

# SERVICE MANUAL

W650SZ / W651SZ / W655SZ

*notebook*





**Notebook Computer**

**W650SZ / W651SZ / W655SZ**

**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 **W650SZ / W651SZ / W655SZ** 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 19V, 4.74A (90 Watts) minimum AC/DC Adapter.

## CAUTION

**This Computer's Optical Device is a Laser Class 1 Product**

### 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.

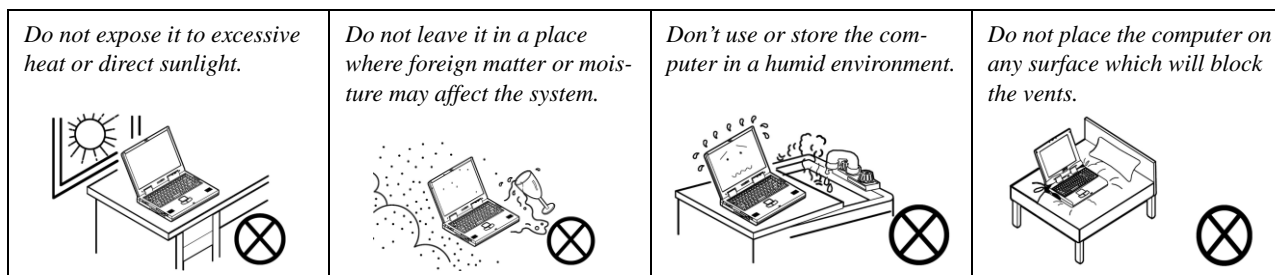
## Instructions for Care and Operation

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

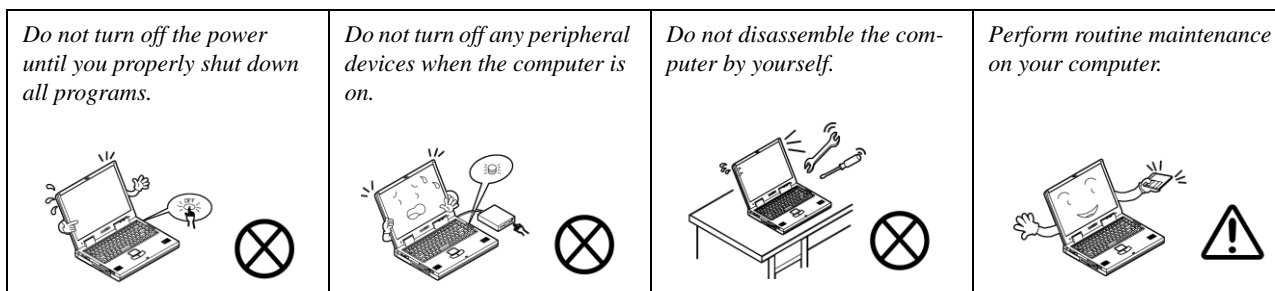
1. **Don't drop it, or expose it to shock.** If the computer falls, the case and the components could be damaged.



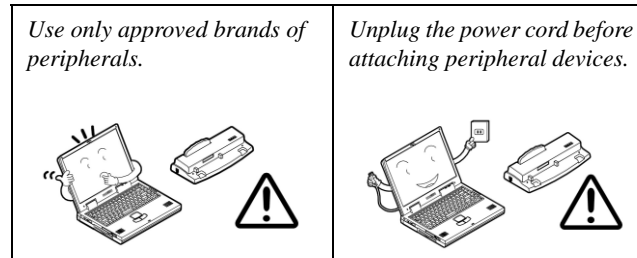
2. **Keep it dry, and don't overheat it.** Keep the computer and power supply away from any kind of heating element. This is an electrical appliance. If water or any other liquid gets into it, the computer could be badly damaged.



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.



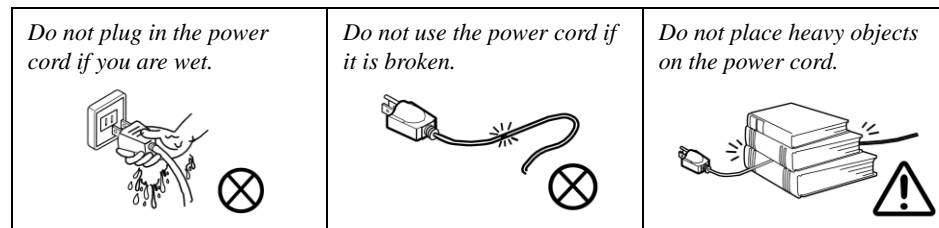
4. **Avoid interference.** Keep the computer away from high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage your data.
5. **Take care when using peripheral devices.**



## 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

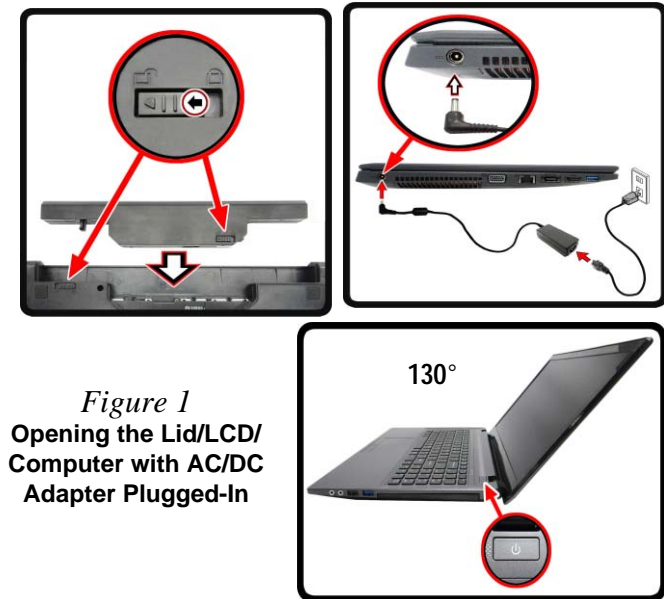
You may also need to consult the following manual for additional information:

#### 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 clicking **Settings** in the **Charms Bar** (use the **Windows Logo Key**  + **C** key combination to access the Charms Bar) and choosing **Shut down** from the **Power** menu.

This will help prevent hard disk or system problems.

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# Chapter 1: Introduction

## Overview

This manual covers the information you need to service or upgrade the **W650SZ / W651SZ / W655SZ** 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*, 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 **W650SZ / W651SZ / W655SZ** 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

##### i7-4900MQ (2.80GHz)

8MB L3 Cache, 22nm, DDR3L-1600MHz, TDP 47W

##### i7-4800MQ (2.7GHz), i7-4700MQ (2.4GHz)

6MB L3 Cache, 22nm, DDR3L-1600MHz, TDP 47W

### Core Logic

Intel® HM86 Chipset

### BIOS

48Mb SPI Flash ROM

AMI BIOS

### Memory

Two 204 Pin SO-DIMM Sockets Supporting **DDR3L**

**1600MHz** Memory

Memory Expandable up to 16GB

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

### Storage

One Changeable 2.5" 9.5mm (h) SATA HDD

**(Factory Option)** One 12.7mm(h) Optical Device Type Drive (Super Multi Drive/Blu-Ray Combo Drive/Blu-Ray Writer Drive)

Or

**(Factory Option)** 9.5mm 2nd HDD caddy

**(Factory Option)** One mSATA Solid State Drive (SSD)

### LCD

15.6" (39.62cm) HD / FHD

### Audio

High Definition Audio Compliant Interface

2 \* Built-In Speakers

Built-In Microphone

### Security

Security (Kensington® Type) Lock Slot

BIOS Password

### Video Adapter

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

**Supports NVIDIA® Optimus Technology**

#### Intel Integrated GPU

##### **Intel® HD Graphics 4600**

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

Microsoft DirectX®11 Compatible

### Keyboard

Full-size "WinKey" keyboard (with numeric keypad)

### Pointing Device

Built-in Touchpad

### Interface

One USB 2.0 Port

Two USB 3.0 Ports

One eSATA Port (USB 3.0 Combo)

One HDMI-Out Port

One External Monitor Port

One Headphone-Out Jack

One Microphone-In Jack

One RJ-45 LAN Jack

One DC-in Jack

### Mini Card Slots

Slot 1 for **WLAN** Module or **WLAN and Bluetooth** Combo Module

**(Factory Option)** Slot 2 for **3G** Module or mSATA **SSD**

### Card Reader

Embedded Multi-In-1 Card Reader

MMC (MultiMedia Card) / RS MMC

SD (Secure Digital) / Mini SD / SDHC/ SDXC

MS (Memory Stick) / MS Pro / MS Duo

### Communication

Built-In Gigabit Ethernet LAN

2M HD PC Camera Module

**(Factory Option)** 3G Mini-Card Module

#### **WLAN/ Bluetooth Half Mini-Card Modules:**

**(Factory Option)** Intel® Centrino® Advanced-N 6235 Wireless LAN (**802.11a/g/n**) + Bluetooth 4.0

**(Factory Option)** Intel® Centrino® Wireless-N 2230 Wireless LAN (**802.11b/g/n**) + Bluetooth 4.0

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

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

6 Cell Smart Lithium-Ion Battery Pack, 48.84WH

**(Factory Option)** 6 Cell Smart Lithium-Ion Battery Pack, 62.16WH

Full Range AC/DC Adapter

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

DC Output: 19V, 4.74A (**90W**)

### Dimensions & Weight

374mm (w) \* 252mm (d) \* 14 - 31.4mm (h)

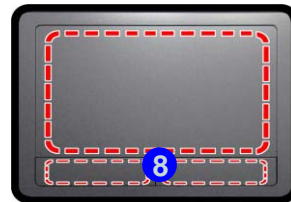
(Height Excluding Battery Area)

**2.5kg** (with ODD and 62.16WH Battery)

## Introduction

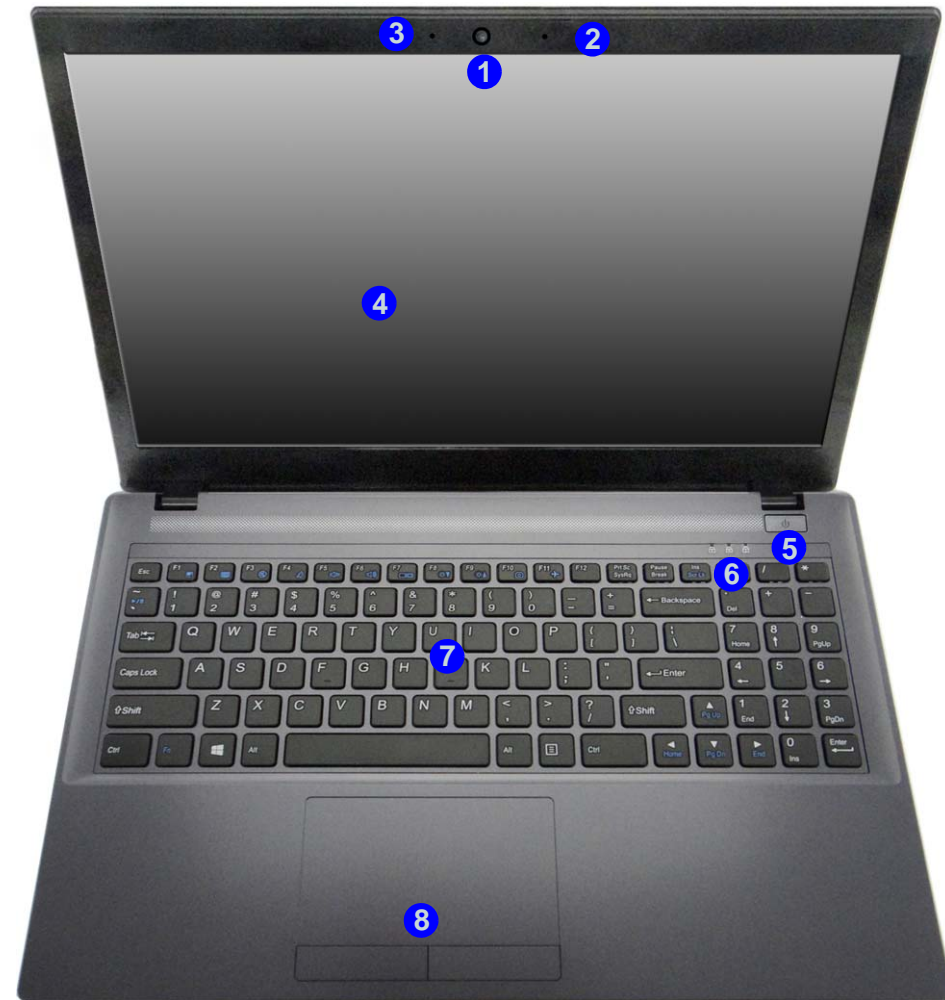
Figure 1  
Top View

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



Note that the Touchpad and Buttons valid operational area is that indicated within the red dotted lines.

## External Locator - Top View with LCD Panel Open





## External Locator - Front & Right Side Views

FRONT VIEW



*Figure 2*  
**Front View**

1. LED Indicator
2. Multi-in-1 Card Reader

RIGHT SIDE VIEW



*Figure 3*  
**Right Side View**

1. Microphone-In Jack
2. Headphone-Out Jack
3. USB Ports
4. Optical Device Drive Bay
5. Emergency Eject Hole
6. Security Lock Slot

**Introduction**

**External Locator - Left Side & Rear View**

*Figure 4*  
**Left Side View**

- 1. DC-In Jack
- 2. Vent
- 3. External Monitor Port
- 4. RJ-45 LAN Jack
- 5. Combined eSATA/USB 3.0 Port
- 6. HDMI-Out Port
- 7. USB 3.0 Ports

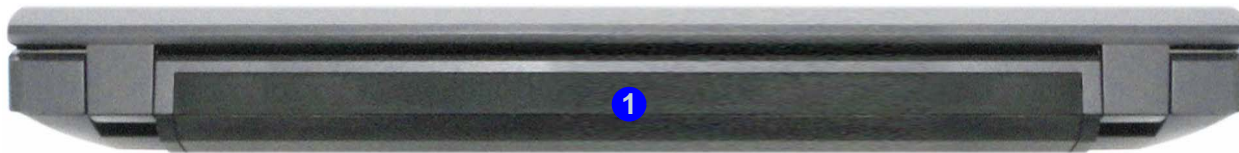
LEFT SIDE VIEW



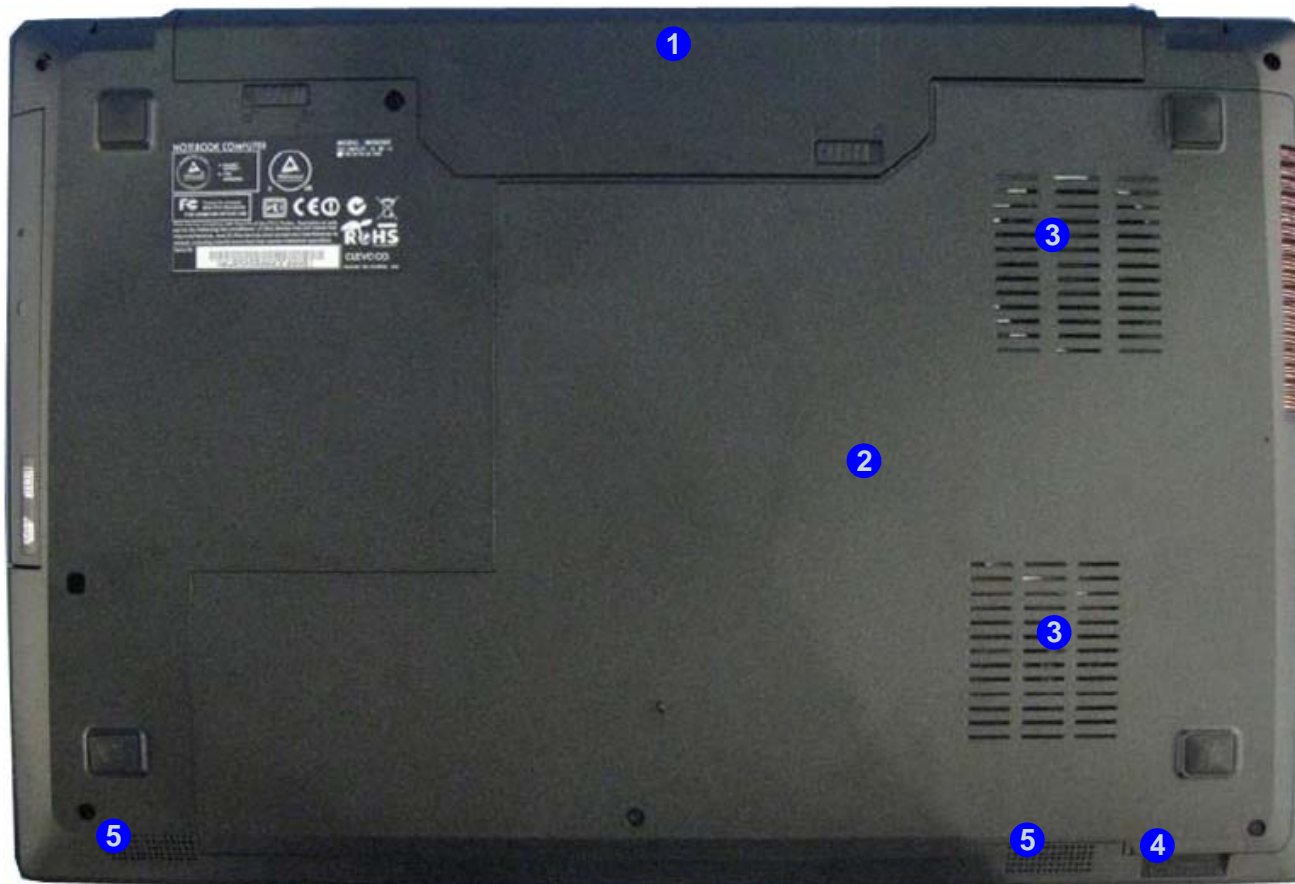
*Figure 5*  
**Rear View**

- 1. Battery

REAR VIEW



## External Locator - Bottom View



*Figure 6*  
**Bottom View**

1. Battery
2. Component Bay Cover
3. Vent
4. Multi-in-1 Card Reader
5. Speakers



### Overheating

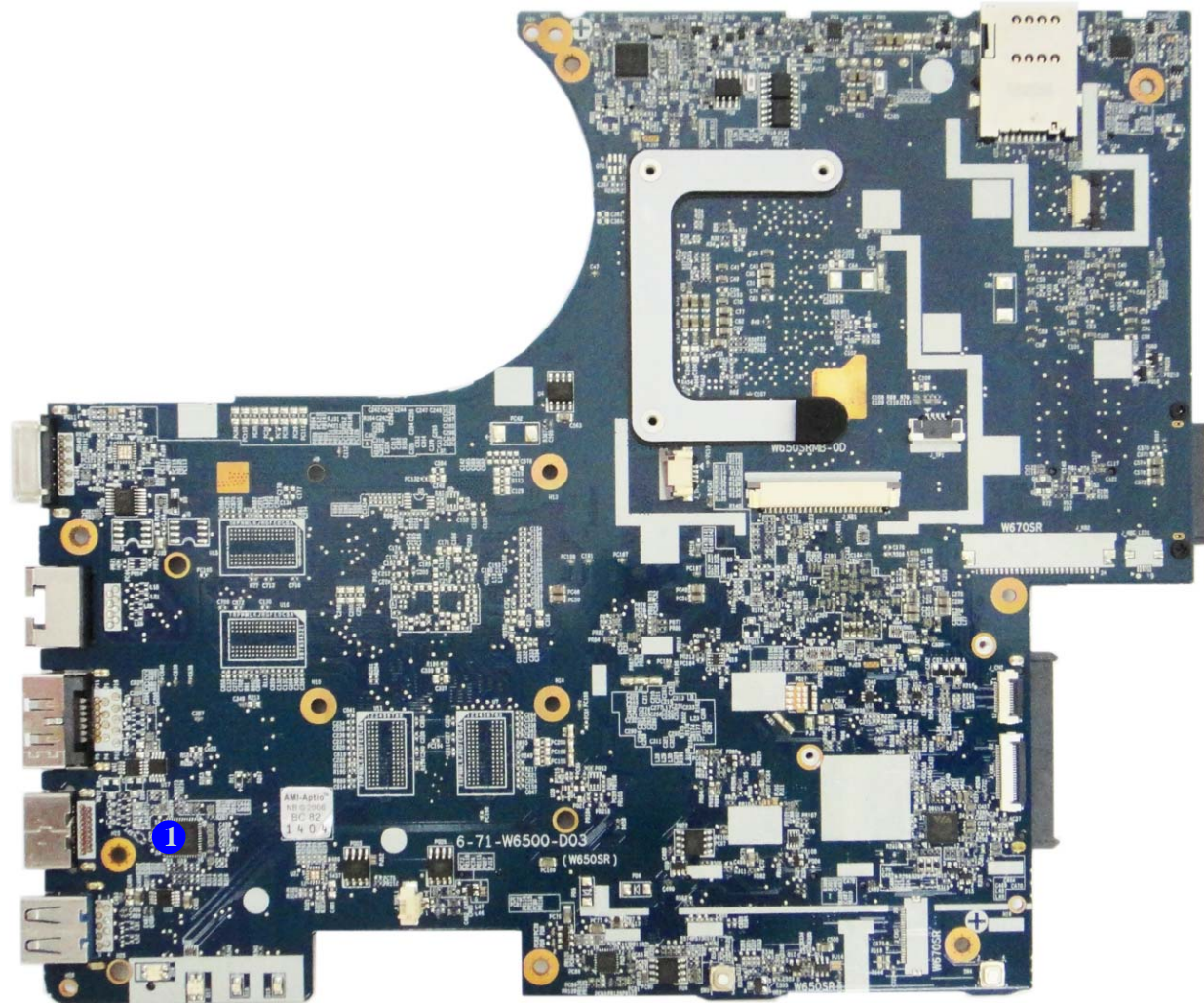
To prevent your computer from overheating, make sure nothing blocks any vent while the computer is in use.

## Introduction

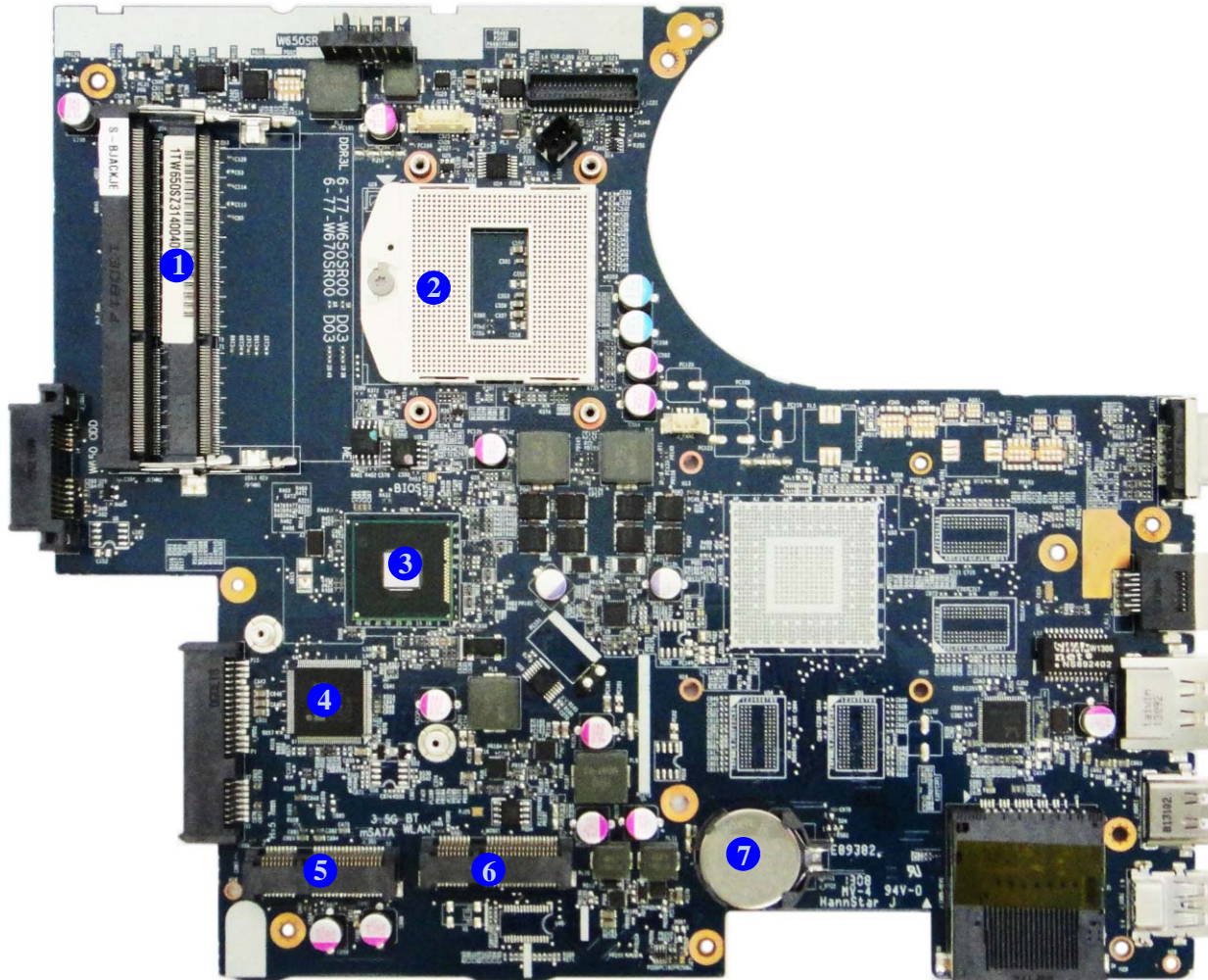
*Figure 7*  
Mainboard Top  
Key Parts

1. Audio Codec

## Mainboard Overview - Top (Key Parts)



## Mainboard Overview - Bottom (Key Parts)



*Figure 8*  
**Mainboard Bottom  
Key Parts**

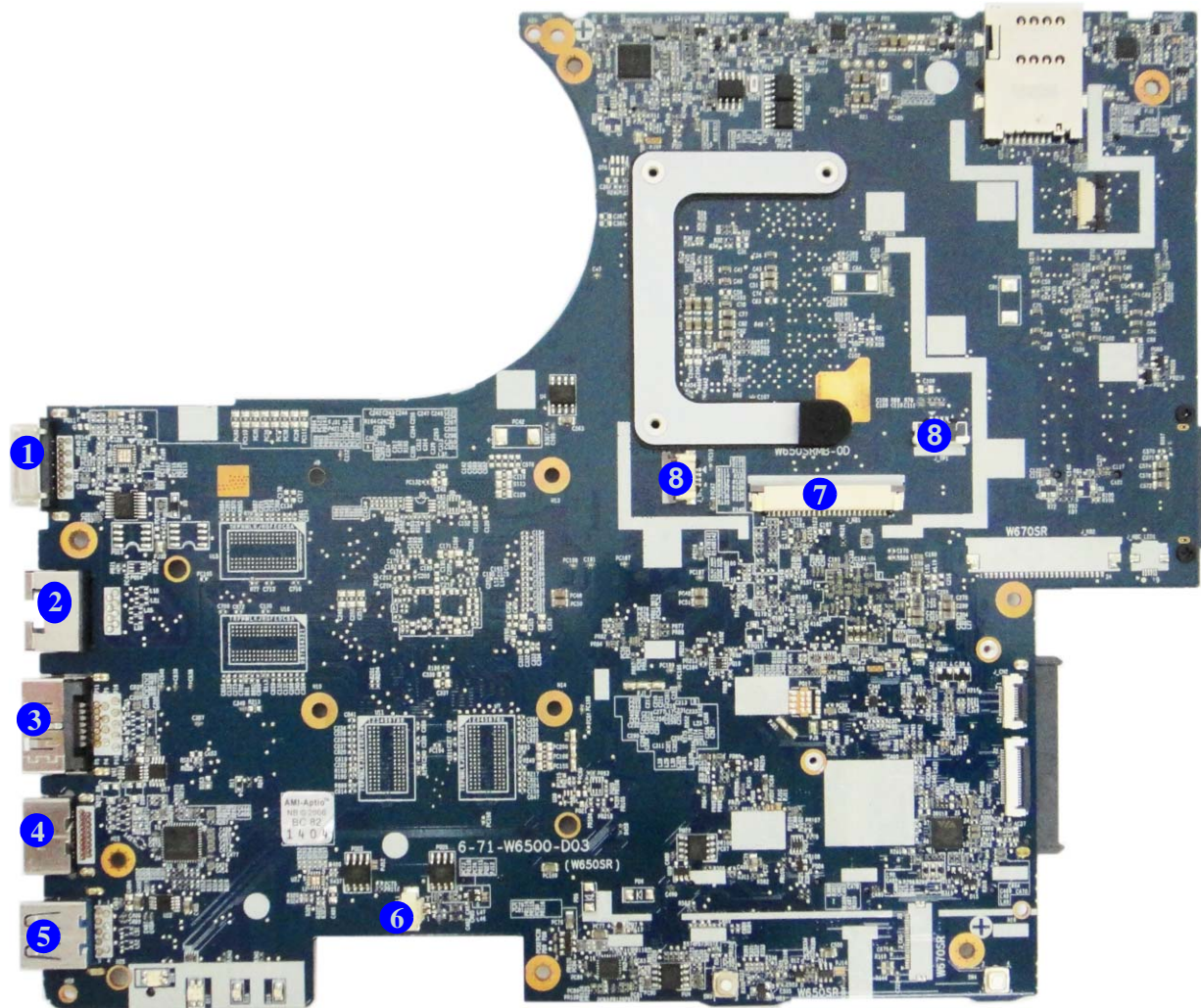
1. Memory Slots  
DDR3 SO-DIMM
2. CPU Socket (no  
CPU installed)
3. Platform Controller  
Hub
4. KBC-ITE IT8518
5. Mini-Card  
Connector (WLAN  
Module)
6. Mini-Card  
Connector  
(mSATA Module)
7. CMOS Battery

## Introduction

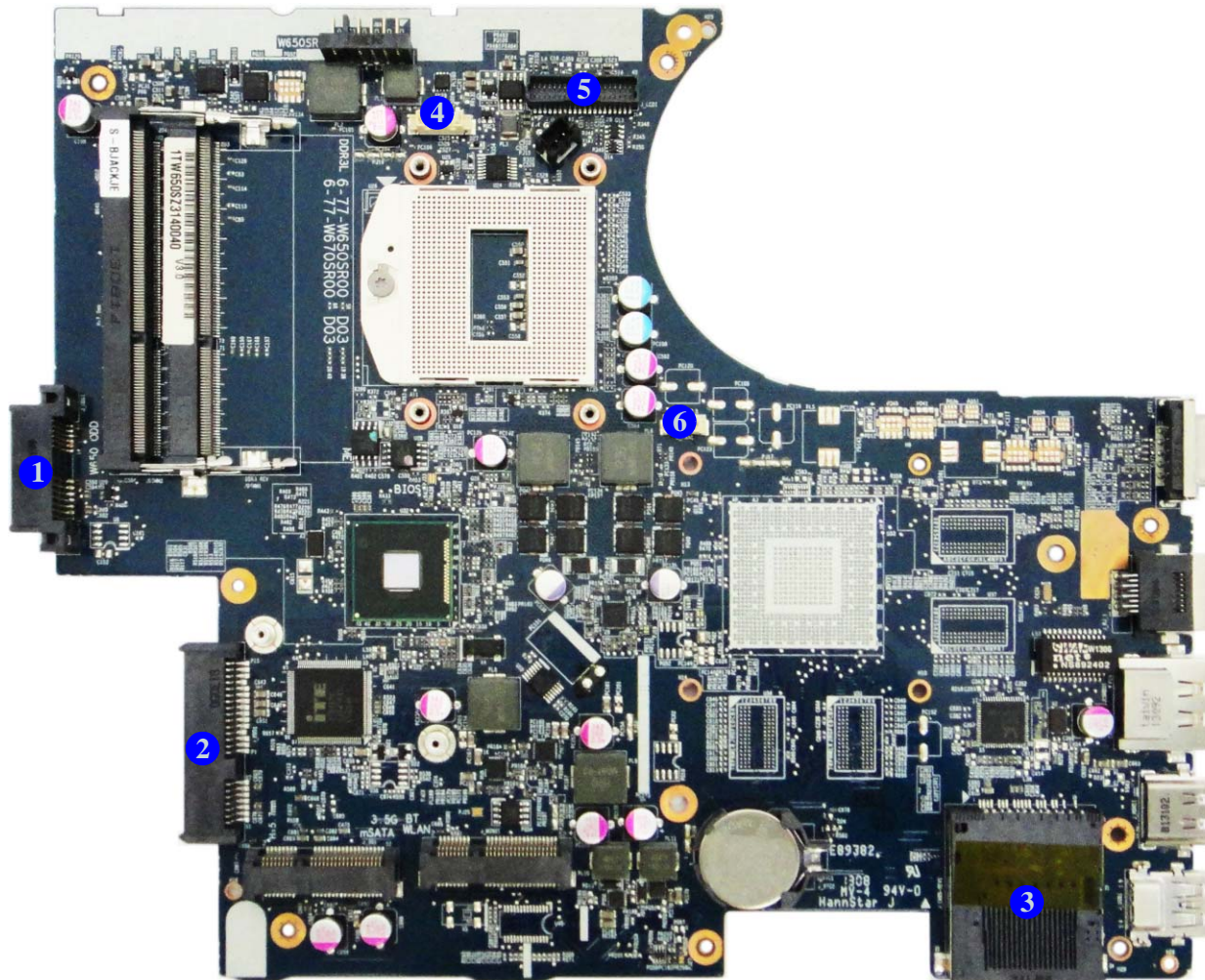
*Figure 9*  
**Mainboard Top Connectors**

1. External Monitor Port
2. RJ-45 LAN Jack
3. eSATA + USB Port
4. HDMI-Out Port
5. USB Port 3.0
6. Speaker Cable Connector
7. Keyboard Cable Connector
8. TouchPad Cable Connector

## Mainboard Overview - Top (Connectors)



## Mainboard Overview - Bottom (Connectors)



*Figure 10*  
**Mainboard Bottom  
Connectors**

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






# Chapter 2: Disassembly

## Overview

This chapter provides step-by-step instructions for disassembling the *W650SZ / W651SZ / W655SZ* series notebook's parts and subsystems. When it comes to reassembly, reverse the procedures (unless otherwise indicated).

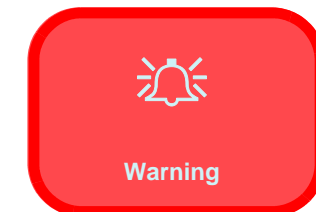
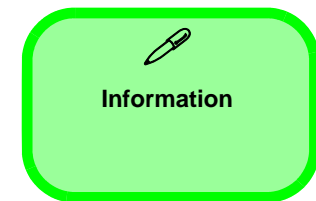
We suggest you completely review any procedure before you take the computer apart.

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

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

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

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



## Disassembly

---

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

### Maintenance Tools

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

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

### Connections

Connections within the computer are one of four types:

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

## Maintenance Precautions

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

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

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

#### To remove the Keyboard:

1. Remove the battery [page 2 - 5](#)
2. Remove the keyboard [page 2 - 6](#)

#### To remove the HDD:

1. Remove the battery [page 2 - 5](#)
2. Remove the HDD [page 2 - 7](#)

#### To remove the Optical Device:

1. Remove the battery [page 2 - 5](#)
2. Remove the Optical device [page 2 - 10](#)

#### To remove the System Memory:

1. Remove the battery [page 2 - 5](#)
2. Remove the system memory [page 2 - 12](#)

#### To remove and install a Processor:

1. Remove the battery [page 2 - 5](#)
2. Remove the processor [page 2 - 14](#)
3. Install the processor [page 2 - 16](#)

#### To remove the Wireless LAN Module:

1. Remove the battery [page 2 - 5](#)
2. Remove the WLAN [page 2 - 17](#)

#### To remove the MSATA Module:

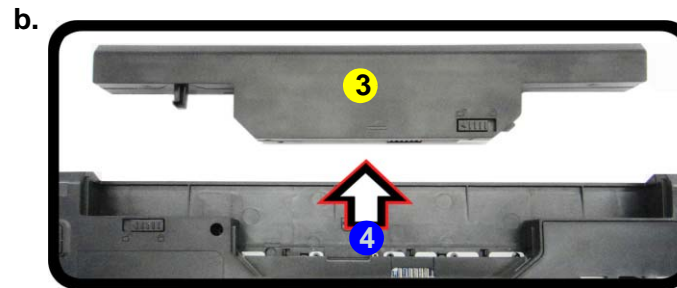
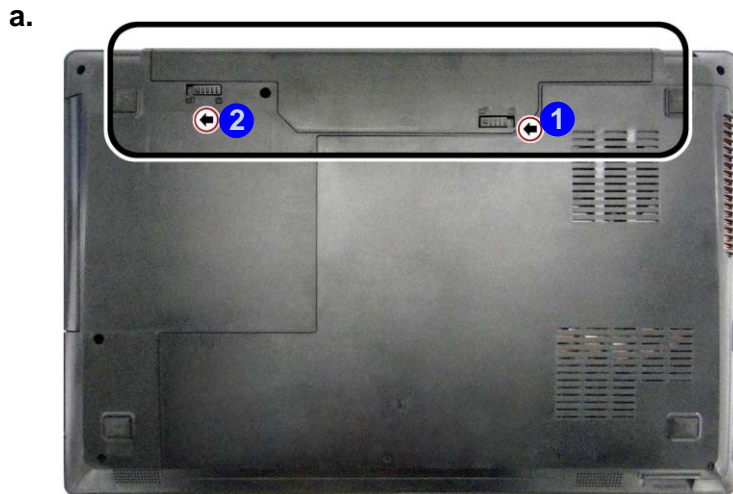
1. Remove the battery [page 2 - 5](#)
2. Remove the MSATA [page 2 - 18](#)

#### To remove the CCD Module:

1. Remove the battery [page 2 - 5](#)
2. Remove the CCD module [page 2 - 19](#)

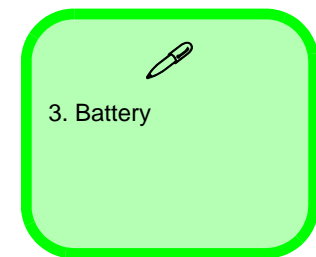
## Removing the Battery

1. Turn the computer **off**, and turn it over.
2. Slide the latch **1** in the direction of the arrow (*Figure 1a*).
3. Slide the latch **2** in the direction of the arrow, and hold it in place (*Figure 1a*).
4. Slide the battery **3** in the direction of the arrow **4** (*Figure 1b*).



*Figure 1*  
**Battery Removal**

- a. Slide the latch and hold it in place.
- b. Slide the battery in the direction of the arrow.



## Disassembly

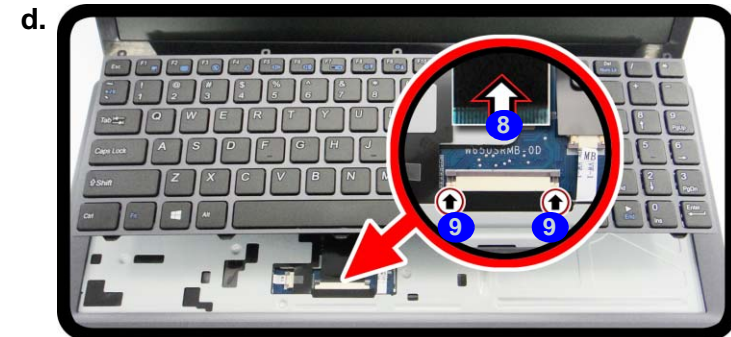
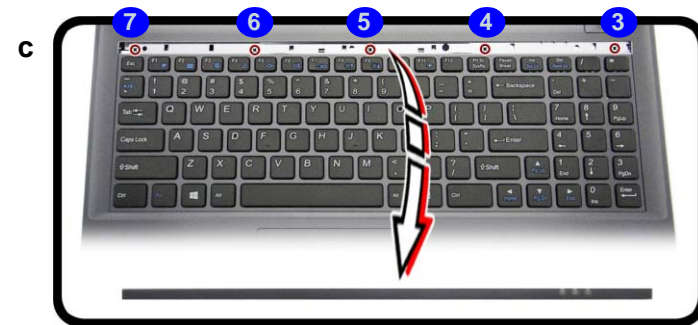
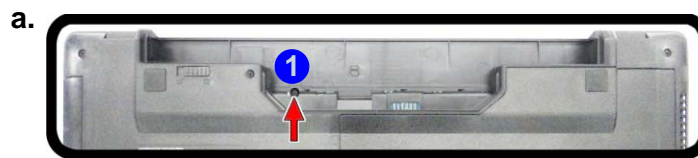
Figure 2

### Keyboard Removal

- Press at point 1 to un-snap LED cover module.
- Remove the LED cover module.
- Remove the screws.
- Carefully lift the keyboard up and disconnect the ribbon cable.
- Remove the keyboard.

## Removing the Keyboard

- Turn off the computer, turn it over, remove the battery (page 2 - 5).
- Carefully press at point 1, from the bottom of the computer to un-snap the LED cover module (use the eject pin tool to do this - Figure 2a)
- Turn the computer over, remove the un-snap LED cover module 2 from the computer (Figure 2b).
- Remove screws 3 - 7 from the keyboard (Figure 2c).
- Lift the keyboard up, being careful not to bend the keyboard ribbon cable 8. Disconnect the keyboard ribbon cable from the locking collar socket 9 (Figure 2d).
- Carefully lift the keyboard 10 off the computer (Figure 2e).



2. LED Cover Module  
10. Keyboard

- 5 Screws

## Removing the Hard Disk Drive

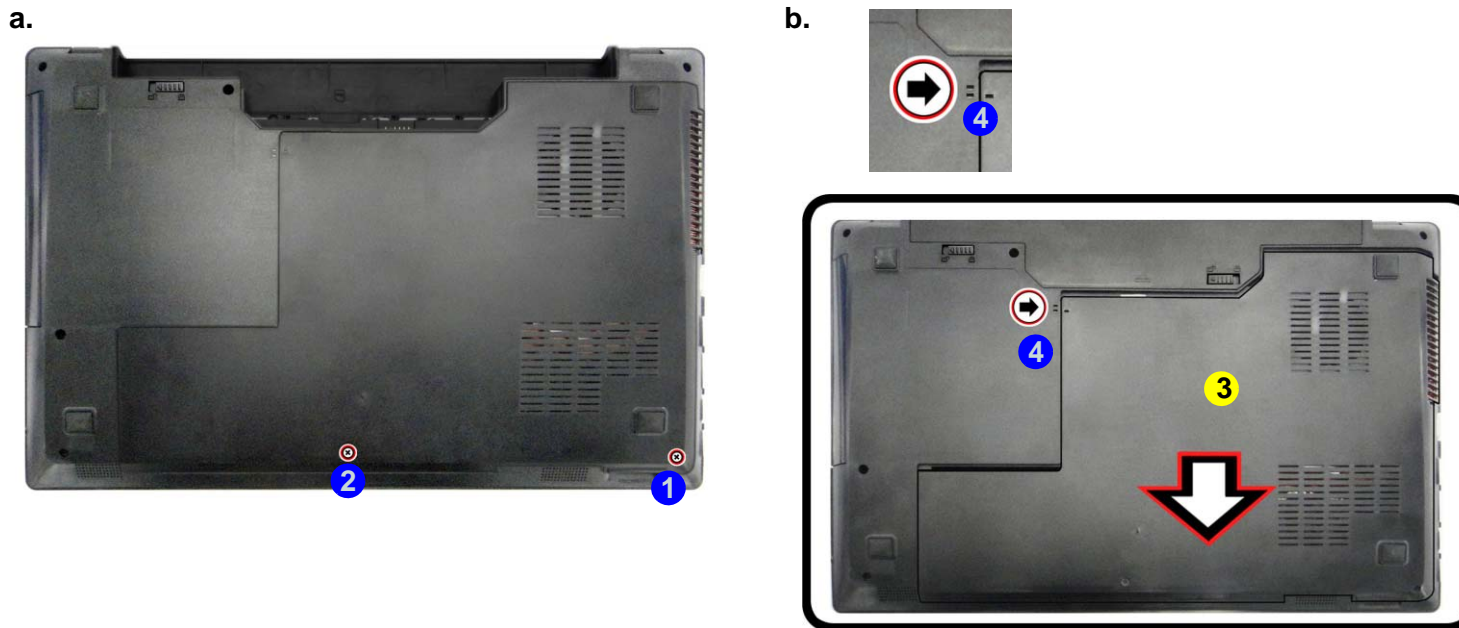
The hard disk drive can be taken out to accommodate other 2.5" serial (SATA) hard disk drives with a height of 9.5mm or 7mm (h). Follow your operating system's installation instructions, and install all necessary drivers and utilities (as outlined in **Chapter 4 of the User's Manual**) when setting up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


### Hard Disk Upgrade Process

1. Turn **off** the computer, and remove the battery ([page 2 - 5](#)).
2. Locate the component bay cover and remove screws **1** - **2** ([Figure 3a](#)).
3. Slide the component bay cover **3** until the cover and case indicators **4** are aligned ([Figure 3b](#)).

*Figure 3*  
**HDD Assembly Removal**

- a. Remove the screws.
- b. Remove the component bay cover.





3. Component Bay Cover

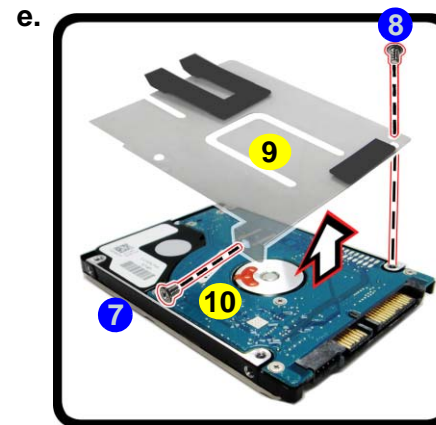
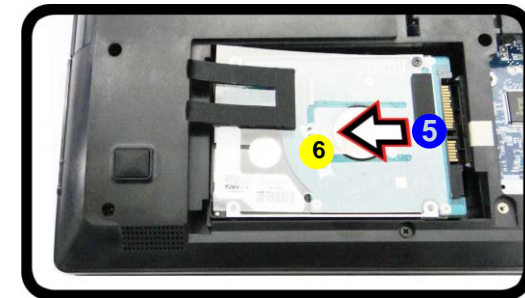
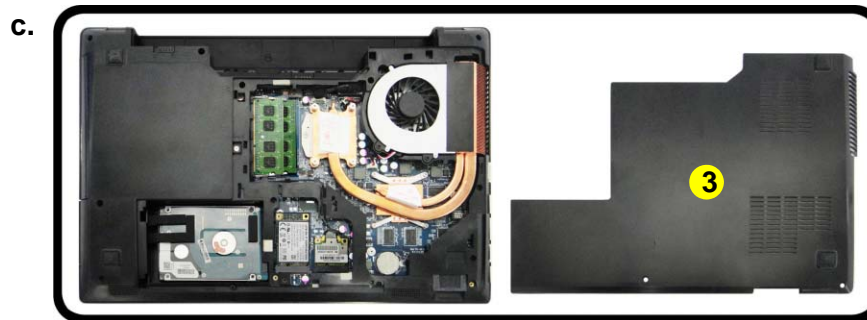
- 2 Screws

## Disassembly

### Figure 4 HDD Assembly Removal (cont'd.)

- c. Remove the bay cover.  
 d. Lift the rubber and slide the HDD assembly in the direction of the arrow to lift the HDD assembly out.  
 e. Remove the screws and adhesive cover.

4. Remove the component bay cover **3** (*Figure 4c*).  
 5. Lift the HDD sponge up at point **4** and grip the tab to slide the hard disk assembly in the direction of arrow **5** to lift the hard disk assembly **6** out (*Figure 4d*).  
 6. Remove the screws **7** - **8** and the adhesive cover **9** from the hard disk **10** (*Figure 4e*).  
 7. Reverse the process to install a new hard disk (do not forget to replace the screws and bay cover).



#### 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.

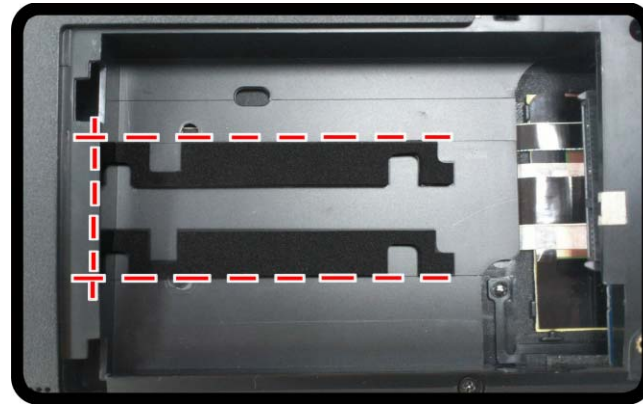


- 3. Component Bay Cover
- 6. HDD Assembly
- 9. Adhesive Cover
- 10. HDD
- 2 Screws



### Hard Disk Size Note (Foam Rubber Insert)

Note that the hard disks pictured on the following pages are all 9.5mm(H) hard disk drives. In some cases 7mm(H) hard disk drives will be installed. For more information contact your distributor/supplier, and bear in mind your warranty terms.



*Figure 5*  
**Foam Rubber  
Insert for 7mm(H)  
HDDs**

- If you are replacing a 9.5mm(H) HDD with a 7mm(H) HDD then insert the foam rubber insert (as shown above).
- If you are replacing a 7mm(H) HDD with a 9.5mm(H) HDD then remove the foam rubber insert.

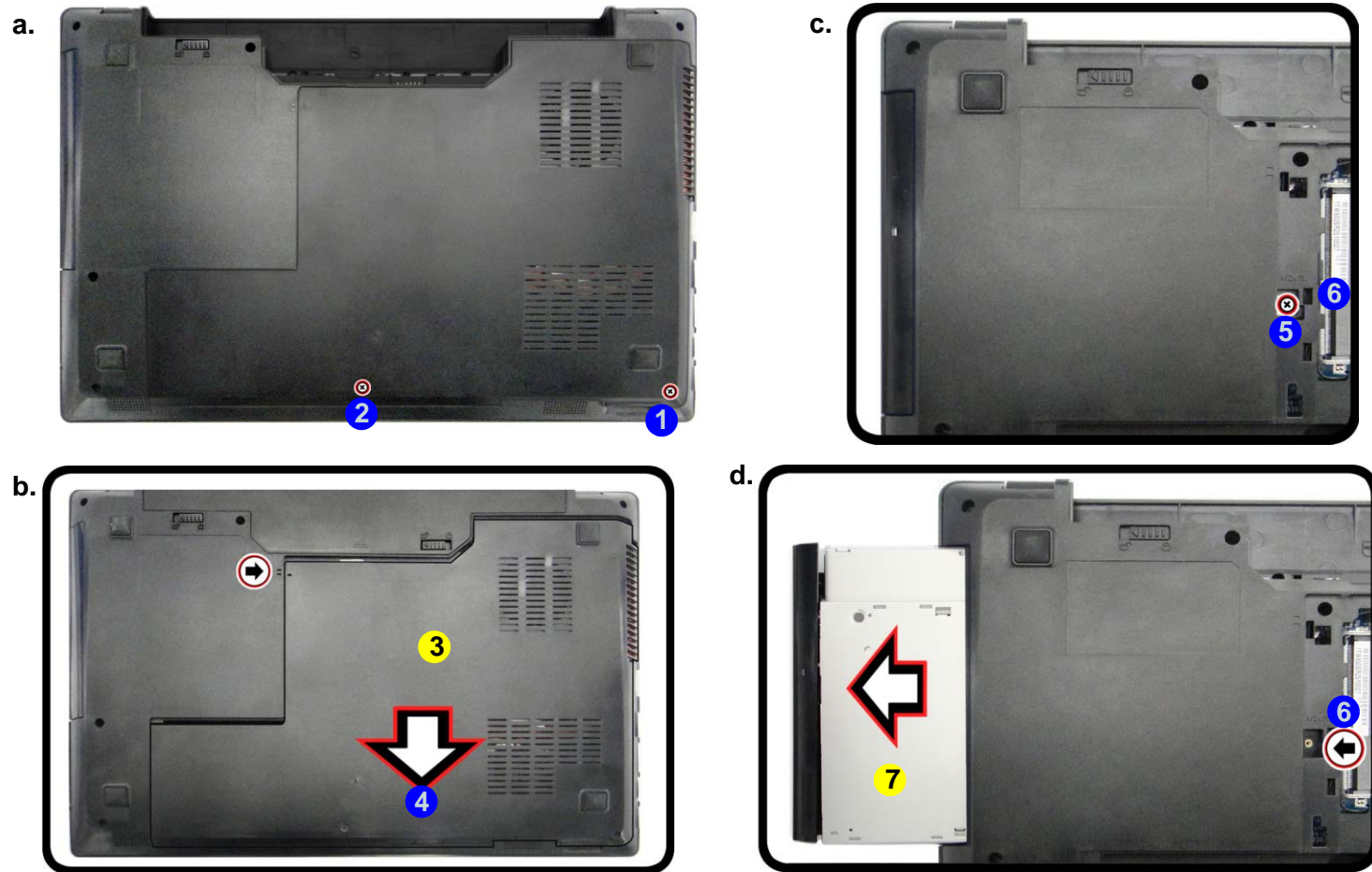
## Disassembly

### Figure 6 Optical Device Removal

- Remove the screws.
- Remove the component bay cover.
- Remove the screw at point 5.
- Use a screwdriver to carefully push out the optical device at point 6.

## Removing the Optical (CD/DVD) Device

- Turn **off** the computer, and remove the battery ([page 2 - 5](#)).
- Locate the component bay cover and remove screws 1 - 2 ([Figure 6a](#)).
- Remove the component bay cover 3 in the direction of the arrow 4 ([Figure 6b](#)).
- Remove the screw at point 5 ([Figure 6c](#)).
- Use a screwdriver to carefully push out the optical device 7 at point 6 ([Figure 6d](#)).



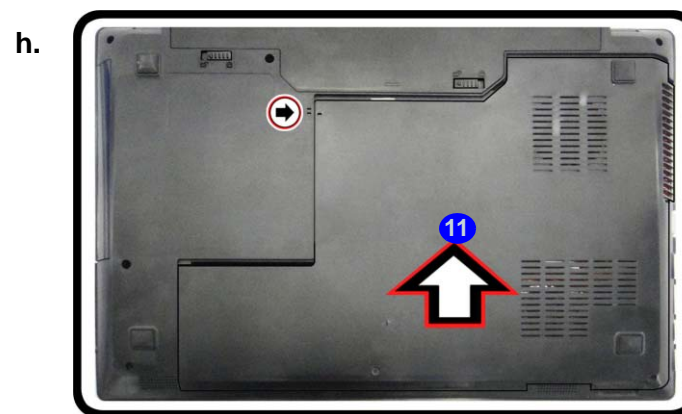
3. Component Bay Cover


- 2 Screws

6. Carefully pry the bezel **9** off the optical device at point **8** (*Figure 7e*).
7. Separate the bezel **9** and the optical device.
8. Reverse the process to attach the front bezel **9** with the new optical device at point **10** (*Figure 7g*).
9. Insert the new device and carefully slide it into the computer (the device only fits one way. DO NOT FORCE IT; The screw holes should line up).
10. Replace the bay cover by pushing it at point **11** until the cover and case indicator are aligned, then tighten the screws.
11. Restart the computer to allow it to automatically detect the new device.

*Figure 7*  
**Optical Device Removal (cont'd.)**

- e. Pry the bezel off the optical device.
- f. Separate the bezel and optical device.
- g. Install the front bezel.
- h. Replace the component bay cover and screws.





7. Optical Device

- 1 Screw

## Disassembly

*Figure 8*  
**RAM Module Removal**

- Remove the screws from the component bay cover.
- Remove the component bay cover. The RAM modules will be visible at point **4** on the mainboard.

### 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.



### 3. Component Bay Cover

- 2 Screws

## Removing the System Memory (RAM)

The computer has two memory sockets for 204 pin Small Outline Dual In-line Memory Modules (SO-DIMM) supporting DDRIII (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.

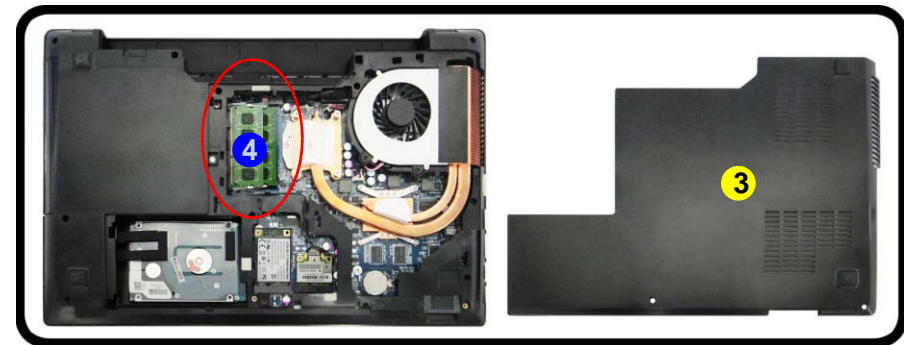
### Memory Upgrade Process

- Turn **off** the computer, turn it over, and remove the battery ([page 2 - 5](#)).
- Remove screws **1** - **2** from the component bay cover ([Figure 8a](#)).
- Carefully remove the bay cover **3**.
- The RAM modules will be visible at point **4** on the mainboard ([Figure 8b](#)).

a.



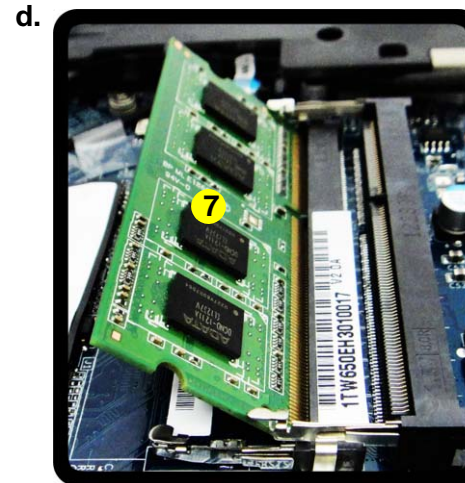
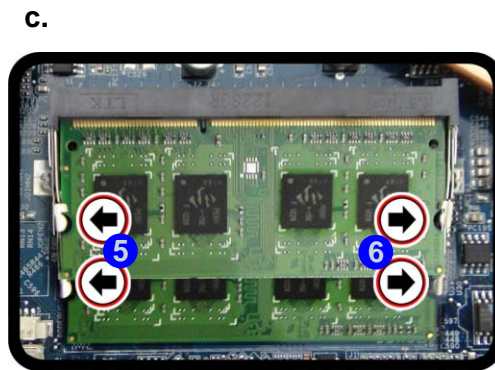
b.



- Gently pull the two release latches (5 & 6) on the sides of the memory socket in the direction indicated by the arrows (Figure 9c). The RAM module 7 will pop-up (Figure 9d), 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 component bay cover and the screws (see page 2 - 12).
- Restart the computer to allow the BIOS to register the new memory configuration as it starts up.

Figure 9  
RAM Module  
Removal (cont'd)

- Pull the release latches.
- Remove the module.



### Single Memory Module Installation

If your computer has a single memory module, then insert the module into the **Channel 0 (JDIMM1)** socket. In this case this is the **lower memory socket** (the socket closest to the mainboard).

### 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.

7. RAM Module

## Disassembly

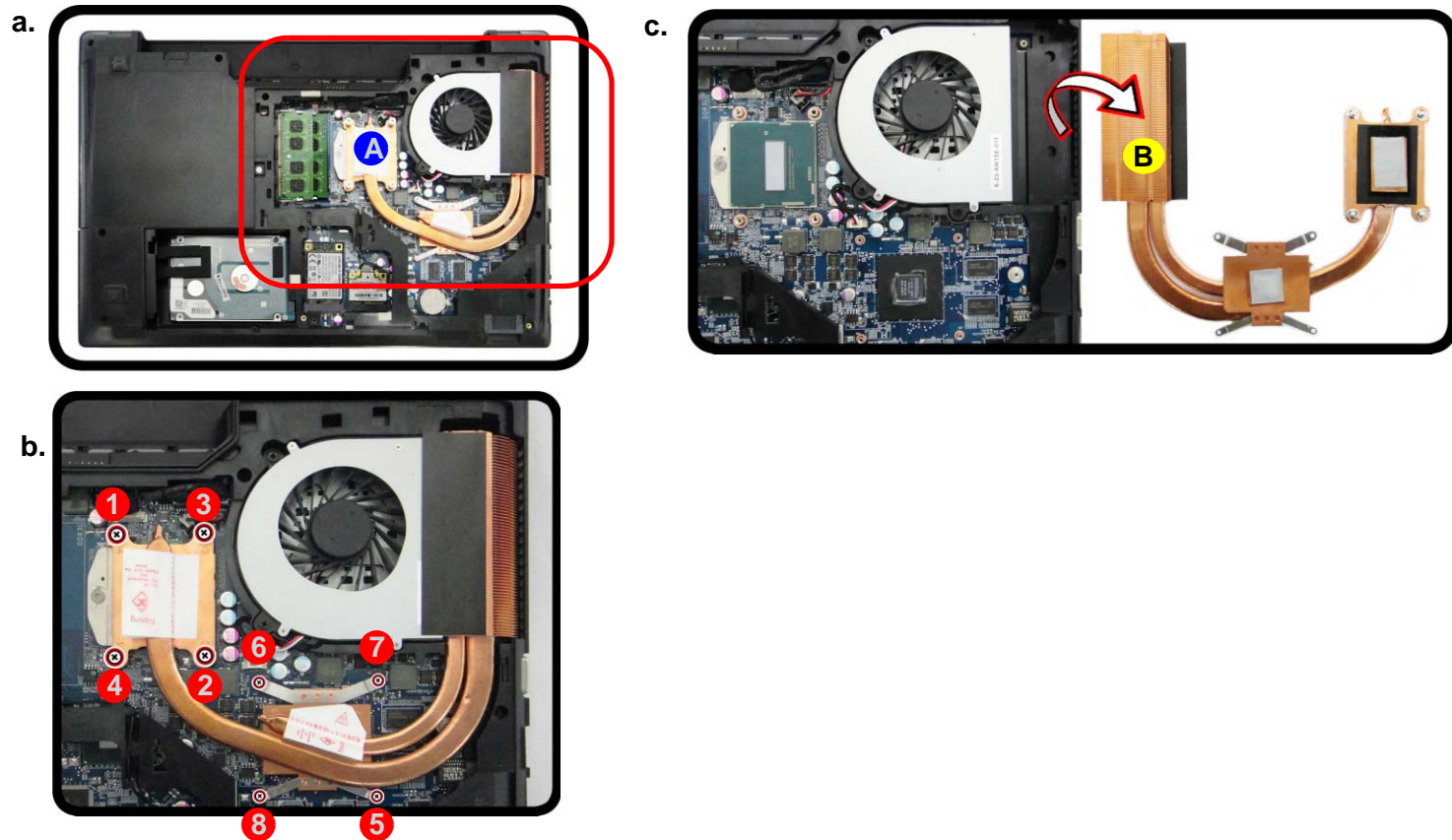
Figure 10  
Processor Removal


- Locate the CPU heat sink.
- Remove the screws.
- Carefully remove the heat sink unit.


## Removing and Installing a Processor

### Processor Removal Procedure

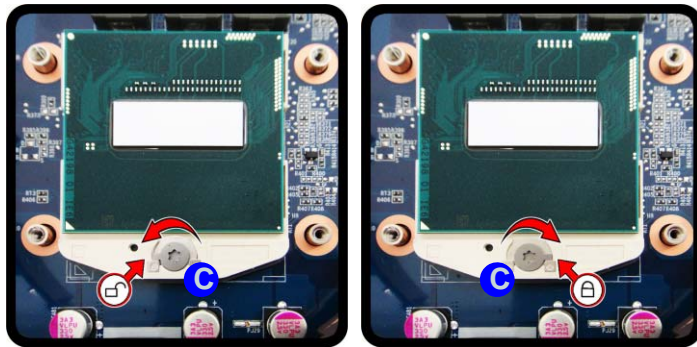
- Turn **off** the computer, turn it over, remove the battery ([page 2 - 5](#)) and the component bay cover ([page 2 - 7](#)).
- The CPU heat sink will be visible at point **A** ([Figure 10a](#)).
- Loosen the CPU heat sink screws in the order **8**, **7**, **6**, **5**, **4**, **3**, **2** & **1** (the reverse order as indicated on the label ([Figure 10b](#))).
- Carefully (it may be hot) remove the heat sink unit **B** off the computer ([Figure 10c](#)).



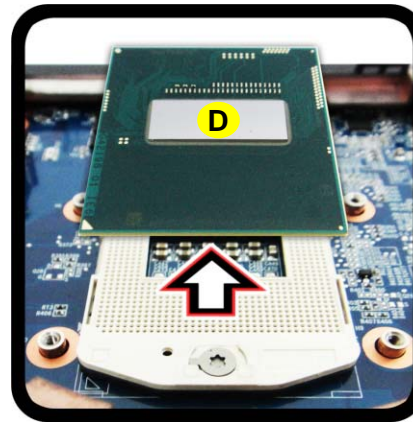
-  B. Heat Sink
- 8 Screws

- Turn the release latch **C** towards the unlock symbol  to release the CPU (**Figure 11f**).
- Carefully (it may be hot) lift the CPU **D** up and out of the socket (**Figure 11g**).
- Reverse the process to install a new CPU.
- When re-inserting the CPU, pay careful attention to the pin alignment, it will fit only one way (DO NOT FORCE IT!)

d.



e.



### Caution

The heat sink, and CPU area in general, contains parts which are subject to high temperatures. Allow the area time to cool before removing these parts.



D. CPU

*Figure 11*  
**Processor Removal**  
**(cont'd)**


- Turn the release latch to unlock the CPU.
- Lift the CPU out of the socket.

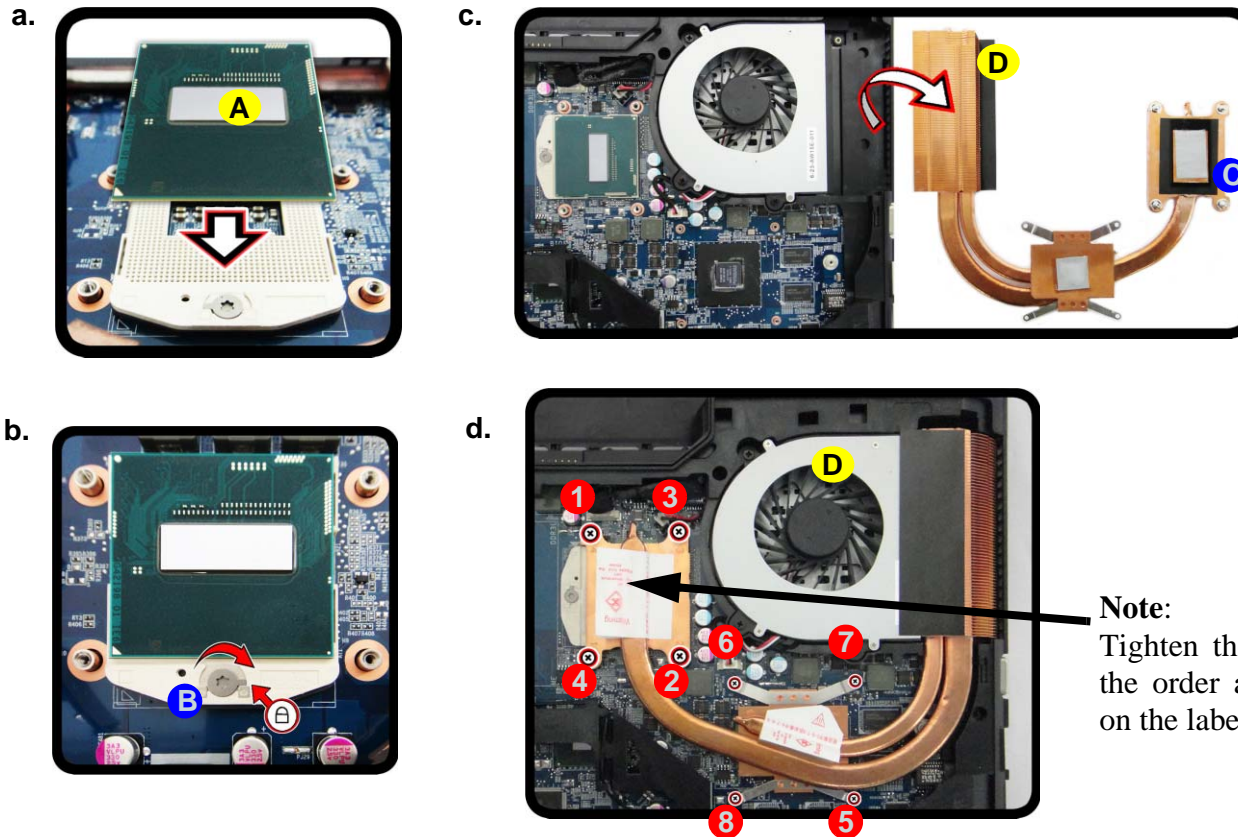
## Disassembly

*Figure 12*  
**Processor Installation**

- Insert the CPU.
- Turn the release latch towards the lock symbol.
- Insert the heat sink.
- Tighten the screws.

### Processor Installation Procedure

- Insert the CPU **A** (*Figure 12a*), and pay careful attention to the pin alignment; it will fit only one way (DO NOT FORCE IT!), and turn the release latch **B** towards the lock symbol  (*Figure 12b*).
- Remove the sticker **C**** (*Figure 12c*) from the heat sink unit (if it is a new unit).
- Insert the heat sink **D** as indicated in *Figure 12c*.
- Tighten the CPU heat sink screws in the order **1**, **2**, **3**, **4**, **5**, **6**, **7** & **8** (the order as indicated on the label and *Figure 12d*).
- Replace the CPU fan, component bay cover and tighten the screws (*page 2 - 14*).



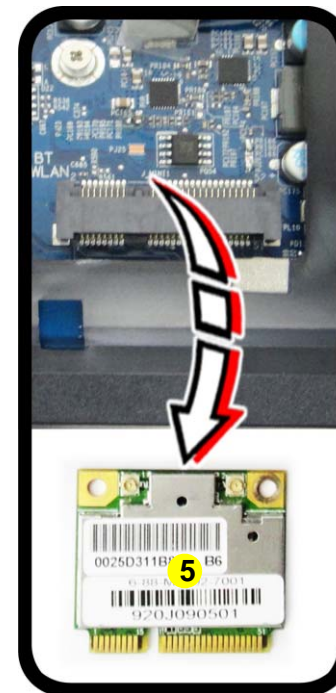
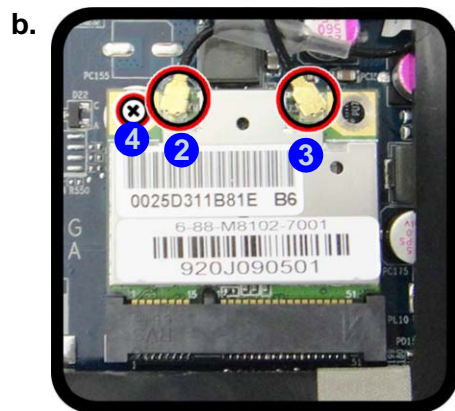
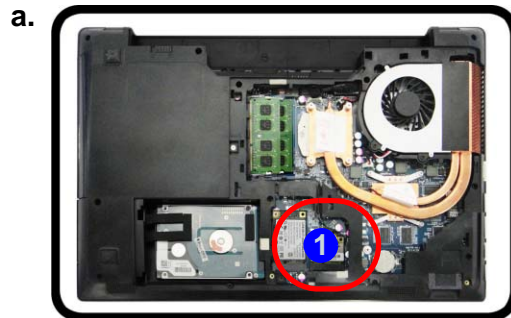
**Note:**  
Tighten the screws in the order as indicated on the label.

- A. CPU
- D. Heat Sink
- 4 Screws



## Removing the Wireless LAN Module


1. Turn **off** the computer, turn it over, remove the battery ([page 2 - 5](#)) and the component bay cover ([page 2 - 7](#)).
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

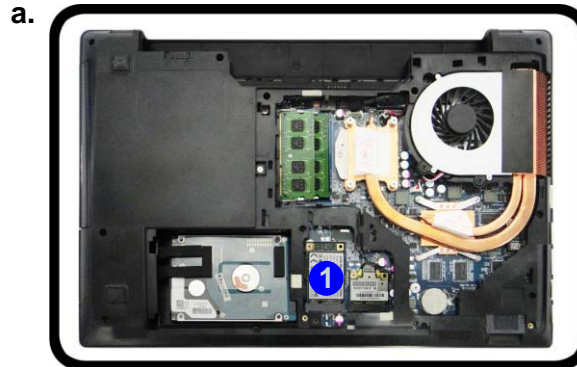
## Disassembly

*Figure 14*  
**MSATA Module  
 Removal**

- Locate the module.
- Remove the screw.
- The module will pop-up.
- Lift the module up off the socket.

## Removing the MSATA Module

- Turn **off** the computer, remove the battery ([page 2 - 14](#)), and component bay cover ([page 2 - 7](#)).
- Locate the module, it is visible at point **1** ([Figure 14a](#)).
- Carefully remove the screw **2** from the module ([Figure 14b](#)).
- Lift the module **3** up and off the computer ([Figure 14c](#)).

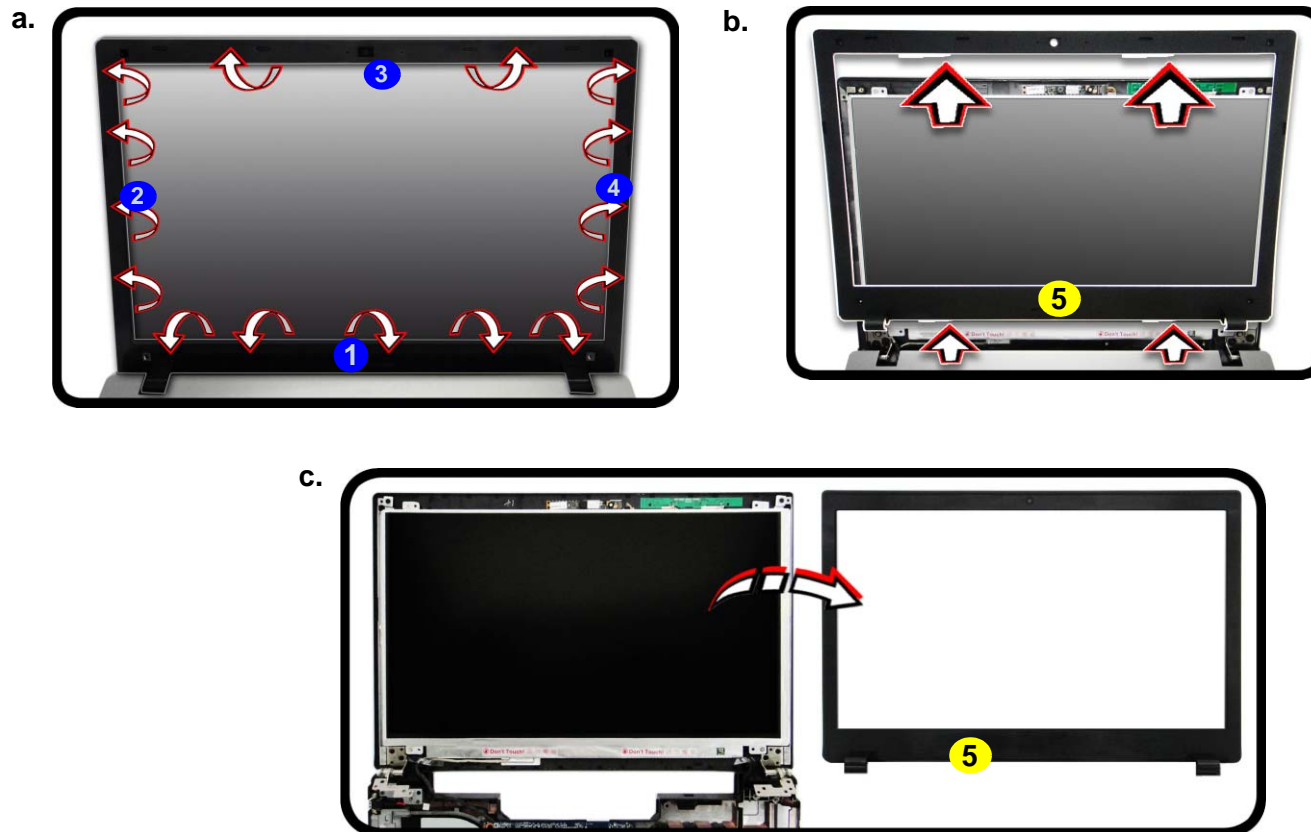


3. MSATA Module

- 1 Screw

## Removing the CCD

1. Turn **off** the computer, turn it over, and remove the battery ([page 2 - 14](#)).
2. Run your fingers around the inner frame of the LCD panel at the points as indicated by the arrows **1** - **4**.
3. Lay the computer down on a flat surface with the top case up forming a 90 degree angle. Push the LCD front cover **5** upwards before carefully lifting it up.
4. Remove the LCD front cover **5** ([Figure 15c](#)).



*Figure 15*  
CCD Removal

- a. Run your fingers around the inner frame of the LCD panel at the points indicated by the arrows.
- b. Lay the computer down on a flat surface with the top case up forming a 90 degree angle. Push the LCD front panel upwards before carefully lifting it up.
- c. Remove the LCD front cover.



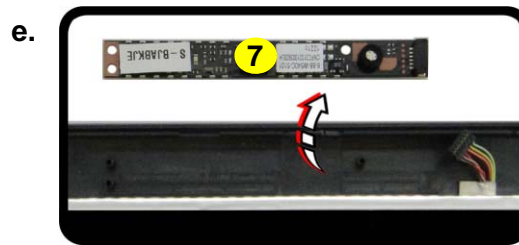
## Disassembly

---

*Figure 16*  
**CCD Removal**  
**(cont'd)**

- d. Disconnect the cable.
- e. Remove the CCD module.

- 5. Disconnect the cable **6**.
- 6. Remove the CCD module **7** (*Figure 16f*).
- 7. Reverse the process to install a new CCD module.



7. CCD Module

---

# Appendix A:Part Lists

This appendix breaks down the *W650SZ / W651SZ / W655SZ* series notebook's construction into a series of illustrations. The component part numbers are indicated in the tables opposite the drawings.

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

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

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

---

## Part List Illustration Location

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

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

Part	
Top	<i>page A - 3</i>
Bottom	<i>page A - 4</i>
COMBO	<i>page A - 5</i>
DVD Dual Drive	<i>page A - 6</i>
HDD	<i>page A - 7</i>
2nd HDD	<i>page A - 8</i>
LCD	<i>page A - 9</i>

# Top

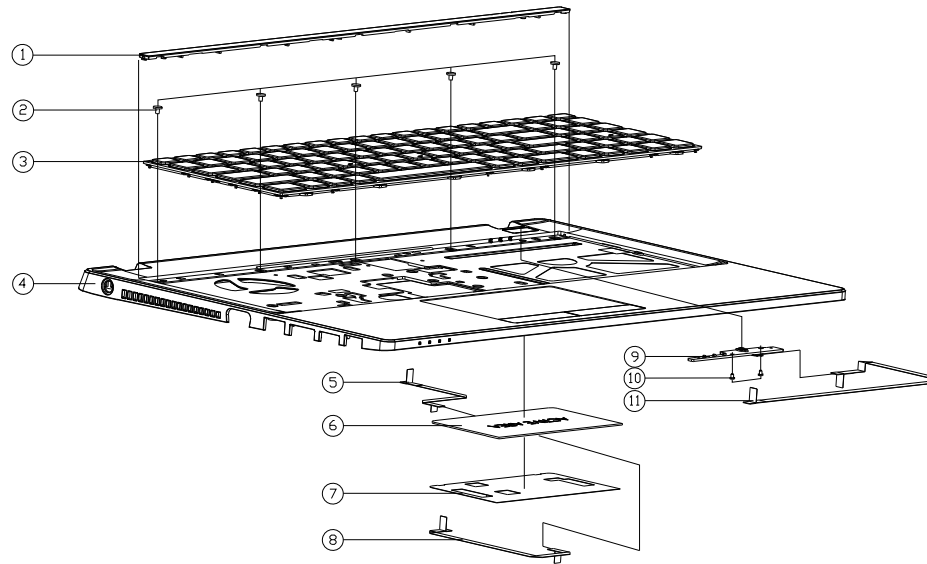
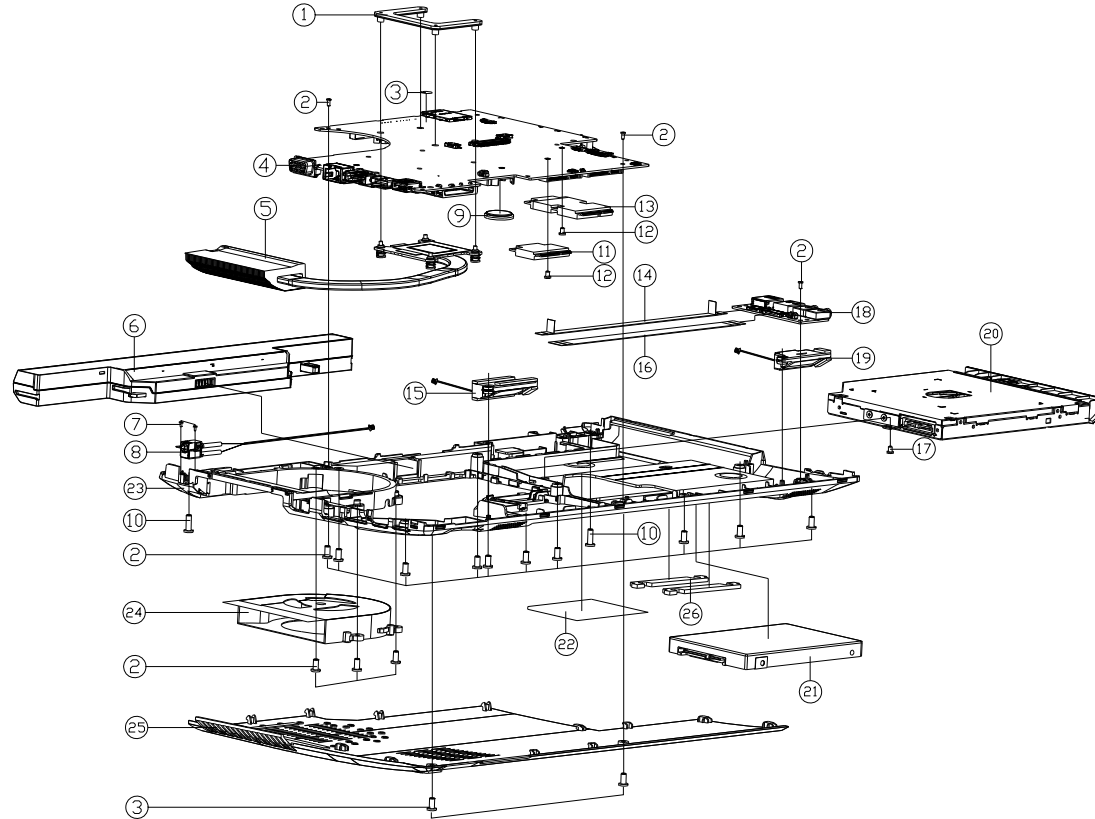


Figure A - 1  
Top

ITEM	PART NAME	PART NO	REMARK
1	KB COVER PC+ABS W650SR	6-42-W6502-043	FDR W650SX
1	EPSON KB COVER PC+ABS W652SH-E	6-42-W6522-010-E	FDR W652SH-E
2	SCREW M2X2.5L KI BK/2 ICT NY#35 T-03	6-35-B6120-2RB	
3	VNB KB ISOLATION FRAME(05) MODULE W650R	6-79-W650SRW-010-W	
4	TOP CASE MODULE W650SR(CHANGE)	6-39-W6502-015	FDR W650SX
4	TOP CASE MODULE (EPSON) W652SH-E	6-39-W6522-010-E	FDR W652SH-E
5	FFC CABLE FOR TP_OUT TO NB 4PIN OSD W650R	6-43-W6500-021	
6	TOUCH PAD ELAN SA055D-6200 W650EH	6-49-W65E3-010	
7	TOUCH PAD W650R(0055455) BLACK PE/VEA W650R	6-40-W6502-023	
8	FFC CABLE FOR TP_OUT TO NB 4PIN OSD W650S	6-43-W6500-031	
9	POWER SWITCH BOARD V3.0A W650EH	6-77-W650S-003A-A	
10	SCREW M2X3L KI NI ICT NY 100#445,01#044	6-35-B1120-3RE	
11	FFC CABLE FOR POWER BOARD TO NB 10PIN OSD W650R	6-43-W6500-011	

# Bottom

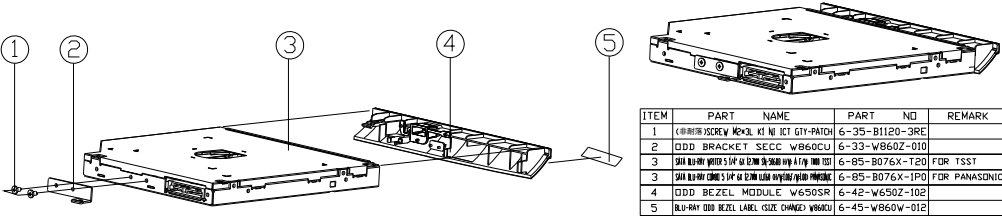
Figure A - 2  
Bottom



ITEM	PART NAME	PART NO	REMARK
1	CPU SUPPORT BRACKET SECC T=1.5 P150MM	6-33-X510S-011	
2	SCREW M2.5*6L K BZ ICT NY	6-35-B2125-6RA	
3	MYLAR D10 FR83 M760S	6-40-M760S-010	
4	MAIN BOARD V30 (W/3D) W650SZ	6-77-W650SZ00-003	
4	MAIN BOARD V30 (W/D 3D) W650SZ	6-77-W650SZ00-003-1	
4	MAIN BOARD V30 (W/E/W/P/W/VIDEO CHARGE) W650SZ	6-77-W650SZ00-003-2	
5	CPU HEATSINK MODULE W650SZ	6-31-W65SN-100	
6	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-87-W650S-4D7A2	(OPTION)
6	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-87-W650S-4D4A2	(OPTION)
6	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-87-W650S-4E71	(OPTION)
7	SCREW M2.6*3L KT-12 (E-45) BZ ICT NY	6-35-B2116-3R5	
8	ICE CABLE FOR 3.5" SATA (OPTIONAL) (OPTIONAL) (OPTIONAL)	6-43-W15E0-040	
9	BATTERY 3V ZIGBAG CR2032 (MITSUBISHI)	6-23-6201S-607	
10	SCREW M2.5*6L K1 BK/Z NY ICT	6-35-B6125-6R0	
11	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-88-P17EF-4200	(OPTION)
11	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-88-W345F-9400	(OPTION)
11	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-88-W345F-7000	(OPTION)
11	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-88-W253F-4200	(OPTION)
11	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-88-P3702-9400	(OPTION)
11	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-88-P3702-7000	(OPTION)
12	SCREW M2*3L KT BK/Z ICT NY (R35 L=0.3)	6-35-B6120-3RE	
13	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-85-D4032-L02	(OPTION)
13	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-88-W650W-8800	(OPTION)
14	FFC CABLE FOR HD TO AUDIO BOARD (2PIN HD) W650SR	6-43-W6500-042	
15	SPK CABLE L (SMA) (2PINS) 2W 40 MM SPK (W650SR)	6-23-W655E-0L1	
16	FFC CABLE HD TO AUDIO BOARD (2PIN HD) W650SR	6-43-W650E-022	
17	SCREW M2*3L KT NI ICT NY (OD=4.5,DT=0.4)	6-35-B1120-3RE	
18	AUDIO BOARD V5.0 W650SR	6-77-W6508-005	
19	SPK CABLE R (SMA) (2PINS) 2W 40 MM SPK (W650SR)	6-23-W655E-0R1	
20	W/D 2ND HDD ASS'Y W650SR	6-79-W650SR0J-010	
20	W/D 2ND HDD ASS'Y W650SR	6-79-W650SR0J-020	
20	W/D HDD ASS'Y W650SR	6-79-W650SR0Z-000	
20	SATA DVD SUPER MULTI ASSY (OPTION)	6-79-W650SR0W-010	
20	SATA Blu-RAY WRITER/COMBO ASSY (OPTION)	6-79-W650SR0W-000	
21	W/D HDD ASS'Y W650EH	6-79-W650EH0J-010	
21	W/HDD ASS'Y W650EH	6-79-W650EH0J-020	
22	PRODUCT LABEL FOR W650SZ	6-45-W650Z03-010	
23	BOTTOM CASE MODULE W650SR	6-39-W6503-013	
24	OPTIONAL BATTERY FOR SPINNING MEDIA DRIVE (OPTIONAL) (OPTIONAL)	6-23-AW15E-011	
25	CPU COVER MODULE W650SR	6-42-W6508-103	
26	SPK (OPTIONAL) CABLE FOR 7MM HD (W650)	6-47-0019A-760	ONLY FOR 7MM HDD



# COMBO

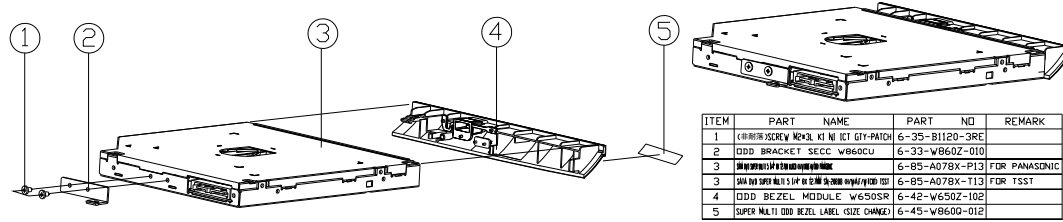


ITEM	PART NAME	PART NO	REMARK
1	〔ネジ〕 ねじ M2x3.5 KI NI ICT GY-PATCH	6-35-B1120-3RE	
2	DDD BRACKET SECC WB60CU	6-33-WB60Z-010	
3	〔DVD-RWドライブ〕 DVD-RWドライブ 12cm 24X 160MB	6-85-B076X-T20	FOR 1SS1
3	〔DVD-RWドライブ〕 DVD-RWドライブ 12cm 24X 160MB	6-85-B076X-1P0	FOR PANASONIC
4	DDD BEZEL MODULE W650SR	6-42-W650Z-102	
5	〔DVD-RWドライブ〕 DVD BEZEL LABEL (SIZE CHANGED) WB60CU	6-45-WB60W-012	

Figure A - 3  
COMBO

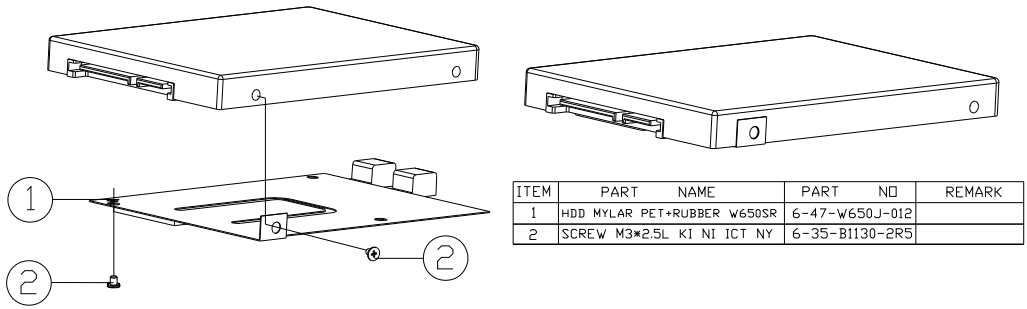
# DVD DUAL

Figure A - 4  
DVD DUAL



ITEM	PART NAME	PART NO	REMARK
1	ODD BEZEL MODULE W/SLIP KIT (CT-DY-PA10H)	6-35-B1120-3RE	
2	ODD BRACKET SECC W/BEZEL	6-33-W8602-010	
3	ODD BEZEL MODULE W/SLIP KIT (CT-DY-PA10H)	6-85-A078X-P13	FOR PANASONIC
3	ODD BEZEL MODULE W/SLIP KIT (CT-DY-PA10H)	6-85-A078X-T13	FOR TSSST
4	ODD BEZEL MODULE W/650SR	6-42-W6502-102	
5	SUPER MULTI ODD BEZEL LABEL SIZE CHANGE	6-45-W8600-012	

# HDD



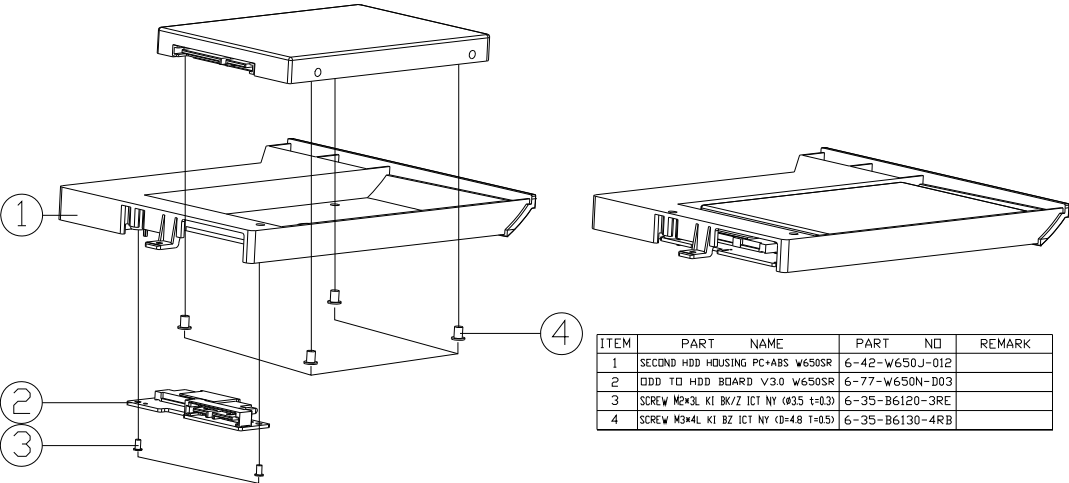
ITEM	PART NAME	PART NO	REMARK
1	HDD MYLAR PET+RUBBER W650SR	6-47-W650J-012	
2	SCREW M3*2.5L K1 NI ICT NY	6-35-B1130-2R5	

Figure A - 5  
HDD

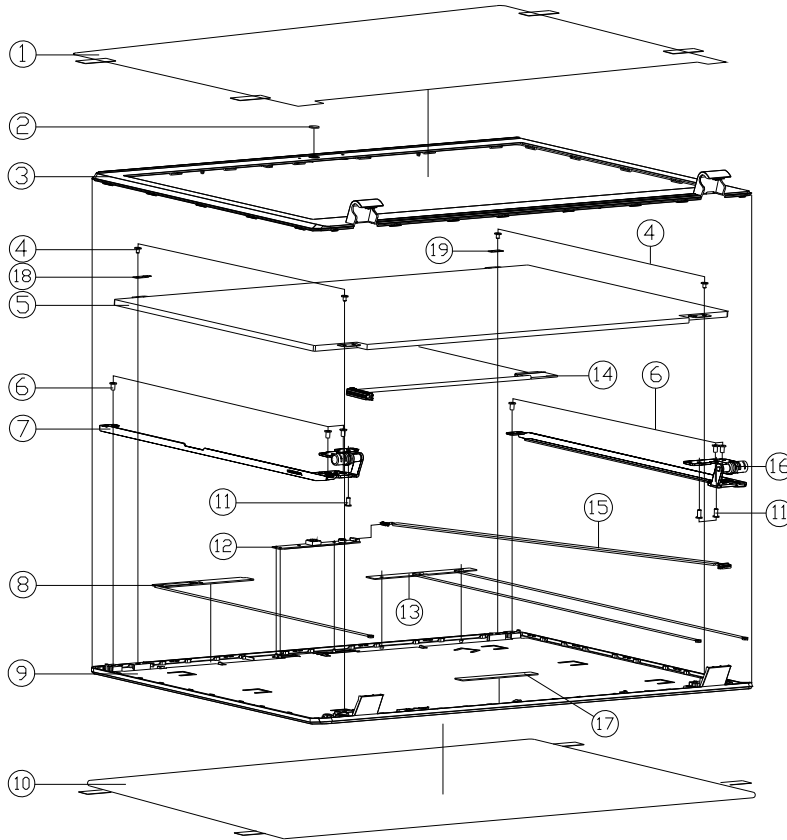


# 2nd HDD

Figure A - 6  
2nd HDD



# LCD



ITEM	PART NAME	PART NO	REMARK
1	LED FRONT COVER PROTECTION MILAR GREY-20000 CS200	6-40-E5101-030-1	
2	CCD LENS PMMA W650SR	6-42-W6501-010	
3	LCD FRONT COVER MODULE W650SR	6-39-W6501-014	FDR W650SX
3	LCD FRONT COVER MODULE OPTION LOOZ W650SH	6-39-W6521-010-E	FDR W652SH-E
4	SCREW M2x4 K1 W ICT NY 08-44501-040	6-35-B1120-3RE	
5	LCD 15.6" FHD LG LP156VH4-SL18 G3ANN LED IPS	6-50-LB234-L02	OPTION
5	LCD 15.6" FHD LG LP156VH4-SL18 G3ANN LED	6-50-LB234-L01	OPTION
5	LCD 15.6" HD LG LP156VH3-TL11 QLED 38 W	6-50-L8138-L02	OPTION
5	LCD 15.6" HD LG LP156VH3-TL11 QLED 38 W	6-50-L8138-L03	OPTION
5	LCD 15.6" HD AU B156VH4 V6 G38MO LED	6-50-L8138-G01	OPTION
5	LCD 15.6" HD LG LP156VH3-TLE1 QLAKE TYPE3	6-50-L8138-L00	OPTION
5	LCD 15.6" HD LG LP156VH3-TL11 QLED 38 W	6-50-L8138-L01	OPTION
5	LCD 15.6" HD AU B156VH33 QLAKE TYPE G32MO LED	6-50-L8132-G00	OPTION
5	LCD 15.6" HD AU B156VH334 G32MO LED	6-50-L8132-G01	OPTION
5	LED 15.6" FHD CHAMEL W650E-L81 QLAKE TYPE3 QLED 32 W	6-50-LB232-D00	OPTION
5	LED 15.6" FHD CHAMEL W650E-L81 QLED 32 W	6-50-LB232-D01	OPTION
6	SCREW M2.5x4L X11-05 B-45 Bx7Z ICT	6-35-B6125-4R0	
7	LCD HINGE L (CSK7+SECC) W650SR	6-33-W6501-0L4	
8	WIRE CABLE FOR CCD 500MM (4L) W650SR	6-43-W6501-011	FDR W650SR/SZ
8	WIRE CABLE FOR CCD 500MM (4L) W650SH	6-43-W6501-010	FDR W650SH/CH-E
9	LCD BACK COVER MODULE W650SR	6-39-W6501-024	FDR W650SR/CH
9	LCD BACK COVER MODULE OPTION LOOZ W650SH-E	6-39-W6521-020-E	FDR W652SH-E
10	LCD BACK COVER PROTECTION MILAR GREY-20000 W650SR	6-40-W6508-010	FDR W650SR/CH/CH-E
10	LCD BACK COVER PROTECTION MILAR GREY-20000 CS200	6-40-E5101-041	FDR W650SZ/SH
11	SCREW M2.5x6L K BZ ICT NY	6-35-B2125-6RA	
12	WIRE CABLE FOR CCD 500MM (4L) W650SR	6-43-W6501-011	OPTION
12	WIRE CABLE FOR CCD 500MM (4L) W650SH	6-43-W6501-010	OPTION
12	WIRE CABLE FOR CCD 500MM (4L) W650SR	6-43-W6501-011	OPTION
12	WIRE CABLE FOR CCD 500MM (4L) W650SH	6-43-W6501-010	OPTION
13	WIRE CABLE FOR CCD 500MM (4L) W650SR	6-43-W6501-011	OPTION
13	WIRE CABLE FOR CCD 500MM (4L) W650SH	6-43-W6501-010	OPTION
14	WIRE CABLE FOR CCD 500MM (4L) W650SR	6-43-W6501-011	FDR (FULL HD)
14	WIRE CABLE FOR CCD 500MM (4L) W650SH	6-43-W6501-010	FDR (HD)
15	WIRE CABLE FOR CCD 500MM (4L) W650SR	6-43-W6501-011	
16	LCD HINGE R (CSK7+SECC) W650SR	6-33-W6501-0R4	
17	BACK COVER SPONGE (654x42) EC-28 W650SR	6-47-0019A-655	FDR W650SR/CH/CH-E
18	LCD BRACKET L (CSUS304 02T) W650SR	6-33-W6501-1L0	ONLY FOR 6-50-LB234-L01
19	LCD BRACKET R (CSUS304 02T) W650SR	6-33-W6501-1R0	ONLY FOR 6-50-LB234-L01

Figure A - 7  
LCD



# Appendix B: Schematic Diagrams

This appendix has circuit diagrams of the *W650SZ / W651SZ / W655SZ* 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>VGA I/O - Page B - 18</i>	<i>HDD, TP, Audio, USB - Page B - 34</i>
<i>Processor 1/7-DMI, FDI, PEG - Page B - 3</i>	<i>VGA NVVDD Decoupling - Page B - 19</i>	<i>HDMI, RJ45, Fan, KBC, LED - Page B - 35</i>
<i>Processor 2/7- CLK, MISC - Page B - 4</i>	<i>CRT, Holes - Page B - 20</i>	<i>AUDIO CODEC VT1802S - Page B - 36</i>
<i>Processor 3/7- (DDR3) - Page B - 5</i>	<i>Lynx 1/9 - Page B - 21</i>	<i>KBC-ITE IT8587 - Page B - 37</i>
<i>Processor 4/7- Power - Page B - 6</i>	<i>Lynx 2/9 - Page B - 22</i>	<i>5VS, 3VS, 3.3VM, 5VM - Page B - 38</i>
<i>Processor 5/7- GFX PWR - Page B - 7</i>	<i>Lynx 3/9 - Page B - 23</i>	<i>1.05V - Page B - 39</i>
<i>Processor 6/7- GND - Page B - 8</i>	<i>Lynx 4/9 - Page B - 24</i>	<i>VDD3, VDD5 - Page B - 40</i>
<i>Processor 7/7- RSVD - Page B - 9</i>	<i>Lynx 5/9 - Page B - 25</i>	<i>1.5V or 1.35V / 0.75VS, 1.5VS - Page B - 41</i>
<i>DDR3 SO-DIMM_1 - Page B - 10</i>	<i>Lynx 6/9 - Page B - 26</i>	<i>POWER VCORE - Page B - 42</i>
<i>DDR3 SO-DIMM_2 - Page B - 11</i>	<i>Lynx 7/9 - Page B - 27</i>	<i>N14P, NVVDD, PEX, FBVDDQ - Page B - 43</i>
<i>PS8625 - Page B - 12</i>	<i>Lynx 8/9 - Page B - 28</i>	<i>AC IN, CHARGER - Page B - 44</i>
<i>PANEL, INVERTER - Page B - 13</i>	<i>Lynx 9/9 - Page B - 29</i>	<i>AUDIO BOARD - Page B - 45</i>
<i>VGA PCI-E Interface - Page B - 14</i>	<i>3G, WLAN, PCIE, CON - Page B - 30</i>	<i>POWER SWITCH BOARD - Page B - 46</i>
<i>VGA Frame Buffer Interface - Page B - 15</i>	<i>USB Charge, CCD, TPM, Power Con - Page B - 31</i>	<i>ODD to HDD BOARD - Page B - 47</i>
<i>VGA Frame Buffer A - Page B - 16</i>	<i>eSATA/USB3.0, LED - Page B - 32</i>	
<i>VGA Frame Buffer C - Page B - 17</i>	<i>Card Reader (RTL8411) - Page B - 33</i>	

*Table B - 1*  
**SCHEMATIC  
DIAGRAMS**

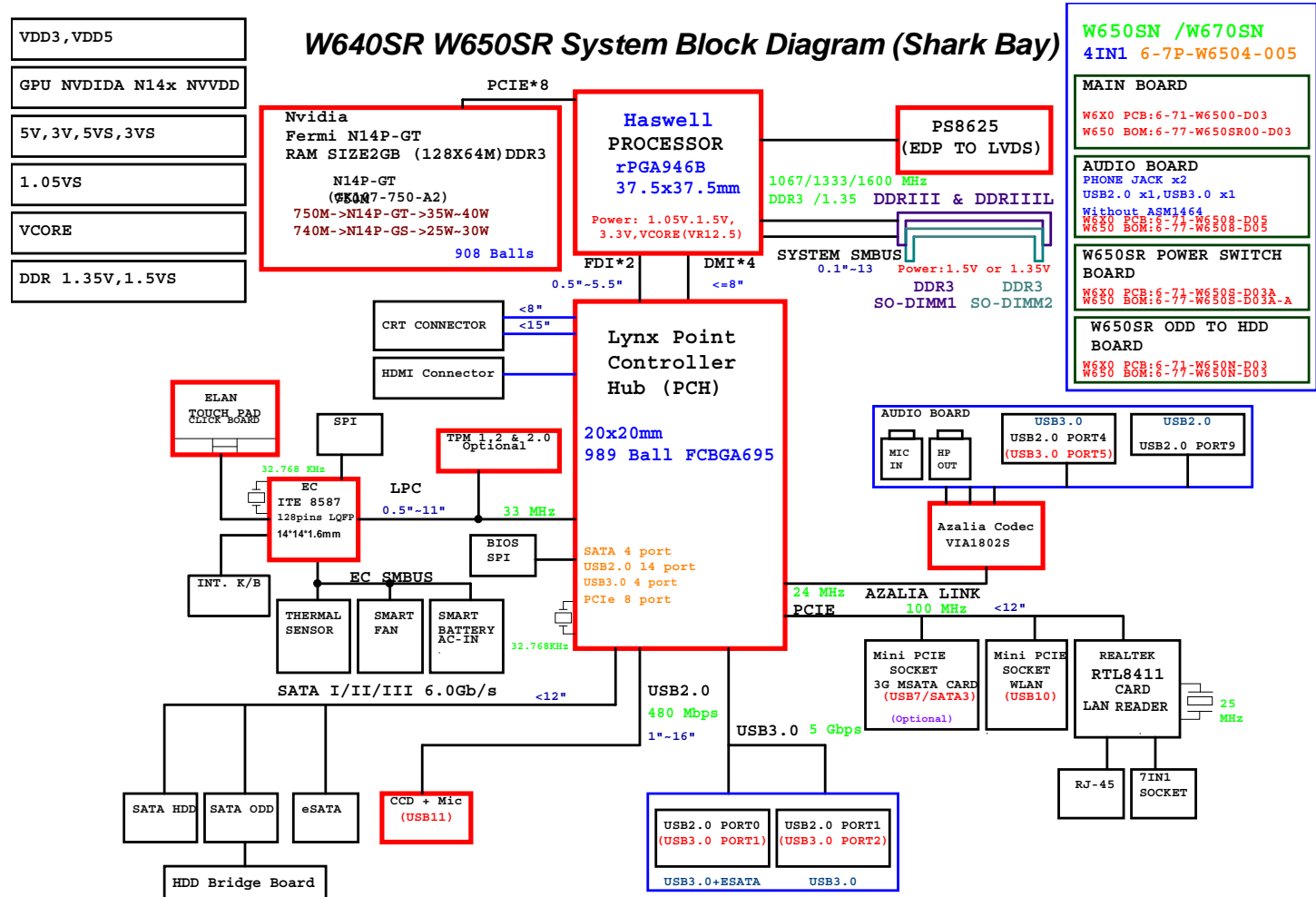


**Version Note**

The schematic diagrams in this chapter are based upon version 6-7P-W6504-005. If your mainboard (or other boards) are a later version, please check with the Service Center for updated diagrams (if required).

# System Block Diagram

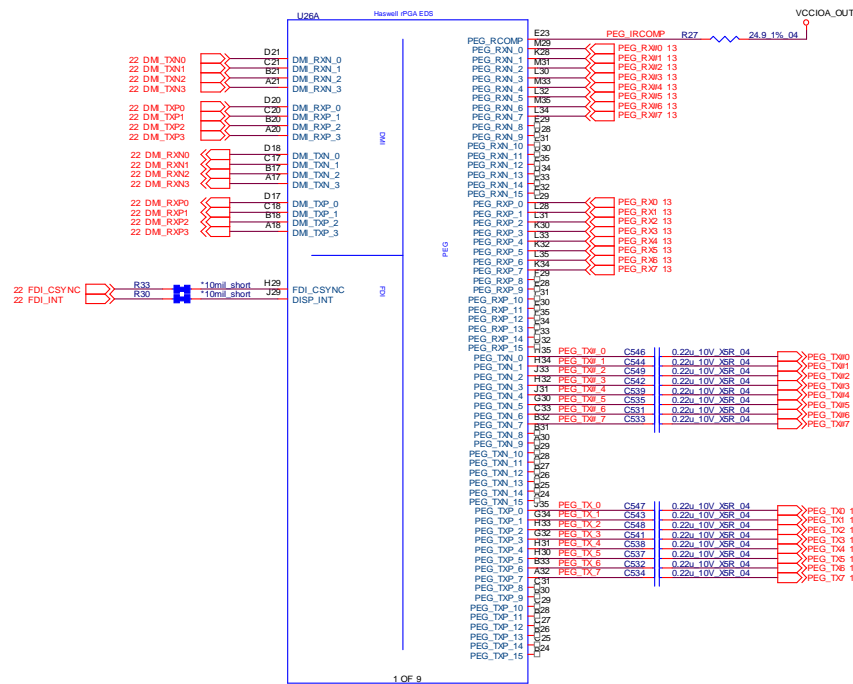
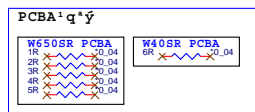
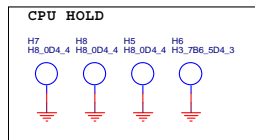
Sheet 1 of 46  
System Block  
Diagram





# Processor 1/7-DMI, FDI, PEG

## Haswell rPGA Processor 1/7 ( DMI,PEG,FDI )

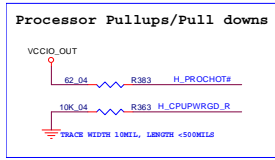


Sheet 2 of 46  
Processor 1/7-DMI,  
FDI, PEG

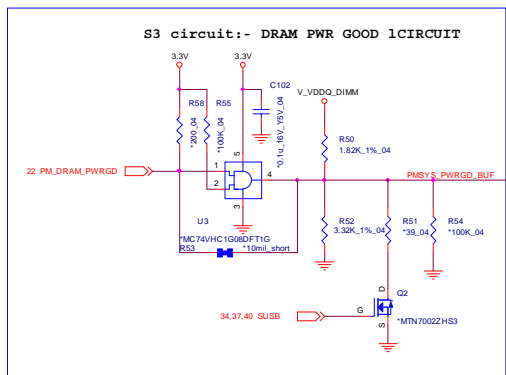
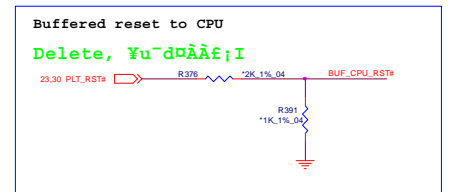
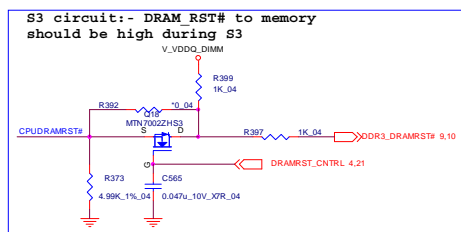
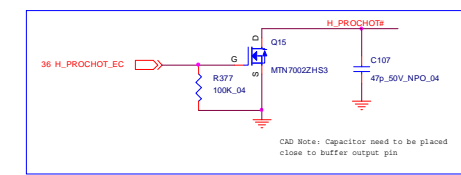
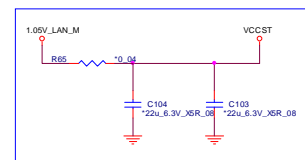
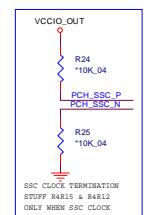
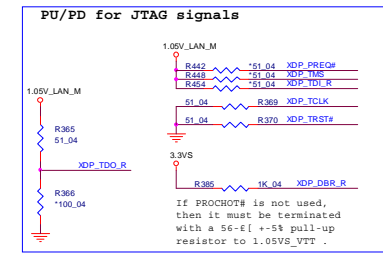
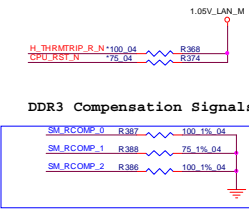
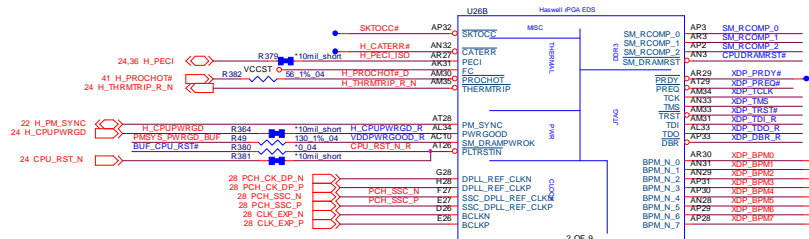
B.Schematic Diagrams

# Processor 2/7- CLK, MISC

Sheet 3 of 46  
Processor 2/7-CLK,  
MISC



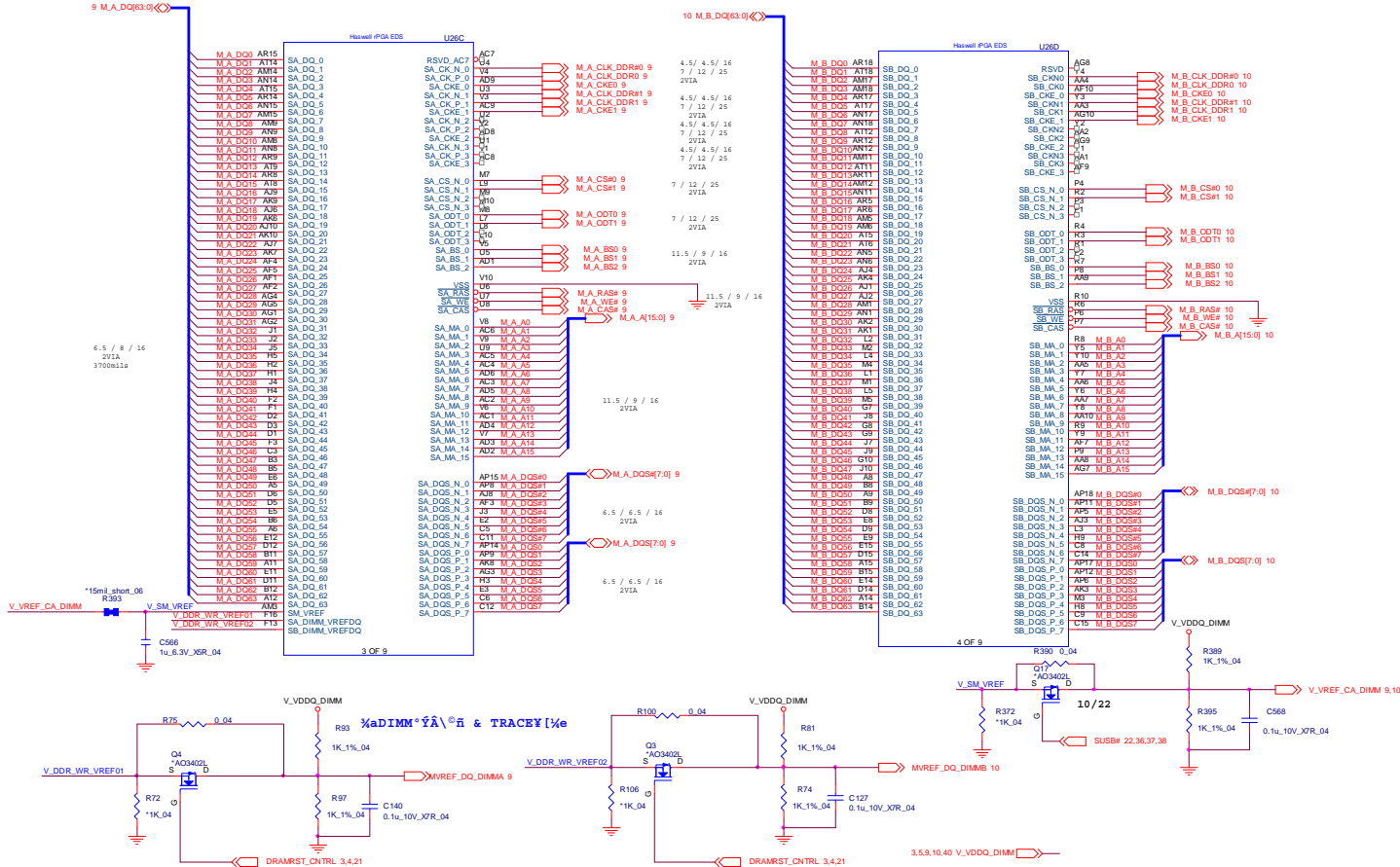
## Haswell Processor 2/7 (CLK, MISC, JTAG)



- 4.5,9,10,40 V\_VDDQ\_DIMM
- 6,8 VCCIO\_OUT
- 6,26,27,38,41,42,1,05V\_LAN\_M
- 2,12,17,20,24,25,27,28,29,31,33,35,37,38,40,42 3.3V
- 6,9,10,11,12,19,20,21,22,23,24,26,27,28,29,30,31,32,33,34,35,36,37,41 3.3VS

# Processor 3/7- (DDR3)

## Haswell Processor 3/7 ( DDR3 )



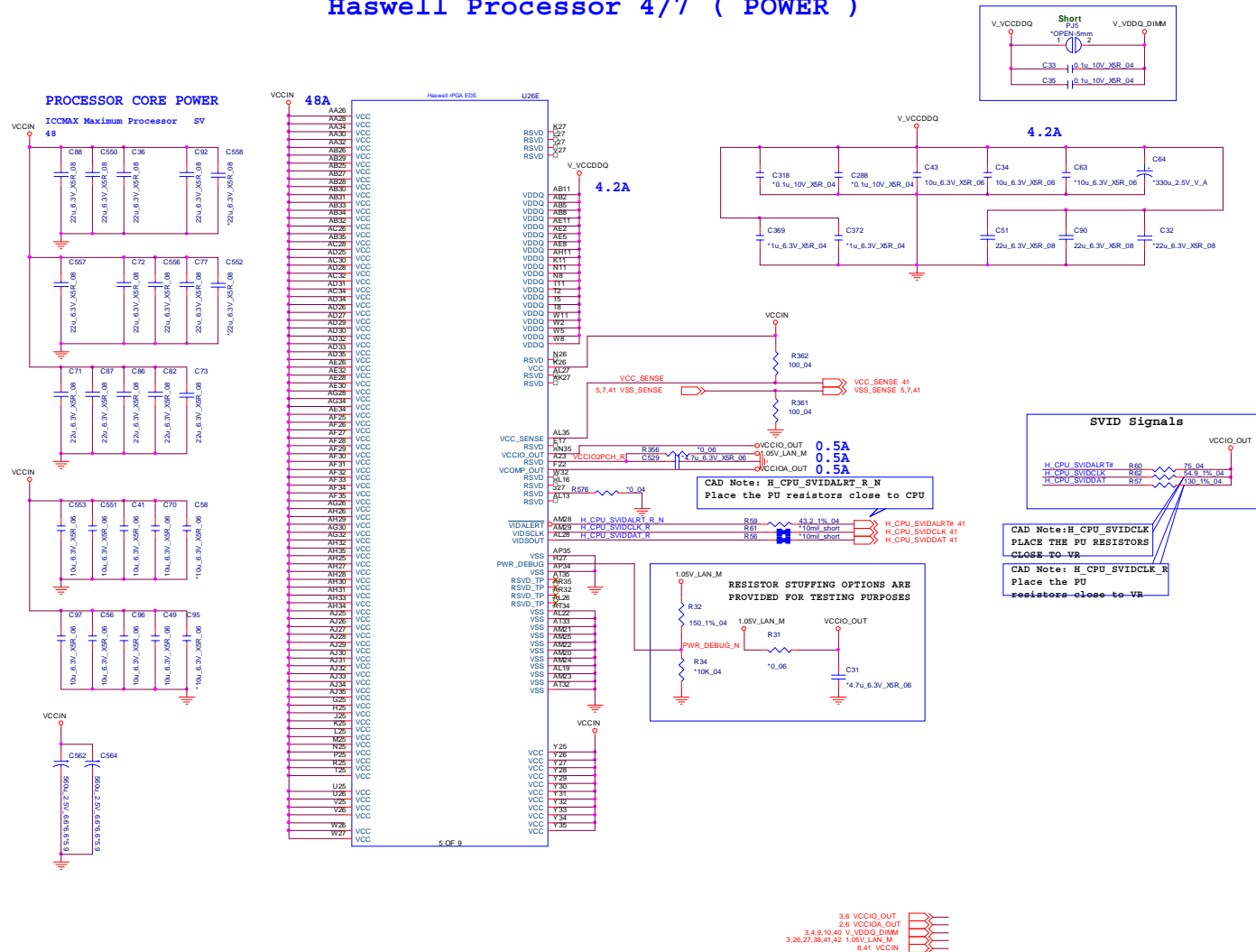
Sheet 4 of 46  
 Processor 3/7-  
 (DDR3)

B.Schematic Diagrams

# Processor 4/7- Power

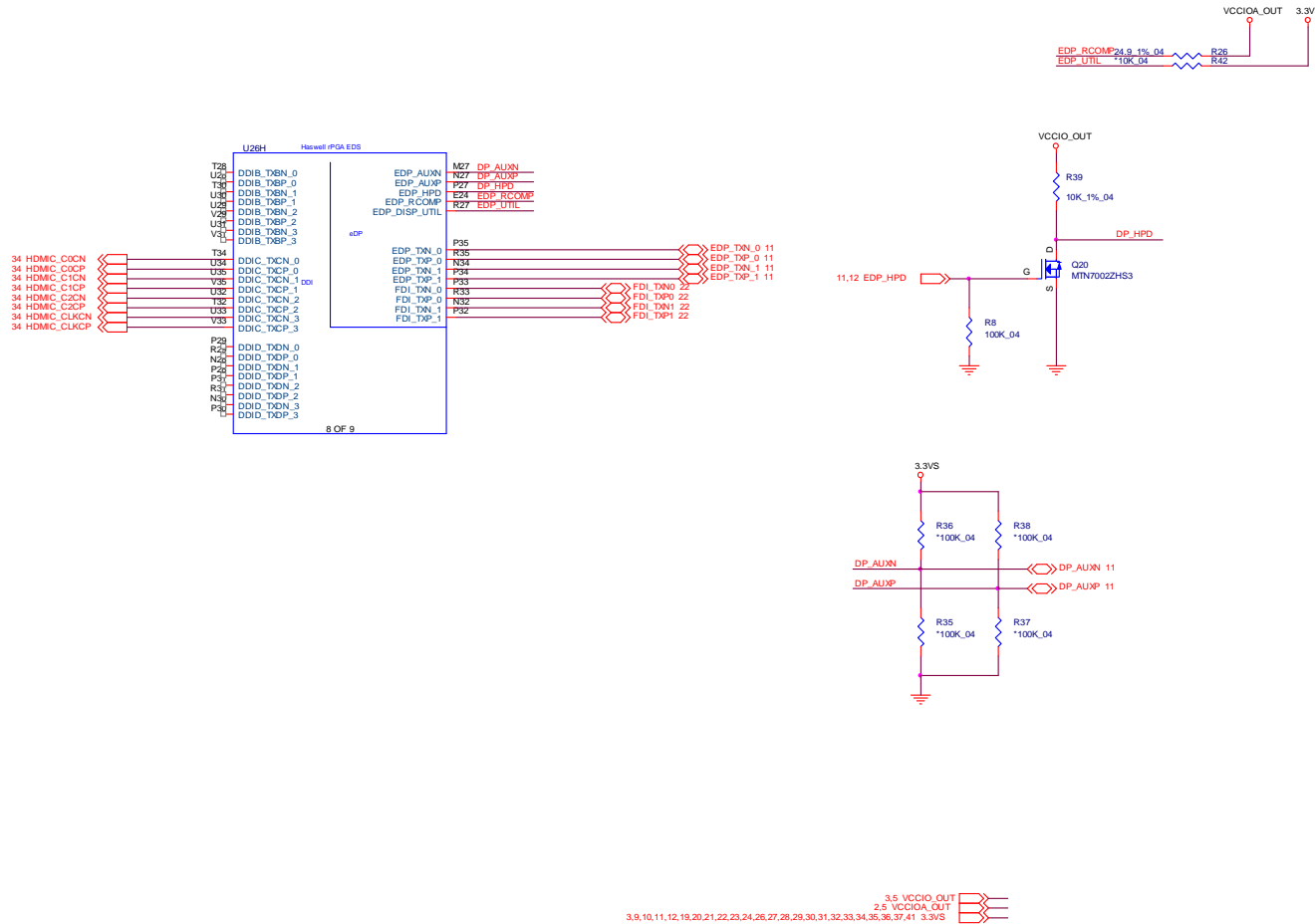
## Haswell Processor 4/7 ( POWER )

Sheet 5 of 46  
Processor 4/7-  
Power



# Processor 5/7- GFX PWR

## Haswell Processor 5/7 ( GRAPHICS POWER )

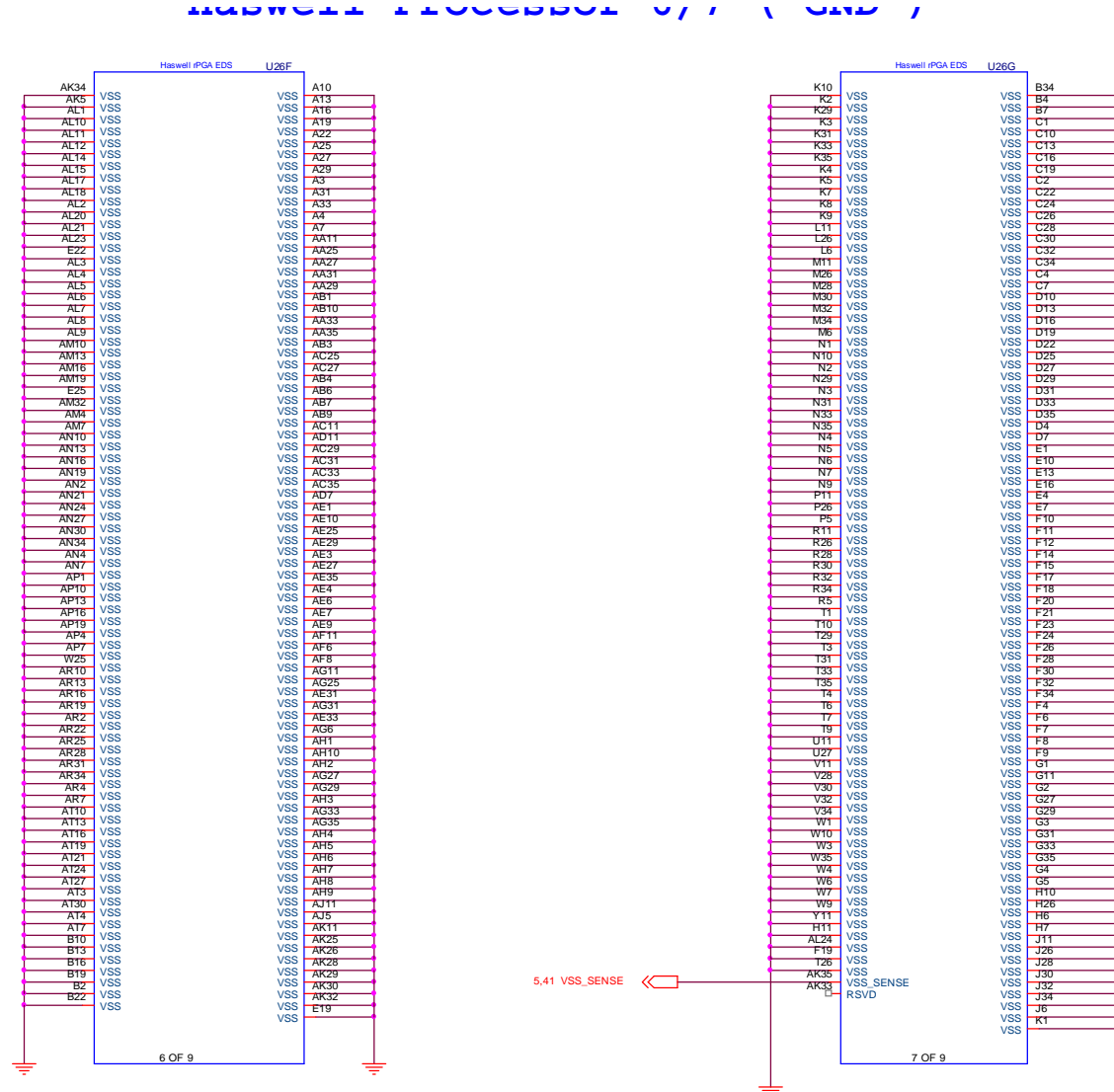


Sheet 6 of 46  
 Processor 5/7- GFX  
 PWR

Schematic Diagrams

Processor 6/7- GND

Sheet 7 of 46  
Processor 6/7- GND



# Processor 7/7- RSVD

## Haswell Processor 7/7 ( RESERVED )

B.Schematic Diagrams

**CFG Straps for Processor**

PCI EXPRESS STATIC LANE REVERSAL FOR ALL PEG PORTS

CFG2	1: (DEFAULT)NORMAL OPERATION; (Default) LANE# DEFINITION MATCHES 0: LANE REVERSAL
------	---

**DISPLAY PORT PRESENCE STRAP**

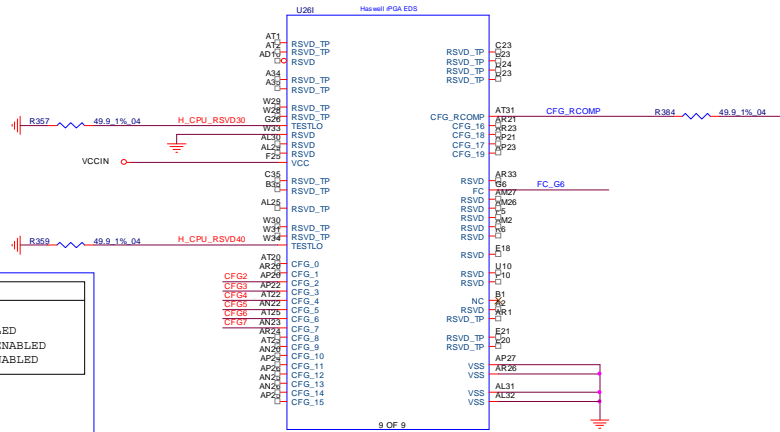
CFG4	1: DISABLED; NO PHYSICAL DISPLAY PORT ATTACHED TO EMBEDDED DISPLAY PORT 0:ENABLED; AN EXTERNAL DISPLAY PORT DEVICE AN EXTERNAL DISPLAY PORT DEVICE IS CONNECTED TO THE EMBEDDED DISPLAY PORT
------	---

**PCIe Port Bifurcation Straps**

CFG [6 : 5]	11: DEVICE1 FUNTION 1, DEVICE 1 FUNCTION2 DISABLED 10: DEVICE1 FUNCTION1 ENABLED DEVICE1 FUNCTION 2 DISABLED 01: DEVICE 1 FUNCTION 1 DISABLED, DEVICE 1 FUNCTION 2 ENABLED 00: DEVICE 1 FUNCTION 1 ENABLED, DEVICE 1 FUNCTION 2 ENABLED
-------------	--

**DEFENSIVE PULL DOWN SITE**

**NOTE:**  
PHYSICAL\_DEBUG\_ENABLED (DFX PRIVACY)  
0 : ENABLED SET DFX ENABLED BIT IN DEBUG INTERFACE MSR  
1 : DISABLED



**NOTE:**  
RESERVE THIS CIRCUIT FOR FUTURE COMPATIBILITY

5.41 VCCIN

Sheet 8 of 46  
Processor 7/7-  
RSVD

# DDR3 SO-DIMM\_1

## SO-DIMM A\_0

CHANGE TO STANDARD

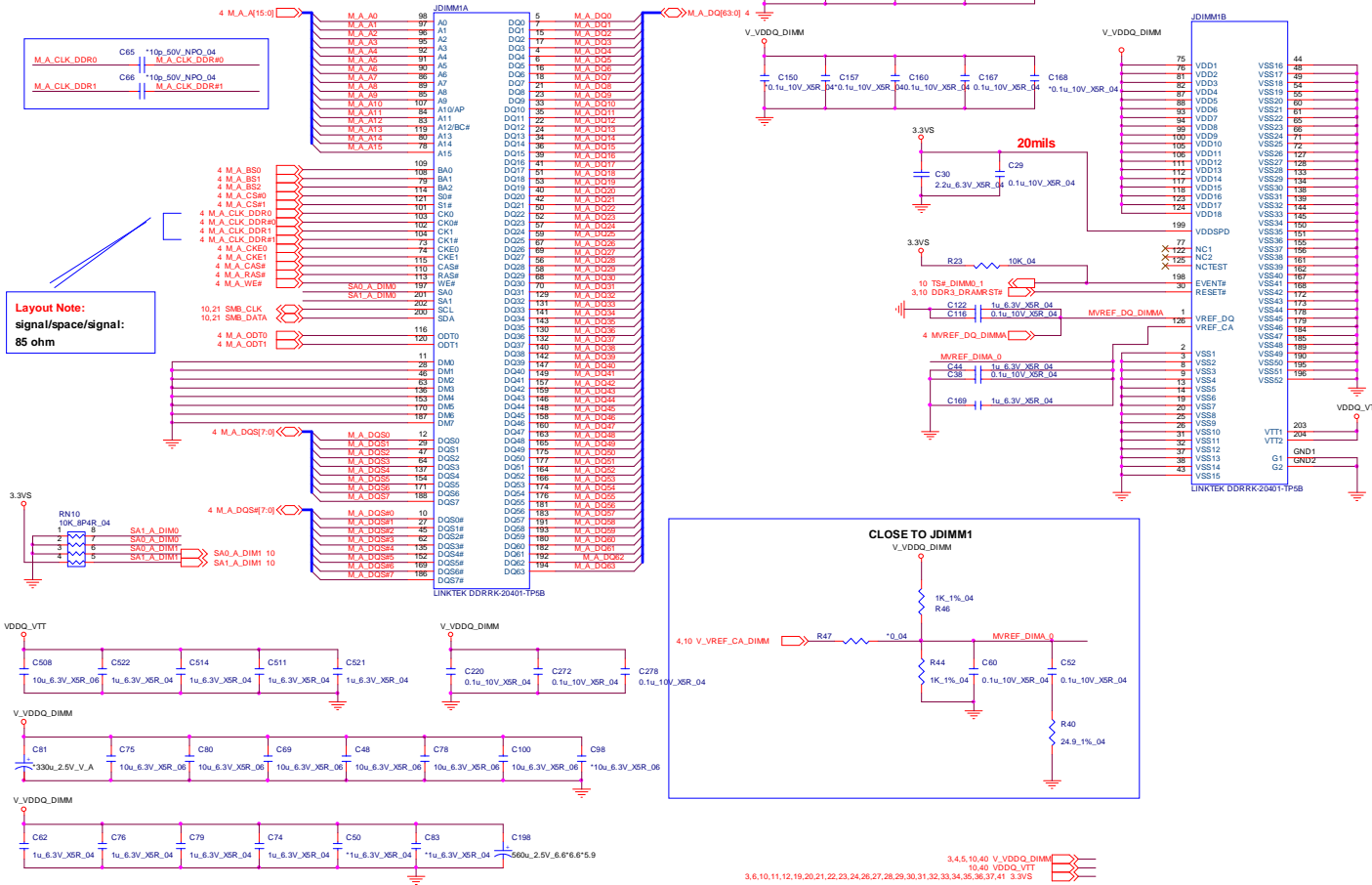
5.2mm

6-86-24204-005

6-86-24204-002

B.Schematic Diagrams

Sheet 9 of 46  
DDR3 SO-DIMM\_0

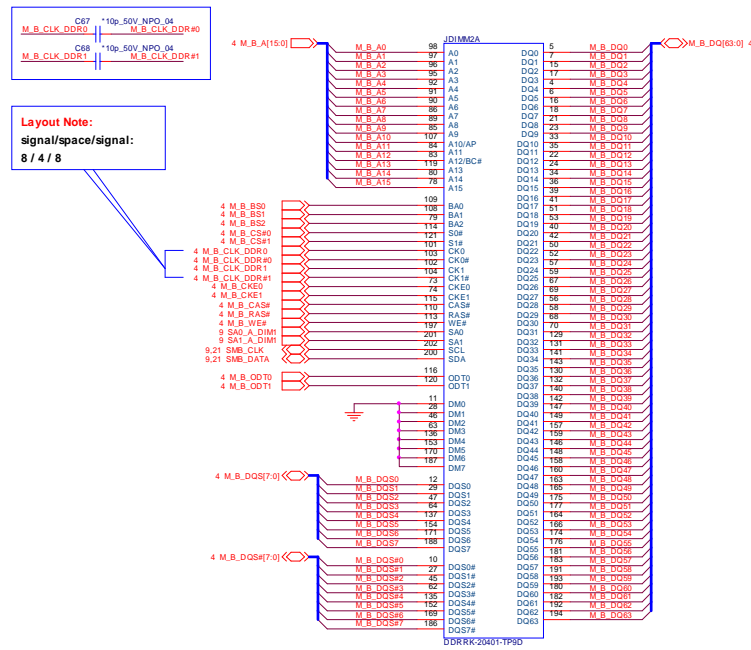




# DDR3 SO-DIMM\_2

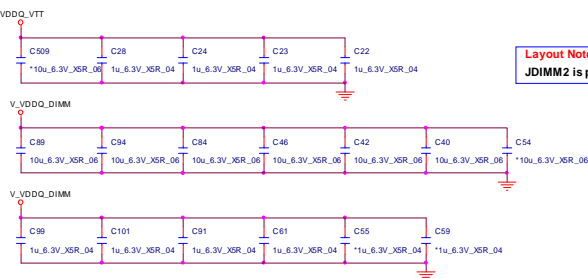
SO-DIMM B\_0

CHANGE TO STANDARD

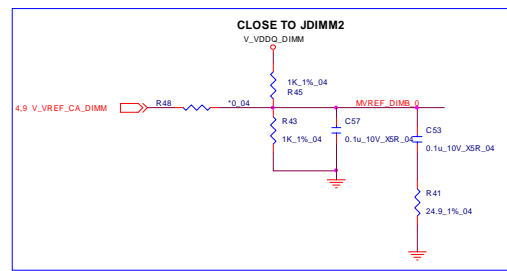
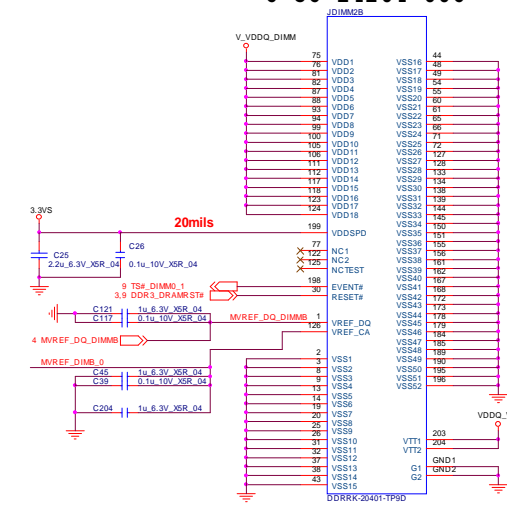


Layout Note:  
signal/space/signal:  
8 / 4 / 8

Layout Note:  
JDIMM2 is placed farther from the GMCH than JDIMM1



9.2mm  
6-86-24204-001  
6-86-24204-006

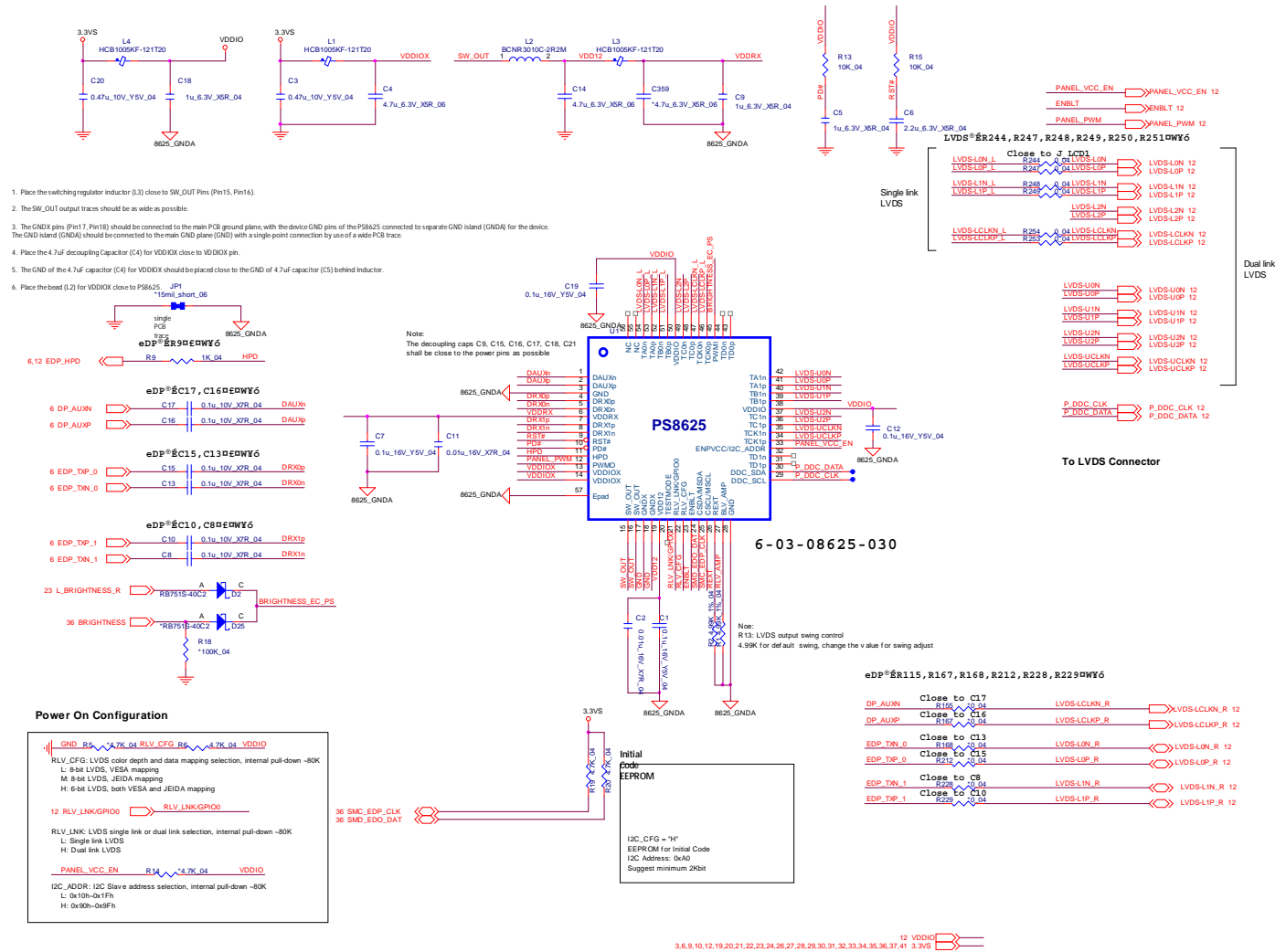


3.4,5,9,40 V\_VDDQ\_DIMM  
9,40 VDDQ\_VTT  
3,6,9,11,12,19,20,21,22,23,24,26,27,28,29,30,31,32,33,34,35,36,37,41 3.3VS

Sheet 10 of 46  
DDR3 SO-DIMM\_1

B.Schematic Diagrams

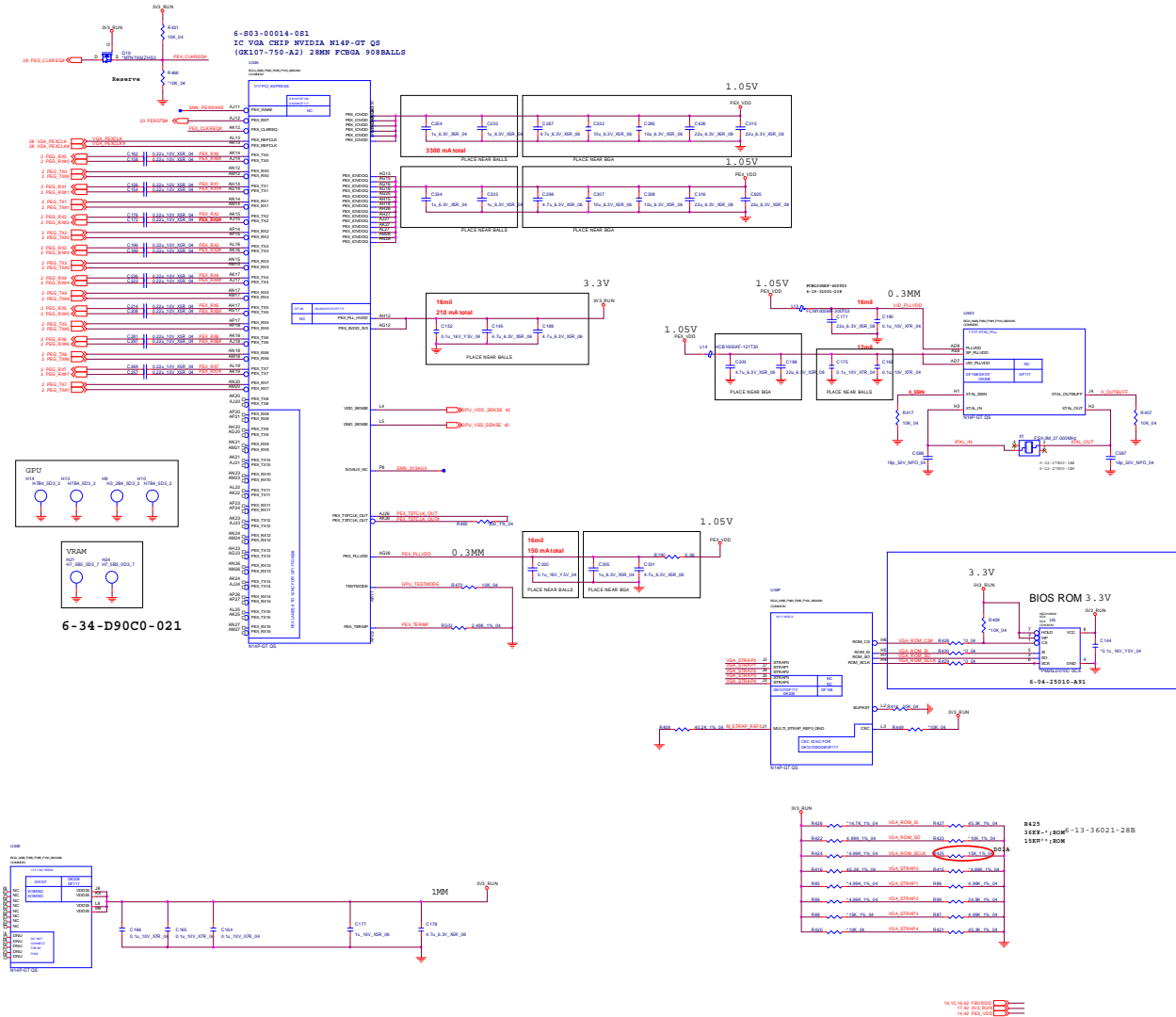
# PS8625





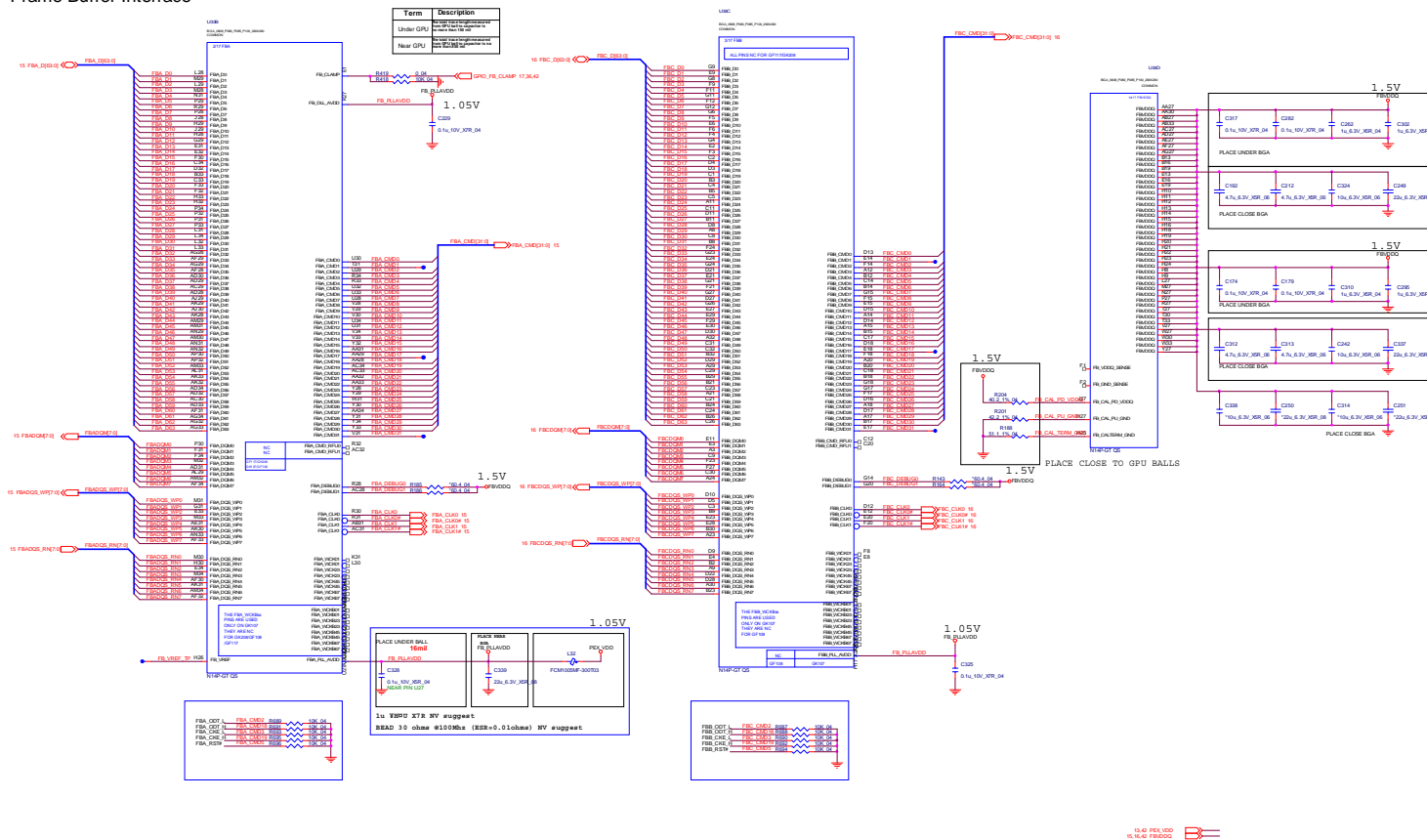
# VGA PCI-E Interface

Sheet 13 of 46  
VGA PCI-E Interface



# VGA Frame Buffer Interface

Frame Buffer Interface

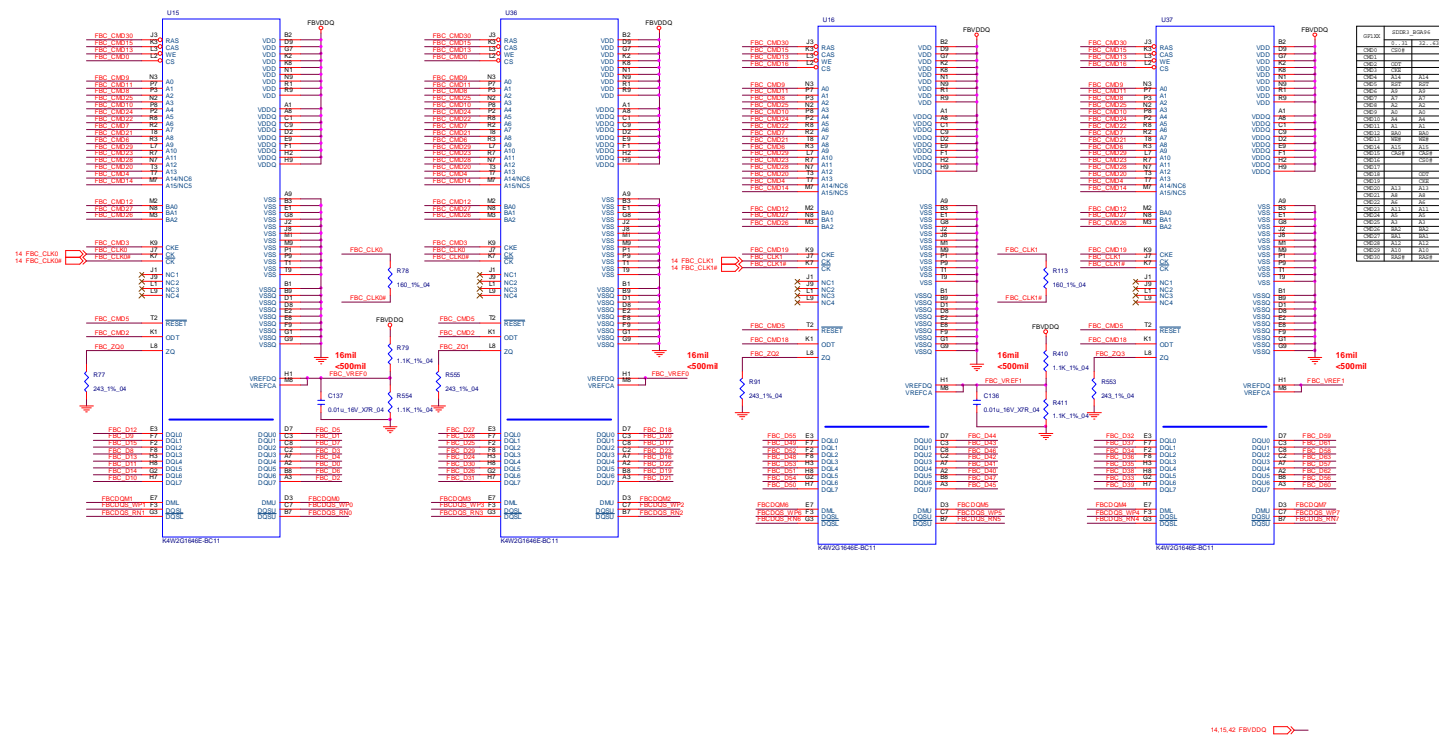
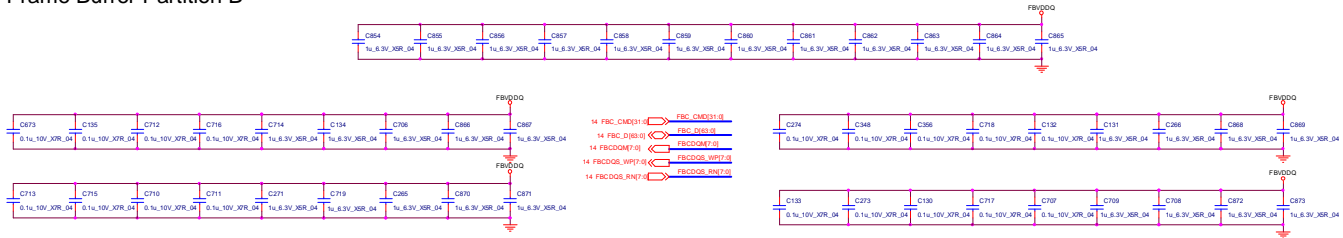


Sheet 14 of 46  
VGA Frame Buffer Interface



# VGA Frame Buffer C

## Frame Buffer Partition B



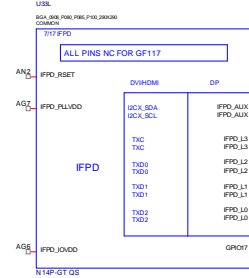
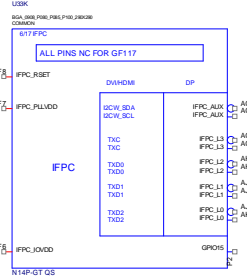
Sheet 16 of 46  
VGA Frame Buffer  
C

# Schematic Diagrams

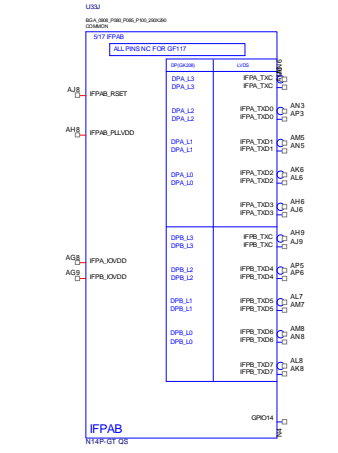
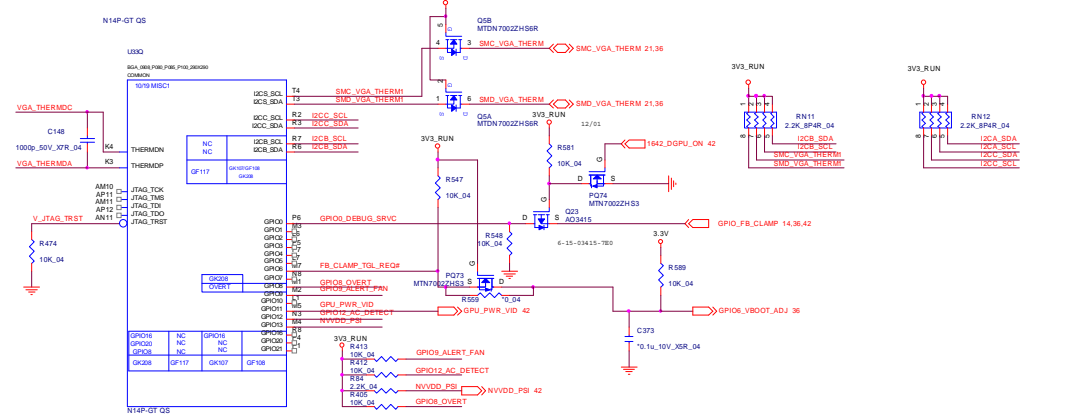
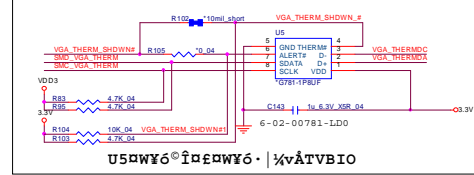
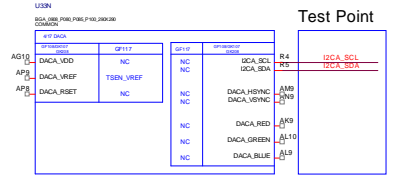
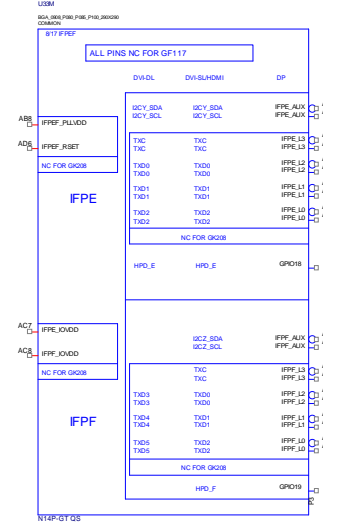
## VGA I/O

B.Schematic Diagrams

Sheet 17 of 46  
VGA I/O



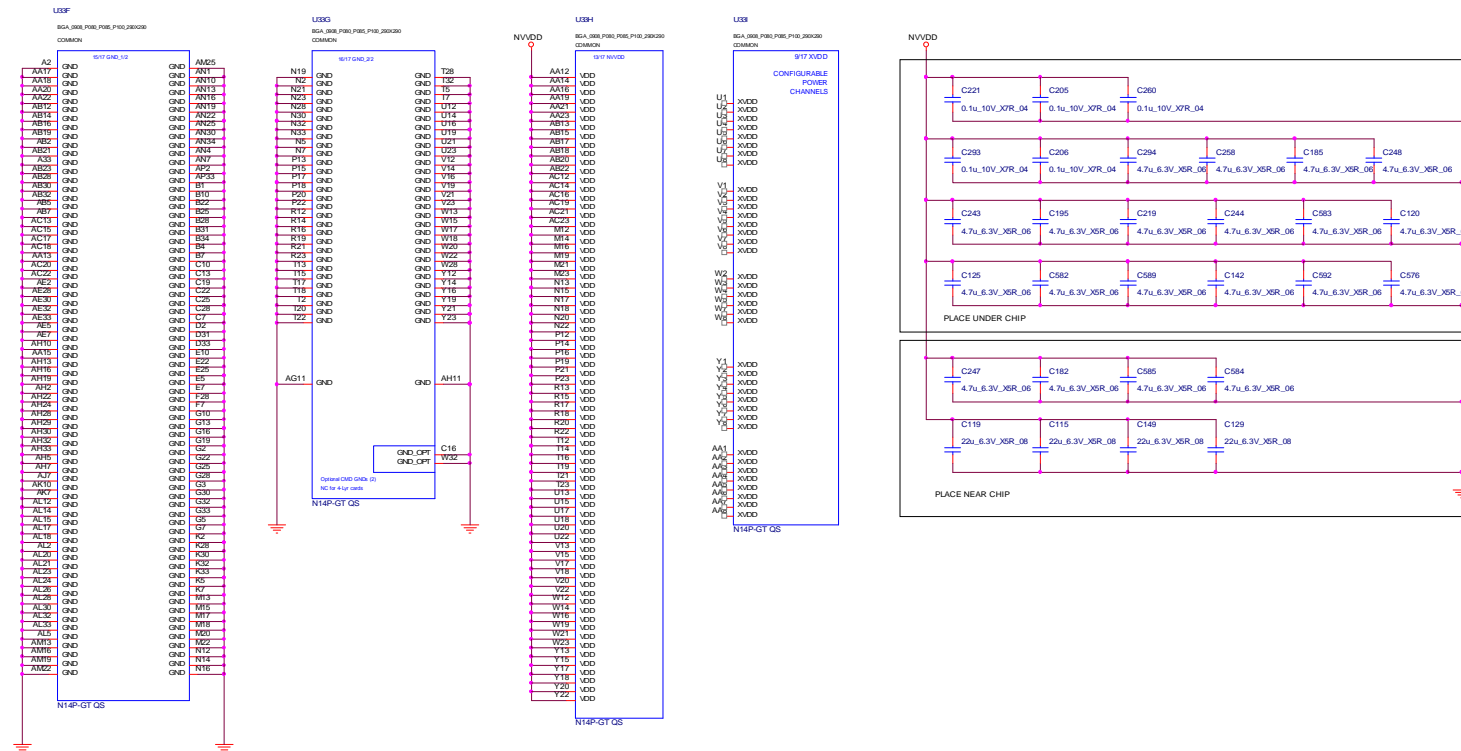
Term	Description
Under GPU	The I/O pins are not measured from GPU I/O connector as per more than 100 mil
Near GPU	The I/O pins are measured from GPU I/O connector as per more than 800 mil



20, 21, 22, 24, 27, 28, 29, 30, 32, 33, 36, 37, 38, 39, 40, 43 VDD3  
2, 3, 12, 20, 24, 25, 27, 28, 29, 31, 33, 35, 37, 38, 40, 42 3.3V



# VGA NVVDD Decoupling



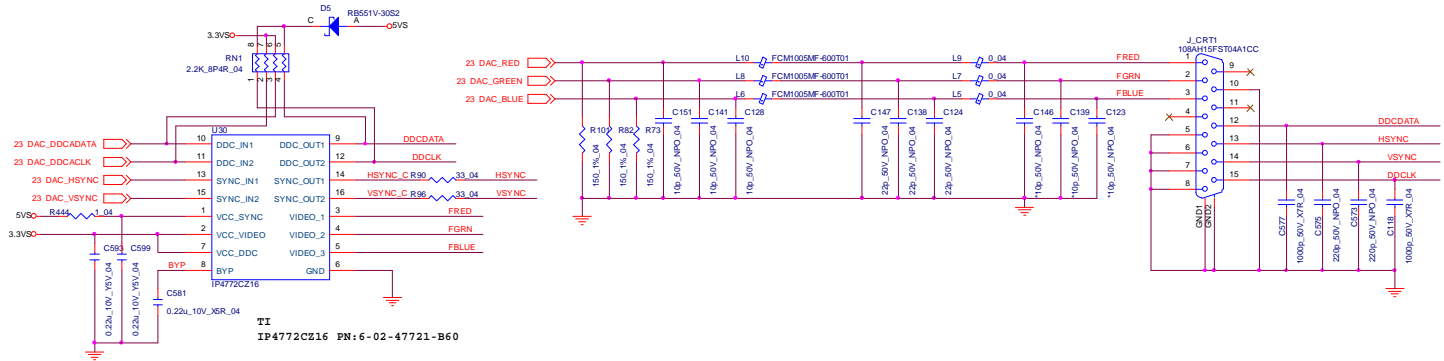
Sheet 18 of 46  
VGA NVVDD  
Decoupling

B.Schematic Diagrams

17,20,21,22,24,27,28,29,30,32,33,36,37,38,39,40,43 VDD3  
42 NVVDD  
13,17,42 SV3\_P0IN

# CRT, Holes

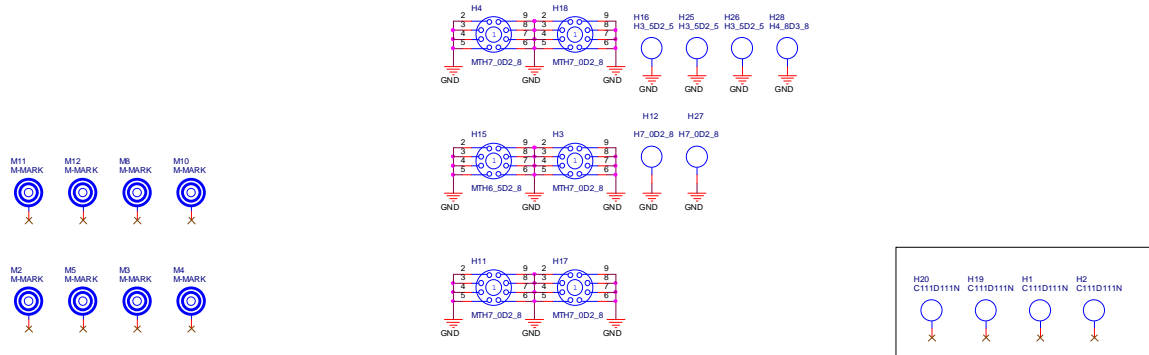
## CRT



Sheet 19 of 46  
CRT, Holes

B.Schematic Diagrams

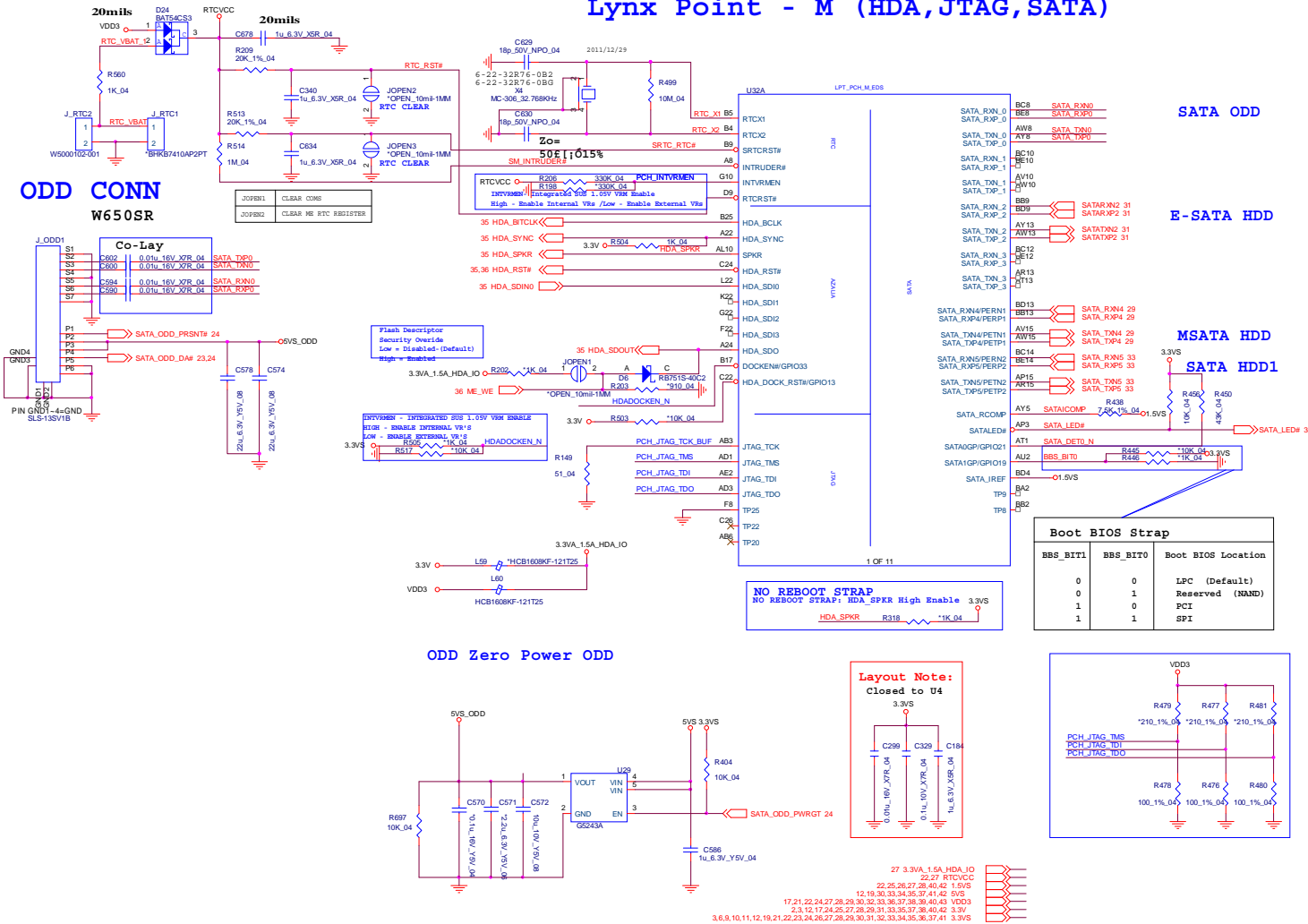
## M/B PCH



3,6,9,10,11,12,20,21,22,23,24,26,27,28,29,30,31,32,33,34,35,36,37,41, 3,9V<sub>S</sub>  
12,20,30,33,34,35,37,41,42 5V<sub>S</sub>

# Lynx 1/9

## Lynx Point - M (HDA, JTAG, SATA)

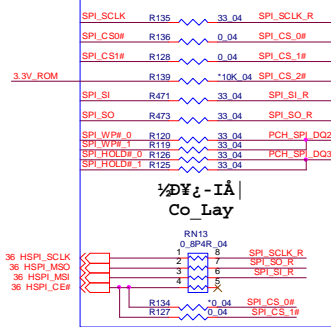
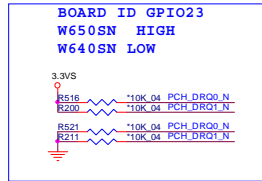
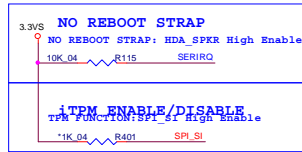


Sheet 20 of 46  
Lynx 1/9

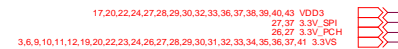
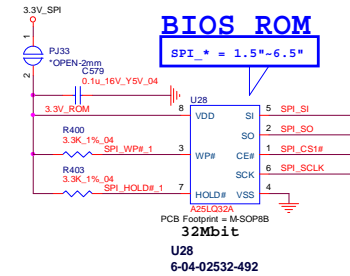
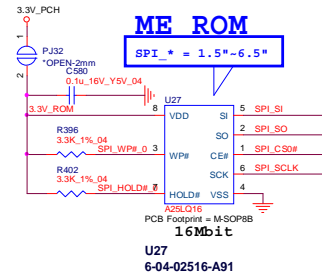
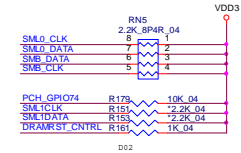
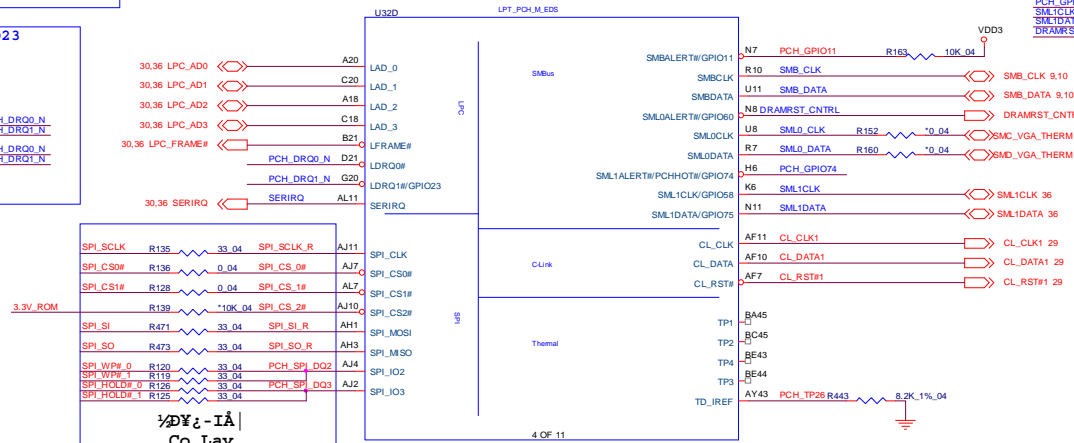
B.Schematic Diagrams

# Lynx 2/9

Sheet 21 of 46  
Lynx 2/9

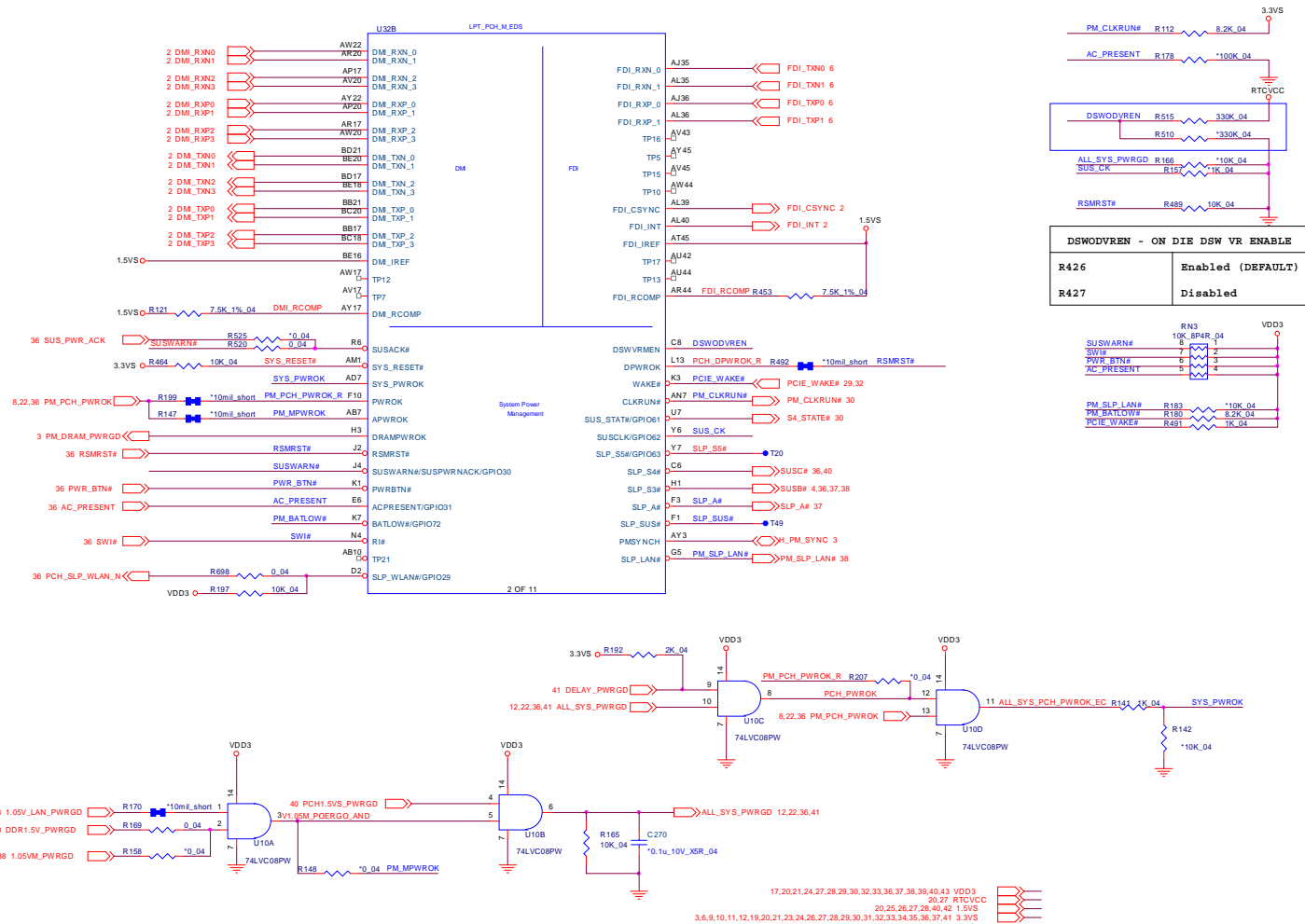


## Lynx Point - M (LPC, SMBUS, SPI, C-LINK)

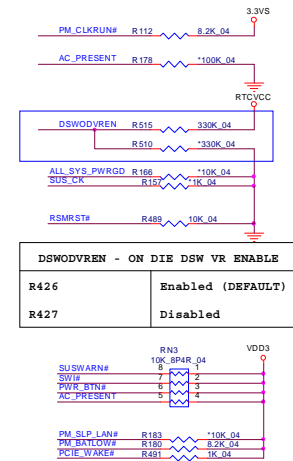


# Lynx 3/9

## Lynx Point -M (DMI, FDI, PWRGD)



Sheet 22 of 46  
Lynx 3/9



DSWODVREN - ON DIE DSW VR ENABLE	
R426	Enabled (DEFAULT)
R427	Disabled

B.Schematic Diagrams

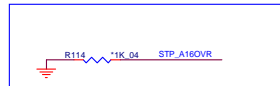
# Lynx 4/9

Sheet 23 of 46  
Lynx 4/9

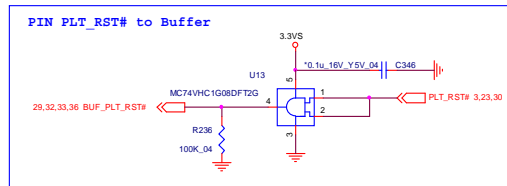
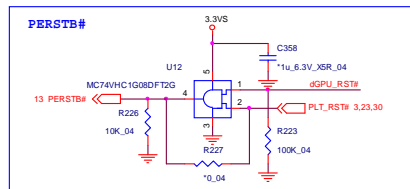
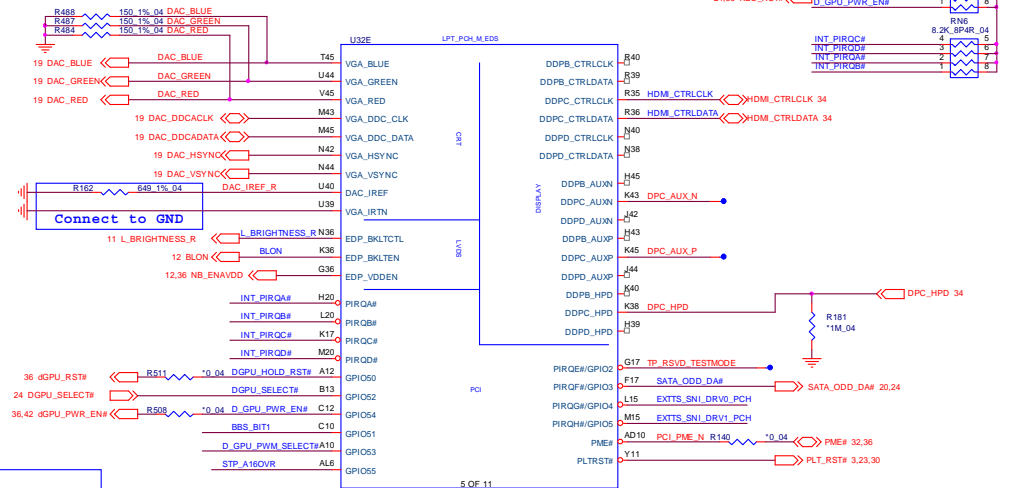
Boot BIOS Strap		
BBS_BIT1	BBS_BIT0	Boot BIOS Location
0	0	LPC
0	1	Reserved (NAND)
1	0	PCI
1	1	SPI



A16 SWAP OVERRIDE STRAP	
STP_A16OVR	LOW = A16 SWAP OVERRIDE HIGH = DEFAULT



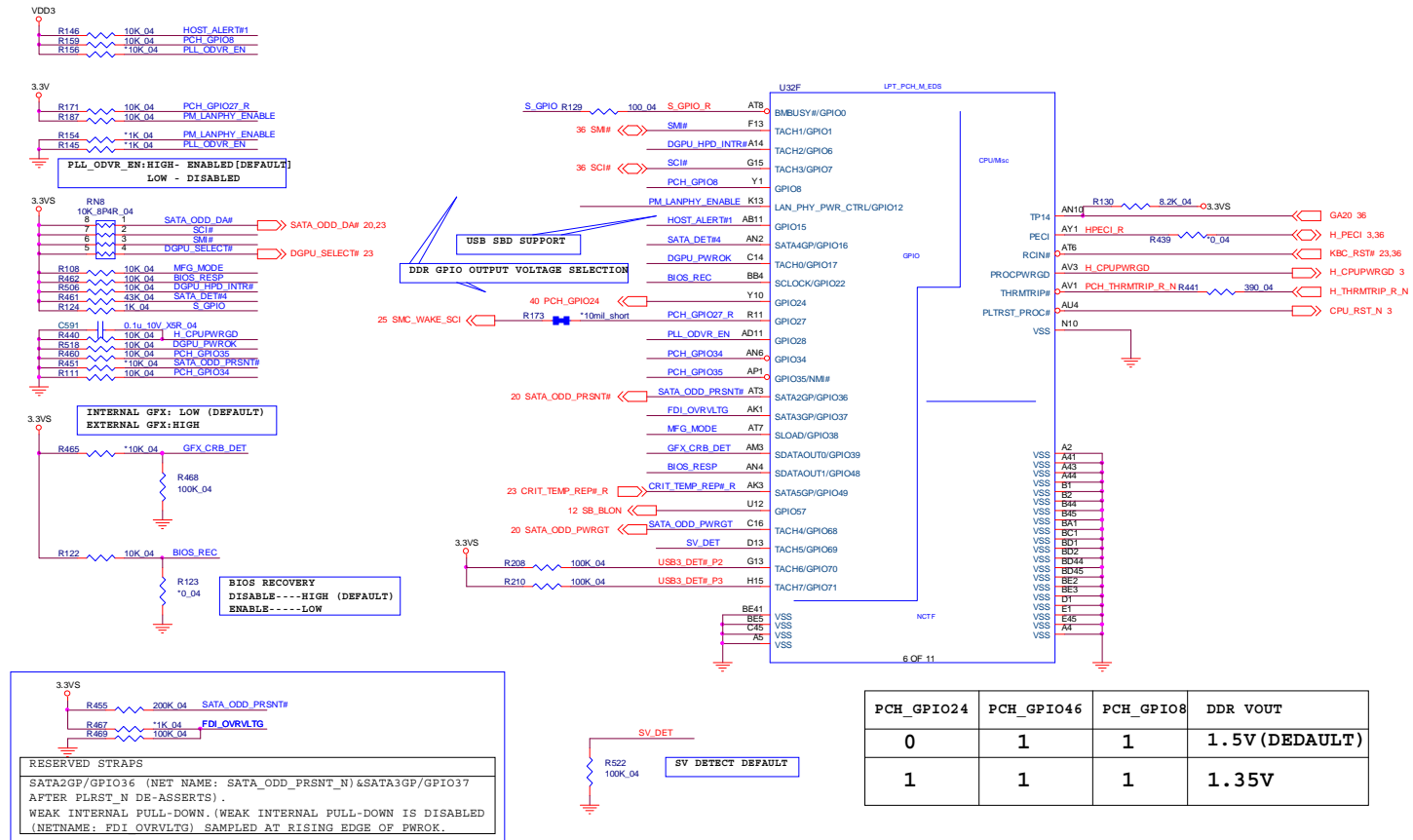
## Lynx Point -M (CRT, LVDS, PCI, DISPLAY)



12, 18, 20, 30, 33, 34, 35, 37, 41, 42 5V  
3, 6, 9, 10, 11, 12, 19, 20, 21, 22, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 41 3.3V

# Lynx 5/9

## Lynx Point - M (GPIO, CPU/MISC, NCTF)



17,20,21,22,27,28,29,30,32,33,36,37,38,39,40,43 VDD3  
2,3,12,17,20,25,27,28,29,31,33,35,37,38,40,42 3.3V  
3,6,9,10,11,12,19,20,21,22,23,26,27,28,29,30,31,32,33,34,36,37,41 3.3VS

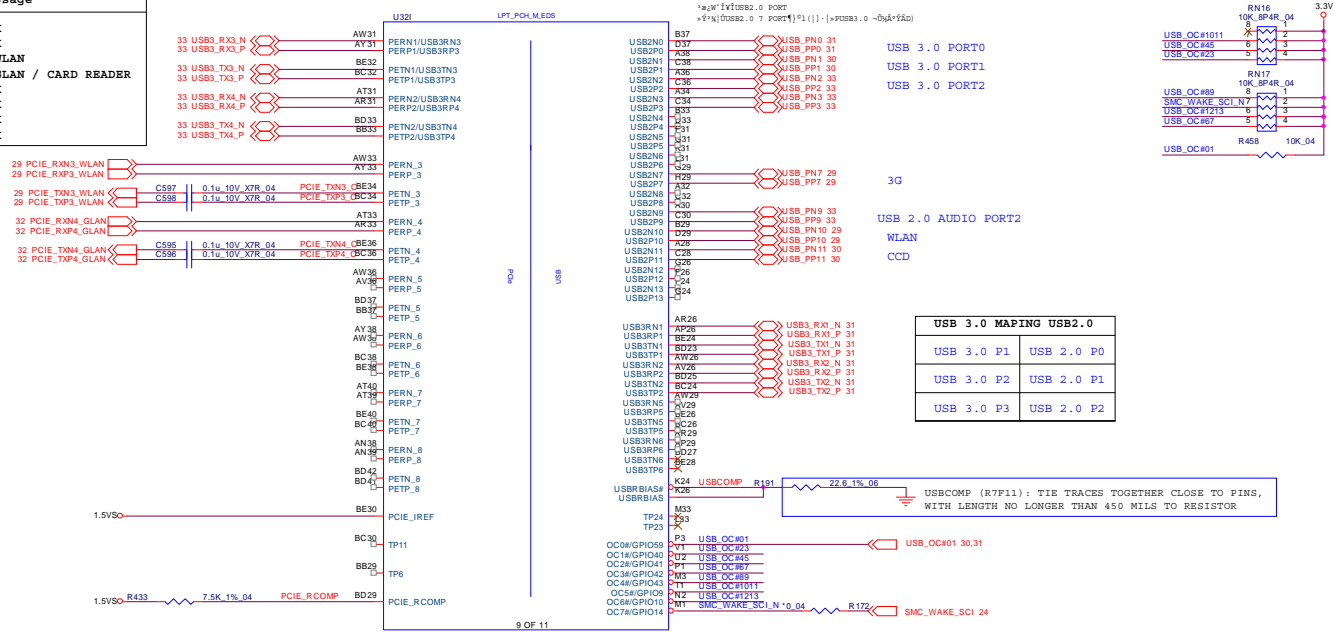
Sheet 24 of 46  
Lynx 5/9

# Schematic Diagrams

## Lynx 6/9

### Lynx Point -M (PCIe, USB)

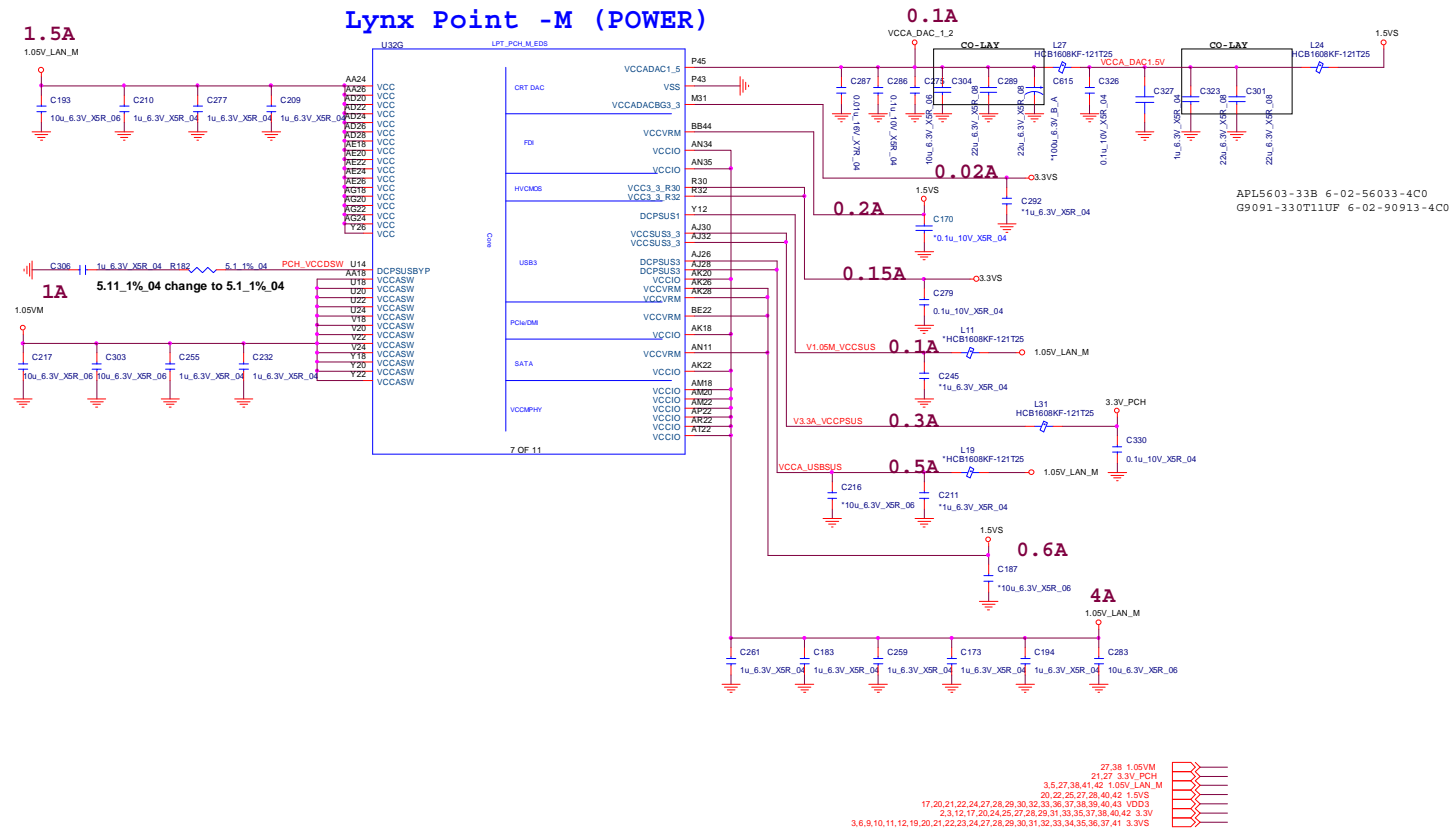
PCI-E x1	Usage
Lane 1	X
Lane 2	X
Lane 3	WLAN
Lane 4	GLAN / CARD READER
Lane 5	X
Lane 6	X
Lane 7	X
Lane 8	X



Sheet 25 of 46  
Lynx 6/9



# Lynx 7/9



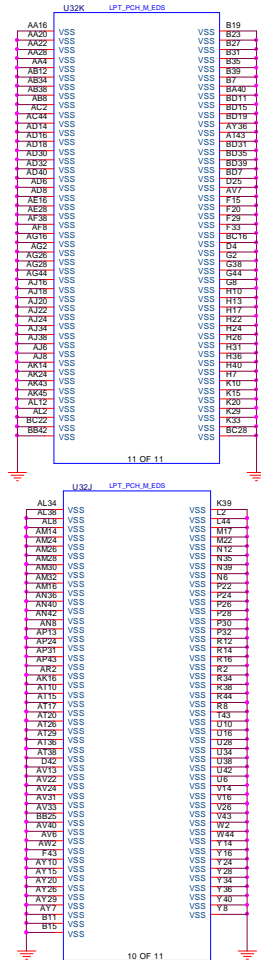
Sheet 26 of 46  
Lynx 7/9

B.Schematic Diagrams

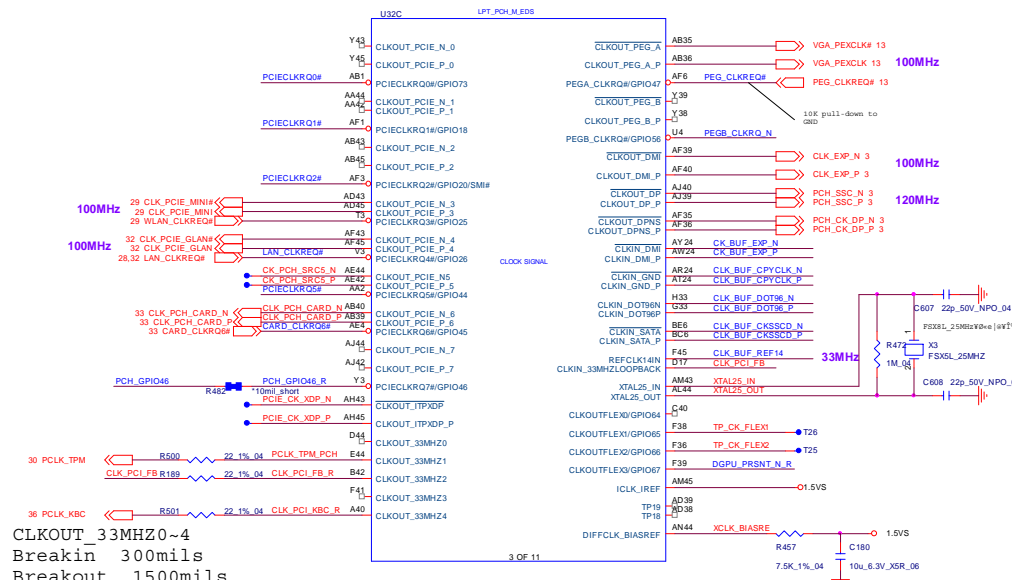


# Lynx 9/9

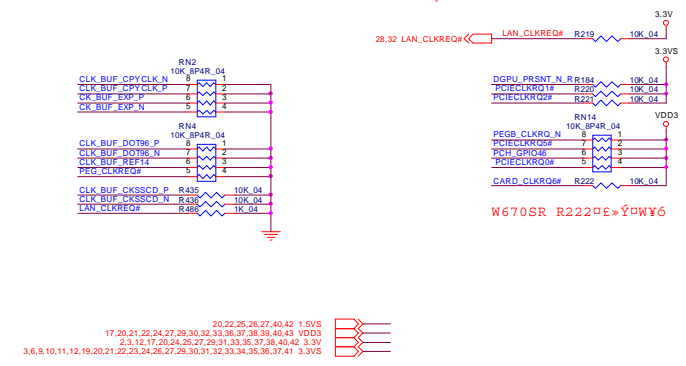
Lynx Point -M (GND)



Lynx Point -M (CLK)



Voltage Rail	Voltage	S0	Iccmax	Current (A)
V_CPU_IO	1.05	1	(mA)	
V_SRF	5	1	(mA)	
V_SRF_Bus	5	1	(mA)	
Vcc3_3	3.3	0.266		
VccADAC3	1.05	1	(mA)	
VccADPLLA	1.05	0.08		
VccADPLL	1.05	0.08		
VccCore	1.05	1.3		
VccDMI	1.1	0.042		
VccIO	1.05	2.925		
VccASW	1.05	1.01		
VccSPI	3.3	0.020		
VccDSW3_3	3.3	2	(mA)	
VccDFTERR	1.8	0.19		
VccBus2_3	3.3	0.097		
VccBusA	3.3	1	(mA)	
VccWRM	1.5	0.16		
VccCLKDMI	1.05	0.02		
VccSC	1.05	0.095		
VccDIFFCLKN	1.05	0.055		
VccLVDS	3.3	1	(mA)	
VccTX_LVDS	1.8	0.06		



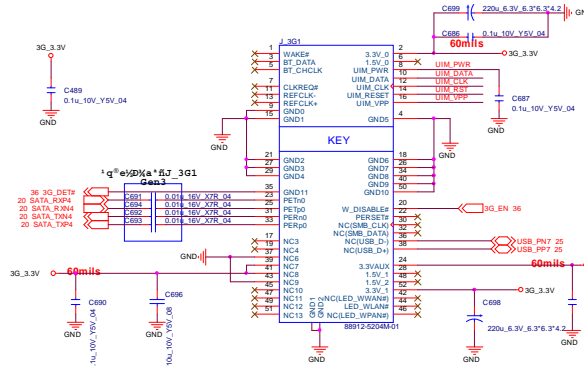
Sheet 28 of 46  
Lynx 9/9

# Schematic Diagrams

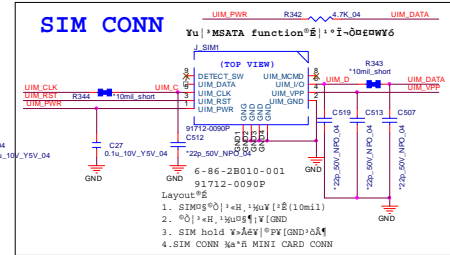
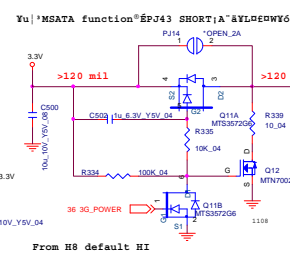
## 3G, WLAN, PCIE, CON

Sheet 29 of 46  
3G, WLAN, PCIE,  
CON

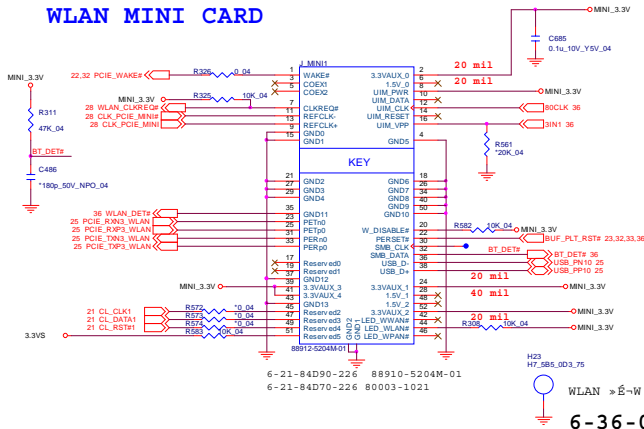
### 3G/MSATA MINI CARD



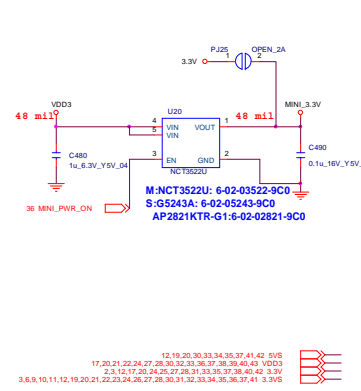
### 3G POWER



### WLAN MINI CARD

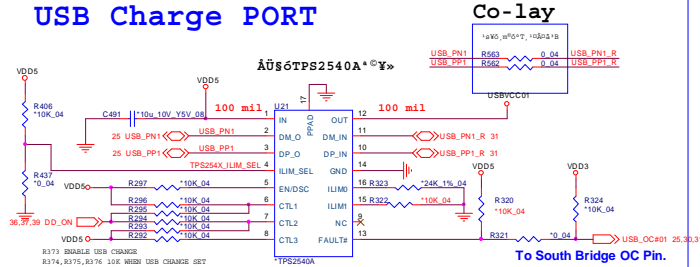


### MINI POWER Smart Connect Function

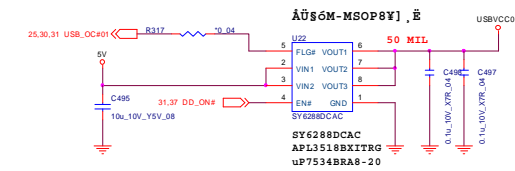


# USB Charge, CCD, TPM, Power Con

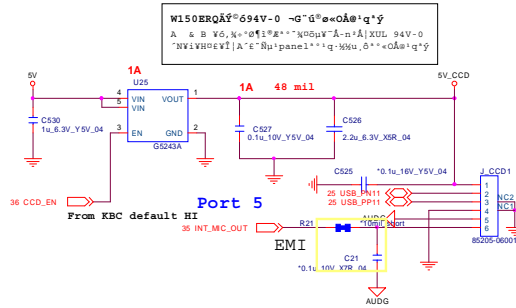
## USB Charge PORT



CTL1	CTL2	CTL3:	0	0	0	→ Out discharge, power switch Off
CTL1	CTL2	CTL3:	0	x	1	→ Dedicated charging port, auto-detect
CTL1	CTL2	CTL3:	1	0	1	→ Dedicated charging port, Divider Mode only
CTL1	CTL2	CTL3:	1	1	1	→ Charging downstream port, BC1.2.



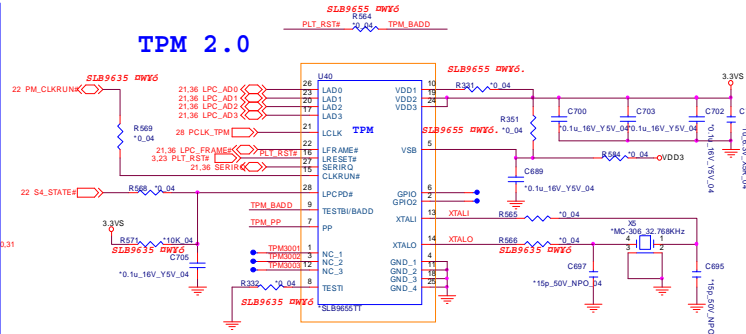
## CCD+Mic



## Co-layer



## TPM 2.0



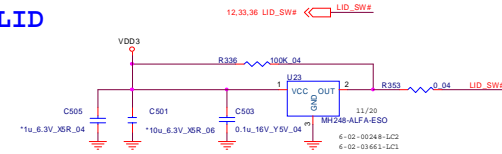
Asserted before entering S3  
LPC PD# inactive to LRST# inactive 32-96us

TPM_PP	TPM_BADD	TPM_PP	TPM_PP
LOW: NORMAL (Internal PD)	LOW: 4E'4F'H	LOW: 2E'2F'H	LOW: 2E'2F'H

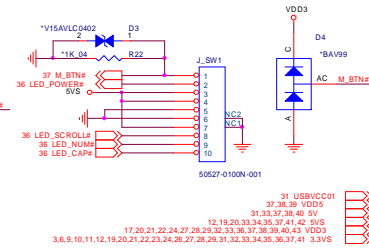
Sheet 30 of 46  
USB Charge, CCD,  
TPM, Power Con

B.Schematic Diagrams

## LID



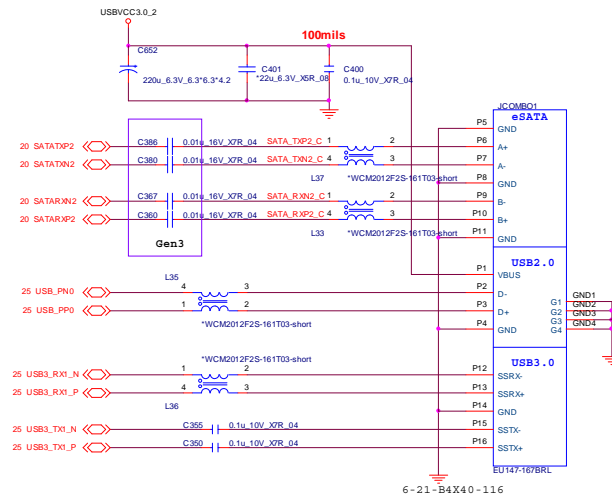
## FOR POWER SWITCH BOARD



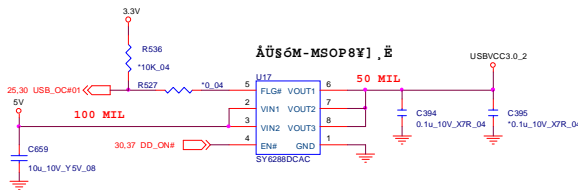
# eSATA/USB3.0, LED

Sheet 31 of 46  
eSATA/USB3.0,  
LED

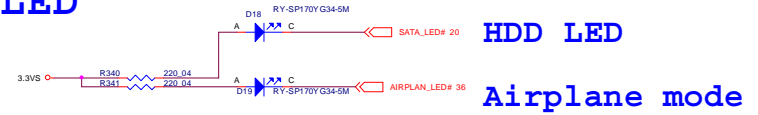
## ESATA+USB3.0 USB3.0 PORT(PORT1)



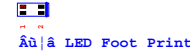
## USB POWER SWITCH



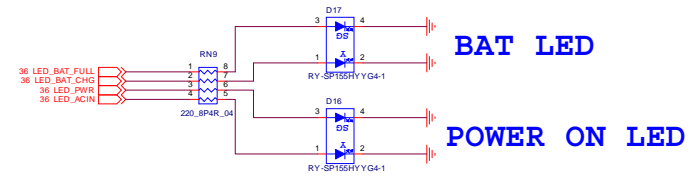
## LED



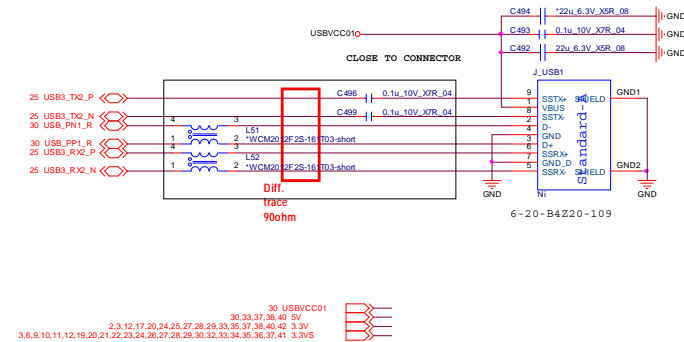
### WLAN/BLUETOOTH LED



	WLAN ON	WLAN LED
Windows 7	WLAN OFF	⊠E<G
Windows 8	Airplane ON	⊠E<G
	Airplane OFF	⊠E<G

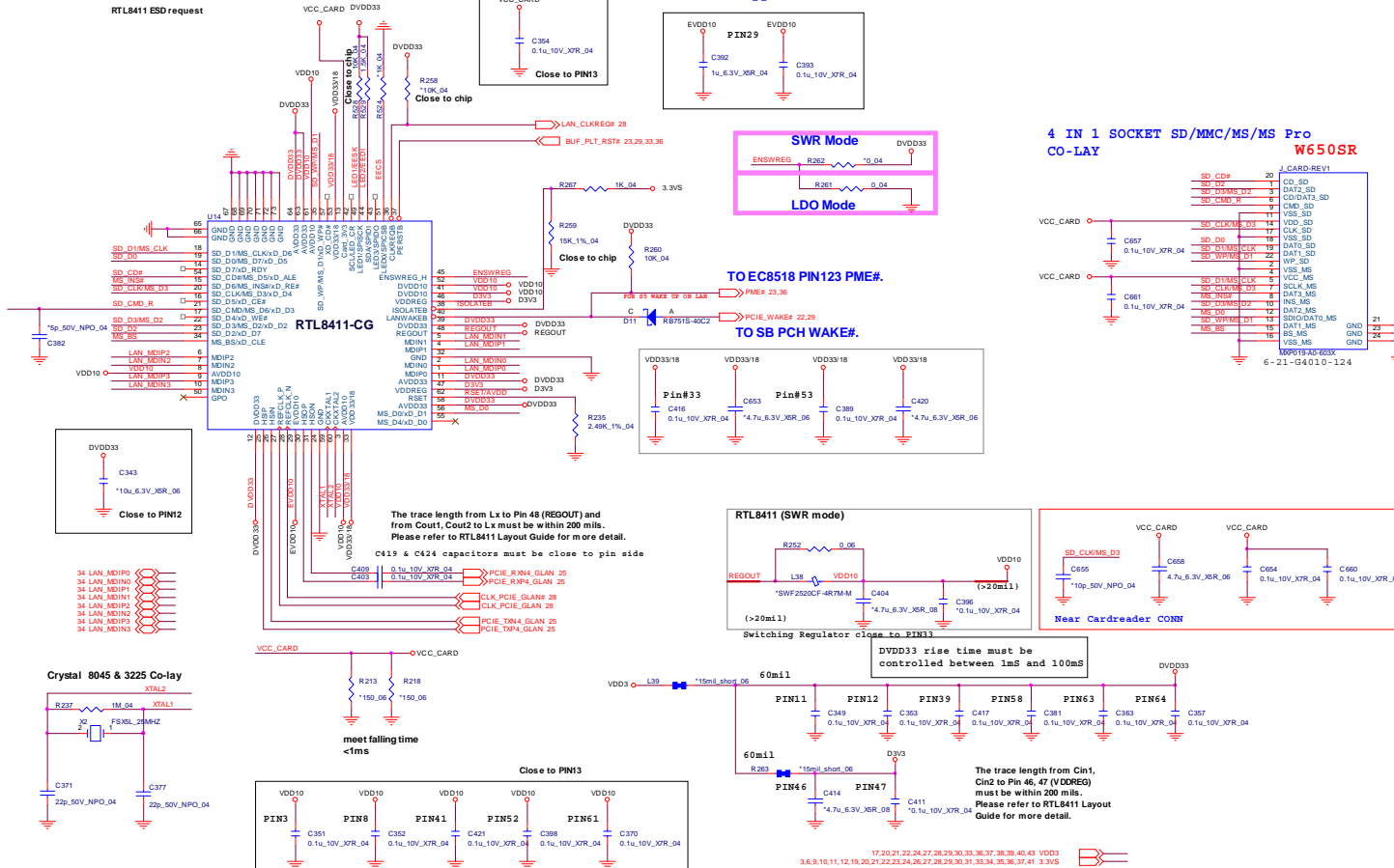


## USB3.0 PORT(PORT3)



# Card Reader (RTL8411)

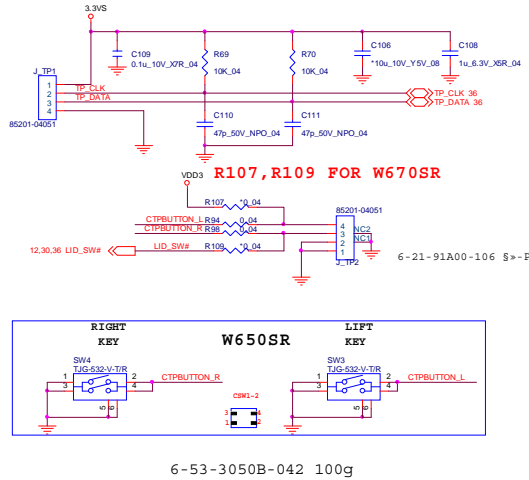
## LAN (RTL8411)



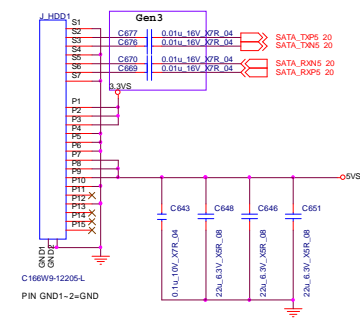
Sheet 32 of 46  
Card Reader  
(RTL8411)

# HDD, TP, Audio, USB

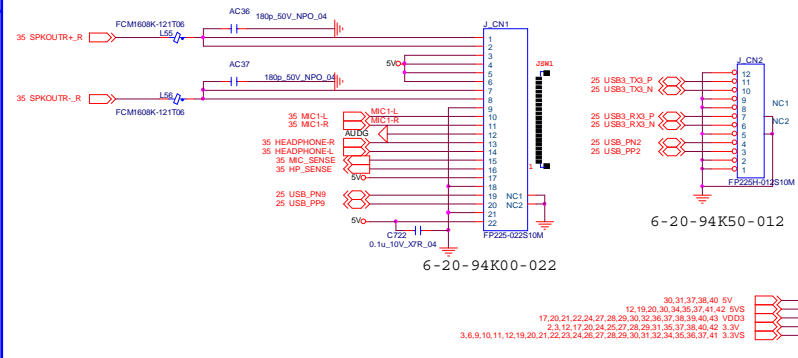
## CLICK TP



## HDD CONNECT1 (MASTER)



## FOR AUDIO BOARD



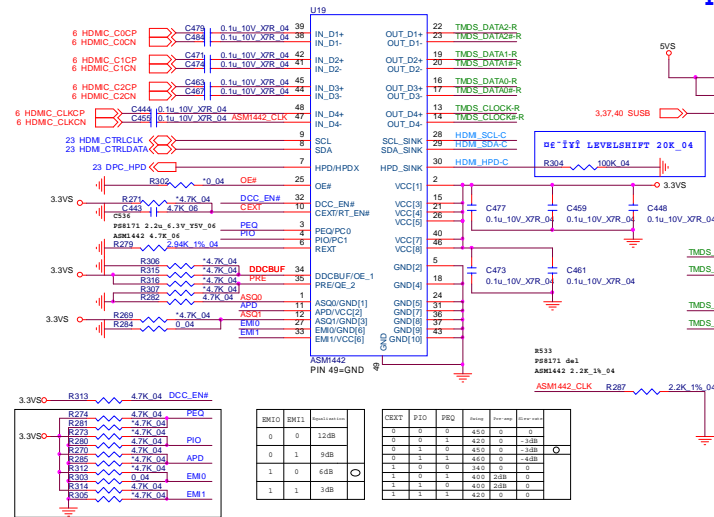
B.Schematic Diagrams

Sheet 33 of 46  
HDD, TP, Audio,  
USB

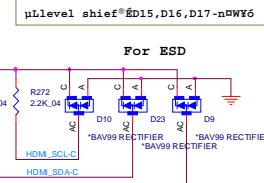
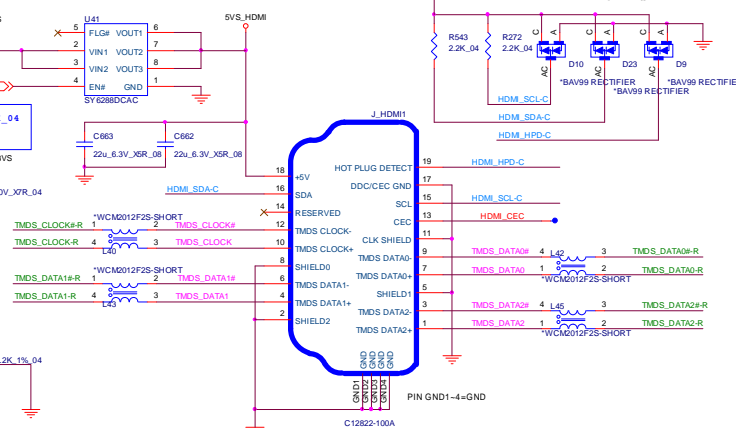


# HDMI, RJ45, Fan, KBC, LED

## HDMI LEVEL SHIFT



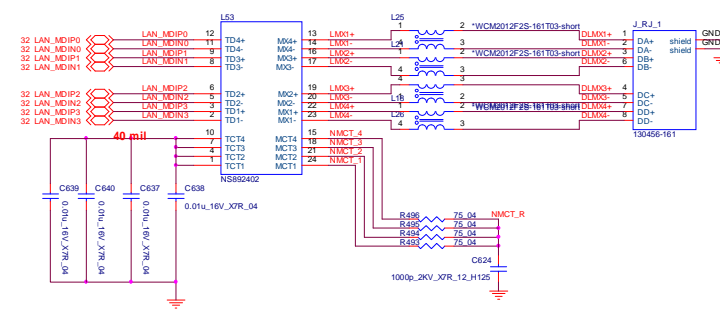
## HDMI CONNECTOR



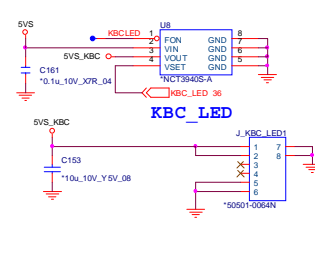
Sheet 34 of 46  
HDMI, RJ45, Fan,  
KBC, LED

B.Schematic Diagrams

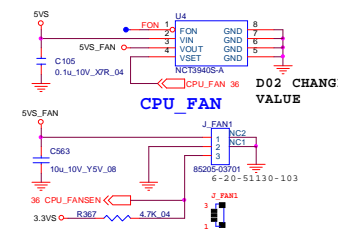
## GIGA LAN (RTL8411) LAN POART



## KBC LED CONTROL



## CPU FAN CONTROL

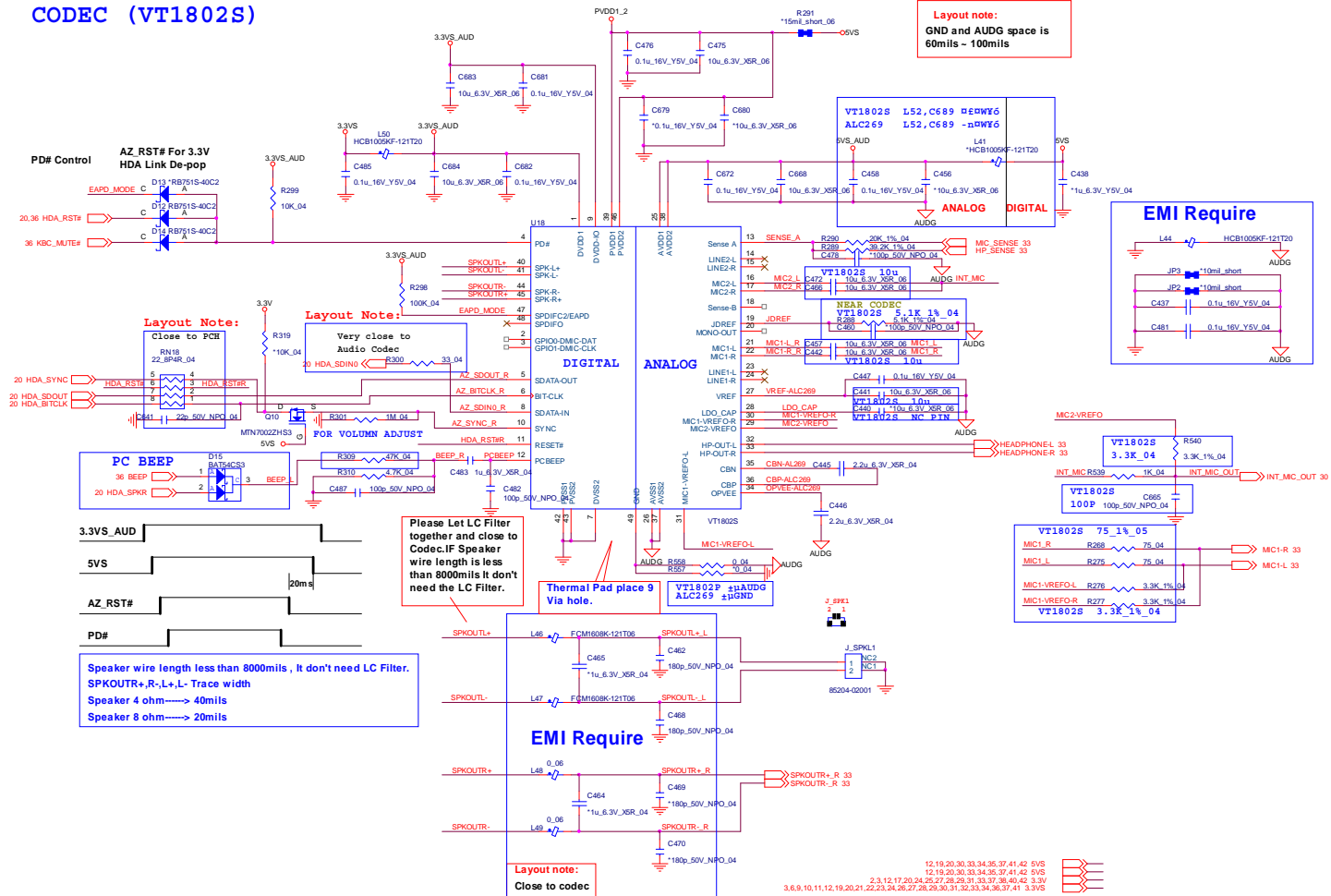


12, 19, 20, 30, 33, 35, 37, 41, 42 5V5  
3, 6, 9, 10, 11, 12, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 37, 41 3.3V5

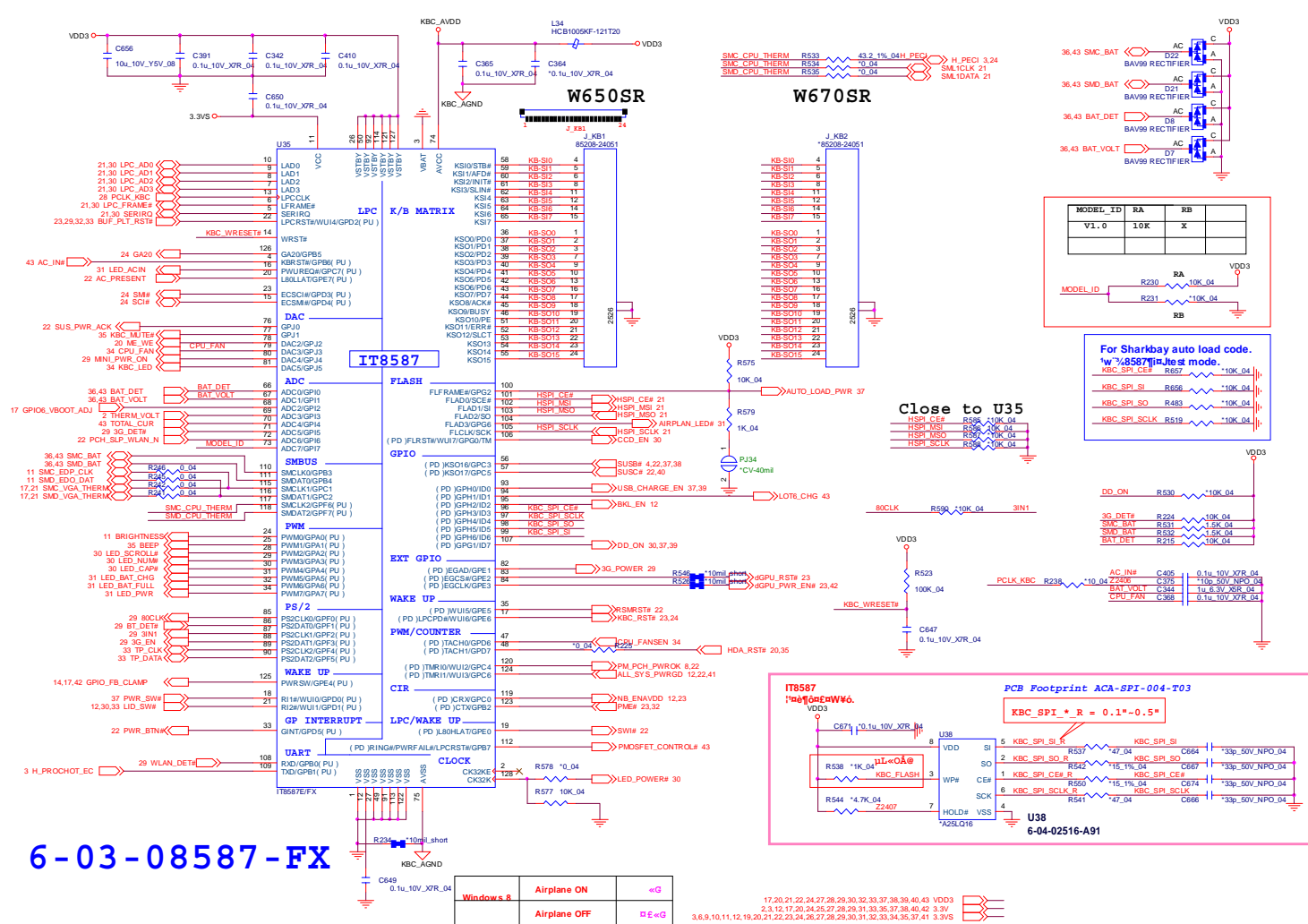
# AUDIO CODEC VT1802S

Sheet 35 of 46  
AUDIO CODEC  
VT1802S

CODEC (VT1802S)



# KBC-ITE IT8587



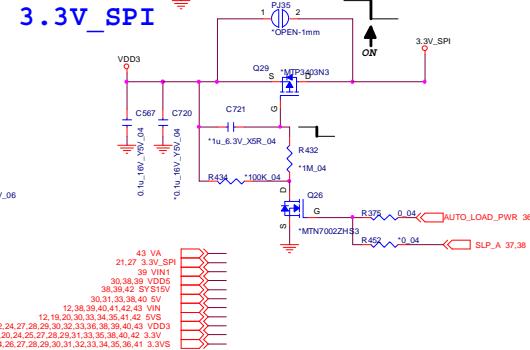
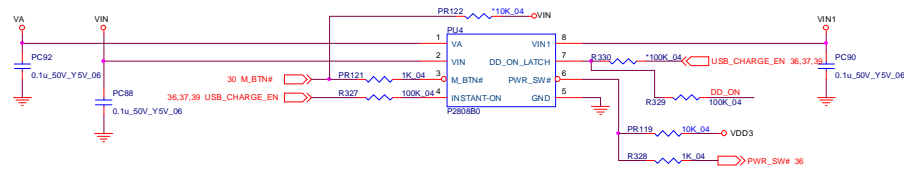
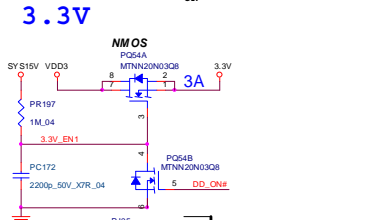
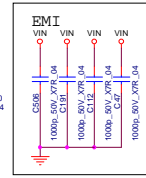
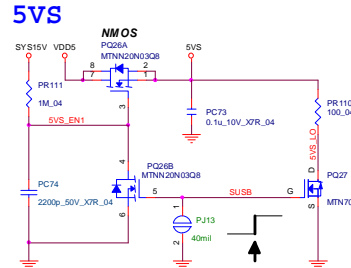
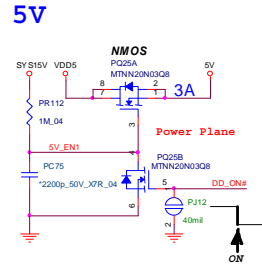
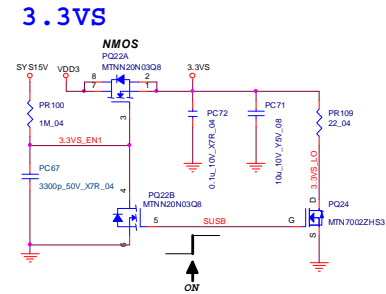
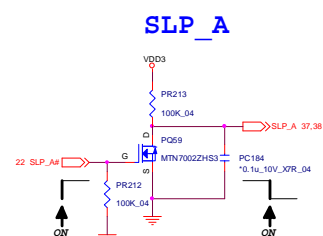
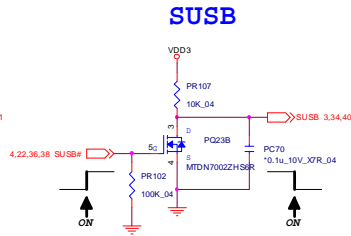
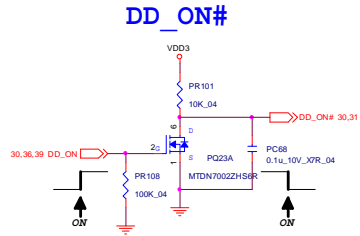
Sheet 36 of 46  
KBC-ITE IT8587

# Schematic Diagrams

## 5VS, 3VS, 3.3VM, 5VM

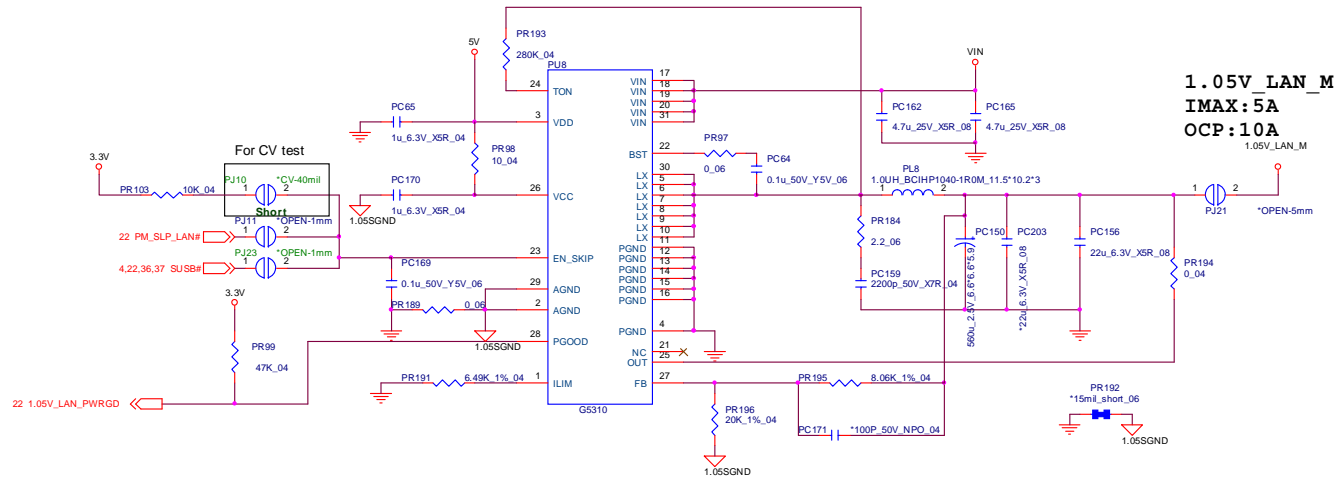
B.Schematic Diagrams

Sheet 37 of 46  
5VS, 3VS, 3.3VM,  
5VM



- 43 VA
- 21,27 3.3V\_SPI
- 39 VIN1
- 30,38,39 VDD5
- 38,39,42 SY515V
- 12,38,39,40,41,42,43 VIN
- 12,19,20,30,33,34,35,41,42 5VS
- 17,20,21,22,24,27,28,29,30,32,33,36,38,39,40,43 VDD3
- 2,3,12,17,20,24,25,27,28,29,31,33,35,38,40,42 3.3V
- 3,6,9,10,11,12,19,20,21,22,23,24,26,27,28,29,30,31,32,33,34,35,36,41 3.3VS

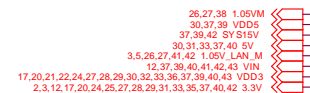
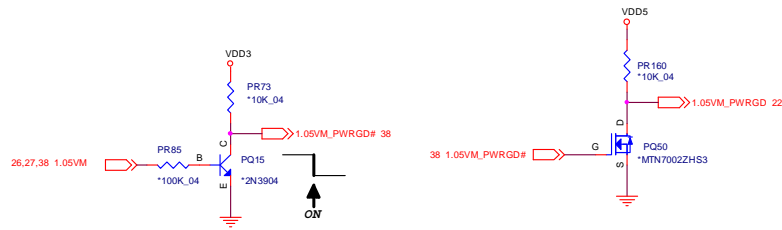
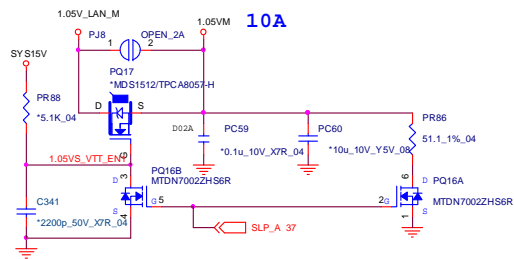
# 1.05V



Sheet 38 of 46  
 1.05V

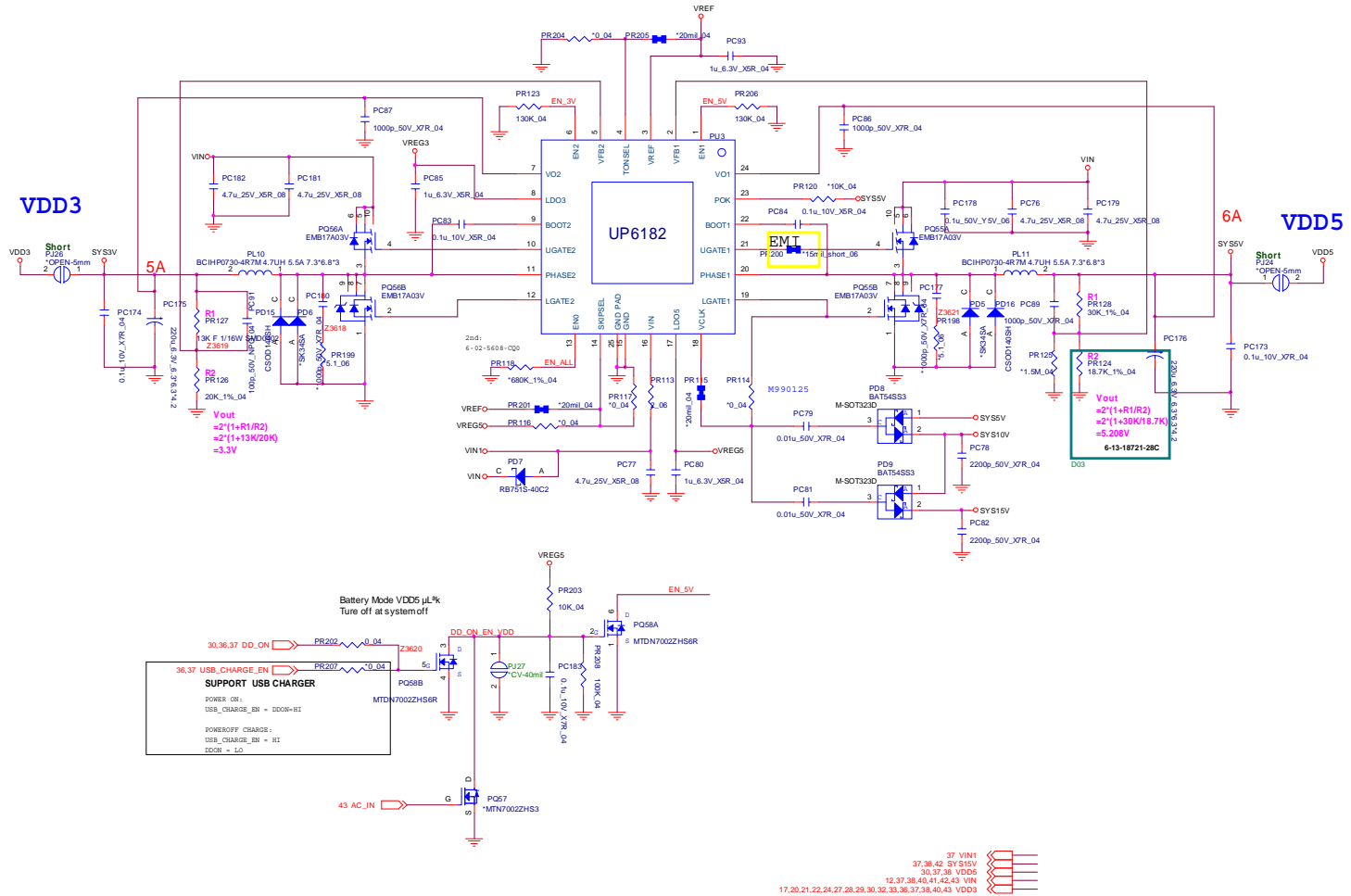
B.Schematic Diagrams

## 1.05VM



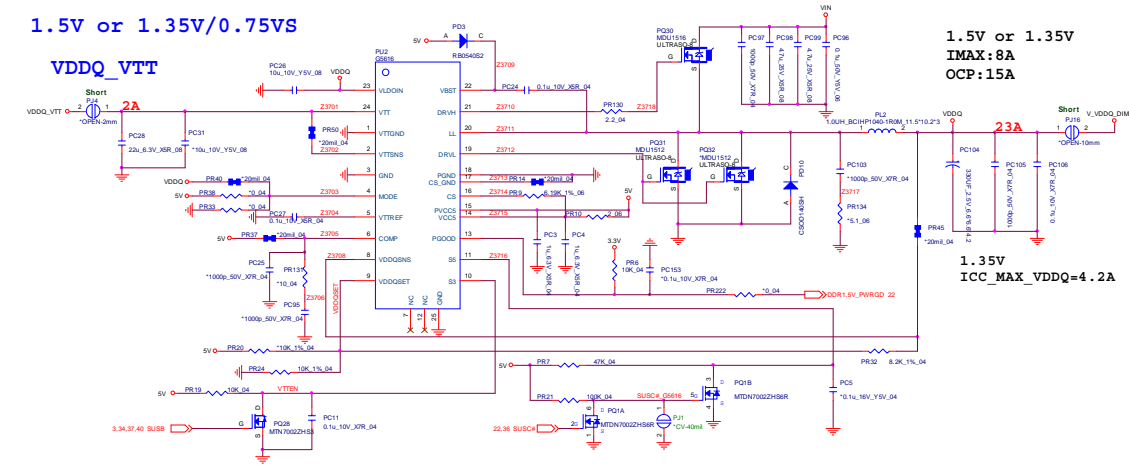
# VDD3, VDD5

VDD3 / VDD5

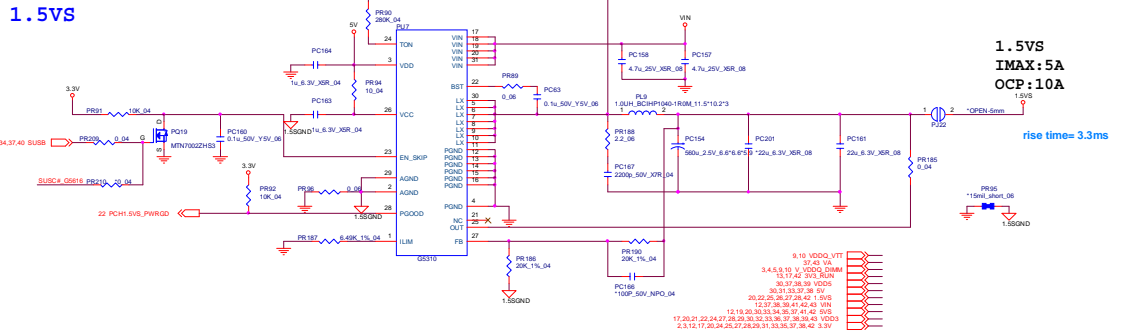
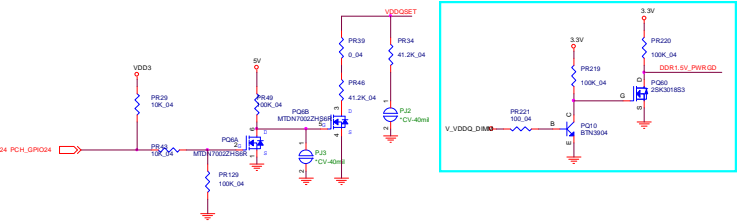


Sheet 39 of 46  
 VDD3, VDD5

# 1.5V or 1.35V / 0.75VS, 1.5VS



PCH_GPIO24	PCH_GPIO46	PCH_GPIO8	DDR VOUT
0	1	1	1.5V (DEDAULT)
1	1	1	1.35V

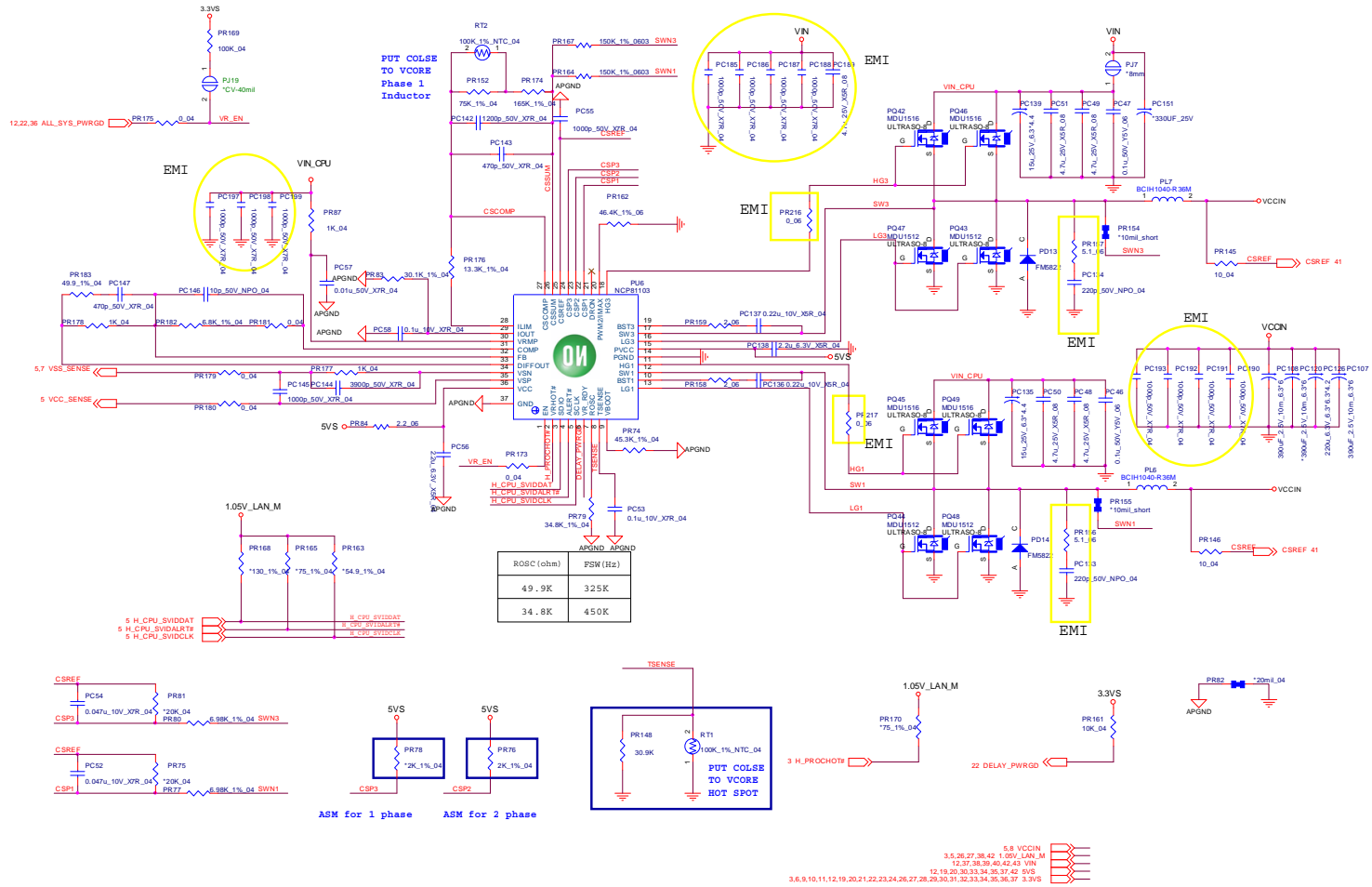


Sheet 40 of 46  
1.5V or 1.35V /  
0.75VS, 1.5VS

B.Schematic Diagrams

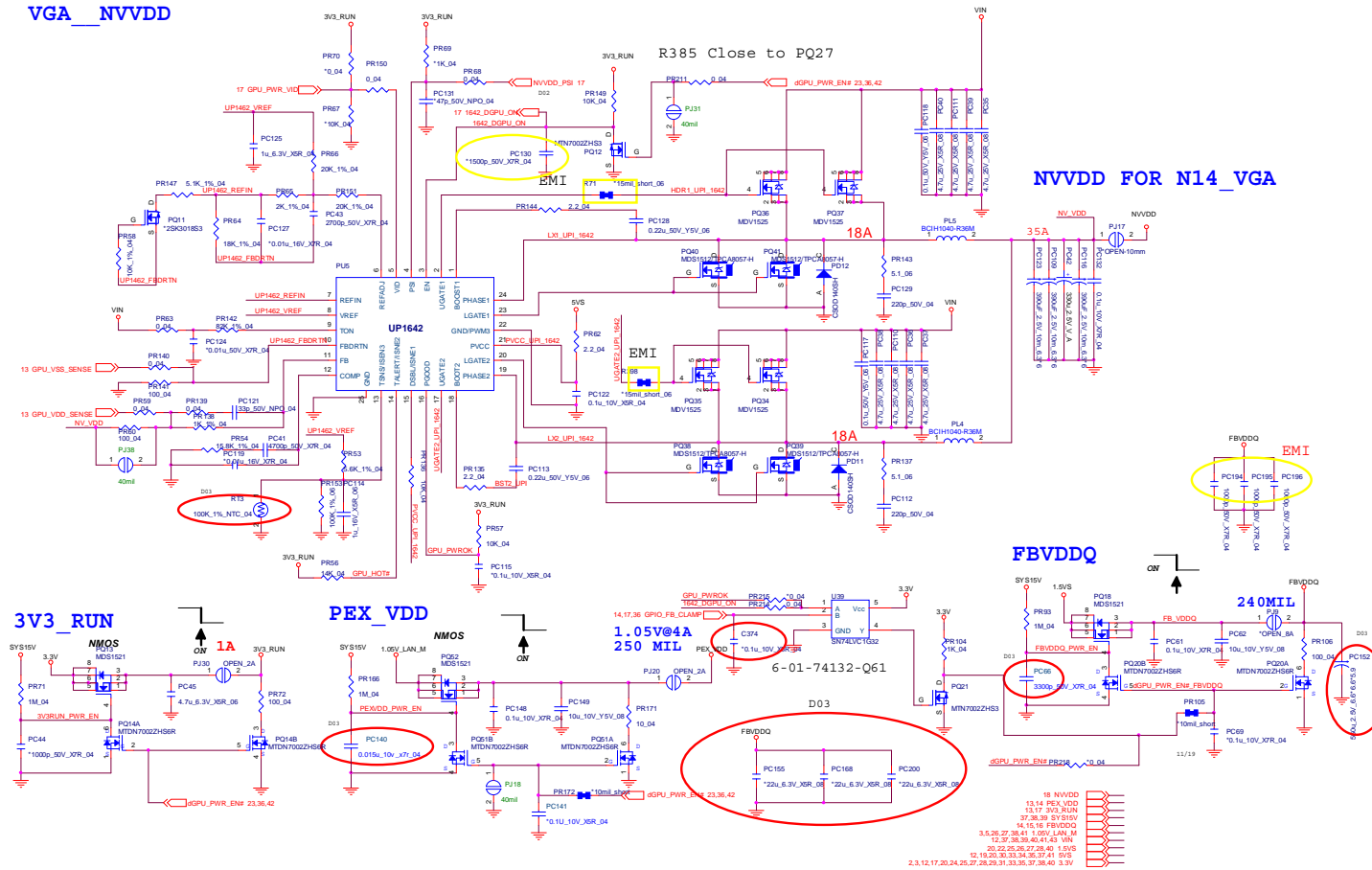
# POWER VCORE

Sheet 41 of 46  
POWER VCORE





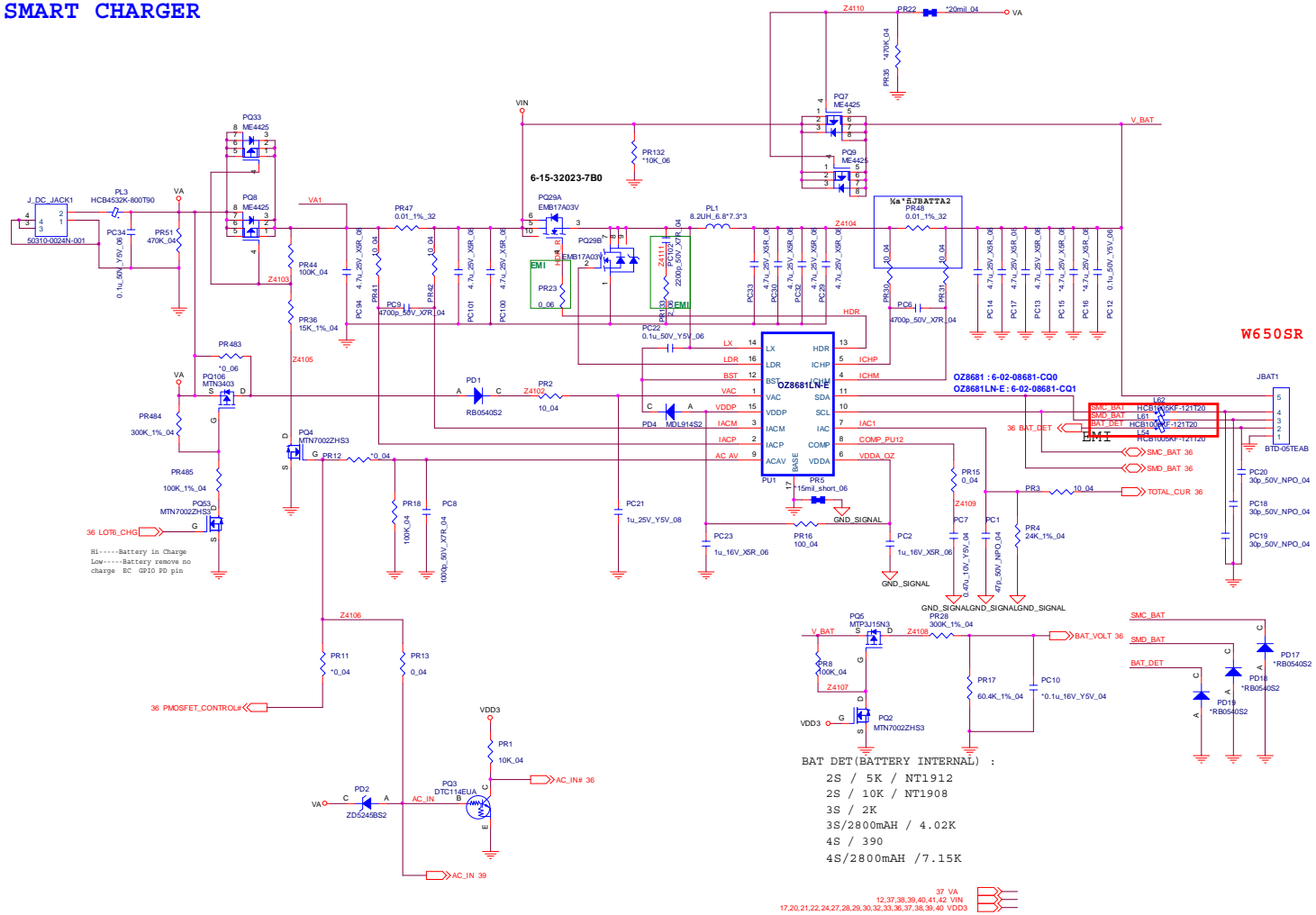
# N14P, NVVDD, PEX, FBVDDQ



B.Schematic Diagrams

# AC IN, CHARGER

## SMART CHARGER

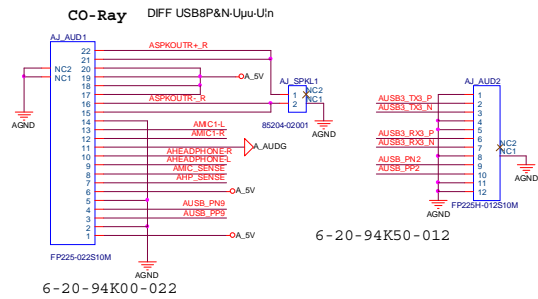


B.Schematic Diagrams

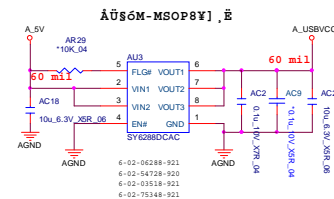
# AUDIO BOARD

**6-71-W6508-D05**

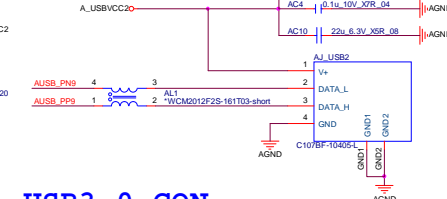
## AUDIO BOARD Connect



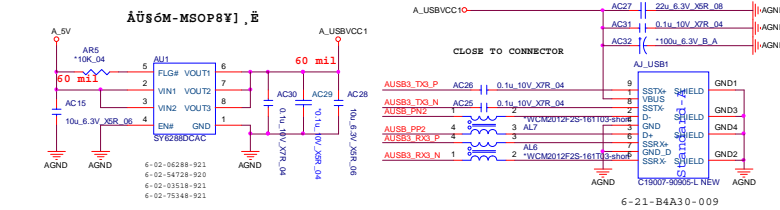
## USB PORT (PORT9)



## USB2.0 CON

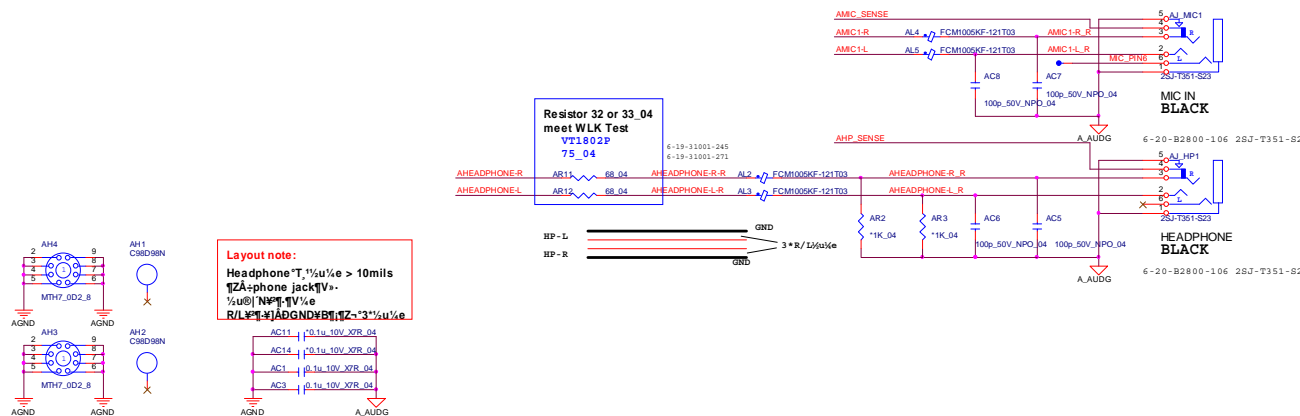


## USB3.0 CON



Sheet 44 of 46  
AUDIO BOARD

## AUDIO JACK



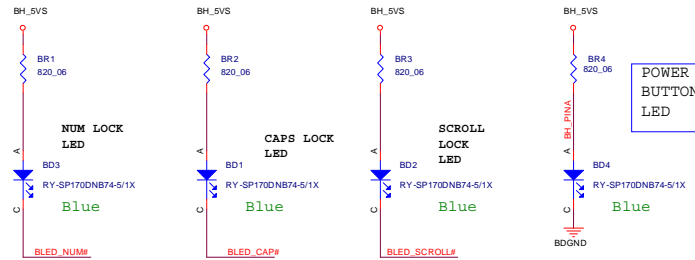
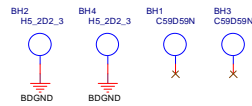
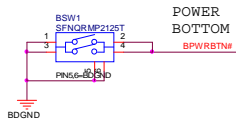
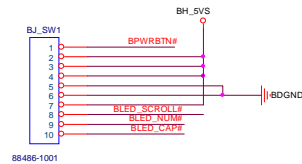
B.Schematic Diagrams

# POWER SWITCH BOARD

Sheet 45 of 46  
POWER SWITCH  
BOARD

## POWER & LED BOARD

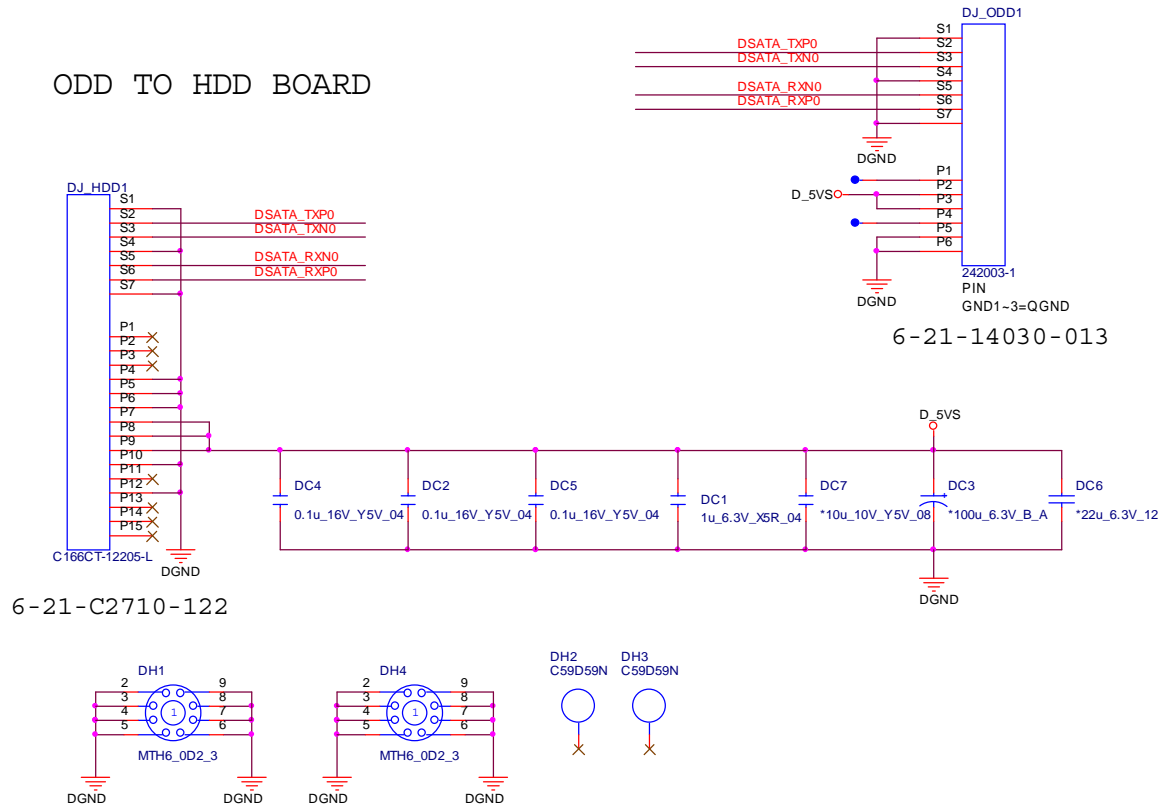
6-71-W650S-D03-A



# ODD to HDD BOARD

6-71-W650N-D03

ODD TO HDD BOARD



Sheet 46 of 46  
ODD to HDD  
BOARD

B.Schematic Diagrams

**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 **F10** to save any changes you have made and exit the BIOS to restart the computer.



### BIOS Version

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

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

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

## BIOS Update

---

### Use the flash tools to update the BIOS

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

**C:\> Flash.bat**

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 **F9**) and select “**Yes**” to confirm the selection.
5. Press **F10** 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.