

# SERVICE MANUAL

P670SA / P671SA

*notebook*





**Notebook Computer**

**P670SA / P671SA**

**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 *P670SA* / *P671SA* 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

## 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 19.5V, 7.7A (**150** 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:

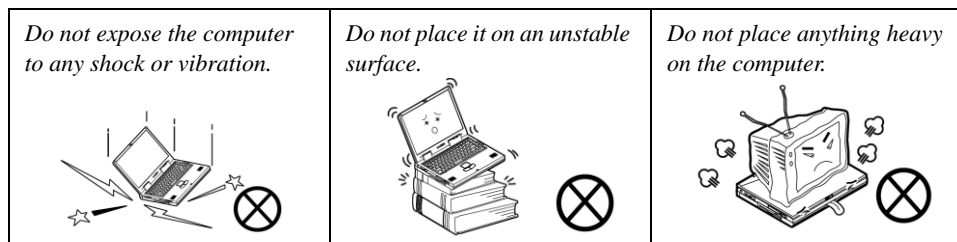
This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

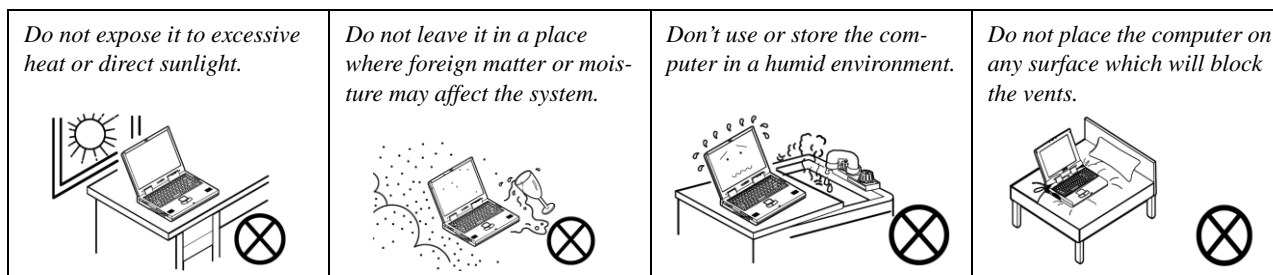
## Instructions for Care and Operation

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

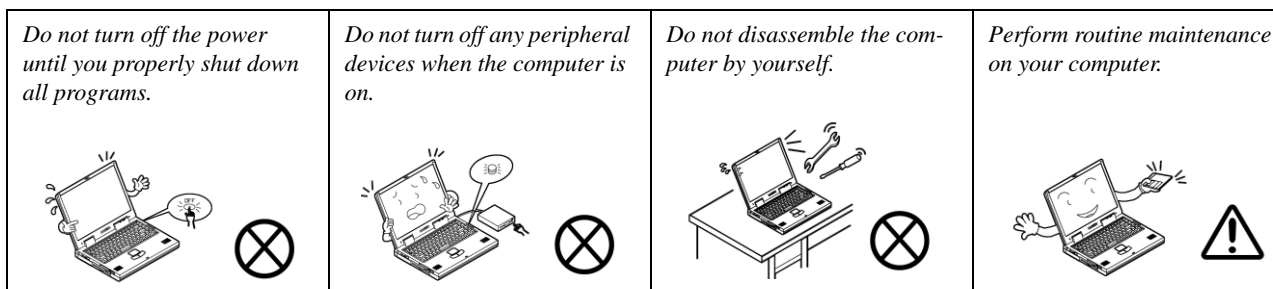
1. **Don't drop it, or expose it to shock.** If the computer falls, the case and the components could be damaged.



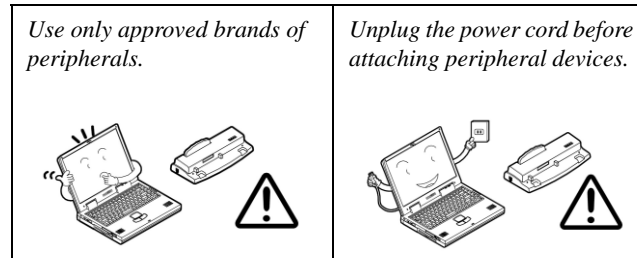
2. **Keep it dry, and don't overheat it.** Keep the computer and power supply away from any kind of heating element. This is an electrical appliance. If water or any other liquid gets into it, the computer could be badly damaged.



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.



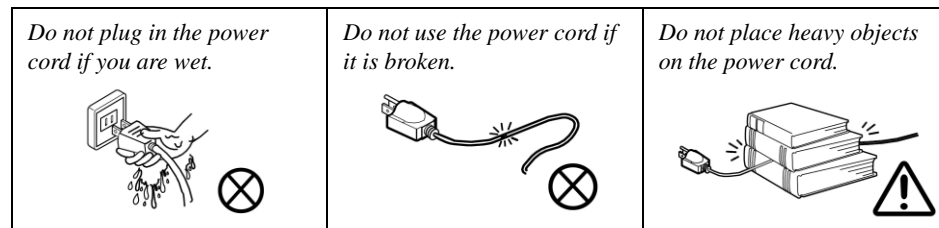
4. **Avoid interference.** Keep the computer away from high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage your data.
5. **Take care when using peripheral devices.**



## 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

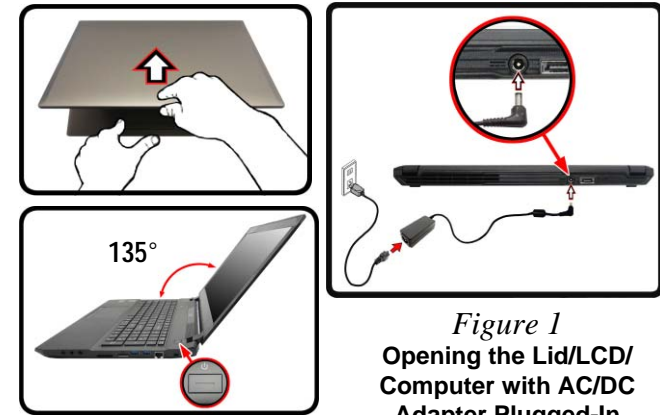
You may also need to consult the following manual for additional information:

### 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 on the left of the computer, then plug the AC power cord into an outlet, and connect the AC power cord to the AC/DC adapter.
6. 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).
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 **P670SA / P671SA** 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 **P670SA / P671SA** 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 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

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

### Processor Options

**Intel® Core™ i7 Processor**  
**i7-4870HQ (2.50GHz), i7-4720HQ (2.60GHz)**  
 6MB L3 Cache, **22nm**, DDR3L-1600MHz, TDP 47W

### Core Logic

Intel® HM87 Chipset

### BIOS

AMI BIOS (48Mb SPI Flash-ROM)

### LCD

17.3" (43.94cm), 16:9, FHD (1920x1080)

### Video Adapter

**Intel® Integrated GPU and NVIDIA® Discrete GPU**

**Supports Microsoft Hybrid Graphics**

#### Intel Integrated GPU

**Intel® HD Graphics 5200 (Core i7-4870HQ CPU Integrated)**

Dynamic Frequency (Intel Dynamic Video Memory Technology for up to **1.7GB**)

Microsoft DirectX®11.1 Compatible

**Intel® HD Graphics 4600 (Core i7-4720HQ CPU Integrated)**

Dynamic Frequency (Intel Dynamic Video Memory Technology for up to **1.7GB**)

Microsoft DirectX®11.1 Compatible

#### NVIDIA Discrete GPU

**NVIDIA® GeForce GTX 965M**

**2GB GDDR5 Video RAM**

Microsoft DirectX®12 Compatible

### Memory

Four 204 Pin SO-DIMM Sockets Supporting **DDR3L 1600MHz** Memory

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

Memory Expandable from **4GB (minimum)** up to **32GB (maximum)**

### Storage

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

Or

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

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

### Security

Security (Kensington® Type) Lock Slot

BIOS Password

**(Factory Option)** Fingerprint Reader Module

Trusted Platform Module 2.0

### 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 MB3  
 ANSP™ 3D sound technology on headphone output  
 Built-In Array Microphone  
 Sub-Woofer

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

**Interface**

Three USB 3.0 Ports (Including one AC/DC Powered USB port)  
 One eSATA Port (USB 3.0 Port Combined)  
 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

**Card Reader**

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

**M.2 Slots**

Slot 1 for **Combo WLAN and Bluetooth** Module  
 Slot 2 for **SATA or PCIe SSD**  
**(Factory Option)** Slot 3 for **SATA SSD**

**Communication**

Built-In Gigabit Ethernet LAN  
 2.0M FHD PC Camera Module

**WLAN/ Bluetooth M.2 Modules:**

**(Factory Option)** Intel® Wireless-AC 7265 Wireless LAN **(802.11ac)** + Bluetooth **4.0**

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

**(Factory Option)** Intel® Wireless-AC 3160 Wireless LAN **(802.11ac)** + Bluetooth **4.0**

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

**(Factory Option)** Qualcomm® Atheros Killer Wireless-AC 1525 Wireless LAN **(802.11ac)** + Bluetooth **4.0**

**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: 19.5V, 7.7A **(150W)**

**Dimensions & Weight**

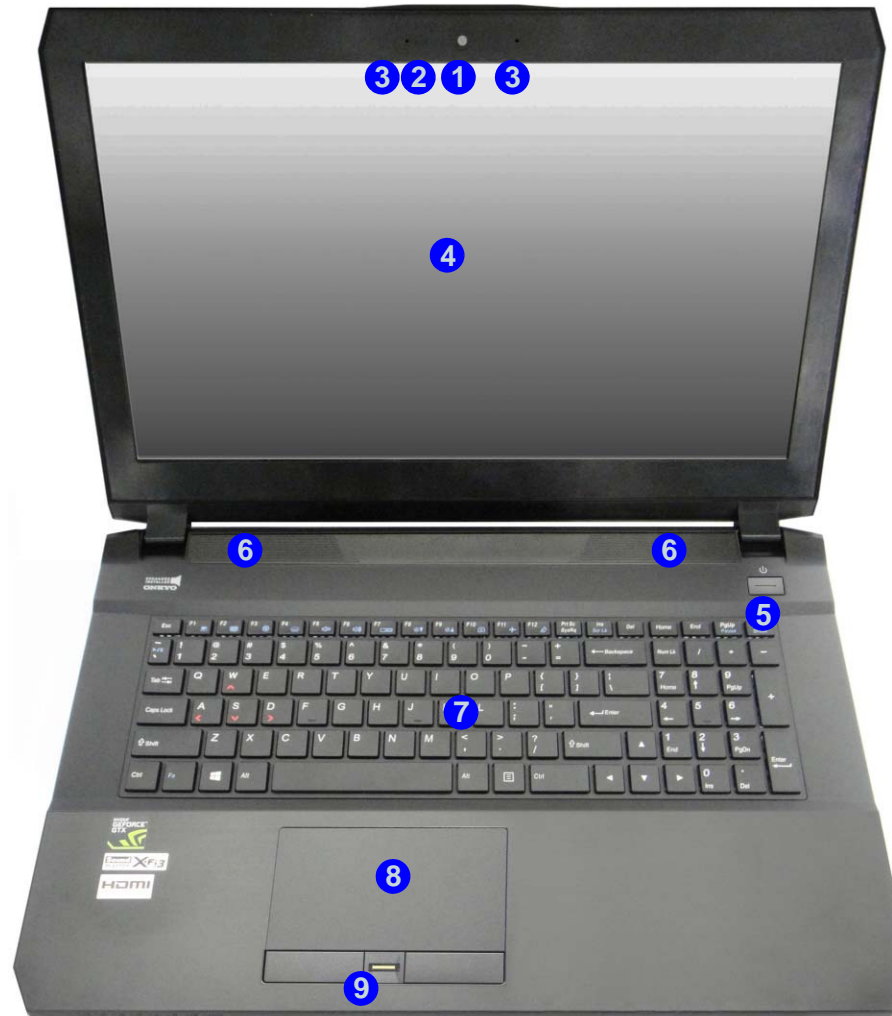
417mm (w) \* 287mm (d) \* 29.98mm (h)  
 3.2kg (Barebone with 60WH Battery)

## Introduction

Figure 1  
Top View

1. PC Camera
2. \*PC Camera LED  
*\*When the PC camera is in use, the LED will be illuminated in red.*
3. Built-In Array Microphone
4. LCD
5. Power Button
6. Speakers
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

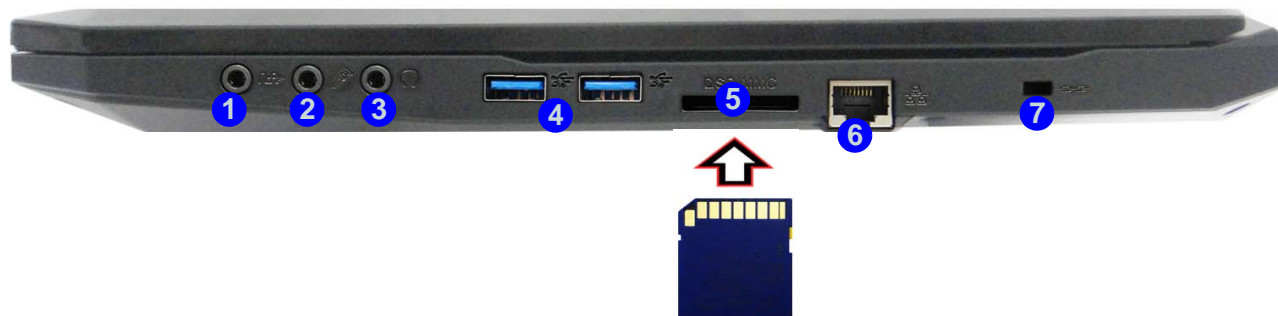


Figure 3  
Right Side View

1. S/PDIF-Out Jack
2. Microphone-In Jack
3. Headphone-Out Jack
4. USB 3.0 Ports
5. Multi-in-1 Card Reader
6. RJ-45 LAN Jack
7. 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



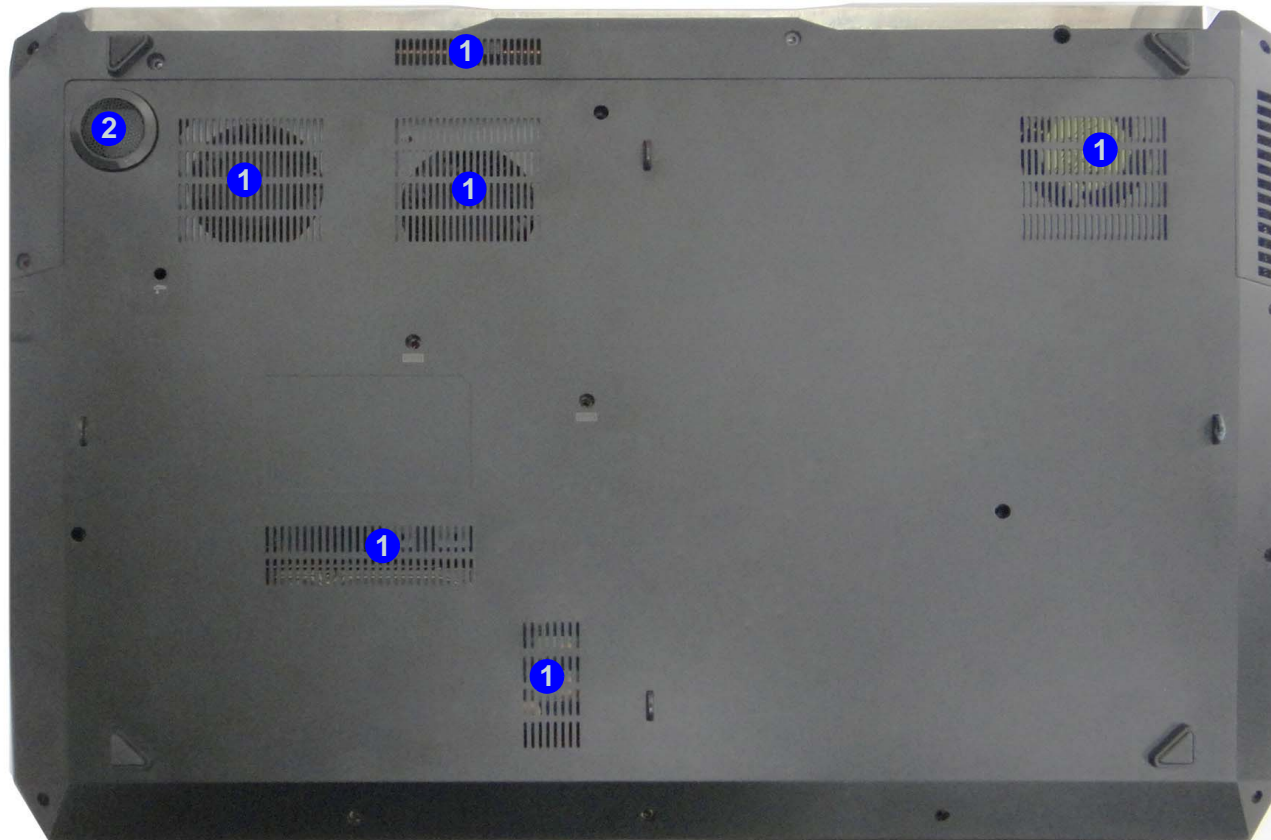
*Figure 5*  
**Rear View**

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

REAR VIEW



## External Locator - Bottom View



*Figure 6*  
**Bottom View**

1. Vent
2. Sub Woofer



### Overheating

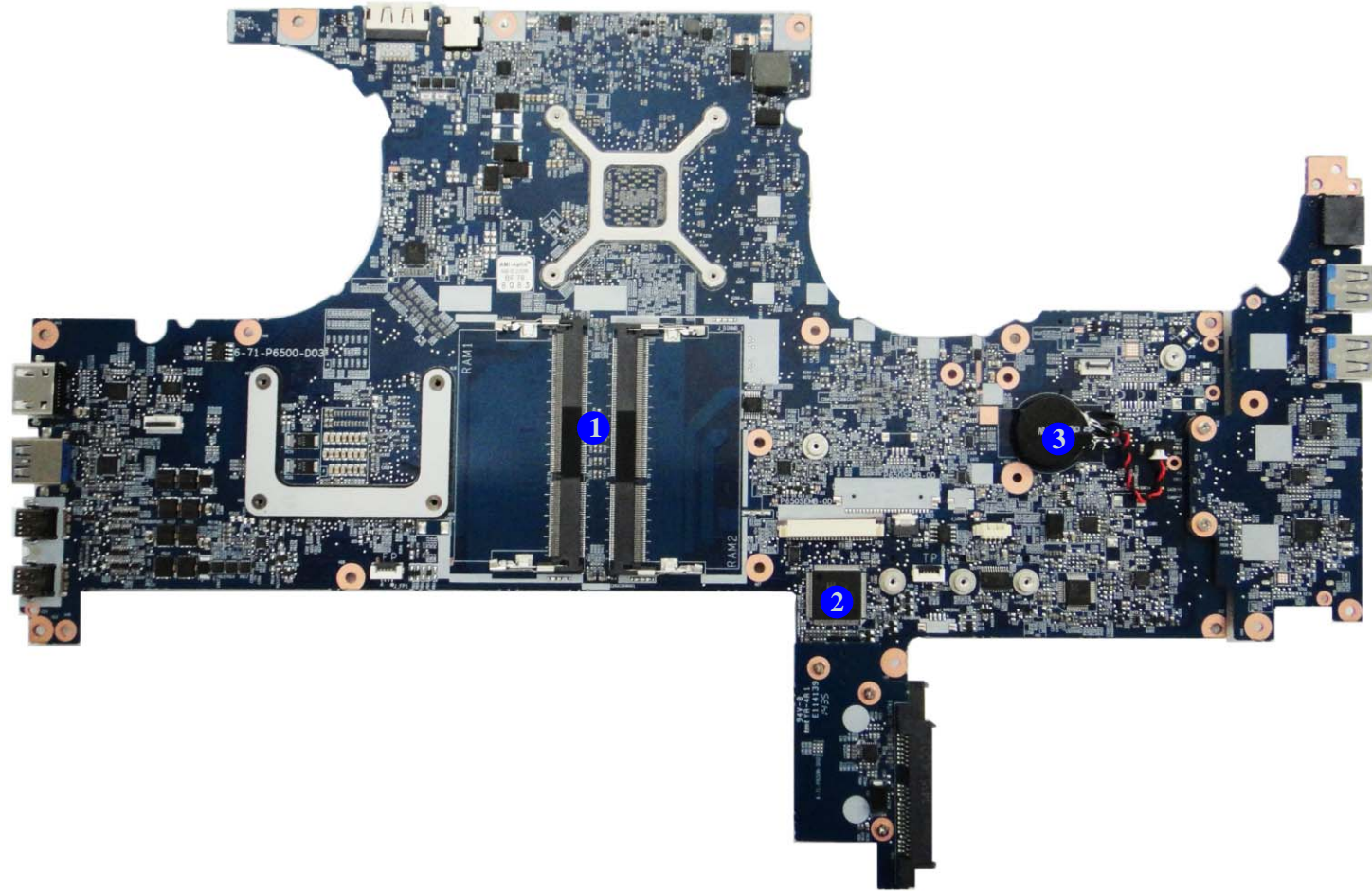
To prevent your computer from overheating, make sure nothing blocks any vent while the computer is in use.

## Introduction

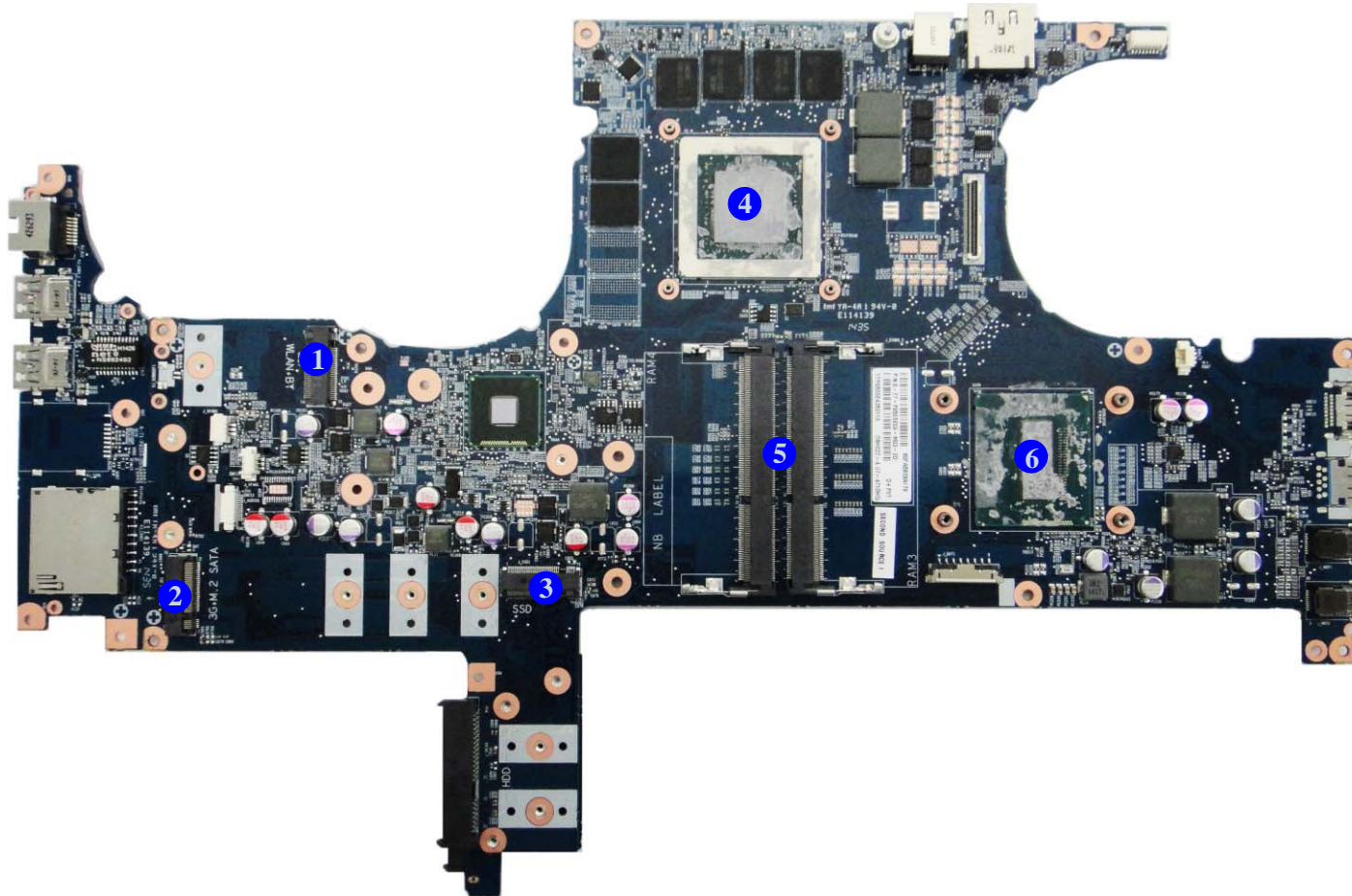
*Figure 7*  
**Mainboard Top  
Key Parts**

1. Memory Slots  
DDR3L 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**

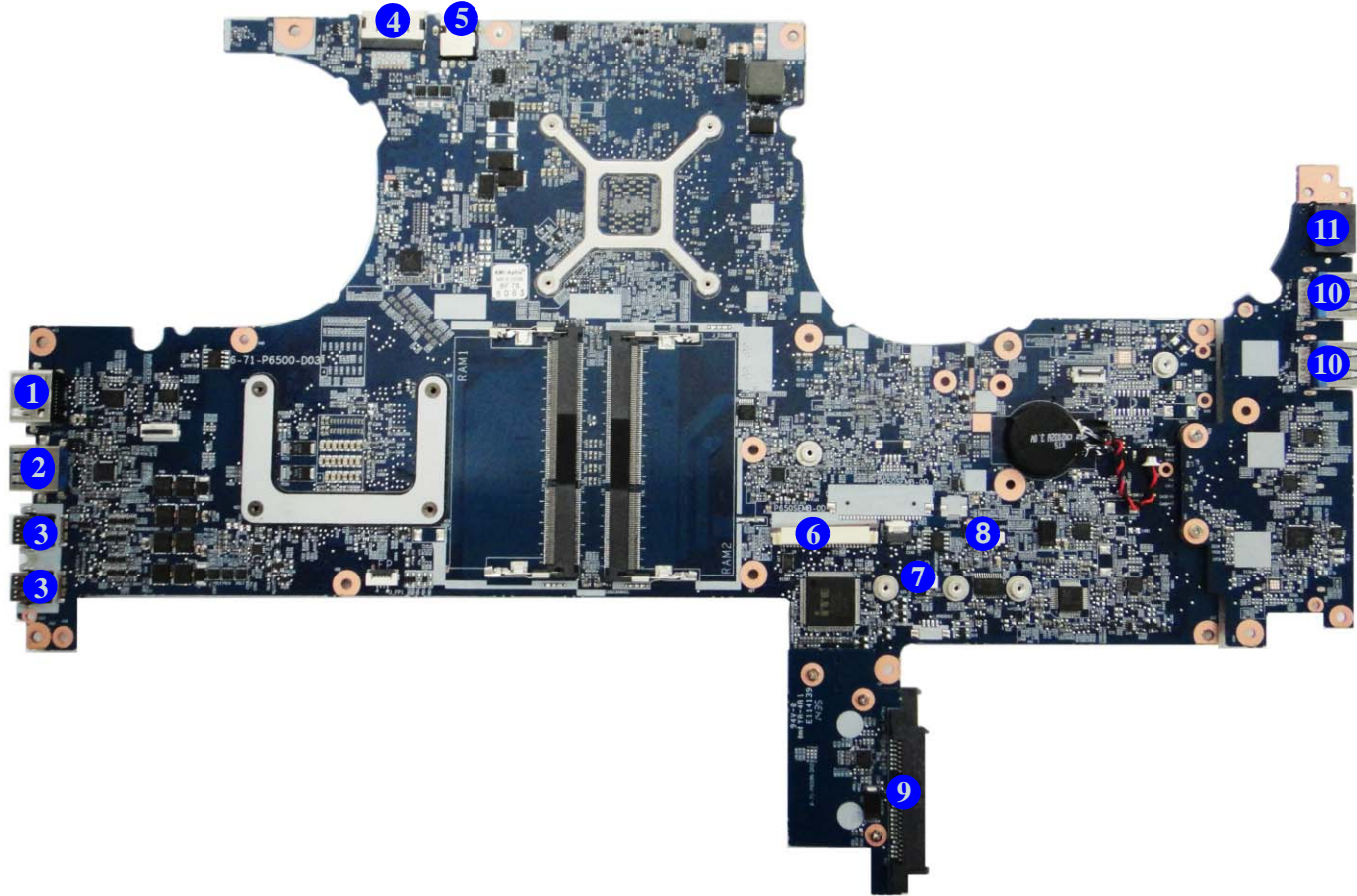
1. Mini-Card Connector (WLAN Module)
2. Mini-Card Connector (M.2 3G/SATA Module)
3. Mini-Card Connector (M.2 PCIE/SATA SSD Module)
4. GPU-GTX965M
5. Memory Slots (DDR3L SO-DIMM)
6. CPU

## Introduction

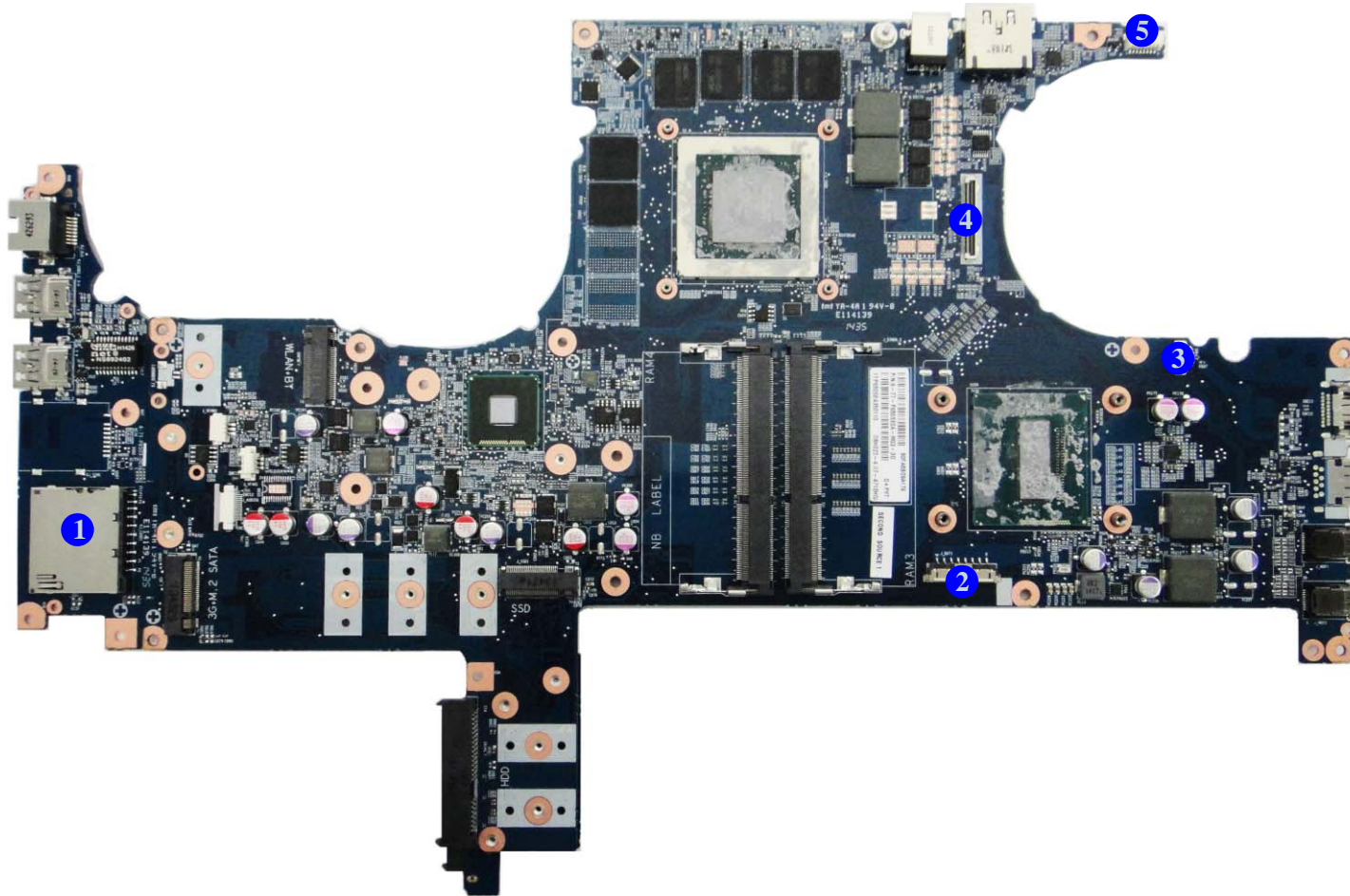
*Figure 9*  
**Mainboard Top  
Connectors**

1. HDMI-Out Port
2. USB Port 3.0  
Connector
3. Mini Display Port
4. eSATA + USB 3.0
5. DC-In Jack
6. Keyboard Cable  
Connector
7. TP Connector
8. Speaker  
Connector
9. HDD Connector
10. USB Port 3.0  
Connector
11. 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 *P670SA / P671SA* series notebook's parts and sub-systems. When it comes to reassembly, reverse the procedures (unless otherwise indicated).

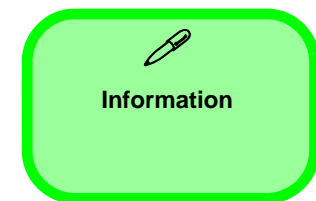
We suggest you completely review any procedure before you take the computer apart.

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

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**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-borne 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 Module:

1. Remove the battery [page 2 - 6](#)
2. Remove the M.2 SSD [page 2 - 13](#)
3. Install the M.2 SSD [page 2 - 15](#)

#### To remove the Wireless LAN Module:

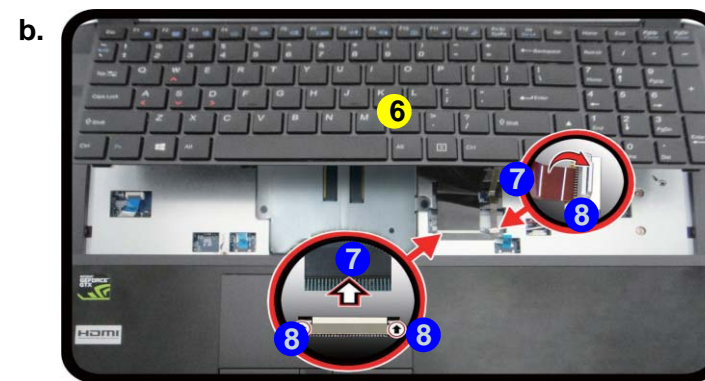
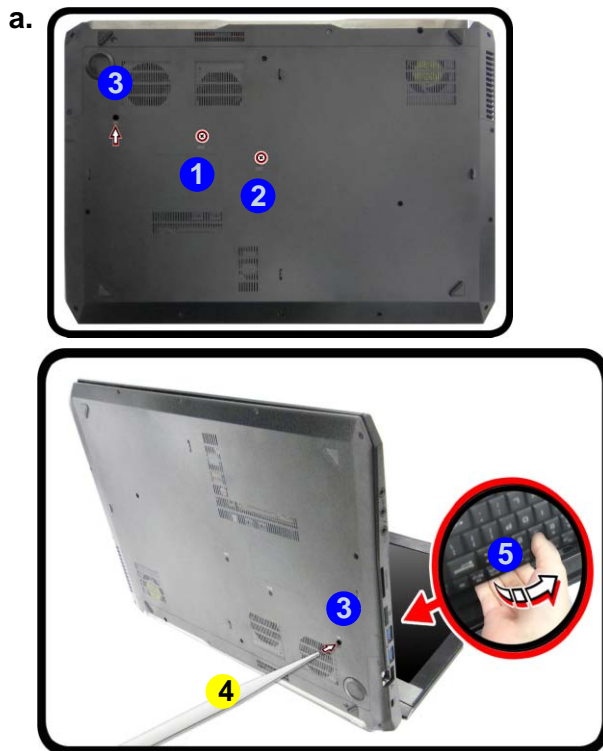
1. Remove the battery [page 2 - 6](#)
2. Remove the WLAN [page 2 - 17](#)

#### To remove the 3G / M.2 SATA Module:

1. Remove the battery [page 2 - 6](#)
2. Remove the 3G [page 2 - 19](#)
3. Remove the M.2 SATA [page 2 - 20](#)

## 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 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

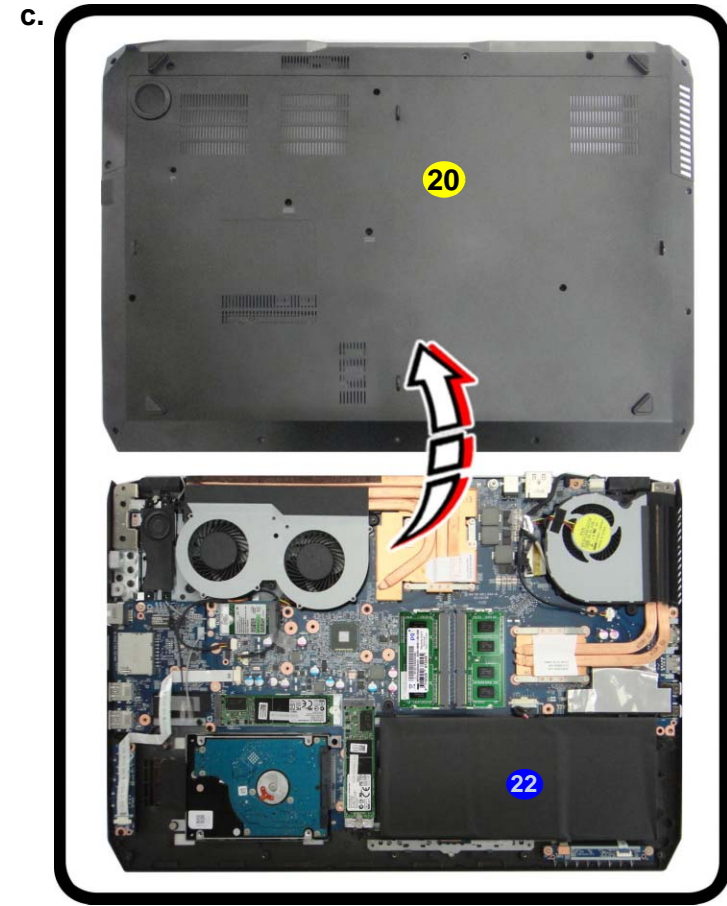
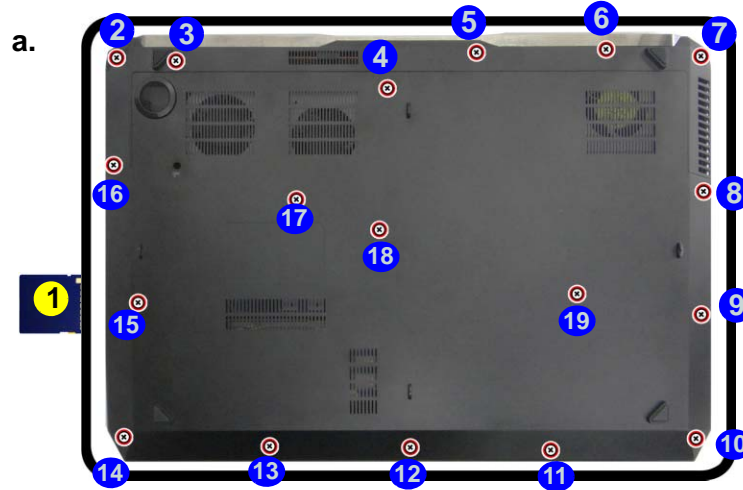
## Disassembly

*Figure 2*  
**Battery Removal**

- Remove the SD card cover and screws.
- Remove the screws at the rear of the computer.
- Remove the bottom case to locate the battery.

## Removing the Battery

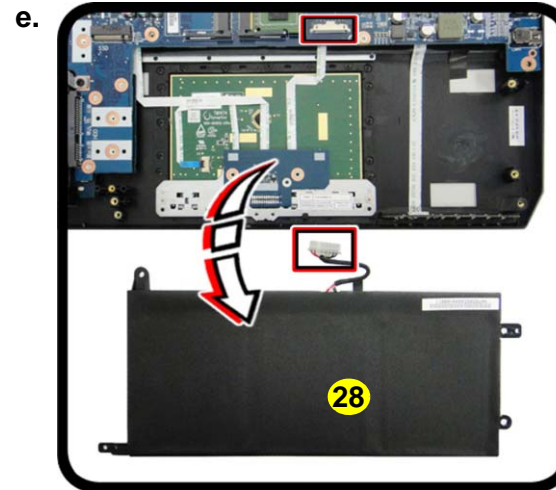
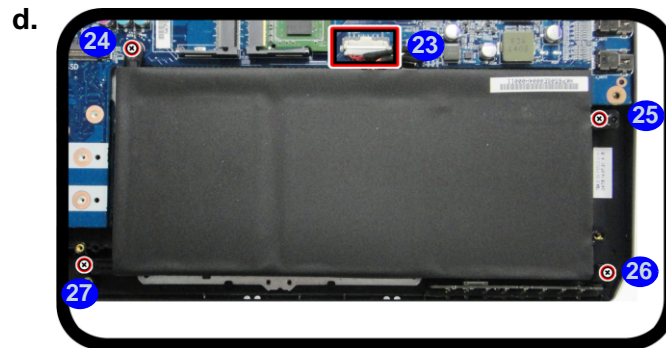
- Turn the computer off, and turn it over.
- Remove the SD card cover **1** and screws **2** - **19** (*Figure 2a*).
- Carefully lift the bottom case **20** up in the direction of the arrow **21** and remove it (*Figure 2b*).
- The battery will be visible at point **22** on the computer (*Figure 2c*).



1. SD Card Cover  
20. Bottom Case

- 18 Screws

- Carefully disconnect the cable **23**, then remove screws **24** - **27** (*Figure 3d*).
- Lift the battery **28** off the computer (*Figure 3e*).
- Reinsert the bottom case starting from point **29** 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.)

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



28. Battery

- 4 Screws

*Figure 4*  
**HDD Assembly  
Removal**

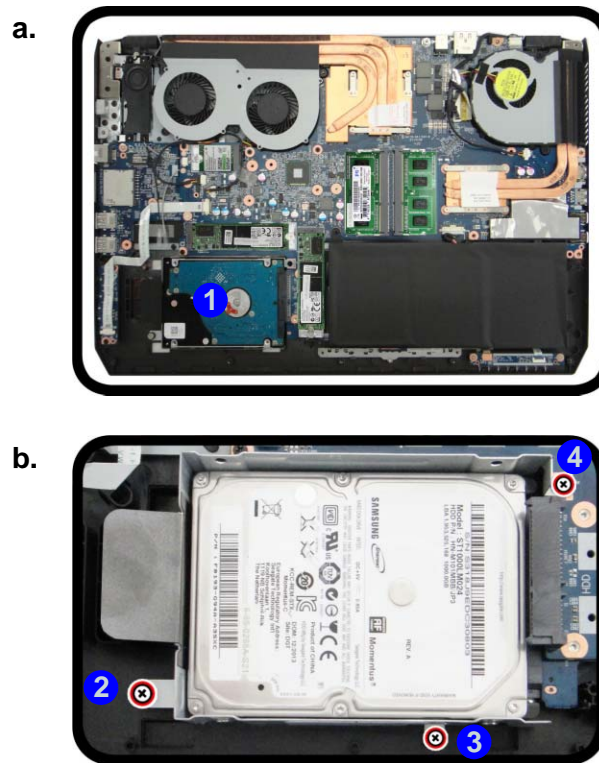
- Locate the HDD.
- Remove the screws.

## 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](#)).



#### 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.



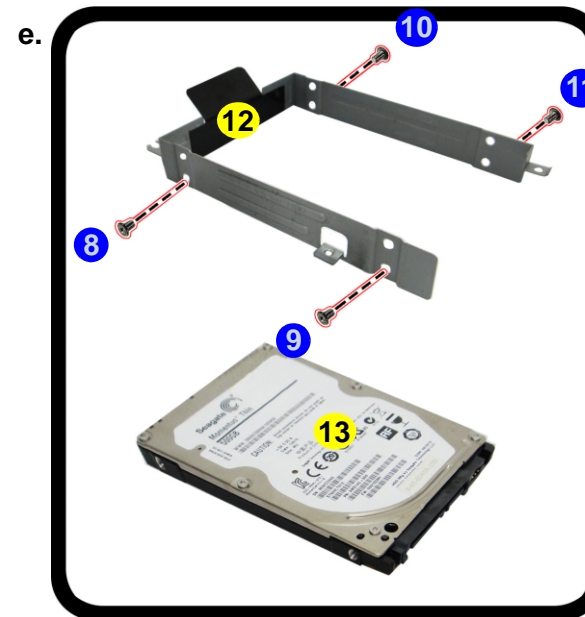
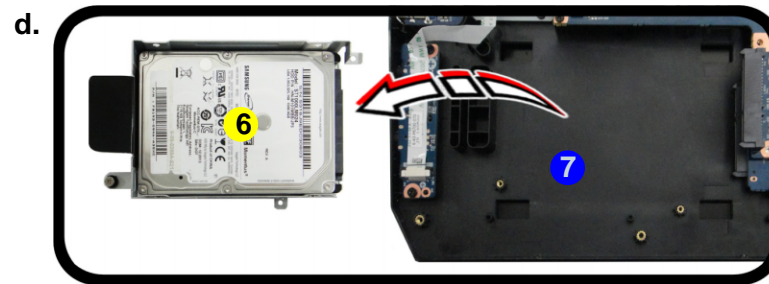
- Hard Disk
- 3 Screws




4. Carefully pull the hard disk assembly 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 - 11 and bracket 12 from the hard disk 13 (Figure 5e).
7. Reverse the process to install a new hard disk (do not forget to replace the screws).

Figure 5  
HDD Assembly  
Removal (cont'd.)

- c. 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.






**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 be installed on either upper or lower 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.



6. HDD Assembly  
 12. Adhesive Cover  
 13. HDD

- 4 Screws

## Disassembly

*Figure 6*  
**RAM-1 Module  
Removal**

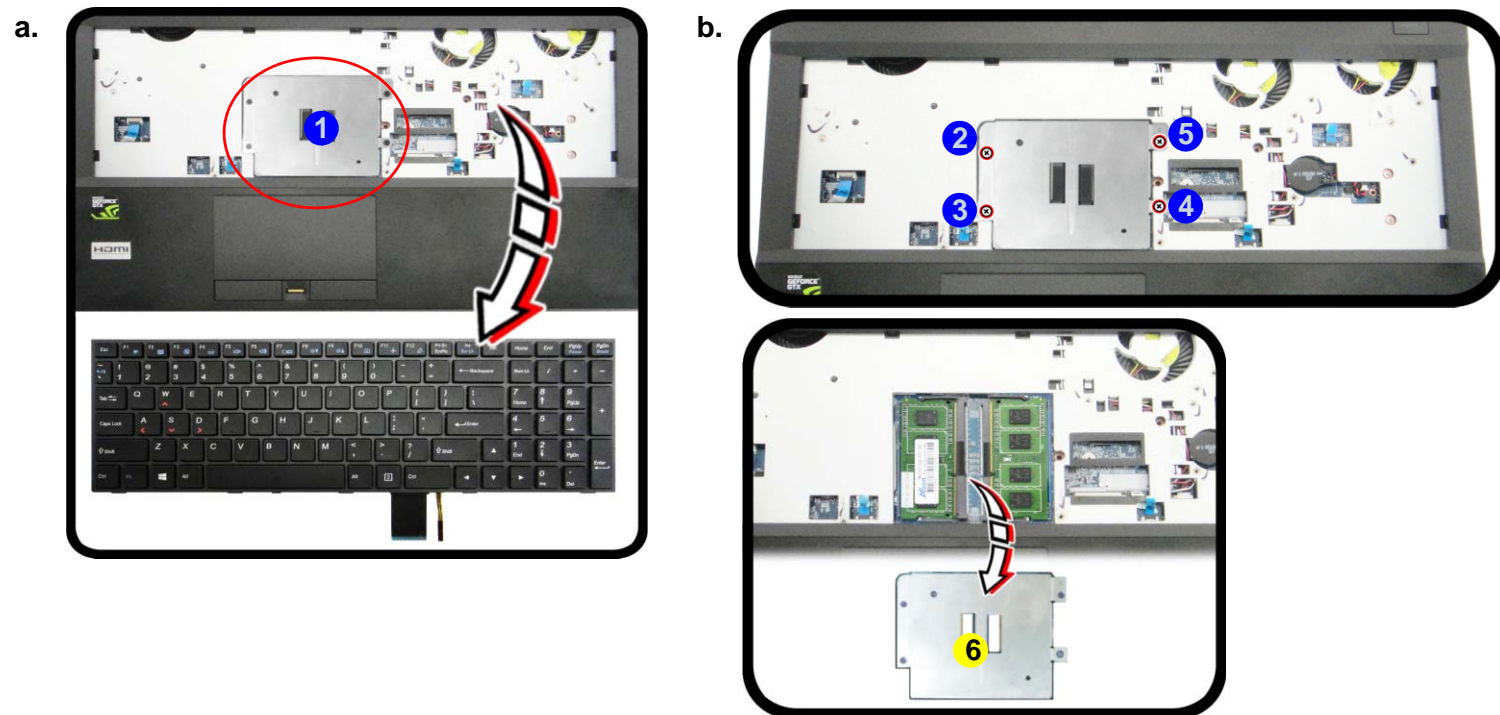
- The RAM modules will be visible at point ①.
- Remove the screws and lift the shielding plate out.

## Removing the System Memory (RAM)

The computer has two memory sockets for 204 pin Small Outline Dual In-line Memory Modules (SO-DIMM) supporting DDR3L up to 1600 MHz. The main memory can be expanded up to 16GB. 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

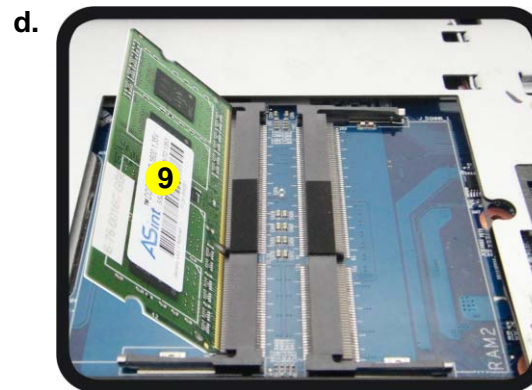
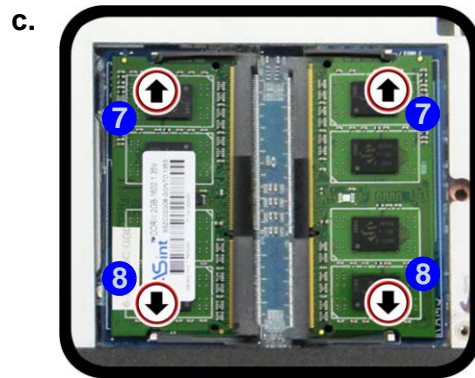
Be careful not to touch the metal pins on the module's connecting edge. Even the cleanest hands have oils which can attract particles, and degrade the module's performance.



#### 6. RAM Shielding Plate

- 4 Screws

- 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.
- Pull the latches to release the second module if necessary.
- Insert a new module holding it at about a 30° angle and fit the connectors firmly into the memory slot.
- 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.
- 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)**

- Pull the release latches.
- 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**

- The RAM modules will be visible at point **1** on the mainboard.
- Pull the release latches.
- Remove the module.



### Contact Warning

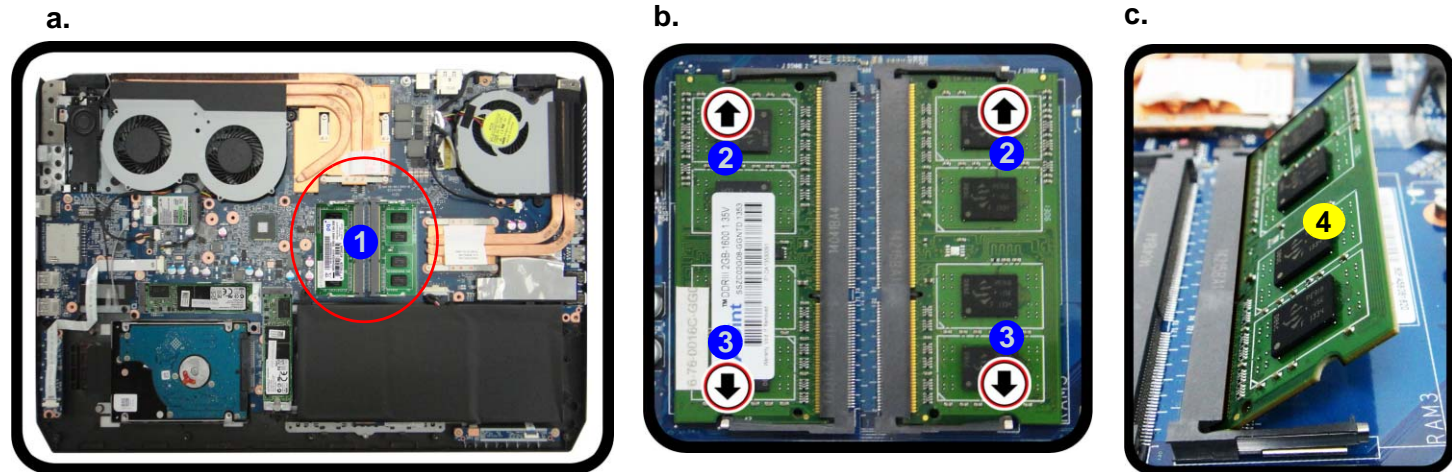
Be careful not to touch the metal pins on the module's connecting edge. Even the cleanest hands have oils which can attract particles, and degrade the module's performance.



### 4. RAM Module

## Memory-2 Upgrade Process

- Turn **off** the computer, turn it over, remove the battery ([page 2 - 6](#)).
- The RAM-2 modules will be visible at point **1** on the mainboard ([Figure 8a](#)).
- 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.
- Pull the latches to release the second module if necessary.
- Insert a new module holding it at about a 30° angle and fit the connectors firmly into the memory slot.
- 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.
- Press the module in and down towards the mainboard until the slot levers click into place to secure the module.
- Replace the bottom cover and the screws (see [page 2 - 6](#)).
- Restart the computer to allow the BIOS to register the new memory configuration as it starts up.



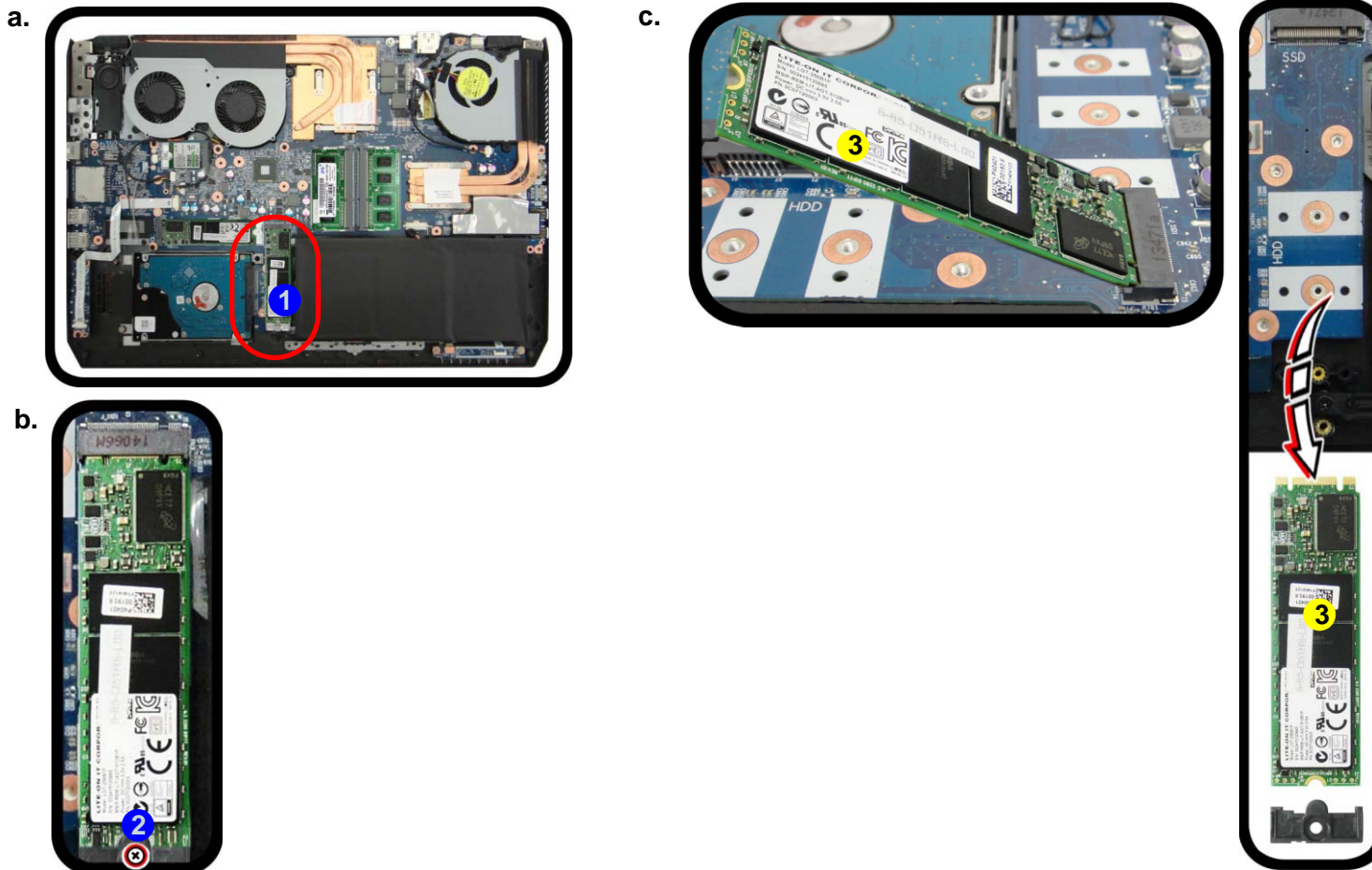
# Removing and Installing the the M.2 SSD Module

## M.2 SSD-1 Removal Procedure

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

*Figure 9*  
M.2 SSD-1 Module Removal

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



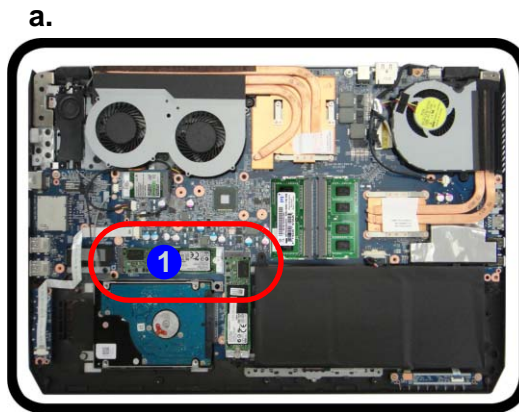
## Disassembly

*Figure 10*  
**M.2 SSD-2 Module Removal**

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

### M.2 SSD-2 Removal Procedure

- Turn off the computer, remove the battery ([page 2 - 6](#)).
- Locate the module, it is visible at point **1** ([Figure 10a](#)).
- Remove the screw **2** from the module ([Figure 10b](#)).
- The module **3** will pop-up ([Figure 10c](#)).
- Lift the module **3** up and off the computer ([Figure 10d](#)).
- Reverse the process to install a new module.



3. M2 SATA Module

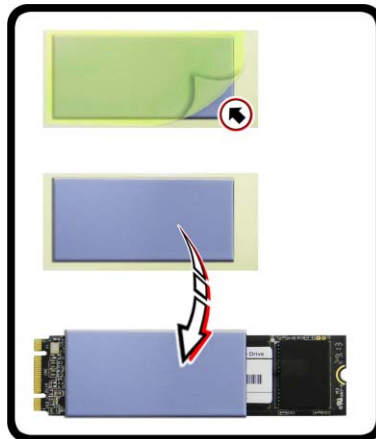
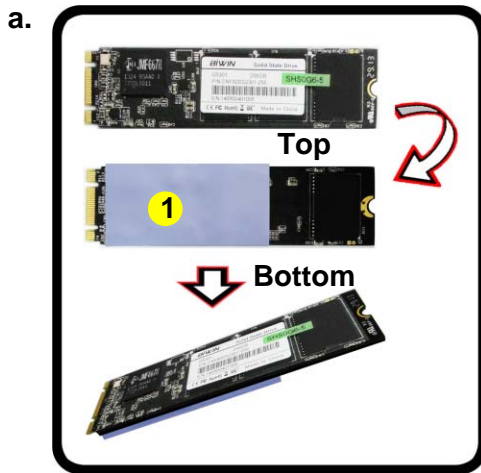
- 1 Screw


### M.2 SSD-2 Installation Procedure


1. Place the thermal pad **1** on the module as shown (*Figure 11a*).
2. Insert the module **2** in the computer (*Figure 11b*).
3. Tighten the screw **3** to secure it in place (*Figure 11c*).

*Figure 11*  
**M.2 SSD-2 Module Installation**

- a. Place the thermal pad.
- b. Insert the module.
- c. Tighten the screw.



  
**Thermal Pad**  
Be sure to place the thermal pad's adhesive side down onto the module surface as shown.

  
1. Thermal Pad  
2. M2 SATA Module  
• 1 Screw

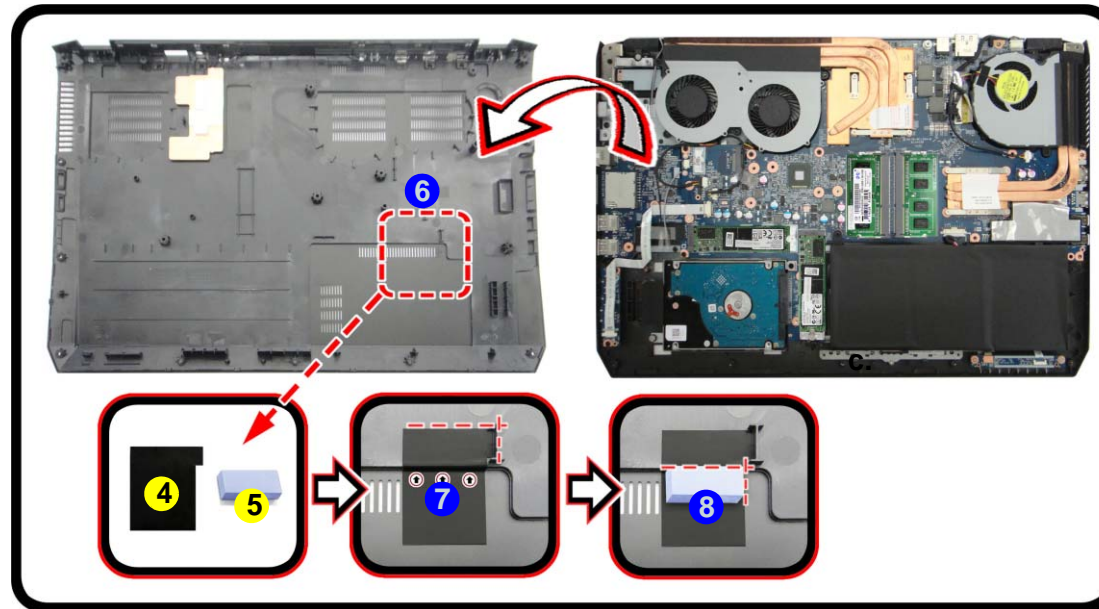
## Disassembly

*Figure 12*  
**M.2 SSD-2 Module  
 Installation (cont'd)**

d. Place the mylar and thermal pad as shown.

4. Press down the mylar **4** and thermal pad **5** into place at point **6** as shown (*Figure 12d*).
5. Make sure that the mylar is secure in place **7** and the thermal pad is in place along the contour **8** (no glue is required).
6. Replace the component bay cover and tighten the screws.

d.

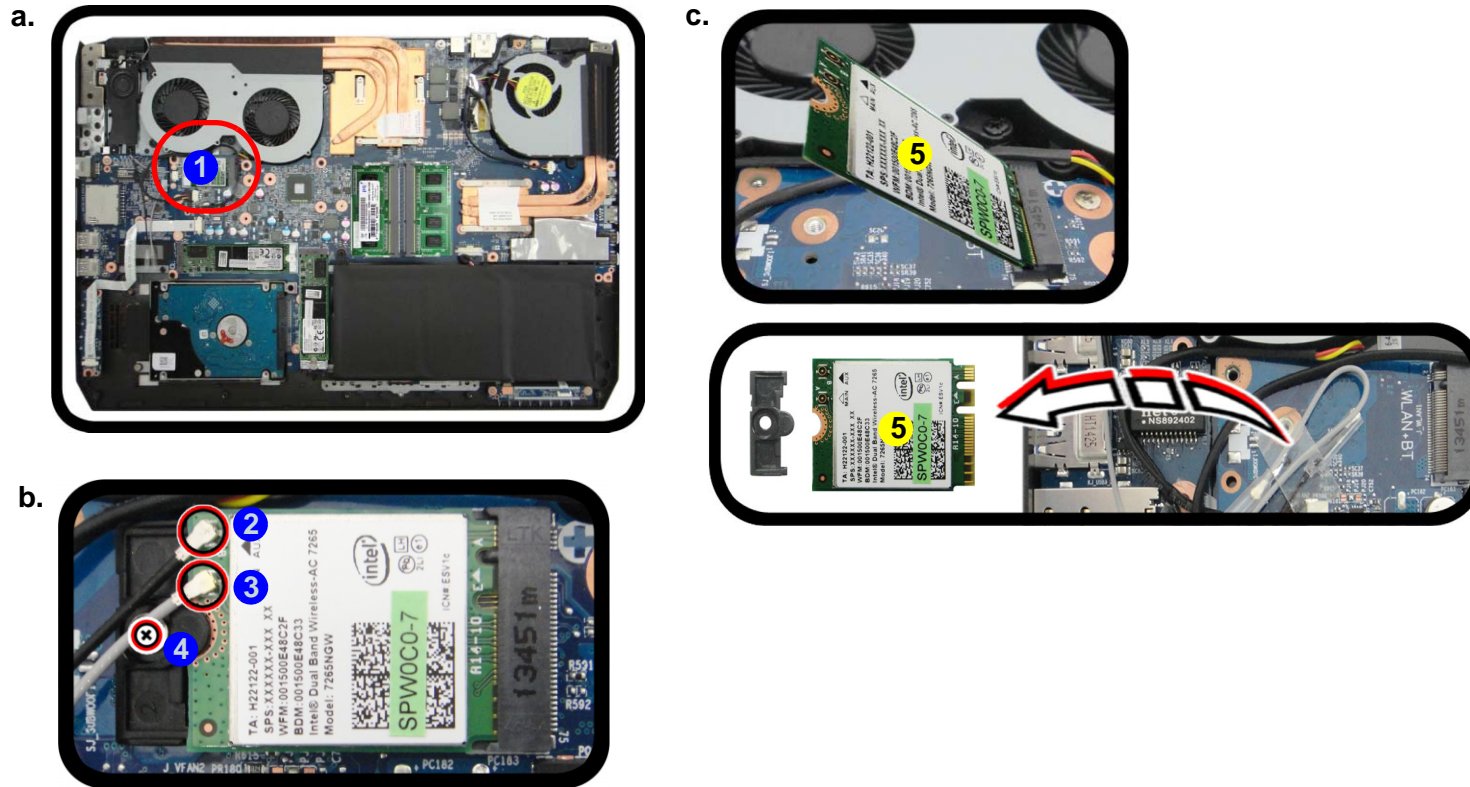


4. Mylar
5. Thermal Pad



## Removing the Wireless LAN Module


1. Turn **off** the computer, turn it over, remove the battery ([page 2 - 6](#)).
2. The Wireless LAN module will be visible at point **1** on the mainboard ([Figure 13a](#)).
3. Carefully disconnect the cables **2** & **3**, and then remove the screw **4** ([Figure 13b](#))
4. The Wireless LAN module **5** ([Figure 13c](#)) will pop-up, and you can remove it from the computer.



*Figure 13*  
**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 13b](#)).



5. Wireless LAN Module

- 1 Screw

## 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	Black	
	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).

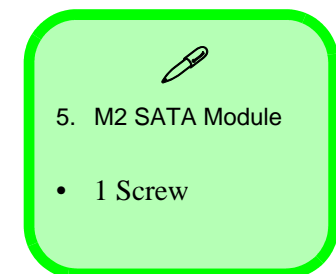
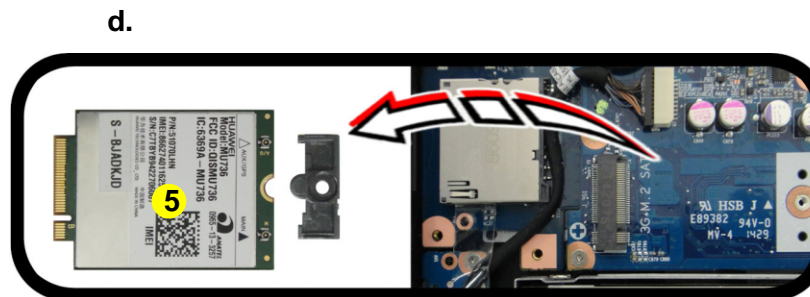
## Removing the 3G / M.2 SATA Module

### 3G Removal Procedure

1. Turn **off** the computer, remove the battery ([page 2 - 6](#)).
2. Locate the module, it is visible at point **1** ([Figure 14a](#)).
3. Carefully disconnect the cables **2** & **3**, and then remove the screw **4** from the module ([Figure 14b](#)).
4. The module **3** will pop-up ([Figure 14c](#)).
5. Lift the module **5** up and off the computer ([Figure 14d](#)).
6. Reverse the process to install a new module.

*Figure 14*  
**3G 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.



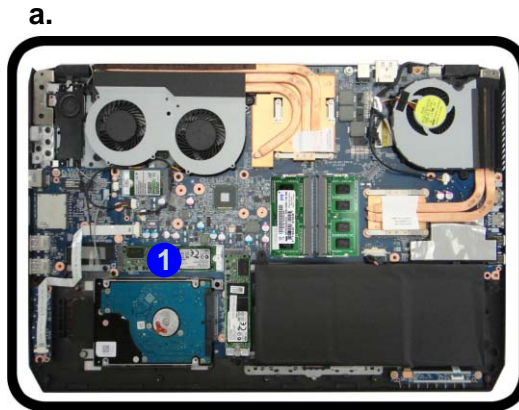
## Disassembly

*Figure 15*  
**M.2 SATA Module Removal**

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

### M.2 SATA Removal Procedure

- Turn off the computer, remove the battery ([page 2 - 6](#)).
- Locate the module, it is visible at point **1** ([Figure 15a](#)).
- Remove the screw **2** from the module ([Figure 15b](#)).
- The module **3** will pop-up ([Figure 15c](#)).
- Lift the module **3** up and off the computer ([Figure 15d](#)).
- Reverse the process to install a new module.



3. M2 SATA Module

- 1 Screw

---

# Appendix A:Part Lists

This appendix breaks down the *P670SA / P671SA* 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.

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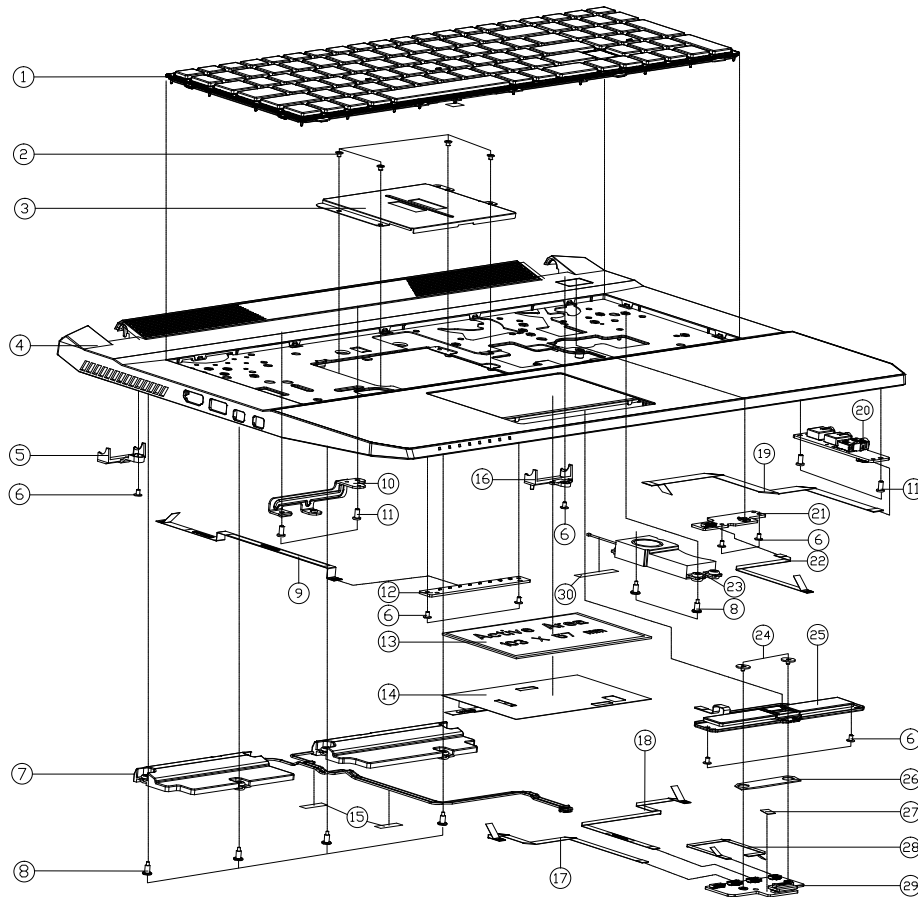
## Part List Illustration Location

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>
MB	<i>page A - 5</i>
HDD	<i>page A - 6</i>
LCD	<i>page A - 7</i>

# Top

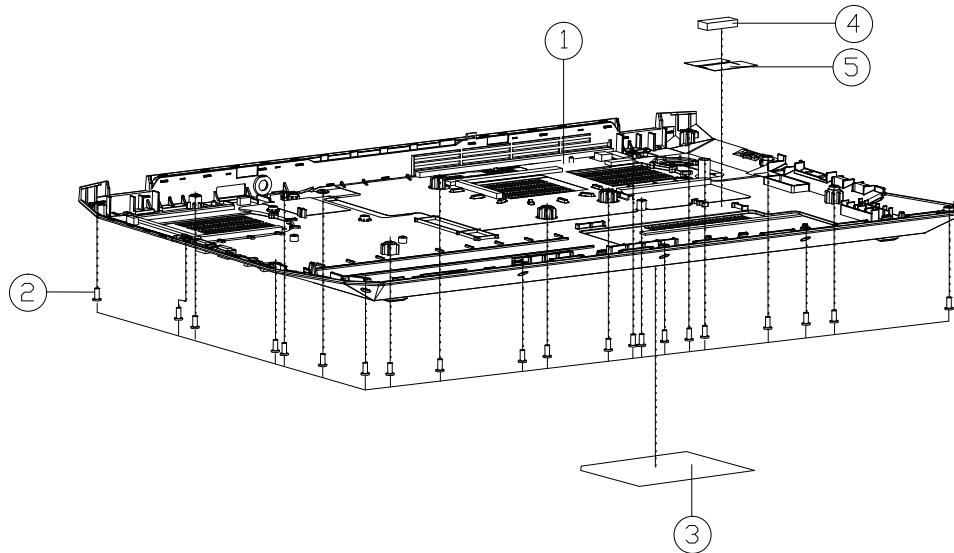


ITEM	PART NAME	PART NO	REMARK
1	W/TE R. LD USA W/ FINGER/KEY P/SIDE BLACK COILATION WITH VINE KEY + K/O FRAME	6-80-P6500-012-1	
2	SCREW M2*2L KI BK/Z ICT NY (#6,T=0.5)	6-35-B6120-2RC	
3	DDR BRACKET (SUS304) P650SE	6-33-P6502-050	
4	TOP CASE MODULE (DNKYDKKAPDK) P670SG	6-39-P6702-012-N	
5	HINGE COVER L (SABIC C7230P-BKIC340) P670SG	6-42-P6702-0L1	
6	SCREW M2*3L KI NI ICT NY (D0=#4.5,DT=0.4)	6-35-B1120-3RE	
7	SPK CABLE FRONT PAL SWR0 T5.2 2V 41 EEPREDA L-2365MM R-230MM P650SE	6-23-5P650-0S1	
8	SCREW M2*6.2L NI ICT NY FOR SPEAKER	6-35-Z1120-6R2	
9	FFC CABLE LED TO MB (P=40) 153MM 60V 12PIN P670SG	6-43-P6700-041	
10	TOP BKT L2 SECC , T=1 MM P670SG	6-33-P6702-1L0	
11	SCREW M2.5*5L KI BK/Z ICT NY	6-35-B6125-5RA	
12	LED BOARD V3.0 P670SE	6-77-P6704-D03	
13	TOUCH PAD SYNAPTICS TM-01474-003 P377SMF	6-49-P3773-010	
14	TP MYLAR PET P670SG	6-40-P6702-030	
15	TAPE MYLAR TRANSPARENT (204)(40.05) P180HM	6-40-P1803-020	
16	HINGE COVER R (SABIC C7230P-BKIC340) P670SG	6-42-P6702-0R1	
17	FFC CABLE FINGER TO MB (P=10) 92MM 60V 4PIN P670SG	6-43-P6700-050	ONLY FOR FINGER
18	FFC CABLE TRANSFER TO MB (P=10) 84MM 60V 4PIN P670SG	6-43-P6700-020	
19	FFC CABLE AUDIO TO MB (P=15) 109MM 60V 15PIN P670SG	6-43-P6700-070	
20	AUDIO BOARD V3.0 P650SE	6-77-P6508-D03	
21	POWER BOARD V1.0B P650SE	6-77-P650C-D01B	
22	FFC CABLE POWER TO MB (P=10) 72MM 60V 4PIN P670SG	6-43-P6700-031	
23	SPK CABLE SUBWOOFER 26640 25W 41 16MM NO GASKET PRECISEN P650H	6-23-5P15E-0W3	
24	SCREW M2*2L KI BK/Z ICT NY(#8,T=0.6)	6-35-B6120-2RE	
25	FUNCTION KEY FOR CLICK BUTTON MODULE W/O FINGER P650SE	6-23-KP650-022	FOR W/O FINGER
25	FUNCTION KEY FOR CLICK BUTTON MODULE W/FINGER P650SE	6-23-KP650-013	FOR W/FINGER
26	CLICK W/O FP MYLAR PET (48)(44.015T) P650SE	6-40-P6502-080	ONLY FOR W/O FINGER
27	CLICK W/FP MYLAR PET (9.5)(5.5)(0.15T) P650SE	6-40-P6502-090	ONLY FOR W/FINGER
28	FFC CABLE TP TO CLICK (P=15) 112MM 60V 6PIN P650SE	6-43-P6500-020	
29	CLICK TRANSFER BOARD V3.0 (W/F/FINGER SENSOR BOARD V1.0) P650SE	6-77-P650A-N03	FOR W/FINGER
29	CLICK TRANSFER BOARD V3.0 (W/O FP) P650SE	6-77-P6502-D03-1	W/O FINGER
30	TAPE MYLAR (C),MYLAR M550J	6-40-M55J2-030	

Figure A - 1  
Top

# Bottom

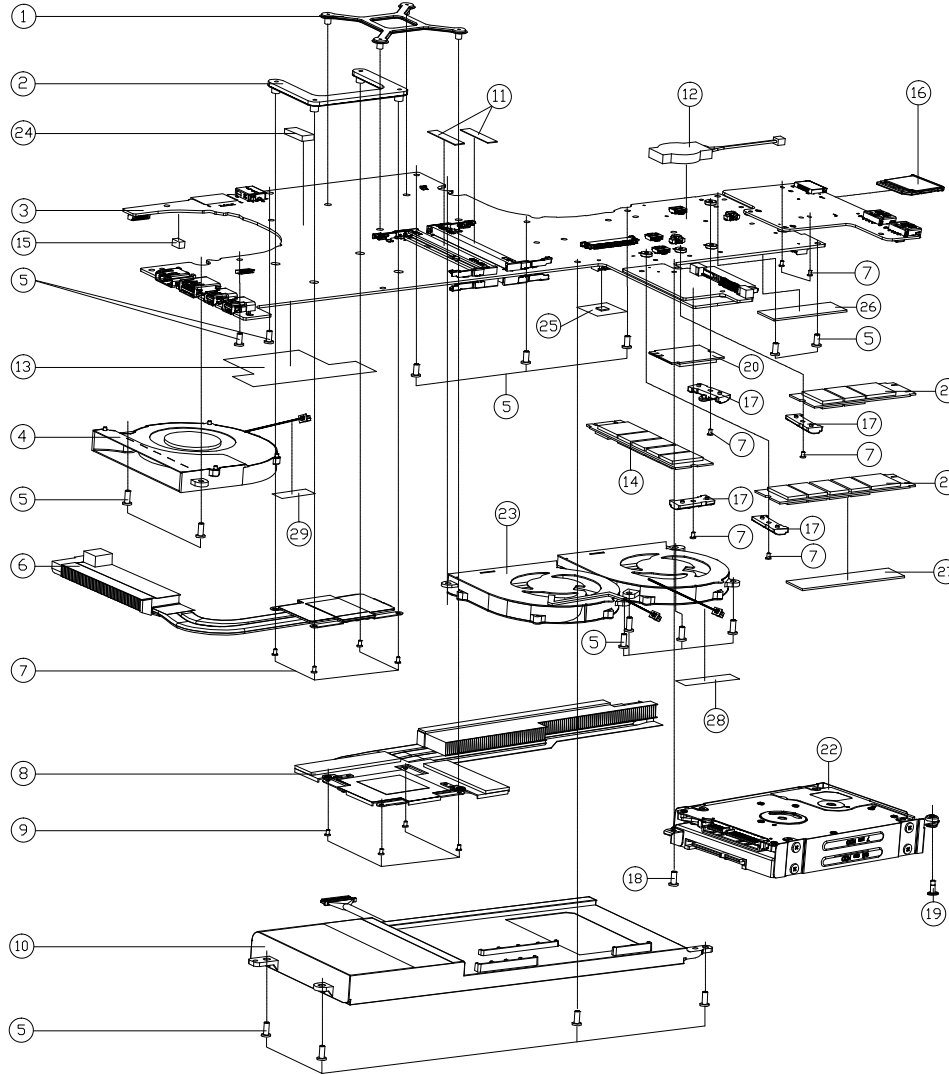
Figure A - 2  
Bottom



ITEM	PART NAME	PART NO	REMARK
1	BOTTOM CASE MODULE P670SG	6-39-P6703-012	
2	SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
3	PRODUCT LABEL FOR P670SA	6-45-P670SA03-010	
3	PRODUCT LABEL FOR P670SG	6-45-P670SG03-010	
3	PRODUCT LABEL FOR P670SE	6-45-P670SE03-010	
4	THERMAL PAD M4500 (21X85X47)MM FOR M-SATA	6-48-P6703-010	ONLY FOR SSD
5	MYLAR FOR SSD 33#25#0.15 (MYLAR+ADHESIVE)	6-40-P6703-020	ONLY FOR SSD



# MB

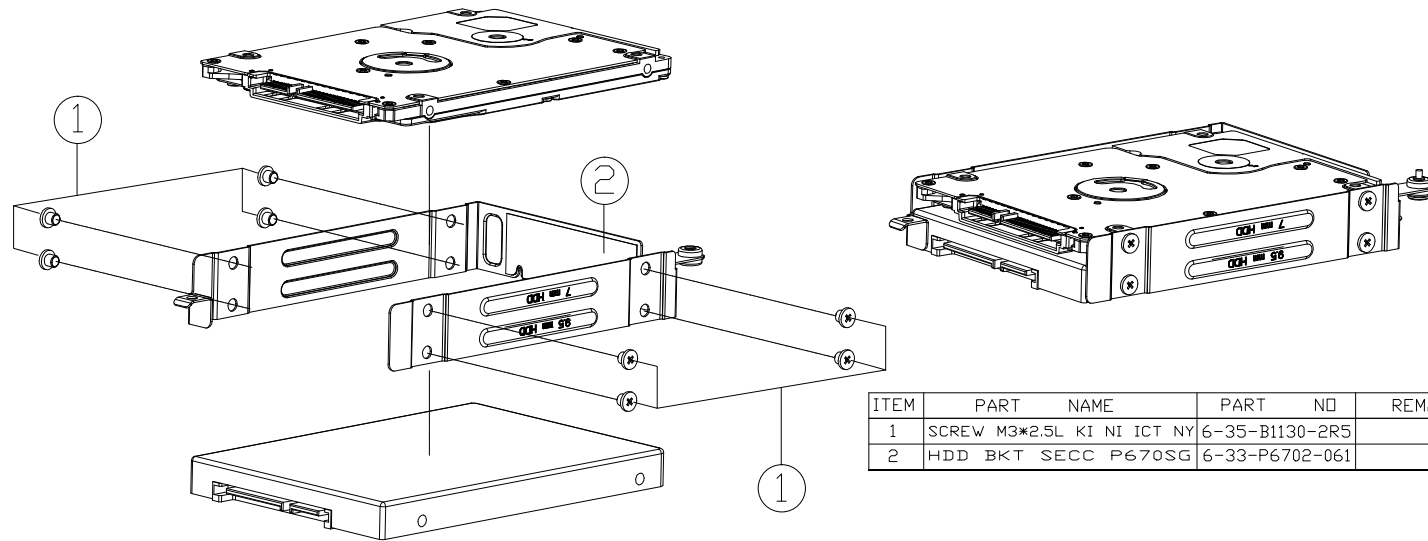


ITEM	PART NAME	PART NO	REMARK
1	VGA SUPPORTER SUS430 X7200	6-33-X720S-040	
2	CPU SUPPORT BRACKET SEC. THIS PCB04M	6-33-X510S-011	
3	NO.001 PPT COVER TO LOCATE COVER SUPPORT AND CPU IN BOARD AND CPU	6-77-P670S0A-N03-IE	
3	NO.001 PPT COVER TO LOCATE COVER SUPPORT AND CPU IN BOARD AND CPU	6-77-P670S0A-N03-G	
3	NO.001 PPT COVER TO LOCATE COVER SUPPORT AND CPU IN BOARD AND CPU	6-77-P670S0A-N03-ED	
3	NO.001 PPT COVER TO LOCATE COVER SUPPORT AND CPU IN BOARD AND CPU	6-77-P670S0A-N03-7D	
3	NO.001 PPT COVER TO LOCATE COVER SUPPORT AND CPU IN BOARD AND CPU	6-77-P670S0A-N03-G	
3	NO.001 PPT COVER TO LOCATE COVER SUPPORT AND CPU IN BOARD AND CPU	6-77-P670S0A-N03-7G	
3	NO.001 PPT COVER TO LOCATE COVER SUPPORT AND CPU IN BOARD AND CPU	6-77-P670S0A-N03-3F	
3	NO.001 PPT COVER TO LOCATE COVER SUPPORT AND CPU IN BOARD AND CPU	6-77-P670S0A-N03-C	
4	CPU FAN MODULE (FORCECOO) P650SE	6-31-P650D-101	
5	SCREW M2.5xSL K1 BK/Z ICT NY	6-35-B612S-5RA	
6	CPU HEATSINK MODULE P650SE	6-31-P650N-101	
7	SCREW M2xSL XT NI ICT NY (00-4ASJ)-B4	6-35-B1120-3RE	
8	GPU HEATSINK MODULE P650SE	6-31-P650N-201	
9	SCREW M4x3SL KIT#12 D#45) RZ ICT NY	6-35-B2116-3RS	
10	NO.111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-87-P650S-4U3	
10	NO.111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-87-P650S-4U31	
10	NO.111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-87-P650S-4E52-1	
10	NO.111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-87-P650S-4E52	
11	DOP SOCKET RUBBER(G450) SILICONE P650SE	6-47-P650S-010	
12	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-23-22015-TE0	
13	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-23-22015-TE0	
14	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-47-P650S-020	
14	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51R6-L00	OPTION
14	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51R6-B00	OPTION
14	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51R6-100	OPTION
14	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51C8-B00	OPTION
14	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51S8-100	OPTION
14	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D4000-Z02	OPTION
14	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51R6-L00	OPTION
15	RUBBER (G430447) SILICONE P670SG	6-47-P6702-030	
16	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-42-W970B-010	
17	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-42-P6503-031	
18	SCREW M2.5xSL K1 BK/Z ICT NY	6-35-B2125-6RA	
19	SCREW M2x6.2L NI ICT NY FOR SPEAKER	6-35-Z1120-6R2	FOR P650SE-W3 FOR P650SG-W1
20	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-88-P650F-8100	OPTION
20	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-88-P6502-4250	OPTION
20	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-88-P6502-4210	OPTION
20	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-88-P6502-4220	OPTION
20	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-88-P6502-4230	OPTION
20	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-88-S210F-9400	OPTION
21	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51R6-B00	OPTION
21	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51R6-100	OPTION
21	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51C8-B00	OPTION
21	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51S8-100	OPTION
21	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D4000-Z02	OPTION
21	NO. 2000 20 20MM VOLUME 50MM DIAMETER 50MM HEIGHT	6-85-D51R6-L00	OPTION
22	W/D HDD ASS'Y P670SG	6-79-P670SG0J-010	
22	W/HDD ASS'Y P670SG	6-79-P670SG0J-029	
22	W/D 2ND HDD ASS'Y P670SG	6-79-P670SG0J-030	
22	W/ 2ND HDD ASS'Y P670SG	6-79-P670SG0J-040	
23	GPU FAN MODULE (FORCECOO) P650SE	6-31-P650D-201	
24	RUBBER MB (SILICONE) G4 DEGREE) P650SE	6-47-P6502-030	
25	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-40-P650S-020	
26	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-48-P6703-010	
27	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-48-P650S-020	
28	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-40-M55J2-030	
29	NO. 111 RUBBER PAD (SILICONE) FOR COVER PROTECT THE COVER	6-40-P1803-020	

Figure A - 3  
MB

# 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	HDD BKT SECC P670SG	6-33-P6702-061	

# LCD

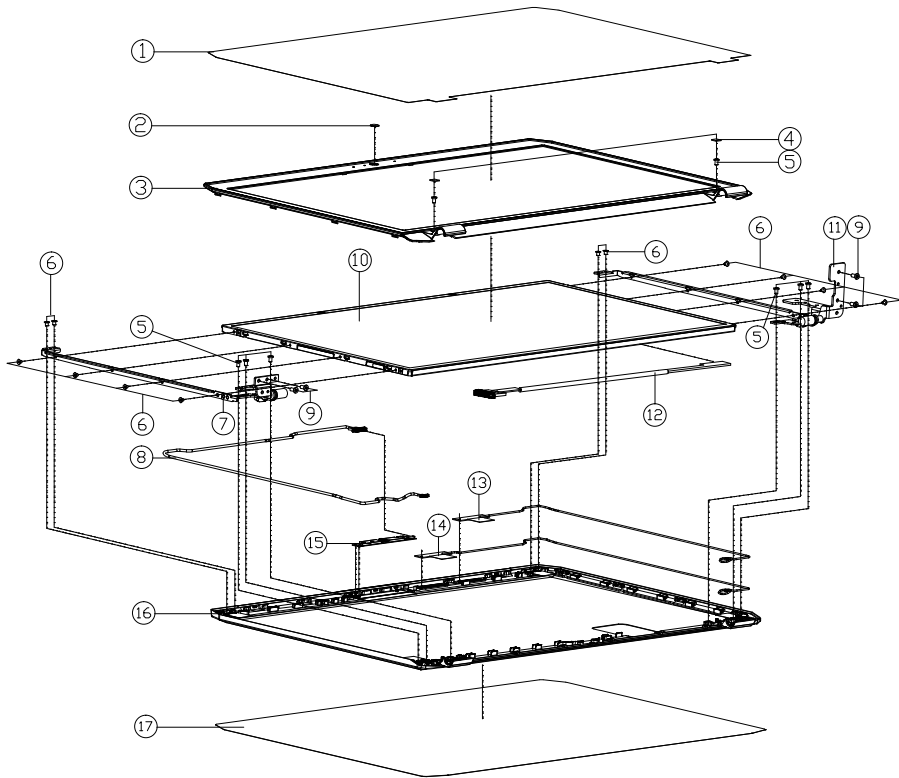


Figure A - 5  
LCD

ITEM	PART NAME	PART NO	REMARK
1	LCD FRONT COVER PROTECTIVE MYLAR (PET+3MB915) P670SG	6-40-P6708-020	
2	LCD CCD LENS PMMA P177SM (ELAYNE)	6-42-P177T-010-1	
3	LCD FRONT COVER MODULE P670SG	6-39-P6701-012	
4	RUBBER FRONT COVER SCREW SILICONE W970SUW	6-47-W9701-041	
5	SCREW M2.5*4L K1 BK/D ICT NY	6-35-B4125-4RA	
6	SCREW M2*3L K1 NI ICT NY (DD=04.5,DT=0.4)	6-35-B1120-3RE	
7	HINGE L (SECC+SK7) P670SG	6-33-P6701-0L0	
8	WIRE CALBE FOR CCD 585MM 30V 8PIN (HLD) P670SG	6-43-P670T-010	
9	SCREW M2.5*5L K1 BK/Z ICT NY	6-35-B6125-5RA	
10	LCD 17.3" FHD (EDP) CHIMEI N173HGE-E1(LEED) 6.0 MM	6-50-NB260-D03	
10	LCD 17.3" FHD AU B173HW02 V(LEED) 6.0 MM	6-50-NB260-G04	
10	LCD 17.3" FHD CHIMEI N173HGE-L11 (LEED) 6.0 MM	6-50-NB260-D01	
11	HINGE R (SECC+SK7) P670SG	6-33-P6701-0R0	
12	WIRE CABLE FOR EIP 405MM 30V 30P (H/L/W CONLV030-212) P670SG	6-43-P6701-022-N	
12	WIRE CABLE FOR LVIS 415MM 30V 40P (H/L/W CONLV030-212) P670SG	6-43-P6701-012-N	
13	ANTENNA WLAN VGT V42 PCB 24G/5G IPEX4 L=60MM BLACK CABLE P670SG	6-23-7P650-021	
14	ANTENNA WLAN VGT V41 PCB 24G/5G IPEX4 L=650MM P670SG	6-23-7P650-011	
15	INC CAMERA 800W FX 08V16VH-49 2K FIB 50 INV224 P650E FIBRE W/LED Varray MC	6-88-P650C-4900	OPTION
16	LCD BACK COVER MODULE P670SG	6-39-P6701-022	
17	LCD BACK COVER PROTECTIVE MYLAR (PET+3MB915) P670SG	6-40-P6708-010	



# Appendix B: Schematic Diagrams

This appendix has circuit diagrams of the *P670SA / P671SA* notebook's PCB's. The following table indicates where to find the appropriate schematic diagram.

Diagram - Page	Diagram - Page	Diagram - Page
<i>System Block Diagram - Page B - 2</i>	<i>Frame Buffer Partition C - Page B - 25</i>	<i>Fan, LID, KB, LED, G Sensor - Page B - 51</i>
<i>Processor 1/7-DMI, FDI, PEG - Page B - 3</i>	<i>Frame Buffer Partition D - Page B - 26</i>	<i>Connector - Page B - 52</i>
<i>Processor 2/7- CLK, MISC - Page B - 4</i>	<i>Frame Buffer Partition C_D - Page B - 27</i>	<i>DDR 1.35V / 0.75VS, PCH 1.5V - Page B - 53</i>
<i>Processor 3/7- (DDR3L) - Page B - 5</i>	<i>GPU Decoupling - Page B - 28</i>	<i>VDD3, VDD5 - Page B - 54</i>
<i>Processor 4/7- Display - Page B - 6</i>	<i>DACA Interface XTAL - Page B - 29</i>	<i>5V, 5VS, 3.3V, 3.3VS, 3.3VA - Page B - 55</i>
<i>Processor 5/7- Power - Page B - 7</i>	<i>IFP I/O Interface - Page B - 30</i>	<i>1.05 Series - Page B - 56</i>
<i>Processor 6/7- POGND - Page B - 8</i>	<i>Misc - GPIO, I2C and ROM - Page B - 31</i>	<i>AC_In, Charger - Page B - 57</i>
<i>Processor 7/7- RSVD - Page B - 9</i>	<i>GPU NVVDD, FBVDDQ, and GND - Page B - 32</i>	<i>POWER V-Core1 - Page B - 58</i>
<i>DDR3 CHA SO-DIMM_0 - Page B - 10</i>	<i>Lynx 1/9 - Page B - 33</i>	<i>PEX_VDD, 3V3_AON, 3V3_RUN - Page B - 59</i>
<i>DDR3 CHA SO-DIMM_1 - Page B - 11</i>	<i>Lynx 5/9 - Page B - 37</i>	<i>NVVDD Phase 1 &amp; 2 - Page B - 60</i>
<i>DDR3 CHB SO-DIMM_0 - Page B - 12</i>	<i>Lynx 6/9 - Page B - 38</i>	<i>FBVDDQ - Page B - 61</i>
<i>DDR3 CHB SO-DIMM_1 - Page B - 13</i>	<i>Lynx 7/9 - Page B - 39</i>	<i>Audio Board - Page B - 62</i>
<i>Panel, Inverter - Page B - 14</i>	<i>Lynx 8/9 - Page B - 40</i>	<i>Power Board - Page B - 63</i>
<i>RTD2136N-CG - Page B - 15</i>	<i>Lynx 9/9 - Page B - 41</i>	<i>HDD Board - Page B - 64</i>
<i>Mini DP Port D - Page B - 16</i>	<i>USB3.0 + eSATA Combo - Page B - 42</i>	<i>Finger Sensor Board - Page B - 65</i>
<i>Mini DP Port B - Page B - 17</i>	<i>USB Charger - Page B - 43</i>	<i>Click Board - Page B - 66</i>
<i>HDMI Connector - Page B - 18</i>	<i>M.2 3G + M.2 SATA - Page B - 44</i>	<i>USB Board 1/4 - Page B - 67</i>
<i>VGA PCI Express - Page B - 19</i>	<i>M.2 WLAN+BT, PCIE4X SSD - Page B - 45</i>	<i>USB Board 2/4 - Page B - 68</i>
<i>VGA Frame Buffer Partition - Page B - 20</i>	<i>Realtek ALC892 - Page B - 46</i>	<i>USB Board 3/4 - Page B - 69</i>
<i>Frame Buffer Partition A - Page B - 21</i>	<i>TPA2008D2 - Page B - 47</i>	<i>USB Board 4/4 - Page B - 70</i>
<i>Frame Buffer Partition B - Page B - 22</i>	<i>Subwoofer - Page B - 48</i>	<i>LED Board - Page B - 71</i>
<i>Frame Buffer Partition A_B - Page B - 23</i>	<i>KBC-ITE IT8587 - Page B - 49</i>	
<i>GPU Frame Buffer Partition - Page B - 24</i>	<i>TPM, CCD, TP - Page B - 50</i>	

Table B - 1  
**SCHEMATIC  
DIAGRAMS**

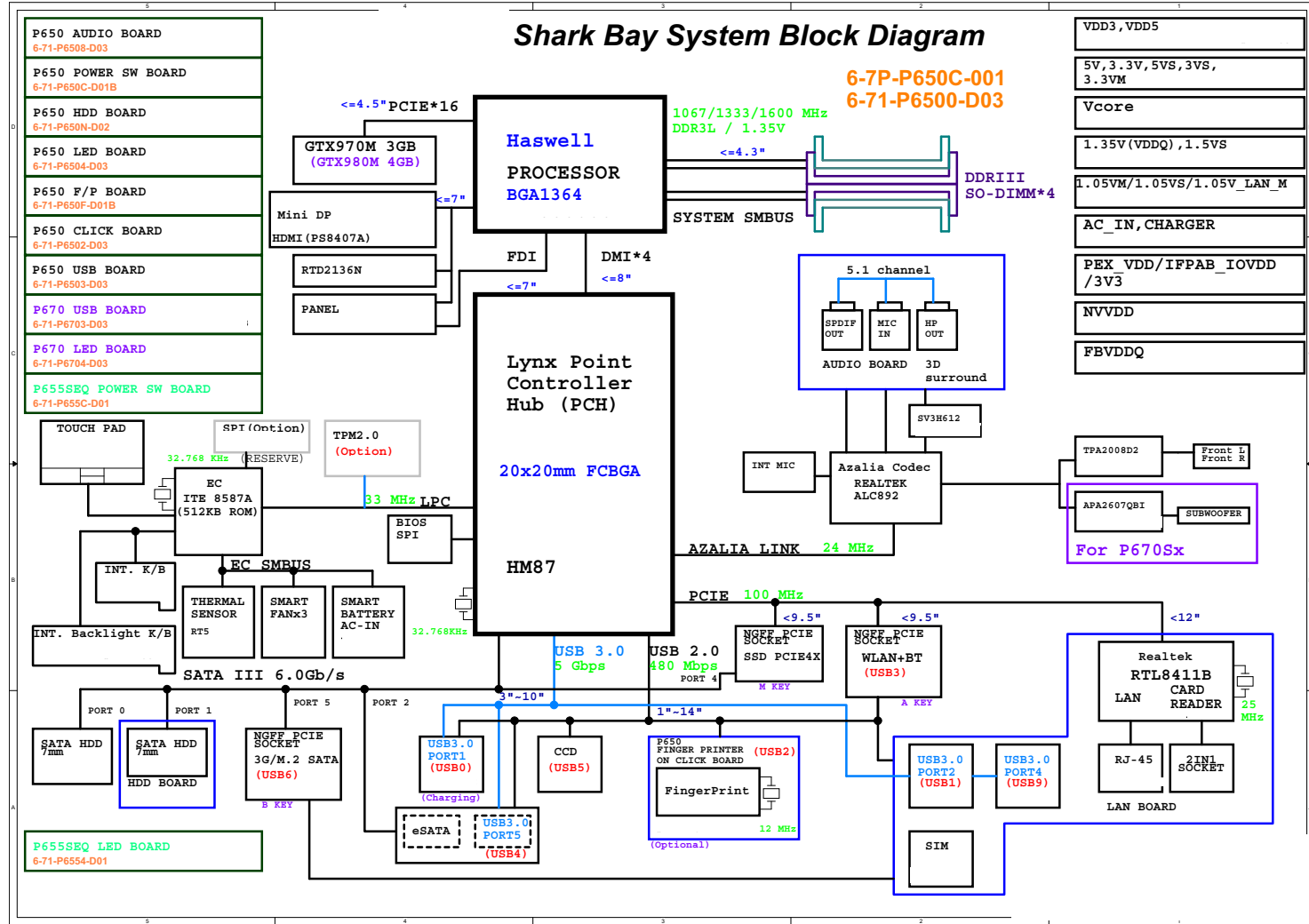


**Version Note**

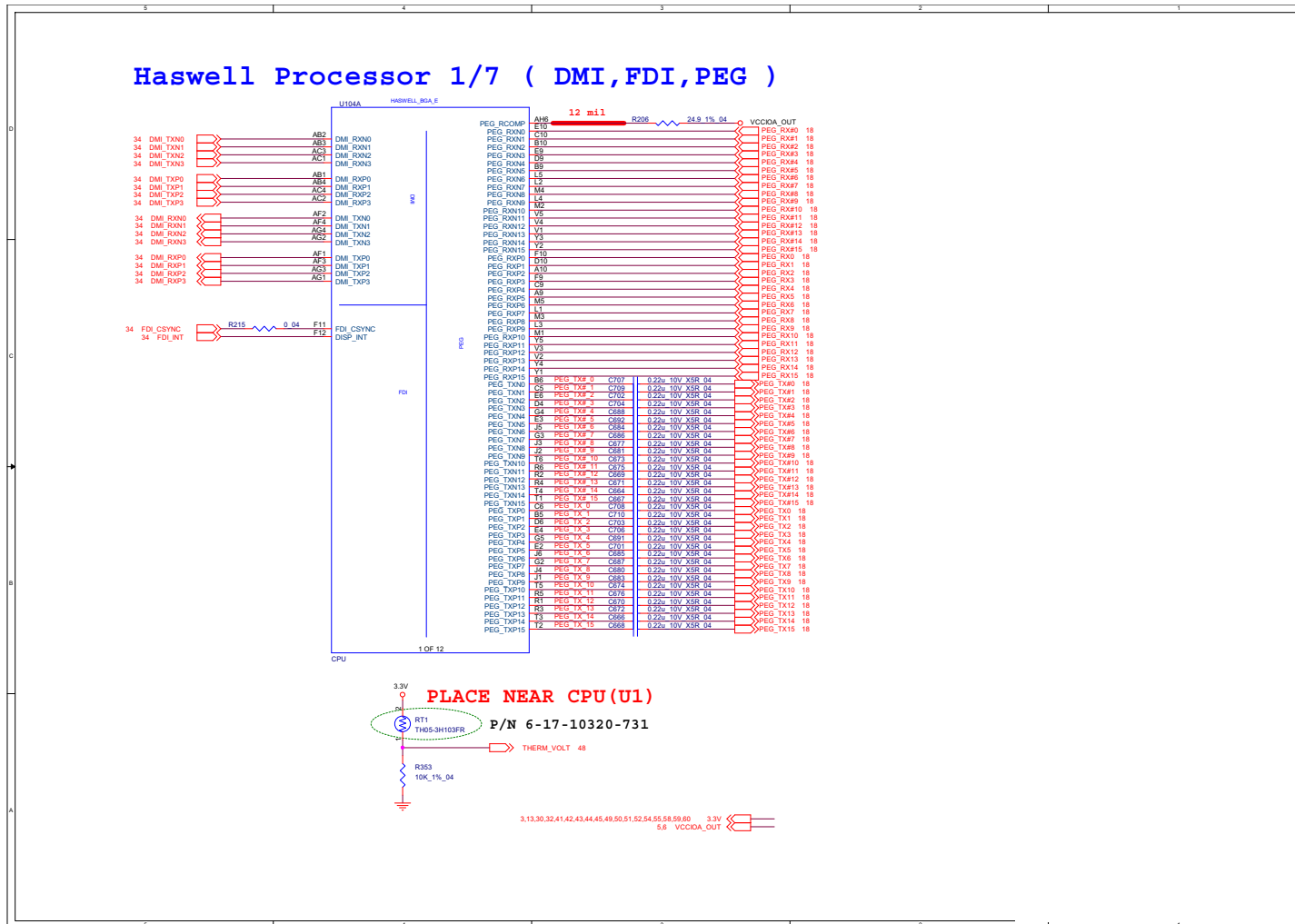
The schematic diagrams in this chapter are based upon version 6-7P-P650C-001. If your mainboard (or other boards) are a later version, please check with the Service Center for updated diagrams (if required).

# System Block Diagram

Sheet 1 of 70  
System Block  
Diagram



# Processor 1/7-DMI, FDI, PEG

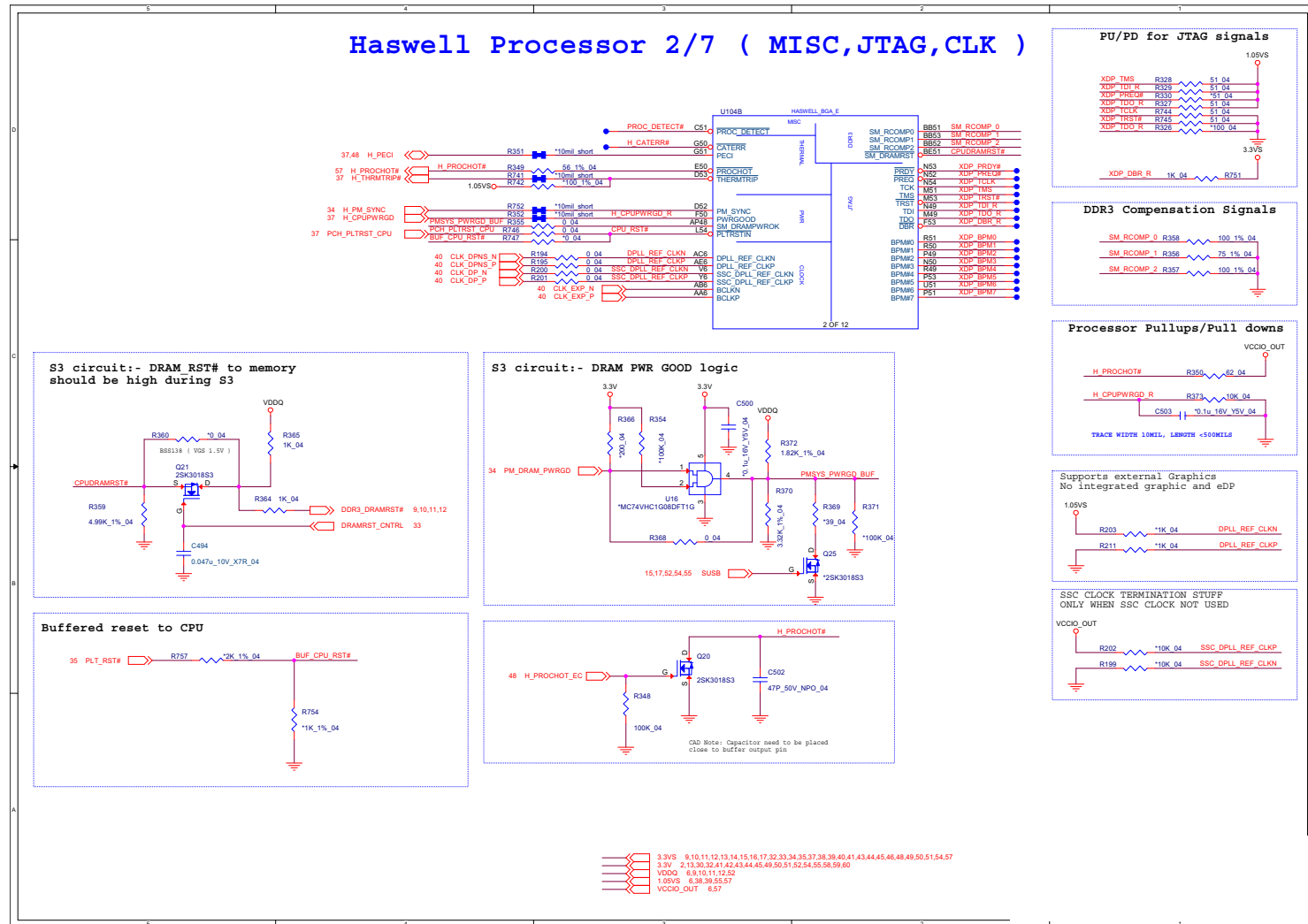


Sheet 2 of 70  
 Processor 1/7-DMI,  
 FDI, PEG

B.Schematic Diagrams

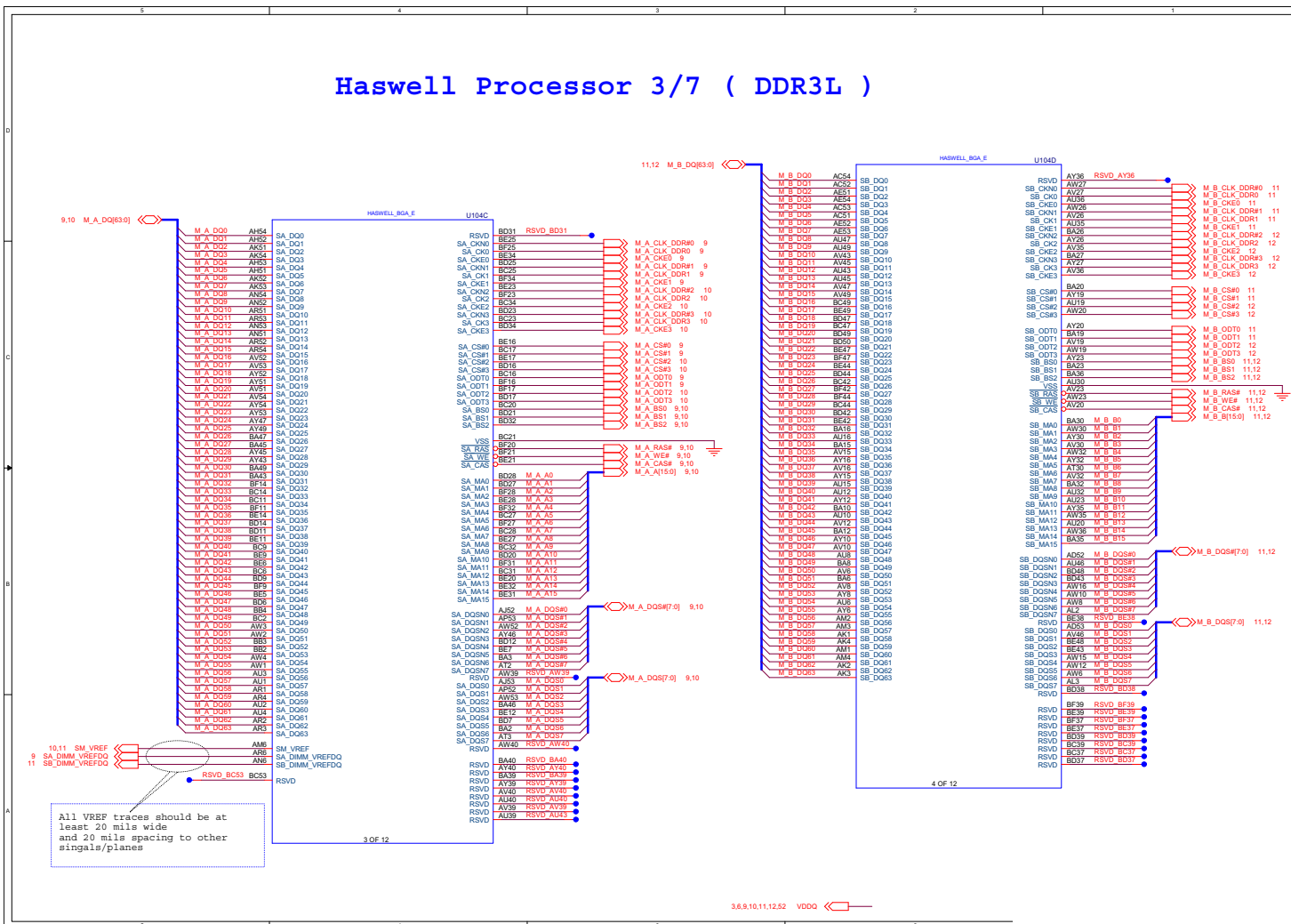
# Processor 2/7- CLK, MISC

Sheet 3 of 70  
Processor 2/7-CLK,  
MISC





# Processor 3/7- (DDR3L)

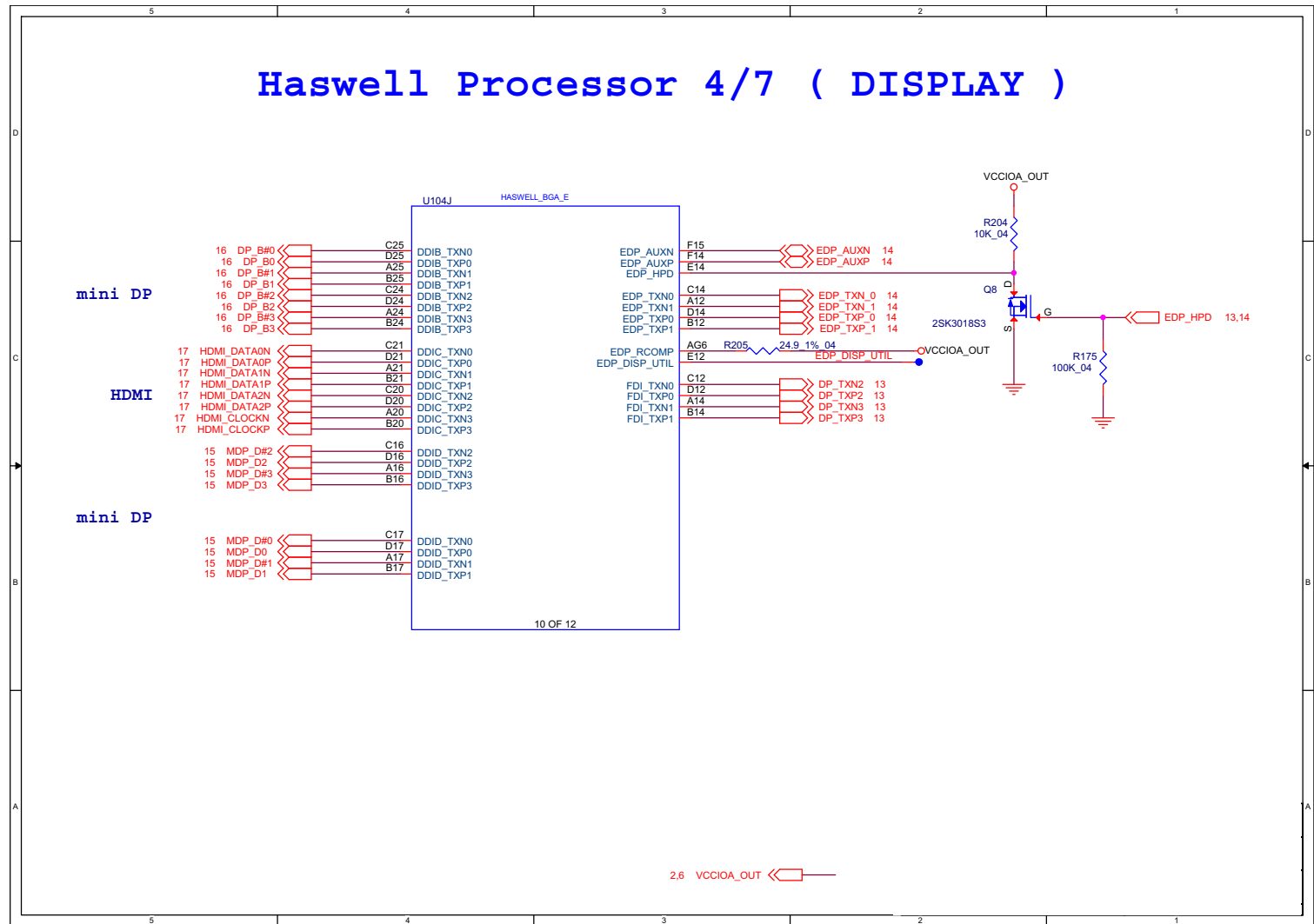


Sheet 4 of 70  
Processor 3/7-  
(DDR3L)

B.Schematic Diagrams

# Processor 4/7- Display

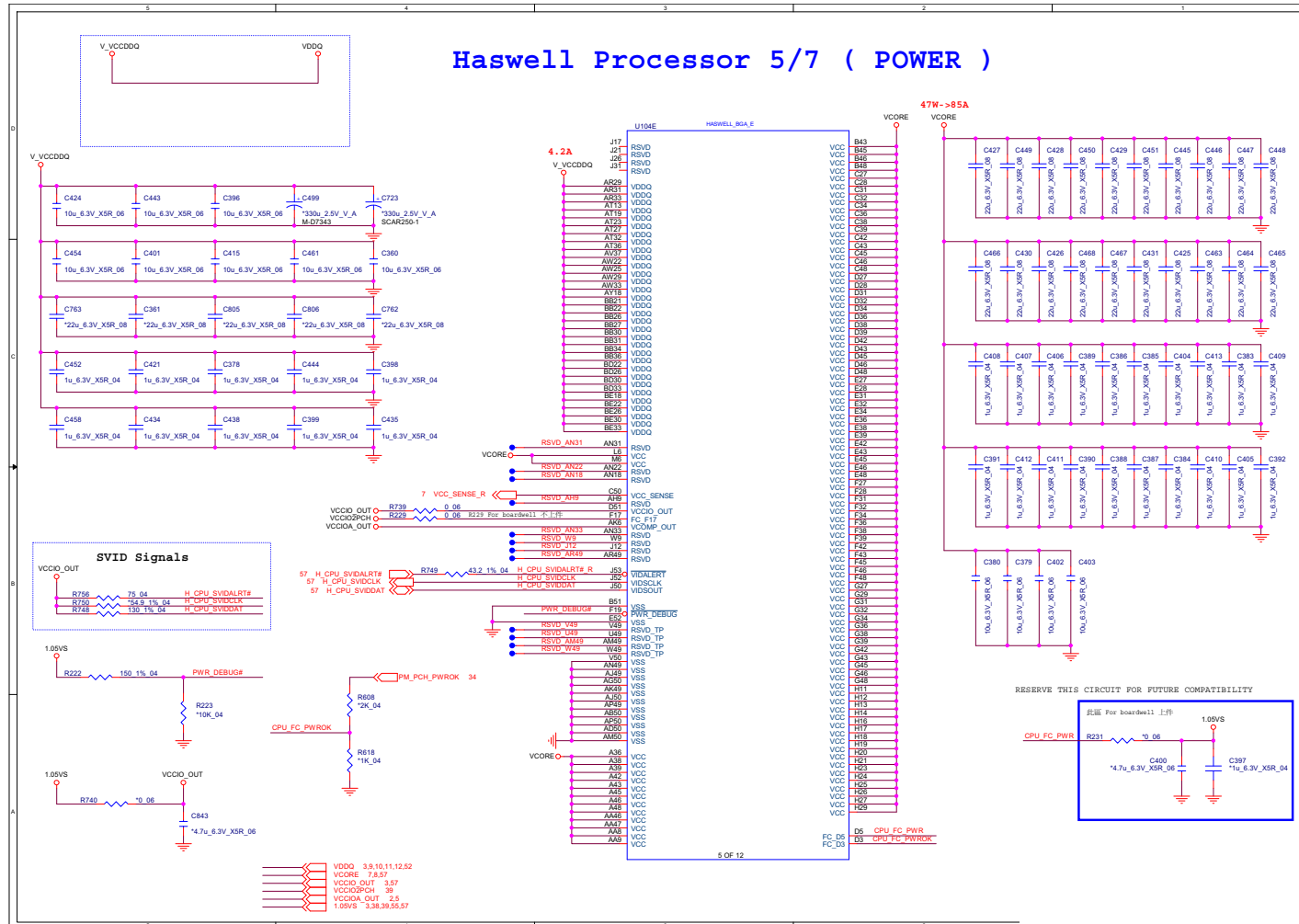
Sheet 5 of 70  
Processor 4/7-  
Display



# Processor 5/7- Power

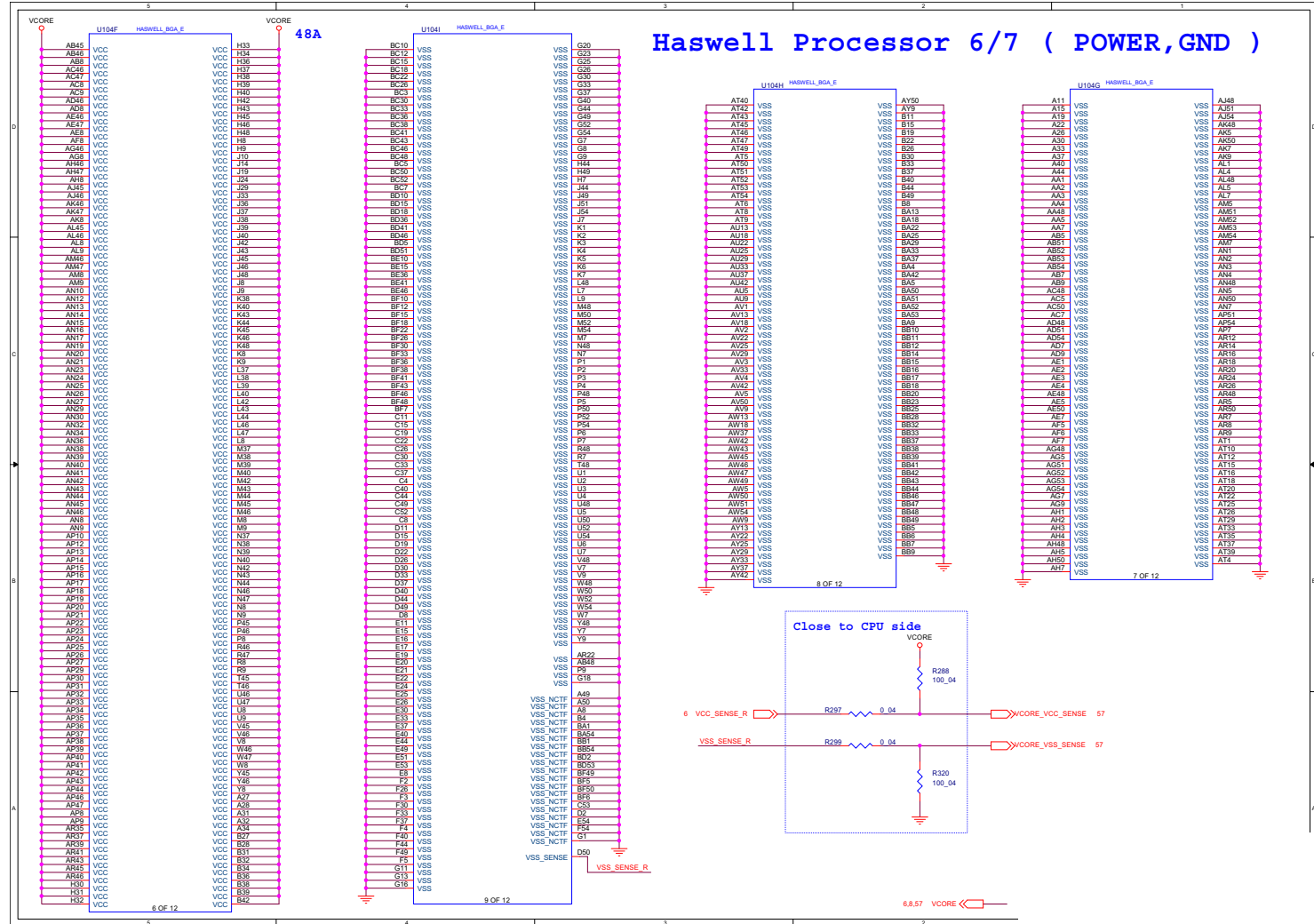
B.Schematic Diagrams

Sheet 6 of 70  
Processor 5/7-  
Power



# Processor 6/7- POGND

Sheet 7 of 70  
Processor 6/7- GND



# Processor 7/7- RSVD

## Haswell Processor 7/7 ( RESERVED )

CFG STRAPS FOR PROCESSOR

**CFG2**  
1: (DEFAULT) NORMAL OPERATION;  
LANE# DEFINITION MATCHES  
SOCKET PIN MAP DEFINITION  
0: LANE REVERSAL



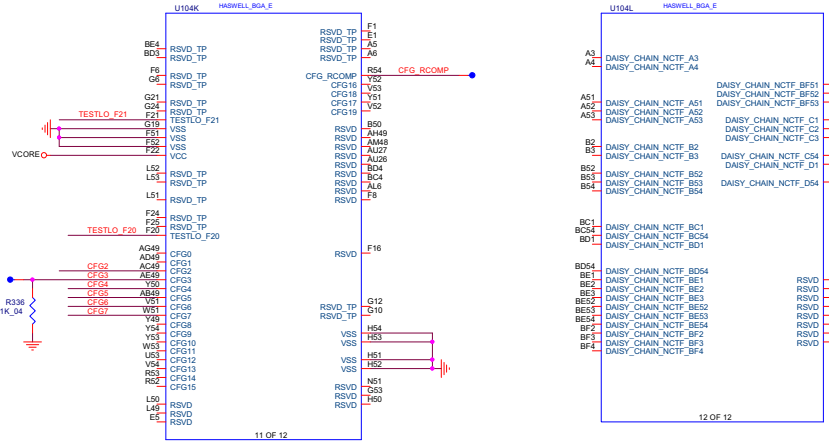
**CFG4**  
1: DISABLED;  
NO PHYSICAL DISPLAY PORT ATTACHED  
TO EMBEDDED DISPLAY PORT  
0: ENABLED;  
AN EXTERNAL DISPLAY PORT DEVICE  
IS CONNECTED TO THE EMBEDDED  
DISPLAY PORT



**CFG [6 : 5]**  
11: (Default) x16 - Device 1 functions 1 and 2 disabled  
10: x8, x8 - Device 1 function 1 enabled ; function 2 disabled  
01: Reserved - (Device 1 function 1 disabled ; function 2 enabled)  
00: x8,x4,x4 - Device 1 functions 1 and 2 enabled



**CFG7**  
1: (Default) PEG Train immediately following xxRESets de assertion  
0: PEG Wait for BIOS for training



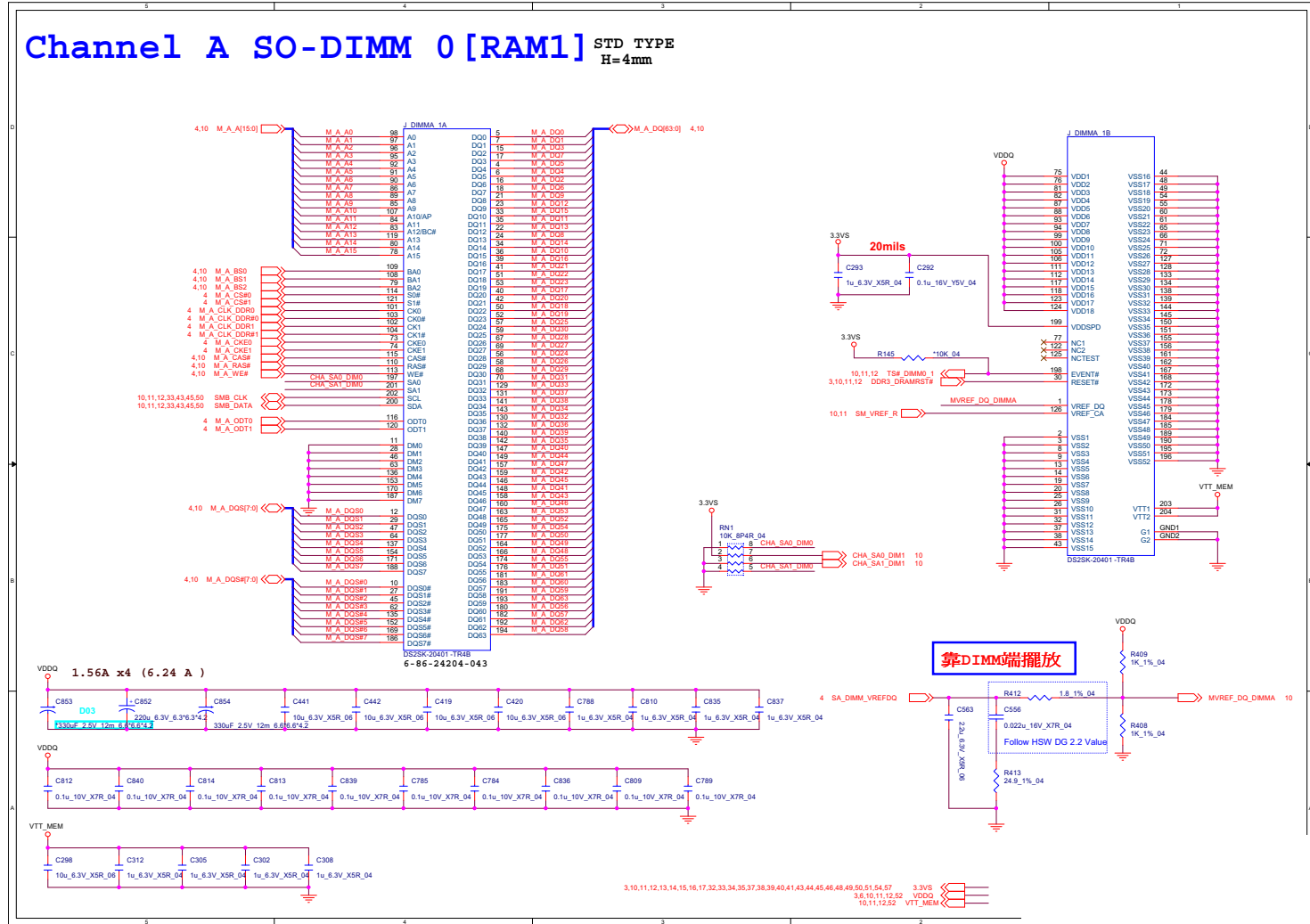
6.7.57 VCORE

Sheet 8 of 70  
Processor 7/7-  
RSVD

B.Schematic Diagrams

# DDR3 CHA SO-DIMM\_0

Channel A SO-DIMM 0 [RAM1] STD TYPE  
H=4mm

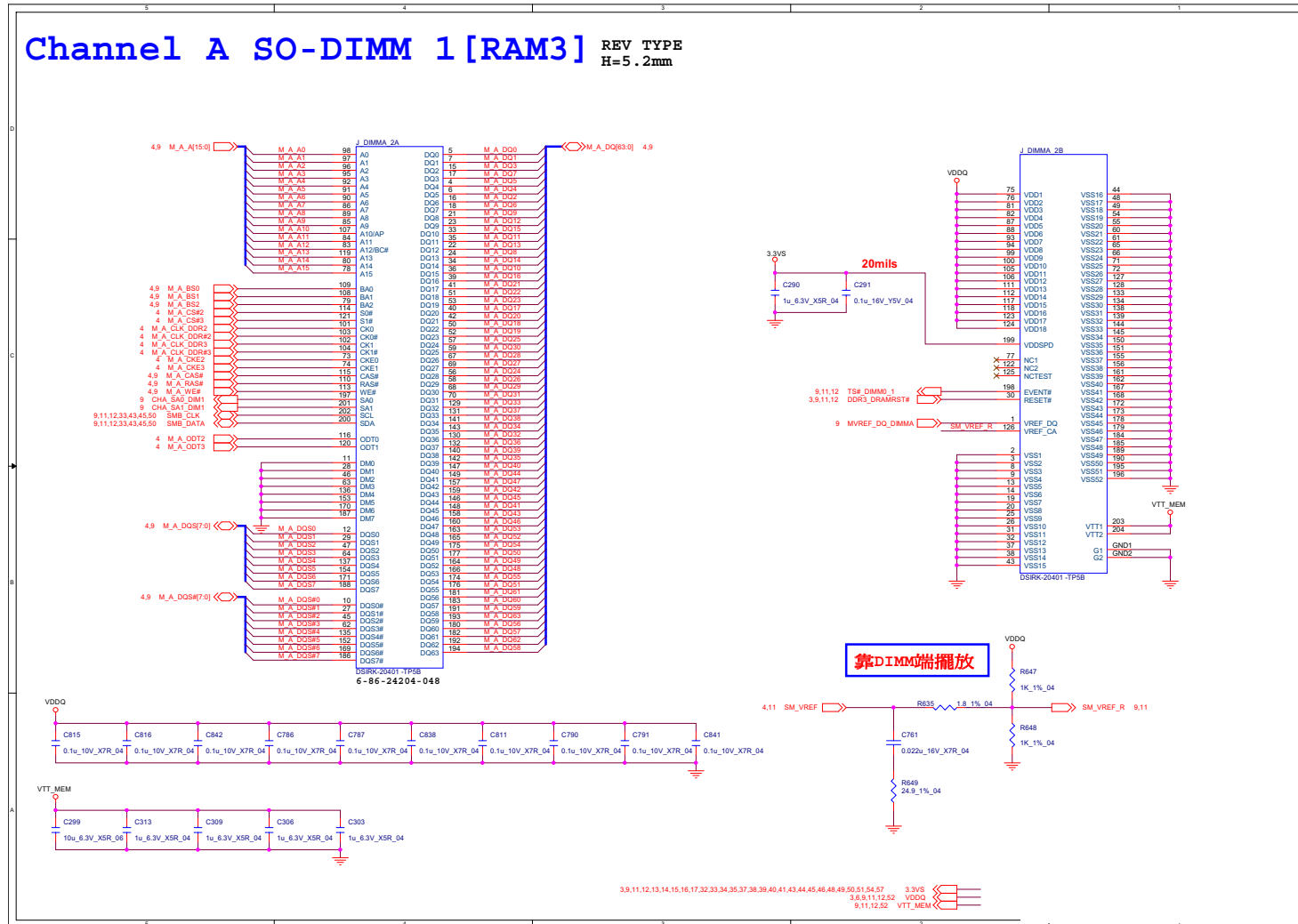


B.Schematic Diagrams

Sheet 9 of 70  
DDR3 CHA SO-DIMM\_0

靠DIMM端擺放

# DDR3 CHA SO-DIMM\_1



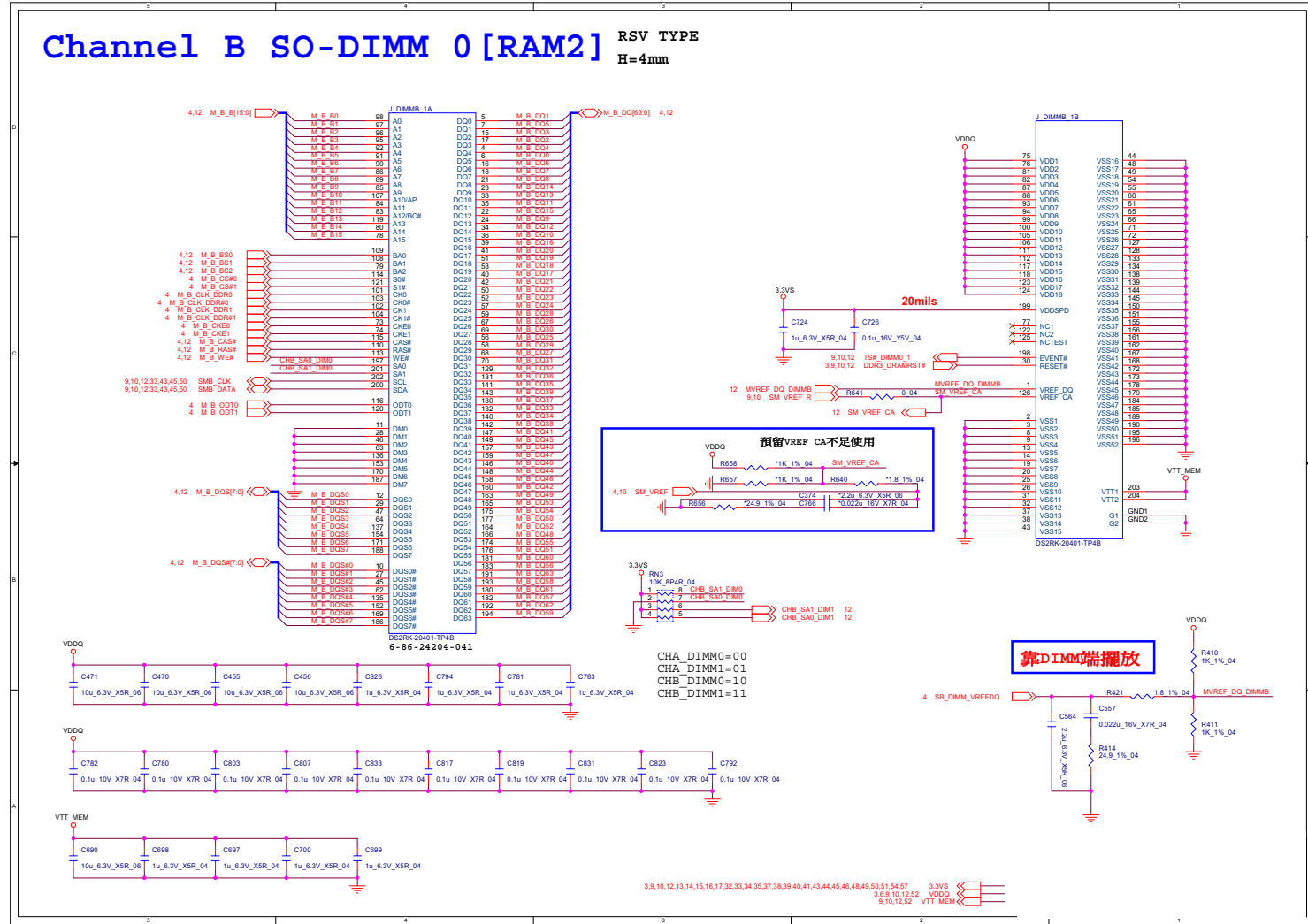
Sheet 10 of 70  
DDR3 CHA SO-DIMM\_1

B.Schematic Diagrams

# DDR3 CHB SO-DIMM\_0

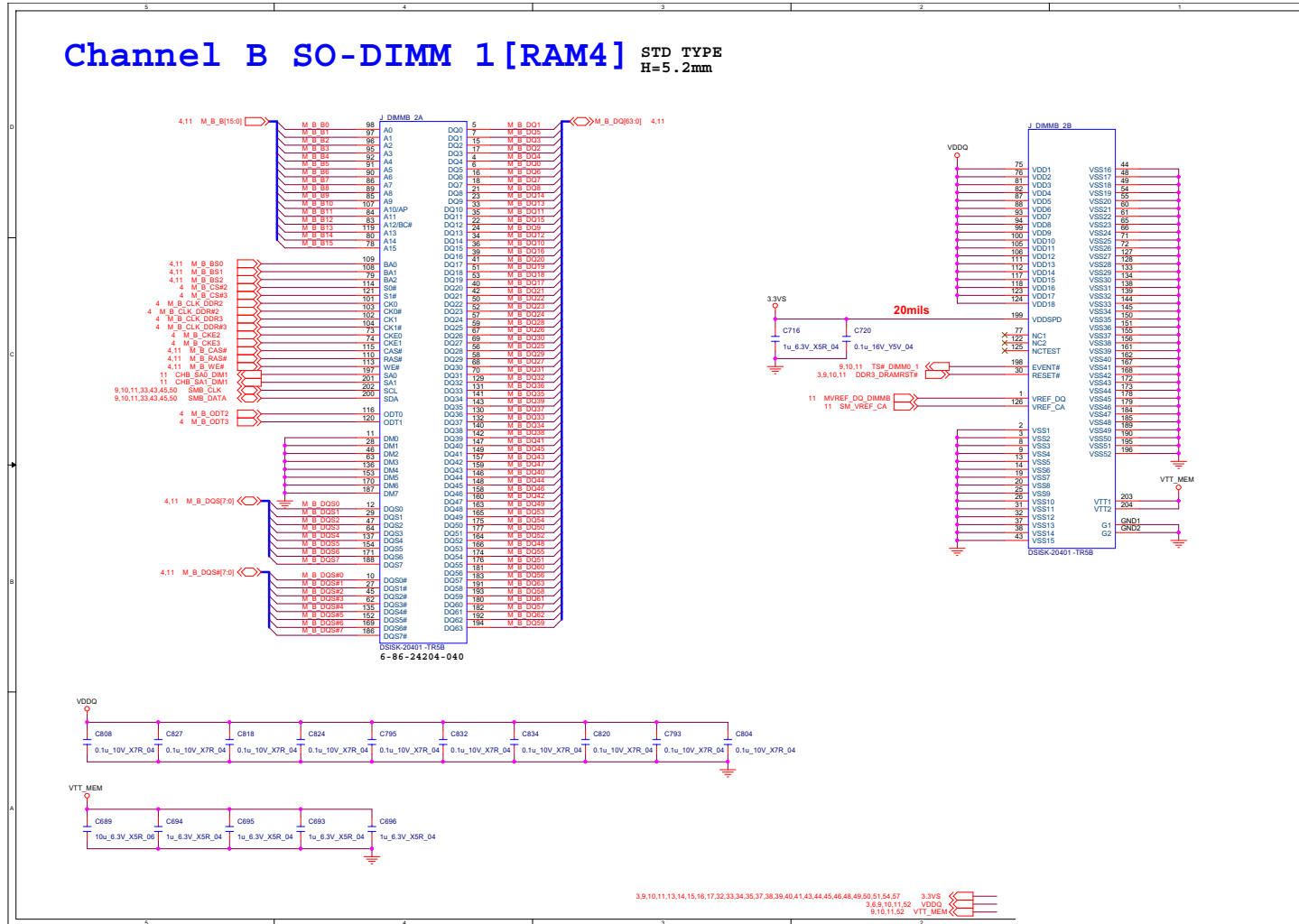
B.Schematic Diagrams

Sheet 11 of 70  
DDR3 CHB SO-  
DIMM\_0





# DDR3 CHB SO-DIMM\_1

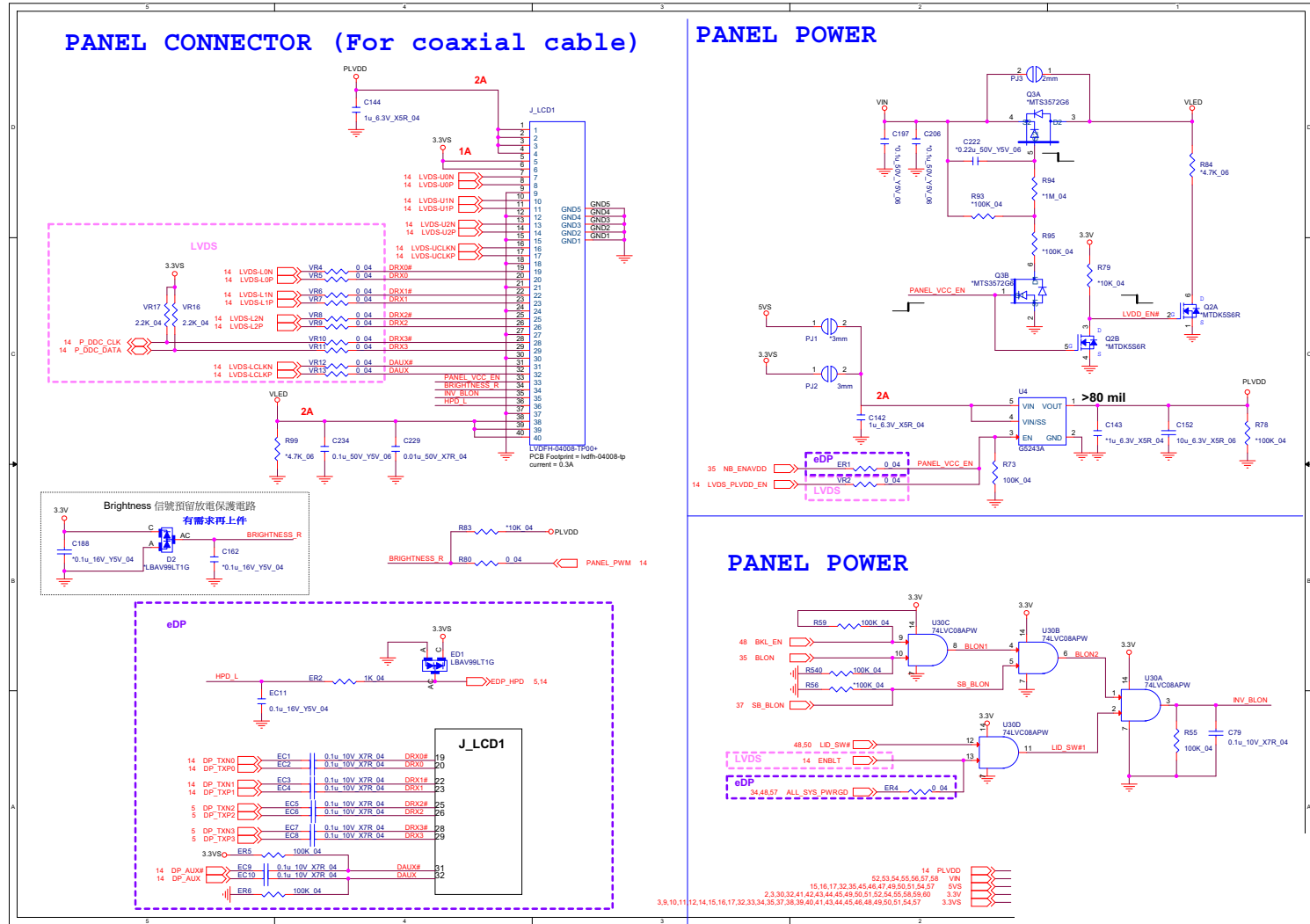


B. Schematic Diagrams

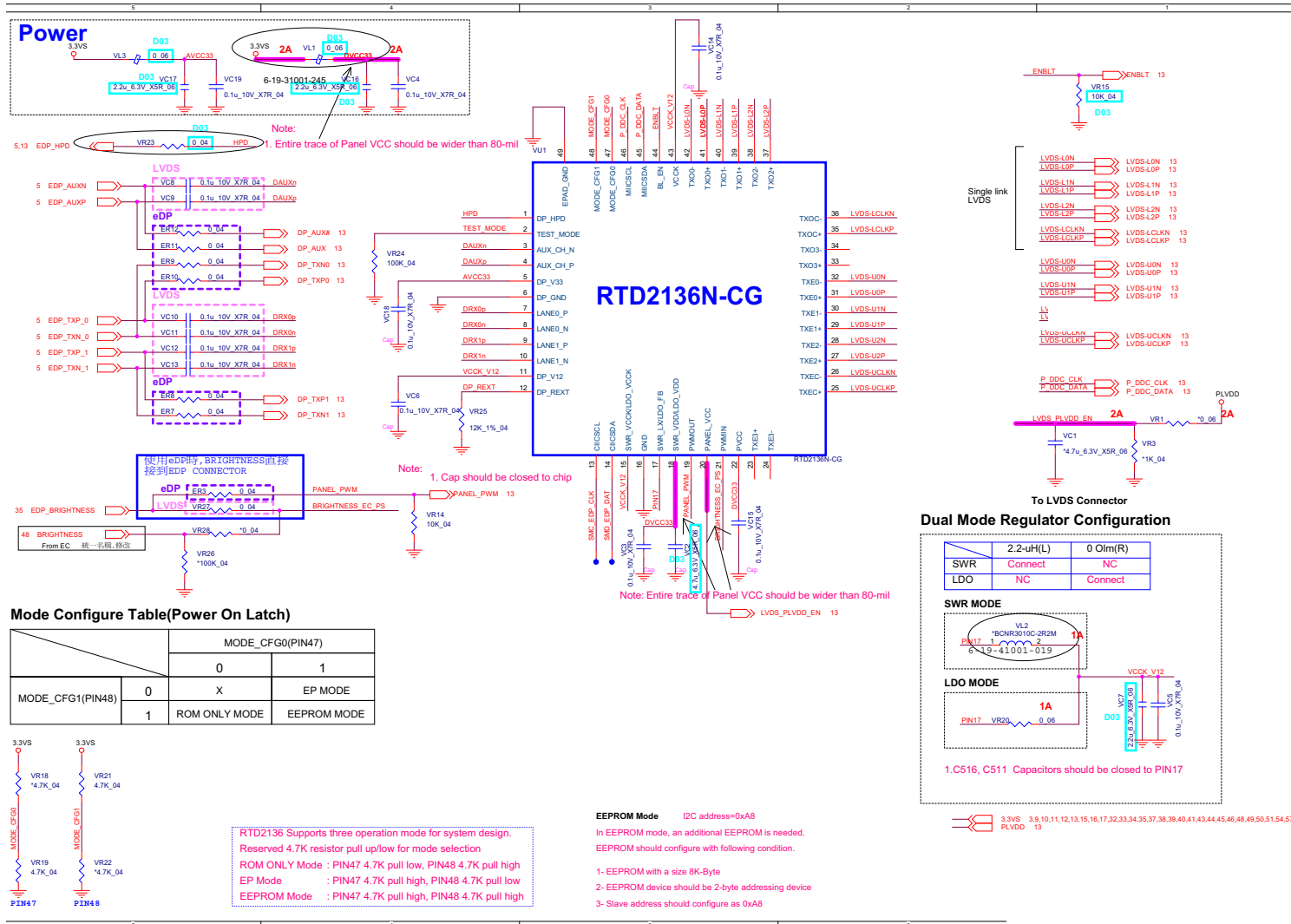
Sheet 12 of 70  
DDR3 CHB SO-DIMM\_1

# Panel, Inverter

Sheet 13 of 70  
Panel, Inverter



# RTD2136N-CG

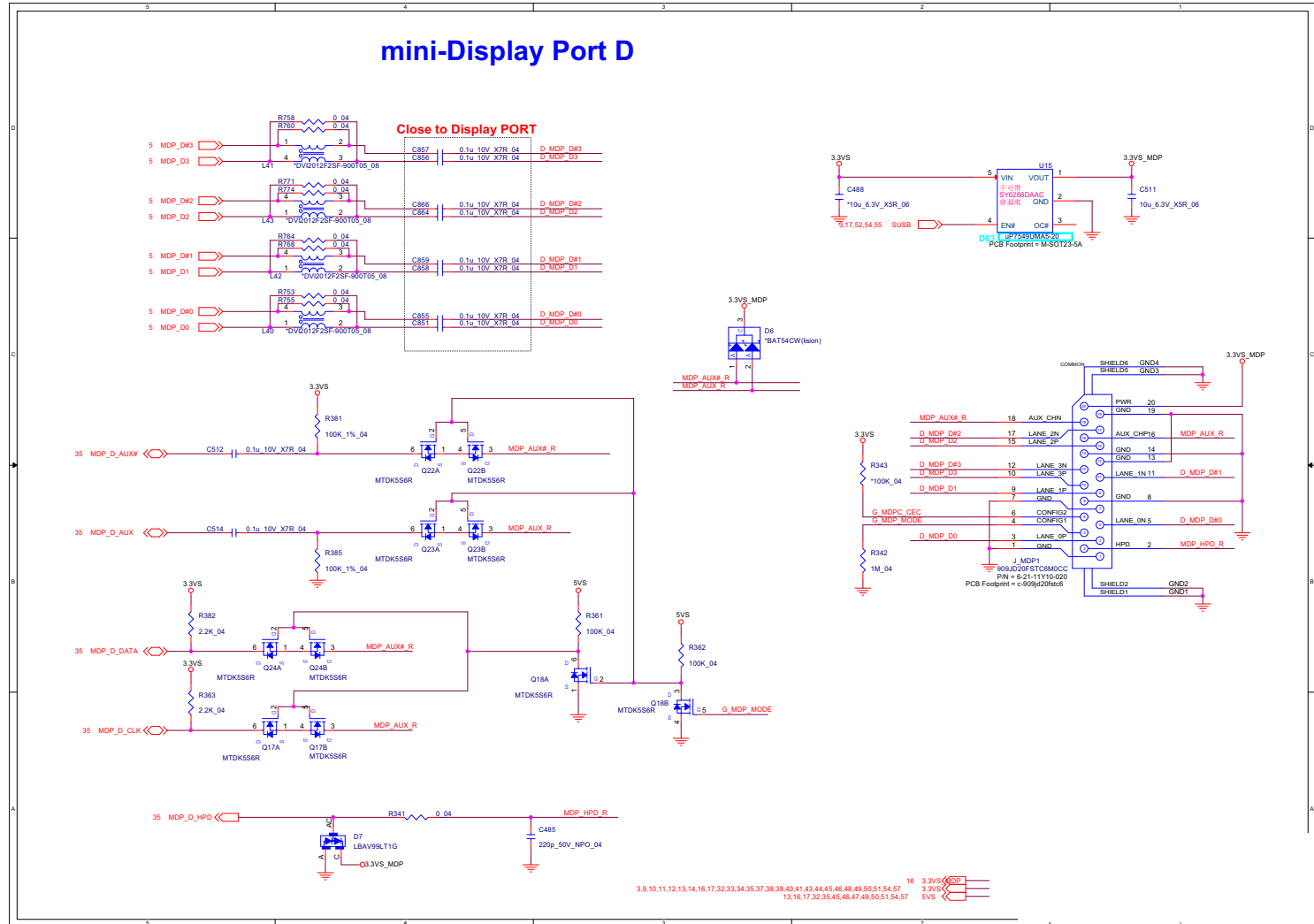


Sheet 14 of 70  
RTD2136N-CG

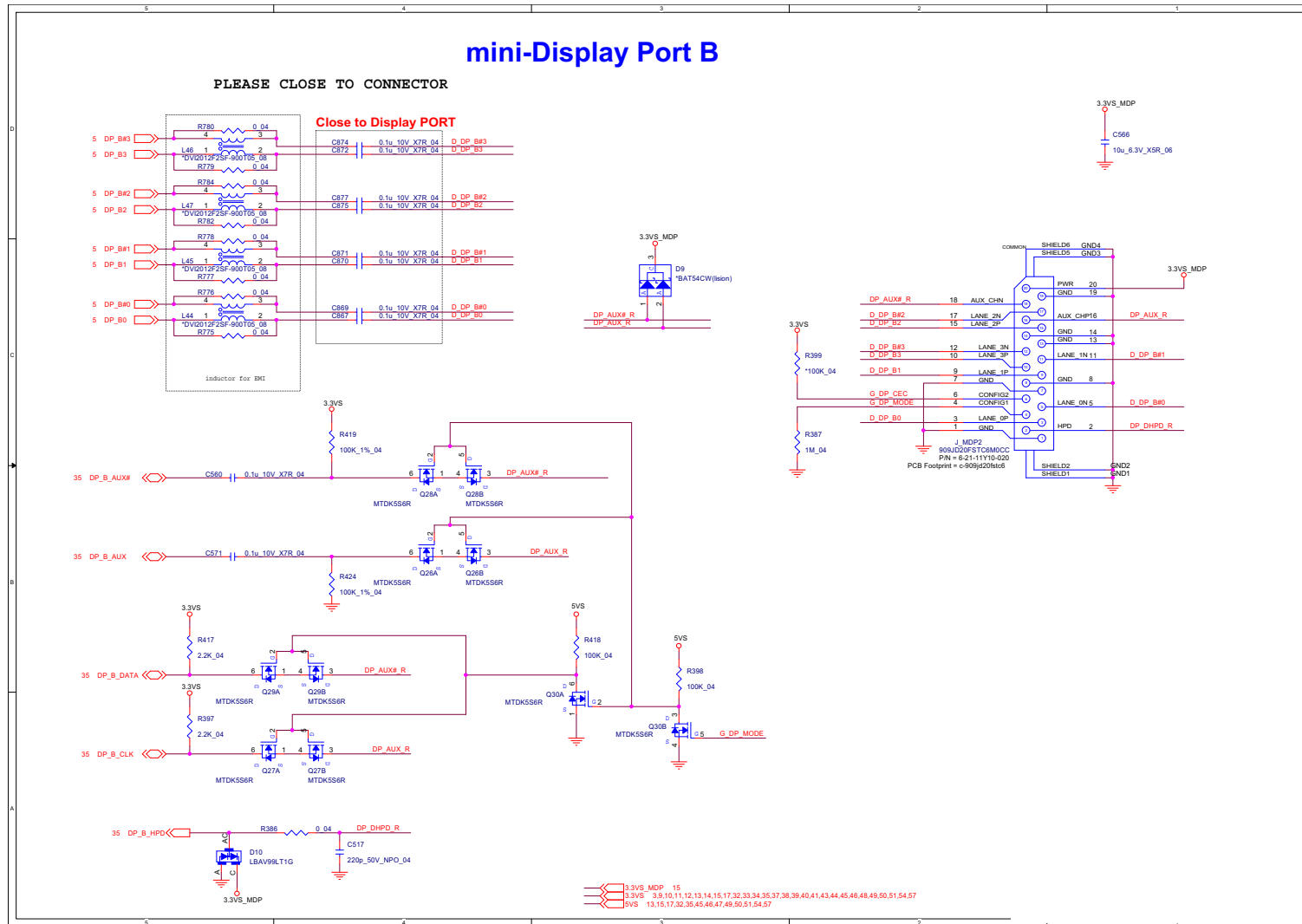
B.Schematic Diagrams

# Mini DP Port D

Sheet 15 of 70  
Mini DP Port D



# Mini DP Port B

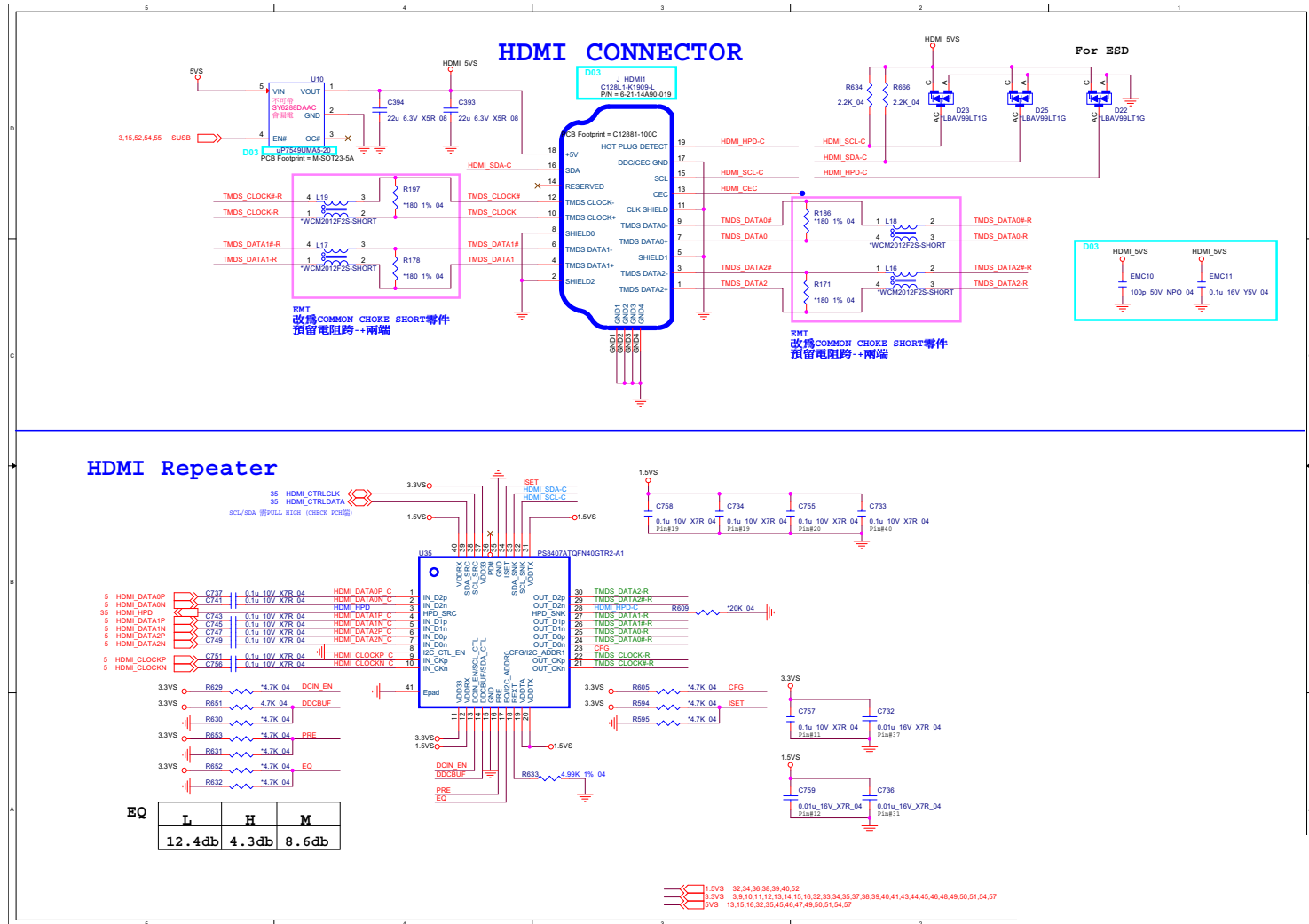


Sheet 16 of 70  
Mini DP Port B

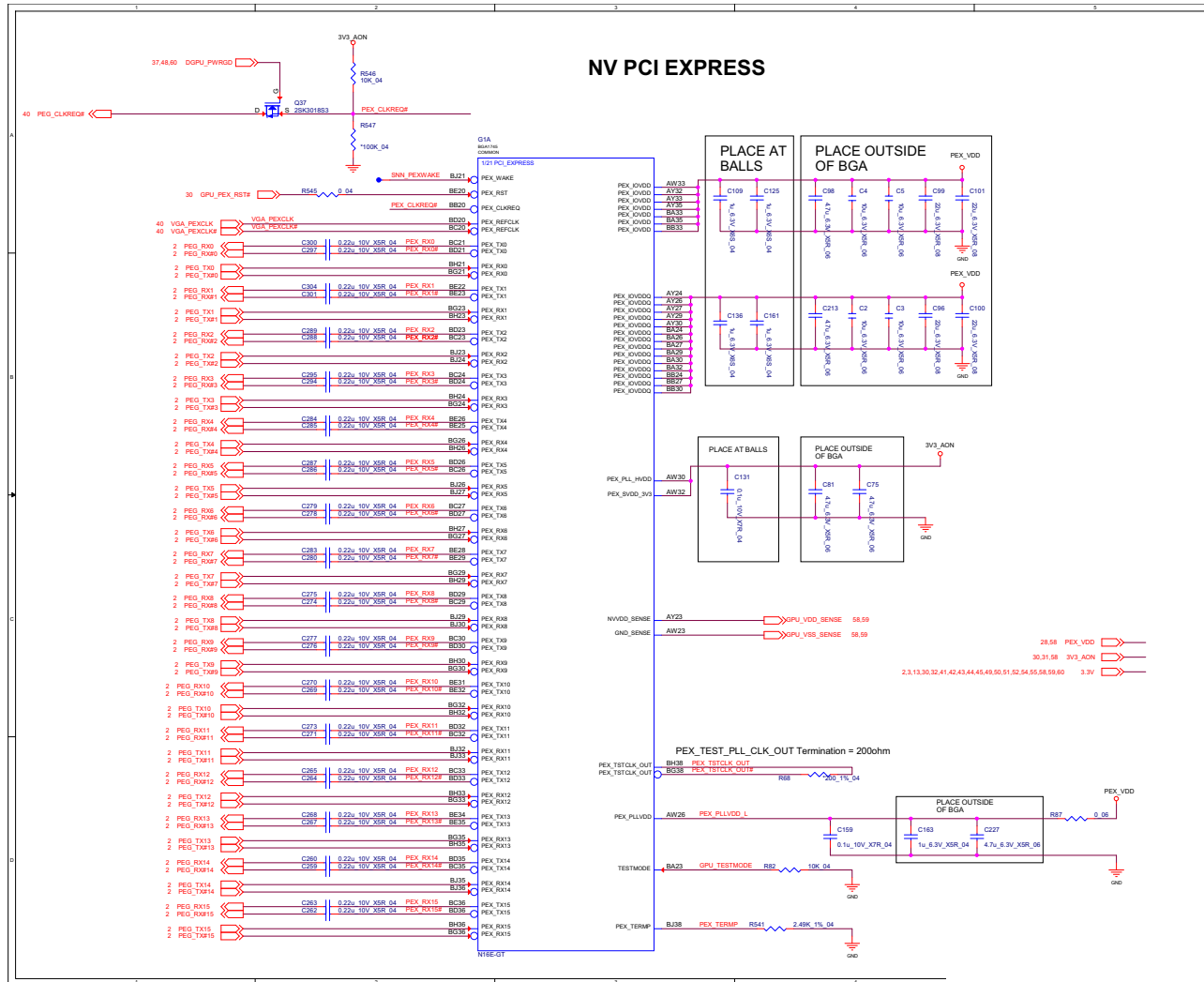
B.Schematic Diagrams

# HDMI Connector

Sheet 17 of 70  
HDMI Connector



# VGA PCI Express

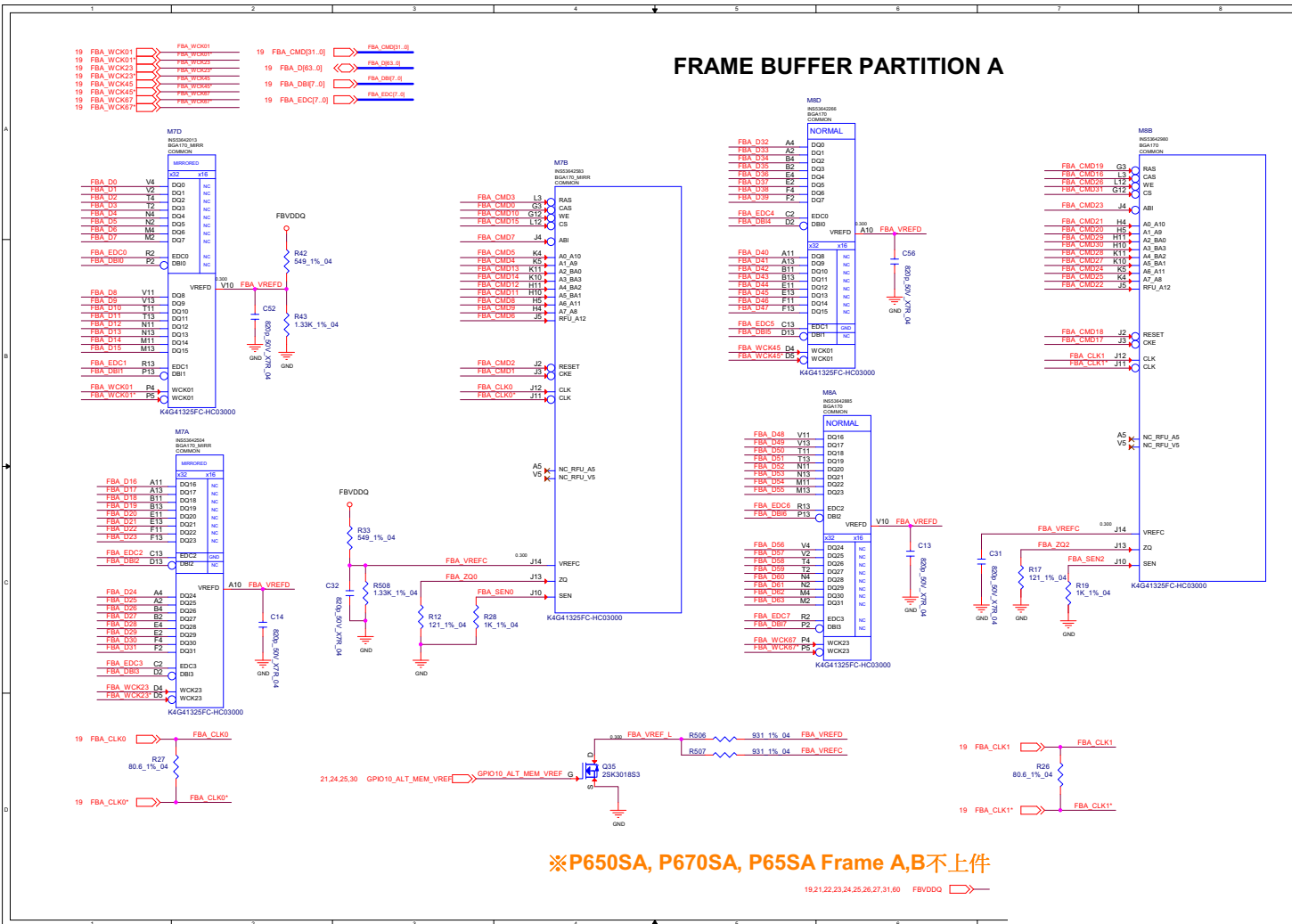


Sheet 18 of 70  
VGA PCI Express





# Frame Buffer Partition A

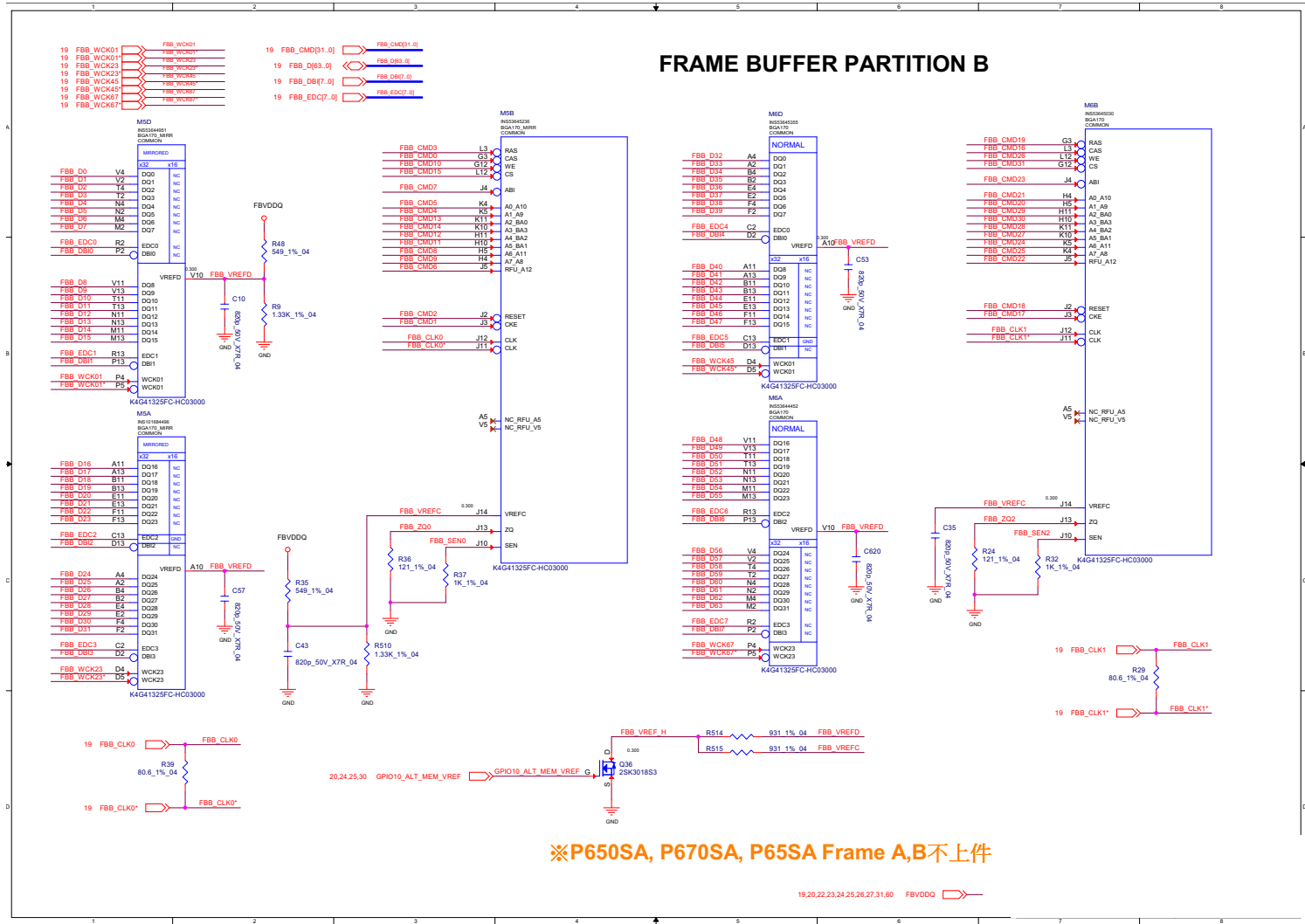


B.Schematic Diagrams

Sheet 20 of 70  
Frame Buffer  
Partition A

# Frame Buffer Partition B

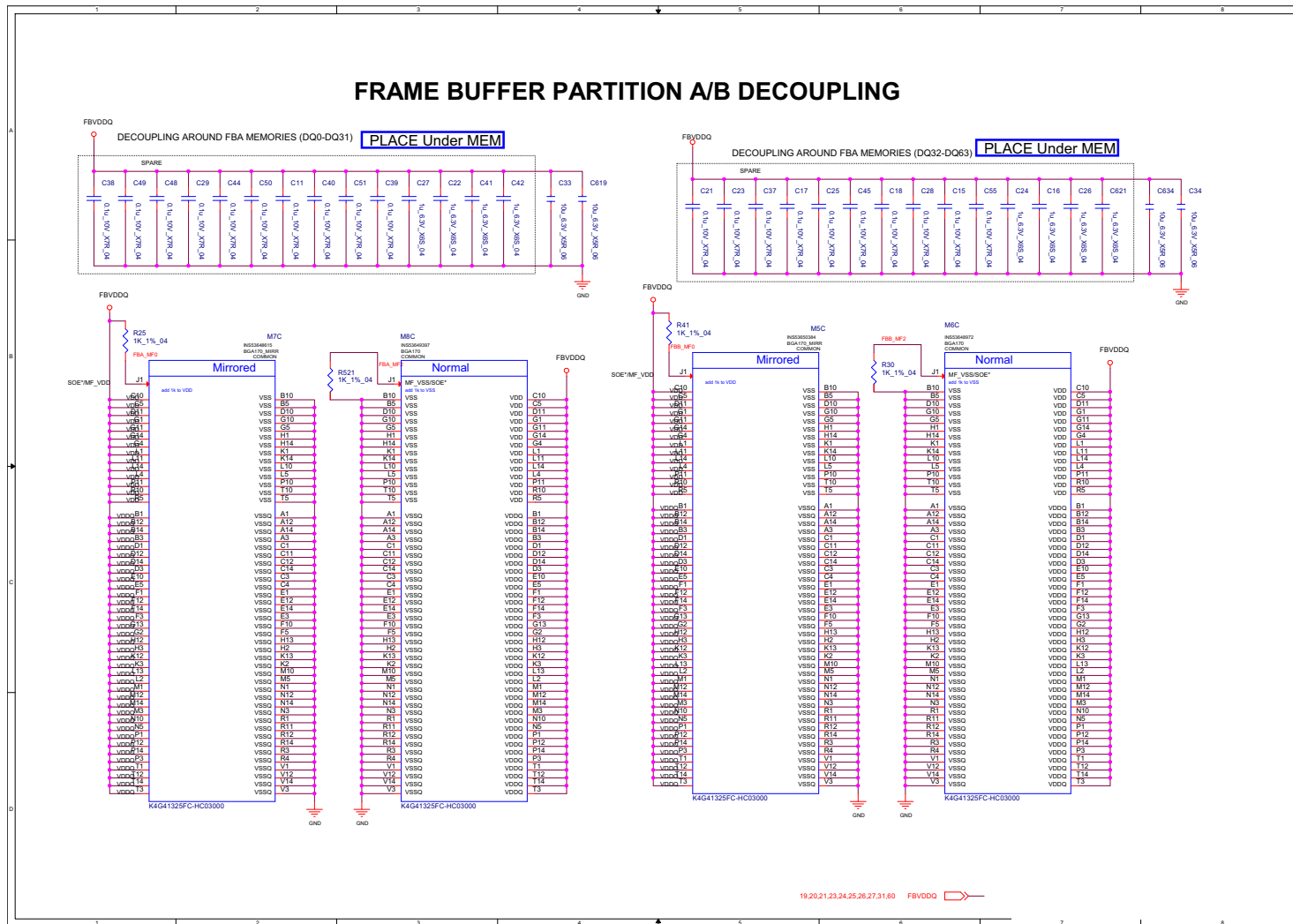
Sheet 21 of 70  
Frame Buffer  
Partition B



# Frame Buffer Partition A\_B

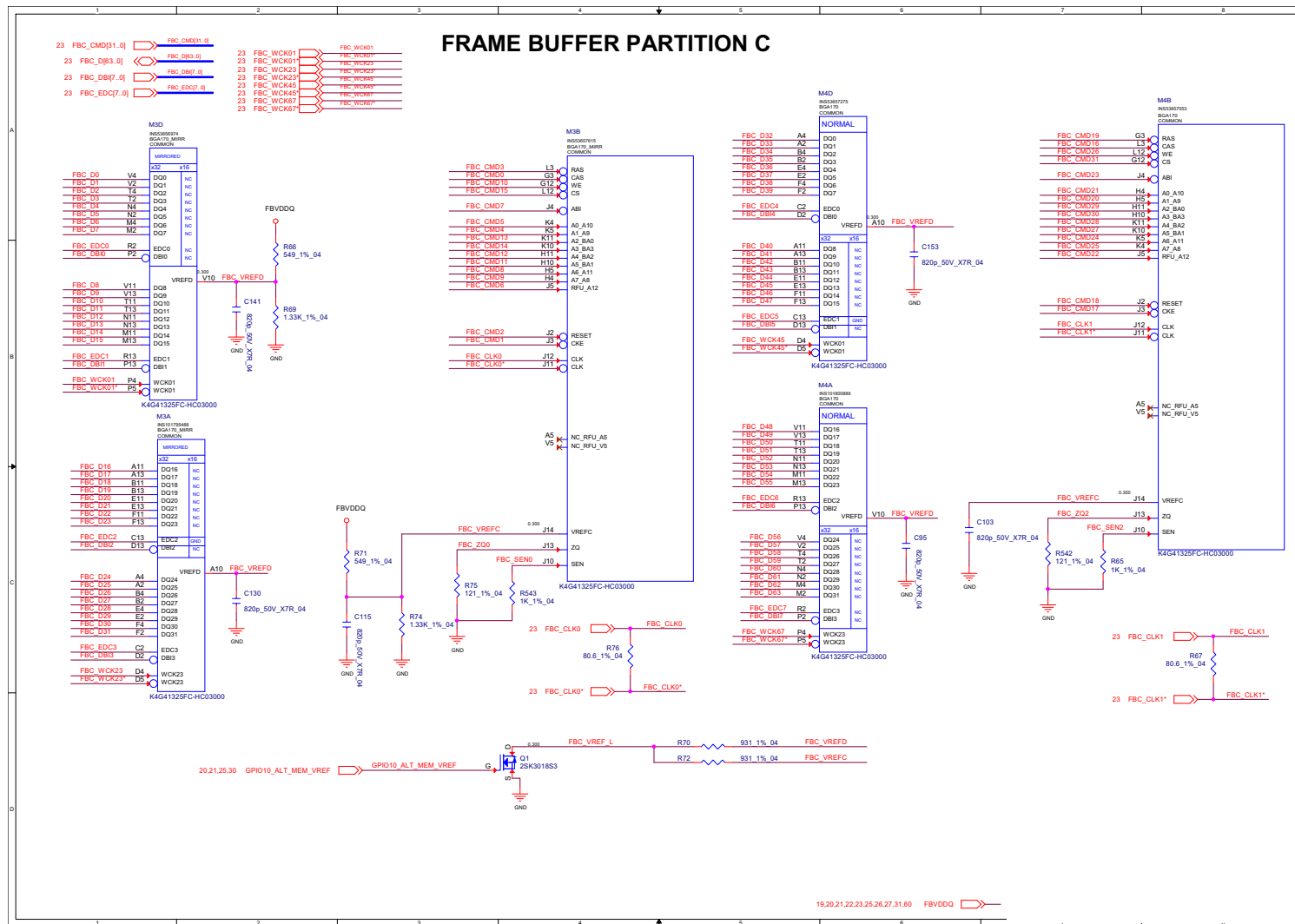
B.Schematic Diagrams

Sheet 22 of 70  
Frame Buffer  
Partition A\_B





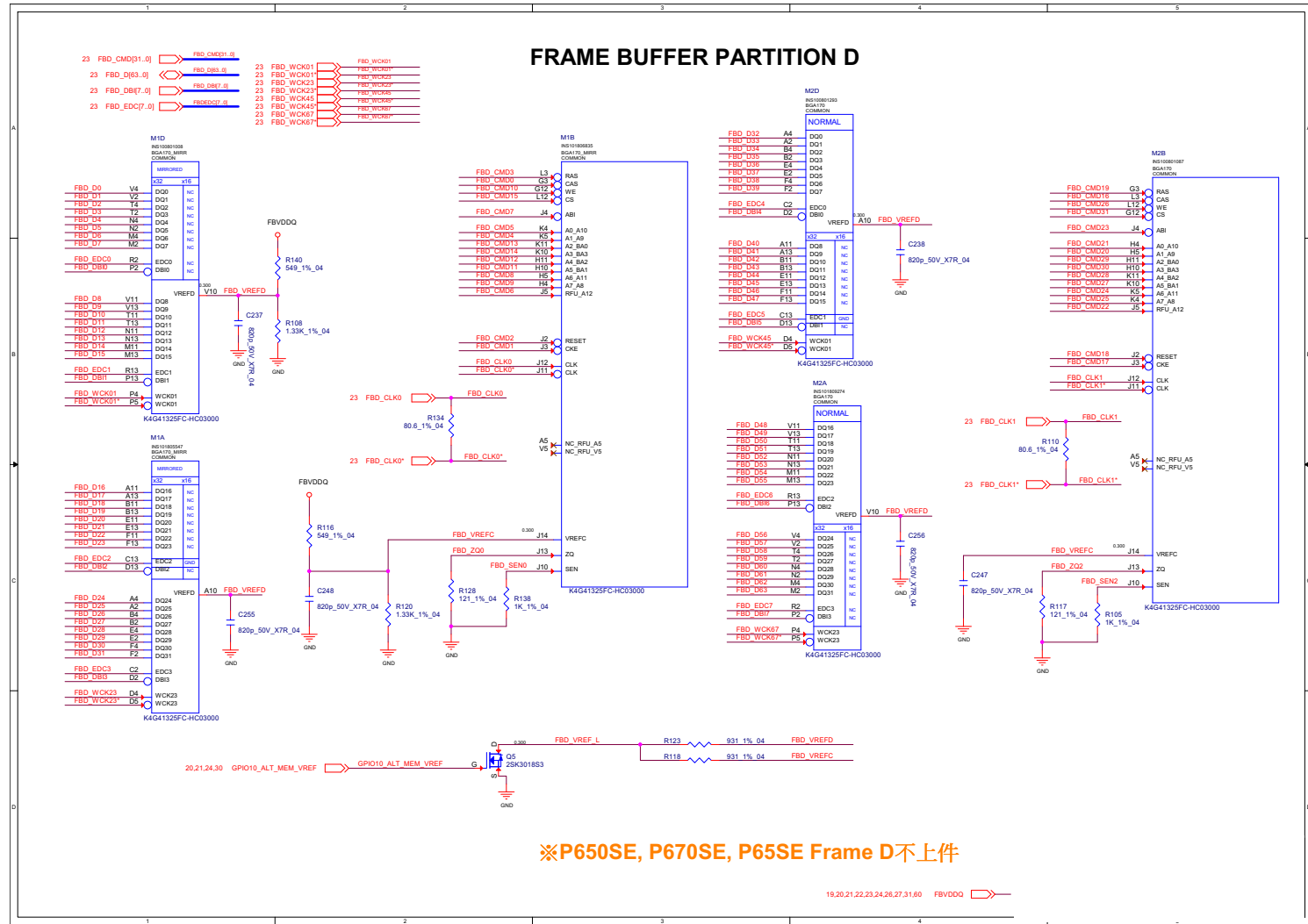
# Frame Buffer Partition C



Sheet 24 of 70  
Frame Buffer  
Partition C

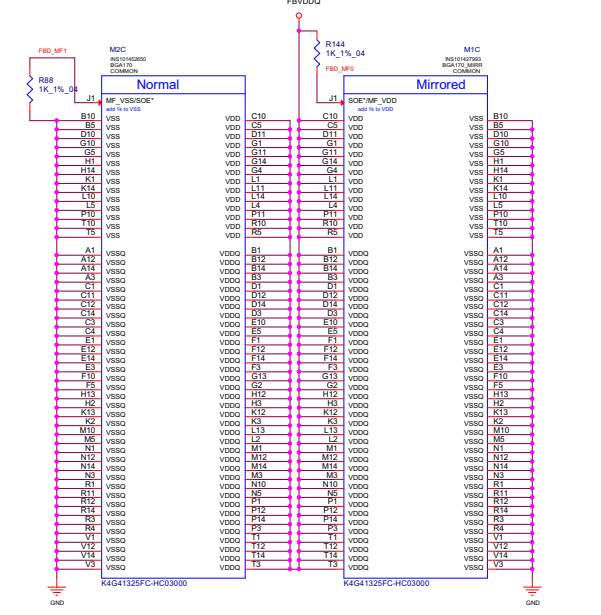
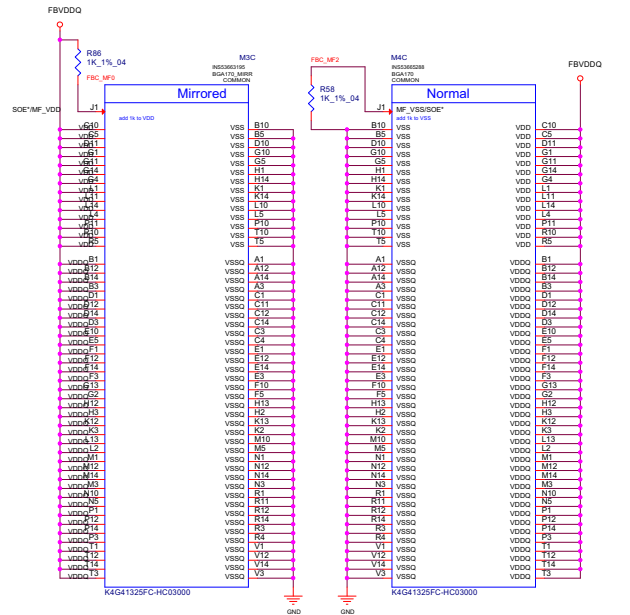
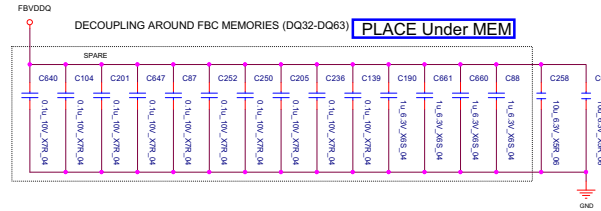
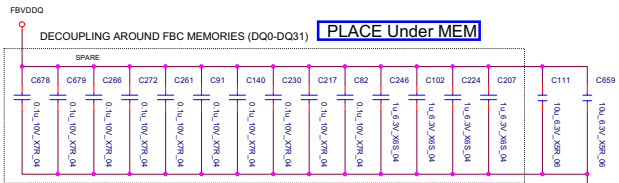
# Frame Buffer Partition D

Sheet 25 of 70  
Frame Buffer  
Partition D



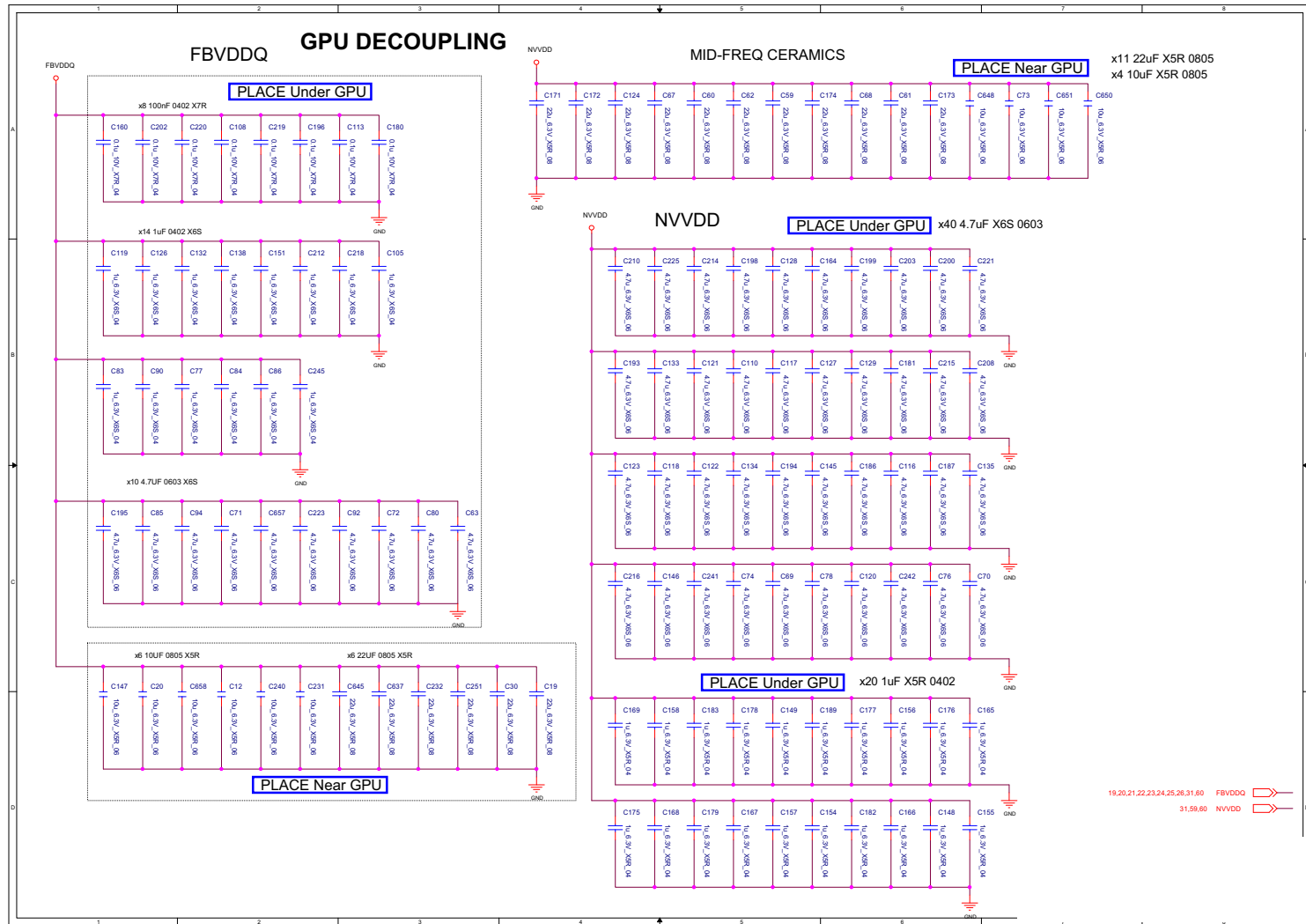
# Frame Buffer Partition C\_D

## FRAME BUFFER PARTITION C/D DECOUPLING



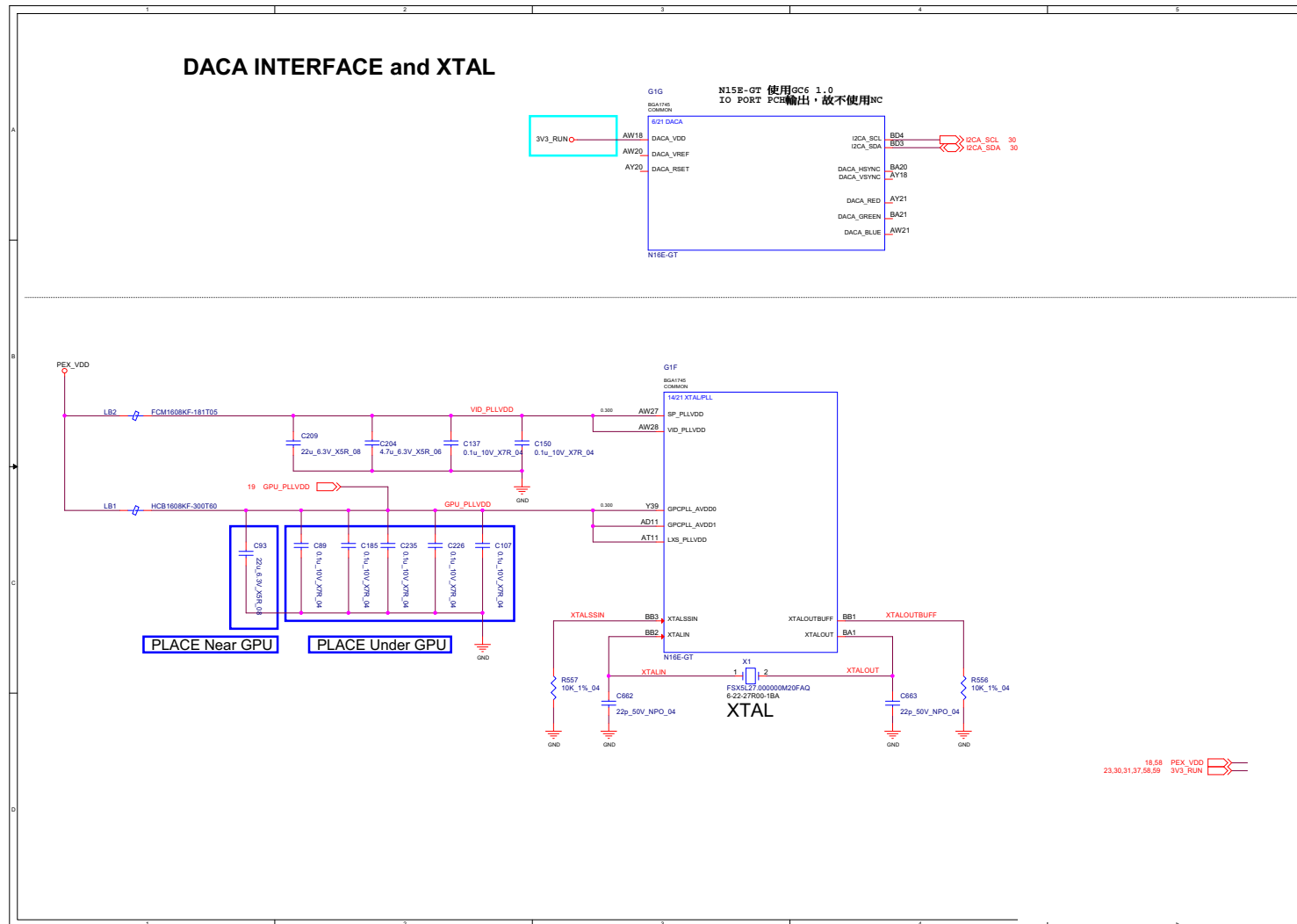
Sheet 26 of 70  
Frame Buffer  
Partition C\_D

# GPU Decoupling



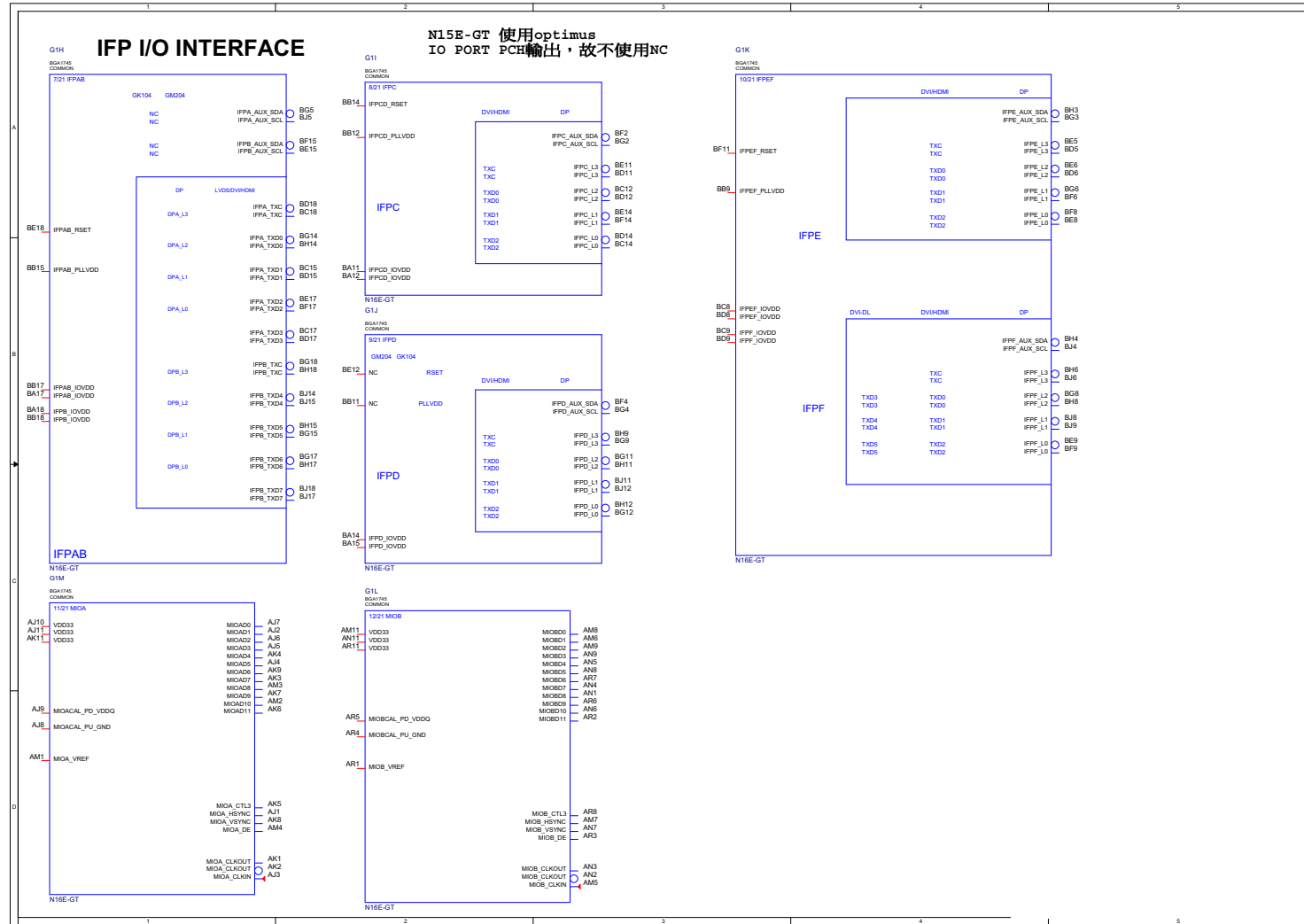


# DACA Interface XTAL



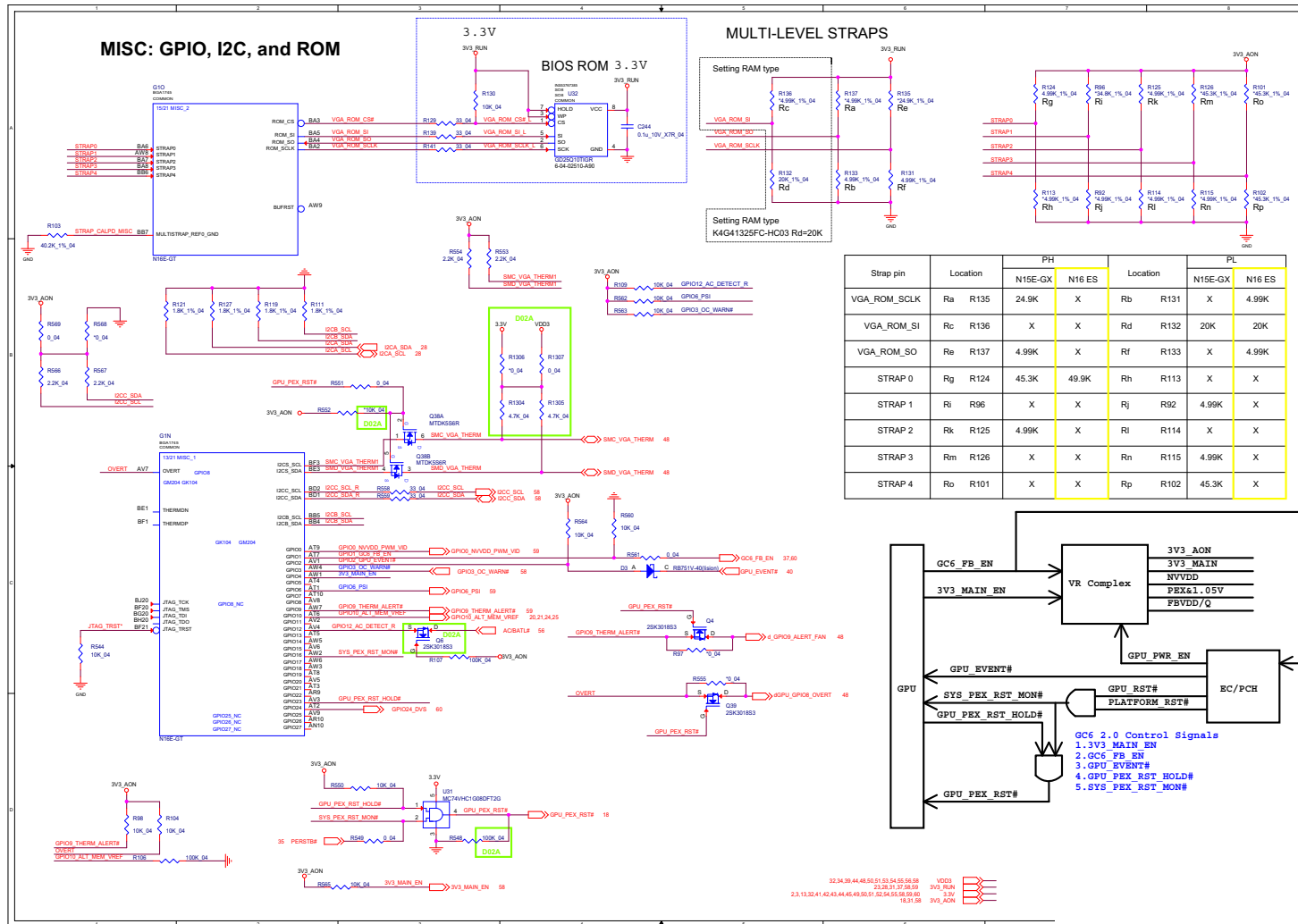
Sheet 28 of 70  
 DACA Interface and  
 XTAL

# IFP I/O Interface



Sheet 29 of 70  
IFP I/O Interface

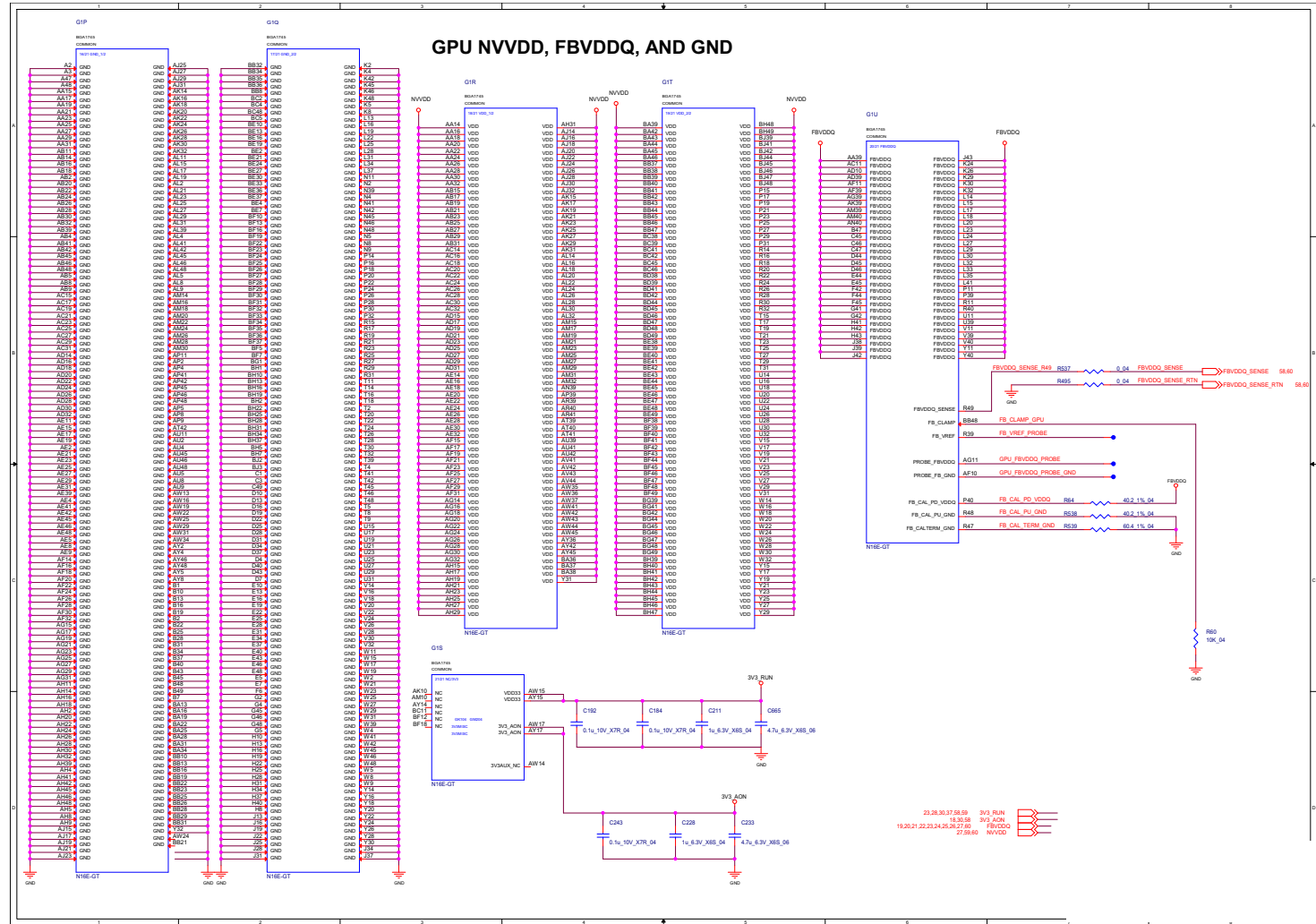
# Misc - GPIO, I2C and ROM



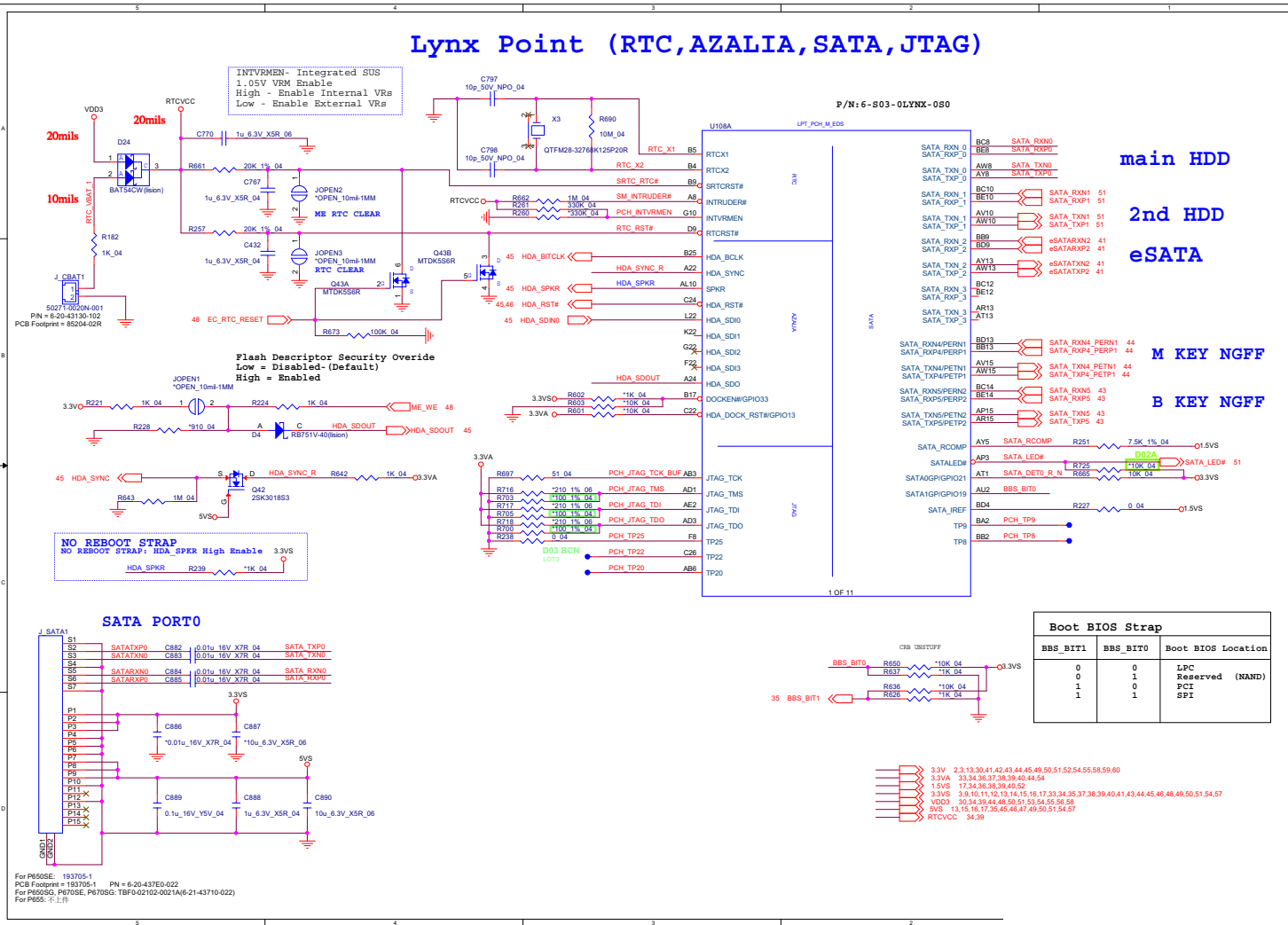
Sheet 30 of 70  
Misc - GPIO, I2C  
and ROM

# GPU NVVDD, FBVDDQ, and GND

Sheet 31 of 70  
GPU NVVDD,  
FBVDDQ, GND



# Lynx 1/9

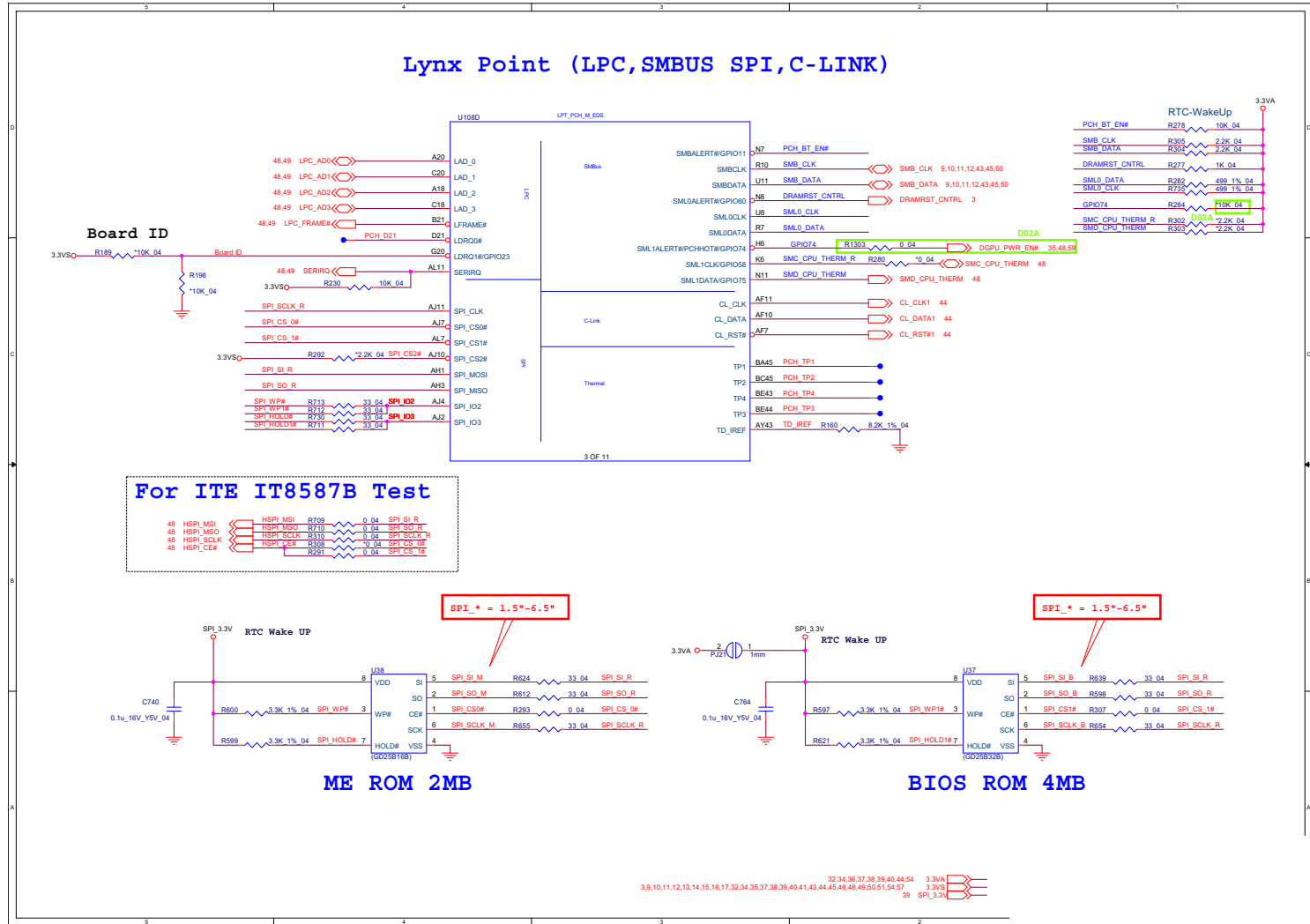


B.Schematic Diagrams

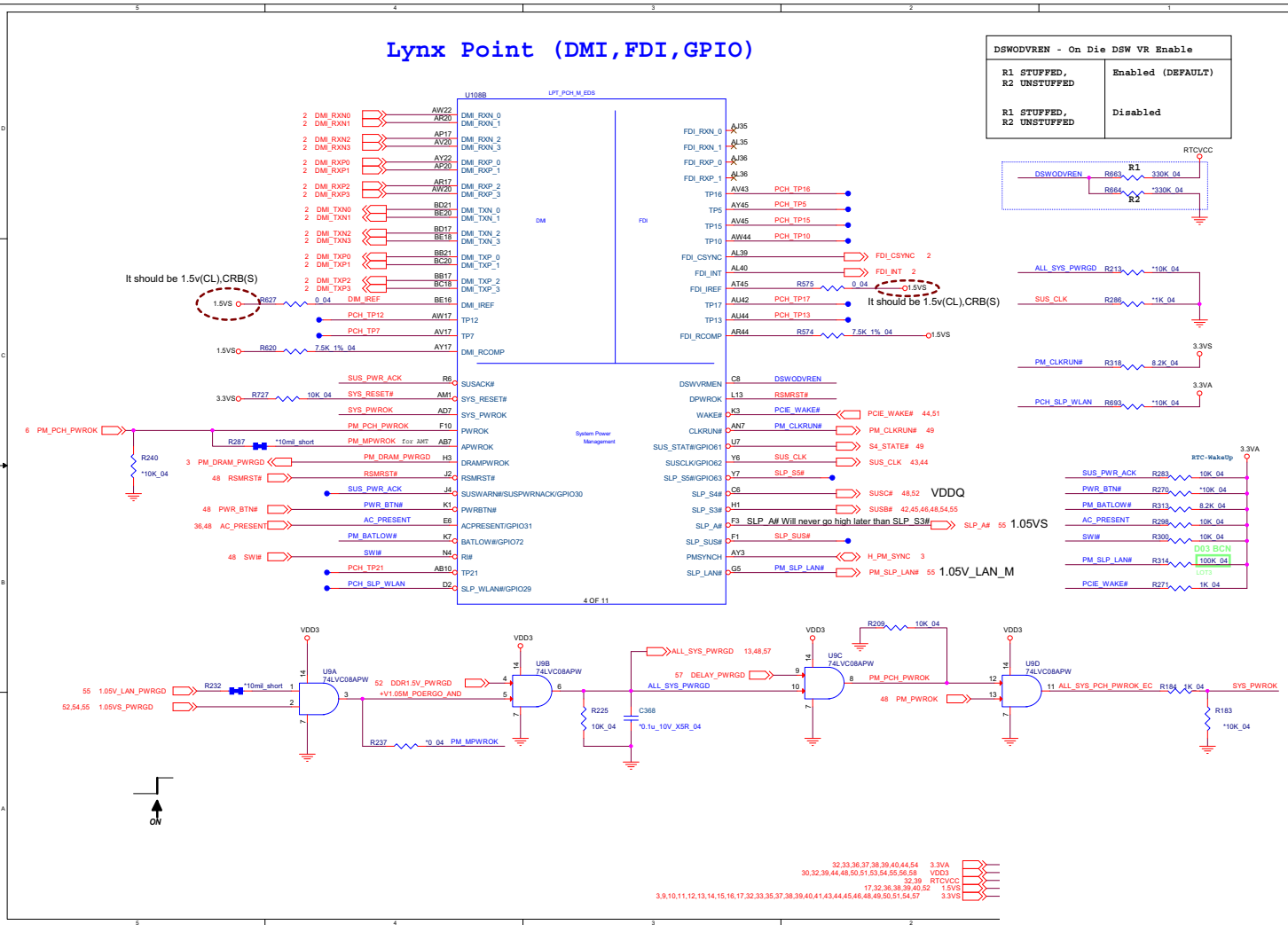
Sheet 32 of 70  
Lynx 1/9

# Lynx 2/9

Sheet 33 of 70  
Lynx 2/9



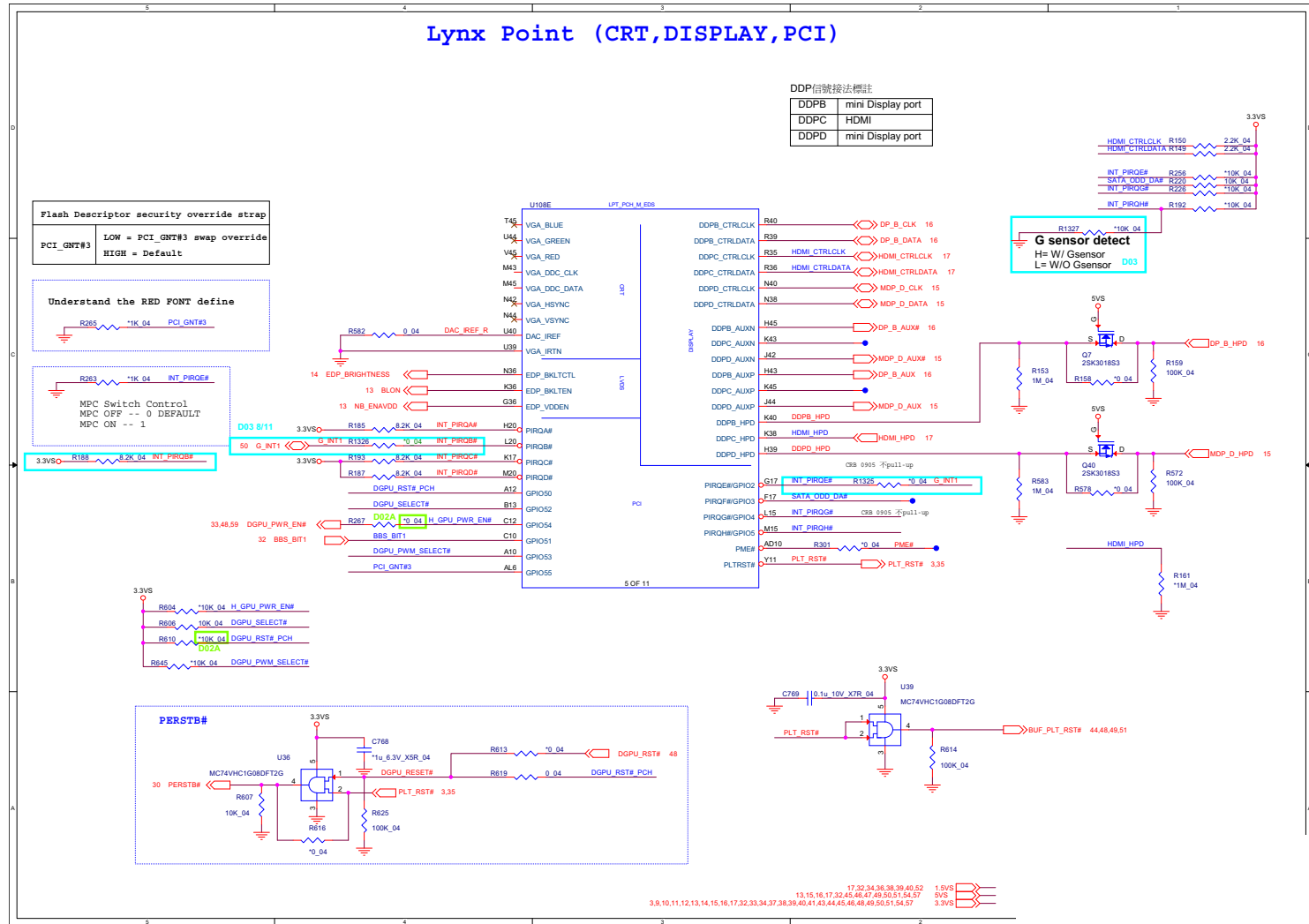
# Lynx 3/9



Sheet 34 of 70  
Lynx 3/9

# Lynx 4/9

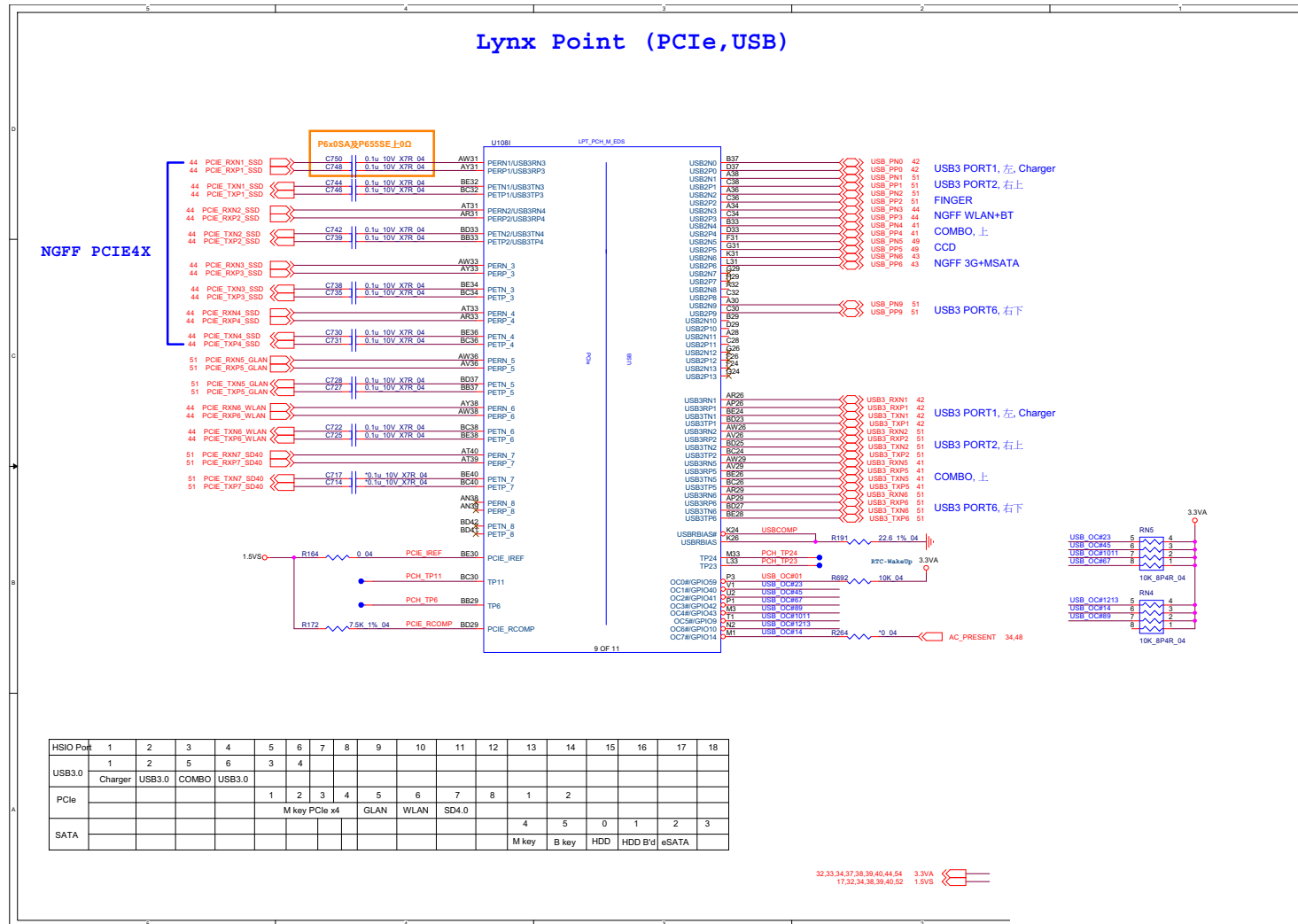
Sheet 35 of 70  
Lynx 4/9





# Lynx 5/9

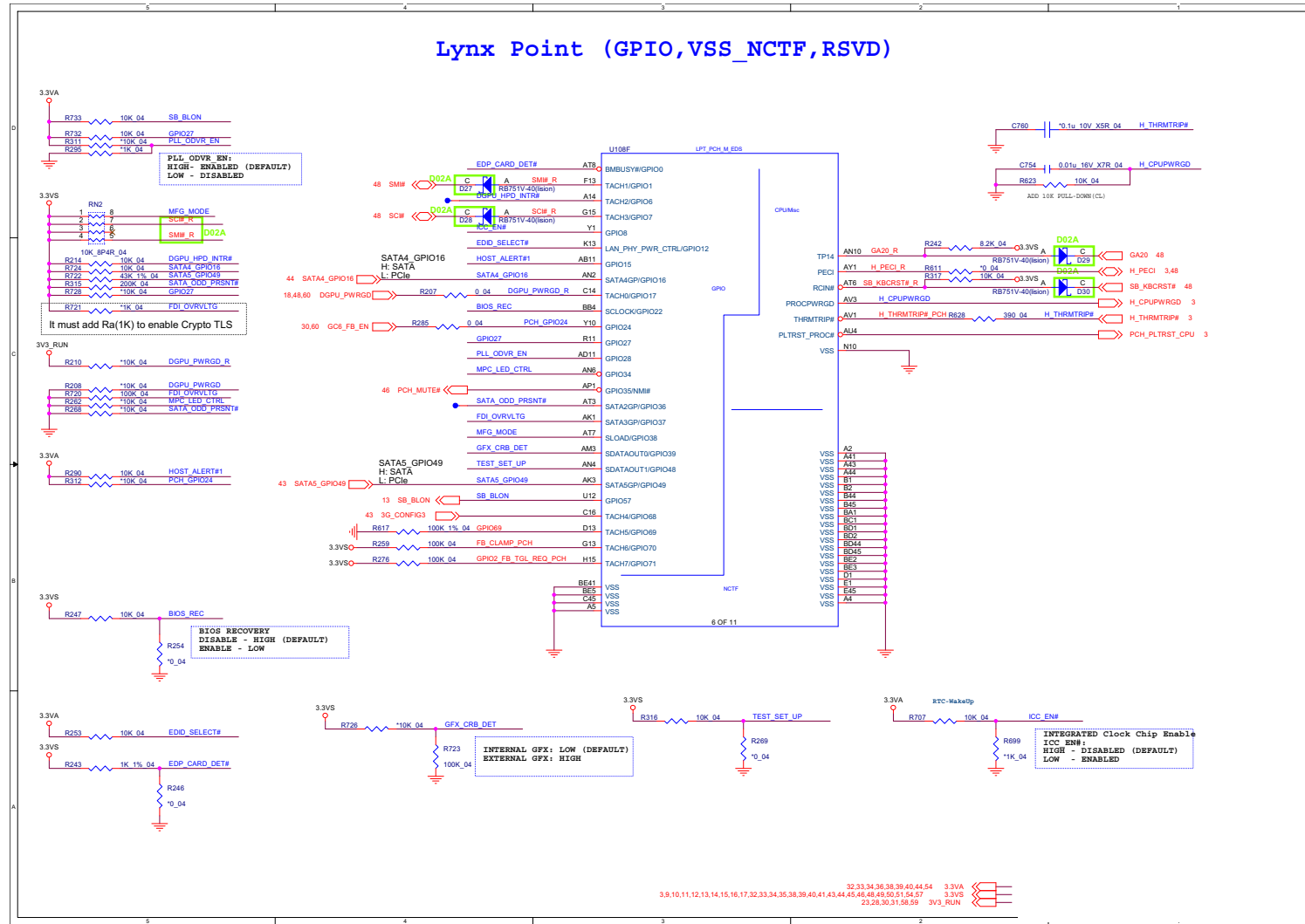
B.Schematic Diagrams



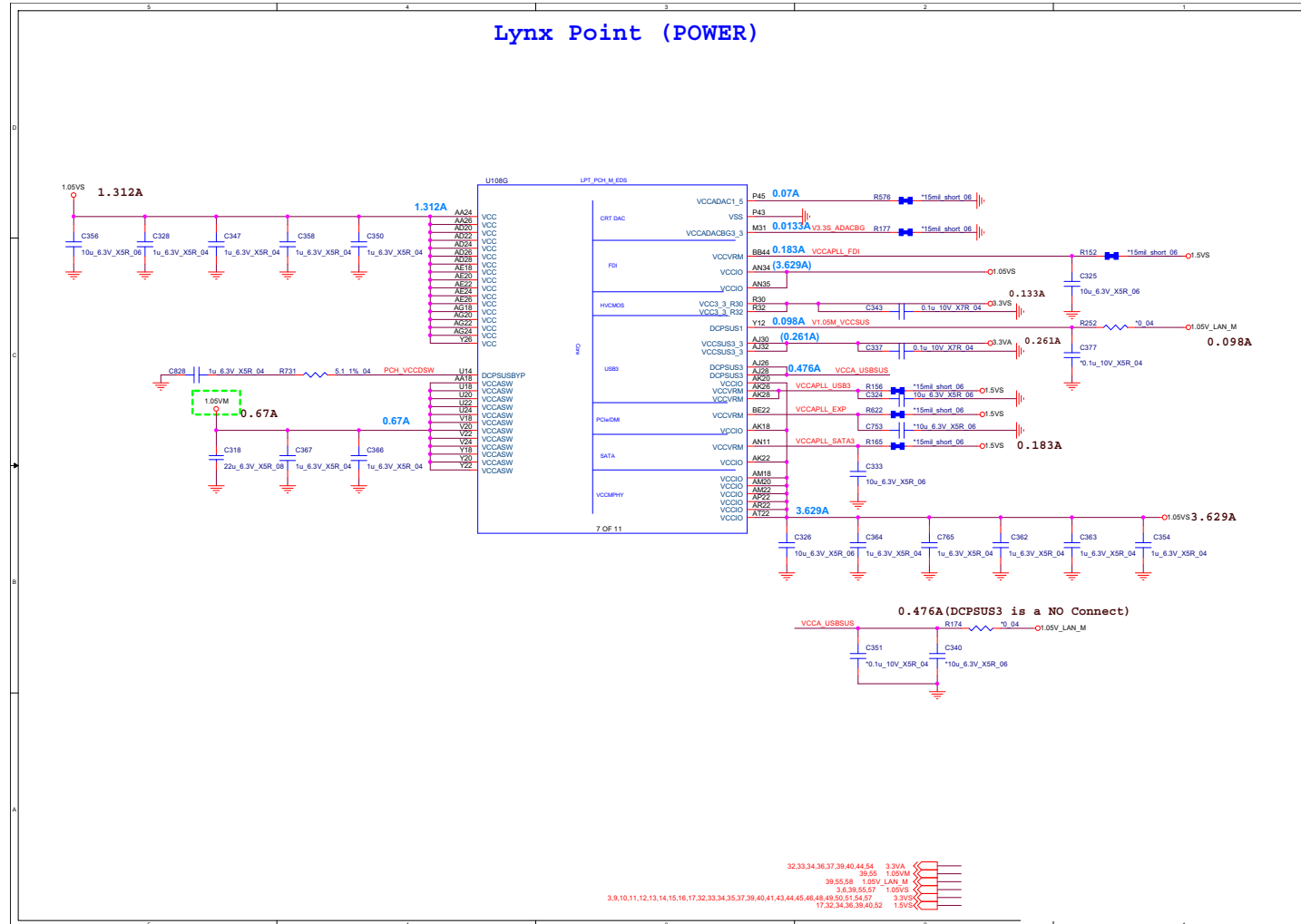
Sheet 36 of 70  
Lynx 5/9

# Lynx 6/9

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Lynx 6/9



Lynx 7/9

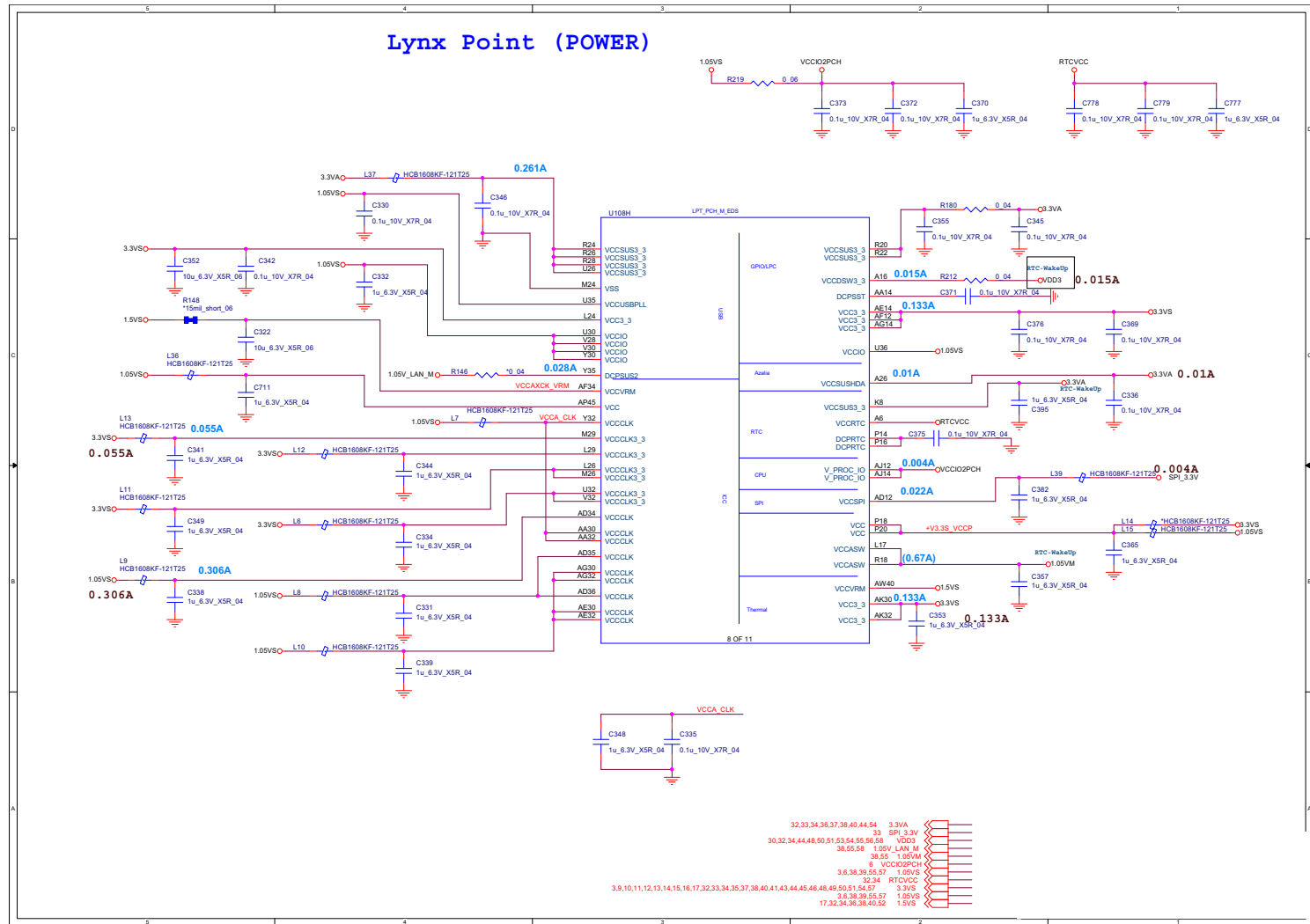


Sheet 38 of 70  
Lynx 7/9

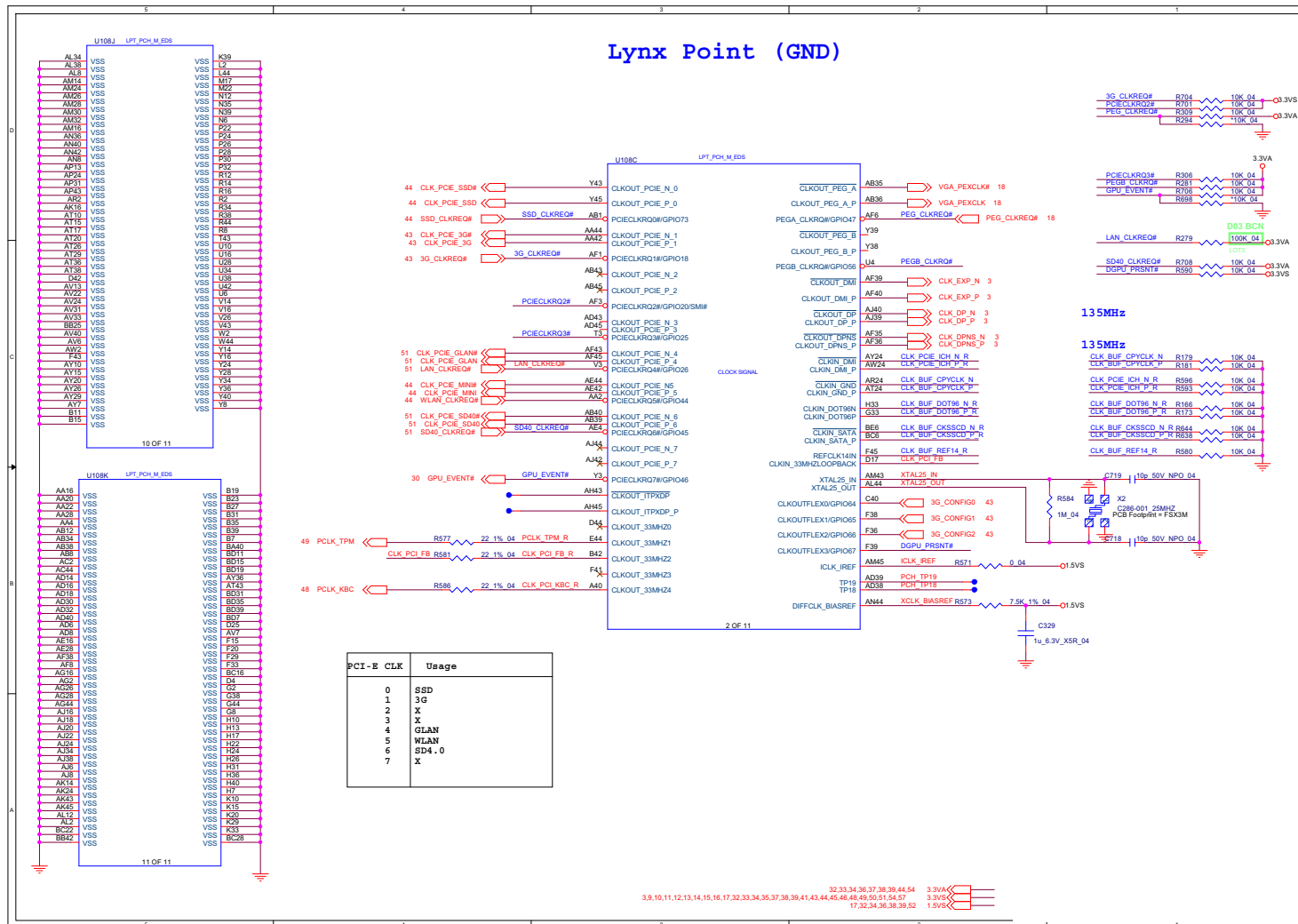
B.Schematic Diagrams

# Lynx 8/9

Sheet 39 of 70  
Lynx 8/9



# Lynx 9/9

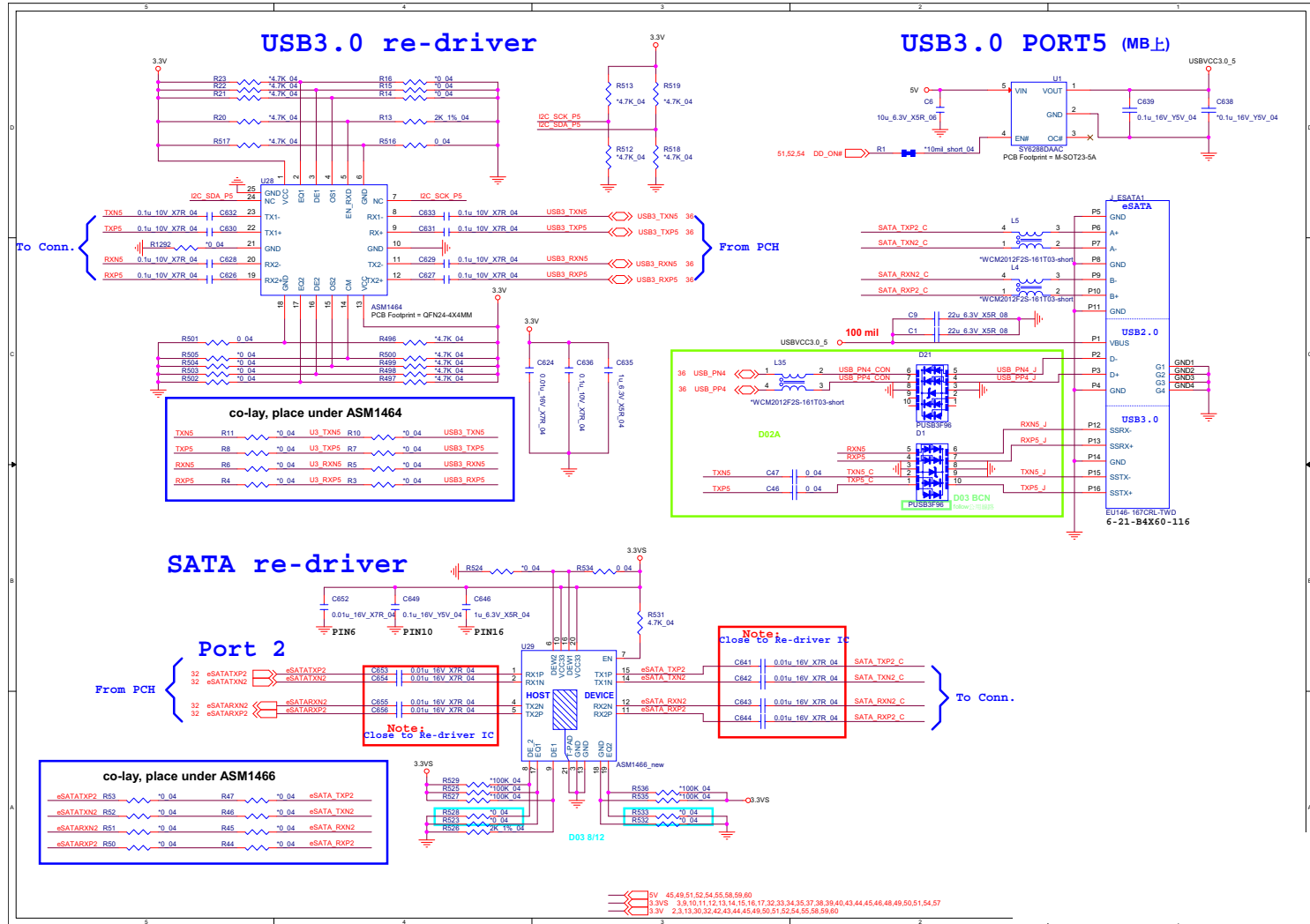


Sheet 40 of 70  
Lynx 9/9

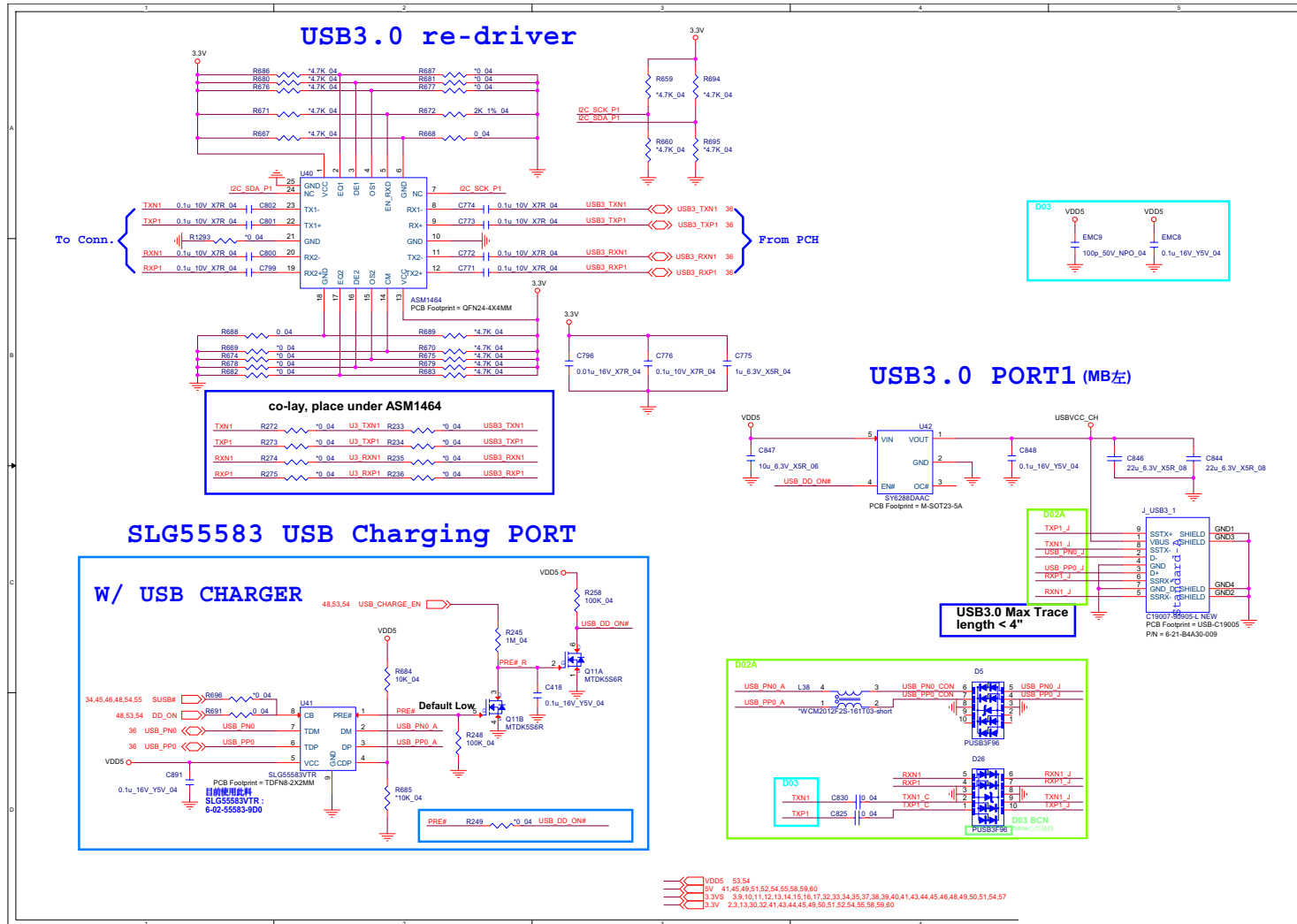
B.Schematic Diagrams

# USB3.0 + eSATA Combo

Sheet 41 of 70  
USB3.0 + eSATA  
Combo



# USB Charger

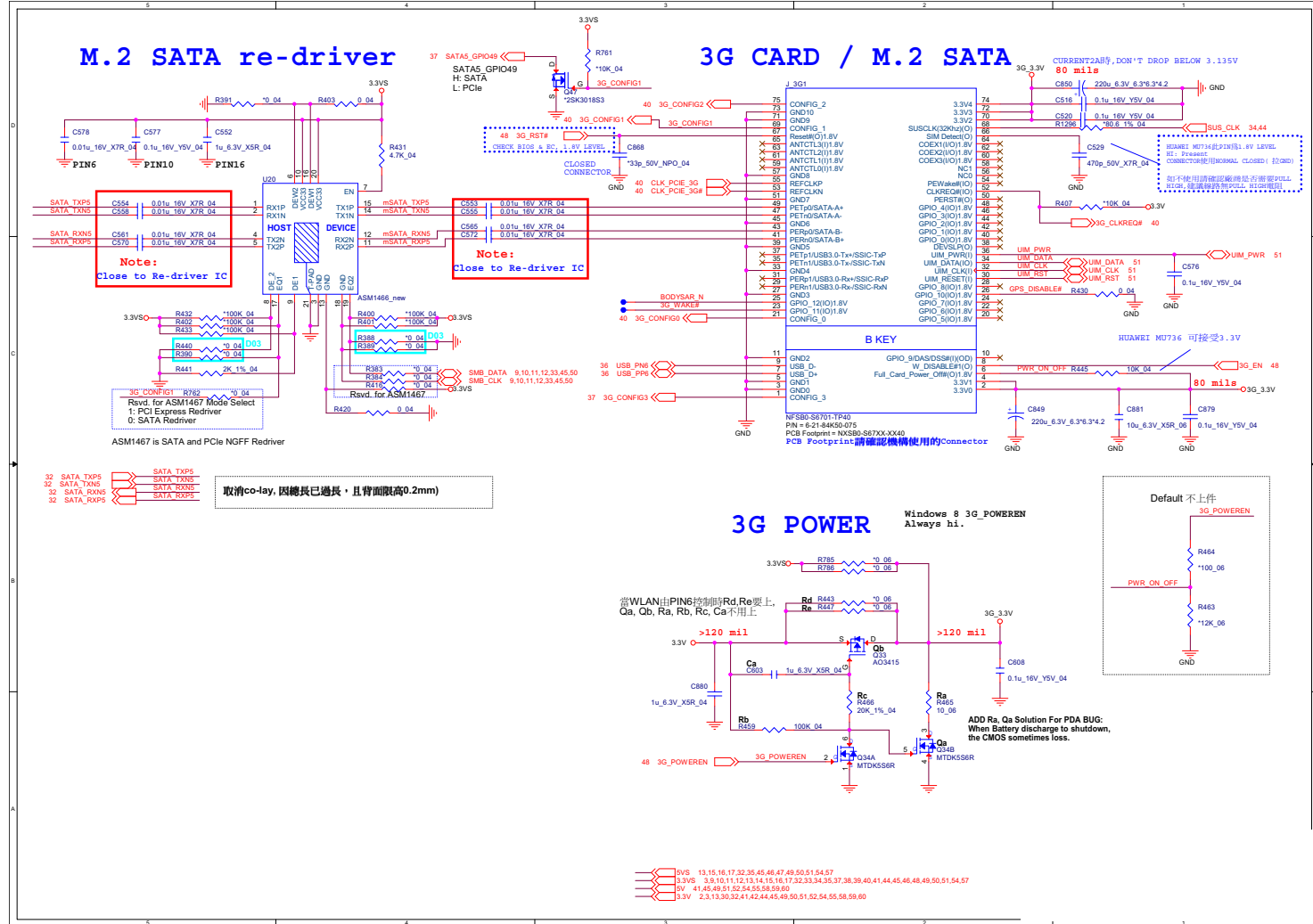


Sheet 42 of 70  
USB Charger

B.Schematic Diagrams

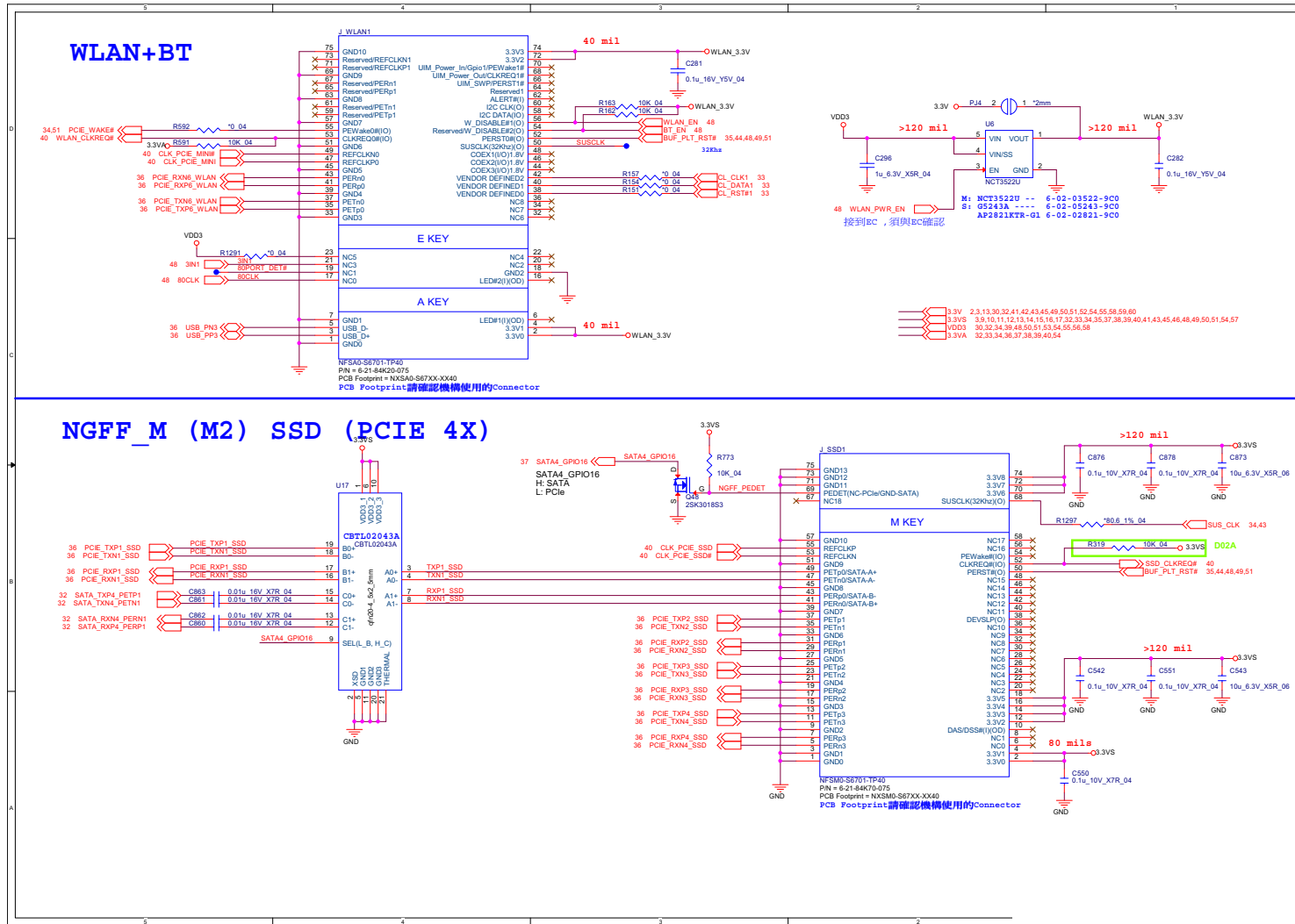
# M.2 3G + M.2 SATA

Sheet 43 of 70  
M.2 3G + M.2 SATA





# M.2 WLAN+BT, PCIE4X SSD

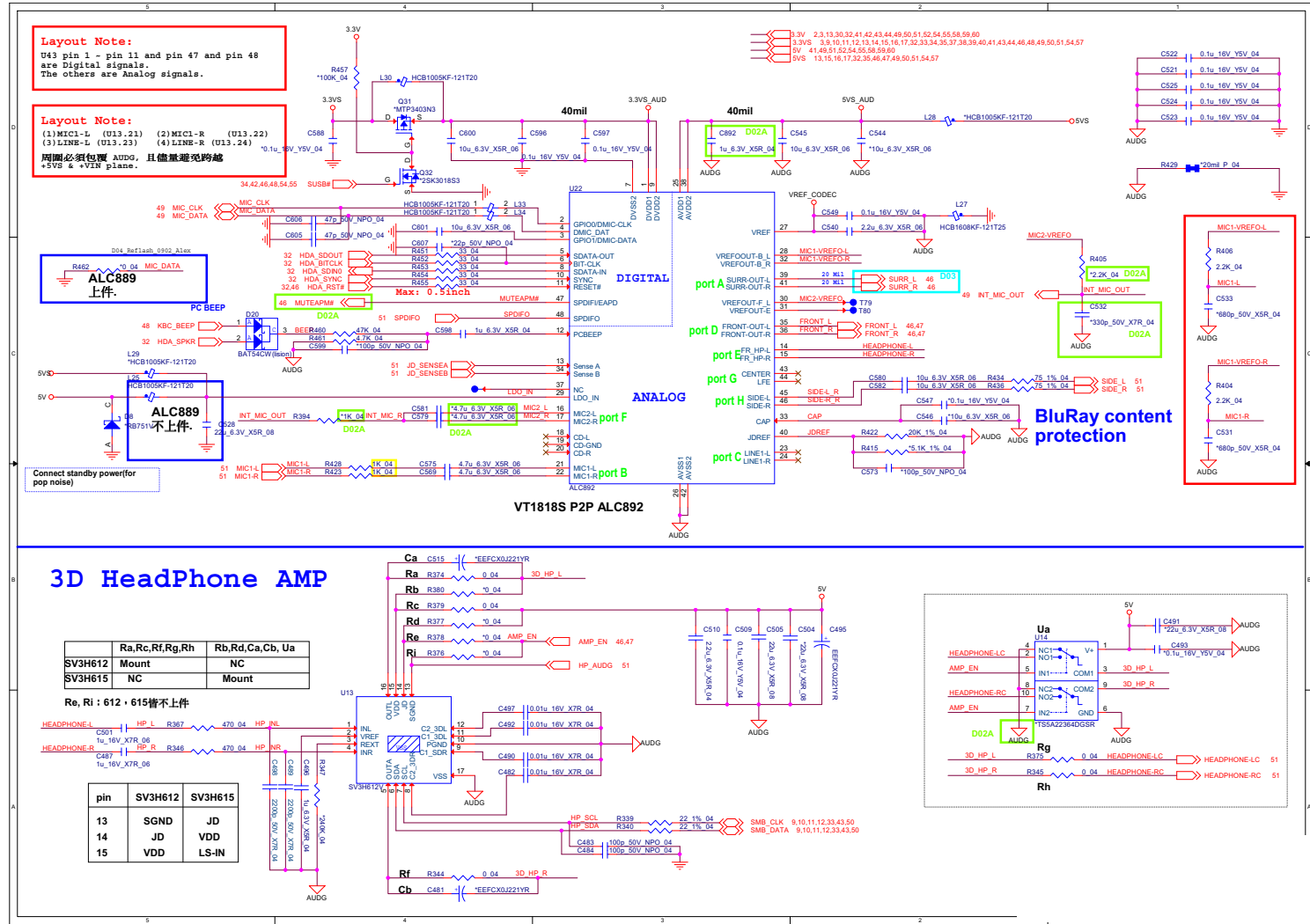


Sheet 44 of 70  
M.2 WLAN+BT,  
PCIE4X SSD

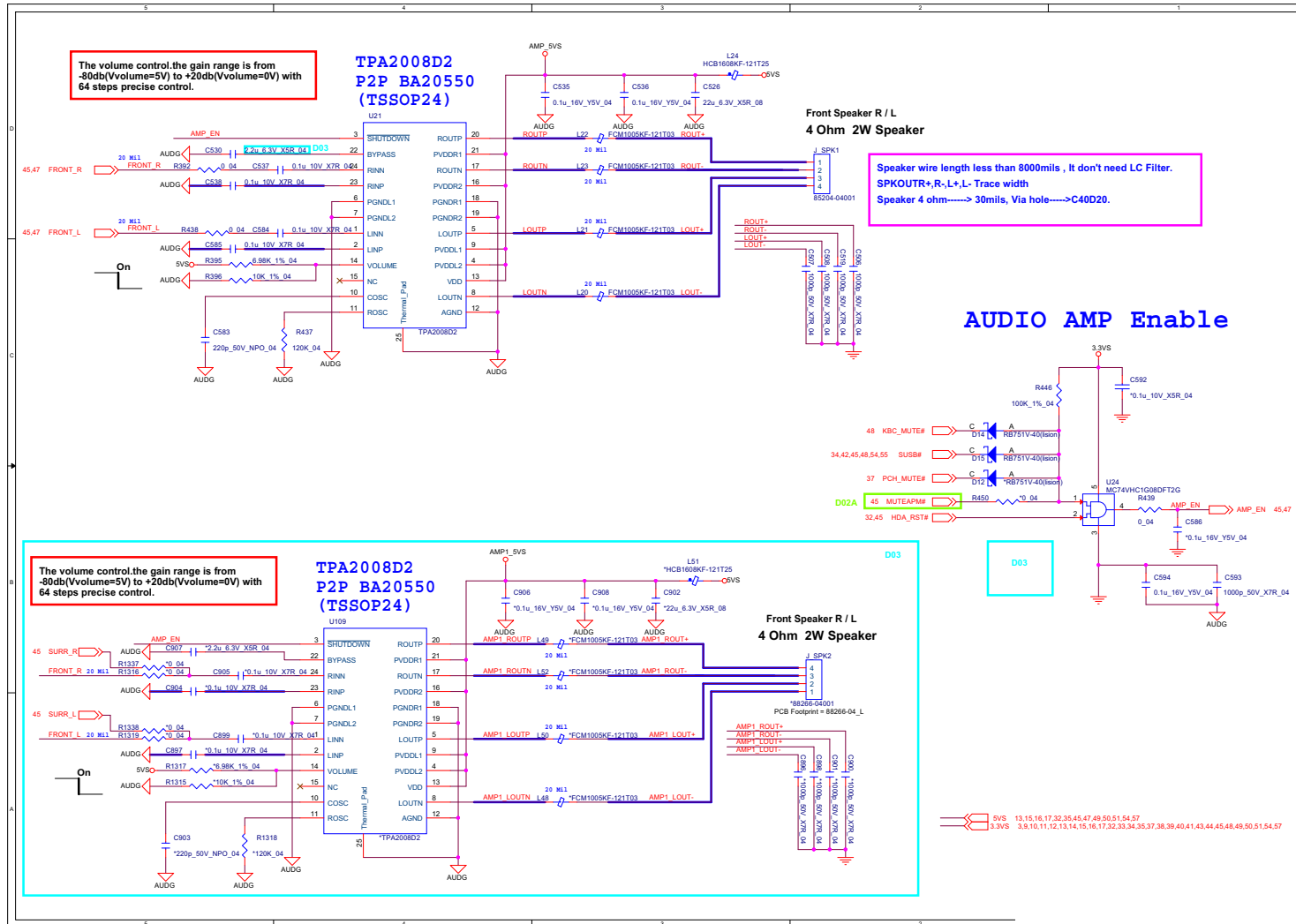
B.Schematic Diagrams

# Realtek ALC892

Sheet 45 of 70  
Realtek ALC892



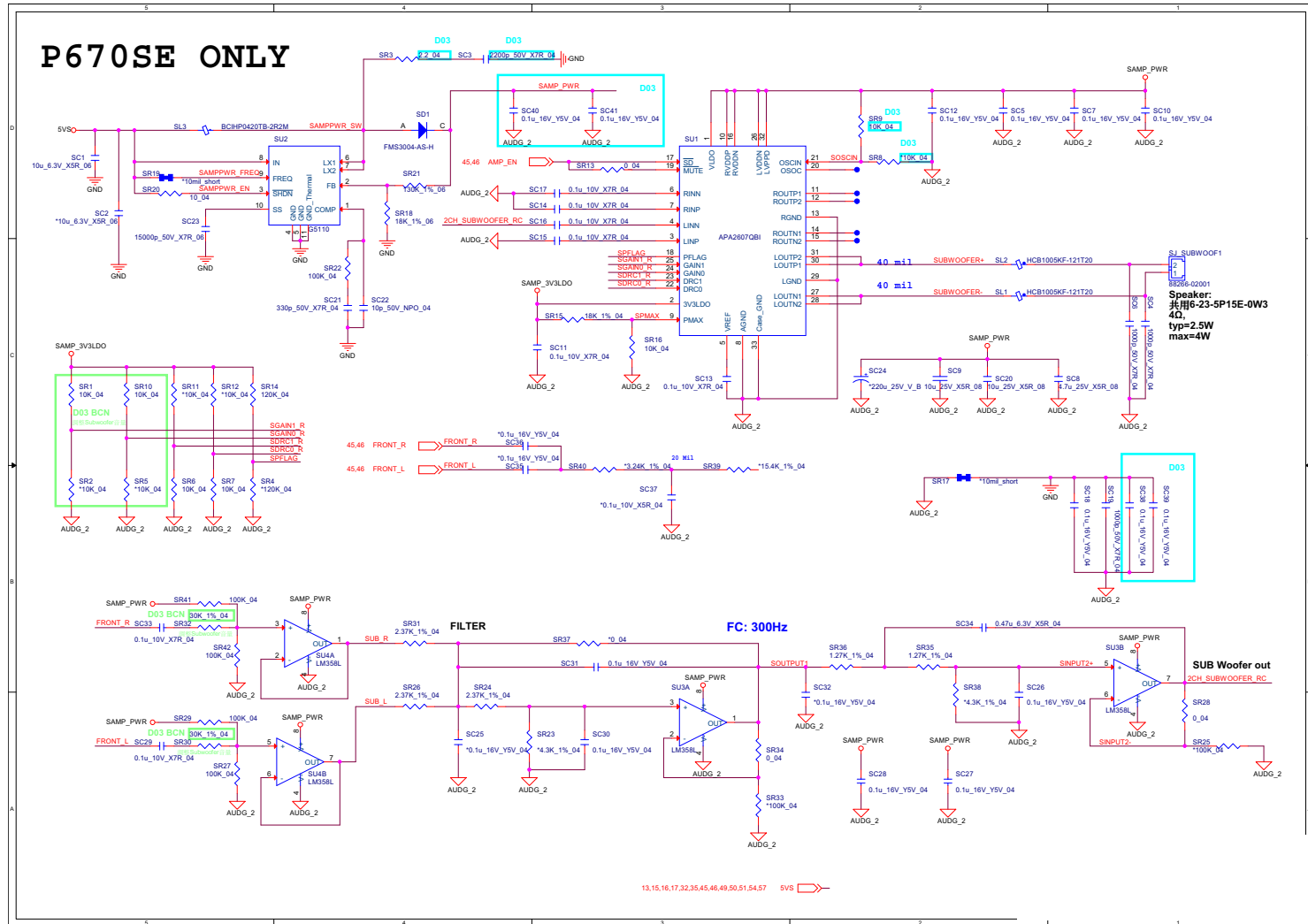
# TPA2008D2



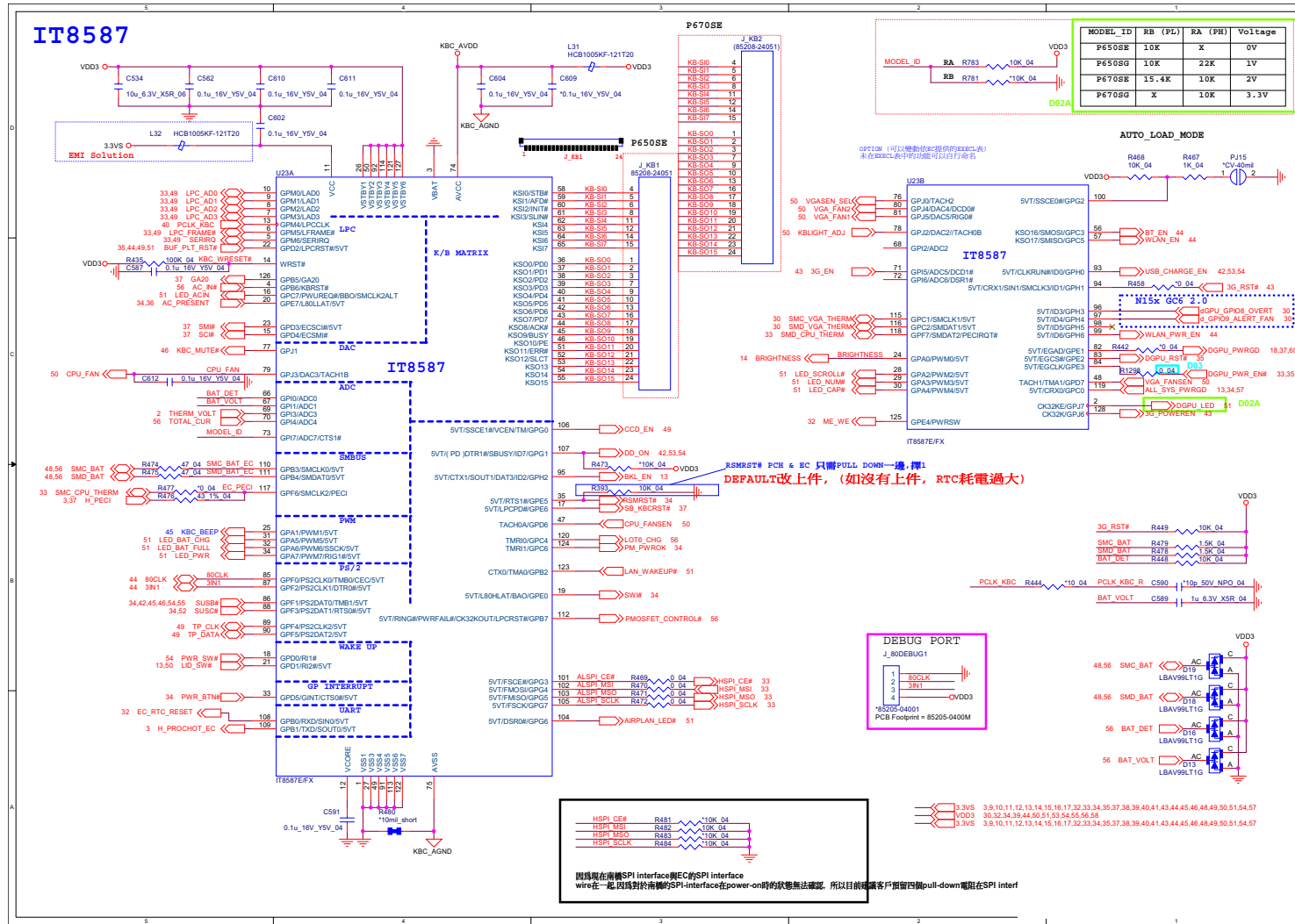
B.Schematic Diagrams

# Subwoofer

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Subwoofer



KBC-ITE IT8587

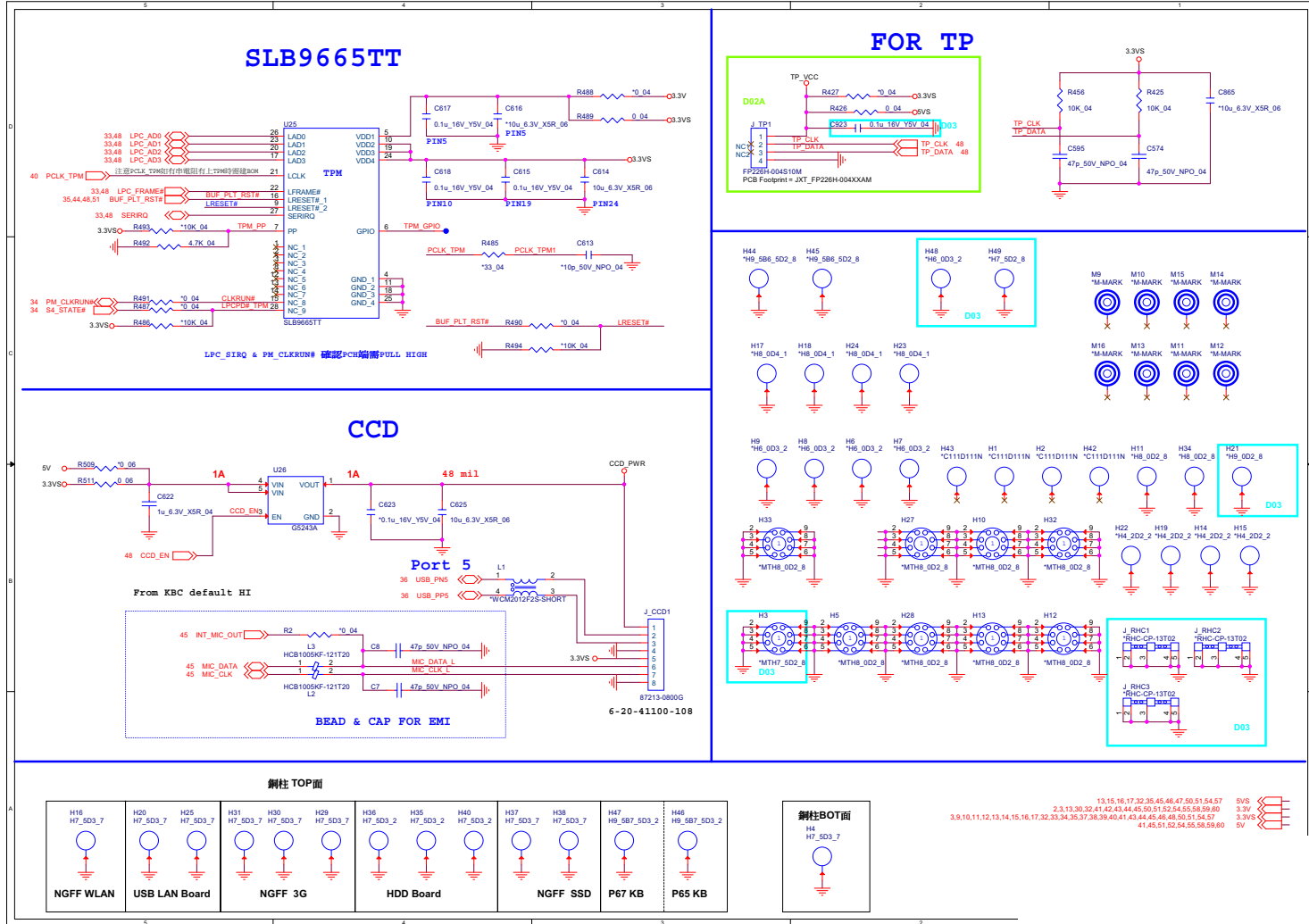


Sheet 48 of 70  
KBC-ITE IT8587

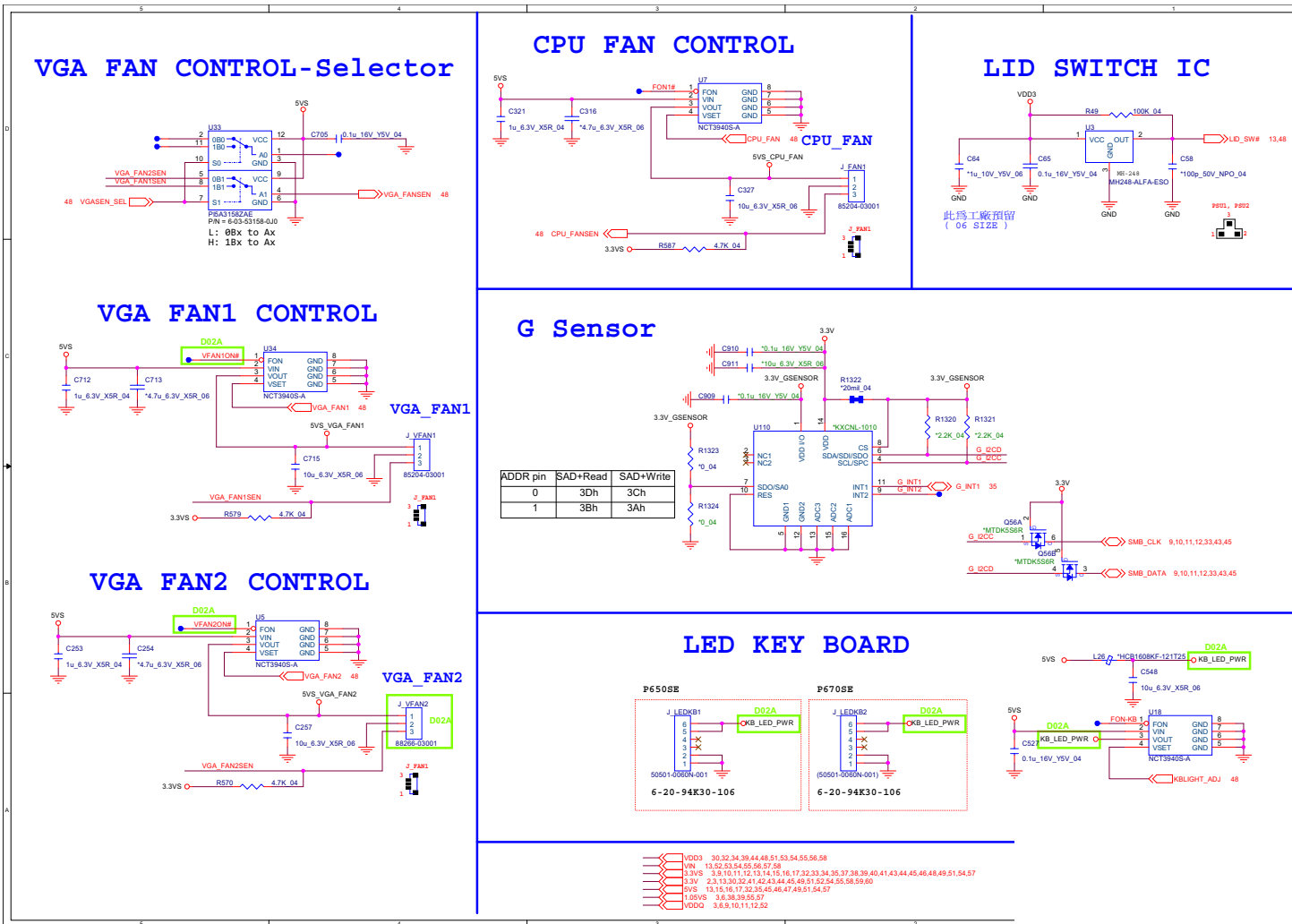
# TPM, CCD, TP

B.Schematic Diagrams

Sheet 49 of 70  
TPM, CCD, TP



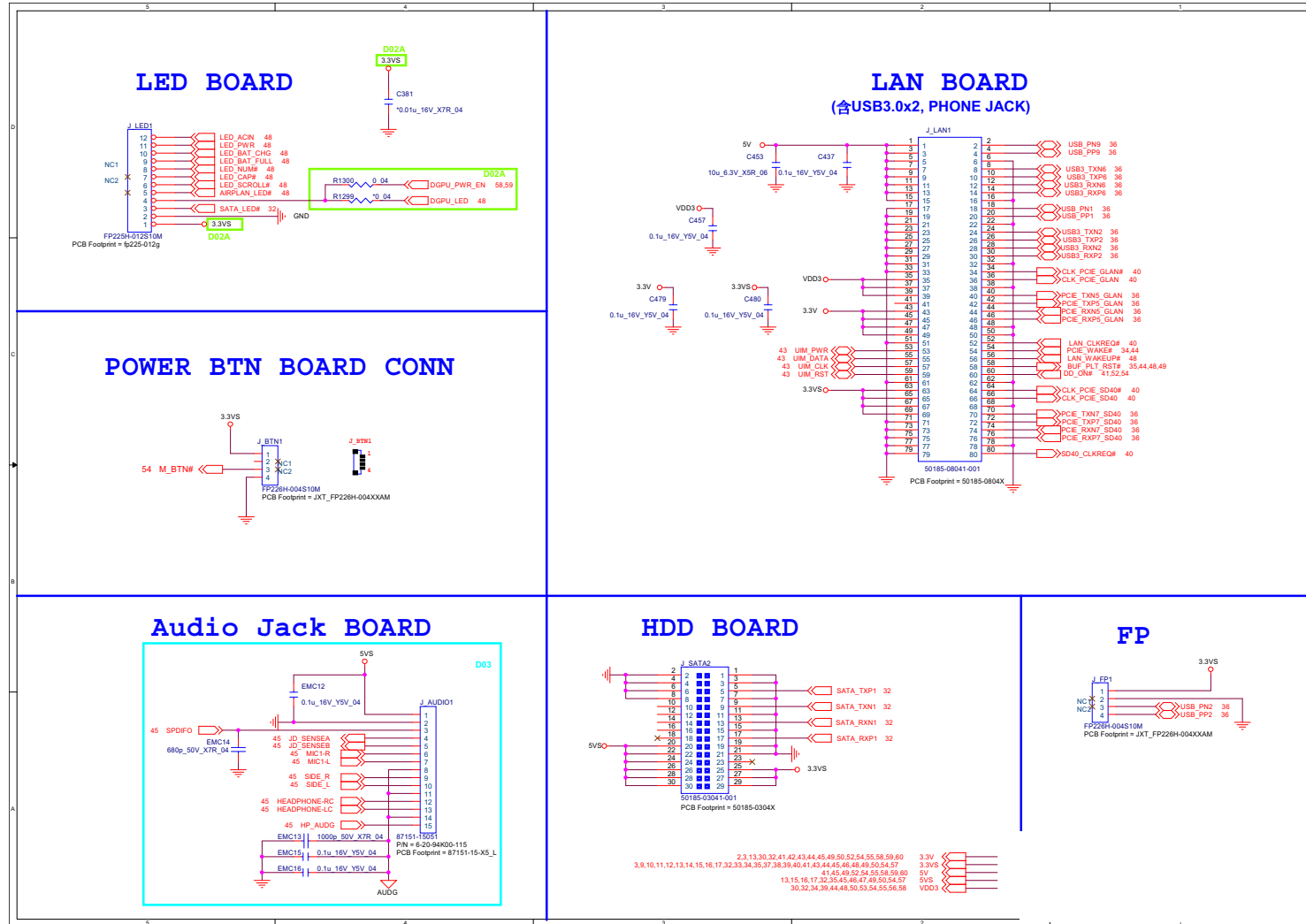
# Fan, LID, KB, LED, G Sensor



Sheet 50 of 70  
Fan, LID, KB, LED,  
G Sensor

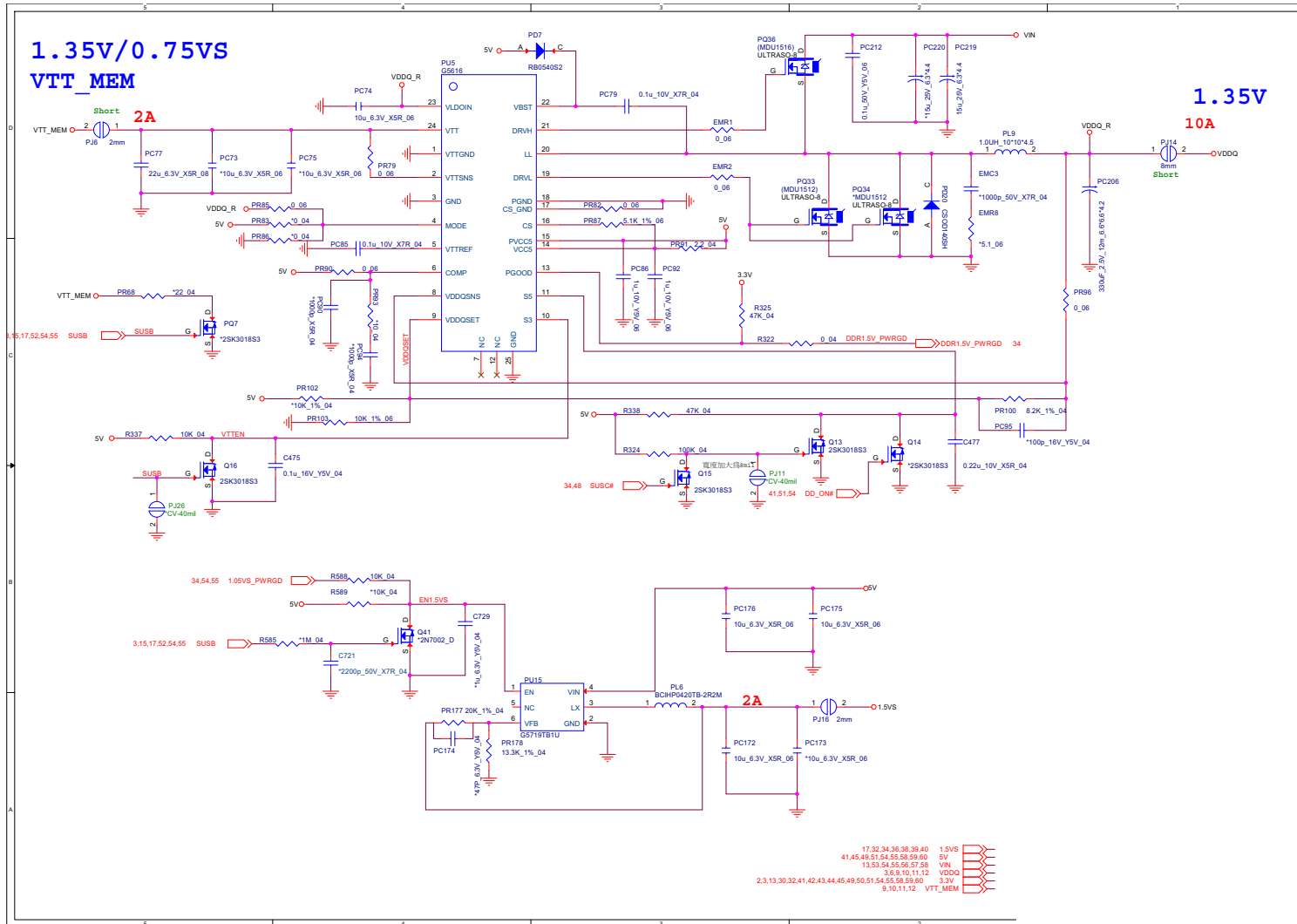
# Connector

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Connector





# DDR 1.35V / 0.75VS, PCH 1.5V

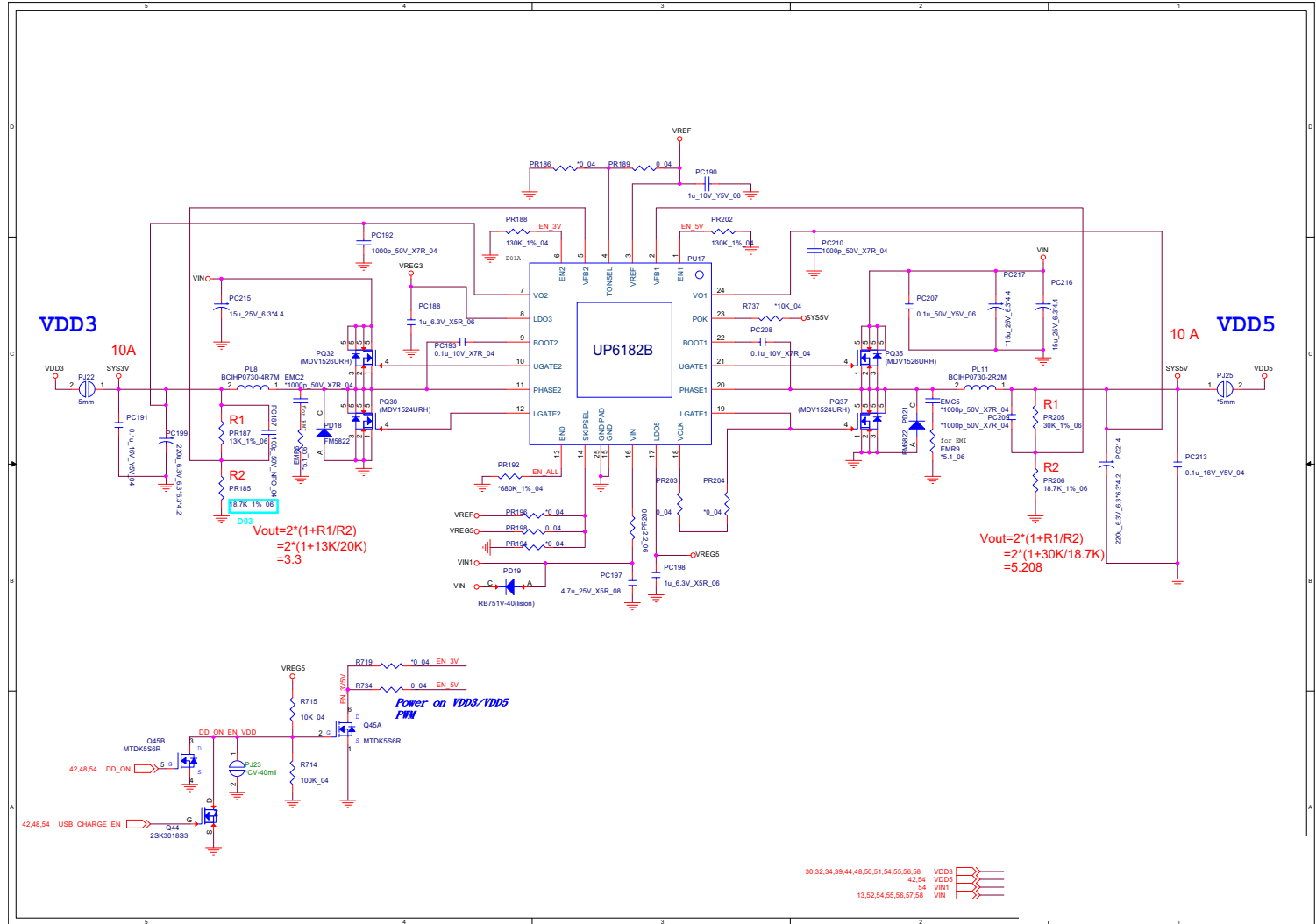


B.Schematic Diagrams

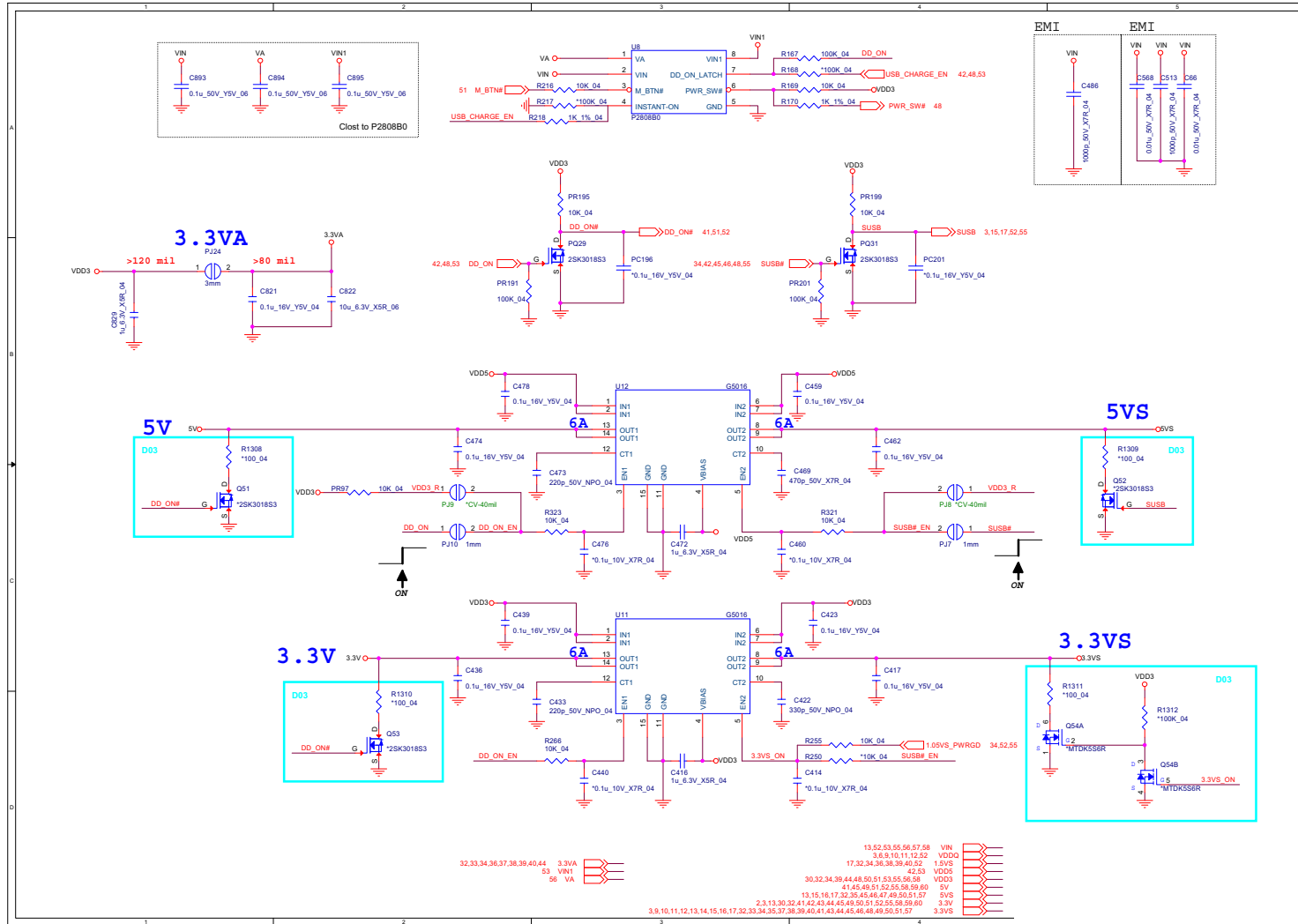
Sheet 52 of 70  
DDR 1.35V/0.75VS,  
PCH 1.5V

# VDD3, VDD5

Sheet 53 of 70  
VDD3, VDD5



# 5V, 5VS, 3.3V, 3.3VS, 3.3VA

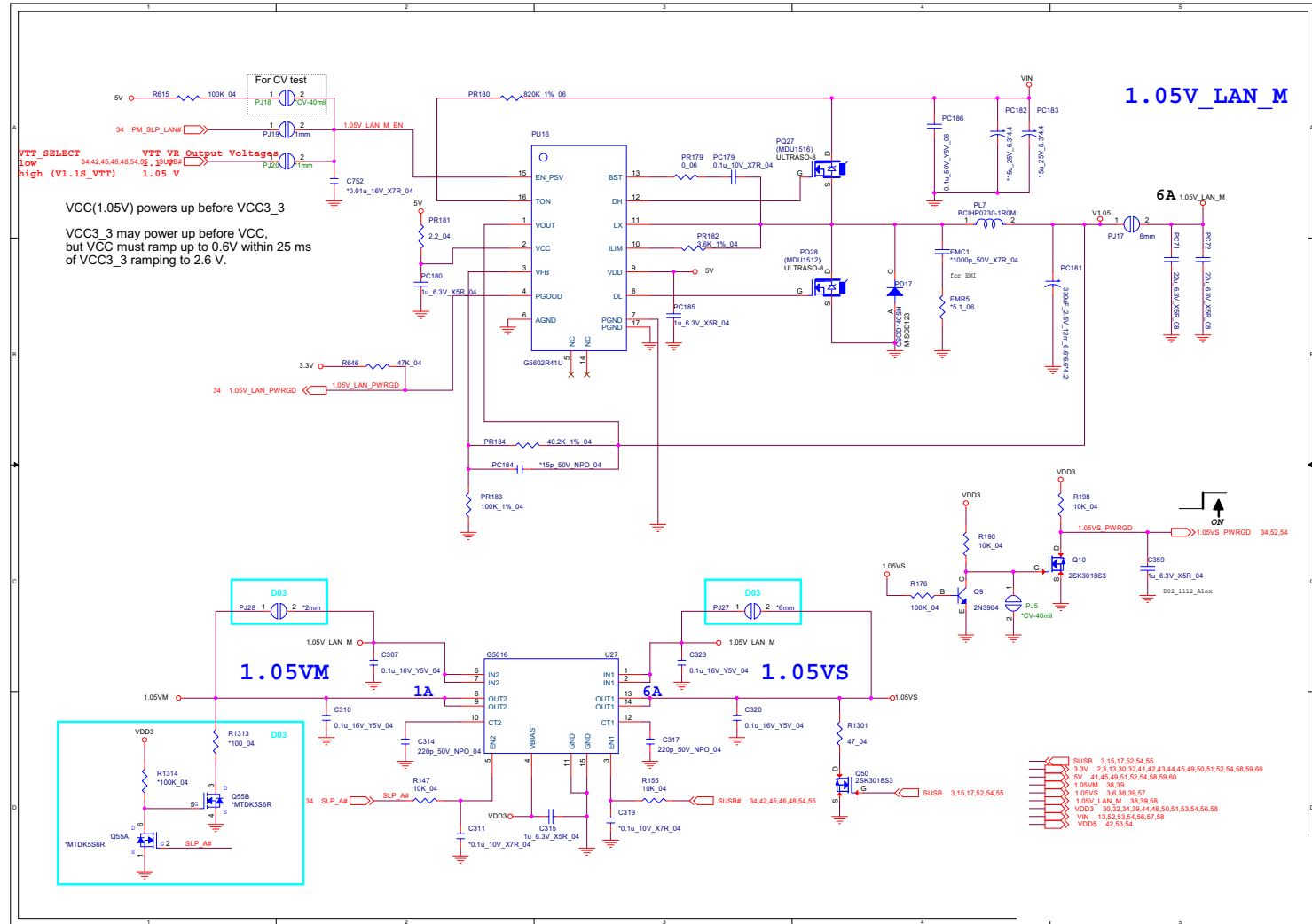


Sheet 54 of 70  
5V, 5VS, 3.3V,  
3.3VS, 3.3VA

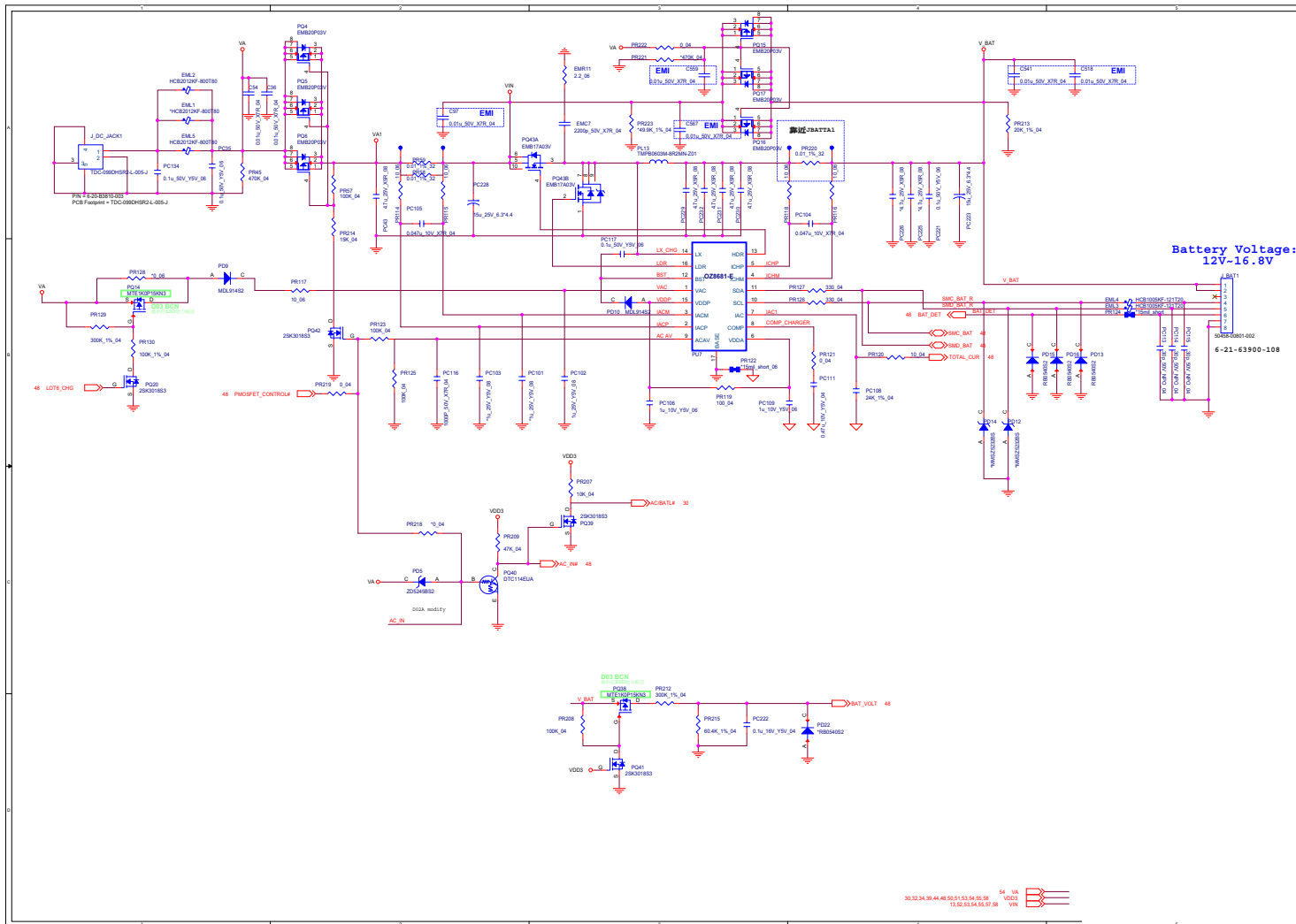
B.Schematic Diagrams

# 1.05 Series

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1.05 Series



# AC\_In, Charger

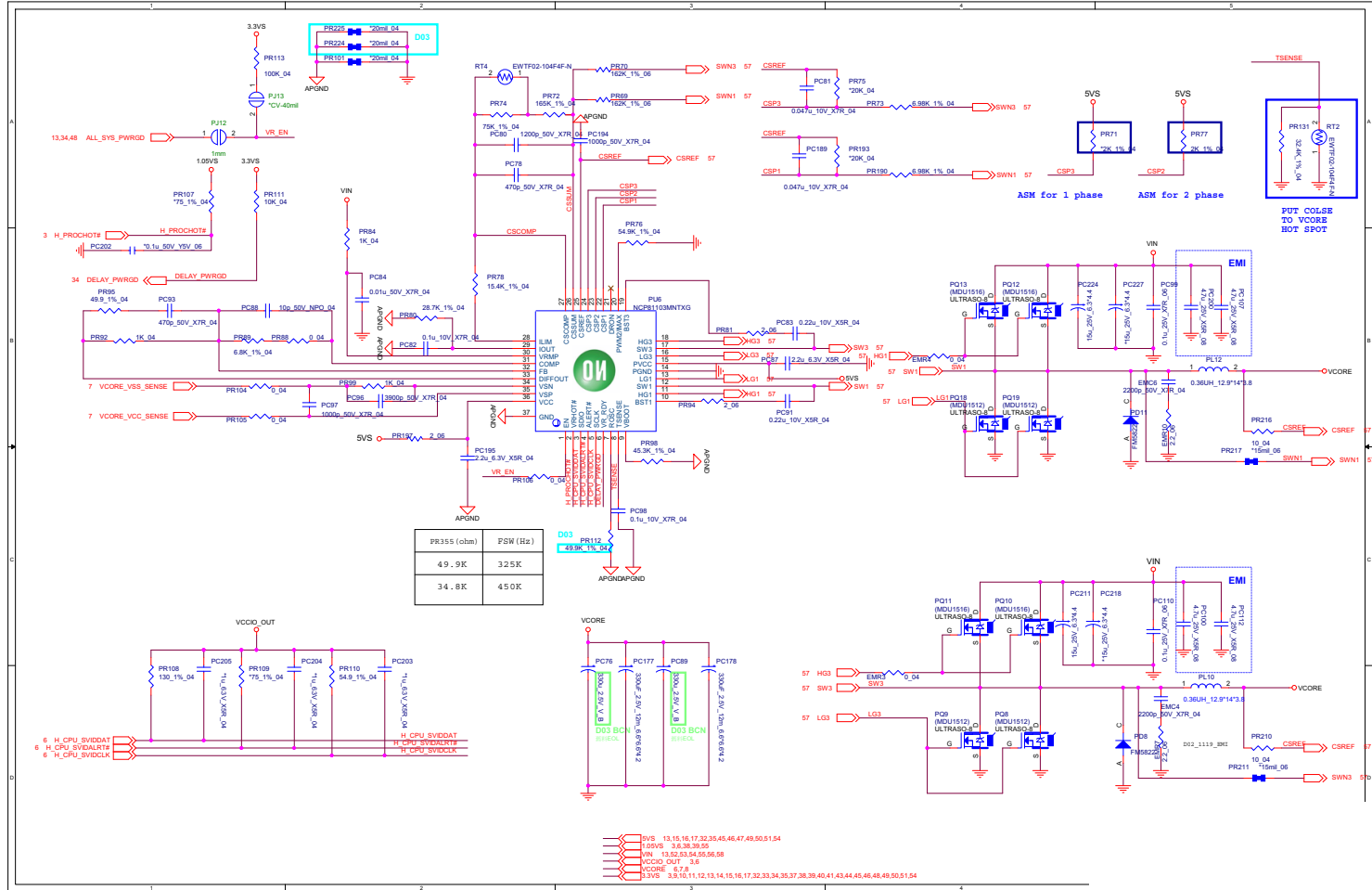


Sheet 56 of 70  
AC\_In, Charger

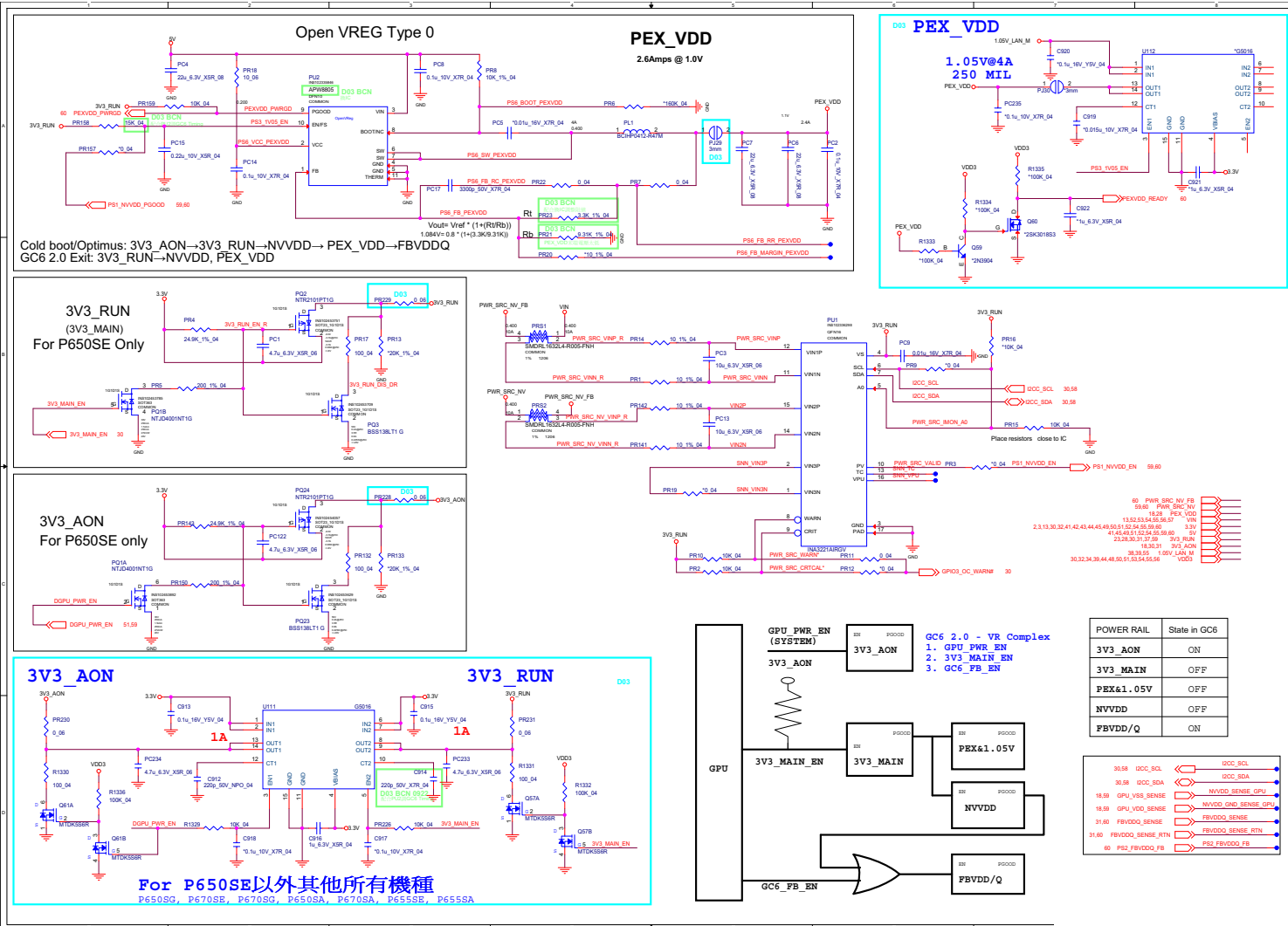
B.Schematic Diagrams

# POWER V-Core1

Sheet 57 of 70  
POWER V-Core1



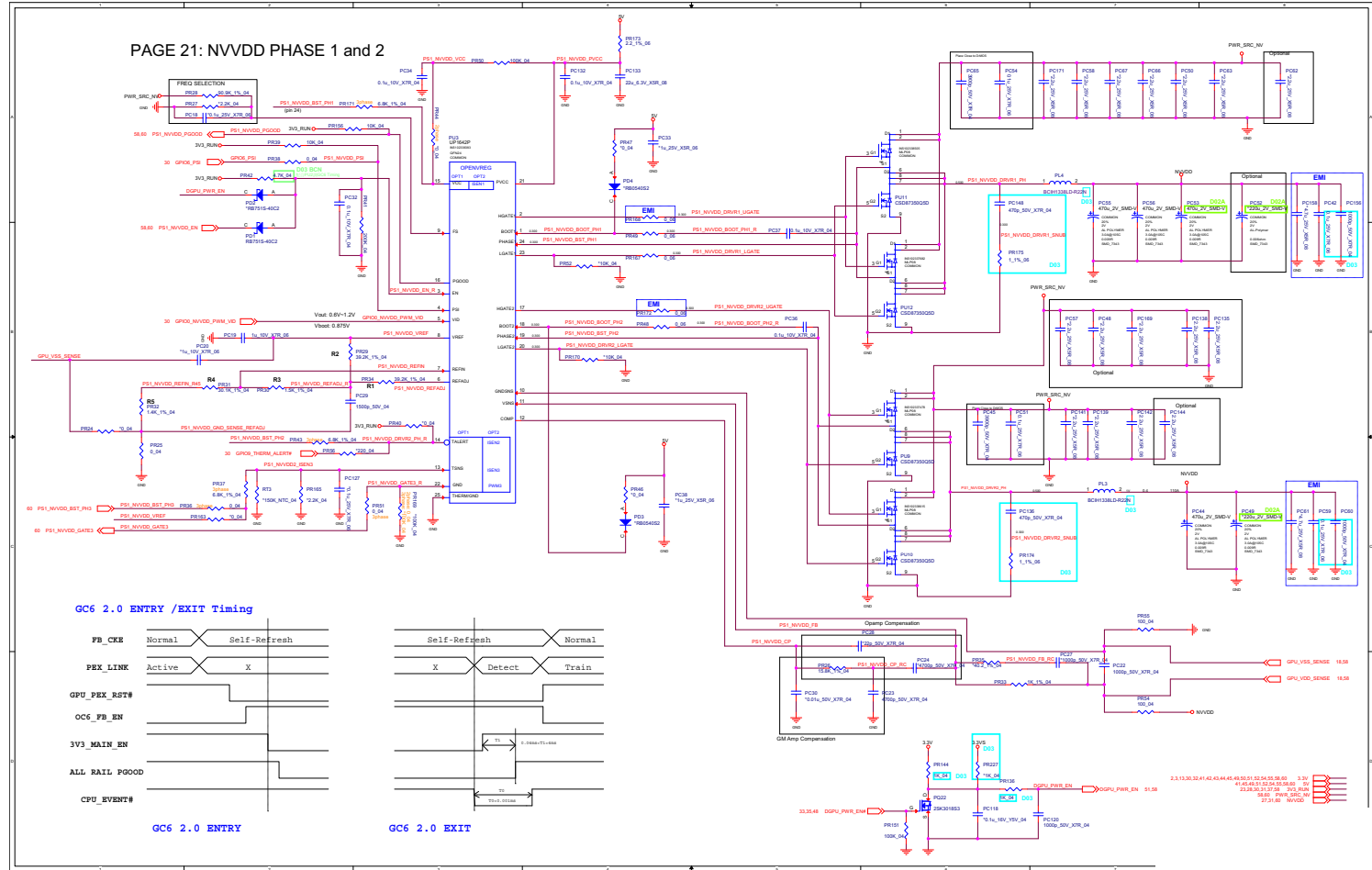
# PEX\_VDD, 3V3\_AON, 3V3\_RUN



Sheet 58 of 70  
PEX\_VDD,  
3V3\_AON,  
3V3\_RUN

B.Schematic Diagrams

# NVDD Phase 1 & 2



B.Schematic Diagrams

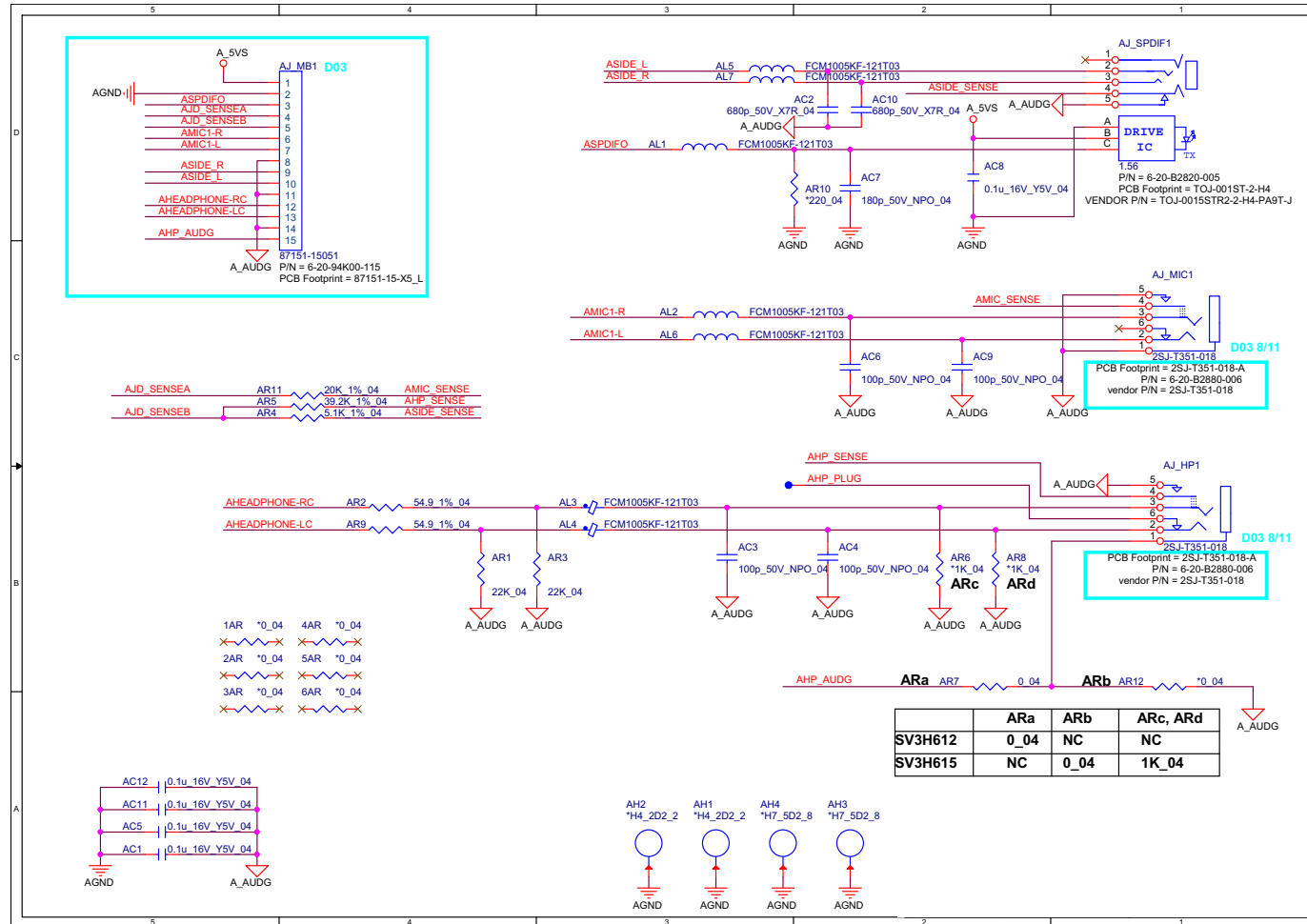
Sheet 59 of 70  
NVDD Phase 1 & 2



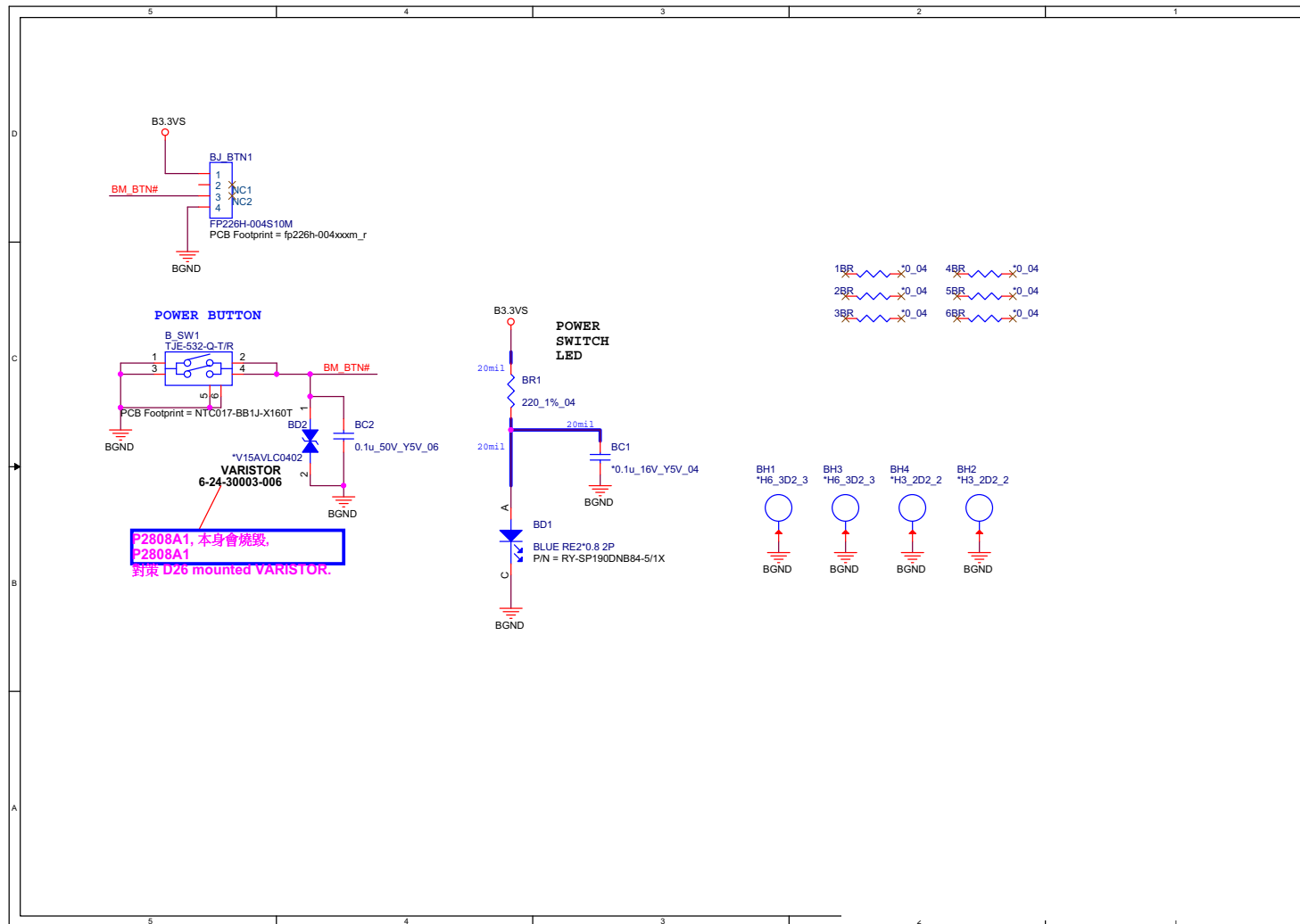


# Audio Board

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Audio Board



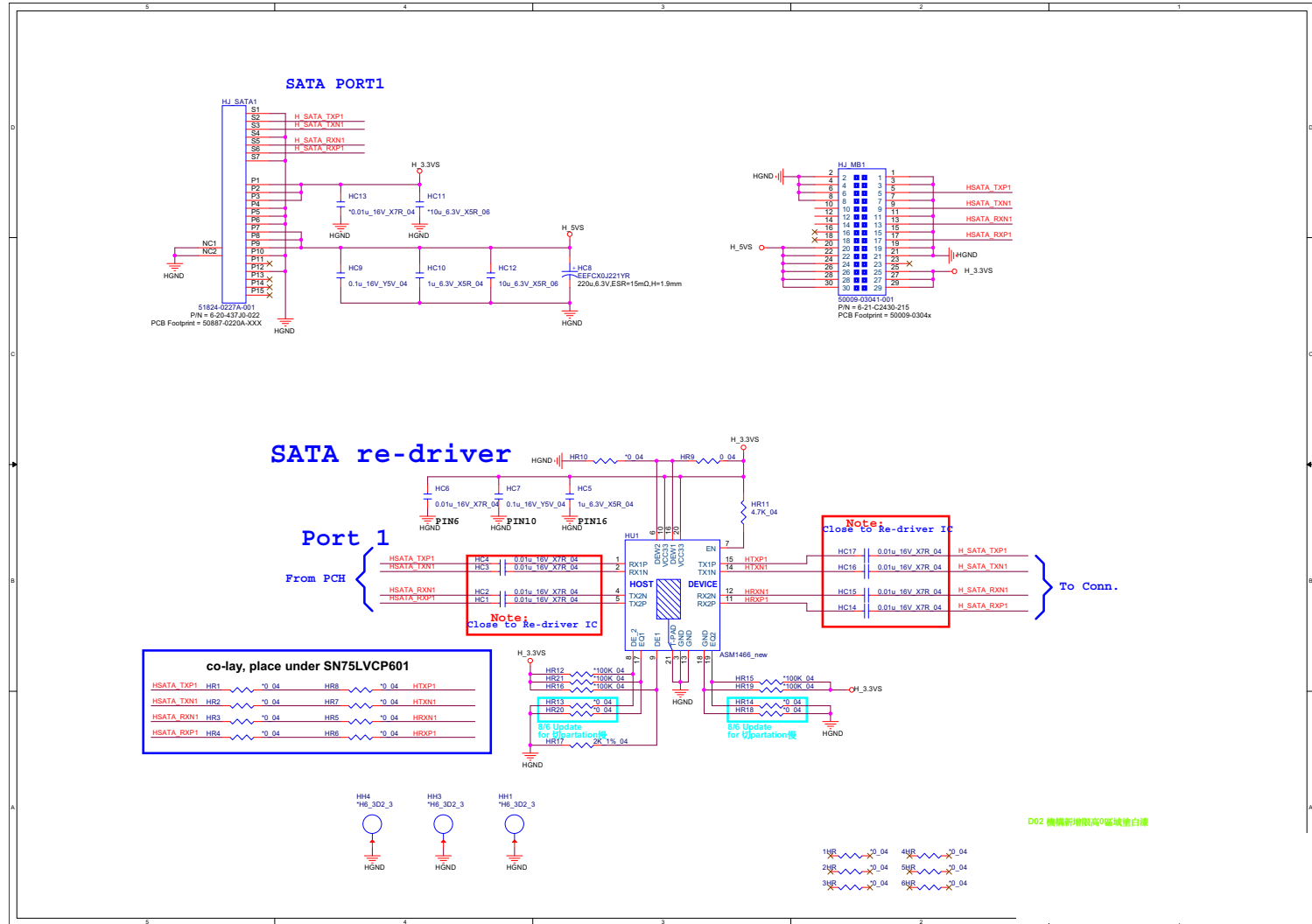
# Power Board



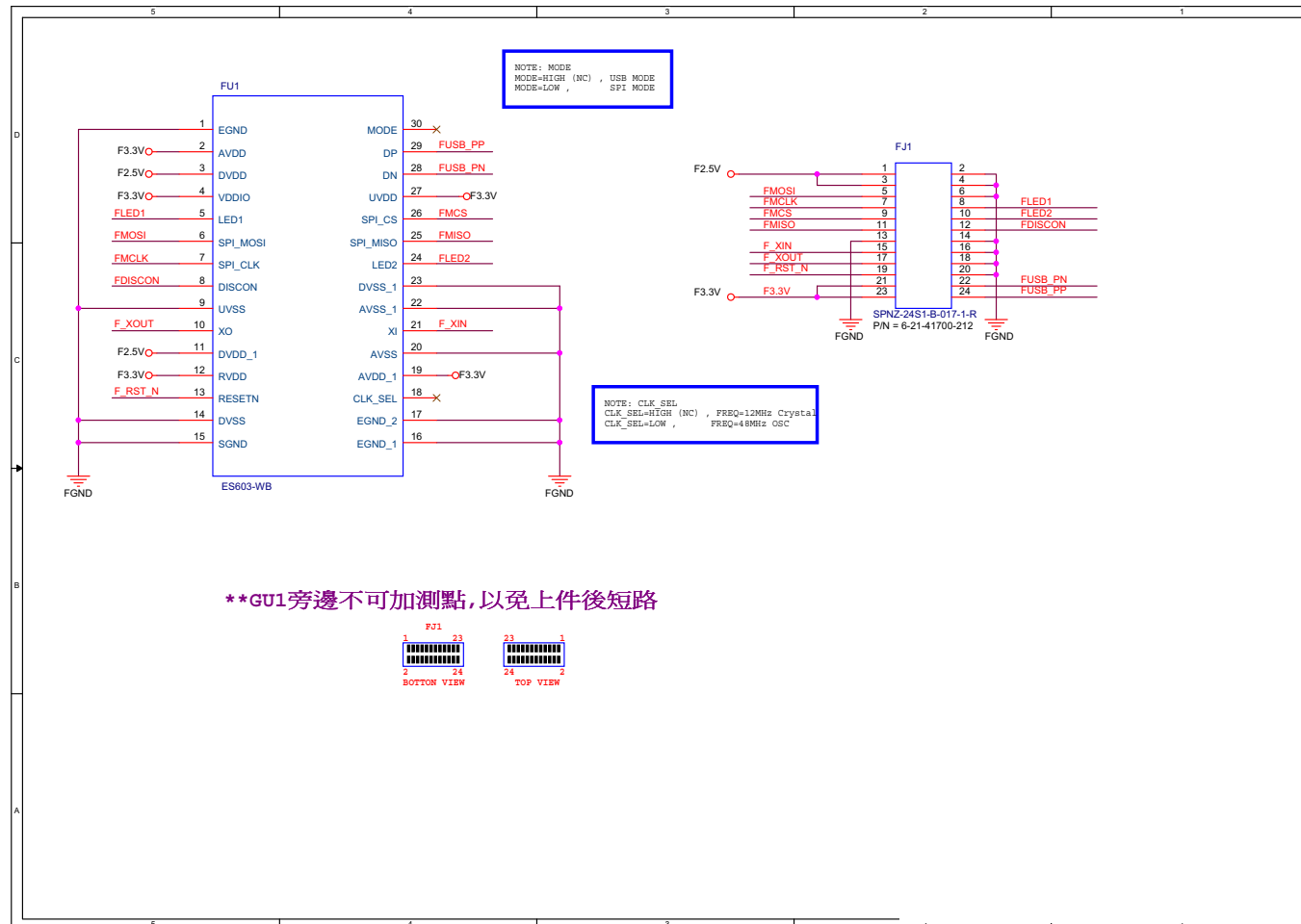
Sheet 62 of 70  
Power Board

# HDD Board

Sheet 63 of 70  
HDD Board



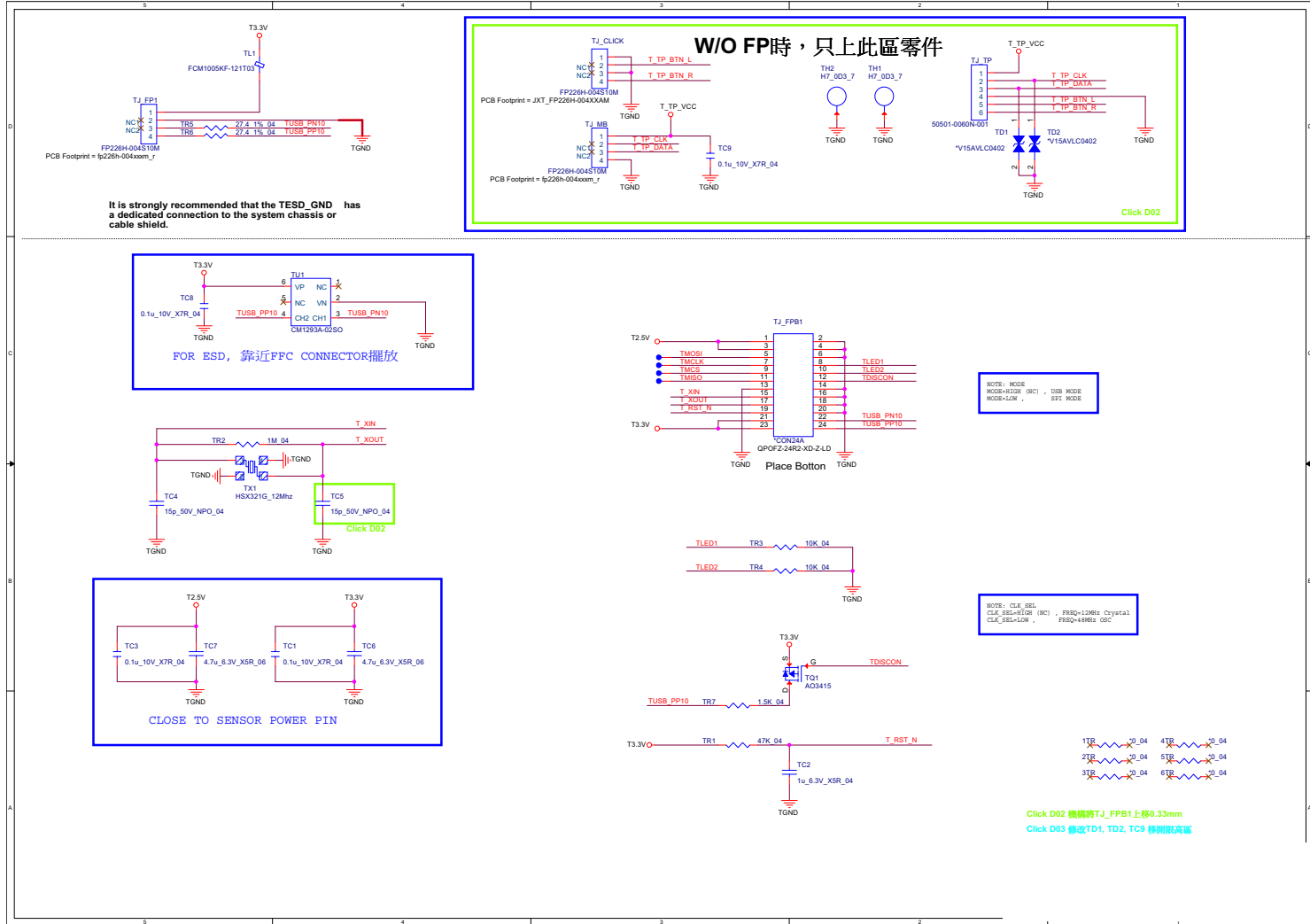
# Finger Sensor Board



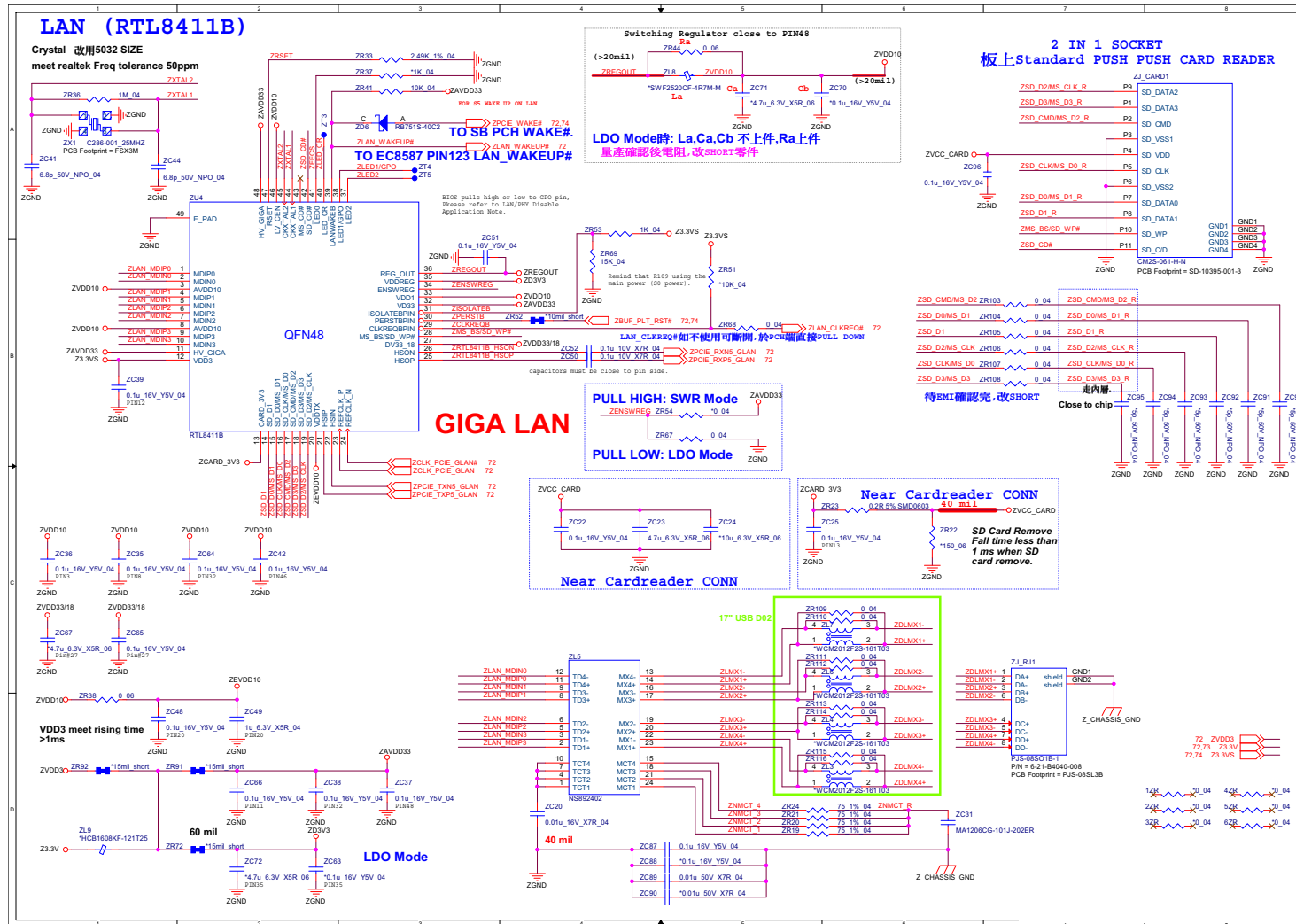
Sheet 64 of 70  
 Finger Sensor  
 Board

# Click Board

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Click Board



# USB Board 1/4

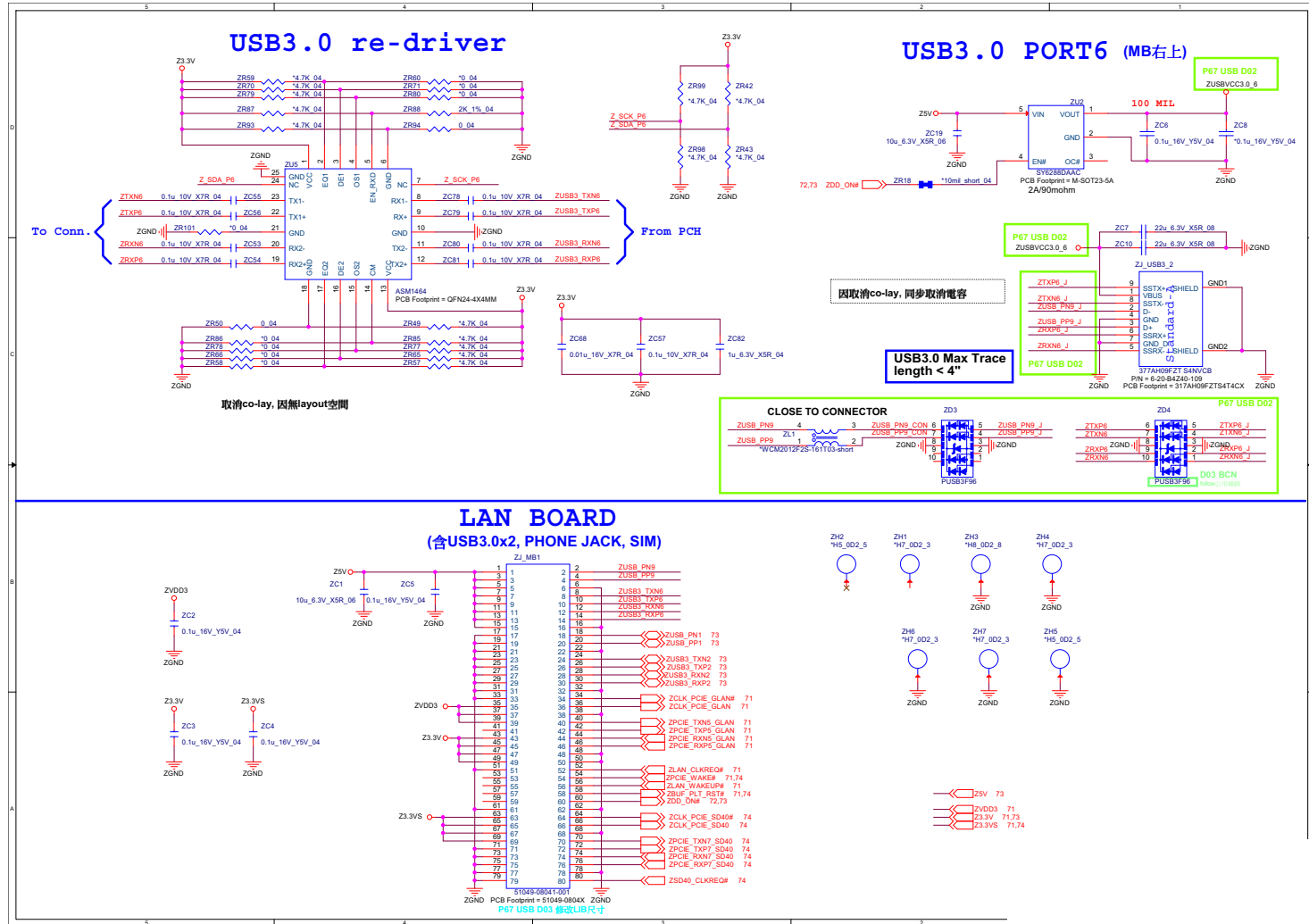


Sheet 66 of 70  
USB Board 1/4

B.Schematic Diagrams

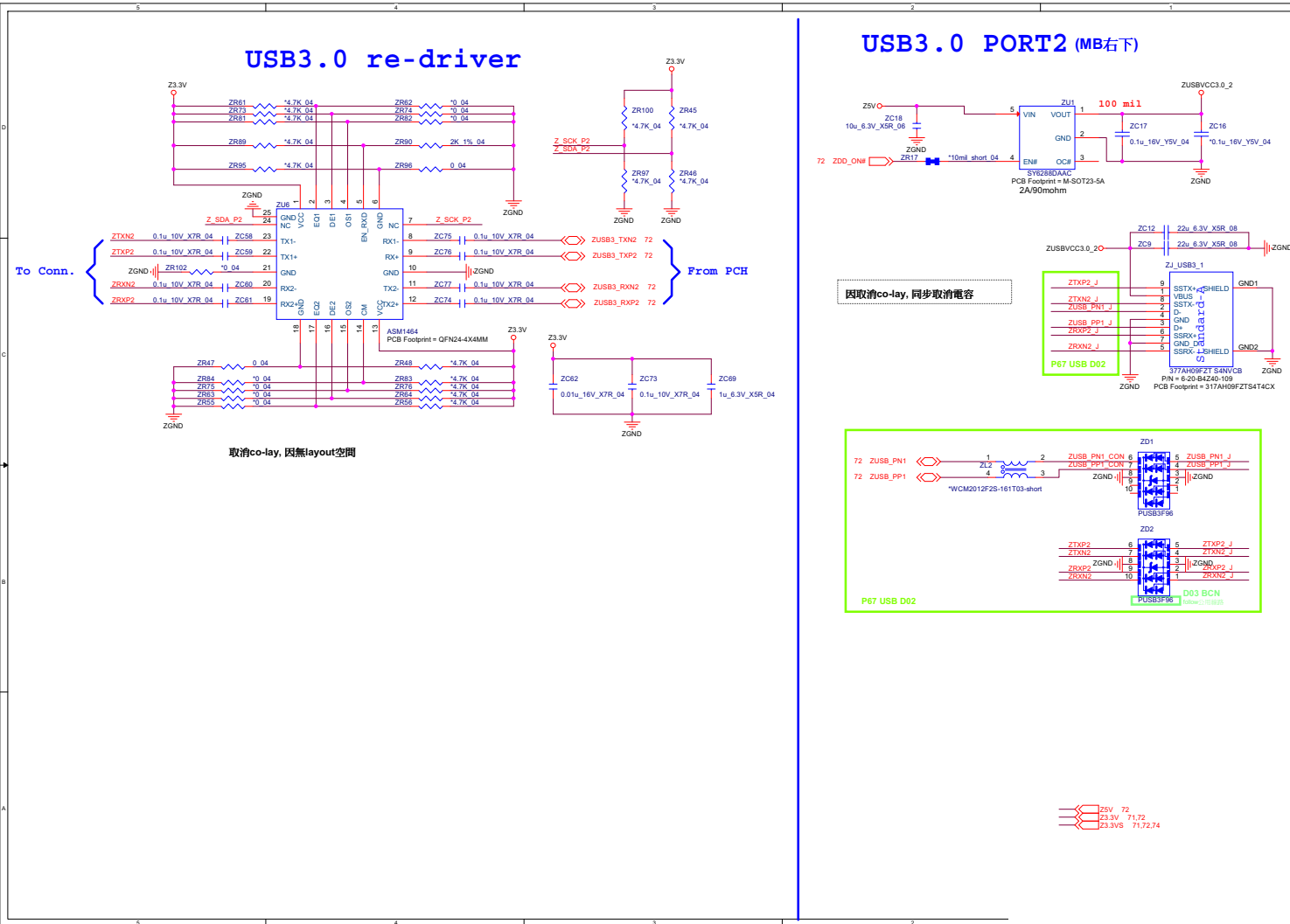
# USB Board 2/4

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USB Board 2/4





# USB Board 3/4



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USB Board 3/4

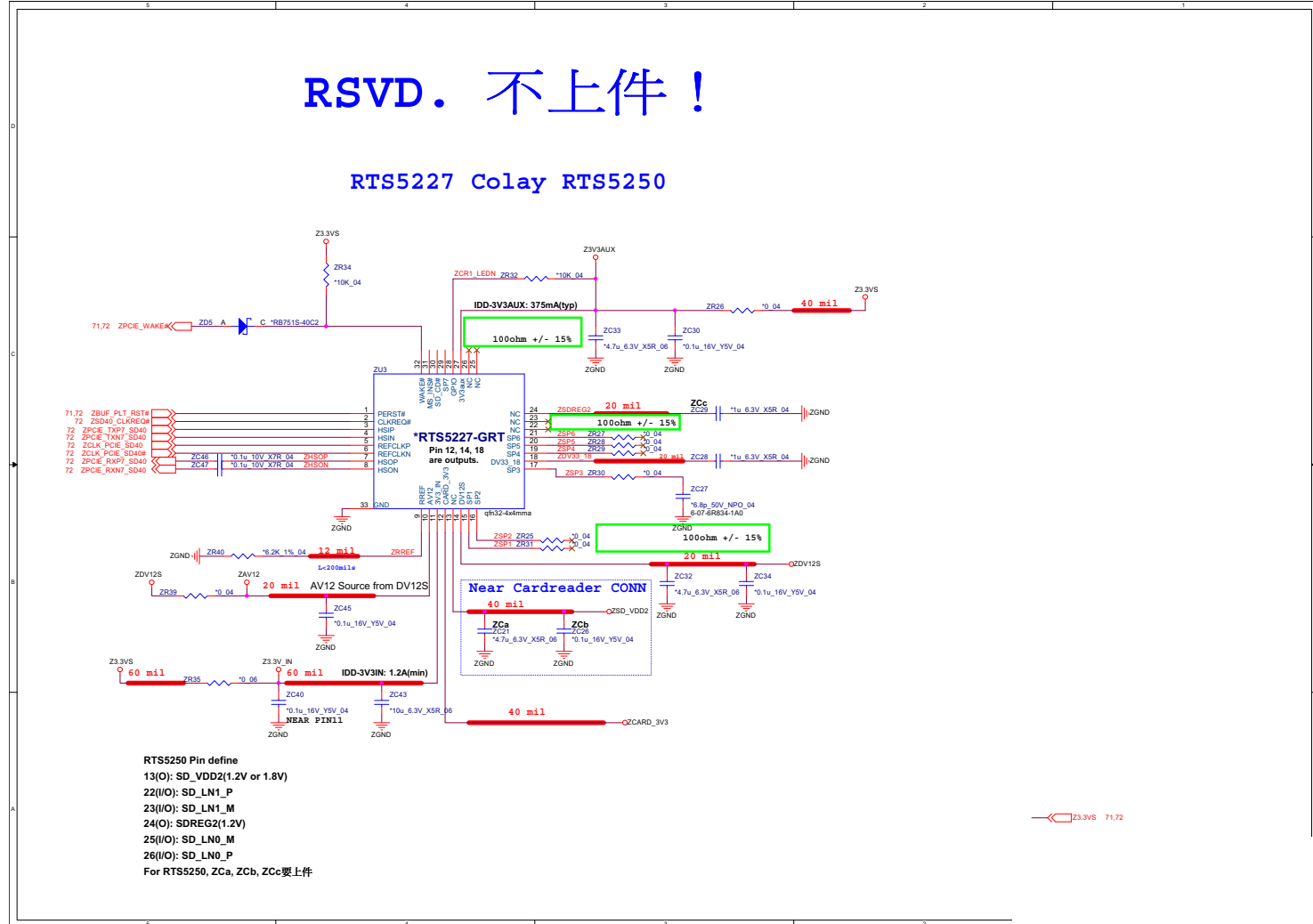
B.Schematic Diagrams

# USB Board 4/4

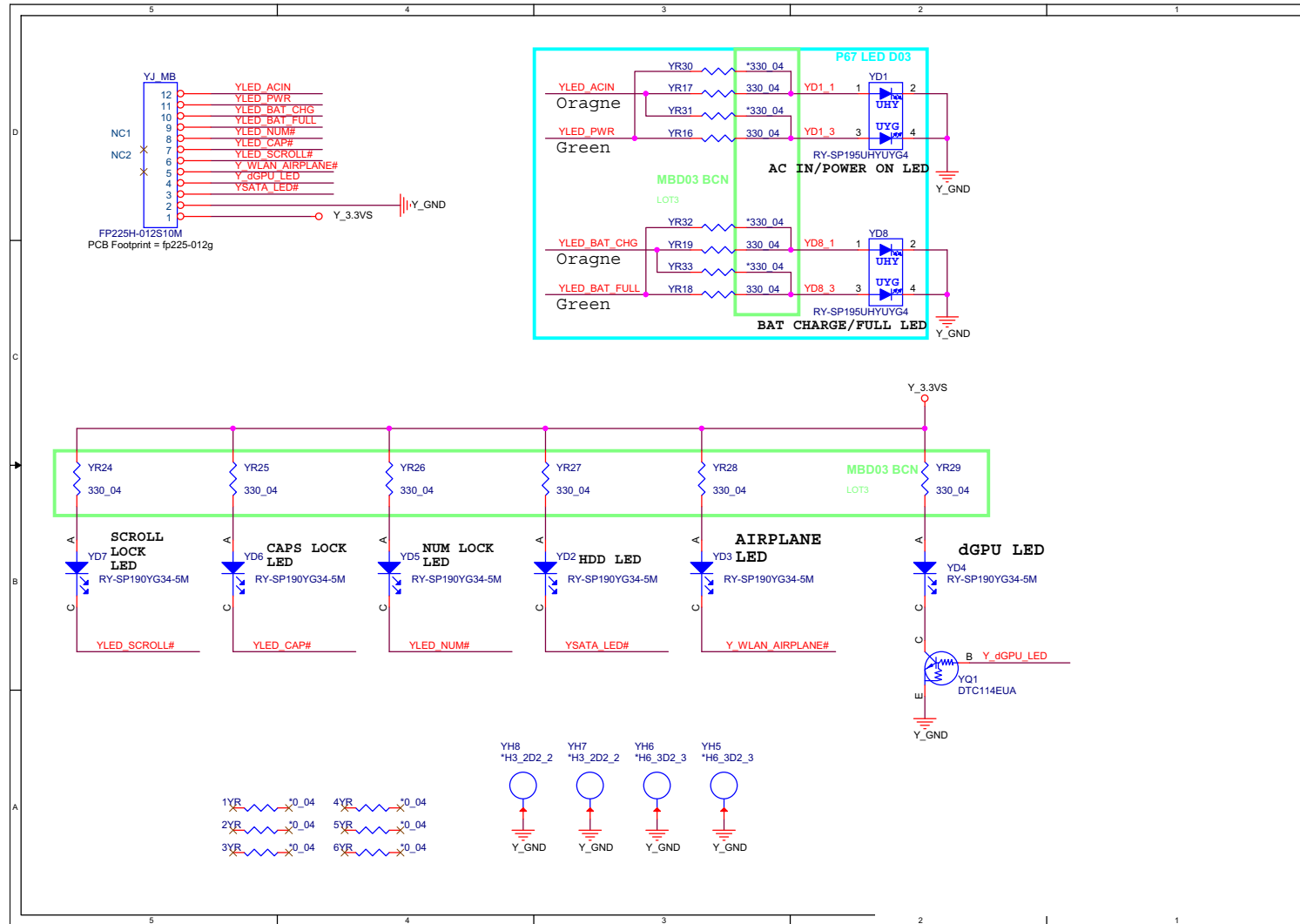
Sheet 69 of 70  
USB Board 4/4

RSVD. 不上件!

RTS5227 Colay RTS5250



# LED Board



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LED Board

**Schematic Diagrams**

# 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](http://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 **V1.00.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 1.00.05, you **MAY NOT** then go back and flash the BIOS to ver 1.00.04).

## 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.