-7P650-052	
20	FRONT COVER GLUE UPE ONTTTO 5000 180X(41.5) FOR W6555Z	6-40-W6551-020	
21	SPONGE(10*7*2.5T)FOR P650SA	6-47-0019A-10Q	
22	SHARP PANEL SPONGE (47*8x2T) (CR4382+3M467) P650SE	6-47-0019A-471	
23	SHARP PANEL SPONGE (210*8x2T) (CR4382+3M467) P650SE	6-47-0019A-215	
24	MYLAR(10*6*0.2T)FOR P650SE	6-40-00150-10L	

Appendix B: Schematic Diagrams

This appendix has circuit diagrams of the **P650REG(-G) / P651RG(-G)** notebook's PCB's. The following table indicates where to find the appropriate schematic diagram.

Diagram - Page	Diagram - Page	Diagram - Page	Diagram - Page
System Block Diagram - Page B - 2	GPU Frame Buffer Partition - Page B - 24	Realtek ALC892 - Page B - 46	P650RE HDD Board - Page B - 68
Processor 1/7 - Page B - 3	Frame Buffer Partition C - Page B - 25	TPA2008D2 - Page B - 47	P650RE LED Board - Page B - 69
Processor 2/7 - Page B - 4	Frame Buffer Partition D - Page B - 26	Subwoofer - Page B - 48	Finger Sensor Board - Page B - 70
Processor 3/7 - Page B - 5	Frame Buffer Partition C_D - Page B - 27	KBC-ITE IT8587 - Page B - 49	P650RE Click Board - Page B - 71
Processor 4/7 - Page B - 6	GPU Decoupling - Page B - 28	TPM, CCD, TP - Page B - 50	P650RE USB Board 1/3 - Page B - 72
Processor 5/7 - Page B - 7	DACA Interface & XTAL - Page B - 29	Fan, LID, KB, LED - Page B - 51	P650RE USB Board 2/3 - Page B - 73
Processor 6/7 - Page B - 8	IFP I/O Interface - Page B - 30	Connector - Page B - 52	P650RE USB Board 3/3 - Page B - 74
Processor 7/7 - Page B - 9	Misc - GPIO, I2C and ROM - Page B - 31	DDR 1.2V / 0.6VS - Page B - 53	P670RE USB Board 1/3 - Page B - 75
DDR4 CHA SO-DIMM_0 - Page B - 10	GPU NVVDD, FBVDDQ, and GND - Page B - 32	VDD3, VDD5 - Page B - 54	P670RE USB Board 2/3 - Page B - 76
DDR4 CHA SO-DIMM_1 - Page B - 11	PCH 1/9 - Page B - 33	5V, 5VS, 3.3V, 3.3VS, 3.3VA - Page B - 55	P670RE USB Board 3/3 - Page B - 77
DDR4 CHB SO-DIMM_0 - Page B - 12	PCH 2/9 - Page B - 34	Power 1.0V, VCCIO - Page B - 56	P670RE LED Board - Page B - 78
DDR4 CHB SO-DIMM_1 - Page B - 13	PCH 3/9 - Page B - 35	AC_In, Charger - Page B - 57	P655RE Power Board - Page B - 79
Panel, Inverter - Page B - 14	PCH 4/9 - Page B - 36	1.0DX_VCCSTG/VCCSFR_OC/2.5V - Page B - 58	P655RE LED Board - Page B - 80
Redriver - Page B - 15	PCH 5/9 - Page B - 37	PEX_VDD, 3V3_AON, 3V3_RUN - Page B - 59	
Mini DP Port E - Page B - 16	PCH 6/9 - Page B - 38	NVVDD Phase 1 & 2 - Page B - 60	
Mini DP Port F - Page B - 17	PCH 7/9 - Page B - 39	FBVDDQ - Page B - 61	
HDMI Connector - Page B - 18	PCH 8/9 - Page B - 40	VCC_Core & VCCSA - Page B - 62	
VGA PCI Express - Page B - 19	PCH 9/9 - Page B - 41	VCore & VCCSA Output Stage - Page B - 63	
VGA Frame Buffer Partition - Page B - 20	USB3.0 - Page B - 42	VCCGT - Page B - 64	
Frame Buffer Partition A - Page B - 21	USB Charger - Page B - 43	VCCGT Output Stage - Page B - 65	
Frame Buffer Partition B - Page B - 22	M.2 3G + M.2 SATA - Page B - 44	P650RE Audio Board A - Page B - 66	
Frame Buffer Partition A_B - Page B - 23	M.2 WLAN+BT, PCIE4X SSD - Page B - 45	P650RE Power Board - Page B - 67	

Table B - 1
**SCHEMATIC
DIAGRAMS**

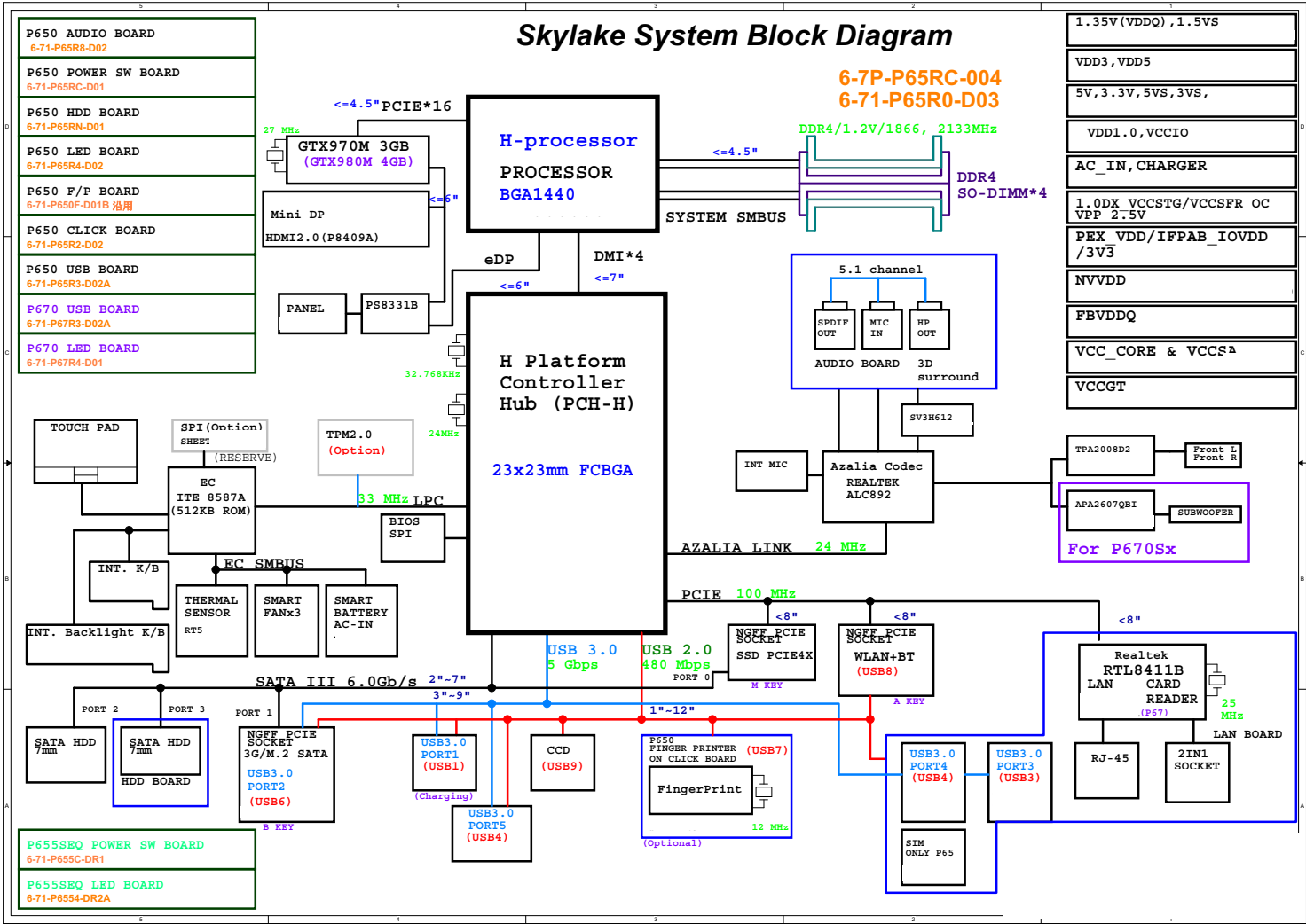


Version Note

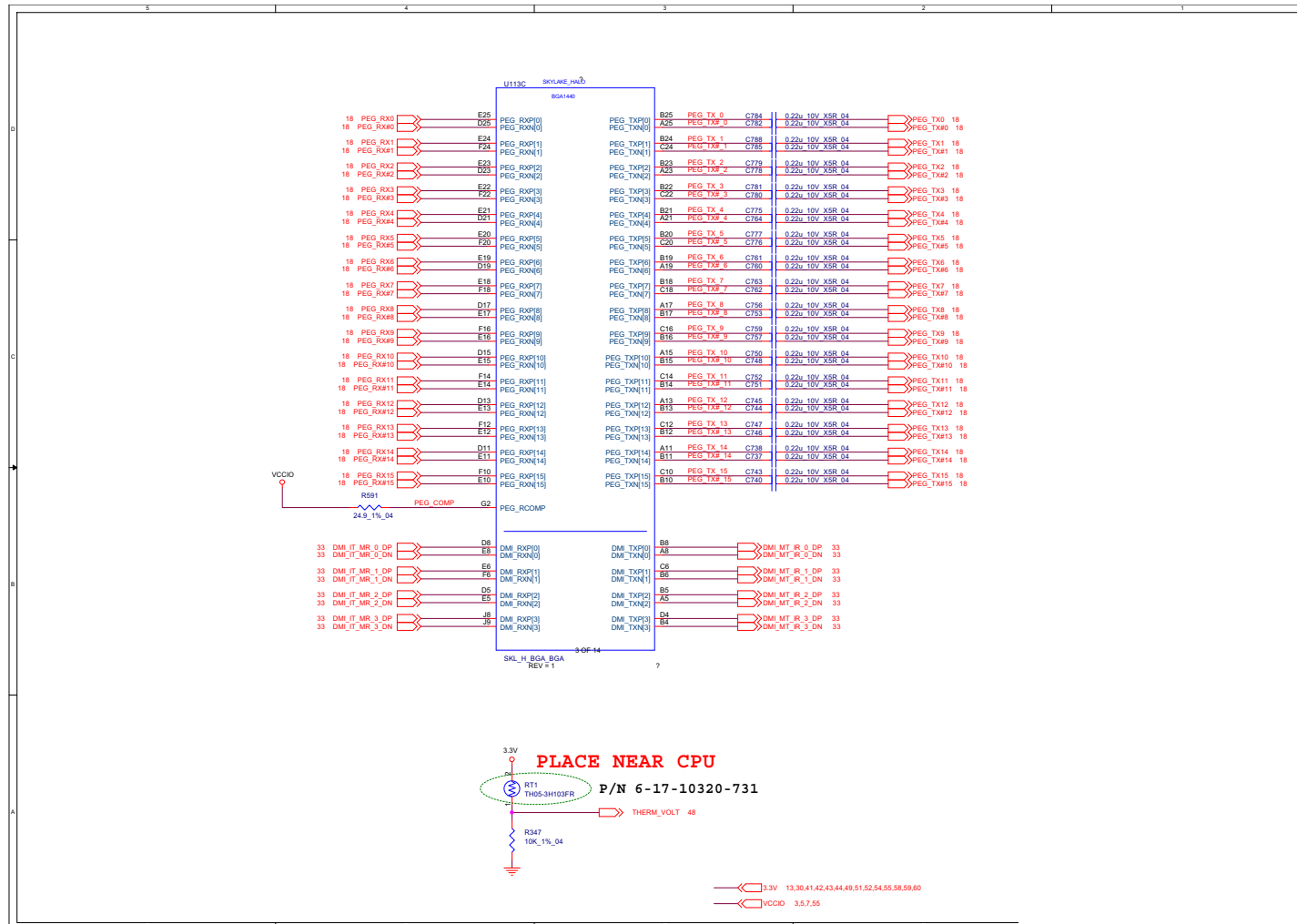
The schematic diagrams in this chapter are based upon version 6-7P-P65RC-003. If your mainboard (or other boards) are a later version, please check with the Service Center for updated diagrams (if required).

System Block Diagram

Sheet 1 of 79
System Block
Diagram

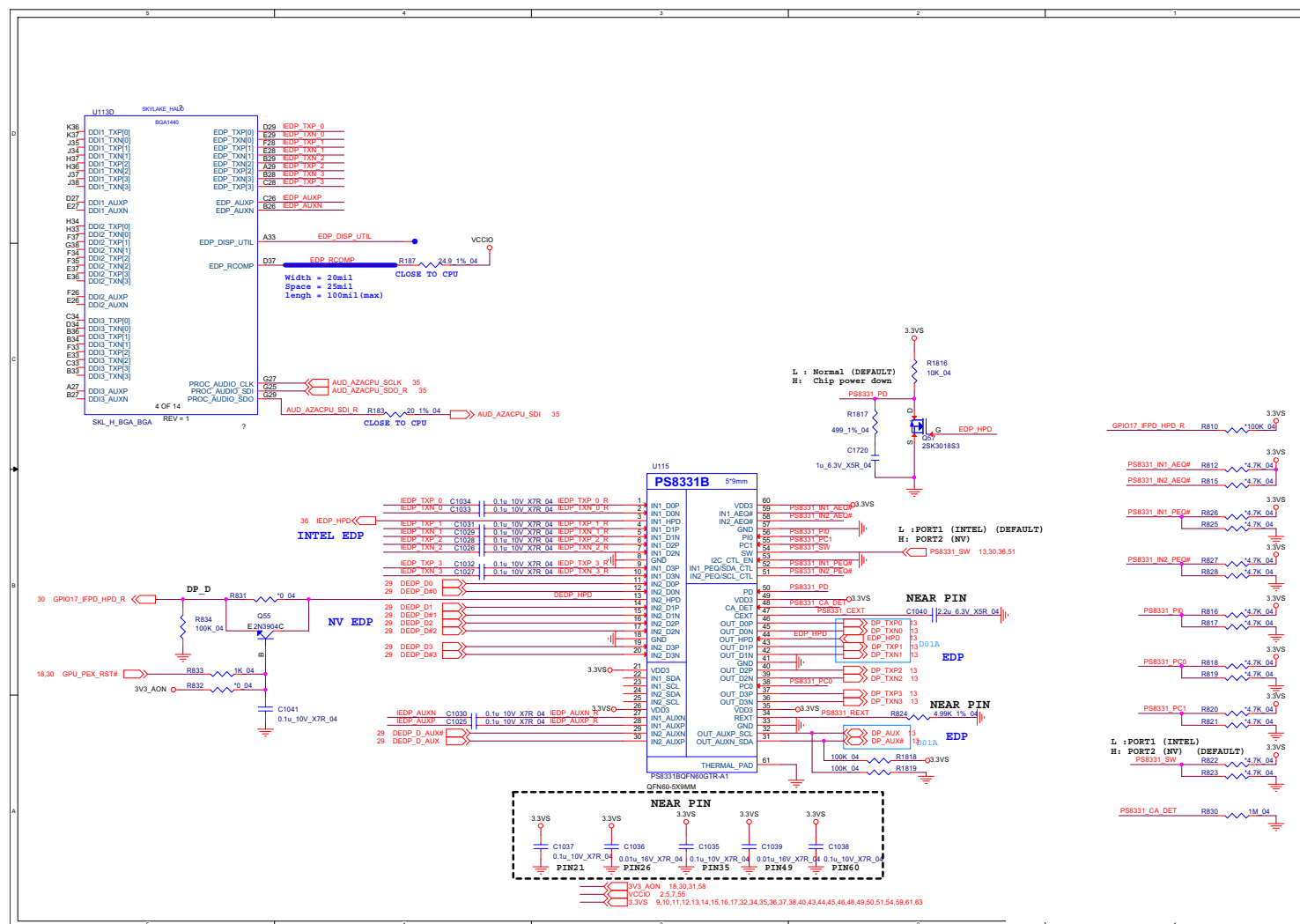


Processor 1/7

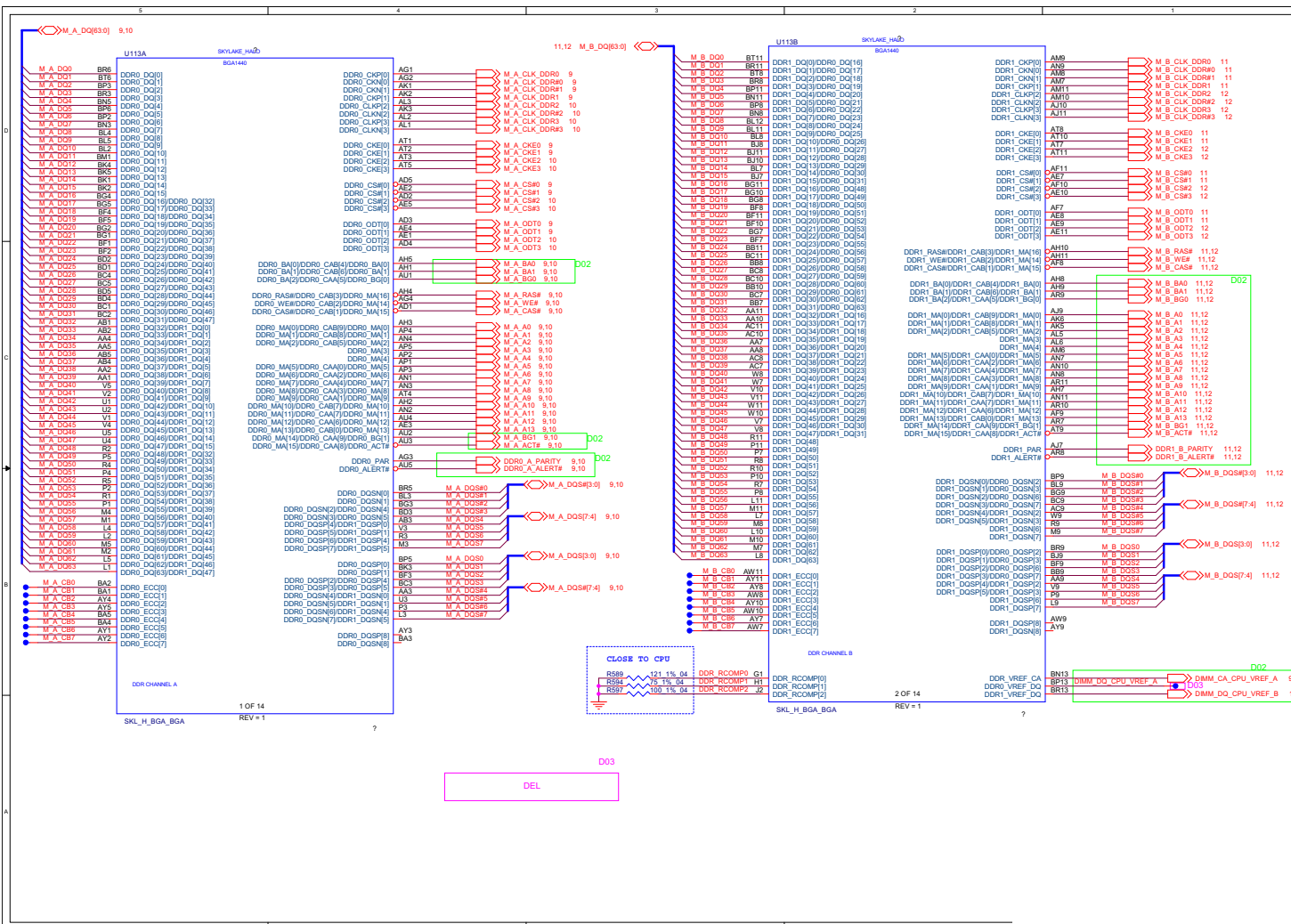
Sheet 2 of 79
Processor 1/7

Processor 2/7

Sheet 3 of 79
Processor 2/7



Processor 3/7

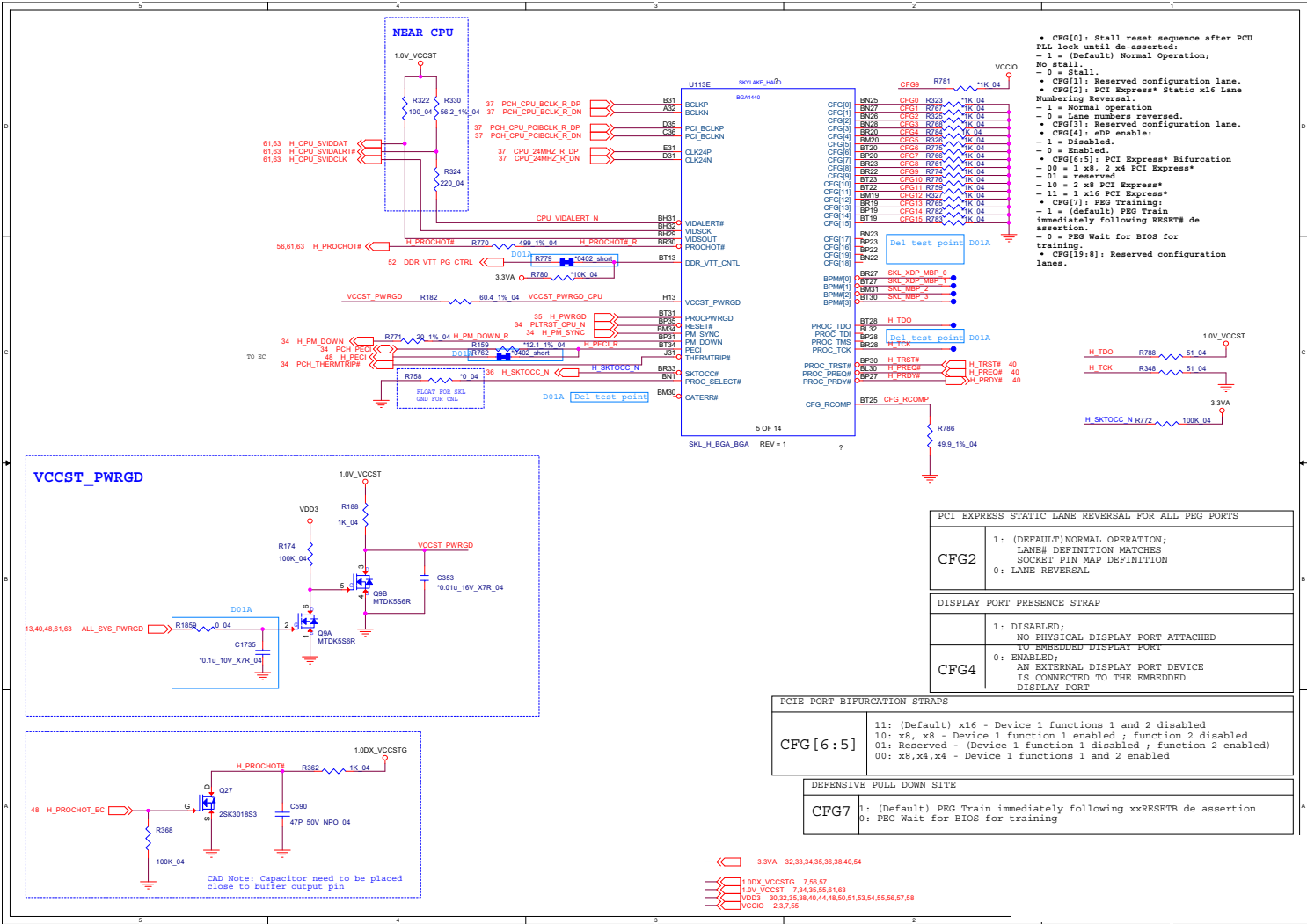
Sheet 4 of 79
Processor 3/7

B.Schematic Diagrams

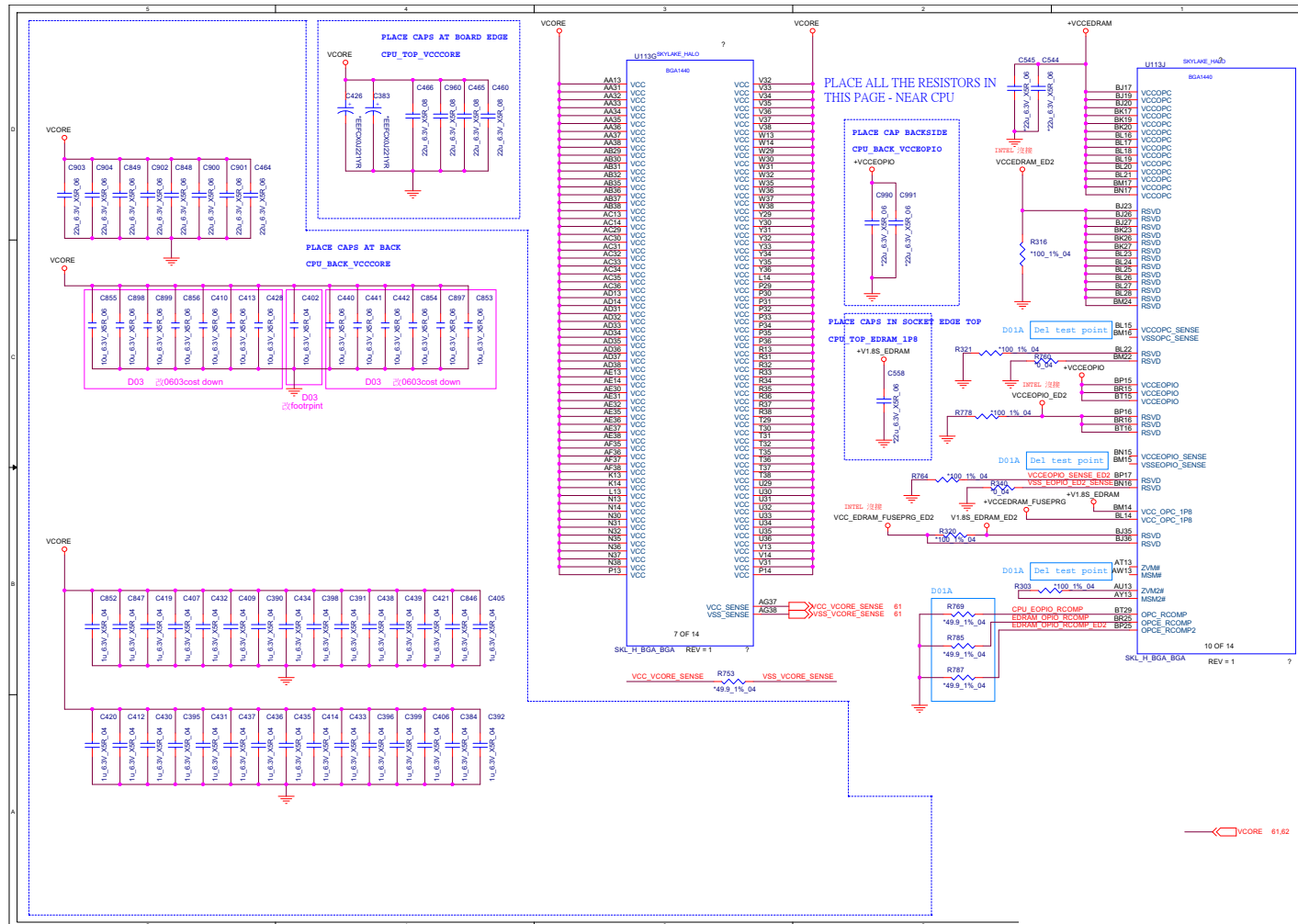
Schematic Diagrams

Processor 4/7

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Processor 4/7

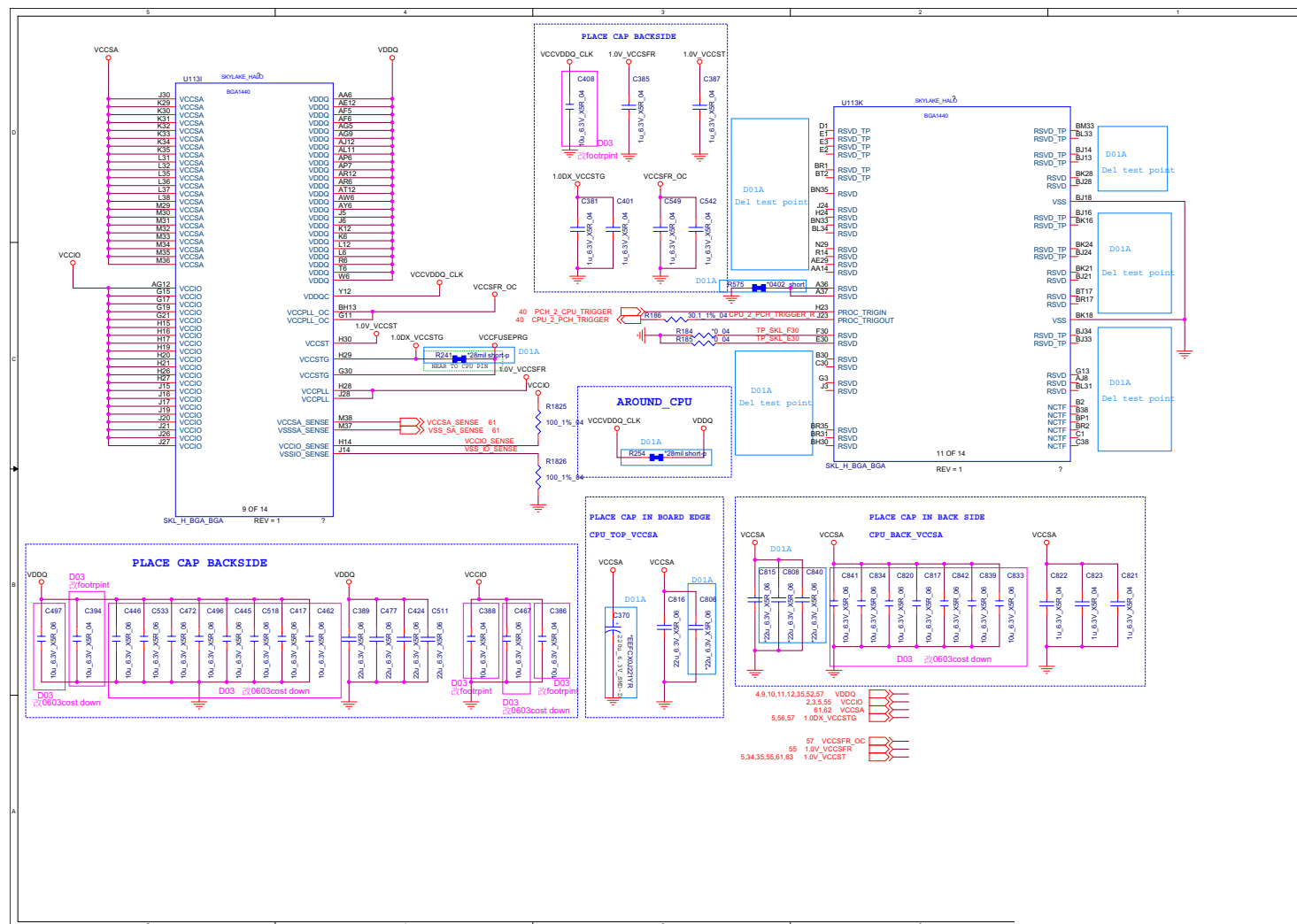


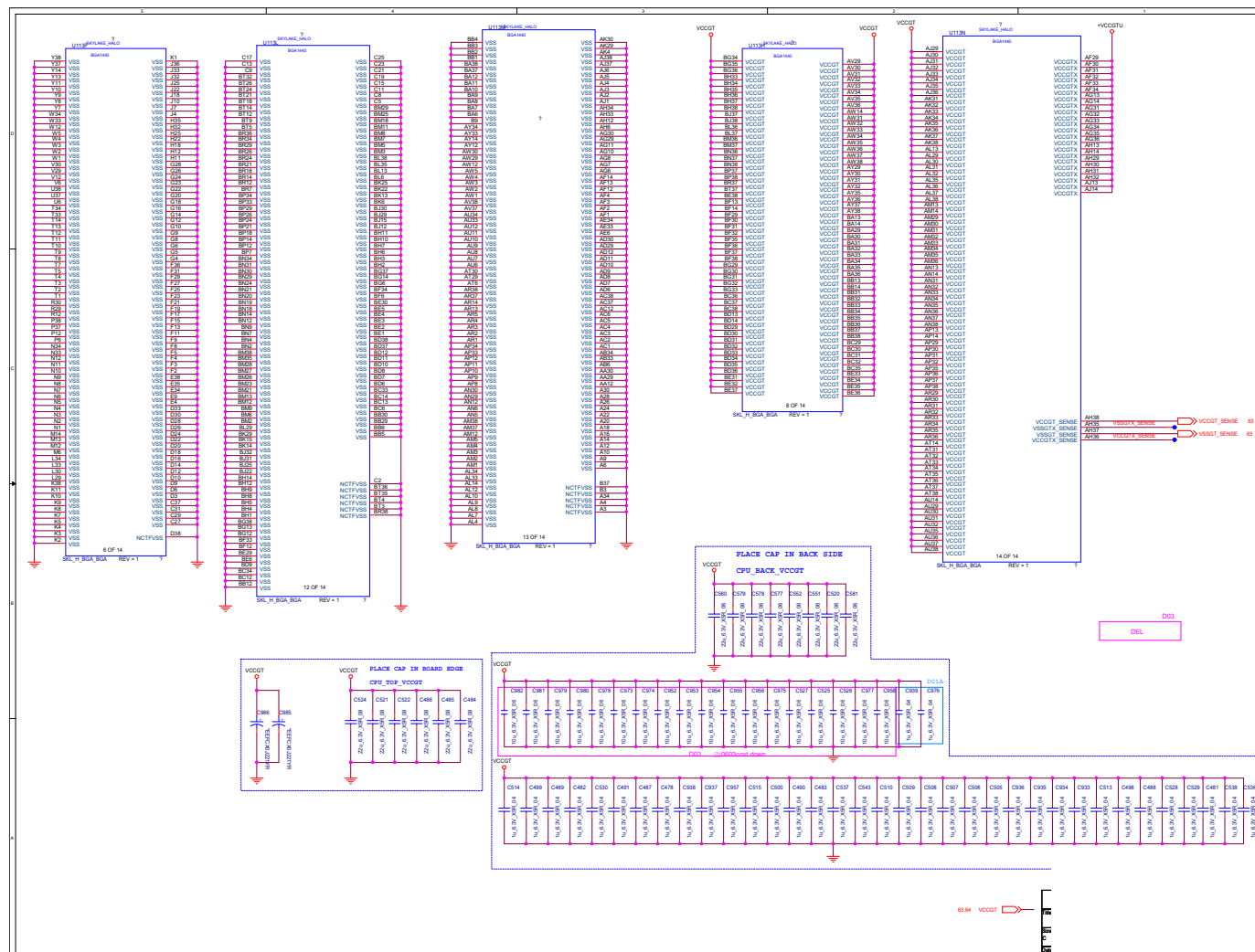
Processor 5/7 B - 7



Processor 6/7

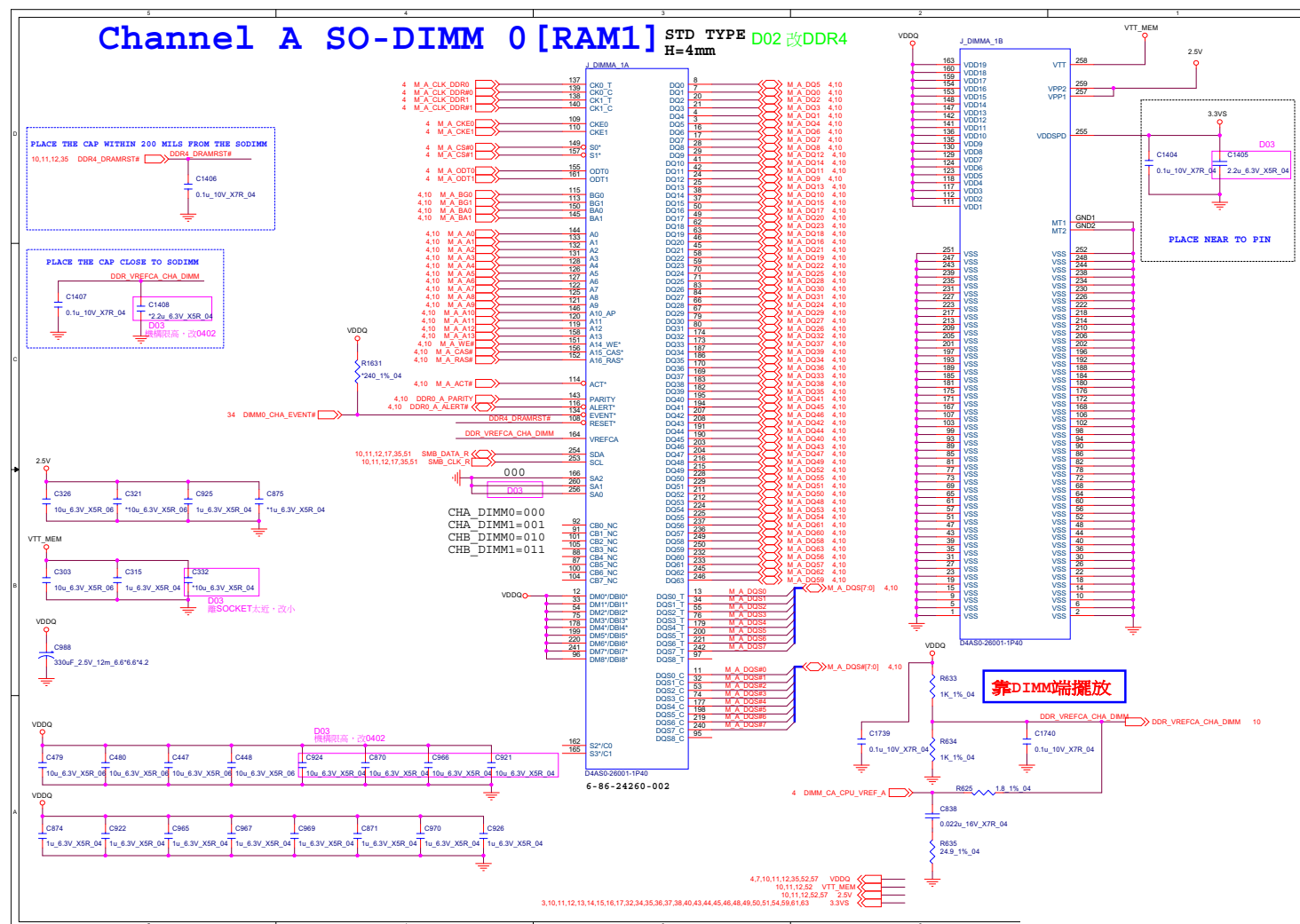
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Processor 6/7





DDR4 CHA SO-DIMM_0

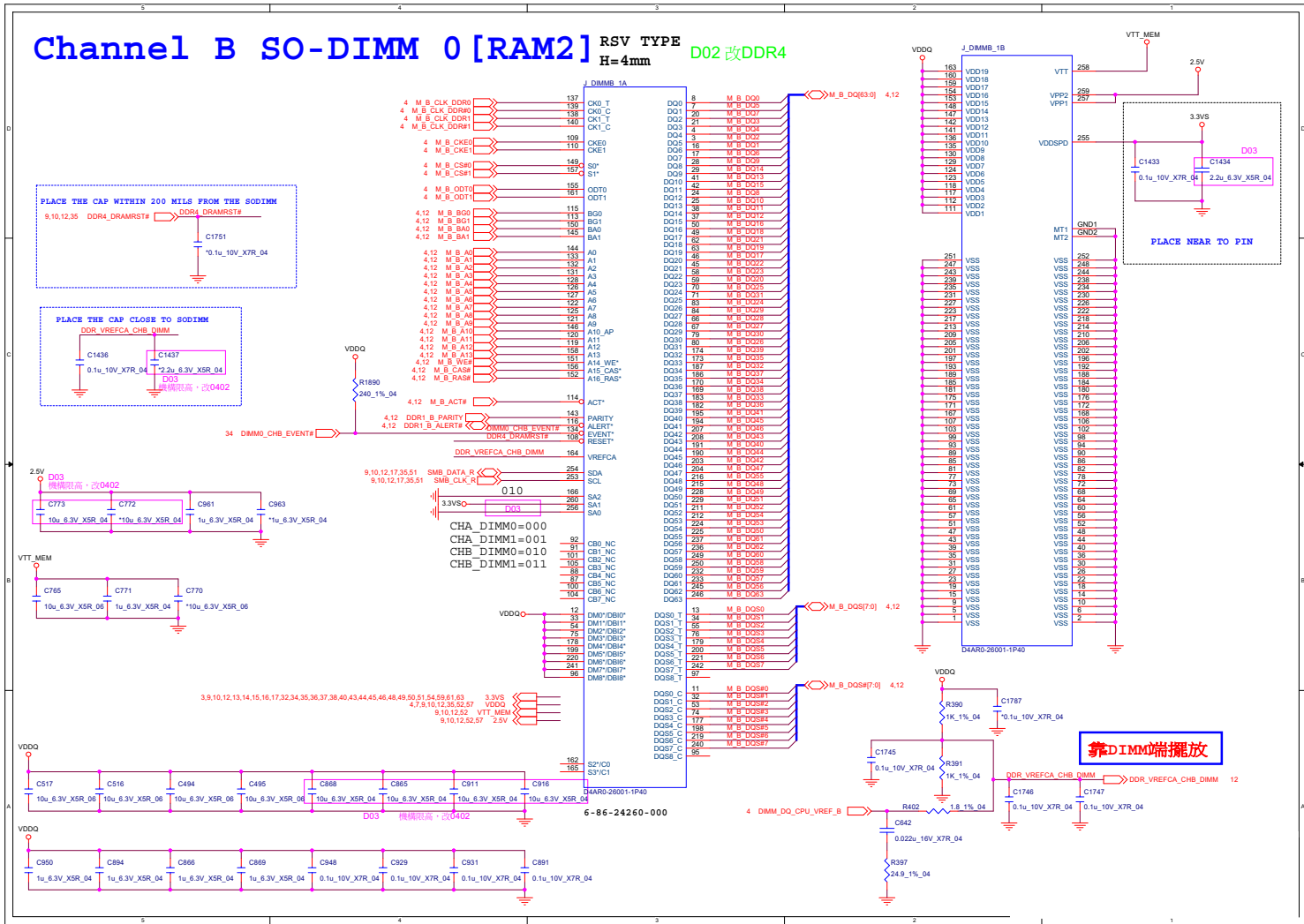
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DDR4 CHA SO-
DIMM 0



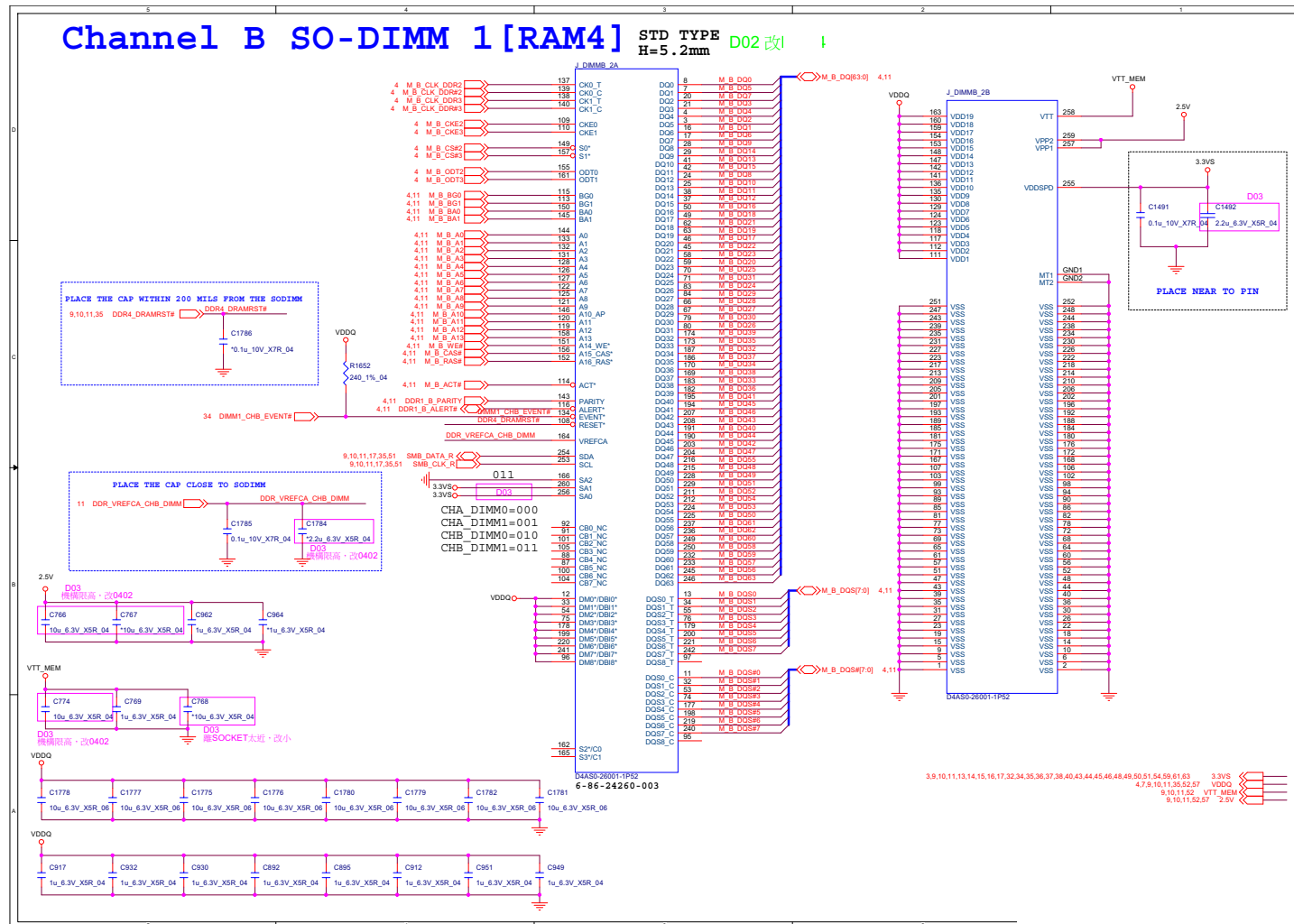
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B.Schematic Diagrams

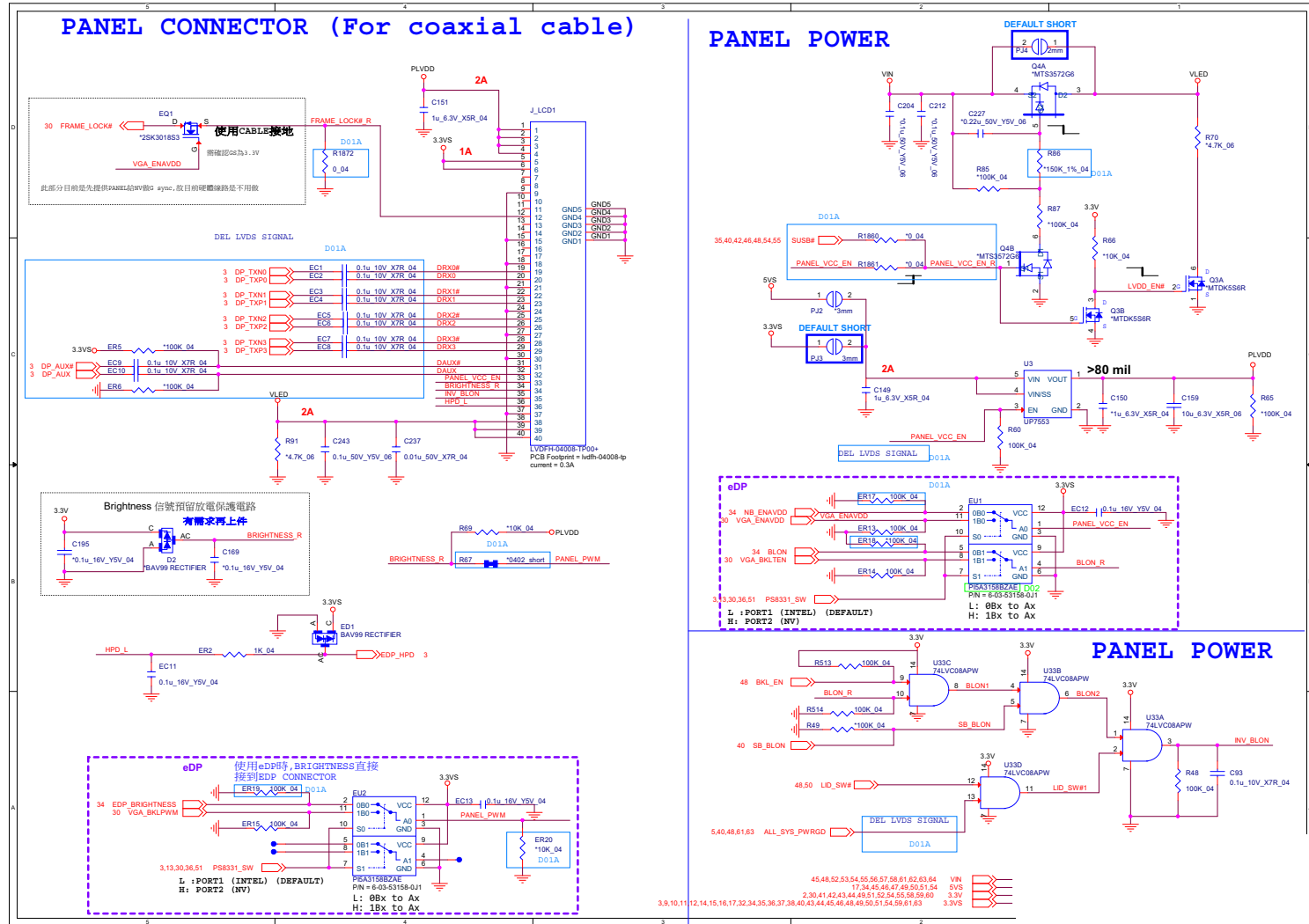
Sheet 11 of 79
DDR4 CHB SO-
DIMM_0



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DDR4 CHB SO-
DIMM_1



Panel, Inverter



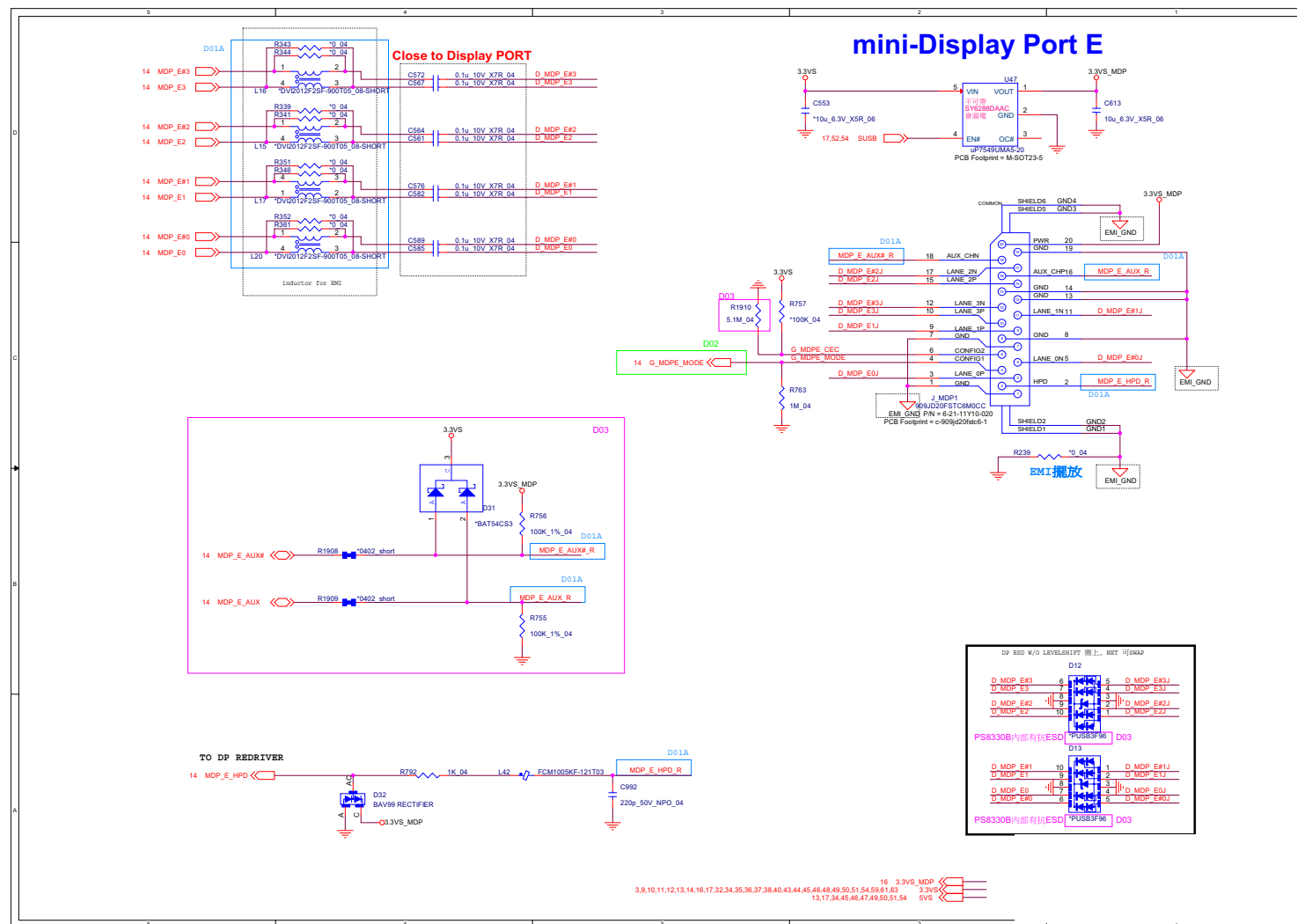
Sheet 13 of 79
Panel, Inverter

Redriver B - 15

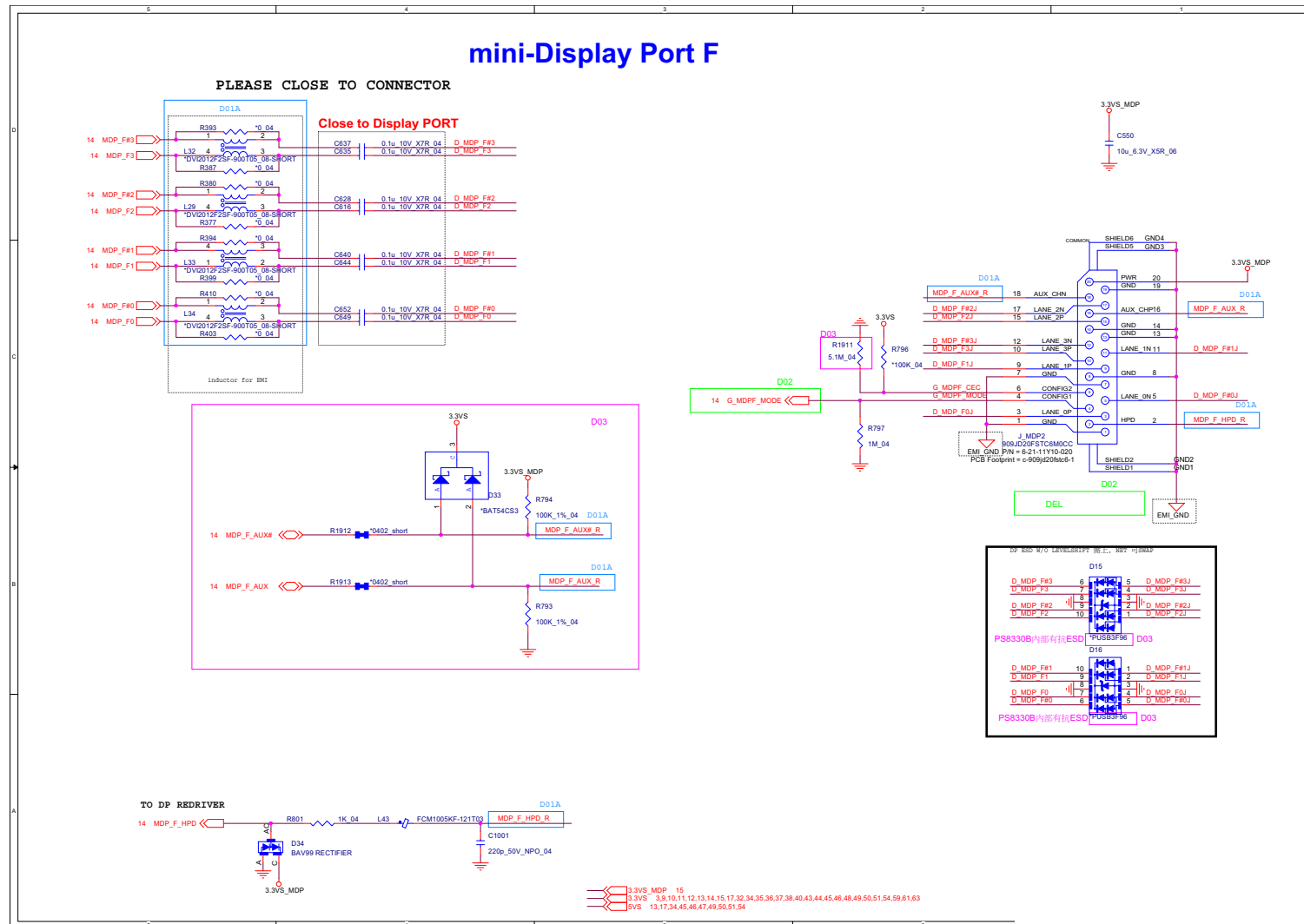


Mini DP Port E

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Mini DP Port E



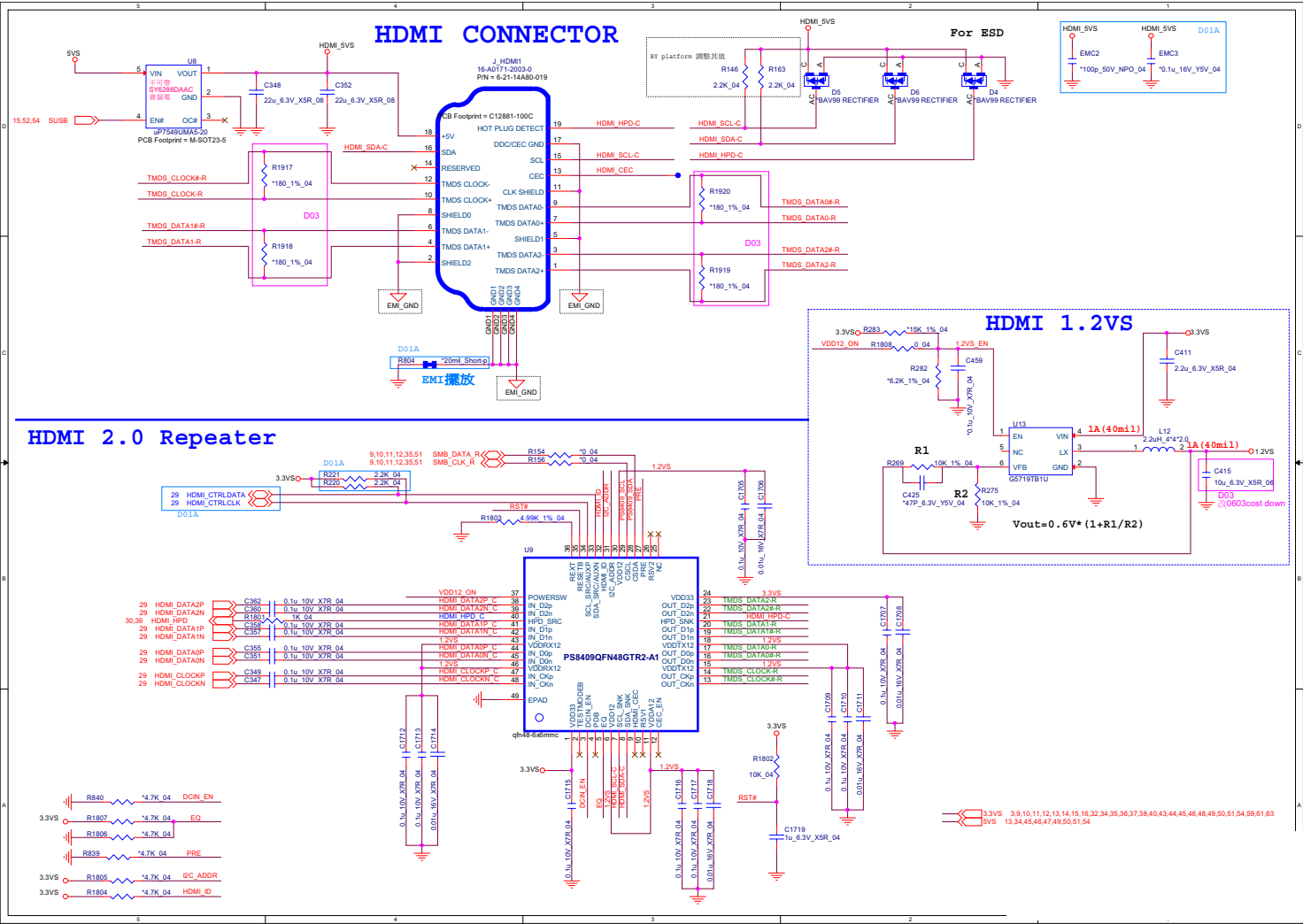
Mini DP Port F B - 17



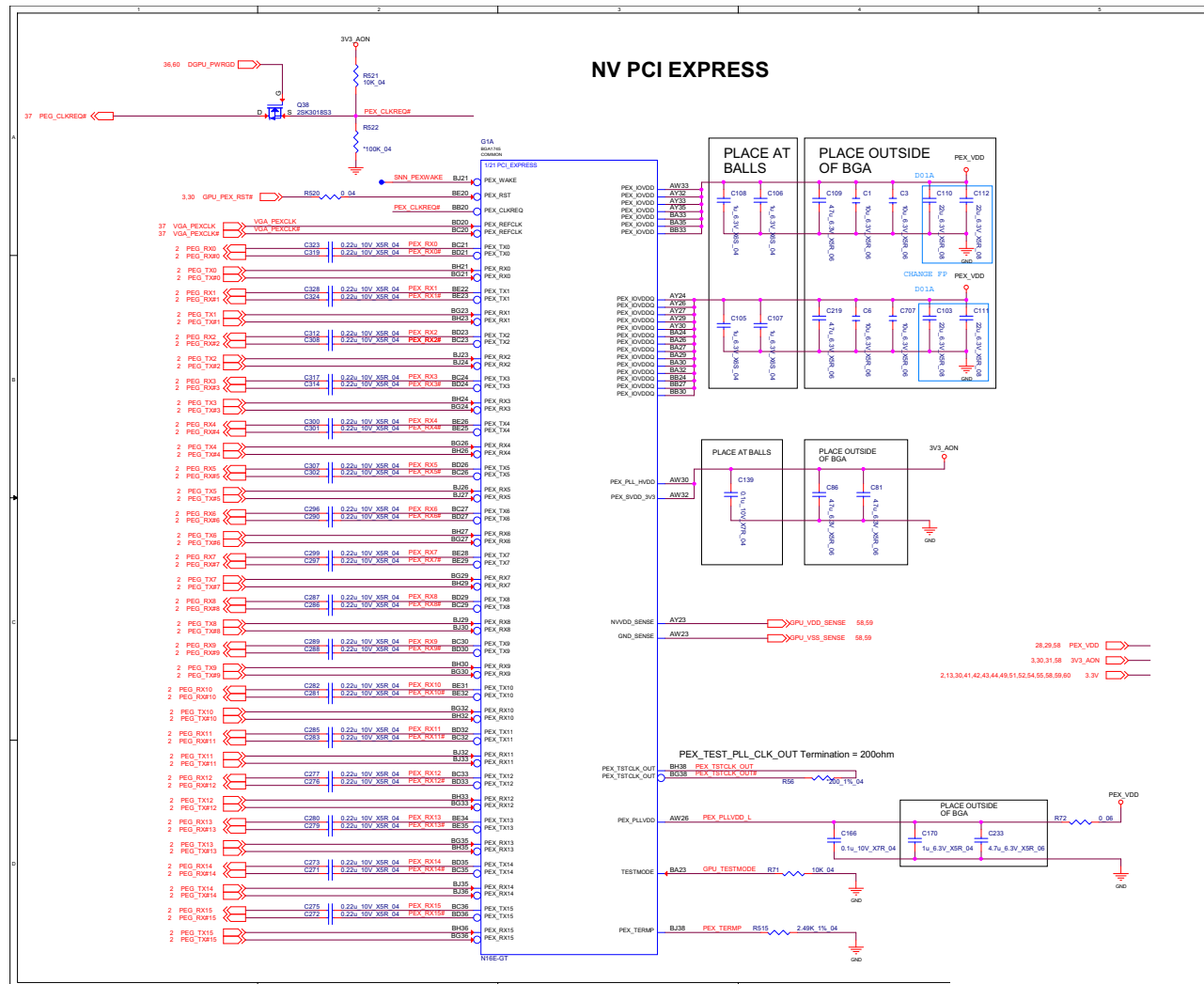
Schematic Diagrams

HDMI Connector

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HDMI Connector

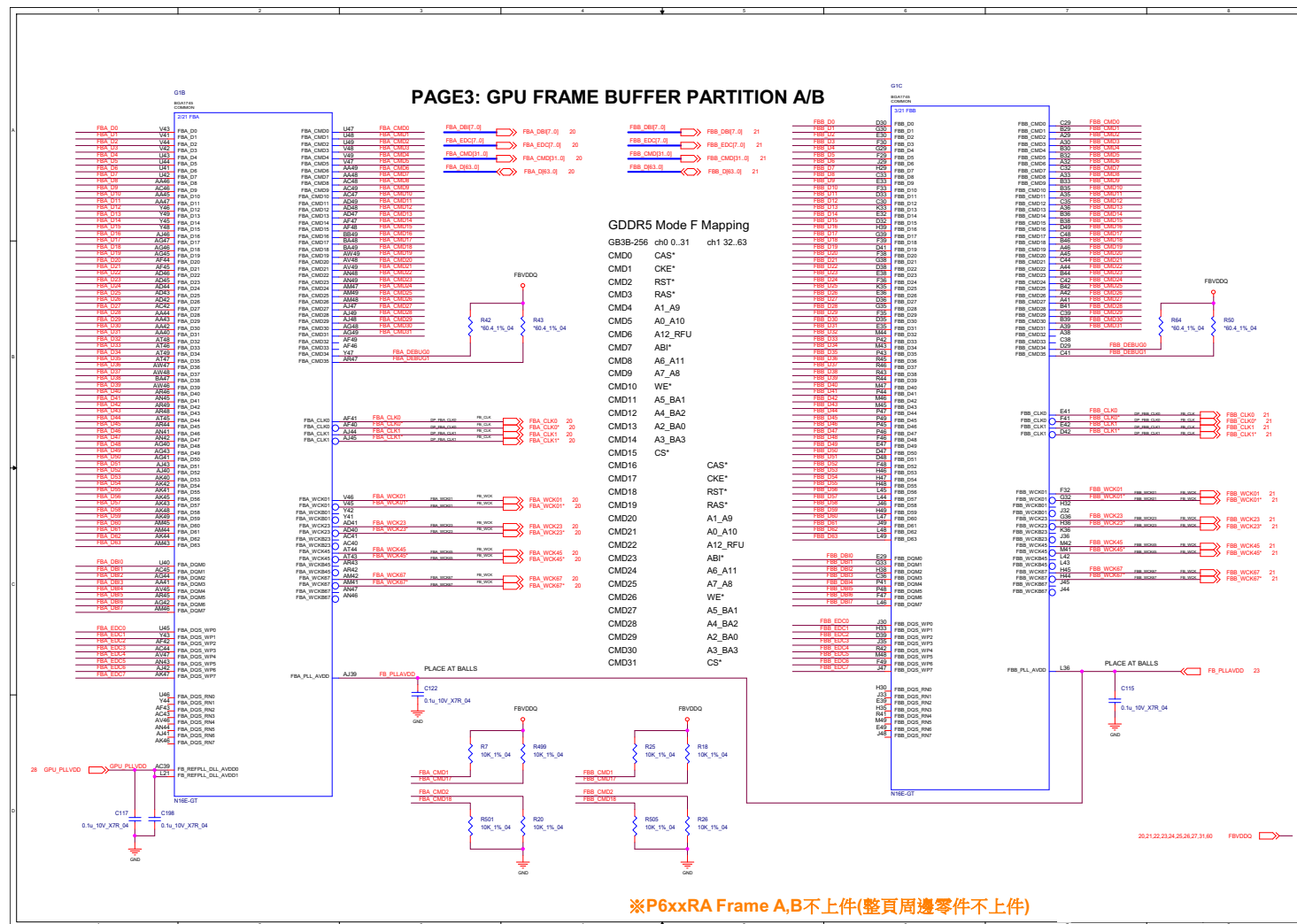


VGA PCI Express B - 19



B. Schematic Diagrams

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VGA Frame Buffer
Partition

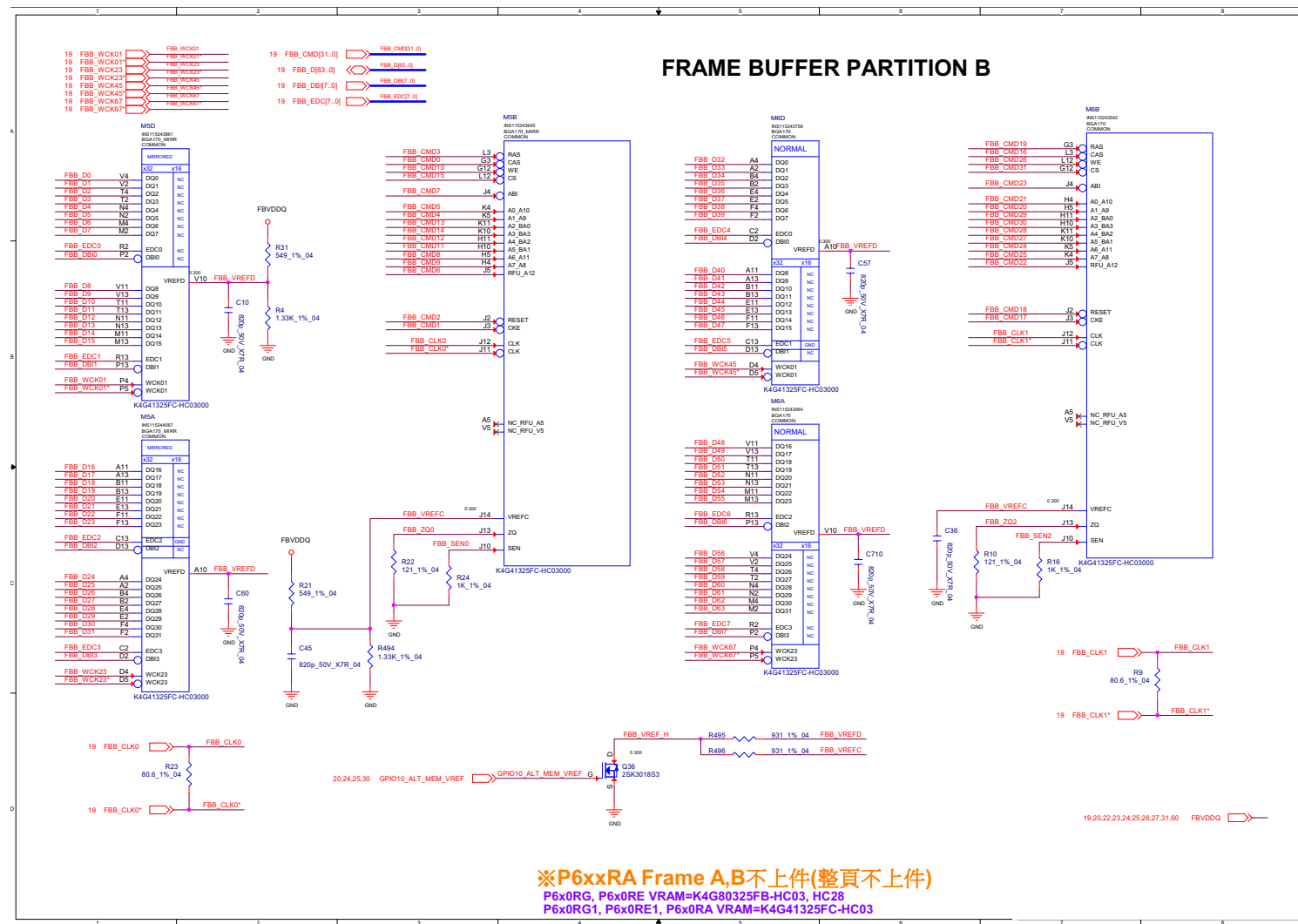


Sheet 20 of 79
Frame Buffer
Partition A

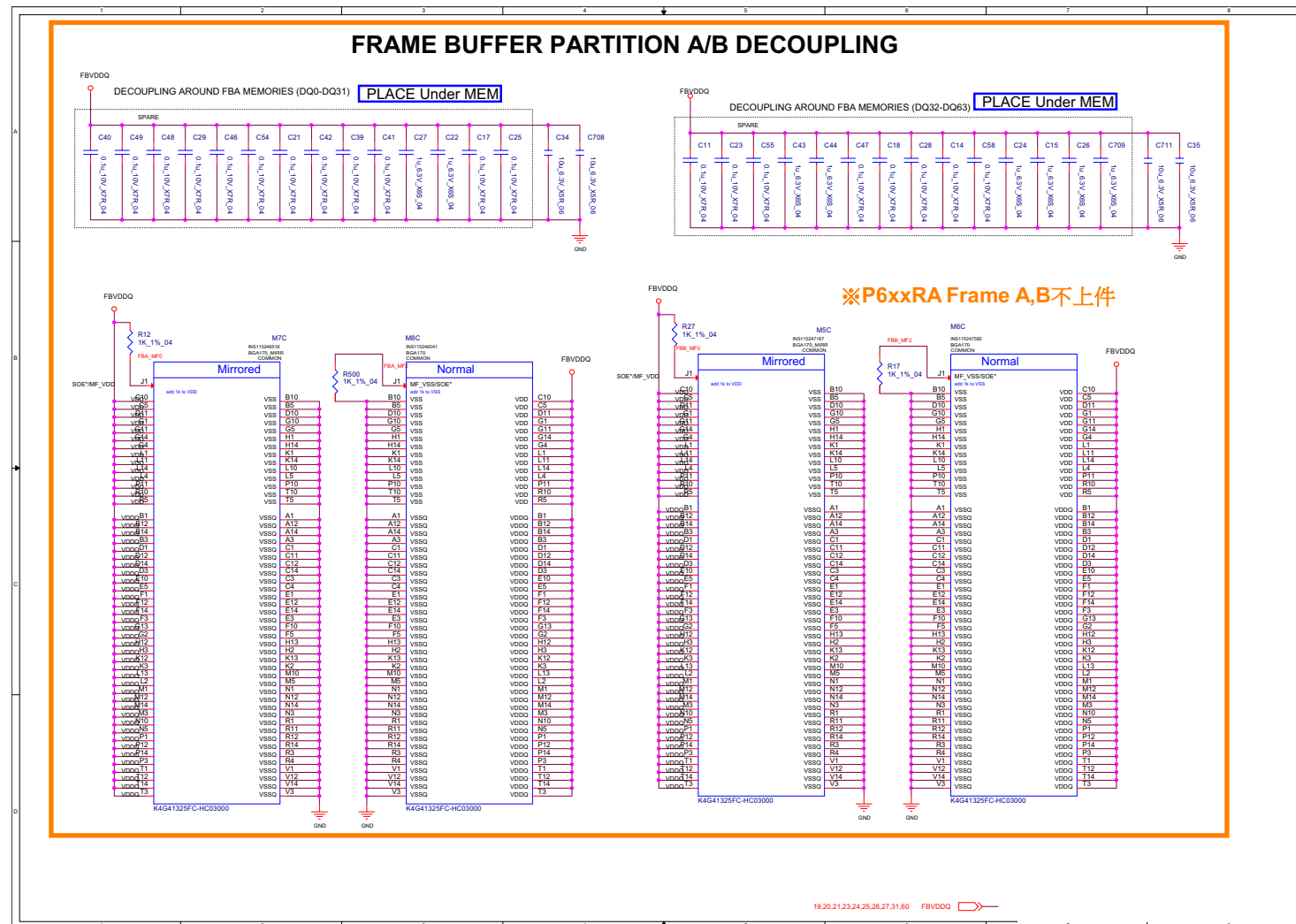


Frame Buffer Partition B

Sheet 21 of 79
Frame Buffer
Partition B

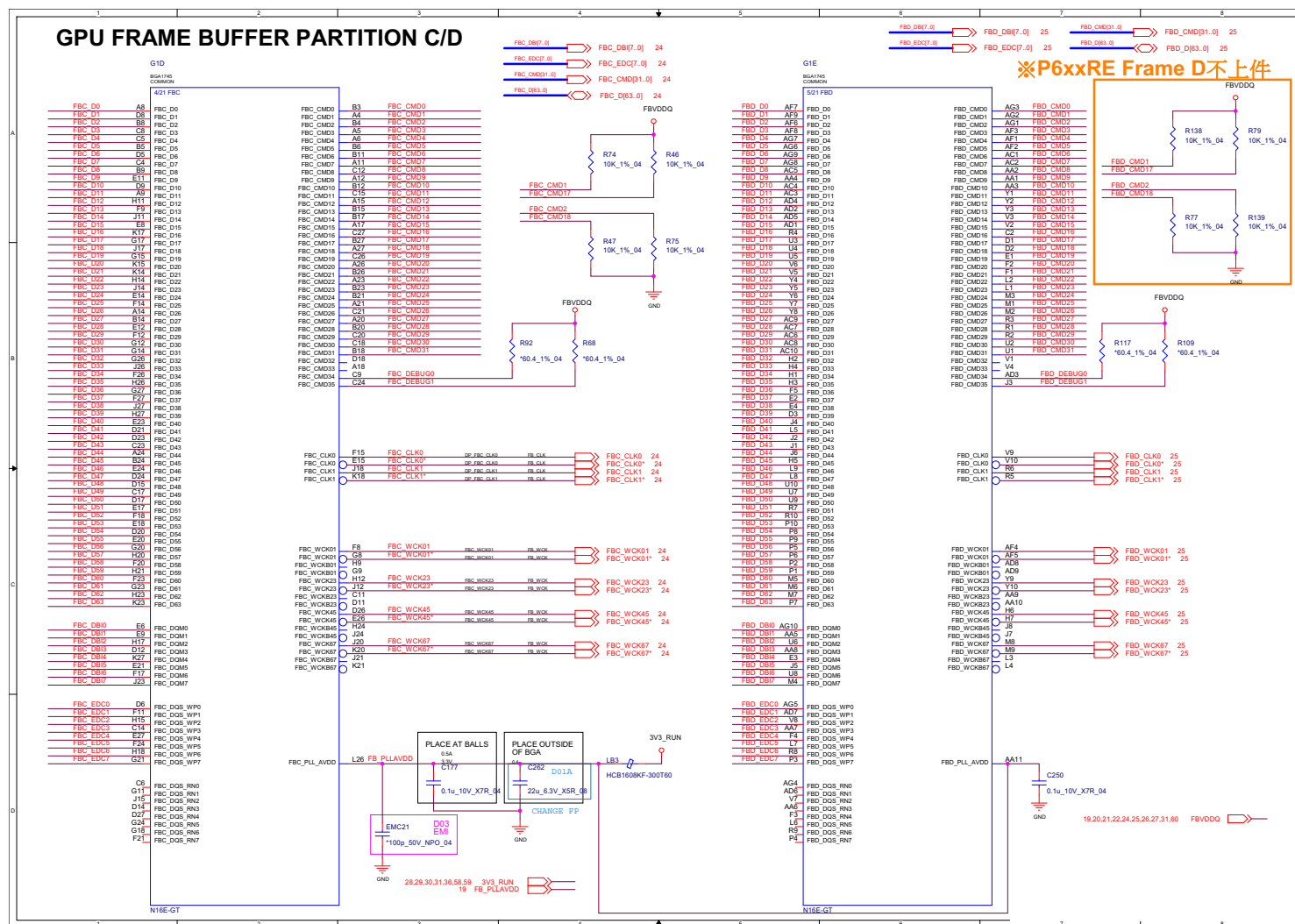


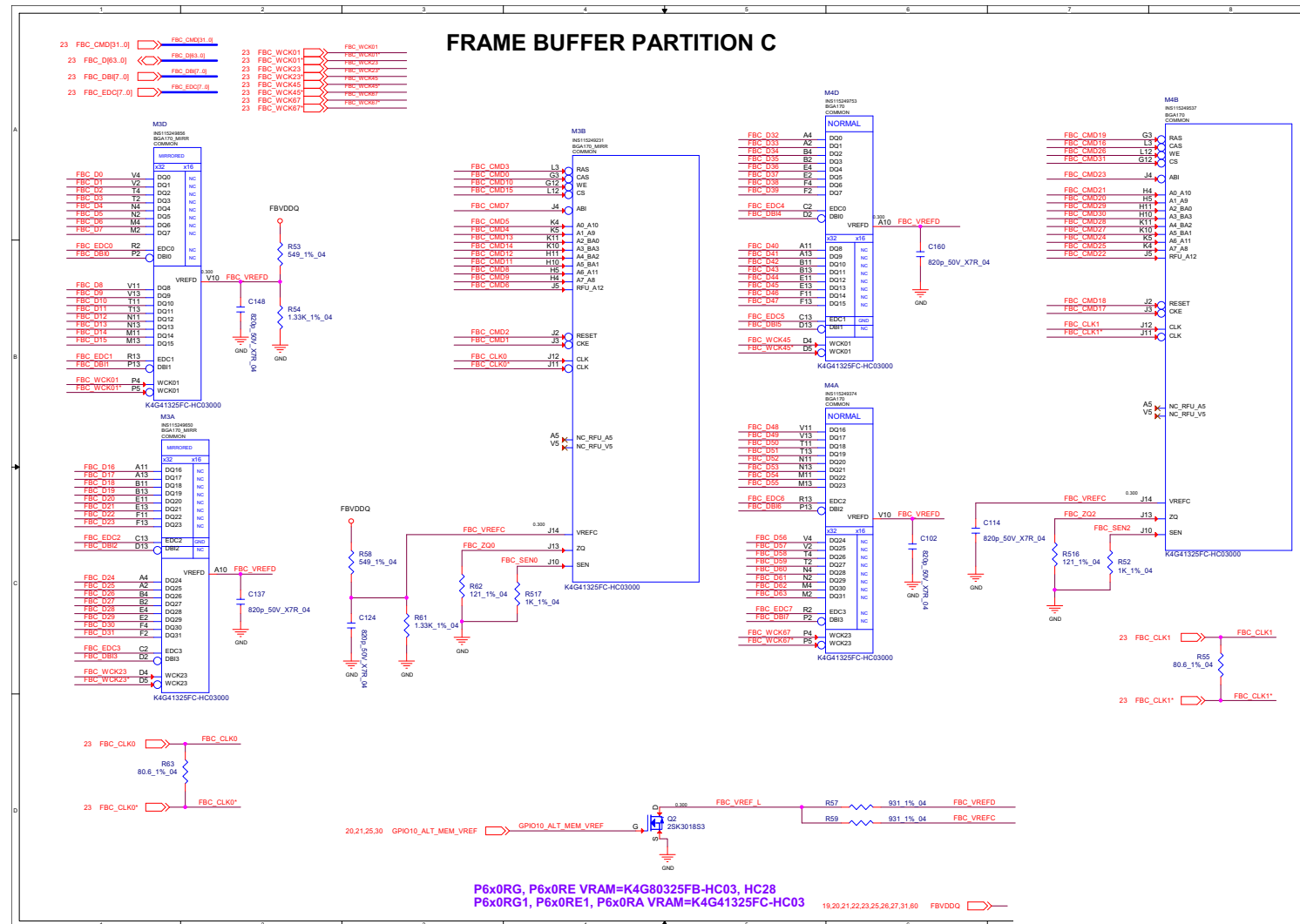
Frame Buffer Partition A_B



GPU Frame Buffer Partition

Sheet 23 of 79
GPU Frame Buffer
Partition

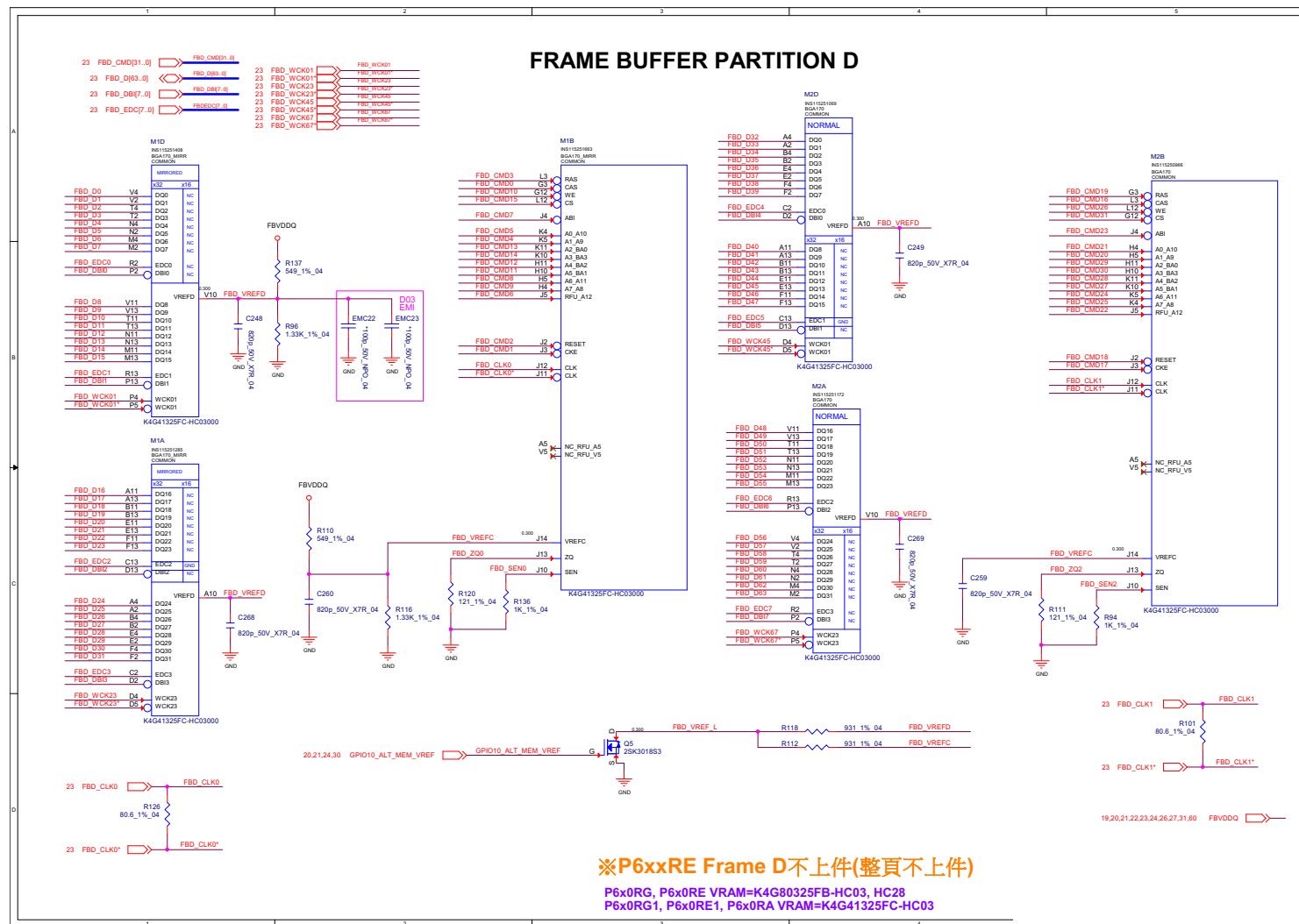




Frame Buffer Partition D

B. Schematic Diagrams

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Frame Buffer
Partition D

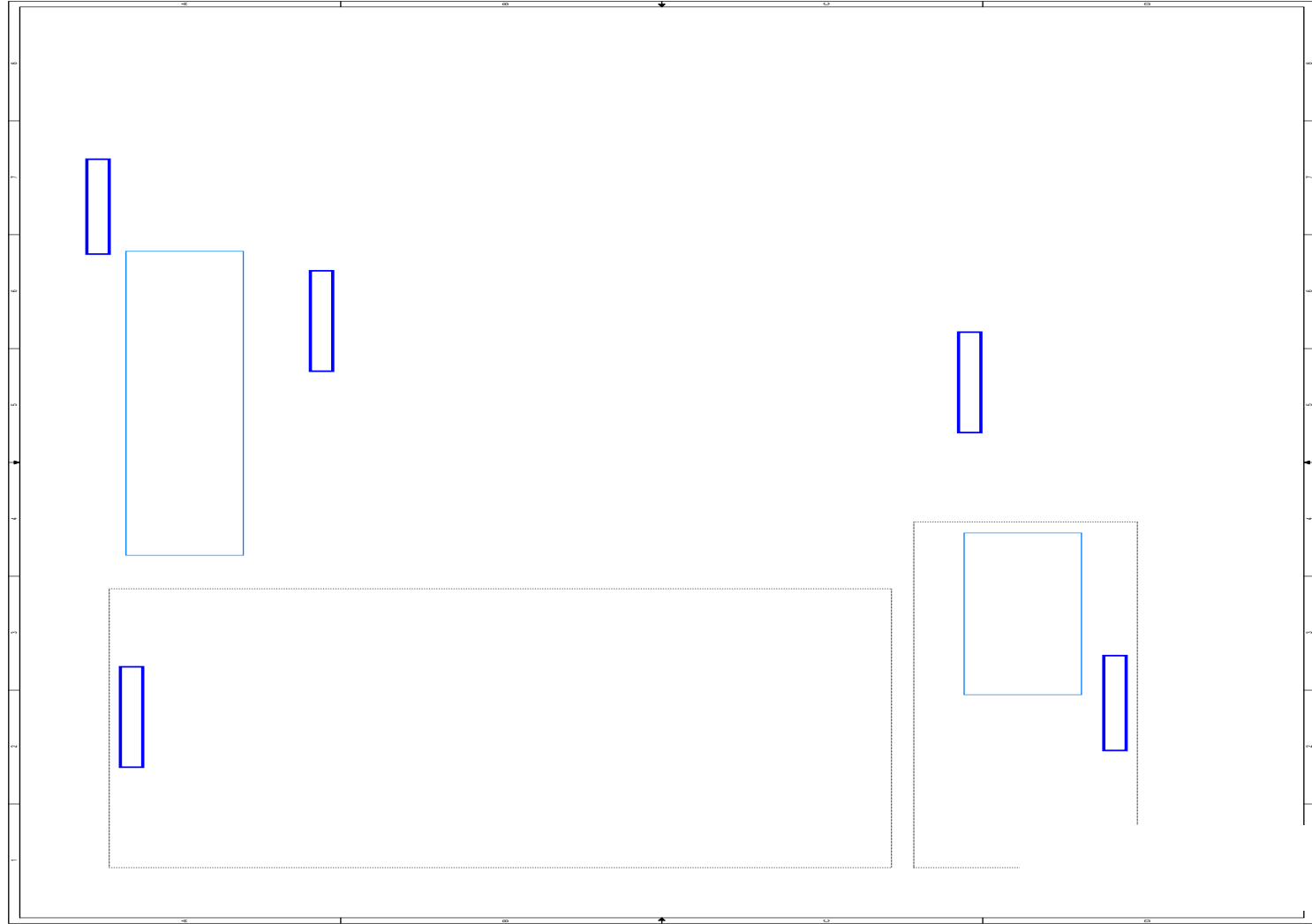


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Frame Buffer
Partition C D

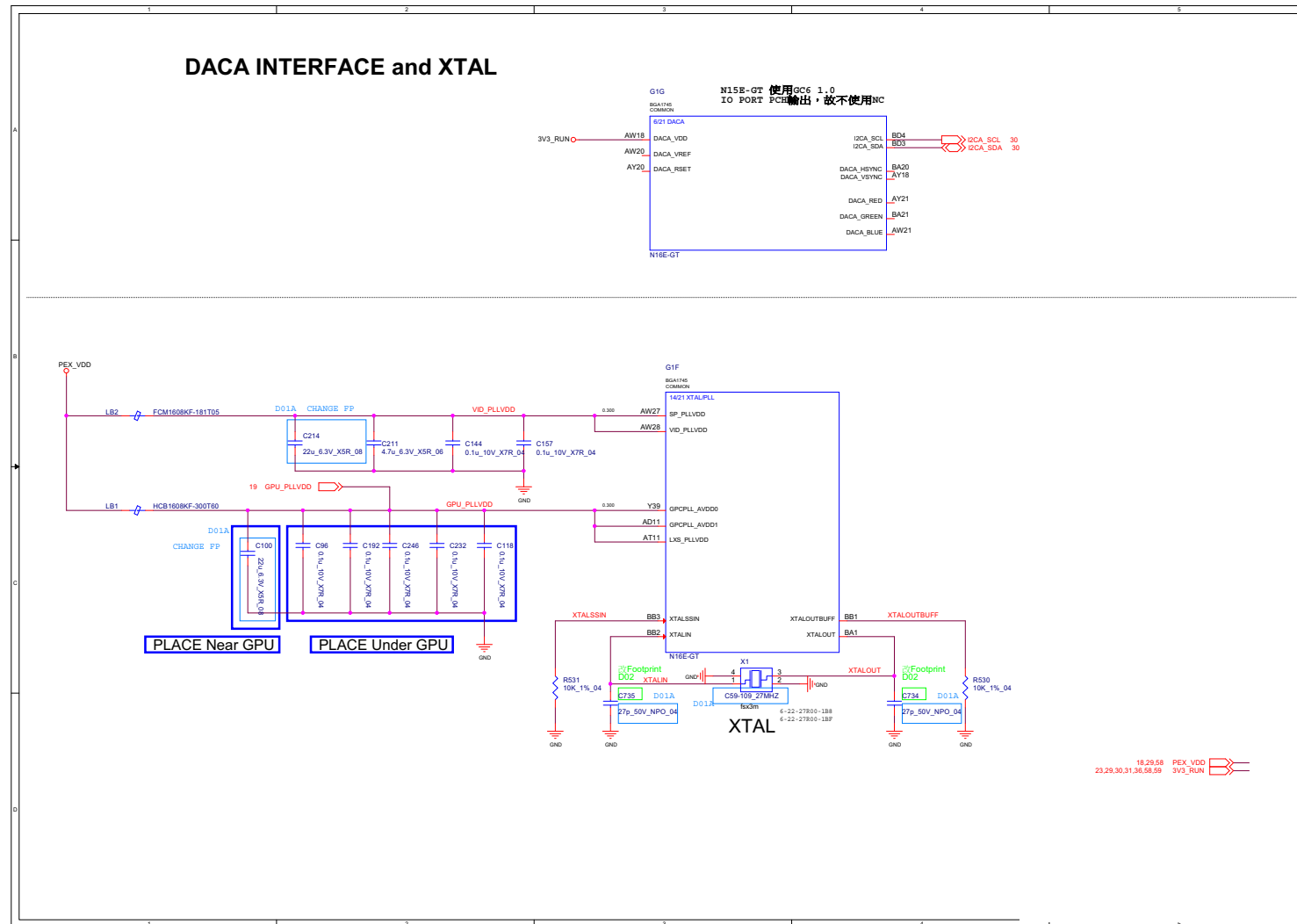


GPU Decoupling

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GPU Decoupling



DACA Interface & XTAL

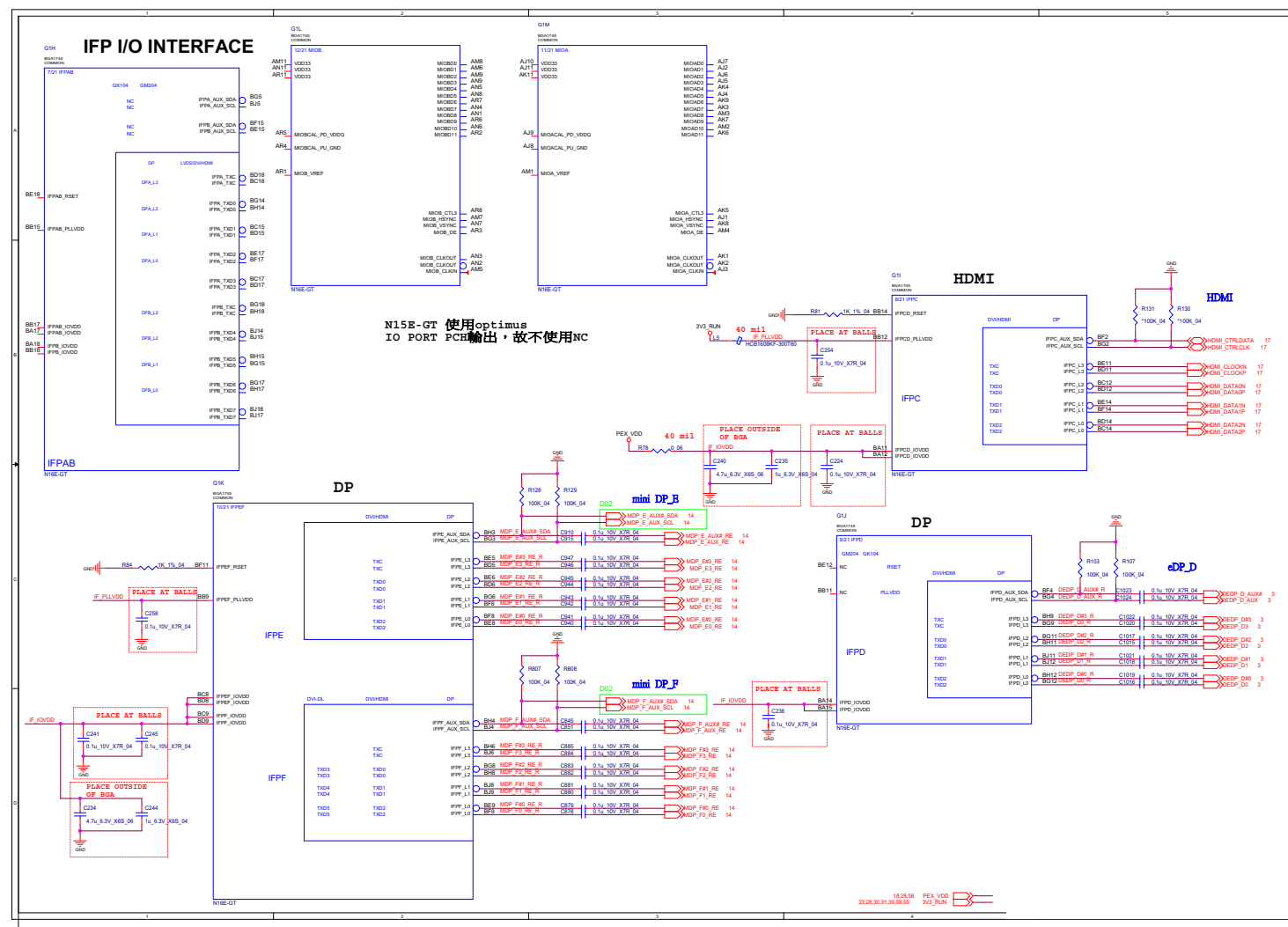


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DACA Interface and
XTAL

IFP I/O Interface

B. Schematic Diagrams

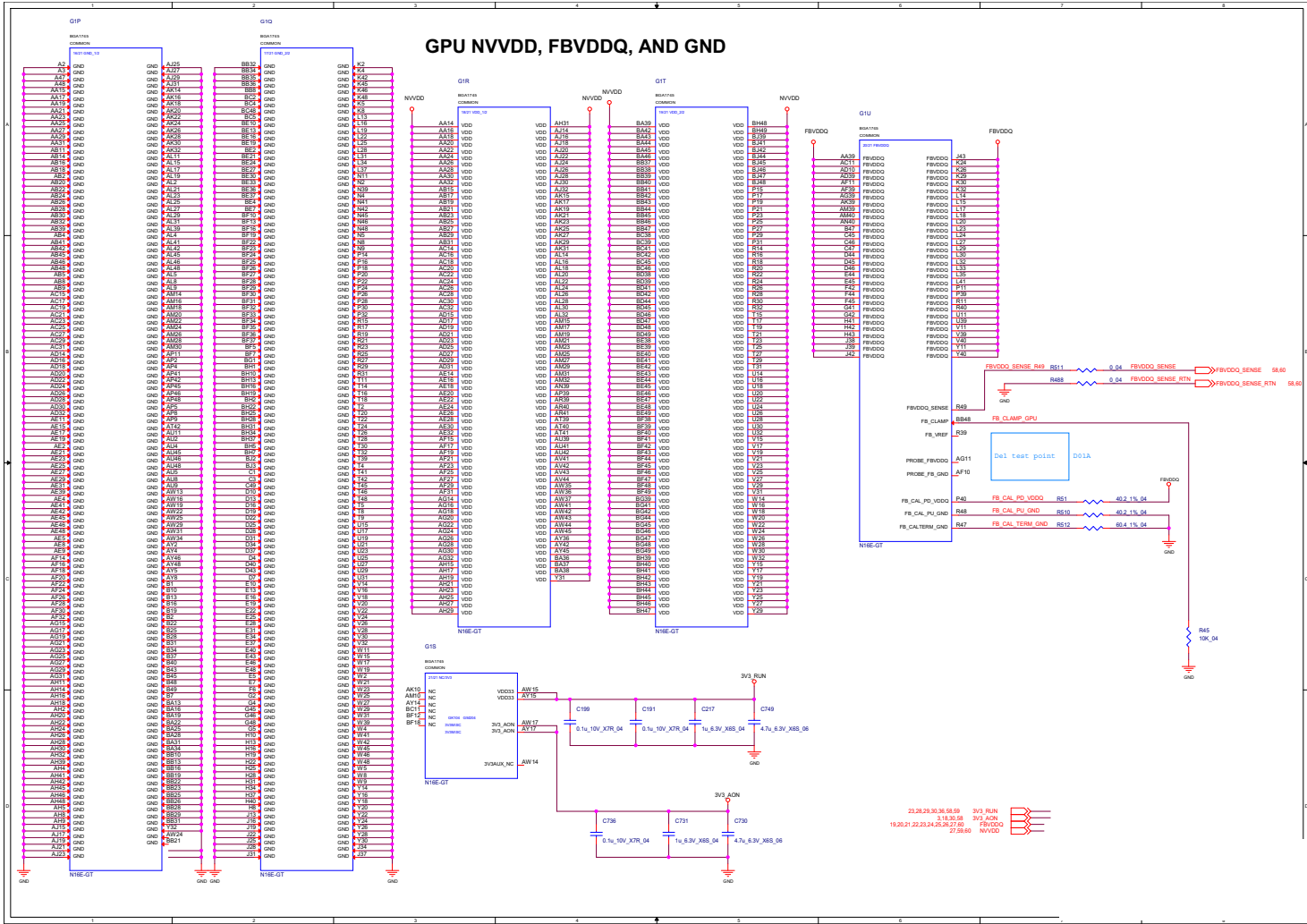
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IFP I/O Interface



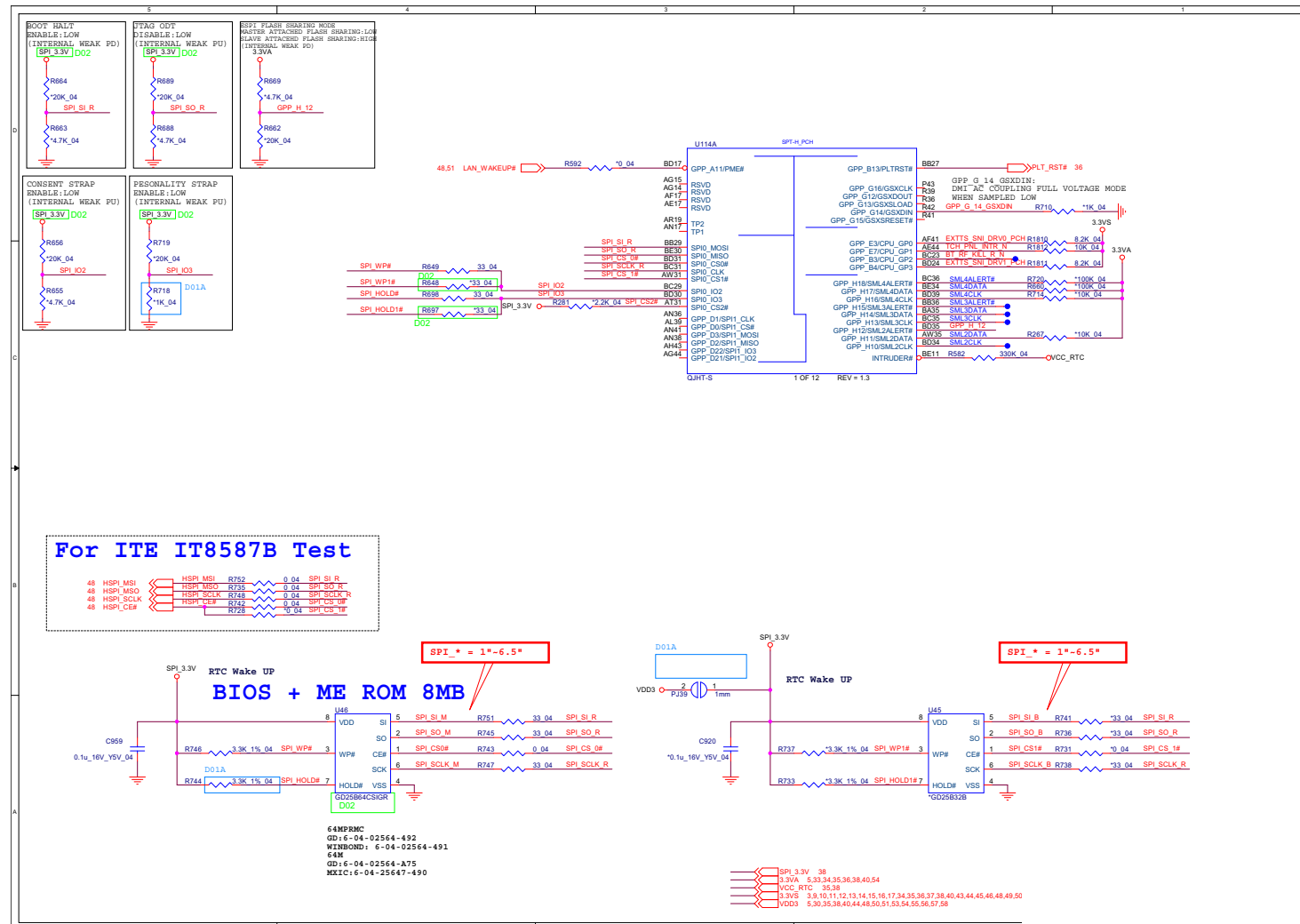
Sheet 30 of 79
Misc - GPIO, I2C
and ROM



GPU NVVDD, FBVDDQ, and GND

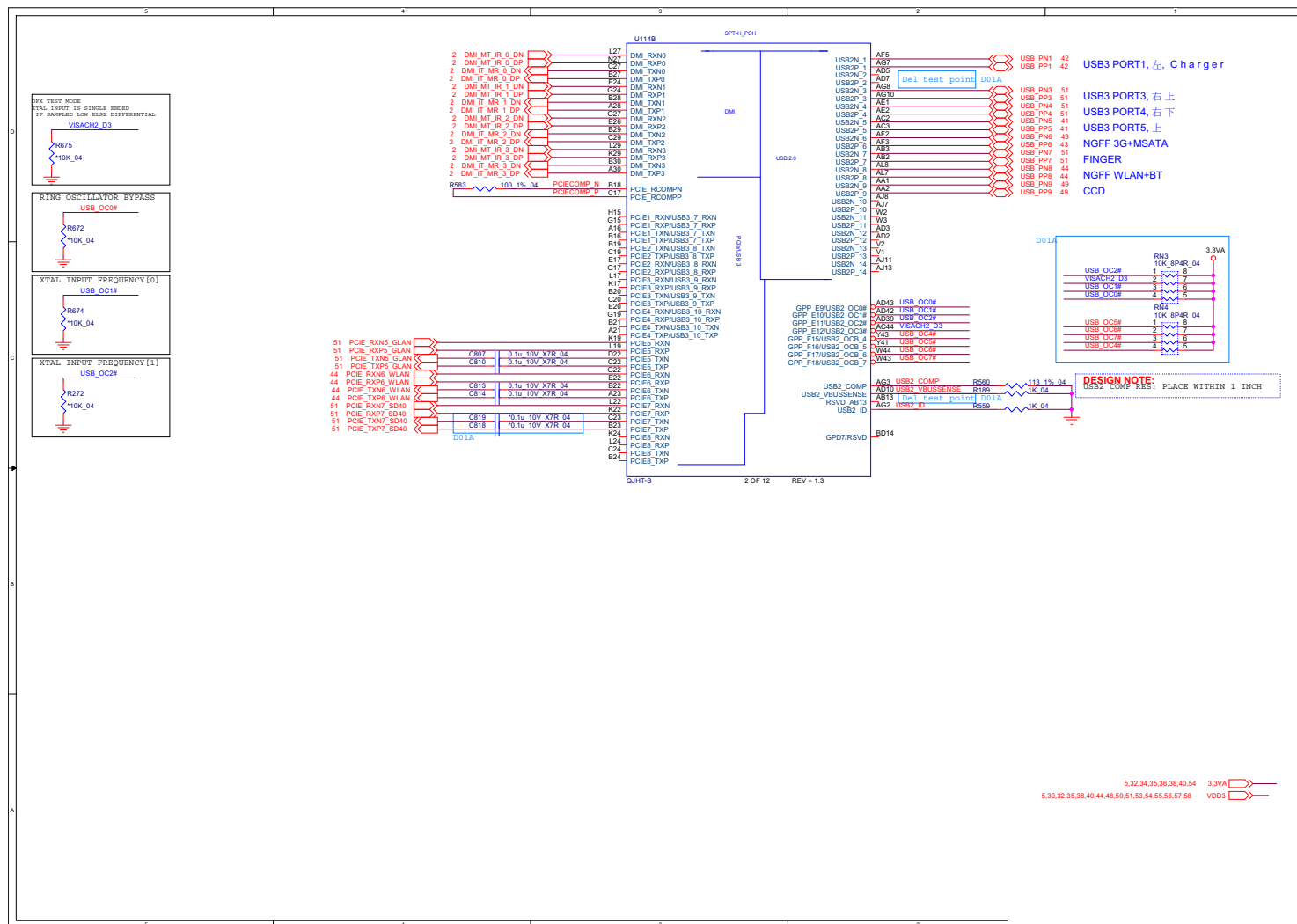


PCH 1/9 B - 33

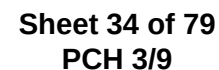


PCH 2/9

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PCH 2/9



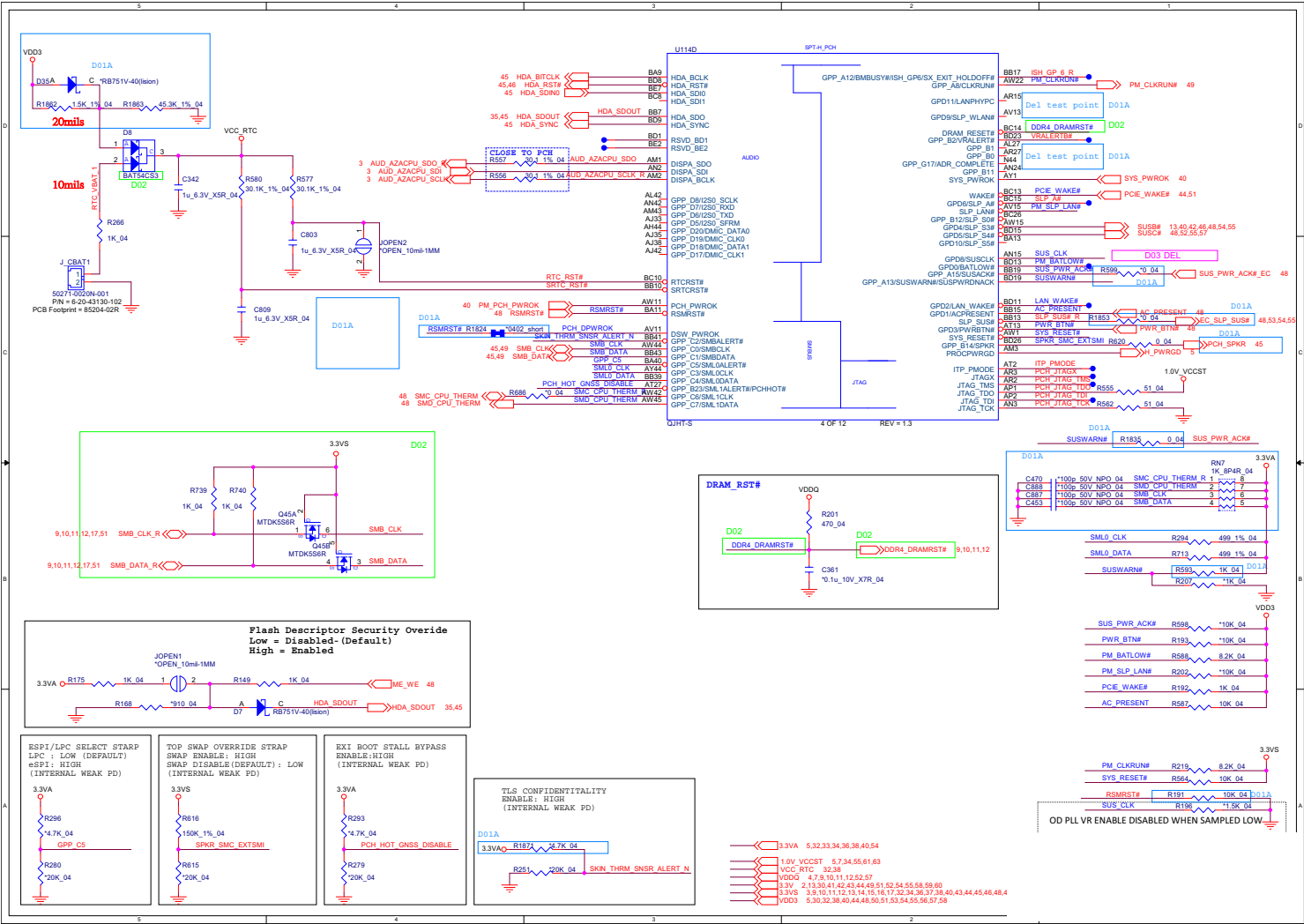
PCH 3/9 B - 35



Schematic Diagrams

PCH 4/9

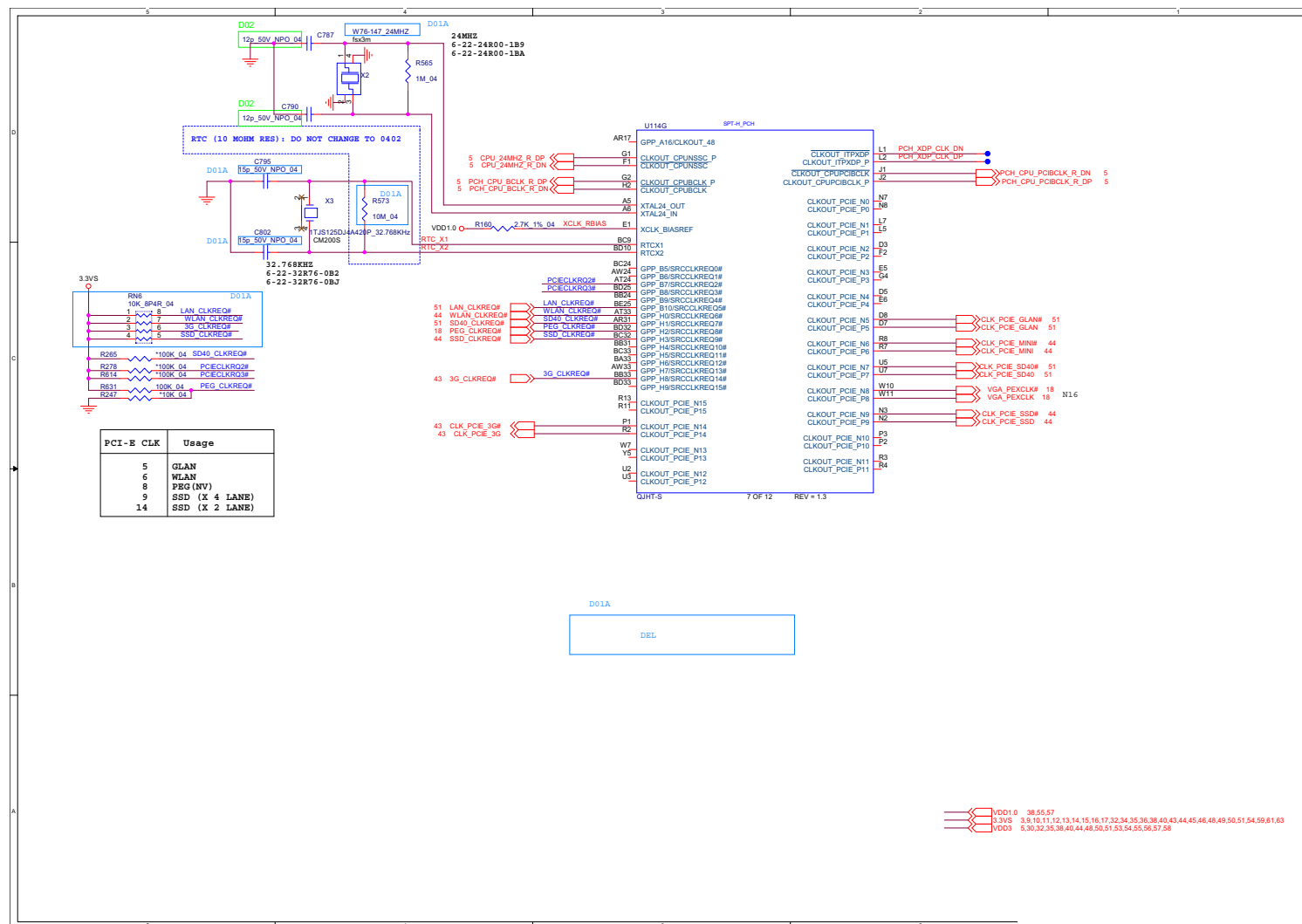
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PCH 4/9



PCH 6/9

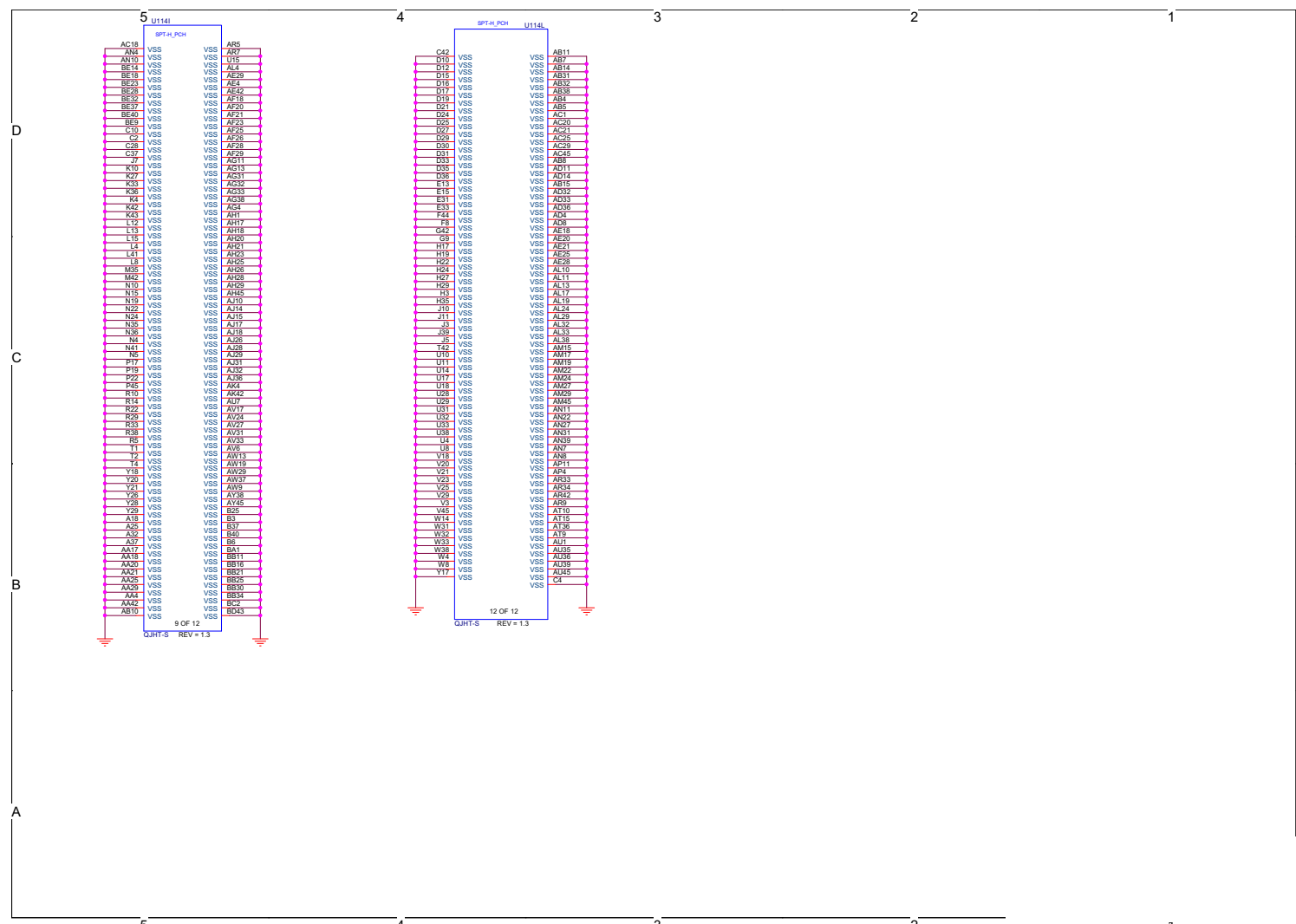
B. Schematic Diagrams

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PCH 6/9

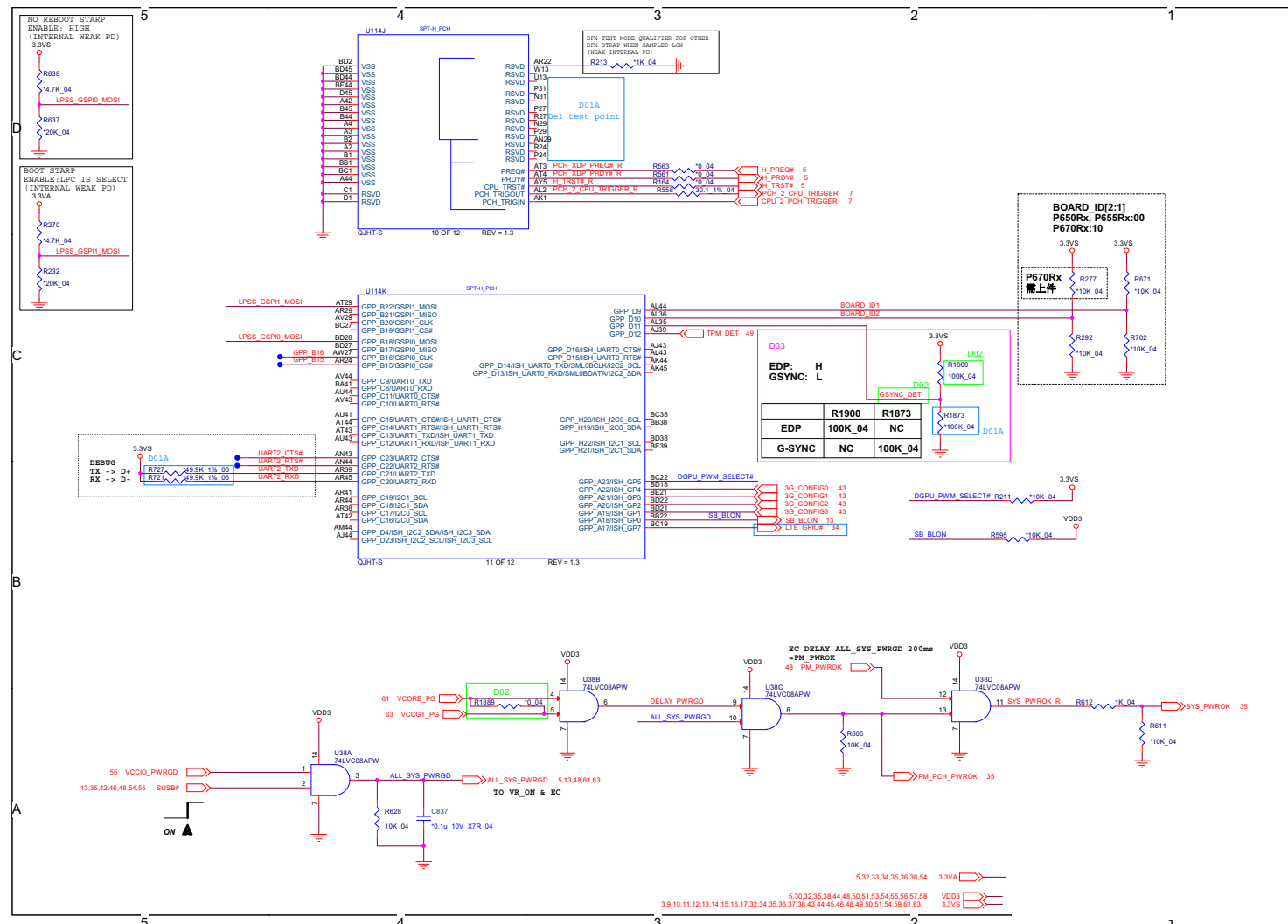


PCH 8/9

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PCH 8/9



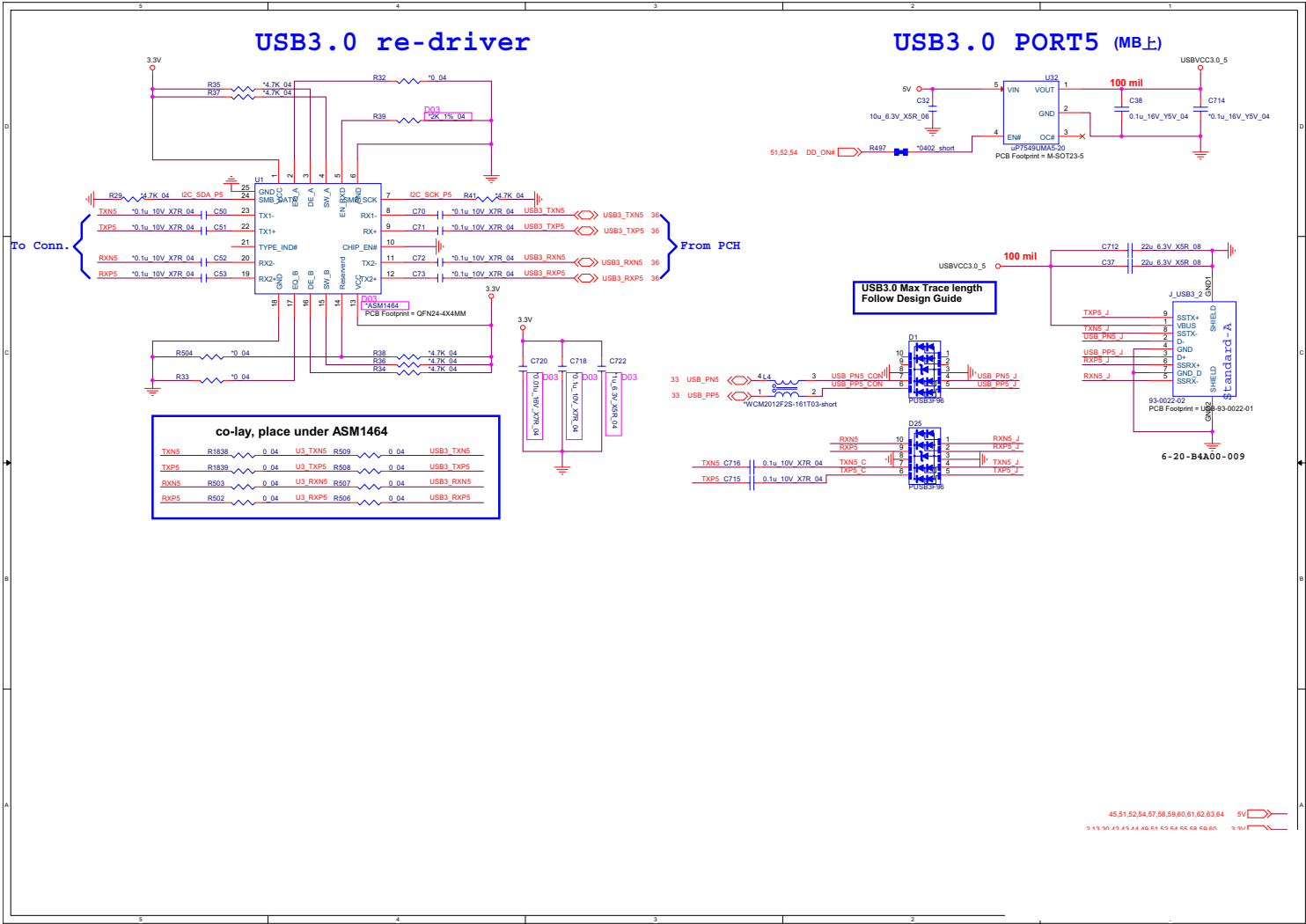
PCH 9/9

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PCH 9/9

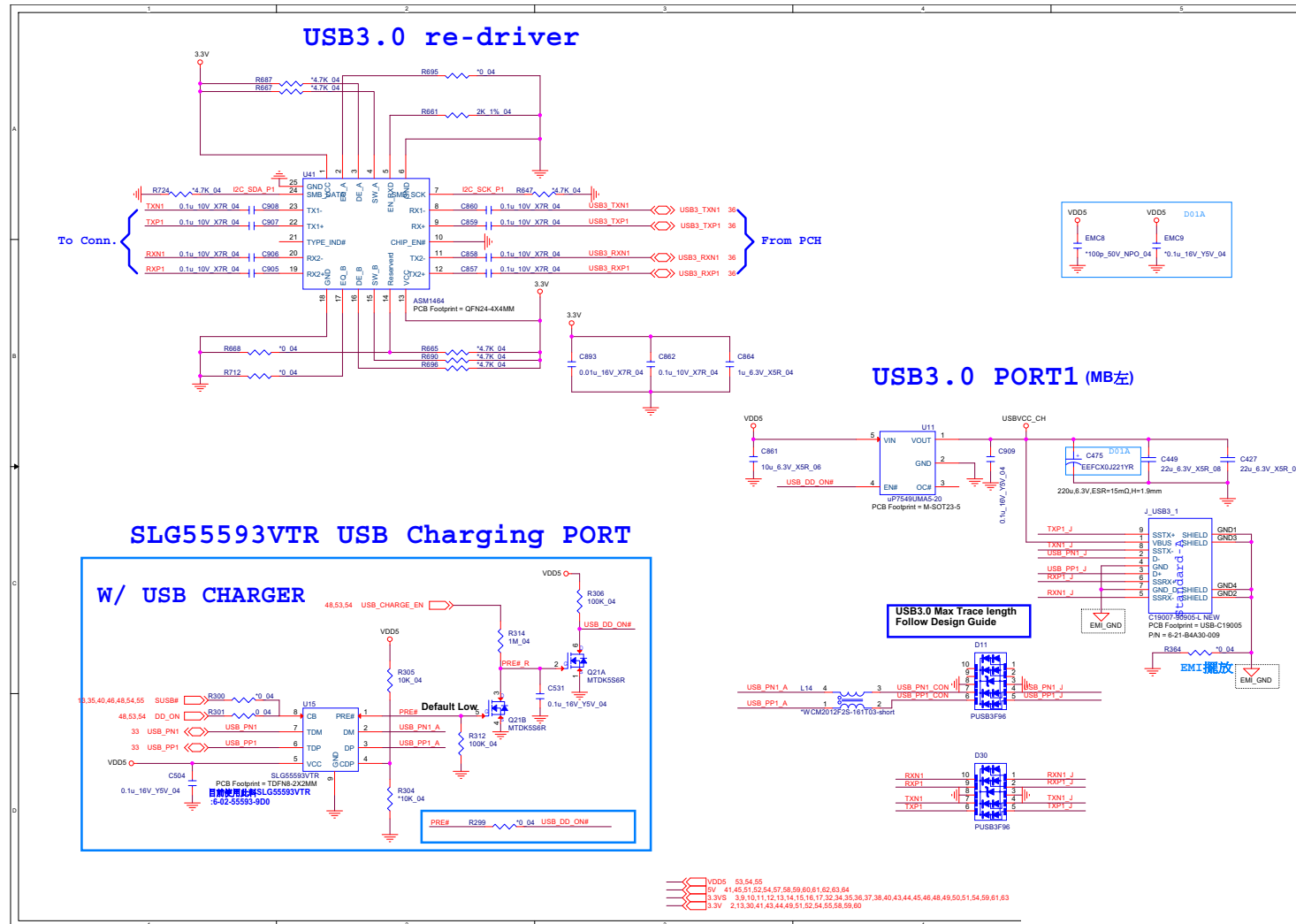
Schematic Diagrams

USB3.0

Sheet 41 of 79
USB3.0

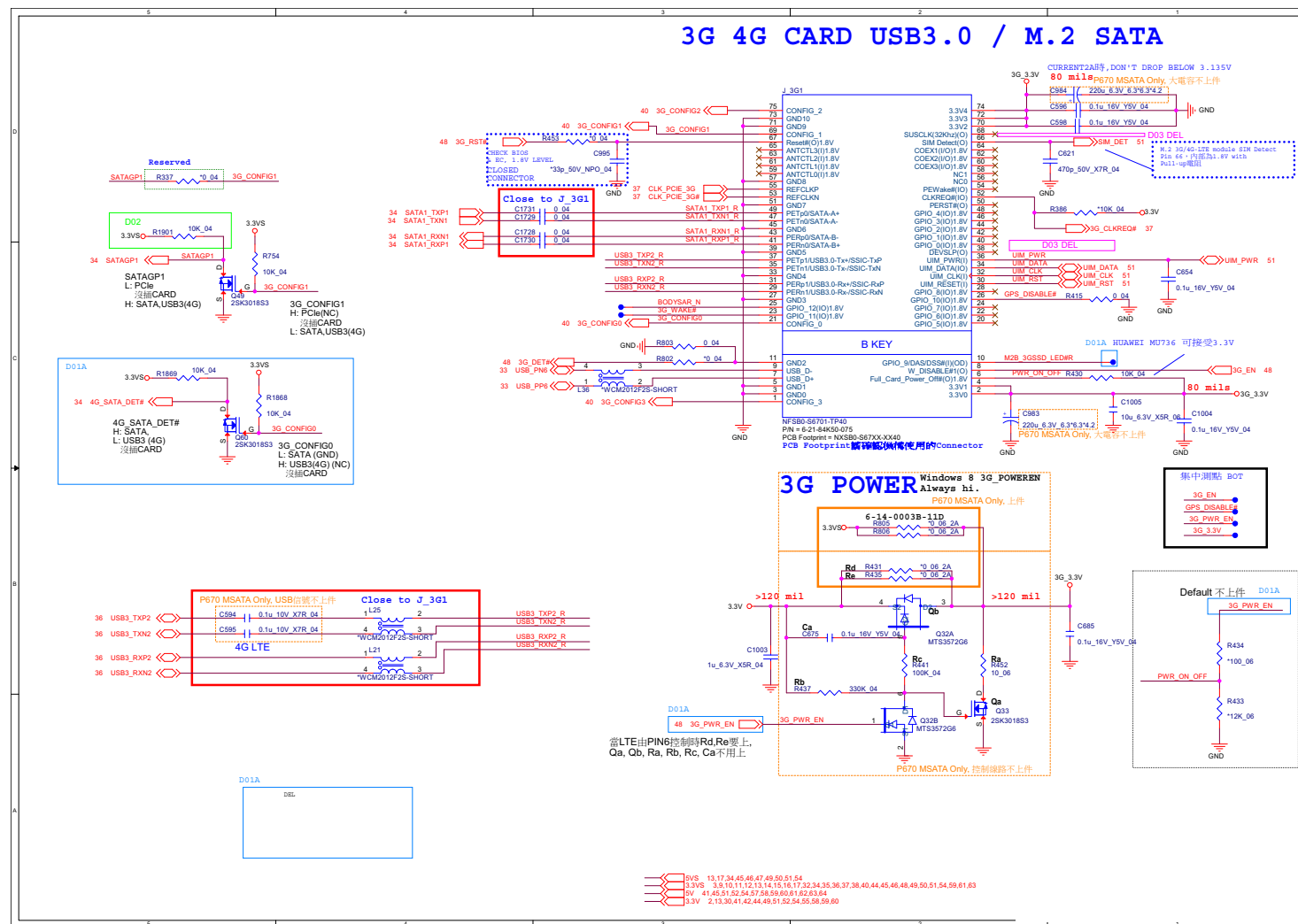


USB Charger B - 43



M.2 3G + M.2 SATA

Sheet 43 of 79
M.2 3G + M.2 SATA



The image displays a detailed PCB layout for an NGFF_M (M2) SSD (PCIe 4X). The layout includes various components, connectors, and a table of pin functions.

WLAN+BT

The WLAN+BT section shows the connection of the WLAN and Bluetooth modules. Key components include the WLAN_3.3V, WLAN_PWR_EN, and WLAN_3.3V. The layout includes a 40 mil trace for the WLAN_3.3V signal and a 120 mil trace for the WLAN_PWR_EN signal. The WLAN_3.3V signal is connected to the WLAN_PWR_EN pin of the WLAN module.

USB PWR

The USB PWR section shows the connection of the USB power pins. Key components include the USB_PWR, USB_PWR, and USB_PWR. The layout includes a 40 mil trace for the USB_PWR signal and a 120 mil trace for the USB_PWR signal.

NGFF_M (M2) SSD (PCIe 4X)

The NGFF_M (M2) SSD (PCIe 4X) section shows the connection of the SSD. Key components include the SSD1, SSD1, and SSD1. The layout includes a 40 mil trace for the SSD1 signal and a 120 mil trace for the SSD1 signal.

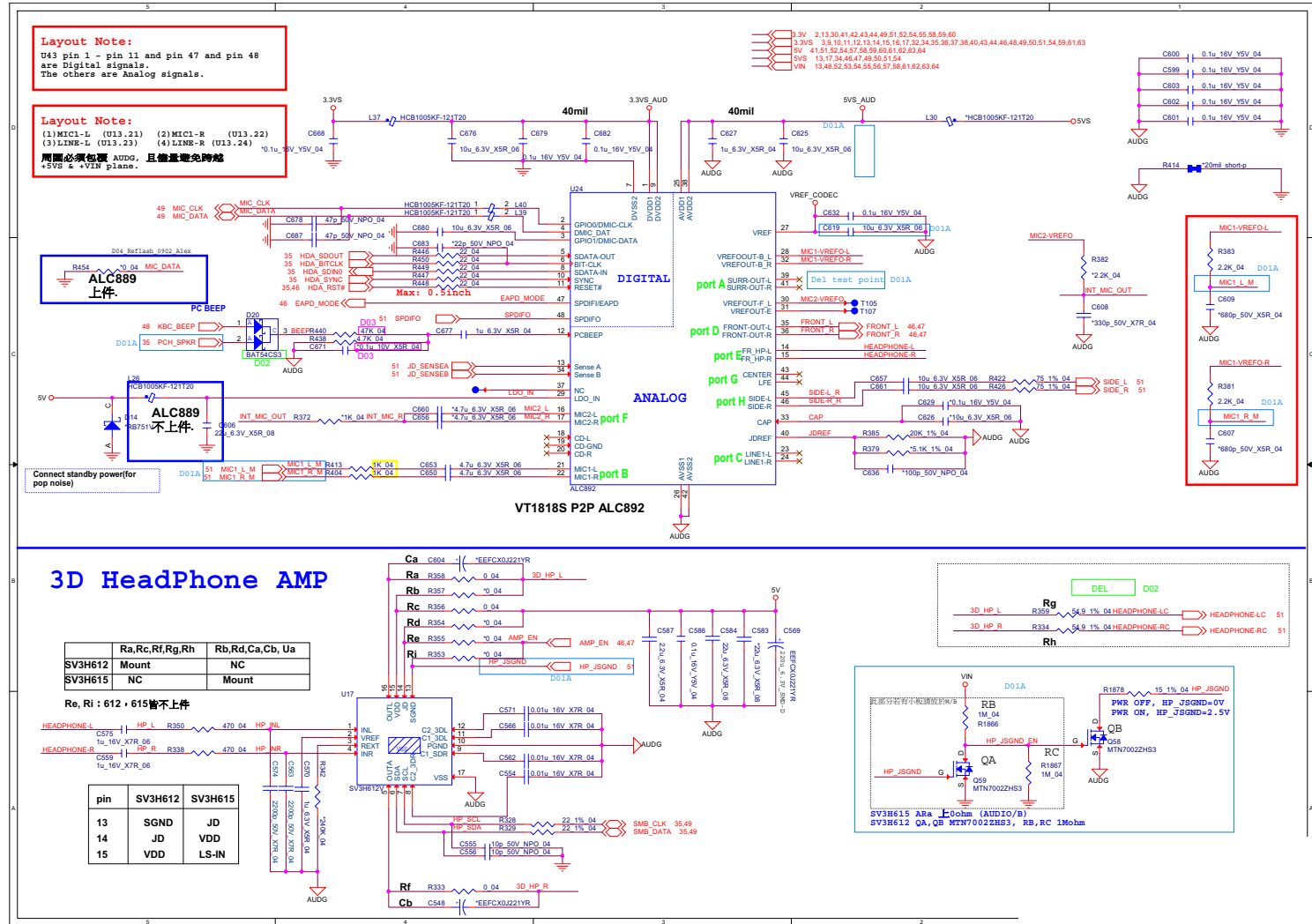
Table of Pin Functions

KEY	M-KEY (J_SSD1)	B-KEY (J_301)
1	PCIE X 4	USB3
2	PCIE X 4	SATA
3	SATA	USB3
4	SATA	SATA

Sheet 44 of 79
M.2 WLAN+BT,
PCIE4X SSD

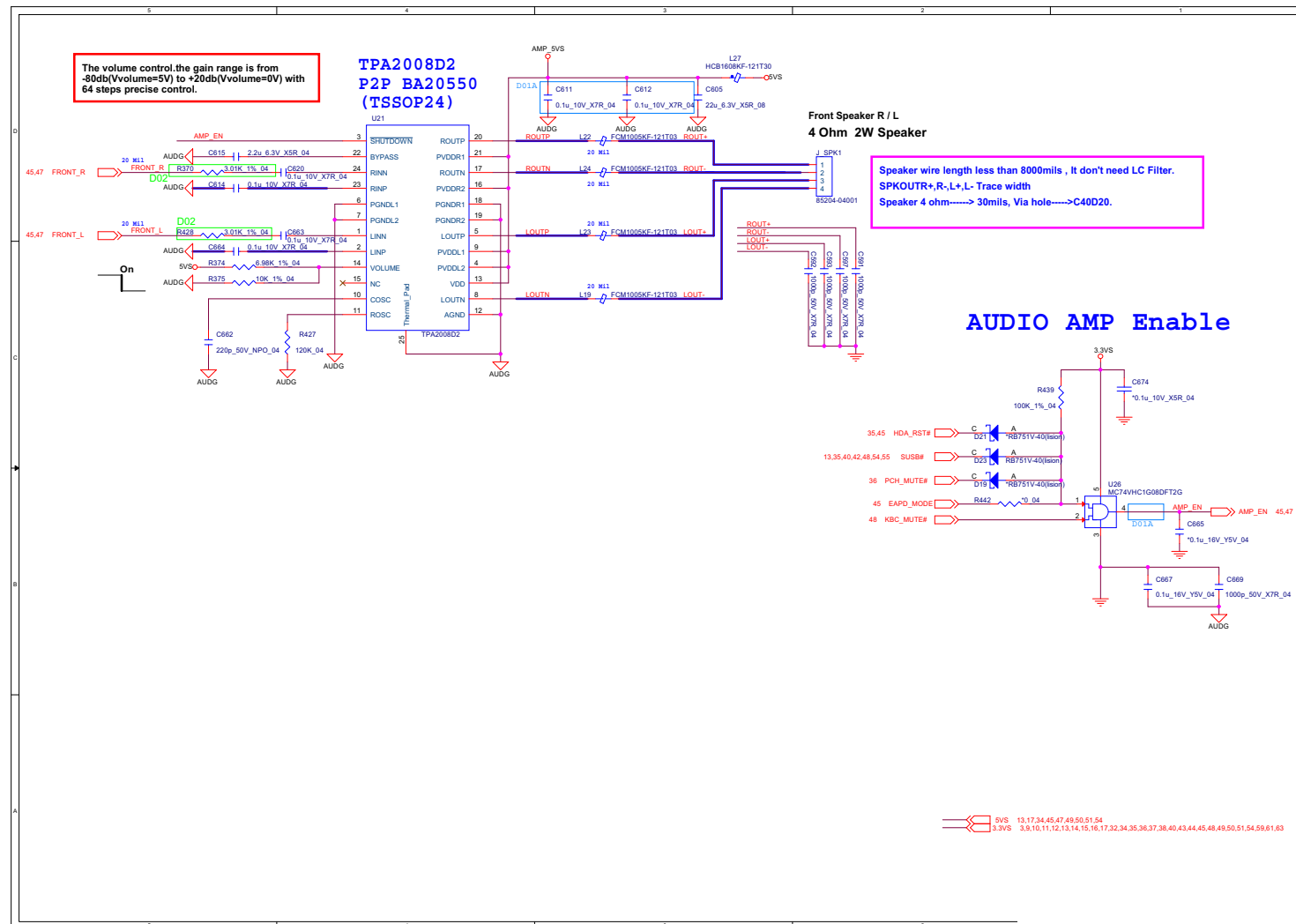
Realtek ALC892

Sheet 45 of 79
Realtek ALC892



Schematic Diagrams

TPA2008D2



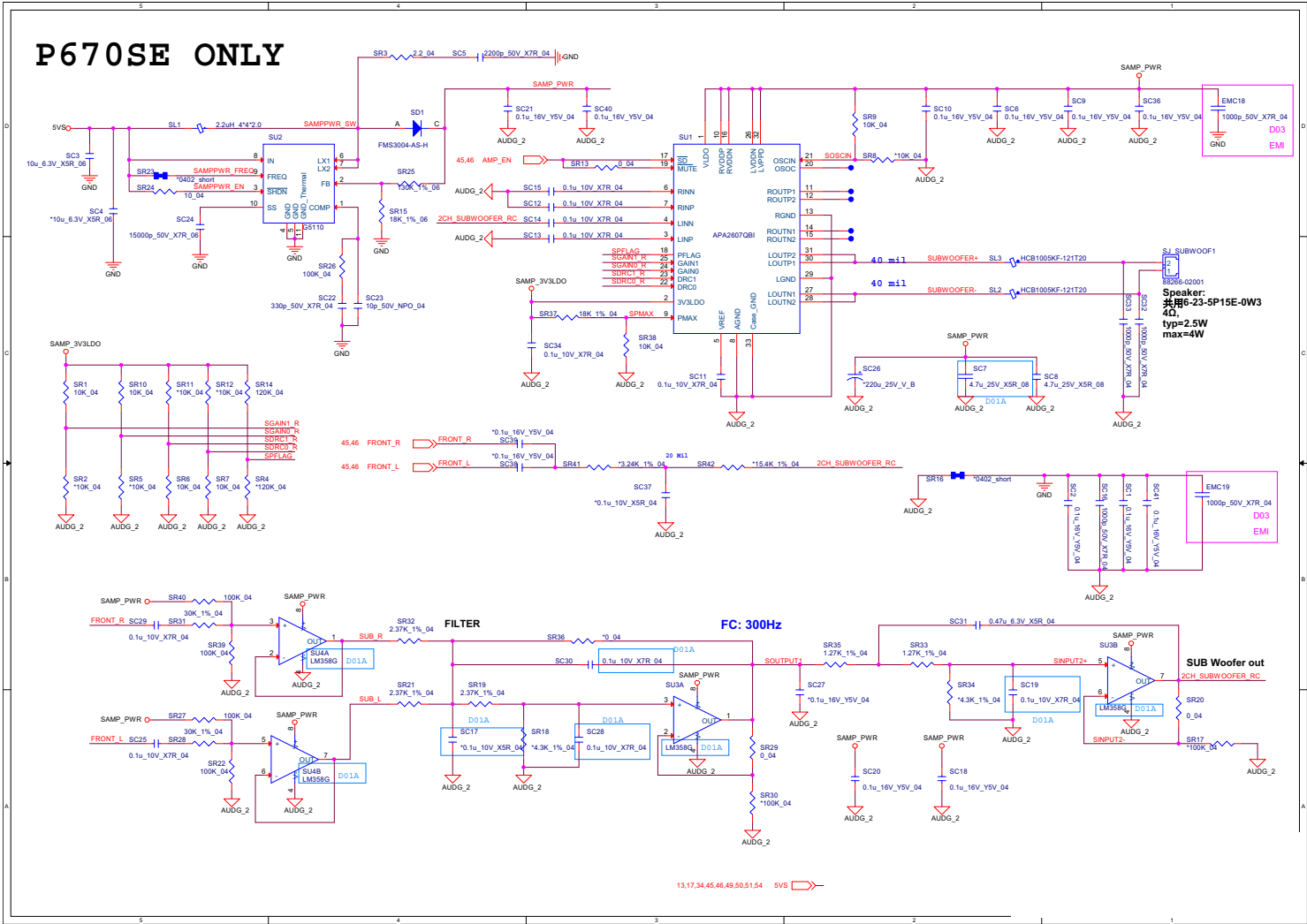
B.Schematic Diagrams

Sheet 46 of 79
TPA2008D2

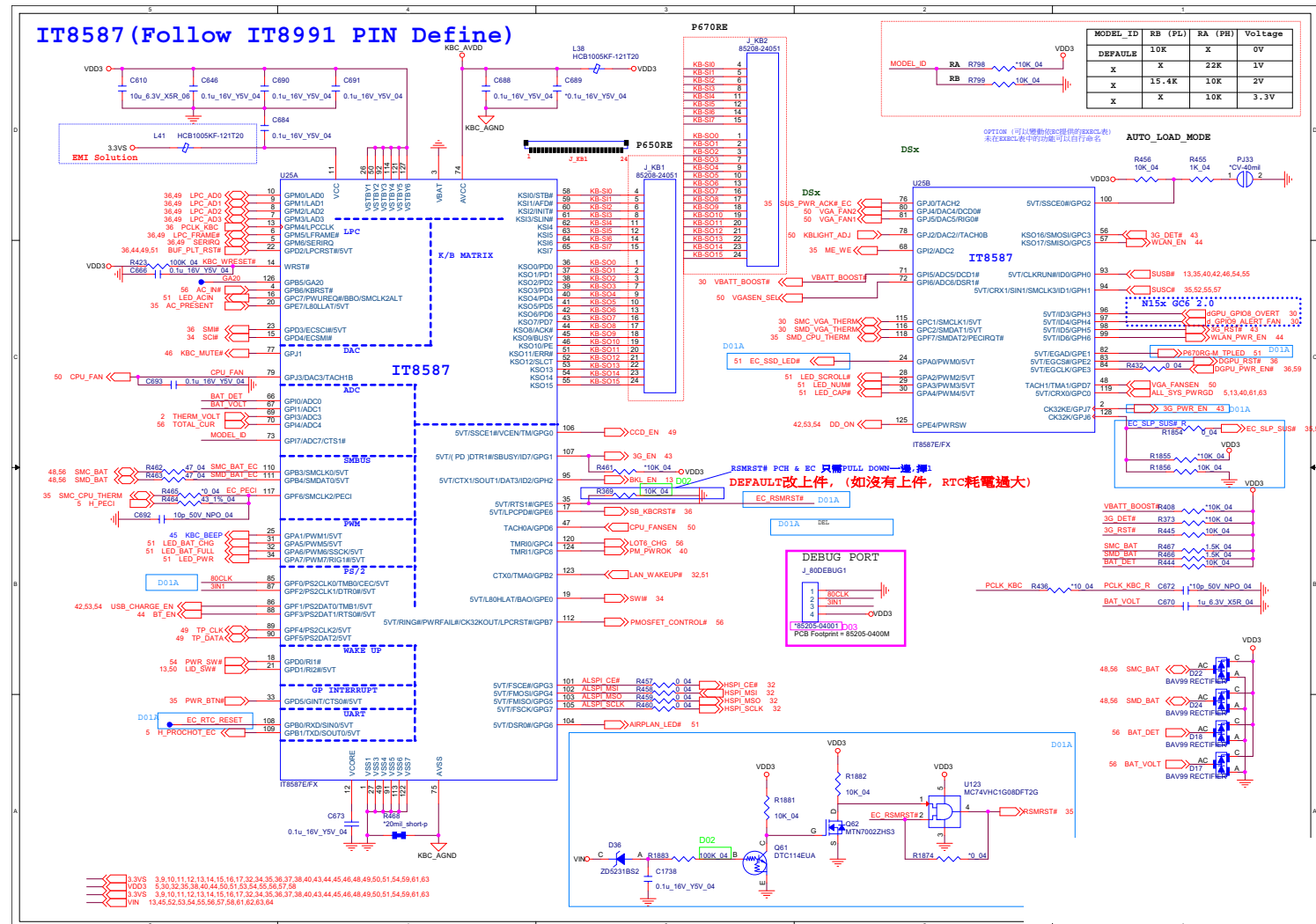
Schematic Diagrams

Subwoofer

Sheet 47 of 79
Subwoofer

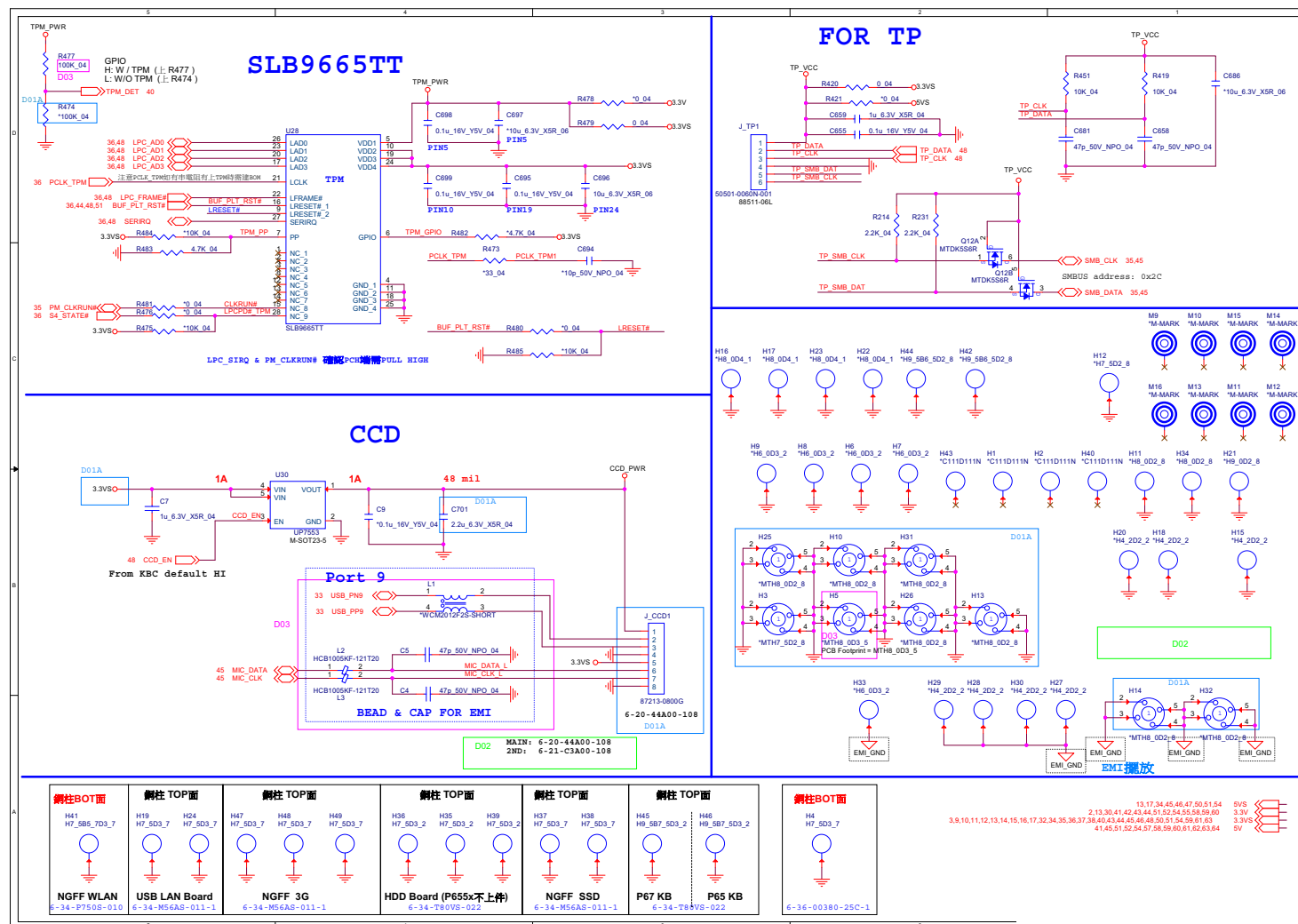


KBC-ITE IT8587

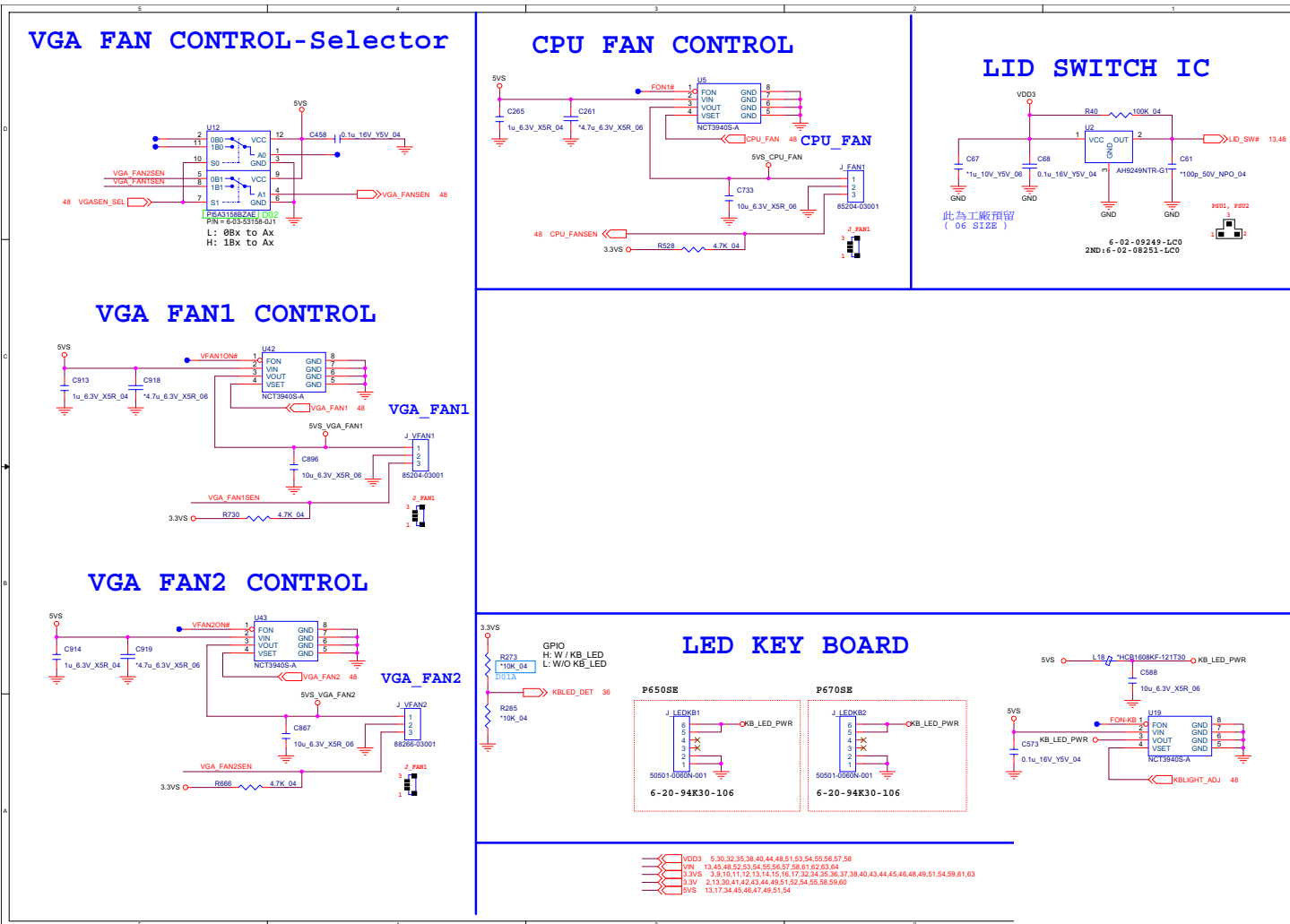


TPM, CCD, TP

Sheet 49 of 79
TPM, CCD, TP



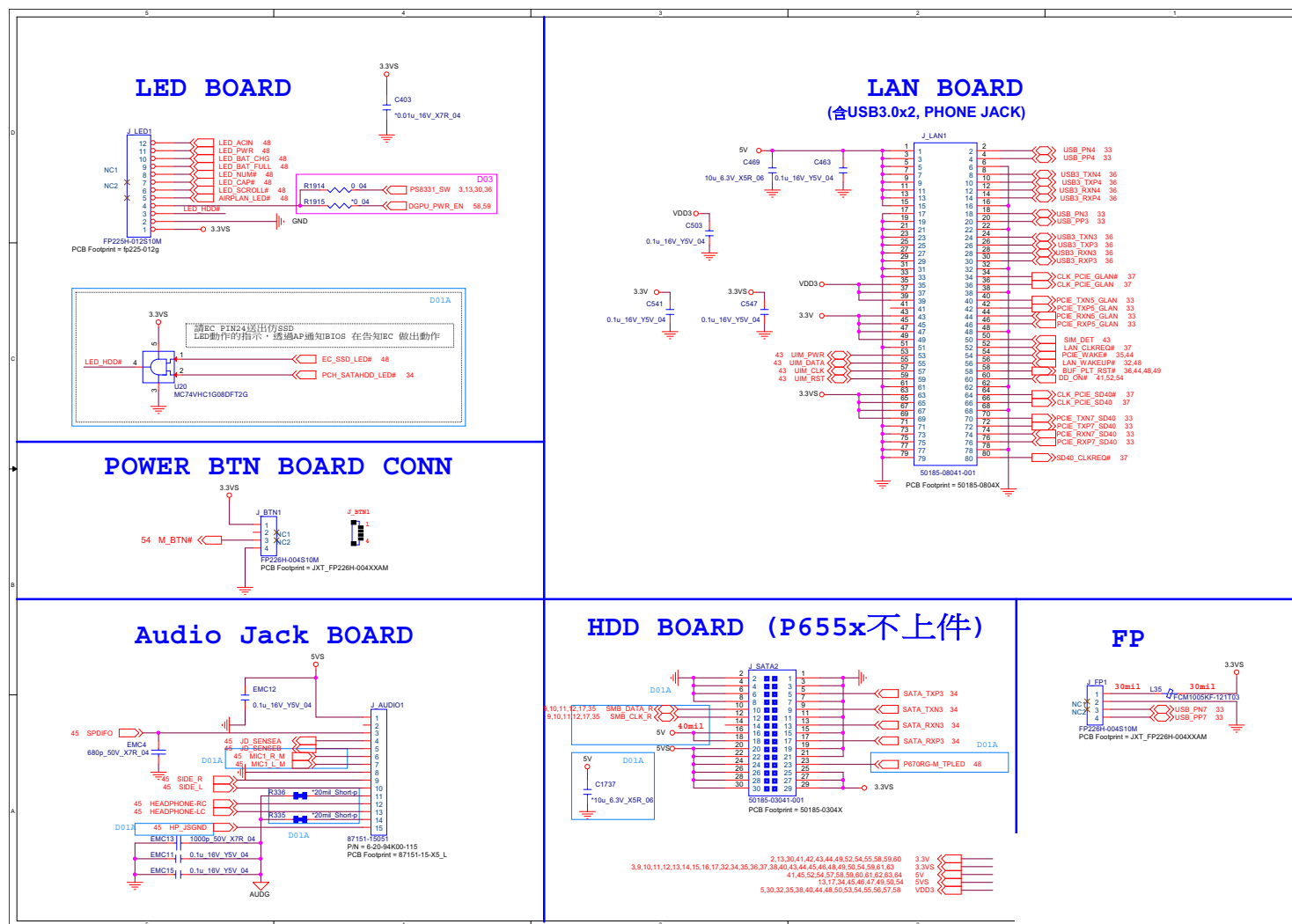
Fan, LID, KB, LED



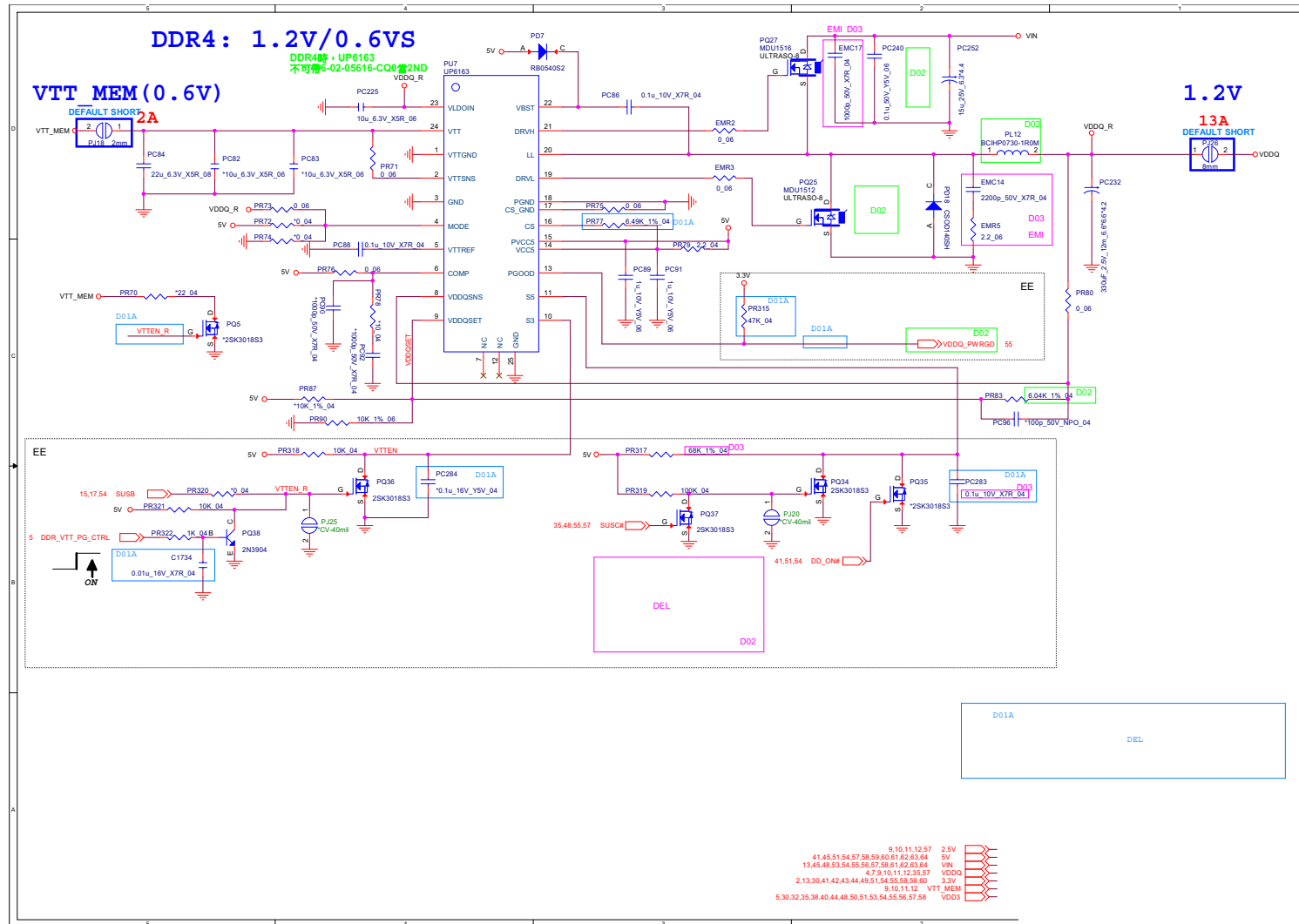
Sheet 50 of 79
Fan, LID, KB, LED

Schematic Diagrams

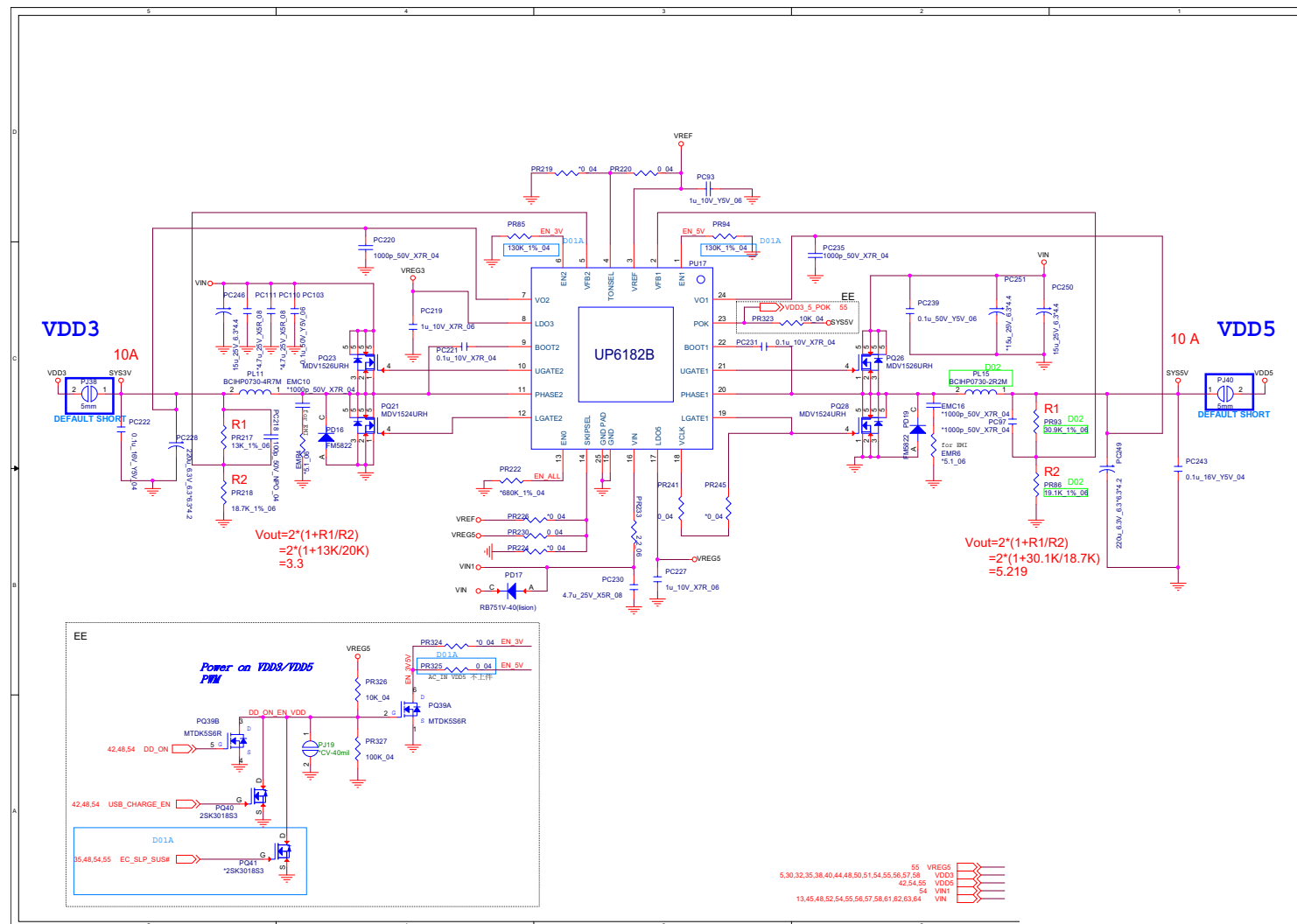
Connector

Sheet 51 of 79
Connector

DDR 1.2V / 0.6VS



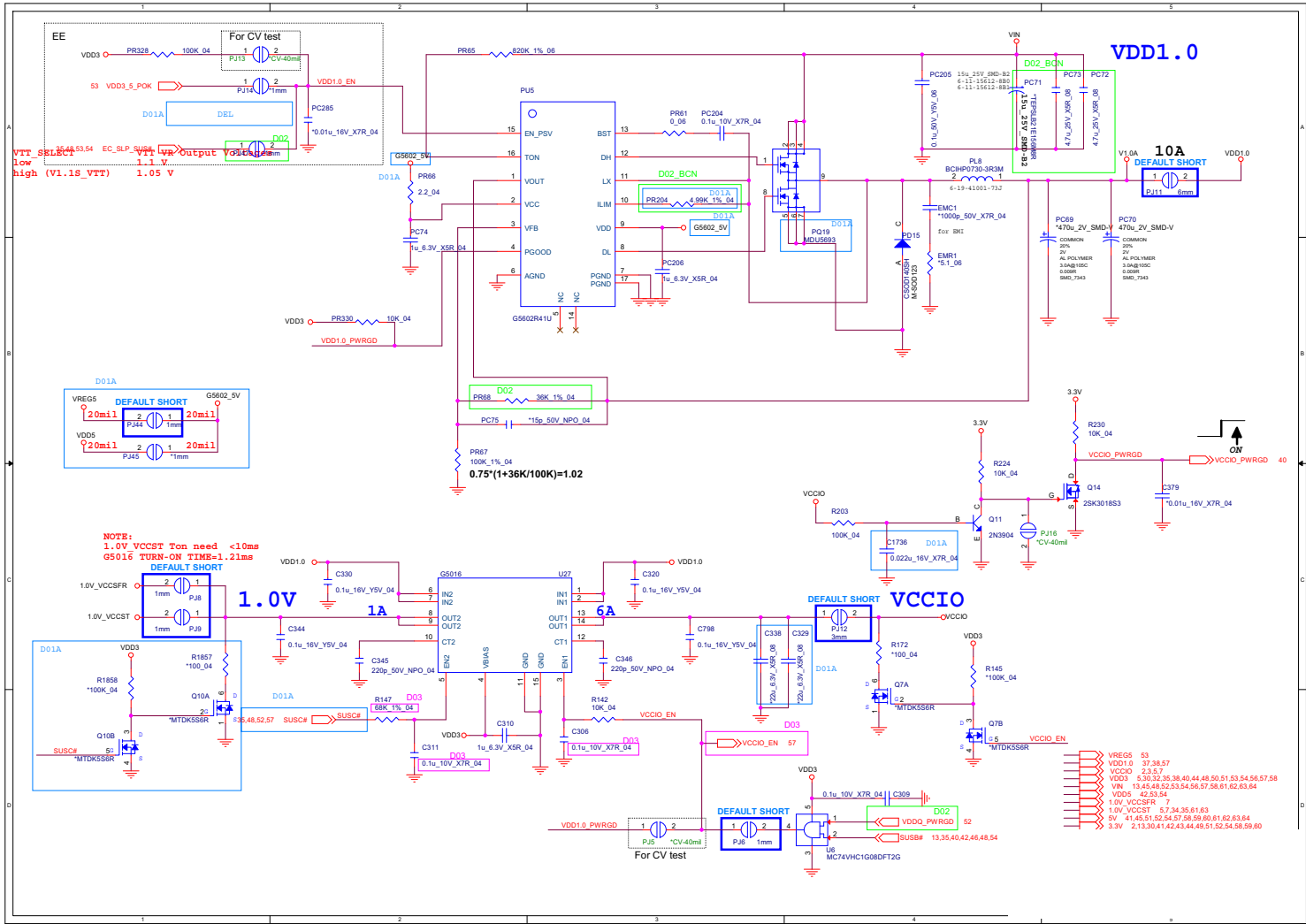
Sheet 53 of 79
VDD3, VDD5



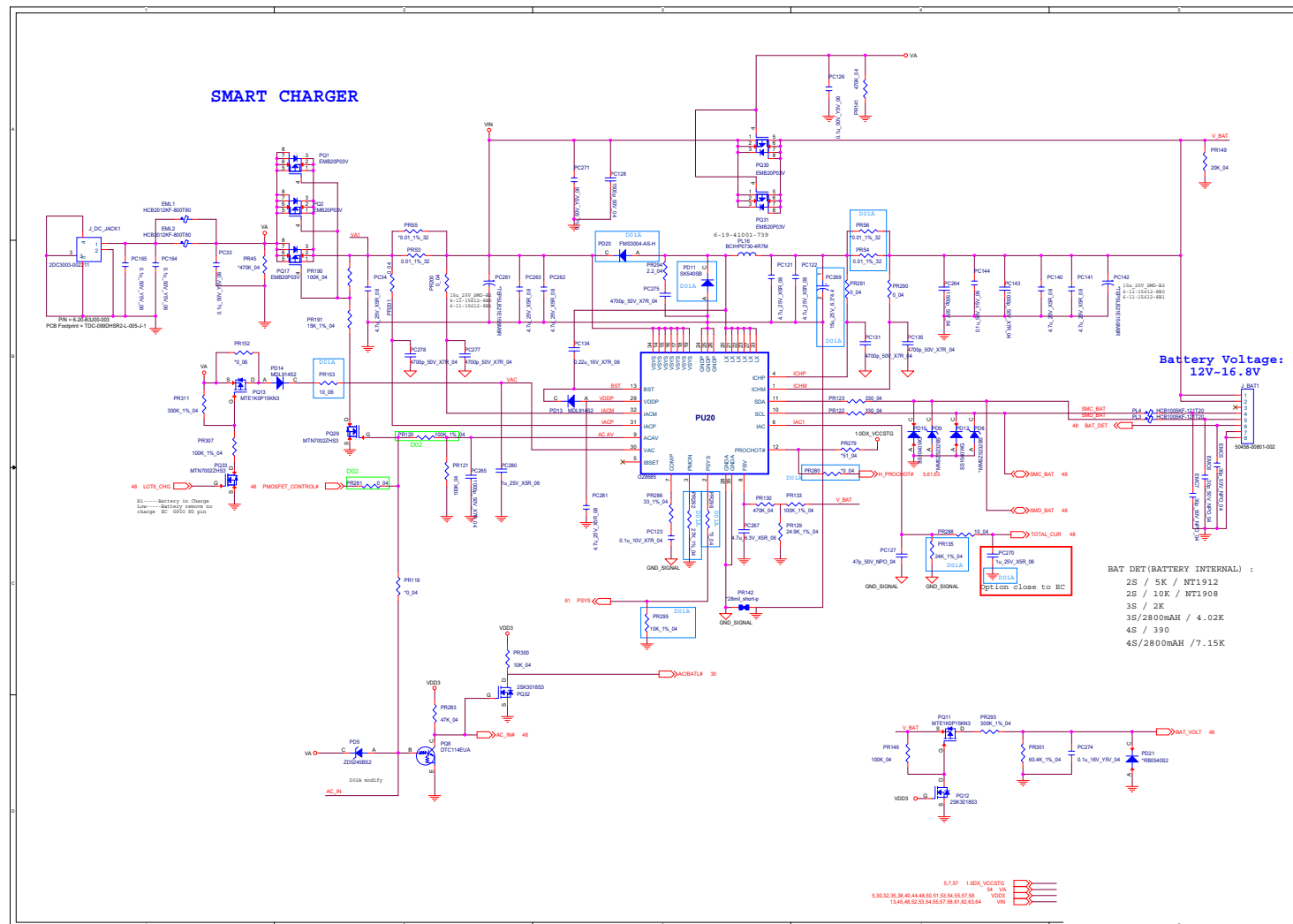
Sheet 54 of 79
5V, 5VS, 3.3V,
3.3VS, 3.3VA



Power 1.0V, VCCIO



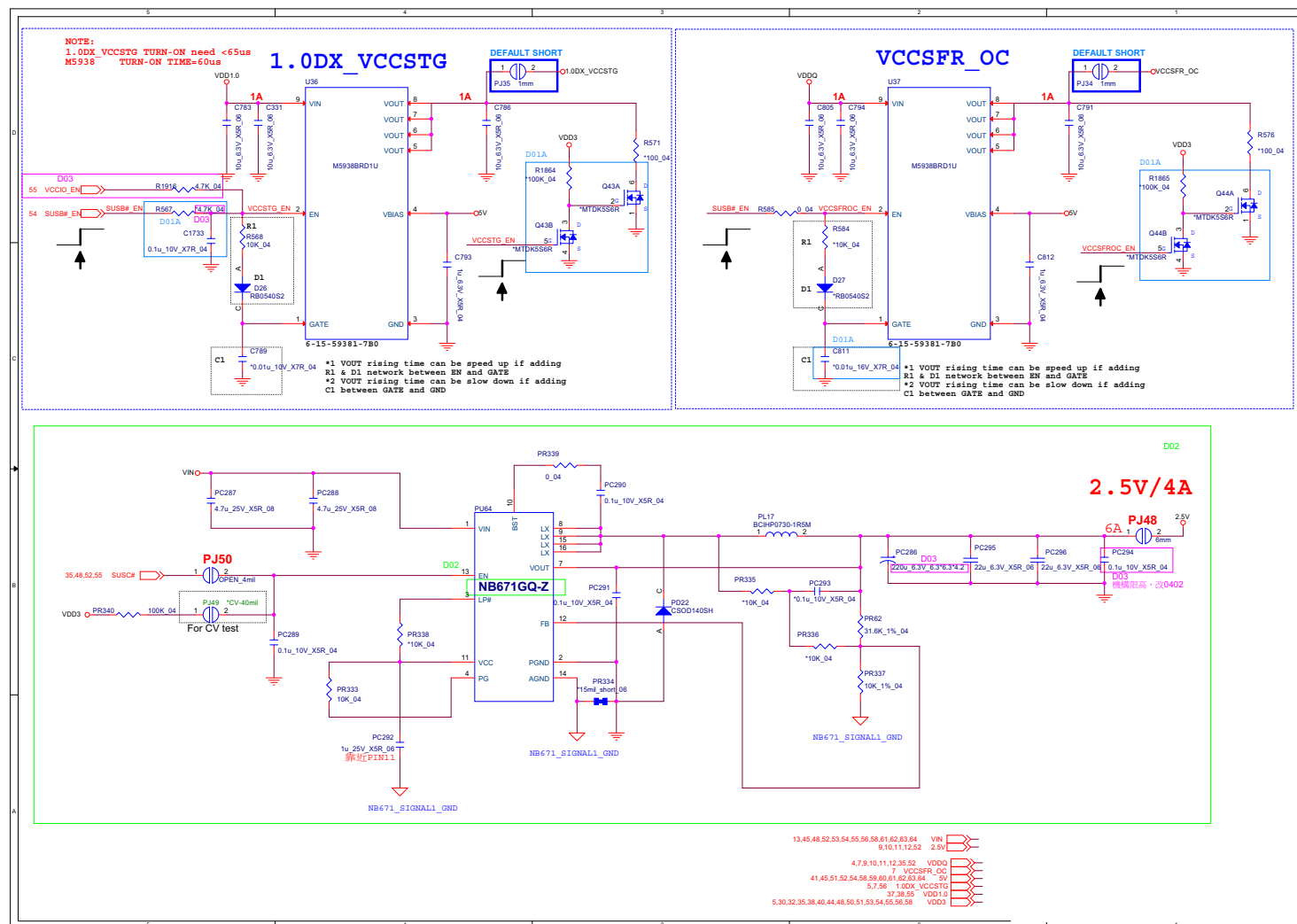
AC_In, Charger B - 57



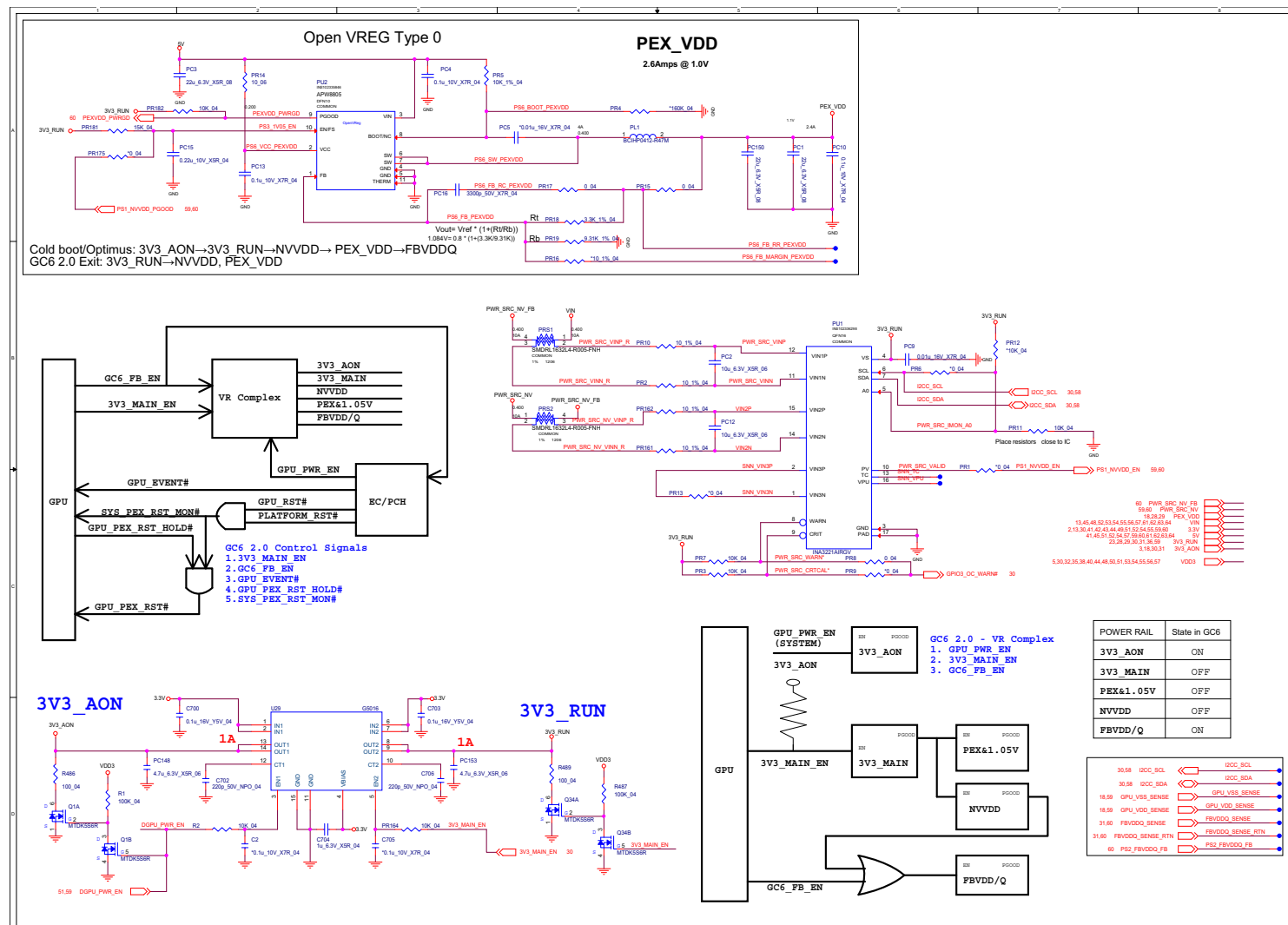
Schematic Diagrams

1.0DX_VCCSTG/VCCSFR_OC/2.5V

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1.0DX_VCCSTG/
VCCSFR_OC/2.5V



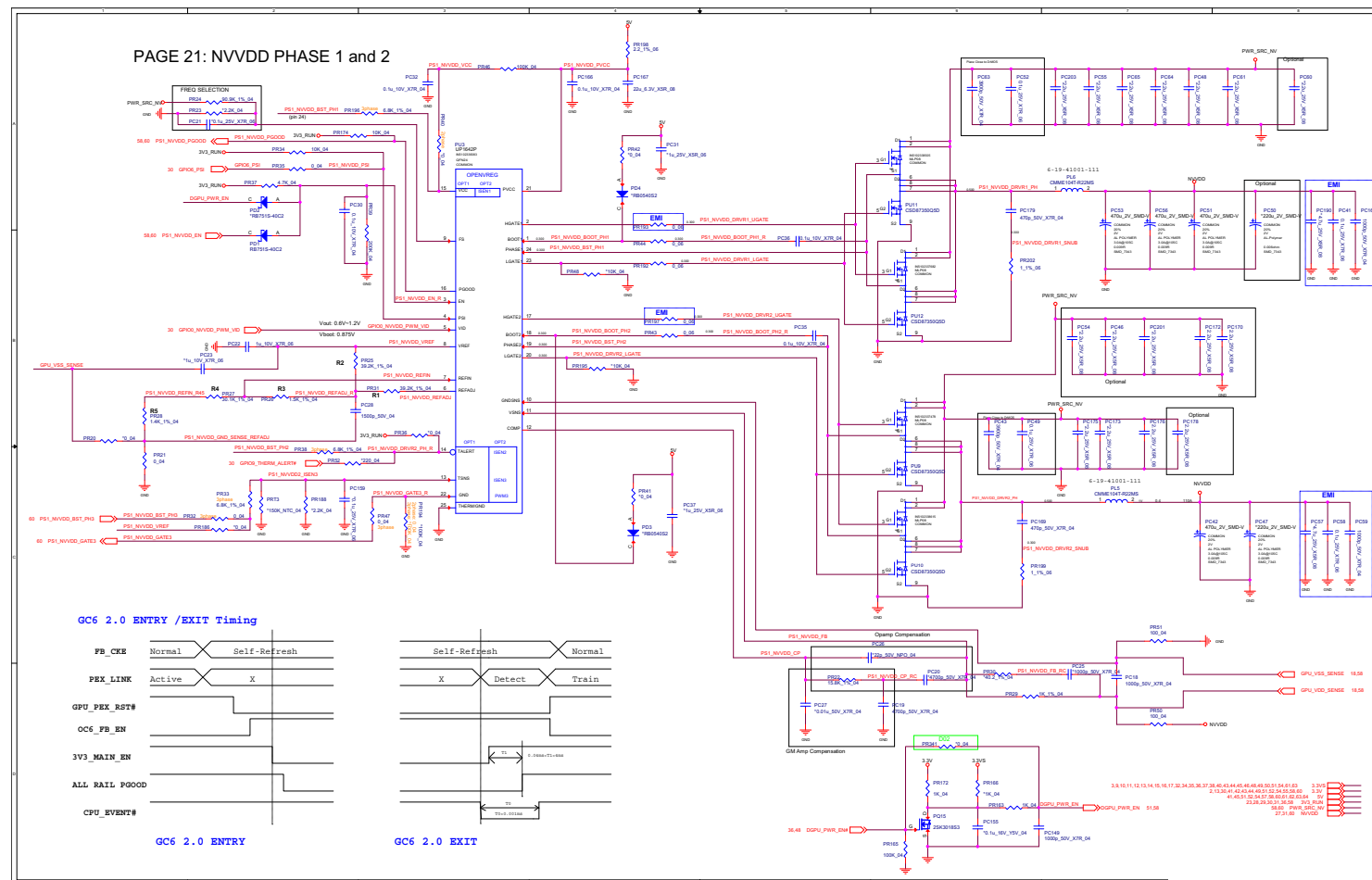
PEX_VDD, 3V3_AON, 3V3_RUN



NVVDD Phase 1 & 2

B.Schematic Diagrams

Sheet 59 of 79
NVVDD Phase 1 & 2



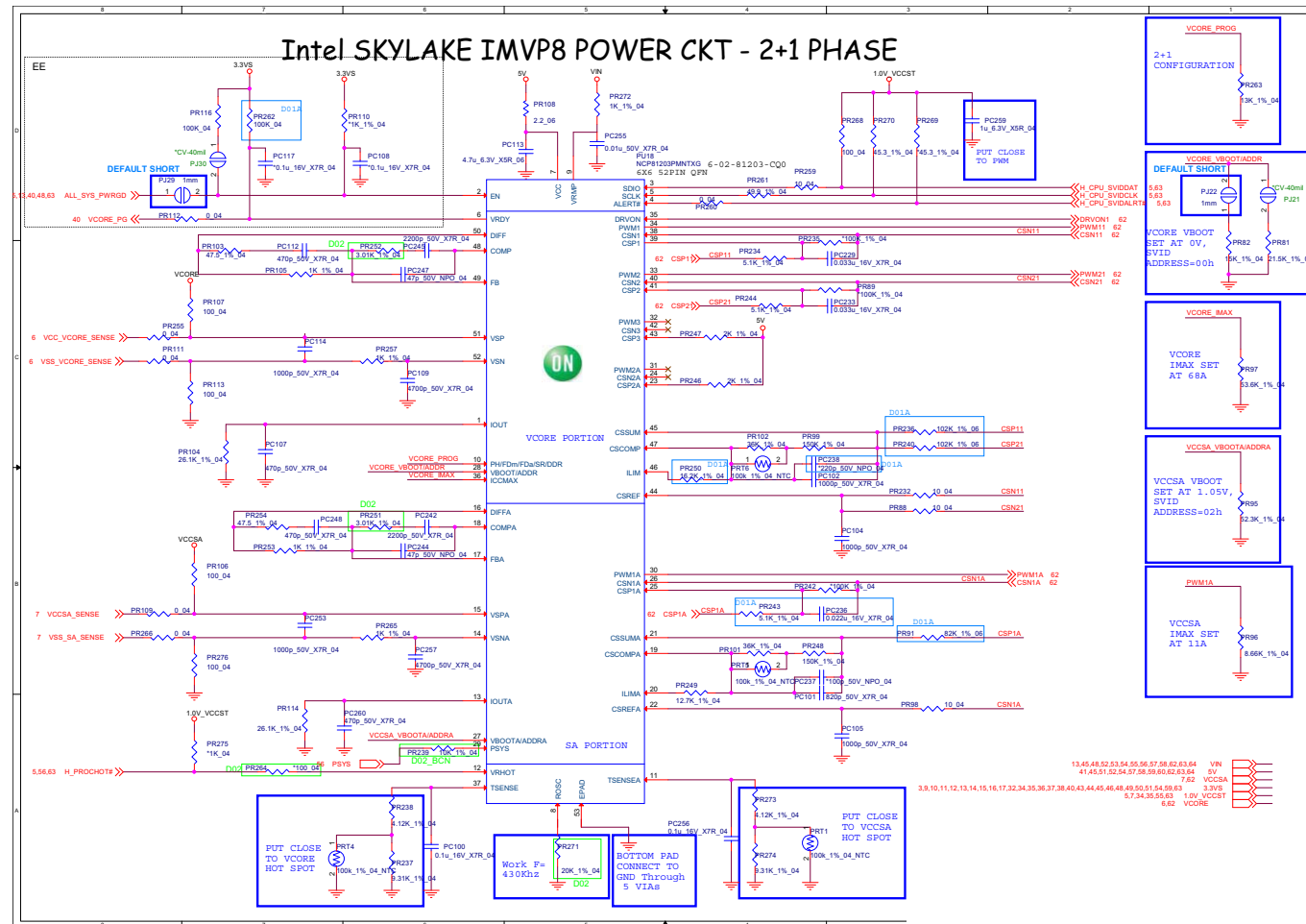
FBVDDQ B - 61



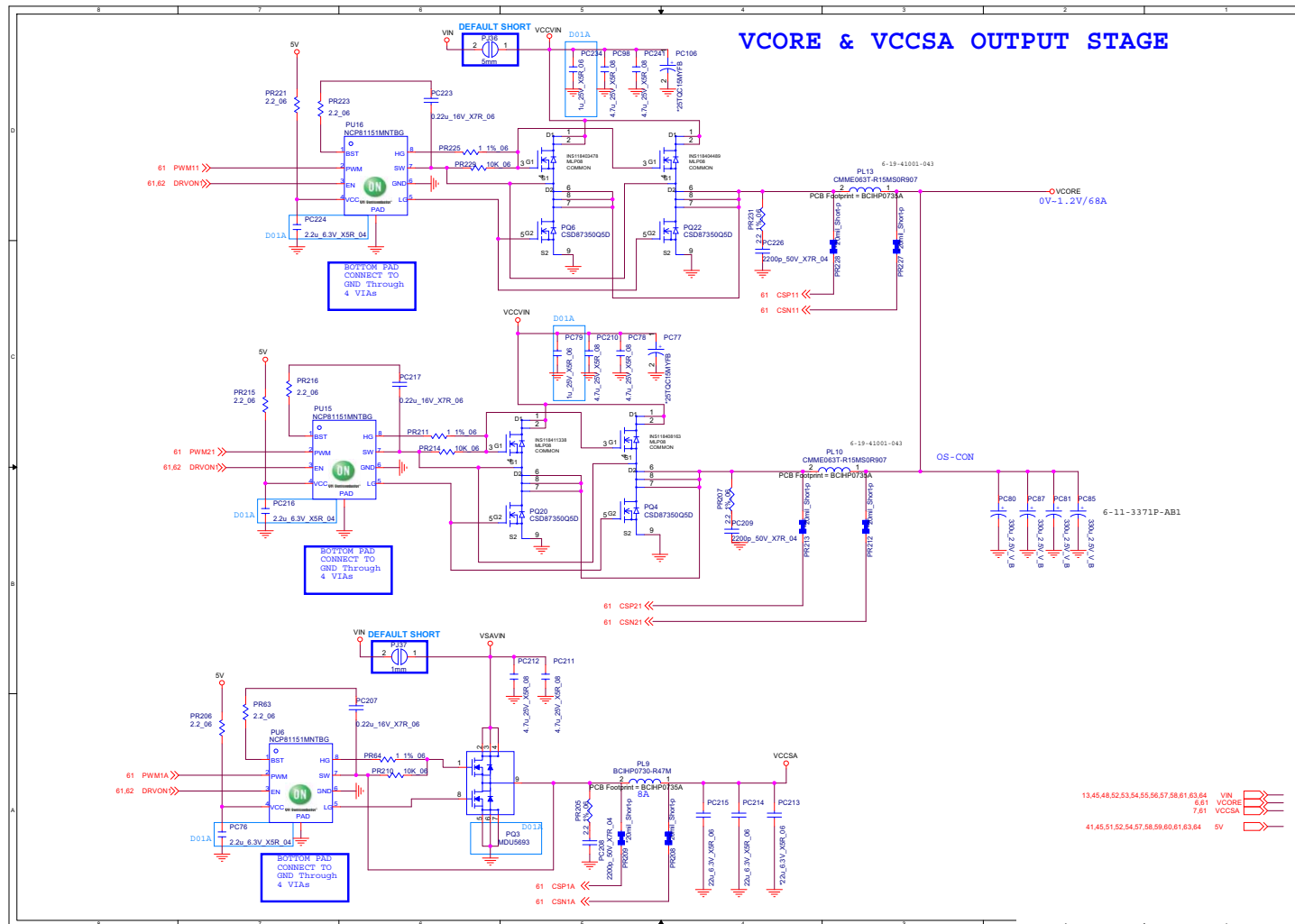
Schematic Diagrams

VCC_Core & VCCSA

Sheet 61 of 79
VCC_Core &
VCCSA



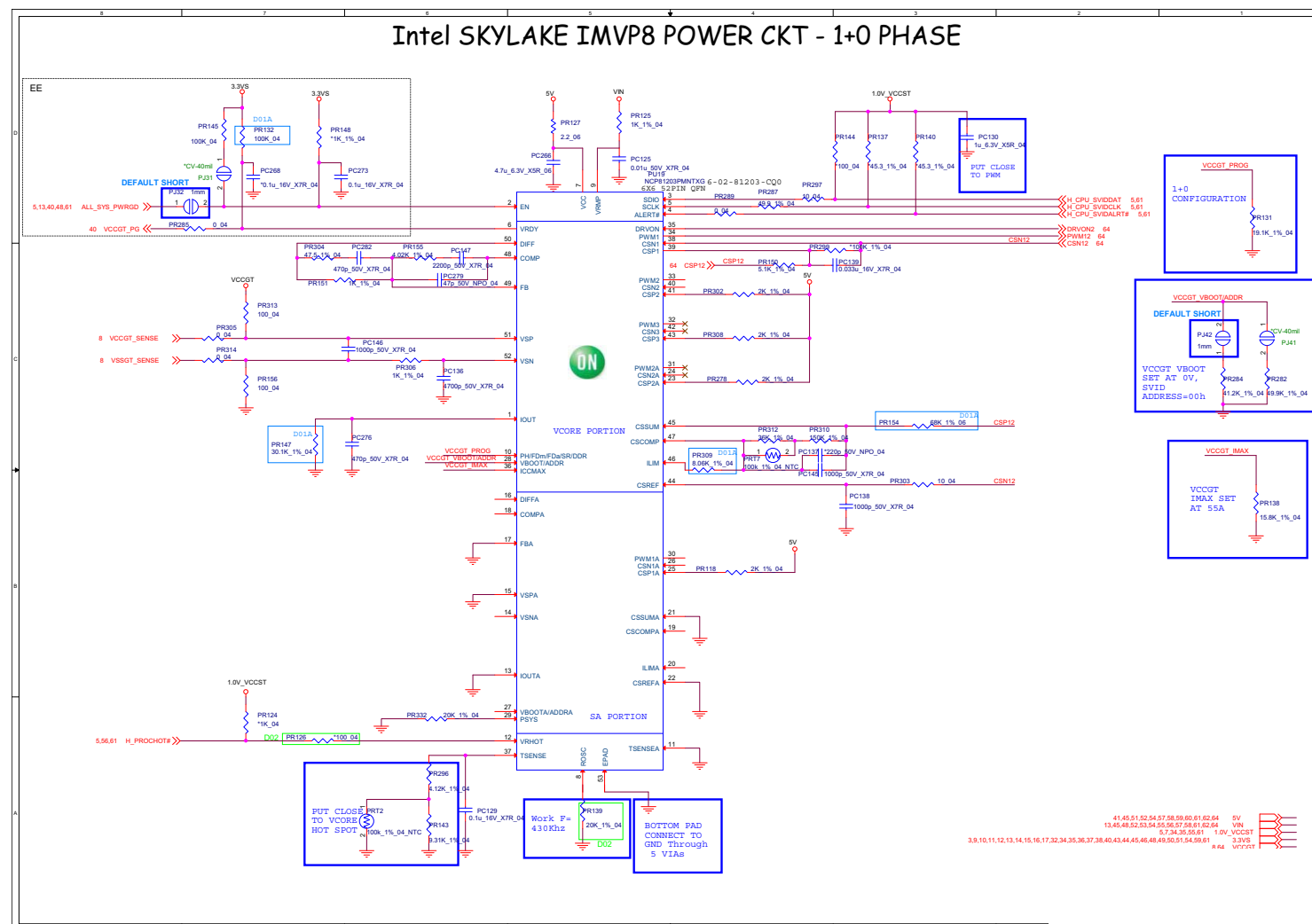
VCore & VCCSA Output Stage



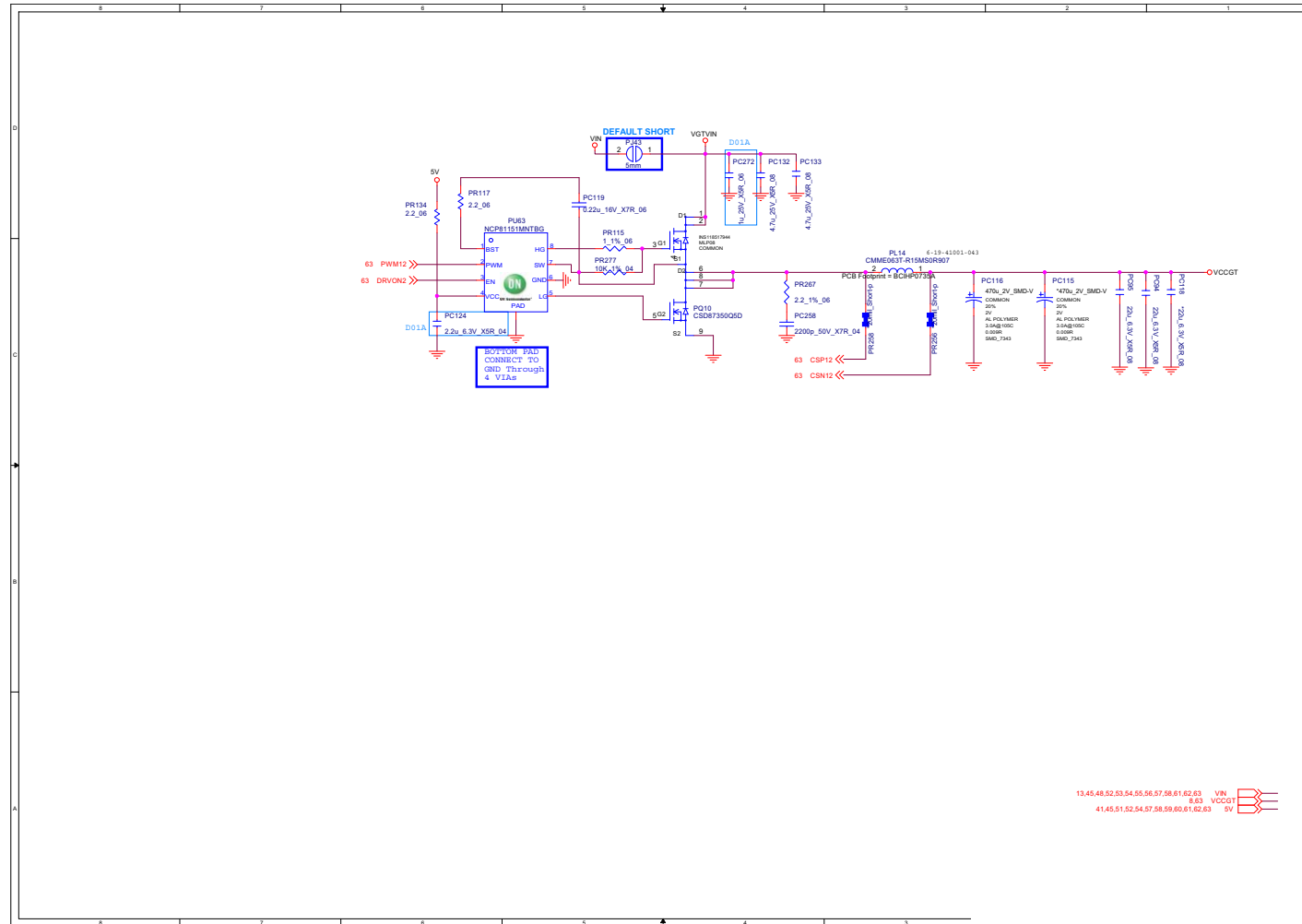
Sheet 62 of 79
VCore & VCCSA
Output Stage

VCCGT

Sheet 63 of 79
VCCGT



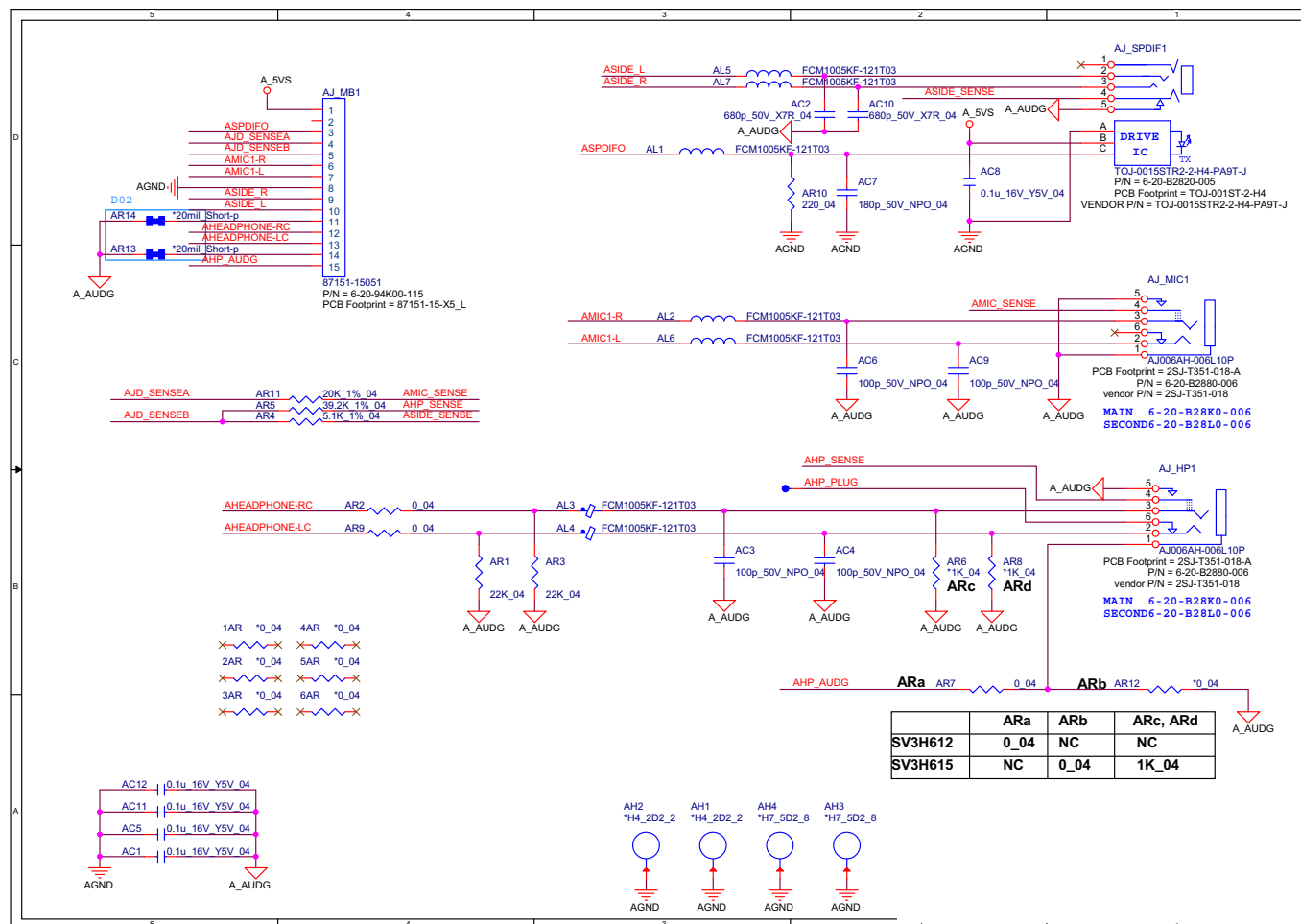
VCCGT Output Stage



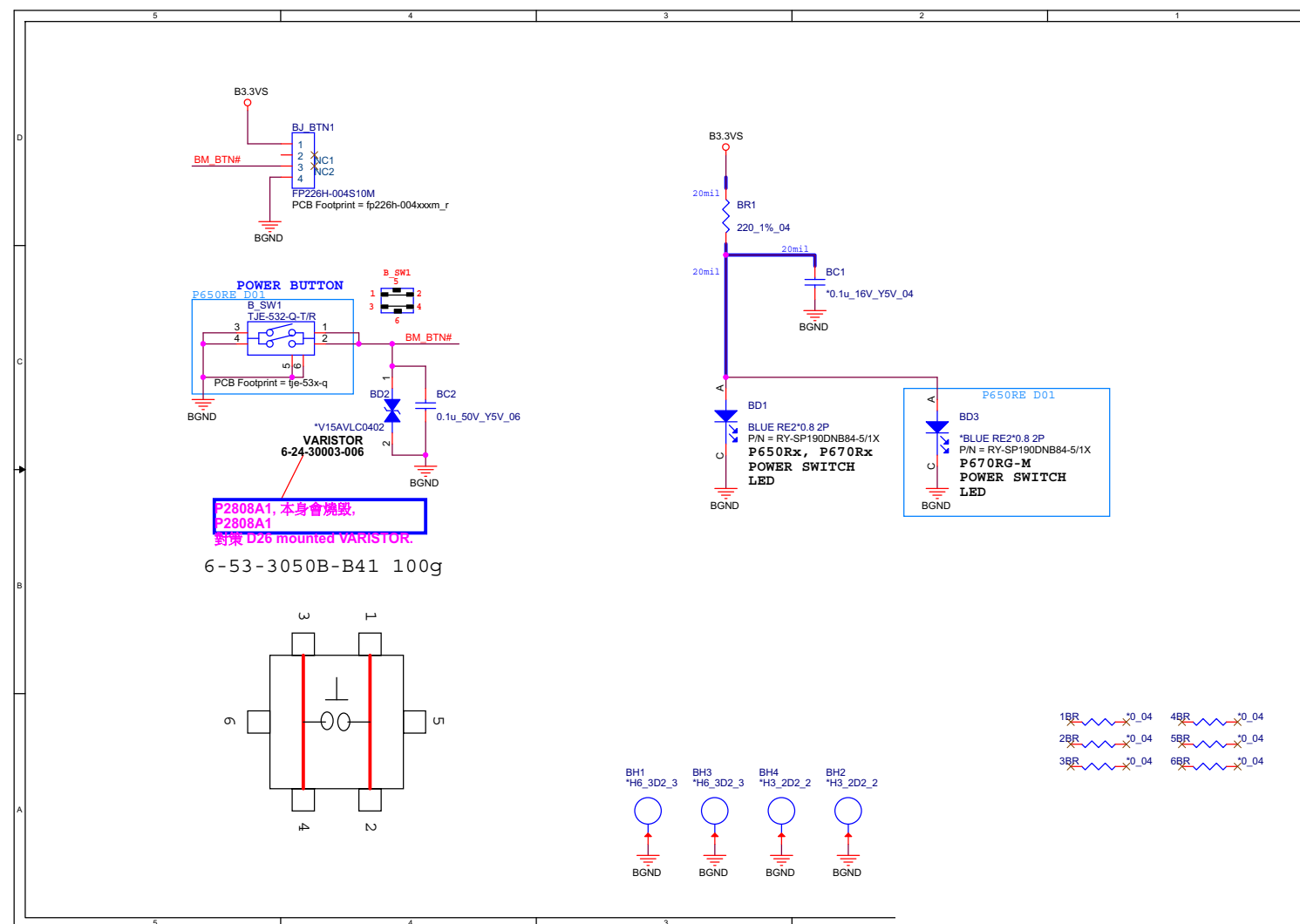
P650RE Audio Board A

B. Schematic Diagrams

Sheet 65 of 79
P650RE Audio
Board A



P650RE Power Board

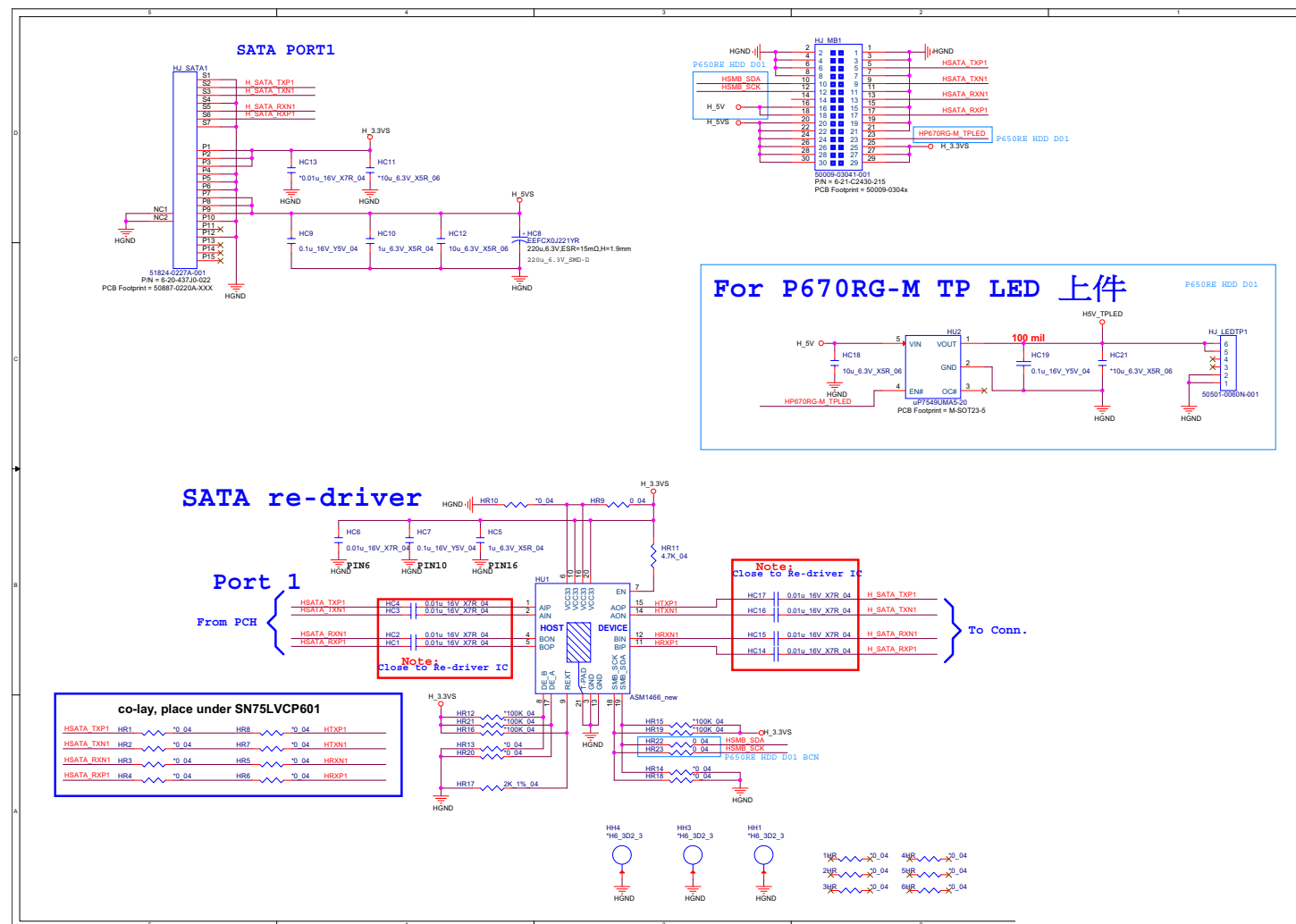


Sheet 66 of 79
P650RE Power
Board

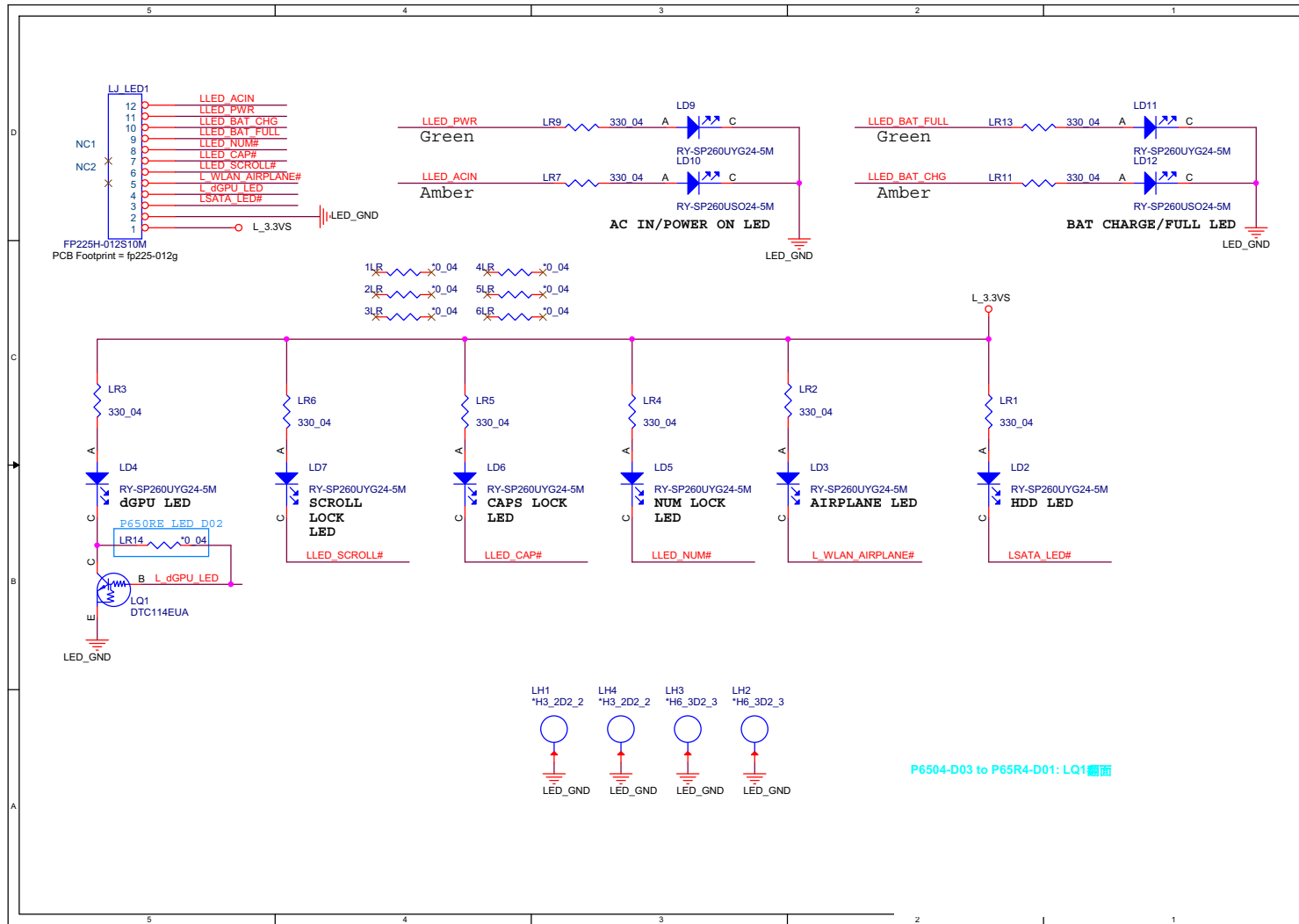
B.Schematic Diagrams

P650RE HDD Board

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P650RE HDD Board



P650RE LED Board

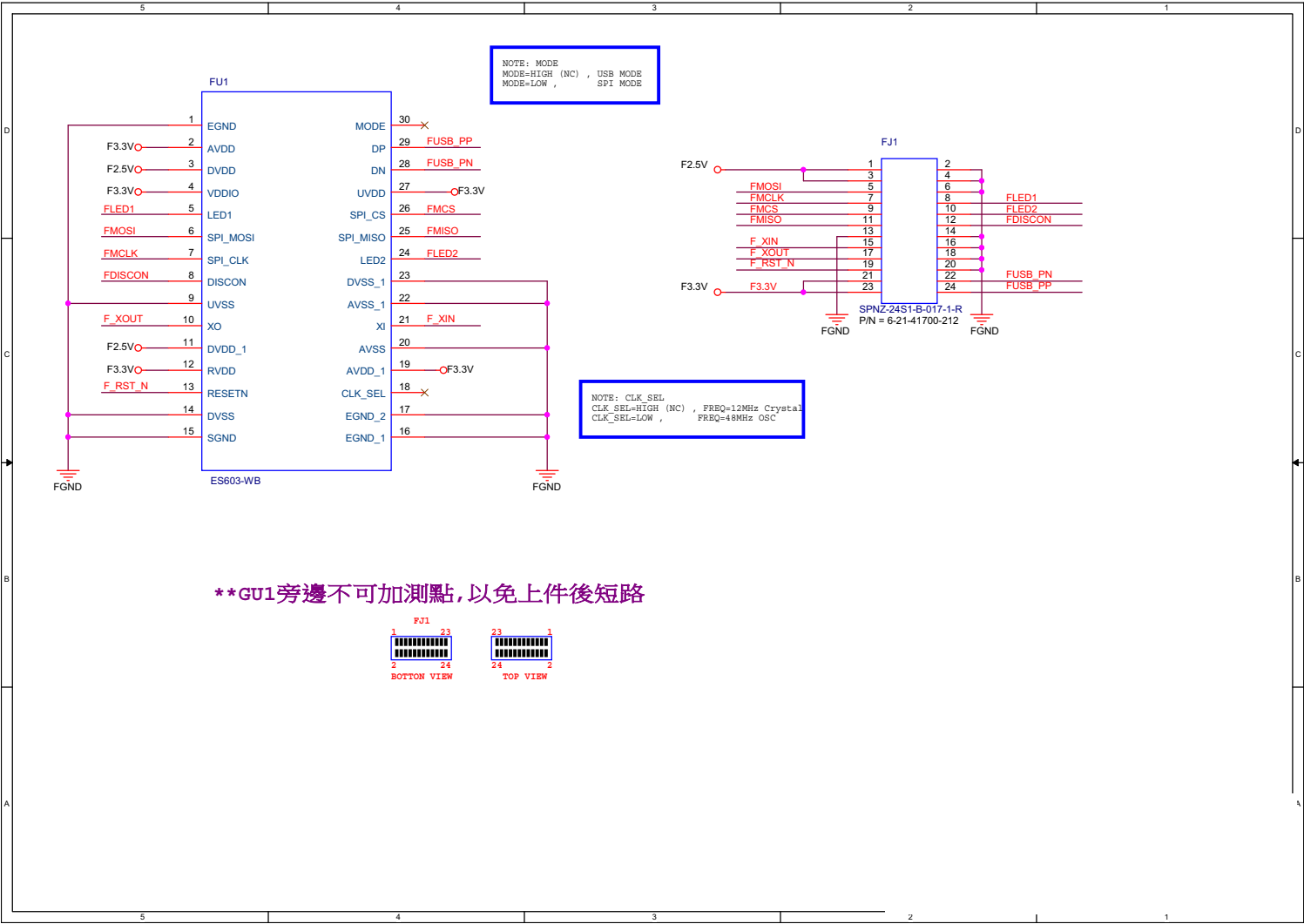


Sheet 68 of 79
P650RE LED Board

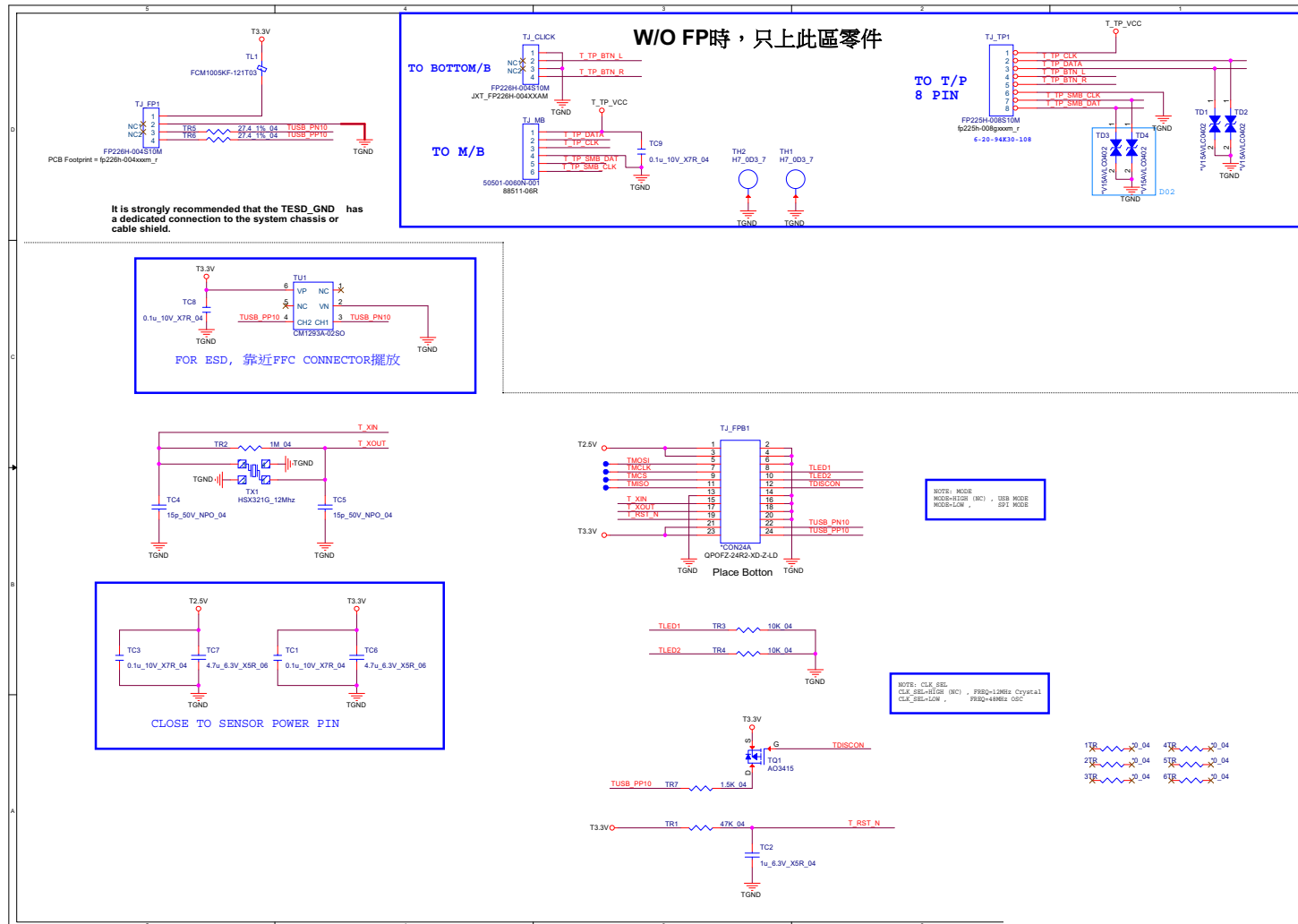
Schematic Diagrams

Finger Sensor Board

Sheet 69 of 79
Finger Sensor Board



P650RE Click Board

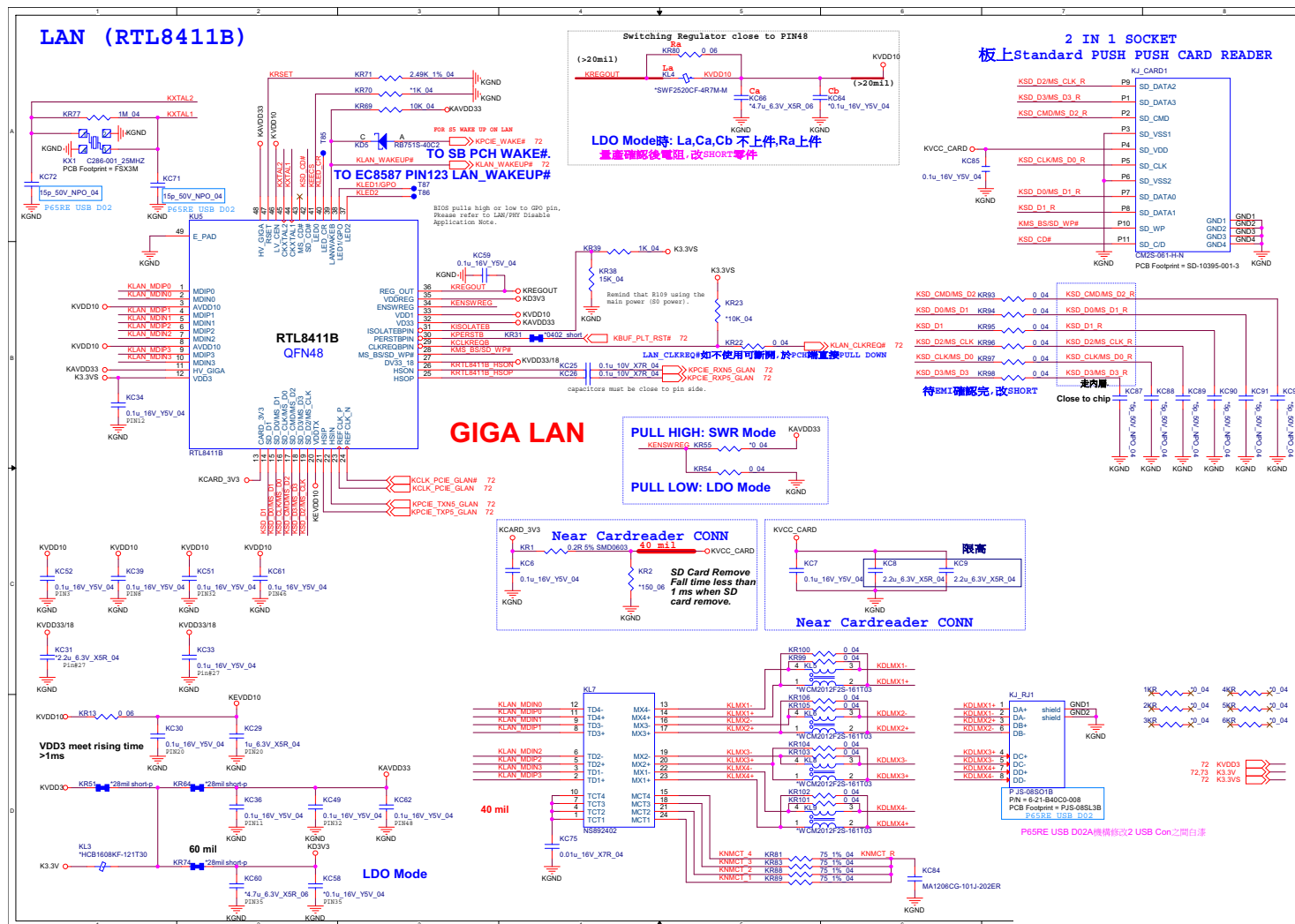


Sheet 70 of 79
P650RE Click
Board

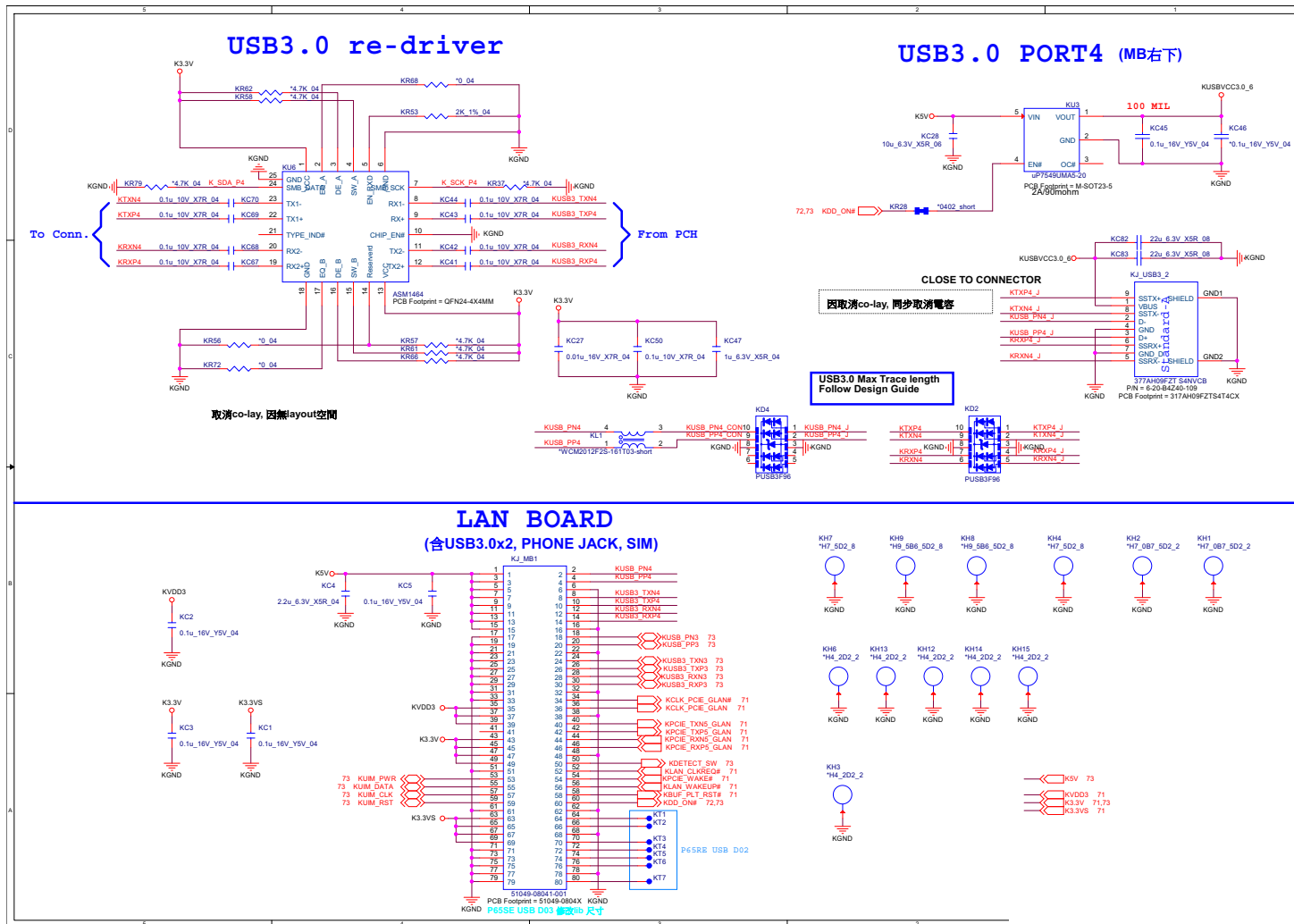
B.Schematic Diagrams

P650RE USB Board 1/3

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P650RE USB Board
1/3

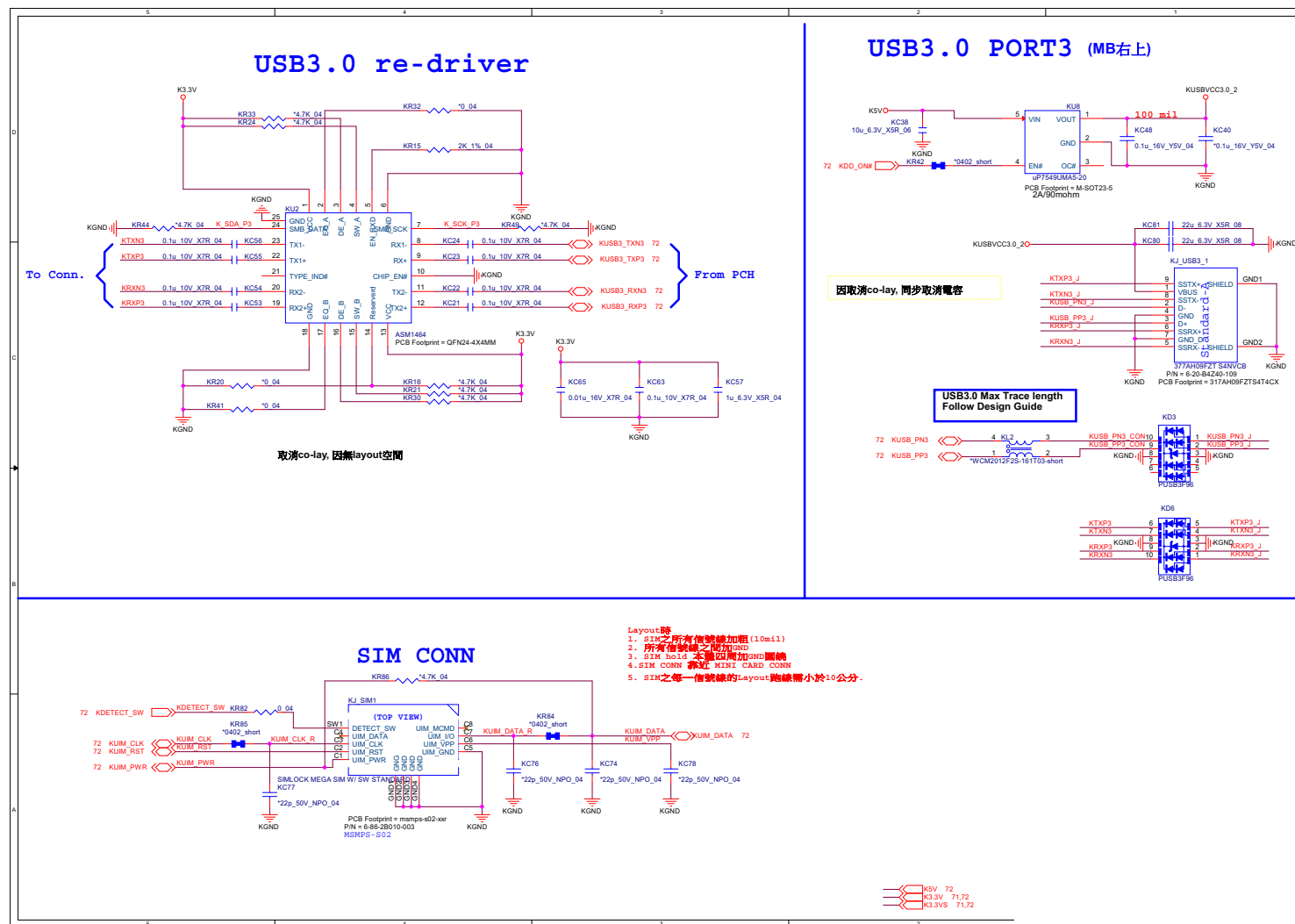


P650RE USB Board 2/3



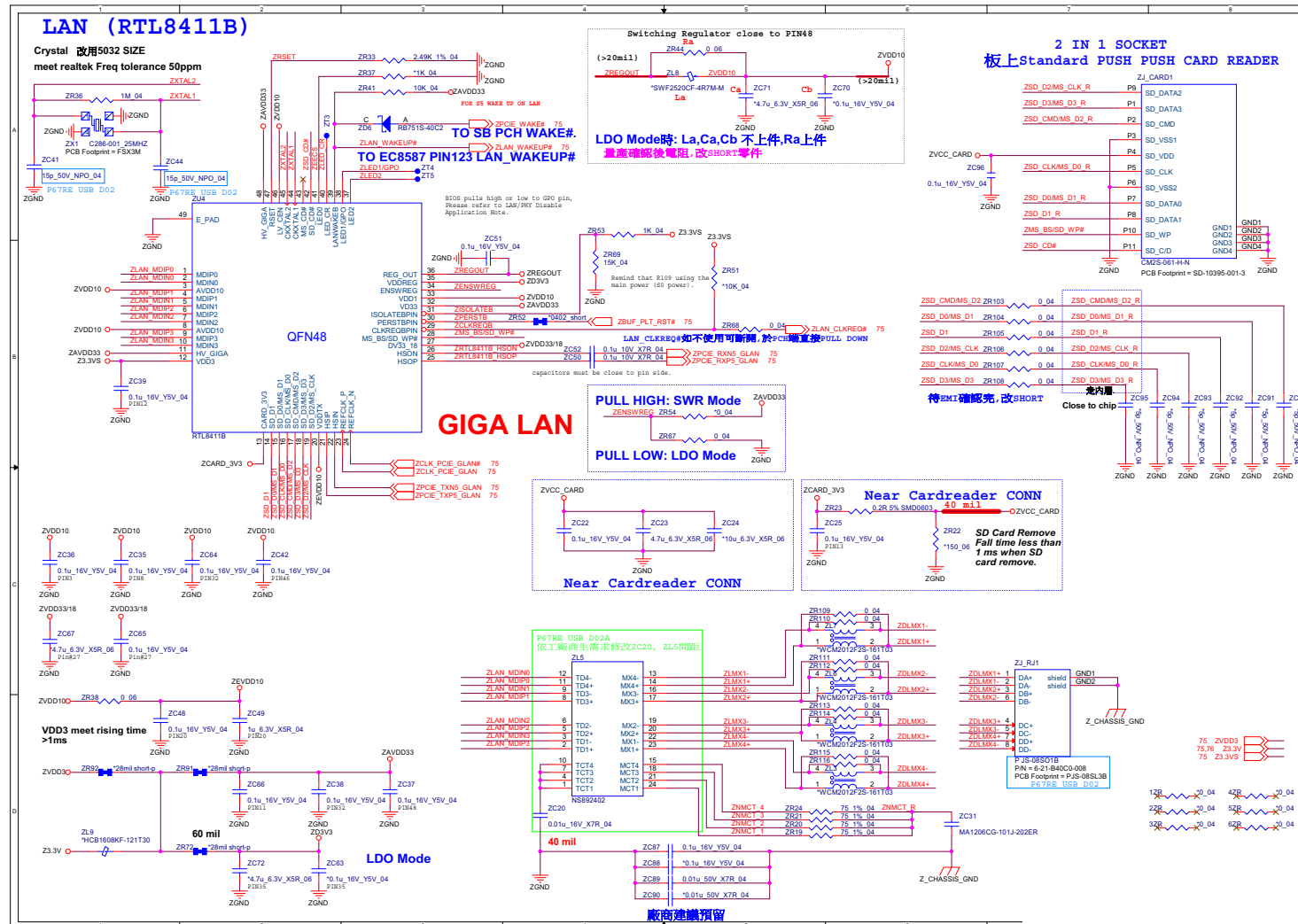
B. Schematic Diagrams

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P650RE USB Board
3/3



Schematic Diagrams

P670RE USB Board 1/3

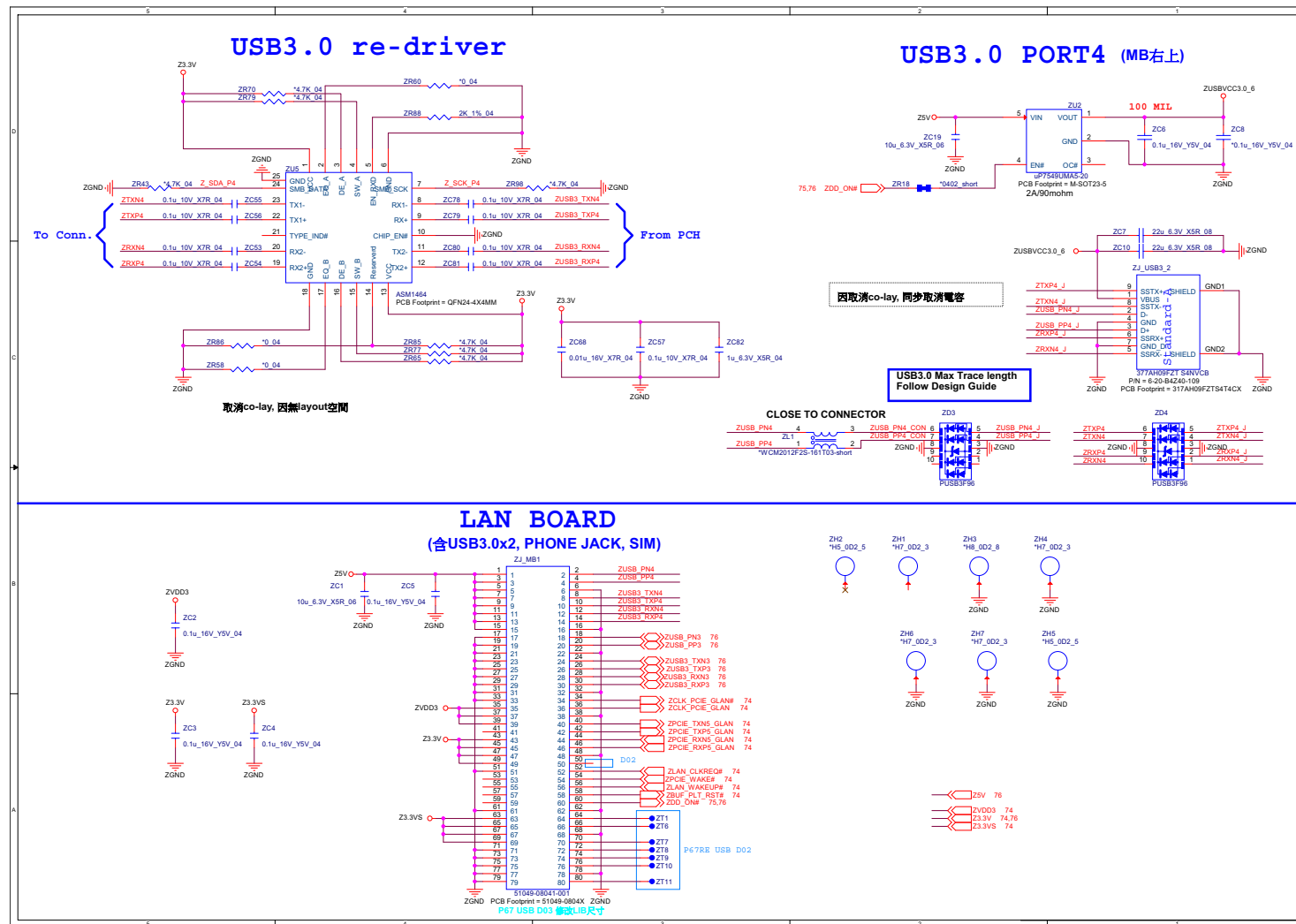


B.Schematic Diagrams

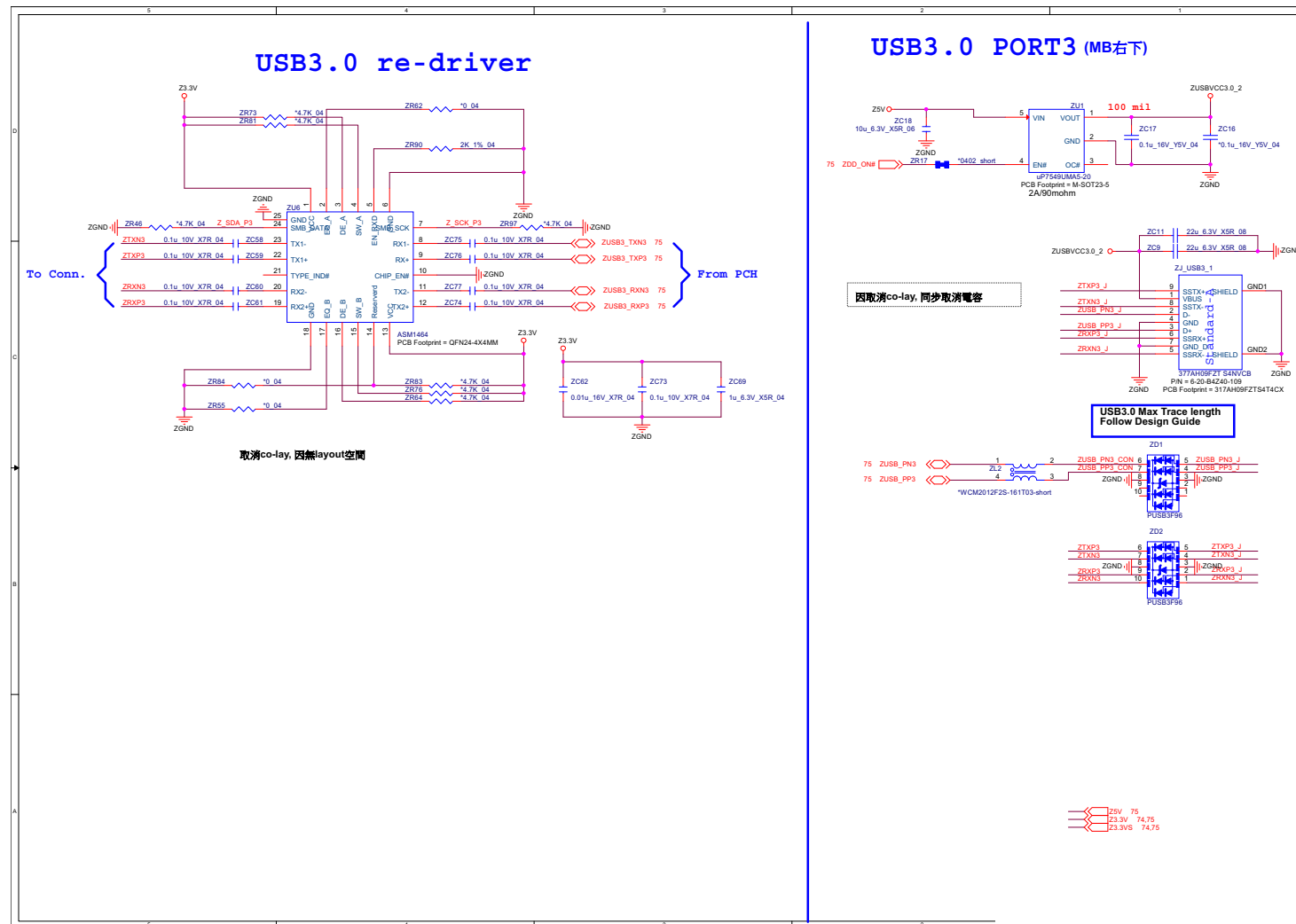
Sheet 74 of 79
P670RE USB Board
1/3

B. Schematic Diagrams

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P670RE USB Board
2/3



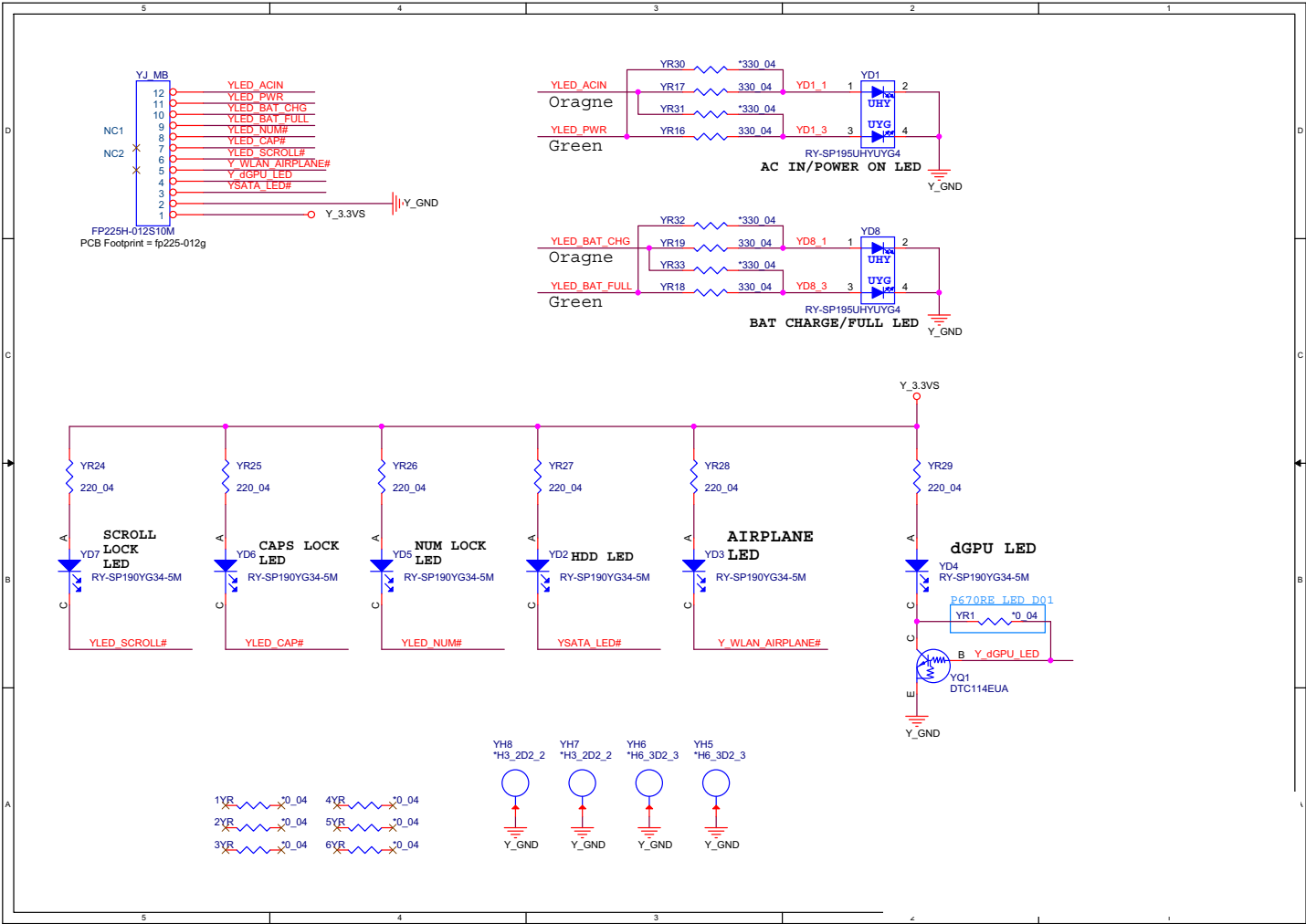
Sheet 76 of 79
P670RE USB Board
3/3



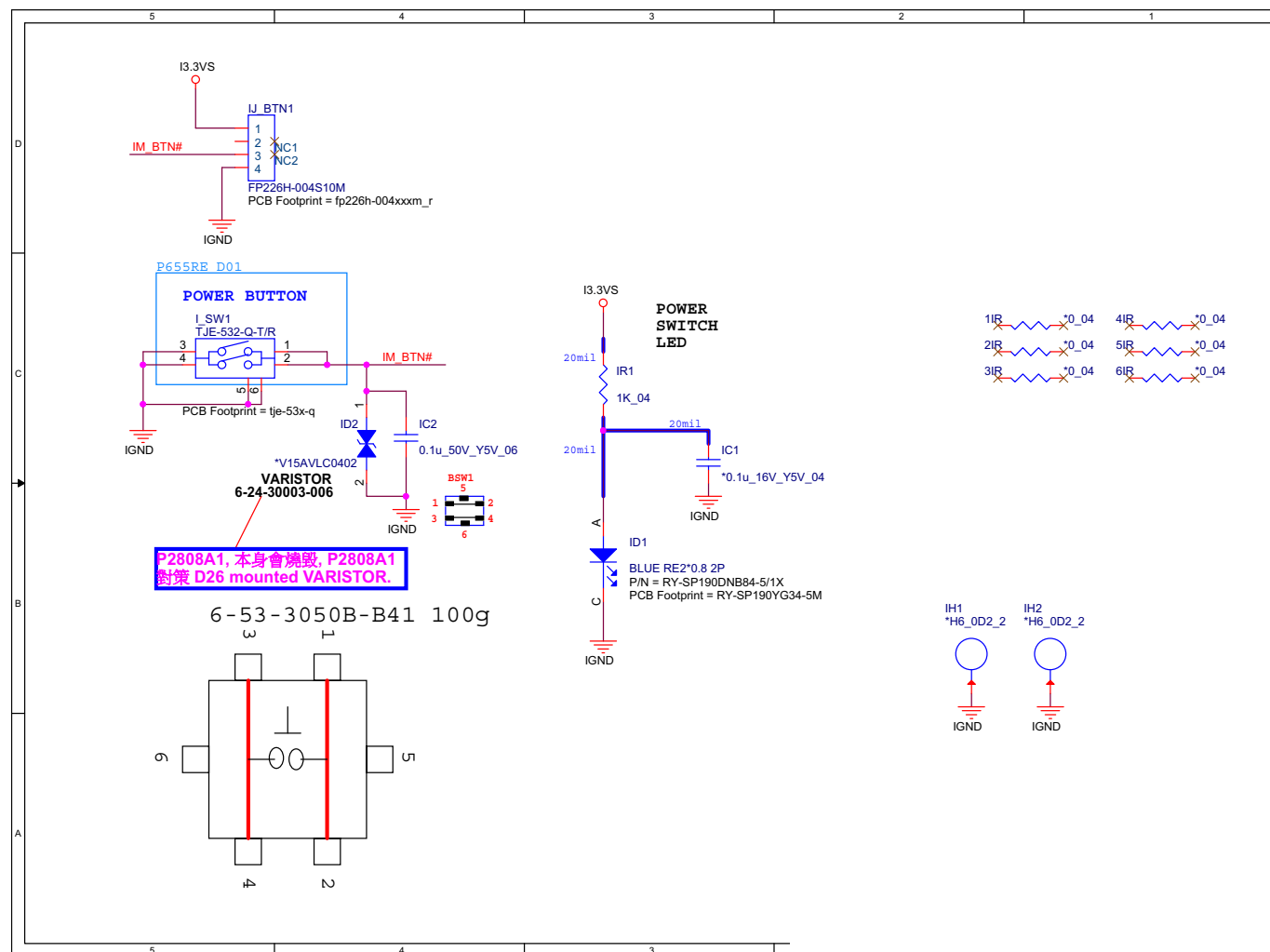
Schematic Diagrams

P670RE LED Board

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P670RE LED Board



P655RE Power Board

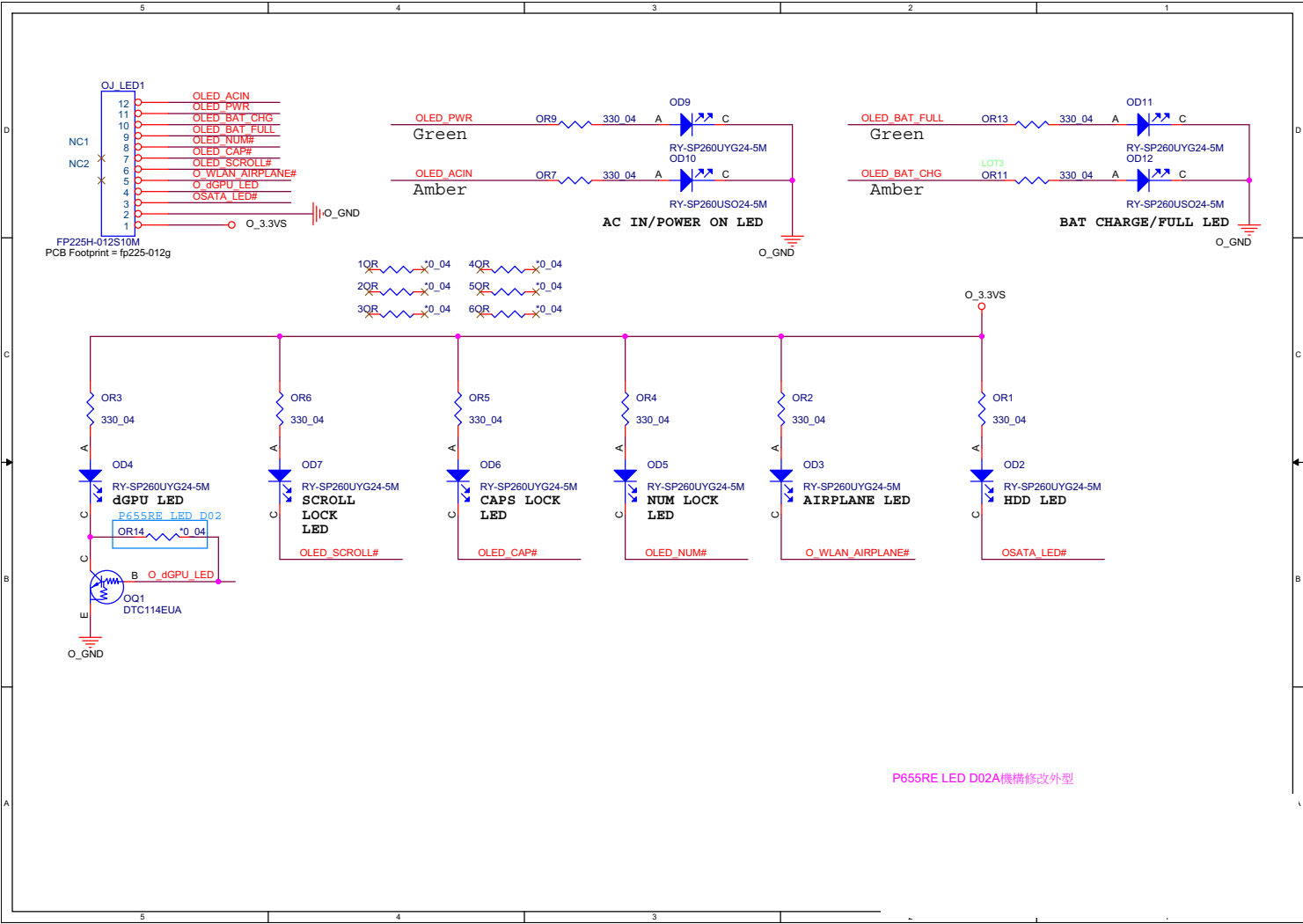


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P655RE Power
Board

Schematic Diagrams

P655RE LED Board

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P655RE LED Board



Appendix C: Updating the FLASH ROM BIOS

To update the FLASH ROM BIOS, you must:

- Download the BIOS update from the web site.
- Unzip the files onto a bootable CD/DVD/USB Flash Drive.
- Reboot your computer from an external CD/DVD/USB Flash Drive.
- Use the flash tools to update the flash BIOS using the commands indicated below.
- Restart the computer booting from the HDD and press **F2** at startup enter the BIOS.
- Load setup defaults from the BIOS and save the default settings and exit the BIOS to restart the computer.
- After rebooting the computer you may restart the computer again and make any required changes to the default BIOS settings.

Download the BIOS

1. Go to www.clevo.com.tw and point to **E-Services** and click **E-Channel**.
2. Use your user ID and password to access the appropriate download area (BIOS), and download the latest BIOS files (the BIOS file will be contained in a batch file that may be run directly once unzipped) for your computer model (see sidebar for important information on BIOS versions).

Unzip the downloaded files to a bootable CD/DVD/ or USB Flash drive

1. Insert a bootable CD/DVD/USB flash drive into the CD/DVD drive/USB port of the computer containing the downloaded files.
2. Use a tool such as Winzip or Winrar to unzip all the BIOS files and refresh tools to your bootable CD/DVD/USB flash drive (you may need to create a bootable CD/DVD with the files using a 3rd party software).

Set the computer to boot from the external drive

1. With the bootable CD/DVD/USB flash drive containing the BIOS files in your CD/DVD drive/USB port, restart the computer and press **F2** (in most cases) to enter the BIOS.
2. Use the arrow keys to highlight the **Boot** menu.
3. Use the “+” and “-” keys to move boot devices up and down the priority order.
4. Make sure that the CD/DVD drive/USB flash drive is set first in the boot priority of the BIOS.
5. Press **F4** to save any changes you have made and exit the BIOS to restart the computer.



BIOS Version

Make sure you download the latest correct version of the BIOS appropriate for the computer model you are working on.

You should only download BIOS versions that are **V1.01.XX or higher** as appropriate for your computer model.

Note that BIOS versions are not backward compatible and therefore **you may not downgrade your BIOS to an older version** after upgrading to a later version (e.g if you upgrade a BIOS to ver 1.01.05, you **MAY NOT** then go back and flash the BIOS to ver 1.01.04).

BIOS Update

Use the flash tools to update the BIOS

1. Make sure you are not loading any memory management programs such as HIMEM by holding the **F8** key as you see the message “**EFI Shell**”. You will then be prompted to give “**Y**” or “**N**” responses to the programs being loaded by EFI Shell. Choose “**N**” for any memory management programs.
2. You should now see **DISK fsX:\>** (X is the designated drive number for the CD/DVD drive/USB flash drive).
3. **Type the following command:**

fsX:\> Flash.nsh

4. The utility will then proceed to flash the BIOS.
5. You should then be prompted to press any key to restart the system or turn the power off, and then on again but make sure you remove the CD/DVD/USB flash drive from the CD/DVD drive/USB port before the computer restarts.

Restart the computer (booting from the HDD)

1. With the CD/DVD/USB flash drive removed from the CD/DVD drive/USB port the computer should restart from the HDD.
2. Press **F2** as the computer restarts to enter the BIOS.
3. Use the arrow keys to highlight the **Exit** menu.
4. Select **Load Setup Defaults** (or press **F3**) and select “**Yes**” to confirm the selection.
5. Press **F4** to save any changes you have made and exit the BIOS to restart the computer.

Your computer is now running normally with the updated BIOS

You may now enter the BIOS and make any changes you require to the default settings.