

SERVICE MANUAL

W940PU / W945PUQ

notebook



Notebook Computer
W940PU / W945PUQ
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 **W940PU** / **W945PUQ** series notebook PC.

The following information is included:

Chapter 1, Introduction, provides general information about the location of system elements and their specifications.
Chapter 2, Disassembly, provides step-by-step instructions for disassembling parts and subsystems and how to upgrade elements of the system.

Appendix A, Part Lists

Appendix B, Schematic Diagrams

Appendix C, Updating the FLASH ROM BIOS

Preface

IMPORTANT SAFETY INSTRUCTIONS

Follow basic safety precautions, including those listed below, to reduce the risk of fire, electric shock and injury to persons when using any electrical equipment:

1. Do not use this product near water, for example near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
2. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord and batteries indicated in this manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for possible special disposal instructions.
5. This product is intended to be supplied by a Listed Power Unit with an AC Input of 100 - 240V, 50 - 60Hz, DC Output of 19V, 2.1A (**40 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.

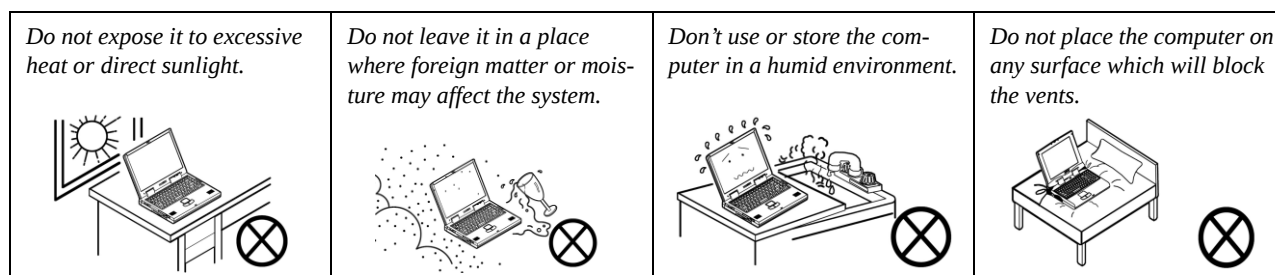
Instructions for Care and Operation

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

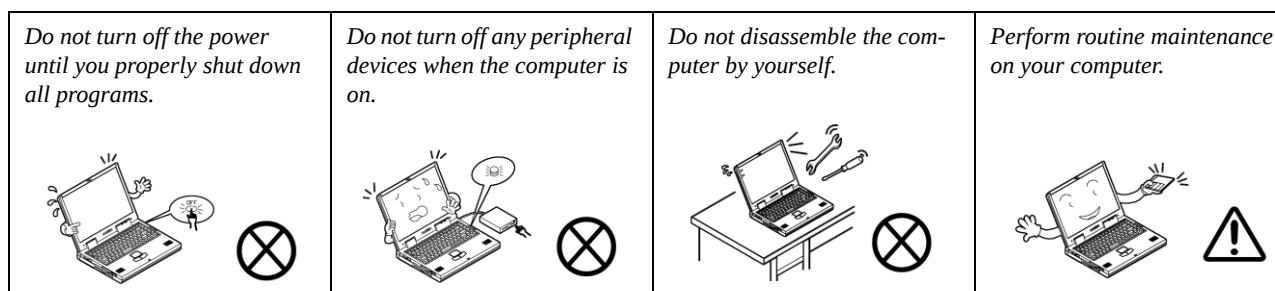
1. **Don't drop it, or expose it to shock.** If the computer falls, the case and the components could be damaged.



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.

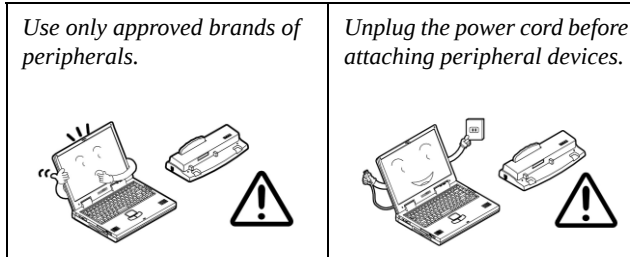


3. **Follow the proper working procedures for the computer.** Shut the computer down properly and don't forget to save your work. Remember to periodically save your data as data may be lost if the battery is depleted.



Preface

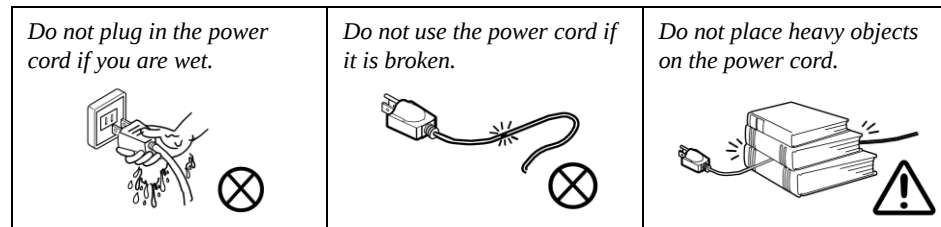
4. **Avoid interference.** Keep the computer away from high capacity transformers, electric motors, and other strong magnetic fields. These can hinder proper performance and damage your data.
5. **Take care when using peripheral devices.**



Power Safety

The computer has specific power requirements:

- Only use a power adapter approved for use with this computer.
- Your AC adapter may be designed for international travel but it still requires a steady, uninterrupted power supply. If you are unsure of your local power specifications, consult your service representative or local power company.
- The power adapter may have either a 2-prong or a 3-prong grounded plug. The third prong is an important safety feature; do not defeat its purpose. If you do not have access to a compatible outlet, have a qualified electrician install one.
- When you want to unplug the power cord, be sure to disconnect it by the plug head, not by its wire.
- Make sure the socket and any extension cord(s) you use can support the total current load of all the connected devices.
- Before cleaning the computer, make sure it is disconnected from any external power supplies.



Power Safety Warning

Before you undertake any upgrade procedures, make sure that you have turned off the power, and disconnected all peripherals and cables (including telephone lines and power cord). It is advisable to also remove your battery in order to prevent accidentally turning the machine on.

Battery Precautions

- Only use batteries designed for this computer. The wrong battery type may explode, leak or damage the computer.
- Do not continue to use a battery that has been dropped, or that appears damaged (e.g. bent or twisted) in any way. Even if the computer continues to work with a damaged battery in place, it may cause circuit damage, which may possibly result in fire.
- Recharge the batteries using the notebook's system. Incorrect recharging may make the battery explode.
- Do not try to repair a battery pack. Refer any battery pack repair or replacement to your service representative or qualified service personnel.
- Keep children away from, and promptly dispose of a damaged battery. Always dispose of batteries carefully. Batteries may explode or leak if exposed to fire, or improperly handled or discarded.
- Keep the battery away from metal appliances.
- Affix tape to the battery contacts before disposing of the battery.
- Do not touch the battery contacts with your hands or metal objects.

Battery Guidelines

The following can also apply to any backup batteries you may have.

- If you do not use the battery for an extended period, then remove the battery from the computer for storage.
- Before removing the battery for storage charge it to 60% - 70%.
- Check stored batteries at least every 3 months and charge them to 60% - 70%.



Battery Disposal

The product that you have purchased contains a rechargeable battery. The battery is recyclable. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal.

Caution

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used battery according to the manufacturer's instructions.

Battery Level

Click the battery icon  in the taskbar to see the current battery level and charge status. A battery that drops below a level of 10% will not allow the computer to boot up. Make sure that any battery that drops below 10% is recharged within one week.

Preface

Related Documents

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

User's Manual on CD/DVD

This describes the notebook PC's features and the procedures for operating the computer and its ROM-based setup program. It also describes the installation and operation of the utility programs provided with the notebook PC.

System Startup

1. Remove all packing materials.
2. Place the computer on a stable surface.
3. Insert the battery and make sure it is locked in position.
4. Securely attach any peripherals you want to use with the computer (e.g. keyboard and mouse) to their ports.
5. Attach the AC/DC adapter to the DC-In jack at the rear of the computer, then plug the AC power cord into an outlet, and connect the AC power cord to the AC/DC adapter.
6. Use one hand to raise the lid/LCD to a comfortable viewing angle (do not exceed 127 degrees); use the other hand (as illustrated in Figure 1) to support the base of the computer (**Note: Never** lift the computer by the lid/LCD).
7. Press the power button to turn the computer "on".

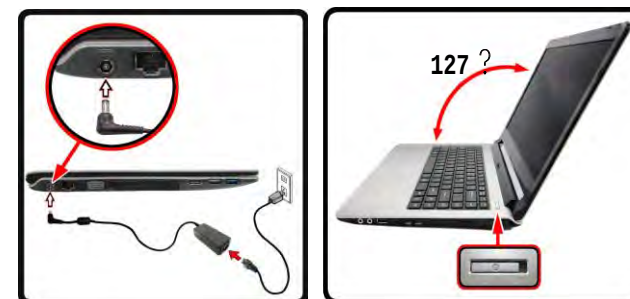


Figure 1
**Opening the Lid/LCD/
Computer with AC/DC
Adapter Plugged-In**



Shut Down

Note that you should always shut your computer down by choosing the **Shut down** command in **Windows** (see below). This will help prevent hard disk or system problems.

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

Or

Choose **Shut down or sign out > Shut down** from the context menu (use the **Windows Logo Key**  + **X** key combination to access the context menu).

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Chapter 1: Introduction

Overview

This manual covers the information you need to service or upgrade the **W940PU / W945PUQ** 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. *Window 10*, etc.) have their own manuals as do application softwares (e.g. word processing and database programs). If you have questions about those programs, you should consult those manuals.

The **W940PU / W945PUQ** 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® Pentium® Processor

N4200 (1.10GHz)

2MB Smart Cache, **14nm**, DDR3L-1866MHz, TDP 6W

Intel® Celeron® Processor

N3450 (1.10GHz)

2MB Smart Cache, **14nm**, DDR3L-1866MHz, TDP 6W

N3350 (1.10GHz)

2MB Smart Cache, **14nm**, DDR3L-1866MHz, TDP 6W

BIOS

64Mb SPI Flash ROM

AMI BIOS

Memory

Two 204 Pin SO-DIMM Sockets Supporting **DDR3L 1600/1866MHz** Memory

Memory Expandable up to 8GB

LCD Options

14" (35.56cm), 16:9, HD (1366x768)/FHD (1920x1080)

Video Adapter

Intel HD Graphics

Dynamic Frequency

Intel Dynamic Video Memory Technology

Microsoft DirectX®12 Compatible

Audio

High Definition Audio Compliant Interface

2 * Built-In Speakers

Built-In Microphone

(Factory Option) Built-In Array Microphone

Security

Security (Kensington® Type) Lock Slot

BIOS Password

Intel® PTT

(Factory Option) TPM v 2.0

Storage

One Changeable 2.5" **7mm** (h) SATA **HDD**

(Factory Option) One 9.5mm(h) Optical Device Type Drive (Super Multi Drive)

Or

(Factory Option) Dummy ODD

(Factory Option) 32GB eMMC

Pointing Device

Built-in Touchpad

Keyboard

"WinKey" keyboard (with embedded numeric keypad)

M.2 Slots

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

(Factory Option) Slot 2 for **3G** or **4G** Module

Interface

One HDMI-Out Port

One External Monitor Port

One Headphone-Out Jack

One Microphone-In Jack

One RJ-45 LAN Jack

Two USB 3.0 Ports

One DC-in Jack

One USB 2.0 Port

Communication

Built-In 10/100/1000Mb Base-TX Ethernet LAN
1.0M HD PC Camera Module
(Factory Option) 3G or 4G M.2 Module

WLAN/Bluetooth M.2 Modules:
(Factory Option) Intel® Wireless-AC 3168 Wireless LAN (802.11ac) + Bluetooth 4.0
(Factory Option) Intel® Wireless-N 7265 Wireless LAN (802.11b/g/n) + Bluetooth 4.0
(Factory Option) Third-Party Wireless LAN (802.11b/g/n) + Bluetooth 4.0

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

Environmental Spec

Temperature
Operating: 5°C - 35°C
Non-Operating: -20°C - 60°C

Relative Humidity
Operating: 20% - 80%
Non-Operating: 10% - 90%

Power

Full Range AC/DC Adapter
AC Input: 100 - 240V, 50 - 60Hz
DC Output: 19V, 2.1A (40W)

Built-in 4 Cell Smart Lithium-Ion Battery Pack, 32WH
(Factory Option) Built-in 3 Cell Smart Lithium-Ion Battery Pack, 24WH
(Factory Option) Built-in 4 Cell Smart Lithium-Ion Battery Pack, 44WH
(Factory Option) Built-in 6 Cell Smart Lithium-Ion Battery Pack, 48WH
(Factory Option) Built-in 6 Cell Smart Lithium-Ion Battery Pack, 62WH

Dimensions & Weight

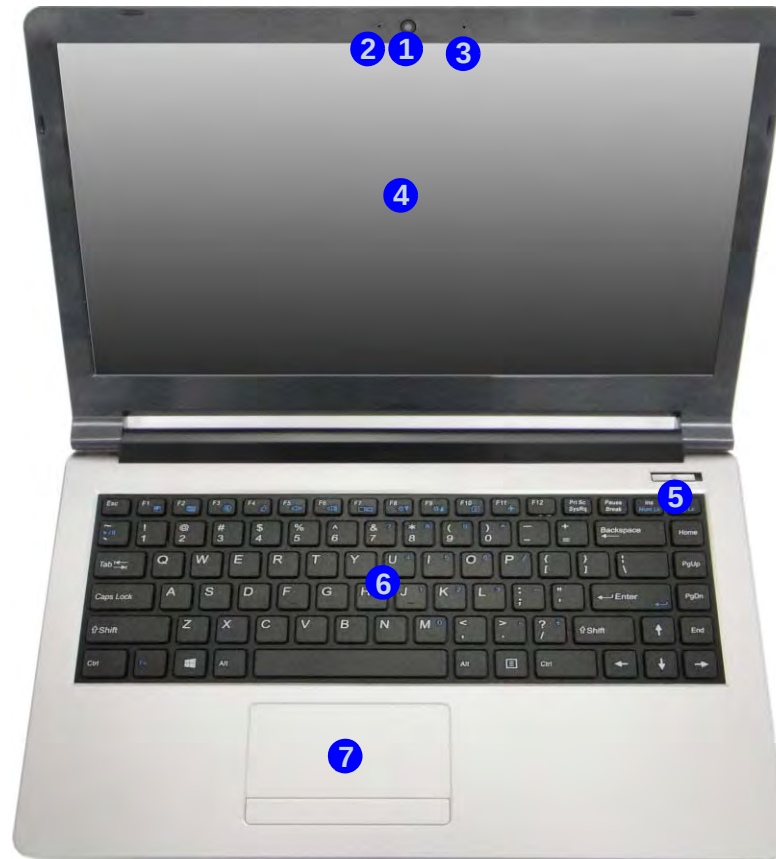
340mm (w) * 242mm (d) * 26.5mm (h)
(Height Excluding Battery Area)
2.0kg (Barebone with ODD and 32WH Battery)

Introduction

Figure 1
Top View

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

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 2.0 Port
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. RJ-45 LAN Jack
3. External Monitor Port
4. Vent
5. HDMI-Out Port
6. USB 3.0 Ports

LEFT SIDE VIEW



Figure 5
Rear View

REAR VIEW



External Locator - Bottom View

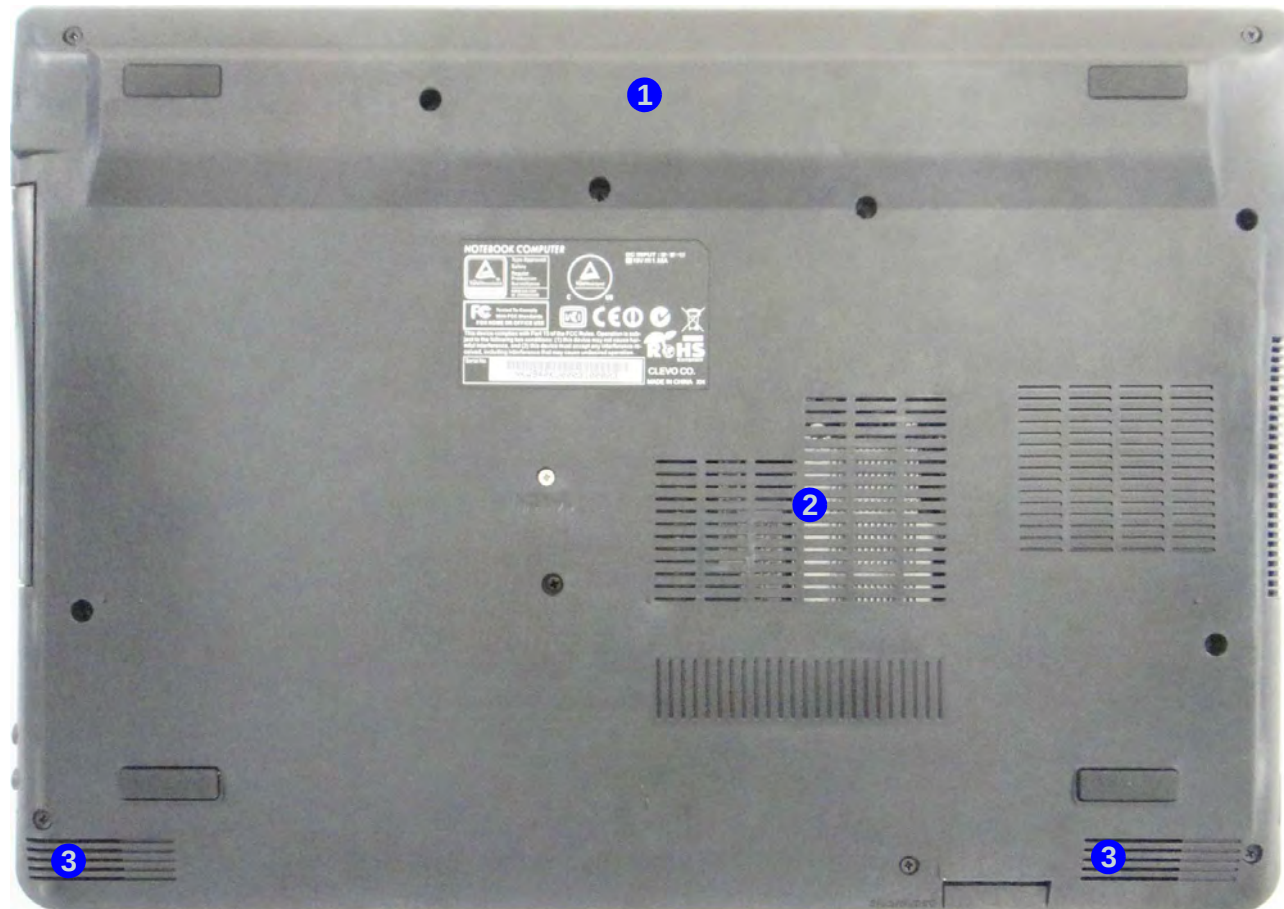


Figure 6
Bottom View

1. Battery Location
2. Vent
3. Speakers



Overheating

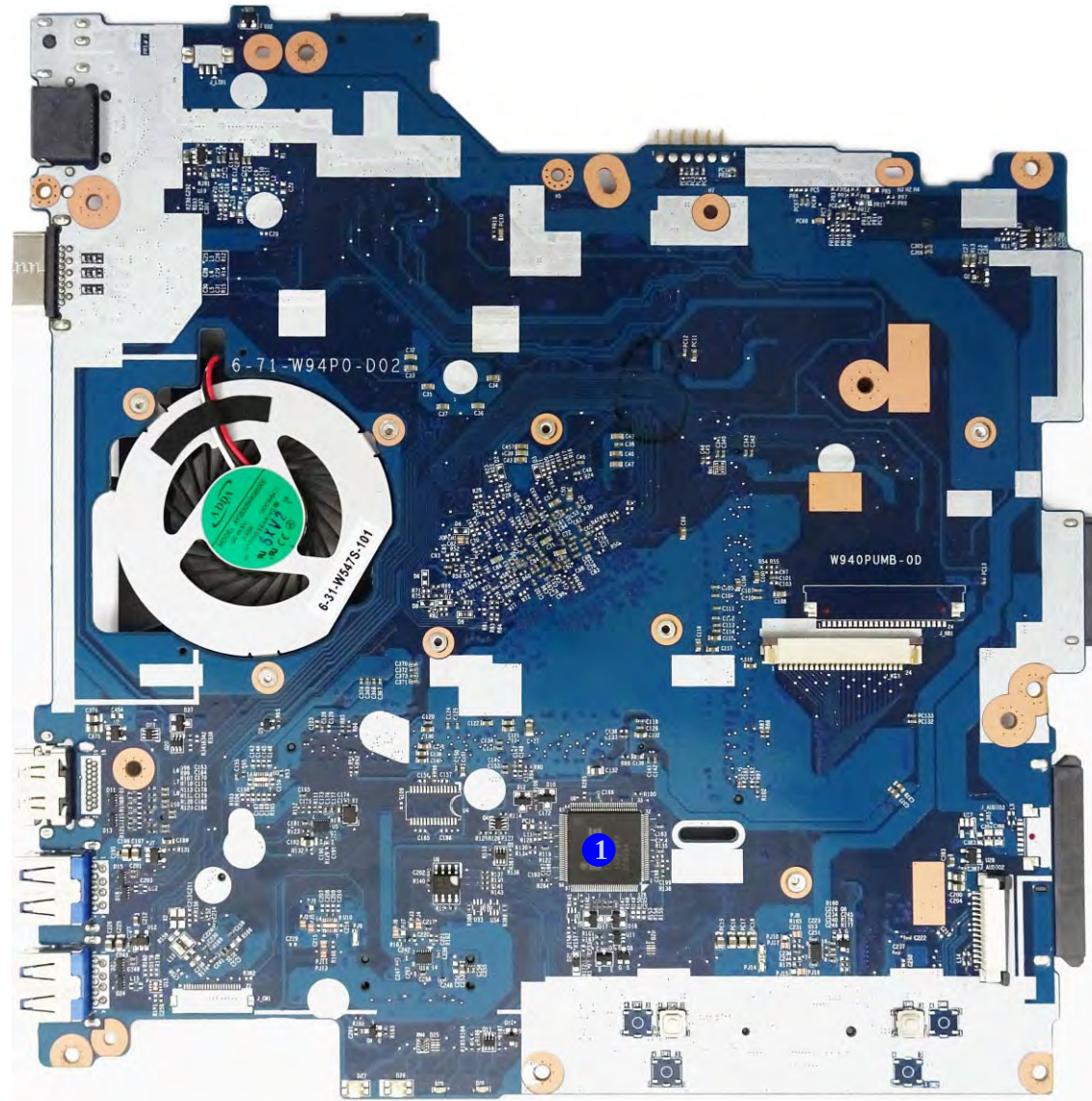
To prevent your computer from overheating, make sure nothing blocks any vent while the computer is in use.

Introduction

Figure 7
**Mainboard Top
Key Parts**

1. KBC-ITE IT8587

Mainboard Overview - Top (Key Parts)



Mainboard Overview - Bottom (Key Parts)

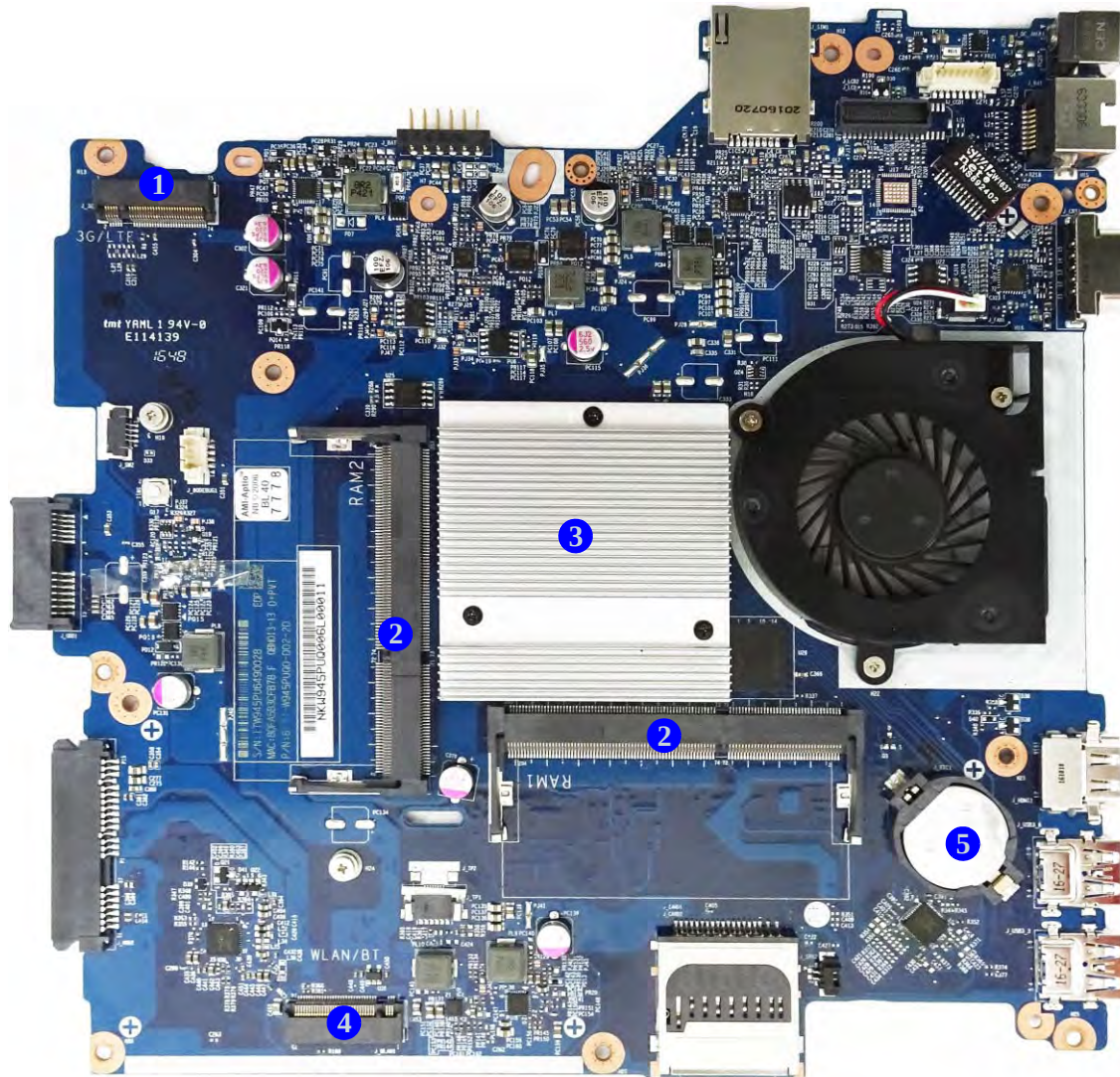


Figure 8
**Mainboard Bottom
Key Parts**

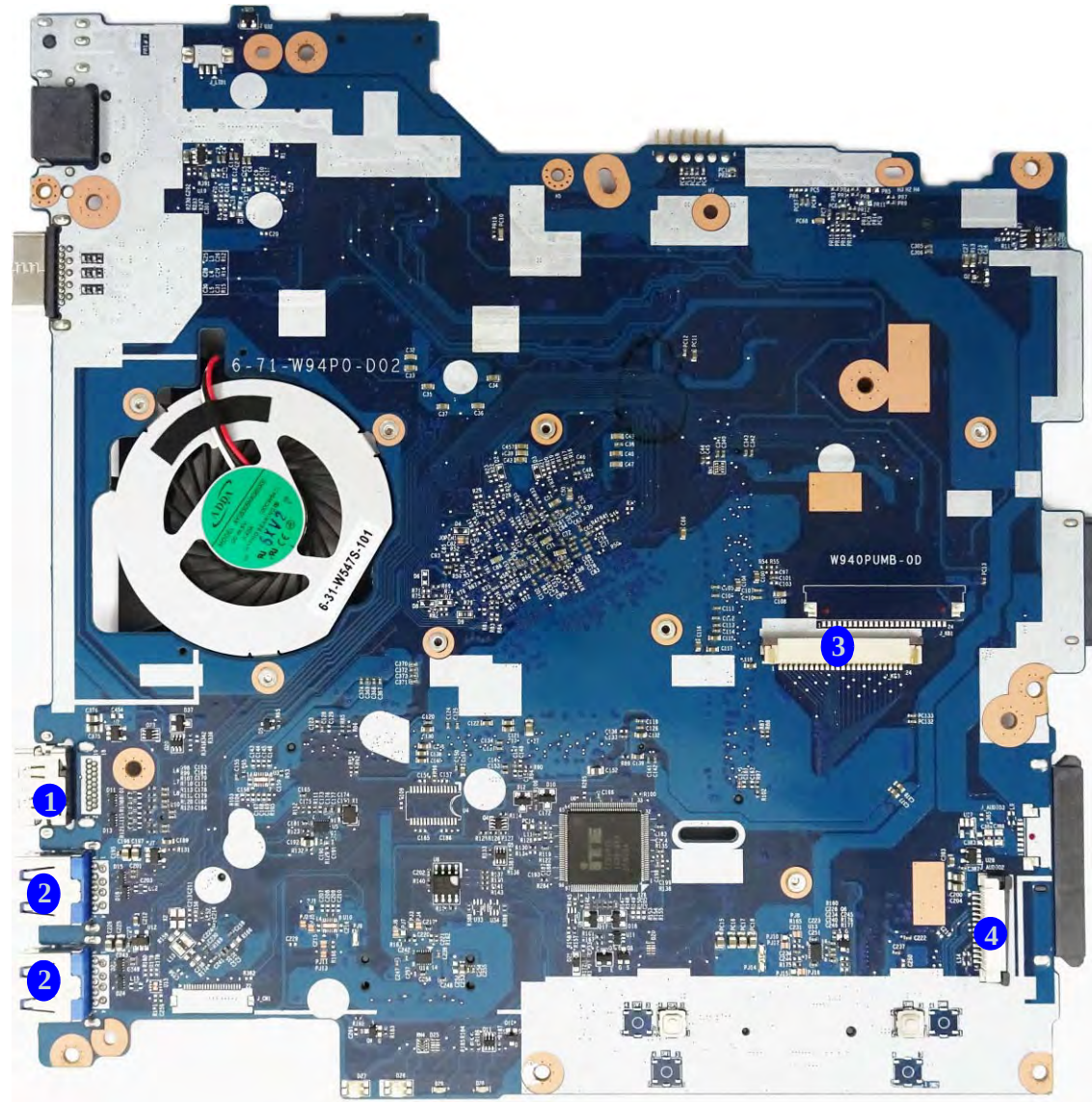
1. M.2 Card Connector (3G Module)
2. Memory Slots (DDR3 SO-DIMM)
3. CPU
4. M.2 Card Connector (WLAN Module)
5. CMOS Battery

Introduction

Figure 9
**Mainboard Top
Connectors**

1. HDMI-Out Port
2. USB Ports 3.0
3. Keyboard Cable Connector
4. Audio Board 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. External Monitor Port
5. RJ-45 LAN Jack
6. DC-In Jack
7. CCD Connector
8. LCD Cable Connector
9. Touchpad Connector

Chapter 2: Disassembly

Overview

This chapter provides step-by-step instructions for disassembling the **W940PU / W945PUQ** series notebook's parts and subsystems. When it comes to reassembly, reverse the procedures (unless otherwise indicated).

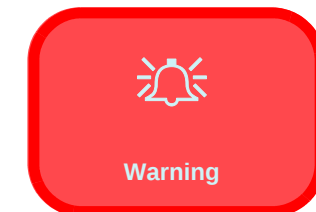
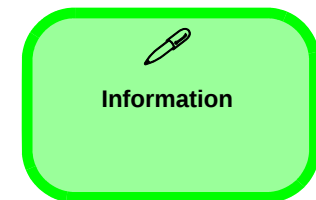
We suggest you completely review any procedure before you take the computer apart.

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

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

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

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



Disassembly

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

Maintenance Tools

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

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

Connections

Connections within the computer are one of four types:

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

Maintenance Precautions

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

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

Cleaning

Do not apply cleaner directly to the computer, use a soft clean cloth.

Do not use volatile (petroleum distillates) or abrasive cleaners on any part of the computer.



Power Safety Warning

Before you undertake any upgrade procedures, make sure that you have turned off the power, and disconnected all peripherals and cables (including telephone lines and power cord). It is advisable to also remove your battery in order to prevent accidentally turning the machine on.

Disassembly Steps

The following table lists the disassembly steps, and on which page to find the related information. **PLEASE PERFORM THE DISASSEMBLY STEPS IN THE ORDER INDICATED.**

To remove the Battery:

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

To remove the Optical Device:

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

To remove the HDD:

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

1. Remove the battery [page 2 - 5](#)
2. Remove the keyboard [page 2 - 14](#)

To remove the Wireless LAN Module:

1. Remove the battery [page 2 - 5](#)
2. Remove the WLAN [page 2 - 15](#)

To remove the 3G Module:

1. Remove the battery [page 2 - 5](#)
2. Remove the 3G [page 2 - 17](#)

To remove the CCD Module:

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

Removing the Battery

1. Turn **off** the computer, turn it over.
2. Remove screws **1** - **13** from the bottom case (*Figure 1a*).
3. Carefully separate the bottom cover **14** from the top case in the direction of the arrow at point **15** - **18** (*Figure 1b*).
4. The battery will be visible at point **19** (*Figure 1c*).

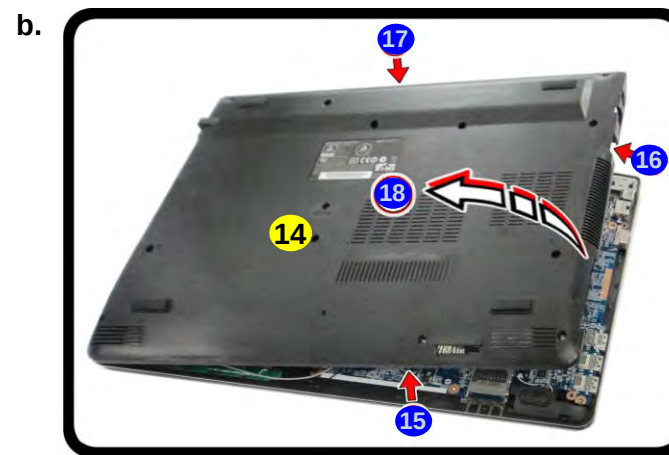
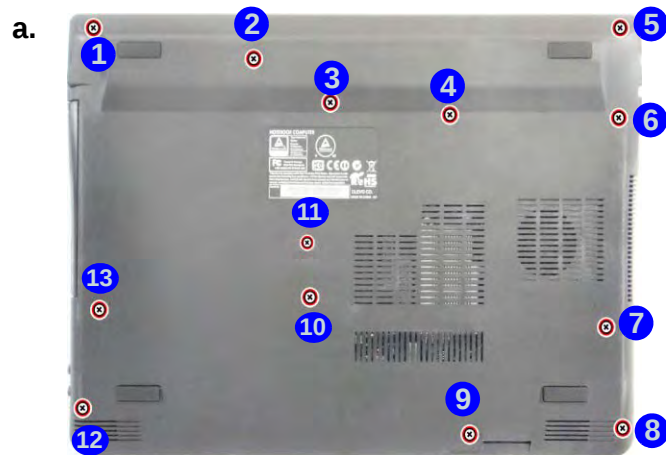


Figure 1
Battery Removal

- a. Remove screws from the bottom case.
- b. Separate the top and bottom case.
- c. The battery will be visible.



14. Bottom Cover

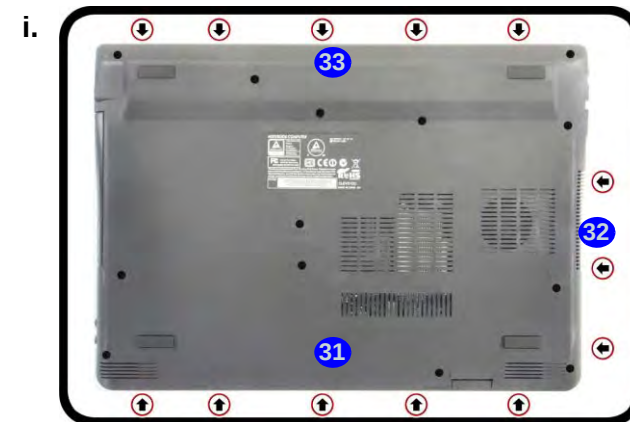
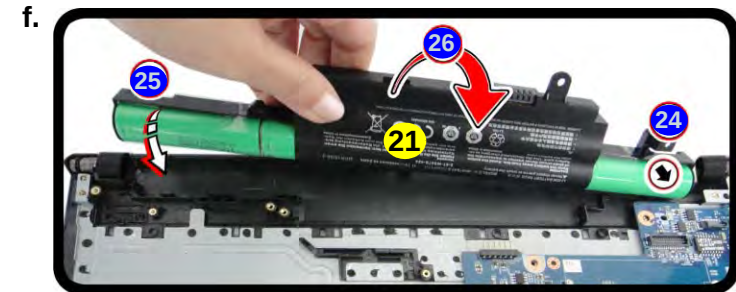
- 13 Screws

Disassembly

Figure 2
Battery Removal & Assembly (cont'd.)

- d. Remove the screws.
- e. Turn the battery in the direction of the arrow and lift it out.
- f. Install a new battery and turn the battery to align the connector.
- g. Tighten the screws
- h. Reattach the bottom cover and top case.
- i. Snap the sides to close and replace the screws.

5. Remove screws 19 - 20 from the battery (Figure 2d).
6. Turn the battery 21 in the direction of the arrow 22 and lift it out 23 (Figure 2e).
7. Insert a new battery 21 at point 24 in the direction of the arrow 25. Turn the battery 26 to align the connectors.
8. Tighten screws 27 - 28 (Figure 2g).
9. Reattach the bottom cover with the top case at point 29 in the direction of the arrow 30 (Figure 2h).
10. Snap together the sides 31 - 33 of the bottom cover and top case (Figure 2i) and replace the corresponding screws.



21. Battery

- 2 Screws

Removing the Optical (CD/DVD) Device

1. Turn **off** the computer, turn it over to remove the battery ([page 2 - 5](#)).
2. Carefully pull out the optical device **1** out of the bay at point **2** ([Figure 3a](#)).
3. Carefully pry the bezel **4** off the optical device at point **3** ([Figure 3b](#)).
4. Separate the bezel **4** and the optical device ([Figure 3c](#)).

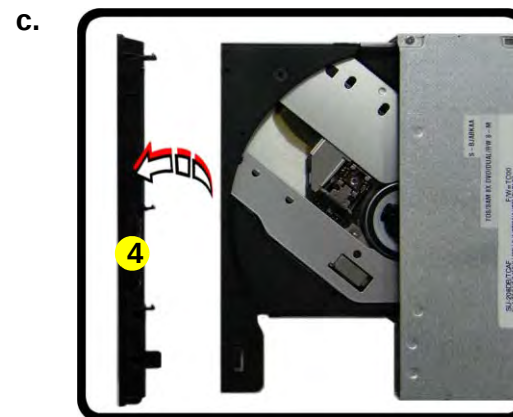
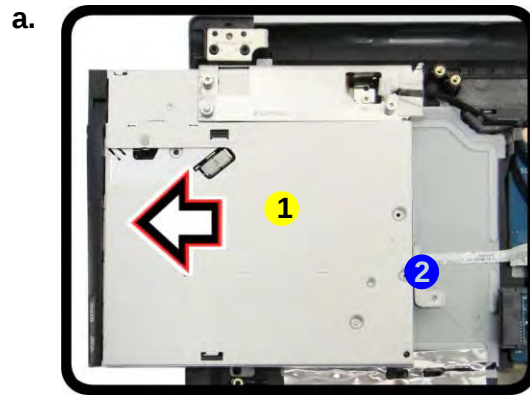


Figure 3
**Optical Device
Removal**

- a. Pull out the optical device.
- b. Pry the bezel off the optical device.
- c. Separate the bezel and optical device



1. Optical Device
4. Bezel

Disassembly

Figure 4
**Optical Device
Assembly**

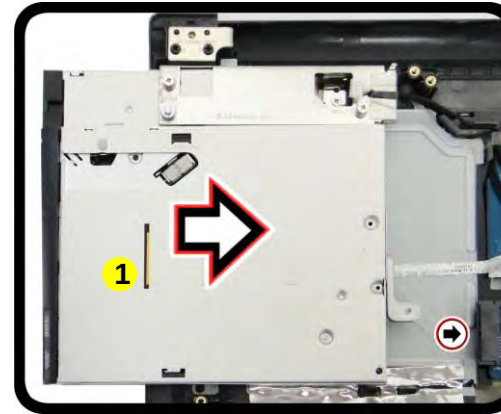
- d. Install the front bezel.
e. Insert the optical device.
f. Tighten the screw.

5. Reverse the process to attach the front bezel **4** with the new optical device at point **5** (*Figure 4e*).
6. Insert the new optical device **1** and carefully slide it into the computer (the device only fits one way. DO NOT FORCE IT; The screw holes should line up).
7. Replace the bottom cover and tighten the screw **6** (*Figure 4g*).
8. Restart the computer to allow it to automatically detect the new device.

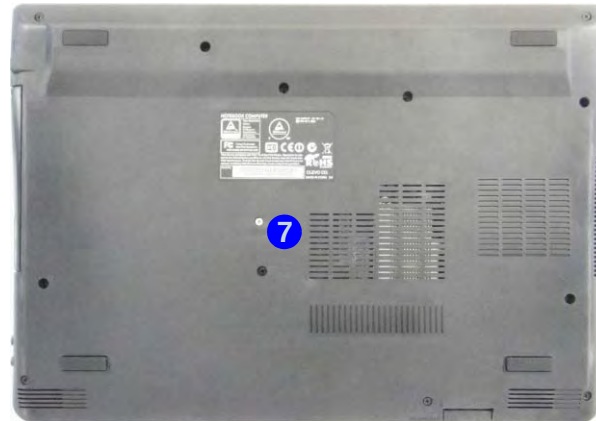
d.



e.



f.



1. Optical Device
4. Bezel

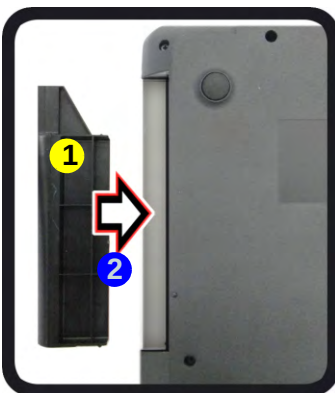
- 1 Screw

Installing and Removing the Dummy ODD Bezel

Installing the Dummy ODD Bezel

1. Insert the dummy ODD bezel **1** to lock it into the bay in the direction of the arrow **2** (*Figure 5a*).

a.



Removing the Dummy ODD Bezel

1. Turn **off** the computer, turn it over to remove the battery (*page 2 - 5*).
2. Slide the dummy ODD bezel **1** out in the direction of the arrow **2** (*Figure 6a*).
3. Reattach the bottom cover with the top case and replace the corresponding screws.

a.

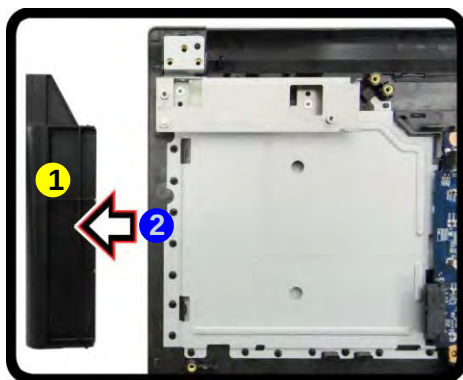


Figure 5
**Dummy ODD Bezel
Installation**

- a. Insert the dummy ODD bezel into the ODD bay.

Figure 6
**Dummy ODD Bezel
Removal**

- a. Remove the dummy ODD bezel from the ODD bay.
- b. Replace the bottom cover and screws.



1. Dummy ODD Bezel

Disassembly

Removing the Hard Disk Drive

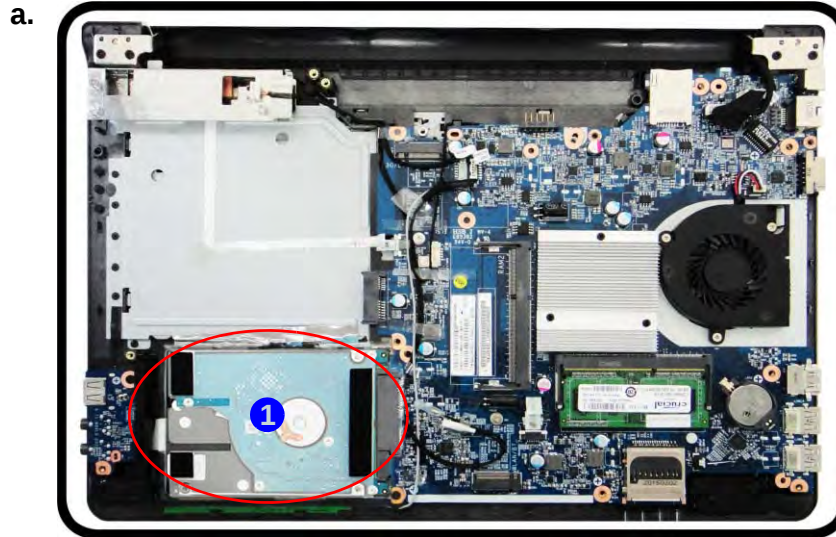
Figure 7
**HDD Assembly
Removal**

The hard disk drive can be taken out to accommodate other 2.5" serial (SATA) hard disk drives with a height of 7.0mm (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.

a. Locate the HDD assembly.

Hard Disk Upgrade Process

1. Turn **off** the computer, turn it over to remove the battery ([page 2 - 5](#)).
2. The hard disk drive will be visible at point **1** ([Figure 7a](#)).



HDD System Warning

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

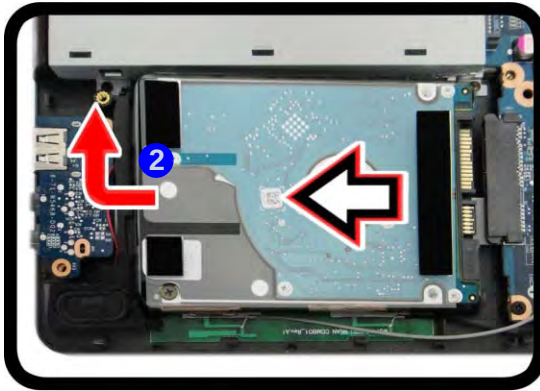
You have backed up any data you want to keep from your old HDD.

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

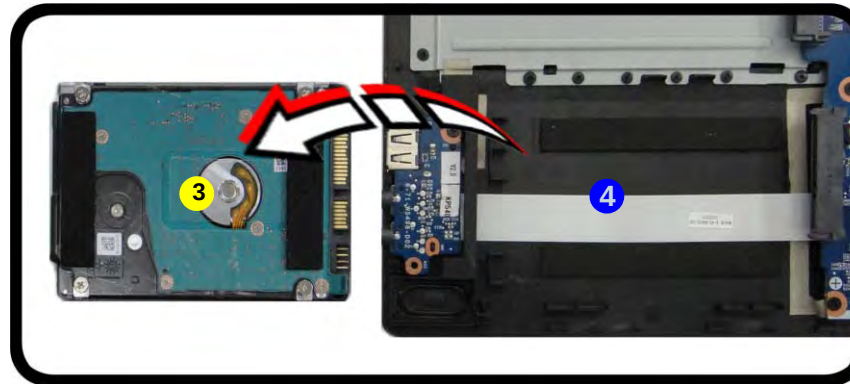
If you have access to the internet, download the latest application and hardware driver updates for the operating system you plan to install. Copy these to a removable medium.

3. Slightly lift and pull the hard disk assembly in the direction of arrow ② (Figure 8b).
4. Lift the hard disk assembly ③ out of the bay ④ (Figure 8c).
5. Remove the screws ⑤ - ⑥ and the adhesive cover ⑦ from the hard disk ⑧ (Figure 8d).
6. Reverse the process to install a new hard disk (do not forget to replace all the screws and bottom cover).

b.



c.



d.

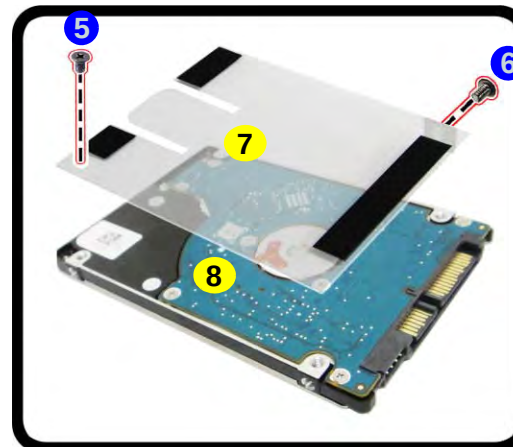


Figure 8
**HDD Assembly
Removal (cont'd.)**

- b. Slightly lift and pull the HDD assembly in the direction of the arrow.
- c. Lift the HDD assembly out of the bay.
- d. Remove the screws and adhesive cover.



- 3. HDD Assembly
- 7. Adhesive Cover
- 8. HDD
- 2 Screws

Disassembly

Figure 9
RAM Module Removal

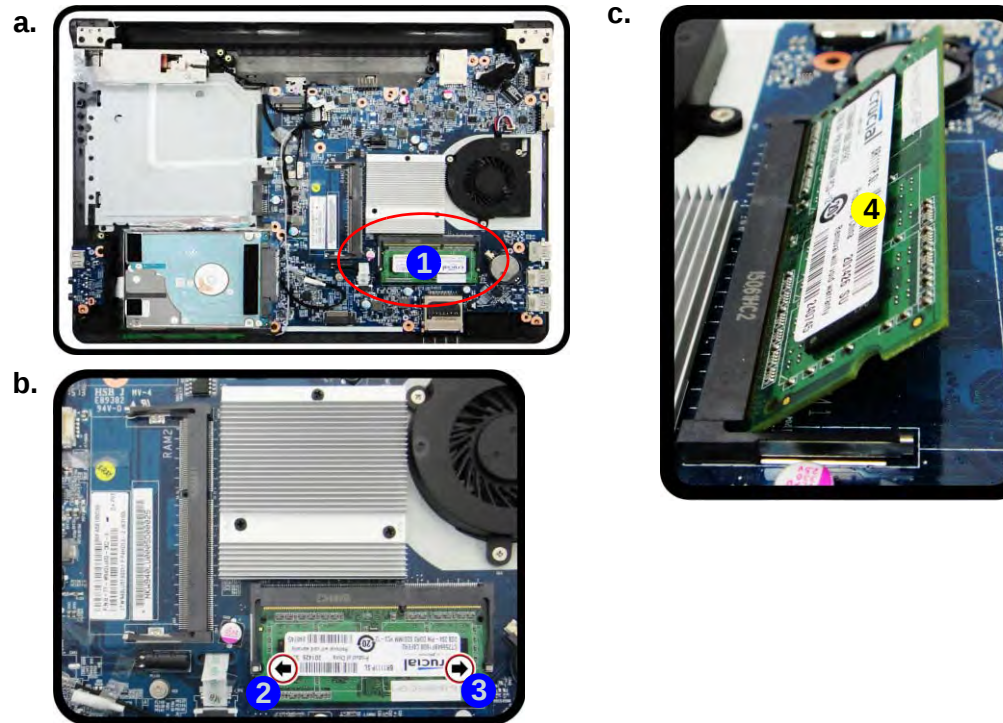
- The RAM modules will be visible at point **1** on the mainboard.
- Pull the release latches.
- Remove the module.

Removing the System Memory (RAM)

The computer has two memory sockets for 204 pin Small Outline Dual In-line Memory Modules (SO-DIMM) supporting single or dual channel DDR3L depending on the CPU. The main memory can be expanded up to 8GB. 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 to remove the battery ([page 2 - 5](#)).
- The RAM modules will be visible at point **1** on the mainboard ([Figure 9b](#)).
- Gently pull the two release latches (**2** & **3**) on the sides of the memory socket in the direction indicated by the arrows ([Figure 9b](#)). The RAM module **4** will pop-up ([Figure 9c](#)), and you can then remove it.



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.

Single Memory Module Installation

If your computer has a single memory module, then insert the module into the **Channel 0 (JDIMM1 / RAM1)** socket. In this case this is the **horizontal** memory socket.

4. RAM Module

4. Pull the latches to release the second module if necessary.
5. Insert a new module holding it at about a 30° angle and fit the connectors firmly into the memory slot.
6. The module will only fit one way as defined by its pin alignment. Make sure the module is seated as far into the slot as it will go. DO NOT FORCE IT; it should fit without much pressure.
7. Press the module in and down towards the mainboard until the slot levers click into place to secure the module.
8. Replace the bottom case and the screws (see [page 2 - 5](#)).
9. Restart the computer to allow the BIOS to register the new memory configuration as it starts up.

Disassembly

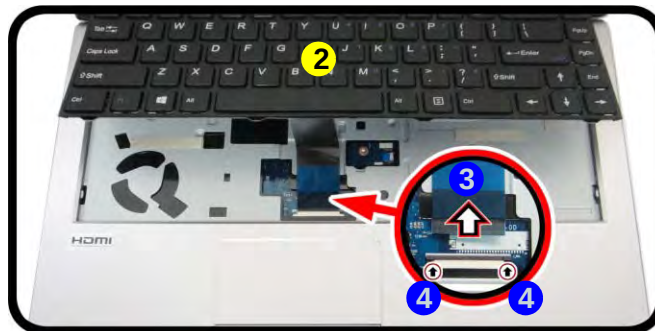
Figure 10
Keyboard Removal

- a. Release the keyboard by pressing at point ①.
 - b. Disconnect the keyboard ribbon cable from the locking collar socket.
 - c. Remove the keyboard.
1. Turn **off** the computer, turn it over to remove the battery ([page 2 - 5](#)).
 2. Press at point ① to release the keyboard ([Figure 10a](#)).
 3. Turn the computer over, remove the keyboard ② ([Figure 10b](#)).
 4. Carefully lift the keyboard up, being careful not to bend the keyboard ribbon cable ③. Disconnect the keyboard ribbon cable from the locking collar socket ④ ([Figure 10b](#)).
 5. Carefully lift up the keyboard ② off the computer ([Figure 10c](#)).
 6. Reverse the process to install the keyboard (be careful not to bend the keyboard ribbon cable).

a.



b.



c.



2. Keyboard

Removing the Wireless LAN Module

1. Turn **off** the computer, turn it over to remove the battery ([page 2 - 5](#)).
2. The Wireless LAN module will be visible at point **1** on the mainboard ([Figure 11a](#)).
3. Carefully disconnect the cables **2** & **3**, and then remove the screw **4** ([Figure 11b](#))
4. The Wireless LAN module **5** ([Figure 11c](#)) will pop-up, and you can remove it from the computer.



Figure 11
**Wireless LAN
Module Removal**

- a. Locate the WLAN.
- b. Disconnect the cable and remove the screw.
- c. The WLAN module will pop up and lift it out of the computer.

Note: Make sure you reconnect the antenna cable to the “1 + 2” socket ([Figure 11b](#)).



5. Wireless LAN Module

- 1 Screw

Disassembly

Wireless LAN, and Combo Module Cables

Note that the cables for connecting to the antennae on WLAN, WLAN & Bluetooth Combo, 3G and LTE modules are not labelled. The cables/covers (each cable will have either a black or transparent cable cover) are color coded for identification as outlined in the table below.

Module Type	Antenna Type	Cable Color	Cable Cover Type
WLAN/WLAN & Bluetooth Combo	WM 1	Black	Transparent
	WM 2	Gray	
	WM 3	White	
LTE Broadband	LTE 1	Black	Black
	LTE 2	Gray	
3G Broadband	3G 1	Black	Black
	3G 2	Gray	

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

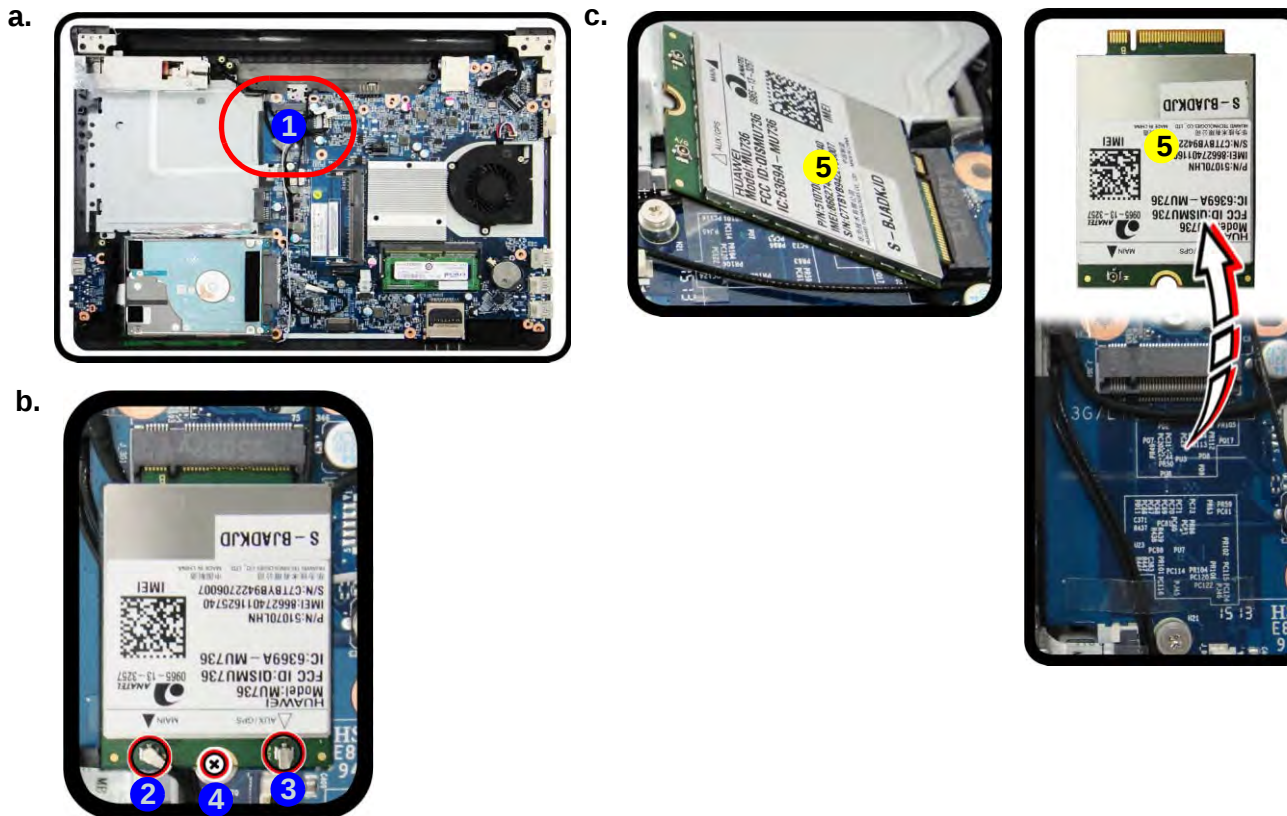
Removing the 3G Module

3G Module Removal Procedure

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

Figure 12
3G Module Removal

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



- 
5. 3G Module
- 1 Screw

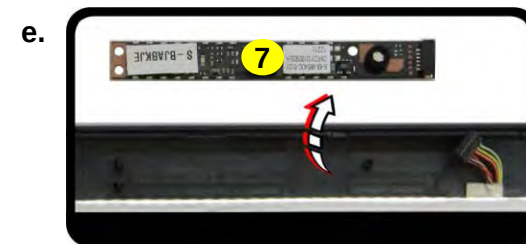
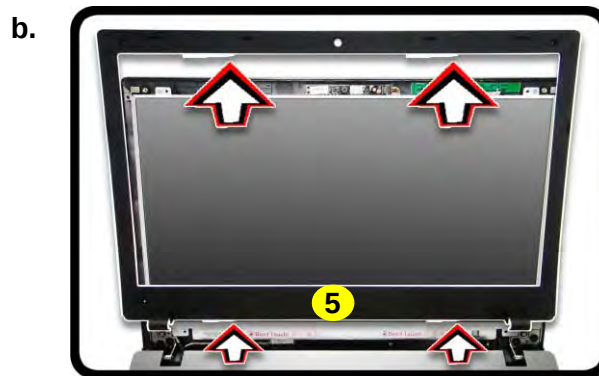
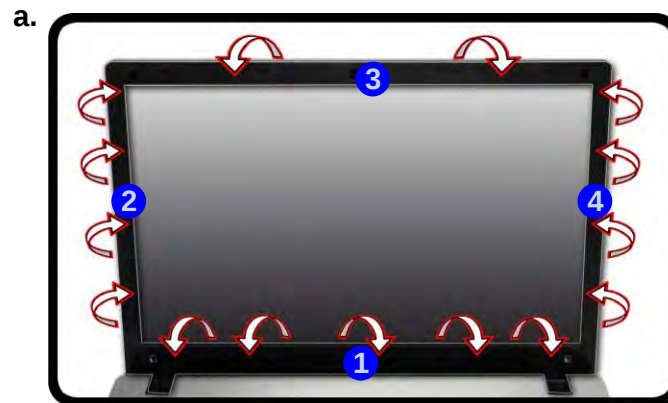
Disassembly

Figure 13
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.
- d. Disconnect the cable.
- e. Remove the CCD module.

Removing the CCD

1. Turn **off** the computer, turn it over to remove the battery ([page 2 - 5](#)).
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 13c](#)).
5. Disconnect the cable **6**.
6. Remove the CCD module **7** ([Figure 13e](#)).
7. Reverse the process to install a new CCD module.



5. LCD Front Cover
7. CCD Module

Appendix A:Part Lists

This appendix breaks down the **W940PU / W945PUQ** 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.

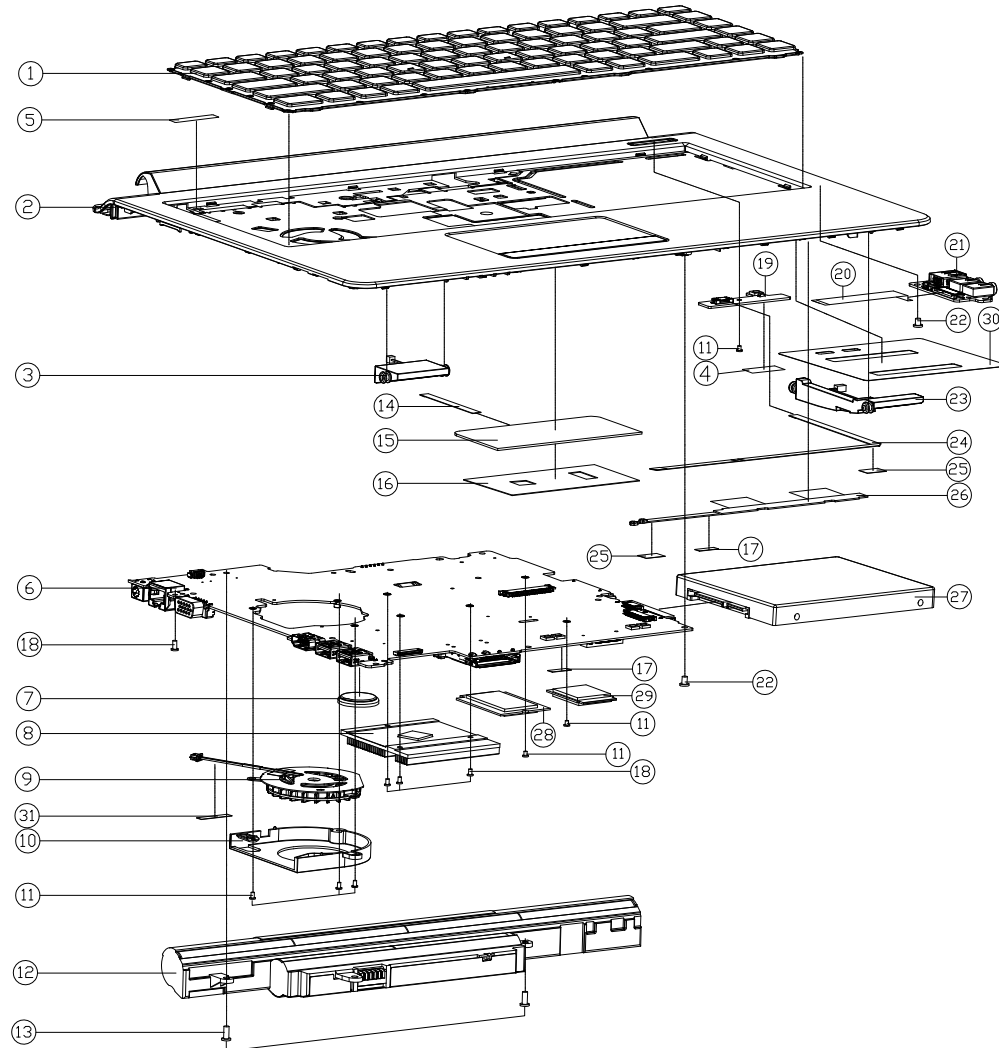
Part List Illustration Location

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

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

Part	W940PU	W945PUQ
Top (Stand)	<i>page A - 3</i>	
Top		<i>page A - 4</i>
Bottom - ODD	<i>page A - 5</i>	
Bottom - Dummy	<i>page A - 6</i>	
Bottom		<i>page A - 7</i>
LCD	<i>page A - 8</i>	<i>page A - 9</i>
DVD Dual Drive	<i>page A - 10</i>	<i>page A - 11</i>
HDD	<i>page A - 12</i>	

Top (Stand) (W940PU)

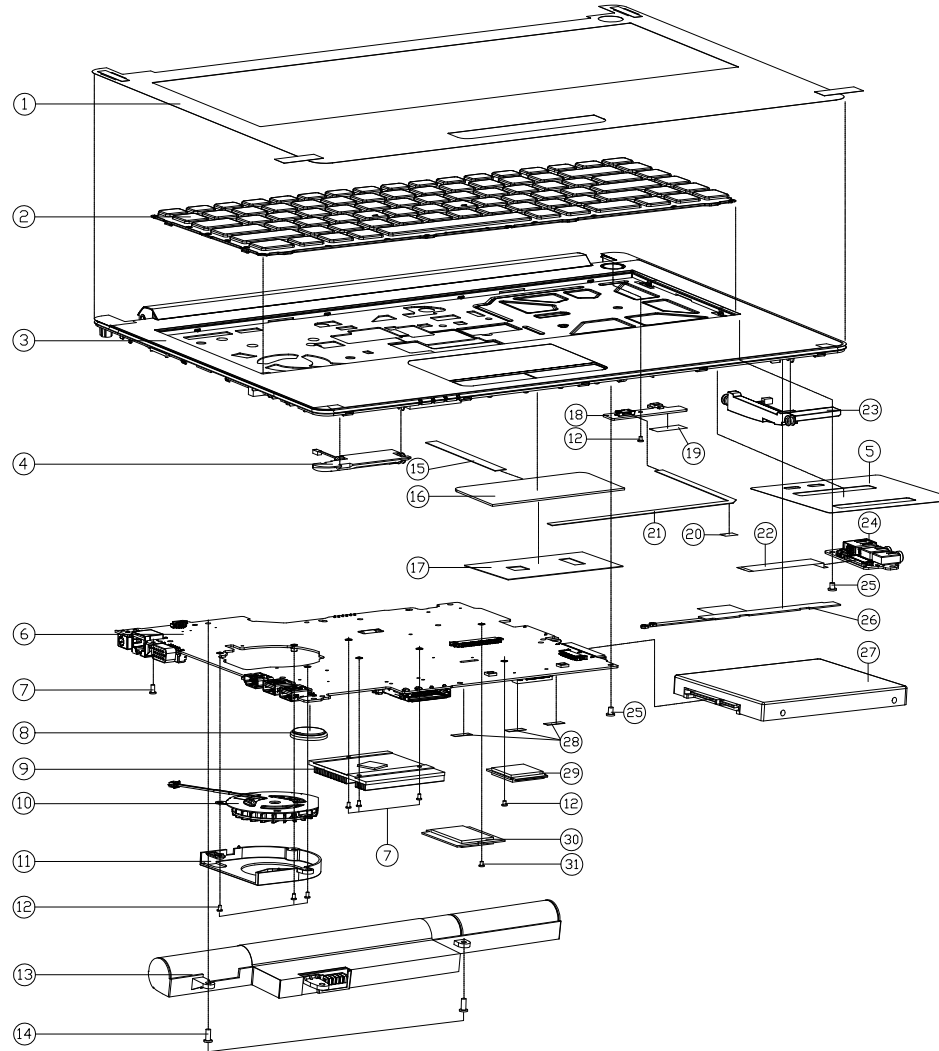


ITEM	PART NAME	PART NO	REMARK
1	VINE K/B USA BLACKON FRAME US3 MODULE W940SU	6-79-W940SUUK-000-W	
2	TOP CASE MODULE W940TU	6-39-W9402-012	
2	TOP CASE MODULE (POSITIVD) W940TU	6-39-W9402-012-P	
2	TOP CASE MODULE W940TU-D	6-39-W9402-010	
2	TOP CASE MODULE W940SU1	6-39-W9402-010	
3	SPK/CABLE L (27) LOW RT W940TU (VYITECD)	6-23-5W940-0L1	
4	TOP CASE MYLAR TESA 945 (COPOLYESTER) W940TU	6-40-W9402-020	
5	MYLAR MAGNET 35K540.3MM FOR W740SU	6-40-W7402-080	
6	RNA BOND (CONDUCTIVE) VES 100 (MIL/PMU) THROUGH DRUGS W940	6-77-W940LU00-D02-F	
6	RNA BOND (CONDUCTIVE) VES 100 (MIL/PMU) THROUGH DRUGS W940	6-77-W940LU00-D02-E	
6	RNA BOND (CONDUCTIVE) VES 100 (MIL/PMU) THROUGH DRUGS W940	6-77-W940LU00-D02-IE	
6	RNA BOND (CONDUCTIVE) VES 100 (MIL/PMU) THROUGH DRUGS W940	6-77-W940LU00-D02-SD	
6	RNA BOND (CONDUCTIVE) VES 100 (MIL/PMU) THROUGH DRUGS W940	6-77-W940LU00-D02-D	
6	RNA BOND (CONDUCTIVE) VES 100 (MIL/PMU) THROUGH DRUGS W940	6-77-W940LU00-D02-7E	
6	RNA BOND (CONDUCTIVE) VES 100 (MIL/PMU) THROUGH DRUGS W940	6-77-W940LU00-D02-18F	
6	RNA BOND (CONDUCTIVE) VES 100 (MIL/PMU) THROUGH DRUGS W940	6-77-W940LU00-D02-19F	
7	BATTERY 3V 220MA BB0000028 (CTS)	6-23-6A2B2-030	
8	CPU HEATSINK AL6063 W940TU	6-31-W940S-011	
9	FAN MODULE (ADDA) W547BL	6-31-W547S-101	FOR W940PU
9	FAN MODULE (A-POWER) W547BL	6-31-W547S-103-1	FOR W940LU
10	FAN HOUSING TENUNICE/ABS T3075BX W940TU	6-42-W940S-011	
11	SCREW M2X4.5 KI NI ICT NY (C00=45.91T-04)	6-35-B1120-3RE	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-42F3	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-4UF-1	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-4UF	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-4244	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-4UF1-1	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-4UF1	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-4UF1	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-4UF1	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-42F1-1	
12	IMP S LU 100V/250V 200V 250V 500V 1000V 1000V 1000V	6-87-W940S-4274	
13	SCREW M2X4.5 KI NI ICT NY	6-35-B2125-6RA	
14	FFC CABLE FOR TOUCH PAD 72MM 60V 60V 60V 60V 60V 60V	6-43-W9402-011-1	
15	TOUCH PAD SYNAPTICS TM-0146-003 MULTI-GE3	6-49-C4802-010	
16	MYLAR FOR TOUCHPAD COMPONENT MYLAR/RESIN/PS W940	6-40-W3402-020	
17	TAPE MYLAR TRANSPARENT (CONDUCTIVE) W250PQ	6-40-W25P3-010	
18	SCREW M2X4.5 KI BZ ICT NY	6-35-B6120-4RA	
19	POWER SWITCH BOARD V2.0 W940LU	6-77-W94LS-D02	FOR W940LU
19	POWER SWITCH BOARD V2.0 W940PU	6-77-W94PS-D02	FOR W940PU
20	FFC CABLE FOR AUDIO BOARD TO MP3 12MM 60V 60V 60V 60V	6-43-W5470-021-2	
21	AUDIO BOARD V2.0 W940LU	6-77-W94LB-D02	FOR W940LU
21	AUDIO BOARD V1.0 W940PU	6-77-W94PB-D01	FOR W940PU
22	SCREW M2X4.5 KI CT ICT NY	6-35-B6125-4R0	
23	SPK/CABLE R (SD) LOW RT W940TU (VYITECD)	6-23-5W940-0R1	
24	FFC CABLE FOR POWER BOARD TO MP3 12MM 60V 60V 60V 60V	6-43-W9400-011-1	
25	TAPE MYLAR TRANSPARENT (CONDUCTIVE) P180M	6-40-P1803-020	
26	W/D HDD ASS'Y W940TU	6-23-W950-030	
27	W/D HDD ASS'Y W940TU	6-79-W940TUJ-010	
28	W/D HDD ASS'Y W940TU	6-79-W940TUJ-020	
28	W/D HDD ASS'Y W940TU	6-88-S210W-8810	
28	W/D HDD ASS'Y W940TU	6-88-V3306-8830	
28	W/D HDD ASS'Y W940TU	6-88-V3306-8841	
29	W/D HDD ASS'Y W940TU	6-88-P653F-4210	
29	W/D HDD ASS'Y W940TU	6-88-S210F-9400	
29	W/D HDD ASS'Y W940TU	6-88-N240F-4200	
29	W/D HDD ASS'Y W940TU	6-88-N170F-5100	
29	W/D HDD ASS'Y W940TU	6-88-W95LF-4240	
30	ALUMINUM FOIL (95X77X0.13) W940LU	6-47-W94A2-010	ONLY FOR LTE-2
31	TAPE MYLAR (C)MYLAR M550J	6-40-M55J2-030	

Figure A - 1
Top (Stand)
(W940PU)

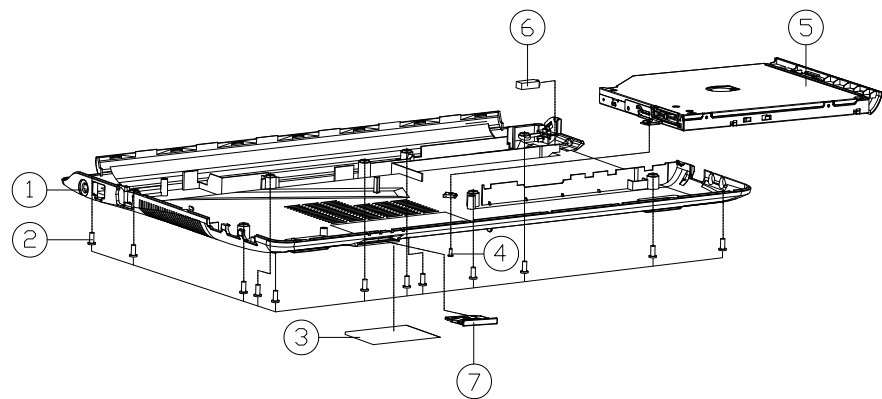
Top (W945PUQ)

Figure A - 2
Top (W945PUQ)



ITEM	PART NAME	PART NO	REMARK
1	TOP CASE PROTECT MYLAR (8835*38 895) W945UQ	6-40-W9452-060	
2	VING K/8 USA BLACK FRAME (10) MODULE W940U/V945UQ	6-79-W940AUK-010-W	
3	TOP CASE MODULE W945TUQ	6-39-W9452-T11	
3	TOP CASE MODULE W945KUQ	6-39-W9452-013	
4	SPK+CABLE L (27) LOW 87 W940TU (VYTECH)	6-23-SW940-0L1	
5	ALUMINUM FOIL (85*77*0.13) W940AU	6-47-W94A2-010	ONLY FOR LTE-2
6	MAIN BOARD CPU/VIDEO/SD/USB V945UQ/TPM V945UQ	6-77-W945LU00-D02-E	
6	MAIN BOARD CPU/VIDEO/SD/USB V945UQ/TPM V945UQ	6-77-W945LU00-D02-ED	
6	MAIN BOARD CPU/VIDEO/SD/USB V945UQ/TPM V945UQ	6-77-W945PU00-D02-ED	
6	MAIN BOARD CPU/VIDEO/SD/USB V945UQ/TPM V945UQ	6-77-W945PU00-D02-10F	
6	MAIN BOARD CPU/VIDEO/SD/USB V945UQ/TPM V945UQ	6-77-W945PU00-D02-11F	
6	MAIN BOARD CPU/VIDEO/SD/USB V945UQ/TPM V945UQ	6-77-W945PU00-D02-12F	
7	SCREW M2*4L KI BZ ICT NY	6-35-B6120-4RA	
8	BATTERY 3V 220MA BBBCR20328 (KTS)	6-23-6A2B2-030	
9	CPU HEATSINK AL6063 W940TU	6-31-W940S-011	
10	FAN MODULE (A-POWER) W5478BL	6-31-W547S-103-1	
11	FAN HOUSING TENJINPC+ABS T30715BX W940TU	6-42-W940S-011	
12	SCREW M2*3L KI NI ICT NY (DD=44.5,DT=0.4)	6-35-B1120-3RE	
13	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-87-W945S-42L1	
13	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-87-W945S-42F1	
13	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-87-W945S-42F2	
13	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-87-W945S-42L2	
14	SCREW M2.5*6L K BZ ICT NY	6-35-B2125-6RA	
15	FFC CABLE FOR TOUCH PAD 72MM 60V 6P/PC (C0US) W940TU	6-43-W9402-011-1	
16	TOUCH PAD SYNAPTICS TM-0146-003 MULTI-GE5	6-49-C4802-010	
17	MYLAR FOR TOUCHPAD (TRANSPARENT MYLAR+TESAPAKS) W940TU	6-40-W3402-D20	
18	POWER SWITCH BOARD V2.0 W945LUQ	6-77-W94LS-D02-A	
18	POWER SWITCH BOARD V2.0 W950PU	6-77-W94PS-D02-A	
19	TOP CASE MYLAR SONY G4000 (300*940*25) W940TU	6-40-W9402-D20	
20	TAPE MYLAR TRANSPARENT (200*100*0.05) P180HM	6-40-P1803-020	
21	FFC CABLE FOR POWER BOARD TO W945UQ 60V 4P (C0US) W940TU	6-43-W5470-011-2	
22	FFC CABLE FOR AUDIO BOARD TO W945UQ 60V 4P (C0US) W940TU	6-43-W5470-021-2	
23	SPK+CABLE R (50) LOW 87 W940TU (VYTECH)	6-23-SW940-0R1	
24	AUDIO BOARD V2.0 W940LU	6-77-W94L8-D02	
24	AUDIO BOARD V1.0 W940PU	6-77-W94P8-D01	
25	SCREW M2.5*4L KI CT=0.5 D=4.5) BK/Z ICT	6-35-B6125-4R0	
26	W/O HDD ASS'Y W940TU	6-23-W950-030	
27	W/O HDD ASS'Y W940TU	6-79-W940TU0J-010	
27	W/O HDD ASS'Y W940TU	6-79-W940TU0J-020	
28	TAPE MYLAR TRANSPARENT (300*500*0.05) W251HPQ	6-40-W25P3-010	
29	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-88-S210F-9400	
29	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-88-N240F-4200	
29	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-88-N170F-5100	
29	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-88-W95LF-4240	
29	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-88-P65SF-4210	
30	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-88-W3306-8830	
30	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-88-W3306-8841	
30	IMP 1.0 W940TU REP IMPEDANCE 250V PVS/INDUCTIVE (SOLDER IF BATTERY D0)	6-88-S210W-8810	
31	SCREW M2*3L KI BZ ICT NY (DD=44.5,DT=0.4)	6-35-B6120-3RD	

Bottom - ODD (W940PU)

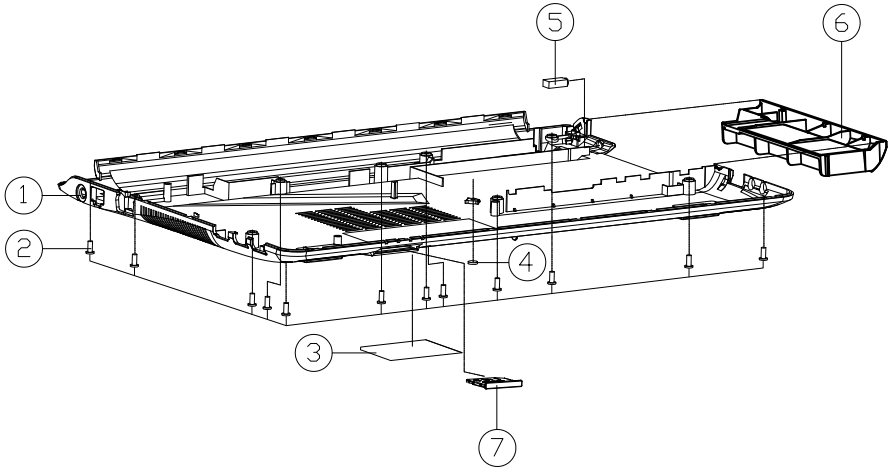


ITEM	PART NAME	PART NO	REMARK
1	BOTTOM CASE MODULE FOR W940LU	6-39-W94L3-010	
1	BOTTOM CASE MODULE FOR W940LU-C	6-39-W94L3-010-C	
2	SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
3	PRODUCT LABEL FOR W940LU	6-45-W940LU03-010	
3	PRODUCT LABEL FOR W940JU	6-45-W940JU03-010	
3	PRODUCT LABEL FOR W940PU	6-45-W940PU03-010	
3	PRODUCT LABEL(MOUSE/NOTEBOOK COMPUTER) W942LU	6-45-W942LU03-7J0	
4	SCREW M2*4L KI BZ ICT NY	6-35-B6120-4RA	
5	SATA DVD SUPER MULTI ASS'Y (OPTION)	6-79-W940TU00-000	<OPTION>
5	SATA BLU-RAY COMBO ASS'Y (OPTION)	6-79-W940SU1W-000	<OPTION>
5	SATA DVD SUPER MULTI ASS'Y (OPTION)	6-79-W942SV00-010	<OPTION>
5	SATA DVD SUPER MULTI ASS'Y (OPTION)	6-79-W940AU00-010	<OPTION>
5	W/O ODD ASS'Y W940TU	6-79-W940TU0Z-000	<OPTION>
6	TV RUBBER (SILICON HARDNESS 60 BLACK) FOR W940TU	6-47-W9403-041	FOR W/O TV TUNER
7	DUMMY 3IN1 NON PUSH TYPE PC+ABS (C7230P-7010C) W9700JW	6-42-W9708-030	

Figure A - 3
Bottom - ODD
(W940PU)

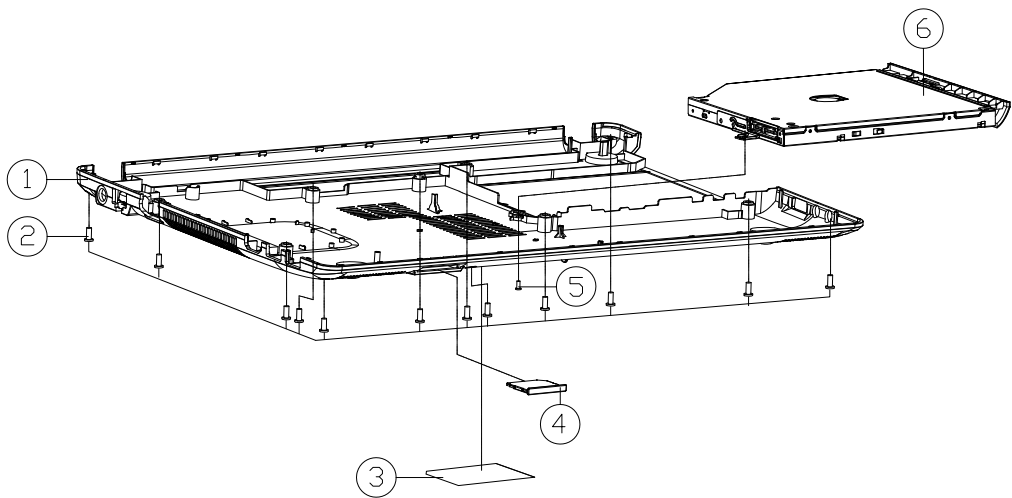
Bottom - Dummy (W940PU)

Figure A - 4
Bottom - Dummy
(W940PU)



ITEM	PART NAME	PART NO	REMARK
1	BOTTOM CASE MODULE FOR W940LU	6-39-W94L3-010	
1	BOTTOM CASE MODULE FOR W940LU-C	6-39-W94L3-010-C	
2	SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
3	PRODUCT LABEL FOR W940LU	6-45-W940LU03-010	
3	PRODUCT LABEL FOR W940JU	6-45-W940JU03-010	
3	PRODUCT LABEL FOR W940PU	6-45-W940PU03-010	
3	PRODUCT LABEL(MOUSE/NOTEBOOK COMPUTER) W942LU	6-45-W942LU03-7J0	
4	ODD RUBBER (SILICON HARDNESS 60 BLACK) W940TU	6-47-W940Z-010	
5	TV RUBBER (SILICON HARDNESS 60 BLACK) FOR W940TU	6-47-W9403-041	
6	ODD DUMMY TNEJNPCHBS TN3715BX W940TU	6-42-W940Z-041	
7	DUMMY 3IN1 NON PUSH TYPE PC-HBS (C7230P-700D) W970SUW	6-42-W9708-030	

Bottom (W945PUQ)

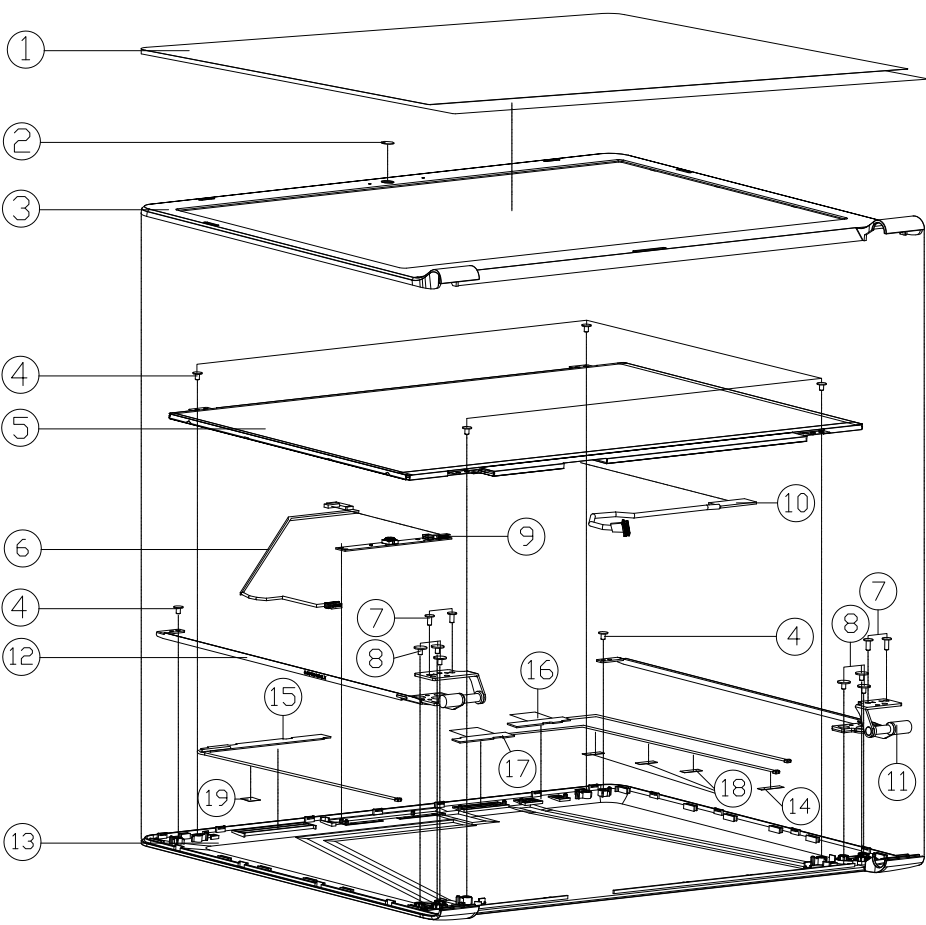


ITEM	PART NAME	PART NO	REMARK
1	BOTTOM CASE MODULE W945KUQ	6-39-W9453-011	
1	BOTTOM CASE MODULE W945KUQ-C	6-39-W9453-011-C	
1	BOTTOM CASE MODULE W945TUQ	6-39-W9453-T11	
1	BOTTOM CASE MODULE W945TUQ	6-39-W9453-T12	
2	SCREW M2.5*6L K BZ ICT NY	6-35-B2125-6RA	
3	PRODUCT LABEL FOR W945KUQ	6-45-W945KUQ3-010	
3	PRODUCT LABEL FOR W945TUQ	6-45-W945TUQ3-010	
3	PRODUCT LABEL FOR W945SUW	6-45-W945SUW3-010	
3	PRODUCT LABEL FOR W945SUY	6-45-W945SUY3-010	
3	PRODUCT LABEL FOR W945AUQ	6-45-W945AUQ3-010	
3	PRODUCT LABEL FOR W945LUQ	6-45-W945LUQ3-010	
3	PRODUCT LABEL FOR W945JUQ	6-45-W945JUQ3-010	
3	PRODUCT LABEL FOR W945BUQ	6-45-W945BUQ3-010	
3	PRODUCT LABEL FOR W945PUQ	6-45-W945PUQ3-010	
4	DUMMY 3MM HEN PUSH TYPE PC-ABS (CZ22P-PIED) W9700A	6-42-W9700-030	
5	SCREW M2*4L KI BZ ICT NY	6-35-B6120-4RA	
6	SATA DVD SUPER MULTI ASS'Y (OPTION)	6-79-W945AUQ0-001	(OPTION)
6	SATA DVD SUPER MULTI ASS'Y (OPTION)	6-79-W945KUQ0-000	(OPTION)
6	SATA BLU-RAY COMBO ASS'Y (OPTION)	6-79-W945AUQ0-001	(OPTION)
6	SATA BLU-RAY COMBO ASS'Y (OPTION)	6-79-W945SUW0-010	(OPTION)
6	SATA BLU-RAY COMBO ASS'Y (OPTION)	6-79-W945SUY0-010	(OPTION)
6	W/O ODD ASS'Y W945KUQ	6-79-W945KUQ0-000	(OPTION)

Figure A - 5
Bottom
(W945PUQ)

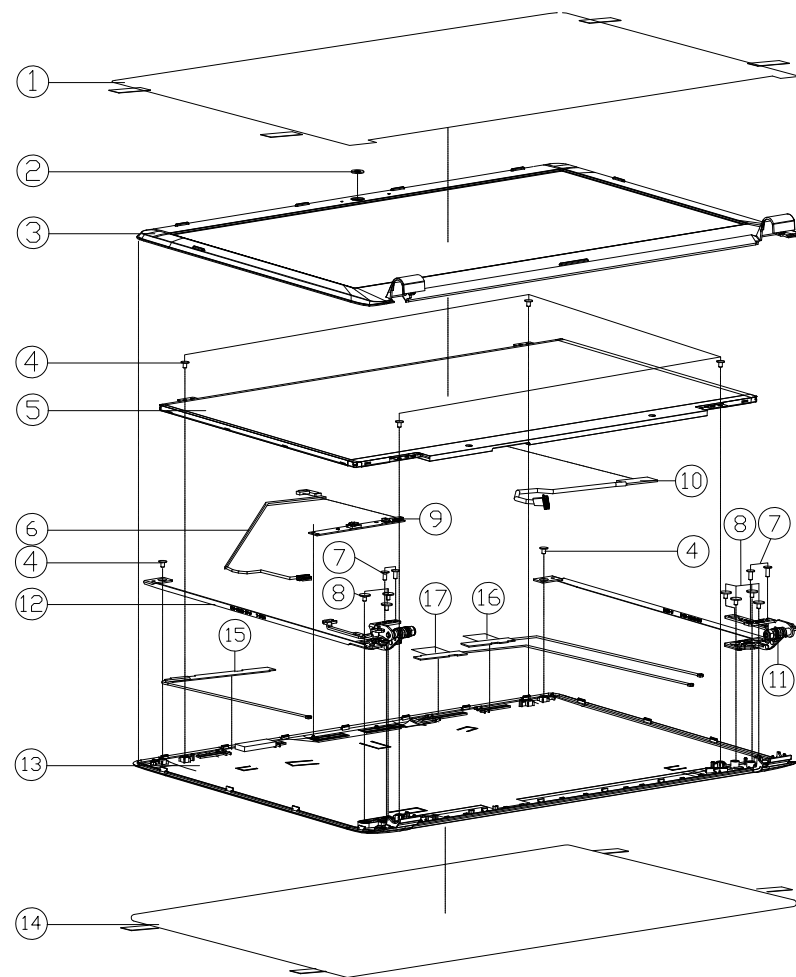
LCD (W940PU)

Figure A - 6
LCD (W940PU)



ITEM	PART NAME	PART NO	REMARK
1	LCD PROTECT MYLAR BOPP N240JU	6-40-N24J1-040	
2	CCD LENS (VIEWING AREA 4MMXPMMA)W940TU	6-42-W9401-020	OPTION
3	LCD FRONT COVER MODULE (CHANGE)W940TU	6-39-W9401-012	
3	LCD FRONT COVER MODULE (MOUSE/MOUSE COMPUTER)W940TU	6-39-W9401-012-M3	
3	LCD FRONT COVER MODULE (D-MIC) W940JU	6-39-W9401-014	
4	SCREW M2X3L KI NI ICT NY (D0=M4.5,D1=0.4)	6-35-B1120-3RE	
5	LCD 14.0" HD EDP/CLARE TYPE BDE H84H0V5-301 (LED) 3.6MM	6-50-J8136-Z01	
5	LCD 14.0" HD+ CHINEE N44HGE-EA2 (LED) 3.0MM X EDP	6-50-JA130-D00	
5	LCD 14.0" HD (CEP) CLARE TYPE AU B44KTM34 (LED) 3.6MM	6-50-J8136-G12	
5	LCD 14.0" HD (CEP) INNOLOX N44HGE-EA3 (LED) 3.0 MM	6-50-J8130-V00	
5	LCD 14.0" HD EDP CLARE TYPE LP44H0B-TP22 (LED) 3.6MM	6-50-J8136-LOG	
5	LCD 14.0" FHD IPS (CEP) LG LP140WV1-SPK1 (LED) 3.0MM	6-50-JB230-L01	
5	LCD 14.0" FHD IPS (CEP) LG LP140WV6-SP02 (NA) (LED) 3.0MM	6-50-JB230-L07	
5	LCD 14.0" FHD (CEP) INNOLOX N44HGE-EA4 (LED) 3.0MM	6-50-JB230-V00	
5	LCD 14.0" HD LG LP140WV8-TL-B1 (LED) 3.6MM	6-50-J8136-L0F	
5	LCD 14.0" HD/ GT/ EDP AU B44KTM39 (LED) 3.6MM	6-50-J8A36-G000	
6	WIRE CABLE FOR CCD 8P8 305MM 3.3V 8PIN (CDS) W940TU	6-43-W9401-021-1	
7	SCREW M2.5X4L K1CT NY	6-35-82125-6RA	ONLY FOR -012
7	SCREW M2.5X4L K1CT NY (D=0.5 D=4.5) BK/Z ICT	6-35-B6125-4R0	ONLY FOR POSITIVO
8	SCREW M2X2L KI BK/Z ICT NY(0.8,T=0.6)	6-35-B6120-2RE	
9	INC CAMERA CDSM F1.8 2000000-200 IN HD 1000000 10-100 V940TU F1.8000 1000000 1000000 1000000	6-88-W940C-4902	OPTION
9	INC CAMERA CDSM F1.8 2000000-200 IN HD 1000000 10-100 V940TU F1.8000 1000000 1000000 1000000	6-88-W977C-5100	OPTION
9	INC CAMERA CDSM F1.8 2000000-200 IN HD 1000000 10-100 V940TU F1.8000 1000000 1000000 1000000	6-88-W940C-5100	OPTION
9	INC CAMERA CDSM F1.8 2000000-200 IN HD 1000000 10-100 V940TU F1.8000 1000000 1000000 1000000	6-88-W51PC-5100	OPTION
9	INC CAMERA CDSM F1.8 2000000-200 IN HD 1000000 10-100 V940TU F1.8000 1000000 1000000 1000000	6-88-N650C-4900	OPTION
9	INC CAMERA CDSM F1.8 2000000-200 IN HD 1000000 10-100 V940TU F1.8000 1000000 1000000 1000000	6-88-W51PC-5110	OPTION
9	INC CAMERA CDSM F1.8 2000000-200 IN HD 1000000 10-100 V940TU F1.8000 1000000 1000000 1000000	6-88-N650C-4910	OPTION
10	WIRE CABLE FOR EDP 17MM 17V 30PIN 1000000 1000000 1000000 1000000	6-43-W9401-020-1N	
10	WIRE CABLE FOR LENS 17MM 17V 30PIN 1000000 1000000 1000000 1000000	6-43-W9401-011-N	
11	LCD HINGE R (CSK7) (SUS430) (CHANGE BRACKET)W940TU	6-33-W9401-0R4	
12	LCD HINGE L (CSK7) (SUS430) (CHANGE BRACKET) W940TU	6-33-W9401-0L4	
13	LCD BACK COVER MODULE W940TU	6-39-W9401-022	
13	LCD BACK COVER MODULE W940TU-C	6-39-W9401-022-C	
13	LCD BACK COVER MODULE(MOUSE/MOUSE COMPUTER) W942SV	6-39-W94S1-021-M	
13	LCD BACK COVER MODULE W942SV	6-39-W94S1-021	
14	TAPE MYLAR TRANSPARENT (20X100X0.05) P180HM	6-40-P1803-020	
15	ANTENNA PEBA WLAN WGT WLT PCB 24G/5G/2.4G/5G/2.4G/5G W940TU	6-23-7W94L-030	
16	ANTENNA PEBA WLAN WGT WLT PCB 24G/5G/2.4G/5G/2.4G/5G W940TU	6-23-7W94L-011	
17	ANTENNA PEBA WLAN WGT WLT PCB 24G/5G/2.4G/5G/2.4G/5G W940TU	6-23-7W94L-021	
18	TAPE MYLAR TRANSPARENT (30X5X0.05) W25H1PQ	6-40-W25P3-010	
19	TOP CASE MYLAR (TESA 4965) 20X20X0.25T W940JU	6-40-W9S12-010	

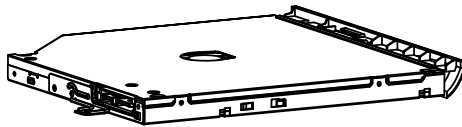
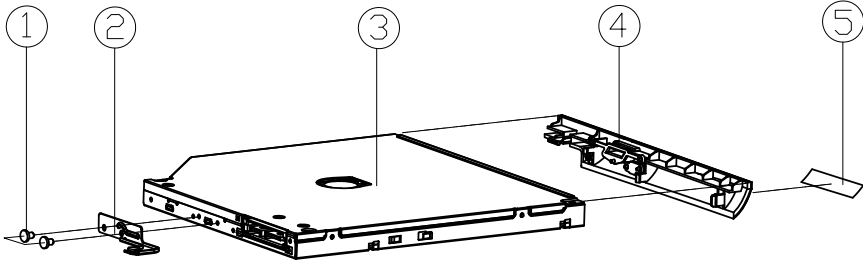
LCD (W945PUQ)



ITEM	PART NAME	PART NO	REMARK
1	LCD FRONT COVER PROTECTION MYLAR (PET-30095) (設備) C450	6-40-C4501-011	
2	CCD LENS PMMA WA50SHQ	6-42-WA501-020	OPTION
3	LCD FRONT COVER MODULE W945KUQ	6-39-W9451-012	
4	SCREW M2*3L KT NI ICT NY (DD=0.45,DT=0.4)	6-35-B1120-3RE	
5	LCD 14.0" HD LG (GLARE TYPE) LP140WH8-TLAI (LED) 3.6MM	6-50-J8136-L0E	
5	LCD 14.0" HD EDP/GLARE TYPE BOE HB140WX1-301 (LED) 3.6MM	6-50-J8136-Z01	
5	LCD 14.0" HD+ CHIMEI N140FGE-EA2 (LED) 3.0MM (EDP)	6-50-JA130-D00	
5	LCD 14.0" HD (EDP) GLARE TYPE INNOLUX N140BGE-E43 (LED) 3.6MM	6-50-J8136-V03	
5	LCD 14.0" HD (EDP) GLARE TYPE AU B140XTN03.4 (LED) 3.6MM	6-50-J8136-G12	
5	LCD 14.0" FHD IPS (EDP) LG LP140WF6-SP02 (M4) (LED) 3.0MM	6-50-JB230-L07	
5	LCD 14.0" FHD (EDP) INNOLUX N140HGE-EA4 (LED) 3.0MM	6-50-JB230-V00	
5	LCD 14.0" HD LG LP140WH8-TLBI (LED) 3.6MM	6-50-J8136-L0F	
5	LCD 14.0" HD/ GT/ EDP AU B140XTN03.9 (LED) 3.6MM	6-50-J8A36-G000	
6	WIRE CABLE FOR CCD 8PB 305MM 3.3V 8PIN (CJUS) W940TU	6-43-W940T-021-1	
7	SCREW M2.5*6L K BZ ICT NY	6-35-82125-6RA	
8	SCREW M2*2L KI BK/Z ICT NY(0.8,T=0.6)	6-35-B6120-2RE	
9	UVC CAMERA CHIMNEY FIX CNF002 300K HINDX H-7M W940TU FV60R WLED VIO-MC	6-88-W97TC-5100	OPTION
9	UVC CAMERA BISON FIX DMV0007-30 IN HD HINDX H2 V940TU FV60R WLED VIO-MC	6-88-W940C-4902	OPTION
9	UVC CAMERA CHIMNEY FIX CNF0065 IN HD SETI S1071 V940TU FV66G5 WLED VIO-MC	6-88-W940C-5100	OPTION
9	UVC CAMERA CHIMNEY FIX CNF000000000 IN HD DVS04 V300P FV60R WWHITE-LED VIO-MC	6-88-W51PC-5100	OPTION
9	UVC CAMERA BISON FIX DMV0007-30 IN HD HINDX H2S V940TU FV60R WWHITE-LED VIO-MC	6-88-N650C-4910	OPTION
10	WIRE CABLE FOR LVDS 177MM 19V 30PIN (GL/W) CONLV0304-202-H7 V940TU	6-43-W9401-011-N	
10	WIRE CABLE FOR EDP 177MM 19V 30PIN (CJUS/LW) CONLV0304-202-H7 V940TU	6-43-W9401-020-1N	
11	HINGE R (SUS430+SK7) SINHER W945KUQ	6-33-W9451-0R1	
12	HINGE L (SUS430+SK7) SINHER W945KUQ	6-33-W9451-0L1	
13	LCD BACK COVER MODULE W945KUQ	6-39-W9451-022	
13	LCD BACK COVER MODULE W945KUQ-C	6-39-W9451-022-C	
14	LCD BACK COVER PROTECT MYLAR PET W945KUQ	6-40-W9451-020	
15	ANTENNA IPX4 LTE WGT LITE PCB 070/036/156/036/236/236HZ L-50MM W945AU	6-23-7W945-010	
16	ANTENNA WLAN WGT W1 PCB 246/50HZ WL1-60MM W940LU	6-23-7W94A-010	FOR W945AUQ
16	ANTENNA IPX4 WLAN WGT W1 PCB 246/50HZ WL1-60MM W940LU	6-23-7W94L-011	FOR W945LUQ
17	ANTENNA WLAN WGT W2 PCB 246/50HZ WL2-60MM W940LU	6-23-7W94A-020	FOR W945AUQ
17	ANTENNA IPX4 WLAN WGT W2 PCB 246/50HZ WL2-60MM W940LU	6-23-7W94L-021	FOR W945LUQ

Figure A - 7
LCD (W945PUQ)

Figure A - 8
DVD DUAL
(W940PU)



ITEM	PART	NAME	PART	NO	REMARK
1	CHINA SCREW M2X3.5	K1 NI CTG GY-PATCH	6-35-B1120-3RE		
2	ODD BRACKET	(SU530 T=0.59MM) W540EU	6-33-W540Z-010		
3	SMA DOW SUPER MSLTS 1/4"	8-35MM OD-660000 (P=100) H=10 IN QD ON PLD	6-85-A088X-L04		FOR PLDS
3	SMA DOW SUPER MSLTS 1/4"	8-35MM OD-660000 (P=100) H=10 IN QD ON PLD	6-85-A088X-502		FOR HLDS
4	ODD BEZEL	MODULE W940TU	6-42-W940Z-102		
5	SUPER MSLT	ODD BEZEL LABEL (SIZE CHANGE)	6-45-W8600-011		

DVD DUAL (W945PUQ)

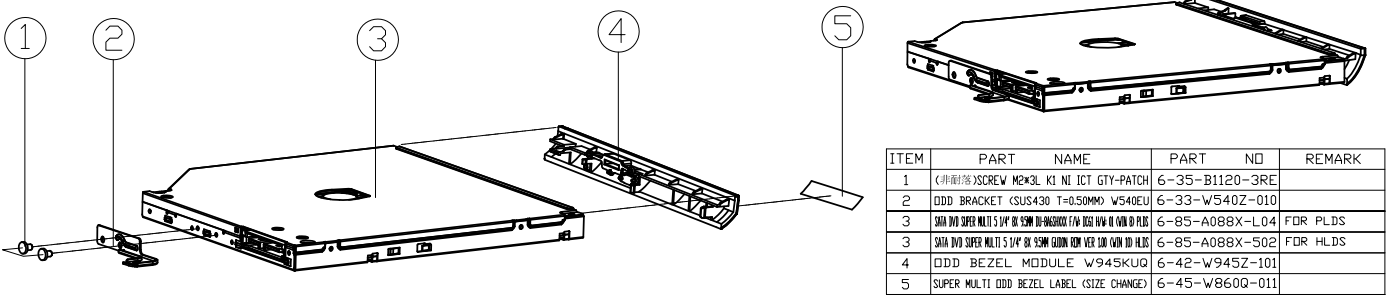
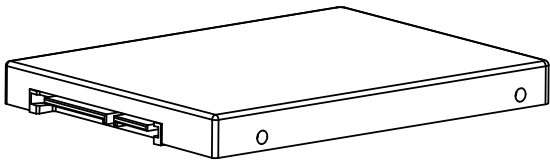
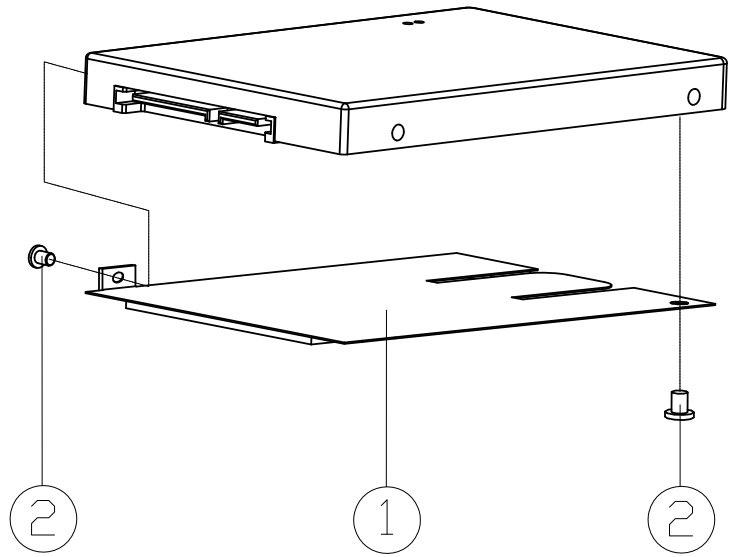


Figure A - 9
DVD DUAL
(W945PUQ)

HDD

Figure A - 10
HDD



ITEM	PART NAME	PART NO	REMARK
1	HDD MYLAR <PET0.25T+CR2030> W940TU	6-40-W940J-010	
2	SCREW M3*2.5L KI NI ICT NY	6-35-B1130-2R5	

Appendix B: Schematic Diagrams

This appendix has circuit diagrams of the **W940PU / W945PUQ** notebook's PCB's. The following table indicates where to find the appropriate schematic diagram.

Diagram - Page	Diagram - Page	Diagram - Page
System Block Diagram - Page B - 2	Panel Conn - Page B - 15	1.05VA, 1.8VA, 1.24VA - Page B - 28
Processor 1/8 - Page B - 3	RTD2168, CRT - Page B - 16	PWR_VCGI - Page B - 29
Processor 2/8 - Page B - 4	HDMI - Page B - 17	PWR_VNN - Page B - 30
Processor 3/8 - Page B - 5	Audio Codec - Page B - 18	AC_IN, Charger - Page B - 31
Processor 4/8 - Page B - 6	RTL8411B - Page B - 19	Audio Board - Page B - 32
Processor 5/8 - Page B - 7	Fan, Click, CCD Conn - Page B - 20	Power SW Board - Page B - 33
Processor 6/8 - Page B - 8	HDD, ODD, LED, LID, TPM - Page B - 21	Power Sequence - Page B - 34
Processor 7/8 - Page B - 9	NGFF - Page B - 22	
Processor 8/8 - Page B - 10	USB - Page B - 23	
eMMC - Page B - 11	KBC IT8987E - Page B - 24	
DDR SO-DIMM_A - Page B - 12	System Power - Page B - 25	
DDR SO-DIMM_B - Page B - 13	VDD3, VDD5 - Page B - 26	
PS8625 - Page B - 14	PWR_VDDQ, VTT - Page B - 27	

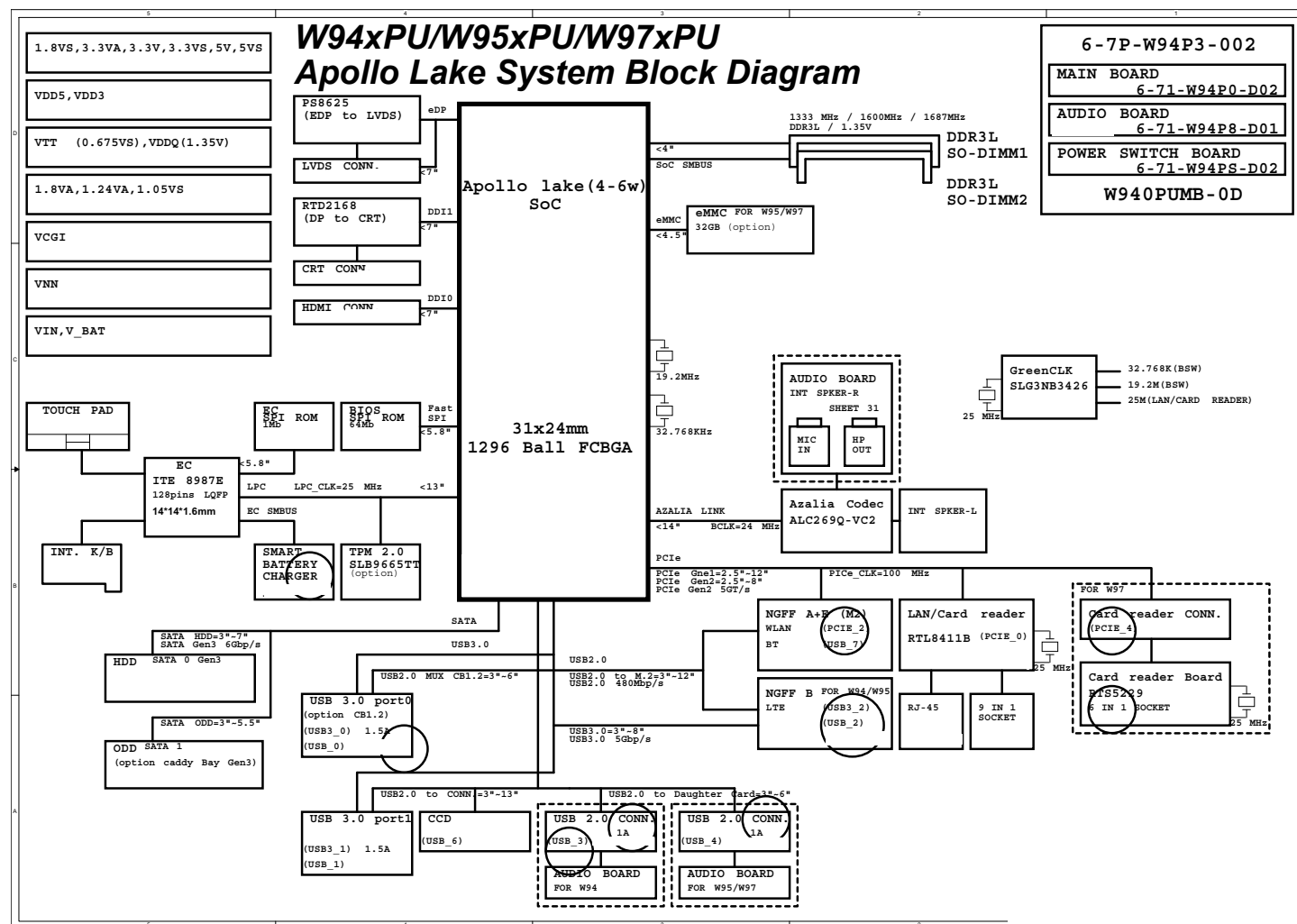
Table B - 1
**SCHEMATIC
DIAGRAMS**



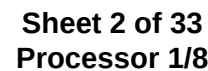
Version Note

The schematic diagrams in this chapter are based upon version 6-7P-W94P3-002. If your mainboard (or other boards) are a later version, please check with the Service Center for updated diagrams (if required).

Sheet 1 of 33
System Block
Diagram

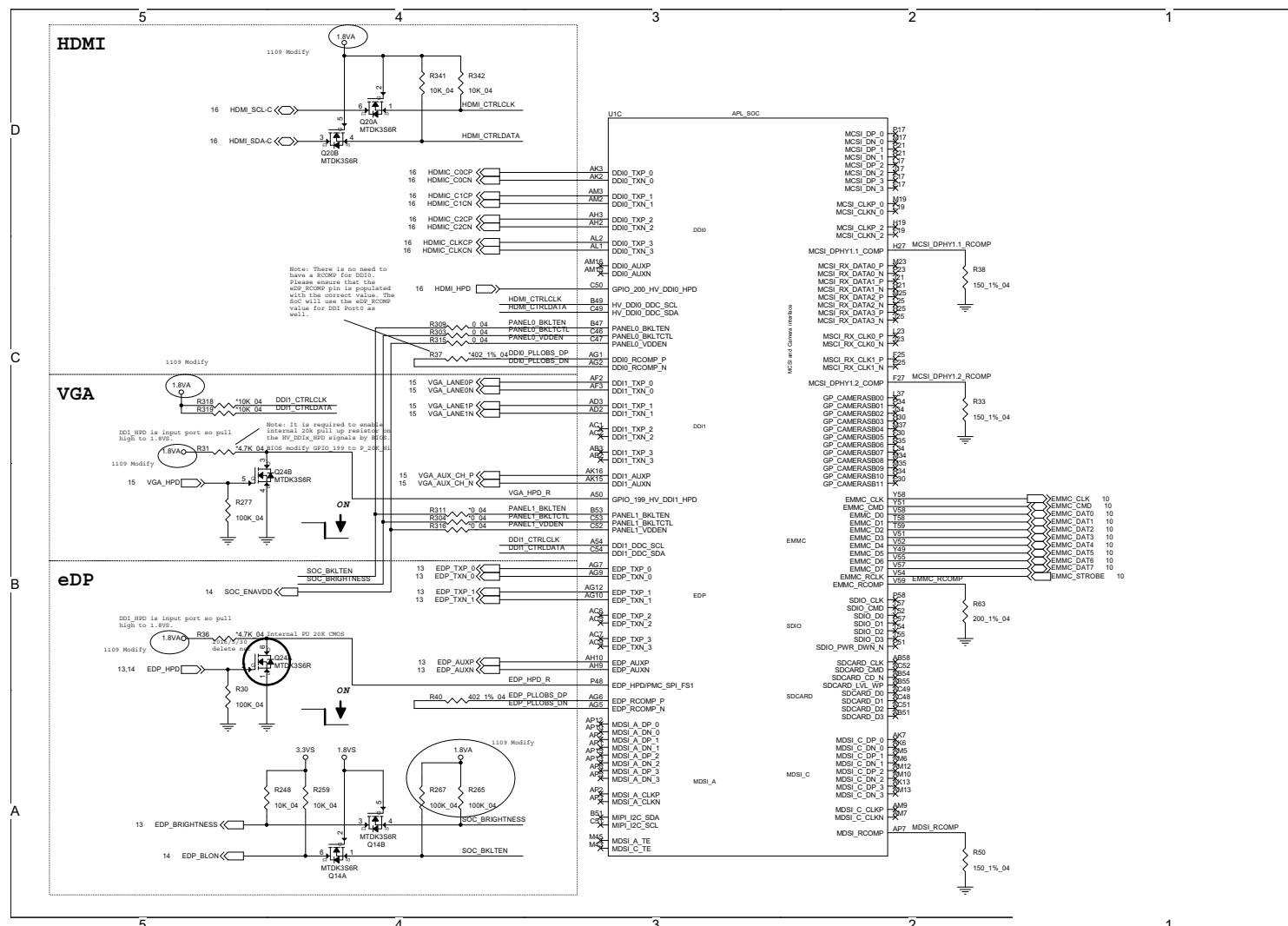


Processor 1/8 B - 3

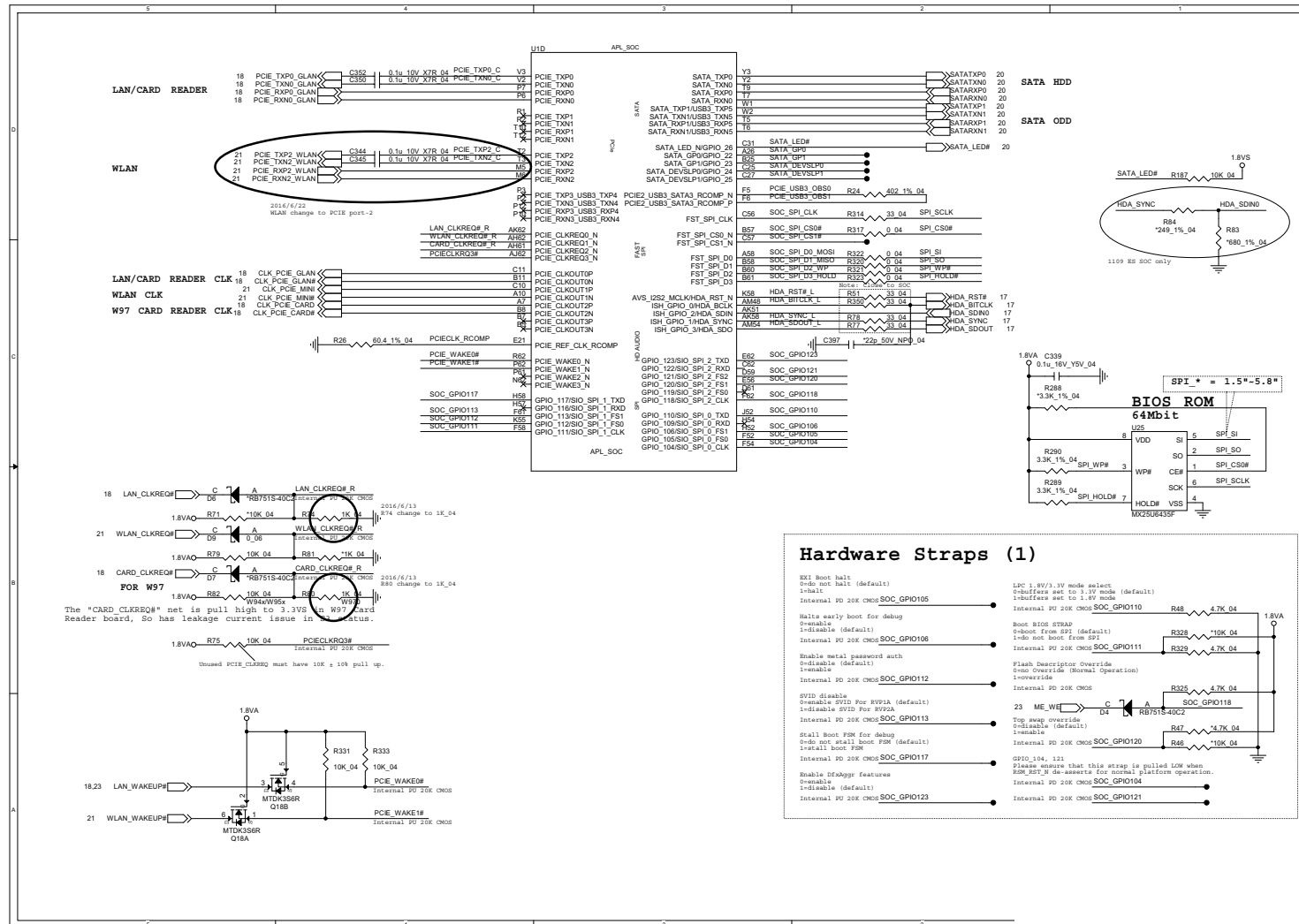


Processor 2/8

Sheet 3 of 33
Processor 2/8



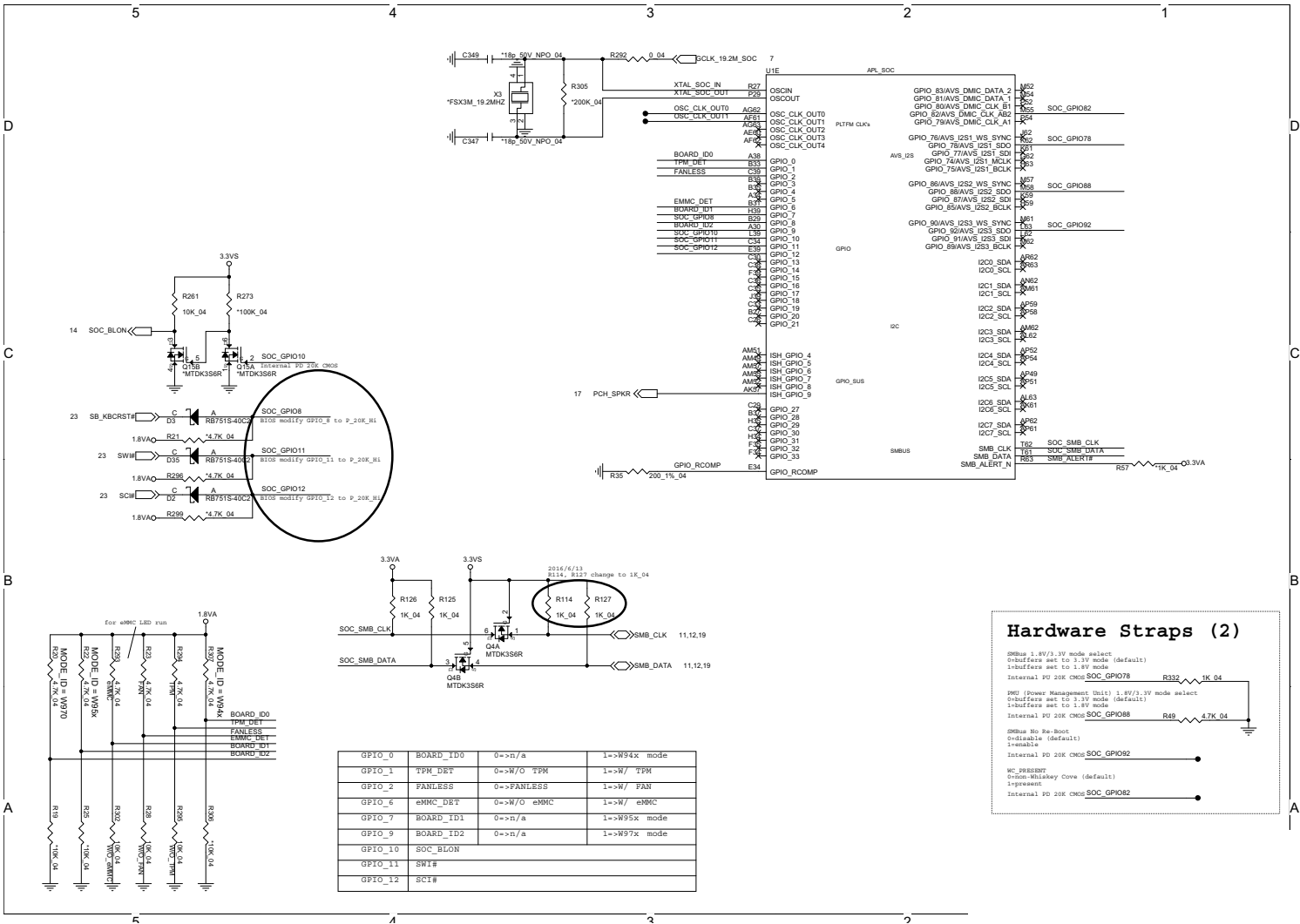
Processor 3/8

Sheet 4 of 33
Processor 3/8

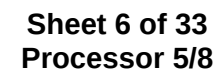
Schematic Diagrams

Processor 4/8

Sheet 5 of 33
Processor 4/8

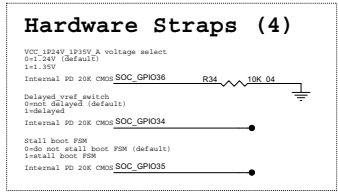


Processor 5/8 B - 7



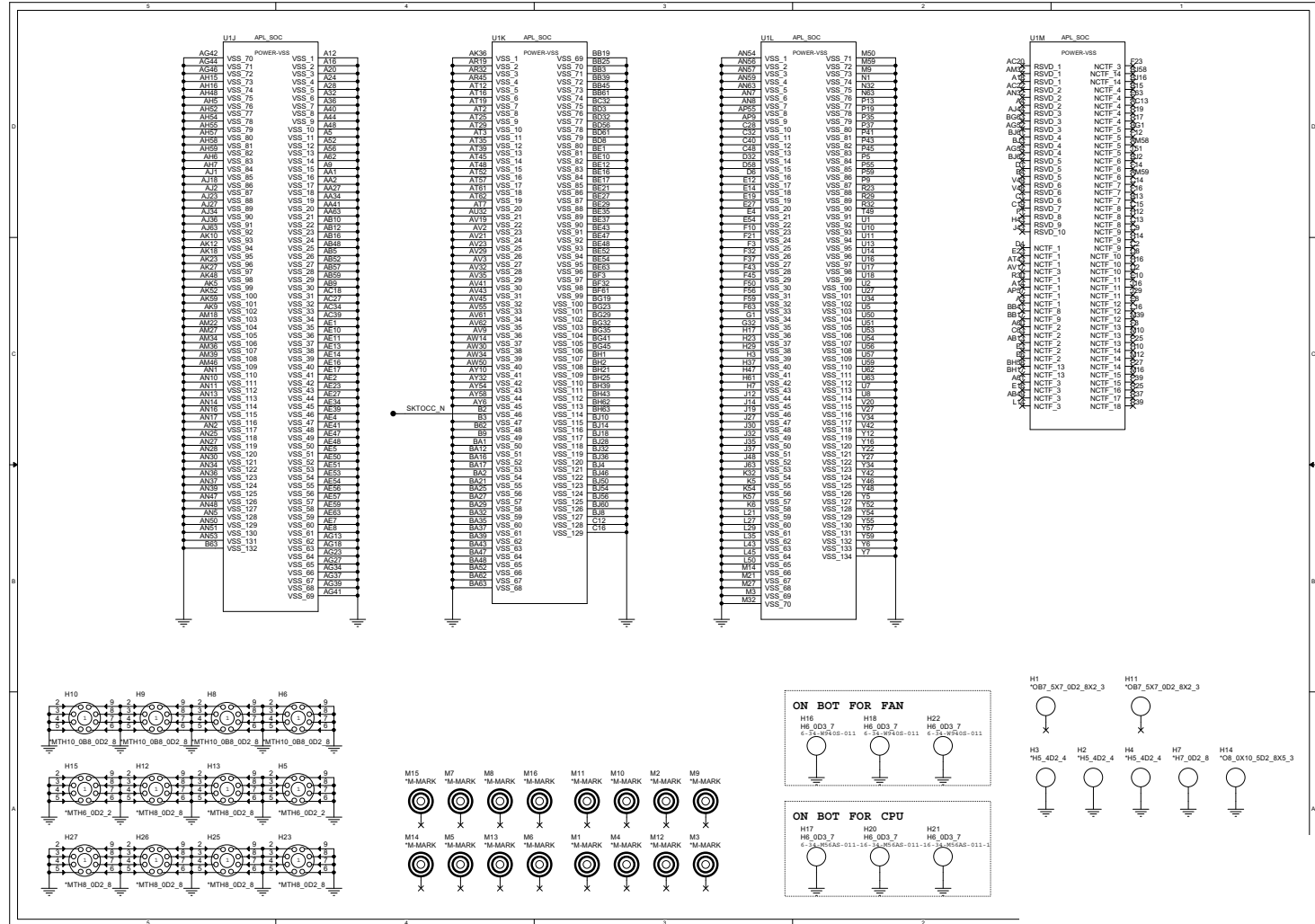
B. Schematic Diagrams

Sheet 7 of 33
Processor 6/8



Processor 8/8

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Processor 8/8



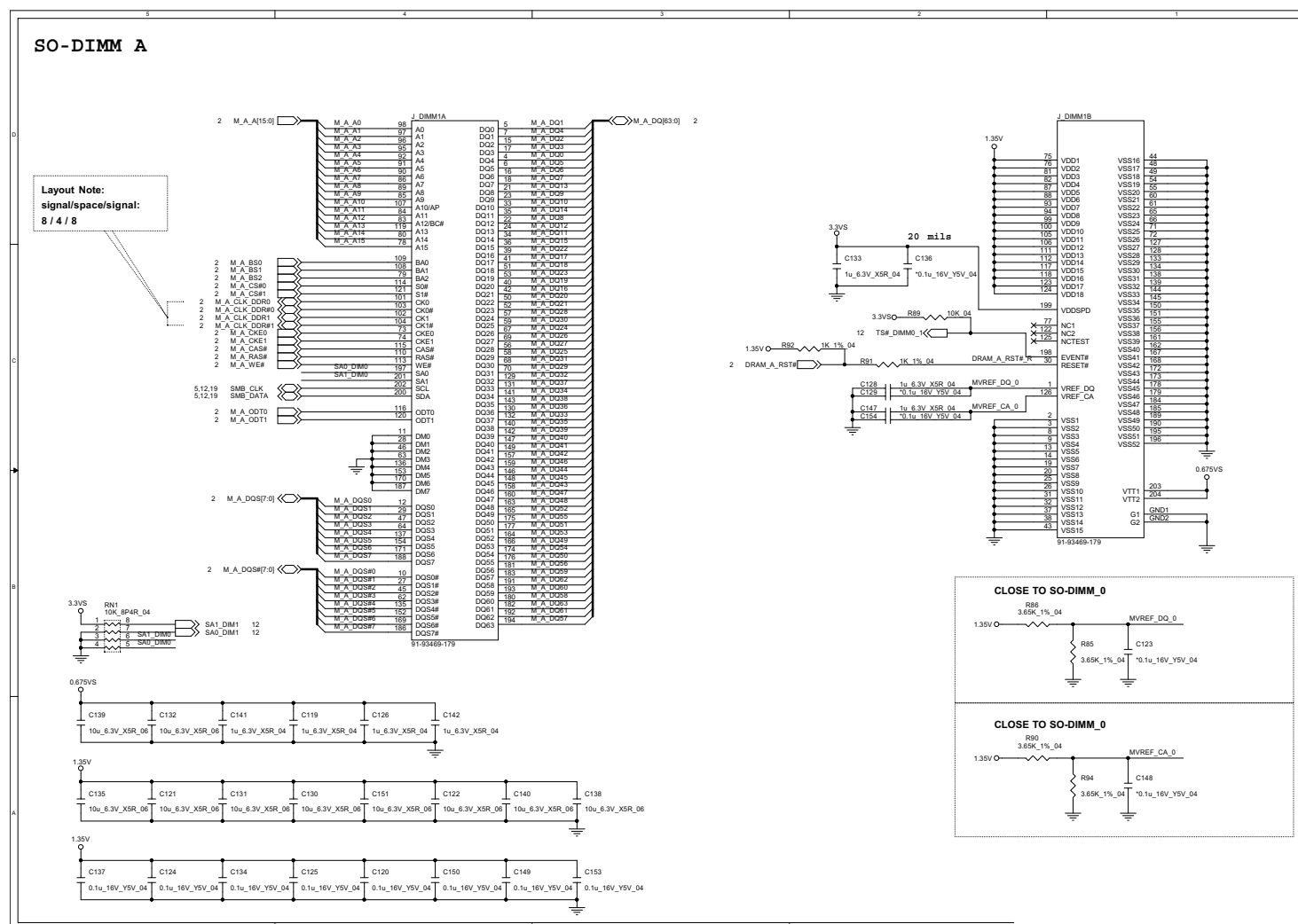
eMMC B - 11



DDR SO-DIMM_A

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

B.Schematic Diagrams



SO-DIMM B

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

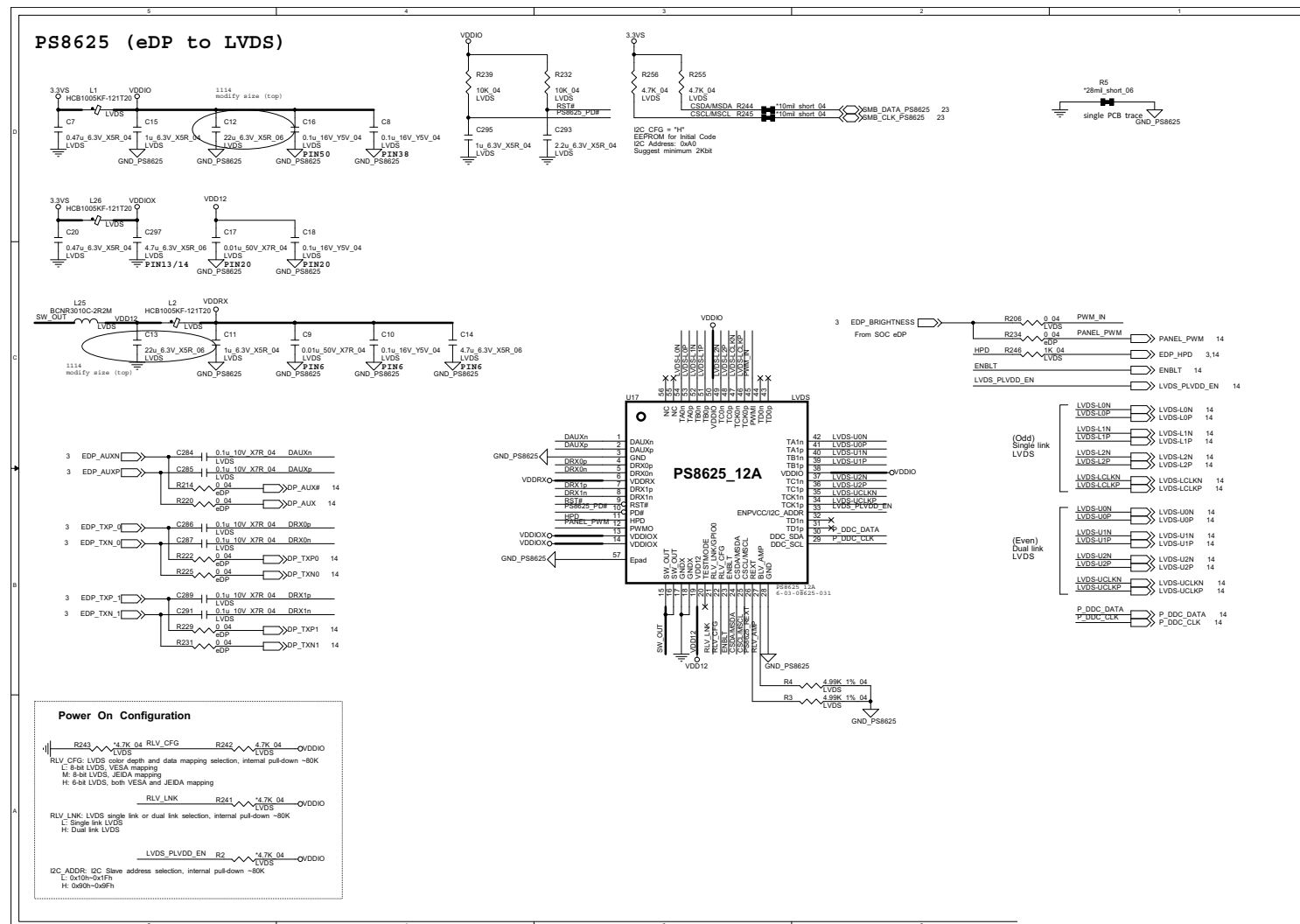
Pinout Table:

J DIMM2A				J DIMM2B			
2	M_B_A[15:0]	M_B_A0	88	5	M_B_DO1	M_B_DQ[63:0]	2
2	M_B_B[0:7]	M_B_B0	89	7	M_B_DQ1		
2	M_B_B[8:15]	M_B_B16	90	9	M_B_DQ2		
2	M_B_B[16:23]	M_B_B24	91	11	M_B_DQ3		
2	M_B_B[24:31]	M_B_B32	92	13	M_B_DQ4		
2	M_B_C[0:7]	M_B_C0	93	15	M_B_DQ5		
2	M_B_C[8:15]	M_B_C16	94	17	M_B_DQ6		
2	M_B_C[16:23]	M_B_C24	95	19	M_B_DQ7		
2	M_B_C[24:31]	M_B_C32	96	21	M_B_DQ8		
2	M_B_D[0:7]	M_B_D0	97	23	M_B_DQ9		
2	M_B_D[8:15]	M_B_D16	98	25	M_B_DQ10		
2	M_B_D[16:23]	M_B_D24	99	27	M_B_DQ11		
2	M_B_D[24:31]	M_B_D32	100	29	M_B_DQ12		
2	M_B_E[0:7]	M_B_E0	101	31	M_B_DQ13		
2	M_B_E[8:15]	M_B_E16	102	33	M_B_DQ14		
2	M_B_E[16:23]	M_B_E24	103	35	M_B_DQ15		
2	M_B_E[24:31]	M_B_E32	104	37	M_B_DQ16		
2	M_B_F[0:7]	M_B_F0	105	39	M_B_DQ17		
2	M_B_F[8:15]	M_B_F16	106	41	M_B_DQ18		
2	M_B_F[16:23]	M_B_F24	107	43	M_B_DQ19		
2	M_B_F[24:31]	M_B_F32	108	45	M_B_DQ20		
2	M_B_G[0:7]	M_B_G0	109	47	M_B_DQ21		
2	M_B_G[8:15]	M_B_G16	110	49	M_B_DQ22		
2	M_B_G[16:23]	M_B_G24	111	51	M_B_DQ23		
2	M_B_G[24:31]	M_B_G32	112	53	M_B_DQ24		
2	M_B_H[0:7]	M_B_H0	113	55	M_B_DQ25		
2	M_B_H[8:15]	M_B_H16	114	57	M_B_DQ26		
2	M_B_H[16:23]	M_B_H24	115	59	M_B_DQ27		
2	M_B_H[24:31]	M_B_H32	116	61	M_B_DQ28		
2	M_B_I[0:7]	M_B_I0	117	63	M_B_DQ29		
2	M_B_I[8:15]	M_B_I16	118	65	M_B_DQ30		
2	M_B_I[16:23]	M_B_I24	119	67	M_B_DQ31		
2	M_B_I[24:31]	M_B_I32	120	69	M_B_DQ32		
2	M_B_J[0:7]	M_B_J0	121	71	M_B_DQ33		
2	M_B_J[8:15]	M_B_J16	122	73	M_B_DQ34		
2	M_B_J[16:23]	M_B_J24	123	75	M_B_DQ35		
2	M_B_J[24:31]	M_B_J32	124	77	M_B_DQ36		
2	M_B_K[0:7]	M_B_K0	125	79	M_B_DQ37		
2	M_B_K[8:15]	M_B_K16	126	81	M_B_DQ38		
2	M_B_K[16:23]	M_B_K24	127	83	M_B_DQ39		
2	M_B_K[24:31]	M_B_K32	128	85	M_B_DQ40		
2	M_B_L[0:7]	M_B_L0	129	87	M_B_DQ41		
2	M_B_L[8:15]	M_B_L16	130	89	M_B_DQ42		
2	M_B_L[16:23]	M_B_L24	131	91	M_B_DQ43		
2	M_B_L[24:31]	M_B_L32	132	93	M_B_DQ44		
2	M_B_M[0:7]	M_B_M0	133	95	M_B_DQ45		
2	M_B_M[8:15]	M_B_M16	134	97	M_B_DQ46		
2	M_B_M[16:23]	M_B_M24	135	99	M_B_DQ47		
2	M_B_M[24:31]	M_B_M32	136	101	M_B_DQ48		
2	M_B_N[0:7]	M_B_N0	137	103	M_B_DQ49		
2	M_B_N[8:15]	M_B_N16	138	105	M_B_DQ50		
2	M_B_N[16:23]	M_B_N24	139	107	M_B_DQ51		
2	M_B_N[24:31]	M_B_N32	140	109	M_B_DQ52		

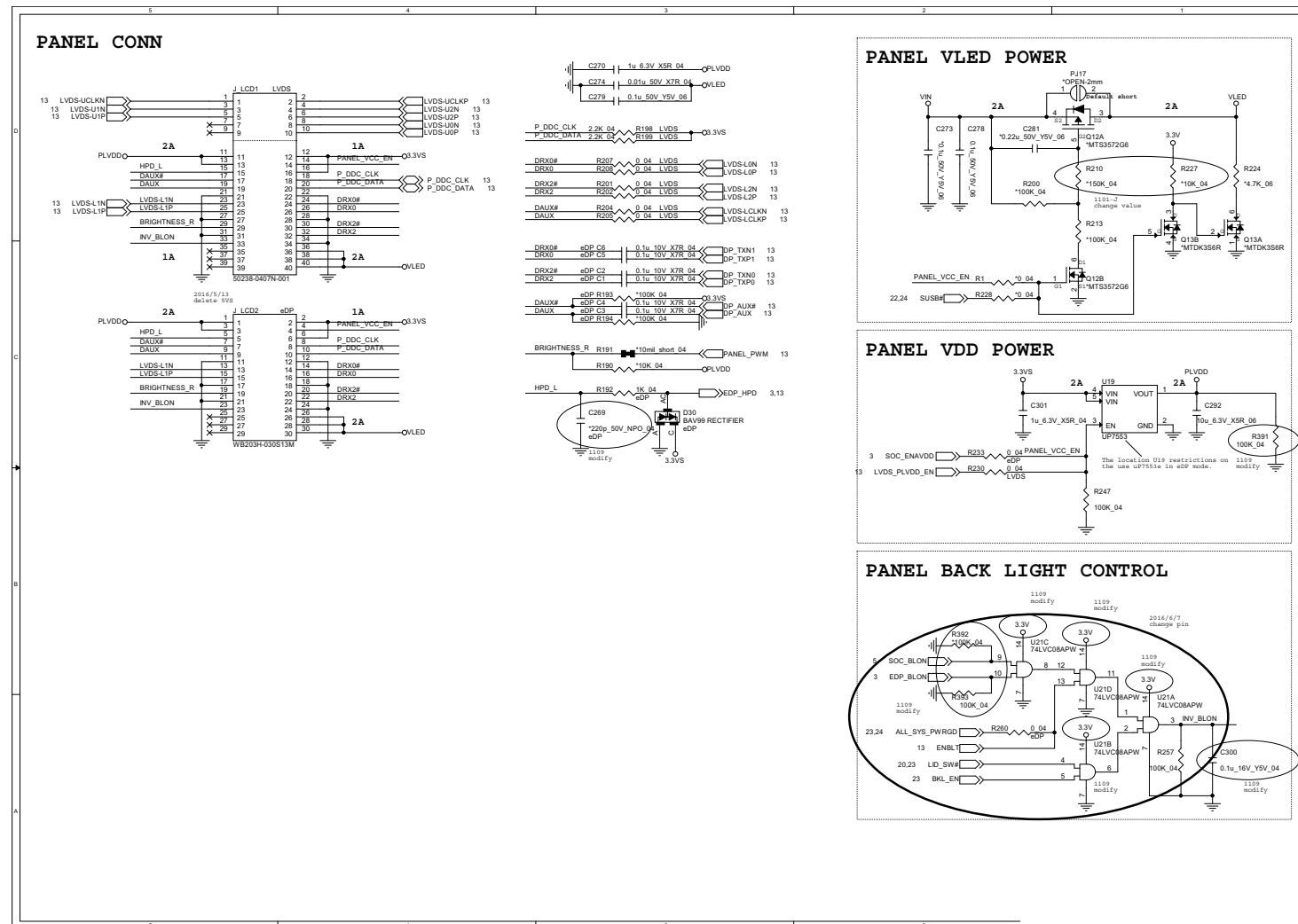
B.Schematic Diagrams

PS8625

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PS8625



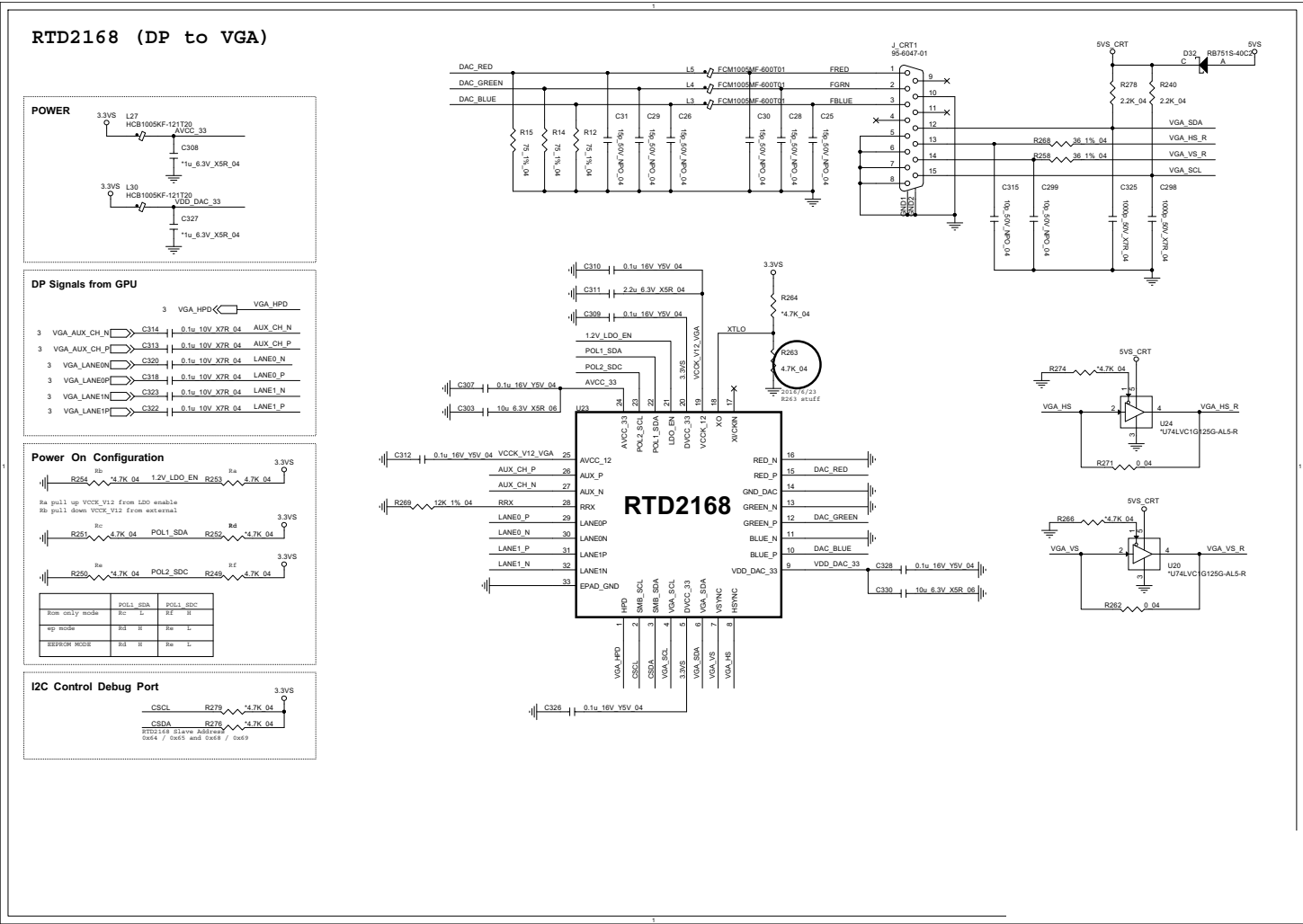
Panel Conn

Sheet 14 of 33
Panel Conn

Schematic Diagrams

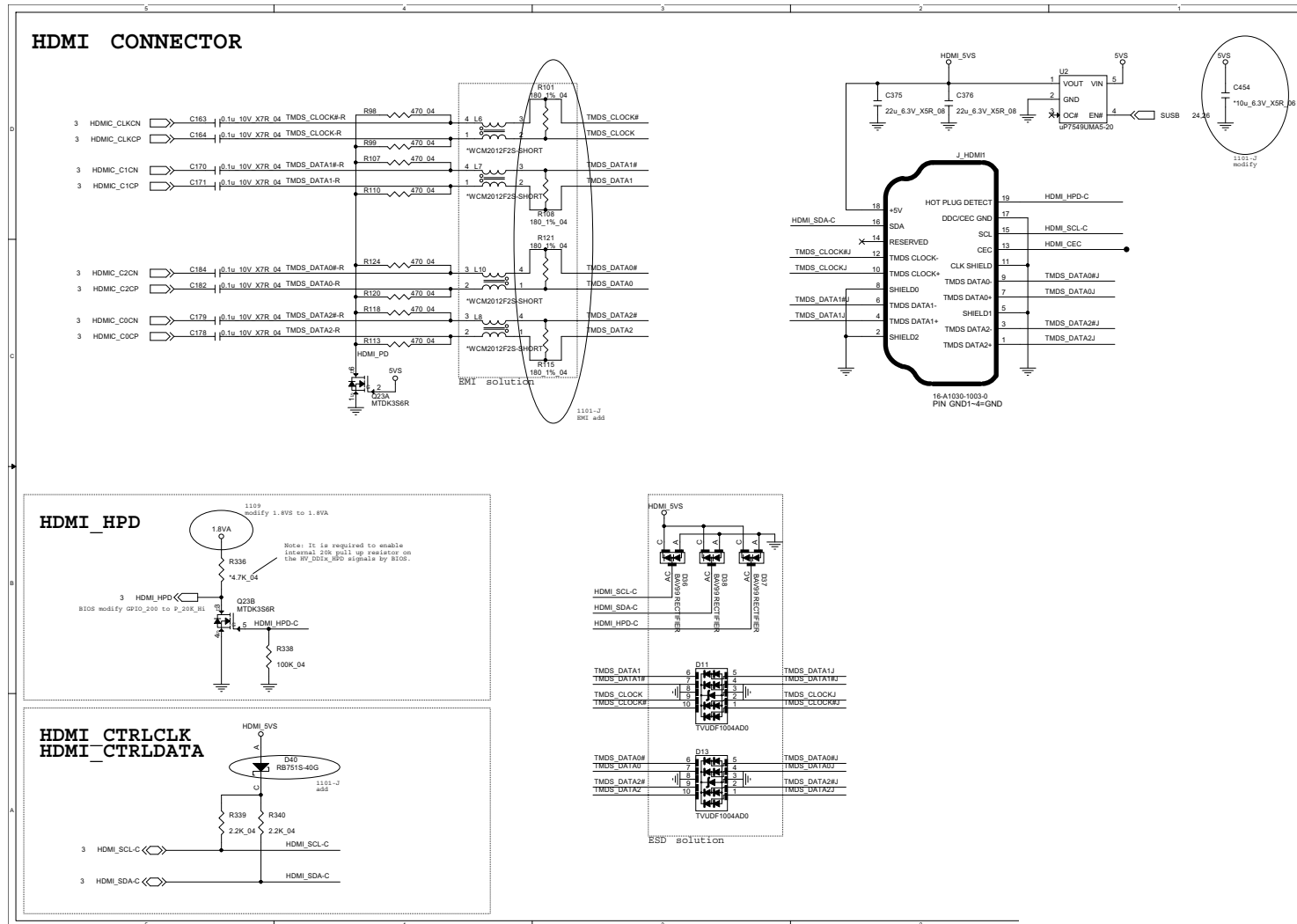
RTD2168, CRT

Sheet 15 of 33
RTD2168, CRT



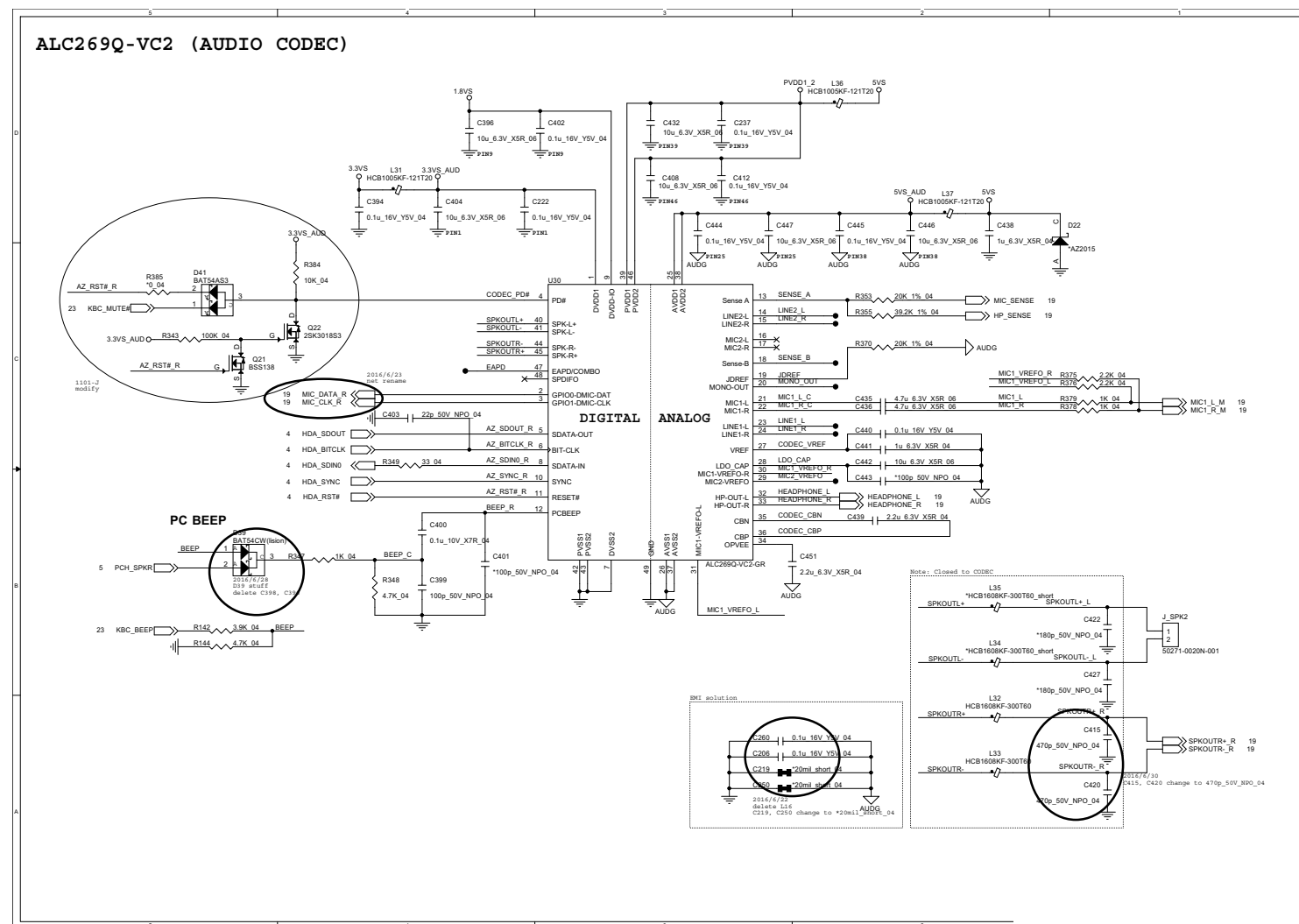
HDMI

Sheet 16 of 33
HDMI

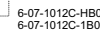


Audio Codec

Sheet 17 of 33
Audio Codec

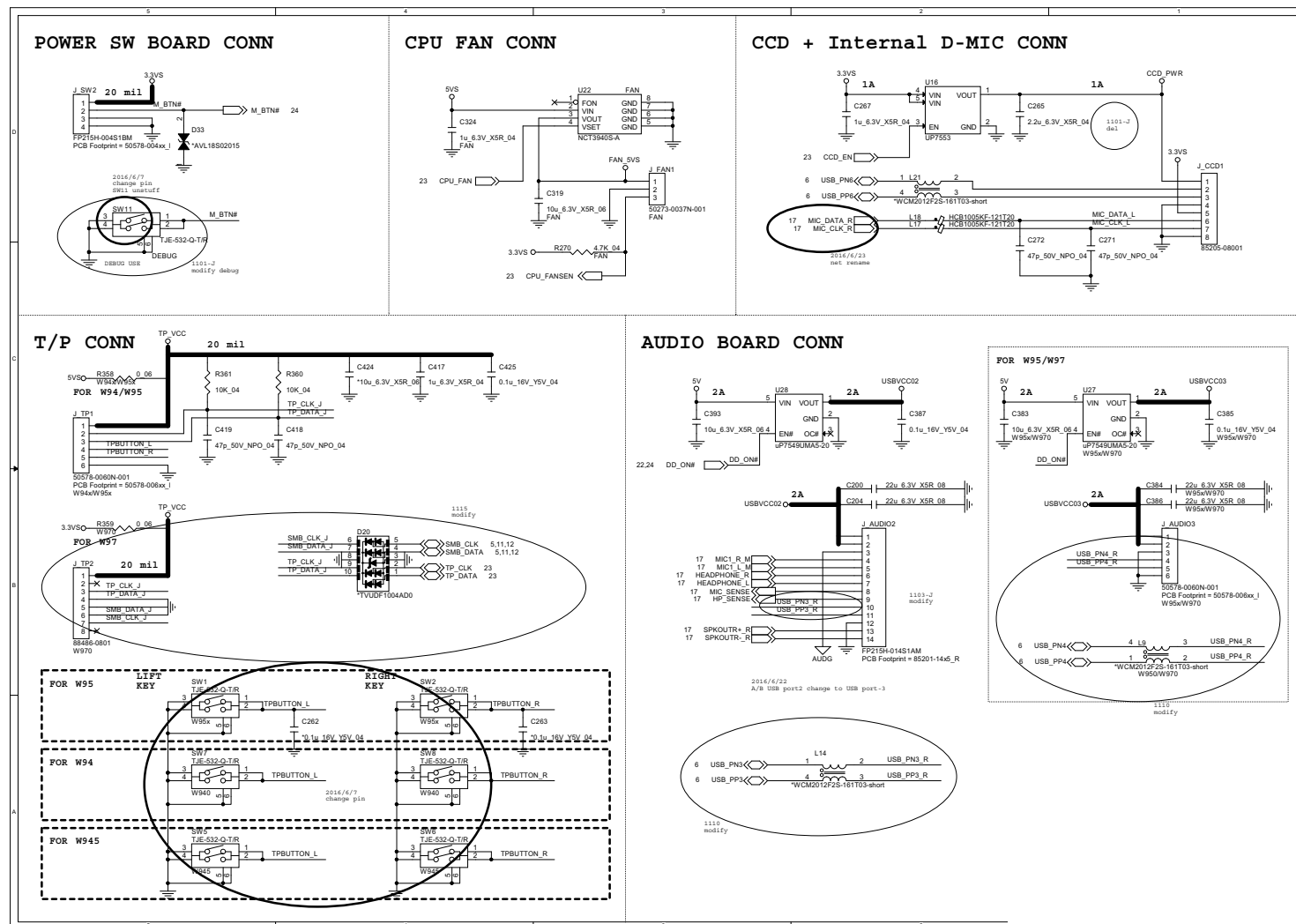


RTL8411B B - 19



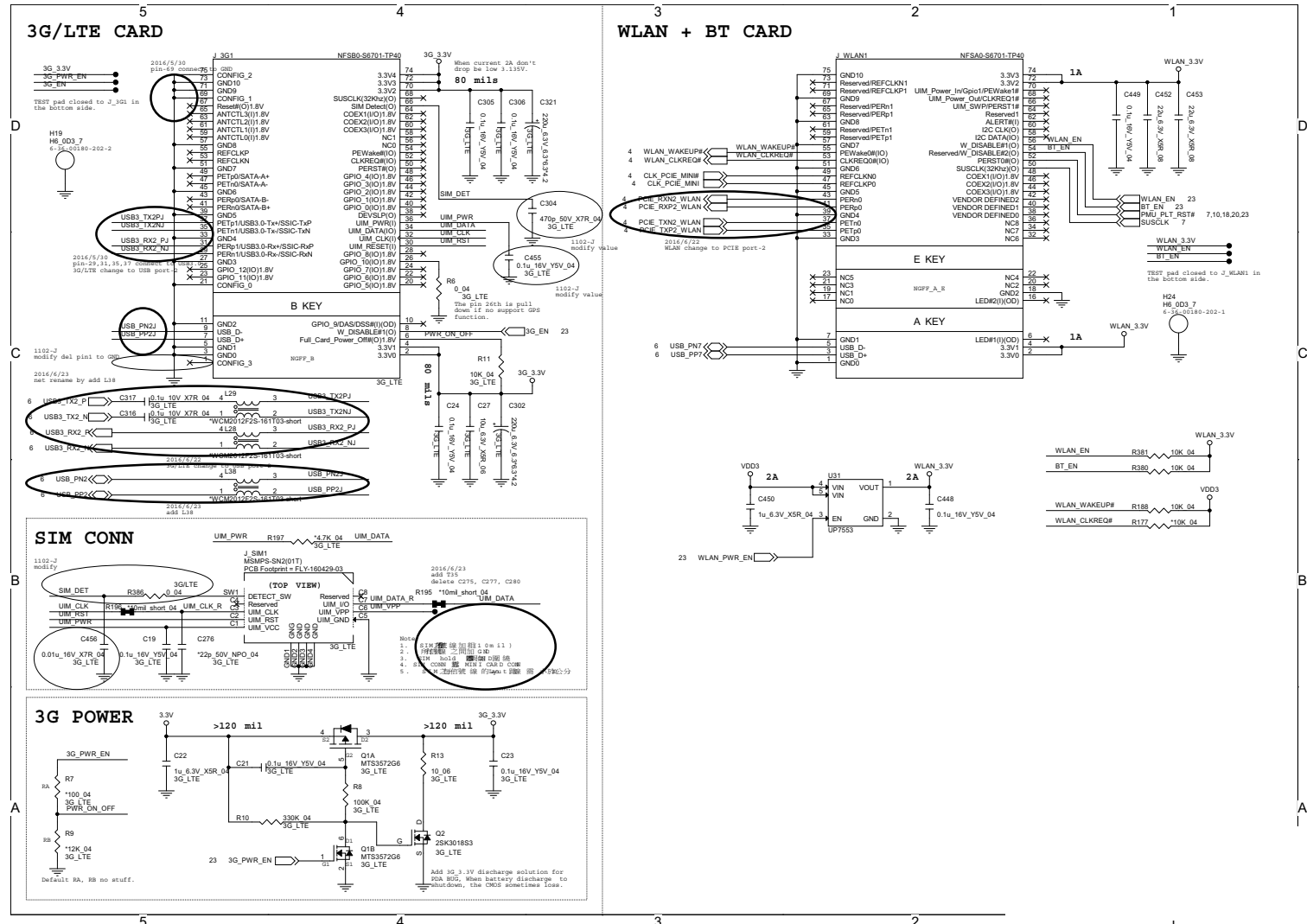
B. Schematic Diagrams

Sheet 19 of 33
Fan, Click, CCD
Conn



HDD, ODD, LED, LID, TPM B - 21

NGFF

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NGFF

USB PORT Charge

```
(USB 3.0 port0)
```

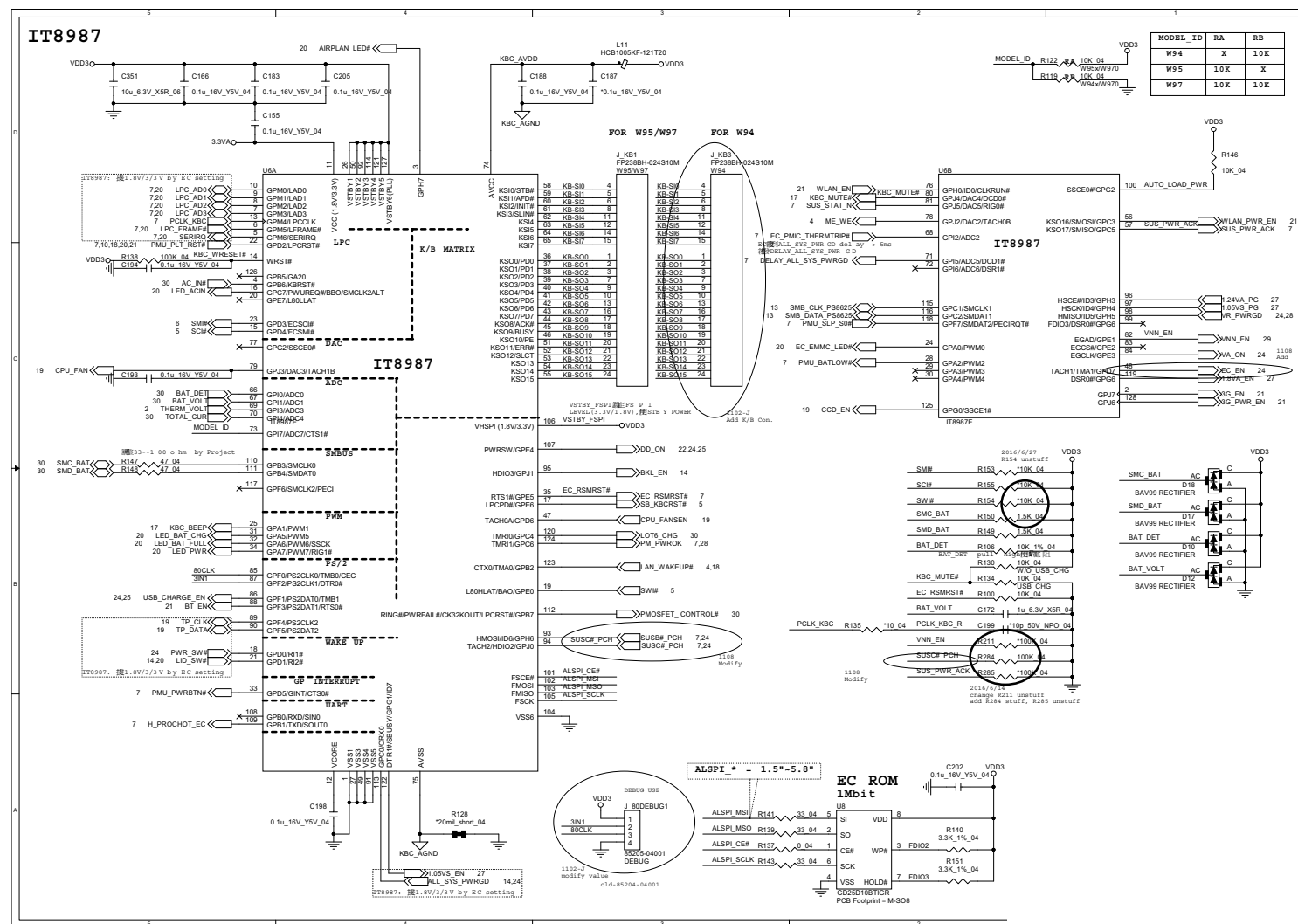
UB251H-009G11M

(USB 3.0 port1)

KBC IT8987E

B.Schematic Diagrams

Sheet 23 of 33
KBC IT8987E

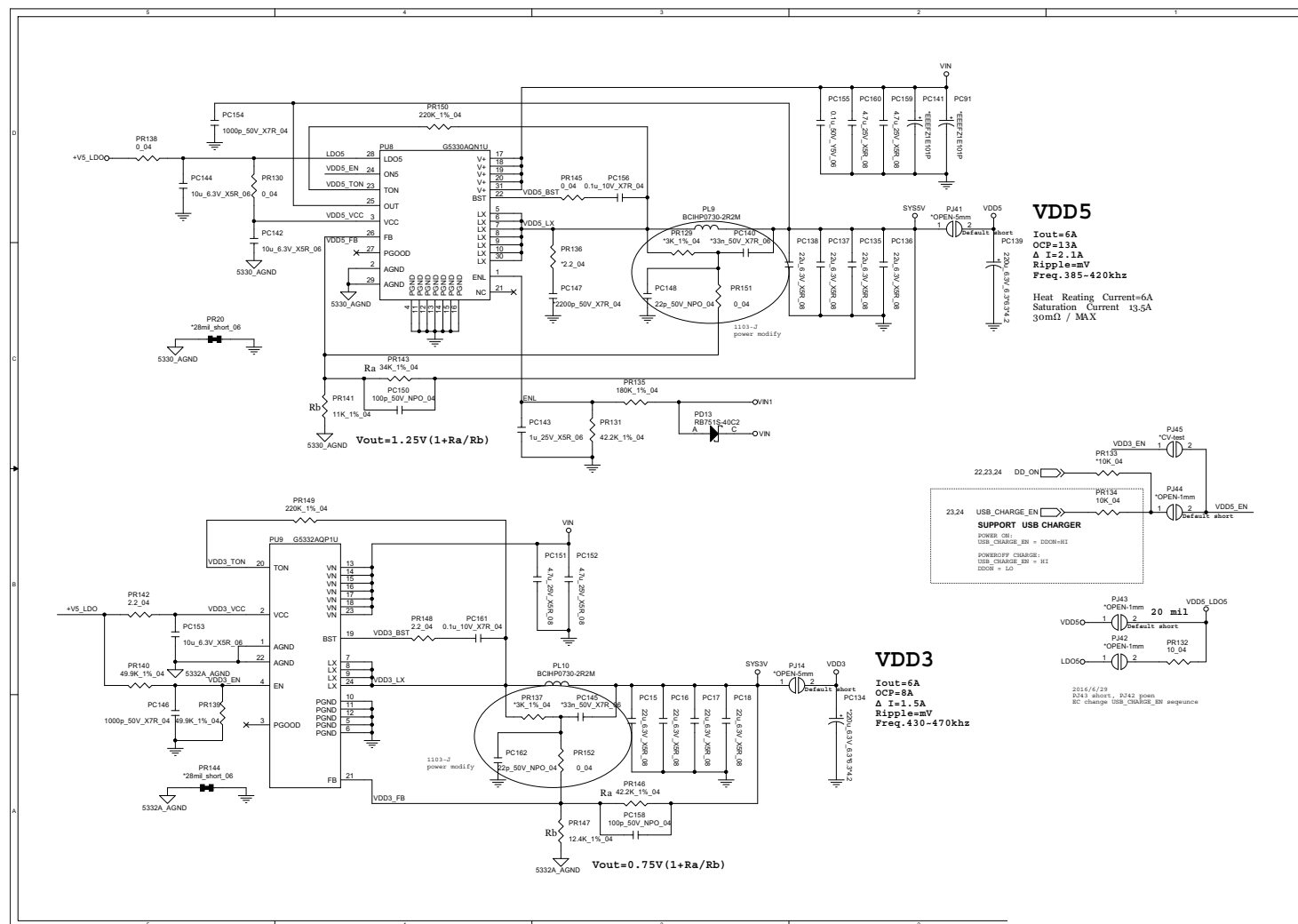


System Power B - 25

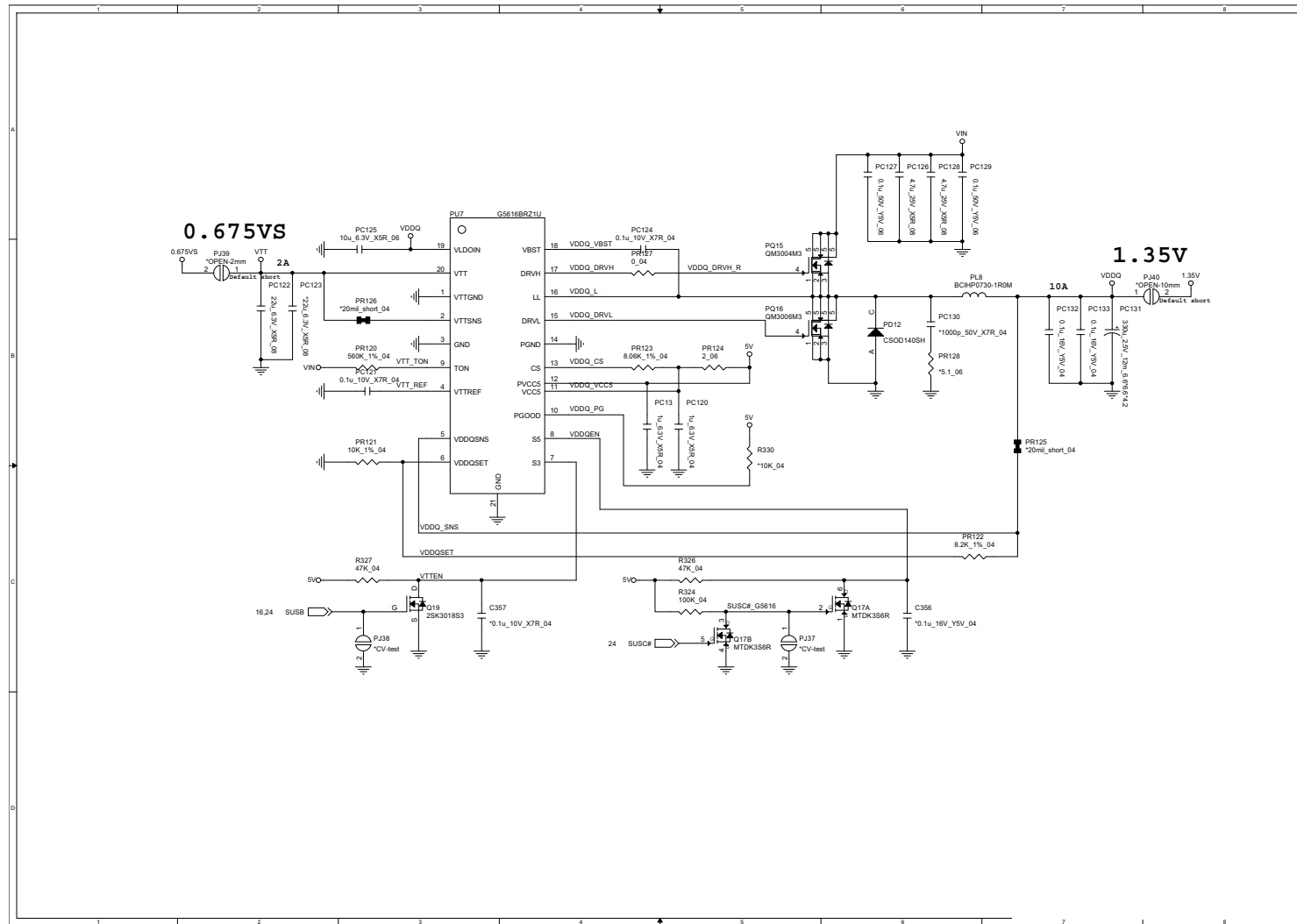


B.Schematic Diagrams

Sheet 25 of 33
VDD3, VDD5



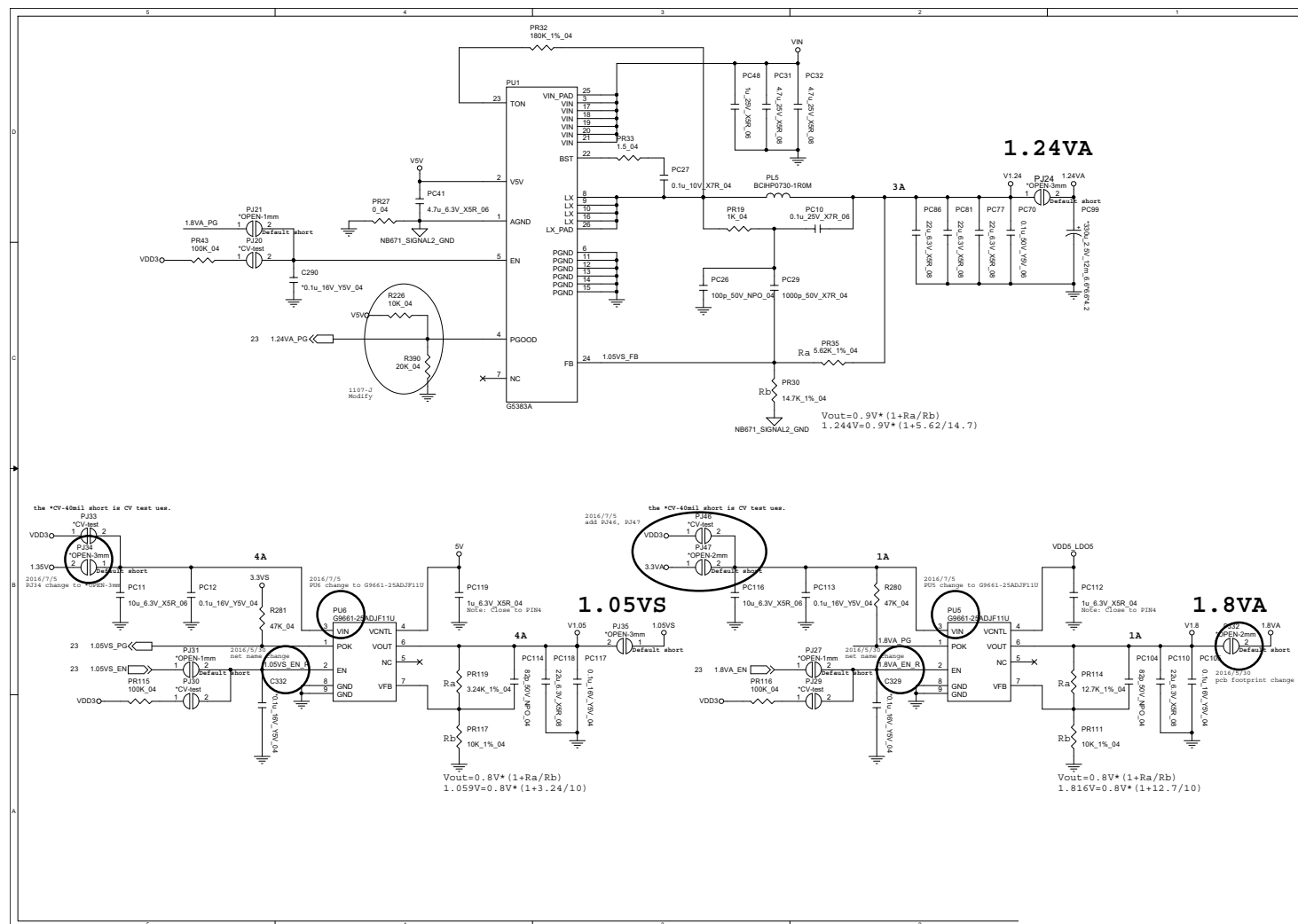
PWR_VDDQ, VTT B - 27



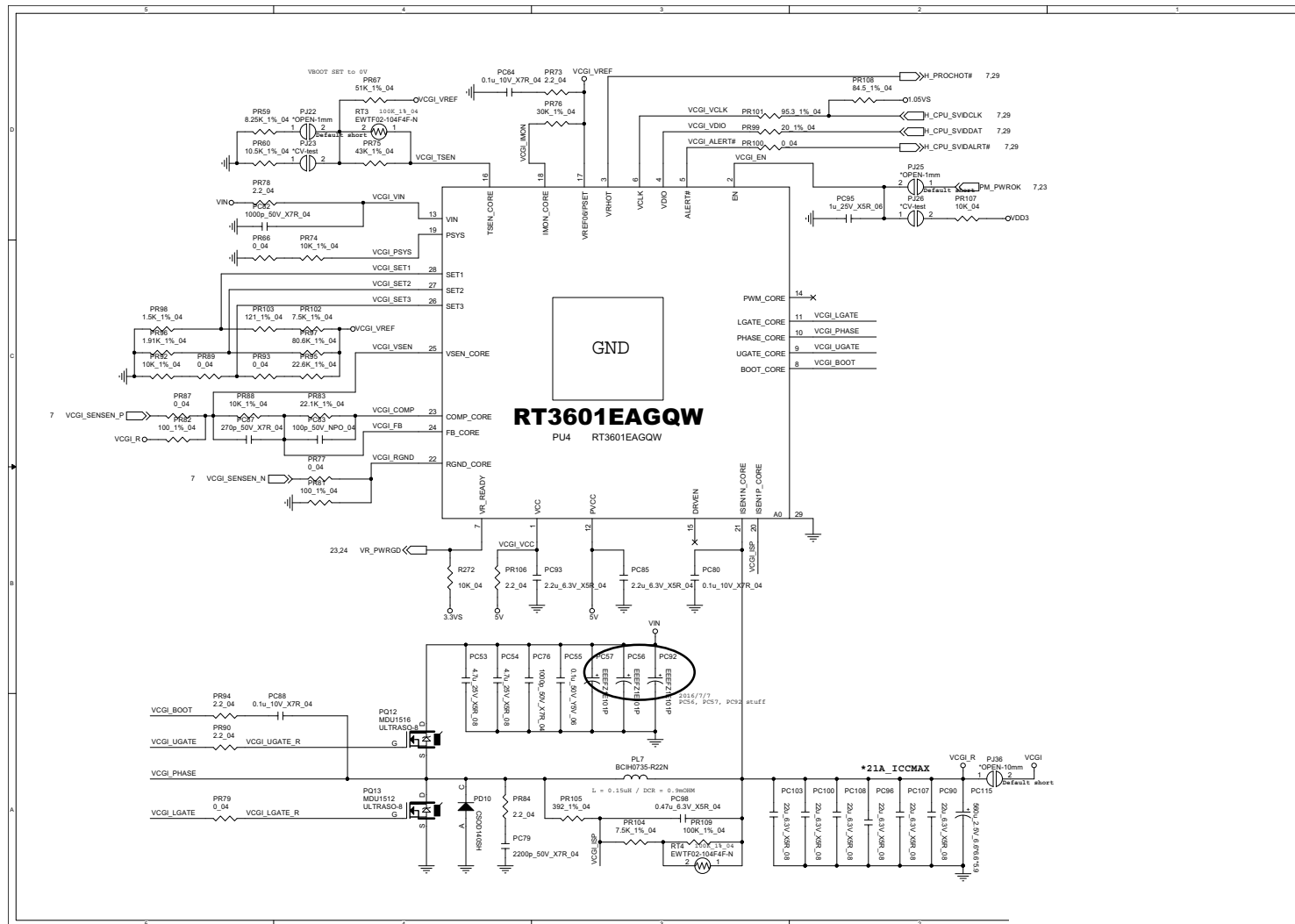
Sheet 26 of 33
PWR_VDDQ, VTT

B. Schematic Diagrams

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1.05VA, 1.8VA,
1.24VA



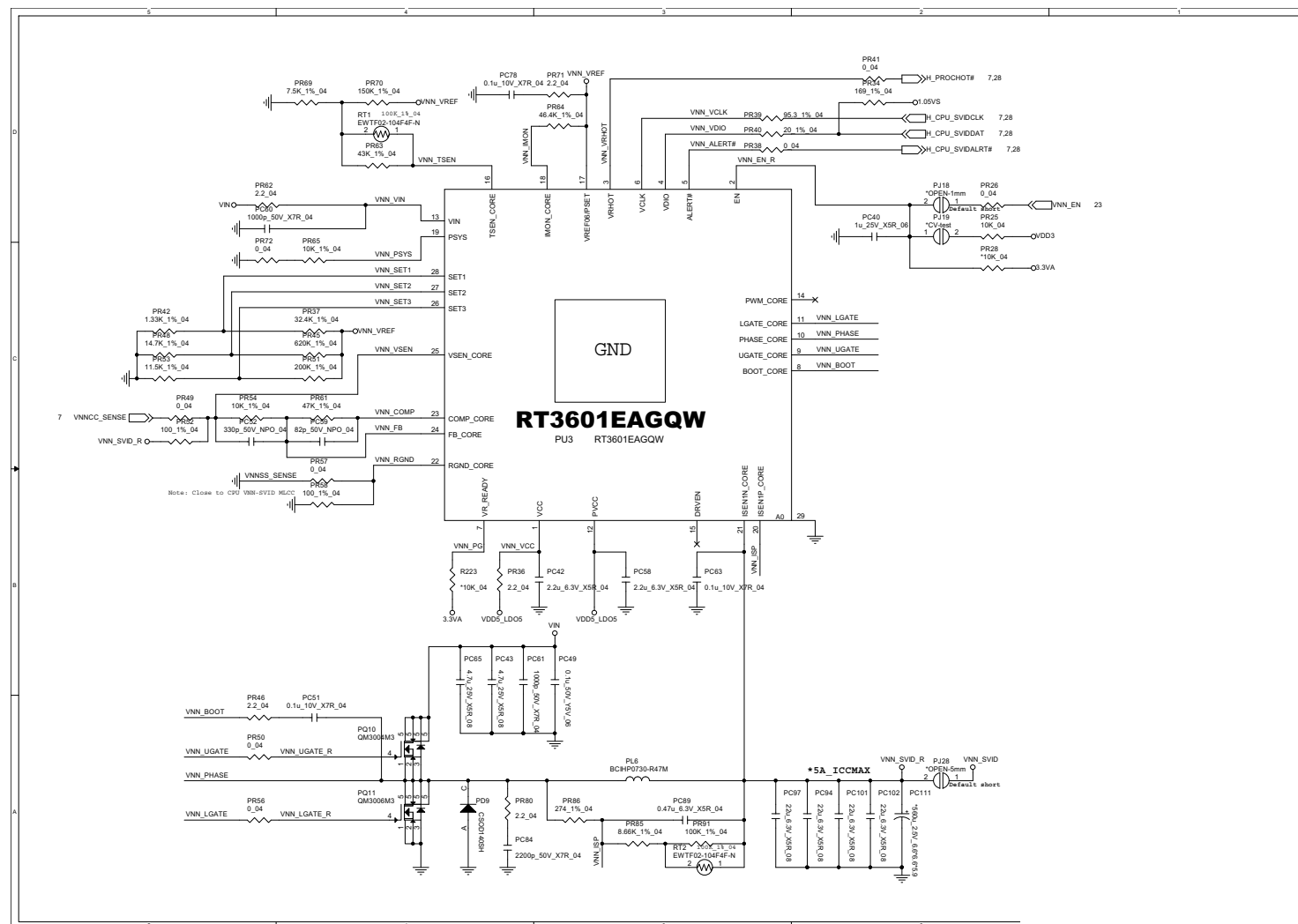
PWR_VCGI



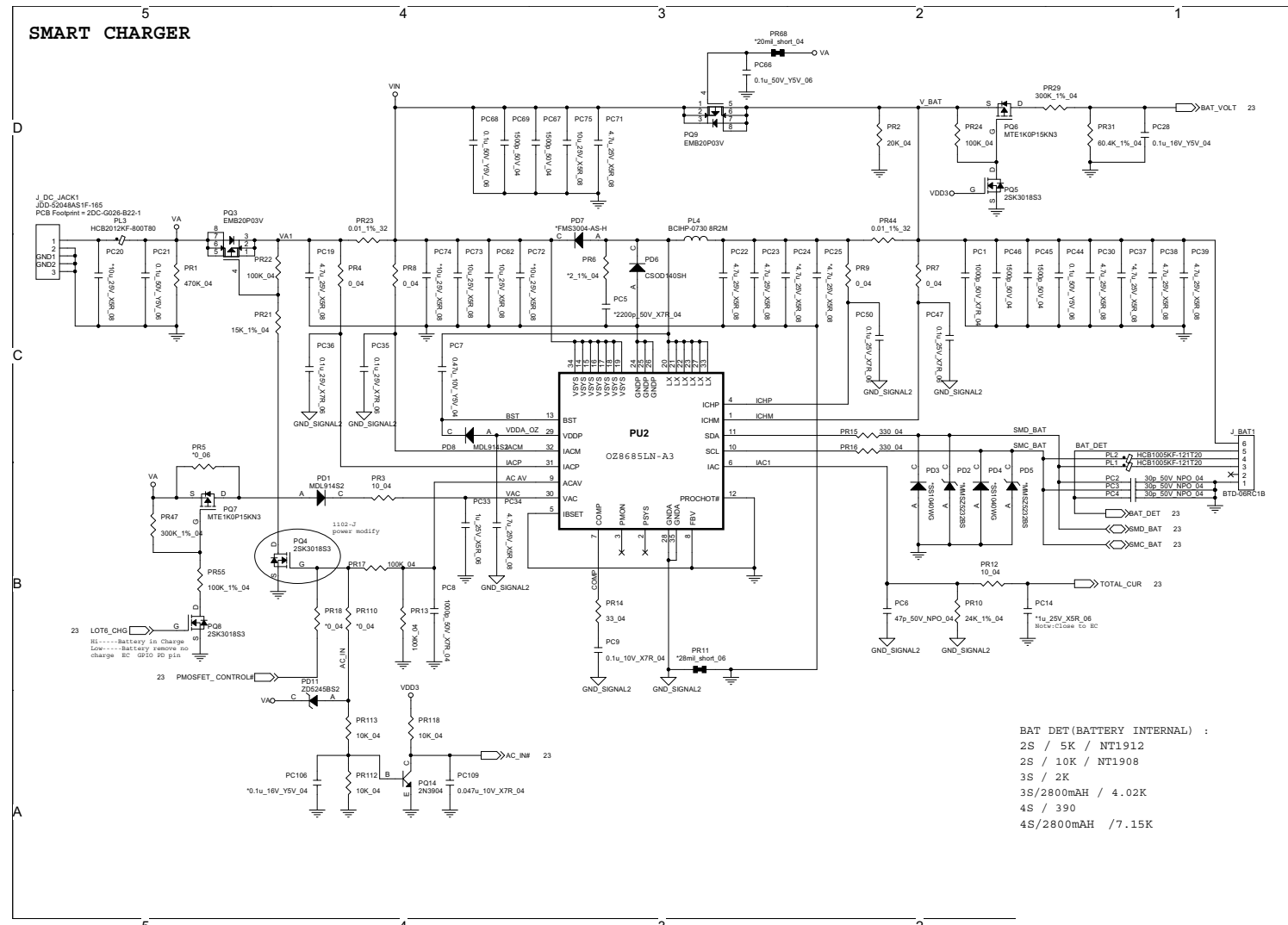
Sheet 28 of 33
PWR_VCGI

PWR_VNN

B. Schematic Diagrams



AC_IN, Charger

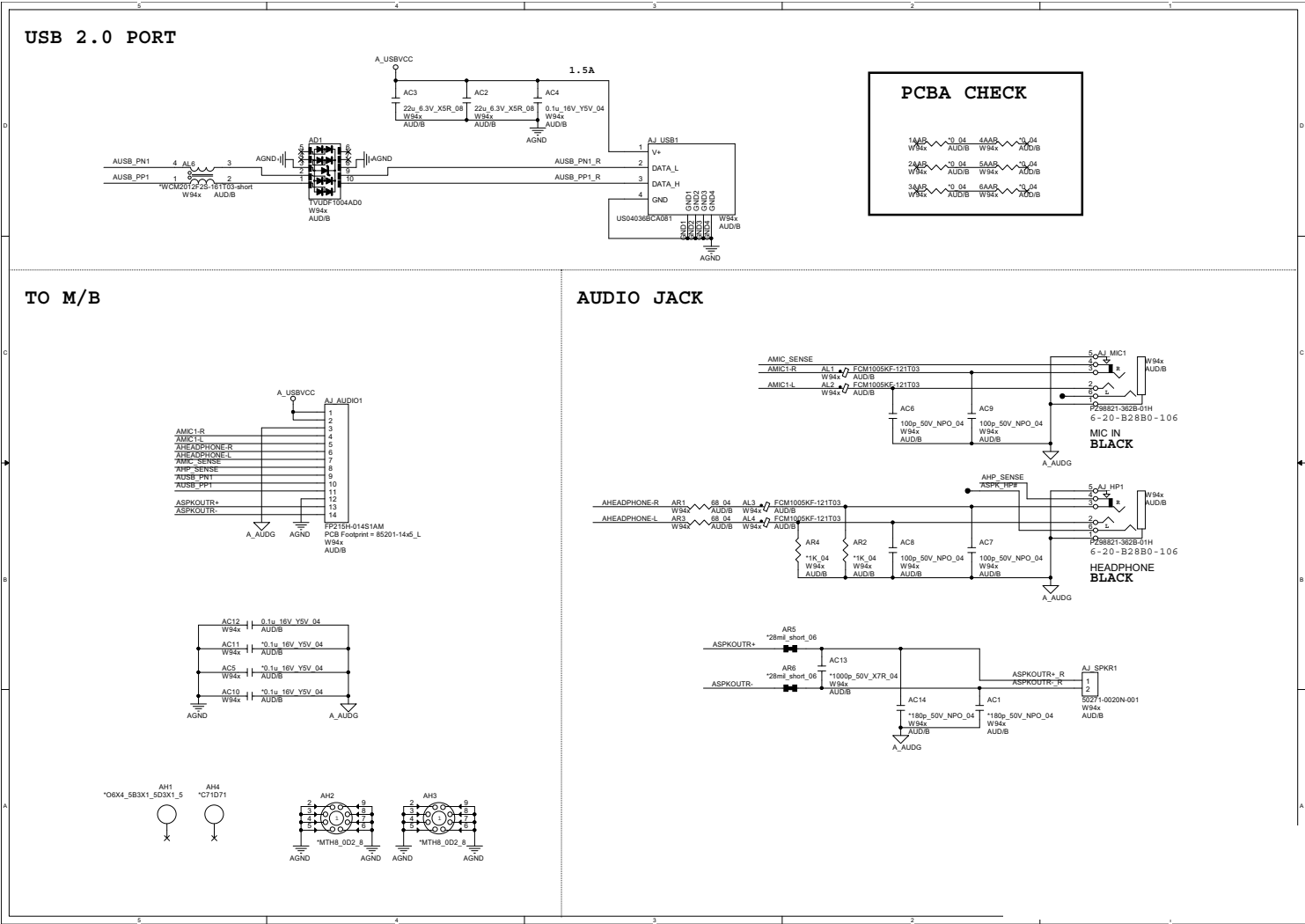


Sheet 30 of 33
AC_IN, Charger

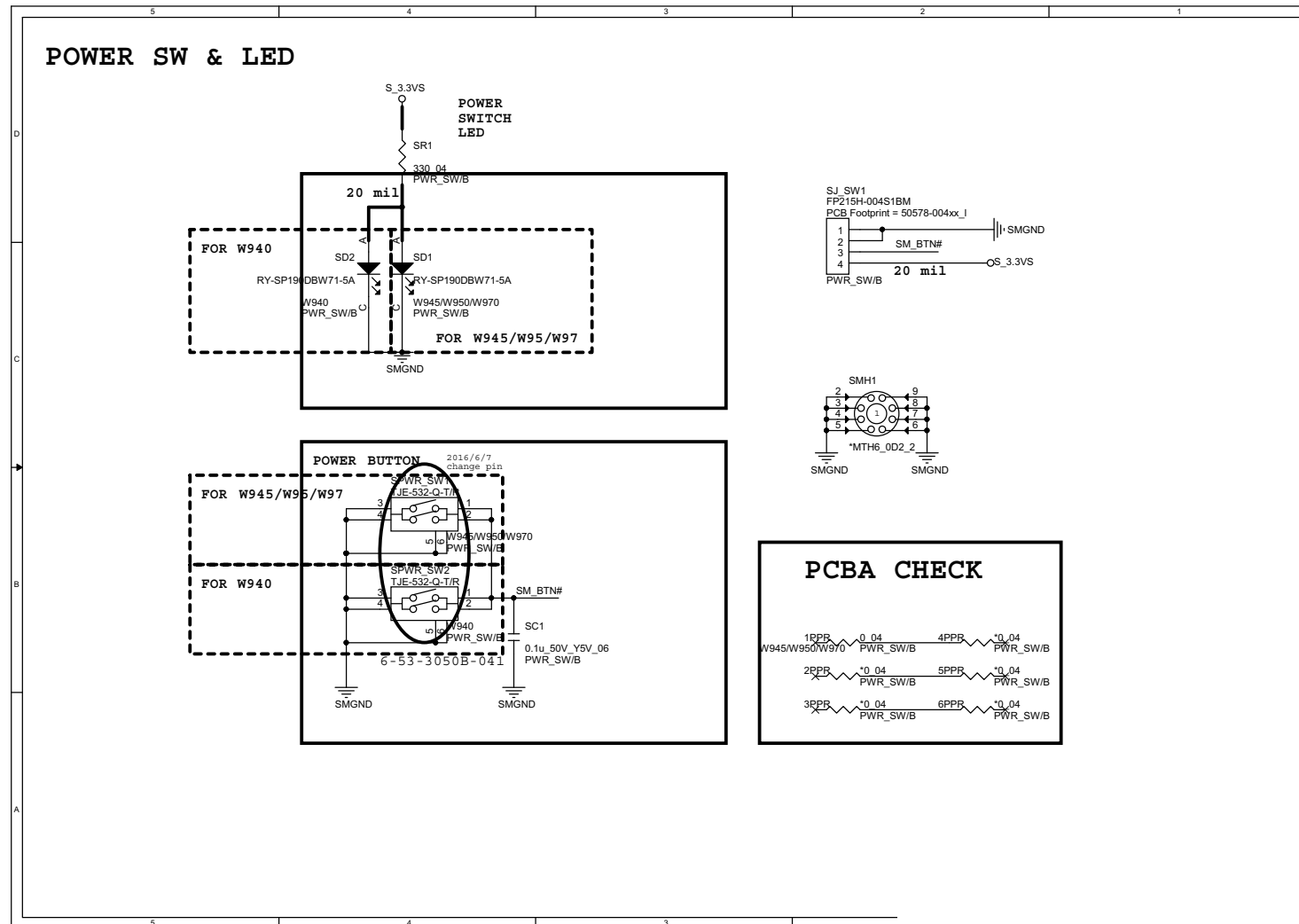
Schematic Diagrams

Audio Board

Sheet 31 of 33
Audio Board



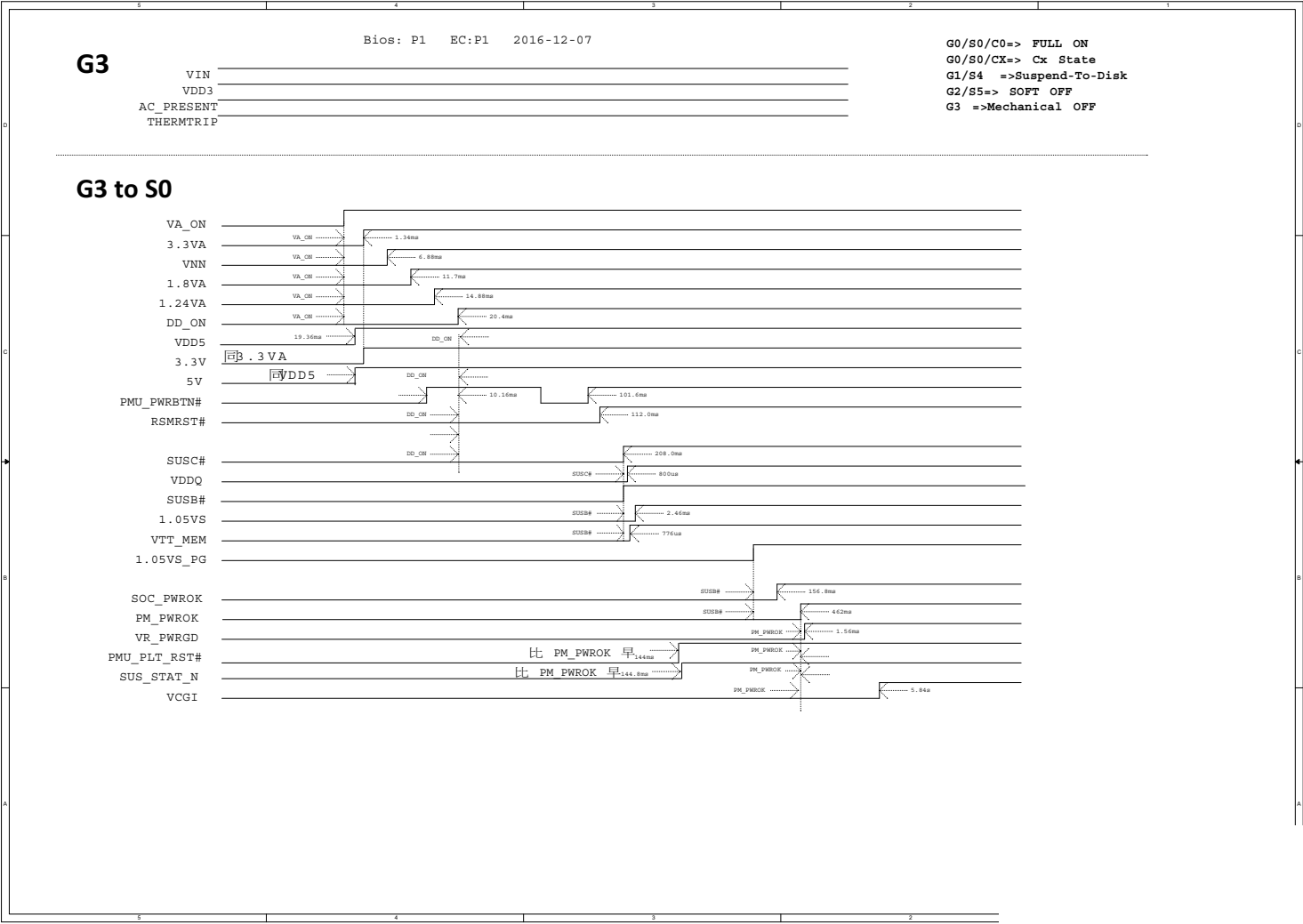
Power SW Board



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Power SW Board

Power Sequence

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Power Sequence



Appendix C: Updating the FLASH ROM BIOS

To update the FLASH ROM BIOS, you must:

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

Download the BIOS

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

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

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

Set the computer to boot from the external drive

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



BIOS Version

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

You should only download BIOS versions that are V1.0X.XX or higher as appropriate for your computer model.

Note that BIOS versions are not backward compatible and therefore **you may not downgrade your BIOS to an older version** after upgrading to a later version (e.g if you upgrade a BIOS to ver 1.0X.05, you **MAY NOT** then go back and flash the BIOS to ver 1.0X.04).

BIOS Update

Use the flash tools to update the BIOS

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

fsX:\> Flash.nsh

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

Restart the computer (booting from the HDD)

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

Your computer is now running normally with the updated BIOS

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