

SERVICE MANUAL

P650HP6(-G) / P651HP6(-G)

notebook





Notebook Computer

P650HP6(-G) / P651HP6(-G)

Service Manual

Preface

Notice

The company reserves the right to revise this publication or to change its contents without notice. Information contained herein is for reference only and does not constitute a commitment on the part of the manufacturer or any subsequent vendor. They assume no responsibility or liability for any errors or inaccuracies that may appear in this publication nor are they in anyway responsible for any loss or damage resulting from the use (or misuse) of this publication.

This publication and any accompanying software may not, in whole or in part, be reproduced, translated, transmitted or reduced to any machine readable form without prior consent from the vendor, manufacturer or creators of this publication, except for copies kept by the user for backup purposes.

Brand and product names mentioned in this publication may or may not be copyrights and/or registered trademarks of their respective companies. They are mentioned for identification purposes only and are not intended as an endorsement of that product or its manufacturer.

Version 1.0
December 2016

Trademarks

Intel and **Intel Core** are trademarks of Intel Corporation.

Windows® is a registered trademark of Microsoft Corporation.

Other brand and product names are trademarks and /or registered trademarks of their respective companies.



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 **P650HP6(-G) / P651HP6(-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.

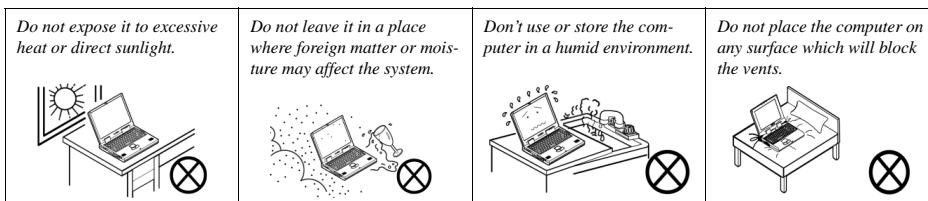
Instructions for Care and Operation

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

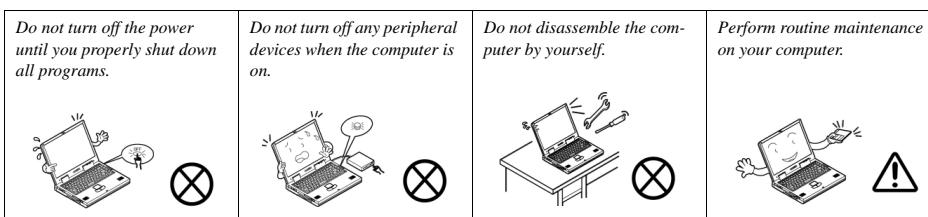
- 1. Don't drop it, or expose it to shock.** If the computer falls, the case and the components could be damaged.



- 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.

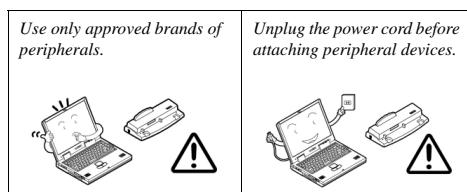


- 3. Follow the proper working procedures for the computer.** Shut the computer down properly and don't forget to save your work. Remember to periodically save your data as data may be lost if the battery is depleted.



Preface

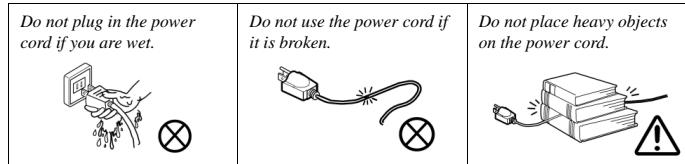
4. **Avoid interference.** Keep the computer away from high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage your data.
5. **Take care when using peripheral devices.**



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.



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.

Preface

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.

Contents

Introduction1-1

Overview	1-1
Specifications	1-2
External Locator - Top View with LCD Panel Open	1-4
External Locator - Front & Right Side Views	1-5
External Locator - Left Side & Rear View	1-6
External Locator - Bottom View	1-7
Mainboard Overview - Top (Key Parts)	1-8
Mainboard Overview - Bottom (Key Parts)	1-9
Mainboard Overview - Top (Connectors)	1-10
Mainboard Overview - Bottom (Connectors)	1-11

Disassembly2-1

Overview	2-1
Maintenance Tools	2-2
Connections	2-2
Maintenance Precautions	2-3
Disassembly Steps	2-4
Removing the Keyboard	2-5
Removing the Battery	2-6
Removing the Hard Disk Drive	2-8
Removing the System Memory (RAM)	2-10
Removing and Installing the M.2 SSD Module	2-13
Removing the Wireless LAN Module	2-16
Wireless LAN, Combo, 3G & LTE Module Cables	2-17
Removing the 3G/4G Module	2-17

Part ListsA-1

Part List Illustration Location	A-2
Top	A-3
Bottom	A-4

Main Board	A-5
------------------	-----

HDD	A-6
-----------	-----

LCD	A-7
-----------	-----

LCD (Sharp)	A-8
-------------------	-----

Schematic Diagrams.....B-1

System Block Diagram	B-2
Processor 1/7	B-3
Processor 2/7	B-4
Processor 3/7	B-5
Processor 4/7	B-6
Processor 5/7	B-7
Processor 6/7	B-8
Processor 7/7	B-9
DDR CHA SO-DIMM_0	B-10
DDR CHA SO-DIMM_1	B-11
DDR CHB SO-DIMM_0	B-12
DDR CHB SO-DIMM_1	B-13
Panel, Inverter	B-14
Redriver	B-15
Mini DP Port E	B-16
Mini DP Port F	B-17
HDMI Connector	B-18
VGA PCI Express	B-19
VGA Frame Buffer Partition	B-20
Frame Buffer Partition A	B-21
Frame Buffer Partition B	B-22
Frame Buffer Partition A_B	B-23
GPU Frame Buffer Partition	B-24
Frame Buffer Partition C	B-25
Frame Buffer Partition C_D	B-26

Preface

GPU Decoupling	B-27
GPU Decoupling 2	B-28
Straps and XTAL	B-29
IFP I/O Interface	B-30
Misc - GPIO, I2C and ROM	B-31
NVIDIA Power Sequence	B-32
GPU NVVDD, FBVDDQ	B-33
GPU GND	B-34
PCH 1/9	B-35
PCH 2/9	B-36
PCH 3/9	B-37
PCH 4/9	B-38
PCH 5/9	B-39
PCH 6/9	B-40
PCH 7/9	B-41
PCH 8/9	B-42
PCH 9/9	B-43
KBC IT8587	B-44
USB Charger	B-45
USB	B-46
M.2 WLAN+BT, PCIE4X SSD	B-47
M.2 3G/LTE	B-48
Realtek ALC892	B-49
TPA2008D2	B-50
TPM, CCD, TP	B-51
Fan, LID, KB LED	B-52
Connector	B-53
DDR 1.2V / 0.6VS	B-54
VDD3, VDD5	B-55
5V, 5VS, 3.3V, 3.3VS, 3.3VA	B-56
Power 1.0V, VCCIO	B-57
AC_In, Charger	B-58

1.0DX_VCCSTG/VCCSFR_OC/2.5V	B-59
1V8_RUN/AON, NV3V3	B-60
NVVDD Phase 1 & 2	B-61
NVVDDS	B-62
PEX_VDD	B-63
FBVDDQ	B-64
VCC_Core & VCCSA	B-65
VCores Output Stage	B-66
VCCGT	B-67
VCCGT Output Stage	B-68
LAN RTL8411, Card Reader	B-69
AR_TBT	B-70
AR_Power	B-71
TPS65982, Type C	B-72
TPS65982, Type A	B-73
USB, Type A	B-74
Audio Board_3D AMP	B-75
HDD Board	B-76
Power Board	B-77
LED Board	B-78
Click Board	B-79
Finger Sensor Board	B-80
Power Board	B-81
LED Board	B-82

Updating the FLASH ROM BIOS..... C-1

Download the BIOS	C-1
Unzip the downloaded files to a bootable CD/DVD or USB Flash drive	C-1
Set the computer to boot from the external drive	C-1
Use the flash tools to update the BIOS	C-2
Restart the computer (booting from the HDD)	C-2

Chapter 1: Introduction

Overview

This manual covers the information you need to service or upgrade the **P650HP6(-G) / P651HP6(-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 10*, 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 **P650HP6(-G) / P651HP6(-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 here are correct at the time of sending them to the press. Certain items (particularly processor types/speeds) may be changed, delayed or updated due to the manufacturer's release schedule. Check with your service center for more details.

CPU Speed & Computer in DC Mode

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

Processor Options

i7-7820HK (2.70GHz), i7-7700HQ (2.60GHz)
8MB Smart Cache, 14nm, DDR4-2133MHz, TDP 45W
Supports Intel® CPU over-clocking technology on i7-6820HK

Core Logic

Intel® HM175 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 2400MHz** Memory
Memory Expandable from **8GB** (minimum) up to **64GB** (maximum)
Supports XMP 2666MHz (XMP support depends on processor)

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.

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
Supports NVIDIA Surround View via HDMI x 1 and MiniDP x2

Intel Integrated GPU

Intel® HD Graphics 630

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

NVIDIA® Discrete GPU

NVIDIA® GeForce GTX 1060

6GB GDDR5 Video RAM
Microsoft DirectX®12 Compatible
Supports GPU Overclocking

Pointing Device

Built-in Touchpad (scrolling key functionality integrated)

Keyboard

(Factory Option) Full Color Illuminated Full-size Winkey Keyboard (with numeric keypad)
Or
(Factory Option) Full-size Illuminated White LED Winkey Keyboard (with numeric keypad)

1 - 2 Specifications

Introduction

Storage	Communication	Features
<p>(Factory Option) Two SATA M.2 2280 SSDs supporting RAID level 0/1 Or (Factory Option) One PCIe Gen3 x4 M.2 2280 SSD</p> <p>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 Or One changeable 2.5" (6cm) 7.0mm/9.5mm (h) SATA (Serial) Hard Disk Drive/Solid State Drive (SSD)</p>	<p>Built-In Gigabit Ethernet LAN 2.0M FHD PC Camera Module (Factory Option) M.2 3G/4G Module</p> <p>WLAN/ Bluetooth M.2 Modules:</p> <ul style="list-style-type: none"> (Factory Option) Intel® Wireless-AC 8265 Wireless LAN (802.11ac) + Bluetooth 4.1 (Factory Option) Intel® Wireless-AC 3168 Wireless LAN (802.11ac) + Bluetooth 4.0 (Factory Option) Qualcomm® Atheros Killer™ Wireless-AC 1535 Wireless LAN (802.11ac) + Bluetooth 4.1 (Factory Option) Qualcomm® Wireless LAN (802.11ac/ad) + Bluetooth 4.1 	<p>Supports NVIDIA G-SYNC Technology in dGPU Mode (G-SYNC is only supported if you have a G-SYNC capable display and a GTX series video adapter) Virtual Reality Ready</p>
Audio	Card Reader	Environmental Spec
<p>High Definition Audio Compliant Interface S/PDIF Digital Output Two Speakers Sound Blaster Audio ANSP™ 3D sound technology on headphone output Built-In Array Microphone</p> <p>Note: External 5.1CH Audio Output Supported by Line-Out, Microphone-In and Headphone & S/PDIF Out Combo Jacks</p>	<p>Embedded Multi-In-1 Push-Push Card Reader MMC (MultiMedia Card) / RS MMC SD (Secure Digital) / Mini SD / SDHC/ SDXC</p>	<p>Temperature Operating: 5°C - 35°C Non-Operating: -20°C - 60°C</p> <p>Relative Humidity Operating: 20% - 80% Non-Operating: 10% - 90%</p>
Interface	M.2 Slots	Power
<p>Two USB 3.1 Gen 2 Type C Ports Three USB 3.0 (USB 3.1 Gen 1) Ports (Including one AC/DC Powered USB port) Two Mini DisplayPorts (1.3) One HDMI-Out Port One 2-In-1 Audio Jack (Headphone & S/PDIF Optical Output Combo Jack) One Microphone-In Jack One Line-Out Jack One RJ-45 LAN Jack One DC-In Jack</p>	<p>Slot 1 for Combo WLAN and Bluetooth Module Slot 2 for SATA or PCIe Gen3 x4 SSD Slot 3 for SATA SSD (Factory Option) Slot 4 for 3G/4G Module Note: (Factory Option) LTE or 802.11ad Antenna</p>	<p>Embedded 4-Cell Polymer Battery Pack, 60WH Full Range AC/DC Adapter AC Input: 100 - 240V, 50 - 60Hz DC Output: 19V, 10.5A (200W)</p>
	 M.2 SSD Limitation <p>When slot 3 has an M.2 SATA SSD installed, then slot 2 will not be available for M.2 PCIe SSDs.</p>	Dimensions & Weight 385mm (w) * 271mm (d) * 25.4mm (h) 2.6kg (Barebone with 60WH Battery)

Specifications 1 - 3

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**)



1 - 4 External Locator - Top View with LCD Panel Open

Introduction

External Locator - Front & Right Side Views

Figure 2
Front View

1. LED Indicator

FRONT VIEW



Figure 3
Right Side View

1. Headphone & S/PDIF Combo Jack
2. Microphone-In Jack
3. Line-Out Jack
4. USIM Card Reader (for 3G/4G USIM Cards)
5. Multi-in-1 Card Reader
6. USB 3.1 Ports
7. USB 3.0 Port
8. RJ-45 LAN Jack
9. Security Lock Slot

RIGHT SIDE VIEW



External Locator - Front & Right Side Views 1 - 5

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 3.0/3.1 Port

REAR VIEW



1 - 6 External Locator - Left Side & 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.

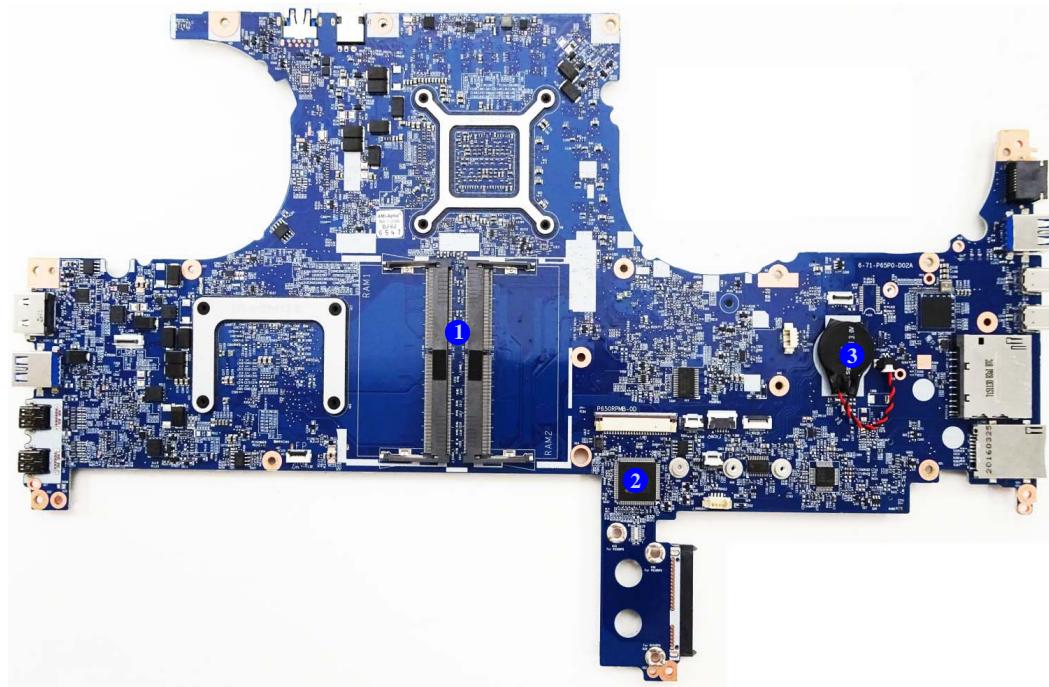
External Locator - Bottom View 1 - 7

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)

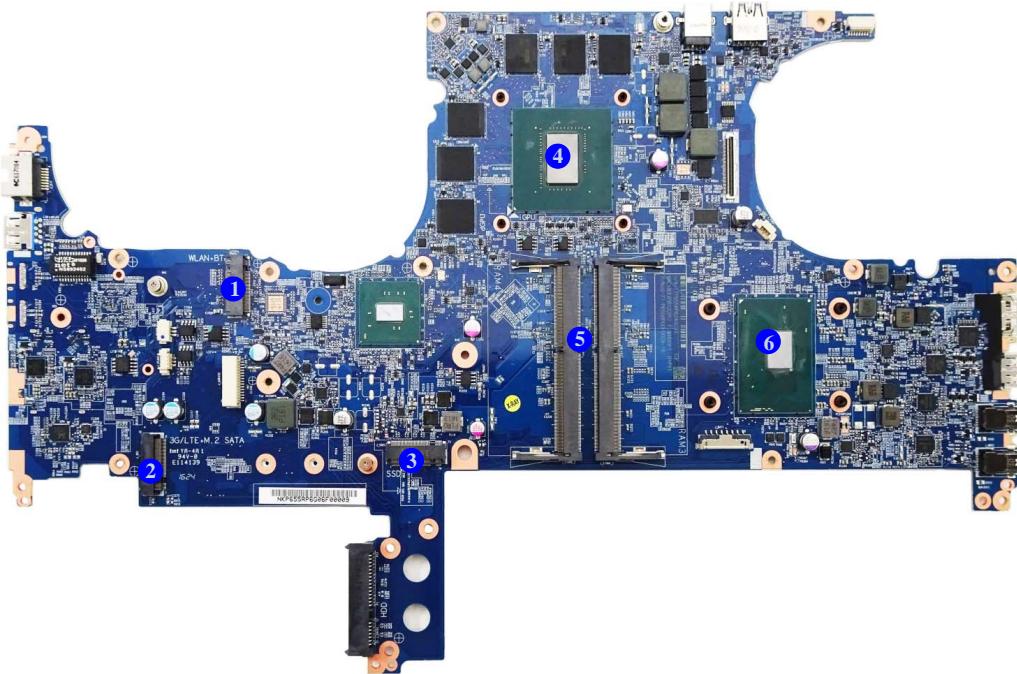


1 - 8 Mainboard Overview - Top (Key Parts)

Introduction

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-GTX1060M
5. Memory Slots DDR4 SO-DIMM
6. CPU

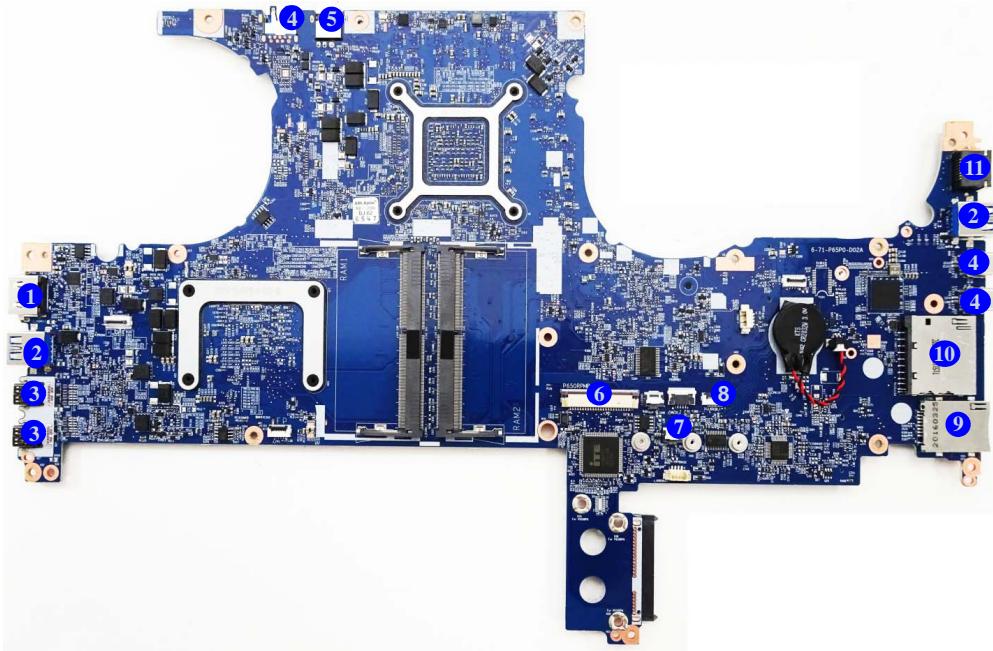
Mainboard Overview - Bottom (Key Parts) 1 - 9

Introduction

Figure 9
Mainboard Top
Connectors

1. HDMI Port
2. USB Port 3.0 Connector
3. Mini Display Port
4. USB Port 3.1 Connector
5. DC-In Jack
6. Keyboard Cable Connector
7. TP Connector
8. Speaker Connector
9. USIM Card Reader (for 3G/ 4G USIM Cards)
10. Multi-in-1 Card Reader
11. RJ-45 LAN Jack

Mainboard Overview - Top (Connectors)

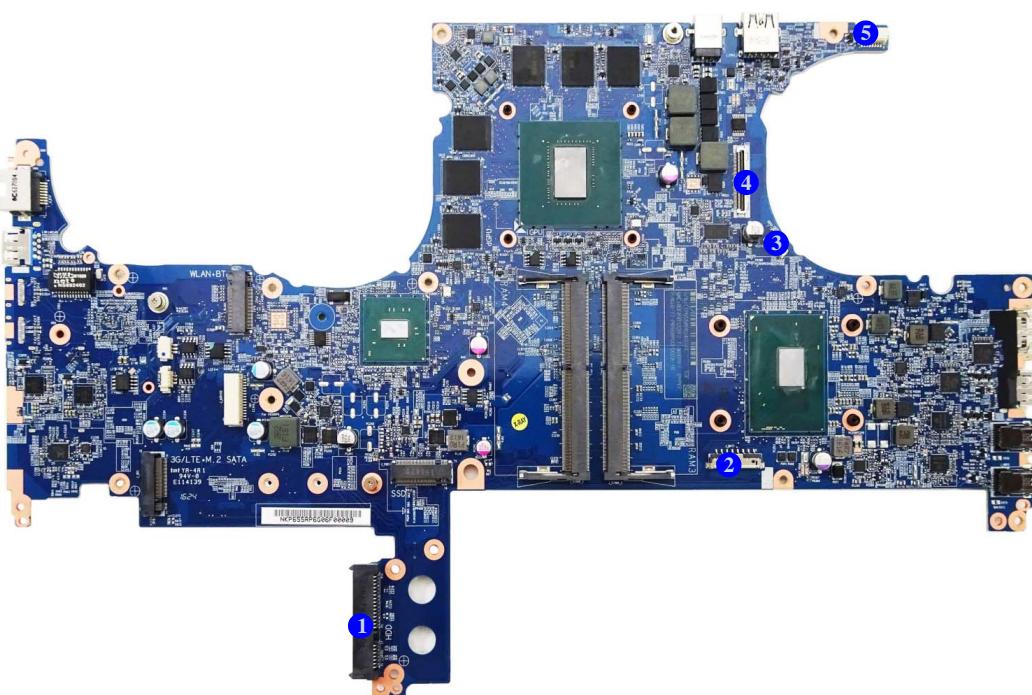


1 - 10 Mainboard Overview - Top (Connectors)

Introduction

Mainboard Overview - Bottom (Connectors)

Figure 10
Mainboard Bottom
Connectors



Mainboard Overview - Bottom (Connectors) 1 - 11

Introduction

Chapter 2: Disassembly

Overview

This chapter provides step-by-step instructions for disassembling the **P650HP6(-G) / P651HP6(-G)** series notebook's parts and subsystems. When it comes to reassembly, reverse the procedures (unless otherwise indicated).

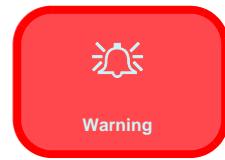
We suggest you completely review any procedure before you take the computer apart.

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.

2 - 2 Overview

Disassembly

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.

Overview 2 - 3

Disassembly

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 and install the M.2 SSD:

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 - 16](#)

To remove the 3G/4G Module:

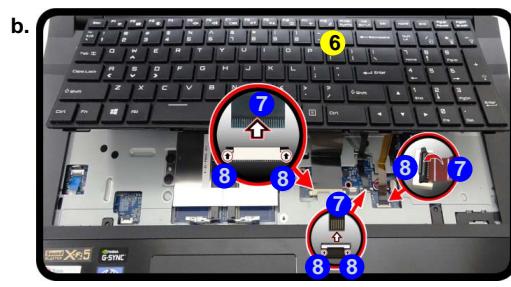
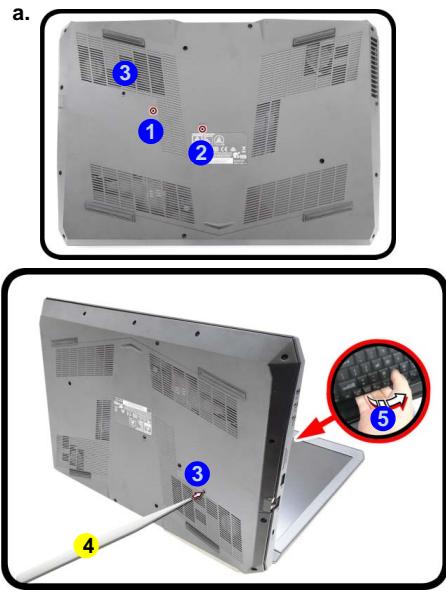
1. Remove the battery [page 2 - 6](#)
2. Remove the 3G/4G [page 2 - 18](#)

2 - 4 Disassembly Steps

Disassembly

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 ⑧ from the locking collar socket by using a flat-head screwdriver to pry the locking collar pins ⑨ 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

Removing the Keyboard 2 - 5

Disassembly

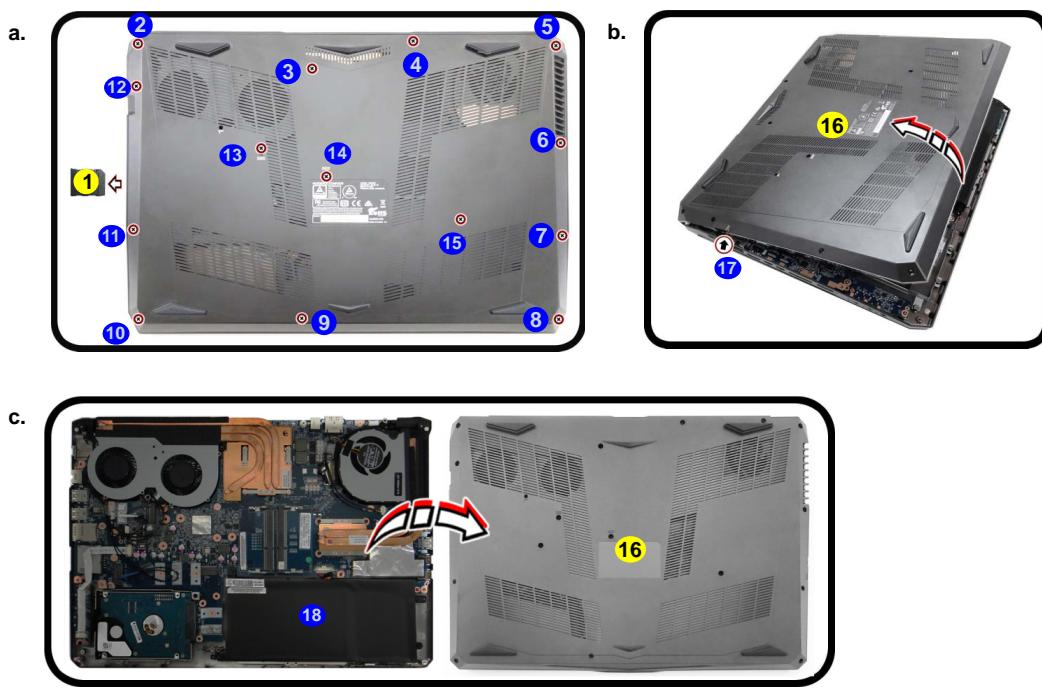
Figure 2

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).



2 - 6 Removing the Battery

Disassembly

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 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.

23. Battery
- 3 Screws

Removing the Battery 2 - 7

Disassembly

Figure 4 HDD Assembly Removal

- a. Locate the HDD.
- b. 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.

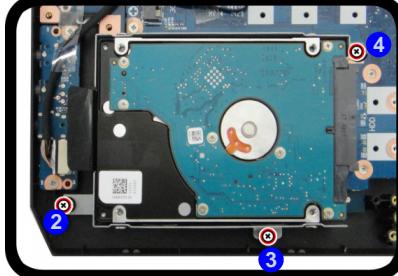
Hard Disk Disassembly Process

1. Turn off the computer, and remove the battery ([page 2 - 6](#)).
2. The HDD will be visible at point ① on the mainboard ([Figure 4a](#)).
3. Remove screws ② - ⑤ from the HDD assembly ([Figure 4b](#)).

a.



b.



6. Hard Disk
- 4 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.

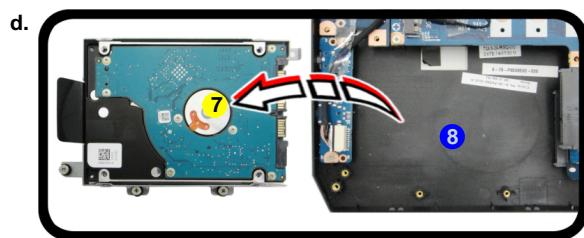
You have all the CD-ROMs and FDDs required to install your operating system and programs.

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.

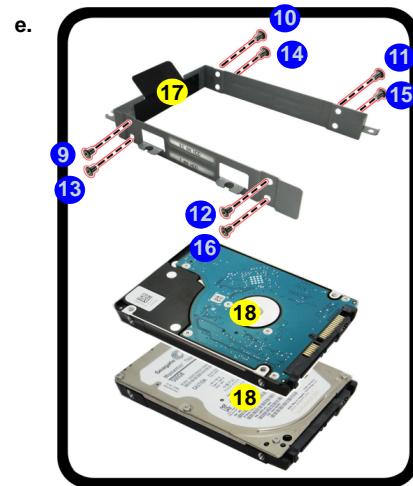
2 - 8 Removing the Hard Disk Drive

Disassembly

4. Slightly lift and pull the hard disk in the direction of arrow **6** (*Figure 5c*).
5. Lift the hard disk assembly **7** out of the bay **8** (*Figure 5d*).
6. Remove screws **9** - **16** and bracket **17** from the hard disk **18** (*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. 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.



- 7. HDD Assembly
17. Adhesive Cover
18. HDD*
- 8 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 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.

Removing the Hard Disk Drive 2 - 9

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.

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.

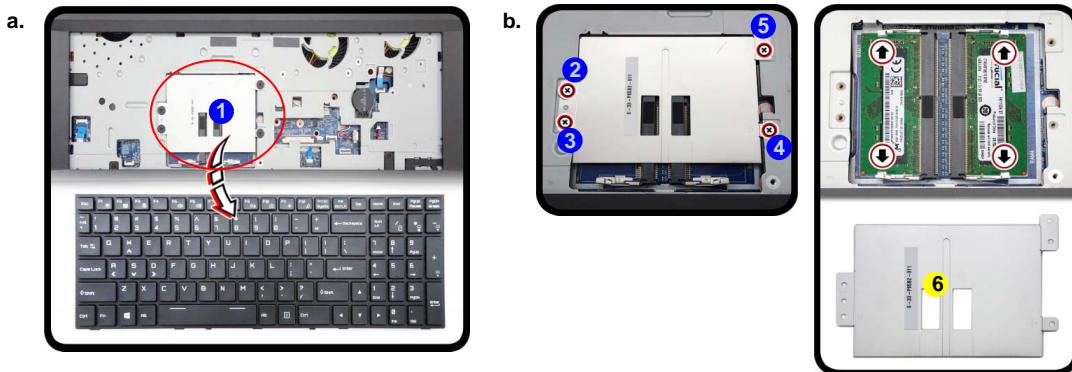
- 6. RAM Shielding Plate
- 4 Screws

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 Up to 2400 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](#)).



2 - 10 Removing the System Memory (RAM)

Disassembly

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

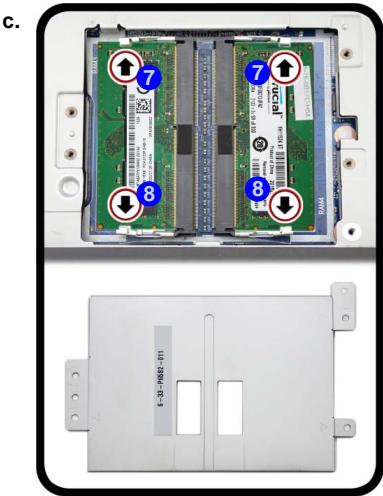


Figure 7
RAM-1 Module Removal (cont'd)

- 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

Removing the System Memory (RAM) 2 - 11

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.

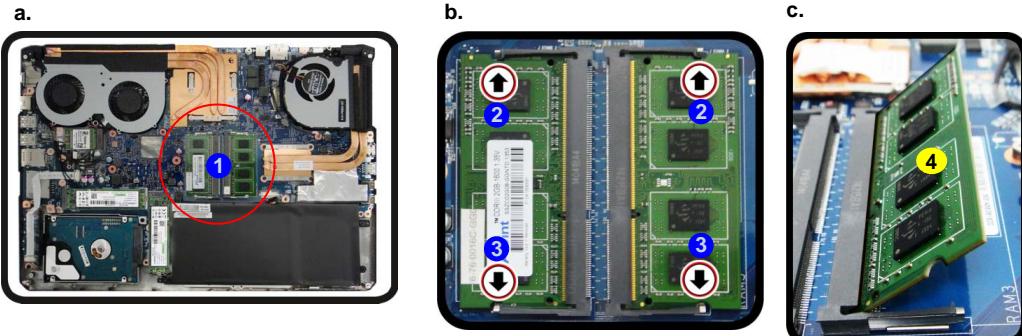


Contact Warning

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.

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.



4. RAM Module

2 - 12 Removing the System Memory (RAM)

Disassembly

Removing and Installing 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 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.
5. Reverse the process to install a new module (do not forget to replace the screws and thermal pad).



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

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

3.M2 SSD Module

- 1 Screw

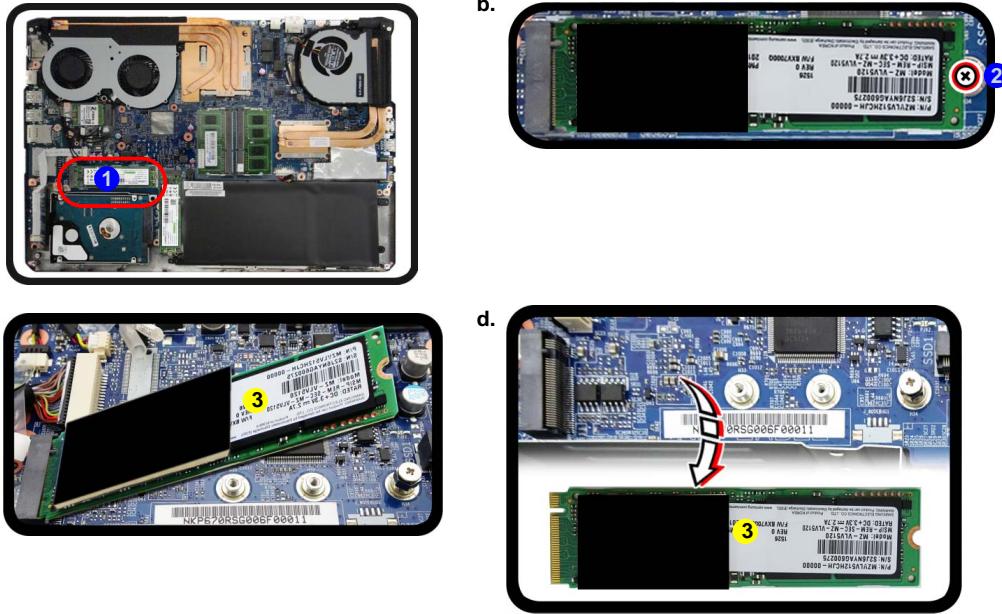
Disassembly

Figure 10
M.2 SSD-2 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.

M.2 SSD-2 Removal Procedure

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



2 - 14 Removing and Installing the M.2 SSD Module

Disassembly

M.2 SSD 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*).

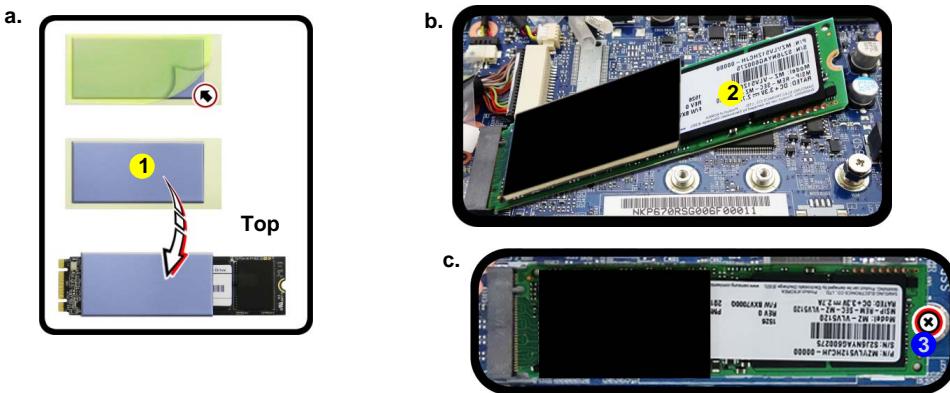


Figure 11
**M.2 SSD Module
Installation**

- 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 SSD Module
- 1 Screw

Disassembly

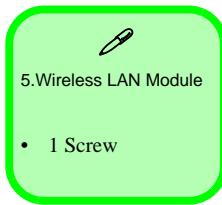
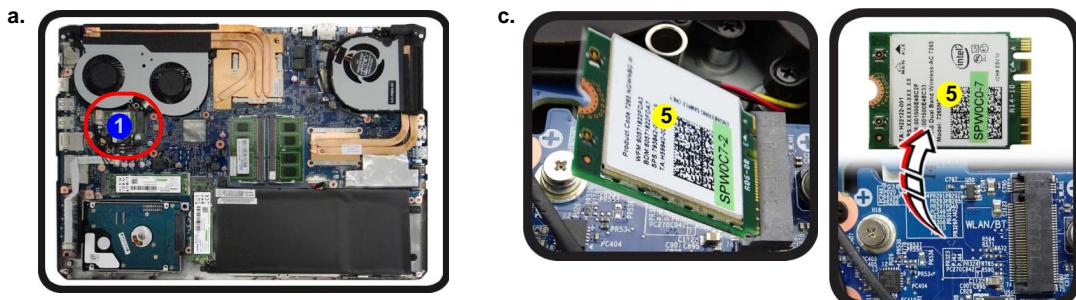
Figure 12 Wireless LAN Module Removal

- 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 12b](#)).

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 12a](#)).
- Carefully disconnect the cables 2 & 3, and then remove the screw 4 ([Figure 12b](#))
- The Wireless LAN module 5 ([Figure 12c](#)) will pop-up, and you can remove it from the computer.



2 - 16 Removing the Wireless LAN Module

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		White
LTE Broadband	LTE 1	Black	Black
	LTE 2		Blue
3G Broadband	3G 1	Black	Black
	3G 2		Blue

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

Removing the 3G/4G Module

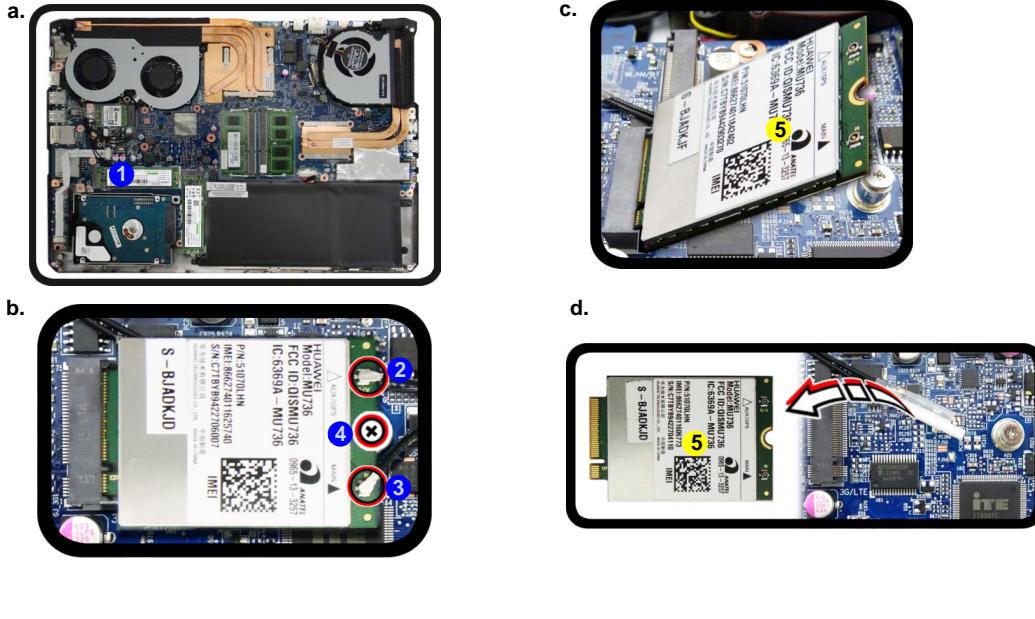
Disassembly

Figure 13
3G/4G 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.

3G/4G Module Removal Procedure

1. Turn off the computer, remove the battery ([page 2 - 6](#)).
2. Locate the module, it is visible at point 1 (*Figure 13a*).
3. Carefully disconnect the cables 2 & 3, and then remove the screw 4 from the module (*Figure 13b*).
4. The module 5 will pop-up (*Figure 13c*).
5. Lift the module 5 up and off the computer (*Figure 13d*).



2 - 18 Removing the 3G/4G Module

5. 3G/4G Module
- 1 Screw

Appendix A:Part Lists

This appendix breaks down the **P650HP6(-G) / P651HP6(-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.

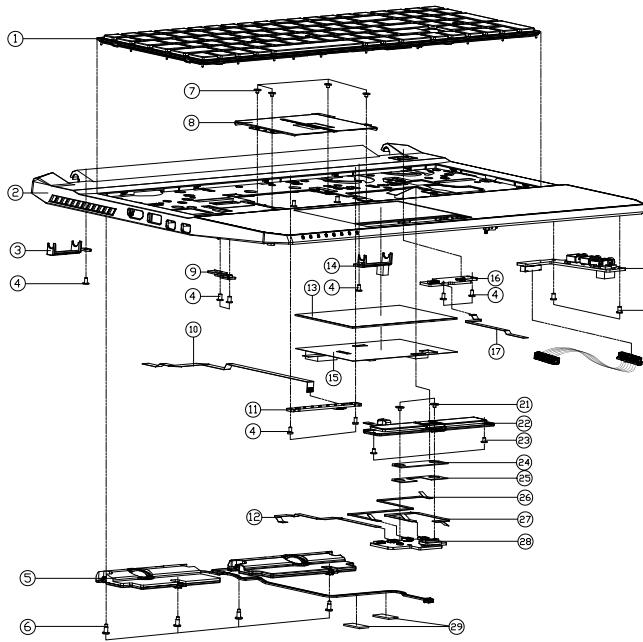
Note: Be sure to check any update notices. The parts shown in these illustrations are appropriate for the system at the time of publication. Over the product life, some parts may be improved or re-configured, resulting in *new* part numbers.

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

Part List Illustration Location

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

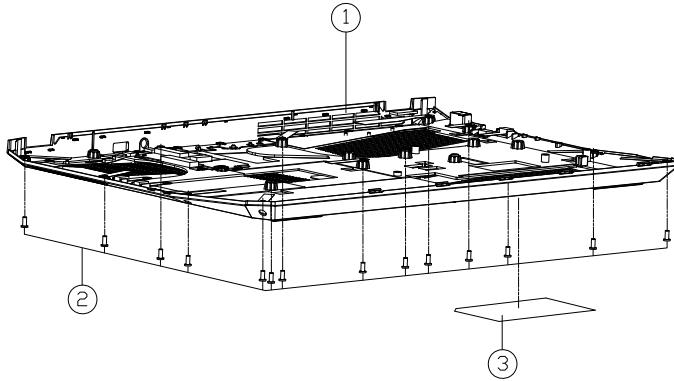
Part	
Top	<i>page A - 3</i>
Bottom	<i>page A - 4</i>
Main Board	<i>page A - 5</i>
HDD	<i>page A - 6</i>
LCD	<i>page A - 7</i>
LCD (Sharp)	<i>page A - 8</i>

Top

ITEM	PART NAME	PART NO	REMARK
1	HEAT SINK TOP COVER AND BASE COLOR SILVER AND 0.1MM THICK	6-80-P65S0-011-1	
1	WIRE & BOARD FOR CHARGER PORT AND COLOR SILVER AND 0.1MM THICK	6-80-P6500-013-1	
2	TOP CASE MODULE ENKYOKAKOPO P65RPM	6-39-P65P2-013-N	
2	TOP CASE MODULE ENKYOKAKOPO P65RPM	6-39-P65P2-113-N	
3	HINGE COVER L (YELLOW) IN7075K8-CM62600 P65S0	6-42-P6502-0L2	
4	SCREW M2x6L NI NI ICT NY (0.04-0.45),L=0.65	6-35-B1120-4RE	
5	SPACER FROM AL 30x5.52x2.4 P65RPM P65S0	6-23-5P650-0S1	
6	SCREW M2x6L NI NI ICT NY FOR SPEAKER	6-35-Z1120-GR2	
7	SCREW M2x6L KI NI ICT NY (0.04-0.45),L=0.65	6-35-B1120-2R0	
8	DDR BRACKET CSUS304 P65RPS	6-33-P65S2-012	
9	SPK BRK-3 (SECC T=1.0MM) P65S0E	6-33-P6502-031	
10	FPC CABLE (L TO R) P65RPM P65RPS	6-43-P6500-040	
11	LED BOARD V3.0 P65RPM	6-77-P65P4-D03	
12	TC CABLE TRANSFER TO R P65RPM AND 0.1MM THICK	6-43-P6500-051 ONLY FOR W/FINGER	
13	TOUCH PAD STANIFICS TH-3035-02 P65RPM	6-49-P65S3-010	
14	HINGE COVER R MODULE P65S0E	6-42-P6502-R00	
15	TP MYLAR PET P65RPM	6-40-P65P2-023	
16	POWER BOARD V1.0 P65RPM	6-77-P65PC-D01	
17	FPC CABLE POWER TO R P65RPM 6V 4PIN ROHS	6-43-P6500-030	
18	AUDIO 3DHP BOARD V2.0 P65RPM	6-77-P65PB-D12	
19	SCREW M2.5x4L KI NI ICT NY	6-35-21125-4R0	
20	WIRE CABLE 3PIN 3V FOR 3D AMP AUDIO 0.5MM THICK	6-43-P67P6-010	
21	SCREW M2x6L KI BK/Z ICT NY(0.04-0.45)	6-35-B6120-2RE	
22	FUNCTION KEY FOR CLICK BUTTON MODULE VIA FINGER P65RPM	6-23-KP65R-022	
22	FUNCTION KEY FOR CLICK BUTTON MODULE VIA FINGER P65RPM	6-23-KP65R-012	
23	SCREW M2x6L KI BK/Z ICT NY (0.04-0.45),L=0.64	6-35-B6120-3RD	
24	CLICK W/FINGER MYLAR PET (48X141MM) P65RPM	6-40-P6502-080 ONLY FOR W/FINGER	
25	CLICK W/FINGER MYLAR PET (48X141MM) P65RPM	6-40-P6502-040 ONLY FOR W/FINGER	
26	FPC CABLE TRANSFER TO R P65RPM 6V 4PIN ROHS	6-43-P65R0-011	
27	FPC CABLE L TO CLEX P65RPM 6V 4PIN ROHS	6-43-P65R0-021	
28	CLICK BOARD V1.0 (W/D FP) P65RPM	6-77-P65P2-D01-1	
28	CLICK BOARD VIA FINGER BOARD V1.0 P65RPM	6-77-P65PA-N01	
29	TAPE MYLAR TRANSPARENT (2000005) P180H	6-40-P1803-020	

Figure A - 1
Top

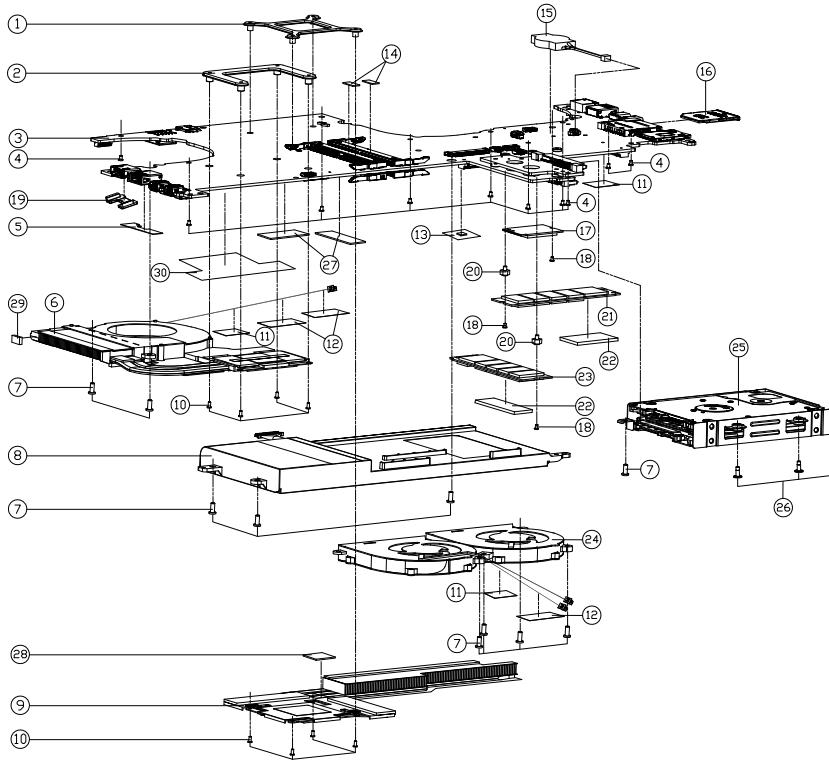
Top A - 3

BottomFigure A - 2
Bottom

ITEM	PART NAME	PART NO	REMARK
1	BOTTOM CASE MODULE P650RP6	6-39-P65P3-014	
1	BOTTOM CASE MODULE P651RP6	6-39-P65P3-114	
2	SCREW M2.5x6L K BZ ICT NY	6-35-82125-6RA	
3	PRODUCT LABEL FOR P650P6 (FOLIO NEW CE SWTO)	6-45-P650RP63-011	
3	PRODUCT LABEL FOR P650P6 (FOLIO NEW CE SWTO)	6-45-P651RP63-011	
3	PRODUCT LABEL FOR P650P6 (FOLIO NEW CE SWTO)	6-45-P650RP6G-011	
3	PRODUCT LABEL FOR P650P6 (FOLIO NEW CE SWTO)	6-45-P651RP6G-011	
3	PRODUCT LABEL FOR P650P6 (FOLIO NEW CE SWTO)	6-45-P650RP6G-011	
3	PRODUCT LABEL FOR P650P6 (FOLIO NEW CE SWTO)	6-45-P651RP6G-011	
3	PRODUCT LABEL PRO-PD FOR P650RP6-H	6-45-P651RP6H-010	
3	PRODUCT LABEL FOR P651HP6	6-45-P651HP63-010	
3	PRODUCT LABEL FOR P650HP6	6-45-P650HP63-010	
3	PRODUCT LABEL FOR P650HP6-G	6-45-P650HP6G-010	
3	PRODUCT LABEL FOR P651HP6-G	6-45-P651HP6G-010	
3	PRODUCT LABEL FOR P650HP3	6-45-P650HP33-010	
3	PRODUCT LABEL FOR P651HP3	6-45-P651HP33-010	
3	PRODUCT LABEL FOR P650HP3-G	6-45-P650HP3G-010	
3	PRODUCT LABEL FOR P651HP3-G	6-45-P651HP3G-010	

A - 4 Bottom

Main Board



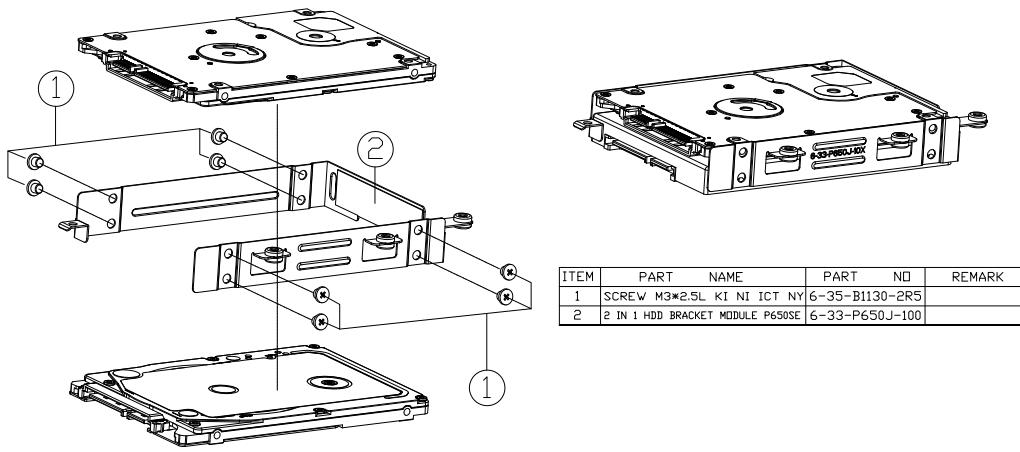
ITEM	PART	NAME	PART	REMARK
1	NET CARD ASSY	W/ 256MB P/N:PC	6-31-P2755-001	
2	PSU POWER UNIT	12V 600W 80MM FAN	6-31-PCSPS-001	
3	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
4	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
5	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
6	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
7	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
8	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
9	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
10	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
11	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
12	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
13	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
14	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
15	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
16	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
17	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
18	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
19	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
20	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
21	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
22	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
23	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
24	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
25	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
26	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
27	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
28	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
29	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	
30	PCI R/W HHD	IDE 1.3GB 3.5INHDD	6-31-PCSPH-001	

Figure A - 3
Main Board

Main Board A - 5

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	2 IN 1 HDD BRACKET MODULE P650E	6-33-P650J-100	

A - 6 HDD

LCD

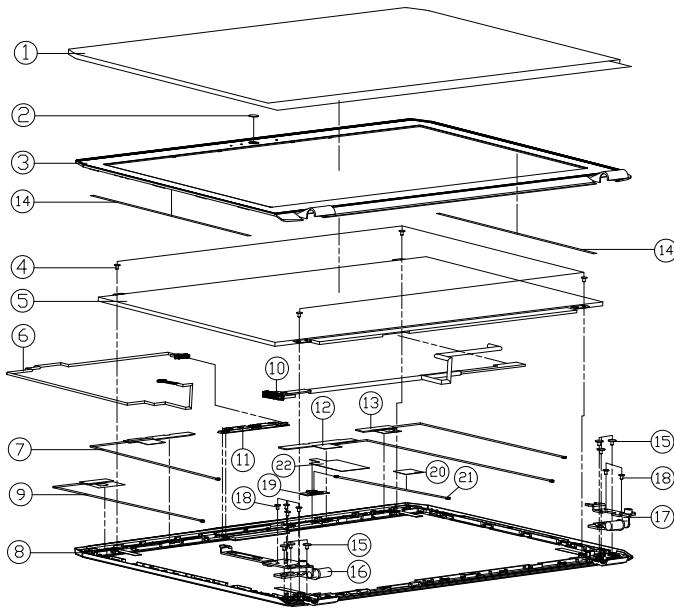


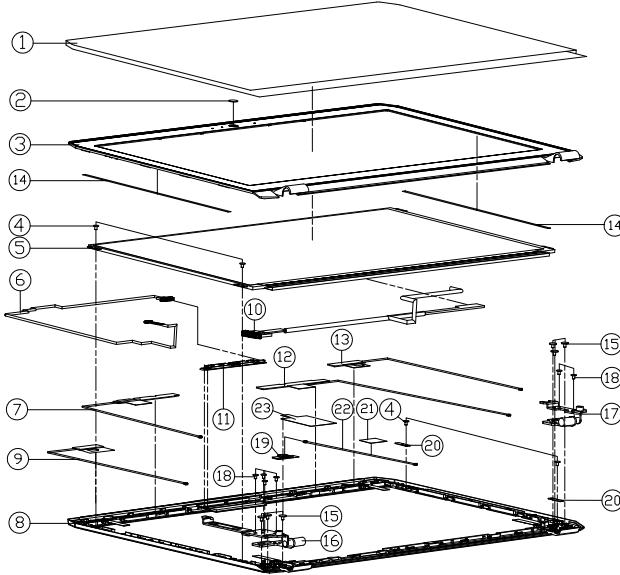
Figure A - 5
LCD

ITEM	PART	NAME	PART	ND	REMARK
1	LCD PROTECT MYLAR DOPP N650DU		6-40-N6508-040		
2	CCD LENS PMMA P650SE		6-42-P6501-010		
3	LCD FRONT COVER MODULE P550SE		6-39-P6501-015		
4	SCREW M2x5.1 KI BK/Z ICI NTY#1-05		6-35-B6120-2RD		
5	LD 504 BULB INTEGRAL 10W 12V 500LM		6-50-L1226-M03		
5	LD 504 BULB INTEGRAL 10W 12V 500LM		6-50-L1223-L04		
5	LD 504 BULB INTEGRAL 10W 12V 500LM		6-50-L1223-L06		
5	LD 504 BULB INTEGRAL 10W 12V 500LM		6-50-L1226-L06		
5	LD 504 BULB INTEGRAL 10W 12V 500LM		6-50-L1223-L08		
5	LD 504 BULB INTEGRAL 10W 12V 500LM		6-50-L1223-G17		
6	VIRE CALKE FOR CC 35MM 3PIN (PN) PS505		6-43-P6507-011-C		
7	PCB SIDE BOARD FOR 10MM 1000LM 1000K		6-23-TP650-072		尺寸:100.0±0.1, 厚度:1.1±0.05, 宽度:11.1±0.8
8	LCD BACK COVER MODULE P650SE		6-39-P6501-027		
8	LCD BACK COVER MODULE P651SE		6-39-P6511-026		
9	MEMO PEN VEN JIN 232 245G BLACK BODY + BLACK TIP		6-23-TP650-050		
10	VERBALIS CABLE FOR DISPLAY 30 CM 3PIN (PN)		6-43-P6501-032-IC		
10	VIRE CABLE FOR DISPLAY 30 CM 3PIN (PN)		6-43-P6501-042-IC		
10	VIRE CABLE FOR DISPLAY 30 CM 3PIN (PN) CCFL1500LM PS505		6-43-P6501-010-IC		
11	INCUBATOR FOR DISPLAY 30 CM 3PIN (PN)		6-88-W655C-5100		OPTION
11	INCUBATOR FOR DISPLAY 30 CM 3PIN (PN) CCFL1500LM PS505		6-88-B775C-4900		OPTION
12	MEMO PEN FOR SIDE BOARD FOR 10MM 1000LM 1000K		6-23-TP650-060		尺寸:100.0±0.1, 厚度:1.1±0.05, 宽度:11.1±0.8
13	ANTONIA PEAK XIAN CHI WU PC 24G/5.1 500LM		6-23-TP650-041		OPTION
14	FRONT COVER GLASS INTO LCD 35MM FOR W550		6-40-W6551-020		
15	SCREW M2x5.1 KI BK/Z ICI NTY#1-05		6-35-B6120-2RE		
16	LCD HINGE L (SKT) P650RS		6-33-P6551-011		
17	LCD HINGE R (SKT) P650RS		6-33-P6551-011		
18	SCREW M2.5x14 KI NI ICT NTY		6-35-2125-4R0		
19	MEMO PEN VEN JIN 232 245G BLACK BODY + BLACK TIP		6-88-B7782-010		FOR -88-P7787-010
20	800210A TAPE NYLON GLASS200M#0127#5559R		6-40-P655S-P10		FOR -88-P7787-010
20	800210A TAPE NYLON GLASS200M#0127#5559R		6-40-P655S-P10		FOR -88-P7787-010
21	800211A LINEAR ALUMINUM MOTOR CONDUCTOR		6-23-TP7782-010		FOR -88-P7787-010
22	800211A COPPER FOLD TP7750M		6-47-P7751-211		FOR -88-P7787-010

LCD A - 7

LCD (Sharp)

Figure A - 6
LCD (sharp)



ITEM	PART NAME	PART NO	REMARK
1	LCD PROTECT MYLAN BOPP N6500U	6-40-N6508-040	
2	CCD LENS PMMA P650SE	6-42-P6501-010	
3	LCD FRONT COVER MODULE P650SE	6-39-P6501-015	
4	SCREW M2x5L KI BK/Z ICT NY IN 453 T40	6-35-B6120-2RD	
5	LCD GRY 400 0.95" PT KNE SHIP LOGO/LV UD SWB /7W W/WK	6-50-L1231-A01	
6	WIRE CABLE FOR CCD 530M 30V 8PIN (CCD) P650SE	6-43-P650T-011-1	
7	ADHESIVE TAPE FOR LCD BACK COVER MODULE AND BACK	6-23-TP650-072	◎带粘性胶的双面胶 不可用温水清洗干燥
8	LCD BACK COVER MODULE P650SE	6-39-P6501-027	
9	LCD BACK COVER MODULE P651SE	6-39-P6511-026	
10	ANTENNA SPEAK ALUM ZN M2 PCB 24/56 CABLE BLACK 1.8MM P650E	6-23-TP650-052	
11	INCUBATION CABLE FOR EXPANSION 200W BY 40W INPUT SOURCE	6-88-W65DC-5100	OPTION
11	INCUBATION CABLE FOR EXPANSION 200W BY 40W INPUT SOURCE	6-88-P77SC-4900	OPTION
12	ADHESIVE TAPE FOR LCD BACK COVER MODULE AND BACK	6-23-TP650-040	带胶的双面胶 不可用温水清洗干燥
13	ANTENNA SPEAK ALUM ZN M2 PCB 24/56 CABLE P650E	6-23-TP650-041	OPTION
14	FRONT COVER GLUE (AN OINTTO 500 BIOCLOUD FOR W552)	6-40-W6551-020	
15	SCREW M2x5L KI BK/Z ICT NY (48, T=0.6)	6-35-B6120-2RE	
16	LCD HINGE L (SK7) P650RS	6-33-P65SI-0L1	
17	LCD HINGE R (SK7) P650RP6	6-33-P65PI-0R1	
18	SCREW M2.5x4L KI NI ICT NY	6-35-21125-4R0	
19	ANTENNA SPEAK ALUM ZN M2 PCB 24/56 CABLE BLACK 1.8MM P650E	6-88-P8722-8100	FDR 6-88-P872F-8100
20	LCD PANEL BRACKET (SECC) P650SE	6-33-P6501-010	
21	802.11AB TAPE MYLAR/BLACK 20X50M 1270#P655P9	6-40-P655S-P10	FDR 6-88-P872F-8100
22	802.11AB CABLE 60MM PLATE 24AWG 40WATT CONNECTOR POWER	6-23-TP672-010	FDR 6-88-P872F-8100
23	802.11AB COPPER FOIL P775DM2	6-47-P7751-211	FDR 6-88-P872F-8100

A - 8 LCD (Sharp)

Schematic Diagrams

Appendix B: Schematic Diagrams

This appendix has circuit diagrams of the **P650HP6(-G) / P651HP6(-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	Frame Buffer Partition A, B - Page B - 23	KBC IT8587 - Page B - 44	VCC_Core & VCCSA - Page B - 65
Processor 1/7 - Page B - 3	GPU Frame Buffer Partition - Page B - 24	USB Charger - Page B - 45	VCore Output Stage - Page B - 66
Processor 2/7 - Page B - 4	Frame Buffer Partition C - Page B - 25	USB - Page B - 46	VCCGT - Page B - 67
Processor 3/7 - Page B - 5	Frame Buffer Partition C,D - Page B - 26	M.2 WLAN+BT, PCIE4X SSD - Page B - 47	VCCGT Output Stage - Page B - 68
Processor 4/7 - Page B - 6	GPU Decoupling - Page B - 27	M.2 3G/LTE - Page B - 48	LAN RTL8411, Card Reader - Page B - 69
Processor 5/7 - Page B - 7	GPU Decoupling 2 - Page B - 28	Realtek ALC892 - Page B - 49	AR_TBT - Page B - 70
Processor 6/7 - Page B - 8	Straps and XTAL - Page B - 29	TPA2008D2 - Page B - 50	AR_Power - Page B - 71
Processor 7/7 - Page B - 9	IFP I/O Interface - Page B - 30	TPM, CCD, TP - Page B - 51	TPS65982, Type C - Page B - 72
DDR CHA SO-DIMM_0 - Page B - 10	Misc - GPIO, I2C and ROM - Page B - 31	Fan, LID, KB LED - Page B - 52	TPS65982, Type A - Page B - 73
DDR CHA SO-DIMM_1 - Page B - 11	NVIDIA Power Sequence - Page B - 32	Connector - Page B - 53	USB, Type A - Page B - 74
DDR CHB SO-DIMM_0 - Page B - 12	GPU NVVDD, FBVDDQ - Page B - 33	DDR 1.2V / 0.6VS - Page B - 54	Audio Board_3D AMP - Page B - 75
DDR CHB SO-DIMM_1 - Page B - 13	GPU GND - Page B - 34	VDD3, VDD5 - Page B - 55	HDD Board - Page B - 76
Panel, Inverter - Page B - 14	PCH 1/9 - Page B - 35	5V, 5VS, 3.3V, 3.3VS, 3.3VA - Page B - 56	Power Board - Page B - 77
Redriver - Page B - 15	PCH 2/9 - Page B - 36	Power 1.0V, VCCIO - Page B - 57	LED Board - Page B - 78
Mini DP Port E - Page B - 16	PCH 3/9 - Page B - 37	AC_In, Charger - Page B - 58	Click Board - Page B - 79
Mini DP Port F - Page B - 17	PCH 4/9 - Page B - 38	1.0DX_VCCSTG/VCCSFR_OC/2.5V - Page B - 59	Finger Sensor Board - Page B - 80
HDMI Connector - Page B - 18	PCH 5/9 - Page B - 39	IV8_RUN/AON, NV3V3 - Page B - 60	Power Board - Page B - 81
VGA PCI Express - Page B - 19	PCH 6/9 - Page B - 40	NVVDD Phase 1 & 2 - Page B - 61	LED Board - Page B - 82
VGA Frame Buffer Partition - Page B - 20	PCH 7/9 - Page B - 41	NVVDDS - Page B - 62	
Frame Buffer Partition A - Page B - 21	PCH 8/9 - Page B - 42	PEX_VDD - Page B - 63	
Frame Buffer Partition B - Page B - 22	PCH 9/9 - Page B - 43	FBVDDQ - Page B - 64	

Table B - 1
**SCHEMATIC
DIAGRAMS**

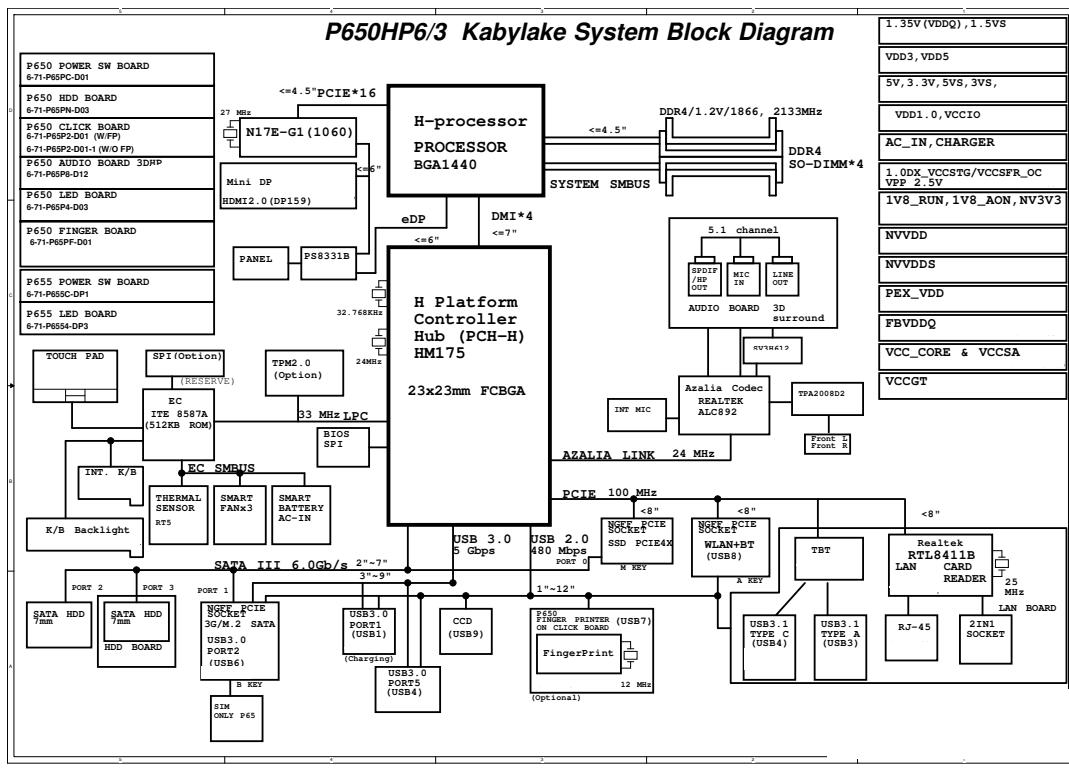


Version Note

The schematic diagrams in this chapter are based upon version 6-7P-P65P9-002. If your mainboard (or other boards) are a later version, please check with the Service Center for updated diagrams (if required).

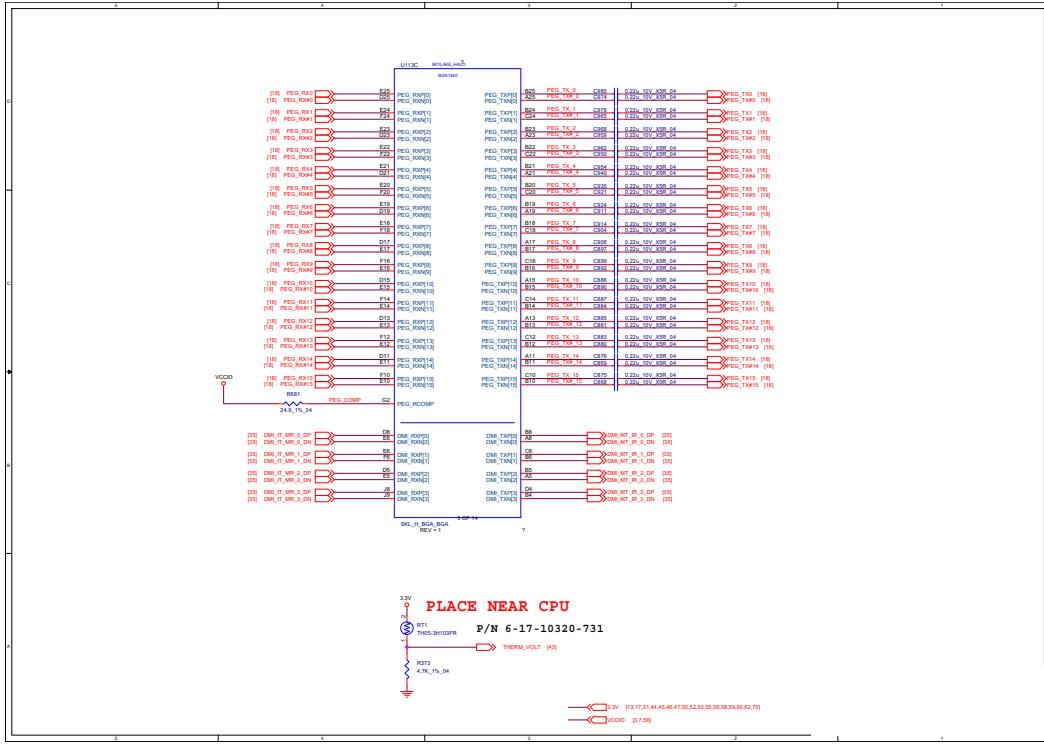
Schematic Diagrams**System Block Diagram**

**Sheet 1 of 81
System Block
Diagram**

**B - 2 System Block Diagram**

Schematic Diagrams

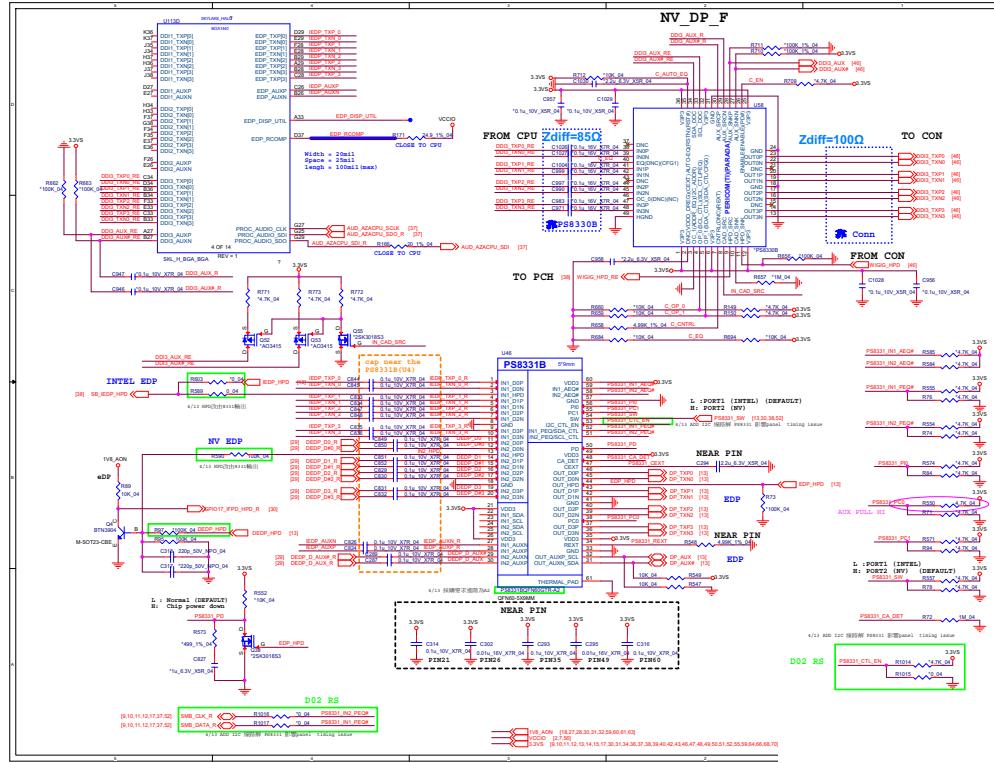
Processor 1/7



Sheet 2 of 81
Processor 1/7

Schematic Diagrams

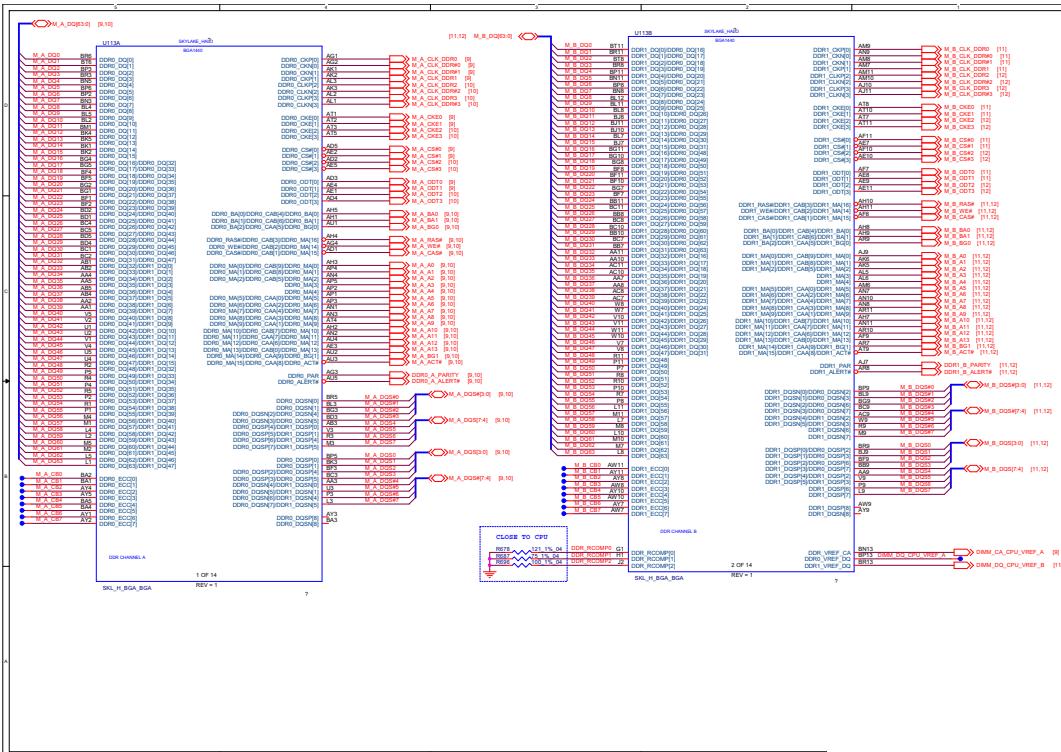
Processor 2/7



B - 4 Processor 2/7

Schematic Diagrams

Processor 3/7

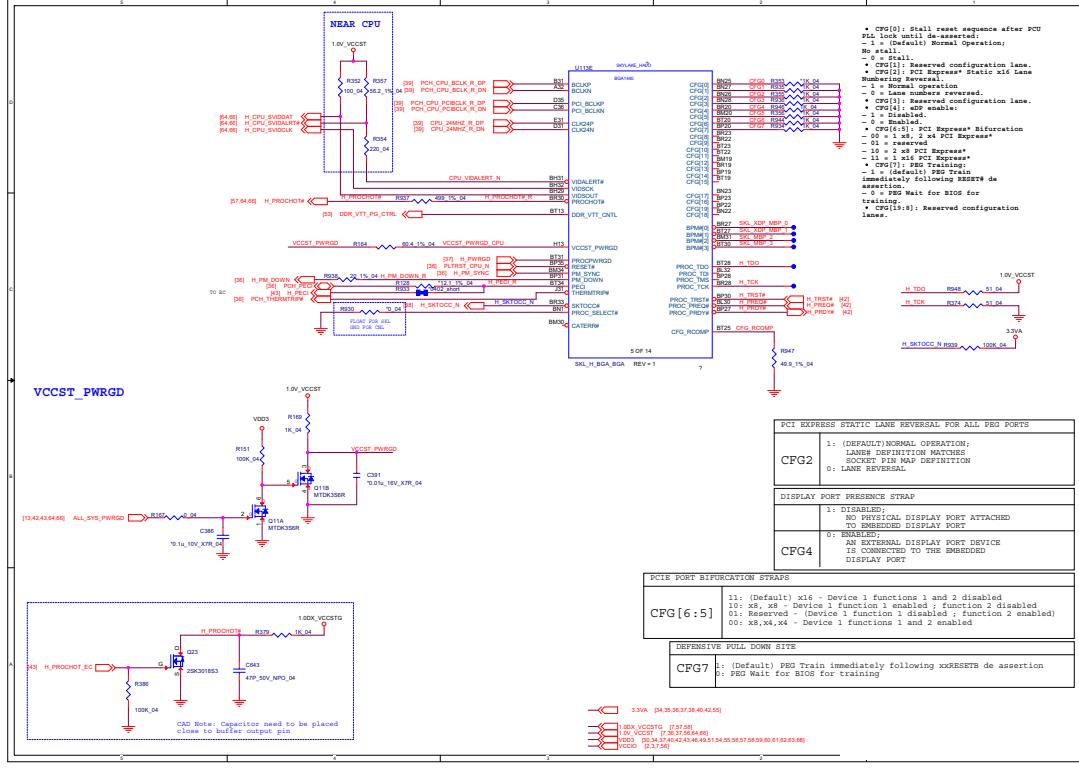


Sheet 4 of 81
Processor 3/7

Processor 3/7 B - 5

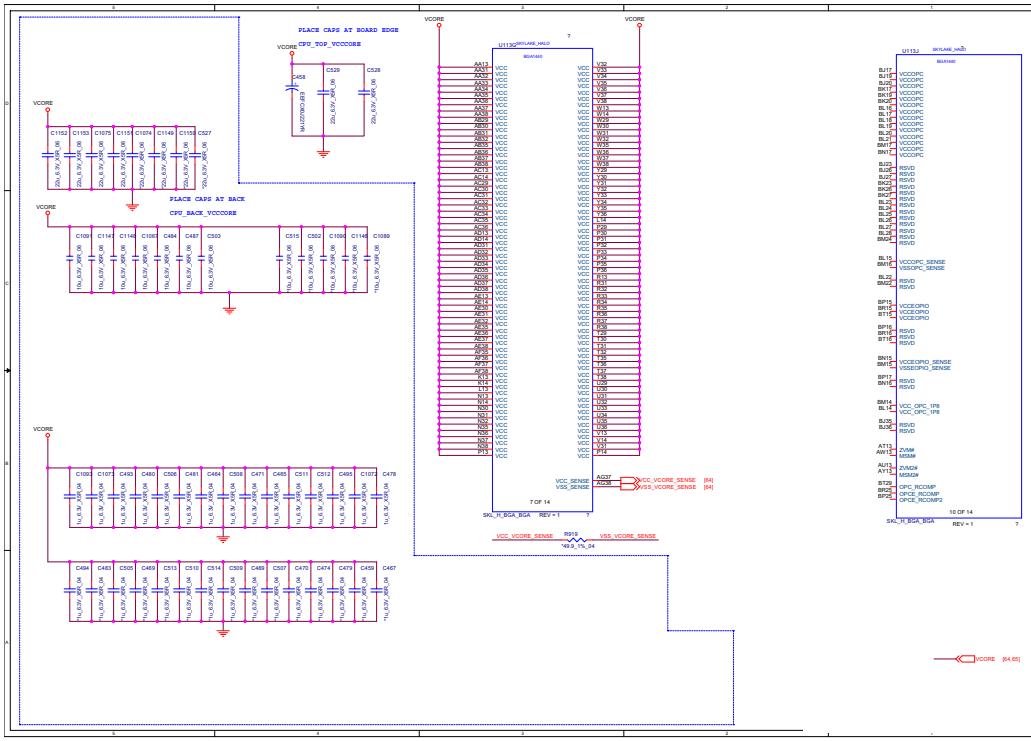
Schematic Diagrams

Processor 4/7



Schematic Diagrams

Processor 5/7



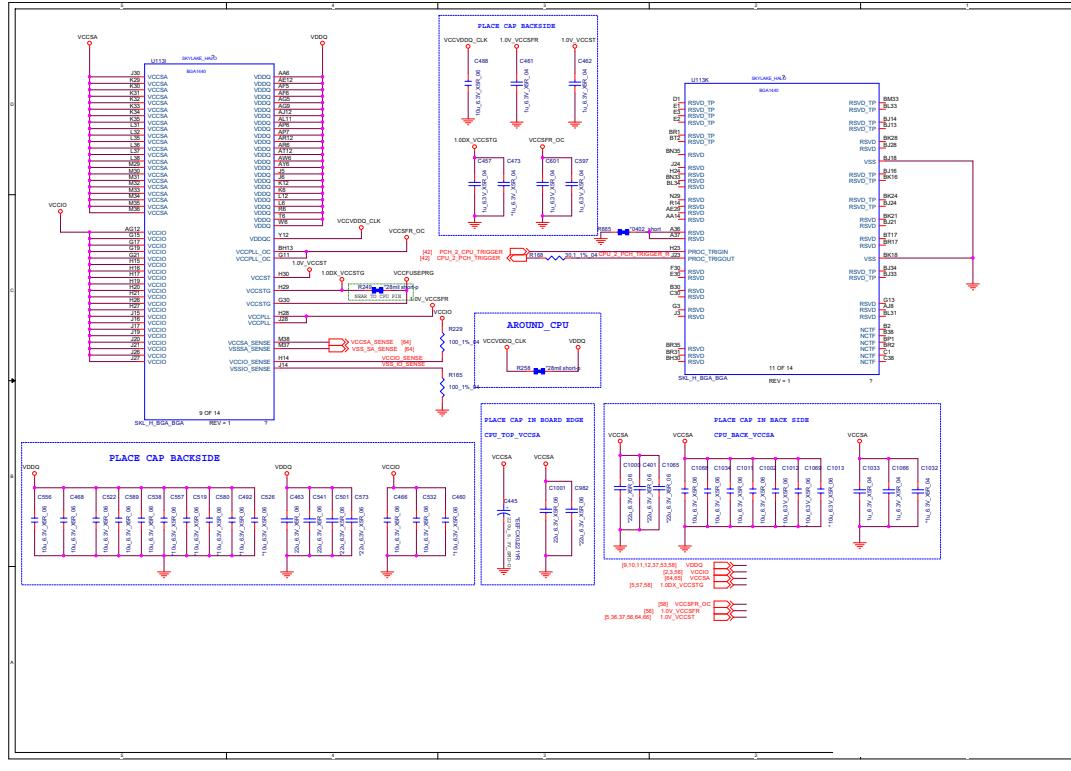
Sheet 6 of 81
Processor 5/7

Processor 5/7 B - 7

Schematic Diagrams

Processor 6/7

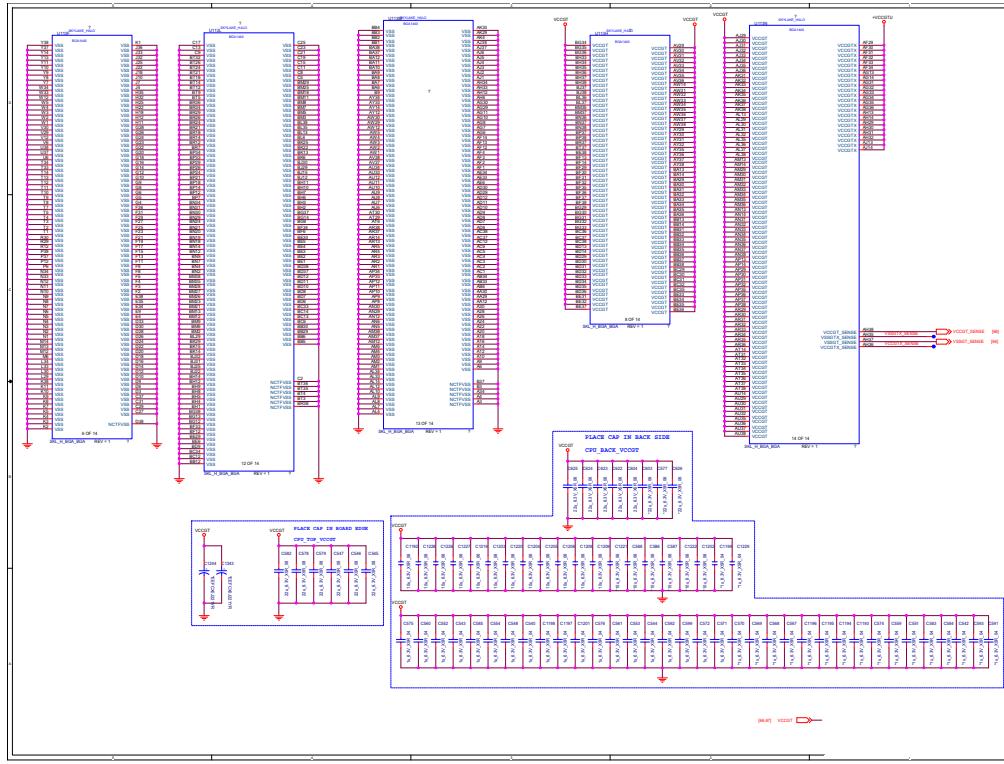
Sheet 7 of 81
Processor 6/



B - 8 Processor 6/7

Schematic Diagrams

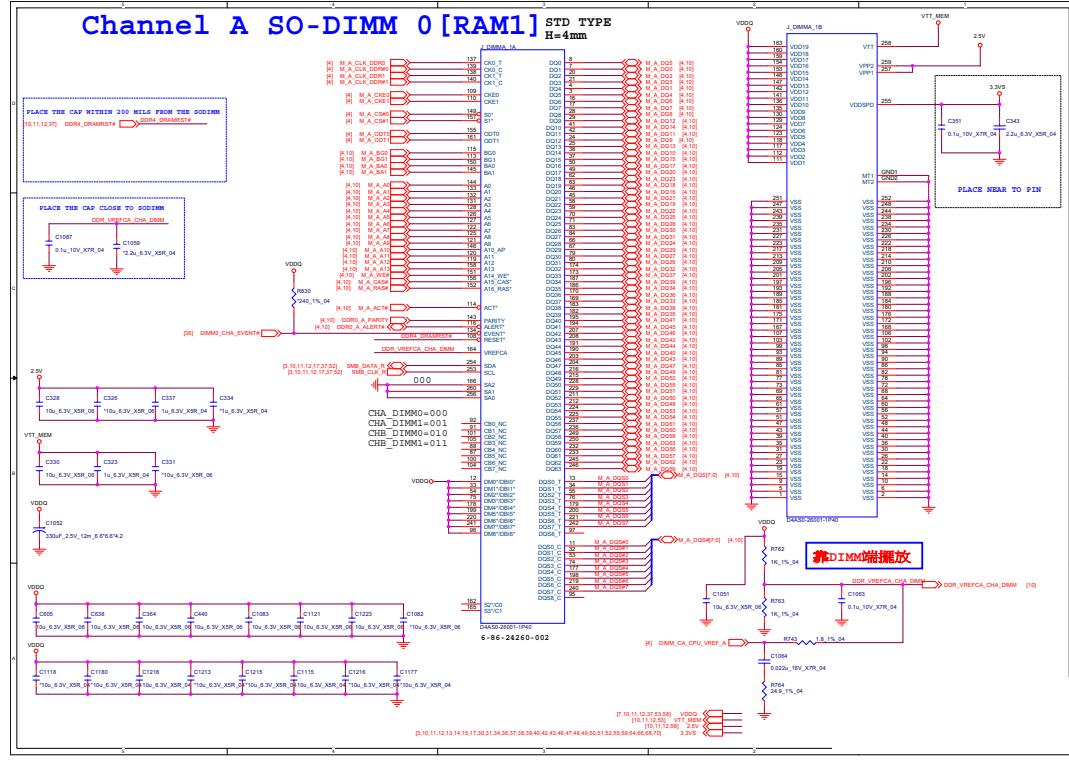
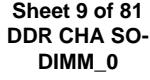
Processor 7/7



Sheet 8 of 81
Processor 7/7

Schematic Diagrams

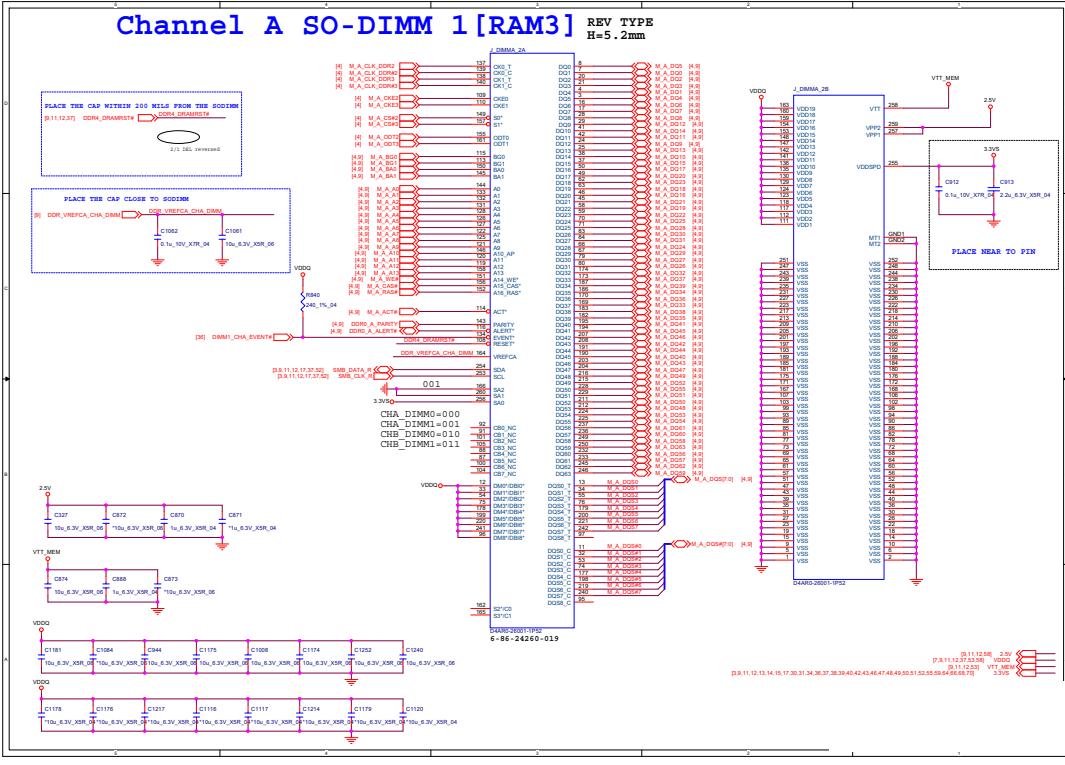
DDR CHA SO-DIMM_0



B - 10 DDR CHA SU-DIMM_0

Schematic Diagrams

DDR CHA SO-DIMM_1

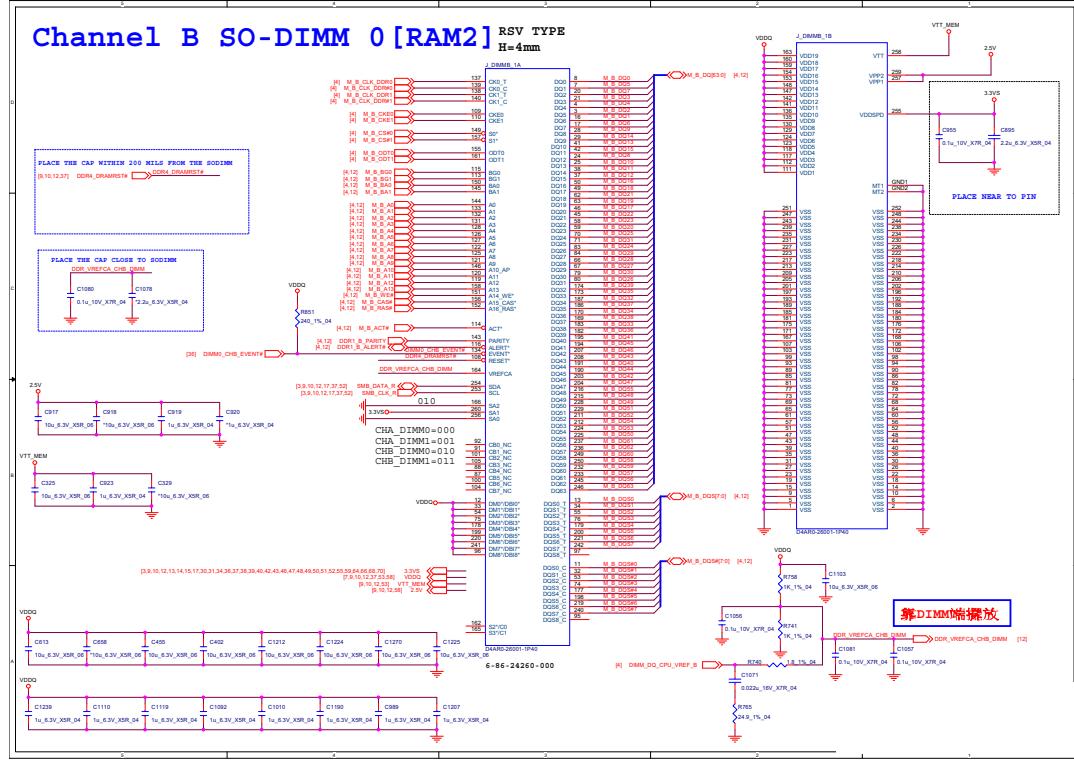


Sheet 10 of 81
DDR CHA SO-
DIMM_1

DDR CHA SO-DIMM_1 B - 11

Schematic Diagrams

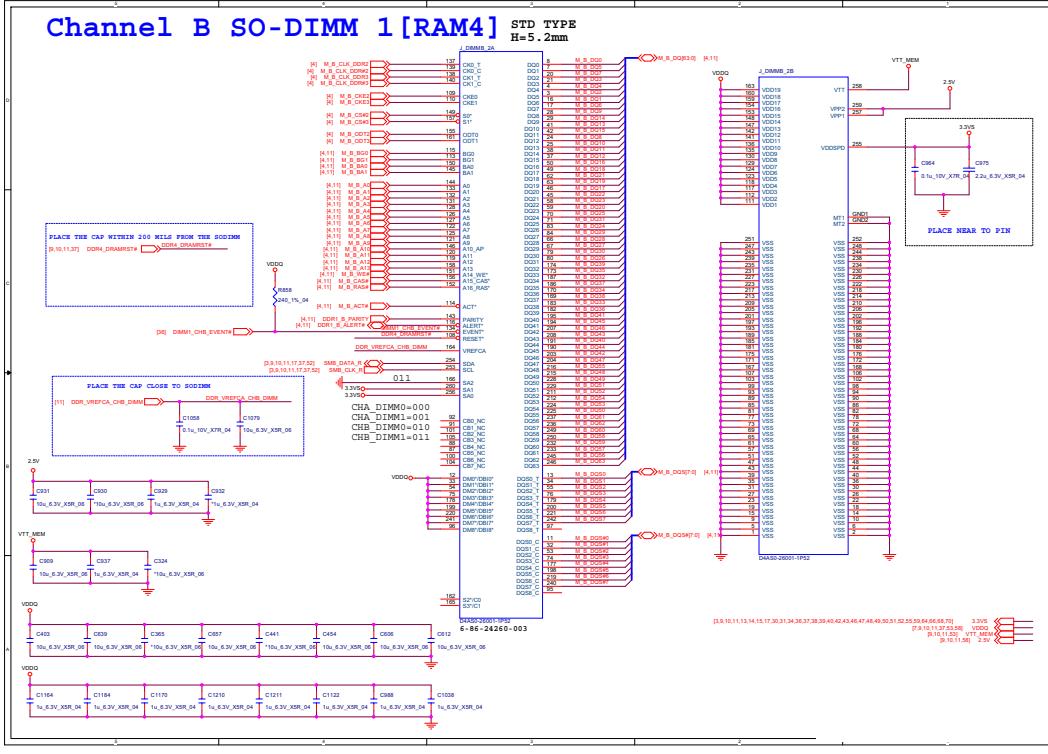
DDR CHB SO-DIMM_0



B - 12 DDR CHB SO-DIMM_0

Schematic Diagrams

DDR CHB SO-DIMM_1

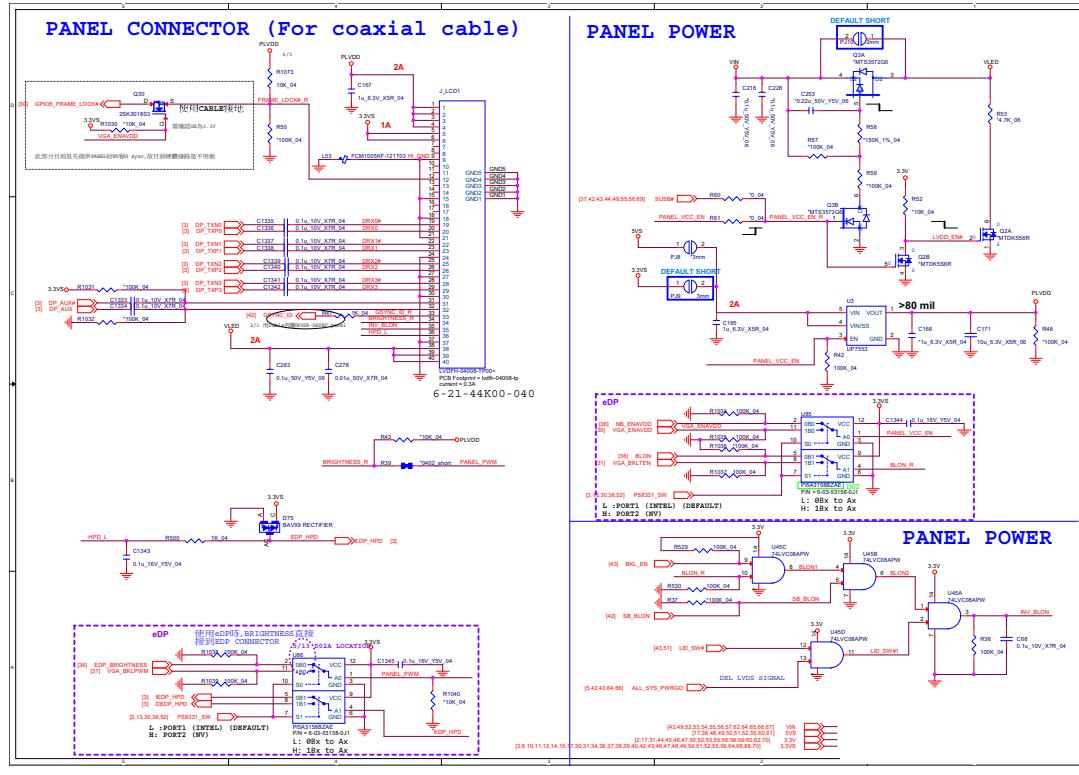


Sheet 12 of 81
DDR CHB SO-
DIMM_1

DDR CHB SO-DIMM_1 B - 13

Schematic Diagrams**Panel, Inverter**

Sheet 13 of 81
Panel, Inverter



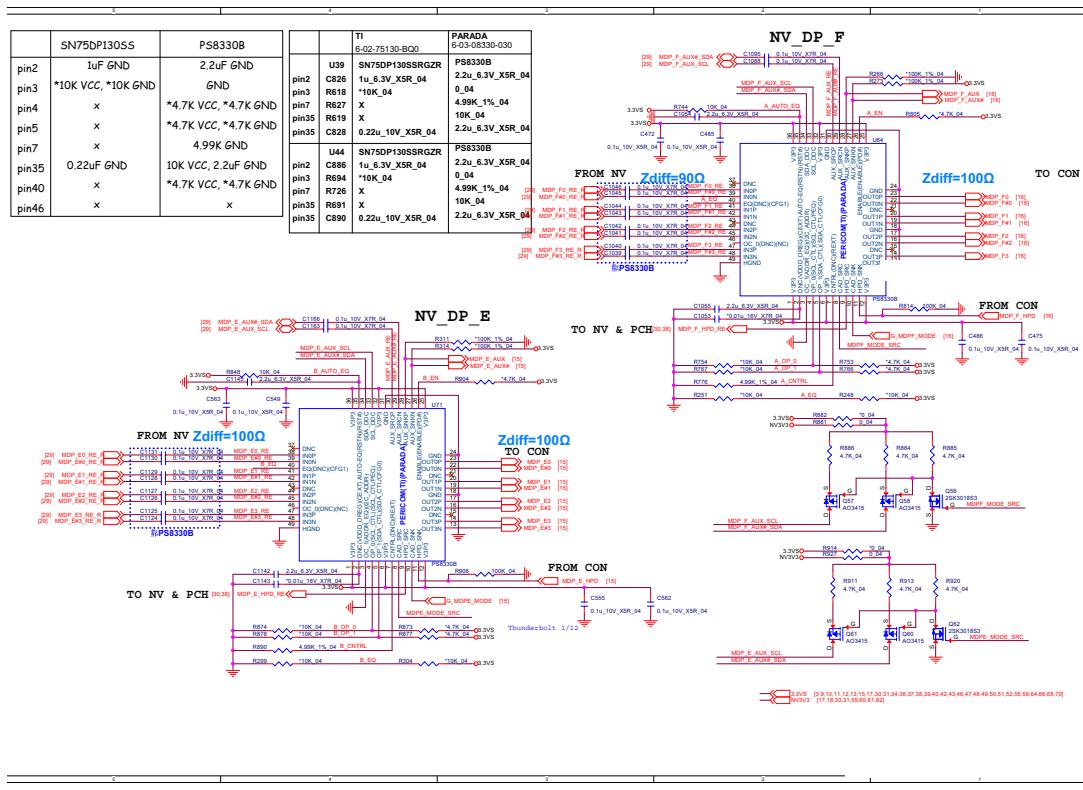
B - 14 Panel, Inverter

Schematic Diagrams

Redriver

	SN75DP130SS	PS8330B
pin2	1uF GND	2.2uF GND
pin3	*10K VCC, *10K GND	GND
pin4	x	*4.7K VCC, *4.7K GND
pin5	x	*4.7K VCC, *4.7K GND
pin7	x	4.99K GND
pin35	0.22uF GND	10K VCC, 2.2uF GND
pin40	x	*4.7K VCC, *4.7K GND
pin46	x	x

	TI	PARADA
	6-02-7510-BQ0	6-05-08530-030
U99	SN7D5P130SXRGZ	P8330B
C926	1u_6.3V_XSR_04	2.2u_6.3V_XSR_04
R618	*10K_04	4.99K_1%,04
R617	R27	10K_04
pin35	R619	2.2u_6.3V_XSR_04
pin35	C828	0.22u_10V_XSR_04
U4	SN7D5P130SXRGZ	P8330B
C986	1u_6.3V_XSR_04	2.2u_6.3V_XSR_04
R694	*10K_04	0.34
R726	X7	4.99K_1%,04
pin35	R691	10K_04
C980	0.22u_10V_XSR_04	2.2u_6.3V_XSR_04



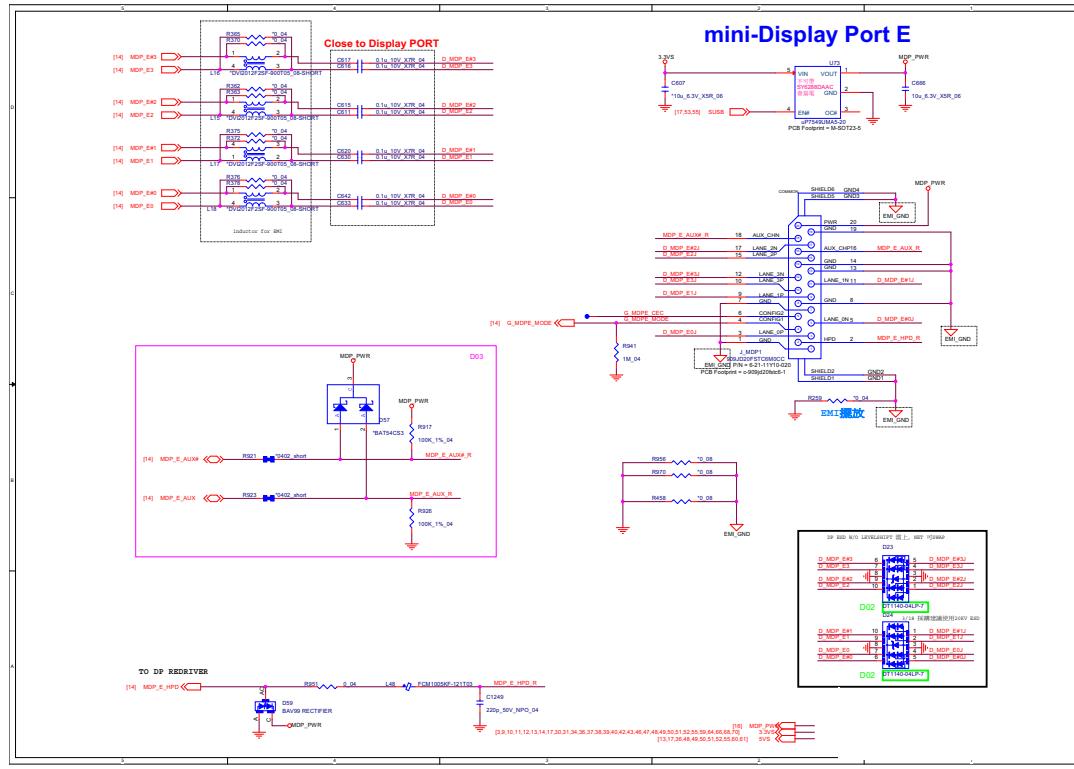
Sheet 14 of 81
Redriver

Redriver B - 15

Schematic Diagrams

Mini DP Port E

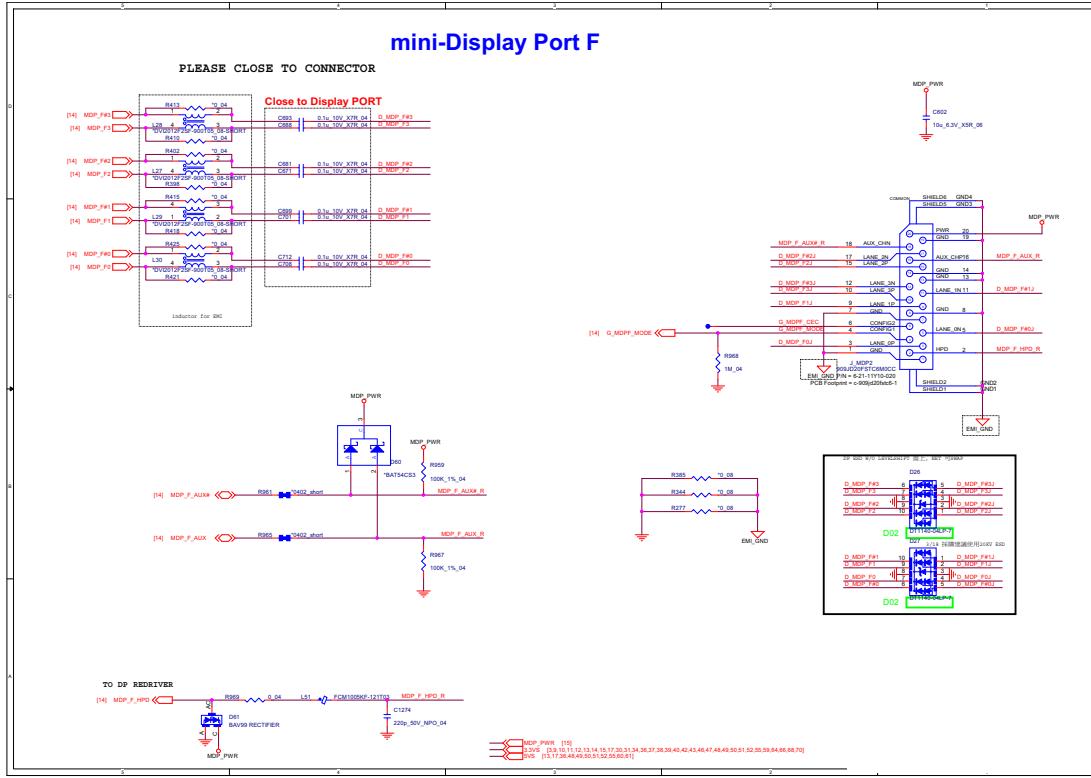
Sheet 15 of 81
Mini DP Port E



B - 16 Mini DP Port E

Schematic Diagrams

Mini DP Port F

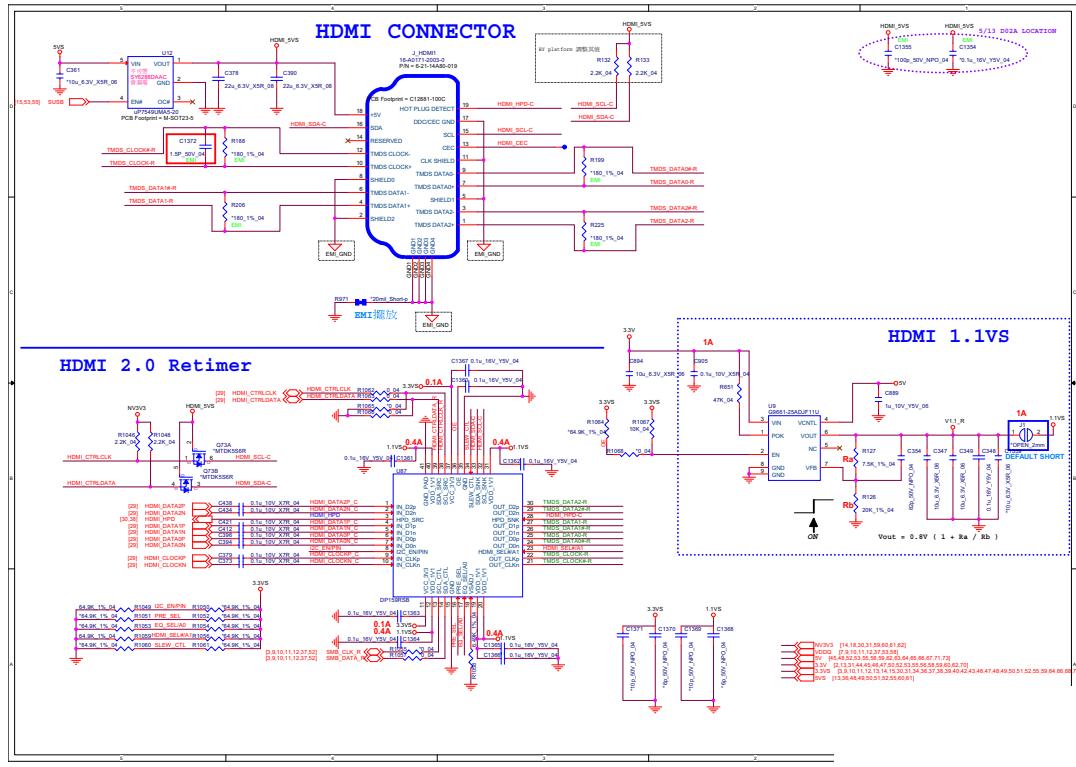


Sheet 16 of 81
Mini DP Port F

Mini DP Port F B - 17

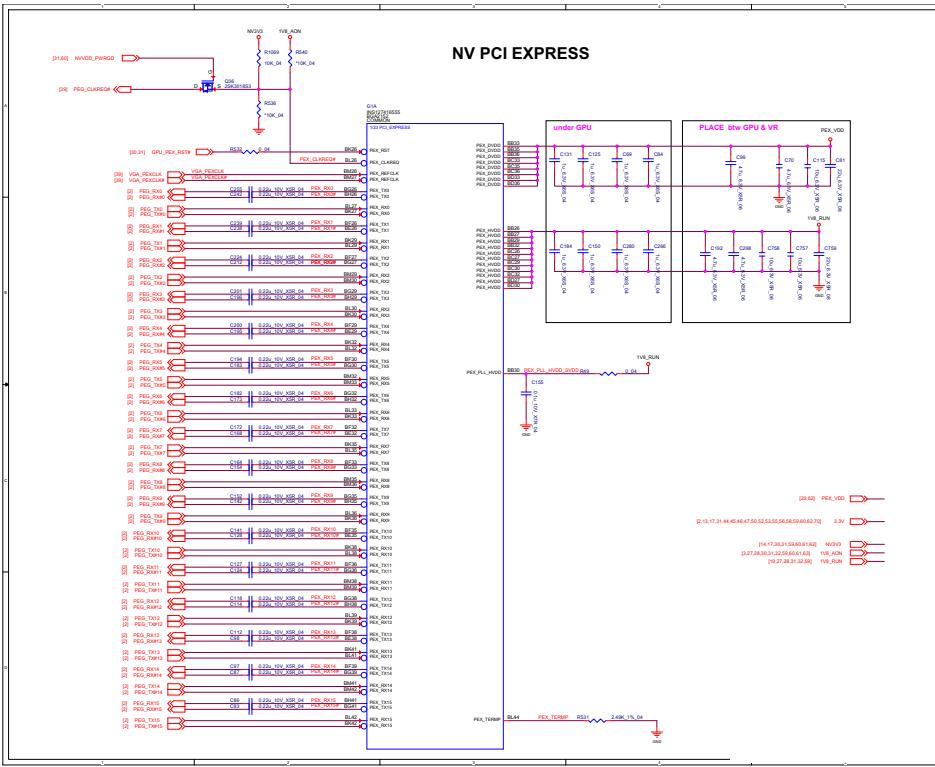
Schematic Diagrams**HDMI Connector**

Sheet 17 of 81
HDMI Connector



Schematic Diagrams

VGA PCI Express

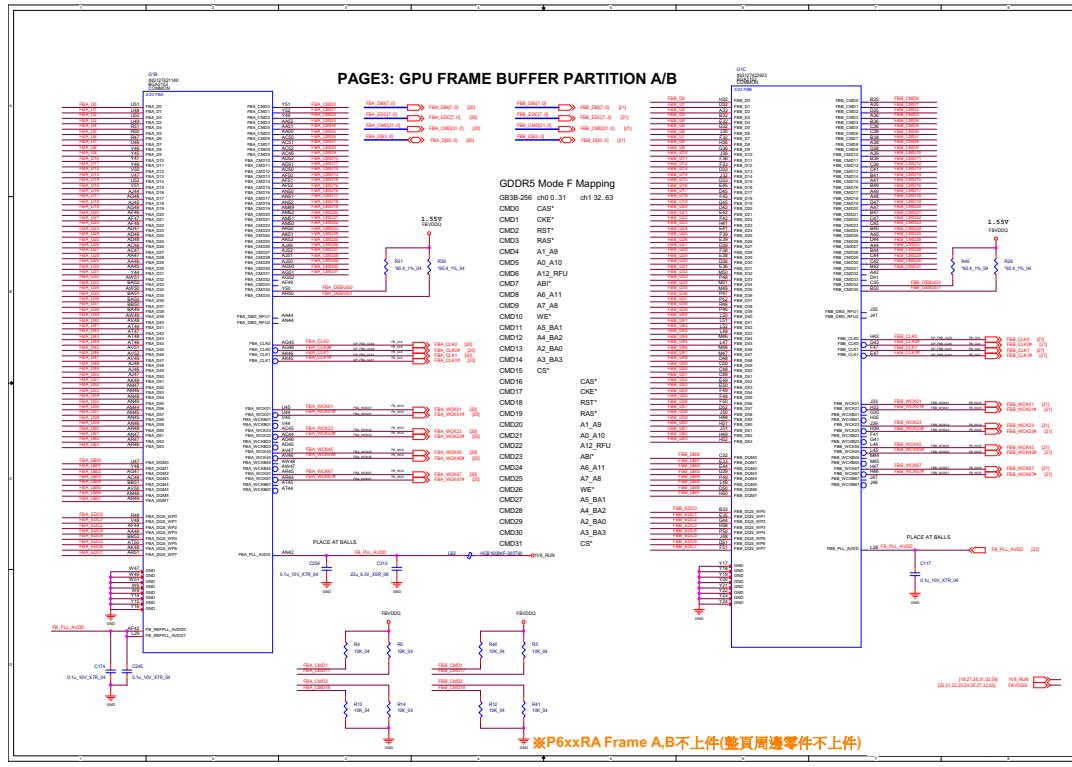


Sheet 18 of 81
VGA PCI Express

VGA PCI Express B - 19

Schematic Diagrams

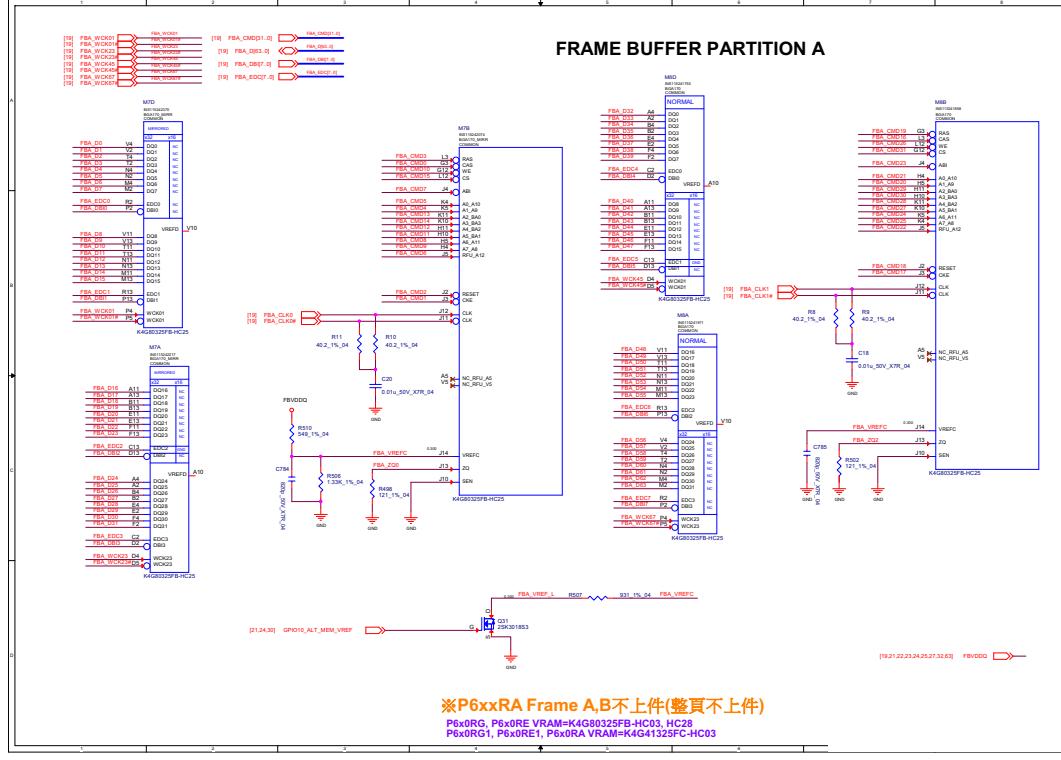
VGA Frame Buffer Partition



B - 20 VGA Frame Buffer Partition

Schematic Diagrams

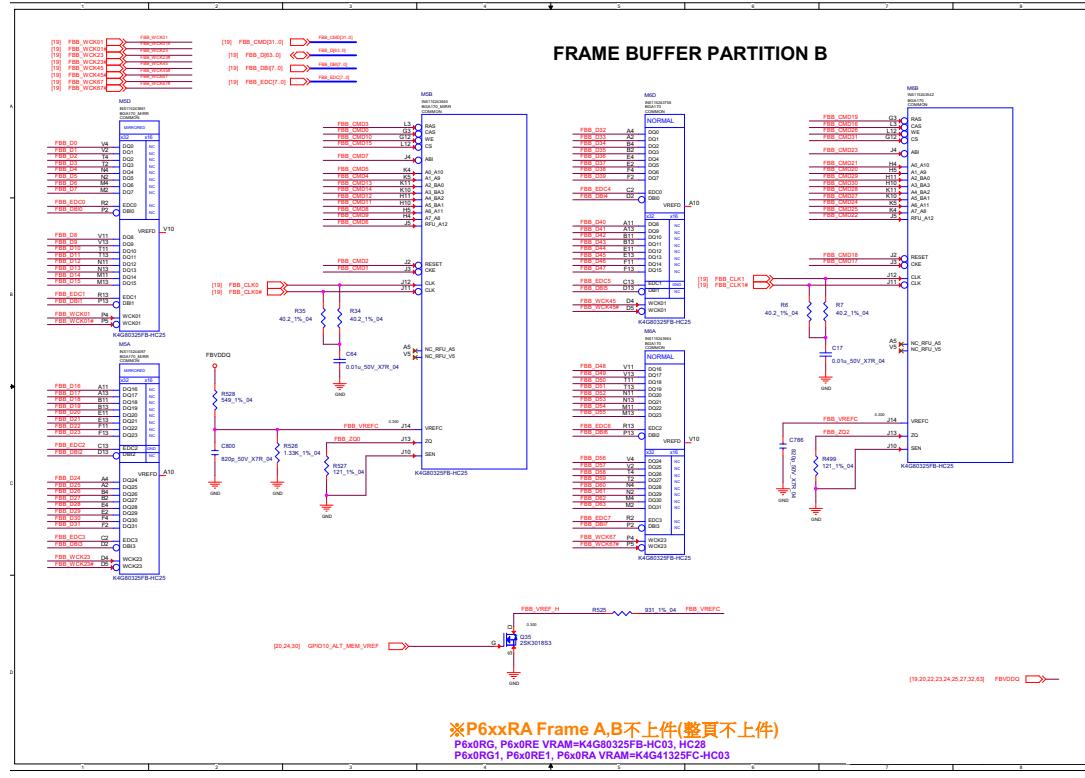
Frame Buffer Partition A



Sheet 20 of 81
Frame Buffer
Partition A

Schematic Diagrams

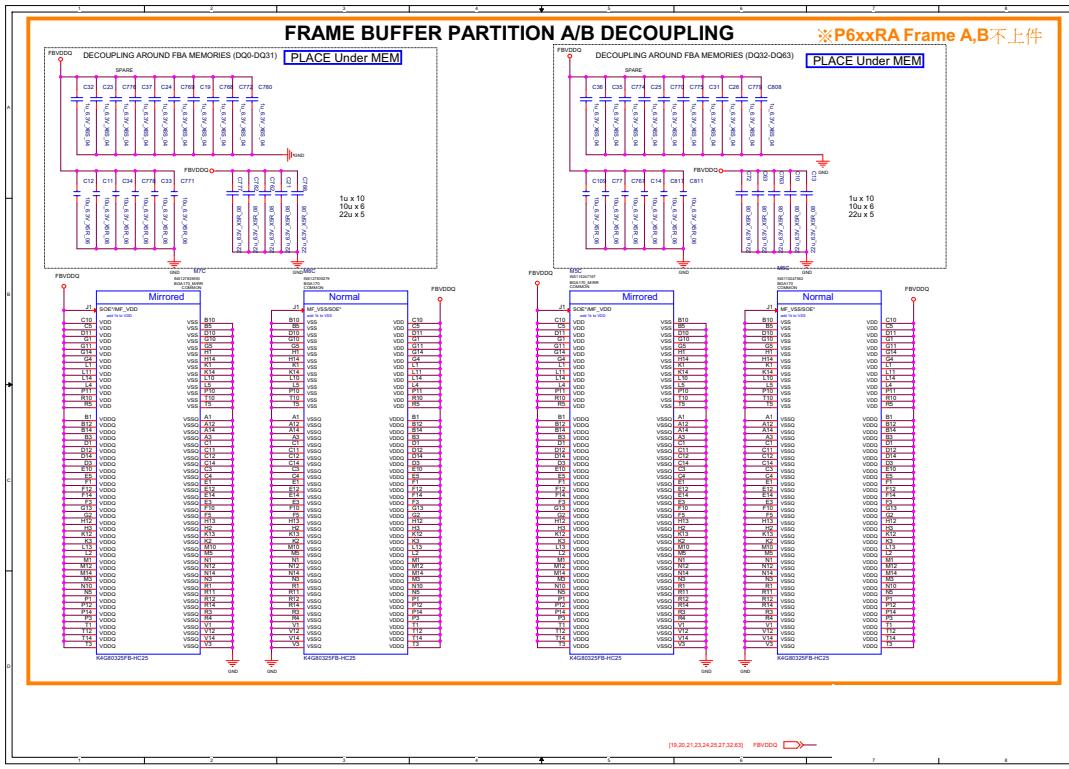
Frame Buffer Partition B



B - 22 Frame Buffer Partition B

Schematic Diagrams

Frame Buffer Partition A_B

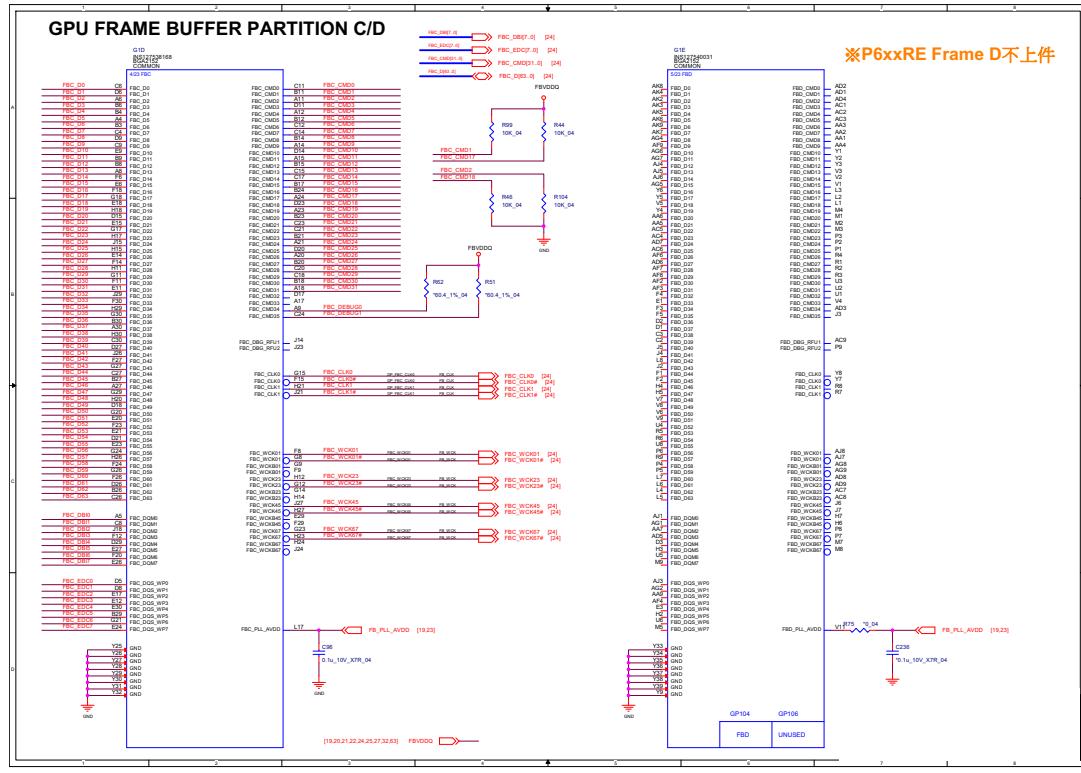


Sheet 22 of 81
Frame Buffer
Partition A_B

Frame Buffer Partition A_B B - 23

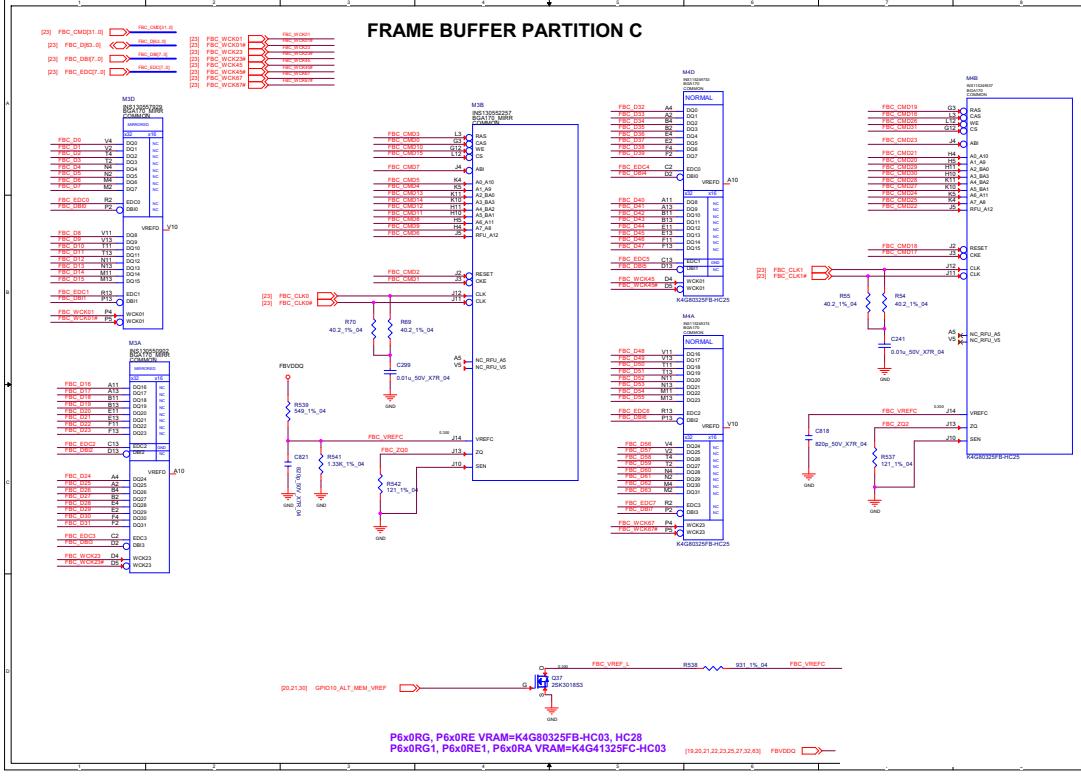
Schematic Diagrams**GPU Frame Buffer Partition**

Sheet 23 of 81
GPU Frame Buffer Partition

**B - 24 GPU Frame Buffer Partition**

Schematic Diagrams

Frame Buffer Partition C



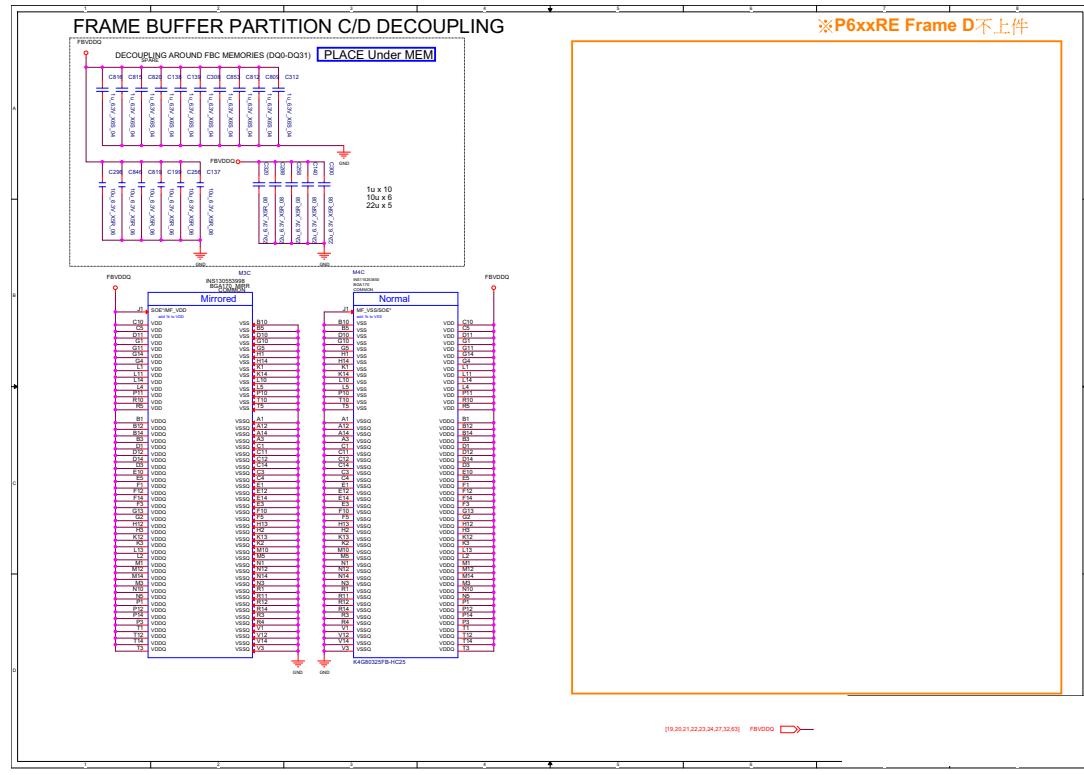
Sheet 24 of 81
Frame Buffer
Partition C

Frame Buffer Partition C B - 25

Schematic Diagrams

Frame Buffer Partition C_D

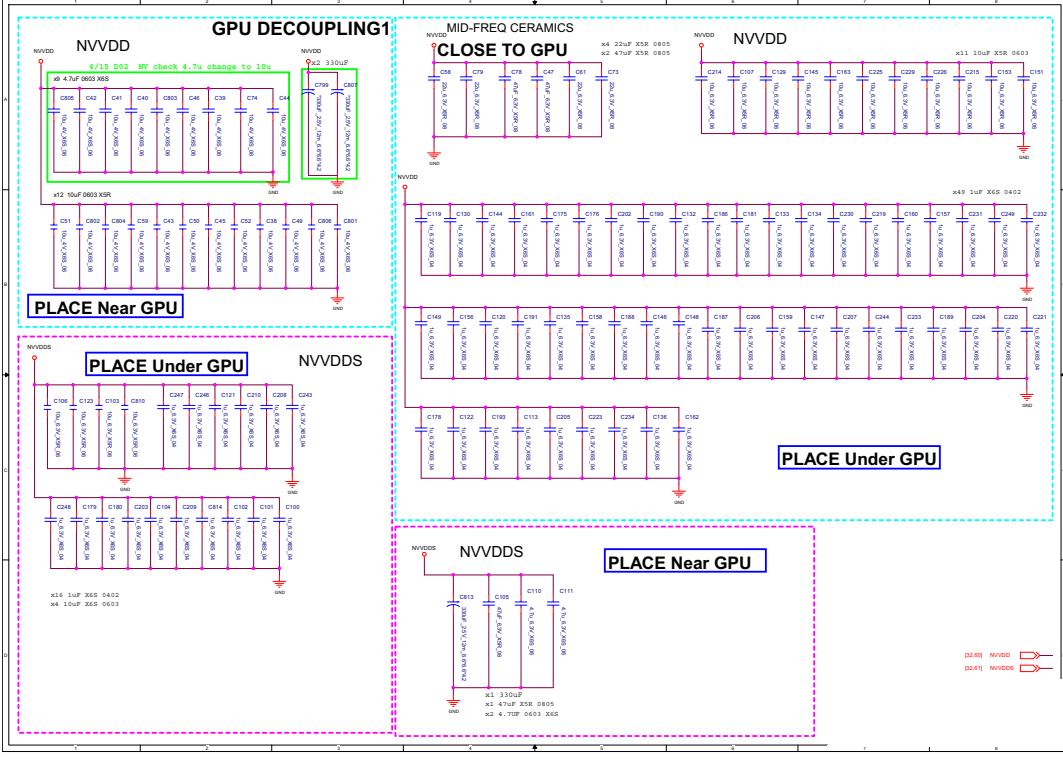
Sheet 25 of 81
Frame Buffer
Partition C_D



B - 26 Frame Buffer Partition C_D

Schematic Diagrams

GPU Decoupling

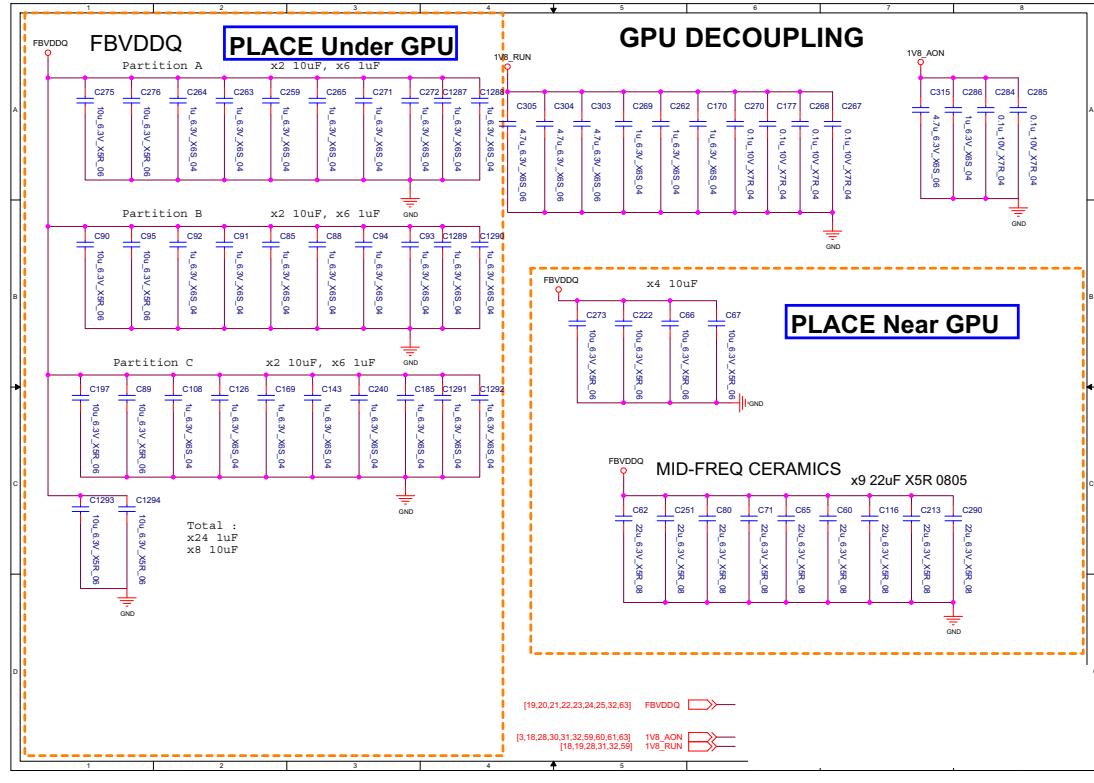


Sheet 26 of 81
GPU Decoupling

GPU Decoupling B - 27

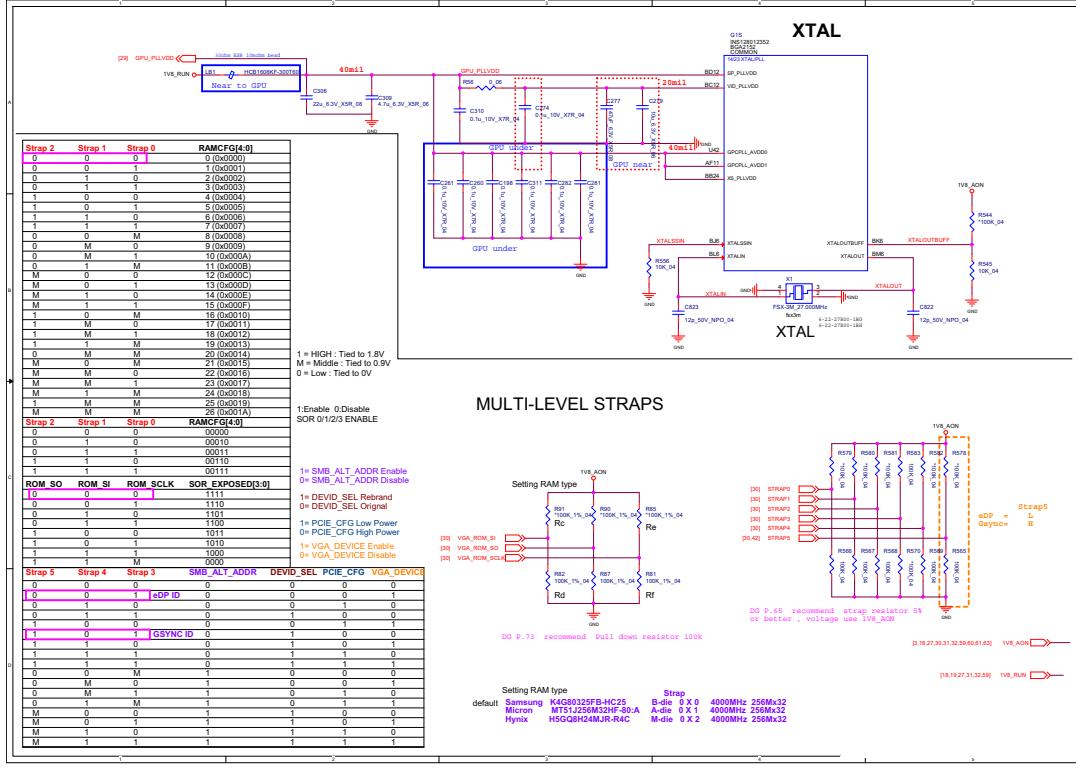
Schematic Diagrams

GPU Decoupling 2



Schematic Diagrams

Straps and XTAL

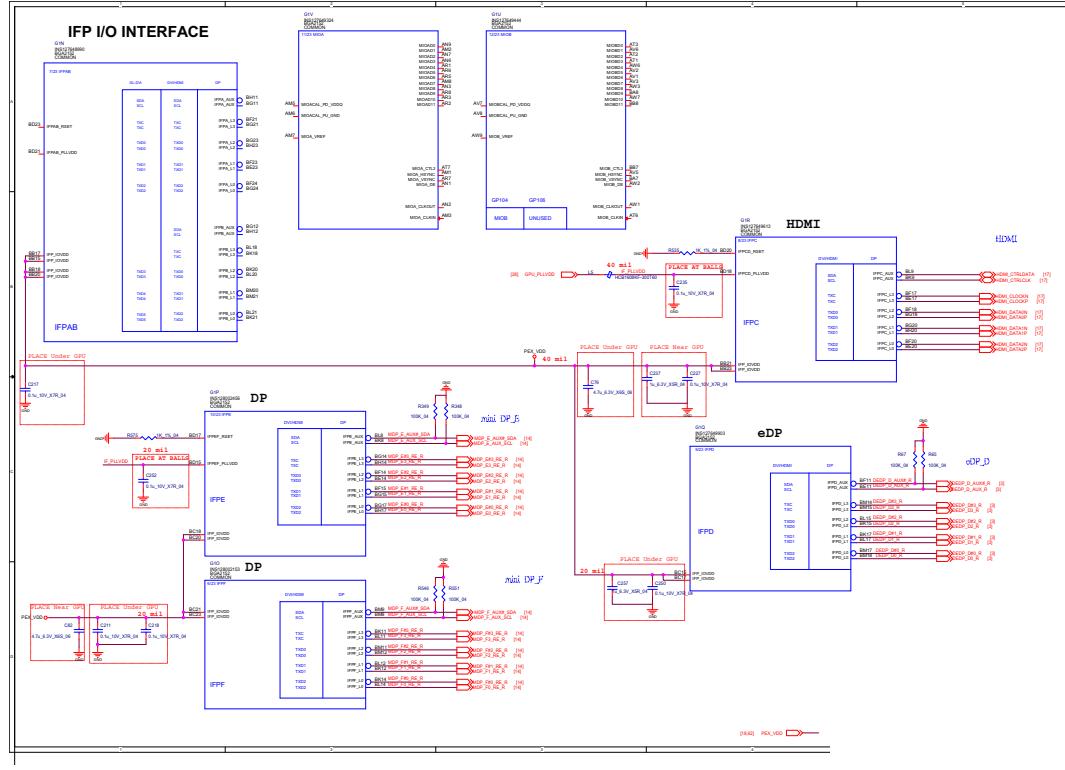


Sheet 28 of 81
Straps and XTAL

Straps and XTAL B - 29

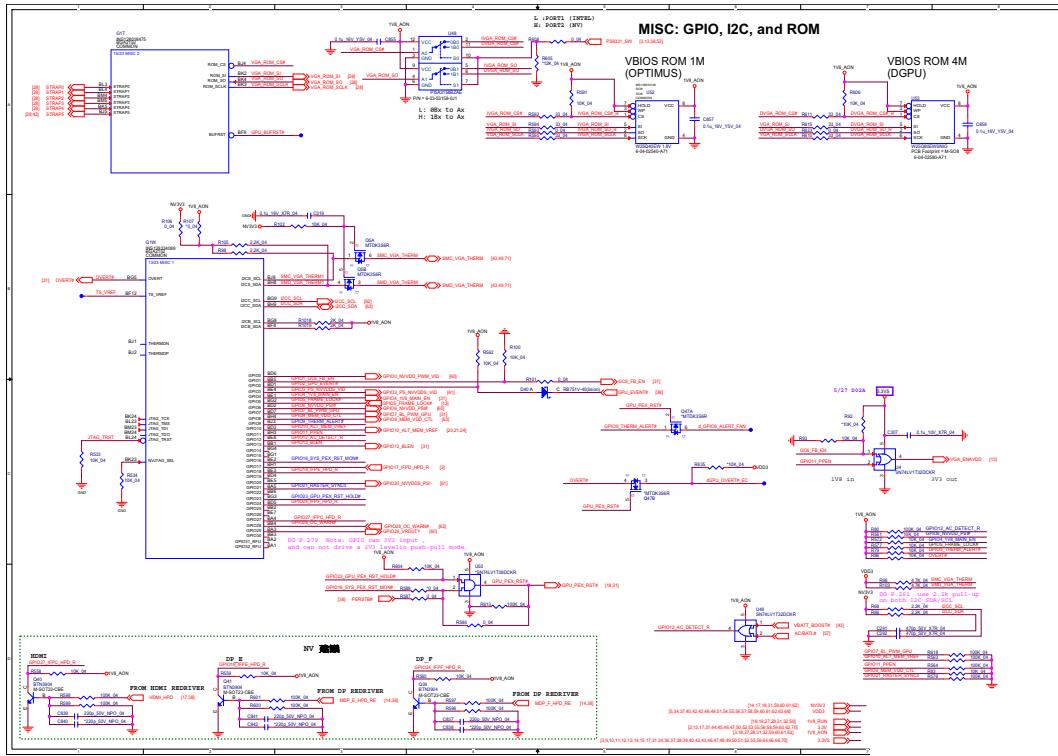
Schematic Diagrams**IFP I/O Interface**

Sheet 29 of 81
IFP I/O Interface

**B - 30 IFP I/O Interface**

Schematic Diagrams

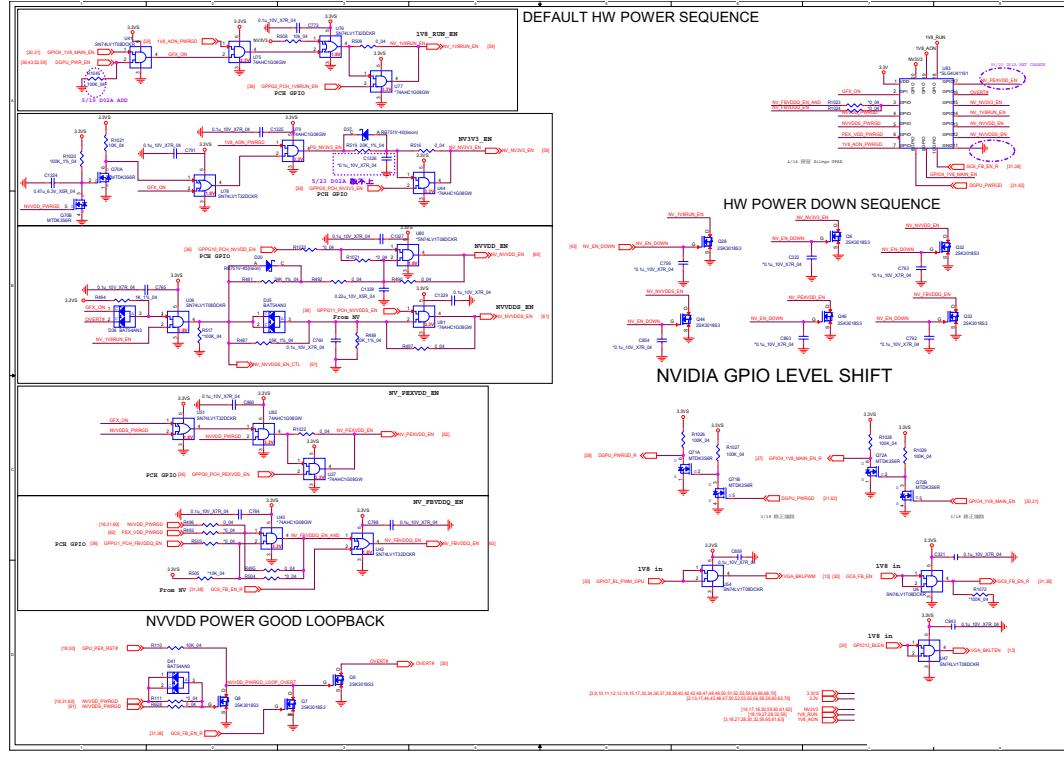
Misc - GPIO, I2C and ROM



Sheet 30 of 81
Misc - GPIO, I2C
and ROM

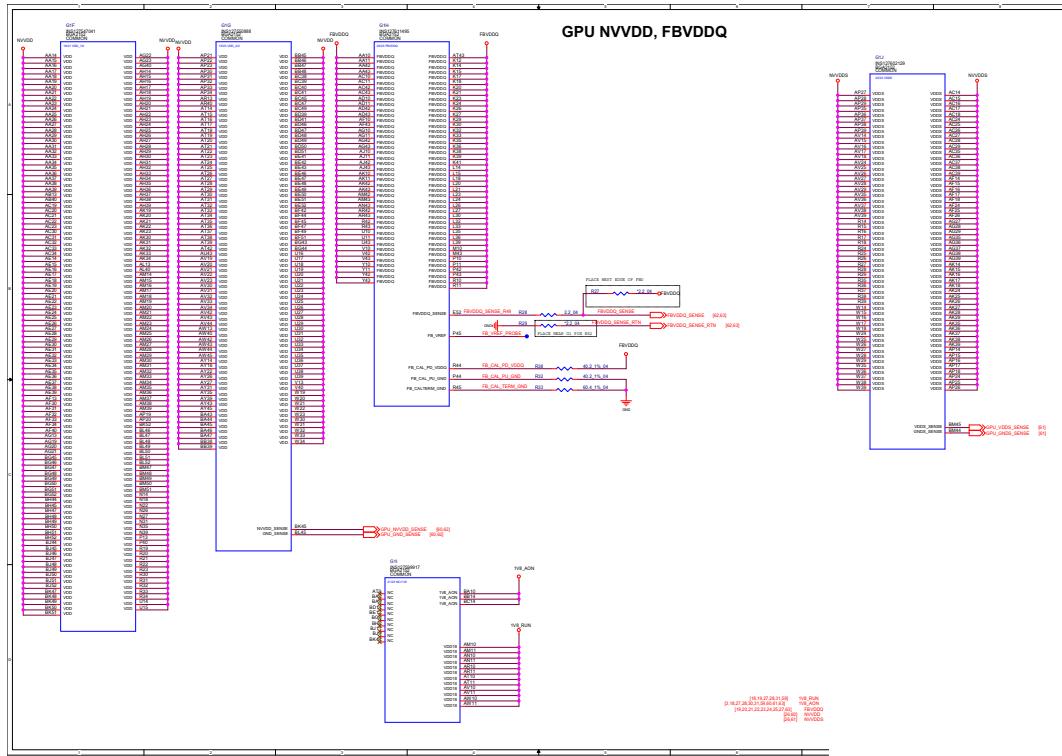
Schematic Diagrams**NVIDIA Power Sequence**

Sheet 31 of 81
NVIDIA Power Sequence

**B - 32 NVIDIA Power Sequence**

Schematic Diagrams

GPU NNVDD, FBVDDQ

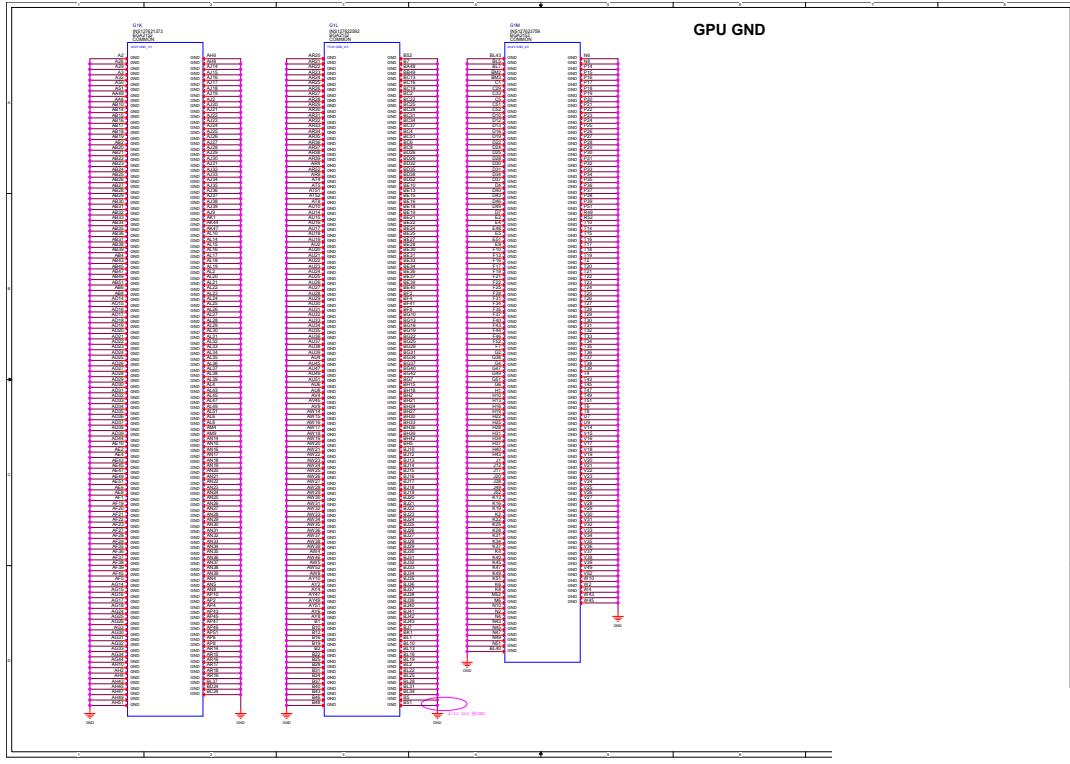


Sheet 32 of 81
GPU NVVDD,
FBVDDQ

Schematic Diagrams

GPU GND

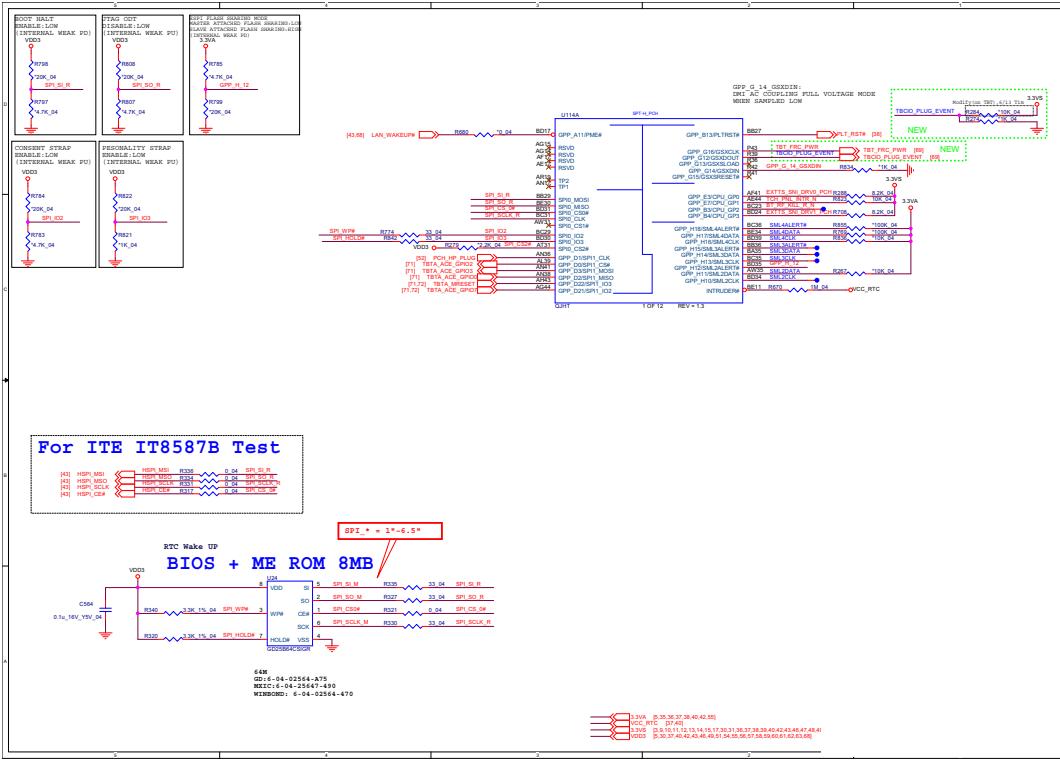
Sheet 33 of 81
GPU GND



B - 34 GPU GND

Schematic Diagrams

PCH 1/9

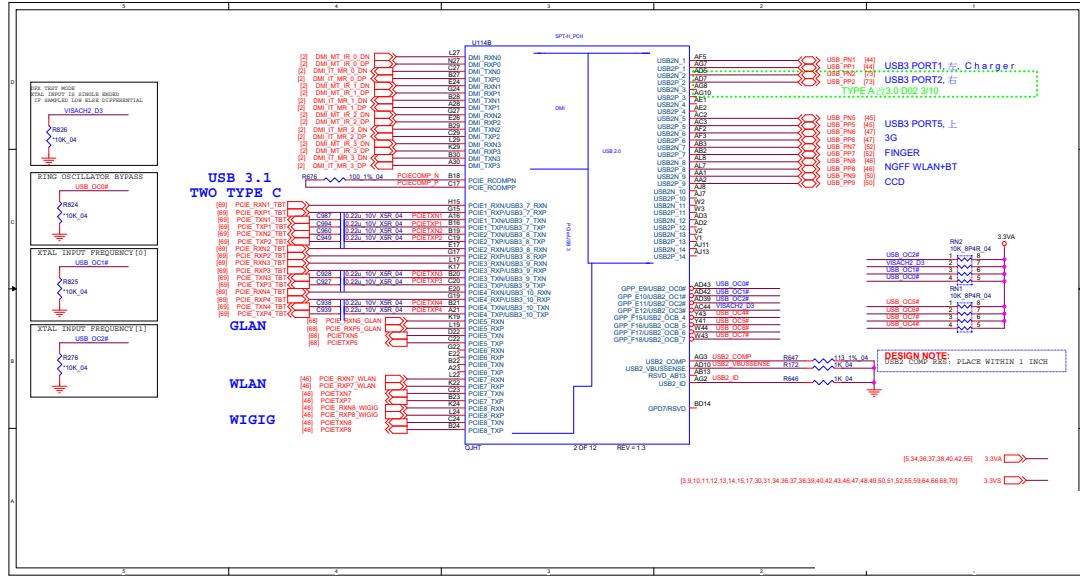


Sheet 34 of 81
PCH 1/9

PCH 1/9 B - 35

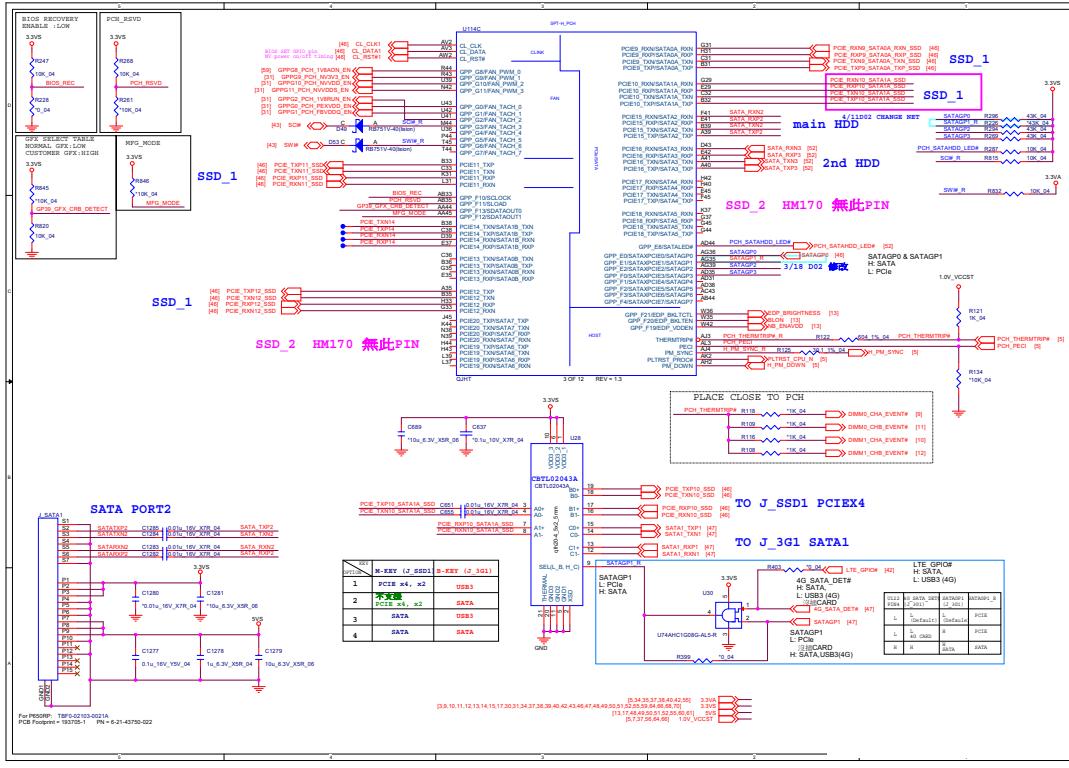
Schematic Diagrams**PCH 2/9**

Sheet 35 of 81
PCH 2/9



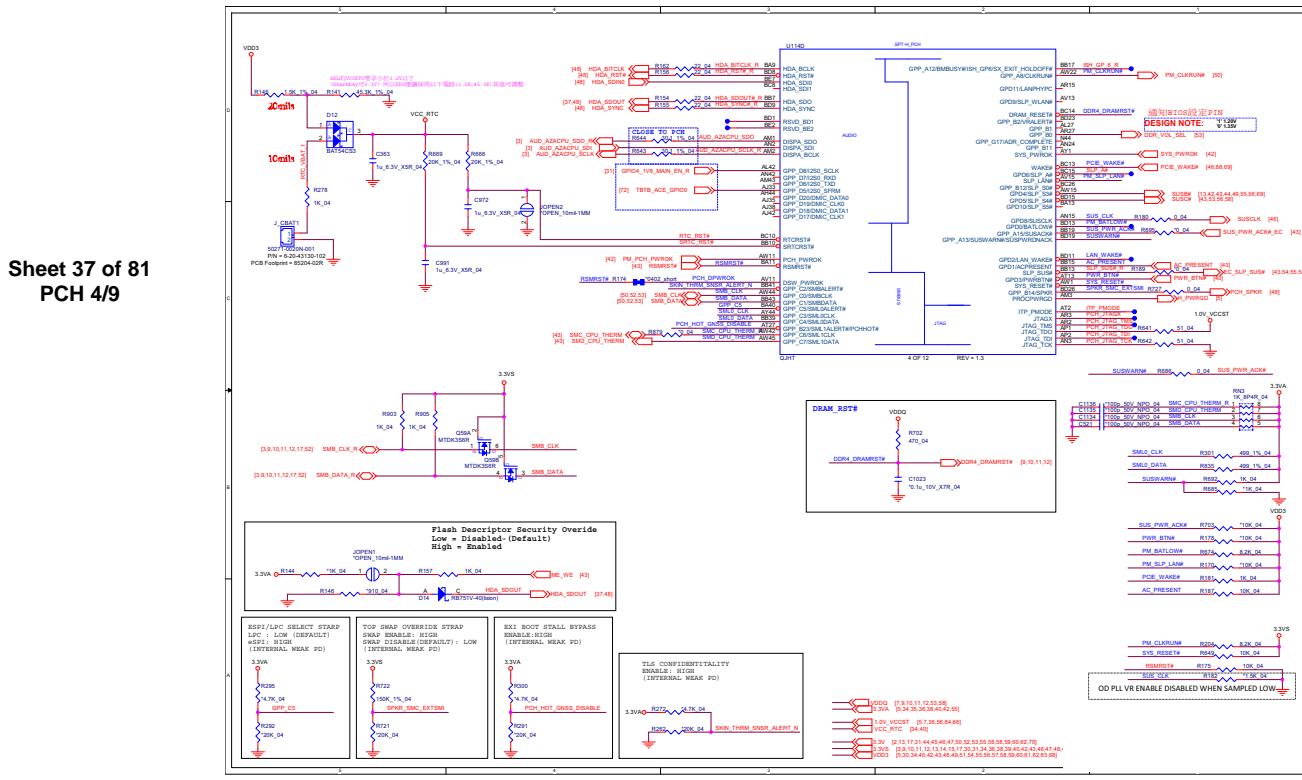
Schematic Diagrams

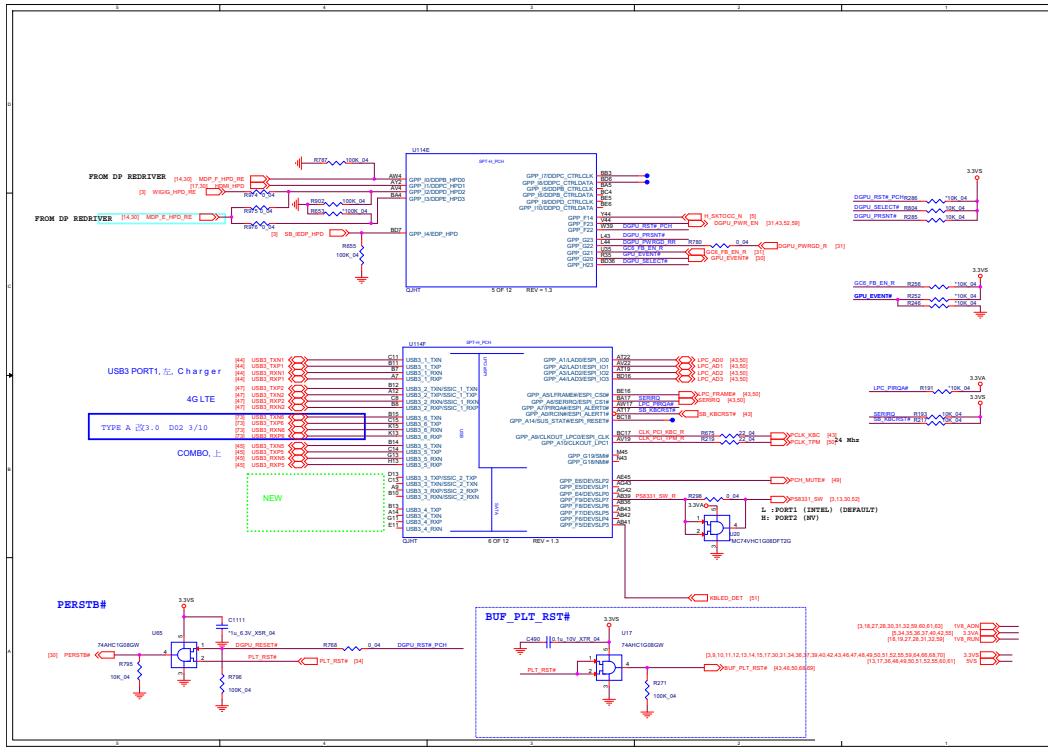
PCH 3/9



Schematic Diagrams

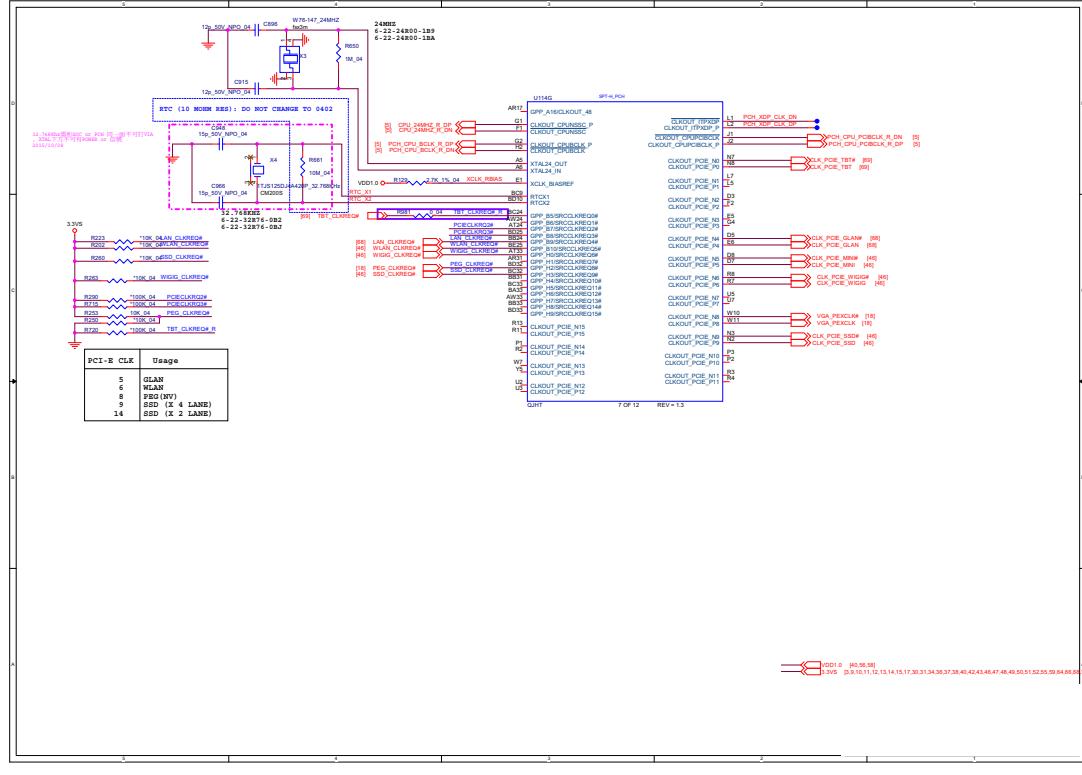
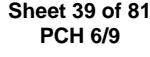
PCH 4/9



Schematic Diagrams**PCH 5/9****PCH 5/9 B - 39**

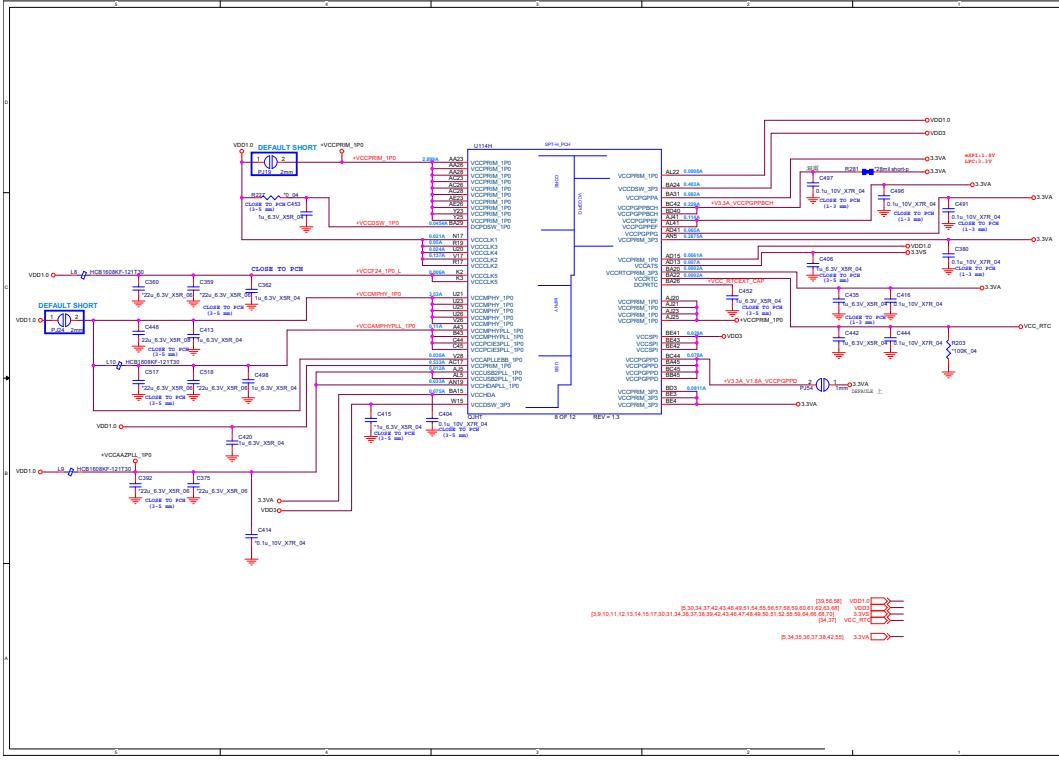
Schematic Diagrams

PCH 6/9



Schematic Diagrams

PCH 7/9



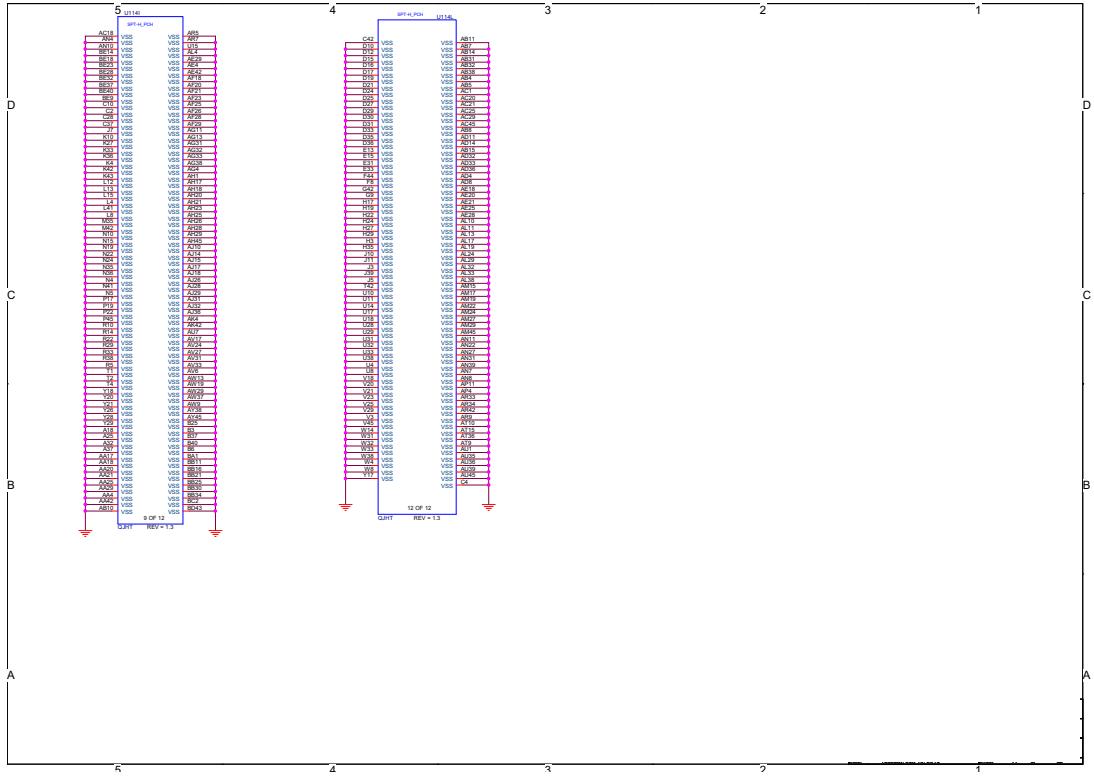
Sheet 40 of 81
PCH 7/9

PCH 7/9 B - 41

Schematic Diagrams

PCH 8/9

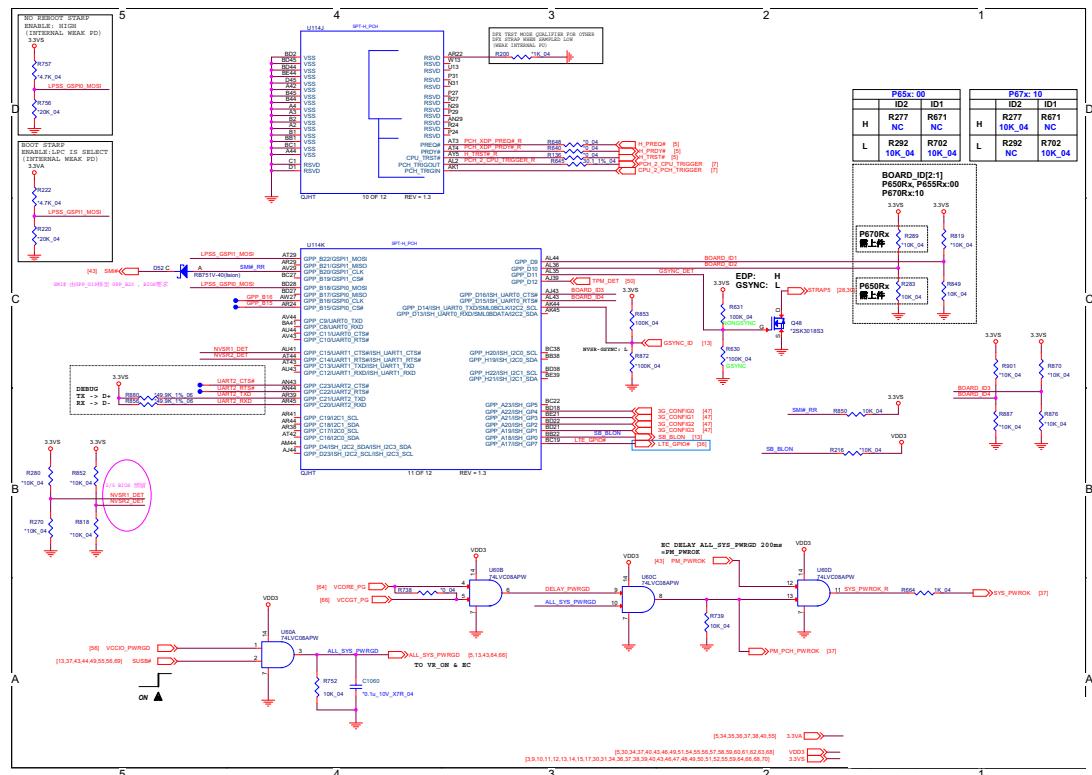
Sheet 41 of 81
PCH 8/9



B - 42 PCH 8/9

Schematic Diagrams

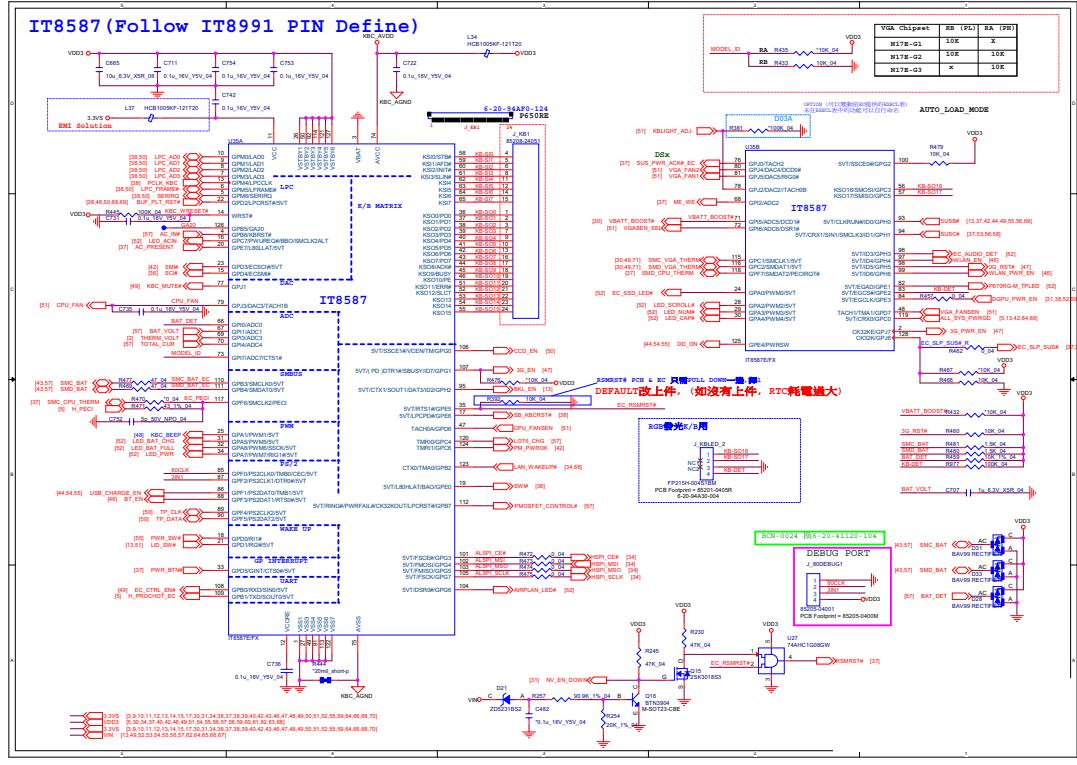
PCH 9/9



Sheet 42 of 81
PCH 9/9

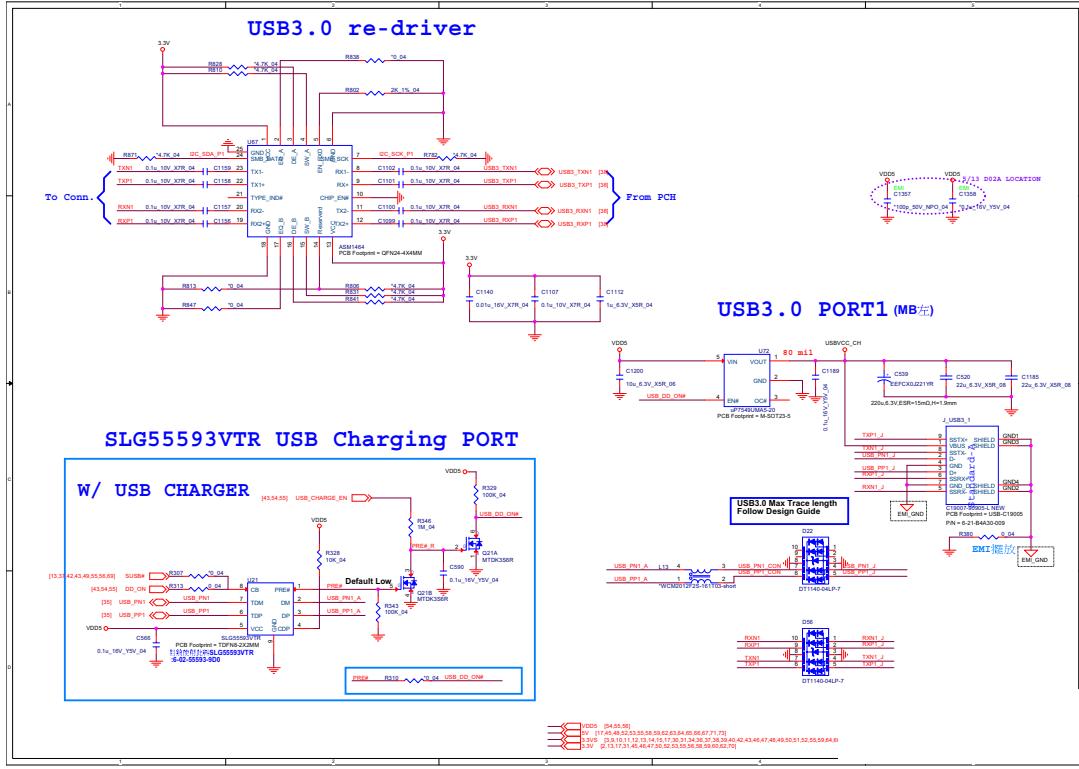
Schematic Diagrams**KBC IT8587**

Sheet 43 of 81
KBC IT8587



Schematic Diagrams

USB Charger



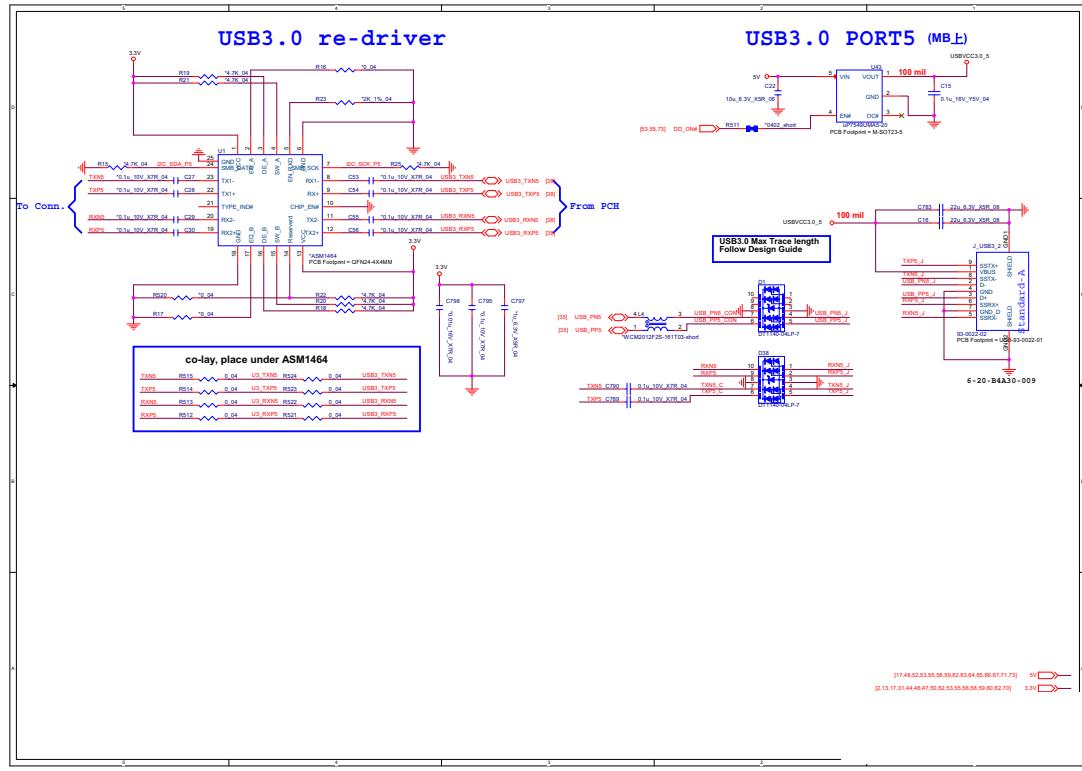
Sheet 44 of 81
USB Charger

USB Charger B - 45

Schematic Diagrams

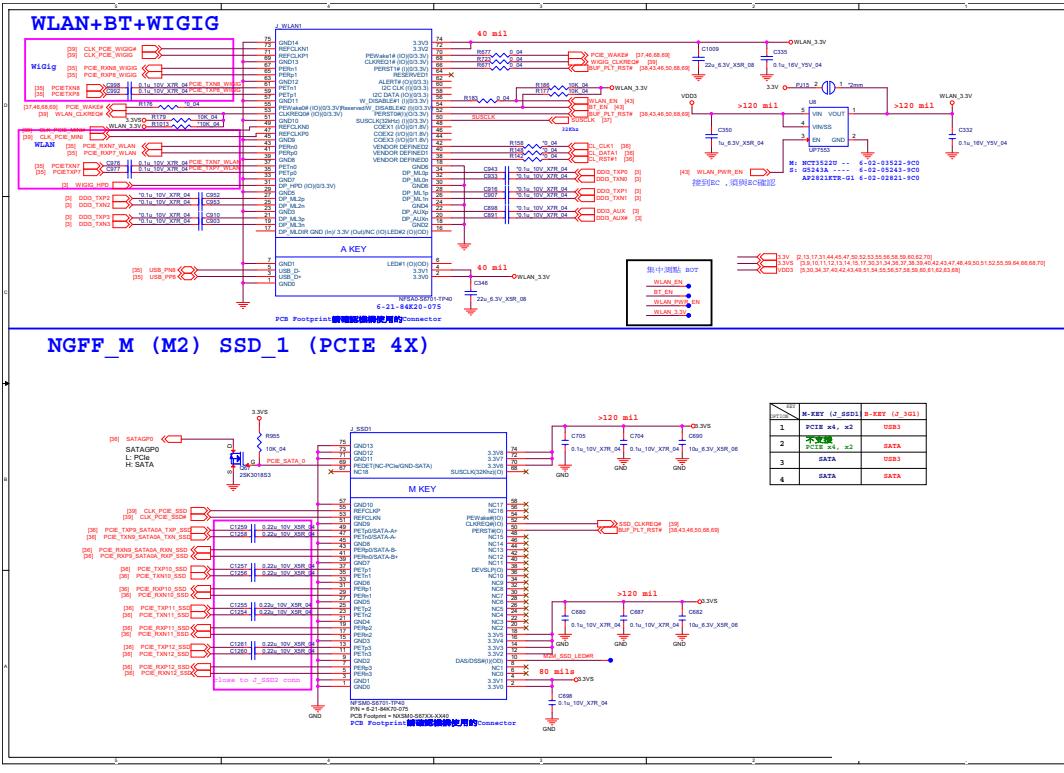
USB

Sheet 45 of 81
USB



Schematic Diagrams

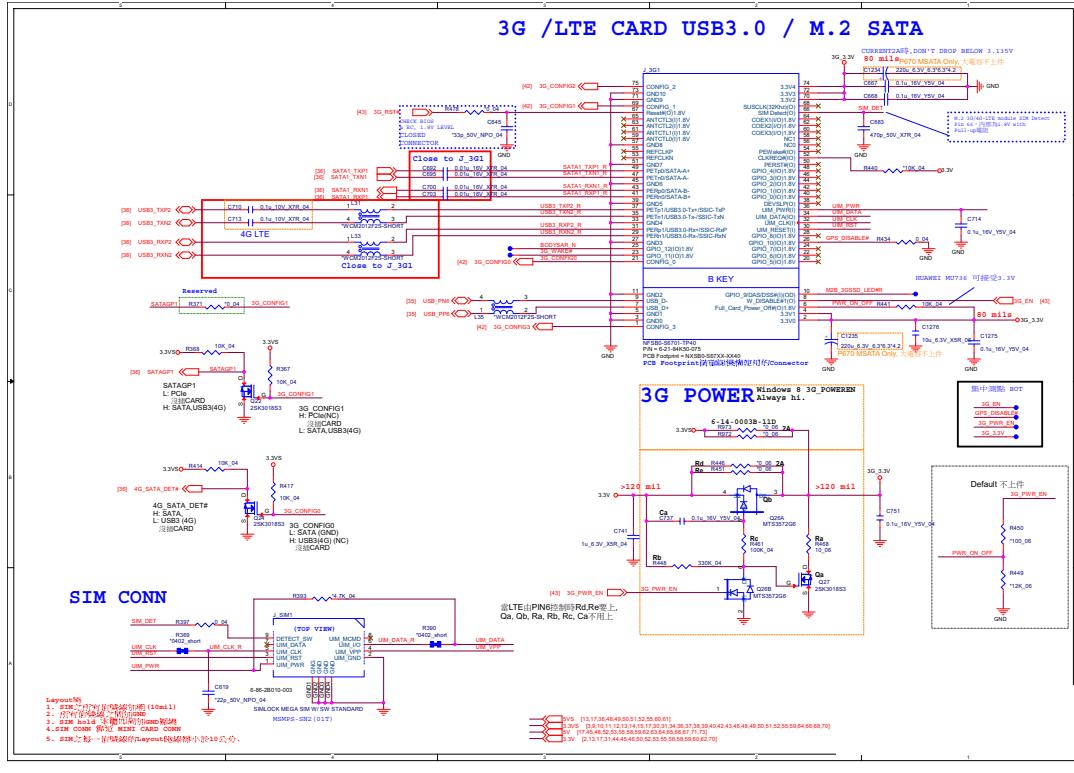
M.2 WLAN+BT, PCIE4X SSD



M.2 WLAN+BT, PCIE4X SSD B - 47

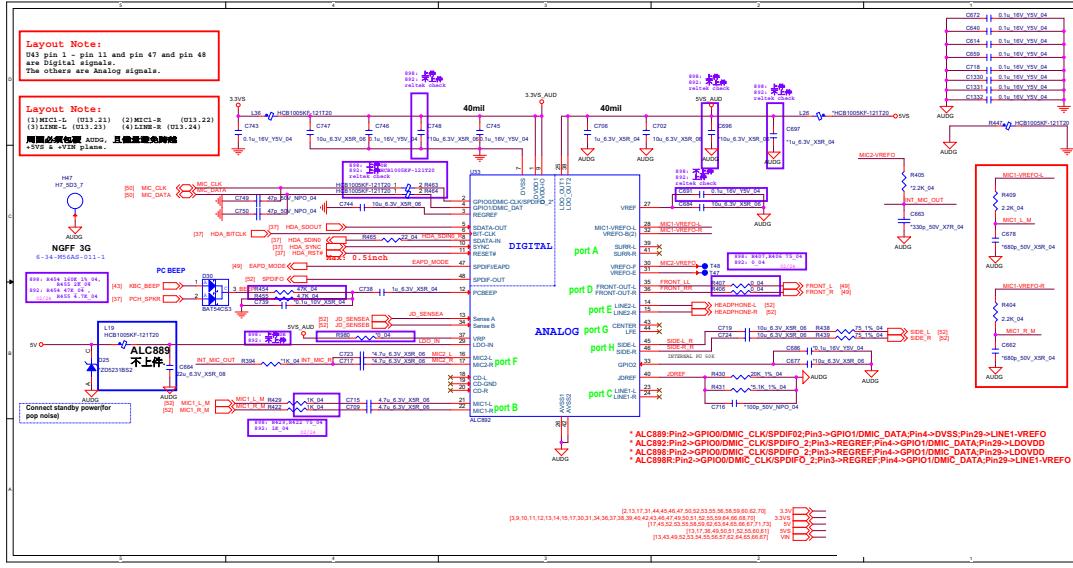
Schematic Diagrams**M.2 3G/LTE**

Sheet 47 of 81
M.2 3G/LTE



Schematic Diagrams

Realtek ALC892

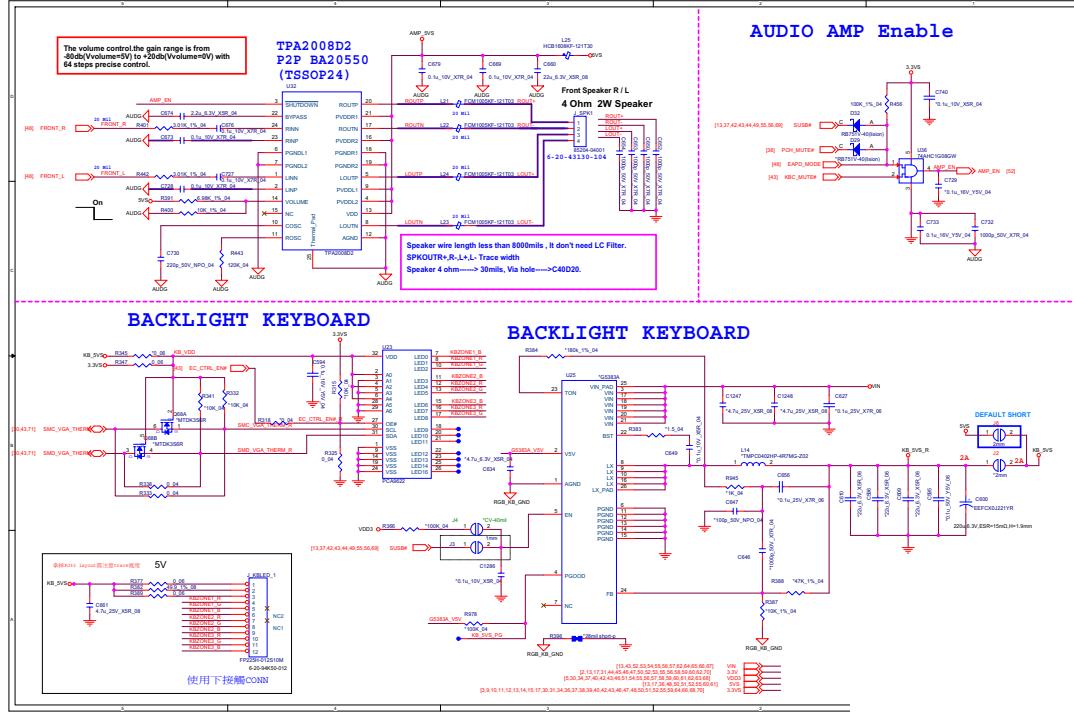


Sheet 48 of 81
Realtek ALC892

Realtek ALC892 B - 49

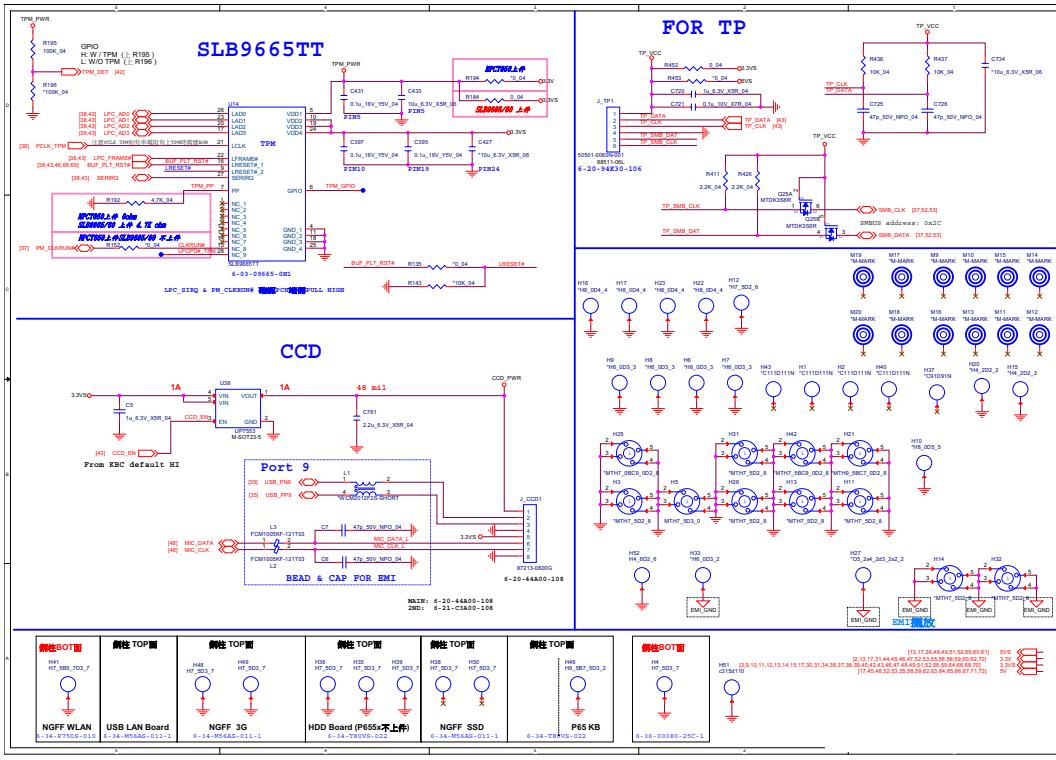
Schematic Diagrams**TPA2008D2**

Sheet 49 of 81
TPA2008D2



Schematic Diagrams

TPM, CCD, TP



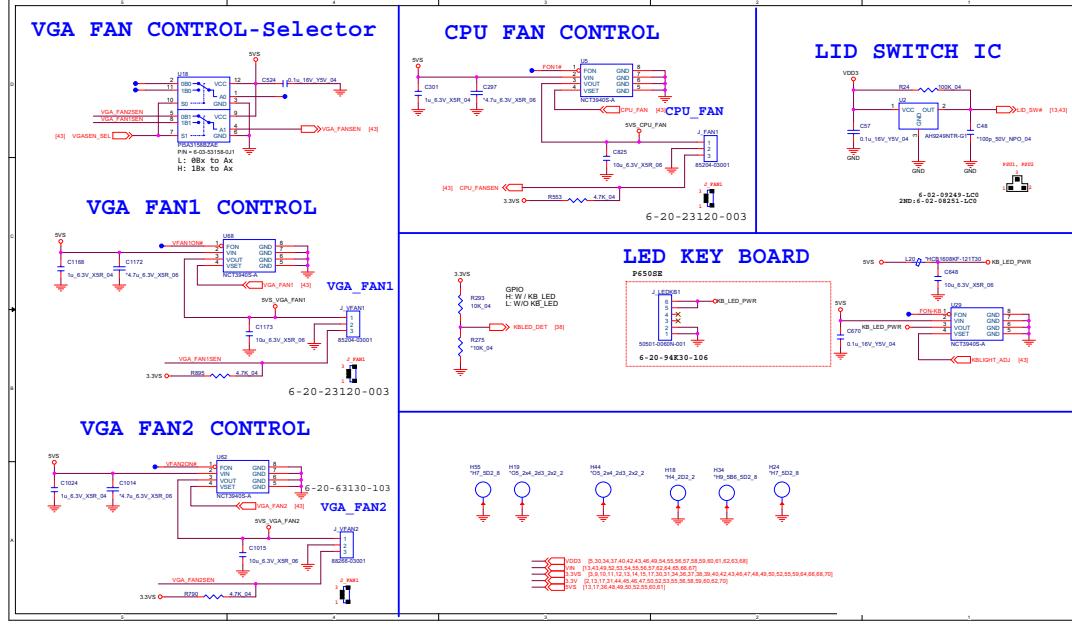
Sheet 50 of 81
TPM, CCD, TP

TPM, CCD, TP B - 51

Schematic Diagrams

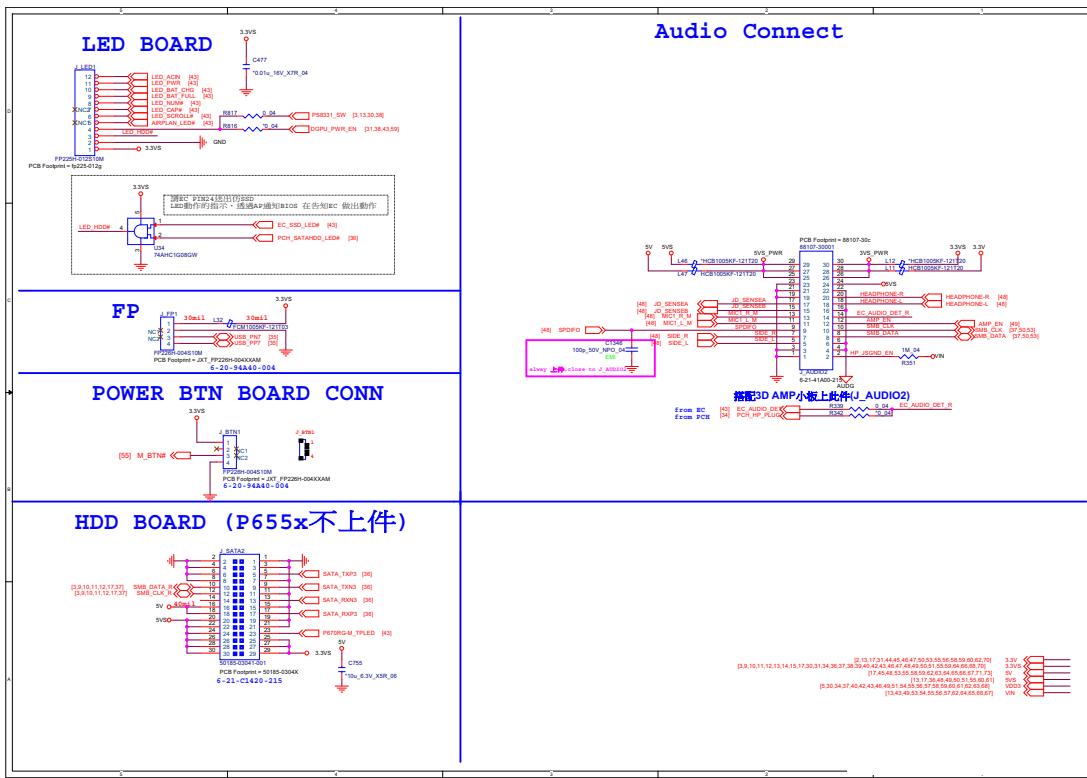
Fan, LID, KB LED

Sheet 51 of 81
Fan, LID, KB LED



Schematic Diagrams

Connector



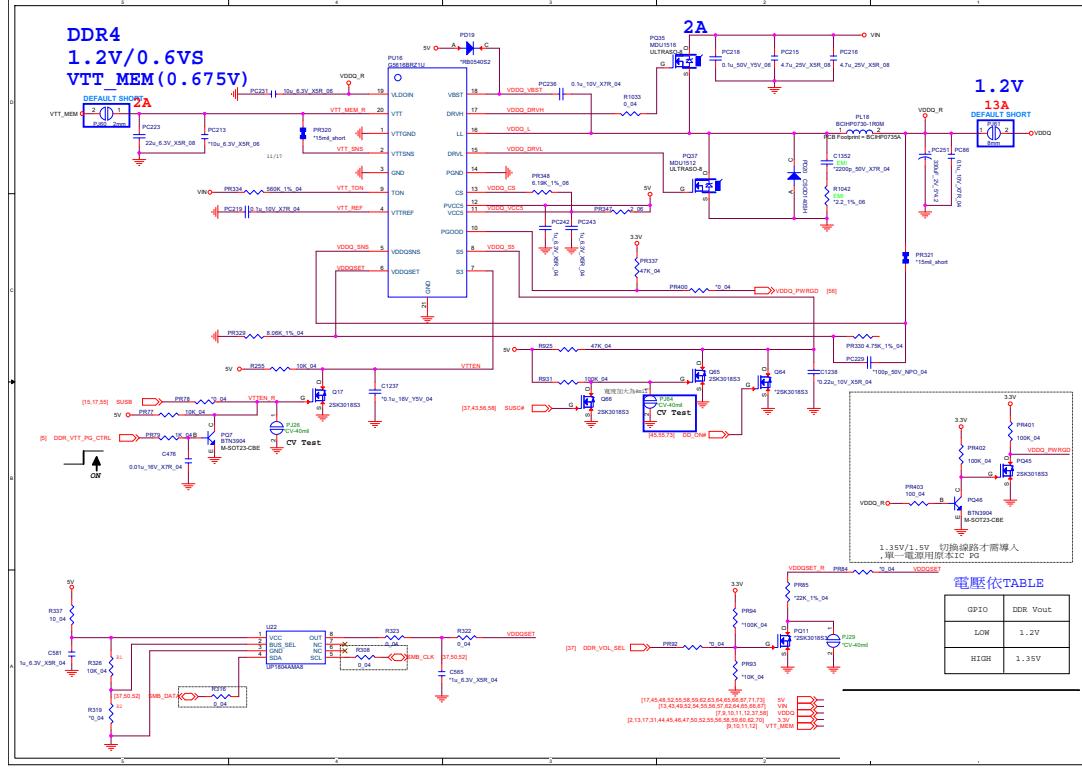
Sheet 52 of 81
Connector

Connector B - 53

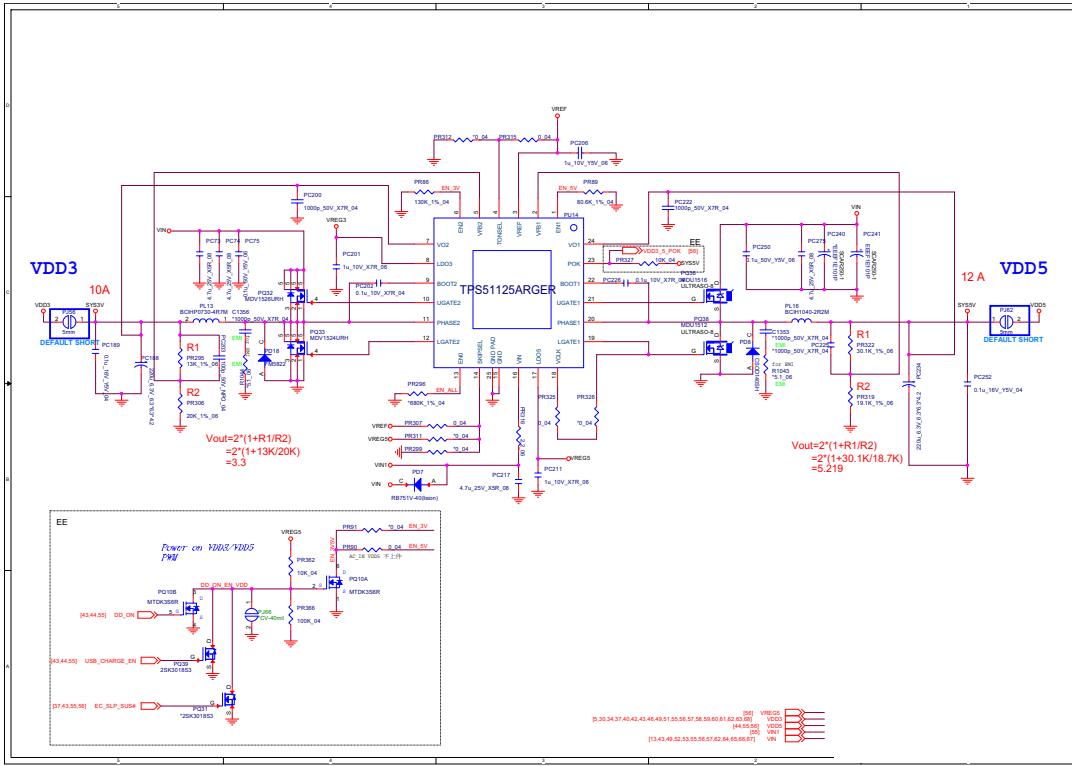
Schematic Diagrams

DDR 1.2V / 0.6VS

Sheet 53 of 81
DDR 1.2V / 0.6VS

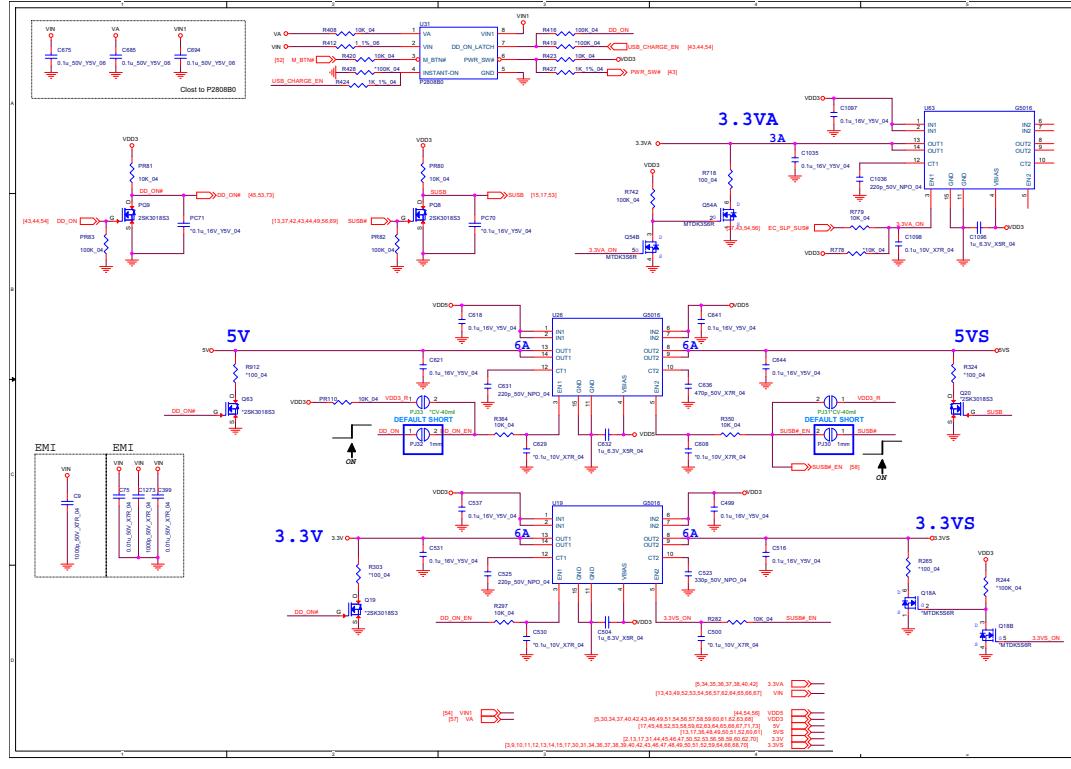


B - 54 DDR 1.2V / 0.6VS

Schematic Diagrams**VDD3, VDD5****VDD3, VDD5 B - 55**

Schematic Diagrams

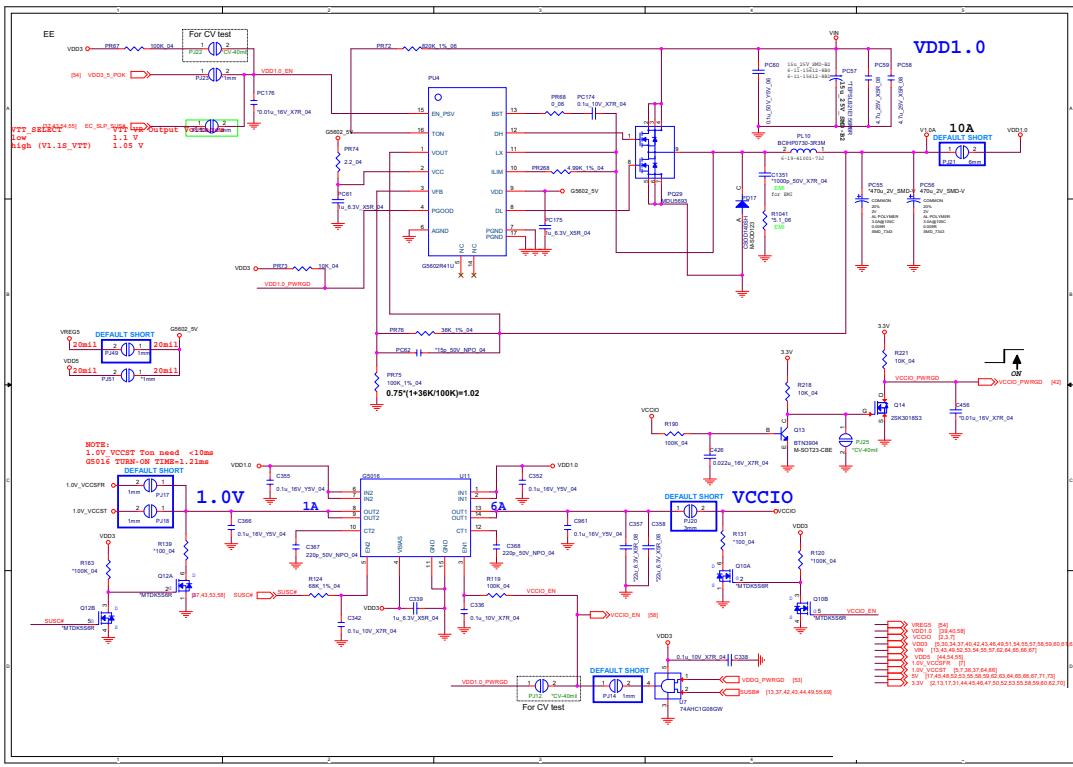
5V, 5VS, 3.3V, 3.3VS, 3.3VA



B - 56 5V, 5VS, 3.3V, 3.3VS, 3.3VA

Schematic Diagrams

Power 1.0V, VCCIO



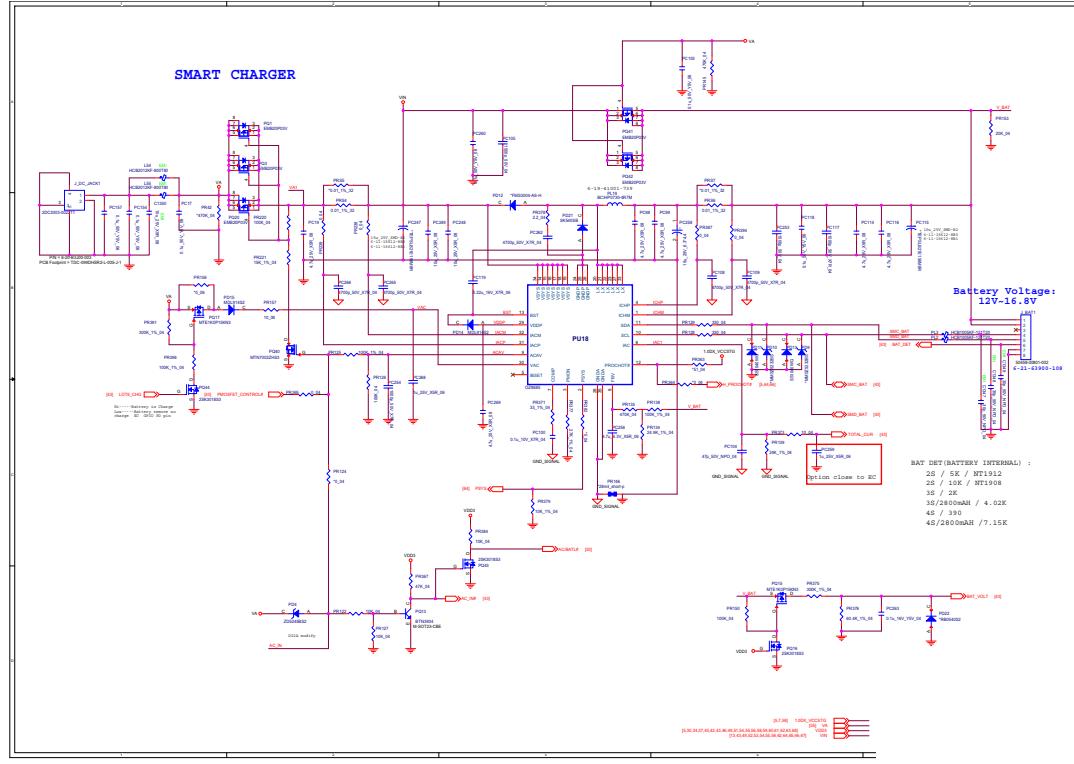
Sheet 56 of 81
Power 1.0V, VCCIO

Power 1.0V, VCCIO B - 57

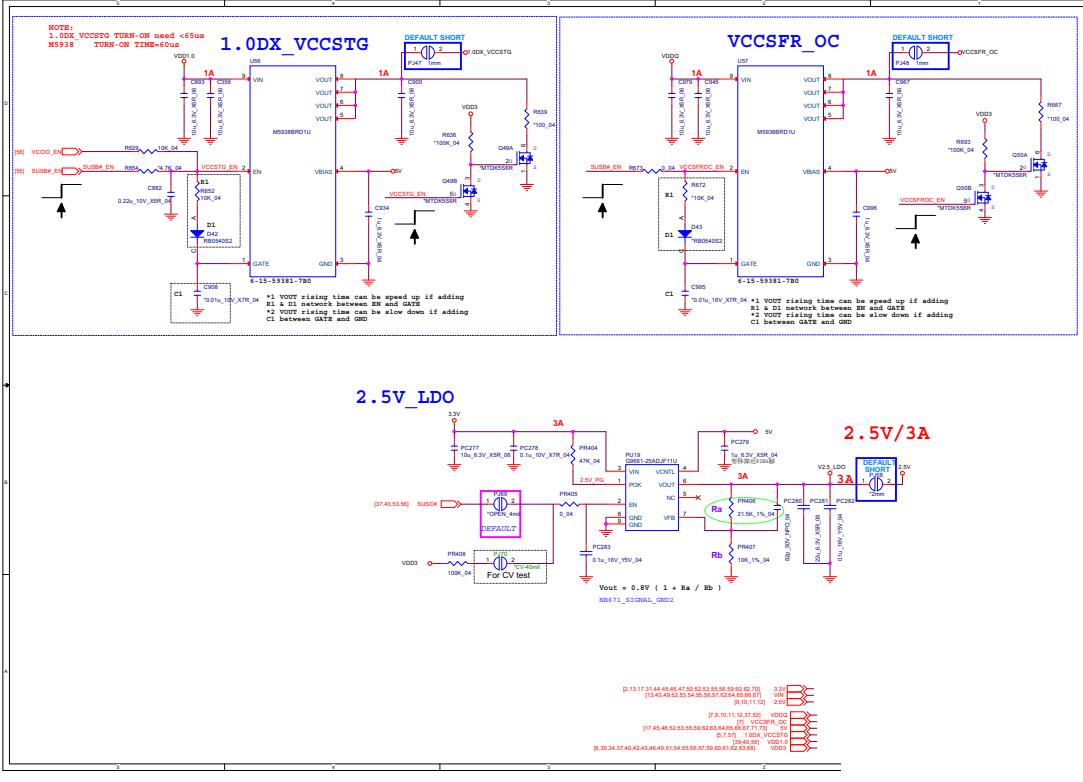
Schematic Diagrams

AC_In, Charger

Sheet 57 of 81
AC_In, Charger

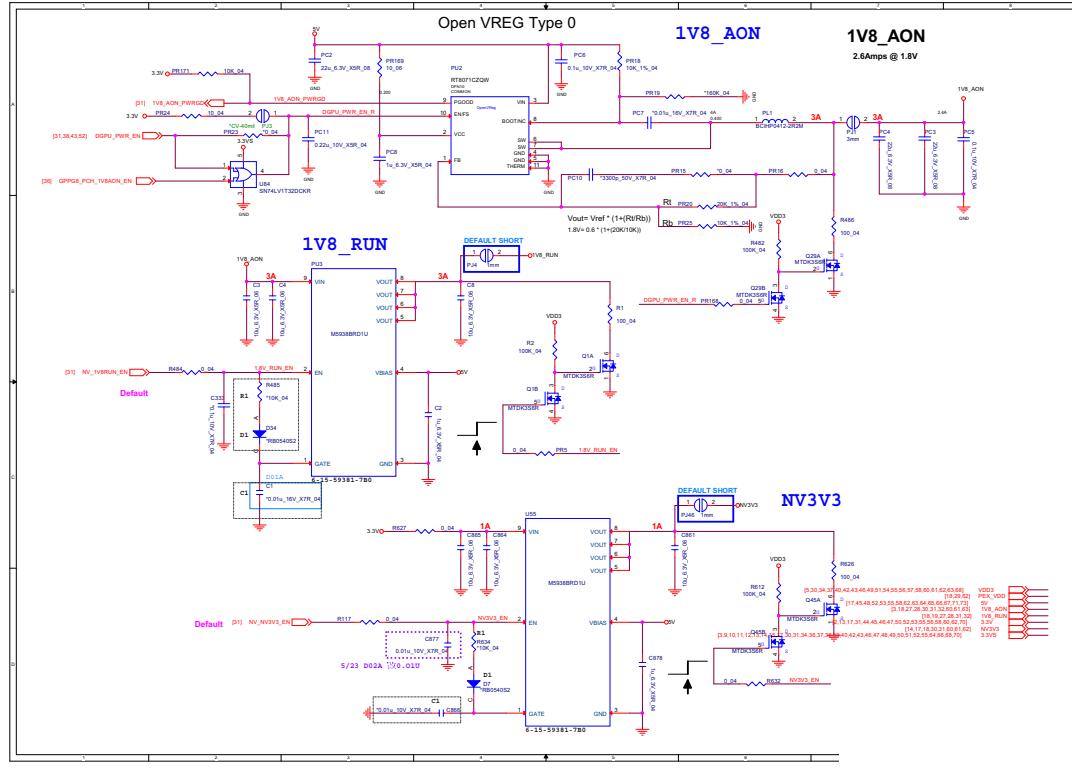


B - 58 AC_In, Charger

Schematic Diagrams**1.0DX_VCCSTG/VCCSFR_OC/2.5V**

Schematic Diagrams

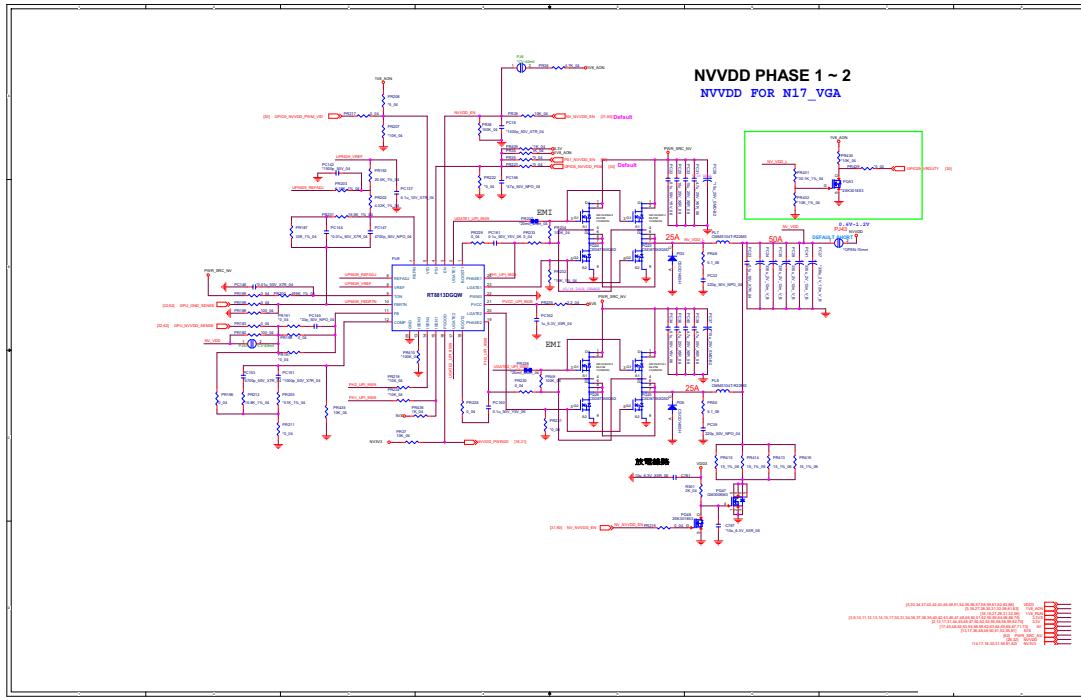
1V8_RUN/AON, NV3V3



B - 60 1V8_RUN/AON, NV3V3

Schematic Diagrams

NVVDD Phase 1 & 2

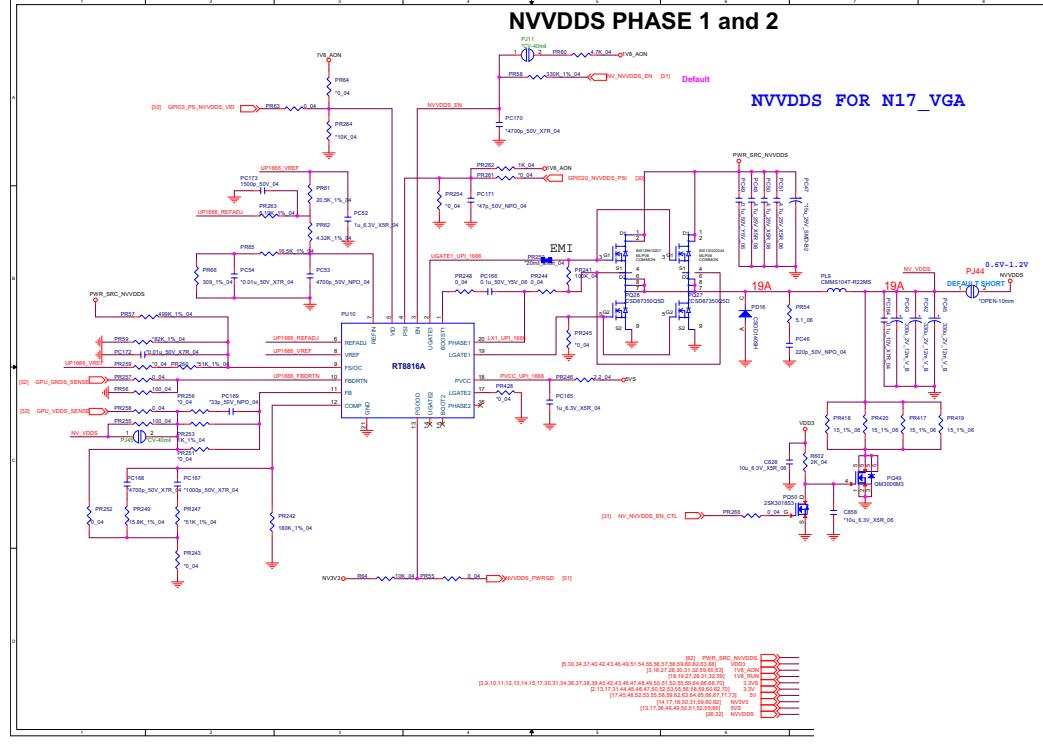


Sheet 60 of 81
NVVDD Phase 1 & 2

NVVDD Phase 1 & 2 B - 61

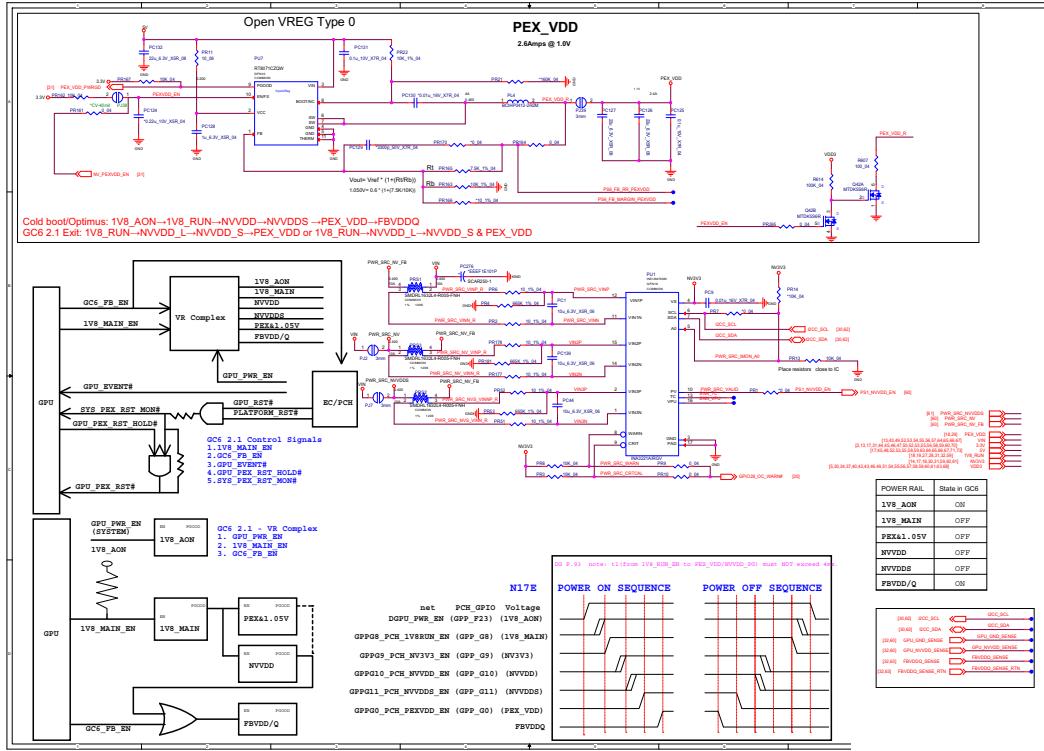
Schematic Diagrams

NVVDDS



Schematic Diagrams

PEX_VDD

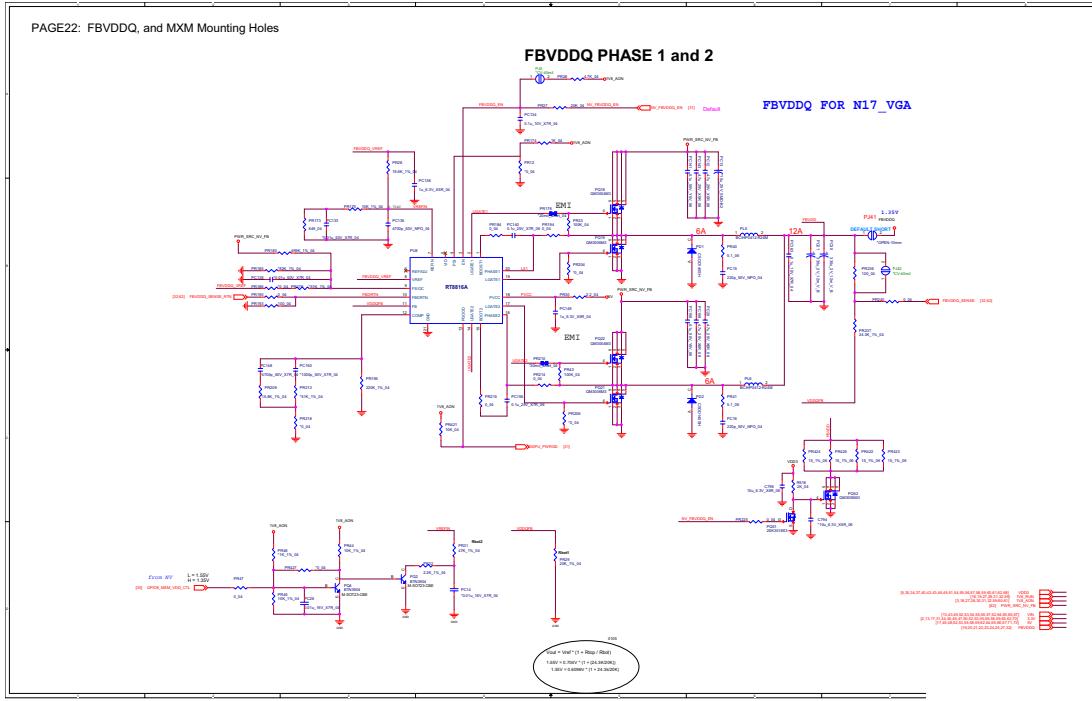


Sheet 62 of 81
PEX_VDD

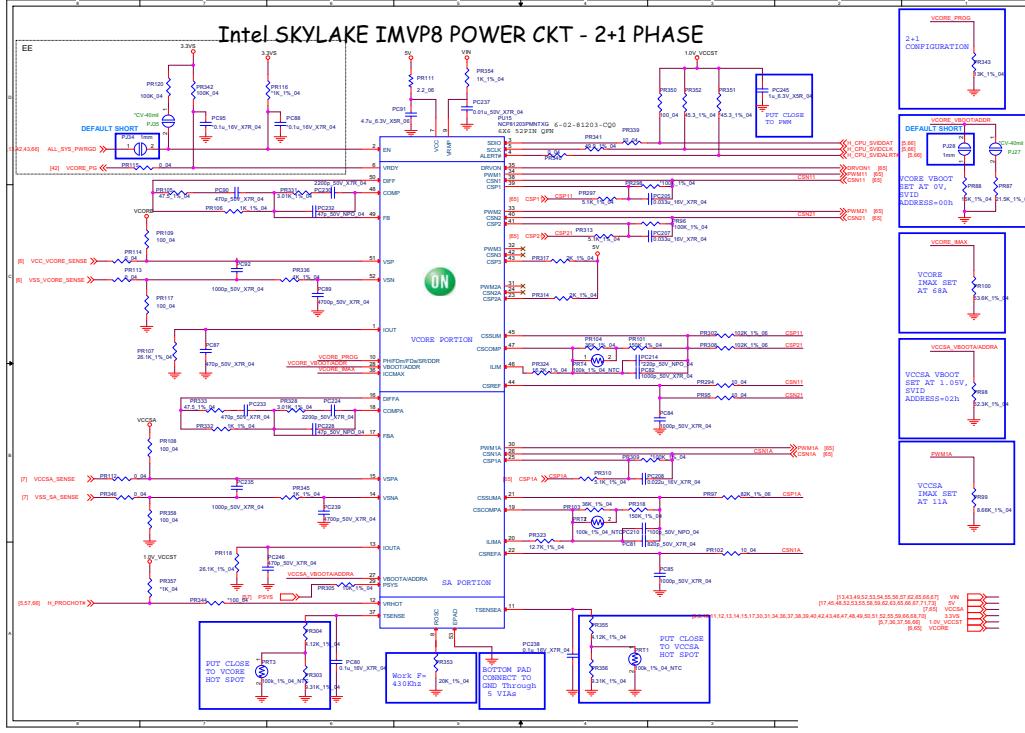
Schematic Diagrams

FBVDDQ

Sheet 63 of 81
FBVDDQ



B - 64 FBVDDQ

Schematic Diagrams**VCC_Core & VCCSA**

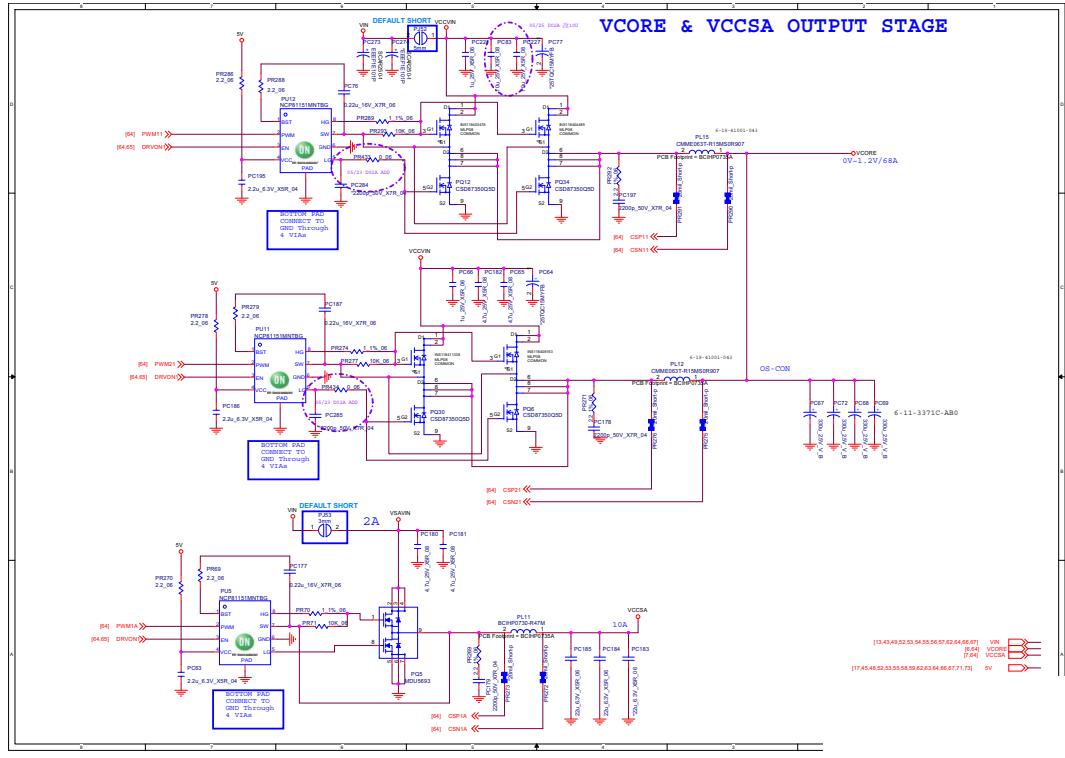
Sheet 64 of 81
VCC_Core & VCCSA

VCC_Core & VCCSA B - 65

Schematic Diagrams

VCore Output Stage

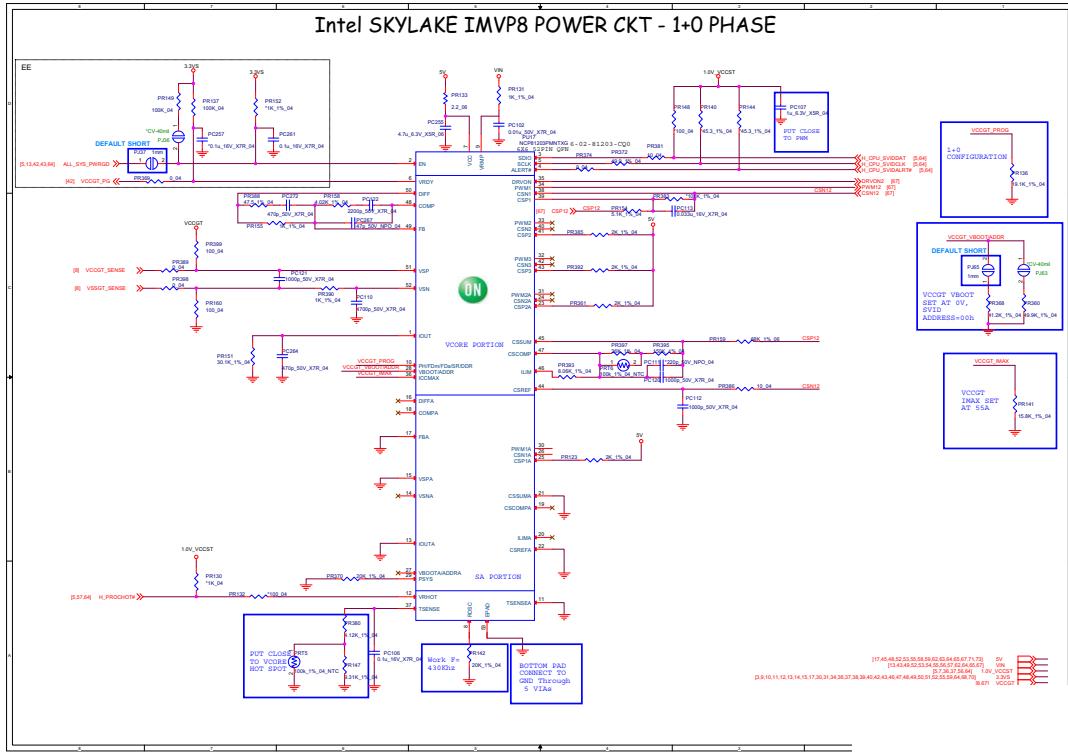
Sheet 65 of 81
VCore Output
Stage



B - 66 VCore Output Stage

Schematic Diagrams

VCCGT



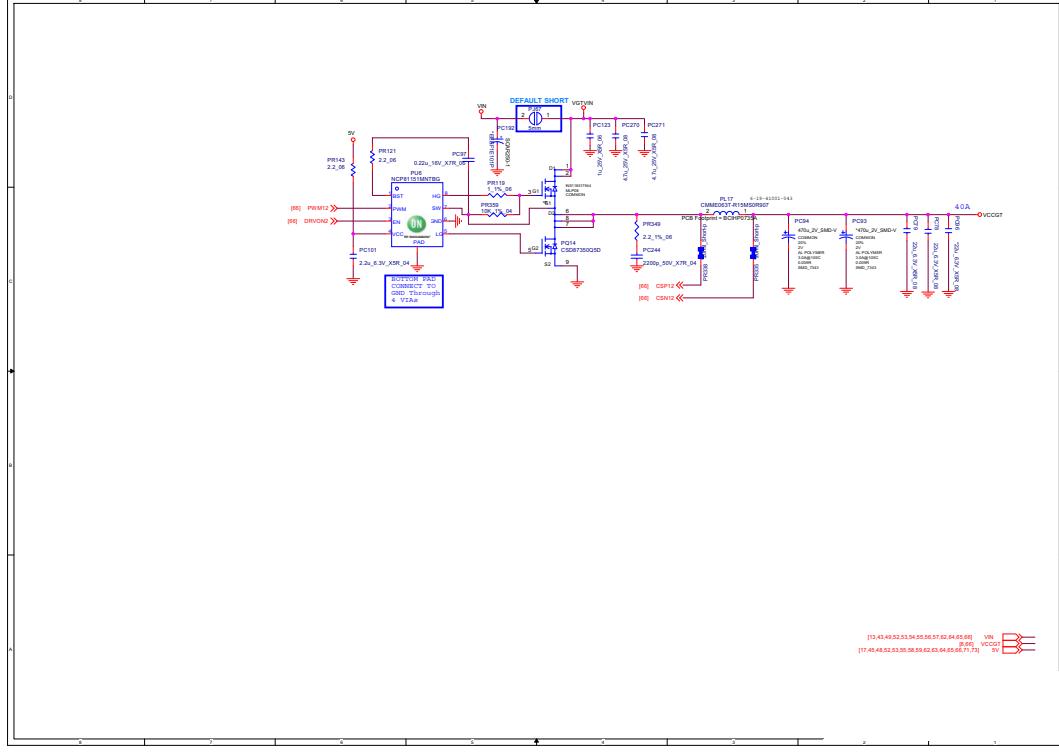
Sheet 66 of 81
VCCGT

VCCGT B - 67

Schematic Diagrams

VCCGT Output Stage

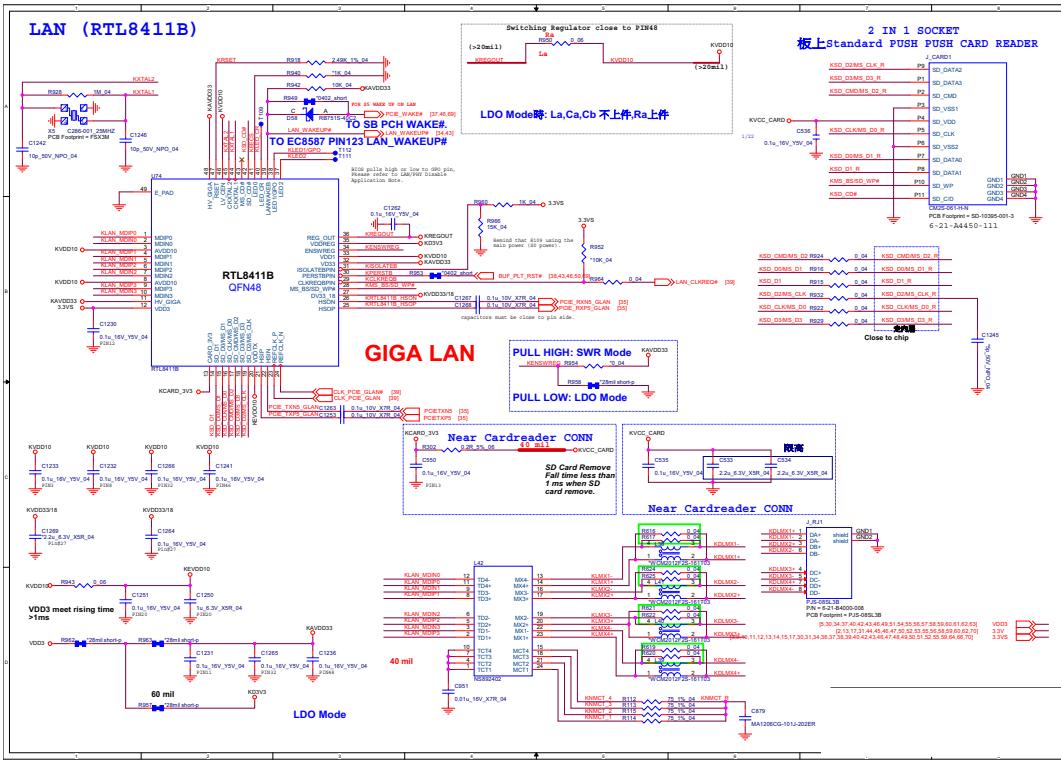
Sheet 67 of 81
VCCGT Output
Stage



B - 68 VCCGT Output Stage

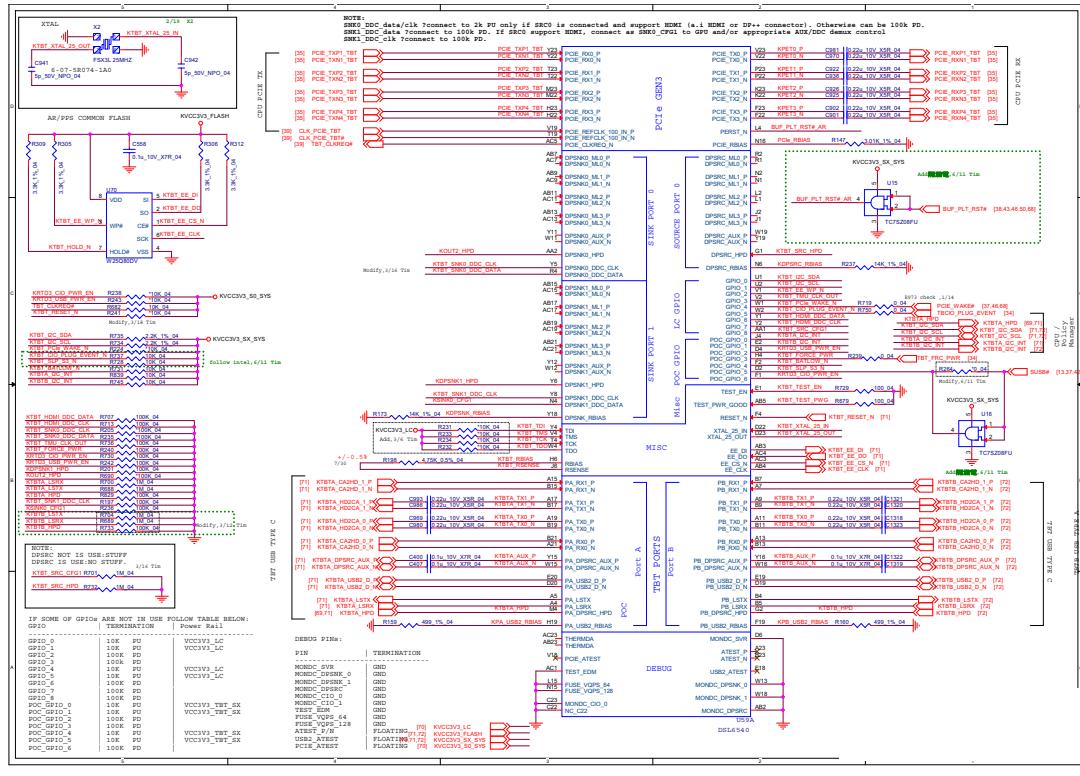
Schematic Diagrams

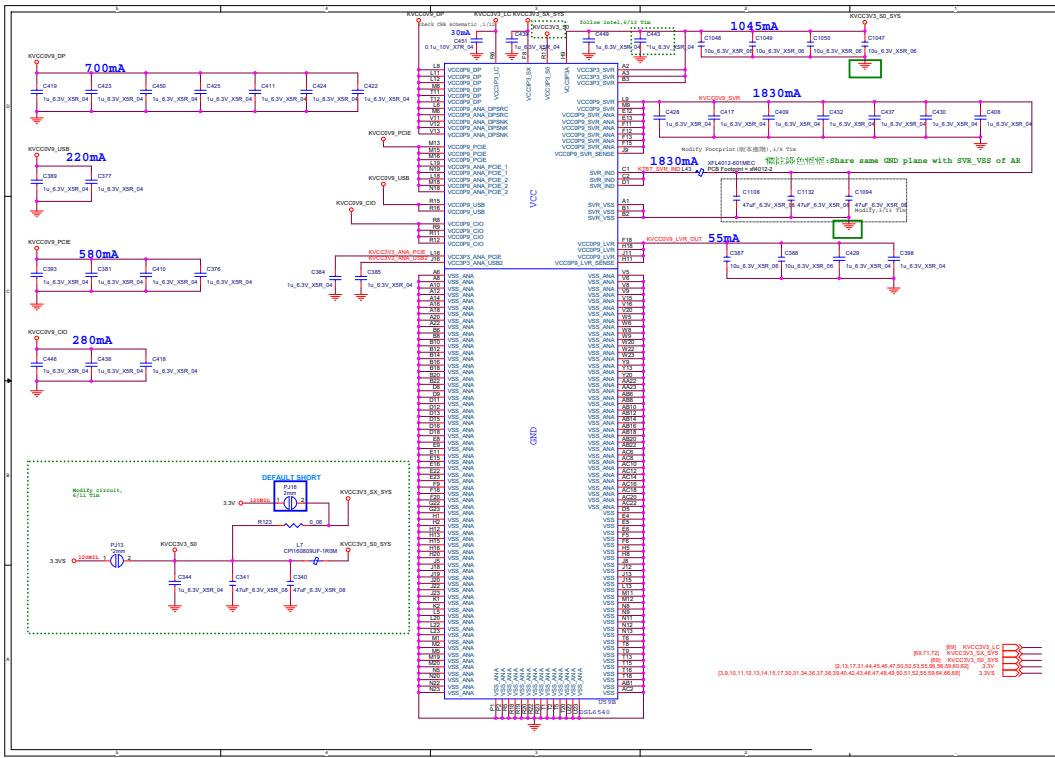
LAN RTL8411, Card Reader



Schematic Diagrams**AR_TBT**

Sheet 69 of 81
AR_TBT

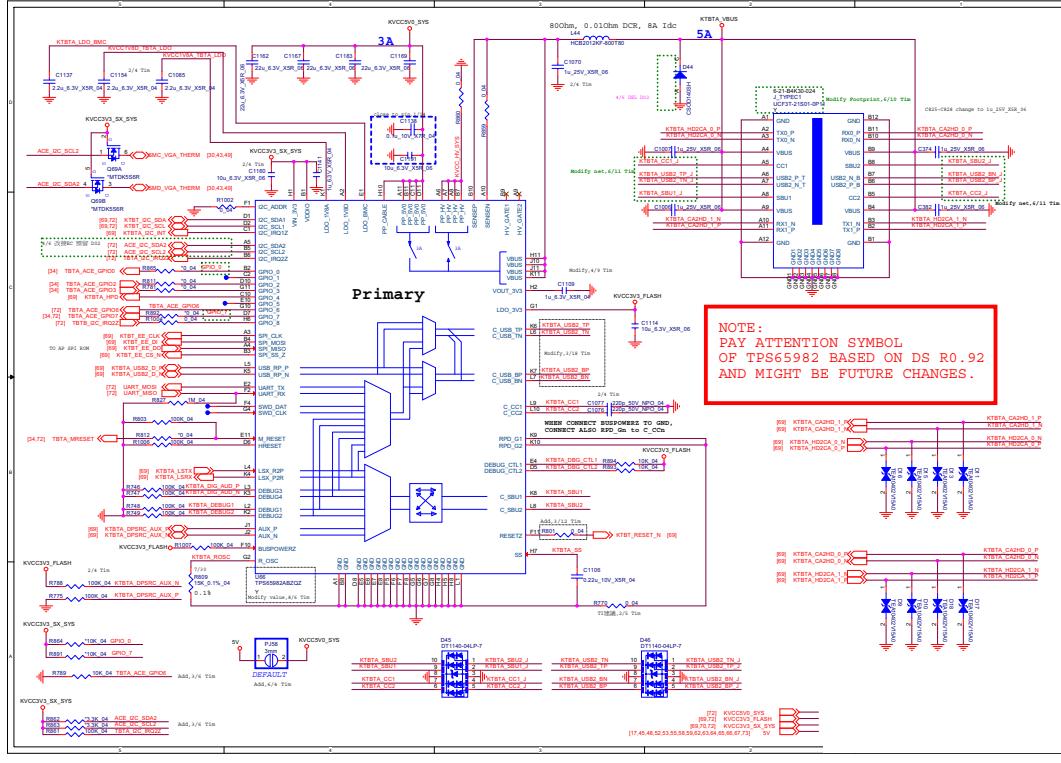


Schematic Diagrams**AR_Power**

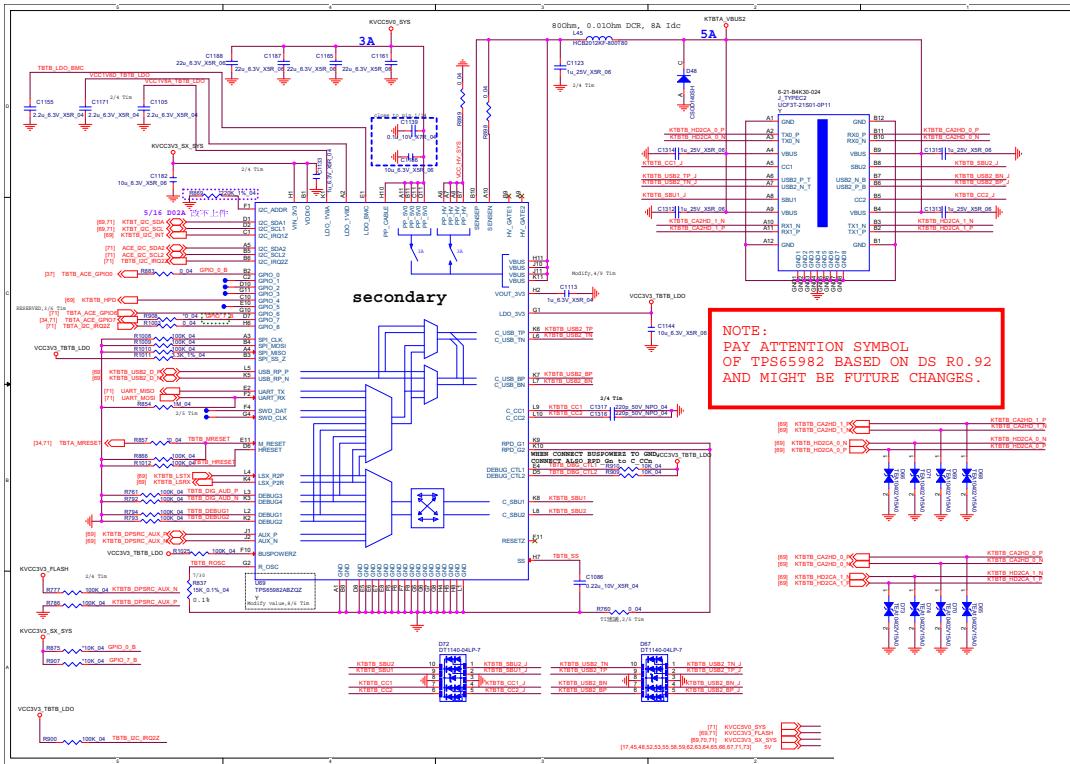
Schematic Diagrams

TPS65982, Type C

Sheet 71 of 81
TPS65982, Type C



B - 72 IPS65982, Type C

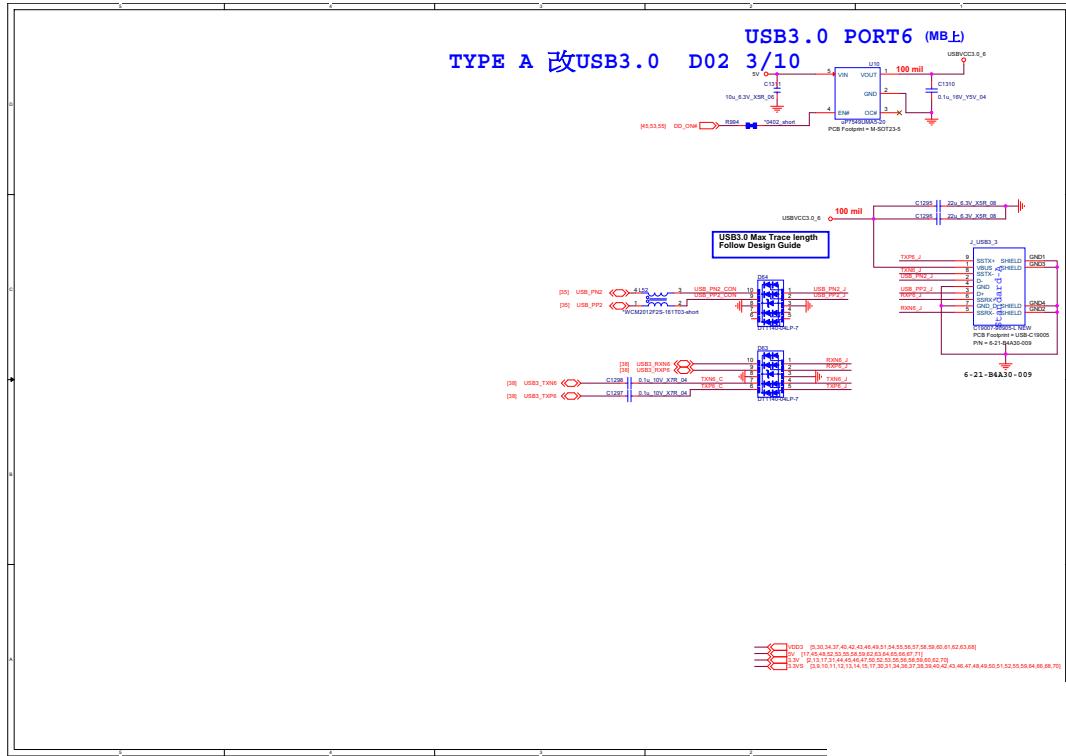
Schematic Diagrams**TPS65982, Type A**

Sheet 72 of 81
TPS65982, Type A

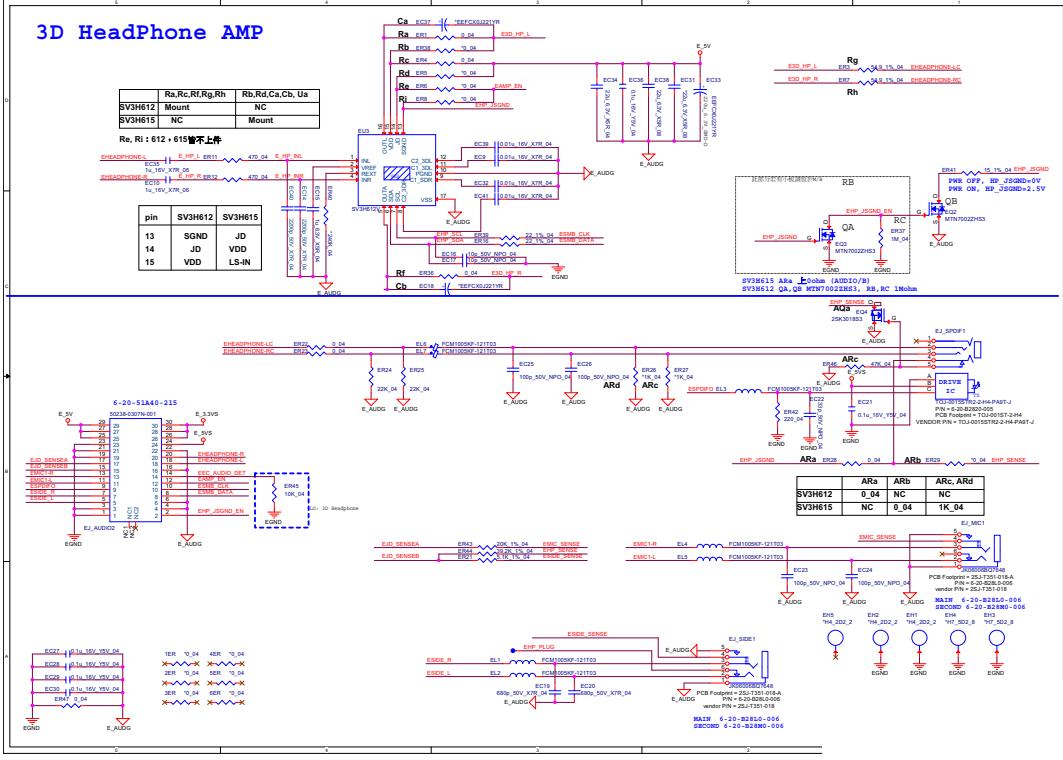
TPS65982, Type A B - 73

Schematic Diagrams

USB, Type A



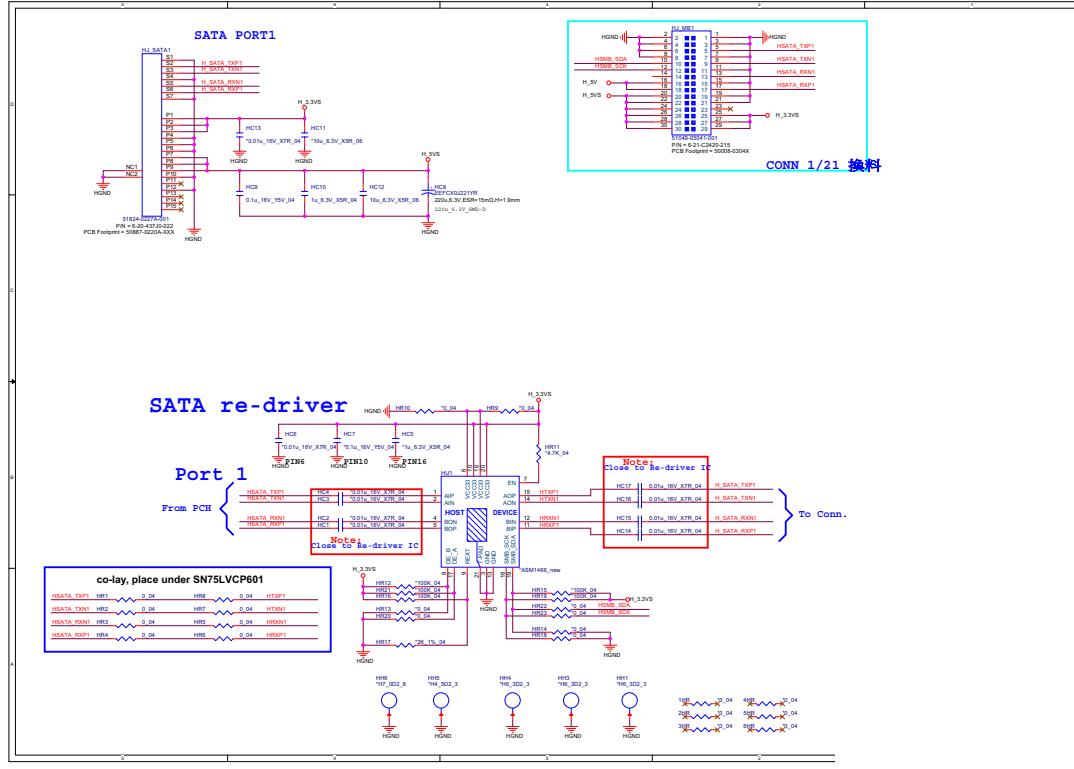
B - 74

Schematic Diagrams**Audio Board_3D AMP**

Schematic Diagrams

HDD Board

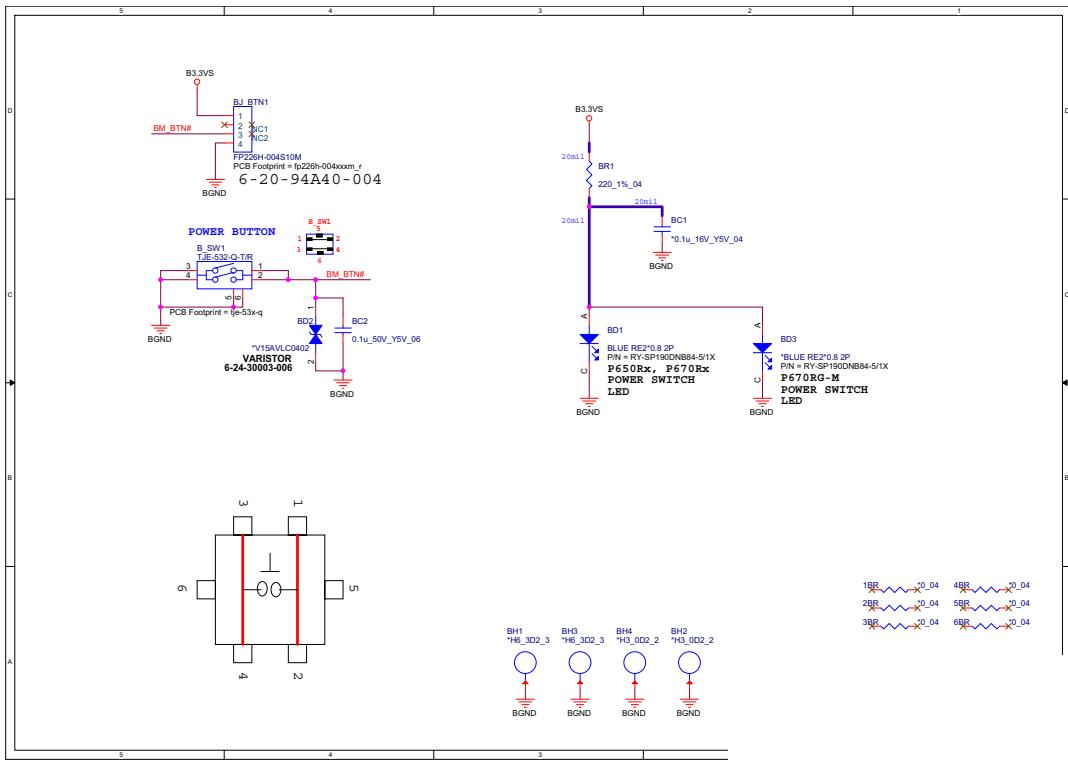
Sheet 75 of 81
HDD Board



B - 76 HDD Board

Schematic Diagrams

Power Board



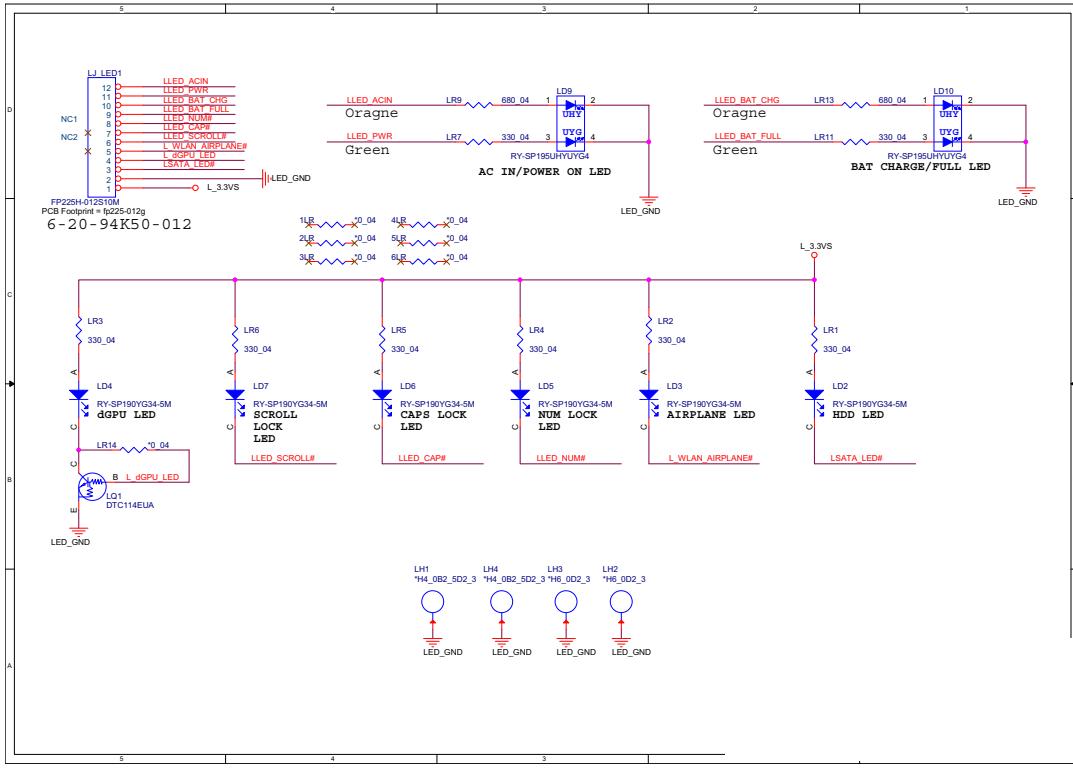
Sheet 76 of 81
Power Board

Power Board B - 77

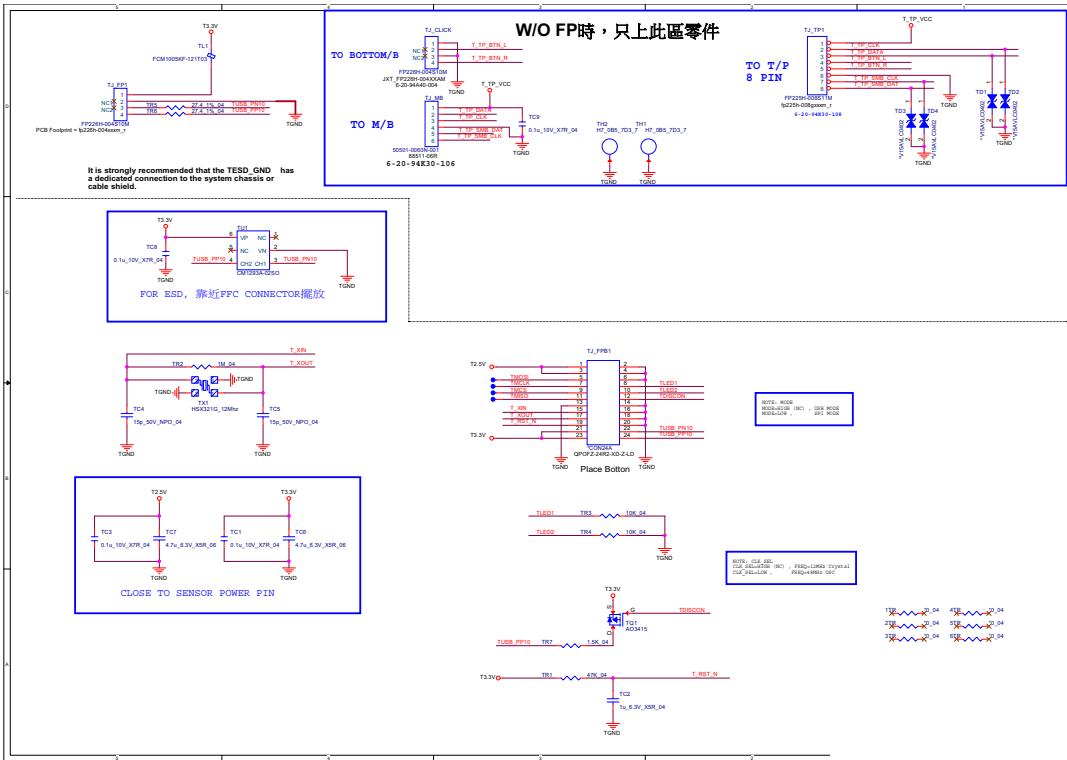
Schematic Diagrams

LED Board

Sheet 77 of 81
LED Board

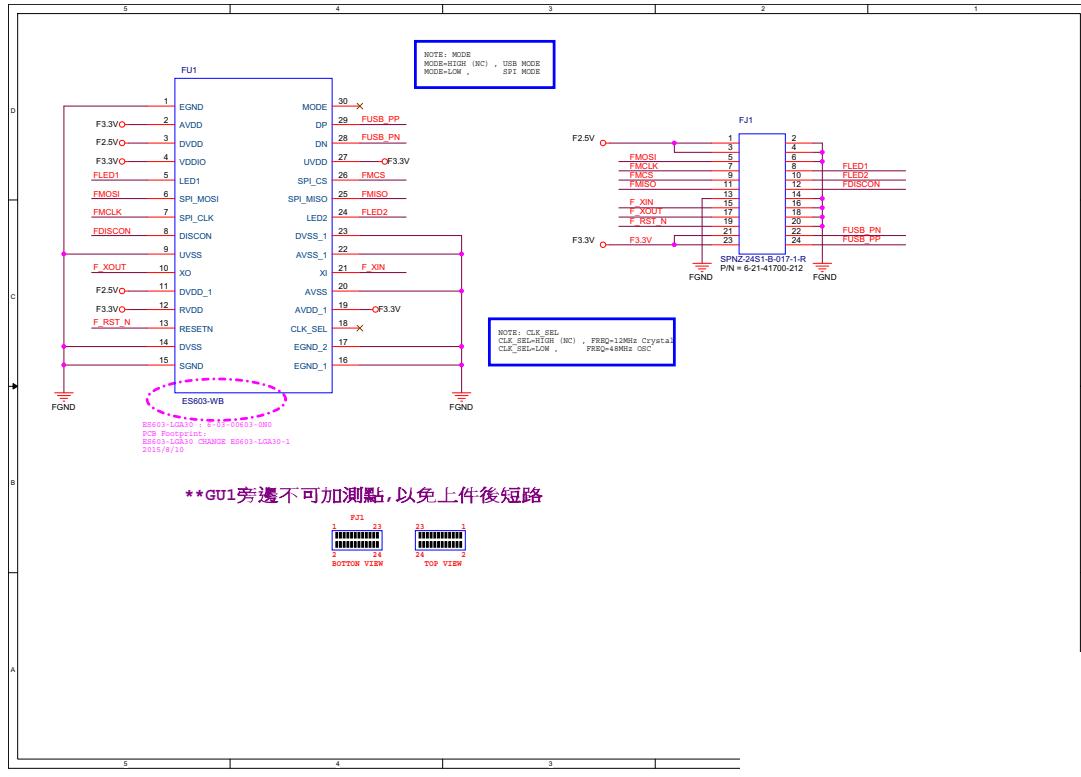


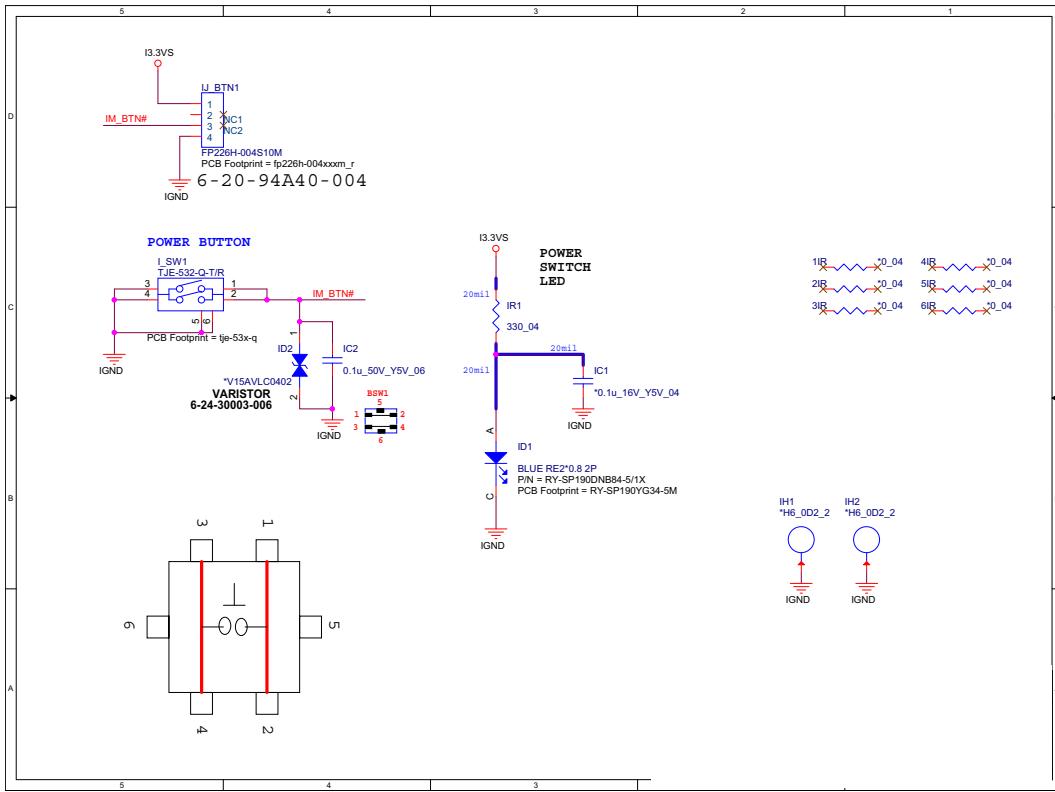
B - 78 LED Board

Schematic Diagrams**Click Board**

Schematic Diagrams**Finger Sensor Board**

Sheet 79 of 81
Finger Sensor
Board

**B - 80 Finger Sensor Board**

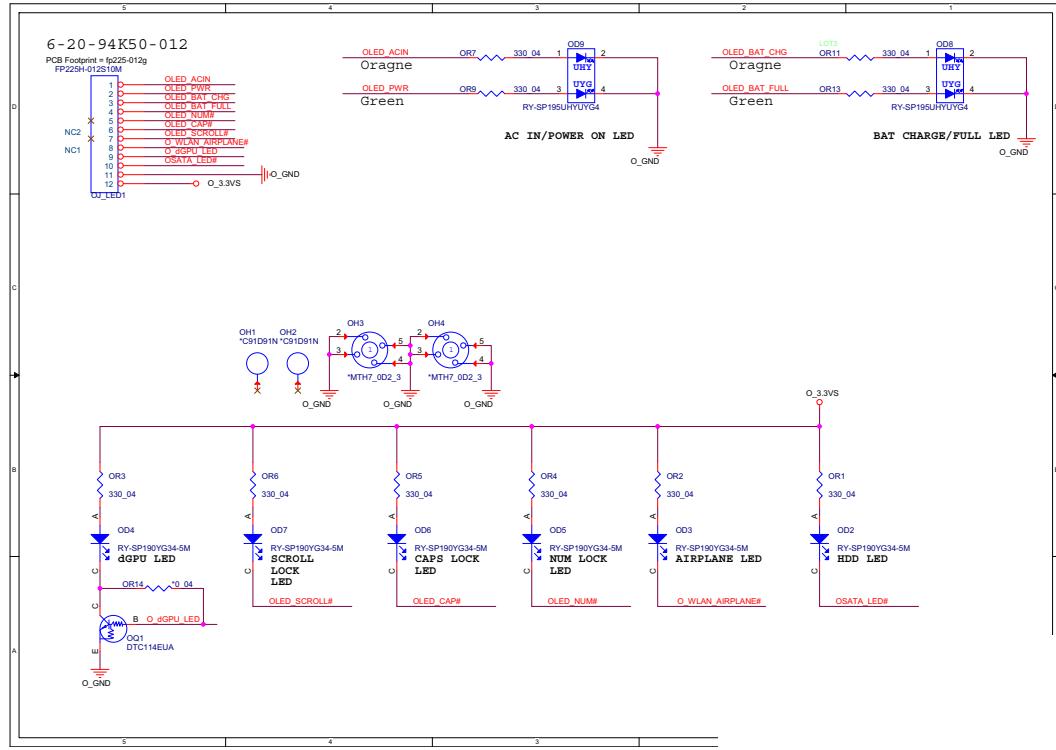
Schematic Diagrams**Power Board**

Sheet 80 of 81
Power Board

Power Board B - 81

Schematic Diagrams

LED Board



Sheet 81 of 81
LED Board

B - 82 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 V1.0X.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 1.0X.05, you MAY NOT then go back and flash the BIOS to ver 1.0X.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.